PUB. NO. 229
VOL. 4

SIGHT REDUCTION TABLES

FOR

MARINE NAVIGATION

LATITUDES 45°—60°, Inclusive

NATIONAL IMAGERY AND MAPPING AGENCY

INTERPOLATION TABLE

Left Section

Dec. Inc.	Tens 10′	20′	30′	40′	50′	Dec.	Units 0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
0.1	0.0	0.0	0.0	0.0	0.1	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
0.2	0.0	0.0	0.1	0.1	0.1	.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.3	0.0	0.1	0.1	0.2	0.2	.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.4	0.1	0.1	0.2	0.3	0.3	.4	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.5	0.1	0.2	0.3	0.3	0.4	.5	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.6	0.1	0.2	0.3	0.4	0.5	.6	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.7	0.1	0.3	0.4	0.5	0.6	.7	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.8	0.2	0.3	0.4	0.6	0.7	.8	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
0.9	0.2	0.3	0.5	0.6	0.8	.9	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
1.0	0.1	0.3	0.5	0.6	0.8	.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2
1.1	0.2	0.3	0.5	0.7	0.9	.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.2	0.2	0.4	0.6	0.8	1.0	.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.3	0.2	0.4	0.6	0.9	1.1	.3	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.4	0.2	0.5	0.7	0.9	1.2	.4	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.5	0.3	0.5	0.8	1.0	1.3	.5	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.6	0.3	0.5	0.8	1.1	1.3	.6	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.7	0.3	0.6	0.9	1.2	1.4	.7	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.8	0.3	0.6	0.9	1.2	1.5	.8	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.9	0.4	0.7	1.0	1.3	1.6	.9	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
2.0	0.3	0.6	1.0	1.3	1.6	.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
2.1	0.3	0.7	1.0	1.4	1.7	.1	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
2.2	0.3	0.7	1.1	1.4	1.8	.2	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
2.3	0.4	0.8	1.1	1.5	1.9	.3	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
2.4	0.4	0.8	1.2	1.6	2.0	.4	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
2.5	0.4	0.8	1.3	1.7	2.1	.5	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4
2.6	0.4	0.9	1.3	1.7	2.2	.6	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4
2.7	0.5	0.9	1.4	1.8	2.3	.7	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
2.8	0.5	1.0	1.4	1.9	2.4	.8	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
2.9	0.5	1.0	1.5	2.0	2.5	.9	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
3.0	0.5	1.0	1.5	2.0	2.5	.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5
3.1	0.5	1.0	1.5	2.0	2.6	.1	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5
3.2	0.5	1.0	1.6	2.1	2.6	.2	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.5
3.3	0.5	1.1	1.6	2.2	2.7	.3	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.5
3.4	0.6	1.1	1.7	2.3	2.8	.4	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
3.5	0.6	1.2	1.8	2.3	2.9	.5	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6
3.6	0.6	1.2	1.8	2.4	3.0	.6	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
3.7	0.6	1.3	1.9	2.5	3.1	.7	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
3.8	0.7	1.3	1.9	2.6	3.2	.8	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
3.9	0.7	1.3	2.0	2.6	3.3	.9	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
4.0	0.6	1.3	2.0	2.6	3.3	.0	0.0	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7
4.1	0.7	1.3	2.0	2.7	3.4	.1	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7
4.2	0.7	1.4	2.1	2.8	3.5	.2	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
4.3	0.7	1.4	2.1	2.9	3.6	.3	0.0	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.7
4.4	0.7	1.5	2.2	2.9	3.7	.4	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
4.5	0.8	1.5	2.3	3.0	3.8	.5	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7
4.6	0.8	1.5	2.3	3.1	3.8	.6	0.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
4.7	0.8	1.6	2.4	3.2	3.9	.7	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7
4.8	0.8	1.6	2.4	3.2	4.0	.8	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7
4.9	0.9	1.7	2.5	3.3	4.1	.9	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.7
5.0	0.8	1.6	2.5	3.3	4.1	.0	0.0	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
5.1	0.8	1.7	2.5	3.4	4.2	.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8
5.2	0.8	1.7	2.6	3.4	4.3	.2	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8
5.3	0.9	1.8	2.6	3.5	4.4	.3	0.0	0.1	0.2	0.4	0.4	0.5	0.6	0.7	0.8	0.9
5.4	0.9	1.8	2.7	3.6	4.5	.4	0.0	0.1	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.9
5.5	0.9	1.8	2.8	3.7	4.6	.5	0.0	0.1	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.9
5.6	0.9	1.9	2.8	3.7	4.7	.6	0.1	0.1	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.9
5.7	1.0	1.9	2.9	3.8	4.8	.7	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5.8	1.0	2.0	2.9	3.9	4.9	.8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.9
5.9	1.0	2.0	3.0	4.0	5.0	.9	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9
6.0	1.0	2.0	3.0	4.0	5.0	.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0
6.1	1.0	2.0	3.0	4.0	5.1	.1	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0
6.2	1.0	2.0	3.1	4.1	5.1	.2	0.0	0.1	0.2	0.3	0.5	0.6	0.7	0.8	0.9	1.0
6.3	1.0	2.1	3.1	4.2	5.2	.3	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.0
6.4	1.1	2.1	3.2	4.3	5.3	.4	0.0	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
6.5	1.1	2.2	3.3	4.3	5.4	.5	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
6.6	1.1	2.2	3.3	4.4	5.5	.6	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
6.7	1.1	2.3	3.4	4.5	5.6	.7	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.1
6.8	1.2	2.3	3.4	4.6	5.7	.8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.1
6.9	1.2	2.3	3.5	4.6	5.8	.9	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1
7.0	1.1	2.3	3.5	4.6	5.8	.0	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1
7.1	1.2	2.3	3.5	4.7	5.9	.1	0.0	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.1
7.2	1.2	2.4	3.6	4.8	6.0	.2	0.0	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.1
7.3	1.2	2.4	3.6	4.9	6.1	.3	0.0	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.2
7.4	1.2	2.5	3.7	4.9	6.2	.4	0.0	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2
7.5	1.3	2.5	3.8	5.0	6.3	.5	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.2
7.6	1.3	2.5	3.8	5.1	6.3	.6	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.2
7.7	1.3	2.6	3.9	5.2	6.4	.7	0.1	0.2	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.2
7.8	1.3	2.6	3.9	5.2	6.5	.8	0.1	0.2	0.3	0.5	0.6	0.7	0.9	1.0	1.1	1.2
7.9	1.4	2.7	4.0	5.3	6.6	.9	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2

Double Second Diff. and Corr. (left section):

Double Second Diff.	Corr.
0.0 / 48.2	0.0
16.2 / 48.6	0.1
8.2 / 24.6 / 41.0	0.1 / 0.2
5.0 / 15.0 / 25.0 / 35.1	0.1 / 0.2 / 0.3
3.6 / 10.9 / 18.2 / 25.5 / 32.8 / 40.1	0.1 / 0.2 / 0.3 / 0.4 / 0.5
2.9 / 8.6 / 14.4 / 20.2 / 25.9 / 31.7 / 37.5	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6
2.4 / 7.2 / 12.0 / 16.8 / 21.6 / 26.4 / 31.2 / 36.0	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7
2.1 / 6.2 / 10.4 / 14.5 / 18.6 / 22.8 / 26.9 / 31.1 / 35.2	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8
1.8 / 5.5 / 9.1 / 12.8 / 16.5 / 20.1 / 23.8 / 27.4 / 31.1 / 34.7	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9

Right Section

Dec. Inc.	Tens 10′	20′	30′	40′	50′	Dec.	Units 0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
8.0	1.3	2.6	4.0	5.3	6.6	.0	0.0	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3
8.1	1.3	2.7	4.0	5.4	6.7	.1	0.0	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.1	1.3
8.2	1.3	2.7	4.1	5.4	6.8	.2	0.0	0.2	0.3	0.5	0.6	0.7	0.9	1.0	1.2	1.3
8.3	1.4	2.8	4.1	5.5	6.9	.3	0.0	0.2	0.4	0.5	0.6	0.8	0.9	1.0	1.2	1.3
8.4	1.4	2.8	4.2	5.6	7.0	.4	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.0	1.2	1.3
8.5	1.4	2.8	4.3	5.7	7.1	.5	0.1	0.2	0.4	0.5	0.6	0.8	0.9	1.1	1.2	1.3
8.6	1.4	2.9	4.3	5.7	7.2	.6	0.1	0.2	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.4
8.7	1.5	2.9	4.4	5.8	7.3	.7	0.1	0.2	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.4
8.8	1.5	3.0	4.4	5.9	7.4	.8	0.1	0.3	0.4	0.5	0.7	0.8	1.0	1.1	1.2	1.4
8.9	1.5	3.0	4.5	6.0	7.5	.9	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.4
9.0	1.5	3.0	4.5	6.0	7.5	.0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4
9.1	1.5	3.0	4.5	6.0	7.6	.1	0.0	0.2	0.3	0.5	0.6	0.8	1.0	1.1	1.3	1.4
9.2	1.5	3.0	4.6	6.1	7.6	.2	0.0	0.2	0.4	0.5	0.7	0.8	1.0	1.1	1.3	1.5
9.3	1.5	3.1	4.6	6.2	7.7	.3	0.0	0.2	0.4	0.5	0.7	0.8	1.0	1.2	1.3	1.5
9.4	1.6	3.1	4.7	6.3	7.8	.4	0.1	0.2	0.4	0.5	0.7	0.9	1.0	1.2	1.3	1.5
9.5	1.6	3.2	4.8	6.3	7.9	.5	0.1	0.2	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.5
9.6	1.6	3.2	4.8	6.4	8.0	.6	0.1	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.5
9.7	1.6	3.3	4.9	6.5	8.1	.7	0.1	0.3	0.4	0.6	0.7	0.9	1.1	1.2	1.4	1.5
9.8	1.7	3.3	4.9	6.6	8.2	.8	0.1	0.3	0.4	0.6	0.8	0.9	1.1	1.2	1.4	1.6
9.9	1.7	3.3	5.0	6.6	8.3	.9	0.1	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6
10.0	1.6	3.3	5.0	6.6	8.3	.0	0.0	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6
10.1	1.7	3.3	5.0	6.7	8.4	.1	0.0	0.2	0.4	0.5	0.7	0.9	1.1	1.2	1.4	1.6
10.2	1.7	3.4	5.1	6.8	8.5	.2	0.0	0.2	0.4	0.6	0.7	0.9	1.1	1.3	1.4	1.6
10.3	1.7	3.4	5.1	6.9	8.6	.3	0.1	0.2	0.4	0.6	0.8	0.9	1.1	1.3	1.5	1.6
10.4	1.7	3.5	5.2	6.9	8.7	.4	0.1	0.2	0.4	0.6	0.8	0.9	1.1	1.3	1.5	1.6
10.5	1.8	3.5	5.3	7.0	8.8	.5	0.1	0.3	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7
10.6	1.8	3.5	5.3	7.1	8.8	.6	0.1	0.3	0.5	0.6	0.8	1.0	1.2	1.3	1.5	1.7
10.7	1.8	3.6	5.4	7.2	8.9	.7	0.1	0.3	0.5	0.6	0.8	1.0	1.2	1.3	1.5	1.7
10.8	1.8	3.6	5.4	7.2	9.0	.8	0.1	0.3	0.5	0.7	0.8	1.0	1.2	1.4	1.5	1.7
10.9	1.9	3.7	5.5	7.3	9.1	.9	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7
11.0	1.8	3.6	5.5	7.3	9.1	.0	0.0	0.2	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7
11.1	1.8	3.7	5.5	7.4	9.2	.1	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.7
11.2	1.8	3.7	5.6	7.4	9.3	.2	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
11.3	1.9	3.8	5.6	7.5	9.4	.3	0.1	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
11.4	1.9	3.8	5.7	7.6	9.5	.4	0.1	0.3	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8
11.5	1.9	3.8	5.8	7.7	9.6	.5	0.1	0.3	0.5	0.7	0.9	1.1	1.2	1.4	1.6	1.8
11.6	1.9	3.9	5.8	7.7	9.7	.6	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.6	1.8
11.7	2.0	3.9	5.9	7.8	9.8	.7	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9
11.8	2.0	4.0	5.9	7.9	9.9	.8	0.2	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9
11.9	2.0	4.0	6.0	8.0	10.0	.9	0.2	0.4	0.6	0.7	0.9	1.1	1.3	1.5	1.7	1.9
12.0	2.0	4.0	6.0	8.0	10.0	.0	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.9
12.1	2.0	4.0	6.0	8.0	10.1	.1	0.0	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.7	1.9
12.2	2.0	4.0	6.1	8.1	10.1	.2	0.0	0.2	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9
12.3	2.0	4.1	6.1	8.2	10.2	.3	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9
12.4	2.1	4.1	6.2	8.3	10.3	.4	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	2.0
12.5	2.1	4.2	6.3	8.3	10.4	.5	0.1	0.3	0.5	0.7	1.0	1.1	1.4	1.6	1.8	2.0
12.6	2.1	4.2	6.3	8.4	10.5	.6	0.1	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.8	2.0
12.7	2.1	4.3	6.4	8.5	10.6	.7	0.1	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
12.8	2.2	4.3	6.4	8.6	10.7	.8	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
12.9	2.2	4.3	6.5	8.6	10.8	.9	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.9	2.1
13.0	2.1	4.3	6.5	8.6	10.8	.0	0.0	0.2	0.4	0.7	0.9	1.1	1.3	1.5	1.8	2.0
13.1	2.2	4.3	6.5	8.7	10.9	.1	0.0	0.2	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0
13.2	2.2	4.4	6.6	8.8	11.0	.2	0.0	0.3	0.5	0.7	0.9	1.2	1.4	1.6	1.8	2.1
13.3	2.2	4.4	6.6	8.9	11.1	.3	0.1	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.9	2.1
13.4	2.2	4.5	6.7	8.9	11.2	.4	0.1	0.3	0.5	0.8	1.0	1.2	1.4	1.7	1.9	2.1
13.5	2.3	4.5	6.8	9.0	11.3	.5	0.1	0.3	0.6	0.8	1.0	1.2	1.5	1.7	1.9	2.1
13.6	2.3	4.5	6.8	9.1	11.3	.6	0.1	0.4	0.6	0.8	1.0	1.3	1.5	1.7	1.9	2.2
13.7	2.3	4.6	6.9	9.2	11.4	.7	0.2	0.4	0.6	0.8	1.1	1.3	1.5	1.7	2.0	2.2
13.8	2.3	4.6	6.9	9.2	11.5	.8	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.8	2.0	2.2
13.9	2.4	4.7	7.0	9.3	11.6	.9	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2
14.0	2.3	4.6	7.0	9.3	11.6	.0	0.0	0.2	0.5	0.7	1.0	1.2	1.4	1.7	1.9	2.2
14.1	2.3	4.7	7.0	9.4	11.7	.1	0.0	0.3	0.5	0.7	1.0	1.2	1.5	1.7	2.0	2.2
14.2	2.3	4.7	7.1	9.4	11.8	.2	0.0	0.3	0.5	0.8	1.0	1.3	1.5	1.7	2.0	2.2
14.3	2.4	4.7	7.1	9.5	11.9	.3	0.1	0.3	0.6	0.8	1.0	1.3	1.5	1.8	2.0	2.2
14.4	2.4	4.8	7.2	9.6	12.0	.4	0.1	0.3	0.6	0.8	1.1	1.3	1.5	1.8	2.0	2.3
14.5	2.4	4.8	7.3	9.7	12.1	.5	0.1	0.4	0.6	0.9	1.1	1.3	1.6	1.8	2.1	2.3
14.6	2.4	4.9	7.3	9.7	12.2	.6	0.1	0.4	0.6	0.9	1.1	1.4	1.6	1.8	2.1	2.3
14.7	2.5	4.9	7.4	9.8	12.3	.7	0.2	0.4	0.7	0.9	1.1	1.4	1.6	1.9	2.1	2.3
14.8	2.5	5.0	7.4	9.9	12.4	.8	0.2	0.4	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.4
14.9	2.5	5.0	7.5	10.0	12.5	.9	0.2	0.5	0.7	0.9	1.2	1.4	1.7	1.9	2.2	2.4
15.0	2.5	5.0	7.5	10.0	12.5	.0	0.0	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.1	2.3
15.1	2.5	5.0	7.5	10.0	12.6	.1	0.0	0.3	0.5	0.8	1.1	1.3	1.6	1.8	2.1	2.4
15.2	2.5	5.0	7.6	10.1	12.6	.2	0.1	0.3	0.6	0.8	1.1	1.3	1.6	1.9	2.1	2.4
15.3	2.5	5.1	7.6	10.2	12.7	.3	0.1	0.4	0.6	0.9	1.1	1.4	1.6	1.9	2.1	2.4
15.4	2.6	5.1	7.7	10.3	12.8	.4	0.1	0.4	0.6	0.9	1.1	1.4	1.7	1.9	2.2	2.4
15.5	2.6	5.2	7.8	10.3	12.9	.5	0.1	0.4	0.6	0.9	1.2	1.4	1.7	1.9	2.2	2.5
15.6	2.6	5.2	7.8	10.4	13.0	.6	0.2	0.4	0.7	0.9	1.2	1.4	1.7	2.0	2.2	2.5
15.7	2.6	5.3	7.9	10.5	13.1	.7	0.2	0.4	0.7	1.0	1.2	1.5	1.7	2.0	2.2	2.5
15.8	2.7	5.3	7.9	10.6	13.2	.8	0.2	0.5	0.7	1.0	1.2	1.5	1.8	2.0	2.3	2.5
15.9	2.7	5.3	8.0	10.6	13.3	.9	0.2	0.5	0.7	1.0	1.3	1.5	1.8	2.0	2.3	2.6

Double Second Diff. and Corr. (right section):

Double Second Diff.	Corr.
1.6 / 4.8 / 8.0 / 11.2 / 14.5 / 17.7 / 20.9 / 24.1 / 27.3 / 30.5 / 33.7 / 36.9	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1
1.4 / 4.2 / 7.1 / 9.9 / 12.7 / 15.5 / 18.4 / 21.2 / 24.0 / 26.8 / 29.7 / 32.5 / 35.3	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2
1.3 / 3.8 / 6.3 / 8.9 / 11.4 / 14.0 / 16.5 / 19.0 / 21.6 / 24.1 / 26.7 / 29.2 / 31.7 / 34.3	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3
1.2 / 3.5 / 5.8 / 8.1 / 10.5 / 12.8 / 15.1 / 17.4 / 19.8 / 22.1 / 24.4 / 26.7 / 29.1 / 31.4 / 33.7 / 36.0	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5
1.1 / 3.2 / 5.3 / 7.5 / 9.6 / 11.7 / 13.9 / 16.0 / 18.1 / 20.3 / 22.4 / 24.5 / 26.7 / 28.8 / 30.9 / 33.1 / 35.2	0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

INTERPOLATION TABLE

Left Section

Dec. Inc.	10′	20′	30′	40′	50′	Dec.	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
16.0	2.6	5.3	8.0	10.6	13.3	.0	0.0	0.3	0.5	0.8	1.1	1.4	1.6	1.9	2.2	2.5
16.1	2.7	5.3	8.0	10.7	13.4	.1	0.0	0.3	0.6	0.9	1.1	1.4	1.7	2.0	2.2	2.5
16.2	2.7	5.4	8.1	10.8	13.5	.2	0.1	0.3	0.6	0.9	1.2	1.4	1.7	2.0	2.3	2.5
16.3	2.7	5.4	8.1	10.9	13.6	.3	0.1	0.4	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6
16.4	2.7	5.5	8.2	10.9	13.7	.4	0.1	0.4	0.7	0.9	1.2	1.5	1.8	2.0	2.3	2.6
16.5	2.8	5.5	8.3	11.0	13.8	.5	0.1	0.4	0.7	1.0	1.2	1.5	1.8	2.1	2.3	2.6
16.6	2.8	5.5	8.3	11.1	13.8	.6	0.2	0.4	0.7	1.0	1.3	1.5	1.8	2.1	2.4	2.6
16.7	2.8	5.6	8.4	11.2	13.9	.7	0.2	0.5	0.7	1.0	1.3	1.6	1.8	2.1	2.4	2.7
16.8	2.8	5.6	8.4	11.2	14.0	.8	0.2	0.5	0.8	1.0	1.3	1.6	1.9	2.1	2.4	2.7
16.9	2.9	5.7	8.5	11.3	14.1	.9	0.2	0.5	0.8	1.1	1.3	1.6	1.9	2.2	2.4	2.7
17.0	2.8	5.6	8.5	11.3	14.1	.0	0.0	0.3	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6
17.1	2.8	5.7	8.5	11.4	14.2	.1	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7
17.2	2.8	5.7	8.6	11.4	14.3	.2	0.1	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7
17.3	2.9	5.8	8.6	11.5	14.4	.3	0.1	0.4	0.7	1.0	1.3	1.5	1.8	2.1	2.4	2.7
17.4	2.9	5.8	8.7	11.6	14.5	.4	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.2	2.4	2.7
17.5	2.9	5.8	8.8	11.7	14.6	.5	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.2	2.5	2.8
17.6	2.9	5.9	8.8	11.7	14.7	.6	0.2	0.5	0.8	1.0	1.3	1.6	1.9	2.2	2.5	2.8
17.7	3.0	5.9	8.9	11.8	14.8	.7	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8
17.8	3.0	6.0	8.9	11.9	14.9	.8	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9
17.9	3.0	6.0	9.0	12.0	15.0	.9	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9
18.0	3.0	6.0	9.0	12.0	15.0	.0	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.2	2.5	2.8
18.1	3.0	6.0	9.0	12.0	15.1	.1	0.0	0.3	0.6	1.0	1.3	1.6	1.9	2.2	2.5	2.8
18.2	3.0	6.0	9.1	12.1	15.1	.2	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.2	2.5	2.8
18.3	3.0	6.1	9.1	12.2	15.2	.3	0.1	0.4	0.7	1.0	1.3	1.6	1.9	2.3	2.6	2.9
18.4	3.1	6.1	9.2	12.3	15.3	.4	0.1	0.4	0.7	1.0	1.4	1.7	2.0	2.3	2.6	2.9
18.5	3.1	6.2	9.3	12.3	15.4	.5	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9
18.6	3.1	6.2	9.3	12.4	15.5	.6	0.2	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.7	3.0
18.7	3.1	6.3	9.4	12.5	15.6	.7	0.2	0.5	0.8	1.1	1.4	1.8	2.1	2.4	2.7	3.0
18.8	3.2	6.3	9.4	12.6	15.7	.8	0.2	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
18.9	3.2	6.3	9.5	12.6	15.8	.9	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.1
19.0	3.1	6.3	9.5	12.6	15.8	.0	0.0	0.3	0.6	1.0	1.3	1.6	1.9	2.3	2.6	2.9
19.1	3.2	6.3	9.5	12.7	15.9	.1	0.0	0.4	0.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0
19.2	3.2	6.4	9.6	12.8	16.0	.2	0.1	0.4	0.7	1.0	1.4	1.7	2.0	2.3	2.7	3.0
19.3	3.2	6.4	9.6	12.9	16.1	.3	0.1	0.4	0.7	1.1	1.4	1.7	2.0	2.4	2.7	3.0
19.4	3.2	6.5	9.7	12.9	16.2	.4	0.1	0.5	0.8	1.1	1.4	1.8	2.1	2.4	2.7	3.1
19.5	3.3	6.5	9.8	13.0	16.3	.5	0.2	0.5	0.8	1.1	1.5	1.8	2.1	2.4	2.8	3.1
19.6	3.3	6.5	9.8	13.1	16.3	.6	0.2	0.5	0.8	1.2	1.5	1.8	2.1	2.5	2.8	3.1
19.7	3.3	6.6	9.9	13.2	16.4	.7	0.2	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.2
19.8	3.3	6.6	9.9	13.2	16.5	.8	0.3	0.6	0.9	1.2	1.6	1.9	2.2	2.5	2.9	3.2
19.9	3.4	6.7	10.0	13.3	16.6	.9	0.3	0.6	0.9	1.3	1.6	1.9	2.2	2.6	2.9	3.2
20.0	3.3	6.6	10.0	13.3	16.7	.0	0.0	0.3	0.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1
20.1	3.3	6.7	10.0	13.4	16.7	.1	0.0	0.4	0.7	1.1	1.4	1.7	2.1	2.4	2.8	3.1
20.2	3.3	6.7	10.1	13.4	16.8	.2	0.1	0.4	0.8	1.1	1.4	1.8	2.1	2.5	2.8	3.1
20.3	3.4	6.8	10.1	13.5	16.9	.3	0.1	0.4	0.8	1.1	1.5	1.8	2.2	2.5	2.8	3.2
20.4	3.4	6.8	10.2	13.6	17.0	.4	0.1	0.5	0.8	1.2	1.5	1.8	2.2	2.5	2.9	3.2
20.5	3.4	6.8	10.3	13.7	17.1	.5	0.2	0.5	0.9	1.2	1.5	1.9	2.2	2.6	2.9	3.2
20.6	3.4	6.9	10.3	13.7	17.2	.6	0.2	0.6	0.9	1.2	1.6	1.9	2.3	2.6	2.9	3.3
20.7	3.5	6.9	10.4	13.8	17.3	.7	0.2	0.6	0.9	1.3	1.6	1.9	2.3	2.6	3.0	3.3
20.8	3.5	7.0	10.4	13.9	17.4	.8	0.3	0.6	1.0	1.3	1.6	2.0	2.3	2.7	3.0	3.3
20.9	3.5	7.0	10.5	14.0	17.5	.9	0.3	0.6	1.0	1.3	1.7	2.0	2.4	2.7	3.0	3.4
21.0	3.5	7.0	10.5	14.0	17.5	.0	0.0	0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.9	3.2
21.1	3.5	7.0	10.5	14.0	17.6	.1	0.0	0.4	0.8	1.1	1.5	1.8	2.2	2.5	2.9	3.3
21.2	3.5	7.0	10.6	14.1	17.6	.2	0.1	0.4	0.8	1.1	1.5	1.9	2.2	2.6	2.9	3.3
21.3	3.5	7.1	10.6	14.2	17.7	.3	0.1	0.5	0.8	1.2	1.5	1.9	2.3	2.6	3.0	3.3
21.4	3.6	7.1	10.7	14.3	17.8	.4	0.1	0.5	0.9	1.2	1.6	1.9	2.3	2.7	3.0	3.4
21.5	3.6	7.2	10.8	14.3	17.9	.5	0.2	0.5	0.9	1.3	1.6	2.0	2.3	2.7	3.0	3.4
21.6	3.6	7.2	10.8	14.4	18.0	.6	0.2	0.6	0.9	1.3	1.6	2.0	2.4	2.7	3.1	3.4
21.7	3.6	7.3	10.9	14.5	18.1	.7	0.3	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5
21.8	3.7	7.3	10.9	14.6	18.2	.8	0.3	0.6	1.0	1.4	1.7	2.1	2.4	2.8	3.2	3.5
21.9	3.7	7.3	11.0	14.6	18.3	.9	0.3	0.7	1.0	1.4	1.8	2.1	2.5	2.8	3.2	3.5
22.0	3.6	7.3	11.0	14.6	18.3	.0	0.0	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4
22.1	3.7	7.3	11.0	14.7	18.4	.1	0.0	0.4	0.8	1.2	1.5	1.9	2.3	2.7	3.0	3.4
22.2	3.7	7.4	11.1	14.8	18.5	.2	0.1	0.4	0.8	1.2	1.6	1.9	2.3	2.7	3.1	3.4
22.3	3.7	7.4	11.1	14.9	18.6	.3	0.1	0.5	0.9	1.2	1.6	2.0	2.4	2.7	3.1	3.5
22.4	3.7	7.5	11.2	14.9	18.7	.4	0.1	0.5	0.9	1.3	1.6	2.0	2.4	2.8	3.1	3.5
22.5	3.8	7.5	11.3	15.0	18.8	.5	0.2	0.6	0.9	1.3	1.7	2.1	2.4	2.8	3.2	3.6
22.6	3.8	7.5	11.3	15.1	18.8	.6	0.2	0.6	1.0	1.3	1.7	2.1	2.5	2.8	3.2	3.6
22.7	3.8	7.6	11.4	15.2	18.9	.7	0.3	0.6	1.0	1.4	1.8	2.1	2.5	2.9	3.3	3.6
22.8	3.8	7.6	11.4	15.2	19.0	.8	0.3	0.7	1.0	1.4	1.8	2.2	2.5	2.9	3.3	3.7
22.9	3.9	7.7	11.5	15.3	19.1	.9	0.3	0.7	1.1	1.5	1.8	2.2	2.6	3.0	3.3	3.7
23.0	3.8	7.6	11.5	15.3	19.1	.0	0.0	0.4	0.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5
23.1	3.8	7.7	11.5	15.4	19.2	.1	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6
23.2	3.8	7.7	11.6	15.4	19.3	.2	0.1	0.5	0.9	1.3	1.6	2.0	2.4	2.8	3.2	3.6
23.3	3.9	7.8	11.6	15.5	19.4	.3	0.1	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7
23.4	3.9	7.8	11.7	15.6	19.5	.4	0.2	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7
23.5	3.9	7.8	11.8	15.7	19.6	.5	0.2	0.6	1.0	1.4	1.8	2.2	2.5	2.9	3.3	3.7
23.6	3.9	7.9	11.8	15.7	19.7	.6	0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0	3.4	3.8
23.7	4.0	7.9	11.9	15.8	19.8	.7	0.3	0.7	1.0	1.4	1.9	2.3	2.6	3.0	3.4	3.8
23.8	4.0	8.0	11.9	15.9	19.9	.8	0.3	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.4	3.8
23.9	4.0	8.0	12.0	16.0	20.0	.9	0.4	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.9

Left Section — Double Second Diff. and Corr.

Diff. (16–17)	Corr.	Diff. (18–19)	Corr.	Diff. (20–21)	Corr.	Diff. (22–23)	Corr.
1.0		0.9		0.9		0.8	
3.0	0.1	2.8	0.1	2.6	0.1	2.5	0.1
4.9	0.2	4.6	0.2	4.4	0.2	4.2	0.2
6.9	0.3	6.5	0.3	6.2	0.3	5.9	0.3
8.9	0.4	8.3	0.4	7.9	0.4	7.6	0.4
10.8	0.5	10.2	0.5	9.7	0.5	9.3	0.5
12.8	0.6	12.0	0.6	11.4	0.6	11.0	0.6
14.8	0.7	13.9	0.7	13.2	0.7	12.7	0.7
16.7	0.8	15.7	0.8	14.9	0.8	14.4	0.8
18.7	0.9	17.6	0.9	16.7	0.9	16.1	0.9
20.7	1.0	19.4	1.0	18.5	1.0	17.8	1.0
22.7	1.1	21.3	1.1	20.2	1.1	19.5	1.1
24.6	1.2	23.1	1.2	22.0	1.2	21.2	1.2
26.6	1.3	25.0	1.3	23.7	1.3	22.8	1.3
28.6	1.4	26.8	1.4	25.5	1.4	24.5	1.4
30.5	1.5	28.7	1.5	27.3	1.5	26.2	1.5
32.5	1.6	30.5	1.6	29.0	1.6	27.9	1.6
34.5	1.7	32.3	1.7	30.8	1.7	29.6	1.7
		34.2	1.8	32.5	1.8	31.3	1.8
				34.3	1.9	33.0	1.9
						34.7	2.0

Right Section

Dec. Inc.	10′	20′	30′	40′	50′	Dec.	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
24.0	4.0	8.0	12.0	16.0	20.0	.0	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.9	3.3	3.7
24.1	4.0	8.0	12.0	16.0	20.1	.1	0.0	0.4	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7
24.2	4.0	8.0	12.1	16.1	20.1	.2	0.1	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.8
24.3	4.0	8.1	12.1	16.2	20.2	.3	0.1	0.5	0.9	1.3	1.8	2.2	2.6	3.0	3.4	3.8
24.4	4.1	8.1	12.2	16.3	20.3	.4	0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0	3.4	3.8
24.5	4.1	8.2	12.3	16.3	20.4	.5	0.2	0.6	1.0	1.4	1.8	2.2	2.7	3.1	3.5	3.9
24.6	4.1	8.2	12.3	16.4	20.5	.6	0.2	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.9
24.7	4.1	8.3	12.4	16.5	20.6	.7	0.3	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.6	4.0
24.8	4.2	8.3	12.4	16.6	20.7	.8	0.3	0.7	1.1	1.6	2.0	2.4	2.8	3.2	3.6	4.0
24.9	4.2	8.3	12.5	16.6	20.8	.9	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
25.0	4.1	8.3	12.5	16.6	20.8	.0	0.0	0.4	0.8	1.3	1.7	2.1	2.5	3.0	3.4	3.8
25.1	4.2	8.3	12.5	16.7	20.9	.1	0.0	0.5	0.9	1.3	1.7	2.2	2.6	3.0	3.4	3.9
25.2	4.2	8.4	12.6	16.8	21.0	.2	0.1	0.5	0.9	1.4	1.8	2.2	2.6	3.1	3.5	3.9
25.3	4.2	8.4	12.6	16.9	21.1	.3	0.1	0.6	1.0	1.4	1.8	2.3	2.7	3.1	3.5	4.0
25.4	4.2	8.5	12.7	16.9	21.2	.4	0.2	0.6	1.0	1.4	1.9	2.3	2.7	3.1	3.6	4.0
25.5	4.3	8.5	12.8	17.0	21.3	.5	0.2	0.6	1.1	1.5	1.9	2.3	2.8	3.2	3.6	4.0
25.6	4.3	8.5	12.8	17.1	21.3	.6	0.3	0.7	1.1	1.5	2.0	2.4	2.8	3.2	3.7	4.1
25.7	4.3	8.6	12.9	17.2	21.4	.7	0.3	0.7	1.1	1.6	2.0	2.4	2.8	3.3	3.7	4.1
25.8	4.3	8.6	12.9	17.2	21.5	.8	0.3	0.8	1.2	1.6	2.0	2.5	2.9	3.3	3.7	4.2
25.9	4.4	8.7	13.0	17.3	21.6	.9	0.4	0.8	1.2	1.7	2.1	2.5	2.9	3.4	3.8	4.2
26.0	4.3	8.6	13.0	17.3	21.6	.0	0.0	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0
26.1	4.3	8.7	13.0	17.4	21.7	.1	0.0	0.5	0.9	1.4	1.8	2.3	2.7	3.1	3.6	4.0
26.2	4.3	8.7	13.1	17.4	21.8	.2	0.1	0.5	1.0	1.4	1.9	2.3	2.7	3.2	3.6	4.1
26.3	4.4	8.8	13.1	17.5	21.9	.3	0.1	0.6	1.0	1.5	1.9	2.3	2.8	3.2	3.7	4.1
26.4	4.4	8.8	13.2	17.6	22.0	.4	0.2	0.6	1.1	1.5	1.9	2.4	2.8	3.3	3.7	4.2
26.5	4.4	8.8	13.3	17.7	22.1	.5	0.2	0.7	1.1	1.5	2.0	2.4	2.9	3.3	3.8	4.2
26.6	4.4	8.9	13.3	17.7	22.2	.6	0.3	0.7	1.1	1.6	2.0	2.5	2.9	3.4	3.8	4.3
26.7	4.5	8.9	13.4	17.8	22.3	.7	0.3	0.8	1.2	1.6	2.1	2.5	3.0	3.4	3.8	4.3
26.8	4.5	9.0	13.4	17.9	22.4	.8	0.4	0.8	1.2	1.7	2.1	2.6	3.0	3.4	3.9	4.3
26.9	4.5	9.0	13.5	18.0	22.5	.9	0.4	0.8	1.3	1.7	2.2	2.6	3.0	3.5	3.9	4.4
27.0	4.5	9.0	13.5	18.0	22.5	.0	0.0	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1
27.1	4.5	9.0	13.5	18.1	22.6	.1	0.0	0.5	1.0	1.4	1.9	2.3	2.8	3.3	3.7	4.2
27.2	4.5	9.0	13.6	18.1	22.6	.2	0.1	0.5	1.0	1.5	1.9	2.4	2.9	3.3	3.8	4.2
27.3	4.5	9.1	13.6	18.2	22.7	.3	0.1	0.6	1.1	1.5	2.0	2.4	2.9	3.3	3.8	4.3
27.4	4.6	9.1	13.7	18.3	22.8	.4	0.2	0.6	1.1	1.6	2.0	2.5	2.9	3.4	3.8	4.3
27.5	4.6	9.2	13.8	18.3	22.9	.5	0.2	0.7	1.1	1.6	2.1	2.5	3.0	3.4	3.9	4.4
27.6	4.6	9.2	13.8	18.4	23.0	.6	0.3	0.7	1.2	1.6	2.1	2.6	3.0	3.5	3.9	4.4
27.7	4.6	9.3	13.9	18.5	23.1	.7	0.3	0.8	1.2	1.7	2.2	2.6	3.1	3.5	4.0	4.4
27.8	4.7	9.3	13.9	18.6	23.2	.8	0.4	0.8	1.3	1.7	2.2	2.7	3.1	3.6	4.0	4.5
27.9	4.7	9.3	14.0	18.6	23.3	.9	0.4	0.9	1.3	1.8	2.2	2.7	3.2	3.6	4.1	4.5
28.0	4.6	9.3	14.0	18.6	23.3	.0	0.0	0.5	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.3
28.1	4.7	9.3	14.0	18.7	23.4	.1	0.0	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.8	4.3
28.2	4.7	9.4	14.1	18.8	23.5	.2	0.1	0.6	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.3
28.3	4.7	9.4	14.1	18.9	23.6	.3	0.1	0.6	1.1	1.6	2.0	2.5	3.0	3.5	3.9	4.4
28.4	4.7	9.5	14.2	18.9	23.7	.4	0.2	0.7	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5
28.5	4.8	9.5	14.3	19.0	23.8	.5	0.2	0.7	1.2	1.7	2.1	2.6	3.1	3.6	4.1	4.6
28.6	4.8	9.5	14.3	19.1	23.8	.6	0.3	0.8	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6
28.7	4.8	9.6	14.4	19.2	23.9	.7	0.3	0.8	1.3	1.8	2.2	2.7	3.2	3.7	4.1	4.6
28.8	4.8	9.6	14.4	19.2	24.0	.8	0.4	0.9	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7
28.9	4.9	9.7	14.5	19.3	24.1	.9	0.4	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7
29.0	4.8	9.6	14.5	19.3	24.1	.0	0.0	0.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4
29.1	4.8	9.7	14.5	19.4	24.2	.1	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
29.2	4.8	9.7	14.6	19.4	24.3	.2	0.1	0.6	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5
29.3	4.9	9.8	14.6	19.5	24.4	.3	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6
29.4	4.9	9.8	14.7	19.6	24.5	.4	0.2	0.7	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6
29.5	4.9	9.8	14.8	19.7	24.6	.5	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7
29.6	4.9	9.9	14.8	19.7	24.7	.6	0.3	0.8	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7
29.7	5.0	9.9	14.9	19.8	24.8	.7	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8
29.8	5.0	10.0	14.9	19.9	24.9	.8	0.4	0.9	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.8
29.9	5.0	10.0	15.0	20.0	25.0	.9	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9
30.0	5.0	10.0	15.0	20.0	25.0	.0	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.6	4.1	4.6
30.1	5.0	10.0	15.0	20.0	25.1	.1	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6
30.2	5.0	10.0	15.1	20.1	25.1	.2	0.1	0.6	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.7
30.3	5.0	10.1	15.1	20.2	25.2	.3	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7
30.4	5.1	10.1	15.2	20.2	25.3	.4	0.2	0.7	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8
30.5	5.1	10.2	15.3	20.3	25.4	.5	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8
30.6	5.1	10.2	15.3	20.4	25.5	.6	0.3	0.8	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9
30.7	5.1	10.3	15.4	20.5	25.6	.7	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9
30.8	5.2	10.3	15.4	20.6	25.7	.8	0.4	0.9	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0
30.9	5.2	10.3	15.5	20.6	25.8	.9	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
31.0	5.1	10.3	15.5	20.6	25.8	.0	0.0	0.5	1.1	1.6	2.1	2.6	3.1	3.7	4.2	4.7
31.1	5.2	10.3	15.5	20.7	25.9	.1	0.1	0.6	1.1	1.6	2.2	2.7	3.2	3.7	4.3	4.8
31.2	5.2	10.4	15.6	20.8	26.0	.2	0.1	0.6	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8
31.3	5.2	10.4	15.6	20.9	26.1	.3	0.2	0.7	1.2	1.7	2.3	2.8	3.3	3.8	4.4	4.9
31.4	5.2	10.5	15.7	20.9	26.2	.4	0.2	0.7	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9
31.5	5.3	10.5	15.8	21.0	26.3	.5	0.3	0.8	1.3	1.8	2.4	2.9	3.4	3.9	4.5	5.0
31.6	5.3	10.5	15.8	21.1	26.3	.6	0.3	0.8	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0
31.7	5.3	10.6	15.9	21.2	26.4	.7	0.4	0.9	1.4	1.9	2.5	3.0	3.5	4.1	4.6	5.1
31.8	5.3	10.6	15.9	21.2	26.5	.8	0.4	0.9	1.5	2.0	2.5	3.0	3.6	4.1	4.6	5.1
31.9	5.4	10.7	16.0	21.3	26.6	.9	0.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.7	5.2

Right Section — Double Second Diff. and Corr.

Diff. (24–25)	Corr.	Diff. (26–27)	Corr.	Diff. (28–29)	Corr.	Diff. (30–31)	Corr.
0.8		0.8		0.8		0.8	
2.5	0.1	2.4	0.1	2.4	0.1	2.4	0.1
4.1	0.2	4.0	0.2	4.0	0.2	4.0	0.2
5.8	0.3	5.7	0.3	5.6	0.3	5.6	0.3
7.4	0.4	7.3	0.4	7.2	0.4	7.2	0.4
9.1	0.5	8.9	0.5	8.8	0.5	8.8	0.5
10.7	0.6	10.5	0.6	10.4	0.6	10.4	0.6
12.3	0.7	12.1	0.7	12.0	0.7	12.0	0.7
14.0	0.8	13.7	0.8	13.6	0.8	13.6	0.8
15.6	0.9	15.4	0.9	15.2	0.9	15.2	0.9
17.3	1.0	17.0	1.0	16.8	1.0	16.8	1.0
18.9	1.1	18.6	1.1	18.4	1.1	18.4	1.1
20.6	1.2	20.2	1.2	20.0	1.2	20.0	1.2
22.2	1.3	21.8	1.3	21.6	1.3	21.6	1.3
23.9	1.4	23.4	1.4	23.2	1.4	23.2	1.4
25.5	1.5	25.1	1.5	24.8	1.5	24.8	1.5
27.2	1.6	26.7	1.6	26.4	1.6	26.4	1.6
28.8	1.7	28.3	1.7	28.0	1.7	28.0	1.7
30.4	1.8	29.9	1.8	29.6	1.8	29.6	1.8
32.1	1.9	31.5	1.9	31.2	1.9	31.2	1.9
33.7	2.0	33.1	2.0	32.8	2.0	32.8	2.0
35.4	2.1	34.7	2.1	34.4	2.1	34.4	2.1

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

INTERPOLATION TABLE

Left half

Dec. Inc.	Tens 10′	20′	30′	40′	50′	Dec	Units 0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
28.0	4.6	9.3	14.0	18.6	23.3	.0	0.0	0.5	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.3
28.1	4.7	9.3	14.0	18.7	23.4	.1	0.0	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.8	4.3
28.2	4.7	9.4	14.1	18.8	23.5	.2	0.1	0.6	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4
28.3	4.7	9.4	14.1	18.9	23.6	.3	0.1	0.6	1.1	1.6	2.0	2.5	3.0	3.5	3.9	4.4
28.4	4.7	9.5	14.2	18.9	23.7	.4	0.2	0.7	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5
28.5	4.8	9.5	14.3	19.0	23.8	.5	0.2	0.7	1.2	1.7	2.1	2.6	3.1	3.6	4.0	4.5
28.6	4.8	9.5	14.3	19.1	23.8	.6	0.3	0.8	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6
28.7	4.8	9.6	14.4	19.2	23.9	.7	0.3	0.8	1.3	1.8	2.2	2.7	3.2	3.7	4.1	4.6
28.8	4.8	9.6	14.4	19.2	24.0	.8	0.4	0.9	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7
28.9	4.9	9.7	14.5	19.3	24.1	.9	0.4	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7
29.0	4.8	9.6	14.5	19.3	24.1	.0	0.0	0.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4
29.1	4.8	9.7	14.5	19.4	24.2	.1	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
29.2	4.8	9.7	14.6	19.4	24.3	.2	0.1	0.6	1.1	1.6	2.1	2.6	3.0	3.5	4.0	4.5
29.3	4.9	9.8	14.6	19.5	24.4	.3	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6
29.4	4.9	9.8	14.7	19.6	24.5	.4	0.2	0.7	1.2	1.7	2.2	2.7	3.1	3.6	4.1	4.6
29.5	4.9	9.8	14.8	19.7	24.6	.5	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7
29.6	4.9	9.9	14.8	19.7	24.7	.6	0.3	0.8	1.3	1.8	2.3	2.8	3.2	3.7	4.2	4.7
29.7	5.0	9.9	14.9	19.8	24.8	.7	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8
29.8	5.0	10.0	14.9	19.9	24.9	.8	0.4	0.9	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.8
29.9	5.0	10.0	15.0	20.0	25.0	.9	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9
30.0	5.0	10.0	15.0	20.0	25.0	.0	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.6	4.1	4.6
30.1	5.0	10.0	15.0	20.0	25.1	.1	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	4.6
30.2	5.0	10.0	15.1	20.1	25.1	.2	0.1	0.6	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.7
30.3	5.0	10.1	15.1	20.2	25.2	.3	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7
30.4	5.1	10.1	15.2	20.3	25.3	.4	0.2	0.7	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8
30.5	5.1	10.2	15.3	20.3	25.4	.5	0.3	0.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8
30.6	5.1	10.2	15.3	20.4	25.5	.6	0.3	0.8	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9
30.7	5.1	10.3	15.4	20.5	25.6	.7	0.4	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9
30.8	5.2	10.3	15.4	20.6	25.7	.8	0.4	0.9	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0
30.9	5.2	10.3	15.5	20.6	25.8	.9	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
31.0	5.1	10.3	15.5	20.6	25.8	.0	0.0	0.5	1.0	1.6	2.1	2.6	3.1	3.7	4.2	4.7
31.1	5.2	10.3	15.5	20.7	25.9	.1	0.1	0.6	1.1	1.6	2.2	2.7	3.2	3.7	4.3	4.8
31.2	5.2	10.4	15.6	20.8	26.0	.2	0.1	0.6	1.2	1.7	2.2	2.7	3.3	3.8	4.3	4.8
31.3	5.2	10.4	15.6	20.9	26.1	.3	0.2	0.7	1.2	1.7	2.3	2.8	3.3	3.8	4.4	4.9
31.4	5.2	10.5	15.7	20.9	26.2	.4	0.2	0.7	1.3	1.8	2.3	2.8	3.4	3.9	4.4	4.9
31.5	5.3	10.5	15.8	21.0	26.3	.5	0.3	0.8	1.3	1.8	2.4	2.9	3.4	3.9	4.5	5.0
31.6	5.3	10.5	15.8	21.1	26.3	.6	0.3	0.8	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0
31.7	5.3	10.6	15.9	21.2	26.4	.7	0.4	0.9	1.4	1.9	2.5	3.0	3.5	4.0	4.6	5.1
31.8	5.3	10.6	15.9	21.2	26.5	.8	0.4	0.9	1.5	2.0	2.5	3.0	3.6	4.1	4.6	5.1
31.9	5.4	10.7	16.0	21.3	26.6	.9	0.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.7	5.2
32.0	5.3	10.6	16.0	21.3	26.6	.0	0.0	0.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9
32.1	5.3	10.7	16.0	21.4	26.7	.1	0.1	0.6	1.1	1.7	2.2	2.8	3.3	3.8	4.4	4.9
32.2	5.3	10.7	16.1	21.4	26.8	.2	0.1	0.6	1.2	1.7	2.3	2.8	3.4	3.9	4.4	5.0
32.3	5.4	10.8	16.1	21.5	26.9	.3	0.2	0.7	1.2	1.8	2.3	2.9	3.4	4.0	4.5	5.0
32.4	5.4	10.8	16.2	21.6	27.0	.4	0.2	0.8	1.3	1.8	2.4	2.9	3.5	4.0	4.5	5.1
32.5	5.4	10.8	16.3	21.7	27.1	.5	0.3	0.8	1.4	1.9	2.4	3.0	3.5	4.1	4.6	5.1
32.6	5.4	10.9	16.3	21.7	27.2	.6	0.3	0.9	1.4	1.9	2.5	3.0	3.6	4.1	4.7	5.2
32.7	5.5	10.9	16.4	21.8	27.3	.7	0.4	0.9	1.5	2.0	2.5	3.1	3.6	4.2	4.7	5.3
32.8	5.5	11.0	16.4	21.9	27.4	.8	0.4	1.0	1.5	2.1	2.6	3.1	3.7	4.2	4.8	5.3
32.9	5.5	11.0	16.5	22.0	27.5	.9	0.5	1.0	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.4
33.0	5.5	11.0	16.5	22.0	27.5	.0	0.0	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.5	5.0
33.1	5.5	11.0	16.5	22.0	27.6	.1	0.1	0.6	1.2	1.7	2.3	2.8	3.4	4.0	4.5	5.1
33.2	5.5	11.0	16.6	22.1	27.6	.2	0.1	0.7	1.2	1.8	2.3	2.9	3.5	4.0	4.6	5.1
33.3	5.5	11.1	16.6	22.2	27.7	.3	0.2	0.7	1.3	1.8	2.4	3.0	3.5	4.1	4.6	5.2
33.4	5.6	11.1	16.7	22.3	27.8	.4	0.2	0.8	1.3	1.9	2.5	3.0	3.6	4.1	4.7	5.2
33.5	5.6	11.2	16.8	22.3	27.9	.5	0.3	0.8	1.4	2.0	2.5	3.1	3.6	4.2	4.7	5.3
33.6	5.6	11.2	16.8	22.4	28.0	.6	0.3	0.9	1.5	2.0	2.6	3.1	3.7	4.2	4.8	5.4
33.7	5.6	11.3	16.9	22.5	28.1	.7	0.4	0.9	1.5	2.1	2.6	3.2	3.7	4.3	4.9	5.4
33.8	5.7	11.3	16.9	22.6	28.2	.8	0.4	1.0	1.6	2.1	2.7	3.2	3.8	4.4	4.9	5.5
33.9	5.7	11.3	17.0	22.6	28.3	.9	0.5	1.1	1.6	2.2	2.7	3.3	3.9	4.4	5.0	5.5
34.0	5.6	11.3	17.0	22.6	28.3	.0	0.0	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.2
34.1	5.7	11.3	17.0	22.7	28.4	.1	0.1	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.7	5.2
34.2	5.7	11.4	17.1	22.8	28.5	.2	0.1	0.7	1.3	1.8	2.4	3.0	3.6	4.1	4.7	5.3
34.3	5.7	11.4	17.1	22.9	28.6	.3	0.2	0.7	1.3	1.9	2.5	3.0	3.6	4.2	4.8	5.4
34.4	5.7	11.5	17.2	22.9	28.7	.4	0.2	0.8	1.4	2.0	2.5	3.1	3.7	4.3	4.8	5.4
34.5	5.8	11.5	17.3	23.0	28.8	.5	0.3	0.9	1.4	2.0	2.6	3.2	3.8	4.3	4.9	5.5
34.6	5.8	11.5	17.3	23.1	28.8	.6	0.3	0.9	1.5	2.1	2.6	3.2	3.8	4.4	5.0	5.5
34.7	5.8	11.6	17.4	23.2	28.9	.7	0.4	1.0	1.6	2.1	2.7	3.3	3.9	4.4	5.0	5.6
34.8	5.8	11.6	17.4	23.2	29.0	.8	0.4	1.0	1.6	2.2	2.8	3.3	3.9	4.5	5.1	5.6
34.9	5.9	11.7	17.5	23.3	29.1	.9	0.5	1.1	1.7	2.2	2.8	3.4	4.0	4.5	5.1	5.7
35.0	5.8	11.6	17.5	23.3	29.1	.0	0.0	0.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3
35.1	5.8	11.7	17.5	23.4	29.2	.1	0.1	0.7	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4
35.2	5.8	11.7	17.6	23.4	29.3	.2	0.1	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.4
35.3	5.9	11.8	17.6	23.5	29.4	.3	0.2	0.8	1.4	2.0	2.6	3.2	3.7	4.3	4.9	5.5
35.4	5.9	11.8	17.7	23.6	29.5	.4	0.2	0.8	1.4	2.0	2.6	3.2	3.8	4.4	5.0	5.6
35.5	5.9	11.8	17.8	23.7	29.6	.5	0.3	0.9	1.5	2.1	2.7	3.3	3.8	4.4	5.0	5.6
35.6	5.9	11.9	17.8	23.7	29.7	.6	0.4	0.9	1.5	2.1	2.7	3.3	3.9	4.5	5.1	5.7
35.7	6.0	11.9	17.9	23.8	29.8	.7	0.4	1.0	1.6	2.2	2.8	3.4	4.0	4.6	5.2	5.8
35.8	6.0	12.0	17.9	23.9	29.9	.8	0.5	1.1	1.7	2.2	2.8	3.4	4.0	4.6	5.2	5.8
35.9	6.0	12.0	18.0	24.0	30.0	.9	0.5	1.1	1.7	2.3	2.9	3.5	4.1	4.7	5.3	5.9

Double Second Diff. and Corr. (left half)

28.0–29.9		30.0–31.9		32.0–33.9		34.0–35.9	
0.8		0.8		0.8		0.8	
2.4	0.1	2.4	0.1	2.4	0.1	2.5	0.1
4.0	0.2	4.0	0.2	4.0	0.2	4.1	0.2
5.6	0.3	5.6	0.3	5.7	0.3	5.8	0.3
7.2	0.4	7.2	0.4	7.3	0.4	7.4	0.4
8.8	0.5 / 0.6	8.8	0.5 / 0.6	8.9	0.5 / 0.6	9.1	0.5 / 0.6
10.4	0.7	10.4	0.7	10.5	0.7	10.7	0.7
12.0	0.8	12.0	0.8	12.1	0.8	12.3	0.8
13.6	0.9	13.6	0.9	13.7	0.9	14.0	0.9
15.2	1.0	15.2	1.0	15.4	1.0	15.6	1.0
16.8	1.1	16.8	1.1	17.0	1.1	17.3	1.1
18.4	1.2	18.4	1.2	18.6	1.2	18.9	1.2
20.0	1.3	20.0	1.3	20.2	1.3	20.6	1.3
21.6	1.4	21.6	1.4	21.8	1.4	22.2	1.4
23.2	1.5	23.2	1.5	23.4	1.5	23.9	1.5
24.8	1.6	24.8	1.6	25.1	1.6	25.5	1.6
26.4	1.7	26.4	1.7	26.7	1.7	27.2	1.7
28.0	1.8	28.0	1.8	28.3	1.8	28.8	1.8
29.6	1.9	29.6	1.9	29.9	1.9	30.4	1.9
31.2	2.0	31.2	2.0	31.5	2.0	32.1	2.0
32.8	2.1	32.8	2.1	33.1	2.1	33.7	2.1
34.4		34.4		34.7		35.4	

Right half

Dec. Inc.	Tens 10′	20′	30′	40′	50′	Dec	Units 0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
36.0	6.0	12.0	18.0	24.0	30.0	.0	0.0	0.6	1.2	1.8	2.4	3.0	3.6	4.3	4.9	5.5
36.1	6.0	12.0	18.0	24.0	30.1	.1	0.1	0.7	1.3	1.9	2.5	3.1	3.7	4.3	4.9	5.5
36.2	6.0	12.0	18.1	24.1	30.1	.2	0.1	0.7	1.3	1.9	2.6	3.2	3.8	4.4	5.0	5.6
36.3	6.0	12.1	18.1	24.2	30.2	.3	0.2	0.8	1.4	2.0	2.6	3.2	3.8	4.4	5.0	5.7
36.4	6.1	12.1	18.2	24.3	30.3	.4	0.2	0.9	1.5	2.1	2.7	3.3	3.9	4.5	5.1	5.7
36.5	6.1	12.2	18.3	24.3	30.4	.5	0.3	0.9	1.5	2.1	2.7	3.3	4.0	4.6	5.2	5.8
36.6	6.1	12.2	18.3	24.4	30.5	.6	0.4	1.0	1.6	2.2	2.8	3.4	4.0	4.6	5.2	5.8
36.7	6.1	12.3	18.4	24.5	30.6	.7	0.4	1.0	1.6	2.3	2.9	3.5	4.1	4.7	5.3	5.9
36.8	6.2	12.3	18.4	24.6	30.7	.8	0.5	1.1	1.7	2.3	2.9	3.5	4.1	4.7	5.4	6.0
36.9	6.2	12.3	18.5	24.6	30.8	.9	0.5	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0
37.0	6.1	12.3	18.5	24.6	30.8	.0	0.0	0.6	1.2	1.9	2.5	3.1	3.7	4.4	5.0	5.6
37.1	6.2	12.3	18.5	24.7	30.9	.1	0.1	0.7	1.3	1.9	2.6	3.2	3.8	4.4	5.1	5.7
37.2	6.2	12.4	18.6	24.8	31.0	.2	0.1	0.7	1.4	2.0	2.6	3.2	3.9	4.5	5.1	5.7
37.3	6.2	12.4	18.6	24.9	31.1	.3	0.2	0.8	1.4	2.1	2.7	3.3	3.9	4.6	5.2	5.8
37.4	6.2	12.5	18.7	24.9	31.2	.4	0.2	0.9	1.5	2.1	2.7	3.4	4.0	4.6	5.2	5.9
37.5	6.3	12.5	18.8	25.0	31.3	.5	0.3	0.9	1.6	2.2	2.8	3.4	4.1	4.7	5.3	5.9
37.6	6.3	12.5	18.8	25.1	31.3	.6	0.4	1.0	1.6	2.2	2.9	3.5	4.1	4.7	5.4	6.0
37.7	6.3	12.6	18.9	25.2	31.4	.7	0.4	1.1	1.7	2.3	2.9	3.6	4.2	4.8	5.4	6.1
37.8	6.3	12.6	18.9	25.2	31.5	.8	0.5	1.1	1.7	2.4	3.0	3.6	4.2	4.9	5.5	6.1
37.9	6.4	12.7	19.0	25.3	31.6	.9	0.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.6	6.2
38.0	6.3	12.6	19.0	25.3	31.6	.0	0.0	0.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8
38.1	6.3	12.7	19.0	25.4	31.7	.1	0.1	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.8
38.2	6.3	12.7	19.1	25.4	31.8	.2	0.1	0.8	1.4	2.1	2.7	3.3	4.0	4.6	5.3	5.9
38.3	6.4	12.8	19.1	25.5	31.9	.3	0.2	0.8	1.5	2.1	2.8	3.4	4.0	4.7	5.3	6.0
38.4	6.4	12.8	19.2	25.6	32.0	.4	0.3	0.9	1.5	2.2	2.8	3.5	4.1	4.7	5.4	6.0
38.5	6.4	12.8	19.3	25.7	32.1	.5	0.3	1.0	1.6	2.2	2.9	3.5	4.2	4.8	5.5	6.1
38.6	6.4	12.9	19.3	25.7	32.2	.6	0.4	1.0	1.7	2.3	3.0	3.6	4.2	4.9	5.5	6.2
38.7	6.5	12.9	19.4	25.8	32.3	.7	0.4	1.1	1.7	2.4	3.0	3.7	4.3	4.9	5.6	6.2
38.8	6.5	13.0	19.4	25.9	32.4	.8	0.5	1.2	1.8	2.4	3.1	3.7	4.4	5.0	5.6	6.3
38.9	6.5	13.0	19.5	26.0	32.5	.9	0.6	1.2	1.9	2.5	3.1	3.8	4.4	5.1	5.7	6.4
39.0	6.5	13.0	19.5	26.0	32.5	.0	0.0	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.3	5.9
39.1	6.5	13.0	19.5	26.0	32.6	.1	0.1	0.7	1.4	2.0	2.7	3.4	4.0	4.7	5.4	6.0
39.2	6.5	13.0	19.6	26.1	32.6	.2	0.1	0.8	1.4	2.1	2.8	3.4	4.1	4.7	5.4	6.1
39.3	6.5	13.1	19.6	26.2	32.7	.3	0.2	0.9	1.5	2.2	2.8	3.5	4.1	4.8	5.5	6.1
39.4	6.6	13.1	19.7	26.3	32.8	.4	0.3	0.9	1.6	2.2	2.9	3.6	4.2	4.9	5.5	6.2
39.5	6.6	13.2	19.8	26.3	32.9	.5	0.3	1.0	1.6	2.3	3.0	3.6	4.3	4.9	5.6	6.3
39.6	6.6	13.2	19.8	26.4	33.0	.6	0.4	1.1	1.7	2.4	3.0	3.7	4.3	5.0	5.7	6.3
39.7	6.6	13.3	19.9	26.5	33.1	.7	0.5	1.1	1.8	2.4	3.1	3.8	4.4	5.1	5.7	6.4
39.8	6.7	13.3	19.9	26.6	33.2	.8	0.5	1.2	1.8	2.5	3.2	3.8	4.5	5.1	5.8	6.5
39.9	6.7	13.3	20.0	26.6	33.3	.9	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.2	5.9	6.5
40.0	6.6	13.3	20.0	26.6	33.3	.0	0.0	0.7	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.1
40.1	6.7	13.3	20.0	26.7	33.4	.1	0.1	0.7	1.4	2.1	2.8	3.4	4.1	4.8	5.5	6.1
40.2	6.7	13.4	20.1	26.8	33.5	.2	0.1	0.8	1.5	2.2	2.8	3.5	4.2	4.9	5.5	6.2
40.3	6.7	13.4	20.1	26.9	33.6	.3	0.2	0.9	1.6	2.2	2.9	3.6	4.3	4.9	5.6	6.3
40.4	6.7	13.5	20.2	26.9	33.7	.4	0.3	0.9	1.6	2.3	3.0	3.6	4.3	5.0	5.7	6.3
40.5	6.8	13.5	20.3	27.0	33.8	.5	0.3	1.0	1.7	2.4	3.0	3.7	4.4	5.1	5.8	6.5
40.6	6.8	13.5	20.3	27.1	33.8	.6	0.4	1.1	1.8	2.4	3.1	3.8	4.5	5.1	5.8	6.5
40.7	6.8	13.6	20.4	27.2	33.9	.7	0.5	1.1	1.8	2.5	3.2	3.8	4.5	5.2	5.9	6.5
40.8	6.8	13.6	20.4	27.2	34.0	.8	0.5	1.2	1.9	2.6	3.2	3.9	4.6	5.3	5.9	6.6
40.9	6.9	13.7	20.5	27.3	34.1	.9	0.6	1.3	2.0	2.6	3.3	4.0	4.7	5.3	6.0	6.7
41.0	6.8	13.6	20.5	27.3	34.1	.0	0.0	0.7	1.4	2.1	2.8	3.5	4.1	4.8	5.5	6.2
41.1	6.8	13.7	20.5	27.4	34.2	.1	0.1	0.8	1.5	2.1	2.8	3.5	4.2	4.9	5.6	6.3
41.2	6.8	13.7	20.6	27.4	34.3	.2	0.1	0.8	1.5	2.2	2.9	3.6	4.3	5.0	5.7	6.4
41.3	6.9	13.8	20.6	27.5	34.4	.3	0.2	0.9	1.6	2.3	3.0	3.7	4.4	5.0	5.7	6.4
41.4	6.9	13.8	20.7	27.6	34.5	.4	0.3	1.0	1.7	2.4	3.0	3.7	4.4	5.1	5.8	6.5
41.5	6.9	13.8	20.8	27.7	34.6	.5	0.3	1.0	1.7	2.4	3.1	3.8	4.5	5.2	5.9	6.6
41.6	6.9	13.9	20.8	27.7	34.7	.6	0.4	1.1	1.8	2.5	3.2	3.9	4.6	5.3	5.9	6.6
41.7	7.0	13.9	20.9	27.8	34.8	.7	0.5	1.2	1.9	2.6	3.3	3.9	4.6	5.3	6.0	6.7
41.8	7.0	14.0	20.9	27.9	34.9	.8	0.5	1.2	1.9	2.6	3.3	4.0	4.7	5.4	6.1	6.8
41.9	7.0	14.0	21.0	28.0	35.0	.9	0.6	1.3	2.0	2.7	3.4	4.1	4.8	5.5	6.2	6.8
42.0	7.0	14.0	21.0	28.0	35.0	.0	0.0	0.7	1.4	2.1	2.8	3.5	4.2	5.0	5.7	6.4
42.1	7.0	14.0	21.0	28.0	35.1	.1	0.1	0.8	1.5	2.2	2.9	3.6	4.3	5.0	5.7	6.4
42.2	7.0	14.0	21.1	28.1	35.1	.2	0.1	0.8	1.6	2.3	3.0	3.7	4.4	5.1	5.8	6.5
42.3	7.0	14.1	21.1	28.2	35.2	.3	0.2	0.9	1.6	2.3	3.0	3.8	4.5	5.2	5.9	6.6
42.4	7.1	14.1	21.2	28.3	35.3	.4	0.3	1.0	1.7	2.4	3.1	3.8	4.6	5.3	6.0	6.7
42.5	7.1	14.2	21.3	28.3	35.4	.5	0.4	1.1	1.8	2.5	3.2	3.9	4.6	5.3	6.0	6.7
42.6	7.1	14.2	21.3	28.4	35.5	.6	0.4	1.1	1.8	2.5	3.2	4.0	4.7	5.4	6.1	6.8
42.7	7.1	14.3	21.4	28.5	35.6	.7	0.5	1.2	1.9	2.6	3.3	4.0	4.7	5.5	6.2	6.9
42.8	7.2	14.3	21.4	28.6	35.7	.8	0.6	1.3	2.0	2.7	3.4	4.1	4.8	5.6	6.3	7.0
42.9	7.2	14.3	21.5	28.6	35.8	.9	0.6	1.3	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0
43.0	7.1	14.3	21.5	28.6	35.8	.0	0.0	0.7	1.4	2.1	2.9	3.6	4.3	5.1	5.8	6.5
43.1	7.2	14.3	21.5	28.7	35.9	.1	0.1	0.8	1.5	2.2	2.9	3.7	4.4	5.1	5.9	6.6
43.2	7.2	14.4	21.6	28.8	36.0	.2	0.1	0.9	1.6	2.3	3.0	3.8	4.5	5.2	5.9	6.7
43.3	7.2	14.4	21.6	28.9	36.1	.3	0.2	1.0	1.7	2.4	3.1	3.9	4.6	5.3	6.1	6.8
43.4	7.2	14.5	21.7	28.9	36.2	.4	0.3	1.0	1.7	2.5	3.2	3.9	4.6	5.4	6.1	6.8
43.5	7.3	14.5	21.8	29.0	36.3	.5	0.4	1.1	1.8	2.5	3.3	4.0	4.7	5.4	6.2	6.9
43.6	7.3	14.5	21.8	29.1	36.3	.6	0.4	1.2	1.9	2.6	3.3	4.1	4.8	5.5	6.2	7.0
43.7	7.3	14.6	21.9	29.2	36.4	.7	0.5	1.2	2.0	2.7	3.4	4.1	4.9	5.6	6.3	7.0
43.8	7.3	14.6	21.9	29.2	36.5	.8	0.6	1.3	2.0	2.7	3.5	4.2	4.9	5.7	6.4	7.1
43.9	7.4	14.7	22.0	29.3	36.6	.9	0.7	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.4	7.2

Double Second Diff. and Corr. (right half)

36.0–37.9		38.0–39.9		40.0–41.9		42.0–43.9	
0.8		0.9		0.9		1.0	
2.5	0.1	2.6	0.1	2.8	0.1	3.0	0.1
4.2	0.2	4.4	0.2	4.6	0.2	4.9	0.2
5.9	0.3	6.2	0.3	6.5	0.3	6.9	0.3
7.6	0.4	7.9	0.4	8.3	0.4	8.9	0.4
9.3	0.5 / 0.6	9.7	0.5 / 0.6	10.2	0.5 / 0.6	10.8	0.5 / 0.6
11.0	0.7	11.4	0.7	12.0	0.7	12.8	0.7
12.7	0.8	13.2	0.8	13.9	0.8	14.8	0.8
14.4	0.9	14.9	0.9	15.7	0.9	16.7	0.9
16.1	1.0	16.7	1.0	17.6	1.0	18.7	1.0
17.8	1.1	18.5	1.1	19.4	1.1	20.7	1.1
19.5	1.2	20.2	1.2	21.3	1.2	22.7	1.2
21.2	1.3	22.0	1.3	23.1	1.3	24.6	1.3
22.8	1.4	23.7	1.4	25.0	1.4	26.6	1.4
24.5	1.5	25.5	1.5	26.8	1.5	28.6	1.5
26.2	1.6	27.3	1.6	28.7	1.6	30.5	1.6
27.9	1.7	29.0	1.7	30.5	1.7	32.5	1.7
29.6	1.8	30.8	1.8	32.3	1.8	34.5	
31.3	1.9	32.5	1.9	34.2			
33.0	2.0	34.3					
34.7							

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

INTERPOLATION TABLE

Left page (Dec. Inc. 44.0–51.9)

Dec. Inc.	10′	20′	30′	40′	50′	(dec)	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
44.0	7.3	14.6	22.0	29.3	36.6	.0	0.0	0.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7
44.1	7.3	14.7	22.0	29.4	36.7	.1	0.1	0.8	1.6	2.3	3.0	3.8	4.5	5.3	6.0	6.7
44.2	7.3	14.7	22.1	29.4	36.8	.2	0.1	0.9	1.6	2.4	3.1	3.9	4.6	5.3	6.1	6.8
44.3	7.4	14.8	22.1	29.5	36.9	.3	0.2	1.0	1.7	2.4	3.2	3.9	4.7	5.4	6.2	6.9
44.4	7.4	14.8	22.2	29.6	37.0	.4	0.3	1.0	1.8	2.5	3.3	4.0	4.7	5.5	6.2	7.0
44.5	7.4	14.8	22.3	29.7	37.1	.5	0.4	1.1	1.9	2.6	3.3	4.1	4.8	5.6	6.3	7.0
44.6	7.4	14.9	22.3	29.7	37.2	.6	0.4	1.2	1.9	2.7	3.4	4.2	4.9	5.6	6.4	7.1
44.7	7.5	14.9	22.4	29.8	37.3	.7	0.5	1.3	2.0	2.7	3.5	4.2	5.0	5.7	6.5	7.2
44.8	7.5	15.0	22.4	29.9	37.4	.8	0.6	1.3	2.1	2.8	3.6	4.3	5.0	5.8	6.5	7.3
44.9	7.5	15.0	22.5	30.0	37.5	.9	0.7	1.4	2.2	2.9	3.6	4.4	5.1	5.9	6.6	7.3
45.0	7.5	15.0	22.5	30.0	37.5	.0	0.0	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.1	6.8
45.1	7.5	15.0	22.5	30.0	37.6	.1	0.1	0.8	1.6	2.4	3.1	3.9	4.6	5.4	6.1	6.9
45.2	7.5	15.0	22.6	30.1	37.6	.2	0.2	0.9	1.7	2.4	3.2	3.9	4.7	5.5	6.2	7.0
45.3	7.5	15.1	22.6	30.2	37.7	.3	0.2	1.0	1.7	2.5	3.3	4.0	4.8	5.5	6.3	7.1
45.4	7.6	15.1	22.7	30.3	37.8	.4	0.3	1.1	1.8	2.6	3.3	4.1	4.9	5.6	6.4	7.1
45.5	7.6	15.2	22.8	30.3	37.9	.5	0.4	1.1	1.9	2.7	3.4	4.2	4.9	5.7	6.4	7.2
45.6	7.6	15.2	22.8	30.4	38.0	.6	0.5	1.2	2.0	2.7	3.5	4.2	5.0	5.8	6.5	7.3
45.7	7.6	15.3	22.9	30.5	38.1	.7	0.5	1.3	2.0	2.8	3.6	4.3	5.1	5.8	6.6	7.4
45.8	7.7	15.3	22.9	30.6	38.2	.8	0.6	1.4	2.1	2.9	3.6	4.4	5.2	5.9	6.7	7.4
45.9	7.7	15.3	23.0	30.6	38.3	.9	0.7	1.4	2.2	3.0	3.7	4.5	5.2	6.0	6.7	7.5
46.0	7.6	15.3	23.0	30.6	38.3	.0	0.0	0.8	1.5	2.3	3.1	3.9	4.6	5.4	6.2	7.0
46.1	7.7	15.3	23.0	30.7	38.4	.1	0.1	0.9	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1
46.2	7.7	15.4	23.1	30.8	38.5	.2	0.2	0.9	1.7	2.5	3.3	4.0	4.8	5.6	6.4	7.1
46.3	7.7	15.4	23.1	30.9	38.6	.3	0.2	1.0	1.8	2.6	3.3	4.1	4.9	5.7	6.4	7.2
46.4	7.7	15.5	23.2	30.9	38.7	.4	0.3	1.1	1.9	2.6	3.4	4.2	5.0	5.7	6.5	7.3
46.5	7.8	15.5	23.3	31.0	38.8	.5	0.4	1.2	1.9	2.7	3.5	4.3	5.0	5.8	6.6	7.4
46.6	7.8	15.5	23.3	31.1	38.8	.6	0.5	1.2	2.0	2.8	3.5	4.3	5.1	5.9	6.7	7.4
46.7	7.8	15.6	23.4	31.2	38.9	.7	0.5	1.3	2.1	2.9	3.6	4.4	5.2	6.0	6.7	7.5
46.8	7.8	15.6	23.4	31.2	39.0	.8	0.6	1.4	2.2	2.9	3.7	4.5	5.3	6.0	6.8	7.6
46.9	7.9	15.7	23.5	31.3	39.1	.9	0.7	1.5	2.2	3.0	3.8	4.6	5.3	6.1	6.9	7.7
47.0	7.8	15.6	23.5	31.3	39.1	.0	0.0	0.8	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1
47.1	7.8	15.7	23.5	31.4	39.2	.1	0.1	0.9	1.7	2.5	3.2	4.0	4.8	5.6	6.4	7.2
47.2	7.8	15.7	23.6	31.4	39.3	.2	0.2	0.9	1.7	2.5	3.3	4.1	4.9	5.7	6.5	7.3
47.3	7.9	15.8	23.6	31.5	39.4	.3	0.2	1.0	1.8	2.6	3.4	4.2	5.0	5.8	6.6	7.4
47.4	7.9	15.8	23.7	31.6	39.5	.4	0.3	1.1	1.9	2.7	3.5	4.3	5.1	5.9	6.7	7.4
47.5	7.9	15.8	23.8	31.7	39.6	.5	0.4	1.2	2.0	2.8	3.6	4.4	5.1	5.9	6.7	7.5
47.6	7.9	15.9	23.8	31.7	39.7	.6	0.5	1.3	2.1	2.8	3.6	4.4	5.2	6.0	6.8	7.6
47.7	8.0	15.9	23.9	31.8	39.8	.7	0.6	1.3	2.1	2.9	3.7	4.5	5.3	6.1	6.9	7.7
47.8	8.0	16.0	23.9	31.9	39.9	.8	0.6	1.4	2.2	3.0	3.8	4.6	5.4	6.2	7.0	7.8
47.9	8.0	16.0	24.0	32.0	40.0	.9	0.7	1.5	2.3	3.1	3.9	4.7	5.5	6.3	7.0	7.8
48.0	8.0	16.0	24.0	32.0	40.0	.0	0.0	0.8	1.6	2.4	3.2	4.0	4.8	5.7	6.5	7.3
48.1	8.0	16.0	24.0	32.0	40.1	.1	0.1	0.9	1.7	2.5	3.3	4.1	4.9	5.7	6.5	7.3
48.2	8.0	16.0	24.1	32.1	40.1	.2	0.2	1.0	1.8	2.6	3.4	4.2	5.0	5.8	6.6	7.4
48.3	8.0	16.1	24.1	32.2	40.2	.3	0.2	1.1	1.9	2.7	3.5	4.3	5.1	5.9	6.7	7.5
48.4	8.1	16.1	24.2	32.3	40.3	.4	0.3	1.1	1.9	2.7	3.6	4.4	5.2	6.0	6.8	7.6
48.5	8.1	16.2	24.3	32.4	40.4	.5	0.4	1.2	2.0	2.8	3.6	4.5	5.3	6.1	6.9	7.7
48.6	8.1	16.2	24.3	32.4	40.5	.6	0.5	1.3	2.1	2.9	3.7	4.5	5.3	6.1	7.0	7.8
48.7	8.1	16.3	24.4	32.5	40.6	.7	0.6	1.4	2.2	3.0	3.8	4.6	5.4	6.2	7.0	7.8
48.8	8.2	16.3	24.4	32.6	40.7	.8	0.6	1.5	2.3	3.1	3.9	4.7	5.5	6.3	7.1	7.9
48.9	8.2	16.3	24.5	32.6	40.8	.9	0.7	1.5	2.3	3.2	4.0	4.8	5.6	6.4	7.2	8.0
49.0	8.1	16.3	24.5	32.6	40.8	.0	0.0	0.8	1.6	2.5	3.3	4.1	4.9	5.8	6.6	7.4
49.1	8.2	16.3	24.5	32.7	40.9	.1	0.1	0.9	1.7	2.6	3.4	4.2	5.0	5.9	6.7	7.5
49.2	8.2	16.4	24.6	32.8	41.0	.2	0.2	1.0	1.8	2.6	3.5	4.3	5.1	5.9	6.8	7.6
49.3	8.2	16.4	24.6	32.9	41.1	.3	0.2	1.1	1.9	2.7	3.5	4.4	5.2	6.0	6.8	7.7
49.4	8.2	16.5	24.7	32.9	41.2	.4	0.3	1.2	2.0	2.8	3.6	4.5	5.3	6.1	6.9	7.8
49.5	8.3	16.5	24.8	33.0	41.3	.5	0.4	1.2	2.1	2.9	3.7	4.5	5.4	6.2	7.0	7.8
49.6	8.3	16.5	24.8	33.1	41.3	.6	0.5	1.3	2.1	3.0	3.8	4.6	5.4	6.3	7.1	7.9
49.7	8.3	16.6	24.9	33.2	41.4	.7	0.6	1.4	2.2	3.1	3.9	4.7	5.5	6.4	7.2	8.0
49.8	8.3	16.6	24.9	33.2	41.5	.8	0.7	1.5	2.3	3.1	4.0	4.8	5.6	6.4	7.3	8.1
49.9	8.4	16.7	25.0	33.3	41.6	.9	0.7	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.2
50.0	8.3	16.6	25.0	33.3	41.6	.0	0.0	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.6
50.1	8.3	16.7	25.0	33.4	41.7	.1	0.1	0.9	1.8	2.6	3.5	4.3	5.1	6.0	6.8	7.7
50.2	8.3	16.7	25.1	33.4	41.8	.2	0.2	1.0	1.9	2.7	3.5	4.4	5.2	6.1	6.9	7.7
50.3	8.4	16.8	25.1	33.5	41.9	.3	0.3	1.1	1.9	2.8	3.6	4.5	5.3	6.1	7.0	7.8
50.4	8.4	16.8	25.2	33.6	42.0	.4	0.3	1.2	2.0	2.9	3.7	4.5	5.4	6.2	7.1	7.9
50.5	8.4	16.8	25.3	33.7	42.1	.5	0.4	1.3	2.1	2.9	3.8	4.6	5.5	6.3	7.2	8.0
50.6	8.4	16.9	25.3	33.7	42.2	.6	0.5	1.3	2.2	3.0	3.9	4.7	5.6	6.4	7.2	8.1
50.7	8.5	16.9	25.4	33.8	42.3	.7	0.6	1.4	2.3	3.1	4.0	4.8	5.6	6.5	7.3	8.2
50.8	8.5	17.0	25.4	33.9	42.4	.8	0.7	1.5	2.4	3.2	4.0	4.9	5.7	6.6	7.4	8.2
50.9	8.5	17.0	25.5	34.0	42.5	.9	0.8	1.6	2.4	3.3	4.1	5.0	5.8	6.6	7.5	8.3
51.0	8.5	17.0	25.5	34.0	42.5	.0	0.0	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7
51.1	8.5	17.0	25.5	34.0	42.6	.1	0.1	0.9	1.8	2.7	3.5	4.4	5.2	6.1	7.0	7.8
51.2	8.5	17.0	25.6	34.1	42.6	.2	0.2	1.0	1.9	2.7	3.6	4.5	5.3	6.2	7.0	7.9
51.3	8.5	17.1	25.6	34.2	42.7	.3	0.3	1.1	2.0	2.8	3.7	4.5	5.4	6.3	7.1	8.0
51.4	8.6	17.1	25.7	34.3	42.8	.4	0.4	1.2	2.1	2.9	3.8	4.6	5.5	6.4	7.2	8.1
51.5	8.6	17.2	25.8	34.3	42.9	.5	0.4	1.3	2.1	3.0	3.9	4.7	5.6	6.4	7.3	8.2
51.6	8.6	17.2	25.8	34.4	43.0	.6	0.5	1.4	2.2	3.1	3.9	4.8	5.7	6.5	7.4	8.2
51.7	8.6	17.3	25.9	34.5	43.1	.7	0.6	1.5	2.3	3.2	4.0	4.9	5.8	6.6	7.5	8.3
51.8	8.7	17.3	25.9	34.6	43.2	.8	0.7	1.5	2.4	3.3	4.1	5.0	5.8	6.7	7.6	8.4
51.9	8.7	17.3	26.0	34.6	43.3	.9	0.8	1.6	2.5	3.3	4.2	5.1	5.9	6.8	7.6	8.5

Double Second Diff. and Corr. (left page), successive blocks:

Block 44–45: 1.1 / 3.2 → 0.1 / 5.3 → 0.2 / 7.5 → 0.3 / 9.6 → 0.4 / 11.7 → 0.5 / 13.9 → 0.6 / 16.0 → 0.7 / 18.1 → 0.8 / 20.3 → 0.9 / 22.4 → 1.0 / 24.5 → 1.1 / 26.7 → 1.2 / 28.8 → 1.3 / 30.9 → 1.4 / 33.1 → 1.5 / 35.2 → 1.6

Block 46–47: 1.2 / 3.5 → 0.1 / 5.8 → 0.2 / 8.1 → 0.3 / 10.5 → 0.4 / 12.8 → 0.5 / 15.1 → 0.6 / 17.4 → 0.7 / 19.8 → 0.8 / 22.1 → 0.9 / 24.4 → 1.0 / 26.7 → 1.1 / 29.1 → 1.2 / 31.4 → 1.3 / 33.7 → 1.4 / 36.0 → 1.5

Block 47.5–48: 1.3 / 3.8 → 0.1 / 6.3 → 0.2 / 8.9 → 0.3 / 11.4 → 0.4 / 14.0 → 0.5 / 16.5 → 0.6 / 19.0 → 0.7 / 21.6 → 0.8 / 24.1 → 0.9 / 26.7 → 1.0 / 29.2 → 1.1 / 31.7 → 1.2 / 34.3 → 1.3

Block 49: 1.4 / 4.2 → 0.1 / 7.1 → 0.2 / 9.9 → 0.3 / 12.7 → 0.4 / 15.5 → 0.5 / 18.4 → 0.6 / 21.2 → 0.7 / 24.0 → 0.8 / 26.8 → 0.9 / 29.7 → 1.0 / 32.5 → 1.1 / 35.3 → 1.2

Block 50.5–51: 1.6 / 4.8 → 0.1 / 8.0 → 0.2 / 11.2 → 0.3 / 14.5 → 0.4 / 17.7 → 0.5 / 20.9 → 0.6 / 24.1 → 0.7 / 27.3 → 0.8 / 30.5 → 0.9 / 33.7 → 1.0 / 36.9 → 1.1

Right page (Dec. Inc. 52.0–59.9)

Dec. Inc.	10′	20′	30′	40′	50′	(dec)	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
52.0	8.6	17.3	26.0	34.6	43.3	.0	0.0	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9
52.1	8.7	17.3	26.0	34.7	43.4	.1	0.1	1.0	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0
52.2	8.7	17.4	26.1	34.8	43.5	.2	0.2	1.0	1.9	2.8	3.7	4.5	5.4	6.3	7.2	8.0
52.3	8.7	17.4	26.1	34.9	43.6	.3	0.3	1.1	2.0	2.9	3.8	4.6	5.5	6.4	7.3	8.1
52.4	8.7	17.5	26.2	34.9	43.7	.4	0.3	1.2	2.1	3.0	3.8	4.7	5.6	6.5	7.3	8.2
52.5	8.8	17.5	26.3	35.0	43.8	.5	0.4	1.3	2.2	3.1	3.9	4.8	5.7	6.6	7.4	8.3
52.6	8.8	17.5	26.3	35.1	43.8	.6	0.5	1.4	2.3	3.1	4.0	4.9	5.8	6.6	7.5	8.4
52.7	8.8	17.6	26.4	35.2	43.9	.7	0.6	1.5	2.4	3.2	4.1	5.0	5.9	6.7	7.6	8.5
52.8	8.8	17.6	26.4	35.2	44.0	.8	0.7	1.6	2.4	3.3	4.2	5.1	5.9	6.8	7.7	8.6
52.9	8.9	17.7	26.5	35.3	44.1	.9	0.8	1.7	2.5	3.4	4.3	5.2	6.0	6.9	7.8	8.7
53.0	8.8	17.6	26.5	35.3	44.1	.0	0.0	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0
53.1	8.8	17.7	26.5	35.4	44.2	.1	0.1	1.0	1.9	2.8	3.7	4.5	5.4	6.3	7.2	8.1
53.2	8.8	17.7	26.6	35.4	44.3	.2	0.2	1.1	2.0	2.9	3.7	4.6	5.5	6.4	7.3	8.2
53.3	8.9	17.8	26.6	35.5	44.4	.3	0.3	1.2	2.1	2.9	3.8	4.7	5.6	6.5	7.4	8.3
53.4	8.9	17.8	26.7	35.6	44.5	.4	0.4	1.2	2.1	3.0	3.9	4.8	5.7	6.6	7.5	8.4
53.5	8.9	17.8	26.8	35.7	44.6	.5	0.4	1.3	2.2	3.1	4.0	4.9	5.8	6.7	7.6	8.5
53.6	8.9	17.9	26.8	35.7	44.7	.6	0.5	1.4	2.3	3.2	4.1	5.0	5.9	6.8	7.7	8.6
53.7	9.0	17.9	26.9	35.8	44.8	.7	0.6	1.5	2.4	3.3	4.2	5.1	6.0	6.9	7.8	8.7
53.8	9.0	18.0	26.9	35.9	44.9	.8	0.7	1.6	2.5	3.4	4.3	5.2	6.1	7.0	7.8	8.7
53.9	9.0	18.0	27.0	36.0	45.0	.9	0.8	1.7	2.6	3.5	4.4	5.3	6.2	7.0	7.9	8.8
54.0	9.0	18.0	27.0	36.0	45.0	.0	0.0	0.9	1.8	2.7	3.6	4.5	5.4	6.4	7.3	8.2
54.1	9.0	18.0	27.0	36.0	45.1	.1	0.1	1.0	1.9	2.8	3.7	4.6	5.5	6.4	7.3	8.3
54.2	9.0	18.0	27.1	36.1	45.1	.2	0.2	1.1	2.0	2.9	3.8	4.7	5.6	6.5	7.4	8.3
54.3	9.0	18.1	27.1	36.2	45.2	.3	0.3	1.2	2.1	3.0	3.9	4.8	5.7	6.6	7.5	8.4
54.4	9.1	18.1	27.2	36.3	45.3	.4	0.4	1.3	2.2	3.1	4.0	4.9	5.8	6.7	7.6	8.5
54.5	9.1	18.2	27.3	36.3	45.4	.5	0.5	1.4	2.3	3.2	4.1	5.0	5.9	6.8	7.7	8.6
54.6	9.1	18.2	27.3	36.4	45.5	.6	0.6	1.5	2.4	3.2	4.1	5.0	5.9	6.9	7.8	8.7
54.7	9.1	18.3	27.4	36.5	45.6	.7	0.6	1.5	2.5	3.4	4.3	5.2	6.1	7.0	7.9	8.8
54.8	9.2	18.3	27.4	36.6	45.7	.8	0.7	1.6	2.5	3.5	4.4	5.3	6.2	7.1	8.0	8.9
54.9	9.2	18.3	27.5	36.6	45.8	.9	0.8	1.7	2.6	3.5	4.5	5.4	6.3	7.2	8.1	9.0
55.0	9.1	18.3	27.5	36.6	45.8	.0	0.0	0.9	1.8	2.8	3.7	4.6	5.5	6.5	7.4	8.3
55.1	9.2	18.3	27.5	36.7	45.9	.1	0.1	1.0	1.9	2.9	3.8	4.7	5.6	6.6	7.5	8.4
55.2	9.2	18.4	27.6	36.8	46.0	.2	0.2	1.1	2.0	3.0	3.9	4.8	5.7	6.7	7.6	8.5
55.3	9.2	18.4	27.6	36.9	46.1	.3	0.3	1.2	2.1	3.1	4.0	4.9	5.8	6.8	7.7	8.6
55.4	9.2	18.5	27.7	36.9	46.2	.4	0.4	1.3	2.2	3.1	4.1	5.0	5.9	6.8	7.8	8.7
55.5	9.3	18.5	27.8	37.0	46.3	.5	0.5	1.4	2.3	3.2	4.2	5.1	6.0	6.9	7.9	8.8
55.6	9.3	18.5	27.8	37.1	46.3	.6	0.6	1.5	2.4	3.3	4.3	5.2	6.1	7.0	8.0	8.9
55.7	9.3	18.6	27.9	37.2	46.4	.7	0.6	1.6	2.5	3.4	4.3	5.3	6.2	7.1	8.0	9.0
55.8	9.3	18.6	27.9	37.2	46.5	.8	0.7	1.7	2.6	3.5	4.4	5.4	6.3	7.2	8.1	9.1
55.9	9.4	18.7	28.0	37.3	46.6	.9	0.8	1.8	2.7	3.6	4.5	5.5	6.4	7.3	8.2	9.2
56.0	9.3	18.6	28.0	37.3	46.6	.0	0.0	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5
56.1	9.3	18.7	28.0	37.4	46.7	.1	0.1	1.0	2.0	2.9	3.9	4.8	5.7	6.7	7.6	8.6
56.2	9.3	18.7	28.1	37.4	46.8	.2	0.2	1.1	2.1	3.0	4.0	4.9	5.8	6.8	7.7	8.7
56.3	9.4	18.8	28.1	37.5	46.9	.3	0.3	1.2	2.2	3.1	4.0	5.0	5.9	6.9	7.8	8.8
56.4	9.4	18.8	28.2	37.6	47.0	.4	0.4	1.3	2.3	3.2	4.1	5.1	6.0	7.0	7.9	8.9
56.5	9.4	18.8	28.3	37.7	47.1	.5	0.5	1.4	2.4	3.3	4.2	5.2	6.1	7.1	8.0	9.0
56.6	9.4	18.9	28.3	37.7	47.2	.6	0.6	1.5	2.4	3.4	4.3	5.3	6.2	7.2	8.1	9.0
56.7	9.5	18.9	28.4	37.8	47.3	.7	0.7	1.6	2.5	3.5	4.4	5.4	6.3	7.3	8.2	9.1
56.8	9.5	19.0	28.4	37.9	47.4	.8	0.8	1.7	2.6	3.6	4.5	5.5	6.4	7.3	8.3	9.2
56.9	9.5	19.0	28.5	38.0	47.5	.9	0.8	1.8	2.7	3.7	4.6	5.6	6.5	7.4	8.4	9.3
57.0	9.5	19.0	28.5	38.0	47.5	.0	0.0	1.0	1.9	2.8	3.8	4.8	5.7	6.7	7.6	8.6
57.1	9.5	19.0	28.5	38.0	47.6	.1	0.1	1.1	2.0	3.0	3.9	4.9	5.8	6.8	7.8	8.7
57.2	9.5	19.0	28.6	38.1	47.6	.2	0.2	1.1	2.1	3.1	4.0	5.0	5.9	6.9	7.9	8.8
57.3	9.5	19.1	28.6	38.2	47.7	.3	0.3	1.2	2.2	3.2	4.1	5.1	6.0	7.0	8.0	8.9
57.4	9.6	19.1	28.7	38.3	47.8	.4	0.4	1.3	2.3	3.3	4.2	5.2	6.1	7.1	8.1	9.0
57.5	9.6	19.2	28.8	38.3	47.9	.5	0.5	1.4	2.4	3.3	4.3	5.3	6.2	7.2	8.1	9.1
57.6	9.6	19.2	28.8	38.4	48.0	.6	0.6	1.5	2.5	3.4	4.4	5.4	6.3	7.3	8.2	9.2
57.7	9.6	19.3	28.9	38.5	48.1	.7	0.7	1.6	2.6	3.5	4.5	5.5	6.4	7.4	8.3	9.3
57.8	9.7	19.3	28.9	38.6	48.2	.8	0.8	1.7	2.7	3.6	4.6	5.5	6.5	7.5	8.4	9.4
57.9	9.7	19.3	29.0	38.6	48.3	.9	0.9	1.8	2.8	3.7	4.7	5.7	6.6	7.6	8.5	9.5
58.0	9.6	19.3	29.0	38.6	48.3	.0	0.0	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8
58.1	9.7	19.3	29.0	38.7	48.4	.1	0.1	1.1	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9
58.2	9.7	19.4	29.1	38.8	48.5	.2	0.2	1.2	2.1	3.1	4.1	5.1	6.0	7.0	8.0	9.0
58.3	9.7	19.4	29.1	38.9	48.6	.3	0.3	1.3	2.2	3.2	4.2	5.2	6.1	7.1	8.1	9.1
58.4	9.7	19.5	29.2	38.9	48.7	.4	0.4	1.4	2.3	3.3	4.3	5.3	6.2	7.2	8.2	9.2
58.5	9.8	19.5	29.3	39.0	48.8	.5	0.5	1.5	2.4	3.4	4.4	5.4	6.3	7.3	8.3	9.3
58.6	9.8	19.5	29.3	39.1	48.8	.6	0.6	1.6	2.5	3.5	4.5	5.5	6.4	7.4	8.4	9.4
58.7	9.8	19.6	29.4	39.2	48.9	.7	0.7	1.7	2.6	3.6	4.6	5.6	6.5	7.5	8.5	9.5
58.8	9.8	19.6	29.4	39.2	49.0	.8	0.8	1.8	2.7	3.7	4.7	5.7	6.6	7.6	8.6	9.6
58.9	9.9	19.7	29.5	39.3	49.1	.9	0.9	1.9	2.8	3.8	4.8	5.8	6.7	7.7	8.7	9.7
59.0	9.8	19.6	29.5	39.3	49.1	.0	0.0	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9
59.1	9.8	19.7	29.5	39.4	49.2	.1	0.1	1.1	2.1	3.1	4.1	5.1	6.0	7.0	8.0	9.0
59.2	9.8	19.7	29.6	39.4	49.3	.2	0.2	1.2	2.2	3.2	4.2	5.2	6.1	7.1	8.1	9.1
59.3	9.9	19.8	29.6	39.5	49.4	.3	0.3	1.3	2.3	3.3	4.3	5.3	6.2	7.2	8.2	9.2
59.4	9.9	19.8	29.7	39.6	49.5	.4	0.4	1.4	2.4	3.3	4.3	5.3	6.3	7.3	8.3	9.3
59.5	9.9	19.8	29.8	39.7	49.6	.5	0.5	1.5	2.5	3.5	4.5	5.5	6.4	7.4	8.4	9.4
59.6	9.9	19.9	29.8	39.7	49.7	.6	0.6	1.6	2.6	3.6	4.6	5.6	6.5	7.5	8.5	9.5
59.7	10.0	19.9	29.9	39.8	49.8	.7	0.7	1.7	2.7	3.7	4.7	5.7	6.6	7.6	8.6	9.6
59.8	10.0	20.0	29.9	39.9	49.9	.8	0.8	1.8	2.8	3.8	4.8	5.8	6.7	7.7	8.7	9.7
59.9	10.0	20.0	30.0	40.0	50.0	.9	0.9	1.9	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8

Double Second Diff. and Corr. (right page), successive blocks:

Block 52: 1.8 / 5.5 → 0.1 / 9.1 → 0.2 / 12.8 → 0.3 / 16.5 → 0.4 / 20.1 → 0.5 / 23.8 → 0.6 / 27.4 → 0.7 / 31.1 → 0.8 / 34.7 → 0.9

Block 53: 2.1 / 6.2 → 0.1 / 10.4 → 0.2 / 14.5 → 0.3 / 18.6 → 0.4 / 22.8 → 0.5 / 26.9 → 0.6 / 31.1 → 0.7 / 35.2 → 0.8

Block 54: 2.4 / 7.2 → 0.1 / 12.0 → 0.2 / 16.8 → 0.3 / 21.6 → 0.4 / 26.4 → 0.5 / 31.2 → 0.6 / 36.0 → 0.7

Block 55: 2.9 / 8.6 → 0.1 / 14.4 → 0.2 / 20.2 → 0.3 / 25.9 → 0.4 / 31.7 → 0.5 / 37.5 → 0.6

Block 56: 3.6 / 10.9 → 0.1 / 18.2 → 0.2 / 25.5 → 0.3 / 32.8 → 0.4 / 40.1 → 0.5

Block 57: 5.0 / 15.0 → 0.1 / 25.0 → 0.2 / 35.1 → 0.3

Block 58: 8.2 / 24.6 → 0.1 / 41.0 → 0.2

Block 59: 16.2 / 48.6 → 0.1

Block (bottom): 0.0 / 48.2 → 0.0

The Double-Second-Difference correction (Corr.) is always to be added to the tabulated altitude.

PREFACE

This six-volume series of *Sight Reduction Tables for Marine Navigation* is designed to facilitate the practice of celestial navigation at sea by the Marcq Saint Hilaire or intercept method.

The tabular data are the solutions of the navigational triangle of which two sides and the included angle are known and it is necessary to find the values of the third side and adjacent angle.

The tables, intended for use with *The Nautical Almanac*, are designed for precise interpolation of altitude for declination by means of interpolation tables which facilitate linear interpolation and provide additionally for the effect of second differences when required.

The diagrams for additional interpolation of the altitude for latitude and local hour angle increments, which were in each volume of the first printing of the tables, have been omitted from the reprint of this volume.

The concept, design, development, and preparation of these tables are the results of the collaborative efforts and joint accomplishments of the National Imagery and Mapping Agency, the U.S. Naval Observatory, and Her Majesty's Nautical Almanac Office, Royal Greenwich Observatory. The tabular material in identical format has been published in the United Kingdom by the Hydrographic Department, Ministry of Defence (Navy), as N.P. 401.

This reprint was compiled on a Hewlett Packard K420 server with an HP C180 client workstation, and was composed in its entirety as a digital document.

Users should refer corrections, additions, and comments for improving this product to:

MARITIME SAFETY INFORMATION CENTER
ST D 44
NATIONAL IMAGERY AND MAPPING AGENCY
4600 SANGAMORE ROAD
BETHESDA MD 20816-5003

CONTENTS

INTRODUCTION

A. DESCRIPTION OF TABLES

1. Purpose and Scope. The main purpose of these tables is to facilitate the practice of celestial navigation at sea. A secondary purpose is to provide, within the limitations of the tabular precision and interval, a table of the solutions of a spherical triangle of which two sides and the included angle are known and it is necessary to find the values of the third side and adjacent angle.

The tables have been designed primarily for use with the Marcq Saint Hilaire or intercept method of sight reduction, utilizing a position assumed or chosen so that interpolation for latitude and local hour angle is not required.

For entering arguments of integral degrees of latitude, declination, and local hour angle, altitudes and their differences are tabulated to the nearest tenth of a minute, azimuth angles to the nearest tenth of a degree. But the tables are designed for precise interpolation of altitude for declination only by means of interpolation tables which facilitate linear interpolation and provide additionally for the effect of second differences.

The data are applicable to the solutions of sights of all celestial bodies; there are no limiting values of altitude, latitude, hour angle, or declination.

2. Arrangement. The tables are divided into six volumes, each of which includes two eight-degree zones of latitude. An overlap of 1° occurs between volumes. The six volumes cover latitude bands 0° to 15°, 15° to 30°, 30° to 45°, 45° to 60°, 60° to 75°, and 75° to 90°.

Each consecutive opening of the pages of a latitude zone differs from the preceding one by 1° of local hour angle (LHA). As shown in figures 1 and 2, the values of LHA are prominently displayed at the top and bottom of each page; the horizontal argument heading each column is latitude, and the vertical argument is declination.

For each combination of arguments, the tabulations are: the tabular altitude (ht or Tab. Hc), the altitude difference (d) with its sign, and the azimuth angle (Z).

Within each opening, the data on the left-hand page are the altitudes, altitude differences, and azimuth angles of celestial bodies when the latitude of the observer has the same name as the declinations of the bodies. For any LHA tabulated on a left-hand page and any combination of the tabular latitude and declination arguments, the tabular altitude and associated azimuth angle respondents on the left-hand page are those of a body above the celestial horizon of the observer.

The LHA's tabulated on the left-hand pages are limited to the following ranges: 0° increasing to 90° and 360° decreasing to 270°. On any left-hand page there are two tabulated LHA's, one LHA in the range 0° increasing to 90° and the second in the range 360° decreasing to 270°.

On the right-hand page of each opening, the data above the horizontal rules are the tabular altitudes, altitude differences, and azimuth angles of celestial bodies above the celestial horizon when the latitude of the observer has a name contrary to the name of the declinations of the bodies and the LHA's of the bodies are those tabulated at the top of the page. The data below the horizontal rules are the tabular altitudes, altitude differences, and azimuth angles of celestial bodies above the celestial horizon when the latitude of the observer has the same name as the declinations of the bodies and the LHA's of the bodies are those tabulated at the bottom of the page.

The LHA's tabulated at the top of a right-hand page are the same as those tabulated on the left-hand page of the opening. The LHA's tabulated at the bottom of the right-hand page are limited to the range 90° increasing to 270°; one of the two LHA's at the bottom of the page is in the range 90° increasing to 180°; the other LHA is in the range 180° increasing to 270°; the LHA in the range 90° increasing to 180° is the supplement of the LHA at the top of the page in the range 0° increasing to 90°. When the LHA is 90°, the left and right-hand pages are identical.

The horizontal rules, known as the Contrary-Same Line or C-S Line, indicate the degree of declination in which the celestial horizon occurs.

60°, 300° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	45°			46°			47°			48°			49°			50°			51°			52°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	20 42.3	+45.3	112.2	20 19.4	+46.0	112.6	19 56.3	+46.6	112.9	19 32.8	+47.2	113.2	19 09.0	+47.8	113.5	18 44.8	+48.5	113.9	18 20.4	+49.1	114.2	17 55.7	+49.7	114.5	0
1	21 27.6	+45.0	111.5	21 05.4	+45.8	111.9	20 42.9	+46.4	112.2	20 20.0	+47.1	112.6	19 56.8	+47.8	112.9	19 33.3	+48.4	113.2	19 09.5	+48.9	113.6	18 45.4	+49.5	113.9	1
2	22 12.6	+45.0	110.8	21 51.2	+45.6	111.2	21 29.3	+46.3	111.5	21 07.1	+46.9	111.9	20 44.6	+47.5	112.3	20 21.7	+48.2	112.6	19 58.4	+48.8	112.9	19 34.9	+49.4	113.3	2
3	22 57.6	+44.7	110.1	22 36.8	+45.4	110.5	22 15.6	+46.1	110.9	21 54.0	+46.8	111.2	21 32.1	+47.5	111.6	21 09.9	+48.0	112.0	20 47.2	+48.7	112.3	20 24.3	+49.3	112.7	3
4	23 42.3	+44.5	109.3	23 22.2	+45.2	109.8	23 01.7	+45.9	110.2	22 40.8	+46.6	110.6	22 19.6	+47.2	110.9	21 57.9	+47.9	111.3	21 35.9	+48.6	111.7	21 13.6	+49.1	112.1	4
5	24 26.8	+44.3	108.6	24 07.4	+45.0	109.0	23 47.6	+45.7	109.5	23 27.4	+46.4	109.9	23 06.8	+47.1	110.3	22 45.8	+47.8	110.7	22 24.5	+48.4	111.1	22 02.7	+49.0	111.4	5
6	25 11.1	+44.0	107.9	24 52.4	+44.8	108.3	24 33.3	+45.6	108.8	24 13.8	+46.3	109.2	23 53.9	+46.9	109.6	23 33.6	+47.6	110.0	23 12.9	+48.2	110.4	22 51.7	+48.9	110.8	6
7	25 55.1	+43.8	107.1	25 37.2	+44.6	107.6	25 18.9	+45.3	108.0	25 00.1	+46.0	108.5	24 40.8	+46.8	108.9	24 21.2	+47.4	109.3	24 01.1	+48.1	109.8	23 40.6	+48.7	110.2	7
8	26 38.9	+43.6	106.4	26 21.8	+44.3	106.8	26 04.2	+45.1	107.3	25 46.1	+45.8	107.8	25 27.6	+46.5	108.2	25 08.6	+47.2	108.7	24 49.2	+47.8	109.1	24 29.3	+48.5	109.5	8
9	27 22.5	+43.3	105.6	27 06.1	+44.1	106.1	26 49.3	+44.8	106.6	26 31.9	+45.6	107.0	26 14.1	+46.3	107.5	25 55.8	+47.0	108.0	25 37.0	+47.7	108.4	25 17.8	+48.4	108.9	9
10	28 05.8	+43.1	104.8	27 50.2	+43.9	105.3	27 34.1	+44.7	105.8	27 17.5	+45.4	106.3	27 00.4	+46.1	106.8	26 42.8	+46.8	107.3	26 24.7	+47.6	107.8	26 06.2	+48.2	108.2	10
11	28 48.9	+42.8	104.0	28 34.1	+43.6	104.5	28 18.8	+44.3	105.1	28 02.9	+45.1	105.6	27 46.5	+45.9	106.1	27 29.6	+46.7	106.6	27 12.3	+47.3	107.1	26 54.4	+48.0	107.6	11
12	29 31.7	+42.4	103.2	29 17.7	+43.3	103.8	29 03.1	+44.1	104.3	28 48.0	+44.9	104.8	28 32.4	+45.6	105.4	28 16.3	+46.3	105.9	27 59.6	+47.1	106.4	27 42.4	+47.8	106.9	12
13	30 14.1	+42.2	102.4	30 01.0	+43.0	103.0	29 47.2	+43.8	103.5	29 32.9	+44.6	104.1	29 18.0	+45.4	104.6	29 02.6	+46.2	105.2	28 46.7	+46.9	105.7	28 30.2	+47.6	106.2	13
14	30 56.3	+41.9	101.6	30 44.0	+42.7	102.2	30 31.0	+43.6	102.7	30 17.5	+44.3	103.3	30 03.4	+45.1	103.9	29 48.8	+45.9	104.4	29 33.6	+46.6	105.0	29 17.8	+47.3	105.5	14
15	31 38.2	+41.5	100.7	31 26.7	+42.4	101.3	31 14.6	+43.2	101.9	31 01.9	+44.0	102.5	30 48.6	+44.8	103.1	30 34.7	+45.6	103.7	30 20.2	+46.4	104.3	30 05.1	+47.2	104.8	15
16	32 19.7	+41.1	99.9	32 09.1	+42.0	100.5	31 57.8	+42.9	101.1	31 45.9	+43.8	101.7	31 33.4	+44.6	102.3	31 20.3	+45.4	102.9	31 06.6	+46.1	103.5	30 52.3	+46.9	104.1	16
17	33 00.8	+40.8	99.0	32 51.1	+41.7	99.7	32 40.7	+42.6	100.3	32 29.7	+43.3	100.9	32 18.0	+44.3	101.5	32 05.7	+45.1	102.2	31 52.7	+45.9	102.8	31 39.2	+46.6	103.4	17
18	33 41.6	+40.5	98.1	33 32.8	+41.3	98.8	33 23.3	+42.2	99.4	33 13.1	+43.1	100.1	33 02.3	+43.9	100.7	32 50.8	+44.8	101.4	32 38.6	+45.6	102.0	32 25.8	+46.4	102.6	18
19	34 22.1	+40.0	97.2	34 14.1	+41.0	97.9	34 05.5	+41.9	98.6	33 56.2	+42.8	99.3	33 46.2	+43.7	99.9	33 35.6	+44.4	100.6	33 24.2	+45.3	101.2	33 12.2	+46.1	101.9	19
20	35 02.1	+39.6	96.3	34 55.1	+40.6	97.0	34 47.4	+41.5	97.7	34 39.0	+42.4	98.4	34 29.9	+43.3	99.1	34 20.0	+44.2	99.8	34 09.5	+45.0	100.4	33 58.3	+45.8	101.1	20
21	35 41.7	+39.2	95.4	35 35.7	+40.1	96.1	35 28.9	+41.1	96.8	35 21.4	+42.0	97.5	35 13.2	+42.9	98.2	35 04.2	+43.8	98.9	34 54.5	+44.7	99.6	34 44.1	+45.5	100.3	21
22	36 20.9	+38.8	94.5	36 15.8	+39.8	95.2	36 10.0	+40.7	95.9	36 03.4	+41.7	96.7	35 56.1	+42.5	97.4	35 48.0	+43.5	98.1	35 39.2	+44.3	98.8	35 29.6	+45.2	99.5	22
23	36 59.7	+38.2	93.5	36 55.6	+39.3	94.3	36 50.7	+40.3	95.0	36 45.1	+41.2	95.8	36 38.6	+42.2	96.5	36 31.5	+43.0	97.3	36 23.5	+44.0	98.0	36 14.8	+44.8	98.7	23
24	37 37.9	+37.8	92.6	37 34.9	+38.8	93.3	37 31.0	+39.8	94.1	37 26.3	+40.8	94.9	37 20.8	+41.8	95.6	37 14.5	+42.7	96.4	37 07.5	+43.6	97.1	36 59.6	+44.5	97.9	24
25	38 15.7	+37.3	91.6	38 13.7	+38.3	92.4	38 10.8	+39.4	93.1	38 07.1	+40.3	93.9	38 02.6	+41.3	94.7	37 57.2	+42.3	95.5	37 51.1	+43.2	96.3	37 44.1	+44.2	97.0	25
26	38 53.0	+36.8	90.6	38 52.0	+37.9	91.4	38 50.2	+38.8	92.2	38 47.4	+39.9	93.0	38 43.9	+40.9	93.8	38 39.5	+41.9	94.6	38 34.3	+42.8	95.4	38 28.3	+43.7	96.2	26
27	39 29.8	+36.3	89.6	39 29.9	+37.3	90.4	39 29.0	+38.4	91.2	39 27.3	+39.4	92.0	39 24.8	+40.4	92.8	39 21.4	+41.4	93.7	39 17.1	+42.4	94.5	39 12.0	+43.3	95.3	27
28	40 06.1	+35.6	88.5	40 07.2	+36.7	89.4	40 07.4	+37.8	90.2	40 06.7	+38.9	91.0	40 05.2	+39.9	91.8	40 02.8	+40.9	92.7	39 59.5	+41.9	93.6	39 55.3	+42.9	94.4	28
29	40 41.7	+35.1	87.5	40 43.9	+36.2	88.3	40 45.2	+37.3	89.2	40 45.6	+38.4	90.0	40 45.1	+39.5	90.9	40 43.7	+40.5	91.8	40 41.4	+41.5	92.6	40 38.2	+42.5	93.5	29
30	41 16.8	+34.5	86.4	41 20.1	+35.6	87.3	41 22.5	+36.7	88.1	41 24.0	+37.8	89.0	41 24.6	+38.9	89.9	41 24.2	+40.0	90.8	41 22.9	+41.0	91.7	41 20.7	+42.0	92.5	30
31	41 51.3	+33.8	85.3	41 55.7	+35.0	86.2	41 59.2	+36.2	87.1	42 01.8	+37.3	88.0	42 03.5	+38.3	88.9	42 04.2	+39.4	89.8	42 03.9	+40.5	90.7	42 02.7	+41.5	91.6	31
32	42 25.1	+33.2	84.2	42 30.7	+34.4	85.1	42 35.4	+35.5	86.0	42 39.1	+36.6	86.9	42 41.8	+37.8	87.8	42 43.6	+38.9	88.7	42 44.4	+39.9	89.7	42 44.2	+41.0	90.6	32
33	42 58.3	+32.5	83.0	43 05.1	+33.7	84.0	43 10.9	+34.8	84.9	43 15.7	+36.0	85.8	43 19.6	+37.1	86.8	43 22.5	+38.2	87.7	43 24.3	+39.4	88.7	43 25.2	+40.5	89.6	33
34	43 30.8	+31.8	81.9	43 38.8	+32.9	82.8	43 45.7	+34.2	83.8	43 51.7	+35.4	84.7	43 56.7	+36.6	85.7	44 00.7	+37.7	86.7	44 03.7	+38.8	87.6	44 05.7	+39.9	88.6	34
35	44 02.6	+31.0	80.7	44 11.7	+32.3	81.7	44 19.9	+33.5	82.6	44 27.1	+34.7	83.6	44 33.3	+35.9	84.6	44 38.4	+37.1	85.6	44 42.5	+38.2	86.6	44 45.6	+39.4	87.5	35
36	44 33.6	+30.3	79.5	44 44.0	+31.6	80.5	44 53.4	+32.8	81.5	45 01.8	+34.0	82.5	45 09.2	+35.2	83.5	45 15.5	+36.4	84.5	45 20.7	+37.6	85.5	45 25.0	+38.7	86.5	36
37	45 03.9	+29.5	78.3	45 15.6	+30.7	79.3	45 26.2	+32.0	80.3	45 35.8	+33.3	81.3	45 44.4	+34.4	82.3	45 51.9	+35.7	83.3	45 58.3	+36.9	84.4	46 03.7	+38.0	85.4	37
38	45 33.4	+28.7	77.1	45 46.3	+30.0	78.1	45 58.2	+31.2	79.1	46 09.1	+32.4	80.1	46 18.8	+33.8	81.1	46 27.6	+34.9	82.2	46 35.2	+36.2	83.2	46 41.7	+37.4	84.3	38
39	46 02.1	+27.8	75.8	46 16.3	+29.1	76.8	46 29.4	+30.5	77.8	46 41.5	+31.7	78.9	46 52.6	+33.0	79.9	47 02.5	+34.3	81.0	47 11.4	+35.5	82.0	47 19.1	+36.7	83.1	39
40	46 29.9	+27.0	74.5	46 45.4	+28.	75.5														+34.7	80.9	47 55.8	+36.0	81.9	40
41	46 56.9	+26.0	73.2	47 13.7	+27.															+33.9	79.6	48 31.8	+35.2	80.7	41
42	47 22.9	+25.2	71.9	47 41.1	+26.															+33.1	78.4	49 07.0	+34.4	79.5	42
43	47 48.1	+24.1	70.5	48 07.5	+25.															+32.2	77.1	49 41.4	+33.6	78.3	43
44	48 12.2	+23.2	69.2	48 33.0	+24.															+31.4	75.8	50 15.0	+32.6	77.0	44
45	48 35.4	+22.2	67.8	48 57.6	+23.															+30.4	74.5	50 47.6	+31.8	75.6	45
46	48 57.6	+21.1	66.4	49 21.1	+22.															+29.4	73.1	51 19.4	+30.8	74.3	46
47	49 18.7	+20.0	65.0	49 43.6	+21.															+28.4	71.7	51 50.2	+29.8	72.9	47
48	49 38.7	+19.0	63.5	50 05.0	+20.															+27.4	70.3	52 20.0	+28.8	71.5	48
49	49 57.7	+17.8	62.0	50 25.3	+19.															+26.2	68.8	52 48.8	+27.7	70.1	49
50	50 15.5	+16.7	60.5	50 44.5	+18.															+25.2	67.3	53 16.5	+26.6	68.6	50
51	50 32.2	+15.4	59.0	51 02.6	+16.															+23.9	65.8	53 43.1	+25.5	67.1	51
52	50 47.6	+14.3	57.5	51 19.4	+15.															+22.8	64.3	54 08.6	+24.2	65.5	52
53	51 01.9	+13.0	56.0	51 35.0	+14.															+21.5	62.7	54 32.8	+23.0	64.0	53
54	51 14.9	+11.8	54.4	51 49.4	+13.															+20.2	61.1	54 55.8	+21.7	62.4	54
55	51 26.7	+10.6	52.8	52 02.6	+11.															+18.9	59.5	55 17.5	+20.4	60.7	55
56	51 37.3	+9.2	51.3	52 14.4	+10.															+17.6	58.0	55 37.9	+19.0	59.1	56
57	51 46.5	+7.9	49.7	52 24.9	+9.															+16.1	56.2	55 56.9	+17.6	57.4	57
58	51 54.4	+6.7	48.1	52 34.2	+7.															+14.7	54.5	56 14.5	+16.2	55.7	58
59	52 01.1	+5.3	46.4	52 42.1	+6.															+13.2	52.7	56 30.7	+14.7	53.9	59
60	52 06.4	+3.9	44.8	52 48.6	+5.															+11.8	51.0	56 45.4	+13.2	52.2	60
61	52 10.3	+2.6	43.2	52 53.7	+3.															+10.2	49.2	56 58.6	+11.6	50.4	61
62	52 12.9	+1.3	41.6	52 57.5	+2.															+8.7	47.4	57 10.2	+10.1	48.6	62
63	52 14.2	-0.1	39.9	52 59.9	+1.															+7.1	45.7	57 20.3	+8.5	46.8	63
64	52 14.1	-1.4	38.3	53 00.9	-0.															+5.6	43.8	57 28.8	+6.9	44.9	64
65	52 12.7	-2.8	36.7	53 00.5	-1.															+3.9	42.0	57 35.7	+5.2	43.1	65
66	52 09.9	-4.1	35.0	52 58.3	-2.															+2.4	40.2	57 40.9	+3.6	41.2	66
67	52 05.8	-5.5	33.4	52 55.6	-4.															+0.7	38.4	57 44.5	+1.9	39.3	67
68	52 00.3	-6.8	31.8	52 51.1	-5.															-0.9	36.5	57 46.4	+0.3	37.5	68
69	51 53.5	-8.1	30.2	52 45.2	-7.															-2.5	34.7	57 46.7	-1.4	35.6	69
70	51 45.4	-9.4	28.6	52 37.9	-8.															-4.1	32.9	57 45.3	-3.1	33.7	70
71	51 36.0	-10.7	27.0	52 29.3	-10.															-5.6	31.0	57 42.2	-4.7	31.9	71
72	51 25.3	-12.0	25.4	52 19.3	-11.															-7.3	29.2	57 37.5	-6.3	30.0	72
73	51 13.3	-13.2	23.8	52 08.1	-12.															-8.8	27.4	57 31.2	-8.0	28.1	73
74	51 00.1	-14.4	22.3	51 55.5	-13.															-10.4	25.6	57 23.2	-9.5	26.3	74
75	50 45.7	-15.6	20.8	51 41.7	-15.															-11.8	23.8	57 13.7	-11.1	24.5	75
76	50 30.1	-16.9	19.2	51 26.6	-16.															-13.4	22.1	57 02.6	-12.7	22.7	76
77	50 13.2	-17.9	17.7	51 10.3	-17.															-14.8	20.3	56 49.9	-14.2	20.9	77
78	49 55.3	-19.1	16.2	50 52.8	-18.															-16.3	18.6	56 35.7	-15.7	19.1	78
79	49 36.2	-20.2	14.8	50 34.2	-19.															-17.6	16.9	56 20.0	-17.2	17.3	79
80	49 16.0	-21.2	13.3	50 14.4	-21.															-19.0	15.2	56 02.8	-18.6	15.6	80
81	48 54.8	-22.3	11.9	49 53.4	-22.															-20.4	13.6	55 44.2	-19.9	13.9	81
82	48 32.5	-23.3	10.5	49 31.4	-23.															-21.6	12.0	55 24.3	-21.3	12.3	82
83	48 09.2	-24.3	9.1	49 08.4	-24.															-22.9	10.4	55 03.0	-22.6	10.6	83
84	47 44.9	-25.3	7.7	48 44.3	-25.1	7.9	49 43.7	-24.9	8.1	50 43.1	-24.7	8.2	51 42.5	-24.5	8.4	52 41.8	-24.3	8.6	53 41.1	-24.0	8.8	54 40.4	-23.8	9.0	84
85	47 19.6	-26.2	6.4	48 19.2	-26.0	6.5	49 18.8	-25.9	6.6	50 18.4	-25.7	6.8	51 18.0	-25.6	6.9	52 17.5	-25.4	7.1	53 17.1	-25.3	7.3	54 16.6	-25.1	7.4	85
86	46 53.4	-27.1	5.1	47 53.2	-27.0	5.2	48 52.9	-26.8	5.3	49 52.7	-26.8	5.4	50 52.4	-26.6	5.5	51 52.1	-26.5	5.6	52 51.8	-26.3	5.7	53 51.5	-26.2	5.9	86
87	46 26.3	-27.9	3.8	47 26.2	-27.9	3.8	48 26.1	-27.8	3.9	49 25.9	-27.7	4.0	50 25.8	-27.7	4.1	51 25.6	-27.5	4.2	52 25.5	-27.4	4.3	53 25.3	-27.4	4.4	87
88	45 58.4	-28.8	2.5	46 58.3	-28.7	2.5	47 58.3	-28.7	2.6	48 58.2	-28.6	2.6	49 58.1	-28.6	2.7	50 58.1	-28.6	2.8	51 58.0	-28.5	2.8	52 57.9	-28.4	2.9	88
89	45 29.6	-29.6	1.2	46 29.6	-29.6	1.3	47 29.6	-29.6	1.3	48 29.6	-29.6	1.3	49 29.6	-29.6	1.3	50 29.5	-29.5	1.4	51 29.5	-29.5	1.4	52 29.5	-29.5	1.4	89
90	45 00.0	-30.4	0.0	46 00.0	-30.4	0.0	47 00.0	-30.4	0.0	48 00.0	-30.4	0.0	49 00.0	-30.4	0.0	50 00.0	-30.5	0.0	51 00.0	-30.5	0.0	52 00.0	-30.5	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

FIGURE 1
VI

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 60°, 300°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	20 42.3	−45.5	112.2	20 19.4	−46.1	112.6	19 56.3	−46.8	112.9	19 32.8	−47.4	113.2	19 09.0	−48.0	113.5	18 44.8	−48.6	113.9	18 20.4	−49.2	114.2	17 55.7	−49.7	114.5	0
1	19 56.8	−45.6	112.9	19 33.3	−46.2	113.2	19 09.5	−46.9	113.6	18 45.4	−47.5	113.9	18 21.0	−48.2	114.2	17 56.2	−48.7	114.5	17 31.2	−49.3	114.8	17 06.0	−49.9	115.0	1
2	19 11.2	−45.7	113.6	18 47.1	−46.4	113.9	18 22.6	−47.0	114.2	17 57.9	−47.7	114.5	17 32.8	−48.2	114.8	17 07.5	−48.8	115.1	16 41.9	−49.3	115.4	16 16.1	−49.9	115.6	2
3	18 25.5	−45.9	114.3	18 00.7	−46.6	114.6	17 35.6	−47.2	114.9	17 10.2	−47.7	115.2	16 44.6	−48.3	115.5	16 18.7	−48.9	115.7	15 52.6	−49.5	116.0	15 26.2	−50.0	116.2	3
4	17 39.6	−46.0	115.0	17 14.1	−46.6	115.2	16 48.4	−47.2	115.5	16 22.5	−47.9	115.8	15 56.2	−48.4	116.0	15 29.8	−49.1	116.3	15 03.1	−49.6	116.5	14 36.2	−50.2	116.8	4
5	16 53.6	−46.2	115.6	16 27.5	−46.8	115.9	16 01.2	−47.4	116.2	15 34.6	−48.0	116.4	15 07.8	−48.6	116.7	14 40.7	−49.1	116.9	14 13.5	−49.7	117.1	13 46.0	−50.1	117.3	5
6	16 07.4	−46.3	116.3	15 40.7	−46.9	116.5	15 13.8	−47.5	116.8	14 46.6	−48.1	117.0	14 19.2	−48.6	117.3	13 51.6	−49.2	117.5	13 23.8	−49.7	117.7	12 55.9	−50.3	117.9	6
7	15 21.1	−46.4	117.0	14 53.8	−47.0	117.2	14 26.3	−47.6	117.4	13 58.5	−48.1	117.7	13 30.6	−48.8	117.9	13 02.4	−49.2	118.1	12 34.1	−49.8	118.3	12 05.6	−50.3	118.5	7
8	14 34.7	−46.5	117.6	14 06.8	−47.1	117.8	13 38.7	−47.7	118.1	13 10.4	−48.3	118.3	12 41.8	−48.8	118.5	12 13.2	−49.4	118.7	11 44.3	−49.9	118.8	11 15.3	−50.4	119.0	8
9	13 48.2	−46.6	118.3	13 19.7	−47.2	118.5	12 51.0	−47.8	118.7	12 22.1	−48.3	118.9	11 53.3	−49.0	119.2	11 23.8	−49.4	119.2	10 54.4	−49.9	119.4	10 24.9	−50.5	119.6	9
10	13 01.6	−46.7	118.9	12 32.5	−47.3	119.1	12 03.2	−47.9	119.3	11 33.8	−48.5	119.5	11 04.1	−48.9	119.7	10 34.4	−49.5	119.8	10 04.5	−50.0	120.0	9 34.4	−50.5	120.1	10
11	12 14.9	−46.9	119.6	11 45.2	−47.4	119.7	11 15.3	−47.9	119.9	10 45.3	−48.4	120.1	10 15.2	−49.0	120.2	9 44.9	−49.5	120.4	9 14.5	−50.1	120.5	8 43.9	−50.5	120.7	11
12	11 28.0	−46.8	120.2	10 57.8	−47.5	120.4	10 27.4	−48.0	120.5	9 56.9	−48.6	120.7	9 26.2	−49.1	120.8	8 55.4	−49.6	121.0	8 24.4	−50.1	121.1	7 53.4	−50.6	121.2	12
13	10 41.2	−47.0	120.8	10 10.3	−47.5	121.0	9 39.4	−48.1	121.1	9 08.3	−48.6	121.3	8 37.1	−49.1	121.4	8 05.8	−49.7	121.5	7 34.3	−50.1	121.7	7 02.8	−50.6	121.8	13
14	9 54.2	−47.0	121.5	9 22.8	−47.6	121.6	8 51.3	−48.1	121.7	8 19.7	−48.7	121.9	7 48.0	−49.2	122.0	7 16.1	−49.7	122.1	6 44.2	−50.2	122.2	6 12.2	−50.7	122.3	14
15	9 07.2	−47.1	122.1	8 35.2	−47.6	122.2	8 03.2	−48.2	122.3	7 31.0	−48.7	122.5	6 58.8	−49.2	122.6	6 26.4	−49.7	122.7	5 54.0	−50.2	122.8	5 21.5	−50.7	122.8	15
16	8 20.1	−47.2	122.7	7 47.6	−47.7	122.8	7 15.0	−48.2	122.9	6 42.3	−48.7	123.0	6 09.6	−49.3	123.1	5 36.7	−49.8	123.2	5 03.8	−50.2	123.3	4 30.8	−50.7	123.4	16
17	7 32.9	−47.2	123.3	6 59.9	−47.8	123.4	6 26.8	−48.3	123.5	5 53.6	−48.8	123.6	5 20.3	−49.3	123.7	4 47.0	−49.8	123.8	4 13.6	−50.3	123.9	3 40.1	−50.7	123.9	17
18	6 45.7	−47.3	124.0	6 12.1	−47.7	124.1	5 38.5	−48.3	124.1	5 04.8	−48.8	124.2	4 31.0	−49.3	124.3	3 57.2	−49.8	124.4	3 23.3	−50.3	124.4	2 49.4	−50.7	124.4	18
19	5 58.4	−47.2	124.6	5 24.4	−47.9	124.7	4 50.2	−48.3	124.7	4 16.0	−48.9	124.8	3 41.7	−49.3	124.9	3 07.4	−49.8	124.9	2 33.0	−50.3	124.9	1 58.7	−50.8	125.0	19
20	5 11.2	−47.4	125.2	4 36.5	−47.8	125.3	4 01.9	−48.4	125.3	3 27.1	−48.8	125.4	2 52.4	−49.4	125.4	2 17.6	−49.9	125.5	1 42.7	−50.3	125.5	1 07.9	−50.8	125.5	20
21	4 23.8	−47.3	125.8	3 48.7	−47.9	125.9	3 13.5	−48.4	125.9	2 38.3	−48.9	126.0	2 03.0	−49.3	126.0	1 27.7	−49.8	126.0	0 52.4	−50.3	126.0	0 17.1	−50.7	126.0	21
22	3 36.5	−47.4	126.4	3 00.8	−47.9	126.5	2 25.1	−48.4	126.5	1 49.4	−48.9	126.5	1 13.7	−49.4	126.6	0 37.9	−49.8	126.6	0 02.1	−50.3	126.6	0 33.6	+50.8	53.4	22
23	2 49.1	−47.4	127.0	2 12.9	−47.9	127.1	1 36.7	−48.4	127.1	1 00.5	−48.9	127.1	0 24.3	−49.4	127.1	0 11.9	+49.9	52.9	C-S Line			1 24.4	+50.7	52.9	23
24	2 01.7	−47.5	127.7	1 25.0	−47.9	127.7	0 48.3	−48.4	127.7	0 11.6	−48.9	127.7	0 25.1	+49.4	52.3	1 01.8	+49.8	52.3	(Contrary-Same Line)			2 15.1	+50.8	52.4	24
25	1 14.2	−47.4	128.3	0 37.1	−48.0	128.3	0 00.1	+48.4	51.7	0 37.3	+48.4	51.7	1 14.5	+49.3	51.7	1 51.6	+49.8	51.7				3 05.9	+50.7	51.8	25
26	0 26.8	−47.4	128.9	0 10.9	+47.9	51.1	0 48.5	+48.4	51.1	1 26.2	+48.9	51.1	2 03.8	+49.3	51.2	2 41.4	+49.9	51.2	3 19.0	+50.3	51.2	3 56.6	+50.7	51.3	26
27	0 20.6	+47.5	50.5	0 58.8	+47.9	50.5	1 36.9	+48.4	50.5	2 15.1	+48.8	50.6	2 53.2	+49.3	50.6	3 31.3	+49.7	50.6	4 09.3	+50.2	50.7	4 47.3	+50.7	50.7	27
28	1 08.1	+47.4	49.9	1 46.7	+47.9	49.9	2 25.3	+48.4	49.9	3 03.9	+48.9	49.9	3 42.5	+49.3	50.1	4 21.0	+49.8	50.1	4 59.5	+50.2	50.1	5 38.0	+50.6	50.2	28
29	1 55.5	+47.4	49.3	2 34.6	+47.9	49.3	3 13.7	+48.4	49.3	3 52.8	+48.8	49.4	4 31.8	+49.3	49.4	5 10.8	+49.7	49.5	5 49.7	+50.2	49.6	6 28.6	+50.6	49.7	29
30	2 42.9	+47.4	48.7	3 22.5	+47.9	48.7	4 02.1	+48.3	48.8	4 41.6	+48.8	48.8	5 21.1	+49.3	48.9	6 00.5	+49.7	49.0	6 39.9	+50.2	49.0	7 19.2	+50.6	49.1	30
31	3 30.3	+47.4	48.0	4 10.4	+47.8	48.1	4 50.4	+48.3	48.2	5 30.4	+48.8	48.2	6 10.4	+49.2	48.3	6 50.2	+49.7	48.4	7 30.1	+50.1	48.5	8 09.8	+50.5	48.6	31
32	4 17.7	+47.3	47.4	4 58.2	+47.8	47.5	5 38.7	+48.3	47.6	6 19.2	+48.7	47.6	6 59.6	+49.2	47.7	7 39.9	+49.6	47.8	8 20.2	+50.0	47.9	9 00.3	+50.5	48.0	32
33	5 05.0	+47.3	46.8	5 46.0	+47.8	46.9	6 27.0	+48.2	47.0	7 07.9	+48.7	47.1	7 48.8	+49.1	47.1	8 29.5	+49.6	47.3	9 10.2	+50.0	47.4	9 50.8	+50.4	47.5	33
34	5 52.3	+47.3	46.2	6 33.8	+47.7	46.3	7 15.2	+48.2	46.4	7 56.6	+48.6	46.5	8 37.9	+49.1	46.6	9 19.1	+49.5	46.7	10 00.2	+50.0	46.8	10 41.2	+50.4	46.9	34
35	6 39.6	+47.2	45.6	7 21.5	+47.7	45.7	8 03.4	+48.1	45.8	8 45.2	+48.6	45.9	9 27.0	+49.0	46.0	10 08.6	+49.5	46.1	10 50.2	+49.8	46.2	11 31.6	+50.3	46.4	35
36	7 26.8	+47.1	45.0	8 09.2	+47.6	45.1	8 51.5	+48.1	45.2	9 33.8	+48.5	45.3	10 16.0	+48.9	45.4	10 58.1	+49.4	45.5	11 40.0	+49.9	45.7	12 21.9	+50.2	45.8	36
37	8 13.9	+47.1	44.3	8 56.8	+47.6	44.4	9 39.6	+48.0	44.6	10 22.3	+48.5	44.7	11 04.9	+48.9	44.8	11 47.5	+49.3	45.0	12 29.9	+49.7	45.1	13 12.1	+50.2	45.3	37
38	9 01.0	+47.1	43.7	9 44.4	+47.5	43.8	10 27.6	+48.0	43.9	11 10.8	+48.4	44.1	11 53.8	+48.8	44.2	12 36.8	+49.2	44.4	13 19.6	+49.7	44.5	14 02.3	+50.1	44.7	38
39	9 48.1	+47.0	43.1	10 31.9	+47.4	43.2	11 15.6	+47.8	43.3	11 59.2	+48.2	43.5	12 42.6	+48.8	43.6	13 26.0	+49.2	43.8	14 09.3	+49.6	44.0	14 52.4	+50.0	44.1	39
40	10 35.1	+46.9	42.4	11 19.3	+47.3	42.6	12 03.4	+47.8	42.7	12 47.4	+48.2	42.9	13 31.4	+48.6	43.0	14 15.2	+49.0	43.2	14 58.9	+49.4	43.4	15 42.4	+49.9	43.6	40
41	11 22.0	+46.8	41.8	12 06.6	+47.3															+49.4	42.8	16 32.3	+49.8	43.0	41
42	12 08.8	+46.7	41.2	12 53.9	+47.1															+49.3	42.2	17 22.1	+49.7	42.4	42
43	12 55.5	+46.6	40.5	13 41.0	+47.1															+49.2	41.6	18 11.8	+49.6	41.8	43
44	13 42.1	+46.6	39.9	14 28.1	+47.0															+49.1	41.0	19 01.4	+49.5	41.2	44
45	14 28.7	+46.4	39.2	15 15.1	+46.8															+49.0	40.4	19 50.9	+49.4	40.6	45
46	15 15.1	+46.3	38.6	16 01.9	+46.8															+48.8	39.8	20 40.3	+49.2	40.0	46
47	16 01.4	+46.2	37.9	16 48.7	+46.6															+48.7	39.2	21 29.5	+49.1	39.4	47
48	16 47.6	+46.0	37.3	17 35.3	+46.4															+48.5	38.5	22 18.6	+49.0	38.8	48
49	17 33.6	+45.9	36.6	18 21.7	+46.4															+48.4	37.9	23 07.6	+48.8	38.2	49
50	18 19.5	+45.8	35.9	19 08.1	+46.2															+48.3	37.3	23 56.4	+48.7	37.5	50
51	19 05.3	+45.6	35.2	19 54.3	+46.0															+48.1	36.6	24 45.1	+48.4	36.9	51
52	19 50.9	+45.5	34.5	20 40.3	+45.9															+47.9	36.0	25 33.5	+48.1	36.2	52
53	20 36.4	+45.3	33.8	21 26.2	+45.7															+47.7	35.3	26 21.9	+48.1	35.6	53
54	21 21.7	+45.1	33.1	22 11.9	+45.5															+47.5	34.6	27 10.0	+47.9	34.9	54
55	22 06.8	+44.9	32.4	22 57.4	+45.3															+47.3	33.9	27 57.9	+47.7	34.2	55
56	22 51.7	+44.8	31.7	23 42.7	+45.1															+47.2	33.2	28 45.6	+47.6	33.5	56
57	23 36.5	+44.5	31.0	24 27.8	+45.0															+46.9	32.5	29 33.2	+47.3	32.8	57
58	24 21.0	+44.3	30.2	25 12.8	+44.7															+46.6	31.8	30 20.5	+47.0	32.1	58
59	25 05.3	+44.1	29.5	25 57.5	+44.4															+46.4	31.1	31 07.5	+46.8	31.4	59
60	25 49.4	+43.8	28.8	26 41.9	+44.3															+46.2	30.4	31 54.3	+46.6	30.7	60
61	26 33.2	+43.7	28.0	27 26.2	+44.0															+45.9	29.6	32 40.9	+46.3	29.9	61
62	27 16.9	+43.3	27.2	28 10.2	+43.7															+45.6	28.8	33 27.2	+46.0	29.2	62
63	28 00.2	+43.1	26.4	28 53.9	+43.4															+45.4	28.1	34 13.2	+45.7	28.4	63
64	28 43.3	+42.8	25.7	29 37.3	+43.2															+45.0	27.3	34 58.9	+45.4	27.6	64
65	29 26.1	+42.5	24.9	30 20.5	+42.9															+44.7	26.5	35 44.3	+45.1	26.8	65
66	30 08.6	+42.2	24.0	31 03.4	+42.5															+44.3	25.7	36 29.4	+44.7	26.0	66
67	30 50.8	+41.9	23.2	31 45.9	+42.3															+44.0	24.8	37 14.1	+44.4	25.2	67
68	31 32.7	+41.6	22.4	32 28.2	+41.9															+43.7	24.0	37 58.5	+44.0	24.3	68
69	32 14.3	+41.2	21.5	33 10.1	+41.5															+43.2	23.1	38 42.5	+43.6	23.4	69
70	32 55.5	+40.9	20.7	33 51.6	+41.2															+42.9	22.2	39 26.1	+43.2	22.6	70
71	33 36.4	+40.4	19.8	34 32.8	+40.8															+42.4	21.3	40 09.3	+42.8	21.6	71
72	34 16.8	+40.1	18.9	35 13.6	+40.3															+42.0	20.4	40 52.1	+42.3	20.7	72
73	34 56.9	+39.7	18.0	35 53.9	+40.0															+41.5	19.5	41 34.4	+41.8	19.8	73
74	35 36.6	+39.2	17.1	36 33.9	+39.5															+41.0	18.5	42 16.2	+41.4	18.8	74
75	36 15.8	+38.8	16.1	37 13.4	+39.1															+40.6	17.6	42 57.6	+40.8	17.8	75
76	36 54.6	+38.4	15.2	37 52.5	+38.6															+40.0	16.6	43 38.4	+40.3	16.8	76
77	37 33.0	+37.9	14.2	38 31.1	+38.1															+39.4	15.5	44 18.7	+39.8	15.7	77
78	38 10.9	+37.3	13.2	39 09.2	+37.6															+38.9	14.5	44 58.5	+39.1	14.7	78
79	38 48.2	+36.9	12.2	39 46.8	+37.1															+38.2	13.4	45 37.6	+38.5	13.7	79
80	39 25.1	+36.3	11.2	40 23.9	+36.5															+37.6	12.3	46 16.1	+37.9	12.6	80
81	40 01.4	+35.7	10.2	41 00.4	+35.9															+37.0	11.2	46 54.0	+37.1	11.4	81
82	40 37.1	+35.2	9.1	41 36.3	+35.4															+36.2	10.1	47 31.1	+36.5	10.3	82
83	41 12.3	+34.5	8.1	42 11.7	+34.7	8.2	43 11.0	+34.9	8.3	44 10.4	+35.0	8.5	45 09.7	+35.2	8.6	46 09.1	+35.3	8.8	47 08.3	+35.6	8.9	48 07.6	+35.7	9.1	83
84	41 46.8	+33.9	7.0	42 46.4	+34.0	7.1	43 45.9	+34.2	7.2	44 45.4	+34.4	7.3	45 44.9	+34.5	7.5	46 44.4	+34.6	7.6	47 43.9	+34.8	7.7	48 43.3	+35.0	7.9	84
85	42 20.7	+33.3	5.9	43 20.4	+33.4	6.0	44 20.1	+33.5	6.1	45 19.8	+33.6	6.2	46 19.4	+33.7	6.3	47 19.0	+33.9	6.4	48 18.7	+33.9	6.5	49 18.3	+34.1	6.6	85
86	42 54.0	+32.6	4.7	43 53.8	+32.7	4.8	44 53.6	+32.7	4.9	45 53.4	+32.8	5.0	46 53.3	+33.0	5.1	47 52.9	+33.0	5.2	48 52.6	+33.2	5.3	49 52.4	+33.3	5.4	86
87	43 26.6	+31.9	3.6	44 26.5	+31.9	3.6	45 26.3	+32.1	3.7	46 26.2	+32.1	3.8	47 26.1	+32.1	3.8	48 25.9	+32.3	3.9	49 25.8	+32.3	4.0	50 25.7	+32.3	4.1	87
88	43 58.5	+31.1	2.4	44 58.4	+31.2	2.4	45 58.4	+31.2	2.5	46 58.3	+31.3	2.5	47 58.2	+31.4	2.6	48 58.2	+31.3	2.6	49 58.1	+31.4	2.7	50 58.0	+31.5	2.8	88
89	44 29.6	+30.4	1.2	45 29.6	+30.4	1.2	46 29.6	+30.4	1.3	47 29.6	+30.4	1.3	48 29.6	+30.4	1.3	49 29.5	+30.5	1.3	50 29.5	+30.5	1.4	51 29.5	+30.5	1.4	89
90	45 00.0	+29.6	0.0	46 00.0	+29.6	0.0	47 00.0	+29.6	0.0	48 00.0	+29.6	0.0	49 00.0	+29.5	0.0	50 00.0	+29.5	0.0	51 00.0	+29.5	0.0	52 00.0	+29.5	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Figure (center): Celestial sphere diagram with labels Z(N), Z 115°.6, LHA 60°, Pn, Q, Dec 5°S, Lat 45°N, NORTH DECLINATION, Alt 16°53'.6, CELESTIAL HORIZON, N, S, SOUTH DECLINATION, CELESTIAL EQUATOR, PRIME VERTICAL, t 120° E, Q', Ps, Z 64°.4, Z(S); graduations 10°–70°.

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 120°, 240°

FIGURE 2
VII

Figures 1 and 2 illustrate four of the eight possible celestial triangles for specific numerical values of latitude and declination and the LHA's tabulated on the left and right-hand pages of an opening of the tables.

The diagram on the plane of the celestial meridian in figure 1 indicates that the celestial body always lies above the celestial horizon when the observer's latitude has the same name as the declination of the body and the values of LHA are those tabulated on the left-hand page of an opening of the tables. The diagram in figure 2 reveals that for the various combinations of arguments on the right-hand page, including whether the name of the observer's latitude is the same as or contrary to the name of the declination, the numerical value of the declination governs whether the body is above or below the celestial horizon. For example, the following arguments are used for entering the tables:

LHA	60°	
Latitude	45° N	(Contrary Name to Declination)
Declination	5° S	

The respondents are:

Tabular altitude,	ht (Tab. Hc)	16°53.6′
Altitude difference,	d	(−)46.2′
Azimuth angle,	Z	115.6°

As can be verified by an inspection of figures 2 and 4a, the altitude respondent is for a body 16°53.6′ above the celestial horizon. Further inspection of these figures reveals that with the LHA and latitude (Contrary Name) remaining constant, the altitude of the body decreases as the declination increases. Between values of declination 26° and 27° the body crosses the celestial horizon. When the declination reaches 35°, the altitude is 6°39.6′ below the celestial horizon; the tabular azimuth angle is the supplement of the actual azimuth angle of 134.4°.

As an additional example, the following arguments are used for entering the tables:

LHA	240°	(t 120°E)
Latitude	45° S	(Same Name as Declination)
Declination	5° S	

The respondents are:

Tabular altitude,	ht (Tab. Hc)	16°53.6′
Altitude difference,	d	(−)46.2′
Azimuth angle,	Z	115.6°

However, inspection of the diagram on the plane of the celestial meridian in figures 2 and 4b reveals that the altitude is 16°53.6′ *below* the celestial horizon; the tabular azimuth angle is the *supplement* of the actual azimuth angle of 64.4°. Further inspection of these figures reveals that with the LHA and latitude (Same Name) remaining constant, the altitude of the body increases as the declination increases. Between values of declination of 26° and 27° the body crosses the celestial horizon. When the declination reaches 35°, the altitude is 6°39.6′ above the celestial horizon; the tabular azimuth angle is the actual azimuth angle of 45.6°.

Inspection of figures 1, 2, and 3 reveals that if the left-hand page of an opening of the tables is entered with latitude of contrary name and one of the LHA's tabulated at the bottom of the facing page, the tabular altitudes are negative; the tabular azimuth angles are the supplements of the actual azimuth angles.

A. DESCRIPTION OF TABLES

$Z_{(N)}$, zenith of observer at latitude 45° N.
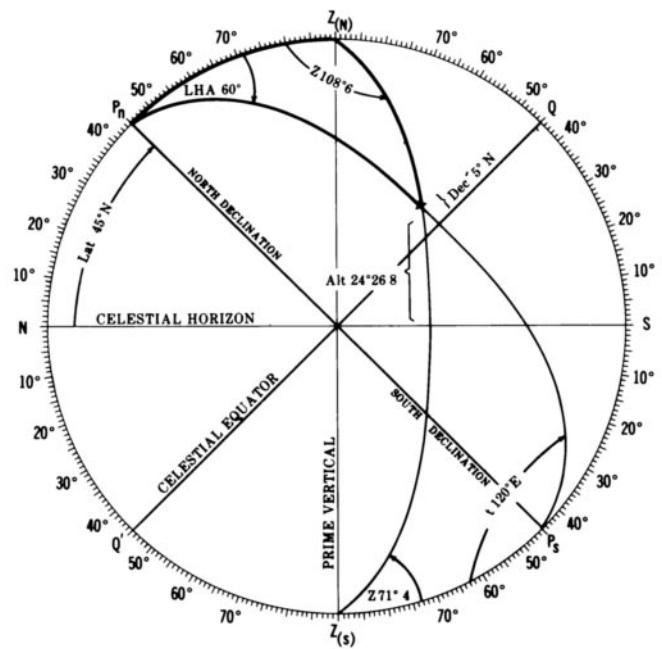
FIGURE 3a
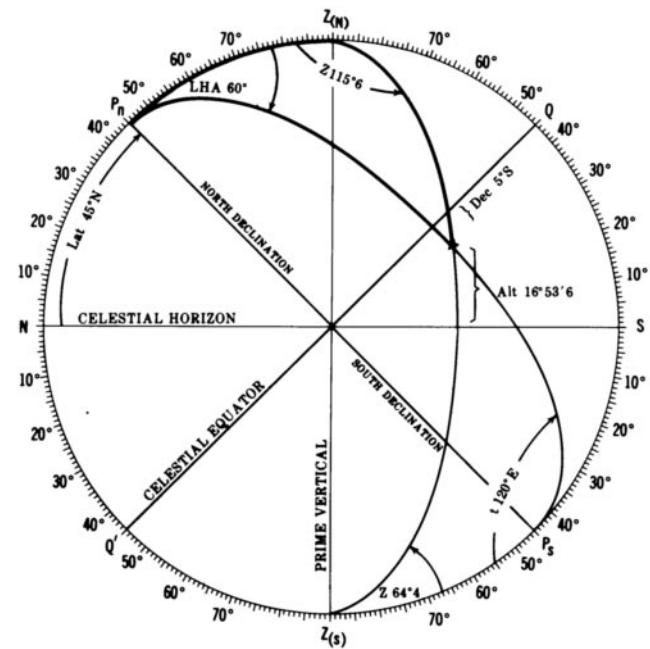
FIGURE 4a

$Z_{(S)}$, zenith of observer at latitude 45° S.
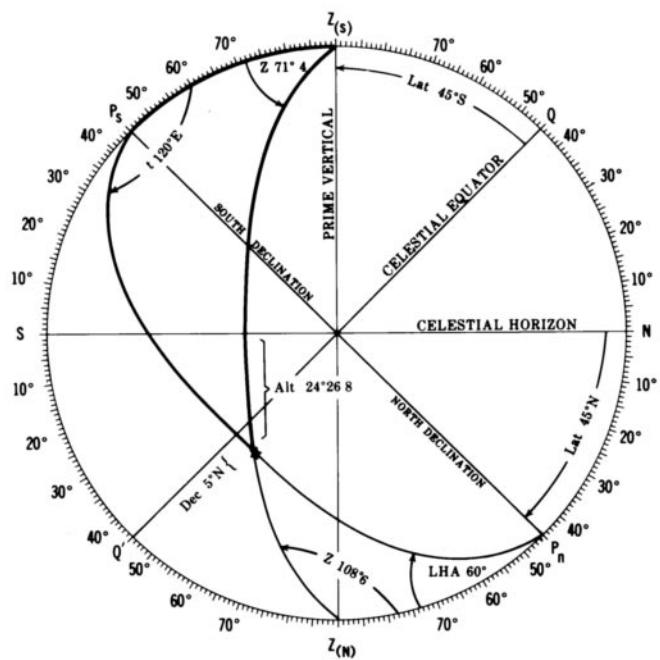
FIGURE 3b
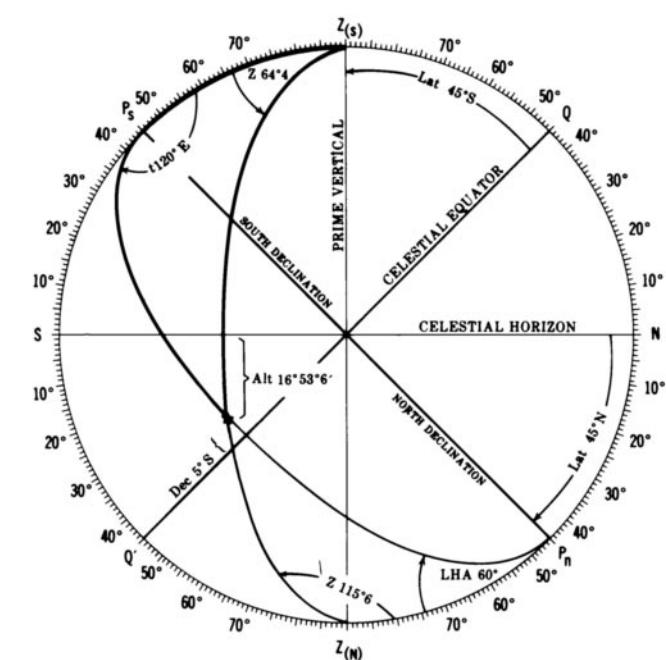
FIGURE 4b

B. INTERPOLATION

1. Requirements. In the normal use of the tables with the Marcq Saint Hilaire method, it is only necessary to interpolate the tabular altitude and azimuth angle for the excess of the actual declination of the celestial body over the integral declination argument. When the tabular altitude is less than 60°, the required interpolation can always be effected through the use of the tabulated altitude differences. When the tabular altitude is in excess of 60°, it may be necessary to include the effects of second differences. When the tabular altitude difference is printed in italic type followed by a small dot, the effects of the second differences should be included in the interpolation. Although the effects of second differences may not be required, these effects can always be included in the interpolation whenever it is desired to obtain greater accuracy.

If the sight reduction is from a position such that interpolation for latitude and local hour angle increments is necessary, the required additional interpolation of the altitude can be effected by graphical means.

2. First and Second Differences. The data in the column for latitude 45° (Same Name as Declination) as contained in figure 1 is rearranged in Table I to illustrate the first and second differences.

TABLE I

LHA 60°, Lat. 45° (Same Name as Declination)

Dec.	ht (Tab. Hc)	First Difference	Second Difference
4°	23°42.3′		
		+44.5′	
5°	24°26.8′		−0.2′
		+44.3′	
6°	25°11.1′		−0.3′
		+44.0′	
7°	25°55.1′		

Table I illustrates that the first differences are the differences between successive altitudes in a latitude column; the second differences are the differences between successive first differences.

3. Linear Interpolation. The usual case is that the change of altitude with 60′ increase in declination is nearly linear as illustrated in figure 5. In this case, the required interpolation can be effected by multiplying the altitude difference (a first difference) by the excess of the actual declination over the integral declination argument divided by 60′. This excess of declination in minutes and tenths of minutes of arc is referred to as the declination increment and is abbreviated Dec. Inc.

Using the data of Table I, the computed altitude when the LHA is 60°, the latitude (Same Name) is 45°, and the declination is 5°45.5′ is determined as follows:

$$\text{Correction} = \text{Altitude difference} \times \frac{\text{Dec. Inc.}}{60'} = (+)44.3' \times \frac{45.5'}{60'} = 33.6'$$

$$\text{Hc=ht+correction}=24°26.8' + 33.6' = 25°00.4'$$
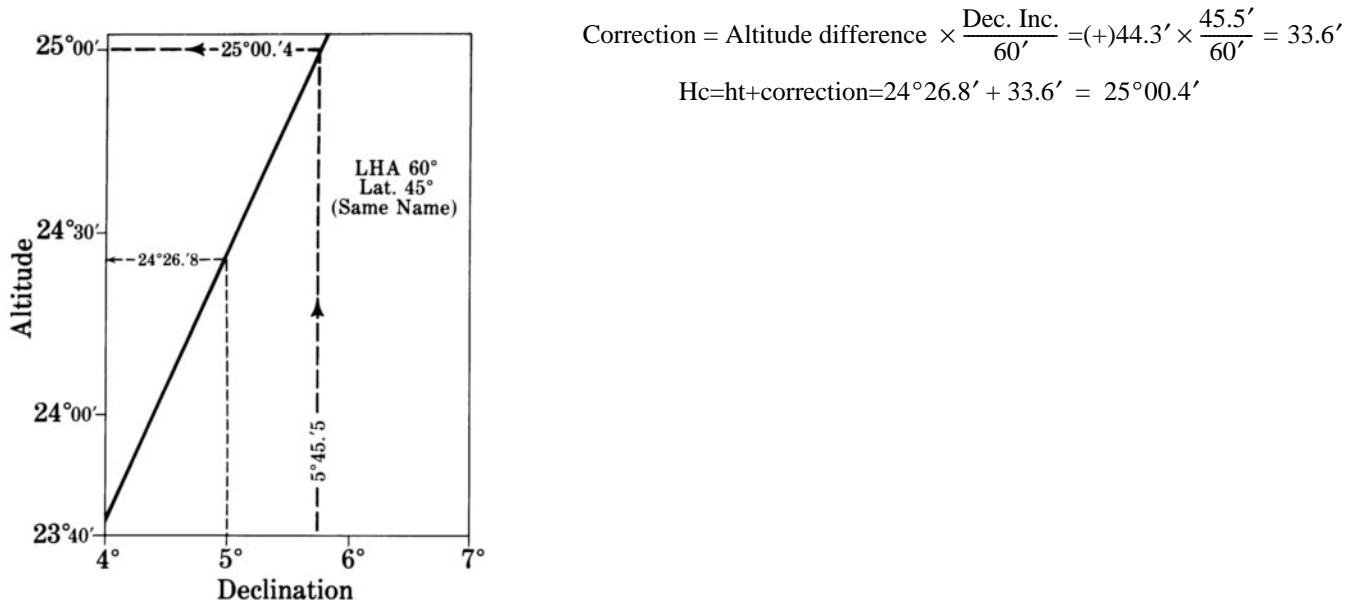
FIGURE 5

4. The Interpolation Table.

(a) Design. The main part of the four-page Interpolation Table is basically a multiplication table providing tabulations of:

$$\text{Altitude Difference} \times \frac{\text{Declination Increment}}{60'}$$

The design of the Interpolation Table is such that the desired product must be derived from component parts of the altitude difference. The first part is a multiple of 10′ (10′, 20′, 30′, 40′, or 50′) of the altitude difference; the second part is the remainder in the range 0.0′ to 9.9′. For example, the component parts of altitude difference 44.3′ are 40′ and 4.3′.

In the use of the first part of the altitude difference, the Interpolation Table arguments are Dec. Inc. and the integral multiple of 10′ in the altitude difference, d. The respondent is:

$$\text{Tens} \times \frac{\text{Dec. Inc.}}{60'} \text{ (See figure 6)}$$

In the use of the second part of the altitude difference, the Interpolation Table arguments are the nearest Dec. Inc. ending in 0.5′ and Units and Decimals. The respondent is:

$$\text{Units and Decimals} \times \frac{\text{Dec. Inc.}}{60'}$$

INTERPOLATION TABLE

FIGURE 6

In computing the table, the values in the Tens part of the multiplication table were modified by small quantities varying from −0.042′ to +0.033′ before rounding to the tabular precision to compensate for any difference between the actual Dec. Inc. and the nearest Dec. Inc. ending in 0.5′ when using the Units and Decimals part of the table.

(b) Instructions for use of the Interpolation Table.

(i) Turn to the Interpolation Table on the inside front cover and facing page if the Dec. Inc. is in the range 0.0′ to 31.9′ or on the inside back cover and facing page if the Dec. Inc. is in the range 28.0′ to 59.9′.

(ii) Enter the Interpolation Table with Dec. Inc. as the vertical argument.

(iii) On the same horizontal line as the Dec. Inc., extract the altitude correction for the first part of the altitude difference from the appropriate Tens column.

(iv) From the Units and Decimals subtable immediately to the right, extract the altitude correction for the second part of the altitude difference.

(v) Add the two parts to form the correction to the tabular altitude for declination increment. The sign of the correction is in accordance with the sign of the altitude difference, d.

(vi) When the altitude difference, d, is printed in italic type followed by a small dot, enter that compartment of the DSD table opposite the block in which the Dec. Inc. is found with the DSD as the argument to obtain the DSD correction to the altitude. The DSD correction is always plus. (See section B.5)

(c) Example of the Use of Interpolation Table. As an example of the use of the Interpolation Table, the computed altitude and true azimuth are determined for Lat. 45°N, LHA 60°, and Dec. 5°45.5′ N. Data are exhibited in figure 7.

The respondents for the entering arguments (Lat. 45° Same Name as Declination, LHA 60°, and Dec. 5°) are:

tabular altitude,	ht	24°26.8′
altitude difference,	d	(+)44.3′
tabular azimuth angle,	Z	108.6°

Note that Dec. Inc. 45.5′ is the vertical argument for entering the Interpolation Table to extract the correction for tens of minutes of altitude difference, d, and that it also indicates the subtable where the correction for minutes and tenths of minutes (Units and Decimals) of altitude difference, d, is found. Entering the Interpolation Table with Dec. Inc. 45.5′ as the vertical argument, the correction for 40′ of the altitude difference is 30.3′; the correction for 4.3′ of the altitude difference is 3.3′. Adding the two parts, the correction is (+)33.6′, the sign of the correction being in accordance with the sign of the altitude difference, d.

No special table is provided for interpolation of the azimuth angle, and the differences are not tabulated. With latitude and local hour angle constant, the successive azimuth angle differences corresponding to 1° increase in declination are less than 10.0° for altitudes less than 84°, and can easily be found by inspection. If formal interpolation of azimuth angle is desired, the degrees and tenths of degrees of azimuth angle difference are treated as minutes and tenths of minutes in obtaining the required correction from the Units and Decimals subtable to the right of the declination increment. But for most practical applications, interpolation by inspection usually suffices. In this example of formal interpolation, using an azimuth angle difference of −0.7° and a Dec. Inc. of 45.5′, the correction as extracted from the Units and Decimals subtable to the right of the Dec.Inc. is −0.5°. Therefore, the azimuth angle as interpolated for declination increment is 108.1° (108.6° −0.5°). In summary,

FIGURE 7

5. Interpolation when Second Differences are Required. The accuracy of linear interpolation usually decreases as the altitude increases. At altitudes above 60° it may be necessary to include the effect of second differences in the interpolation. When the altitude difference, d, is printed in italic type followed by a small dot, the second-difference correction may exceed 0.25′, and should normally be applied. The need for a second-difference correction is illustrated by the graph of Table II data in figure 8.

TABLE II

LHA 38°, Lat. 45° (Same Name as Declination)

Dec.	ht (Tab. Hc)	First Difference	Second Difference
50°	64°08.2′		
		+2.8′·	
51°	64°11.0′		−2.3′
		+0.5′·	
52°	64°11.5′		−2.1′
		−1.6′·	
53°	64°09.9′		
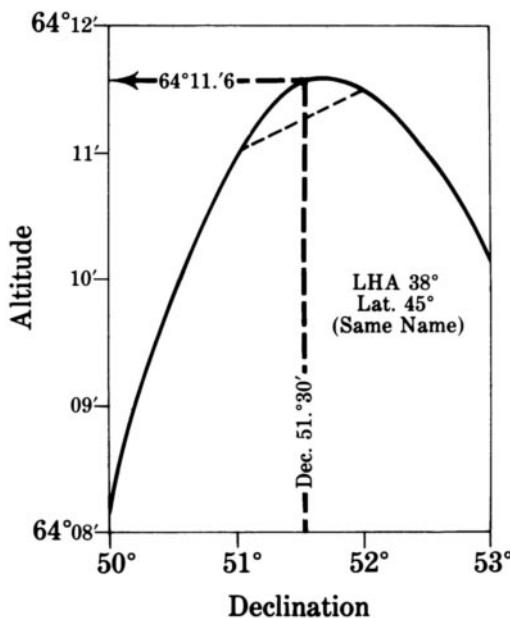
FIGURE 8

Other than graphically, the required correction for the effects of second differences is obtained from the appropriate subtable of the Interpolation Table. However, before the Interpolation Table can be used for this purpose, what is known as the double-second difference (DSD) must be formed.

(a) Forming the Double-Second Difference (DSD)

The double-second difference is the sum of two successive second differences. Although second differences are not tabulated, the DSD can be formed readily by subtracting, algebraically, the tabular altitude difference immediately above the respondent altitude difference from the tabular altitude difference immediately below. The result will always be a negative value.

(b) The Double-Second Difference Correction

As shown in figure 9, that compartment of the DSD table opposite the block in which the Dec. Inc. is found is entered with the DSD to obtain the DSD correction to the altitude. The correction is always plus. Therefore, the sign of the DSD need not be recorded. When the DSD entry corresponds to an exact tabular value, always use the upper of the two possible corrections.

(c) Example of the Use of the Double-Second Difference.

As an example of the use of the double-second difference (DSD) the computed altitude and true azimuth are determined for Lat. 45°N, LHA 38°, and Dec. 51°30.0′N. Data are exhibited in figure 9.

The respondents for the entering arguments (Lat. 45° Same Name as Declination, LHA 38°, and Dec. 51°) are:

tabular altitude,	ht	64°11.0′
altitude difference,	d	(+)0.5′·
azimuth angle,	Z	62.8°

The linear interpolation correction to the tabular altitude for Dec. Inc. 30.0′ is (+)0.3′.

$$Hc=ht+\text{linear correction}=64°11.0′+0.3′=64°11.3′$$

However, by inspection of figure 8, illustrating this solution graphically, the computed altitude should be 64°11.6′. The actual change in altitude with an increase in declination is nonlinear. The altitude value lies on the curve between the points for declination 51° and declination 52° instead of the straight line connecting these points.

The DSD is formed by subtracting, algebraically, the tabular altitude difference immediately above the respondent altitude difference from the tabular altitude difference immediately below. Thus, the DSD is formed by algebraically subtracting (+)2.8′ from (−)1.6′; the result is (−)4.4′.

As shown in figure 9, that compartment of the DSD table opposite the block in which the Dec. Inc. (30.0′) is found is entered with the DSD (4.4′) to obtain the DSD correction to the altitude. The correction is 0.3′. The correction is always plus.

$$Hc=ht+\text{linear correction}+\text{DSD correction}$$
$$Hc=64°11.0′+0.3′+0.3′=64°11.6′$$

INTERPOLATION TABLE

Data from Page 78

38°, 322° L.H.A.

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180°....Zn=Z / L.H.A. less than 180°........Zn=360°-Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
49	64 03.4	+4.8•	67.4	64 25.5	+7.1•	69.3	64 45.7	+9.3•	71.3	65 03.9	+11.7•	73.3	65 20.0	+14.1•	75.4	65 34.1	+16.3•	77.6	65 45.9	+18.7•	79.7	65 55.4	+21.2•	81.9	49
50	64 08.2	+2.8•	65.1	64 32.6	+4.9•	67.0	64 55.0	+7.2•	69.0	65 15.6	+9.4•	71.0	65 34.1	+11.8•	73.1	65 50.4	+14.2•	75.2	66 04.6	+16.7•	77.4	66 16.6	+19.0•	79.6	50
51	64 11.0	+0.5•	62.8	64 37.5	+2.7•	64.7	65 02.2	+4.9•	66.6	65 25.0	+7.3•	68.6	65 45.9	+9.5•	70.7	66 04.6	+12.0•	72.8	66 21.3	+14.3•	75.0	66 35.6	+16.9•	77.2	51
52	64 11.5	−1.6•	60.5	64 40.2	+0.5•	62.4	65 07.1	+2.7•	64.3	65 32.3	+4.9•	66.3	65 55.4	+7.3•	68.3	66 16.6	+9.6•	70.4	66 35.6	+12.1•	72.6	66 52.5	+14.5•	74.8	52
53	64 09.9	−3.7•	58.2	64 40.7	−1.7•	60.0	65 09.8	+0.5•	61.9	65 37.2	+2.6•	63.8	66 02.7	+4.9•	65.9	66 26.2	+7.3•	68.0	66 47.7	+9.7•	70.1	67 07.0	+12.2•	72.3	53
54	64 06.2	−5.9•	56.0	64 39.0	−3.9•	57.7	65 10.3	−1.9•	59.5	65 39.8	+0.4•	61.4	66 07.6	+2.6•	63.4	66 33.5	+4.9•	65.5	66 57.4	+7.3•	67.6	67 19.2	+9.8•	69.8	54
55	64 00.3	−8.0•	53.7	64 35.1	−6.1•	55.4	65 08.4	−4.0•	57.1	65 40.2	−2.0•	59.0	66 10.2	+0.2•	60.9	66 38.4	+2.5•	63.0	67 04.7	+4.9•	65.1	67 29.0	+7.3•	67.2	55
56	63 52.3	−10.1•	51.4	64 29.0	−8.3•	53.1	65 04.4	−6.4•	54.8	65 38.2	−4.3•	56.6	66 10.4	−2.1•	58.5	66 40.9	+0.1•	60.4	67 09.6	+2.4•	62.5	67 36.3	+4.8•	64.6	56
57	63 42.2	−12.2•	49.2	64 20.7	−10.3•	50.8	64 58.0	−8.5•	52.4	65 33.9	−6.6•	54.2	66 08.3	−4.6•	56.0	66 41.0	−2.4•	57.9	67 12.0	−0.1•	59.9	67 41.1	+2.3•	62.0	57
58	63 30.0	−14.1	47.0	64 10.4	−12.5•	48.5	64 49.5	−10.7•	50.1	65 27.3	−8.8•	51.8	66 03.7	−6.8•	53.5	66 38.6	−4.7•	55.4	67 11.9	−2.6•	57.3	67 43.4	−0.3•	59.4	58
59	64 03.4	+4.8•	67.4	63 57.9	−14.5•	46.3	64 38.8	−12.8•	47.8	65 18.5	−11.0•	49.4	65 56.9	−9.2•	51.1	66 33.9	−7.2•	52.9	67 09.3	−5.1•	54.8	67 43.1	−2.9•	56.7	59

FIGURE 9

C. SPECIAL TECHNIQUES

1. Adjustment of Straight Line of Position. The Table of Offsets gives the corrections to the straight line of position (LOP) as drawn on a chart or plotting sheet to provide a closer approximation to the arc of the circle of equal altitude, a small circle of radius equal to the zenith distance. As shown in figure 10, the corrections are offsets of points on the LOP and are drawn at right angles to the LOP in the direction of the observed body. The offset points are joined to obtain the arc of the small circle. Usually the desired approximation to the arc of the small circle can be obtained by drawing a straight line through two offset points. The magnitudes of the offsets are dependent upon altitude and the distance of the offset point from the intercept.
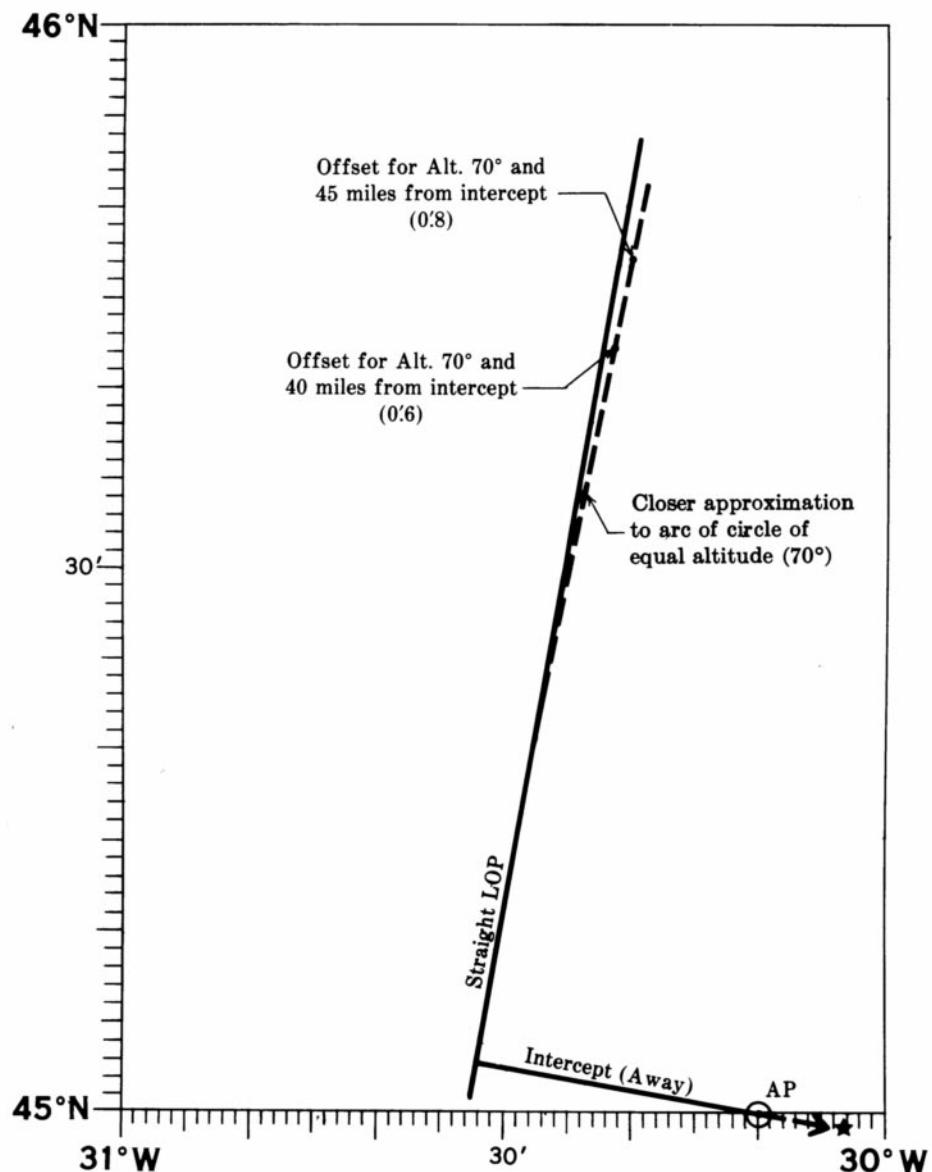
FIGURE 10

TABLE OF OFFSETS

DISTANCE ALONG LINE OF POSITION FROM INTERCEPT

ALT.	00′	05′	10′	15′	20′	25′	30′	35′	40′	45′	ALT.
					OFFSETS						
0°	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0.0′	0°
30	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	30
40	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	40
50	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	50
55	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.4	55
60	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	60
62	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	62
64	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	64
66	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.7	66
68	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.6	0.7	68
70	0.0	0.0	0.0	0.1	0.2	0.2	0.4	0.5	0.6	0.8	70
71	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	71
72	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	72
73	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.0	73
74	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	74
75	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.7	0.9	1.1	75
76	0.0	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.2	76
77	0.0	0.0	0.1	0.1	0.3	0.4	0.6	0.8	1.0	1.3	77
78	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.1	1.4	78
79	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.5	79
80.0	0.0	0.0	0.1	0.2	0.3	0.5	0.7	1.0	1.3	1.7	80.0
80.5	0.0	0.0	0.1	0.2	0.3	0.5	0.8	1.1	1.4	1.8	80.5
81.0	0.0	0.0	0.1	0.2	0.4	0.6	0.8	1.1	1.5	1.9	81.0
81.5	0.0	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.6	2.0	81.5
82.0	0.0	0.0	0.1	0.2	0.4	0.6	0.9	1.3	1.7	2.1	82.0
82.5	0.0	0.0	0.1	0.2	0.4	0.7	1.0	1.4	1.8	2.2	82.5
83.0	0.0	0.0	0.1	0.3	0.5	0.7	1.1	1.5	1.9	2.4	83.0
83.5	0.0	0.0	0.1	0.3	0.5	0.8	1.2	1.6	2.0	2.6	83.5
84.0	0.0	0.0	0.1	0.3	0.5	0.9	1.2	1.7	2.2	2.8	84.0
84.5	0.0	0.0	0.2	0.3	0.6	1.0	1.4	1.9	2.4	3.1	84.5
85.0	0.0	0.0	0.2	0.4	0.7	1.0	1.5	2.1	2.7	3.4	85.0
85.5	0.0	0.0	0.2	0.4	0.7	1.2	1.7	2.3	3.0	3.8	85.5
86.0	0.0	0.1	0.2	0.5	0.8	1.3	1.9	2.6	3.4	4.3	86.0
86.5	0.0	0.1	0.2	0.5	1.0	1.5	2.2	2.9	3.8	4.9	86.5
87.0	0.0	0.1	0.3	0.6	1.1	1.7	2.5	3.4	4.5	5.7	87.0
87.5	0.0	0.1	0.3	0.8	1.3	2.1	3.0	4.1	5.4	6.9	87.5
88.0	0.0	0.1	0.4	0.9	1.7	2.7	3.8	5.2	6.9	8.8	88.0
88.5	0.0	0.2	0.6	1.3	2.3	3.5	5.1	7.1	9.4	12.1	88.5
89.0	0.0	0.3	0.8	1.9	3.4	5.5	8.0	11.3	15.3	20.3	89.0

In adjusting the straight LOP to obtain a closer approximation to the arc of the circle of equal altitude, points on the LOP are offset at right angles to the LOP in the direction of the celestial body. The arguments for entering the table are the distance from the intercept to the point on the LOP to be offset and the altitude of the body.

In the use of the table with the graphical method for interpolating altitude for latitude and LHA increments, the offset of the foot of the perpendicular is along the azimuth line in a direction away from the body. The arguments for entering the table are the distance from the DR to the foot of the perpendicular and the altitude of the body.

2. Interpolation for Latitude and Local Hour Angle. The following graphical method can be used to interpolate the altitude for latitude and local hour angle increments. *The basic method should have most frequent application in great-circle solutions.*

In principle the method is the measurement of the difference of the radii of two circles of equal altitude corresponding to the altitudes of a celestial body from two positions at the same instant. One circle passes through the assumed position (AP), and the second circle passes through the dead reckoning position (DR) or other position from which the computed altitude is required.

The measurement, which is the difference in zenith distances as measured from the zenith of the assumed position and the zenith of some nearby position, is effected as follows:

(1) Draw the azimuth line from the assumed position (AP) as shown in figure 11 (the azimuth angle is interpolated for declination increment before conversion to true azimuth).

(2) From the position (DR) for which the computed altitude is required, draw a line perpendicular to the azimuth line or its extension. This line approximates the arc of the circle of equal altitude passing through the DR.

(3) Measure the distance from the foot of the perpendicular to the DR in nautical miles.

(4) Entering the Table of Offsets with the distance of the DR from the foot of the perpendicular and the altitude of the body as interpolated for declination increment, extract the offset.

(5) From the foot of the perpendicular and in a direction away from the celestial body, lay off the offset on the azimuth line or its extension.

(6) As shown in figure 11, a closer approximation to the arc of the circle of equal altitude through the DR is made by drawing a straight line from the offset point to the DR.

(7) The required correction, in units of minutes of latitude, for the latitude and LHA increments is the length along the azimuth line between the AP and the arc of the circle of equal altitude through the DR.

If the arc of the circle of equal altitude through the DR crosses the azimuth line between the AP and the body, the correction is to be added to the altitude interpolated for declination increment; otherwise, the correction is to be subtracted. The method will give highly satisfactory results except when plotting on a Mercator chart in high latitudes.

FIGURE 11
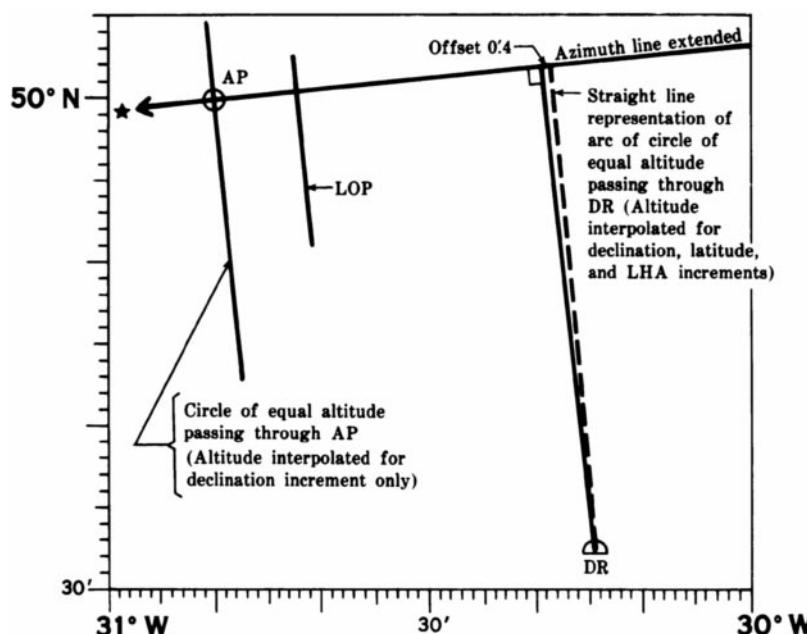
Example:

Computed altitude from AP	Hc	70°05.0′
Observed altitude	Ho	70°00.0′
Intercept	a	5.0 A

Computed altitude from AP	Hc	70°05.0′
Difference of the radii		20.4′
Computed altitude from DR	Hc	69°44.6

Computed altitude from DR	Hc	69°44.6′
Observed altitude	Ho	70°00.0′
Intercept	a	15.4 T

3. Interpolation near the Horizon. This discussion is restricted to the interpolation of altitude for declination within the 1° interval containing the horizon, indicated by the horizontal segments of the C-S Line. Interpolation of altitude in the interval under consideration is accomplished by using the last tabular altitude and altitude difference appearing above the C-S Line. Since the last tabular altitude above the C-S Line indicates the body's altitude above the horizon for LHA at top of page, for the pertinent latitude, and for the last integral declination above the horizontal segment of the C-S Line pertaining to that particular latitude, interpolation resulting in positive altitudes

may be carried out for increments of declination of contrary name so long as the interpolated altitude correction does not exceed the last tabular altitude above the C-S Line; for the LHA at bottom of page, positive altitudes will result when interpolating altitude for increments of declination of same name so long as the interpolated altitude correction exceeds the last tabular value above the C-S Line. Interpolation for declinations and increments of declination in excess of the above limits results in negative altitudes.

The tabular azimuth angle pertinent to this one-degree interval of declination is that immediately above or that immediately below the C-S Line, according as the entering arguments are contrary or same name, respectively. The difference in azimuth angle for the interval is determined by taking the value of tabular azimuth angle, on the same side of the C-S Line as the LHA argument, from the supplement of that on the opposite side of the line.

4. Negative Altitudes. This paragraph is restricted to tabular and interpolated altitudes for declinations other than one-degree intervals of declination containing the C-S Line. For all local hour angles at the top of the right-hand page, all tabular or interpolated altitudes on that page for declinations below the C-S Line are negative; also for any local hour angle at the bottom of the right-hand page, all tabular or interpolated altitudes for declinations above the C-S Line are negative; additionally, for these same local hour angles and latitudes changed to Contrary Name, the tabular or interpolated altitudes on the left-hand page are negative. Interpolation of altitudes for declination increments within these areas of negative altitude should, however, be accomplished as if the altitudes were positive, adhering strictly to the sign given to d. Then, after interpolation, regard the results as negative. In all instances involving negative altitudes, except the one-degree interval of declination which includes the C-S Line, the supplement of the pertinent tabular azimuth angle is that to be converted to true azimuth by the rules to be found on each opening of the basic tables.

5. Interpolation near the Zenith. In the region within 4° of the zenith where normal interpolation methods are inadequate, the following method can usually be used to interpolate both altitude and azimuth angle. The Interpolation Table is employed in carrying out the desired interpolation, but the values of altitude and azimuth angle extracted from the basic tables constitute data which require independent differencing; the tabular altitude difference, d, is not used.

To carry out the altitude interpolation, the basic tables are entered with the pertinent LHA and Dec., and with the integral degree of Lat. so chosen that, when increased by the declination increment, it is within 30′ of the known or DR latitude; this practice will prevent long intercepts. For these entering arguments and for a latitude and declination one degree more than the above referenced latitude and declination, respectively, extract the tabular altitudes and azimuth angles. The altitudes and azimuth angles are then differenced and with these differences interpolation of altitude and azimuth angle for the desired declination is made, utilizing the Interpolation Table. The computed altitude is then compared with that observed to determine the intercept, which together with the interpolated azimuth angle converted to true azimuth makes possible the construction of a line of position, which is plotted from the assumed longitude, and from the latitude of the entering argument, augmented by the declination increment.

	Example	LHA	Lat.	Dec.	Ho
i	2°37′	46°22′S	46°50.2′S	88°08.6′
ii	356°49′	49°47′S	47°28.3′S	86°52.5′

				Example i								*Example ii*		
Lat.	Dec.	Tab. Hc	diff.	Tab. Z	diff.		Lat.	Dec.	Tab. Hc	diff.	Tab. Z	diff.
46°	46°	87°55.0′		88.9°			49°	47°	87°10.0′		133.8°	
			(+)2.2′		0.0°					(+)1.7′		(+)0.5°
47°	47°	87°57.2′		88.9°			50°	48°	87°11.7′		134.3°	

Interpolate to Dec.=46°50.2′   Interpolate to Dec.=47°28.3′
Dec. Inc.=50.2′, diff.=(+)2.2′, Z diff.=0.0°   Dec. Inc.=28.3′, diff.=(+)1.7′, Z diff.=(+)0.5°

Tab. Hc		87°55.0′	Tab. Z		88.9°		Tab. Hc		87°10.0′	Tab. Z	133.8°
Correction		(+) 1.9			0.0		Correction		(+) 0.8		(+) 0.2
	Hc	87°56.9′		Z	88.9°			Hc	87°10.8′	Z	134.0°
	Ho	88°08.6′						Ho	86°52.5′		
Intercept		11.7 T		Zn	268.9°		Intercept		18.3 A	Zn	046.0°

Plot from Lat. 46°50.2′ S   Plot from Lat. 49°28.3′ S

D. OTHER APPLICATIONS

1. Star Identification. Although no formal star identification tables are included in these volumes, a simple approach to star identification is to scan the pages of the appropriate latitudes and observe the combination of arguments which give the altitude and azimuth angle of the observation. Thus the declination and LHA☆ are determined directly. The star's SHA is found from, SHA☆ = LHA☆−LHAϓ. From these quantities the star can be identified from *The Nautical Almanac.*

Another solution is available through an interchange of arguments using the nearest integral values. The procedure consists of entering the tables with the observer's latitude (Same Name as Declination), with the observed azimuth angle (converted from observed true azimuth as required) as LHA and the observed altitude as declination, and extracting from the tables the altitude and azimuth angle respondents. The extracted altitude becomes the body's declination; the extracted azimuth angle (or its supplement) is the meridian angle of the body. Note that the tables are always entered with latitude of same name as declination. In north latitudes the tables can be entered with true azimuth as LHA.

If the respondents are extracted from above the C-S Line on a right-hand page, the name of the latitude is actually contrary to that of the declination. Otherwise, the declination of the body has the same name as the latitude. If the azimuth angle respondent is extracted from above the C-S Line, the supplement of the tabular value is the meridian angle, t, of the body. If the body is east of the observer's meridian, LHA = 360° − t; if the body is west of the meridian, LHA = t.

EXAMPLES FOR STAR IDENTIFICATION (Selection for illustration only)

Ex.	Lat.	Long.	Obs. Alt.	Obs. Zn	LHAϓ*
1	55° 16′ N	10° 42′ W	54° 52′	50°	96°
2	57 25 N	176 19 E	46 42	139	185
3	51 43 N	43 02 W	15 20	146	67
4	48 17 N	162 52 E	32 00	251	207
5	50 55 N	143 38 W	18 19	207	128
6	47 09 N	15 18 W	45 28	311	84
7	54 22 S	23 47 E	46 20	77	292
8	48 47 S	36 13 W	17 27	6	25
9	51 19 S	83 03 E	21 37	150	325
10	47 52 S	120 50 W	36 10	223	120
11	55 23 S	56 57 E	36 25	275	347
12	46 37 S	95 43 W	28 30	340	170

*LHAϓ from *The Nautical Almanac* for date and GMT of observation.

SOLUTIONS

	Entering Arguments					Star Coordinates and Identity				
Ex.	Lat	LHA	Dec.	Page		Dec.	t	LHA☆	SHA☆	Name
1	55°	50°, 310°	55°	Left		62°N	69° E	291°	195°	*Dubhe*
2	57	139 , 221	47	Right, below C-S Line		19 N	28 E	332	147	*Arcturus*
3	52	146 , 214	15	Right, above C-S Line		17 S	34 E	326	259	*Sirius*
4	48	251 , 109	32	Right, below C-S Line		12 N	55 W	55	208	*Regulus*
5	51	207 , 153	18	Right, above C-S Line		17 S	27 W	27	259	*Sirius*
6	47	311 , 49	45	Left		56 N	75 W	75	351	*Schedar*
7	54	180−77=103	46	Right, below C-S Line		29 S	51 E	309	17	*Fomalhaut*
8	49	180−6=174	17	Right, above C-S Line		24 N	6 E	354	329	*Hamal*
9	51	180−150=30	22	Left		53 S	130 E	230	265	*Canopus*
10	48	223−180=43	36	Left		56 S	95 W	95	335	*Achernar*
11	55	275−180=95	36	Right, below C-S Line		26 S	64 W	64	77	*Nunki*
12	47	340−180=160	29	Right, above C-S Line		12 N	18 W	18	208	*Regulus*

2. Great-Circle Sailing. The great-circle distance between any two points on the assumed spherical surface of the Earth and the initial great-circle course angle may be found by relating the problems to the solution of the celestial triangle. For by entering the tables with latitude of departure as latitude, latitude of destination as declination, and difference of longitude as LHA, the tabular altitude and azimuth angle may be extracted and converted to distance and course.

The tabular azimuth angle (or its supplement) becomes the initial great-circle course angle, prefixed N or S for the latitude of departure, and suffixed E or W depending upon the destination being east or west of point of departure.

If all entering arguments are integral degrees, the altitude and azimuth angle are obtained directly from the tables without interpolation. If the latitude of destination is nonintegral, interpolation for the additional minutes of latitude is done as in correcting altitude for any declination increment; if either the latitude of departure or difference of longitude, or both, are nonintegral, the additional interpolation is done graphically.

Since the latitude of destination becomes the declination entry, and all declinations appear on every page, the great-circle solution can always be extracted from the volume which covers the latitude of departure.

Great-circle solutions belong in one of the four following cases:

Case I—Latitudes of departure and destination of same name and initial great-circle distance less than 90°.

Enter the tables with latitude of departure as latitude argument (Same Name), latitude of destination as declination argument, and difference of longitude as local hour angle argument. If the respondents as found on a right-hand page do not lie below the C-S Line, Case III is applicable.

Extract the tabular altitude which subtracted from 90° is the desired great-circle distance. The tabular azimuth angle is the initial great-circle course angle.

Case II—Latitudes of departure and destination of contrary name and great-circle distance less than 90°.

Enter the tables with latitude of departure as latitude argument (Contrary Name) and latitude of destination as declination argument, and with the difference of longitude as local hour angle argument. If the respondents do not lie above the C-S Line on the right-hand page, Case IV is applicable.

Extract the tabular altitude which subtracted from 90° is the desired great-circle distance. The tabular azimuth angle is the initial great-circle course angle.

Case III—Latitudes of departure and destination of same name and great-circle distance greater than 90°.

Enter the tables with latitude of departure as latitude argument (Same Name), latitude of destination as declination argument, and difference of longitude as local hour angle argument. If the respondents as found on a right-hand page do not lie above the C-S Line, Case I is applicable.

Extract the tabular altitude which added to 90° gives the desired great-circle distance. The initial great-circle course angle is 180° minus the tabular azimuth angle.

Case IV—Latitudes of departure and destination of contrary name and great-circle distance greater than 90°.

Enter the tables with latitude of departure as latitude argument (Contrary Name), latitude of destination as declination argument and difference of longitude as local hour angle argument. If the respondents as found on a right-hand page do not lie below the C-S Line, Case II is applicable. If the DLo is in excess of 90°, the respondents are found on the facing left-hand page (See section C.4.).

Extract the tabular altitude which added to 90° gives the desired great-circle distance. The initial great-circle course angle is 180° minus the tabular azimuth angle.

The following two great-circle distance and course solutions illustrate Cases I and IV.

Case I

Required.—Distance and initial great-circle course from Bishop Rock (49°52′N, 6°27′W) to Barbados (13°18′N, 59°39′W).

Solution.—(l) Case I is assumed to be applicable. Since the latitude of the point of departure, the latitude of the destination, and the difference of longitude (DLo) between the point of departure and destination are not integral degrees, the solution is effected from an adjusted point of departure or assumed position of departure chosen as follows: the latitude of the assumed position (AP) is the integral degrees of latitude nearest to the point of departure; the longitude of the AP is chosen to provide integral degrees of DLo. This AP, which should be within 30′ of the longitude of the point of departure, is at latitude 50°N, longitude 6°39′W. The DLo is 53°.

(2) Enter the tables with 50° as the latitude argument (Same Name), 53° as the LHA argument, and 13° as the declination argument.

(3) From page 108 extract the tabular altitude, altitude difference, and azimuth angle; interpolate altitude and azimuth angle for declination increment. The Dec. Inc. is the minutes that the latitude of the destination is in excess of the integral degrees used as the declination argument.

		ht (Tab. Hc)	d	Z
LHA 53°, Lat. 50° (Same),	Dec.13°	33° 18.9′	(+)47.2′	111.4°
Dec. Inc. 18′, d(+)47.2′	Tens	(+) 12.0		
	Units	(+) 2.2		
Interpolated for Dec. Inc.		33° 33.1′	C	N 111.2°W
Initial great-circle course from AP			Cn	248.8°
Great-circle distance from AP (90°-33°33.1′)				3386.9 n.mi.

(4) Using the graphical method for interpolating altitude for latitude and LHA increments, the course line is drawn from the AP in the direction of the initial great-circle course from the AP (248.8°). As shown in figure 12, a line is drawn from the point of departure perpendicular to the initial great-circle course line or its extension.

(5) The required correction, in units of minutes of latitude, for the latitude and DLo increments is the length along the course line between the foot of the perpendicular and the AP. The correction as applied to the distance from the AP is +4.2′; the great-circle distance is 3391 nautical miles.

(6) The azimuth angle interpolated for declination, LHA, and latitude increments is N110.9°W; the initial great-circle course from the point of departure is 249.1°.
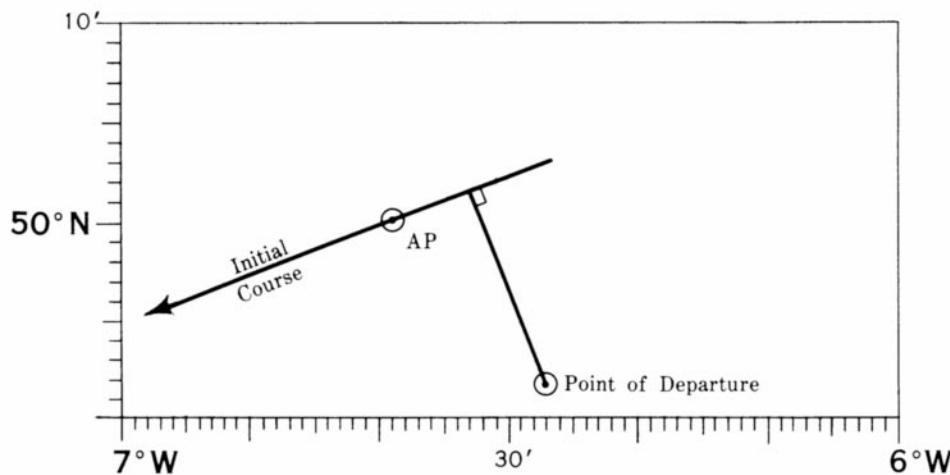
FIGURE 12

Case IV

Required.—Distance and initial great-circle course from Cabo Pilar (52°43′S, 74°41′W) to Wake Island (19°17′N, 166°39′E).

Solution.—(l) Case IV is assumed to be applicable. Since the latitude of the point of departure, the latitude of the destination, and the difference of longitude (DLo) between the point of departure and destination are not integral degrees, the solution is effected from an adjusted point of departure or assumed position of departure chosen as follows: the latitude of the assumed position (AP) is the integral degrees of latitude nearest to the point of departure; the longitude of the AP is chosen to provide integral degrees of DLo. This AP, which should be within 30′ of the longitude of the point of departure, is at latitude 53°S, longitude 74°21′W. The DLo is 119°.

(2) Enter the tables with 53° as the latitude argument (Contrary Name), 119° as the LHA argument and 19° as the declination argument. Inspection of pages 306 and 307 reveals that the respondents to these arguments are not tabulated directly. But as indicated in section C.4, for any LHA at the bottom of a right-hand page substituted for the LHA argument on the facing left-hand page and with latitude changed to contrary name, the tabulations on the left-hand page are negative altitudes and supplements of the azimuth angles.

(3) From page 306 extract the tabular altitude, altitude difference, and azimuth angle; interpolate altitude for Dec. Inc. as if the altitude were positive, adhering strictly to the sign given d. After interpolation regard the results as negative. Subtract tabular azimuth angle from 180°; interpolate for Dec. Inc.

		ht (Tab. Hc)	d	Z
LHA 119°, Lat. 53° (Contrary), Dec.19°		32°24.2′	(+)46.8′	101.6°
Dec. Inc. 17′, d(+)46.8′	Tens	(+)11.3		180°− Z=S78.4°W
	Units	(+) 2.0		
Interpolated for Dec. Inc.		(−) 32°37.5′		C S78.6°W
Initial great-circle course from AP				Cn 258.6°
Great-circle distance from AP (90°+32°37.5′)				7357.5 n.mi.

(4) Using the graphical method for interpolating altitude for latitude and LHA increments, the course line is drawn from the AP in the direction of the initial great-circle course from the AP (258.6°). As shown in figure 13 a line is drawn from the point of departure perpendicular to the course line or its extension.

(5) The required additional correction, in units of minutes of latitude, for the latitude and DLo increments is the length along the course line between the foot of the perpendicular and the AP. The correction as applied to the distance from the AP is −8.5′; the great-circle distance is 7349 nautical miles.

(6) The azimuth angle interpolated for declination, LHA, and latitude increments is 79.1°; the initial great-circle course from the point of departure is 259.1°.
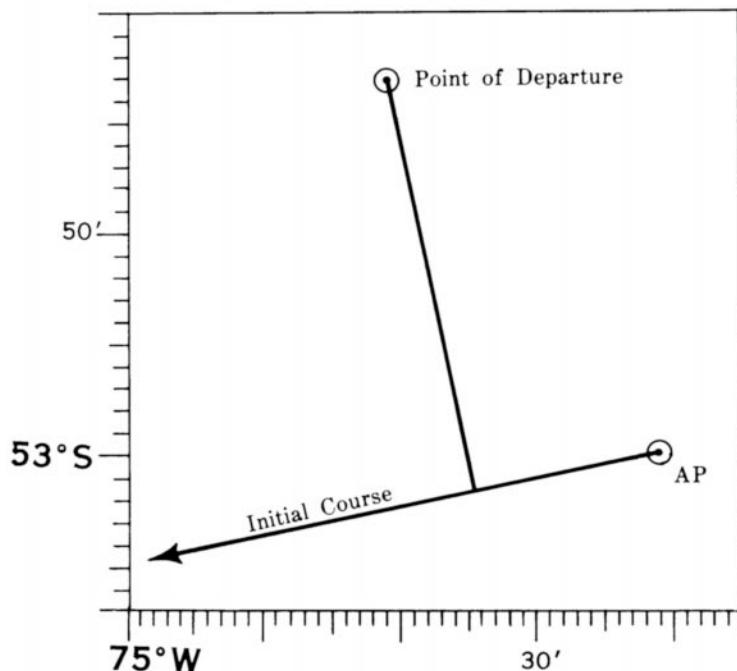
FIGURE 13

3. Points along Great Circle. If the latitude of the point of departure and the initial great-circle course angle are integral degrees, points along the great circle are found by entering the tables with the latitude of departure as the latitude argument (Same Name), the initial great-circle course angle as the LHA argument, and 90° minus distance to a point on the great circle as the declination argument. The latitude of the point on the great circle and the difference of longitude between that point and the point of departure are the tabular altitude and azimuth angle respondents, respectively.

Required.—A number of points at 300-mile intervals along the great circle from latitude 58°S, longitude 99°W when the initial great-circle course angle is S120°W.

Entering the tables with latitude 58° (Same Name), LHA 120°, and with successive declinations of 85°, 80°, 75°, … the latitudes and differences in longitude, from 99°W, are found as tabular altitudes and azimuth angles, respectively.

Distance n. mi, (arc)	300(5°)	600(10°)	900(15°)	1200(20°)
Latitude	55.3°S	52.1°S	48.6°S	44.9°S
DLo	7.6°	14.2°	19.8°	24.7°
Longitude	106.6°W	113.2°W	118.8°W	123.7°W

Note.—If the respondents are abstracted from across the C-S line, the DLo is the supplement of the tabular azimuth angle; the tabular altitudes correspond to latitudes on the side of the equator opposite from the latitude of departure.

4. General Spherical Triangle Solutions. Of the six parts of the spherical astronomical triangle, these tables utilize three as entering arguments and tabulate two as respondents. The only remaining part of the triangle is the parallactic (or position) angle, which is the angle between a body's hour circle and its vertical circle. Values of the parallactic angle, not essential for navigation, have not been included in order to keep the tabulations to a minimum. However, the parallactic angle can be found through the simple interchange of arguments, thus effecting a complete solution. The applicable instructions are as follows:

(a) *When latitude and declination are of same name*, enter the tables with the appropriate local hour angle, with the declination as latitude argument of the same name and the latitude as declination argument, and extract the tabular azimuth angle as the parallactic angle.

(b) *When latitude and declination are of contrary name,* enter the tables with the appropriate local hour angle and with the declination as latitude argument of contrary name and the latitude as declination argument; the tabular azimuth angle is then the supplement of the parallactic angle (i.e., parallactic angle equals 180° minus the azimuth angle). This method generally requires the availability of all volumes of the series.

An approximate value of the parallactic angle, X, accurate enough for most navigational requirements, can be calculated directly from the formula, $\cos X = d/60'$, where d is the difference between successive tabular altitudes for the desired latitude, local hour angle and declination.

Within the limitations of the tabular precision and interval, the tabular data of these tables include the solution of any spherical triangle, given two sides and the included angle. When using the tables for the general solution of the spherical triangle, the use of latitude, declination, and altitude in the tables instead of their corresponding parts of the astronomical triangle must be kept in mind.

In general if any three parts of a spherical triangle are given, these tables can be used to find the remaining parts; this will sometimes mean searching through the volumes to find, for example, a particular altitude in a particular latitude and a given LHA in order to find the corresponding azimuth angle and declination.

5. Compass Error. One of the more frequent applications of sight reduction tables is their use in computing the azimuth of a celestial body for comparison with an observed azimuth in order to determine the error of the compass. In computing the azimuth of a celestial body, for the time and place of observation, it is normally necessary to interpolate the tabular azimuth angle as extracted from the tables for the differences between the table arguments and the actual values of declination, latitude, and local hour angle. The required triple interpolation of the azimuth angle is effected as follows:

(1)   The main tables are entered with the nearest integral values of declination, latitude, and local hour angle; for these arguments, a base azimuth angle is extracted.

(2)   The tables are reentered with the same latitude and LHA arguments but with the declination argument 1° greater or less than the base declination argument depending upon whether the actual declination is greater or less than the base argument. The difference between the respondent azimuth angle and the base azimuth angle establishes the azimuth angle difference (Z Diff.) for the increment of declination.

(3)   The tables are reentered with the base declination and LHA arguments but with the latitude argument 1° greater or less than the base latitude argument depending upon whether the actual (usually DR) latitude is greater or less than the base argument to find the Z Diff. for the increment of latitude.

(4)   The tables are reentered with the base declination and latitude arguments but with the LHA argument 1° greater or less than the base LHA argument depending upon whether the actual LHA is greater or less than the base argument to find the Z Diff. for the increment of LHA.

(5)   The correction to the base azimuth angle for each increment is Z Diff. $\times \dfrac{\text{Inc.}}{60'}$.

Example.—In DR Lat. 45°24.0′N, the azimuth of the Sun is observed as 096.8° pgc. At the time of the observation, the declination of the Sun is 20°13.8′N; the local hour angle of the Sun is 299°41.2′. The error of the gyrocompass is found as follows:

	Actual	Base Arguments	Base Z	Tab* Z	Z Diff.	Increments	Correction (Z Diff×Inc.÷60)
Dec.	20°13.8′N	20°	96.3°	95.4°	−0.9°	13.8′	−0.2°
DR Lat.	45°24.0′N	45° (Same)	96.3°	97.0°	+0.7°	24.0′	+0.3°
LHA	299°41.2′	300°	96.3°	95.6°	−0.7°	18.8′	−0.2°
						Total Corr.	−0.1°

Base Z	96.3°
Corr.	(−) 0.1°
Z	N 96.2°E
Zn	96.2°
Zn pgc	096.8°
Gyro Error	0.6°W

*Respondent for two base arguments and 1° change from third base argument, in vertical order of Dec., DR Lat., and LHA.

E. BACKGROUND

1. Accuracy of Tables. The tabular values as given in these tables have maximum and probable (50%) errors of ±0.05′ and ±0.025′ in altitude and ±0.05° and ±0.025° in azimuth angle.

The maximum error arising from the use of the Interpolation Table for the first-difference correction is ±0.14′, with a probable error of ±0.03′, when used for the interpolation of altitude for declination.

The maximum error arising from the use of the correction for second differences obtained from the Interpolation Table is ±0.12′ with a probable error of ± 0.03′.

When second differences are completely negligible, the maximum error of an interpolated altitude is ±0.19′ with a probable error of ±0.04′; when the second differences are not negligible and the second-difference correction is included in the interpolation, the maximum error of the calculated altitude will be ±0.31′ with a probable error of ±0.05′.

The largest value of the double-second difference when the value of d is not printed in italics is 3.9′, and if the correction for this value is neglected, an error of up to −0.24′ may be introduced into the computed altitude. But such an error is only possible when the altitude is greater than 60° and when the value of Dec. Inc. is close to 30′. The neglect of the second-difference correction when d is not printed in italics will rarely introduce an error as large as −0.2′.

For altitudes less than 86°, i.e., for zenith distances greater than 4°, interpolation of the tabular altitude for declination, utilizing both first and second differences and the Interpolation Table, may be made to within about 0.2′; linear interpolation for azimuth angle can be made to about 0.2°. Closer to the zenith, not only do second differences exceed the limits of the tables but higher differences are also significant.

When the body is in the zenith, its azimuth is indeterminate, that is when LHA is 0° and when latitude and declination are equal and have the Same Name. In these cases Z is tabulated as 90° or as one-half the preceding value. There are 91 of these cases.

When latitude is 90° and declination is 90°, the altitude is 90° for all hour angles. Here the value of Z tabulated is one-half the preceding value. There are 182 of these cases, two of which are included in the previous set. In the above cases the tabulated azimuth angles are the mathematical limits of the azimuth angle when the limit is approached in a specified direction.

In the special cases when the latitude is 90°, i.e., at the poles, all directions from the North Pole are south and from the South Pole are north; the criterion adopted in these cases has been to tabulate the azimuth as equal to 180° minus LHA, i.e., the directions are tabulated as the angular directions from the lower branch of the Greenwich Meridian. There are 90×180 of these cases not included in the previous sets.

2. Computation formulas. For latitude (L), declination (d) and local hour angle (LHA), the altitude (Hc) and the azimuth angle (Z) were calculated from the following formulas:

$$\sin Hc = \sin L \sin d + \cos L \cos d \cos LHA$$

$$\tan Z = \frac{\cos d \sin LHA}{\cos L \sin d - \sin L \cos d \cos LHA}$$

All values of altitude within 1°30′ of the zenith were recalculated using a more appropriate formula because determination of these high altitudes from their sines with only nine figures could introduce errors of the order of 0.0005′, which would sometimes affect the rounding off of the altitude to 0.1′. The formula used is equivalent to:

$$\sin^2 \tfrac{1}{2} z = \cos^2 \tfrac{1}{2} LHA \sin^2 \tfrac{1}{2} (L-d) + \sin^2 \tfrac{1}{2} LHA \cos^2 \tfrac{1}{2} (L+d), \text{ where z is the zenith distance.}$$

F. GLOSSARY

Altitude—the arc of a vertical circle between the horizon and a point or body on the celestial sphere. Altitude as measured by a sextant is called sextant altitude (**hs**). Sextant altitude corrected only for inaccuracies in the reading (instrument, index, and personal errors, as applicable) and inaccuracies in the reference level (principally dip) is called apparent altitude (**ha**). After all corrections are applied, it is called corrected sextant altitude or observed altitude (**Ho**). An altitude taken directly from a table is called a tabular or tabulated altitude (**ht**). Tabular altitude as interpolated for declination, latitude, and LHA increments as required is called computed altitude (**Hc**).

Altitude Difference (d)—the first difference between successive tabulations of altitude in a latitude column of these tables.

Argument—one of the values used for entering a table or diagram.

Assumed (or Chosen) Latitude (aL), Assumed (or Chosen) Longitude (aλ)—geographical coordinates assumed to facilitate sight reduction.

Assumed Position (AP)—a point at which an observer is assumed to be located.

Azimuth (Zn)—the horizontal direction of a celestial body or point from a terrestrial point; the arc of the horizon, or the angle at the zenith, between the north part of the celestial meridian or principal vertical circle and a vertical circle through the body or point, measured from 000° at the north part of the principal vertical circle clockwise through 360°.

Azimuth Angle (Z)—the arc of the horizon, or the angle at the zenith, between the north part or south part of the celestial meridian, according to the elevated pole, and a vertical circle through the body or point, measured from 0° at the north or south reference eastward or westward through 180° according to whether the body is east or west of the local meridian. It is prefixed N or S to agree with the latitude and suffixed E or W to agree with the meridian angle.

Celestial Equator—the primary great circle of the celestial sphere, everywhere 90° from the celestial poles; the intersection of the extended plane of the equator and the celestial sphere. Also called EQUINOCTIAL.

Celestial Horizon—that circle of the celestial sphere formed by the intersection of the celestial sphere and a plane through the center of the Earth and perpendicular to zenith-nadir line.

Celestial Meridian—on the celestial sphere, a great circle through the celestial poles and the zenith. The expression usually refers to the upper branch, that half from pole to pole which passes through the zenith.

Course Angle—course measured from 0° at the reference direction clockwise or counterclockwise through 180°. It is labeled with the reference direction as a prefix and the direction of measurement from the reference direction as a suffix. Thus, course angle S21°E is 21° east of south, or true course 159°.

Course Line—the graphic representation of a ship's course.

Declination (Dec.)—angular distance north or south of the celestial equator; the arc of an hour circle between the celestial equator and a point on the celestial sphere, measured northward or southward from the celestial equator through 90°, and labeled N or S (+ or −) to indicate the direction of measurement.

Declination Increment (Dec. Inc.)—in sight reduction, the excess of the actual declination of a celestial body over the integral declination argument.

Double-Second Difference (DSD)—the sum of successive second differences. Because second differences are not tabulated in these tables, the DSD can be formed most readily by subtracting, algebraically, the first difference immediately above the tabular altitude difference (d) corresponding to the entering arguments from the first difference immediately below. The result will always be a negative value.

Ecliptic—the apparent annual path of the Sun among the stars; the intersection of the plane of the Earth's orbit with the celestial sphere. This is a great circle of the celestial sphere inclined at an angle of about 23°27′ to the celestial equator.

Elevated Pole (Pn or Ps)—the celestial pole above the observer's horizon, agreeing in name with the observer's latitude.

First Difference—the difference between successive tabulations of a quantity.

First Point of Aries (Υ)—that point of intersection of the ecliptic and the celestial equator occupied by the Sun as it changes from south to north declination on or about March 21. Also called VERNAL EQUINOX.

Geographical Position (GP)—the point where a line drawn from a celestial body to the Earth's center passes through the Earth's surface.

Great Circle—the intersection of a sphere and a plane through its center.

Great-Circle Course—the direction of the great circle through the point of departure and the destination, expressed as angular distance from a reference direction, usually north, to the direction of the great circle. The angle varies from point to point along the great circle. At the point of departure it is called INITIAL GREAT-CIRCLE COURSE.

Greenwich Hour Angle (GHA)—angular distance west of the Greenwich celestial meridian; the arc of the celestial equator, or the angle at the celestial pole, between the upper branch of the Greenwich celestial meridian and the hour circle of a point on the celestial sphere, measured westward from the Greenwich celestial meridian through 360°.

Hour Circle—on the celestial sphere, a great circle through the celestial poles and a celestial body or the vernal equinox. Hour circles are perpendicular to the celestial equator.

Intercept (a)—the difference in minutes of arc between the computed and observed altitudes (corrected sextant altitudes). It is labeled T (toward) or A (away) as the observed altitude is greater or smaller than the computed altitude; Hc greater than Ho, intercept is away (A); Ho greater than Hc, intercept is toward (T).

Line of Position (LOP)—a line indicating a series of possible positions of a craft, determined by observation or measurement.

Local Hour Angle (LHA)—angular distance west of the local celestial meridian; the arc of the celestial equator, or the angle at the celestial pole, between the upper branch of the local celestial meridian and the hour circle of a celestial body or point on the celestial sphere, measured westward from the local celestial meridian through 360°.

Meridian Angle (t)—angular distance east or west of the local celestial meridian; the arc of the celestial equator, or the angle at the celestial pole, between the upper branch of the local celestial meridian and the hour circle of a celestial body, measured eastward or westward from the local celestial meridian through 180°, and labeled E or W to indicate the direction of measurement.

Nadir (Na)—that point on the celestial sphere 180° from the observer's zenith.

Name—the labels N and S which are attached to latitude and declination are said to be of the same name when they are both N or S and contrary name when one is N and the other is S.

Navigational Triangle—the spherical triangle solved in computing altitude and azimuth and great-circle sailing problems. The celestial triangle is formed on the celestial sphere by the great circles connecting the elevated pole, zenith of the assumed position of the observer, and a celestial body. The terrestrial triangle is formed on the Earth by the great circles connecting the pole and two places on the Earth: the assumed position of the observer and geographical position of the body for celestial observations, and the point of departure and destination for great-circle sailing problems. The term astronomical triangle applies to either the celestial or terrestrial triangle used for solving celestial observations.

Polar Distance (p)—angular distance from a celestial pole; the arc of an hour circle between a celestial pole, usually the elevated pole, and a point on the celestial sphere, measured from the celestial pole through 180°.

Prime Meridian—the meridian of longitude 0°, used as the origin for measurement of longitude.

Prime Vertical—the vertical circle through the east and west points of the horizon.

Principal Vertical Circle—the vertical circle through the north and south points of the horizon, coinciding with the celestial meridian.

Respondent—the value in a table or diagram corresponding to the entering arguments.

Second Difference—the difference between successive first differences.

Sidereal Hour Angle (SHA)—angular distance west of the vernal equinox; the arc of the celestial equator, or the angle at the celestial pole, between the hour circle of the vernal equinox and the hour circle of a point on the celestial sphere, measured westward from the hour circle of the vernal equinox through 360°.

Sight Reduction—the process of deriving from a sight (observation of the altitude, and sometimes also the azimuth, of a celestial body) the information needed for establishing a line of position.

Small Circle—the intersection of a sphere and a plane which does not pass through its center.

Vertical Circle—on the celestial sphere, a great circle through the zenith and nadir. Vertical circles are perpendicular to the horizon.

Zenith (Z)—that point on the celestial sphere vertically overhead.

Zenith Distance (z)—angular distance from the zenith; the arc of a vertical circle between the zenith and a point on the celestial sphere.

G. EXAMPLE SIGHT REDUCTIONS

Example—On February 25, 1973, the 0616 dead reckoning position of a ship is lat. 45°10′ N, long. 30°15′ W. The ship is on course 180°, speed 20 knots. Observations are made from a height of eye of 31 feet using a sextant having an index error of (+) 1.0′ as indicated below. Determine the 0616 fix.

Body	Zone Time	Sextant Altitude	SHA	Declination
Deneb	6^{h}09^{m}04^s	46°42.9′	49°52.5′	45°10.9′ N
Antares	6^{h}12^{m}05^s	18°56.1′	113°03.3′	26°22.5′ S
Vega	6^{h}16^{m}02^s	66°55.5′	80°59.6′	38°45.2′ N

	DENEB		ANTARES		VEGA
GMT (Feb. 25)	08^{h}09^{m}04^s		08^{h}12^{m}05^s		08^{h}16^{m}02^s
GHA ♈ for 8^h GMT	275°02.6′		275°02.6′		275°02.6′
Increments — 09^{m}04^s	2°16.4′	12^{m}05^s	3°01.7′	16^{m}02^s	4°01.2′
SHA ☆	49°52.5′		113°03.3′		80°59.6′
GHA ☆	327°11.5′		31°07.6′		360°03.4′
aλ	30°11.5′W		30°07.6′W		30°03.4′W
LHA ☆	297°00.0′		1°00.0′		330°00.0′
Dec.	45°10.9′N		26°22.5′S		38°45.2′N
Dec. Inc.	10.9′		22.5′		45.2′
aL	45°00.0′N		45°00.0′N		45°00.0′N
ht (Tab. Hc)	46°38.1′		18°59.6′		66°37.2′
d and correction (+)23.4′	(+) 4.3′	(−) 59.9′	(−) 22.5′	(+) 26.3′·	(+) 20.0′
Hc	46°42.4′		18°37.1′		66°57.2′
Ho	46°35.6′		18°46.9′		66°48.7′
a	6.8 A		9.8 T		8.5 A
Z and Zn — N66.4°E	066.4°	N179.0°W	181.0°	N95.1°E	095.1°
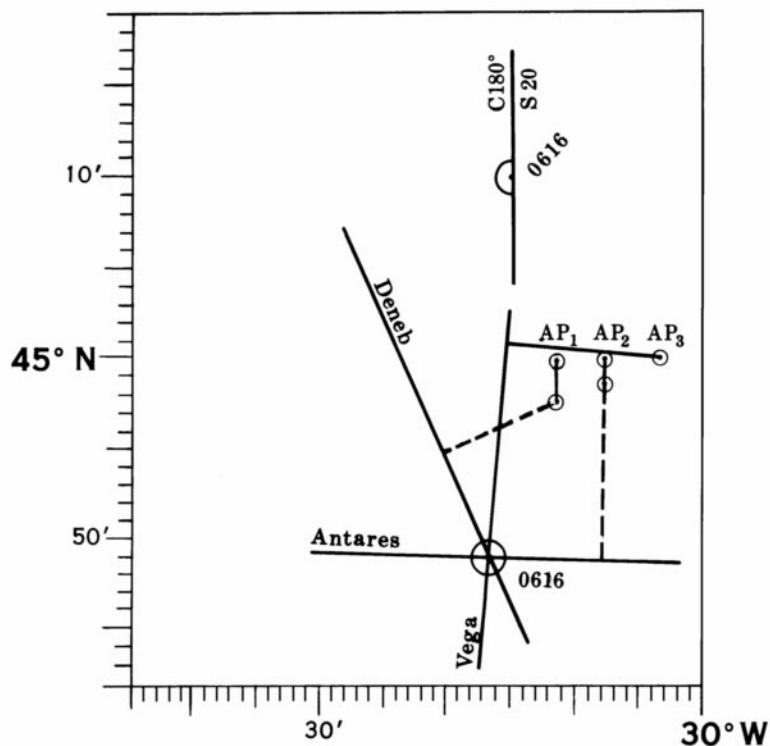
FIGURE 14

Note.—In figure 14 the assumed position of the Deneb line of position is advanced 2.3 miles for a 7-minute run and the assumed position of the Antares line of position is advanced 1.3 miles for a 4-minute run, both in the direction of the course 180°, to obtain a fix at the time of the Vega sight. Each azimuth angle is interpolated for declination increment. The interpolation of the tabular altitude of the Vega sight includes a DSD correction of (+) 0.2′.

SIGHT REDUCTION TABLES

FOR

MARINE NAVIGATION

LATITUDES 45°—60°, Inclusive

0°, 360° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°.............Zn=360°–Z

Dec.	45°	46°	47°	48°	49°	50°	51°	52°	Dec.
	Hc d Z	Hc d Z	Hc d Z	Hc d Z	Hc d Z	Hc d Z	Hc d Z	Hc d Z	
0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	43 00.0 +60.0 180.0	42 00.0 +60.0 180.0	41 00.0 +60.0 180.0	40 00.0 +60.0 180.0	39 00.0 +60.0 180.0	38 00.0 +60.0 180.0	0
1	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	43 00.0 +60.0 180.0	42 00.0 +60.0 180.0	41 00.0 +60.0 180.0	40 00.0 +60.0 180.0	39 00.0 +60.0 180.0	1
2	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	43 00.0 +60.0 180.0	42 00.0 +60.0 180.0	41 00.0 +60.0 180.0	40 00.0 +60.0 180.0	2
3	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	43 00.0 +60.0 180.0	42 00.0 +60.0 180.0	41 00.0 +60.0 180.0	3
4	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	43 00.0 +60.0 180.0	42 00.0 +60.0 180.0	4
5	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	43 00.0 +60.0 180.0	5
6	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	44 00.0 +60.0 180.0	6
7	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	45 00.0 +60.0 180.0	7
8	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	46 00.0 +60.0 180.0	8
9	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	47 00.0 +60.0 180.0	9
10	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	48 00.0 +60.0 180.0	10
11	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	49 00.0 +60.0 180.0	11
12	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	50 00.0 +60.0 180.0	12
13	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	51 00.0 +60.0 180.0	13
14	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	52 00.0 +60.0 180.0	14
15	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	53 00.0 +60.0 180.0	15
16	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	54 00.0 +60.0 180.0	16
17	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	55 00.0 +60.0 180.0	17
18	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	56 00.0 +60.0 180.0	18
19	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	57 00.0 +60.0 180.0	19
20	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	58 00.0 +60.0 180.0	20
21	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	59 00.0 +60.0 180.0	21
22	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	60 00.0 +60.0 180.0	22
23	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	61 00.0 +60.0 180.0	23
24	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	62 00.0 +60.0 180.0	24
25	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	63 00.0 +60.0 180.0	25
26	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	64 00.0 +60.0 180.0	26
27	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	65 00.0 +60.0 180.0	27
28	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	66 00.0 +60.0 180.0	28
29	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	67 00.0 +60.0 180.0	29
30	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	68 00.0 +60.0 180.0	30
31	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	69 00.0 +60.0 180.0	31
32	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	70 00.0 +60.0 180.0	32
33	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	71 00.0 +60.0 180.0	33
34	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	72 00.0 +60.0 180.0	34
35	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	73 00.0 +60.0 180.0	35
36	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	74 00.0 +60.0 180.0	36
37	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	75 00.0 +60.0 180.0	37
38	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	76 00.0 +60.0 180.0	38
39	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	77 00.0 +60.0 180.0	39
40	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	78 00.0 +60.0 180.0	40
41	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	79 00.0 +60.0 180.0	41
42	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	80 00.0 +60.0 180.0	42
43	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	81 00.0 +60.0 180.0	43
44	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	82 00.0 +60.0 180.0	44
45	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	83 00.0 +60.0 180.0	45
46	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	84 00.0 +60.0 180.0	46
47	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	85 00.0 +60.0 180.0	47
48	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	86 00.0 +60.0 180.0	48
49	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	87 00.0 +60.0 180.0	49
50	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	88 00.0 +60.0 180.0	50
51	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	89 00.0 +60.0 180.0	51
52	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	90 00.0 −60.0 90.0	52
53	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	89 00.0 −60.0 0.0	53
54	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	88 00.0 −60.0 0.0	54
55	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	87 00.0 −60.0 0.0	55
56	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	86 00.0 −60.0 0.0	56
57	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	85 00.0 −60.0 0.0	57
58	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	84 00.0 −60.0 0.0	58
59	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	83 00.0 −60.0 0.0	59
60	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	82 00.0 −60.0 0.0	60
61	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	81 00.0 −60.0 0.0	61
62	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	80 00.0 −60.0 0.0	62
63	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	79 00.0 −60.0 0.0	63
64	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	78 00.0 −60.0 0.0	64
65	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	77 00.0 −60.0 0.0	65
66	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	76 00.0 −60.0 0.0	66
67	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	75 00.0 −60.0 0.0	67
68	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	74 00.0 −60.0 0.0	68
69	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	73 00.0 −60.0 0.0	69
70	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	72 00.0 −60.0 0.0	70
71	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	71 00.0 −60.0 0.0	71
72	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	70 00.0 −60.0 0.0	72
73	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	69 00.0 −60.0 0.0	73
74	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	68 00.0 −60.0 0.0	74
75	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	67 00.0 −60.0 0.0	75
76	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	66 00.0 −60.0 0.0	76
77	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	65 00.0 −60.0 0.0	77
78	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	64 00.0 −60.0 0.0	78
79	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	63 00.0 −60.0 0.0	79
80	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	62 00.0 −60.0 0.0	80
81	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	81
82	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	82
83	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	83
84	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	84
85	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	85
86	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	86
87	48 00.0 −60.0 0.0	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	87
88	47 00.0 −60.0 0.0	48 00.0 −60.0 0.0	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	88
89	46 00.0 −60.0 0.0	47 00.0 −60.0 0.0	48 00.0 −60.0 0.0	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	89
90	45 00.0 −60.0 0.0	46 00.0 −60.0 0.0	47 00.0 −60.0 0.0	48 00.0 −60.0 0.0	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	45 00.0	−60.0	180.0	44 00.0	−60.0	180.0	43 00.0	−60.0	180.0	42 00.0	−60.0	180.0	41 00.0	−60.0	180.0	40 00.0	−60.0	180.0	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	0
1	44 00.0	−60.0	180.0	43 00.0	−60.0	180.0	42 00.0	−60.0	180.0	41 00.0	−60.0	180.0	40 00.0	−60.0	180.0	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	1
2	43 00.0	−60.0	180.0	42 00.0	−60.0	180.0	41 00.0	−60.0	180.0	40 00.0	−60.0	180.0	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	2
3	42 00.0	−60.0	180.0	41 00.0	−60.0	180.0	40 00.0	−60.0	180.0	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	3
4	41 00.0	−60.0	180.0	40 00.0	−60.0	180.0	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	4
5	40 00.0	−60.0	180.0	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	5
6	39 00.0	−60.0	180.0	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	6
7	38 00.0	−60.0	180.0	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	7
8	37 00.0	−60.0	180.0	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	8
9	36 00.0	−60.0	180.0	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	9
10	35 00.0	−60.0	180.0	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	10
11	34 00.0	−60.0	180.0	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	11
12	33 00.0	−60.0	180.0	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	12
13	32 00.0	−60.0	180.0	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	13
14	31 00.0	−60.0	180.0	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	14
15	30 00.0	−60.0	180.0	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	15
16	29 00.0	−60.0	180.0	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	16
17	28 00.0	−60.0	180.0	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	17
18	27 00.0	−60.0	180.0	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	18
19	26 00.0	−60.0	180.0	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	19
20	25 00.0	−60.0	180.0	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	20
21	24 00.0	−60.0	180.0	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	21
22	23 00.0	−60.0	180.0	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	22
23	22 00.0	−60.0	180.0	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	23
24	21 00.0	−60.0	180.0	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	24
25	20 00.0	−60.0	180.0	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	25
26	19 00.0	−60.0	180.0	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	26
27	18 00.0	−60.0	180.0	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	27
28	17 00.0	−60.0	180.0	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	28
29	16 00.0	−60.0	180.0	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	29
30	15 00.0	−60.0	180.0	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	30
31	14 00.0	−60.0	180.0	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	31
32	13 00.0	−60.0	180.0	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	32
33	12 00.0	−60.0	180.0	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	33
34	11 00.0	−60.0	180.0	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	34
35	10 00.0	−60.0	180.0	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	35
36	9 00.0	−60.0	180.0	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	36
37	8 00.0	−60.0	180.0	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	37
38	7 00.0	−60.0	180.0	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	38
39	6 00.0	−60.0	180.0	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	39
40	5 00.0	−60.0	180.0	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	40
41	4 00.0	−60.0	180.0	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	41
42	3 00.0	−60.0	180.0	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	42
43	2 00.0	−60.0	180.0	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	43
44	1 00.0	−60.0	180.0	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	44
45	0 00.0	+60.0	0.0	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	45
46	1 00.0	+60.0	0.0	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	46
47	2 00.0	+60.0	0.0	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	47
48	3 00.0	+60.0	0.0	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	48
49	4 00.0	+60.0	0.0	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	49
50	5 00.0	+60.0	0.0	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	50
51	6 00.0	+60.0	0.0	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	51
52	7 00.0	+60.0	0.0	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	52
53	8 00.0	+60.0	0.0	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	53
54	9 00.0	+60.0	0.0	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	54
55	10 00.0	+60.0	0.0	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	55
56	11 00.0	+60.0	0.0	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	56
57	12 00.0	+60.0	0.0	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	57
58	13 00.0	+60.0	0.0	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	58
59	14 00.0	+60.0	0.0	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	59
60	15 00.0	+60.0	0.0	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	60
61	16 00.0	+60.0	0.0	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	61
62	17 00.0	+60.0	0.0	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	62
63	18 00.0	+60.0	0.0	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	63
64	19 00.0	+60.0	0.0	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	64
65	20 00.0	+60.0	0.0	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	65
66	21 00.0	+60.0	0.0	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	66
67	22 00.0	+60.0	0.0	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	67
68	23 00.0	+60.0	0.0	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	68
69	24 00.0	+60.0	0.0	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	69
70	25 00.0	+60.0	0.0	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	70
71	26 00.0	+60.0	0.0	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	71
72	27 00.0	+60.0	0.0	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	72
73	28 00.0	+60.0	0.0	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	73
74	29 00.0	+60.0	0.0	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	74
75	30 00.0	+60.0	0.0	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	75
76	31 00.0	+60.0	0.0	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	76
77	32 00.0	+60.0	0.0	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	77
78	33 00.0	+60.0	0.0	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	78
79	34 00.0	+60.0	0.0	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	79
80	35 00.0	+60.0	0.0	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	80
81	36 00.0	+60.0	0.0	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	81
82	37 00.0	+60.0	0.0	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	82
83	38 00.0	+60.0	0.0	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	83
84	39 00.0	+60.0	0.0	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	84
85	40 00.0	+60.0	0.0	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	85
86	41 00.0	+60.0	0.0	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	86
87	42 00.0	+60.0	0.0	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	87
88	43 00.0	+60.0	0.0	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	88
89	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	89
90	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 180°, 180°**

Each latitude cell below is given as **Hc** (° ′) **d** (′) **Z** (°).

Dec.	45°	46°	47°	48°	49°	50°	51°	52°	Dec.
0	44 59.5 +60.0 178.6	43 59.5 +60.0 178.6	42 59.5 +60.0 178.6	41 59.5 +60.0 178.7	40 59.5 +60.0 178.7	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	37 59.6 +60.0 178.7	0
1	45 59.5 +59.9 178.6	44 59.5 +60.0 178.6	43 59.5 +60.0 178.6	42 59.5 +60.0 178.6	41 59.5 +60.0 178.7	40 59.6 +59.9 178.7	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	1
2	46 59.5 +59.9 178.5	45 59.5 +60.0 178.6	44 59.5 +60.0 178.6	43 59.5 +60.0 178.6	42 59.5 +60.0 178.6	41 59.5 +60.0 178.7	40 59.6 +60.0 178.7	39 59.6 +60.0 178.7	2
3	47 59.4 +60.0 178.5	46 59.5 +60.0 178.6	45 59.5 +60.0 178.6	44 59.5 +60.0 178.6	43 59.5 +60.0 178.6	42 59.5 +60.0 178.6	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	3
4	48 59.4 +59.9 178.5	47 59.5 +59.9 178.5	46 59.5 +60.0 178.5	45 59.4 +60.0 178.6	44 59.5 +60.0 178.6	43 59.5 +60.0 178.6	42 59.5 +59.9 178.7	41 59.6 +59.9 178.7	4
5	49 59.4 +60.0 178.5	48 59.4 +60.0 178.5	47 59.5 +60.0 178.5	46 59.5 +60.0 178.5	45 59.5 +60.0 178.5	44 59.5 +60.0 178.6	43 59.5 +59.9 178.6	42 59.6 +60.0 178.6	5
6	50 59.4 +60.0 178.4	49 59.4 +60.0 178.5	48 59.5 +59.9 178.5	47 59.5 +60.0 178.5	46 59.5 +60.0 178.5	45 59.5 +60.0 178.6	44 59.5 +60.0 178.6	43 59.6 +59.9 178.6	6
7	51 59.4 +60.0 178.4	50 59.4 +60.0 178.4	49 59.5 +60.0 178.4	48 59.5 +59.9 178.5	47 59.5 +60.0 178.5	46 59.5 +60.0 178.5	45 59.5 +60.0 178.6	44 59.5 +60.0 178.6	7
8	52 59.4 +60.0 178.4	51 59.4 +60.0 178.4	50 59.4 +60.0 178.4	49 59.4 +60.0 178.5	48 59.5 +60.0 178.5	47 59.5 +60.0 178.5	46 59.5 +60.0 178.5	45 59.5 +60.0 178.6	8
9	53 59.4 +60.0 178.3	52 59.4 +60.0 178.4	51 59.4 +60.0 178.4	50 59.5 +59.9 178.4	49 59.5 +60.0 178.5	48 59.5 +60.0 178.5	47 59.5 +60.0 178.5	46 59.5 +60.0 178.6	9
10	54 59.4 +60.0 178.3	53 59.4 +60.0 178.3	52 59.4 +60.0 178.4	51 59.4 +60.0 178.4	50 59.5 +60.0 178.4	49 59.5 +60.0 178.4	48 59.5 +60.0 178.5	47 59.5 +60.0 178.5	10
11	55 59.4 +59.9 178.2	54 59.4 +60.0 178.3	53 59.4 +60.0 178.3	52 59.4 +60.0 178.4	51 59.5 +59.9 178.4	50 59.5 +60.0 178.4	49 59.5 +60.0 178.5	48 59.5 +60.0 178.5	11
12	56 59.3 +60.0 178.2	55 59.4 +59.9 178.3	54 59.4 +60.0 178.3	53 59.4 +60.0 178.3	52 59.4 +60.0 178.4	51 59.5 +60.0 178.4	50 59.5 +60.0 178.4	49 59.5 +60.0 178.5	12
13	57 59.3 +60.0 178.2	56 59.3 +60.0 178.2	55 59.4 +59.9 178.3	54 59.4 +60.0 178.3	53 59.4 +60.0 178.3	52 59.5 +59.9 178.3	51 59.5 +60.0 178.4	50 59.5 +60.0 178.4	13
14	58 59.3 +60.0 178.1	57 59.3 +60.0 178.2	56 59.4 +59.9 178.2	55 59.4 +60.0 178.3	54 59.4 +60.0 178.3	53 59.4 +60.0 178.3	52 59.5 +60.0 178.4	51 59.5 +60.0 178.4	14
15	59 59.3 +60.0 178.1	58 59.3 +60.0 178.1	57 59.3 +60.0 178.2	56 59.4 +60.0 178.2	55 59.4 +60.0 178.3	54 59.4 +60.0 178.3	53 59.5 +59.9 178.4	52 59.5 +60.0 178.4	15
16	60 59.3 +59.9 178.0	59 59.3 +60.0 178.1	58 59.3 +60.0 178.1	57 59.4 +59.9 178.2	56 59.4 +60.0 178.2	55 59.4 +60.0 178.3	54 59.4 +60.0 178.3	53 59.5 +60.0 178.4	16
17	61 59.2 +60.0 178.0	60 59.3 +60.0 178.0	59 59.3 +60.0 178.1	58 59.3 +60.0 178.1	57 59.4 +60.0 178.2	56 59.4 +60.0 178.2	55 59.4 +60.0 178.3	54 59.5 +60.0 178.3	17
18	62 59.2 +60.0 177.9	61 59.3 +59.9 178.0	60 59.3 +60.0 178.0	59 59.3 +60.0 178.1	58 59.4 +60.0 178.2	57 59.4 +60.0 178.2	56 59.4 +60.0 178.3	55 59.5 +59.9 178.3	18
19	63 59.2 +60.0 177.8	62 59.2 +60.0 177.9	61 59.3 +60.0 178.0	60 59.3 +60.0 178.1	59 59.4 +59.9 178.1	58 59.4 +60.0 178.2	57 59.4 +60.0 178.2	56 59.4 +60.0 178.3	19
20	64 59.2 +60.0 177.8	63 59.2 +60.0 177.9	62 59.3 +59.9 177.9	61 59.3 +60.0 178.0	60 59.3 +60.0 178.1	59 59.4 +60.0 178.1	58 59.4 +60.0 178.2	57 59.4 +60.0 178.2	20
21	65 59.2 +59.9 177.7	64 59.2 +60.0 177.8	63 59.2 +60.0 177.9	62 59.3 +60.0 177.9	61 59.3 +60.0 178.0	60 59.4 +59.9 178.1	59 59.4 +60.0 178.1	58 59.4 +60.0 178.2	21
22	66 59.1 +60.0 177.6	65 59.2 +59.9 177.7	64 59.2 +60.0 177.8	63 59.3 +59.9 177.9	62 59.3 +60.0 178.0	61 59.3 +60.0 178.0	60 59.4 +60.0 178.1	59 59.4 +60.0 178.1	22
23	67 59.1 +60.0 177.5	66 59.1 +60.0 177.6	65 59.2 +60.0 177.7	64 59.2 +60.0 177.8	63 59.3 +60.0 177.9	62 59.3 +60.0 178.0	61 59.4 +59.9 178.0	60 59.4 +60.0 178.1	23
24	68 59.1 +59.9 177.5	67 59.1 +60.0 177.6	66 59.2 +59.9 177.7	65 59.2 +60.0 177.8	64 59.2 +60.0 177.8	63 59.3 +60.0 177.9	62 59.3 +60.0 178.0	61 59.4 +60.0 178.1	24
25	69 59.0 +60.0 177.4	68 59.1 +59.9 177.4	67 59.1 +60.0 177.6	66 59.2 +60.0 177.7	65 59.2 +60.0 177.7	64 59.3 +60.0 177.8	63 59.3 +60.0 177.9	62 59.3 +59.9 178.0	25
26	70 59.0 +59.9 177.2	69 59.0 +60.0 177.4	68 59.1 +60.0 177.5	67 59.2 +59.9 177.6	66 59.2 +60.0 177.7	65 59.3 +60.0 177.8	64 59.3 +60.0 177.8	63 59.3 +60.0 178.0	26
27	71 58.9 +60.0 177.1	70 59.0 +60.0 177.3	69 59.1 +59.9 177.4	68 59.1 +60.0 177.5	67 59.2 +60.0 177.6	66 59.2 +60.0 177.7	65 59.3 +60.0 177.8	64 59.3 +60.0 177.9	27
28	72 58.9 +59.9 177.0	71 59.0 +59.9 177.2	70 59.0 +60.0 177.3	69 59.1 +59.9 177.4	68 59.2 +60.0 177.5	67 59.2 +60.0 177.6	66 59.3 +59.9 177.7	65 59.3 +60.0 177.8	28
29	73 58.8 +60.0 176.8	72 58.9 +60.0 177.0	71 59.0 +59.9 177.2	70 59.1 +59.9 177.3	69 59.1 +60.0 177.4	68 59.2 +59.9 177.6	67 59.2 +60.0 177.7	66 59.3 +60.0 177.8	29
30	74 58.8 +59.9 176.7	73 58.9 +59.9 176.9	72 58.9 +60.0 177.0	71 59.0 +60.0 177.2	70 59.1 +59.9 177.4	69 59.1 +59.9 177.5	68 59.2 +60.0 177.6	67 59.3 +59.9 177.7	30
31	75 58.7 +59.9 176.5	74 58.8 +59.9 176.7	73 58.9 +59.9 176.9	72 59.0 +59.9 177.1	71 59.0 +60.0 177.2	70 59.1 +59.9 177.3	69 59.2 +59.9 177.5	68 59.2 +60.0 177.6	31
32	76 58.6 +59.9 176.2	75 58.7 +59.9 176.5	74 58.8 +60.0 176.7	73 58.9 +59.9 176.9	72 59.0 +59.9 177.1	71 59.1 +59.9 177.3	70 59.1 +60.0 177.4	69 59.2 +60.0 177.5	32
33	77 58.5 +59.9 176.0	76 58.6 +60.0 176.3	75 58.8 +59.9 176.5	74 58.9 +59.9 176.8	73 59.0 +59.9 177.0	72 59.0 +59.9 177.1	71 59.1 +59.9 177.3	70 59.2 +59.9 177.4	33
34	78 58.4 +59.9 175.7	77 58.7 +59.9 176.3	76 58.7 +59.9 176.3	75 58.8 +59.9 176.6	74 58.9 +59.9 176.8	73 59.0 +60.0 177.0	72 59.1 +59.9 177.2	71 59.1 +60.0 177.3	34
35	79 58.3 +59.8 175.3	78 58.4 +59.9 175.7	77 58.6 +59.9 176.1	76 58.7 +59.9 176.4	75 58.8 +59.9 176.6	74 58.9 +59.9 176.8	73 59.0 +59.9 177.0	72 59.1 +60.0 177.2	35
36	80 58.1 +59.8 174.8	79 58.3 +59.8 175.3	78 58.5 +59.9 175.8	77 58.6 +59.9 176.1	76 58.8 +59.9 176.4	75 58.9 +59.9 176.7	74 59.0 +59.9 176.9	73 59.1 +59.9 177.1	36
37	81 57.9 +59.7 174.3	80 58.1 +59.8 174.8	79 58.5 +59.9 175.4	78 58.5 +59.9 175.8	77 58.6 +59.9 176.2	76 58.8 +59.9 176.5	75 58.9 +59.9 176.8	74 59.0 +59.9 176.9	37
38	82 57.6 +59.7 173.6	81 57.9 +59.8 174.4	80 58.2 +59.8 175.0	79 58.4 +59.8 175.5	78 58.6 +59.9 175.9	77 58.7 +59.9 176.2	76 58.8 +59.9 176.5	75 59.0 +59.9 176.7	38
39	83 57.3 +59.5 172.6	82 57.7 +59.6 173.6	81 58.0 +59.8 174.4	80 58.3 +59.8 175.0	79 58.5 +59.8 175.5	78 58.6 +59.9 175.9	77 58.8 +59.9 176.3	76 58.9 +59.9 176.5	39
40	84 56.8 +59.2 171.3	83 57.3 +59.6 172.7	82 57.8 +59.6 173.7	81 58.1 +59.7 174.5	80 58.3 +59.8 175.1	79 58.5 +59.8 175.6	78 58.7 +59.9 176.0	77 58.8 +59.9 176.3	40
41	85 56.0 +58.8 169.3	84 56.9 +59.3 171.4	83 57.4 +59.6 172.8	82 57.9 +59.6 173.8	81 58.1 +59.8 174.5	80 58.4 +59.8 175.1	79 58.6 +59.9 175.7	78 58.7 +59.9 175.9	41
42	86 54.8 +57.7•166.1	85 56.2 +58.8 169.5	84 57.0 +59.3 171.5	83 57.5 +59.6 172.9	82 57.9 +59.7 173.9	81 58.2 +59.8 174.7	80 58.4 +59.9 175.3	79 58.6 +59.9 175.7	42
43	87 52.5 +53.8•159.9	86 55.0 +57.7•166.3	85 56.3 +58.9 169.6	84 57.1 +59.3 171.7	83 57.6 +59.6 173.0	82 58.0 +59.7 174.0	81 58.3 +59.8 174.8	80 58.5 +59.8 175.1	43
44	88 46.3 +31.3•144.2	87 52.7 +54.0•160.2	86 55.2 +57.8•166.5	85 56.4 +58.9 169.8	84 57.2 +59.3 171.8	83 57.7 +59.7 173.1	82 58.1 +59.7 174.1	81 58.3 +59.8 174.8	44
45	89 17.6 −30.9• 89.6	88 46.7 +31.6•144.6	87 53.0 +54.2•160.5	86 55.3 +57.9•166.7	85 56.6 +59.0 170.0	84 57.3 +59.4 171.9	83 57.8 +59.6 173.3	82 58.1 +59.8 174.2	45
46	88 46.7 −53.7• 34.7	89 18.3 −31.1• 89.6	88 47.2 +31.9•145.1	87 53.2 +54.4•160.8	86 55.5 +58.0•166.9	85 56.7 +59.0 170.1	84 57.4 +59.4 172.1	83 57.9 +59.6 173.4	46
47	87 53.0 −57.7• 18.8	88 47.2 −54.0• 34.2	89 19.1 −31.5• 89.6	88 47.8 +32.3•145.6	87 53.3 +54.5•161.1	86 55.5 +58.0•167.2	85 56.9 +59.1 170.3	84 57.5 +59.4 172.2	47
48	86 55.3 −58.8 12.6	87 53.2 −57.7• 18.5	88 47.6 −54.1• 33.7	89 19.9 −31.9• 89.6	88 48.0 +32.6•146.1	87 53.7 +54.8•161.5	86 55.8 +58.2•167.4	85 56.9 +59.1 170.5	48
49	85 56.5 −59.2 9.3	86 55.5 −58.8 12.3	87 53.5 −57.8 18.1	88 48.0 −54.3• 33.2	89 20.6 −32.1• 89.6	88 48.5 +32.9•146.6	87 54.0 +54.9•161.8	86 56.0 +58.2•167.6	49
50	84 57.3 −59.5 7.3	85 56.7 −59.3 9.1	86 55.7 −59.3 12.1	87 53.7 −57.9 17.8	88 48.5 −54.5• 32.6	89 21.4 −32.5• 89.6	88 48.9 +33.3•147.2	87 54.2 +55.1•162.1	50
51	83 57.8 −59.7 6.0	84 57.4 −59.5 7.2	85 56.8 −59.3 8.9	86 55.8 −58.9 11.8	87 54.0 −58.0• 17.4	88 48.9 −54.7• 32.1	89 22.2 −32.9• 89.6	88 49.3 +33.8•147.7	51
52	82 58.1 −59.7 5.0	83 57.9 −59.7 5.9	84 57.5 −59.6 7.0	85 56.9 −59.3 8.7	86 56.0 −58.9 11.6	87 54.2 −58.0• 17.1	88 49.3 −54.9• 31.5	89 23.1 −33.3• 89.6	52
53	81 58.4 −59.8 4.3	82 58.2 −59.8 4.9	83 57.9 −59.8 5.7	84 57.6 −59.6 6.9	85 57.1 −59.4 8.4	86 56.3 −59.0 11.3	87 54.4 −58.1• 16.7	88 49.8 −55.1• 30.9	53
54	80 58.6 −59.8 3.8	81 58.5 −59.8 4.2	82 58.3 −59.8 4.8	83 58.0 −59.8 5.6	84 57.7 −59.6 6.7	85 57.2 −59.4 8.4	86 56.3 −59.0 11.1	87 54.7 −58.2• 16.3	54
55	79 58.8 −59.9 3.3	80 58.7 −59.9 3.7	81 58.5 −59.8 4.1	82 58.4 −59.8 4.7	83 58.1 −59.7 5.5	84 57.8 −59.6 6.5	85 57.3 −59.4 8.2	86 56.5 −59.1 10.8	55
56	78 58.9 −59.9 2.9	79 58.8 −59.9 3.2	80 58.7 −59.9 3.6	81 58.6 −59.8 4.0	82 58.4 −59.7 4.6	83 58.2 −59.7 5.4	84 57.9 −59.6 6.4	85 57.4 −59.4 8.0	56
57	77 59.0 −59.9 2.6	78 59.0 −59.9 2.9	79 58.8 −59.9 3.1	80 58.8 −59.9 3.5	81 58.7 −59.8 3.9	82 58.5 −59.7 4.5	83 58.3 −59.7 5.2	84 58.0 −59.6 6.2	57
58	76 59.1 −59.9 2.4	77 59.1 −59.9 2.5	78 59.0 −59.8 2.8	79 58.9 −59.8 3.0	80 58.8 −59.8 3.4	81 58.7 −59.8 3.8	82 58.6 −59.8 4.3	83 58.4 −59.8 5.1	58
59	75 59.2 −59.9 2.1	76 59.2 −59.9 2.3	77 59.1 −59.9 2.5	78 59.1 −59.9 2.7	79 59.0 −59.9 3.0	80 58.9 −59.9 3.3	81 58.8 −59.8 3.7	82 58.6 −59.8 4.2	59
60	74 59.3 −60.0 1.9	75 59.2 −59.9 2.1	76 59.2 −59.9 2.2	77 59.2 −60.0 2.4	78 59.1 −59.9 2.6	79 59.0 −59.9 2.9	80 58.9 −59.9 3.2	81 58.8 −59.8 3.6	60
61	73 59.3 −59.9 1.8	74 59.3 −59.9 1.9	75 59.3 −59.9 2.0	76 59.2 −59.9 2.2	77 59.2 −60.0 2.3	78 59.1 −59.9 2.5	79 59.1 −59.9 2.8	80 59.0 −59.9 3.1	61
62	72 59.4 −59.9 1.6	73 59.4 −59.9 1.7	74 59.4 −59.9 1.8	75 59.3 −59.9 1.9	76 59.3 −60.0 2.1	77 59.2 −59.9 2.3	78 59.2 −59.9 2.5	79 59.2 −59.9 2.7	62
63	71 59.5 −60.0 1.5	72 59.4 −59.9 1.6	73 59.4 −59.9 1.6	74 59.4 −60.0 1.8	75 59.4 −60.0 1.9	76 59.3 −59.9 2.0	77 59.3 −59.9 2.2	78 59.2 −59.9 2.4	63
64	70 59.5 −60.0 1.3	71 59.5 −60.0 1.4	72 59.4 −59.9 1.5	73 59.4 −59.9 1.6	74 59.4 −59.9 1.7	75 59.4 −60.0 1.8	76 59.4 −60.0 1.9	77 59.3 −59.9 2.1	64
65	69 59.5 −59.9 1.2	70 59.5 −59.9 1.3	71 59.5 −59.9 1.4	72 59.5 −59.9 1.4	73 59.5 −59.9 1.5	74 59.5 −60.0 1.6	75 59.4 −59.9 1.7	76 59.4 −59.9 1.9	65
66	68 59.6 −59.9 1.1	69 59.6 −60.0 1.2	70 59.6 −60.0 1.2	71 59.5 −59.9 1.3	72 59.5 −59.9 1.4	73 59.5 −59.9 1.5	74 59.5 −59.9 1.6	75 59.4 −59.9 1.7	66
67	67 59.6 −60.0 1.0	68 59.6 −60.0 1.1	69 59.6 −60.0 1.1	70 59.6 −60.0 1.2	71 59.6 −59.9 1.3	72 59.5 −59.9 1.3	73 59.5 −59.9 1.4	74 59.5 −59.9 1.5	67
68	66 59.6 −59.9 1.0	67 59.7 −60.0 1.0	68 59.6 −60.0 1.0	69 59.6 −59.9 1.1	70 59.6 −59.9 1.2	71 59.6 −59.9 1.2	72 59.6 −60.0 1.3	73 59.6 −60.0 1.4	68
69	65 59.7 −60.0 0.9	66 59.7 −60.0 0.9	67 59.7 −60.0 1.0	68 59.6 −59.9 1.0	69 59.6 −59.9 1.0	70 59.6 −59.9 1.1	71 59.6 −59.9 1.2	72 59.6 −60.0 1.2	69
70	64 59.7 −60.0 0.8	65 59.7 −60.0 0.8	66 59.7 −60.0 0.9	67 59.7 −60.0 0.9	68 59.7 −60.0 1.0	69 59.7 −60.0 1.0	70 59.7 −60.0 1.1	71 59.6 −59.9 1.1	70
71	63 59.7 −60.0 0.7	64 59.7 −60.0 0.8	65 59.7 −59.9 0.8	66 59.7 −59.9 0.8	67 59.7 −60.0 0.9	68 59.7 −60.0 0.9	69 59.7 −60.0 1.0	70 59.7 −60.0 1.0	71
72	62 59.7 −59.9 0.7	63 59.8 −59.9 0.7	64 59.7 −59.9 0.7	65 59.7 −59.9 0.8	66 59.7 −59.9 0.8	67 59.7 −59.9 0.8	68 59.7 −59.9 0.9	69 59.7 −60.0 0.9	72
73	61 59.8 −60.0 0.6	62 59.8 −60.0 0.6	63 59.8 −59.9 0.7	64 59.8 −60.0 0.7	65 59.8 −60.0 0.7	66 59.7 −59.9 0.7	67 59.7 −59.9 0.8	68 59.7 −59.9 0.8	73
74	60 59.8 −60.0 0.6	61 59.8 −60.0 0.6	62 59.8 −60.0 0.6	63 59.8 −60.0 0.6	64 59.8 −60.0 0.7	65 59.8 −60.0 0.7	66 59.8 −60.0 0.7	67 59.8 −60.0 0.7	74
75	59 59.8 −60.0 0.5	60 59.8 −60.0 0.5	61 59.8 −60.0 0.6	62 59.8 −60.0 0.5	63 59.8 −60.0 0.6	64 59.8 −60.0 0.6	65 59.8 −60.0 0.6	66 59.8 −60.0 0.6	75
76	58 59.8 −60.0 0.5	59 59.8 −60.0 0.5	60 59.8 −60.0 0.5	61 59.8 −60.0 0.5	62 59.8 −59.9 0.5	63 59.8 −60.0 0.5	64 59.8 −60.0 0.6	65 59.8 −60.0 0.6	76
77	57 59.8 −59.9 0.4	58 59.8 −59.9 0.4	59 59.8 −60.0 0.4	60 59.8 −59.9 0.5	61 59.8 −59.9 0.5	62 59.8 −59.9 0.5	63 59.8 −60.0 0.5	64 59.8 −60.0 0.5	77
78	56 59.9 −60.0 0.4	57 59.9 −60.0 0.4	58 59.9 −60.0 0.4	59 59.9 −60.0 0.4	60 59.9 −60.0 0.4	61 59.9 −60.0 0.4	62 59.8 −59.9 0.5	63 59.8 −59.9 0.5	78
79	55 59.9 −60.0 0.3	56 59.9 −60.0 0.4	57 59.9 −60.0 0.4	58 59.9 −60.0 0.4	59 59.9 −60.0 0.4	60 59.9 −60.0 0.4	61 59.9 −60.0 0.4	62 59.9 −60.0 0.4	79
80	54 59.9 −60.0 0.3	55 59.9 −60.0 0.3	56 59.9 −60.0 0.3	57 59.9 −60.0 0.3	58 59.9 −60.0 0.3	59 59.9 −60.0 0.3	60 59.9 −60.0 0.4	61 59.9 −60.0 0.4	80
81	53 59.9 −60.0 0.3	54 59.9 −60.0 0.3	55 59.9 −60.0 0.3	56 59.9 −60.0 0.3	57 59.9 −60.0 0.3	58 59.9 −60.0 0.3	59 59.9 −60.0 0.3	60 59.9 −60.0 0.3	81
82	52 59.9 −60.0 0.2	53 59.9 −60.0 0.2	54 59.9 −60.0 0.2	55 59.9 −60.0 0.2	56 59.9 −60.0 0.2	57 59.9 −60.0 0.3	58 59.9 −60.0 0.3	59 59.9 −60.0 0.3	82
83	51 59.9 −60.0 0.2	52 59.9 −60.0 0.2	53 59.9 −60.0 0.2	54 59.9 −60.0 0.2	55 59.9 −60.0 0.2	56 59.9 −60.0 0.2	57 59.9 −60.0 0.2	58 59.9 −60.0 0.2	83
84	50 59.9 −60.0 0.2	51 59.9 −60.0 0.2	52 59.9 −60.0 0.2	53 59.9 −60.0 0.2	54 59.9 −60.0 0.2	55 59.9 −60.0 0.2	56 59.9 −60.0 0.2	57 59.9 −60.0 0.2	84
85	49 59.9 −59.9 0.1	50 59.9 −59.9 0.1	51 59.9 −59.9 0.1	52 59.9 −59.9 0.1	53 59.9 −59.9 0.1	54 59.9 −59.9 0.1	55 59.9 −59.9 0.1	56 59.9 −59.9 0.1	85
86	49 00.0 −60.0 0.1	50 00.0 −60.0 0.1	51 00.0 −60.0 0.1	52 00.0 −60.0 0.1	53 00.0 −60.0 0.1	54 00.0 −60.0 0.1	55 00.0 −60.0 0.1	56 00.0 −60.0 0.1	86
87	48 00.0 −60.0 0.1	49 00.0 −60.0 0.1	50 00.0 −60.0 0.1	51 00.0 −60.0 0.1	52 00.0 −60.0 0.1	53 00.0 −60.0 0.1	54 00.0 −60.0 0.1	55 00.0 −60.0 0.1	87
88	47 00.0 −60.0 0.1	48 00.0 −60.0 0.1	49 00.0 −60.0 0.1	50 00.0 −60.0 0.1	51 00.0 −60.0 0.1	52 00.0 −60.0 0.1	53 00.0 −60.0 0.1	54 00.0 −60.0 0.1	88
89	46 00.0 −60.0 0.0	47 00.0 −60.0 0.0	48 00.0 −60.0 0.0	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	53 00.0 −60.0 0.0	89
90	45 00.0 −60.0 0.0	46 00.0 −60.0 0.0	47 00.0 −60.0 0.0	48 00.0 −60.0 0.0	49 00.0 −60.0 0.0	50 00.0 −60.0 0.0	51 00.0 −60.0 0.0	52 00.0 −60.0 0.0	90

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 1°, 359°

Dec.	45° (Hc · d · Z)	46° (Hc · d · Z)	47° (Hc · d · Z)	48° (Hc · d · Z)	49° (Hc · d · Z)	50° (Hc · d · Z)	51° (Hc · d · Z)	52° (Hc · d · Z)	Dec.
0	44 59.5 −60.0 178.6	43 59.5 −60.0 178.6	42 59.5 −60.0 178.6	41 59.5 −60.0 178.7	40 59.5 −59.9 178.7	39 59.6 −60.0 178.7	38 59.6 −60.0 178.7	37 59.6 −60.0 178.7	0
1	43 59.5 −60.0 178.6	42 59.5 −60.0 178.6	41 59.5 −60.0 178.7	40 59.5 −60.0 178.7	39 59.5 −60.0 178.7	38 59.6 −60.0 178.7	37 59.6 −60.0 178.7	36 59.6 −60.0 178.7	1
2	42 59.5 −60.0 178.6	41 59.5 −60.0 178.7	40 59.5 −60.0 178.7	39 59.5 −60.0 178.7	38 59.5 −60.0 178.7	37 59.6 −60.0 178.7	36 59.6 −60.0 178.7	35 59.6 −60.0 178.8	2
3	41 59.5 −60.0 178.7	40 59.5 −60.0 178.7	39 59.5 −60.0 178.7	38 59.5 −59.9 178.7	37 59.6 −60.0 178.7	36 59.6 −60.0 178.7	35 59.6 −60.0 178.8	34 59.6 −60.0 178.8	3
4	40 59.5 −60.0 178.7	39 59.5 −60.0 178.7	38 59.5 −60.0 178.7	37 59.6 −60.0 178.7	36 59.6 −60.0 178.8	35 59.6 −60.0 178.8	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	4
5	39 59.5 −60.0 178.7	38 59.5 −60.0 178.7	37 59.5 −59.9 178.7	36 59.6 −60.0 178.8	35 59.6 −60.0 178.8	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	5
6	38 59.5 −60.0 178.7	37 59.5 −60.0 178.7	36 59.6 −60.0 178.8	35 59.6 −60.0 178.8	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	31 59.6 −60.0 178.8	6
7	37 59.5 −59.9 178.7	36 59.5 −59.9 178.8	35 59.6 −60.0 178.8	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	31 59.6 −60.0 178.8	30 59.6 −60.0 178.8	7
8	36 59.5 −60.0 178.8	35 59.6 −60.0 178.8	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	31 59.6 −60.0 178.8	30 59.6 −60.0 178.8	29 59.6 −60.0 178.9	8
9	35 59.5 −59.9 178.8	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	31 59.6 −60.0 178.8	30 59.6 −60.0 178.8	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	9
10	34 59.6 −60.0 178.8	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	31 59.6 −60.0 178.9	30 59.6 −60.0 178.9	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	10
11	33 59.6 −60.0 178.8	32 59.6 −60.0 178.8	31 59.6 −60.0 178.8	30 59.6 −60.0 178.9	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	11
12	32 59.6 −60.0 178.8	31 59.6 −60.0 178.8	30 59.6 −60.0 178.9	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	25 59.6 −59.9 178.9	12
13	31 59.6 −60.0 178.9	30 59.6 −60.0 178.9	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	25 59.6 −60.0 178.9	24 59.7 −60.0 178.9	13
14	30 59.6 −60.0 178.9	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	25 59.6 −60.0 178.9	24 59.6 −59.9 178.9	23 59.7 −60.0 178.9	14
15	29 59.6 −60.0 178.9	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	25 59.6 −60.0 178.9	24 59.6 −60.0 178.9	23 59.7 −60.0 178.9	22 59.7 −60.0 179.0	15
16	28 59.6 −60.0 178.9	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	25 59.6 −60.0 178.9	24 59.6 −60.0 178.9	23 59.6 −59.9 178.9	22 59.7 −60.0 179.0	21 59.7 −60.0 179.0	16
17	27 59.6 −60.0 178.9	26 59.6 −60.0 178.9	25 59.6 −60.0 178.9	24 59.6 −60.0 178.9	23 59.6 −60.0 179.0	22 59.7 −60.0 179.0	21 59.7 −60.0 179.0	20 59.7 −60.0 179.0	17
18	26 59.6 −60.0 178.9	25 59.6 −60.0 178.9	24 59.6 −60.0 179.0	23 59.6 −60.0 179.0	22 59.6 −60.0 179.0	21 59.7 −60.0 179.0	20 59.7 −60.0 179.0	19 59.7 −60.0 179.0	18
19	25 59.6 −60.0 178.9	24 59.6 −60.0 179.0	23 59.6 −60.0 179.0	22 59.6 −60.0 179.0	21 59.7 −59.9 179.0	20 59.7 −60.0 179.0	19 59.7 −60.0 179.0	18 59.7 −60.0 179.0	19
20	24 59.6 −60.0 179.0	23 59.6 −60.0 179.0	22 59.6 −60.0 179.0	21 59.6 −60.0 179.0	20 59.7 −60.0 179.0	19 59.7 −60.0 179.0	18 59.7 −60.0 179.0	17 59.7 −60.0 179.0	20
21	23 59.6 −60.0 179.0	22 59.6 −60.0 179.0	21 59.6 −60.0 179.0	20 59.6 −59.9 179.0	19 59.7 −60.0 179.0	18 59.7 −60.0 179.0	17 59.7 −60.0 179.0	16 59.7 −60.0 179.0	21
22	22 59.6 −60.0 179.0	21 59.6 −60.0 179.0	20 59.6 −59.9 179.0	19 59.7 −60.0 179.0	18 59.7 −60.0 179.0	17 59.7 −60.0 179.0	16 59.7 −60.0 179.0	15 59.7 −60.0 179.0	22
23	21 59.6 −60.0 179.0	20 59.6 −60.0 179.0	19 59.7 −60.0 179.0	18 59.7 −60.0 179.0	17 59.7 −60.0 179.0	16 59.7 −60.0 179.0	15 59.7 −60.0 179.0	14 59.7 −60.0 179.0	23
24	20 59.6 −60.0 179.0	19 59.6 −59.9 179.0	18 59.7 −60.0 179.0	17 59.7 −60.0 179.0	16 59.7 −60.0 179.0	15 59.7 −60.0 179.0	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	24
25	19 59.6 −60.0 179.0	18 59.7 −60.0 179.0	17 59.7 −60.0 179.0	16 59.7 −60.0 179.1	15 59.7 −60.0 179.1	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	25
26	18 59.6 −59.9 179.0	17 59.7 −60.0 179.1	16 59.7 −60.0 179.1	15 59.7 −60.0 179.1	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	26
27	17 59.7 −60.0 179.1	16 59.7 −60.0 179.1	15 59.7 −60.0 179.1	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	27
28	16 59.7 −60.0 179.1	15 59.7 −60.0 179.1	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	9 59.7 −60.0 179.1	28
29	15 59.7 −60.0 179.1	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	9 59.7 −60.0 179.1	8 59.7 −60.0 179.1	29
30	14 59.7 −60.0 179.1	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	9 59.7 −60.0 179.1	8 59.7 −60.0 179.1	7 59.7 −60.0 179.1	30
31	13 59.7 −60.0 179.1	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	9 59.7 −60.0 179.1	8 59.7 −60.0 179.1	7 59.7 −60.0 179.1	6 59.7 −60.0 179.1	31
32	12 59.7 −60.0 179.1	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	9 59.7 −60.0 179.1	8 59.7 −60.0 179.1	7 59.7 −60.0 179.1	6 59.7 −60.0 179.1	5 59.7 −60.0 179.1	32
33	11 59.7 −60.0 179.1	10 59.7 −60.0 179.1	9 59.7 −60.0 179.1	8 59.7 −60.0 179.2	7 59.7 −60.0 179.2	6 59.7 −60.0 179.2	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	33
34	10 59.7 −60.0 179.2	9 59.7 −60.0 179.2	8 59.7 −60.0 179.2	7 59.7 −60.0 179.2	6 59.7 −60.0 179.2	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	34
35	9 59.7 −60.0 179.2	8 59.7 −60.0 179.2	7 59.7 −60.0 179.2	6 59.7 −60.0 179.2	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	35
36	8 59.7 −60.0 179.2	7 59.7 −60.0 179.2	6 59.7 −60.0 179.2	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	1 59.7 −60.0 179.2	36
37	7 59.7 −60.0 179.2	6 59.7 −59.9 179.2	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	1 59.7 −60.0 179.2	0 59.7 −60.0 179.2	37
38	6 59.7 −60.0 179.2	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	1 59.7 −60.0 179.2	0 59.7 −60.0 179.2	0 00.3 +60.0 0.8	38
39	5 59.7 −60.0 179.2	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	1 59.7 −60.0 179.2	0 59.7 −60.0 179.2	0 00.3 +60.0 0.8	1 00.3 +59.9 0.8	39
40	4 59.7 −60.0 179.2	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	1 59.7 −60.0 179.2	0 59.7 −60.0 179.2	0 00.3 +60.0 0.8	1 00.3 +59.9 0.8	2 00.2 +60.0 0.8	40
41	3 59.7 −60.0 179.2	2 59.7 −60.0 179.2	1 59.7 −60.0 179.2	0 59.7 −60.0 179.2	0 00.3 +60.0 0.8	1 00.3 +60.0 0.8	2 00.2 +60.0 0.8	3 00.2 +60.0 0.8	41
42	2 59.7 −60.0 179.3	1 59.7 −60.0 179.3	0 59.7 −60.0 179.3	0 00.3 +60.0 0.7	1 00.3 +60.0 0.7	2 00.3 +59.9 0.7	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	42
43	1 59.7 −60.0 179.3	0 59.7 −60.0 179.3	0 00.3 +60.0 0.7	1 00.3 +60.0 0.7	2 00.3 +59.9 0.7	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	43
44	0 59.7 −60.0 179.3	0 00.3 +60.0 0.7	1 00.3 +60.0 0.7	2 00.3 +59.9 0.7	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	6 00.2 +60.0 0.7	44
45	0 00.3 +60.0 0.7	1 00.3 +60.0 0.7	2 00.3 +59.9 0.7	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	6 00.2 +60.0 0.7	7 00.2 +60.0 0.7	45
46	1 00.3 +60.0 0.7	2 00.3 +59.9 0.7	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	6 00.2 +60.0 0.7	7 00.2 +60.0 0.7	8 00.2 +60.0 0.7	46
47	2 00.3 +59.9 0.7	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	6 00.2 +60.0 0.7	7 00.2 +60.0 0.7	8 00.2 +60.0 0.7	9 00.2 +60.0 0.7	47
48	3 00.2 +60.0 0.7	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	6 00.2 +60.0 0.7	7 00.2 +60.0 0.7	8 00.2 +60.0 0.7	9 00.2 +60.0 0.7	10 00.2 +60.0 0.7	48
49	4 00.2 +60.0 0.7	5 00.2 +60.0 0.7	6 00.2 +60.0 0.7	7 00.2 +60.0 0.7	8 00.2 +60.0 0.7	9 00.2 +60.0 0.7	10 00.2 +60.0 0.7	11 00.2 +60.0 0.7	49
50	5 00.2 +60.0 0.6	6 00.2 +60.0 0.6	7 00.2 +60.0 0.6	8 00.2 +60.0 0.6	9 00.2 +60.0 0.6	10 00.2 +60.0 0.6	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	50
51	6 00.2 +60.0 0.6	7 00.2 +60.0 0.6	8 00.2 +60.0 0.6	9 00.2 +60.0 0.6	10 00.2 +60.0 0.6	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	51
52	7 00.2 +60.0 0.6	8 00.2 +60.0 0.6	9 00.2 +60.0 0.6	10 00.2 +60.0 0.6	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	14 00.2 +60.0 0.6	52
53	8 00.2 +60.0 0.6	9 00.2 +60.0 0.6	10 00.2 +60.0 0.6	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	14 00.2 +60.0 0.6	15 00.2 +60.0 0.6	53
54	9 00.2 +60.0 0.6	10 00.2 +60.0 0.6	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	14 00.2 +60.0 0.6	15 00.2 +60.0 0.6	16 00.2 +60.0 0.6	54
55	10 00.2 +60.0 0.6	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	14 00.2 +60.0 0.6	15 00.2 +60.0 0.6	16 00.2 +60.0 0.6	17 00.2 +60.0 0.6	55
56	11 00.2 +60.0 0.6	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	14 00.2 +60.0 0.6	15 00.2 +60.0 0.6	16 00.2 +60.0 0.6	17 00.2 +60.0 0.6	18 00.2 +60.0 0.6	56
57	12 00.2 +60.0 0.6	13 00.2 +60.0 0.6	14 00.2 +60.0 0.6	15 00.2 +60.0 0.6	16 00.2 +60.0 0.6	17 00.2 +60.0 0.6	18 00.2 +60.0 0.6	19 00.2 +60.0 0.6	57
58	13 00.2 +60.0 0.5	14 00.2 +60.0 0.5	15 00.2 +60.0 0.5	16 00.2 +60.0 0.6	17 00.2 +60.0 0.6	18 00.2 +60.0 0.6	19 00.2 +60.0 0.6	20 00.2 +60.0 0.6	58
59	14 00.2 +60.0 0.5	15 00.2 +60.0 0.5	16 00.2 +60.0 0.5	17 00.2 +60.0 0.5	18 00.2 +60.0 0.5	19 00.2 +60.0 0.5	20 00.2 +60.0 0.5	21 00.2 +60.0 0.6	59
60	15 00.2 +60.0 0.5	16 00.2 +60.0 0.5	17 00.2 +60.0 0.5	18 00.2 +60.0 0.5	19 00.2 +60.0 0.5	20 00.2 +60.0 0.5	21 00.2 +60.0 0.5	22 00.2 +60.0 0.5	60
61	16 00.2 +60.0 0.5	17 00.2 +60.0 0.5	18 00.2 +60.0 0.5	19 00.2 +60.0 0.5	20 00.2 +60.0 0.5	21 00.2 +60.0 0.5	22 00.2 +60.0 0.5	23 00.2 +60.0 0.5	61
62	17 00.2 +60.0 0.5	18 00.2 +60.0 0.5	19 00.2 +60.0 0.5	20 00.2 +60.0 0.5	21 00.2 +60.0 0.5	22 00.2 +60.0 0.5	23 00.2 +60.0 0.5	24 00.2 +60.0 0.5	62
63	18 00.2 +60.0 0.5	19 00.2 +60.0 0.5	20 00.2 +60.0 0.5	21 00.2 +60.0 0.5	22 00.2 +60.0 0.5	23 00.2 +60.0 0.5	24 00.2 +60.0 0.5	25 00.2 +60.0 0.5	63
64	19 00.2 +60.0 0.5	20 00.2 +60.0 0.5	21 00.2 +60.0 0.5	22 00.2 +60.0 0.5	23 00.2 +60.0 0.5	24 00.2 +60.0 0.5	25 00.2 +60.0 0.5	26 00.2 +60.0 0.5	64
65	20 00.2 +60.0 0.4	21 00.2 +60.0 0.4	22 00.2 +60.0 0.5	23 00.2 +60.0 0.5	24 00.2 +60.0 0.5	25 00.2 +60.0 0.5	26 00.2 +60.0 0.5	27 00.2 +59.9 0.5	65
66	21 00.2 +60.0 0.4	22 00.2 +60.0 0.4	23 00.2 +60.0 0.4	24 00.2 +60.0 0.4	25 00.2 +59.9 0.4	26 00.2 +59.9 0.5	27 00.2 +59.9 0.5	28 00.1 +60.0 0.5	66
67	22 00.2 +60.0 0.4	23 00.2 +59.9 0.4	24 00.2 +59.9 0.4	25 00.2 +59.9 0.4	26 00.1 +60.0 0.4	27 00.1 +60.0 0.4	28 00.1 +60.0 0.4	29 00.1 +60.0 0.4	67
68	23 00.2 +59.9 0.4	24 00.1 +60.0 0.4	25 00.1 +60.0 0.4	26 00.1 +60.0 0.4	27 00.1 +60.0 0.4	28 00.1 +60.0 0.4	29 00.1 +60.0 0.4	30 00.1 +60.0 0.4	68
69	24 00.1 +60.0 0.4	25 00.1 +60.0 0.4	26 00.1 +60.0 0.4	27 00.1 +60.0 0.4	28 00.1 +60.0 0.4	29 00.1 +60.0 0.4	30 00.1 +60.0 0.4	31 00.1 +60.0 0.4	69
70	25 00.1 +60.0 0.4	26 00.1 +60.0 0.4	27 00.1 +60.0 0.4	28 00.1 +60.0 0.4	29 00.1 +60.0 0.4	30 00.1 +60.0 0.4	31 00.1 +60.0 0.4	32 00.1 +60.0 0.4	70
71	26 00.1 +60.0 0.4	27 00.1 +60.0 0.4	28 00.1 +60.0 0.4	29 00.1 +60.0 0.4	30 00.1 +60.0 0.4	31 00.1 +60.0 0.4	32 00.1 +60.0 0.4	33 00.1 +60.0 0.4	71
72	27 00.1 +60.0 0.3	28 00.1 +60.0 0.3	29 00.1 +60.0 0.4	30 00.1 +60.0 0.4	31 00.1 +60.0 0.4	32 00.1 +60.0 0.4	33 00.1 +60.0 0.4	34 00.1 +60.0 0.4	72
73	28 00.1 +60.0 0.3	29 00.1 +60.0 0.3	30 00.1 +60.0 0.3	31 00.1 +60.0 0.3	32 00.1 +60.0 0.3	33 00.1 +60.0 0.3	34 00.1 +60.0 0.4	35 00.1 +60.0 0.4	73
74	29 00.1 +60.0 0.3	30 00.1 +60.0 0.3	31 00.1 +60.0 0.3	32 00.1 +60.0 0.3	33 00.1 +60.0 0.3	34 00.1 +60.0 0.3	35 00.1 +60.0 0.3	36 00.1 +60.0 0.3	74
75	30 00.1 +60.0 0.3	31 00.1 +60.0 0.3	32 00.1 +60.0 0.3	33 00.1 +60.0 0.3	34 00.1 +60.0 0.3	35 00.1 +60.0 0.3	36 00.1 +60.0 0.3	37 00.1 +60.0 0.3	75
76	31 00.1 +60.0 0.3	32 00.1 +60.0 0.3	33 00.1 +60.0 0.3	34 00.1 +60.0 0.3	35 00.1 +60.0 0.3	36 00.1 +60.0 0.3	37 00.1 +60.0 0.3	38 00.1 +60.0 0.3	76
77	32 00.1 +60.0 0.3	33 00.1 +60.0 0.3	34 00.1 +60.0 0.3	35 00.1 +60.0 0.3	36 00.1 +60.0 0.3	37 00.1 +60.0 0.3	38 00.1 +60.0 0.3	39 00.1 +60.0 0.3	77
78	33 00.1 +60.0 0.2	34 00.1 +60.0 0.2	35 00.1 +60.0 0.3	36 00.1 +60.0 0.3	37 00.1 +60.0 0.3	38 00.1 +60.0 0.3	39 00.1 +60.0 0.3	40 00.1 +60.0 0.3	78
79	34 00.1 +60.0 0.2	35 00.1 +60.0 0.2	36 00.1 +60.0 0.2	37 00.1 +60.0 0.2	38 00.1 +60.0 0.2	39 00.1 +60.0 0.2	40 00.1 +60.0 0.2	41 00.1 +60.0 0.3	79
80	35 00.1 +60.0 0.2	36 00.1 +60.0 0.2	37 00.1 +60.0 0.2	38 00.1 +60.0 0.2	39 00.1 +60.0 0.2	40 00.1 +60.0 0.2	41 00.1 +60.0 0.2	42 00.1 +60.0 0.2	80
81	36 00.1 +60.0 0.2	37 00.1 +60.0 0.2	38 00.1 +60.0 0.2	39 00.1 +60.0 0.2	40 00.1 +60.0 0.2	41 00.1 +60.0 0.2	42 00.1 +60.0 0.2	43 00.1 +60.0 0.2	81
82	37 00.1 +60.0 0.2	38 00.1 +60.0 0.2	39 00.1 +60.0 0.2	40 00.1 +60.0 0.2	41 00.1 +60.0 0.2	42 00.1 +60.0 0.2	43 00.1 +60.0 0.2	44 00.1 +60.0 0.2	82
83	38 00.1 +59.9 0.2	39 00.1 +59.9 0.2	40 00.1 +59.9 0.2	41 00.1 +59.9 0.2	42 00.1 +59.9 0.2	43 00.1 +59.9 0.2	44 00.1 +59.9 0.2	45 00.1 +59.9 0.2	83
84	39 00.0 +60.0 0.1	40 00.0 +60.0 0.1	41 00.0 +60.0 0.1	42 00.0 +60.0 0.1	43 00.0 +60.0 0.1	44 00.0 +60.0 0.1	45 00.0 +60.0 0.1	46 00.0 +60.0 0.2	84
85	40 00.0 +60.0 0.1	41 00.0 +60.0 0.1	42 00.0 +60.0 0.1	43 00.0 +60.0 0.1	44 00.0 +60.0 0.1	45 00.0 +60.0 0.1	46 00.0 +60.0 0.1	47 00.0 +60.0 0.1	85
86	41 00.0 +60.0 0.1	42 00.0 +60.0 0.1	43 00.0 +60.0 0.1	44 00.0 +60.0 0.1	45 00.0 +60.0 0.1	46 00.0 +60.0 0.1	47 00.0 +60.0 0.1	48 00.0 +60.0 0.1	86
87	42 00.0 +60.0 0.1	43 00.0 +60.0 0.1	44 00.0 +60.0 0.1	45 00.0 +60.0 0.1	46 00.0 +60.0 0.1	47 00.0 +60.0 0.1	48 00.0 +60.0 0.1	49 00.0 +60.0 0.1	87
88	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.1	47 00.0 +60.0 0.1	48 00.0 +60.0 0.1	49 00.0 +60.0 0.1	50 00.0 +60.0 0.1	88
89	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	89
90	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 179°, 181°

Dec.	45°			46°			47°			48°			49°			50°			51°			52°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	44 57.9	+60.0	177.2	43 58.0	+59.9	177.2	42 58.0	+60.0	177.3	41 58.1	+60.0	177.3	40 58.2	+60.0	177.4	39 58.2	+60.0	177.4	38 58.3	+60.0	177.4	37 58.4	+59.9	177.5	0
1	45 57.9	+59.9	177.1	44 57.9	+60.0	177.1	43 58.0	+59.9	177.2	42 58.1	+60.0	177.3	41 58.2	+59.9	177.3	40 58.2	+60.0	177.4	39 58.3	+60.0	177.4	38 58.3	+60.0	177.4	1
2	46 57.8	+60.0	177.1	45 57.9	+60.0	177.1	44 58.0	+59.9	177.2	43 58.1	+59.9	177.2	42 58.1	+60.0	177.3	41 58.2	+60.0	177.3	40 58.3	+59.9	177.4	39 58.3	+60.0	177.4	2
3	47 57.8	+59.9	177.0	46 57.9	+59.9	177.1	45 57.9	+60.0	177.1	44 58.0	+60.0	177.2	43 58.1	+60.0	177.2	42 58.2	+59.9	177.3	41 58.2	+60.0	177.3	40 58.3	+59.9	177.4	3
4	48 57.7	+60.0	177.0	47 57.8	+60.0	177.0	46 57.9	+59.9	177.1	45 58.0	+59.9	177.1	44 58.1	+60.0	177.2	43 58.1	+60.0	177.2	42 58.2	+60.0	177.3	41 58.3	+59.9	177.3	4
5	49 57.7	+60.0	176.9	48 57.8	+60.0	177.0	47 57.9	+59.9	177.0	46 58.0	+59.9	177.1	45 58.0	+60.0	177.1	44 58.1	+60.0	177.2	43 58.2	+59.9	177.2	42 58.2	+59.9	177.3	5
6	50 57.7	+59.9	176.8	49 57.8	+59.9	176.9	48 57.8	+60.0	177.0	47 57.9	+60.0	177.0	46 58.0	+59.9	177.1	45 58.1	+60.0	177.1	44 58.1	+60.0	177.2	43 58.2	+60.0	177.2	6
7	51 57.6	+60.0	176.8	50 57.7	+60.0	176.8	49 57.8	+59.9	176.9	48 57.9	+59.9	177.0	47 58.0	+59.9	177.0	46 58.0	+60.0	177.1	45 58.1	+60.0	177.1	44 58.2	+59.9	177.1	7
8	52 57.6	+59.9	176.7	51 57.7	+59.9	176.8	50 57.8	+59.9	176.9	49 57.8	+60.0	176.9	48 57.9	+60.0	177.0	47 58.0	+59.9	177.0	46 58.1	+59.9	177.1	45 58.2	+59.9	177.1	8
9	53 57.5	+60.0	176.6	52 57.6	+60.0	176.7	51 57.7	+60.0	176.8	50 57.8	+59.9	176.9	49 57.9	+60.0	176.9	48 58.0	+59.9	177.0	47 58.1	+59.9	177.0	46 58.1	+60.0	177.1	9
10	54 57.5	+59.9	176.6	53 57.6	+59.9	176.7	52 57.7	+59.9	176.7	51 57.8	+59.9	176.8	50 57.9	+59.9	176.9	49 57.9	+60.0	176.9	48 58.0	+60.0	177.0	47 58.1	+59.9	177.0	10
11	55 57.4	+59.9	176.5	54 57.5	+59.9	176.6	53 57.6	+59.9	176.7	52 57.7	+59.9	176.7	51 57.8	+59.9	176.8	50 57.9	+59.9	176.9	49 58.0	+59.9	176.9	48 58.1	+59.9	177.0	11
12	56 57.3	+60.0	176.4	55 57.5	+59.9	176.5	54 57.6	+59.9	176.6	53 57.7	+59.9	176.7	52 57.8	+59.9	176.8	51 57.9	+59.9	176.8	50 58.0	+59.9	176.9	49 58.0	+60.0	177.0	12
13	57 57.3	+59.9	176.3	56 57.4	+59.9	176.4	55 57.5	+59.9	176.5	54 57.6	+59.9	176.6	53 57.7	+60.0	176.7	52 57.8	+60.0	176.8	51 57.9	+60.0	176.8	50 58.0	+60.0	176.9	13
14	58 57.2	+59.9	176.2	57 57.3	+60.0	176.3	56 57.5	+59.9	176.4	55 57.6	+59.9	176.5	54 57.7	+59.9	176.6	53 57.8	+59.9	176.7	52 57.9	+59.9	176.8	51 58.0	+59.9	176.8	14
15	59 57.1	+60.0	176.1	58 57.3	+59.9	176.3	57 57.4	+59.9	176.4	56 57.5	+60.0	176.5	55 57.6	+60.0	176.5	54 57.7	+60.0	176.6	53 57.8	+60.0	176.7	52 57.9	+60.0	176.8	15
16	60 57.1	+59.9	176.0	59 57.2	+59.9	176.2	58 57.3	+60.0	176.3	57 57.5	+59.9	176.4	56 57.6	+59.9	176.5	55 57.7	+59.9	176.5	54 57.8	+59.9	176.6	53 57.9	+59.9	176.7	16
17	61 57.0	+59.9	175.9	60 57.1	+60.0	176.1	59 57.3	+59.9	176.2	58 57.4	+59.9	176.3	57 57.5	+60.0	176.4	56 57.6	+60.0	176.5	55 57.7	+60.0	176.6	54 57.9	+59.9	176.7	17
18	62 56.9	+59.9	175.8	61 57.1	+59.9	176.0	60 57.2	+59.9	176.1	59 57.3	+60.0	176.2	58 57.5	+59.9	176.3	57 57.6	+59.9	176.4	56 57.7	+59.9	176.5	55 57.8	+60.0	176.6	18
19	63 56.8	+59.9	175.7	62 57.0	+59.9	175.9	61 57.1	+59.9	176.0	60 57.3	+59.9	176.1	59 57.4	+59.9	176.2	58 57.5	+59.9	176.3	57 57.6	+60.0	176.4	56 57.8	+59.9	176.5	19
20	64 56.7	+59.9	175.6	63 56.9	+59.9	175.7	62 57.0	+60.0	175.9	61 57.2	+59.9	176.0	60 57.3	+60.0	176.1	59 57.5	+59.9	176.2	58 57.6	+59.9	176.4	57 57.7	+59.9	176.5	20
21	65 56.6	+59.9	175.4	64 56.8	+59.9	175.6	63 57.0	+59.9	175.7	62 57.1	+59.9	175.9	61 57.3	+59.9	176.0	60 57.4	+59.9	176.2	59 57.5	+59.9	176.3	58 57.7	+59.9	176.4	21
22	66 56.5	+59.9	175.3	65 56.7	+59.9	175.4	64 56.9	+59.9	175.6	63 57.0	+60.0	175.8	62 57.2	+59.9	175.9	61 57.3	+60.0	176.1	60 57.5	+59.9	176.3	59 57.6	+60.0	176.3	22
23	67 56.4	+59.8	175.1	66 56.6	+59.9	175.3	65 56.8	+59.9	175.5	64 57.0	+59.9	175.6	63 57.1	+59.9	175.8	62 57.3	+59.9	175.9	61 57.4	+60.0	176.1	60 57.6	+59.9	176.2	23
24	68 56.2	+59.9	174.9	67 56.5	+59.8	175.1	66 56.7	+59.8	175.3	65 56.9	+59.9	175.5	64 57.0	+59.9	175.7	63 57.2	+59.9	175.8	62 57.4	+59.9	176.0	61 57.5	+59.9	176.1	24
25	69 56.1	+59.9	174.7	68 56.3	+59.9	175.0	67 56.5	+59.9	175.2	66 56.8	+59.8	175.4	65 56.9	+59.9	175.5	64 57.1	+59.9	175.7	63 57.3	+59.9	175.8	62 57.4	+60.0	176.0	25
26	70 55.9	+59.8	174.5	69 56.2	+59.8	174.8	68 56.4	+59.9	175.0	67 56.6	+59.9	175.2	66 56.8	+59.9	175.4	65 57.0	+59.9	175.6	64 57.2	+59.9	175.8	63 57.4	+59.9	175.9	26
27	71 55.7	+59.8	174.2	70 56.0	+59.9	174.5	69 56.3	+59.8	174.8	68 56.5	+59.9	175.0	67 56.7	+59.9	175.2	66 56.9	+59.9	175.4	65 57.1	+59.9	175.6	64 57.3	+59.9	175.8	27
28	72 55.5	+59.8	174.0	71 55.8	+59.8	174.3	70 56.1	+59.8	174.6	69 56.4	+59.8	174.8	68 56.6	+59.9	175.1	67 56.8	+59.9	175.3	66 57.0	+59.9	175.5	65 57.2	+59.9	175.7	28
29	73 55.3	+59.8	173.7	72 55.7	+59.7	174.0	71 56.0	+59.8	174.4	70 56.2	+59.9	174.6	69 56.5	+59.9	174.9	68 56.7	+59.9	175.1	67 56.9	+59.9	175.3	66 57.1	+59.9	175.5	29
30	74 55.1	+59.7	173.3	73 55.4	+59.8	173.7	72 55.8	+59.8	174.1	71 56.1	+59.8	174.4	70 56.4	+59.8	174.7	69 56.6	+59.9	174.9	68 56.8	+59.9	175.2	67 57.0	+59.9	175.4	30
31	75 54.8	+59.6	172.9	74 55.2	+59.7	173.3	73 55.6	+59.7	173.8	72 55.9	+59.8	174.2	71 56.2	+59.8	174.5	70 56.5	+59.8	174.7	69 56.7	+59.9	175.0	68 56.9	+59.9	175.2	31
32	76 54.4	+59.7	172.5	75 54.9	+59.7	173.0	74 55.3	+59.8	173.5	73 55.7	+59.8	173.9	72 56.0	+59.9	174.2	71 56.3	+59.8	174.5	70 56.6	+59.8	174.8	69 56.8	+59.9	175.0	32
33	77 54.1	+59.5	172.0	76 54.6	+59.6	172.6	75 55.1	+59.7	173.1	74 55.5	+59.7	173.5	73 55.8	+59.8	173.9	72 56.1	+59.9	174.3	71 56.4	+59.9	174.6	70 56.7	+59.8	174.9	33
34	78 53.6	+59.5	171.4	77 54.2	+59.6	172.1	76 54.8	+59.7	172.7	75 55.2	+59.7	173.2	74 55.6	+59.8	173.6	73 56.0	+59.7	174.0	72 56.3	+59.8	174.4	71 56.6	+59.8	174.6	34
35	79 53.1	+59.3	170.6	78 53.8	+59.5	171.5	77 54.4	+59.6	172.2	76 54.9	+59.7	172.7	75 55.4	+59.7	173.3	74 55.7	+59.8	173.7	73 56.1	+59.8	174.1	72 56.4	+59.8	174.4	35
36	80 52.4	+59.2	169.7	79 53.3	+59.3	170.7	78 54.0	+59.5	171.6	77 54.6	+59.6	172.3	76 55.1	+59.7	172.8	75 55.5	+59.7	173.3	74 55.9	+59.8	173.8	73 56.2	+59.8	174.1	36
37	81 51.6	+58.9	168.6	80 52.6	+59.2	169.8	79 53.5	+59.4	170.9	78 54.2	+59.5	171.7	77 54.7	+59.6	172.4	76 55.2	+59.7	172.9	75 55.7	+59.7	173.4	74 56.0	+59.8	173.8	37
38	82 50.5	+58.7	167.2	81 51.8	+59.0	168.8	80 52.9	+59.2	170.0	79 53.7	+59.4	171.0	78 54.3	+59.6	171.8	77 54.9	+59.6	172.5	76 55.4	+59.7	173.0	75 55.8	+59.8	173.5	38
39	83 49.2	+58.1	165.4	82 50.8	+58.7	167.4	81 52.1	+59.0	168.9	80 53.1	+59.2	170.1	79 53.9	+59.4	171.1	78 54.5	+59.6	171.9	77 55.1	+59.6	172.6	76 55.6	+59.7	173.1	39
40	84 47.3	+57.2	162.9	83 49.5	+58.2	165.6	82 51.1	+58.7	167.6	81 52.3	+59.1	169.1	80 53.3	+59.3	170.3	79 54.1	+59.4	171.2	78 54.7	+59.6	172.0	77 55.3	+59.6	172.7	40
41	85 44.5	+55.6•	159.2	84 47.7	+57.3	163.1	83 49.8	+58.3	165.8	82 51.4	+58.8	167.8	81 52.6	+59.1	169.3	80 53.5	+59.4	170.5	79 54.3	+59.5	171.4	78 54.9	+59.6	172.1	41
42	86 40.1	+52.1•	153.5	85 45.0	+55.7•	159.5	84 48.1	+57.4	163.4	83 50.2	+58.3	166.0	82 51.7	+58.8	168.0	81 52.9	+59.1	169.4	80 53.8	+59.3	170.6	79 54.5	+59.5	171.5	42
43	87 32.2	+43.3•	143.6	86 40.7	+52.3•	153.9	85 45.0	+55.8•	159.8	84 48.4	+57.5	163.6	83 50.5	+58.4	166.2	82 52.0	+58.9	168.1	81 53.1	+59.2	169.6	80 54.0	+59.4	170.7	43
44	88 15.5	+19.6•	124.3	87 33.0	+43.7•	144.0	86 41.3	+52.6•	154.2	85 46.0	+56.0•	160.1	84 48.9	+57.6	163.9	83 50.9	+58.4	166.5	82 52.3	+58.9	168.3	81 53.4	+59.2	169.7	44
45	88 35.1	–18.4•	89.3	88 16.7	+19.9•	124.8	87 33.9	+44.0•	144.5	86 42.0	+52.8•	154.6	85 46.5	+56.1•	160.4	84 49.3	+57.6	164.1	83 51.2	+58.5	166.7	82 52.6	+58.9	168.5	45
46	88 16.7	–42.8•	53.8	88 36.6	–18.7•	89.3	88 17.9	+20.3•	125.3	87 34.8	+44.3•	145.0	86 42.6	+53.0•	155.0	85 46.9	+56.3•	160.8	84 49.7	+57.7	164.4	83 51.5	+58.6	166.9	46
47	87 33.9	–51.9•	34.1	88 17.9	–43.1•	53.3	88 38.2	–19.1•	89.3	88 19.1	+20.6•	125.8	87 35.6	+44.8•	145.5	86 43.2	+53.3•	155.4	85 47.4	+56.5•	161.1	84 50.1	+57.8	164.7	47
48	86 42.0	–55.5•	23.9	87 34.8	–52.2•	33.6	88 19.1	–43.5•	52.8	88 38.2	–19.1•	89.3	88 20.4	+20.9•	126.3	87 36.5	+45.2•	146.0	86 43.9	+53.5•	155.8	85 47.9	+56.6•	161.4	48
49	85 46.5	–57.2	18.1	86 42.6	–55.7•	23.5	87 35.6	–52.4•	33.0	88 20.4	–43.9•	52.2	88 41.3	–19.6•	89.2	88 21.7	+21.2•	126.8	87 37.4	+45.5•	146.5	86 44.5	+53.7•	156.2	49
50	84 47.3	–58.1	14.4	85 46.9	–57.2	17.8	86 43.2	–55.8•	23.1	87 36.5	–52.6•	32.5	88 21.7	–44.3•	51.7	88 42.9	–20.0•	89.2	88 22.9	+21.6•	127.4	87 38.2	+46.0•	147.0	50
51	83 51.2	–58.6	11.8	84 49.7	–58.2	14.1	85 47.4	–57.3	17.4	86 43.9	–56.0•	22.7	87 37.4	–52.9•	32.0	88 22.9	–44.7•	51.1	88 44.5	–20.3•	89.2	88 24.2	+21.9•	128.0	51
52	82 52.6	–59.0	10.0	83 51.5	–58.6	11.6	84 50.1	–58.2	13.8	85 47.9	–57.4	17.1	86 44.5	–56.1•	22.2	87 38.2	–53.1•	31.4	88 24.2	–45.1•	50.4	88 46.1	–20.6•	89.2	52
53	81 53.6	–59.1	8.6	82 52.9	–59.0	9.8	83 52.3	–58.6	11.3	84 50.5	–58.3	13.5	85 48.4	–57.5	16.7	86 45.2	–56.2•	21.8	87 39.1	–53.3•	30.8	88 25.5	–45.9•	49.8	53
54	80 54.5	–59.4	7.5	81 53.9	–59.2	8.4	82 53.2	–59.1	9.5	83 52.2	–58.7	11.1	84 50.9	–58.4	13.2	85 48.9	–57.6	16.3	86 45.8	–56.4•	21.3	87 40.0	–53.6•	30.2	54
55	79 55.1	–59.4	6.6	80 54.7	–59.4	7.3	81 54.1	–59.2	8.2	82 53.5	–59.1	9.3	83 52.5	–58.8	10.8	84 51.3	–58.4	12.9	85 49.4	–57.7	16.0	86 46.4	–56.5•	20.8	55
56	78 55.7	–59.5	5.8	79 55.3	–59.4	6.4	80 54.9	–59.4	7.1	81 54.4	–59.3	8.0	82 53.7	–59.0	9.3	83 52.9	–58.9	10.5	84 51.7	–58.5	12.6	85 49.9	–57.9	15.6	56
57	77 56.1	–59.6	5.2	78 55.9	–59.6	5.7	79 55.5	–59.5	6.2	80 55.1	–59.4	6.9	81 54.7	–59.3	7.8	82 54.0	–59.1	8.8	83 53.2	–58.9	10.3	84 52.0	–58.5	12.3	57
58	76 56.5	–59.6	4.7	77 56.3	–59.6	5.1	78 56.0	–59.5	5.5	79 55.7	–59.5	6.1	80 55.4	–59.5	6.7	81 54.9	–59.3	7.6	82 54.3	–59.2	8.6	83 53.5	–58.9	10.0	58
59	75 56.9	–59.7	4.2	76 56.7	–59.7	4.6	77 56.5	–59.8	4.9	78 56.2	–59.6	5.4	79 55.9	–59.5	5.9	80 55.5	–59.5	6.5	81 55.1	–59.3	7.3	82 54.6	–59.2	8.4	59
60	74 57.1	–59.7	3.9	75 57.0	–59.7	4.1	76 56.8	–59.7	4.4	77 56.6	–59.7	4.8	78 56.4	–59.6	5.2	79 56.1	–59.5	5.7	80 55.8	–59.5	6.4	81 55.4	–59.4	7.1	60
61	73 57.4	–59.8	3.5	74 57.3	–59.8	3.7	75 57.1	–59.7	4.0	76 57.0	–59.7	4.3	77 56.8	–59.7	4.6	78 56.6	–59.6	5.1	79 56.3	–59.5	5.6	80 56.0	–59.5	6.2	61
62	72 57.6	–59.8	3.2	73 57.5	–59.8	3.4	74 57.3	–59.8	3.6	75 57.3	–59.7	3.9	76 57.1	–59.7	4.2	77 57.0	–59.7	4.5	78 56.8	–59.6	4.9	79 56.5	–59.6	5.4	62
63	71 57.8	–59.8	2.9	72 57.7	–59.8	3.1	73 57.7	–59.8	3.3	74 57.5	–59.8	3.5	75 57.4	–59.7	3.7	76 57.3	–59.7	4.0	77 57.1	–59.7	4.4	78 56.9	–59.6	4.7	63
64	70 58.0	–59.8	2.7	71 57.9	–59.8	2.8	72 57.9	–59.9	3.0	73 57.8	–59.8	3.2	74 57.7	–59.8	3.4	75 57.6	–59.8	3.6	76 57.4	–59.7	3.9	77 57.3	–59.7	4.2	64
65	69 58.2	–59.8	2.5	70 58.1	–59.8	2.6	71 58.0	–59.8	2.7	72 58.0	–59.8	2.9	73 57.9	–59.8	3.1	74 57.8	–59.8	3.3	75 57.7	–59.8	3.5	76 57.6	–59.7	3.7	65
66	68 58.3	–59.8	2.3	69 58.3	–59.9	2.4	70 58.2	–59.8	2.5	71 58.2	–59.9	2.6	72 58.1	–59.8	2.8	73 58.0	–59.8	2.9	74 57.9	–59.8	3.1	75 57.8	–59.7	3.4	66
67	67 58.5	–59.9	2.1	68 58.4	–59.9	2.2	69 58.4	–59.9	2.3	70 58.3	–59.8	2.4	71 58.3	–59.9	2.5	72 58.2	–59.8	2.7	73 58.1	–59.9	2.8	74 58.1	–59.9	3.0	67
68	66 58.6	–59.9	1.9	67 58.5	–59.8	2.0	68 58.5	–59.9	2.1	69 58.5	–59.9	2.2	70 58.4	–59.9	2.3	71 58.4	–59.9	2.4	72 58.3	–59.8	2.6	73 58.3	–59.9	2.7	68
69	65 58.7	–59.9	1.8	66 58.7	–59.9	1.8	67 58.6	–59.8	1.9	68 58.6	–59.9	2.0	69 58.6	–59.9	2.1	70 58.5	–59.8	2.2	71 58.5	–59.9	2.3	72 58.4	–59.8	2.4	69
70	64 58.9	–59.9	1.6	65 58.8	–59.9	1.7	66 58.8	–59.9	1.7	67 58.7	–59.9	1.8	68 58.7	–59.9	1.9	69 58.7	–59.9	2.0	70 58.6	–59.9	2.1	71 58.6	–59.9	2.2	70
71	63 58.9	–59.9	1.5	64 58.9	–59.9	1.5	65 58.9	–59.9	1.6	66 58.8	–59.9	1.7	67 58.8	–59.9	1.7	68 58.8	–59.9	1.8	69 58.7	–59.8	1.9	70 58.7	–59.9	2.0	71
72	62 59.0	–59.9	1.4	63 59.0	–60.0	1.4	64 59.0	–59.9	1.5	65 58.9	–59.9	1.5	66 58.9	–59.9	1.6	67 58.9	–59.9	1.6	68 58.9	–59.9	1.7	69 58.8	–59.8	1.8	72
73	61 59.1	–59.9	1.2	62 59.1	–60.0	1.3	63 59.0	–59.9	1.3	64 59.0	–59.9	1.4	65 59.0	–59.9	1.4	66 59.0	–59.9	1.5	67 59.0	–59.9	1.6	68 58.9	–59.8	1.6	73
74	60 59.2	–60.0	1.1	61 59.1	–59.9	1.2	62 59.1	–59.9	1.2	63 59.1	–59.9	1.3	64 59.1	–59.9	1.3	65 59.1	–59.9	1.4	66 59.1	–59.9	1.4	67 59.1	–60.0	1.5	74
75	59 59.2	–59.9	1.0	60 59.2	–59.9	1.1	61 59.2	–59.9	1.1	62 59.2	–59.9	1.1	63 59.2	–60.0	1.2	64 59.2	–59.9	1.2	65 59.2	–60.0	1.3	66 59.1	–59.9	1.3	75
76	58 59.3	–59.9	0.9	59 59.3	–59.9	1.0	60 59.3	–59.9	1.0	61 59.3	–60.0	1.0	62 59.3	–60.0	1.1	63 59.3	–59.9	1.1	64 59.2	–59.9	1.1	65 59.2	–59.9	1.2	76
77	57 59.4	–60.0	0.8	58 59.4	–60.0	0.9	59 59.4	–60.0	0.9	60 59.3	–59.9	0.9	61 59.3	–59.9	1.0	62 59.3	–59.9	1.0	63 59.3	–59.9	1.0	64 59.3	–59.9	1.1	77
78	56 59.4	–59.9	0.8	57 59.4	–59.9	0.8	58 59.4	–59.9	0.8	59 59.4	–60.0	0.8	60 59.4	–59.9	0.8	61 59.4	–59.9	0.9	62 59.4	–59.9	0.9	63 59.4	–59.9	0.9	78
79	55 59.5	–59.9	0.7	56 59.5	–59.9	0.7	57 59.5	–60.0	0.7	58 59.5	–60.0	0.7	59 59.5	–60.0	0.7	60 59.5	–59.9	0.8	61 59.5	–60.0	0.8	62 59.4	–59.9	0.8	79
80	54 59.6	–60.0	0.6	55 59.5	–59.9	0.6	56 59.5	–59.9	0.6	57 59.5	–59.9	0.7	58 59.5	–59.9	0.7	59 59.5	–59.9	0.7	60 59.5	–59.9	0.7	61 59.6	–59.9	0.7	80
81	53 59.6	–60.0	0.5	54 59.6	–59.9	0.5	55 59.6	–60.0	0.5	56 59.6	–59.9	0.6	57 59.6	–60.0	0.6	58 59.6	–59.9	0.6	59 59.6	–59.9	0.6	60 59.6	–59.9	0.6	81
82	52 59.7	–60.0	0.4	53 59.7	–60.0	0.5	54 59.7	–60.0	0.5	55 59.6	–59.9	0.5	56 59.6	–59.9	0.5	57 59.6	–59.9	0.5	58 59.6	–59.9	0.6	59 59.6	–59.9	0.6	82
83	51 59.7	–59.9	0.4	52 59.7	–60.0	0.4	53 59.7	–60.0	0.4	54 59.7	–60.0	0.4	55 59.7	–60.0	0.4	56 59.7	–60.0	0.4	57 59.7	–59.9	0.4	58 59.7	–59.9	0.5	83
84	50 59.8	–60.0	0.3	51 59.8	–60.0	0.3	52 59.8	–60.0	0.3	53 59.8	–60.0	0.3	54 59.7	–59.9	0.3	55 59.7	–59.9	0.4	56 59.7	–59.9	0.4	57 59.7	–59.9	0.4	84
85	49 59.8	–60.0	0.3	50 59.8	–60.0	0.3	51 59.8	–60.0	0.3	52 59.8	–60.0	0.3	53 59.8	–60.0	0.3	54 59.8	–60.0	0.3	55 59.8	–59.9	0.3	56 59.8	–59.9	0.3	85
86	48 59.8	–59.9	0.2	49 59.8	–59.9	0.2	50 59.8	–59.9	0.2	51 59.8	–59.9	0.2	52 59.8	–59.9	0.2	53 59.8	–59.9	0.2	54 59.8	–59.9	0.2	55 59.8	–59.9	0.2	86
87	47 59.9	–60.0	0.2	48 59.9	–60.0	0.2	49 59.9	–59.9	0.2	50 59.9	–60.0	0.2	51 59.9	–60.0	0.2	52 59.9	–60.0	0.2	53 59.9	–59.9	0.2	54 59.9	–59.9	0.2	87
88	46 59.9	–59.9	0.1	47 59.9	–59.9	0.1	48 59.9	–59.9	0.1	49 59.9	–59.9	0.1	50 59.9	–59.9	0.1	51 59.9	–59.9	0.1	52 59.9	–59.9	0.1	53 59.9	–59.9	0.1	88
89	46 00.0	–60.0	0.1	47 00.0	–60.0	0.1	48 00.0	–60.0	0.1	49 00.0	–60.0	0.1	50 00.0	–60.0	0.1	51 00.0	–60.0	0.1	52 00.0	–60.0	0.1	53 00.0	–60.0	0.1	89
90	45 00.0	–60.0	0.0	46 00.0	–60.0	0.0	47 00.0	–60.0	0.0	48 00.0	–60.0	0.0	49 00.0	–60.0	0.0	50 00.0	–60.0	0.0	51 00.0	–60.0	0.0	52 00.0	–60.0	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 57.9	–60.0	177.2	43 58.0	–60.0	177.2	42 58.0	–59.9	177.3	41 58.1	–60.0	177.3	40 58.2	–60.0	177.4	39 58.2	–59.9	177.4	38 58.3	–60.0	177.4	37 58.4	–60.0	177.5	0
1	43 57.9	–59.9	177.2	42 58.0	–60.0	177.3	41 58.1	–59.9	177.3	40 58.1	–59.9	177.4	39 58.2	–60.0	177.4	38 58.2	–59.9	177.4	37 58.3	–59.9	177.5	36 58.4	–60.0	177.5	1
2	42 58.0	–60.0	177.3	41 58.0	–59.9	177.3	40 58.1	–60.0	177.4	39 58.2	–60.0	177.4	38 58.2	–59.9	177.4	37 58.3	–60.0	177.5	36 58.4	–60.0	177.5	35 58.4	–60.0	177.5	2
3	41 58.0	–60.0	177.3	40 58.1	–60.0	177.4	39 58.1	–59.9	177.4	38 58.2	–60.0	177.4	37 58.3	–60.0	177.5	36 58.3	–59.9	177.5	35 58.4	–60.0	177.6	34 58.4	–60.0	177.6	3
4	40 58.0	–59.9	177.4	39 58.1	–60.0	177.4	38 58.2	–60.0	177.4	37 58.2	–59.9	177.5	36 58.3	–60.0	177.5	35 58.3	–59.9	177.5	34 58.4	–60.0	177.6	33 58.4	–59.9	177.6	4
5	39 58.1	–60.0	177.4	38 58.1	–59.9	177.4	37 58.2	–60.0	177.5	36 58.3	–60.0	177.5	35 58.3	–60.0	177.5	34 58.4	–60.0	177.6	33 58.4	–60.0	177.6	32 58.5	–60.0	177.6	5
6	38 58.1	–60.0	177.4	37 58.2	–60.0	177.5	36 58.2	–60.0	177.5	35 58.3	–60.0	177.5	34 58.3	–59.9	177.6	33 58.4	–60.0	177.6	32 58.4	–59.9	177.6	31 58.5	–60.0	177.7	6
7	37 58.1	–59.9	177.5	36 58.2	–60.0	177.5	35 58.2	–59.9	177.5	34 58.3	–60.0	177.6	33 58.4	–60.0	177.6	32 58.4	–60.0	177.6	31 58.5	–60.0	177.7	30 58.5	–60.0	177.7	7
8	36 58.2	–60.0	177.5	35 58.2	–60.0	177.6	34 58.3	–60.0	177.6	33 58.3	–59.9	177.6	32 58.4	–60.0	177.6	31 58.4	–60.0	177.7	30 58.5	–60.0	177.7	29 58.5	–60.0	177.7	8
9	35 58.2	–60.0	177.6	34 58.2	–59.9	177.6	33 58.3	–60.0	177.6	32 58.3	–59.9	177.6	31 58.4	–60.0	177.7	30 58.4	–59.9	177.7	29 58.5	–60.0	177.7	28 58.5	–59.9	177.7	9
10	34 58.2	–60.0	177.6	33 58.3	–60.0	177.6	32 58.3	–60.0	177.7	31 58.4	–60.0	177.7	30 58.4	–60.0	177.7	29 58.4	–59.9	177.7	28 58.5	–60.0	177.7	27 58.6	–60.0	177.7	10
11	33 58.2	–59.9	177.6	32 58.3	–60.0	177.7	31 58.3	–59.9	177.7	30 58.4	–60.0	177.7	29 58.4	–59.9	177.7	28 58.5	–60.0	177.8	27 58.5	–59.9	177.8	26 58.6	–60.0	177.8	11
12	32 58.3	–60.0	177.7	31 58.3	–60.0	177.7	30 58.4	–60.0	177.7	29 58.4	–60.0	177.7	28 58.5	–60.0	177.8	27 58.5	–60.0	177.8	26 58.6	–60.0	177.8	25 58.6	–60.0	177.8	12
13	31 58.3	–60.0	177.7	30 58.3	–59.9	177.7	29 58.4	–60.0	177.8	28 58.4	–59.9	177.8	27 58.5	–60.0	177.8	26 58.5	–60.0	177.8	25 58.6	–60.0	177.8	24 58.6	–60.0	177.8	13
14	30 58.3	–60.0	177.7	29 58.4	–60.0	177.8	28 58.4	–60.0	177.8	27 58.5	–60.0	177.8	26 58.5	–60.0	177.8	25 58.5	–59.9	177.8	24 58.6	–60.0	177.9	23 58.6	–60.0	177.9	14
15	29 58.3	–59.9	177.8	28 58.4	–60.0	177.8	27 58.4	–59.9	177.8	26 58.5	–60.0	177.8	25 58.5	–60.0	177.9	24 58.6	–60.0	177.9	23 58.6	–60.0	177.9	22 58.6	–59.9	177.9	15
16	28 58.4	–60.0	177.8	27 58.4	–60.0	177.8	26 58.5	–60.0	177.9	25 58.5	–60.0	177.9	24 58.6	–59.9	177.9	23 58.6	–60.0	177.9	22 58.6	–60.0	177.9	21 58.7	–60.0	177.9	16
17	27 58.4	–60.0	177.8	26 58.4	–59.9	177.9	25 58.5	–60.0	177.9	24 58.5	–60.0	177.9	23 58.6	–60.0	177.9	22 58.6	–60.0	177.9	21 58.6	–59.9	177.9	20 58.7	–60.0	178.0	17
18	26 58.4	–60.0	177.9	25 58.5	–60.0	177.9	24 58.5	–60.0	177.9	23 58.5	–59.9	177.9	22 58.6	–60.0	178.0	21 58.6	–59.9	178.0	20 58.7	–60.0	178.0	19 58.7	–60.0	178.0	18
19	25 58.4	–59.9	177.9	24 58.5	–60.0	177.9	23 58.5	–60.0	178.0	22 58.6	–60.0	178.0	21 58.6	–60.0	178.0	20 58.6	–59.9	178.0	19 58.7	–60.0	178.0	18 58.7	–60.0	178.0	19
20	24 58.5	–60.0	177.9	23 58.5	–60.0	177.9	22 58.5	–59.9	178.0	21 58.6	–60.0	178.0	20 58.6	–60.0	178.0	19 58.7	–60.0	178.0	18 58.7	–60.0	178.0	17 58.7	–60.0	178.0	20
21	23 58.5	–60.0	178.0	22 58.5	–60.0	178.0	21 58.6	–60.0	178.0	20 58.6	–60.0	178.0	19 58.6	–59.9	178.0	18 58.7	–60.0	178.0	17 58.7	–60.0	178.0	16 58.7	–59.9	178.0	21
22	22 58.5	–60.0	178.0	21 58.5	–59.9	178.0	20 58.6	–60.0	178.0	19 58.6	–60.0	178.0	18 58.7	–60.0	178.1	17 58.7	–60.0	178.1	16 58.7	–60.0	178.1	15 58.8	–60.0	178.1	22
23	21 58.5	–59.9	178.0	20 58.6	–60.0	178.0	19 58.6	–60.0	178.0	18 58.6	–59.9	178.1	17 58.7	–60.0	178.1	16 58.7	–60.0	178.1	15 58.7	–59.9	178.1	14 58.8	–60.0	178.1	23
24	20 58.6	–60.0	178.0	19 58.6	–60.0	178.1	18 58.6	–60.0	178.1	17 58.7	–60.0	178.1	16 58.7	–60.0	178.1	15 58.7	–59.9	178.1	14 58.8	–60.0	178.1	13 58.8	–60.0	178.1	24
25	19 58.6	–60.0	178.1	18 58.6	–60.0	178.1	17 58.6	–59.9	178.1	16 58.7	–60.0	178.1	15 58.7	–60.0	178.1	14 58.8	–60.0	178.1	13 58.8	–59.9	178.1	12 58.8	–60.0	178.1	25
26	18 58.6	–60.0	178.1	17 58.6	–60.0	178.1	16 58.7	–60.0	178.1	15 58.7	–60.0	178.1	14 58.7	–59.9	178.1	13 58.8	–60.0	178.1	12 58.8	–60.0	178.2	11 58.8	–60.0	178.2	26
27	17 58.6	–60.0	178.1	16 58.6	–59.9	178.1	15 58.7	–60.0	178.1	14 58.7	–60.0	178.2	13 58.7	–59.9	178.2	12 58.8	–60.0	178.2	11 58.8	–60.0	178.2	10 58.8	–60.0	178.2	27
28	16 58.6	–59.9	178.2	15 58.7	–60.0	178.2	14 58.7	–60.0	178.2	13 58.7	–60.0	178.2	12 58.8	–60.0	178.2	11 58.8	–60.0	178.2	10 58.8	–60.0	178.2	9 58.8	–59.9	178.2	28
29	15 58.7	–60.0	178.2	14 58.7	–60.0	178.2	13 58.7	–60.0	178.2	12 58.7	–59.9	178.2	11 58.8	–60.0	178.2	10 58.8	–60.0	178.2	9 58.8	–60.0	178.2	8 58.9	–60.0	178.2	29
30	14 58.7	–60.0	178.2	13 58.7	–60.0	178.2	12 58.7	–60.0	178.2	11 58.8	–60.0	178.2	10 58.8	–60.0	178.2	9 58.8	–60.0	178.2	8 58.8	–59.9	178.2	7 58.9	–60.0	178.3	30
31	13 58.7	–60.0	178.2	12 58.7	–60.0	178.2	11 58.7	–59.9	178.3	10 58.8	–60.0	178.3	9 58.8	–60.0	178.3	8 58.8	–60.0	178.3	7 58.9	–60.0	178.3	6 58.9	–60.0	178.3	31
32	12 58.7	–60.0	178.3	11 58.7	–59.9	178.3	10 58.8	–60.0	178.3	9 58.8	–60.0	178.3	8 58.8	–60.0	178.3	7 58.8	–59.9	178.3	6 58.9	–60.0	178.3	5 58.9	–60.0	178.3	32
33	11 58.7	–60.0	178.3	10 58.8	–60.0	178.3	9 58.8	–60.0	178.3	8 58.8	–60.0	178.3	7 58.8	–59.9	178.3	6 58.9	–60.0	178.3	5 58.9	–60.0	178.3	4 58.9	–60.0	178.3	33
34	10 58.7	–59.9	178.3	9 58.8	–60.0	178.3	8 58.8	–60.0	178.3	7 58.8	–60.0	178.3	6 58.9	–60.0	178.3	5 58.9	–60.0	178.3	4 58.9	–60.0	178.3	3 58.9	–59.9	178.3	34
35	9 58.8	–60.0	178.3	8 58.8	–60.0	178.3	7 58.8	–60.0	178.3	6 58.8	–59.9	178.3	5 58.9	–60.0	178.4	4 58.9	–60.0	178.4	3 58.9	–60.0	178.4	2 58.9	–59.9	178.4	35
36	8 58.8	–60.0	178.4	7 58.8	–60.0	178.4	6 58.8	–59.9	178.4	5 58.9	–60.0	178.4	4 58.9	–60.0	178.4	3 58.9	–60.0	178.4	2 58.9	–60.0	178.4	1 59.0	–60.0	178.4	36
37	7 58.8	–60.0	178.4	6 58.8	–60.0	178.4	5 58.9	–60.0	178.4	4 58.9	–60.0	178.4	3 58.9	–60.0	178.4	2 58.9	–60.0	178.4	1 58.9	–59.9	178.4	0 59.0	–60.0	178.4	37
38	6 58.8	–60.0	178.4	5 58.8	–59.9	178.4	4 58.9	–60.0	178.4	3 58.9	–60.0	178.4	2 58.9	–60.0	178.4	1 58.9	–59.9	178.4	0 59.0	–60.0	178.4	0 01.0	+60.0	1.6	38
39	5 58.8	–59.9	178.4	4 58.9	–60.0	178.4	3 58.9	–60.0	178.4	2 58.9	–60.0	178.4	1 58.9	–60.0	178.4	0 59.0	–60.0	178.4	0 01.0	+60.0	1.6	1 01.0	+60.0	1.6	39
40	4 58.9	–60.0	178.5	3 58.9	–60.0	178.5	2 58.9	–60.0	178.5	1 58.9	–59.9	178.5	0 58.9	–59.9	178.5	0 01.0	+60.0	1.5	1 01.0	+60.0	1.5	2 01.0	+60.0	1.5	40
41	3 58.9	–60.0	178.5	2 58.9	–60.0	178.5	1 58.9	–60.0	178.5	0 58.9	–59.9	178.5	0 01.0	+60.0	1.5	1 01.0	+60.0	1.5	2 01.0	+60.0	1.5	3 01.0	+60.0	1.5	41
42	2 58.9	–60.0	178.5	1 58.9	–60.0	178.5	0 58.9	–59.9	178.5	0 01.0	+60.0	1.5	1 01.0	+60.0	1.5	2 01.0	+60.0	1.5	3 01.0	+60.0	1.5	4 01.0	+59.9	1.5	42
43	1 58.9	–60.0	178.5	0 58.9	–59.9	178.5	0 01.0	+60.0	1.5	1 01.0	+60.0	1.5	2 01.0	+60.0	1.5	3 01.0	+60.0	1.5	4 01.0	+60.0	1.5	5 00.9	+60.0	1.5	43
44	0 58.9	–59.9	178.6	0 01.0	+60.0	1.4	1 01.0	+60.0	1.4	2 01.0	+60.0	1.4	3 01.0	+60.0	1.4	4 01.0	+60.0	1.4	5 01.0	+59.9	1.4	6 00.9	+60.0	1.4	44
45	0 01.0	+60.0	1.4	1 01.0	+60.0	1.4	2 01.0	+60.0	1.4	3 01.0	+60.0	1.4	4 01.0	+60.0	1.4	5 01.0	+59.9	1.4	6 00.9	+60.0	1.4	7 00.9	+60.0	1.4	45
46	1 01.0	+60.0	1.4	2 01.0	+60.0	1.4	3 01.0	+60.0	1.4	4 01.0	+60.0	1.4	5 01.0	+59.9	1.4	6 00.9	+60.0	1.4	7 00.9	+60.0	1.4	8 00.9	+60.0	1.4	46
47	2 01.0	+60.0	1.4	3 01.0	+60.0	1.4	4 01.0	+60.0	1.4	5 01.0	+59.9	1.4	6 00.9	+60.0	1.4	7 00.9	+60.0	1.4	8 00.9	+60.0	1.4	9 00.9	+60.0	1.4	47
48	3 01.0	+60.0	1.3	4 01.0	+60.0	1.3	5 01.0	+59.9	1.3	6 00.9	+60.0	1.3	7 00.9	+60.0	1.3	8 00.9	+60.0	1.3	9 00.9	+60.0	1.4	10 00.9	+60.0	1.4	48
49	4 01.0	+60.0	1.3	5 01.0	+59.9	1.3	6 00.9	+60.0	1.3	7 00.9	+60.0	1.3	8 00.9	+60.0	1.3	9 00.9	+60.0	1.3	10 00.9	+60.0	1.3	11 00.9	+59.9	1.3	49
50	5 01.0	+59.9	1.3	6 00.9	+60.0	1.3	7 00.9	+60.0	1.3	8 00.9	+60.0	1.3	9 00.9	+60.0	1.3	10 00.9	+60.0	1.3	11 00.9	+59.9	1.3	12 00.8	+60.0	1.3	50
51	6 00.9	+60.0	1.3	7 00.9	+60.0	1.3	8 00.9	+60.0	1.3	9 00.9	+60.0	1.3	10 00.9	+60.0	1.3	11 00.9	+59.9	1.3	12 00.8	+60.0	1.3	13 00.8	+60.0	1.3	51
52	7 00.9	+60.0	1.2	8 00.9	+60.0	1.2	9 00.9	+60.0	1.2	10 00.9	+60.0	1.3	11 00.9	+59.9	1.3	12 00.8	+60.0	1.3	13 00.8	+60.0	1.3	14 00.8	+60.0	1.3	52
53	8 00.9	+60.0	1.2	9 00.9	+60.0	1.2	10 00.9	+60.0	1.2	11 00.9	+59.9	1.2	12 00.8	+60.0	1.2	13 00.8	+60.0	1.2	14 00.8	+60.0	1.2	15 00.8	+60.0	1.2	53
54	9 00.9	+60.0	1.2	10 00.9	+60.0	1.2	11 00.9	+59.9	1.2	12 00.8	+60.0	1.2	13 00.8	+60.0	1.2	14 00.8	+60.0	1.2	15 00.8	+60.0	1.2	16 00.8	+60.0	1.2	54
55	10 00.9	+59.9	1.2	11 00.9	+59.9	1.2	12 00.8	+60.0	1.2	13 00.8	+60.0	1.2	14 00.8	+60.0	1.2	15 00.8	+60.0	1.2	16 00.8	+60.0	1.2	17 00.8	+60.0	1.2	55
56	11 00.8	+60.0	1.1	12 00.8	+60.0	1.1	13 00.8	+60.0	1.1	14 00.8	+60.0	1.2	15 00.8	+60.0	1.2	16 00.8	+60.0	1.2	17 00.8	+60.0	1.2	18 00.8	+59.9	1.2	56
57	12 00.8	+60.0	1.1	13 00.8	+60.0	1.1	14 00.8	+60.0	1.1	15 00.8	+60.0	1.1	16 00.8	+60.0	1.1	17 00.8	+60.0	1.1	18 00.8	+59.9	1.1	19 00.7	+60.0	1.2	57
58	13 00.8	+60.0	1.1	14 00.8	+60.0	1.1	15 00.8	+60.0	1.1	16 00.8	+60.0	1.1	17 00.8	+59.9	1.1	18 00.8	+59.9	1.1	19 00.7	+60.0	1.1	20 00.7	+60.0	1.1	58
59	14 00.8	+60.0	1.1	15 00.8	+60.0	1.1	16 00.8	+59.9	1.1	17 00.8	+60.0	1.1	18 00.7	+60.0	1.1	19 00.7	+60.0	1.1	20 00.7	+60.0	1.1	21 00.7	+60.0	1.1	59
60	15 00.8	+59.9	1.0	16 00.8	+59.9	1.0	17 00.7	+60.0	1.0	18 00.7	+60.0	1.0	19 00.7	+60.0	1.1	20 00.7	+60.0	1.1	21 00.7	+60.0	1.1	22 00.7	+60.0	1.1	60
61	16 00.7	+60.0	1.0	17 00.7	+60.0	1.0	18 00.7	+60.0	1.0	19 00.7	+60.0	1.0	20 00.7	+60.0	1.0	21 00.7	+60.0	1.0	22 00.7	+60.0	1.0	23 00.7	+59.9	1.1	61
62	17 00.7	+60.0	1.0	18 00.7	+60.0	1.0	19 00.7	+60.0	1.0	20 00.7	+60.0	1.0	21 00.7	+60.0	1.0	22 00.7	+60.0	1.0	23 00.7	+59.9	1.0	24 00.7	+59.9	1.0	62
63	18 00.7	+60.0	1.0	19 00.7	+60.0	1.0	20 00.7	+60.0	1.0	21 00.7	+60.0	1.0	22 00.7	+59.9	1.0	23 00.7	+59.9	1.0	24 00.7	+59.9	1.0	25 00.6	+60.0	1.0	63
64	19 00.7	+60.0	0.9	20 00.7	+60.0	0.9	21 00.7	+60.0	0.9	22 00.7	+59.9	0.9	23 00.7	+59.9	1.0	24 00.6	+60.0	1.0	25 00.6	+60.0	1.0	26 00.6	+60.0	1.0	64
65	20 00.7	+59.9	0.9	21 00.7	+59.9	0.9	22 00.7	+59.9	0.9	23 00.6	+60.0	0.9	24 00.6	+60.0	0.9	25 00.6	+60.0	0.9	26 00.6	+60.0	0.9	27 00.6	+60.0	0.9	65
66	21 00.6	+60.0	0.9	22 00.6	+60.0	0.9	23 00.6	+60.0	0.9	24 00.6	+60.0	0.9	25 00.6	+60.0	0.9	26 00.6	+60.0	0.9	27 00.6	+60.0	0.9	28 00.6	+60.0	0.9	66
67	22 00.6	+60.0	0.8	23 00.6	+60.0	0.8	24 00.6	+60.0	0.9	25 00.6	+60.0	0.9	26 00.6	+60.0	0.9	27 00.6	+60.0	0.9	28 00.6	+60.0	0.9	29 00.6	+60.0	0.9	67
68	23 00.6	+60.0	0.8	24 00.6	+60.0	0.8	25 00.6	+60.0	0.8	26 00.6	+60.0	0.8	27 00.6	+60.0	0.8	28 00.6	+60.0	0.8	29 00.6	+59.9	0.9	30 00.5	+60.0	0.9	68
69	24 00.6	+60.0	0.8	25 00.6	+60.0	0.8	26 00.6	+59.9	0.8	27 00.6	+59.9	0.8	28 00.6	+59.9	0.8	29 00.6	+59.9	0.8	30 00.5	+60.0	0.8	31 00.5	+60.0	0.8	69
70	25 00.6	+59.9	0.8	26 00.6	+59.9	0.8	27 00.5	+60.0	0.8	28 00.5	+60.0	0.8	29 00.5	+60.0	0.8	30 00.5	+60.0	0.8	31 00.5	+60.0	0.8	32 00.5	+60.0	0.8	70
71	26 00.5	+60.0	0.7	27 00.5	+60.0	0.7	28 00.5	+60.0	0.7	29 00.5	+60.0	0.7	30 00.5	+60.0	0.7	31 00.5	+60.0	0.8	32 00.5	+60.0	0.8	33 00.5	+60.0	0.8	71
72	27 00.5	+60.0	0.7	28 00.5	+60.0	0.7	29 00.5	+60.0	0.7	30 00.5	+60.0	0.7	31 00.5	+60.0	0.7	32 00.5	+60.0	0.7	33 00.5	+59.9	0.7	34 00.5	+59.9	0.7	72
73	28 00.5	+60.0	0.7	29 00.5	+60.0	0.7	30 00.5	+60.0	0.7	31 00.5	+60.0	0.7	32 00.5	+60.0	0.7	33 00.5	+59.9	0.7	34 00.5	+59.9	0.7	35 00.4	+60.0	0.7	73
74	29 00.5	+59.9	0.6	30 00.5	+59.9	0.6	31 00.5	+59.9	0.6	32 00.5	+59.9	0.6	33 00.5	+59.9	0.7	34 00.4	+60.0	0.7	35 00.4	+60.0	0.7	36 00.4	+60.0	0.7	74
75	30 00.4	+60.0	0.6	31 00.4	+60.0	0.6	32 00.4	+60.0	0.6	33 00.4	+60.0	0.6	34 00.4	+60.0	0.6	35 00.4	+60.0	0.6	36 00.4	+60.0	0.6	37 00.4	+60.0	0.6	75
76	31 00.4	+60.0	0.6	32 00.4	+60.0	0.6	33 00.4	+60.0	0.6	34 00.4	+60.0	0.6	35 00.4	+60.0	0.6	36 00.4	+60.0	0.6	37 00.4	+60.0	0.6	38 00.4	+60.0	0.6	76
77	32 00.4	+60.0	0.5	33 00.4	+60.0	0.5	34 00.4	+60.0	0.5	35 00.4	+60.0	0.5	36 00.4	+60.0	0.6	37 00.4	+60.0	0.6	38 00.4	+60.0	0.6	39 00.4	+59.9	0.6	77
78	33 00.4	+59.9	0.5	34 00.4	+59.9	0.5	35 00.4	+59.9	0.5	36 00.4	+59.9	0.5	37 00.4	+59.9	0.5	38 00.4	+59.9	0.5	39 00.4	+59.9	0.5	40 00.3	+60.0	0.5	78
79	34 00.3	+60.0	0.5	35 00.3	+60.0	0.5	36 00.3	+60.0	0.5	37 00.3	+60.0	0.5	38 00.3	+60.0	0.5	39 00.3	+60.0	0.5	40 00.3	+60.0	0.5	41 00.3	+60.0	0.5	79
80	35 00.3	+60.0	0.4	36 00.3	+60.0	0.4	37 00.3	+60.0	0.4	38 00.3	+60.0	0.4	39 00.3	+60.0	0.4	40 00.3	+60.0	0.5	41 00.3	+60.0	0.5	42 00.3	+60.0	0.5	80
81	36 00.3	+60.0	0.4	37 00.3	+60.0	0.4	38 00.3	+60.0	0.4	39 00.3	+60.0	0.4	40 00.3	+60.0	0.4	41 00.3	+60.0	0.4	42 00.3	+59.9	0.4	43 00.3	+59.9	0.4	81
82	37 00.3	+59.9	0.3	38 00.3	+59.9	0.4	39 00.3	+59.9	0.4	40 00.3	+59.9	0.4	41 00.3	+59.9	0.4	42 00.3	+59.9	0.4	43 00.3	+59.9	0.4	44 00.2	+60.0	0.4	82
83	38 00.2	+60.0	0.3	39 00.2	+60.0	0.3	40 00.2	+60.0	0.3	41 00.2	+60.0	0.3	42 00.2	+60.0	0.3	43 00.2	+60.0	0.3	44 00.2	+60.0	0.3	45 00.2	+60.0	0.3	83
84	39 00.2	+60.0	0.3	40 00.2	+60.0	0.3	41 00.2	+60.0	0.3	42 00.2	+60.0	0.3	43 00.2	+60.0	0.3	44 00.2	+60.0	0.3	45 00.2	+60.0	0.3	46 00.2	+60.0	0.3	84
85	40 00.2	+59.9	0.2	41 00.2	+59.9	0.2	42 00.2	+59.9	0.2	43 00.2	+59.9	0.2	44 00.2	+59.9	0.2	45 00.2	+59.9	0.2	46 00.2	+59.9	0.3	47 00.2	+59.9	0.3	85
86	41 00.1	+60.0	0.2	42 00.1	+60.0	0.2	43 00.1	+60.0	0.2	44 00.1	+60.0	0.2	45 00.1	+60.0	0.2	46 00.1	+60.0	0.2	47 00.1	+60.0	0.2	48 00.1	+60.0	0.2	86
87	42 00.1	+60.0	0.1	43 00.1	+60.0	0.1	44 00.1	+60.0	0.1	45 00.1	+60.0	0.1	46 00.1	+60.0	0.1	47 00.1	+60.0	0.2	48 00.1	+60.0	0.2	49 00.1	+60.0	0.2	87
88	43 00.1	+59.9	0.1	44 00.1	+59.9	0.1	45 00.1	+59.9	0.1	46 00.1	+59.9	0.1	47 00.1	+59.9	0.1	48 00.1	+59.9	0.1	49 00.1	+59.9	0.1	50 00.1	+59.9	0.1	88
89	44 00.0	+60.0	0.0	45 00.0	+60.0	0.0	46 00.0	+60.0	0.1	47 00.0	+60.0	0.1	48 00.0	+60.0	0.1	49 00.0	+60.0	0.1	50 00.0	+60.0	0.1	51 00.0	+60.0	0.1	89
90	45 00.0	+60.0	0.0	46 00.0	+60.0	0.0	47 00.0	+60.0	0.0	48 00.0	+60.0	0.0	49 00.0	+60.0	0.0	50 00.0	+60.0	0.0	51 00.0	+60.0	0.0	52 00.0	+60.0	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 55.3	+59.9	175.8	43 55.5	+59.9	175.8	42 55.6	+59.9	175.9	41 55.8	+59.9	176.0	40 55.9	+59.9	176.0	39 56.0	+60.0	176.1	38 56.2	+59.9	176.1	37 56.3	+60.0	176.2	0
1	45 55.2	+59.9	175.7	44 55.5	+60.0	175.8	43 55.6	+59.9	175.8	42 55.7	+59.9	175.9	41 55.8	+60.0	176.0	40 56.0	+59.9	176.0	39 56.1	+60.0	176.1	38 56.3	+59.9	176.1	1
2	46 55.1	+59.9	175.6	45 55.3	+59.9	175.7	44 55.5	+59.9	175.8	43 55.6	+60.0	175.8	42 55.8	+59.9	175.9	41 55.9	+60.0	176.0	40 56.1	+59.9	176.0	39 56.2	+60.0	176.1	2
3	47 55.0	+59.9	175.5	46 55.2	+59.9	175.7	45 55.4	+59.9	175.7	44 55.6	+59.9	175.8	43 55.7	+59.9	175.8	42 55.9	+59.9	175.9	41 56.0	+60.0	176.0	40 56.2	+59.9	176.0	3
4	48 54.9	+59.9	175.4	47 55.1	+59.9	175.5	46 55.3	+59.9	175.6	45 55.5	+59.9	175.7	44 55.6	+59.9	175.8	43 55.8	+59.9	175.8	42 56.0	+59.9	175.9	41 56.1	+60.0	176.0	4
5	49 54.8	+59.9	175.4	48 55.0	+59.9	175.4	47 55.2	+59.9	175.5	46 55.4	+59.9	175.6	45 55.6	+59.9	175.7	44 55.7	+60.0	175.8	43 55.9	+59.9	175.8	42 56.1	+59.9	175.9	5
6	50 54.7	+59.9	175.3	49 54.9	+59.9	175.4	48 55.1	+59.9	175.5	47 55.3	+59.9	175.5	46 55.5	+59.9	175.6	45 55.7	+59.9	175.7	44 55.8	+60.0	175.8	43 56.0	+59.9	175.9	6
7	51 54.6	+59.9	175.2	50 54.8	+59.9	175.4	49 55.0	+59.9	175.4	48 55.2	+59.9	175.5	47 55.4	+59.9	175.6	46 55.6	+59.9	175.6	45 55.8	+59.9	175.7	44 55.9	+59.9	175.8	7
8	52 54.5	+59.9	175.1	51 54.7	+59.9	175.2	50 54.9	+60.0	175.3	49 55.1	+60.0	175.4	48 55.3	+60.0	175.5	47 55.5	+59.9	175.6	46 55.7	+59.9	175.7	45 55.9	+59.9	175.7	8
9	53 54.4	+59.9	175.0	52 54.6	+59.9	175.1	51 54.9	+59.8	175.2	50 55.1	+59.9	175.3	49 55.3	+59.9	175.4	48 55.4	+60.0	175.5	47 55.6	+60.0	175.6	46 55.8	+59.9	175.7	9
10	54 54.3	+59.9	174.9	53 54.5	+59.9	175.0	52 54.7	+59.9	175.1	51 55.0	+59.9	175.2	50 55.2	+59.9	175.3	49 55.4	+59.9	175.4	48 55.6	+59.9	175.5	47 55.7	+60.0	175.6	10
11	55 54.2	+59.8	174.7	54 54.4	+59.9	174.9	53 54.6	+59.9	175.0	52 54.9	+59.9	175.1	51 55.1	+59.9	175.2	50 55.3	+59.9	175.3	49 55.5	+59.9	175.4	48 55.7	+59.9	175.5	11
12	56 54.0	+59.9	174.6	55 54.3	+59.9	174.8	54 54.5	+59.9	174.9	53 54.8	+59.9	175.0	52 55.0	+59.9	175.1	51 55.2	+59.9	175.2	50 55.4	+59.9	175.3	49 55.6	+59.9	175.4	12
13	57 53.9	+59.9	174.5	56 54.2	+59.8	174.6	55 54.4	+59.9	174.8	54 54.7	+59.8	174.9	53 54.9	+59.9	175.0	52 55.1	+59.9	175.1	51 55.3	+59.9	175.2	50 55.5	+59.9	175.3	13
14	58 53.7	+59.8	174.4	57 54.0	+59.8	174.6	56 54.3	+59.9	174.7	55 54.5	+59.8	174.8	54 54.8	+59.9	174.9	53 55.0	+59.9	175.1	52 55.2	+59.9	175.2	51 55.4	+59.9	175.3	14
15	59 53.6	+59.8	174.2	58 53.9	+59.8	174.4	57 54.2	+59.8	174.5	56 54.4	+59.9	174.7	55 54.7	+59.9	174.8	54 54.9	+59.9	175.0	53 55.1	+59.9	175.1	52 55.3	+60.0	175.2	15
16	60 53.4	+59.8	174.1	59 53.7	+59.9	174.2	58 54.0	+59.8	174.4	57 54.3	+59.9	174.6	56 54.6	+59.8	174.7	55 54.8	+59.9	174.8	54 55.0	+59.9	175.0	53 55.3	+59.9	175.1	16
17	61 53.2	+59.8	173.9	60 53.6	+59.8	174.1	59 53.9	+59.8	174.3	58 54.2	+59.8	174.4	57 54.4	+59.9	174.6	56 54.7	+59.8	174.7	55 54.9	+59.9	174.9	54 55.2	+59.9	175.0	17
18	62 53.0	+59.8	173.7	61 53.4	+59.8	173.9	60 53.7	+59.8	174.1	59 54.0	+59.9	174.3	58 54.3	+59.9	174.5	57 54.6	+59.8	174.6	56 54.8	+59.9	174.8	55 55.1	+59.9	174.9	18
19	63 52.8	+59.8	173.5	62 53.2	+59.8	173.8	61 53.5	+59.9	174.0	60 53.9	+59.8	174.2	59 54.2	+59.8	174.3	58 54.4	+59.9	174.5	57 54.7	+59.9	174.7	56 55.0	+59.9	174.8	19
20	64 52.6	+59.8	173.3	63 53.0	+59.8	173.6	62 53.4	+59.8	173.8	61 53.7	+59.8	174.0	60 54.0	+59.8	174.2	59 54.3	+59.9	174.4	58 54.6	+59.9	174.5	57 54.9	+59.8	174.7	20
21	65 52.4	+59.7	173.1	64 52.8	+59.8	173.4	63 53.2	+59.8	173.6	62 53.5	+59.8	173.8	61 53.9	+59.8	174.0	60 54.2	+59.8	174.2	59 54.5	+59.9	174.4	58 54.7	+59.9	174.6	21
22	66 52.1	+59.7	172.9	65 52.6	+59.7	173.3	64 53.0	+59.7	173.4	63 53.3	+59.8	173.7	62 53.7	+59.8	173.9	61 54.0	+59.9	174.1	60 54.3	+59.9	174.3	59 54.6	+59.9	174.4	22
23	67 51.8	+59.7	172.7	66 52.3	+59.7	173.0	65 52.7	+59.8	173.2	64 53.1	+59.8	173.5	63 53.5	+59.8	173.7	62 53.9	+59.8	173.9	61 54.2	+59.8	174.1	60 54.5	+59.9	174.3	23
24	68 51.5	+59.7	172.4	67 52.0	+59.7	172.7	66 52.5	+59.7	173.0	65 52.9	+59.8	173.3	64 53.3	+59.8	173.5	63 53.7	+59.8	173.8	62 54.0	+59.8	174.0	61 54.4	+59.8	174.2	24
25	69 51.2	+59.7	172.1	68 51.7	+59.7	172.5	67 52.2	+59.8	172.8	66 52.7	+59.7	173.1	65 53.1	+59.8	173.3	64 53.5	+59.8	173.6	63 53.9	+59.8	173.8	62 54.3	+59.8	174.0	25
26	70 50.8	+59.6	171.8	69 51.4	+59.7	172.1	68 52.0	+59.7	172.5	67 52.5	+59.7	172.8	66 52.9	+59.8	173.1	65 53.3	+59.8	173.4	64 53.7	+59.8	173.6	63 54.1	+59.8	173.9	26
27	71 50.4	+59.6	171.4	70 51.1	+59.6	171.8	69 51.7	+59.6	172.2	68 52.2	+59.7	172.6	67 52.7	+59.7	172.9	66 53.1	+59.8	173.2	65 53.5	+59.8	173.4	64 53.9	+59.8	173.7	27
28	72 50.0	+59.5	171.0	71 50.7	+59.6	171.5	70 51.3	+59.6	171.9	69 51.9	+59.7	172.3	68 52.4	+59.7	172.6	67 52.9	+59.7	172.9	66 53.3	+59.8	173.2	65 53.7	+59.8	173.5	28
29	73 49.5	+59.4	170.5	72 50.3	+59.5	171.1	71 50.9	+59.6	171.6	70 51.6	+59.6	172.0	69 52.1	+59.7	172.4	68 52.6	+59.7	172.7	67 53.1	+59.8	173.0	66 53.5	+59.8	173.3	29
30	74 48.9	+59.4	170.0	73 49.8	+59.4	170.6	72 50.5	+59.6	171.2	71 51.2	+59.6	171.6	70 51.8	+59.7	172.1	69 52.4	+59.7	172.4	68 52.9	+59.7	172.8	67 53.3	+59.8	173.1	30
31	75 48.3	+59.2	169.5	74 49.2	+59.4	170.7	73 50.1	+59.4	170.7	72 50.8	+59.5	171.3	71 51.5	+59.6	171.7	70 52.1	+59.6	172.1	69 52.6	+59.7	172.5	68 53.1	+59.7	172.8	31
32	76 47.5	+59.2	168.8	75 48.6	+59.3	169.6	74 49.5	+59.4	170.2	73 50.3	+59.5	170.8	72 51.1	+59.6	171.3	71 51.7	+59.6	171.8	70 52.3	+59.7	172.2	69 52.8	+59.7	172.6	32
33	77 46.7	+59.0	168.0	76 47.9	+59.2	168.9	75 48.9	+59.3	169.7	74 49.8	+59.5	170.3	73 50.6	+59.5	170.9	72 51.3	+59.6	171.4	71 52.0	+59.6	171.9	70 52.6	+59.6	172.3	33
34	78 45.7	+58.8	167.1	77 47.1	+59.0	168.2	76 48.2	+59.2	169.0	75 49.3	+59.3	169.8	74 50.2	+59.4	170.5	73 50.9	+59.6	171.0	72 51.6	+59.6	171.5	71 52.2	+59.7	172.0	34
35	79 44.5	+58.5	166.1	78 46.1	+58.8	167.3	77 47.4	+59.1	168.3	76 48.6	+59.1	169.2	75 49.6	+59.3	169.9	74 50.5	+59.4	170.6	73 51.2	+59.6	171.1	72 51.9	+59.6	171.6	35
36	80 43.0	+58.2	164.8	79 44.9	+58.6	166.2	78 46.5	+58.9	167.4	77 47.8	+59.1	168.4	76 49.0	+59.2	169.3	75 49.9	+59.4	170.0	74 50.8	+59.5	170.7	73 51.5	+59.6	171.2	36
37	81 41.2	+57.8	163.2	80 43.5	+58.3	165.1	79 45.4	+58.6	166.4	78 46.9	+59.0	167.6	77 48.2	+59.2	168.6	76 49.3	+59.3	169.4	75 50.3	+59.4	170.2	74 51.1	+59.5	170.8	37
38	82 39.0	+57.0	161.2	81 41.8	+57.8	163.4	80 44.0	+58.4	165.2	79 45.9	+58.7	166.6	78 47.4	+59.0	167.8	77 48.6	+59.2	168.7	76 49.7	+59.3	169.6	75 50.6	+59.4	170.3	38
39	83 36.0	+56.0	158.6	82 39.6	+57.2	161.4	81 42.4	+57.9	163.6	80 44.6	+58.3	165.4	79 46.3	+58.8	166.8	78 47.8	+59.0	167.9	77 49.0	+59.2	168.9	76 50.0	+59.4	169.7	39
40	84 32.0	+54.3•	155.1	83 36.8	+56.1	158.9	82 40.3	+57.2	161.7	81 42.9	+58.0	163.8	80 45.1	+58.4	165.6	79 46.8	+58.8	166.9	78 48.2	+59.0	168.1	77 49.4	+59.2	169.0	40
41	85 26.3	+51.4•	150.2	84 32.9	+54.5•	155.4	83 37.5	+56.2	159.2	82 40.9	+57.3	161.9	81 43.5	+58.1	164.1	80 45.6	+58.5	165.8	79 47.2	+58.9	167.1	78 48.6	+59.1	168.3	41
42	86 17.7	+45.8•	143.0	85 27.4	+51.5•	150.6	84 33.7	+54.7•	155.8	83 38.2	+56.4	159.5	82 41.6	+57.4	162.2	81 44.1	+58.1	164.3	80 46.1	+58.6	166.0	79 47.7	+58.9	167.3	42
43	87 03.5	+34.8•	131.8	86 18.9	+46.2•	143.4	85 28.4	+51.8•	151.0	84 34.6	+54.8•	156.1	83 39.0	+56.5	159.8	82 42.2	+57.5	162.5	81 44.7	+58.1	164.5	80 46.6	+58.6	166.2	43
44	88 38.3	+14.4•	114.0	87 05.1	+35.2•	132.2	86 20.2	+46.5•	143.9	85 29.4	+52.1•	151.4	84 35.5	+55.0•	156.5	83 39.7	+56.7	160.1	82 42.8	+57.7	162.7	81 45.2	+58.3	164.8	44
45	87 52.7	–12.4•	88.9	87 40.3	+14.7•	114.4	87 06.7	+35.6•	132.7	86 21.5	+46.9•	144.4	85 30.5	+52.3•	151.8	84 36.4	+55.1•	156.8	83 40.5	+56.7	160.4	82 43.5	+57.7	163.0	45
46	87 40.3	–33.6•	63.5	87 55.0	–12.7•	88.9	87 42.3	+14.9•	114.7	87 08.4	+36.0•	133.2	86 22.8	+47.2•	144.8	85 31.5	+52.6•	152.2	84 37.2	+55.4	157.2	83 41.2	+56.9	160.7	46
47	87 06.7	–42.5•	45.1	87 42.3	–33.9•	63.1	87 57.2	–12.8•	88.9	87 44.4	+15.2•	115.1	87 10.0	+36.5•	133.8	86 24.1	+47.6•	145.3	85 32.6	+52.8•	152.7	84 38.1	+55.5	157.6	47
48	86 21.5	–51.0•	33.5	87 08.4	–45.6•	44.6	87 44.4	–34.4•	62.6	87 59.6	–13.1•	88.9	87 46.5	+15.4•	115.6	87 11.7	+36.9•	134.3	86 25.4	+47.9•	145.8	85 33.6	+53.1•	153.1	48
49	85 30.5	–54.1•	26.0	86 22.8	–51.3•	32.9	87 10.0	–45.9•	44.0	87 46.5	–34.8•	62.2	88 01.9	–13.3•	88.9	87 48.6	+15.7•	116.0	87 13.3	+37.5•	134.9	86 26.7	+48.3•	146.4	49
50	84 36.4	–57.0	21.0	85 31.5	–54.3•	25.5	86 24.1	–51.5•	32.4	87 11.7	–46.3•	43.4	87 48.6	–35.3•	61.7	88 04.3	–13.5•	88.9	87 50.8	+15.9•	116.5	87 15.0	+37.9•	135.5	50
51	83 40.5	–57.0	17.4	84 37.2	–56.0	20.6	85 32.6	–54.5•	25.1	86 25.4	–51.8•	31.9	87 13.3	–46.6•	42.8	87 50.8	–35.8•	61.2	88 06.7	–13.8•	88.8	87 52.9	+16.3•	117.0	51
52	82 43.5	–57.7	14.7	83 41.2	–57.1	17.0	84 38.1	–56.1	20.2	85 33.6	–54.6•	24.6	86 26.7	–52.0•	31.3	87 15.0	–47.0•	42.2	87 52.9	–36.2•	60.7	88 09.2	–14.1•	88.8	52
53	81 45.8	–58.2	12.7	82 44.1	–57.7	14.4	83 42.0	–57.2	16.7	84 39.0	–56.3	19.7	85 34.7	–54.9•	24.1	86 28.0	–52.3•	30.7	87 15.7	–47.4•	41.5	87 55.1	–36.7•	60.1	53
54	80 47.6	–58.5	11.1	81 46.4	–58.3	12.4	82 44.8	–57.9	14.1	83 42.7	–57.3	16.3	84 39.8	–56.4	19.3	85 35.7	–55.0•	23.6	86 29.3	–52.6•	30.1	87 18.4	–47.8•	40.9	54
55	79 49.1	–58.8	9.8	80 48.1	–58.5	10.8	81 46.9	–58.3	12.1	82 45.4	–57.9	13.8	83 43.4	–57.4	15.9	84 40.7	–56.6	18.9	85 36.7	–55.2•	23.1	86 30.6	–52.8•	29.5	55
56	78 50.3	–59.0	8.7	79 49.6	–58.9	9.5	80 48.6	–58.6	10.6	81 47.5	–58.4	11.8	82 46.0	–57.9	13.4	83 44.1	–57.4	15.6	84 41.5	–56.6	18.4	85 37.8	–55.4•	22.6	56
57	77 51.3	–59.1	7.8	78 50.7	–59.0	8.5	79 50.0	–58.9	9.3	80 49.1	–58.6	10.3	81 48.1	–58.5	11.5	82 46.7	–58.1	13.1	83 44.9	–57.6	15.2	84 42.4	–56.8	18.0	57
58	76 52.2	–59.3	7.0	77 51.7	–59.2	7.6	78 51.1	–59.0	8.2	79 50.5	–59.0	9.0	80 49.6	–58.7	10.0	81 48.6	–58.5	11.2	82 47.3	–58.2	12.8	83 45.6	–57.7	14.8	58
59	75 52.9	–59.3	6.3	76 52.5	–59.2	6.8	77 52.1	–59.1	7.4	78 51.5	–59.0	8.0	79 50.9	–59.0	8.9	80 50.1	–58.8	9.7	81 49.1	–58.5	10.9	82 47.9	–58.2	12.4	59
60	74 53.6	–59.4	6.2	75 53.3	–59.4	6.2	76 52.9	–59.3	6.6	77 52.5	–59.3	7.2	78 51.9	–59.1	7.8	79 51.3	–59.0	8.5	80 50.6	–58.8	9.5	81 49.7	–58.6	10.6	60
61	73 54.2	–59.5	5.3	74 53.9	–59.5	5.6	75 53.6	–59.4	6.0	76 53.2	–59.3	6.4	77 52.8	–59.2	6.9	78 52.3	–59.1	7.6	79 51.8	–59.1	8.3	80 51.1	–58.9	9.2	61
62	72 54.7	–59.6	4.8	73 54.4	–59.5	5.1	74 54.2	–59.5	5.4	75 53.9	–59.4	5.8	76 53.5	–59.4	6.2	77 53.2	–59.3	6.1	78 52.7	–59.2	7.3	79 52.2	–59.1	8.0	62
63	71 55.1	–59.6	4.4	72 54.9	–59.5	4.6	73 54.7	–59.5	4.9	74 54.5	–59.5	5.2	75 54.2	–59.4	5.6	76 53.9	–59.4	6.0	77 53.6	–59.3	6.5	78 53.1	–59.2	7.1	63
64	70 55.5	–59.6	4.0	71 55.4	–59.6	4.2	72 55.2	–59.6	4.5	73 55.0	–59.5	4.8	74 54.8	–59.5	5.1	75 54.5	–59.4	5.4	76 54.2	–59.4	5.8	77 53.9	–59.3	6.3	64
65	69 55.9	–59.7	3.7	70 55.8	–59.7	3.9	71 55.6	–59.6	4.1	72 55.5	–59.6	4.3	73 55.3	–59.6	4.6	74 55.1	–59.6	4.9	75 54.9	–59.5	5.2	76 54.6	–59.5	5.6	65
66	68 56.2	–59.7	3.4	69 56.1	–59.7	3.6	70 56.0	–59.7	3.7	71 55.9	–59.7	3.9	72 55.7	–59.7	4.2	73 55.5	–59.6	4.4	74 55.4	–59.6	4.7	75 55.1	–59.5	5.0	66
67	67 56.5	–59.7	3.1	68 56.4	–59.7	3.3	69 56.3	–59.7	3.4	70 56.2	–59.7	3.6	71 56.1	–59.7	3.8	72 56.0	–59.7	4.0	73 55.8	–59.6	4.2	74 55.6	–59.5	4.5	67
68	66 56.8	–59.8	2.9	67 56.7	–59.7	3.0	68 56.6	–59.7	3.1	69 56.6	–59.7	3.3	70 56.4	–59.8	3.4	71 56.3	–59.7	3.6	72 56.2	–59.7	3.8	73 56.0	–59.6	4.1	68
69	65 57.1	–59.8	2.6	66 57.0	–59.7	2.7	67 56.9	–59.7	2.9	68 56.9	–59.8	3.0	69 56.8	–59.7	3.1	70 56.7	–59.7	3.3	71 56.6	–59.7	3.5	72 56.5	–59.7	3.7	69
70	64 57.3	–59.8	2.4	65 57.3	–59.8	2.5	66 57.2	–59.8	2.6	67 57.1	–59.7	2.7	68 57.1	–59.8	2.9	69 57.0	–59.7	3.0	70 56.9	–59.7	3.1	71 56.8	–59.7	3.3	70
71	63 57.5	–59.8	2.2	64 57.5	–59.8	2.3	65 57.4	–59.7	2.4	66 57.4	–59.8	2.5	67 57.3	–59.8	2.6	68 57.3	–59.8	2.7	69 57.2	–59.8	2.8	70 57.1	–59.7	3.0	71
72	62 57.7	–59.8	2.0	63 57.7	–59.8	2.1	64 57.6	–59.8	2.2	65 57.6	–59.8	2.3	66 57.6	–59.7	2.4	67 57.5	–59.8	2.5	68 57.4	–59.7	2.6	69 57.4	–59.7	2.7	72
73	61 57.9	–59.8	1.9	62 57.9	–59.8	1.9	63 57.9	–59.8	2.0	64 57.8	–59.8	2.1	65 57.8	–59.8	2.2	66 57.8	–59.8	2.2	67 57.7	–59.8	2.3	68 57.6	–59.7	2.4	73
74	60 58.1	–59.8	1.7	61 58.1	–59.8	1.8	62 58.1	–59.9	1.8	63 58.0	–59.8	1.9	64 58.0	–59.8	2.0	65 57.9	–59.8	2.0	66 57.9	–59.9	2.1	67 57.9	–59.8	2.2	74
75	59 58.3	–59.9	1.6	60 58.3	–59.9	1.6	61 58.2	–59.9	1.7	62 58.2	–59.8	1.7	63 58.2	–59.8	1.8	64 58.2	–59.9	1.8	65 58.1	–59.8	1.9	66 58.1	–59.9	2.0	75
76	58 58.4	–59.9	1.4	59 58.4	–59.9	1.4	60 58.4	–59.8	1.5	61 58.4	–59.8	1.5	62 58.4	–59.9	1.6	63 58.3	–59.9	1.7	64 58.3	–59.9	1.7	65 58.3	–59.9	1.8	76
77	57 58.6	–59.9	1.3	58 58.6	–59.9	1.3	59 58.6	–59.9	1.3	60 58.5	–59.8	1.4	61 58.5	–59.9	1.4	62 58.5	–59.8	1.5	63 58.5	–59.9	1.5	64 58.5	–59.9	1.6	77
78	56 58.7	–59.9	1.1	57 58.7	–59.9	1.2	58 58.7	–59.9	1.2	59 58.7	–59.8	1.2	60 58.7	–59.9	1.3	61 58.7	–59.9	1.3	62 58.6	–59.9	1.4	63 58.6	–59.9	1.4	78
79	55 58.9	–59.9	1.0	56 58.9	–59.9	1.1	57 58.8	–59.8	1.1	58 58.8	–59.8	1.1	59 58.8	–59.8	1.1	60 58.8	–59.8	1.2	61 58.8	–59.9	1.2	62 58.8	–59.9	1.3	79
80	54 59.0	–59.9	0.9	55 59.0	–59.9	0.9	56 59.0	–59.9	1.0	57 59.0	–59.9	1.0	58 59.0	–59.9	1.0	59 58.9	–59.8	1.0	60 58.9	–59.9	1.1	61 58.9	–59.8	1.1	80
81	53 59.1	–59.9	0.8	54 59.1	–59.9	0.8	55 59.1	–59.9	0.8	56 59.1	–59.9	0.9	57 59.1	–59.9	0.9	58 59.1	–59.9	0.9	59 59.1	–59.9	0.9	60 59.1	–59.9	1.0	81
82	52 59.2	–59.9	0.7	53 59.2	–59.9	0.7	54 59.2	–59.9	0.7	55 59.2	–59.9	0.7	56 59.2	–59.9	0.7	57 59.2	–59.9	0.8	58 59.2	–59.9	0.8	59 59.2	–59.9	0.8	82
83	51 59.3	–59.9	0.6	52 59.3	–59.9	0.6	53 59.3	–59.9	0.6	54 59.3	–59.9	0.6	55 59.3	–59.9	0.7	56 59.3	–59.9	0.7	57 59.3	–59.9	0.7	58 59.3	–59.9	0.7	83
84	50 59.4	–59.9	0.5	51 59.4	–59.9	0.5	52 59.4	–59.9	0.5	53 59.4	–59.9	0.5	54 59.4	–59.9	0.5	55 59.4	–59.9	0.5	56 59.4	–59.9	0.6	57 59.4	–59.9	0.6	84
85	49 59.5	–59.9	0.4	50 59.5	–59.9	0.4	51 59.5	–59.9	0.4	52 59.5	–59.9	0.4	53 59.5	–59.9	0.4	54 59.5	–59.9	0.4	55 59.5	–59.9	0.4	56 59.5	–59.9	0.5	85
86	48 59.6	–59.9	0.3	49 59.6	–59.9	0.3	50 59.6	–59.9	0.3	51 59.6	–59.9	0.3	52 59.6	–59.9	0.3	53 59.6	–59.9	0.4	54 59.6	–59.9	0.4	55 59.6	–59.9	0.4	86
87	47 59.7	–59.9	0.2	48 59.7	–59.9	0.2	49 59.7	–59.9	0.2	50 59.7	–59.9	0.2	51 59.7	–59.9	0.2	52 59.7	–59.9	0.3	53 59.7	–59.9	0.3	54 59.7	–59.9	0.3	87
88	46 59.8	–59.9	0.2	47 59.8	–59.9	0.2	48 59.8	–59.9	0.2	49 59.8	–59.9	0.2	50 59.8	–59.9	0.2	51 59.8	–59.9	0.2	52 59.8	–59.9	0.2	53 59.8	–59.9	0.2	88
89	45 59.9	–59.9	0.1	46 59.9	–59.9	0.1	47 59.9	–59.9	0.1	48 59.9	–59.9	0.1	49 59.9	–59.9	0.1	50 59.9	–59.9	0.1	51 59.9	–59.9	0.1	52 59.9	–59.9	0.1	89
90	45 00.0	–59.9	0.0	46 00.0	–59.9	0.0	47 00.0	–59.9	0.0	48 00.0	–59.9	0.0	49 00.0	–59.9	0.0	50 00.0	–59.9	0.0	51 00.0	–59.9	0.0	52 00.0	–59.9	0.0	90

Latitude columns (repeated at foot): 45° 46° 47° 48° 49° 50° 51° 52°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 55.3	−59.9	175.8	43 55.5	−60.0	175.8	42 55.6	−59.9	175.9	41 55.8	−60.0	176.0	40 55.9	−59.9	176.0	39 56.0	−59.9	176.1	38 56.2	−60.0	176.1	37 56.3	−59.9	176.2	0
1	43 55.4	−59.9	175.8	42 55.5	−59.9	175.9	41 55.7	−59.9	176.0	40 55.8	−59.9	176.0	39 55.9	−60.0	176.1	38 56.1	−60.0	176.1	37 56.2	−59.9	176.2	36 56.4	−59.9	176.2	1
2	42 55.5	−60.0	175.9	41 55.6	−59.9	176.0	40 55.7	−59.9	176.0	39 55.9	−59.9	176.1	38 56.0	−59.9	176.1	37 56.2	−60.0	176.2	36 56.3	−59.9	176.2	35 56.4	−59.9	176.3	2
3	41 55.5	−59.9	176.0	40 55.7	−60.0	176.0	39 55.8	−59.9	176.1	38 56.0	−60.0	176.2	37 56.1	−60.0	176.2	36 56.2	−59.9	176.3	35 56.3	−59.9	176.3	34 56.5	−60.0	176.3	3
4	40 55.6	−59.9	176.0	39 55.7	−59.9	176.1	38 55.9	−59.9	176.2	37 56.0	−59.9	176.2	36 56.1	−59.9	176.3	35 56.3	−60.0	176.3	34 56.4	−59.9	176.4	33 56.5	−59.9	176.4	4
5	39 55.7	−60.0	176.1	38 55.8	−59.9	176.2	37 55.9	−59.9	176.2	36 56.1	−59.9	176.3	35 56.2	−60.0	176.3	34 56.3	−59.9	176.4	33 56.4	−59.9	176.4	32 56.6	−60.0	176.4	5
6	38 55.7	−59.9	176.2	37 55.9	−60.0	176.2	36 56.0	−59.9	176.3	35 56.1	−59.9	176.3	34 56.2	−59.9	176.4	33 56.4	−60.0	176.4	32 56.5	−59.9	176.5	31 56.6	−60.0	176.5	6
7	37 55.8	−59.9	176.2	36 55.9	−59.9	176.3	35 56.1	−60.0	176.3	34 56.2	−59.9	176.4	33 56.3	−59.9	176.4	32 56.4	−59.9	176.5	31 56.5	−59.9	176.5	30 56.6	−59.9	176.5	7
8	36 55.9	−60.0	176.3	35 56.0	−60.0	176.3	34 56.1	−59.9	176.4	33 56.2	−59.9	176.4	32 56.4	−60.0	176.5	31 56.5	−60.0	176.5	30 56.6	−60.0	176.5	29 56.7	−59.9	176.6	8
9	35 55.9	−59.9	176.3	34 56.1	−60.0	176.4	33 56.2	−60.0	176.4	32 56.3	−59.9	176.5	31 56.4	−59.9	176.5	30 56.5	−59.9	176.5	29 56.6	−59.9	176.6	28 56.7	−59.9	176.6	9
10	34 56.0	−59.9	176.4	33 56.1	−59.9	176.4	32 56.2	−59.9	176.5	31 56.3	−59.9	176.5	30 56.4	−59.9	176.6	29 56.6	−60.0	176.6	28 56.6	−60.0	176.6	27 56.8	−60.0	176.7	10
11	33 56.1	−60.0	176.4	32 56.2	−60.0	176.5	31 56.3	−60.0	176.5	30 56.4	−60.0	176.6	29 56.5	−60.0	176.6	28 56.6	−59.9	176.6	27 56.7	−60.0	176.7	26 56.8	−59.9	176.7	11
12	32 56.1	−59.9	176.5	31 56.2	−59.9	176.5	30 56.3	−59.9	176.6	29 56.4	−59.9	176.6	28 56.5	−59.9	176.6	27 56.6	−59.9	176.7	26 56.7	−59.9	176.7	25 56.8	−59.9	176.7	12
13	31 56.2	−59.9	176.6	30 56.3	−60.0	176.6	29 56.4	−59.9	176.6	28 56.5	−60.0	176.7	27 56.6	−60.0	176.7	26 56.7	−60.0	176.7	25 56.8	−60.0	176.7	24 56.9	−59.9	176.8	13
14	30 56.2	−59.9	176.6	29 56.3	−59.9	176.6	28 56.4	−59.9	176.7	27 56.5	−59.9	176.7	26 56.6	−59.9	176.7	25 56.7	−59.9	176.8	24 56.8	−59.9	176.8	23 56.9	−59.9	176.8	14
15	29 56.3	−60.0	176.7	28 56.4	−60.0	176.7	27 56.5	−60.0	176.7	26 56.6	−60.0	176.7	25 56.7	−60.0	176.8	24 56.8	−60.0	176.8	23 56.9	−60.0	176.8	22 57.0	−60.0	176.9	15
16	28 56.3	−59.9	176.7	27 56.4	−59.9	176.7	26 56.5	−59.9	176.8	25 56.6	−59.9	176.8	24 56.7	−59.9	176.8	23 56.8	−59.9	176.8	22 56.9	−59.9	176.9	21 57.0	−59.9	176.9	16
17	27 56.4	−59.9	176.8	26 56.5	−59.9	176.8	25 56.6	−59.9	176.8	24 56.7	−59.9	176.8	23 56.8	−59.9	176.9	22 56.9	−59.9	176.9	21 56.9	−59.9	176.9	20 57.0	−59.9	176.9	17
18	26 56.4	−59.9	176.8	25 56.5	−59.9	176.8	24 56.6	−59.9	176.9	23 56.7	−59.9	176.9	22 56.8	−60.0	176.9	21 56.9	−60.0	176.9	20 57.0	−60.0	176.9	19 57.1	−59.9	177.0	18
19	25 56.5	−59.9	176.8	24 56.6	−60.0	176.9	23 56.7	−60.0	176.9	22 56.8	−60.0	176.9	21 56.9	−59.9	177.0	20 57.0	−59.9	177.0	19 57.0	−60.0	177.0	18 57.1	−59.9	177.0	19
20	24 56.5	−59.9	176.9	23 56.6	−59.9	176.9	22 56.7	−59.9	176.9	21 56.8	−60.0	177.0	20 56.9	−60.0	177.0	19 57.0	−60.0	177.0	18 57.1	−60.0	177.0	17 57.1	−59.9	177.0	20
21	23 56.6	−60.0	176.9	22 56.7	−60.0	177.0	21 56.8	−59.9	177.0	20 56.8	−59.9	177.0	19 56.9	−59.9	177.0	18 57.0	−59.9	177.1	17 57.1	−60.0	177.1	16 57.2	−59.9	177.1	21
22	22 56.6	−59.9	177.0	21 56.7	−59.9	177.0	20 56.8	−59.9	177.0	19 56.9	−59.9	177.1	18 57.0	−60.0	177.1	17 57.0	−59.9	177.1	16 57.1	−59.9	177.1	15 57.2	−60.0	177.1	22
23	21 56.7	−60.0	177.0	20 56.8	−60.0	177.0	19 56.9	−60.0	177.1	18 56.9	−59.9	177.1	17 57.0	−60.0	177.1	16 57.1	−60.0	177.1	15 57.2	−60.0	177.1	14 57.2	−59.9	177.1	23
24	20 56.7	−59.9	177.1	19 56.8	−59.9	177.1	18 56.9	−59.9	177.1	17 57.0	−60.0	177.1	16 57.0	−59.9	177.1	15 57.1	−59.9	177.1	14 57.2	−60.0	177.2	13 57.3	−60.0	177.2	24
25	19 56.8	−60.0	177.1	18 56.9	−60.0	177.1	17 56.9	−59.9	177.2	16 57.0	−59.9	177.2	15 57.1	−60.0	177.2	14 57.2	−60.0	177.2	13 57.2	−59.9	177.2	12 57.3	−60.0	177.2	25
26	18 56.8	−59.9	177.1	17 56.9	−60.0	177.2	16 57.0	−60.0	177.2	15 57.1	−60.0	177.2	14 57.1	−59.9	177.2	13 57.2	−59.9	177.2	12 57.3	−60.0	177.2	11 57.3	−59.9	177.2	26
27	17 56.9	−60.0	177.2	16 57.0	−60.0	177.2	15 57.0	−59.9	177.2	14 57.1	−59.9	177.2	13 57.2	−60.0	177.2	12 57.2	−59.9	177.3	11 57.3	−59.9	177.3	10 57.4	−60.0	177.3	27
28	16 56.9	−59.9	177.2	15 57.0	−59.9	177.2	14 57.1	−59.9	177.3	13 57.1	−59.9	177.3	12 57.2	−59.9	177.3	11 57.3	−60.0	177.3	10 57.3	−59.9	177.3	9 57.4	−59.9	177.3	28
29	15 57.0	−60.0	177.3	14 57.0	−59.9	177.3	13 57.1	−59.9	177.3	12 57.2	−60.0	177.3	11 57.2	−59.9	177.3	10 57.3	−59.9	177.3	9 57.4	−60.0	177.3	8 57.4	−59.9	177.3	29
30	14 57.0	−59.9	177.3	13 57.1	−60.0	177.3	12 57.1	−59.9	177.3	11 57.2	−60.0	177.3	10 57.3	−60.0	177.4	9 57.3	−59.9	177.4	8 57.4	−60.0	177.4	7 57.5	−60.0	177.4	30
31	13 57.1	−60.0	177.4	12 57.1	−59.9	177.4	11 57.2	−60.0	177.4	10 57.2	−59.9	177.4	9 57.3	−59.9	177.4	8 57.4	−60.0	177.4	7 57.4	−59.9	177.4	6 57.5	−60.0	177.4	31
32	12 57.1	−59.9	177.4	11 57.2	−60.0	177.4	10 57.2	−59.9	177.4	9 57.3	−60.0	177.4	8 57.3	−59.9	177.4	7 57.4	−59.9	177.4	6 57.5	−60.0	177.4	5 57.5	−59.9	177.4	32
33	11 57.1	−59.9	177.4	10 57.2	−60.0	177.4	9 57.3	−60.0	177.4	8 57.3	−59.9	177.5	7 57.4	−60.0	177.5	6 57.4	−59.9	177.5	5 57.5	−60.0	177.5	4 57.6	−60.0	177.5	33
34	10 57.2	−60.0	177.5	9 57.2	−59.9	177.5	8 57.3	−59.9	177.5	7 57.4	−60.0	177.5	6 57.4	−59.9	177.5	5 57.5	−60.0	177.5	4 57.5	−59.9	177.5	3 57.6	−60.0	177.5	34
35	9 57.2	−59.9	177.5	8 57.3	−60.0	177.5	7 57.3	−59.9	177.5	6 57.4	−60.0	177.5	5 57.5	−60.0	177.5	4 57.5	−59.9	177.5	3 57.6	−60.0	177.5	2 57.6	−59.9	177.5	35
36	8 57.3	−60.0	177.5	7 57.3	−59.9	177.5	6 57.4	−60.0	177.6	5 57.4	−59.9	177.6	4 57.5	−60.0	177.6	3 57.5	−59.9	177.6	2 57.6	−60.0	177.6	1 57.7	−60.0	177.6	36
37	7 57.3	−59.9	177.6	6 57.4	−60.0	177.6	5 57.4	−59.9	177.6	4 57.5	−60.0	177.6	3 57.5	−59.9	177.6	2 57.6	−60.0	177.6	1 57.6	−59.9	177.6	0 57.7	−60.0	177.6	37
38	6 57.4	−60.0	177.6	5 57.4	−59.9	177.6	4 57.5	−60.0	177.6	3 57.5	−60.0	177.6	2 57.6	−60.0	177.6	1 57.6	−60.0	177.6	0 57.7	−60.0	177.6	0 02.3	+60.0	2.4	38
39	5 57.4	−60.0	177.7	4 57.4	−59.9	177.7	3 57.5	−60.0	177.7	2 57.5	−59.9	177.7	1 57.6	−60.0	177.7	0 57.6	−59.9	177.7	0 02.3	+60.0	2.3	1 02.3	+59.9	2.3	39
40	4 57.4	−59.9	177.7	3 57.5	−60.0	177.7	2 57.5	−59.9	177.7	1 57.6	−60.0	177.7	0 57.6	−59.9	177.7	0 02.3	+60.0	2.3	1 02.3	+59.9	2.3	2 02.2	+60.0	2.3	40
41	3 57.5	−60.0	177.7	2 57.5	−59.9	177.7	1 57.6	−60.0	177.7	0 57.6	−59.9	177.7	0 02.3	+60.0	2.3	1 02.3	+60.0	2.3	2 02.2	+60.0	2.3	3 02.2	+60.0	2.3	41
42	2 57.5	−59.9	177.8	1 57.6	−60.0	177.8	0 57.6	−59.9	177.8	0 02.3	+60.0	2.2	1 02.3	+60.0	2.2	2 02.3	+59.9	2.2	3 02.2	+60.0	2.2	4 02.2	+59.9	2.2	42
43	1 57.6	−60.0	177.8	0 57.6	−60.0	177.8	0 02.3	+60.0	2.2	1 02.3	+60.0	2.2	2 02.3	+59.9	2.2	3 02.2	+60.0	2.2	4 02.2	+59.9	2.2	5 02.1	+60.0	2.2	43
44	0 57.6	−60.0	177.8	0 02.4	+59.9	2.2	1 02.3	+60.0	2.2	2 02.3	+59.9	2.2	3 02.2	+60.0	2.2	4 02.2	+59.9	2.2	5 02.1	+60.0	2.2	6 02.1	+60.0	2.2	44
45	0 02.4	+59.9	2.1	1 02.3	+60.0	2.1	2 02.3	+59.9	2.1	3 02.3	+60.0	2.1	4 02.2	+60.0	2.1	5 02.1	+60.0	2.1	6 02.1	+60.0	2.1	7 02.1	+59.9	2.1	45
46	1 02.3	+60.0	2.1	2 02.3	+59.9	2.1	3 02.2	+60.0	2.1	4 02.2	+60.0	2.1	5 02.2	+59.9	2.1	6 02.1	+60.0	2.1	7 02.1	+59.9	2.1	8 02.0	+60.0	2.1	46
47	2 02.3	+60.0	2.0	3 02.2	+60.0	2.0	4 02.2	+60.0	2.1	5 02.2	+59.9	2.1	6 02.1	+60.0	2.1	7 02.1	+59.9	2.1	8 02.0	+60.0	2.1	9 02.0	+60.0	2.1	47
48	3 02.2	+60.0	2.0	4 02.2	+60.0	2.0	5 02.2	+59.9	2.0	6 02.1	+60.0	2.0	7 02.1	+59.9	2.0	8 02.0	+60.0	2.0	9 02.0	+60.0	2.0	10 02.0	+59.9	2.0	48
49	4 02.2	+59.9	2.0	5 02.2	+59.9	2.0	6 02.1	+60.0	2.0	7 02.1	+59.9	2.0	8 02.0	+60.0	2.0	9 02.0	+60.0	2.0	10 02.0	+59.9	2.0	11 01.9	+60.0	2.0	49
50	5 02.1	+60.0	1.9	6 02.1	+60.0	1.9	7 02.1	+59.9	1.9	8 02.0	+60.0	1.9	9 02.0	+60.0	1.9	10 02.0	+59.9	2.0	11 01.9	+60.0	2.0	12 01.9	+60.0	2.0	50
51	6 02.1	+60.0	1.9	7 02.1	+59.9	1.9	8 02.0	+60.0	1.9	9 02.0	+60.0	1.9	10 02.0	+59.9	1.9	11 01.9	+60.0	1.9	12 01.9	+60.0	1.9	13 01.9	+59.9	1.9	51
52	7 02.1	+59.9	1.9	8 02.0	+60.0	1.9	9 02.0	+60.0	1.9	10 02.0	+59.9	1.9	11 01.9	+60.0	1.9	12 01.9	+60.0	1.9	13 01.9	+59.9	1.9	14 01.8	+60.0	1.9	52
53	8 02.0	+60.0	1.8	9 02.0	+60.0	1.8	10 02.0	+59.9	1.8	11 01.9	+60.0	1.8	12 01.9	+60.0	1.8	13 01.9	+59.9	1.8	14 01.8	+60.0	1.8	15 01.8	+60.0	1.9	53
54	9 02.0	+59.9	1.8	10 02.0	+59.9	1.8	11 01.9	+60.0	1.8	12 01.9	+60.0	1.8	13 01.9	+59.9	1.8	14 01.8	+60.0	1.8	15 01.8	+60.0	1.8	16 01.8	+59.9	1.8	54
55	10 01.9	+60.0	1.7	11 01.9	+60.0	1.8	12 01.9	+59.9	1.8	13 01.9	+59.9	1.8	14 01.8	+60.0	1.8	15 01.8	+60.0	1.8	16 01.8	+59.9	1.8	17 01.7	+60.0	1.8	55
56	11 01.9	+60.0	1.7	12 01.9	+59.9	1.7	13 01.8	+60.0	1.7	14 01.8	+60.0	1.7	15 01.8	+59.9	1.7	16 01.8	+60.0	1.7	17 01.7	+60.0	1.7	18 01.7	+60.0	1.8	56
57	12 01.9	+59.9	1.7	13 01.8	+60.0	1.7	14 01.8	+59.9	1.7	15 01.8	+59.9	1.7	16 01.8	+60.0	1.7	17 01.7	+60.0	1.7	18 01.7	+59.9	1.7	19 01.7	+59.9	1.7	57
58	13 01.8	+60.0	1.6	14 01.8	+59.9	1.6	15 01.8	+59.9	1.6	16 01.7	+60.0	1.7	17 01.7	+60.0	1.7	18 01.7	+59.9	1.7	19 01.7	+59.9	1.7	20 01.6	+60.0	1.7	58
59	14 01.8	+59.9	1.6	15 01.7	+60.0	1.6	16 01.7	+60.0	1.6	17 01.7	+59.9	1.6	18 01.7	+59.9	1.6	19 01.6	+60.0	1.6	20 01.6	+60.0	1.6	21 01.6	+59.9	1.7	59
60	15 01.7	+60.0	1.6	16 01.7	+59.9	1.6	17 01.7	+59.9	1.6	18 01.7	+59.9	1.6	19 01.6	+60.0	1.6	20 01.6	+60.0	1.6	21 01.6	+60.0	1.6	22 01.6	+59.9	1.6	60
61	16 01.7	+59.9	1.5	17 01.7	+59.9	1.5	18 01.6	+60.0	1.5	19 01.6	+60.0	1.5	20 01.6	+59.9	1.5	21 01.6	+59.9	1.6	22 01.5	+60.0	1.6	23 01.5	+60.0	1.6	61
62	17 01.6	+60.0	1.5	18 01.6	+60.0	1.5	19 01.6	+59.9	1.5	20 01.6	+59.9	1.5	21 01.6	+59.9	1.5	22 01.5	+60.0	1.5	23 01.5	+60.0	1.5	24 01.5	+59.9	1.5	62
63	18 01.6	+59.9	1.4	19 01.6	+59.9	1.4	20 01.6	+59.9	1.4	21 01.5	+60.0	1.5	22 01.5	+59.9	1.5	23 01.5	+59.9	1.5	24 01.5	+59.9	1.5	25 01.5	+59.9	1.5	63
64	19 01.5	+60.0	1.4	20 01.5	+60.0	1.4	21 01.5	+59.9	1.4	22 01.5	+59.9	1.4	23 01.5	+59.9	1.4	24 01.5	+59.9	1.4	25 01.4	+60.0	1.5	26 01.4	+59.9	1.5	64
65	20 01.5	+59.9	1.3	21 01.5	+59.9	1.4	22 01.5	+59.9	1.4	23 01.4	+60.0	1.4	24 01.4	+60.0	1.4	25 01.4	+60.0	1.4	26 01.4	+59.9	1.4	27 01.4	+59.9	1.4	65
66	21 01.5	+59.9	1.3	22 01.4	+60.0	1.3	23 01.4	+59.9	1.3	24 01.4	+60.0	1.3	25 01.4	+59.9	1.3	26 01.4	+59.9	1.3	27 01.3	+60.0	1.3	28 01.3	+59.9	1.4	66
67	22 01.4	+60.0	1.3	23 01.4	+59.9	1.3	24 01.4	+59.9	1.3	25 01.4	+59.9	1.3	26 01.3	+60.0	1.3	27 01.3	+60.0	1.3	28 01.3	+60.0	1.3	29 01.3	+59.9	1.3	67
68	23 01.4	+60.0	1.2	24 01.3	+60.0	1.2	25 01.3	+60.0	1.2	26 01.3	+59.9	1.3	27 01.3	+59.9	1.3	28 01.3	+59.9	1.3	29 01.3	+59.9	1.3	30 01.3	+59.9	1.3	68
69	24 01.3	+60.0	1.2	25 01.3	+59.9	1.2	26 01.3	+59.9	1.2	27 01.3	+59.9	1.2	28 01.3	+59.9	1.2	29 01.2	+60.0	1.2	30 01.2	+60.0	1.2	31 01.2	+60.0	1.3	69
70	25 01.3	+59.9	1.1	26 01.2	+60.0	1.1	27 01.2	+60.0	1.2	28 01.2	+60.0	1.2	29 01.2	+60.0	1.2	30 01.2	+59.9	1.2	31 01.2	+59.9	1.2	32 01.2	+59.9	1.2	70
71	26 01.2	+60.0	1.1	27 01.2	+59.9	1.1	28 01.2	+59.9	1.1	29 01.2	+59.9	1.1	30 01.1	+60.0	1.1	31 01.1	+60.0	1.1	32 01.1	+60.0	1.2	33 01.1	+60.0	1.2	71
72	27 01.2	+59.9	1.0	28 01.1	+60.0	1.1	29 01.1	+59.9	1.1	30 01.1	+59.9	1.1	31 01.1	+59.9	1.1	32 01.1	+59.9	1.1	33 01.1	+59.9	1.1	34 01.1	+59.9	1.1	72
73	28 01.1	+59.9	1.0	29 01.1	+59.9	1.0	30 01.1	+59.9	1.0	31 01.1	+59.9	1.0	32 01.1	+59.9	1.0	33 01.1	+59.9	1.0	34 01.0	+60.0	1.1	35 01.0	+60.0	1.1	73
74	29 01.0	+60.0	0.9	30 01.0	+60.0	1.0	31 01.0	+60.0	1.0	32 01.0	+60.0	1.0	33 01.0	+60.0	1.0	34 01.0	+60.0	1.0	35 01.0	+59.9	1.0	36 01.0	+59.9	1.0	74
75	30 01.0	+60.0	0.9	31 01.0	+59.9	0.9	32 01.0	+59.9	0.9	33 01.0	+59.9	0.9	34 01.0	+59.9	0.9	35 01.0	+59.9	0.9	36 00.9	+60.0	0.9	37 00.9	+59.9	1.0	75
76	31 00.9	+60.0	0.8	32 00.9	+60.0	0.9	33 00.9	+60.0	0.9	34 00.9	+59.9	0.9	35 00.9	+59.9	0.9	36 00.9	+59.9	0.9	37 00.9	+59.9	0.9	38 00.9	+59.9	0.9	76
77	32 00.9	+59.9	0.8	33 00.9	+59.9	0.8	34 00.9	+59.9	0.8	35 00.9	+59.9	0.8	36 00.9	+59.9	0.8	37 00.9	+59.9	0.8	38 00.8	+60.0	0.9	39 00.8	+60.0	0.9	77
78	33 00.8	+60.0	0.7	34 00.8	+60.0	0.8	35 00.8	+60.0	0.8	36 00.8	+59.9	0.8	37 00.8	+59.9	0.8	38 00.8	+59.9	0.8	39 00.8	+59.9	0.8	40 00.8	+59.9	0.8	78
79	34 00.8	+59.9	0.7	35 00.8	+59.9	0.7	36 00.8	+59.9	0.7	37 00.8	+59.9	0.7	38 00.7	+60.0	0.7	39 00.7	+60.0	0.7	40 00.7	+60.0	0.7	41 00.7	+59.9	0.8	79
80	35 00.7	+59.9	0.6	36 00.7	+59.9	0.6	37 00.7	+59.9	0.7	38 00.7	+59.9	0.7	39 00.7	+59.9	0.7	40 00.7	+59.9	0.7	41 00.7	+59.9	0.7	42 00.7	+59.9	0.7	80
81	36 00.6	+60.0	0.6	37 00.6	+60.0	0.6	38 00.6	+60.0	0.6	39 00.6	+60.0	0.6	40 00.6	+59.9	0.6	41 00.6	+59.9	0.6	42 00.6	+59.9	0.6	43 00.6	+59.9	0.6	81
82	37 00.6	+59.9	0.5	38 00.6	+59.9	0.5	39 00.6	+59.9	0.5	40 00.6	+59.9	0.5	41 00.6	+59.9	0.5	42 00.6	+59.9	0.5	43 00.6	+59.9	0.5	44 00.6	+60.0	0.6	82
83	38 00.5	+59.9	0.5	39 00.5	+59.9	0.5	40 00.5	+59.9	0.5	41 00.5	+59.9	0.5	42 00.5	+59.9	0.5	43 00.5	+59.9	0.5	44 00.5	+59.9	0.5	45 00.5	+59.9	0.5	83
84	39 00.4	+60.0	0.4	40 00.4	+60.0	0.4	41 00.4	+60.0	0.4	42 00.4	+59.9	0.4	43 00.4	+59.9	0.4	44 00.4	+59.9	0.4	45 00.4	+59.9	0.4	46 00.4	+59.9	0.5	84
85	40 00.4	+59.9	0.3	41 00.4	+59.9	0.3	42 00.4	+59.9	0.4	43 00.4	+59.9	0.4	44 00.4	+59.9	0.4	45 00.4	+59.9	0.4	46 00.3	+59.9	0.3	47 00.4	+59.9	0.4	85
86	41 00.3	+59.9	0.3	42 00.3	+59.9	0.3	43 00.3	+59.9	0.3	44 00.3	+59.9	0.3	45 00.3	+59.9	0.3	46 00.3	+59.9	0.3	47 00.3	+59.9	0.3	48 00.3	+59.9	0.3	86
87	42 00.2	+60.0	0.2	43 00.2	+60.0	0.2	44 00.2	+60.0	0.2	45 00.2	+59.9	0.2	46 00.2	+59.9	0.2	47 00.2	+59.9	0.2	48 00.2	+60.0	0.2	49 00.2	+60.0	0.2	87
88	43 00.2	+59.9	0.1	44 00.2	+59.9	0.1	45 00.2	+59.9	0.1	46 00.2	+59.9	0.2	47 00.2	+59.9	0.2	48 00.2	+59.9	0.2	49 00.2	+59.9	0.2	50 00.2	+59.9	0.2	88
89	44 00.1	+59.9	0.1	45 00.1	+59.9	0.1	46 00.1	+59.9	0.1	47 00.1	+59.9	0.1	48 00.1	+59.9	0.1	49 00.1	+59.9	0.1	50 00.1	+59.9	0.1	51 00.1	+59.9	0.1	89
90	45 00.0	+59.9	0.0	46 00.0	+59.9	0.0	47 00.0	+59.9	0.0	48 00.0	+59.9	0.0	49 00.0	+59.9	0.0	50 00.0	+59.9	0.0	51 00.0	+59.9	0.0	52 00.0	+59.9	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 177°, 183°**

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4°, 356° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 51.6	+59.9	174.4	43 51.9	+59.9	174.4	42 52.2	+59.9	174.5	41 52.5	+59.9	174.6	40 52.7	+59.9	174.7	39 53.0	+59.9	174.8	38 53.2	+59.9	174.9	37 53.5	+59.9	174.9	0
1	45 51.5	+59.9	174.3	44 51.8	+59.8	174.4	43 52.1	+59.9	174.4	42 52.3	+59.9	174.5	41 52.6	+59.9	174.6	40 52.9	+59.9	174.7	39 53.1	+59.9	174.8	38 53.4	+59.9	174.9	1
2	46 51.3	+59.9	174.1	45 51.6	+59.9	174.3	44 51.9	+59.9	174.4	43 52.2	+59.9	174.5	42 52.5	+59.9	174.5	41 52.8	+59.9	174.6	40 53.0	+59.9	174.7	39 53.3	+59.9	174.8	2
3	47 51.2	+59.8	174.0	46 51.5	+59.8	174.2	45 51.8	+59.9	174.3	44 52.1	+59.9	174.4	43 52.4	+59.9	174.5	42 52.7	+59.9	174.5	41 52.9	+59.9	174.6	40 53.2	+59.9	174.7	3
4	48 51.0	+59.8	173.9	47 51.3	+59.9	174.0	46 51.7	+59.8	174.2	45 52.0	+59.9	174.3	44 52.3	+59.9	174.4	43 52.5	+59.9	174.5	42 52.8	+59.9	174.6	41 53.1	+59.9	174.6	4
5	49 50.8	+59.9	173.8	48 51.2	+59.8	173.9	47 51.5	+59.9	174.1	46 51.8	+59.9	174.2	45 52.1	+59.9	174.3	44 52.4	+59.9	174.4	43 52.7	+59.9	174.6	42 53.0	+59.9	174.6	5
6	50 50.7	+59.8	173.7	49 51.0	+59.8	173.8	48 51.4	+59.8	173.9	47 51.7	+59.8	174.1	46 52.0	+59.9	174.2	45 52.3	+59.9	174.3	44 52.6	+59.9	174.4	43 52.9	+59.9	174.5	6
7	51 50.5	+59.8	173.6	50 50.8	+59.9	173.7	49 51.2	+59.8	173.8	48 51.5	+59.9	174.0	47 51.9	+59.8	174.1	46 52.2	+59.8	174.2	45 52.5	+59.9	174.3	44 52.8	+59.9	174.4	7
8	52 50.3	+59.8	173.4	51 50.7	+59.8	173.6	50 51.0	+59.9	173.7	49 51.4	+59.8	173.8	48 51.7	+59.9	174.0	47 52.0	+59.9	174.1	46 52.4	+59.8	174.2	45 52.7	+59.8	174.3	8
9	53 50.1	+59.8	173.3	52 50.5	+59.8	173.5	51 50.9	+59.8	173.6	50 51.2	+59.9	173.7	49 51.6	+59.8	173.9	48 51.9	+59.9	174.0	47 52.2	+59.9	174.1	46 52.5	+59.9	174.2	9
10	54 49.9	+59.7	173.2	53 50.3	+59.8	173.3	52 50.7	+59.8	173.5	51 51.1	+59.8	173.6	50 51.4	+59.8	173.8	49 51.8	+59.8	173.9	48 52.1	+59.9	174.0	47 52.4	+59.9	174.1	10
11	55 49.6	+59.8	173.0	54 50.1	+59.7	173.2	53 50.5	+59.8	173.3	52 50.9	+59.8	173.5	51 51.3	+59.8	173.6	50 51.6	+59.8	173.8	49 52.0	+59.8	173.9	48 52.3	+59.9	174.0	11
12	56 49.4	+59.7	172.8	55 49.8	+59.8	173.0	54 50.3	+59.8	173.2	53 50.7	+59.8	173.4	52 51.1	+59.8	173.5	51 51.5	+59.8	173.7	50 51.8	+59.8	173.8	49 52.2	+59.8	173.9	12
13	57 49.1	+59.8	172.7	56 49.6	+59.8	172.9	55 50.1	+59.7	173.0	54 50.5	+59.8	173.2	53 50.9	+59.8	173.4	52 51.3	+59.8	173.5	51 51.7	+59.8	173.6	50 52.0	+59.9	173.8	13
14	58 48.9	+59.7	172.5	57 49.4	+59.7	172.7	56 49.8	+59.8	172.9	55 50.3	+59.8	173.1	54 50.7	+59.8	173.2	53 51.1	+59.9	173.5	52 51.5	+59.8	173.6	51 51.9	+59.8	173.7	14
15	59 48.6	+59.7	172.3	58 49.1	+59.7	172.5	57 49.6	+59.8	172.7	56 50.1	+59.8	172.9	55 50.5	+59.8	173.1	54 51.0	+59.8	173.3	53 51.4	+59.8	173.4	52 51.7	+59.9	173.6	15
16	60 48.3	+59.7	172.1	59 48.8	+59.8	172.3	58 49.3	+59.7	172.6	57 49.9	+59.7	172.8	56 50.3	+59.8	173.0	55 50.8	+59.8	173.1	54 51.2	+59.8	173.3	53 51.6	+59.8	173.5	16
17	61 48.0	+59.7	171.9	60 48.6	+59.7	172.1	59 49.1	+59.7	172.4	58 49.6	+59.7	172.6	57 50.1	+59.8	172.8	56 50.6	+59.8	173.0	55 51.0	+59.8	173.2	54 51.4	+59.8	173.3	17
18	62 47.6	+59.7	171.7	61 48.3	+59.6	171.9	60 48.8	+59.7	172.2	59 49.4	+59.7	172.4	58 49.9	+59.7	172.6	57 50.4	+59.7	172.8	56 50.8	+59.7	173.0	55 51.2	+59.9	173.2	18
19	63 47.3	+59.6	171.4	62 47.9	+59.7	171.7	61 48.5	+59.6	171.9	60 49.1	+59.7	172.2	59 49.6	+59.7	172.5	58 50.1	+59.8	172.7	57 50.6	+59.8	172.9	56 51.1	+59.9	173.1	19
20	64 46.9	+59.6	171.2	63 47.6	+59.6	171.5	62 48.2	+59.7	171.8	61 48.8	+59.7	172.0	60 49.4	+59.7	172.3	59 49.9	+59.8	172.5	58 50.4	+59.8	172.7	57 50.9	+59.8	172.9	20
21	65 46.5	+59.5	170.9	64 47.2	+59.6	171.2	63 47.9	+59.6	171.5	62 48.5	+59.7	171.8	61 49.1	+59.7	172.1	60 49.7	+59.7	172.3	59 50.2	+59.7	172.6	58 50.7	+59.8	172.8	21
22	66 46.0	+59.5	170.6	65 46.8	+59.6	170.9	64 47.5	+59.6	171.3	63 48.2	+59.6	171.6	62 48.8	+59.7	171.9	61 49.4	+59.7	172.1	60 49.9	+59.8	172.4	59 50.5	+59.7	172.6	22
23	67 45.5	+59.5	170.2	66 46.4	+59.5	170.6	65 47.1	+59.6	171.0	64 47.8	+59.5	171.3	63 48.5	+59.7	171.6	62 49.1	+59.7	171.9	61 49.7	+59.7	172.2	60 50.2	+59.7	172.4	23
24	68 45.0	+59.4	169.9	67 45.9	+59.5	170.3	66 46.7	+59.6	170.7	65 47.5	+59.6	171.1	64 48.2	+59.6	171.4	63 48.8	+59.7	171.7	62 49.4	+59.7	172.0	61 50.0	+59.7	172.2	24
25	69 44.4	+59.4	169.5	68 45.4	+59.4	170.0	67 46.3	+59.4	170.4	66 47.1	+59.5	170.8	65 47.8	+59.6	171.1	64 48.5	+59.7	171.4	63 49.1	+59.7	171.7	62 49.7	+59.8	172.0	25
26	70 43.8	+59.3	169.0	69 44.8	+59.4	169.6	68 45.8	+59.4	170.0	67 46.6	+59.5	170.5	66 47.4	+59.6	170.8	65 48.2	+59.6	171.2	64 48.8	+59.7	171.5	63 49.5	+59.7	171.8	26
27	71 43.1	+59.2	168.6	70 44.2	+59.3	169.1	69 45.2	+59.4	169.7	68 46.1	+59.5	170.1	67 47.0	+59.5	170.5	66 47.8	+59.6	170.9	65 48.5	+59.6	171.3	64 49.2	+59.6	171.6	27
28	72 42.3	+59.1	168.0	71 43.5	+59.2	168.7	70 44.6	+59.2	169.2	69 45.6	+59.4	169.7	68 46.5	+59.4	170.2	67 47.4	+59.5	170.7	66 48.1	+59.6	171.0	65 48.8	+59.7	171.4	28
29	73 41.4	+59.0	167.5	72 42.7	+59.2	168.2	71 44.0	+59.2	168.8	70 45.0	+59.2	169.3	69 46.0	+59.5	169.8	68 46.9	+59.5	170.2	67 47.7	+59.6	170.7	66 48.5	+59.7	171.1	29
30	74 40.4	+58.9	166.8	73 41.9	+59.0	167.6	72 43.2	+59.2	168.3	71 44.4	+59.3	168.9	70 45.5	+59.4	169.4	69 46.4	+59.5	169.9	68 47.3	+59.6	170.4	67 48.1	+59.6	170.8	30
31	75 39.3	+58.7	166.0	74 40.9	+58.9	166.9	73 42.4	+59.2	167.7	72 43.7	+59.2	168.4	71 44.9	+59.3	169.0	70 45.9	+59.4	169.6	69 46.9	+59.5	170.0	68 47.7	+59.6	170.5	31
32	76 38.0	+58.5	165.2	75 39.8	+58.8	166.2	74 41.5	+58.9	167.1	73 42.9	+59.1	167.8	72 44.2	+59.2	168.5	71 45.3	+59.4	169.1	70 46.4	+59.4	169.7	69 47.3	+59.5	170.1	32
33	77 36.5	+58.2	164.2	76 38.6	+58.6	165.3	75 40.4	+58.8	166.3	74 42.0	+59.0	167.2	73 43.4	+59.2	168.0	72 44.7	+59.2	168.6	71 45.8	+59.4	169.2	70 46.8	+59.5	169.8	33
34	78 34.7	+58.0	163.0	77 37.2	+58.3	164.4	76 39.2	+58.6	165.5	75 41.0	+58.9	166.5	74 42.6	+59.0	167.3	73 43.9	+59.2	168.0	72 45.2	+59.3	168.8	71 46.3	+59.4	169.3	34
35	79 32.7	+57.5	161.6	78 35.5	+58.0	163.2	77 37.8	+58.4	164.5	76 39.9	+58.6	165.7	75 41.6	+58.9	166.6	74 43.1	+59.1	167.5	73 44.5	+59.2	168.2	72 45.7	+59.3	168.9	35
36	80 30.2	+56.9	160.0	79 33.5	+57.6	161.9	78 36.2	+58.1	163.4	77 38.5	+58.4	164.7	76 40.5	+58.7	165.8	75 42.2	+58.9	166.8	74 43.7	+59.1	167.6	73 45.0	+59.2	168.4	36
37	81 27.1	+56.2	158.0	80 31.1	+57.0	160.2	79 34.3	+57.7	162.1	78 36.9	+58.2	163.6	77 39.2	+58.5	164.9	76 41.1	+58.8	166.0	75 42.8	+58.9	167.0	74 44.2	+59.2	167.8	37
38	82 23.3	+55.1	155.5	81 28.1	+56.3	158.3	80 32.0	+57.1	160.5	79 35.1	+57.7	162.3	78 37.7	+58.3	163.8	77 39.9	+58.5	165.1	76 41.7	+58.9	166.2	75 43.4	+59.0	167.1	38
39	83 18.4	+53.4•	152.3	82 24.4	+55.2	155.8	81 29.1	+56.4	158.5	80 32.8	+57.3	160.7	79 35.9	+57.8	162.5	78 38.4	+58.3	164.0	77 40.6	+58.6	165.3	76 42.4	+58.8	166.4	39
40	84 11.8	+50.9•	148.1	83 19.6	+53.7•	152.6	82 25.5	+55.4	156.1	81 30.1	+56.5	158.8	80 33.7	+57.4	161.0	79 36.7	+57.9	162.8	78 39.2	+58.3	164.2	77 41.2	+58.7	165.5	40
41	85 02.7	+46.9•	142.4	84 13.3	+51.1•	148.5	83 20.9	+53.8	152.9	82 26.6	+55.5	156.4	81 31.1	+56.6	159.1	80 34.6	+57.5	161.2	79 37.5	+58.0	163.0	78 39.9	+58.4	164.5	41
42	85 49.6	+40.2•	134.6	85 04.4	+47.3•	142.9	84 14.7	+51.5•	148.9	83 22.1	+54.1	153.3	82 27.7	+55.7	156.7	81 32.1	+56.7	159.4	80 35.5	+57.6	161.5	79 38.3	+58.1	163.2	42
43	86 29.8	+28.8•	123.4	85 51.7	+40.5•	135.0	85 06.2	+47.5•	143.3	84 16.2	+51.7•	149.3	83 23.4	+54.2	153.7	82 28.8	+55.9	157.1	81 33.1	+56.9	159.7	80 36.4	+57.6	161.8	43
44	86 58.6	+11.7•	107.9	86 32.2	+29.2•	123.8	85 53.7	+40.9•	135.5	85 07.9	+47.8•	143.8	84 17.6	+52.0•	149.7	83 24.7	+54.4	154.1	82 30.0	+56.0	157.4	81 34.0	+57.1	160.0	44
45	87 10.3	−8.9•	88.6	87 01.4	+11.9•	108.2	86 34.6	+29.7•	124.3	85 55.7	+41.4•	136.0	85 09.6	+48.2•	144.2	84 19.1	+52.2•	150.1	83 26.0	+54.6	154.5	82 31.1	+56.1	157.7	45
46	87 01.4	−26.8•	69.0	87 13.3	−9.0•	88.6	87 04.3	+12.0•	108.5	86 37.1	+30.0•	124.8	85 57.8	+41.8•	136.5	85 11.3	+48.6•	144.7	84 20.6	+52.5•	150.6	83 27.2	+54.9	154.8	46
47	86 34.6	−38.9•	52.8	87 04.3	−27.2•	68.6	87 16.3	−9.2•	88.5	87 07.1	+12.3•	108.8	86 39.3	+30.5•	125.3	85 59.9	+42.2•	137.0	85 13.1	+48.9•	145.2	84 22.1	+52.7•	151.0	47
48	85 55.7	−46.1•	41.1	86 37.1	−39.3•	52.3	87 07.1	−27.5•	68.2	87 19.4	−9.3•	88.5	87 10.1	+12.5•	109.2	86 42.1	+30.9•	125.8	86 02.0	+42.6•	137.6	85 14.8	+49.3•	145.7	48
49	85 09.6	−50.5•	32.8	85 57.8	−46.5•	40.6	86 39.6	−37.7•	51.8	87 10.1	−28.0•	67.8	87 22.6	−9.6•	88.5	87 13.0	+12.7•	109.5	86 44.6	+31.4•	126.3	86 04.1	+43.0•	138.1	49
50	84 19.1	−54.1•	26.9	85 11.3	−50.7•	32.3	86 02.0	−47.2•	39.4	86 42.1	−40.5•	50.6	87 13.0	−28.4•	67.4	87 25.7	−9.7•	88.5	87 16.0	+13.0•	109.9	86 47.1	+31.9•	126.8	50
51	83 26.0	−54.9	22.6	84 20.6	−53.4•	26.4	85 13.1	−51.0•	31.8	86 02.0	−47.2•	39.4	86 44.6	−40.5•	50.6	87 16.0	−28.9•	67.0	87 29.0	−10.0•	88.4	87 19.0	+13.3•	110.3	51
52	82 31.1	−56.1	19.3	83 27.2	−55.0	22.1	84 22.1	−53.6•	25.9	85 14.8	−51.3•	31.2	86 04.1	−47.6•	38.8	86 47.1	−41.0•	50.0	87 19.0	−29.3•	66.6	87 32.3	−10.2•	88.4	52
53	81 35.0	−56.8	16.7	82 32.2	−56.2	18.7	83 28.5	−55.2	21.7	84 23.5	−53.7•	25.4	85 16.5	−51.5•	30.5	86 06.1	−47.8•	38.1	86 49.7	−41.5•	49.4	87 23.1	−29.8•	66.1	53
54	80 38.2	−57.5	14.6	81 36.0	−56.9	16.3	82 33.3	−56.3	18.4	83 29.8	−55.4	21.2	84 25.0	−54.0•	24.9	85 18.3	−51.9•	30.1	86 08.2	−48.2•	37.5	86 52.3	−42.0•	48.7	54
55	79 40.7	−57.8	12.9	80 39.1	−57.6	14.3	81 37.0	−57.0	15.9	82 34.4	−56.4	18.0	83 31.0	−55.5	20.8	84 26.4	−54.1	24.4	85 20.0	−52.1•	29.5	86 10.3	−48.6•	36.8	55
56	78 42.9	−58.3	11.5	79 41.5	−57.9	12.6	80 40.0	−57.7	13.9	81 38.0	−57.2	15.5	82 35.5	−56.5	17.6	83 32.3	−55.7	20.3	84 27.9	−54.4	23.9	85 21.7	−52.4•	28.8	56
57	77 44.6	−58.4	10.3	78 43.6	−58.3	11.2	79 42.3	−58.0	12.3	80 40.8	−57.7	13.6	81 39.0	−57.3	15.2	82 36.6	−56.7	17.2	83 33.5	−55.8	19.8	84 29.3	−54.6	23.3	57
58	76 46.2	−58.7	9.3	77 45.3	−58.5	10.0	78 44.3	−58.3	10.9	79 43.1	−58.1	12.0	80 41.7	−57.8	13.2	81 39.9	−57.3	14.8	82 37.7	−56.8	16.7	83 34.7	−56.0	19.3	58
59	75 47.5	−58.9	8.4	76 46.8	−58.7	9.0	77 46.0	−58.6	9.8	78 45.3	−58.4	10.6	79 43.9	−58.1	11.6	80 42.6	−57.9	12.9	81 40.9	−57.5	14.4	82 38.7	−56.9	16.3	59
60	74 48.6	−59.0	7.6	75 48.1	−58.9	8.2	76 47.4	−58.8	8.8	77 46.6	−58.6	9.5	78 45.8	−58.5	10.3	79 44.7	−58.2	11.3	80 43.4	−57.9	12.5	81 41.8	−57.6	14.0	60
61	73 49.6	−59.1	7.0	74 49.2	−59.1	7.4	75 48.6	−58.9	7.9	76 48.0	−58.8	8.5	77 47.3	−58.7	9.2	78 46.5	−58.6	10.0	79 45.5	−58.3	11.0	80 44.2	−58.0	12.1	61
62	72 50.5	−59.2	6.4	73 50.1	−59.2	6.8	74 49.7	−59.1	7.2	75 49.2	−59.0	7.7	76 48.6	−58.9	8.3	77 47.9	−58.7	8.9	78 47.2	−58.6	9.7	79 46.2	−58.4	10.6	62
63	71 51.3	−59.2	5.8	72 51.0	−59.2	6.2	73 50.6	−59.1	6.5	74 50.2	−59.1	7.0	75 49.8	−59.1	7.4	76 49.2	−58.9	8.0	77 48.6	−58.8	8.6	78 47.8	−58.6	9.4	63
64	70 52.1	−59.4	5.4	71 51.8	−59.3	5.6	72 51.5	−59.3	6.0	73 51.1	−59.2	6.3	74 50.7	−59.1	6.7	75 50.3	−59.0	7.2	76 49.8	−59.0	7.7	77 49.2	−58.8	8.3	64
65	69 52.7	−59.4	4.9	70 52.5	−59.4	5.2	71 52.2	−59.3	5.4	72 51.9	−59.3	5.7	73 51.6	−59.2	6.1	74 51.3	−59.2	6.5	75 50.8	−59.0	6.9	76 50.4	−59.0	7.4	65
66	68 53.3	−59.5	4.5	69 53.1	−59.4	4.7	70 52.9	−59.4	5.0	71 52.6	−59.3	5.2	72 52.4	−59.3	5.5	73 52.1	−59.2	5.9	74 51.8	−59.2	6.2	75 51.4	−59.2	6.7	66
67	67 53.8	−59.5	4.2	68 53.7	−59.5	4.3	69 53.5	−59.5	4.5	70 53.3	−59.4	4.8	71 53.1	−59.4	5.0	72 52.8	−59.3	5.3	73 52.6	−59.3	5.6	74 52.2	−59.2	6.0	67
68	66 54.3	−59.5	3.8	67 54.2	−59.6	4.0	68 54.0	−59.5	4.2	69 53.9	−59.5	4.4	70 53.7	−59.4	4.6	71 53.5	−59.4	4.8	72 53.3	−59.4	5.1	73 53.0	−59.4	5.4	68
69	65 54.8	−59.6	3.5	66 54.7	−59.6	3.7	67 54.5	−59.5	3.8	68 54.4	−59.5	4.0	69 54.3	−59.6	4.2	70 54.1	−59.4	4.4	71 53.9	−59.4	4.6	72 53.7	−59.4	4.9	69
70	64 55.2	−59.6	3.2	65 55.1	−59.6	3.4	66 55.0	−59.6	3.5	67 54.9	−59.6	3.6	68 54.8	−59.6	3.8	69 54.6	−59.5	4.0	70 54.5	−59.5	4.2	71 54.3	−59.4	4.4	70
71	63 55.6	−59.6	3.0	64 55.5	−59.6	3.1	65 55.4	−59.6	3.2	66 55.3	−59.6	3.3	67 55.2	−59.5	3.5	68 55.1	−59.6	3.6	69 55.0	−59.5	3.8	70 54.9	−59.5	4.0	71
72	62 56.0	−59.7	2.7	63 55.9	−59.7	2.8	64 55.8	−59.6	2.9	65 55.7	−59.6	3.0	66 55.7	−59.7	3.1	67 55.6	−59.6	3.3	68 55.5	−59.6	3.4	69 55.4	−59.5	3.6	72
73	61 56.3	−59.7	2.5	62 56.3	−59.7	2.6	63 56.2	−59.7	2.7	64 56.1	−59.6	2.8	65 56.1	−59.7	2.9	66 56.0	−59.6	3.0	67 55.9	−59.6	3.1	68 55.8	−59.6	3.3	73
74	60 56.6	−59.7	2.3	61 56.6	−59.7	2.3	62 56.5	−59.6	2.4	63 56.5	−59.7	2.5	64 56.4	−59.6	2.6	65 56.4	−59.7	2.7	66 56.3	−59.6	2.8	67 56.2	−59.6	2.9	74
75	59 56.9	−59.7	2.1	60 56.9	−59.7	2.1	61 56.9	−59.8	2.2	62 56.8	−59.7	2.2	63 56.8	−59.7	2.3	64 56.7	−59.7	2.4	65 56.7	−59.7	2.5	66 56.6	−59.6	2.6	75
76	58 57.2	−59.7	1.9	59 57.2	−59.7	1.9	60 57.2	−59.8	2.0	61 57.1	−59.7	2.1	62 57.1	−59.7	2.1	63 57.0	−59.7	2.2	64 57.0	−59.7	2.4	65 56.9	−59.6	2.4	76
77	57 57.5	−59.8	1.7	58 57.5	−59.8	1.7	59 57.4	−59.7	1.8	60 57.4	−59.7	1.9	61 57.4	−59.8	1.9	62 57.3	−59.7	2.0	63 57.3	−59.7	2.0	64 57.3	−59.7	2.1	77
78	56 57.7	−59.7	1.5	57 57.7	−59.8	1.6	58 57.7	−59.8	1.6	59 57.7	−59.8	1.7	60 57.6	−59.7	1.7	61 57.6	−59.7	1.8	62 57.6	−59.7	1.8	63 57.6	−59.7	1.9	78
79	55 58.0	−59.8	1.4	56 58.0	−59.8	1.4	57 57.9	−59.7	1.4	58 57.9	−59.8	1.5	59 57.9	−59.8	1.5	60 57.9	−59.8	1.6	61 57.9	−59.8	1.6	62 57.8	−59.7	1.7	79
80	54 58.2	−59.8	1.2	55 58.2	−59.8	1.2	56 58.2	−59.8	1.3	57 58.2	−59.8	1.3	58 58.1	−59.7	1.3	59 58.1	−59.7	1.4	60 58.1	−59.8	1.4	61 58.1	−59.8	1.5	80
81	53 58.4	−59.8	1.1	54 58.4	−59.8	1.1	55 58.4	−59.8	1.1	56 58.4	−59.8	1.1	57 58.4	−59.8	1.2	58 58.4	−59.8	1.2	59 58.3	−59.7	1.3	60 58.3	−59.7	1.3	81
82	52 58.6	−59.8	0.9	53 58.6	−59.8	0.9	54 58.6	−59.8	1.0	55 58.6	−59.8	1.0	56 58.6	−59.8	1.0	57 58.6	−59.8	1.0	58 58.6	−59.8	1.1	59 58.6	−59.8	1.1	82
83	51 58.8	−59.8	0.8	52 58.8	−59.8	0.8	53 58.8	−59.8	0.8	54 58.8	−59.8	0.8	55 58.8	−59.8	0.9	56 58.8	−59.8	0.9	57 58.8	−59.8	0.9	58 58.8	−59.8	1.0	83
84	50 59.0	−59.8	0.7	51 59.0	−59.8	0.7	52 59.0	−59.8	0.7	53 59.0	−59.8	0.7	54 59.0	−59.8	0.7	55 59.0	−59.8	0.7	56 59.0	−59.8	0.8	57 59.0	−59.8	0.8	84
85	49 59.2	−59.9	0.5	50 59.2	−59.8	0.6	51 59.2	−59.8	0.6	52 59.2	−59.8	0.6	53 59.2	−59.8	0.6	54 59.2	−59.8	0.6	55 59.2	−59.8	0.6	56 59.2	−59.8	0.6	85
86	48 59.4	−59.9	0.4	49 59.4	−59.9	0.4	50 59.4	−59.9	0.4	51 59.4	−59.9	0.5	52 59.4	−59.9	0.5	53 59.4	−59.9	0.5	54 59.4	−59.9	0.5	55 59.4	−59.9	0.5	86
87	47 59.5	−59.8	0.3	48 59.5	−59.8	0.3	49 59.5	−59.8	0.3	50 59.5	−59.8	0.3	51 59.5	−59.8	0.3	52 59.5	−59.8	0.3	53 59.5	−59.8	0.4	54 59.5	−59.8	0.4	87
88	46 59.7	−59.8	0.2	47 59.7	−59.8	0.2	48 59.7	−59.8	0.2	49 59.7	−59.8	0.2	50 59.7	−59.8	0.2	51 59.7	−59.8	0.2	52 59.7	−59.8	0.2	53 59.7	−59.8	0.2	88
89	45 59.9	−59.9	0.1	46 59.9	−59.9	0.1	47 59.9	−59.9	0.1	48 59.9	−59.9	0.1	49 59.9	−59.9	0.1	50 59.9	−59.9	0.1	51 59.9	−59.9	0.1	52 59.9	−59.9	0.1	89
90	45 00.0	−59.9	0.0	46 00.0	−59.9	0.0	47 00.0	−59.9	0.0	48 00.0	−59.9	0.0	49 00.0	−59.9	0.0	50 00.0	−59.9	0.0	51 00.0	−59.9	0.0	52 00.0	−59.9	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

4°, 356° L.H.A.   LATITUDE SAME NAME AS DECLINATION

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 51.6	−59.8	174.4	43 51.9	−59.8	174.4	42 52.2	−59.9	174.5	41 52.5	−59.9	174.6	40 52.7	−59.9	174.7	39 53.0	−59.9	174.8	38 53.2	−59.9	174.9	37 53.5	−60.0	174.9	0
1	43 51.8	−59.9	174.4	42 52.1	−59.8	174.5	41 52.3	−59.9	174.6	40 52.6	−59.9	174.7	39 52.8	−59.9	174.8	38 53.1	−59.9	174.9	37 53.3	−59.9	174.9	36 53.5	−59.9	175.0	1
2	42 51.9	−59.8	174.5	41 52.2	−59.8	174.6	40 52.4	−59.8	174.7	39 52.7	−59.9	174.8	38 52.9	−59.9	174.9	37 53.2	−59.9	174.9	36 53.4	−59.9	175.0	35 53.6	−59.9	175.1	2
3	41 52.1	−59.9	174.6	40 52.3	−59.8	174.7	39 52.6	−59.9	174.8	38 52.8	−59.9	174.9	37 53.0	−59.9	174.9	36 53.3	−59.9	175.0	35 53.5	−59.9	175.1	34 53.7	−59.9	175.1	3
4	40 52.2	−59.8	174.7	39 52.4	−59.8	174.8	38 52.7	−59.9	174.9	37 52.9	−59.9	174.9	36 53.1	−59.9	175.0	35 53.4	−59.9	175.1	34 53.6	−59.9	175.1	33 53.8	−59.9	175.2	4
5	39 52.3	−59.9	174.8	38 52.5	−59.8	174.9	37 52.8	−59.9	174.9	36 53.0	−59.9	175.0	35 53.2	−59.9	175.1	34 53.5	−60.0	175.1	33 53.7	−59.9	175.2	32 53.9	−59.9	175.3	5
6	38 52.4	−59.9	174.9	37 52.7	−59.9	175.0	36 52.9	−59.9	175.0	35 53.1	−59.9	175.1	34 53.3	−59.9	175.1	33 53.5	−59.9	175.2	32 53.8	−60.0	175.3	31 54.0	−60.0	175.3	6
7	37 52.5	−59.9	175.0	36 52.8	−59.9	175.0	35 53.0	−59.9	175.1	34 53.2	−59.9	175.2	33 53.4	−59.9	175.2	32 53.6	−59.9	175.3	31 53.8	−59.9	175.3	30 54.0	−59.9	175.4	7
8	36 52.7	−59.9	175.0	35 52.9	−59.9	175.1	34 53.1	−59.9	175.2	33 53.3	−59.9	175.2	32 53.5	−59.9	175.3	31 53.7	−59.9	175.3	30 53.9	−59.9	175.4	29 54.1	−59.9	175.4	8
9	35 52.8	−59.9	175.1	34 53.0	−59.9	175.2	33 53.2	−59.9	175.2	32 53.4	−59.9	175.3	31 53.6	−59.9	175.3	30 53.8	−59.9	175.4	29 54.0	−59.9	175.4	28 54.2	−59.9	175.5	9
10	34 52.9	−59.9	175.2	33 53.1	−59.9	175.3	32 53.3	−59.9	175.3	31 53.5	−59.9	175.4	30 53.7	−59.9	175.4	29 53.9	−59.9	175.5	28 54.1	−60.0	175.5	27 54.3	−60.0	175.5	10
11	33 53.0	−59.9	175.3	32 53.2	−59.9	175.3	31 53.4	−59.9	175.4	30 53.6	−59.9	175.4	29 53.8	−59.9	175.5	28 54.0	−60.0	175.5	27 54.1	−59.9	175.6	26 54.3	−59.9	175.6	11
12	32 53.1	−59.9	175.3	31 53.3	−59.9	175.4	30 53.5	−59.9	175.4	29 53.7	−59.9	175.5	28 53.9	−60.0	175.5	27 54.0	−59.9	175.6	26 54.2	−59.9	175.6	25 54.4	−59.9	175.6	12
13	31 53.2	−59.9	175.4	30 53.4	−59.9	175.5	29 53.6	−59.9	175.5	28 53.8	−60.0	175.6	27 53.9	−59.9	175.6	26 54.1	−59.9	175.6	25 54.3	−59.9	175.7	24 54.5	−59.9	175.7	13
14	30 53.3	−59.9	175.5	29 53.5	−59.9	175.5	28 53.7	−59.9	175.6	27 53.8	−59.9	175.6	26 54.0	−59.9	175.6	25 54.2	−59.9	175.7	24 54.4	−60.0	175.7	23 54.5	−59.9	175.8	14
15	29 53.4	−59.9	175.5	28 53.6	−59.9	175.6	27 53.8	−60.0	175.6	26 53.9	−59.9	175.7	25 54.1	−59.9	175.7	24 54.3	−60.0	175.7	23 54.4	−59.9	175.8	22 54.6	−59.9	175.8	15
16	28 53.5	−59.9	175.6	27 53.7	−59.9	175.6	26 53.8	−59.9	175.7	25 54.0	−59.9	175.7	24 54.2	−59.9	175.8	23 54.3	−59.9	175.8	22 54.5	−59.9	175.8	21 54.7	−60.0	175.9	16
17	27 53.6	−59.9	175.7	26 53.8	−60.0	175.7	25 53.9	−59.9	175.7	24 54.1	−59.9	175.8	23 54.3	−60.0	175.8	22 54.4	−59.9	175.8	21 54.6	−59.9	175.9	20 54.7	−59.9	175.9	17
18	26 53.7	−59.9	175.7	25 53.8	−59.9	175.8	24 54.0	−59.9	175.8	23 54.2	−59.9	175.8	22 54.3	−59.9	175.9	21 54.5	−59.9	175.9	20 54.6	−59.9	175.9	19 54.8	−60.0	176.0	18
19	25 53.8	−59.9	175.8	24 53.9	−59.9	175.8	23 54.1	−59.9	175.9	22 54.2	−59.9	175.9	21 54.4	−60.0	175.9	20 54.6	−60.0	176.0	19 54.7	−59.9	176.0	18 54.8	−59.9	176.0	19
20	24 53.9	−59.9	175.9	23 54.0	−59.9	175.9	22 54.2	−59.9	175.9	21 54.3	−59.9	175.9	20 54.5	−60.0	176.0	19 54.6	−59.9	176.0	18 54.8	−59.9	176.0	17 54.9	−59.9	176.0	20
21	23 54.0	−60.0	175.9	22 54.1	−59.9	175.9	21 54.3	−60.0	176.0	20 54.4	−59.9	176.0	19 54.5	−59.9	176.0	18 54.7	−59.9	176.1	17 54.8	−59.9	176.1	16 55.0	−60.0	176.1	21
22	22 54.0	−59.9	176.0	21 54.2	−59.9	176.0	20 54.3	−59.9	176.0	19 54.5	−60.0	176.1	18 54.6	−59.9	176.1	17 54.8	−60.0	176.1	16 54.9	−59.9	176.1	15 55.0	−59.9	176.1	22
23	21 54.1	−59.9	176.0	20 54.3	−60.0	176.1	19 54.4	−59.9	176.1	18 54.5	−59.9	176.1	17 54.7	−60.0	176.1	16 54.8	−59.9	176.2	15 55.0	−60.0	176.2	14 55.1	−59.9	176.2	23
24	20 54.2	−59.9	176.1	19 54.3	−59.9	176.1	18 54.5	−59.9	176.1	17 54.6	−59.9	176.2	16 54.8	−60.0	176.2	15 54.9	−59.9	176.2	14 55.0	−59.9	176.2	13 55.1	−59.9	176.2	24
25	19 54.3	−59.9	176.1	18 54.4	−59.9	176.2	17 54.6	−60.0	176.2	16 54.7	−59.9	176.2	15 54.8	−59.9	176.2	14 55.0	−60.0	176.3	13 55.1	−59.9	176.3	12 55.2	−59.9	176.3	25
26	18 54.4	−59.9	176.2	17 54.5	−59.9	176.2	16 54.6	−59.9	176.2	15 54.7	−59.9	176.3	14 54.9	−60.0	176.3	13 55.0	−59.9	176.3	12 55.1	−59.9	176.3	11 55.3	−59.9	176.3	26
27	17 54.5	−60.0	176.3	16 54.6	−59.9	176.3	15 54.7	−59.9	176.3	14 54.8	−59.9	176.3	13 55.0	−60.0	176.3	12 55.1	−60.0	176.3	11 55.2	−59.9	176.4	10 55.3	−59.9	176.4	27
28	16 54.5	−59.9	176.3	15 54.7	−60.0	176.3	14 54.8	−59.9	176.3	13 54.9	−59.9	176.4	12 55.0	−59.9	176.4	11 55.1	−59.9	176.4	10 55.3	−60.0	176.4	9 55.4	−60.0	176.4	28
29	15 54.6	−59.9	176.4	14 54.7	−59.9	176.4	13 54.9	−60.0	176.4	12 55.0	−60.0	176.4	11 55.1	−59.9	176.4	10 55.2	−59.9	176.4	9 55.3	−59.9	176.4	8 55.4	−59.9	176.5	29
30	14 54.7	−59.9	176.4	13 54.8	−59.9	176.4	12 54.9	−59.9	176.4	11 55.0	−59.9	176.5	10 55.2	−60.0	176.5	9 55.3	−60.0	176.5	8 55.4	−60.0	176.5	7 55.5	−59.9	176.5	30
31	13 54.8	−60.0	176.5	12 54.9	−59.9	176.5	11 55.0	−60.0	176.5	10 55.1	−60.0	176.5	9 55.2	−59.9	176.5	8 55.3	−59.9	176.5	7 55.4	−59.9	176.5	6 55.5	−59.9	176.5	31
32	12 54.8	−59.9	176.5	11 55.0	−60.0	176.5	10 55.1	−60.0	176.5	9 55.2	−60.0	176.6	8 55.3	−60.0	176.6	7 55.4	−59.9	176.6	6 55.5	−59.9	176.6	5 55.6	−59.9	176.6	32
33	11 54.9	−59.9	176.6	10 55.0	−59.9	176.6	9 55.1	−60.0	176.6	8 55.2	−59.9	176.6	7 55.3	−59.9	176.6	6 55.5	−60.0	176.6	5 55.6	−60.0	176.6	4 55.7	−60.0	176.6	33
34	10 55.0	−59.9	176.6	9 55.1	−59.9	176.6	8 55.2	−59.9	176.6	7 55.3	−59.9	176.7	6 55.4	−59.9	176.7	5 55.5	−59.9	176.7	4 55.6	−59.9	176.7	3 55.7	−59.9	176.7	34
35	9 55.1	−59.9	176.7	8 55.2	−60.0	176.7	7 55.3	−60.0	176.7	6 55.4	−60.0	176.7	5 55.5	−60.0	176.7	4 55.6	−60.0	176.7	3 55.7	−60.0	176.7	2 55.8	−60.0	176.7	35
36	8 55.2	−60.0	176.7	7 55.2	−59.9	176.7	6 55.3	−59.9	176.7	5 55.4	−59.9	176.7	4 55.5	−59.9	176.8	3 55.6	−59.9	176.8	2 55.7	−59.9	176.8	1 55.8	−59.9	176.8	36
37	7 55.2	−59.9	176.8	6 55.3	−59.9	176.8	5 55.4	−59.9	176.8	4 55.5	−60.0	176.8	3 55.6	−60.0	176.8	2 55.7	−60.0	176.8	1 55.8	−60.0	176.8	0 55.9	−60.0	176.8	37
38	6 55.3	−59.9	176.8	5 55.4	−59.9	176.8	4 55.5	−59.9	176.8	3 55.6	−60.0	176.8	2 55.6	−59.9	176.8	1 55.7	−60.0	176.8	0 55.8	−59.9	176.8	0 04.1	+59.9	3.2	38
39	5 55.4	−60.0	176.9	4 55.5	−60.0	176.9	3 55.6	−60.0	176.9	2 55.6	−59.9	176.9	1 55.7	−59.9	176.9	0 55.8	−59.9	176.9	0 04.1	+59.9	3.1	1 04.0	+60.0	3.1	39
40	4 55.4	−59.9	176.9	3 55.5	−59.9	176.9	2 55.6	−59.9	176.9	1 55.7	−59.9	176.9	0 55.8	−59.9	176.9	0 04.1	+60.0	3.1	1 04.0	+60.0	3.1	2 04.0	+59.9	3.1	40
41	3 55.5	−59.9	177.0	2 55.6	−59.9	177.0	1 55.7	−59.9	177.0	0 55.8	−60.0	177.0	0 04.1	+60.0	3.0	1 04.1	+59.9	3.0	2 04.0	+59.9	3.0	3 03.9	+59.9	3.0	41
42	2 55.6	−59.9	177.0	1 55.7	−60.0	177.0	0 55.8	−60.0	177.0	0 04.2	+59.9	3.0	1 04.1	+59.9	3.0	2 04.0	+59.9	3.0	3 03.9	+59.9	3.0	4 03.8	+59.9	3.0	42
43	1 55.7	−60.0	177.1	0 55.7	−59.9	177.1	0 04.2	+59.9	2.9	1 04.1	+59.9	2.9	2 04.0	+60.0	2.9	3 03.9	+60.0	2.9	4 03.9	+59.9	2.9	5 03.8	+59.9	2.9	43
44	0 55.7	−59.9	177.1	0 04.2	+59.9	2.9	1 04.1	+59.9	2.9	2 04.0	+59.9	2.9	3 04.0	+59.9	2.9	4 03.9	+59.9	2.9	5 03.8	+59.9	2.9	6 03.7	+60.0	2.9	44
45	0 04.2	+59.9	2.8	1 04.1	+59.9	2.8	2 04.0	+59.9	2.8	3 04.0	+59.9	2.8	4 03.9	+59.9	2.8	5 03.8	+59.9	2.8	6 03.7	+60.0	2.8	7 03.7	+59.9	2.8	45
46	1 04.1	+59.9	2.8	2 04.0	+60.0	2.8	3 04.0	+59.9	2.8	4 03.9	+59.9	2.8	5 03.8	+60.0	2.8	6 03.8	+59.9	2.8	7 03.7	+59.9	2.8	8 03.6	+60.0	2.8	46
47	2 04.0	+60.0	2.7	3 04.0	+59.9	2.7	4 03.9	+59.9	2.7	5 03.8	+60.0	2.7	6 03.8	+59.9	2.7	7 03.7	+59.9	2.7	8 03.6	+59.9	2.8	9 03.6	+59.9	2.8	47
48	3 04.0	+59.9	2.7	4 03.9	+59.9	2.7	5 03.8	+59.9	2.7	6 03.8	+59.9	2.7	7 03.7	+59.9	2.7	8 03.6	+60.0	2.7	9 03.6	+59.9	2.7	10 03.5	+59.9	2.7	48
49	4 03.9	+59.9	2.6	5 03.8	+60.0	2.6	6 03.8	+59.9	2.6	7 03.7	+59.9	2.6	8 03.6	+60.0	2.6	9 03.6	+59.9	2.7	10 03.5	+60.0	2.7	11 03.4	+60.0	2.7	49
50	5 03.8	+59.9	2.6	6 03.8	+59.9	2.6	7 03.7	+59.9	2.6	8 03.6	+60.0	2.6	9 03.6	+59.9	2.6	10 03.5	+59.9	2.6	11 03.5	+59.9	2.6	12 03.4	+59.9	2.6	50
51	6 03.7	+60.0	2.5	7 03.7	+59.9	2.5	8 03.6	+59.9	2.5	9 03.6	+59.9	2.5	10 03.5	+59.9	2.6	11 03.5	+59.9	2.6	12 03.4	+59.9	2.6	13 03.3	+60.0	2.6	51
52	7 03.7	+59.9	2.5	8 03.6	+59.9	2.5	9 03.6	+59.9	2.5	10 03.5	+59.9	2.5	11 03.4	+60.0	2.5	12 03.4	+59.9	2.5	13 03.3	+60.0	2.5	14 03.3	+59.9	2.5	52
53	8 03.6	+59.9	2.4	9 03.5	+60.0	2.4	10 03.5	+59.9	2.4	11 03.4	+59.9	2.5	12 03.4	+59.9	2.5	13 03.3	+60.0	2.5	14 03.3	+59.9	2.5	15 03.2	+59.9	2.5	53
54	9 03.5	+59.9	2.4	10 03.5	+59.9	2.4	11 03.4	+59.9	2.4	12 03.4	+59.9	2.4	13 03.3	+59.9	2.4	14 03.3	+59.9	2.4	15 03.2	+59.9	2.4	16 03.2	+59.9	2.4	54
55	10 03.4	+60.0	2.3	11 03.4	+59.9	2.3	12 03.3	+60.0	2.3	13 03.3	+59.9	2.4	14 03.2	+60.0	2.4	15 03.2	+59.9	2.4	16 03.1	+60.0	2.4	17 03.1	+59.9	2.4	55
56	11 03.4	+59.9	2.3	12 03.3	+60.0	2.3	13 03.3	+59.9	2.3	14 03.2	+59.9	2.3	15 03.2	+59.9	2.3	16 03.1	+60.0	2.3	17 03.1	+59.9	2.3	18 03.0	+59.9	2.4	56
57	12 03.3	+59.9	2.2	13 03.3	+59.9	2.2	14 03.2	+59.9	2.2	15 03.2	+59.9	2.3	16 03.1	+60.0	2.3	17 03.1	+59.9	2.3	18 03.0	+60.0	2.3	19 03.0	+59.9	2.3	57
58	13 03.2	+59.9	2.2	14 03.2	+59.9	2.2	15 03.1	+60.0	2.2	16 03.1	+59.9	2.2	17 03.0	+60.0	2.2	18 03.0	+59.9	2.2	19 03.0	+59.9	2.2	20 02.9	+59.9	2.3	58
59	14 03.1	+60.0	2.1	15 03.1	+59.9	2.1	16 03.1	+59.9	2.1	17 03.0	+59.9	2.2	18 03.0	+59.9	2.2	19 02.9	+60.0	2.2	20 02.9	+59.9	2.2	21 02.8	+59.9	2.2	59
60	15 03.1	+59.9	2.1	16 03.0	+59.9	2.1	17 03.0	+59.9	2.1	18 02.9	+60.0	2.1	19 02.9	+59.9	2.1	20 02.9	+59.9	2.1	21 02.8	+60.0	2.1	22 02.8	+59.9	2.2	60
61	16 03.0	+59.9	2.0	17 02.9	+60.0	2.0	18 02.9	+59.9	2.0	19 02.9	+59.9	2.1	20 02.8	+60.0	2.1	21 02.8	+59.9	2.1	22 02.8	+59.9	2.1	23 02.7	+59.9	2.1	61
62	17 02.9	+59.9	2.0	18 02.9	+59.9	2.0	19 02.8	+60.0	2.0	20 02.8	+59.9	2.0	21 02.8	+59.9	2.0	22 02.7	+60.0	2.0	23 02.7	+59.9	2.0	24 02.6	+60.0	2.1	62
63	18 02.8	+59.9	1.9	19 02.8	+59.9	1.9	20 02.8	+59.9	1.9	21 02.7	+59.9	1.9	22 02.7	+59.9	2.0	23 02.7	+59.9	2.0	24 02.6	+59.9	2.0	25 02.6	+59.9	2.0	63
64	19 02.7	+60.0	1.9	20 02.7	+59.9	1.9	21 02.7	+59.9	1.9	22 02.6	+60.0	1.9	23 02.6	+59.9	1.9	24 02.6	+59.9	1.9	25 02.5	+60.0	1.9	26 02.5	+59.9	2.0	64
65	20 02.7	+59.9	1.8	21 02.6	+60.0	1.8	22 02.6	+59.9	1.8	23 02.6	+59.9	1.8	24 02.5	+60.0	1.8	25 02.5	+59.9	1.9	26 02.5	+59.9	1.9	27 02.4	+60.0	1.9	65
66	21 02.6	+59.9	1.7	22 02.6	+59.9	1.7	23 02.5	+59.9	1.8	24 02.4	+60.0	1.8	25 02.5	+59.9	1.8	26 02.4	+59.9	1.8	27 02.4	+59.9	1.8	28 02.4	+59.9	1.8	66
67	22 02.5	+59.9	1.7	23 02.5	+59.9	1.7	24 02.4	+60.0	1.7	25 02.4	+59.9	1.7	26 02.4	+59.9	1.7	27 02.4	+59.9	1.8	28 02.3	+60.0	1.8	29 02.3	+59.9	1.8	67
68	23 02.4	+59.9	1.6	24 02.4	+59.9	1.6	25 02.4	+59.9	1.6	26 02.3	+59.9	1.7	27 02.3	+59.9	1.7	28 02.3	+59.9	1.7	29 02.3	+59.9	1.7	30 02.2	+59.9	1.7	68
69	24 02.3	+59.9	1.6	25 02.3	+59.9	1.6	26 02.3	+59.9	1.6	27 02.3	+59.9	1.6	28 02.2	+59.9	1.6	29 02.2	+59.9	1.6	30 02.2	+59.9	1.7	31 02.2	+59.9	1.7	69
70	25 02.2	+59.9	1.5	26 02.2	+59.9	1.5	27 02.2	+59.9	1.5	28 02.2	+59.9	1.5	29 02.1	+60.0	1.6	30 02.1	+59.9	1.6	31 02.1	+59.9	1.6	32 02.1	+59.9	1.6	70
71	26 02.1	+60.0	1.4	27 02.1	+59.9	1.5	28 02.1	+59.9	1.5	29 02.1	+59.9	1.5	30 02.1	+59.9	1.5	31 02.0	+60.0	1.5	32 02.0	+59.9	1.5	33 02.0	+59.9	1.6	71
72	27 02.1	+59.9	1.4	28 02.0	+59.9	1.4	29 02.0	+59.9	1.4	30 02.0	+59.9	1.4	31 02.0	+59.9	1.4	32 02.0	+59.9	1.5	33 01.9	+60.0	1.5	34 01.9	+59.9	1.5	72
73	28 02.0	+59.9	1.3	29 01.9	+60.0	1.3	30 01.9	+59.9	1.3	31 01.9	+59.9	1.4	32 01.9	+59.9	1.4	33 01.9	+59.9	1.4	34 01.9	+59.9	1.4	35 01.8	+60.0	1.4	73
74	29 01.9	+59.9	1.3	30 01.9	+59.9	1.3	31 01.8	+59.9	1.3	32 01.8	+59.9	1.3	33 01.8	+59.9	1.3	34 01.8	+59.9	1.3	35 01.8	+59.9	1.3	36 01.8	+59.9	1.4	74
75	30 01.8	+59.9	1.2	31 01.8	+59.9	1.2	32 01.7	+59.9	1.2	33 01.7	+59.9	1.2	34 01.7	+59.9	1.2	35 01.7	+59.9	1.2	36 01.7	+59.9	1.3	37 01.7	+59.9	1.3	75
76	31 01.7	+59.9	1.1	32 01.7	+59.9	1.1	33 01.6	+59.9	1.2	34 01.6	+59.9	1.2	35 01.6	+59.9	1.2	36 01.6	+59.9	1.2	37 01.6	+59.9	1.2	38 01.6	+59.9	1.2	76
77	32 01.6	+59.9	1.1	33 01.6	+59.9	1.1	34 01.5	+59.9	1.1	35 01.5	+59.9	1.1	36 01.5	+59.9	1.1	37 01.5	+59.9	1.1	38 01.5	+59.9	1.1	39 01.5	+59.9	1.2	77
78	33 01.5	+59.9	1.0	34 01.5	+59.9	1.0	35 01.4	+59.9	1.0	36 01.4	+59.9	1.0	37 01.4	+59.9	1.0	38 01.4	+59.9	1.0	39 01.4	+59.9	1.1	40 01.4	+59.9	1.1	78
79	34 01.4	+59.9	0.9	35 01.4	+59.8	0.9	36 01.3	+59.9	0.9	37 01.3	+59.9	1.0	38 01.3	+59.9	1.0	39 01.3	+59.9	1.0	40 01.3	+59.9	1.0	41 01.3	+59.9	1.0	79
80	35 01.3	+59.8	0.8	36 01.2	+59.9	0.9	37 01.2	+59.9	0.9	38 01.2	+59.9	0.9	39 01.2	+59.9	0.9	40 01.2	+59.9	0.9	41 01.2	+59.9	0.9	42 01.2	+59.9	0.9	80
81	36 01.1	+59.9	0.8	37 01.1	+59.9	0.8	38 01.1	+59.9	0.8	39 01.1	+59.9	0.8	40 01.1	+59.9	0.8	41 01.1	+59.9	0.8	42 01.1	+59.9	0.9	43 01.1	+59.9	0.9	81
82	37 01.0	+59.9	0.7	38 01.0	+59.9	0.7	39 01.0	+59.9	0.7	40 01.0	+59.9	0.7	41 01.0	+59.9	0.7	42 01.0	+59.9	0.7	43 01.0	+59.9	0.8	44 01.0	+59.9	0.8	82
83	38 00.9	+59.9	0.6	39 00.9	+59.9	0.6	40 00.9	+59.8	0.6	41 00.9	+59.9	0.6	42 00.9	+59.9	0.7	43 00.9	+59.9	0.7	44 00.9	+59.9	0.7	45 00.9	+59.9	0.7	83
84	39 00.8	+59.9	0.5	40 00.8	+59.9	0.5	41 00.8	+59.9	0.6	42 00.8	+59.9	0.6	43 00.8	+59.9	0.6	44 00.8	+59.9	0.6	45 00.8	+59.9	0.6	46 00.8	+59.9	0.6	84
85	40 00.7	+59.9	0.5	41 00.7	+59.9	0.5	42 00.7	+59.8	0.5	43 00.7	+59.8	0.5	44 00.7	+59.9	0.5	45 00.7	+59.9	0.5	46 00.7	+59.9	0.5	47 00.7	+59.9	0.5	85
86	41 00.5	+59.9	0.4	42 00.5	+59.9	0.4	43 00.5	+59.9	0.4	44 00.5	+59.9	0.4	45 00.5	+59.9	0.4	46 00.5	+59.9	0.4	47 00.5	+59.9	0.4	48 00.5	+59.9	0.4	86
87	42 00.4	+59.9	0.3	43 00.4	+59.9	0.3	44 00.4	+59.9	0.3	45 00.4	+59.9	0.3	46 00.4	+59.9	0.3	47 00.4	+59.9	0.3	48 00.4	+59.9	0.3	49 00.4	+59.9	0.3	87
88	43 00.3	+59.8	0.2	44 00.3	+59.8	0.2	45 00.3	+59.8	0.2	46 00.3	+59.8	0.2	47 00.3	+59.8	0.2	48 00.3	+59.9	0.2	49 00.3	+59.9	0.2	50 00.3	+59.9	0.2	88
89	44 00.1	+59.9	0.1	45 00.1	+59.9	0.1	46 00.1	+59.9	0.1	47 00.1	+59.9	0.1	48 00.1	+59.9	0.1	49 00.1	+59.9	0.1	50 00.1	+59.9	0.1	51 00.1	+59.9	0.1	89
90	45 00.0	+59.9	0.0	46 00.0	+59.9	0.0	47 00.0	+59.9	0.0	48 00.0	+59.9	0.0	49 00.0	+59.9	0.0	50 00.0	+59.9	0.0	51 00.0	+59.9	0.0	52 00.0	+59.9	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 176°, 184°

5°, 355° L.H.A. LATITUDE SAME NAME AS DECLINATION

Each latitude cell below lists **Hc   d   Z**.

Dec.	45°	46°	47°	48°	49°	50°	51°	52°	Dec.
0	44 46.9 +59.8 172.9	43 47.4 +59.8 173.1	42 47.8 +59.8 173.2	41 48.2 +59.9 173.3	40 48.6 +59.9 173.4	39 49.0 +59.9 173.5	38 49.4 +59.9 173.6	37 49.8 +59.9 173.7	0
1	45 46.7 +59.8 172.8	44 47.2 +59.8 172.9	43 47.6 +59.8 173.1	42 48.1 +59.8 173.2	41 48.5 +59.8 173.3	40 48.9 +59.8 173.4	39 49.3 +59.8 173.5	38 49.7 +59.8 173.6	1
2	46 46.5 +59.7 172.7	45 47.0 +59.7 172.8	44 47.4 +59.8 173.0	43 47.9 +59.8 173.1	42 48.3 +59.8 173.2	41 48.7 +59.8 173.3	40 49.1 +59.8 173.4	39 49.5 +59.9 173.5	2
3	47 46.2 +59.7 172.6	46 46.7 +59.8 172.7	45 47.2 +59.7 172.8	44 47.7 +59.8 173.0	43 48.1 +59.8 173.1	42 48.5 +59.9 173.1	41 49.0 +59.8 173.3	40 49.4 +59.8 173.4	3
4	48 46.0 +59.7 172.4	47 46.5 +59.7 172.6	46 47.0 +59.7 172.7	45 47.5 +59.7 172.8	44 47.9 +59.8 173.0	43 48.4 +59.9 173.1	42 48.8 +59.8 173.2	41 49.2 +59.8 173.3	4
5	49 45.7 +59.7 172.3	48 46.2 +59.7 172.4	47 46.7 +59.7 172.6	46 47.2 +59.8 172.7	45 47.7 +59.7 172.8	44 48.2 +59.8 173.0	43 48.6 +59.8 173.1	42 49.0 +59.9 173.2	5
6	50 45.4 +59.7 172.1	49 46.0 +59.7 172.3	48 46.5 +59.8 172.4	47 47.0 +59.8 172.6	46 47.5 +59.8 172.7	45 48.0 +59.8 172.9	44 48.4 +59.9 173.0	43 48.9 +59.8 173.1	6
7	51 45.1 +59.7 172.0	50 45.7 +59.7 172.1	49 46.3 +59.7 172.3	48 46.8 +59.7 172.5	47 47.3 +59.8 172.6	46 47.8 +59.8 172.7	45 48.3 +59.8 172.9	44 48.7 +59.9 172.9	7
8	52 44.8 +59.7 171.8	51 45.4 +59.7 172.0	50 46.0 +59.7 172.2	49 46.5 +59.7 172.3	48 47.1 +59.7 172.5	47 47.6 +59.8 172.6	46 48.1 +59.8 172.8	45 48.5 +59.9 172.9	8
9	53 44.5 +59.7 171.6	52 45.1 +59.7 171.8	51 45.7 +59.7 172.0	50 46.3 +59.7 172.2	49 46.8 +59.8 172.3	48 47.4 +59.7 172.5	47 47.9 +59.8 172.6	46 48.4 +59.8 172.8	9
10	54 44.2 +59.6 171.5	53 44.8 +59.7 171.7	52 45.4 +59.7 171.8	51 46.0 +59.8 172.0	50 46.6 +59.8 172.0	49 47.1 +59.8 172.2	48 47.7 +59.8 172.5	47 48.2 +59.8 172.7	10
11	55 43.8 +59.7 171.3	54 44.5 +59.7 171.5	53 45.1 +59.7 171.7	52 45.8 +59.7 171.9	51 46.4 +59.7 172.1	50 46.9 +59.8 172.2	49 47.5 +59.7 172.4	48 48.0 +59.8 172.5	11
12	56 43.4 +59.7 171.1	55 44.2 +59.6 171.3	54 44.8 +59.7 171.5	53 45.5 +59.7 171.7	52 46.1 +59.7 171.9	51 46.7 +59.7 172.1	50 47.2 +59.8 172.3	49 47.8 +59.8 172.4	12
13	57 43.1 +59.6 170.9	56 43.8 +59.6 171.1	55 44.5 +59.7 171.3	54 45.2 +59.7 171.5	53 45.8 +59.7 171.7	52 46.4 +59.8 171.9	51 47.0 +59.7 172.1	50 47.6 +59.7 172.3	13
14	58 42.6 +59.6 170.6	57 43.4 +59.6 170.9	56 44.2 +59.6 171.1	55 44.9 +59.6 171.4	54 45.5 +59.7 171.6	53 46.2 +59.7 171.8	52 46.8 +59.7 172.0	51 47.3 +59.8 172.1	14
15	59 42.2 +59.5 170.4	58 43.0 +59.6 170.7	57 43.8 +59.6 170.9	56 44.5 +59.7 171.2	55 45.2 +59.7 171.4	54 45.9 +59.7 171.6	53 46.5 +59.7 171.8	52 47.1 +59.8 172.0	15
16	60 41.7 +59.5 170.1	59 42.6 +59.6 170.4	58 43.4 +59.6 170.7	57 44.2 +59.6 171.0	56 44.9 +59.7 171.2	55 45.6 +59.7 171.4	54 46.2 +59.8 171.7	53 46.9 +59.7 171.8	16
17	61 41.3 +59.4 169.9	60 42.2 +59.5 170.2	59 43.0 +59.6 170.5	58 43.8 +59.6 170.8	57 44.6 +59.6 171.0	56 45.3 +59.7 171.3	55 46.0 +59.7 171.5	54 46.6 +59.7 171.7	17
18	62 40.7 +59.5 169.6	61 41.7 +59.5 169.9	60 42.6 +59.5 170.2	59 43.4 +59.6 170.5	58 44.2 +59.6 170.8	57 45.0 +59.6 171.1	56 45.7 +59.7 171.3	55 46.3 +59.8 171.5	18
19	63 40.2 +59.3 169.3	62 41.2 +59.4 169.7	61 42.1 +59.5 170.0	60 43.0 +59.6 170.3	59 43.8 +59.6 170.6	58 44.6 +59.7 170.9	57 45.4 +59.6 171.1	56 46.1 +59.7 171.4	19
20	64 39.6 +59.3 169.0	63 40.6 +59.5 169.4	62 41.6 +59.5 169.7	61 42.6 +59.5 170.0	60 43.4 +59.6 170.4	59 44.3 +59.6 170.6	58 45.0 +59.7 170.9	57 45.8 +59.7 171.2	20
21	65 38.9 +59.3 168.6	64 40.1 +59.3 169.0	63 41.1 +59.4 169.4	62 42.1 +59.5 169.8	61 43.0 +59.6 170.1	60 43.9 +59.6 170.4	59 44.7 +59.6 170.7	58 45.5 +59.6 171.0	21
22	66 38.2 +59.3 168.2	65 39.4 +59.3 168.7	64 40.5 +59.4 169.1	63 41.6 +59.4 169.5	62 42.6 +59.5 169.8	61 43.5 +59.5 170.2	60 44.3 +59.6 170.5	59 45.1 +59.7 170.8	22
23	67 37.5 +59.1 167.8	66 38.7 +59.3 168.3	65 39.9 +59.4 168.8	64 41.0 +59.5 169.2	63 42.1 +59.5 169.6	62 43.0 +59.6 169.9	61 43.9 +59.6 170.2	60 44.8 +59.6 170.6	23
24	68 36.6 +59.1 167.4	67 38.0 +59.2 167.9	66 39.3 +59.3 168.4	65 40.5 +59.3 168.9	64 41.6 +59.4 169.3	63 42.6 +59.5 169.6	62 43.5 +59.6 170.0	61 44.4 +59.6 170.3	24
25	69 35.7 +59.0 166.9	68 37.2 +59.1 167.5	67 38.6 +59.2 168.0	66 39.8 +59.4 168.5	65 41.0 +59.4 168.9	64 42.1 +59.4 169.3	63 43.1 +59.5 169.7	62 44.0 +59.6 170.1	25
26	70 34.7 +58.9 166.4	69 36.3 +59.1 167.0	68 37.8 +59.2 167.6	67 39.2 +59.2 168.1	66 40.4 +59.3 168.6	65 41.5 +59.4 169.0	64 42.6 +59.5 169.4	63 43.6 +59.5 169.8	26
27	71 33.6 +58.8 165.8	70 35.4 +58.9 166.5	69 37.0 +59.0 167.1	68 38.4 +59.2 167.7	67 39.7 +59.3 168.2	66 40.9 +59.4 168.7	65 42.1 +59.4 169.1	64 43.1 +59.5 169.5	27
28	72 32.4 +58.7 165.1	71 34.3 +58.9 165.9	70 36.0 +59.0 166.6	69 37.6 +59.1 167.2	68 39.0 +59.2 167.8	67 40.3 +59.3 168.3	66 41.5 +59.4 168.8	65 42.6 +59.4 169.2	28
29	73 31.1 +58.5 164.4	72 33.2 +58.7 165.3	71 35.0 +58.9 166.0	70 36.7 +59.0 166.7	69 38.2 +59.1 167.3	68 39.6 +59.3 167.9	67 40.9 +59.4 168.4	66 42.1 +59.4 168.9	29
30	74 29.6 +58.2 163.6	73 31.9 +58.5 164.6	72 33.9 +58.7 165.4	71 35.7 +58.9 166.2	70 37.4 +59.0 166.9	69 38.9 +59.2 167.5	68 40.3 +59.2 168.0	67 41.5 +59.4 168.5	30
31	75 27.8 +58.1 162.7	74 30.4 +58.3 163.8	73 32.6 +58.6 164.7	72 34.6 +58.8 165.6	71 36.4 +59.0 166.3	70 38.1 +59.1 167.0	69 39.5 +59.2 167.6	68 40.9 +59.3 168.1	31
32	76 25.9 +57.7 161.6	75 28.7 +58.1 162.9	74 31.2 +58.4 163.9	73 33.4 +58.7 164.9	72 35.4 +58.8 165.7	71 37.2 +58.9 166.4	70 38.7 +59.2 167.1	69 40.2 +59.2 167.7	32
33	77 23.6 +57.3 160.4	76 26.8 +57.8 161.8	75 29.6 +58.2 163.0	74 32.1 +58.4 164.1	73 34.2 +58.7 165.0	72 36.1 +58.9 165.8	71 37.9 +59.0 166.6	70 39.4 +59.2 167.3	33
34	78 20.9 +56.9 159.0	77 24.6 +57.5 160.6	76 27.8 +57.9 162.0	75 30.5 +58.2 163.2	74 32.9 +58.5 164.3	73 35.0 +58.8 165.2	72 36.9 +58.9 166.0	71 38.6 +59.1 166.7	34
35	79 17.8 +56.3 157.4	78 22.1 +56.9 159.3	77 25.7 +57.5 160.9	76 28.7 +58.0 162.2	75 31.4 +58.3 163.4	74 33.8 +58.5 164.4	73 35.8 +58.8 165.4	72 37.7 +58.9 166.2	35
36	80 14.1 +55.5 155.4	79 19.0 +56.4 157.6	78 23.2 +57.1 159.5	77 26.7 +57.6 161.1	76 29.7 +58.0 162.4	75 32.3 +58.4 163.6	74 34.6 +58.6 164.6	73 36.6 +58.9 165.5	36
37	81 09.6 +54.3 153.1	80 15.4 +55.6 155.7	79 20.3 +56.5 157.9	78 24.3 +57.2 159.7	77 27.7 +57.7 161.3	76 30.7 +58.1 162.6	75 33.2 +58.5 163.8	74 35.5 +58.7 164.8	37
38	82 03.9 +52.9 150.2	81 11.0 +54.6 153.4	80 16.8 +55.7 156.0	79 21.5 +56.6 158.2	78 25.4 +57.3 160.0	77 28.8 +57.8 161.5	76 31.7 +58.1 162.9	75 34.2 +58.4 164.0	38
39	82 56.8 +50.6•146.5	82 05.6 +53.0 150.5	81 12.5 +54.7 153.7	80 18.1 +55.9 156.3	79 22.7 +56.8 158.4	78 26.6 +57.4 160.2	77 29.8 +57.9 161.8	76 32.6 +58.3 163.1	39
40	83 47.4 +47.6•141.9	82 58.6 +51.0•146.9	82 07.2 +53.3 150.9	81 14.0 +54.9 154.0	80 19.5 +56.0 156.6	79 24.0 +56.8 158.7	78 27.7 +57.5 160.5	77 30.9 +58.0 162.0	40
41	84 35.0 +42.7•135.8	83 49.4 +47.8•142.3	83 00.5 +51.2•147.3	82 08.9 +53.5 151.2	81 15.5 +55.1 154.4	80 20.8 +56.2 156.9	79 25.2 +57.0 159.0	78 28.9 +57.6 160.8	41
42	85 17.7 +35.4•127.9	84 37.4 +43.1•136.3	83 51.7 +48.1•142.7	83 02.4 +51.4•147.7	82 10.6 +53.7 151.6	81 17.0 +55.2 154.7	80 22.2 +56.3 157.2	79 26.5 +57.1 159.3	42
43	85 53.1 +24.7•117.3	85 20.5 +35.8•128.3	84 39.8 +43.5•136.7	83 53.8 +48.5•143.2	83 04.3 +51.7•148.1	82 12.2 +53.9 152.0	81 18.5 +55.5 155.1	80 23.6 +56.4 157.5	43
44	86 17.8 +10.1•103.9	85 56.3 +25.1•117.7	85 23.3 +36.3•128.8	84 42.3 +43.9•137.2	83 56.0 +48.8•143.6	83 06.1 +52.0•148.5	82 13.9 +54.1 152.4	81 20.0 +55.6 155.4	44
45	86 27.9 −6.5• 88.2	86 21.4 +10.2•104.1	85 59.6 +25.4•118.1	85 26.2 +36.7•129.2	84 44.8 +44.2•137.7	83 58.1 +49.2•144.1	83 08.0 +52.3•149.0	82 15.6 +54.3 152.8	45
46	86 21.4 −21.8• 72.3	86 31.6 −6.6• 88.2	86 25.0 +10.4•104.4	86 02.9 +25.8•118.5	85 29.0 +37.2•129.7	84 47.3 +44.6•138.2	84 00.3 +49.5•144.6	83 09.9 +52.6•149.4	46
47	85 59.6 −33.4• 58.3	86 25.0 −22.1• 72.0	86 35.4 −6.7• 88.2	86 28.7 +10.6•104.6	86 06.2 +26.1•119.0	85 31.9 +37.7•130.3	84 49.8 +45.1•138.7	84 02.5 +49.9•145.1	47
48	85 26.2 −41.4• 47.1	86 02.9 −33.9• 57.8	86 28.7 −22.5• 71.7	86 39.3 −6.9• 88.1	86 32.4 +10.8•104.9	86 09.6 +26.6•119.5	85 34.9 +38.0•130.8	84 52.3 +45.5•139.3	48
49	84 44.8 −46.7• 38.6	85 29.0 −41.7• 46.6	86 06.2 −34.3• 57.3	86 32.4 −22.8• 71.3	86 43.2 −7.0• 88.1	86 36.2 +11.0•105.2	86 12.9 +27.1•120.0	85 37.8 +38.6•131.4	49
50	83 58.1 −50.1• 32.2	84 47.3 −47.0• 38.1	85 31.9 −42.1• 46.0	86 09.6 −34.7• 56.8	86 36.2 −23.3• 71.0	86 47.2 −7.2• 88.1	86 40.0 +11.2•105.5	86 16.4 +27.5•120.5	50
51	83 08.0 −52.4• 27.3	84 00.3 −50.4• 31.7	84 49.8 −47.3• 37.5	85 34.9 −42.6• 45.4	86 12.9 −35.1• 56.2	86 40.0 −23.6• 70.6	86 51.2 −7.3• 88.1	86 43.9 +11.4•105.8	51
52	82 15.6 −54.1 23.5	83 09.9 −52.6 26.8	84 02.5 −50.7• 31.1	84 52.3 −47.7• 36.9	85 37.8 −43.0• 44.8	86 16.4 −35.7• 55.6	86 43.9 −24.1• 70.2	86 55.3 −7.5• 88.0	52
53	81 21.5 −55.2 20.4	82 17.3 −54.3 23.0	83 11.8 −52.8 26.3	84 04.6 −50.9• 30.6	84 54.8 −48.0• 36.5	85 40.8 −43.4• 44.1	86 20.2 −36.1• 55.0	86 47.8 −24.5• 69.8	53
54	80 26.3 −56.1 18.0	81 23.0 −55.4 20.0	82 19.0 −54.5 22.5	83 13.7 −53.1 25.8	84 06.8 −51.2• 30.0	84 57.3 −48.3• 35.6	85 43.7 −43.9• 43.5	86 23.3 −36.6• 54.4	54
55	79 30.2 −56.8 15.9	80 27.6 −56.2 17.6	81 24.5 −55.5 19.6	82 20.6 −54.6 22.0	83 15.6 −53.3 25.2	84 09.0 −51.5• 29.4	84 59.8 −48.7• 35.0	85 46.7 −44.4• 42.8	55
56	78 33.4 −57.2 14.2	79 31.4 −56.6 15.5	80 29.0 −56.4 17.1	81 26.0 −55.7 19.1	82 22.3 −54.8 21.5	83 17.5 −53.5 24.7	84 11.1 −51.7• 28.8	85 02.3 −49.0• 34.3	56
57	77 36.2 −57.7 12.8	78 34.5 −57.3 13.9	79 32.6 −56.9 15.2	80 30.3 −56.4 16.7	81 27.5 −55.6 18.6	82 24.0 −55.0 21.0	83 19.4 −53.8 24.1	84 13.3 −52.1• 28.1	57
58	76 38.5 −58.0 11.5	77 37.2 −57.7 12.4	78 35.7 −57.5 13.5	79 33.9 −57.1 14.8	80 31.7 −56.6 16.3	81 29.0 −56.0 18.2	82 25.6 −55.2 20.5	83 21.2 −54.0 23.5	58
59	75 40.5 −58.2 10.5	76 39.5 −57.9 11.2	77 38.2 −57.8 12.1	78 36.8 −57.5 13.1	79 35.1 −57.2 14.4	80 33.0 −56.7 15.9	81 30.4 −56.1 17.7	82 27.2 −55.3 20.0	59
60	74 42.3 −58.4 9.5	75 41.4 −58.3 10.2	76 40.4 −58.1 10.9	77 39.2 −57.8 11.8	78 37.9 −57.6 12.8	79 36.3 −57.3 14.0	80 34.3 −56.9 15.4	81 31.9 −56.3 17.2	60
61	73 43.9 −58.6 8.7	74 43.1 −58.5 9.2	75 42.3 −58.3 9.9	76 41.4 −58.2 10.6	77 40.3 −58.0 11.4	78 39.0 −57.7 12.4	79 37.4 −57.4 13.6	80 35.6 −57.0 15.0	61
62	72 45.3 −58.8 7.9	73 44.6 −58.6 8.4	74 43.9 −58.6 8.9	75 43.2 −58.4 9.5	76 42.3 −58.3 10.2	77 41.3 −58.1 11.1	78 40.0 −57.8 12.0	79 38.6 −57.9 13.2	62
63	71 46.5 −58.9 7.3	72 46.0 −58.8 7.7	73 45.4 −58.7 8.1	74 44.8 −58.6 8.6	75 44.0 −58.5 9.2	76 43.2 −58.3 9.9	77 42.2 −58.1 10.7	78 41.1 −57.9 11.6	63
64	70 47.6 −59.0 6.7	71 47.2 −58.9 7.0	72 46.7 −58.8 7.4	73 46.2 −58.7 7.9	74 45.6 −58.7 8.4	75 44.9 −58.5 8.9	76 44.1 −58.4 9.6	77 43.2 −58.2 10.3	64
65	69 48.6 −59.1 6.1	70 48.3 −59.1 6.4	71 47.9 −59.0 6.8	72 47.4 −58.9 7.2	73 46.9 −58.8 7.6	74 46.4 −58.7 8.1	75 45.7 −58.5 8.6	76 45.0 −58.4 9.2	65
66	68 49.5 −59.1 5.6	69 49.2 −59.1 5.9	70 48.9 −59.1 6.2	71 48.5 −59.0 6.5	72 48.1 −58.9 6.9	73 47.7 −58.9 7.3	74 47.2 −58.8 7.8	75 46.6 −58.7 8.3	66
67	67 50.4 −59.2 5.2	68 50.1 −59.2 5.4	69 49.8 −59.1 5.7	70 49.5 −59.1 6.0	71 49.2 −59.0 6.3	72 48.8 −58.9 6.6	73 48.4 −58.9 7.0	74 47.9 −58.8 7.5	67
68	66 51.2 −59.3 4.8	67 50.9 −59.2 5.0	68 50.7 −59.2 5.2	69 50.4 −59.1 5.4	70 50.2 −59.2 5.7	71 49.9 −59.1 6.0	72 49.5 −59.0 6.3	73 49.1 −58.9 6.7	68
69	65 51.9 −59.4 4.4	66 51.7 −59.3 4.6	67 51.5 −59.3 4.8	68 51.3 −59.3 5.0	69 51.0 −59.2 5.2	70 50.8 −59.2 5.5	71 50.5 −59.1 5.8	72 50.2 −59.1 6.1	69
70	64 52.5 −59.4 4.0	65 52.4 −59.4 4.2	66 52.2 −59.3 4.4	67 52.0 −59.3 4.5	68 51.8 −59.2 4.7	69 51.6 −59.2 5.0	70 51.4 −59.2 5.2	71 51.1 −59.1 5.5	70
71	63 53.1 −59.4 3.7	64 53.0 −59.4 3.8	65 52.9 −59.4 4.0	66 52.7 −59.3 4.1	67 52.6 −59.4 4.3	68 52.4 −59.3 4.5	69 52.2 −59.3 4.7	70 52.0 −59.3 5.0	71
72	62 53.7 −59.5 3.4	63 53.6 −59.4 3.5	64 53.5 −59.4 3.6	65 53.4 −59.4 3.8	66 53.2 −59.4 3.9	67 53.1 −59.4 4.1	68 52.9 −59.3 4.3	69 52.7 −59.3 4.5	72
73	61 54.2 −59.5 3.1	62 54.2 −59.5 3.2	63 54.1 −59.5 3.3	64 54.0 −59.5 3.4	65 53.8 −59.4 3.6	66 53.7 −59.4 3.7	67 53.6 −59.4 3.9	68 53.4 −59.3 4.1	73
74	60 54.7 −59.5 2.8	61 54.7 −59.5 2.9	62 54.6 −59.5 3.0	63 54.5 −59.5 3.1	64 54.4 −59.5 3.2	65 54.3 −59.4 3.4	66 54.2 −59.4 3.5	67 54.1 −59.4 3.7	74
75	59 55.2 −59.6 2.6	60 55.2 −59.6 2.7	61 55.1 −59.5 2.7	62 55.1 −59.6 2.8	63 55.0 −59.5 2.9	64 54.9 −59.5 3.0	65 54.8 −59.5 3.2	66 54.7 −59.5 3.3	75
76	58 55.7 −59.6 2.3	59 55.6 −59.6 2.4	60 55.6 −59.6 2.5	61 55.5 −59.6 2.6	62 55.4 −59.5 2.7	63 55.4 −59.6 2.7	64 55.3 −59.5 2.9	65 55.2 −59.5 3.0	76
77	57 56.1 −59.6 2.1	58 56.0 −59.6 2.2	59 56.0 −59.5 2.2	60 55.9 −59.5 2.3	61 55.9 −59.6 2.4	62 55.8 −59.5 2.5	63 55.8 −59.6 2.6	64 55.7 −59.5 2.7	77
78	56 56.5 −59.7 1.9	57 56.4 −59.6 2.0	58 56.4 −59.6 2.0	59 56.4 −59.7 2.1	60 56.3 −59.6 2.1	61 56.3 −59.6 2.2	62 56.2 −59.6 2.3	63 56.2 −59.6 2.4	78
79	55 56.8 −59.6 1.7	56 56.8 −59.6 1.7	57 56.8 −59.6 1.8	58 56.8 −59.7 1.8	59 56.7 −59.6 1.9	60 56.7 −59.6 2.0	61 56.7 −59.6 2.0	62 56.6 −59.6 2.1	79
80	54 57.2 −59.7 1.5	55 57.2 −59.7 1.5	56 57.2 −59.7 1.6	57 57.1 −59.6 1.6	58 57.1 −59.6 1.7	59 57.1 −59.7 1.7	60 57.1 −59.7 1.8	61 57.0 −59.6 1.8	80
81	53 57.5 −59.7 1.3	54 57.5 −59.7 1.4	55 57.5 −59.7 1.4	56 57.5 −59.7 1.4	57 57.5 −59.7 1.5	58 57.4 −59.6 1.5	59 57.4 −59.7 1.6	60 57.4 −59.7 1.6	81
82	52 57.9 −59.7 1.2	53 57.8 −59.6 1.2	54 57.8 −59.6 1.2	55 57.8 −59.7 1.2	56 57.8 −59.7 1.3	57 57.8 −59.7 1.3	58 57.8 −59.7 1.3	59 57.8 −59.7 1.4	82
83	51 58.2 −59.7 1.0	52 58.2 −59.7 1.0	53 58.2 −59.7 1.0	54 58.1 −59.7 1.1	55 58.1 −59.7 1.1	56 58.1 −59.7 1.1	57 58.1 −59.7 1.1	58 58.1 −59.7 1.2	83
84	50 58.5 −59.7 0.8	51 58.5 −59.7 0.8	52 58.5 −59.7 0.9	53 58.4 −59.7 0.9	54 58.4 −59.7 0.9	55 58.4 −59.7 0.9	56 58.4 −59.7 1.0	57 58.4 −59.7 1.0	84
85	49 58.7 −59.7 0.7	50 58.7 −59.7 0.7	51 58.7 −59.7 0.7	52 58.7 −59.7 0.7	53 58.7 −59.7 0.7	54 58.7 −59.7 0.8	55 58.7 −59.7 0.8	56 58.7 −59.7 0.8	85
86	48 59.0 −59.7 0.5	49 59.0 −59.7 0.5	50 59.0 −59.7 0.6	51 59.0 −59.7 0.6	52 59.0 −59.7 0.6	53 59.0 −59.7 0.6	54 59.0 −59.7 0.6	55 59.0 −59.7 0.6	86
87	47 59.3 −59.7 0.4	48 59.3 −59.7 0.4	49 59.3 −59.8 0.4	50 59.3 −59.8 0.4	51 59.3 −59.8 0.4	52 59.3 −59.8 0.4	53 59.3 −59.7 0.4	54 59.3 −59.7 0.5	87
88	46 59.5 −59.7 0.3	47 59.5 −59.7 0.3	48 59.5 −59.7 0.3	49 59.5 −59.7 0.3	50 59.5 −59.7 0.3	51 59.5 −59.8 0.3	52 59.5 −59.7 0.3	53 59.5 −59.7 0.3	88
89	45 59.8 −59.8 0.1	46 59.8 −59.8 0.1	47 59.8 −59.8 0.1	48 59.8 −59.8 0.1	49 59.8 −59.8 0.1	50 59.8 −59.8 0.1	51 59.8 −59.8 0.1	52 59.8 −59.8 0.1	89
90	45 00.0 −59.8 0.0	46 00.0 −59.8 0.0	47 00.0 −59.8 0.0	48 00.0 −59.8 0.0	49 00.0 −59.8 0.0	50 00.0 −59.8 0.0	51 00.0 −59.8 0.0	52 00.0 −59.8 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

5°, 355° L.H.A. LATITUDE SAME NAME AS DECLINATION

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 46.9	−59.7	172.9	43 47.4	−59.8	173.1	42 47.8	−59.8	173.2	41 48.2	−59.8	173.3	40 48.6	−59.8	173.4	39 49.0	−59.8	173.5	38 49.4	−59.8	173.6	37 49.8	−59.9	173.7	0
1	43 47.2	−59.8	173.1	42 47.6	−59.8	173.2	41 48.0	−59.8	173.3	40 48.4	−59.8	173.4	39 48.8	−59.8	173.5	38 49.2	−59.9	173.6	37 49.6	−59.9	173.7	36 49.9	−59.9	173.8	1
2	42 47.4	−59.8	173.2	41 47.8	−59.8	173.3	40 48.2	−59.8	173.4	39 48.6	−59.8	173.5	38 49.0	−59.8	173.6	37 49.3	−59.8	173.7	36 49.7	−59.9	173.8	35 50.1	−59.9	173.8	2
3	41 47.6	−59.8	173.3	40 48.0	−59.8	173.4	39 48.4	−59.9	173.6	38 48.8	−59.8	173.6	37 49.1	−59.8	173.7	36 49.5	−59.8	173.8	35 49.8	−59.8	173.8	34 50.2	−59.9	173.9	3
4	40 47.8	−59.8	173.4	39 48.2	−59.8	173.5	38 48.6	−59.9	173.6	37 48.9	−59.8	173.7	36 49.3	−59.8	173.8	35 49.6	−59.8	173.8	34 50.0	−59.9	173.9	33 50.3	−59.9	174.0	4
5	39 48.0	−59.8	173.5	38 48.4	−59.8	173.6	37 48.7	−59.8	173.7	36 49.1	−59.8	173.8	35 49.4	−59.8	173.9	34 49.8	−59.8	173.9	33 50.1	−59.8	174.0	32 50.4	−59.9	174.1	5
6	38 48.2	−59.8	173.6	37 48.5	−59.8	173.7	36 48.9	−59.8	173.8	35 49.3	−59.9	173.9	34 49.6	−59.8	173.9	33 49.9	−59.8	174.0	32 50.2	−59.8	174.1	31 50.6	−59.9	174.1	6
7	37 48.4	−59.9	173.7	36 48.7	−59.8	173.8	35 49.1	−59.9	173.9	34 49.4	−59.8	174.0	33 49.7	−59.8	174.0	32 50.1	−59.9	174.1	31 50.4	−59.9	174.2	30 50.7	−59.9	174.2	7
8	36 48.5	−59.8	173.8	35 48.9	−59.8	173.9	34 49.2	−59.8	174.0	33 49.6	−59.8	174.0	32 49.9	−59.9	174.1	31 50.2	−59.8	174.2	30 50.5	−59.9	174.2	29 50.8	−59.9	174.3	8
9	35 48.7	−59.8	173.9	34 49.1	−59.9	174.0	33 49.4	−59.9	174.1	32 49.7	−59.8	174.1	31 50.0	−59.8	174.2	30 50.3	−59.9	174.2	29 50.6	−59.9	174.3	28 50.9	−59.9	174.4	9
10	34 48.9	−59.8	174.0	33 49.2	−59.8	174.1	32 49.5	−59.8	174.1	31 49.8	−59.8	174.2	30 50.1	−59.8	174.3	29 50.4	−59.8	174.3	28 50.7	−59.9	174.4	27 51.0	−59.9	174.4	10
11	33 49.1	−59.8	174.1	32 49.4	−59.8	174.2	31 49.7	−59.9	174.2	30 50.0	−59.8	174.3	29 50.3	−59.9	174.3	28 50.6	−59.9	174.4	27 50.9	−59.9	174.4	26 51.1	−59.9	174.5	11
12	32 49.2	−59.8	174.2	31 49.5	−59.8	174.2	30 49.8	−59.8	174.3	29 50.1	−59.8	174.4	28 50.4	−59.9	174.4	27 50.7	−59.9	174.5	26 51.0	−59.9	174.5	25 51.2	−59.9	174.6	12
13	31 49.4	−59.8	174.3	30 49.7	−59.8	174.3	29 50.0	−59.9	174.4	28 50.3	−59.9	174.4	27 50.5	−59.8	174.5	26 50.8	−59.9	174.5	25 51.1	−59.9	174.6	24 51.3	−59.9	174.6	13
14	30 49.5	−59.8	174.3	29 49.8	−59.9	174.4	28 50.1	−59.8	174.5	27 50.4	−59.9	174.5	26 50.7	−59.9	174.6	25 50.9	−59.9	174.6	24 51.2	−59.9	174.7	23 51.5	−59.9	174.7	14
15	29 49.7	−59.8	174.4	28 50.0	−59.9	174.5	27 50.2	−59.8	174.5	26 50.5	−59.8	174.6	25 50.8	−59.9	174.6	24 51.0	−59.8	174.7	23 51.3	−59.9	174.7	22 51.6	−59.9	174.8	15
16	28 49.8	−59.8	174.5	27 50.1	−59.8	174.6	26 50.4	−59.8	174.7	25 50.6	−59.8	174.7	24 50.9	−59.9	174.7	23 51.2	−59.9	174.7	22 51.4	−59.9	174.8	21 51.7	−59.9	174.8	16
17	27 50.0	−59.8	174.6	26 50.3	−59.8	174.6	25 50.5	−59.8	174.7	24 50.8	−59.8	174.7	23 51.0	−59.8	174.8	22 51.3	−59.9	174.8	21 51.5	−59.9	174.8	20 51.8	−59.9	174.9	17
18	26 50.1	−59.8	174.7	25 50.4	−59.8	174.7	24 50.6	−59.8	174.8	23 50.9	−59.8	174.8	22 51.1	−59.8	174.8	21 51.4	−59.9	174.9	20 51.6	−59.9	174.9	19 51.9	−60.0	174.9	18
19	25 50.3	−59.8	174.7	24 50.5	−59.8	174.8	23 50.8	−59.8	174.8	22 51.0	−59.9	174.8	21 51.3	−59.9	174.9	20 51.5	−59.9	174.9	19 51.7	−59.9	175.0	18 51.9	−59.9	175.0	19
20	24 50.4	−59.8	174.8	23 50.7	−59.9	174.9	22 50.9	−59.9	174.9	21 51.1	−59.8	174.9	20 51.4	−59.9	175.0	19 51.6	−59.9	175.0	18 51.8	−59.9	175.0	17 52.0	−59.9	175.1	20
21	23 50.6	−59.9	174.9	22 50.8	−59.8	174.9	21 51.0	−59.9	175.0	20 51.3	−59.9	175.0	19 51.5	−59.9	175.0	18 51.7	−59.9	175.1	17 51.9	−59.9	175.1	16 52.1	−59.9	175.1	21
22	22 50.7	−59.9	175.0	21 50.9	−59.8	175.0	20 51.1	−59.8	175.0	19 51.4	−59.9	175.1	18 51.6	−59.9	175.1	17 51.8	−59.9	175.1	16 52.0	−59.9	175.2	15 52.2	−59.9	175.2	22
23	21 50.8	−59.8	175.0	20 51.0	−59.8	175.1	19 51.3	−59.9	175.1	18 51.5	−59.9	175.1	17 51.7	−59.9	175.2	16 51.9	−59.9	175.2	15 52.1	−59.9	175.2	14 52.3	−59.9	175.3	23
24	20 51.0	−59.9	175.1	19 51.2	−59.9	175.1	18 51.4	−59.9	175.2	17 51.6	−59.9	175.2	16 51.8	−59.9	175.2	15 52.0	−59.9	175.3	14 52.2	−59.9	175.3	13 52.4	−59.9	175.3	24
25	19 51.1	−59.9	175.2	18 51.3	−59.9	175.2	17 51.5	−59.9	175.3	16 51.7	−59.9	175.3	15 51.9	−59.9	175.3	14 52.1	−59.9	175.3	13 52.3	−59.9	175.3	12 52.5	−59.9	175.4	25
26	18 51.2	−59.9	175.3	17 51.4	−59.9	175.3	16 51.6	−59.9	175.3	15 51.8	−59.9	175.3	14 52.0	−59.9	175.4	13 52.2	−59.9	175.4	12 52.4	−59.9	175.4	11 52.6	−59.9	175.4	26
27	17 51.3	−59.8	175.3	16 51.5	−59.8	175.3	15 51.7	−59.9	175.4	14 51.9	−59.9	175.4	13 52.1	−59.9	175.4	12 52.3	−59.9	175.4	11 52.5	−59.9	175.4	10 52.7	−59.9	175.5	27
28	16 51.5	−59.9	175.4	15 51.7	−59.9	175.4	14 51.8	−59.8	175.4	13 52.0	−59.9	175.5	12 52.2	−59.9	175.5	11 52.4	−59.9	175.5	10 52.6	−59.9	175.5	9 52.8	−59.9	175.5	28
29	15 51.6	−59.9	175.5	14 51.8	−59.9	175.5	13 52.0	−59.9	175.5	12 52.1	−59.8	175.5	11 52.3	−59.9	175.5	10 52.5	−59.9	175.5	9 52.7	−59.9	175.6	8 52.9	−59.9	175.6	29
30	14 51.7	−59.9	175.5	13 51.9	−59.9	175.5	12 52.1	−59.9	175.6	11 52.3	−59.9	175.6	10 52.4	−59.9	175.6	9 52.6	−59.9	175.6	8 52.8	−59.9	175.6	7 53.0	−60.0	175.6	30
31	13 51.8	−59.9	175.6	12 52.0	−59.9	175.6	11 52.2	−59.9	175.6	10 52.4	−59.9	175.6	9 52.5	−59.9	175.7	8 52.7	−59.9	175.7	7 52.9	−59.9	175.7	6 53.0	−59.9	175.7	31
32	12 52.0	−59.9	175.7	11 52.1	−59.8	175.7	10 52.3	−59.9	175.7	9 52.5	−59.9	175.7	8 52.6	−59.9	175.7	7 52.8	−59.9	175.7	6 53.0	−59.9	175.7	5 53.1	−59.9	175.7	32
33	11 52.1	−59.9	175.7	10 52.2	−59.8	175.7	9 52.4	−59.9	175.7	8 52.6	−59.9	175.8	7 52.7	−59.9	175.8	6 52.9	−59.9	175.8	5 53.1	−60.0	175.8	4 53.2	−59.9	175.8	33
34	10 52.2	−59.9	175.8	9 52.4	−59.9	175.8	8 52.5	−59.9	175.8	7 52.7	−59.9	175.8	6 52.8	−59.9	175.8	5 53.0	−59.9	175.8	4 53.1	−59.9	175.8	3 53.3	−59.9	175.9	34
35	9 52.3	−59.9	175.8	8 52.5	−59.9	175.9	7 52.6	−59.9	175.9	6 52.8	−59.9	175.9	5 52.9	−59.9	175.9	4 53.1	−59.9	175.9	3 53.2	−59.9	175.9	2 53.4	−59.9	175.9	35
36	8 52.4	−59.9	175.9	7 52.6	−59.9	175.9	6 52.7	−59.9	175.9	5 52.9	−59.9	175.9	4 53.0	−59.9	175.9	3 53.2	−59.9	175.9	2 53.3	−59.9	176.0	1 53.5	−59.9	176.0	36
37	7 52.5	−59.8	176.0	6 52.7	−59.9	176.0	5 52.8	−59.9	176.0	4 53.0	−59.9	176.0	3 53.1	−59.9	176.0	2 53.3	−59.9	176.0	1 53.4	−59.9	176.0	0 53.6	−59.9	176.0	37
38	6 52.7	−59.9	176.0	5 52.8	−59.9	176.0	4 52.9	−59.8	176.0	3 53.1	−59.9	176.1	2 53.2	−59.9	176.1	1 53.4	−59.9	176.1	0 53.5	−59.9	176.1	0 06.3	+60.0	3.9	38
39	5 52.8	−59.9	176.1	4 52.9	−59.9	176.1	3 53.1	−59.9	176.1	2 53.2	−59.9	176.1	1 53.3	−59.9	176.1	0 53.5	−59.9	176.1	0 06.4	+59.9	3.9	1 06.3	+59.9	3.9	39
40	4 52.9	−59.9	176.2	3 53.0	−59.9	176.2	2 53.2	−59.9	176.2	1 53.3	−59.9	176.2	0 53.4	−59.9	176.2	0 06.4	+59.9	3.8	1 06.3	+60.0	3.8	2 06.2	+59.9	3.8	40
41	3 53.0	−59.9	176.2	2 53.1	−59.9	176.2	1 53.2	−59.9	176.2	0 53.4	−59.9	176.2	0 06.5	+59.9	3.8	1 06.3	+60.0	3.8	2 06.2	+59.9	3.8	3 06.1	+59.9	3.8	41
42	2 53.1	−59.9	176.3	1 53.2	−59.9	176.3	0 53.4	−59.9	176.3	0 06.5	+59.9	3.7	1 06.4	+59.9	3.7	2 06.3	+59.9	3.7	3 06.1	+59.9	3.7	4 06.0	+59.9	3.7	42
43	1 53.2	−59.9	176.3	0 53.4	−59.9	176.3	0 06.5	+59.9	3.7	1 06.4	+59.9	3.7	2 06.3	+59.9	3.7	3 06.2	+59.9	3.7	4 06.0	+59.9	3.7	5 05.9	+59.9	3.7	43
44	0 53.3	−59.9	176.4	0 06.5	+59.9	3.6	1 06.4	+59.9	3.6	2 06.3	+59.9	3.6	3 06.2	+59.9	3.6	4 06.1	+59.9	3.6	5 05.9	+60.0	3.6	6 05.8	+59.9	3.6	44
45	0 06.5	+59.9	3.5	1 06.4	+59.9	3.5	2 06.3	+59.9	3.5	3 06.2	+59.9	3.5	4 06.1	+59.9	3.5	5 06.0	+59.9	3.5	6 05.9	+59.9	3.6	7 05.7	+60.0	3.6	45
46	1 06.4	+59.9	3.5	2 06.3	+59.9	3.5	3 06.2	+59.9	3.5	4 06.1	+59.9	3.5	5 06.0	+59.9	3.5	6 05.9	+59.9	3.5	7 05.8	+59.9	3.5	8 05.7	+59.9	3.5	46
47	2 06.3	+59.9	3.4	3 06.2	+59.9	3.4	4 06.1	+59.9	3.4	5 06.0	+59.9	3.4	6 05.9	+59.9	3.4	7 05.8	+59.9	3.4	8 05.7	+59.9	3.4	9 05.6	+59.9	3.5	47
48	3 06.2	+59.9	3.3	4 06.1	+59.9	3.4	5 06.0	+59.9	3.4	6 05.9	+59.9	3.4	7 05.8	+59.9	3.4	8 05.7	+59.9	3.4	9 05.6	+59.9	3.4	10 05.5	+59.9	3.4	48
49	4 06.1	+59.9	3.3	5 06.0	+59.9	3.3	6 05.9	+59.9	3.3	7 05.8	+59.9	3.3	8 05.7	+59.9	3.3	9 05.6	+59.9	3.3	10 05.5	+59.9	3.3	11 05.4	+59.9	3.3	49
50	5 06.0	+59.9	3.2	6 05.9	+59.8	3.2	7 05.8	+59.9	3.2	8 05.7	+59.9	3.2	9 05.6	+59.9	3.3	10 05.5	+59.9	3.3	11 05.4	+59.9	3.3	12 05.3	+59.9	3.3	50
51	6 05.9	+59.8	3.2	7 05.8	+59.9	3.2	8 05.7	+59.9	3.2	9 05.6	+59.9	3.2	10 05.5	+59.9	3.2	11 05.4	+59.9	3.2	12 05.3	+59.9	3.2	13 05.2	+59.9	3.2	51
52	7 05.7	+59.9	3.1	8 05.7	+59.8	3.1	9 05.6	+59.9	3.1	10 05.5	+59.9	3.1	11 05.4	+59.9	3.1	12 05.3	+59.9	3.1	13 05.2	+59.9	3.2	14 05.1	+59.9	3.2	52
53	8 05.6	+59.9	3.0	9 05.5	+59.9	3.0	10 05.5	+59.8	3.1	11 05.4	+59.9	3.1	12 05.3	+59.9	3.1	13 05.2	+59.9	3.1	14 05.1	+59.9	3.1	15 05.0	+59.9	3.1	53
54	9 05.5	+59.9	3.0	10 05.4	+59.9	3.0	11 05.3	+59.9	3.0	12 05.3	+59.9	3.0	13 05.2	+59.9	3.0	14 05.1	+59.9	3.0	15 05.0	+59.9	3.0	16 04.9	+59.9	3.1	54
55	10 05.4	+59.9	2.9	11 05.3	+59.9	2.9	12 05.2	+59.9	2.9	13 05.2	+59.8	2.9	14 05.1	+59.9	3.0	15 05.0	+59.9	3.0	16 04.9	+59.9	3.0	17 04.8	+59.9	3.0	55
56	11 05.3	+59.9	2.8	12 05.2	+59.9	2.9	13 05.1	+59.9	2.9	14 05.0	+59.9	2.9	15 05.0	+59.9	2.9	16 04.9	+59.9	2.9	17 04.8	+59.9	2.9	18 04.7	+59.9	2.9	56
57	12 05.2	+59.8	2.8	13 05.1	+59.9	2.8	14 05.0	+59.9	2.8	15 04.9	+59.9	2.8	16 04.9	+59.9	2.8	17 04.8	+59.9	2.8	18 04.7	+59.9	2.9	19 04.6	+59.9	2.9	57
58	13 05.0	+59.9	2.7	14 05.0	+59.8	2.7	15 04.9	+59.9	2.7	16 04.8	+59.9	2.8	17 04.8	+59.8	2.8	18 04.7	+59.9	2.8	19 04.6	+59.9	2.8	20 04.5	+59.9	2.8	58
59	14 04.9	+59.9	2.7	15 04.8	+59.9	2.7	16 04.8	+59.9	2.7	17 04.7	+59.9	2.7	18 04.6	+59.9	2.7	19 04.6	+59.9	2.7	20 04.5	+59.9	2.7	21 04.4	+59.9	2.8	59
60	15 04.8	+59.9	2.6	16 04.7	+59.9	2.6	17 04.7	+59.8	2.6	18 04.6	+59.9	2.6	19 04.5	+59.9	2.6	20 04.5	+59.9	2.7	21 04.4	+59.9	2.7	22 04.3	+59.9	2.7	60
61	16 04.7	+59.9	2.5	17 04.6	+59.9	2.5	18 04.5	+59.9	2.5	19 04.5	+59.9	2.6	20 04.4	+59.9	2.6	21 04.4	+59.9	2.6	22 04.3	+59.9	2.6	23 04.2	+59.9	2.6	61
62	17 04.5	+59.9	2.5	18 04.5	+59.9	2.5	19 04.4	+59.9	2.5	20 04.4	+59.9	2.5	21 04.3	+59.9	2.5	22 04.3	+59.8	2.5	23 04.2	+59.9	2.5	24 04.1	+59.9	2.6	62
63	18 04.4	+59.9	2.4	19 04.4	+59.9	2.4	20 04.3	+59.9	2.4	21 04.3	+59.9	2.4	22 04.2	+59.9	2.4	23 04.1	+59.9	2.5	24 04.1	+59.9	2.5	25 04.0	+59.9	2.5	63
64	19 04.3	+59.9	2.3	20 04.2	+59.9	2.3	21 04.2	+59.9	2.3	22 04.1	+59.9	2.4	23 04.1	+59.9	2.4	24 04.0	+59.9	2.4	25 04.0	+59.9	2.4	26 03.9	+59.9	2.4	64
65	20 04.2	+59.8	2.2	21 04.1	+59.9	2.3	22 04.1	+59.9	2.3	23 04.0	+59.9	2.3	24 04.0	+59.9	2.3	25 03.9	+59.9	2.3	26 03.9	+59.9	2.4	27 03.8	+59.9	2.4	65
66	21 04.0	+59.9	2.2	22 04.0	+59.9	2.2	23 03.9	+59.9	2.2	24 03.9	+59.9	2.2	25 03.9	+59.9	2.2	26 03.8	+59.9	2.3	27 03.8	+59.9	2.3	28 03.7	+59.9	2.3	66
67	22 03.9	+59.9	2.1	23 03.9	+59.8	2.1	24 03.8	+59.9	2.1	25 03.8	+59.8	2.2	26 03.7	+59.9	2.2	27 03.7	+59.9	2.2	28 03.6	+59.9	2.2	29 03.6	+59.9	2.2	67
68	23 03.8	+59.9	2.0	24 03.7	+59.9	2.0	25 03.7	+59.8	2.1	26 03.6	+59.9	2.1	27 03.6	+59.9	2.1	28 03.6	+59.8	2.1	29 03.5	+59.9	2.1	30 03.5	+59.9	2.2	68
69	24 03.6	+59.9	2.0	25 03.6	+59.9	2.0	26 03.6	+59.8	2.0	27 03.5	+59.9	2.0	28 03.5	+59.9	2.0	29 03.4	+59.9	2.0	30 03.4	+59.9	2.1	31 03.4	+59.8	2.1	69
70	25 03.5	+59.9	1.9	26 03.5	+59.8	1.9	27 03.4	+59.9	1.9	28 03.4	+59.9	1.9	29 03.4	+59.9	2.0	30 03.3	+59.9	2.0	31 03.3	+59.9	2.0	32 03.2	+59.9	2.0	70
71	26 03.4	+59.8	1.8	27 03.3	+59.9	1.8	28 03.3	+59.9	1.8	29 03.3	+59.8	1.9	30 03.2	+59.9	1.9	31 03.2	+59.9	1.9	32 03.2	+59.9	1.9	33 03.1	+59.9	1.9	71
72	27 03.2	+59.9	1.7	28 03.2	+59.9	1.7	29 03.2	+59.9	1.8	30 03.1	+59.9	1.8	31 03.1	+59.8	1.8	32 03.1	+59.9	1.8	33 03.0	+59.9	1.8	34 03.0	+59.9	1.9	72
73	28 03.1	+59.9	1.7	29 03.0	+59.9	1.7	30 03.0	+59.9	1.7	31 03.0	+59.9	1.7	32 03.0	+59.9	1.7	33 02.9	+59.9	1.7	34 02.9	+59.9	1.8	35 02.9	+59.8	1.8	73
74	29 02.9	+59.9	1.6	30 02.9	+59.9	1.6	31 02.9	+59.9	1.6	32 02.8	+59.9	1.6	33 02.8	+59.9	1.6	34 02.8	+59.9	1.6	35 02.8	+59.9	1.7	36 02.7	+59.9	1.7	74
75	30 02.8	+59.9	1.5	31 02.7	+59.9	1.5	32 02.7	+59.9	1.5	33 02.7	+59.9	1.5	34 02.7	+59.9	1.6	35 02.7	+59.9	1.6	36 02.6	+59.9	1.6	37 02.6	+59.9	1.6	75
76	31 02.6	+59.9	1.4	32 02.6	+59.9	1.4	33 02.6	+59.9	1.4	34 02.6	+59.9	1.5	35 02.5	+59.9	1.5	36 02.5	+59.9	1.5	37 02.5	+59.9	1.5	38 02.5	+59.9	1.5	76
77	32 02.5	+59.9	1.3	33 02.4	+59.9	1.3	34 02.4	+59.9	1.4	35 02.4	+59.9	1.4	36 02.4	+59.8	1.4	37 02.4	+59.9	1.4	38 02.4	+59.9	1.4	39 02.3	+59.9	1.4	77
78	33 02.3	+59.9	1.2	34 02.3	+59.9	1.3	35 02.3	+59.9	1.3	36 02.3	+59.9	1.3	37 02.3	+59.9	1.3	38 02.2	+59.9	1.3	39 02.2	+59.9	1.3	40 02.2	+59.9	1.4	78
79	34 02.1	+59.9	1.1	35 02.1	+59.9	1.2	36 02.1	+59.9	1.2	37 02.1	+59.9	1.2	38 02.1	+59.9	1.2	39 02.1	+59.9	1.2	40 02.1	+59.9	1.2	41 02.0	+59.9	1.3	79
80	35 02.0	+59.8	1.1	36 02.0	+59.8	1.1	37 01.9	+59.9	1.1	38 01.9	+59.9	1.1	39 01.9	+59.9	1.1	40 01.9	+59.8	1.1	41 01.9	+59.8	1.1	42 01.9	+59.8	1.2	80
81	36 01.8	+59.8	1.0	37 01.8	+59.9	1.0	38 01.8	+59.9	1.0	39 01.8	+59.9	1.0	40 01.8	+59.9	1.0	41 01.8	+59.9	1.0	42 01.7	+59.9	1.0	43 01.7	+59.9	1.1	81
82	37 01.6	+59.8	0.9	38 01.6	+59.9	0.9	39 01.6	+59.9	0.9	40 01.6	+59.9	0.9	41 01.6	+59.9	0.9	42 01.6	+59.9	0.9	43 01.6	+59.8	1.0	44 01.6	+59.9	1.0	82
83	38 01.4	+59.8	0.8	39 01.4	+59.9	0.8	40 01.4	+59.8	0.8	41 01.4	+59.8	0.8	42 01.4	+59.9	0.8	43 01.4	+59.8	0.8	44 01.4	+59.9	0.8	45 01.4	+59.8	0.9	83
84	39 01.2	+59.8	0.7	40 01.2	+59.8	0.7	41 01.2	+59.9	0.7	42 01.2	+59.8	0.7	43 01.2	+59.8	0.7	44 01.2	+59.8	0.7	45 01.2	+59.8	0.7	46 01.2	+59.8	0.8	84
85	40 01.1	+59.9	0.6	41 01.0	+59.9	0.6	42 01.0	+59.9	0.6	43 01.0	+59.9	0.6	44 01.0	+59.9	0.6	45 01.0	+59.9	0.6	46 01.0	+59.9	0.6	47 01.0	+59.9	0.6	85
86	41 00.9	+59.8	0.5	42 00.9	+59.8	0.5	43 00.9	+59.7	0.5	44 00.8	+59.9	0.5	45 00.8	+59.9	0.5	46 00.8	+59.9	0.5	47 00.8	+59.9	0.5	48 00.8	+59.9	0.5	86
87	42 00.7	+59.7	0.4	43 00.7	+59.7	0.4	44 00.6	+59.9	0.4	45 00.6	+59.9	0.4	46 00.6	+59.8	0.4	47 00.6	+59.8	0.4	48 00.6	+59.9	0.4	49 00.6	+59.9	0.4	87
88	43 00.4	+59.8	0.2	44 00.4	+59.8	0.2	45 00.4	+59.8	0.2	46 00.4	+59.8	0.3	47 00.4	+59.8	0.3	48 00.4	+59.8	0.3	49 00.4	+59.9	0.3	50 00.4	+59.8	0.3	88
89	44 00.2	+59.8	0.1	45 00.2	+59.8	0.1	46 00.2	+59.8	0.1	47 00.2	+59.8	0.1	48 00.2	+59.8	0.1	49 00.2	+59.8	0.1	50 00.2	+59.8	0.1	51 00.2	+59.8	0.1	89
90	45 00.0	+59.8	0.0	46 00.0	+59.8	0.0	47 00.0	+59.8	0.0	48 00.0	+59.8	0.0	49 00.0	+59.8	0.0	50 00.0	+59.8	0.0	51 00.0	+59.8	0.0	52 00.0	+59.8	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 175°, 185°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 41.2	+59.7	171.5	43 41.9	+59.7	171.7	42 42.5	+59.7	171.8	41 43.1	+59.7	171.9	40 43.7	+59.7	172.1	39 44.2	+59.8	172.2	38 44.8	+59.8	172.3	37 45.3	+59.8	172.4	0
1	45 40.9	+59.6	171.4	44 41.6	+59.6	171.5	43 42.2	+59.7	171.7	42 42.8	+59.7	171.8	41 43.4	+59.8	172.0	40 44.0	+59.8	172.1	39 44.6	+59.7	172.2	38 45.1	+59.8	172.3	1
2	46 40.5	+59.7	171.2	45 41.2	+59.7	171.4	44 41.9	+59.7	171.5	43 42.5	+59.7	171.7	42 43.2	+59.7	171.8	41 43.8	+59.7	172.0	40 44.3	+59.7	172.1	39 44.9	+59.8	172.2	2
3	47 40.2	+59.6	171.1	46 40.9	+59.7	171.2	45 41.6	+59.7	171.4	44 42.2	+59.8	171.6	43 42.9	+59.7	171.7	42 43.5	+59.8	171.8	41 44.1	+59.8	172.0	40 44.7	+59.8	172.1	3
4	48 39.8	+59.6	170.9	47 40.6	+59.6	171.1	46 41.3	+59.6	171.3	45 41.6	+59.7	171.4	44 42.6	+59.7	171.6	43 43.3	+59.7	171.7	42 43.9	+59.7	171.8	41 44.5	+59.7	172.0	4
5	49 39.4	+59.6	170.7	48 40.2	+59.6	170.9	47 40.9	+59.7	171.1	46 41.6	+59.7	171.3	45 42.3	+59.7	171.4	44 43.0	+59.7	171.6	43 43.6	+59.7	171.7	42 44.2	+59.7	171.8	5
6	50 39.0	+59.6	170.6	49 39.8	+59.6	170.8	48 40.6	+59.6	170.9	47 41.3	+59.7	171.1	46 42.0	+59.7	171.3	45 42.7	+59.7	171.4	44 43.4	+59.7	171.6	43 44.0	+59.8	171.7	6
7	51 38.6	+59.5	170.4	50 39.4	+59.6	170.6	49 40.2	+59.7	170.8	48 41.0	+59.7	171.0	47 41.7	+59.7	171.1	46 42.4	+59.7	171.3	45 43.1	+59.7	171.5	44 43.8	+59.7	171.6	7
8	52 38.2	+59.5	170.2	51 39.0	+59.6	170.4	50 39.9	+59.6	170.6	49 40.7	+59.6	170.8	48 41.4	+59.6	171.0	47 42.1	+59.7	171.2	46 42.8	+59.7	171.3	45 43.5	+59.8	171.5	8
9	53 37.7	+59.5	170.0	52 38.6	+59.6	170.2	51 39.5	+59.6	170.4	50 40.3	+59.6	170.6	49 41.1	+59.6	170.8	48 41.8	+59.7	171.0	47 42.6	+59.7	171.2	46 43.3	+59.7	171.3	9
10	54 37.2	+59.5	169.8	53 38.2	+59.5	170.0	52 39.1	+59.6	170.2	51 39.9	+59.6	170.4	50 40.7	+59.7	170.7	49 41.5	+59.7	170.7	48 42.3	+59.7	171.0	47 43.0	+59.7	171.2	10
11	55 36.7	+59.5	169.5	54 37.7	+59.5	169.8	53 38.6	+59.6	170.0	52 39.5	+59.6	170.3	51 40.4	+59.6	170.5	50 41.2	+59.6	170.7	49 42.0	+59.6	170.9	48 42.7	+59.7	171.1	11
12	56 36.2	+59.5	169.3	55 37.2	+59.5	169.6	54 38.2	+59.5	169.8	53 39.1	+59.6	170.1	52 40.0	+59.6	170.3	51 40.8	+59.7	170.5	50 41.6	+59.7	170.7	49 42.4	+59.7	170.9	12
13	57 35.7	+59.3	169.0	56 36.7	+59.5	169.3	55 37.7	+59.5	169.6	54 38.7	+59.6	169.9	53 39.6	+59.6	170.1	52 40.5	+59.6	170.3	51 41.3	+59.7	170.5	50 42.1	+59.7	170.7	13
14	58 35.1	+59.3	168.8	57 36.2	+59.4	169.1	56 37.2	+59.5	169.4	55 38.2	+59.6	169.6	54 39.2	+59.6	169.9	53 40.1	+59.6	170.1	52 41.0	+59.6	170.3	51 41.8	+59.7	170.6	14
15	59 34.4	+59.4	168.5	58 35.6	+59.4	168.8	57 36.7	+59.5	169.1	56 37.8	+59.5	169.4	55 38.8	+59.5	169.7	54 39.7	+59.6	169.9	53 40.6	+59.6	170.2	52 41.5	+59.6	170.4	15
16	60 33.8	+59.3	168.2	59 35.0	+59.4	168.5	58 36.2	+59.4	168.9	57 37.3	+59.4	169.2	56 38.3	+59.5	169.5	55 39.3	+59.5	169.7	54 40.2	+59.6	170.0	53 41.1	+59.6	170.2	16
17	61 33.1	+59.2	167.9	60 34.4	+59.3	168.3	59 35.6	+59.4	168.6	58 36.7	+59.5	168.9	57 37.8	+59.5	169.2	56 38.8	+59.5	169.5	55 39.8	+59.6	169.8	54 40.7	+59.6	170.0	17
18	62 32.3	+59.2	167.6	61 33.7	+59.3	168.0	60 35.0	+59.3	168.3	59 36.2	+59.4	168.7	58 37.3	+59.5	169.0	57 38.4	+59.5	169.3	56 39.4	+59.5	169.6	55 40.4	+59.6	169.8	18
19	63 31.5	+59.2	167.2	62 33.0	+59.2	167.7	61 34.3	+59.3	168.0	60 35.6	+59.3	168.4	59 36.8	+59.4	168.7	58 37.9	+59.5	169.0	57 39.0	+59.5	169.4	56 40.0	+59.5	169.6	19
20	64 30.7	+59.0	166.8	63 32.2	+59.2	167.3	62 33.6	+59.3	167.7	61 34.9	+59.4	168.1	60 36.2	+59.4	168.5	59 37.4	+59.4	168.8	58 38.5	+59.5	169.1	57 39.5	+59.6	169.4	20
21	65 29.7	+59.0	166.4	64 31.4	+59.1	166.9	63 32.9	+59.2	167.3	62 34.3	+59.3	167.8	61 35.6	+59.3	168.2	60 36.8	+59.4	168.5	59 38.0	+59.5	168.9	58 39.1	+59.5	169.2	21
22	66 28.7	+58.9	165.9	65 30.5	+59.0	166.5	64 32.1	+59.1	167.0	63 33.6	+59.2	167.4	62 34.9	+59.4	167.8	61 36.2	+59.4	168.2	60 37.5	+59.4	168.6	59 38.6	+59.5	168.9	22
23	67 27.7	+58.8	165.5	66 29.5	+59.0	166.0	65 31.2	+59.1	166.6	64 32.8	+59.2	167.1	63 34.3	+59.3	167.5	62 35.6	+59.3	167.9	61 36.9	+59.4	168.3	60 38.1	+59.5	168.7	23
24	68 26.5	+58.7	164.9	67 28.5	+58.8	165.6	66 30.3	+59.0	166.1	65 32.0	+59.1	166.7	64 33.5	+59.2	167.2	63 35.0	+59.2	167.6	62 36.3	+59.4	168.0	61 37.6	+59.4	168.4	24
25	69 25.2	+58.6	164.4	68 27.3	+58.8	165.1	67 29.3	+58.9	165.7	66 31.1	+59.0	166.2	65 32.7	+59.2	166.8	64 34.2	+59.3	167.2	63 35.7	+59.3	167.7	62 37.0	+59.4	168.0	25
26	70 23.8	+58.4	163.7	69 26.1	+58.6	164.5	68 28.2	+58.8	165.2	67 30.1	+58.9	165.8	66 31.9	+59.0	166.4	65 33.5	+59.2	166.9	64 35.0	+59.3	167.4	63 36.4	+59.3	167.8	26
27	71 22.2	+58.3	163.0	70 24.7	+58.5	163.9	69 27.0	+58.7	164.6	68 29.0	+58.9	165.3	67 30.9	+59.0	165.9	66 32.7	+59.1	166.5	65 34.3	+59.2	167.0	64 35.7	+59.3	167.5	27
28	72 20.5	+58.1	162.3	71 23.2	+58.4	163.2	70 25.7	+58.5	164.0	69 27.9	+58.7	164.7	68 29.9	+58.9	165.4	67 31.8	+59.0	166.0	66 33.5	+59.1	166.6	65 35.0	+59.3	167.1	28
29	73 18.6	+57.9	161.4	72 21.6	+58.1	162.4	71 24.2	+58.4	163.3	70 26.6	+58.6	164.1	69 28.8	+58.8	164.9	68 30.8	+58.9	165.5	67 32.6	+59.1	166.2	66 34.3	+59.1	166.7	29
30	74 16.5	+57.5	160.5	73 19.7	+57.9	161.6	72 22.6	+58.2	162.6	71 25.2	+58.5	163.5	70 27.6	+58.6	164.3	69 29.7	+58.8	165.0	68 31.7	+58.9	165.7	67 33.4	+59.2	166.3	30
31	75 14.0	+57.3	159.4	74 17.6	+57.7	160.7	73 20.8	+58.0	161.8	72 23.7	+58.3	162.8	71 26.2	+58.6	163.7	70 28.5	+58.8	164.4	69 30.6	+58.9	165.2	68 32.6	+59.0	165.8	31
32	76 11.3	+56.8	158.2	75 15.3	+57.3	159.6	74 18.8	+57.8	160.9	73 22.0	+58.0	162.0	72 24.8	+58.3	162.9	71 27.3	+58.5	163.8	70 29.5	+58.8	164.6	69 31.6	+58.9	165.3	32
33	77 08.1	+56.3	156.8	76 12.6	+57.0	158.4	75 16.6	+57.4	159.8	74 20.0	+57.9	161.1	73 23.1	+58.1	162.1	72 25.8	+58.4	163.1	71 28.3	+58.6	164.0	70 30.5	+58.8	164.8	33
34	78 04.4	+55.7	155.2	77 09.6	+56.4	157.0	76 14.0	+57.0	158.6	75 17.9	+57.5	160.0	74 21.2	+57.9	161.3	73 24.2	+58.3	162.3	72 26.9	+58.5	163.3	71 29.3	+58.7	164.2	34
35	79 00.1	+54.9	153.3	78 06.0	+55.8	155.5	77 11.0	+56.6	157.3	76 15.4	+57.1	158.9	75 19.1	+57.6	160.3	74 22.5	+57.9	161.5	73 25.4	+58.3	162.5	72 28.0	+58.5	163.5	35
36	79 55.0	+53.8	151.1	79 01.8	+55.1	153.6	78 07.6	+56.0	155.7	77 12.5	+56.7	157.5	76 16.7	+57.3	159.1	75 20.4	+57.7	160.5	74 23.7	+58.0	161.7	73 26.5	+58.4	162.7	36
37	80 48.8	+52.4	148.5	79 56.9	+54.0	151.4	79 03.6	+55.3	153.9	78 09.2	+56.1	156.0	77 14.0	+56.8	157.8	76 18.1	+57.4	159.4	75 21.7	+57.8	160.7	74 24.9	+58.1	161.9	37
38	81 41.2	+50.6•	145.3	80 50.9	+52.6	148.8	79 58.7	+54.2	151.7	79 05.3	+55.3	154.2	78 10.8	+56.2	156.3	77 15.5	+56.9	158.1	76 19.5	+57.5	159.6	75 23.0	+57.9	160.9	38
39	82 31.8	+47.9•	141.3	81 43.5	+50.8•	145.6	80 52.9	+52.9	149.2	80 00.6	+54.4	152.1	79 07.0	+55.5	154.5	78 12.4	+56.4	156.6	77 17.0	+57.0	158.3	76 20.9	+57.6	159.9	39
40	83 19.7	+44.2•	136.4	82 34.3	+48.2•	141.7	81 45.8	+51.0•	146.0	80 55.0	+53.1	149.5	80 02.5	+54.6	152.4	79 08.8	+55.6	154.8	78 14.0	+56.5	156.9	77 18.5	+57.1	158.6	40
41	84 03.9	+39.1•	130.3	83 22.5	+44.6•	136.9	82 36.8	+48.6•	142.1	81 48.1	+51.3•	146.4	80 57.1	+53.3	149.9	80 04.4	+54.8	152.8	79 10.5	+55.8	155.2	78 15.6	+56.7	157.2	41
42	84 43.0	+31.7•	122.5	84 07.1	+39.5•	130.7	83 25.4	+44.9•	137.3	82 39.4	+48.8•	142.6	81 50.4	+51.6•	146.8	80 59.2	+53.5	150.3	80 06.3	+55.0	153.1	79 12.3	+56.0	155.5	42
43	85 14.7	+21.7•	112.3	84 46.6	+32.1•	122.9	84 10.3	+39.9•	131.2	83 28.2	+45.4•	137.8	82 42.0	+49.1•	143.0	81 52.7	+51.9•	147.2	81 01.3	+53.7	150.7	80 08.3	+55.1	153.5	43
44	85 36.4	+9.1•	101.0	85 18.7	+22.0•	113.1	84 50.2	+32.5•	123.3	84 13.6	+40.3•	131.6	83 31.1	+45.8•	138.2	82 44.6	+49.5•	143.5	81 55.0	+52.2	147.7	81 03.4	+54.0	151.1	44
45	85 45.5	−4.8•	87.9	85 40.7	+9.3•	101.2	85 22.7	+22.4•	113.5	84 53.9	+32.9•	123.8	84 16.9	+40.7•	132.1	83 34.1	+46.1•	138.7	82 47.2	+49.8•	143.9	81 57.4	+52.4	148.1	45
46	85 40.7	−18.0•	74.5	85 50.0	−4.9•	87.8	85 45.1	+9.4•	101.4	85 26.8	+22.8•	113.8	84 57.6	+33.4•	124.3	84 20.2	+41.1•	132.6	83 37.0	+46.5•	139.2	82 49.8	+50.1•	144.4	46
47	85 22.7	−28.6•	62.2	85 45.1	−18.3•	74.2	85 54.5	−4.9•	87.8	85 49.6	+9.6•	101.6	85 31.0	+23.1•	114.2	85 01.3	+33.9•	124.8	84 23.5	+41.6•	133.2	83 39.9	+46.9•	139.8	47
48	84 53.9	−37.0•	51.9	85 26.8	−29.2•	61.8	85 49.6	−18.6•	73.9	85 59.2	−5.1•	87.8	85 54.1	+9.8•	101.9	85 35.2	+23.5•	114.6	85 05.1	+34.3•	125.3	84 26.8	+42.1•	133.7	48
49	84 16.9	−42.8•	43.5	84 57.6	−37.4•	51.3	85 31.0	−29.7•	61.3	85 54.1	−18.9•	73.6	86 03.9	−5.2•	87.7	85 58.7	+10.0•	102.1	85 39.4	+24.0•	115.1	85 08.9	+34.8•	125.8	49
50	83 34.1	−46.9•	36.9	84 20.2	−43.2•	42.9	85 01.3	−37.8•	50.7	85 35.2	−29.7•	60.8	85 57.8	−19.3•	73.3	86 08.7	−5.3•	87.7	86 03.4	+10.1•	102.4	85 43.7	+24.4•	115.6	50
51	82 47.2	−49.8•	31.6	83 37.0	−47.2•	36.3	84 23.5	−43.6•	42.3	85 05.1	−38.3•	50.2	85 39.4	−30.5•	60.3	86 03.4	−19.7•	73.0	86 13.5	−5.4•	87.7	86 08.1	+10.3•	102.6	51
52	81 57.4	−51.9	27.4	82 49.8	−50.1•	31.0	83 39.9	−47.5•	35.7	84 26.8	−43.9•	41.7	85 08.9	−38.7•	49.5	85 43.7	−31.0•	59.8	86 08.1	−20.0•	72.7	86 18.4	−5.5•	87.6	52
53	81 05.5	−53.4	24.0	81 59.7	−52.1	26.9	82 52.4	−50.3•	30.5	83 42.9	−47.9•	35.1	84 30.2	−44.4•	41.0	85 12.7	−39.2•	48.9	85 48.1	−31.5•	59.2	86 12.7	−20.5•	72.3	53
54	80 12.1	−54.6	21.2	81 07.6	−53.6	23.5	82 02.0	−52.3	26.3	82 55.0	−50.6•	29.9	83 45.8	−48.2•	34.4	84 33.5	−44.7•	40.4	85 16.6	−39.7•	48.2	85 52.4	−32.0•	58.6	54
55	79 17.5	−55.4	18.8	80 14.0	−54.8	20.7	81 09.7	−53.8	23.0	82 04.4	−52.6	25.8	82 57.6	−50.9•	29.3	83 48.8	−48.6•	33.8	84 36.9	−45.2•	39.7	85 20.4	−40.1•	47.6	55
56	78 22.1	−56.2	16.9	79 19.2	−55.6	18.4	80 15.9	−54.9	20.2	81 11.8	−54.0	22.5	82 06.7	−52.8	25.2	83 00.2	−51.2•	28.7	83 51.7	−48.9•	33.1	84 40.3	−45.7•	39.0	56
57	77 25.9	−56.7	15.2	78 23.6	−56.2	16.4	79 21.0	−55.8	17.9	80 17.8	−55.1	19.7	81 13.9	−54.3	21.9	82 09.0	−53.1	24.6	83 02.8	−51.5•	28.0	83 54.6	−49.2•	32.5	57
58	76 29.2	−57.1	13.7	77 27.4	−56.8	14.8	78 25.2	−56.4	16.0	79 22.7	−55.9	17.5	80 19.6	−55.2	19.2	81 15.9	−54.4	21.4	82 11.3	−53.3	24.0	83 05.4	−51.8•	27.4	58
59	75 32.1	−57.5	12.4	76 30.6	−57.2	13.4	77 28.8	−56.9	14.4	78 26.8	−56.5	15.6	79 24.4	−56.0	17.0	80 21.5	−55.4	18.8	81 16.9	−54.6	20.8	82 13.6	−53.3	23.5	59
60	74 34.6	−57.8	11.3	75 33.4	−57.6	12.1	76 31.9	−57.3	13.0	77 30.3	−57.0	14.0	78 28.4	−56.7	15.2	79 26.1	−56.2	16.6	80 23.4	−55.6	18.2	81 20.0	−54.8	20.3	60
61	73 36.8	−58.0	10.3	74 35.8	−57.8	11.0	75 34.6	−57.6	11.7	76 33.3	−57.4	12.6	77 31.7	−57.1	13.6	78 29.9	−56.7	14.7	79 27.8	−56.4	16.1	80 25.2	−55.8	17.7	61
62	72 38.8	−58.2	9.5	73 38.0	−58.1	10.0	74 37.0	−57.9	10.7	75 35.9	−57.7	11.4	76 34.6	−57.5	12.2	77 33.2	−57.3	13.2	78 31.4	−56.8	14.3	79 29.4	−56.4	15.6	62
63	71 40.6	−58.4	8.7	72 39.9	−58.3	9.2	73 39.1	−58.2	9.7	74 38.2	−58.0	10.3	75 37.1	−57.8	11.0	76 35.9	−57.6	11.8	77 34.6	−57.4	12.7	78 33.0	−57.1	13.8	63
64	70 42.2	−58.5	8.0	71 41.6	−58.5	8.4	72 40.9	−58.3	8.9	73 40.2	−58.3	9.4	74 39.3	−58.1	10.0	75 38.3	−57.9	10.6	76 37.2	−57.7	11.4	77 35.9	−57.4	12.3	64
65	69 43.7	−58.7	7.3	70 43.1	−58.6	7.7	71 42.6	−58.5	8.1	72 41.9	−58.4	8.5	73 41.2	−58.2	9.0	74 40.4	−58.1	9.6	75 39.5	−57.9	10.3	76 38.5	−57.8	11.0	65
66	68 45.0	−58.8	6.7	69 44.5	−58.7	7.1	70 44.1	−58.6	7.4	71 43.5	−58.5	7.8	72 43.0	−58.5	8.2	73 42.3	−58.4	8.7	74 41.6	−58.3	9.3	75 40.7	−58.0	9.9	66
67	67 46.2	−58.9	6.2	68 45.8	−58.8	6.5	69 45.4	−58.8	6.8	70 45.0	−58.7	7.1	71 44.5	−58.6	7.5	72 43.9	−58.5	7.9	73 43.3	−58.4	8.4	74 42.7	−58.3	8.9	67
68	66 47.3	−59.0	5.7	67 47.0	−58.9	5.9	68 46.6	−58.8	6.2	69 46.3	−58.8	6.5	70 45.9	−58.8	6.8	71 45.4	−58.7	7.2	72 44.9	−58.6	7.6	73 44.4	−58.5	8.0	68
69	65 48.3	−59.0	5.3	66 48.1	−59.1	5.5	67 47.8	−59.0	5.7	68 47.5	−59.0	5.9	69 47.1	−58.9	6.2	70 46.7	−58.8	6.5	71 46.3	−58.7	6.9	72 45.9	−58.7	7.3	69
70	64 49.3	−59.2	4.8	65 49.0	−59.0	5.0	66 48.8	−59.0	5.2	67 48.5	−59.0	5.4	68 48.3	−59.0	5.7	69 48.0	−58.9	5.9	70 47.6	−58.8	6.2	71 47.2	−58.7	6.6	70
71	63 50.1	−59.1	4.4	64 50.0	−59.2	4.6	65 49.8	−59.2	4.8	66 49.5	−59.0	5.0	67 49.3	−59.0	5.2	68 49.0	−58.9	5.4	69 48.8	−58.9	5.7	70 48.5	−58.9	5.9	71
72	62 51.0	−59.3	4.1	63 50.8	−59.2	4.2	64 50.6	−59.1	4.4	65 50.5	−59.2	4.5	66 50.3	−59.2	4.7	67 50.1	−59.1	4.9	68 49.8	−59.0	5.1	69 49.6	−59.0	5.4	72
73	61 51.7	−59.3	3.7	62 51.6	−59.3	3.8	63 51.5	−59.3	4.0	64 51.3	−59.2	4.1	65 51.1	−59.1	4.3	66 51.0	−59.2	4.5	67 50.8	−59.1	4.6	68 50.6	−59.1	4.9	73
74	60 52.4	−59.3	3.4	61 52.3	−59.3	3.5	62 52.2	−59.3	3.6	63 52.1	−59.3	3.8	64 52.0	−59.3	3.9	65 51.8	−59.2	4.0	66 51.7	−59.2	4.2	67 51.5	−59.2	4.4	74
75	59 53.1	−59.3	3.1	60 53.0	−59.3	3.2	61 52.9	−59.3	3.3	62 52.8	−59.3	3.4	63 52.7	−59.3	3.5	64 52.6	−59.3	3.7	65 52.5	−59.3	3.8	66 52.3	−59.3	3.9	75
76	58 53.8	−59.4	2.8	59 53.7	−59.4	2.9	60 53.6	−59.4	3.0	61 53.5	−59.3	3.1	62 53.4	−59.3	3.2	63 53.3	−59.3	3.3	64 53.2	−59.3	3.4	65 53.1	−59.3	3.5	76
77	57 54.4	−59.5	2.5	58 54.3	−59.4	2.6	59 54.2	−59.4	2.7	60 54.2	−59.4	2.8	61 54.1	−59.4	2.9	62 54.0	−59.4	3.0	63 53.9	−59.3	3.1	64 53.8	−59.3	3.2	77
78	56 54.9	−59.4	2.3	57 54.9	−59.5	2.3	58 54.8	−59.4	2.4	59 54.8	−59.4	2.5	60 54.7	−59.4	2.5	61 54.6	−59.4	2.6	62 54.6	−59.4	2.7	63 54.5	−59.4	2.8	78
79	55 55.5	−59.5	2.0	56 55.4	−59.5	2.1	57 55.4	−59.5	2.2	58 55.3	−59.4	2.2	59 55.3	−59.4	2.3	60 55.2	−59.4	2.4	61 55.2	−59.4	2.4	62 55.1	−59.4	2.5	79
80	54 56.0	−59.5	1.8	55 55.9	−59.5	1.9	56 55.9	−59.5	1.9	57 55.9	−59.5	2.0	58 55.8	−59.4	2.0	59 55.8	−59.5	2.1	60 55.8	−59.5	2.1	61 55.7	−59.4	2.2	80
81	53 56.5	−59.6	1.6	54 56.4	−59.5	1.6	55 56.4	−59.5	1.7	56 56.4	−59.5	1.7	57 56.4	−59.6	1.8	58 56.3	−59.5	1.8	59 56.3	−59.5	1.9	60 56.3	−59.5	1.9	81
82	52 56.9	−59.5	1.4	53 56.9	−59.5	1.4	54 56.9	−59.6	1.5	55 56.9	−59.6	1.5	56 56.8	−59.5	1.5	57 56.8	−59.6	1.6	58 56.8	−59.5	1.6	59 56.8	−59.5	1.7	82
83	51 57.4	−59.6	1.2	52 57.4	−59.6	1.2	53 57.3	−59.5	1.3	54 57.3	−59.5	1.3	55 57.3	−59.6	1.3	56 57.3	−59.6	1.3	57 57.3	−59.6	1.4	58 57.3	−59.6	1.4	83
84	50 57.8	−59.6	1.0	51 57.8	−59.6	1.0	52 57.8	−59.6	1.0	53 57.8	−59.6	1.0	54 57.7	−59.5	1.1	55 57.7	−59.6	1.1	56 57.7	−59.6	1.1	57 57.7	−59.6	1.2	84
85	49 58.2	−59.6	0.8	50 58.2	−59.6	0.8	51 58.2	−59.6	0.8	52 58.2	−59.6	0.9	53 58.2	−59.6	0.9	54 58.2	−59.6	0.9	55 58.2	−59.6	0.9	56 58.1	−59.5	1.0	85
86	48 58.6	−59.6	0.6	49 58.6	−59.6	0.6	50 58.6	−59.6	0.7	51 58.6	−59.6	0.7	52 58.6	−59.6	0.7	53 58.6	−59.7	0.7	54 58.6	−59.7	0.7	55 58.6	−59.7	0.7	86
87	47 59.0	−59.6	0.5	48 59.0	−59.6	0.5	49 59.0	−59.7	0.5	50 59.0	−59.7	0.5	51 59.0	−59.7	0.5	52 58.9	−59.6	0.5	53 58.9	−59.6	0.5	54 58.9	−59.6	0.5	87
88	46 59.3	−59.6	0.3	47 59.3	−59.6	0.3	48 59.3	−59.6	0.3	49 59.3	−59.6	0.3	50 59.3	−59.7	0.3	51 59.3	−59.6	0.3	52 59.3	−59.6	0.3	53 59.3	−59.6	0.4	88
89	45 59.7	−59.7	0.2	46 59.7	−59.7	0.2	47 59.7	−59.7	0.2	48 59.7	−59.7	0.2	49 59.7	−59.7	0.2	50 59.7	−59.7	0.2	51 59.7	−59.7	0.2	52 59.7	−59.7	0.2	89
90	45 00.0	−59.7	0.0	46 00.0	−59.7	0.0	47 00.0	−59.7	0.0	48 00.0	−59.7	0.0	49 00.0	−59.7	0.0	50 00.0	−59.7	0.0	51 00.0	−59.7	0.0	52 00.0	−59.7	0.0	90

| | 45° | | 46° | | 47° | | 48° | | 49° | | 50° | | 51° | | 52° | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 41.2	-59.7	171.5	43 41.9	-59.7	171.7	42 42.5	-59.7	171.8	41 43.1	-59.8	171.9	40 43.7	-59.7	172.1	39 44.2	-59.7	172.2	38 44.8	-59.8	172.3	37 45.3	-59.8	172.4	0
1	43 41.5	-59.7	171.7	42 42.2	-59.8	171.8	41 42.8	-59.7	172.0	40 43.3	-59.7	172.1	39 43.9	-59.8	172.2	38 44.5	-59.8	172.3	37 45.0	-59.8	172.4	36 45.5	-59.8	172.5	1
2	42 41.8	-59.7	171.8	41 42.4	-59.7	172.0	40 43.0	-59.8	172.1	39 43.6	-59.8	172.2	38 44.1	-59.7	172.3	37 44.7	-59.8	172.4	36 45.2	-59.8	172.5	35 45.7	-59.8	172.6	2
3	41 42.1	-59.7	172.0	40 42.7	-59.7	172.1	39 43.3	-59.8	172.2	38 43.8	-59.7	172.3	37 44.4	-59.8	172.4	36 44.9	-59.8	172.5	35 45.4	-59.8	172.6	34 45.9	-59.8	172.7	3
4	40 42.4	-59.7	172.1	39 43.0	-59.7	172.2	38 43.5	-59.7	172.3	37 44.1	-59.8	172.4	36 44.6	-59.8	172.5	35 45.1	-59.8	172.6	34 45.6	-59.8	172.7	33 46.1	-59.9	172.8	4
5	39 42.7	-59.7	172.2	38 43.3	-59.7	172.3	37 43.8	-59.7	172.4	36 44.3	-59.8	172.5	35 44.8	-59.8	172.6	34 45.3	-59.8	172.7	33 45.8	-59.8	172.8	32 46.2	-59.8	172.9	5
6	38 43.0	-59.7	172.3	37 43.5	-59.7	172.4	36 44.0	-59.7	172.5	35 44.5	-59.7	172.6	34 45.0	-59.8	172.7	33 45.5	-59.8	172.8	32 46.0	-59.9	172.9	31 46.4	-59.8	173.0	6
7	37 43.3	-59.8	172.5	36 43.8	-59.7	172.6	35 44.3	-59.8	172.7	34 44.8	-59.8	172.7	33 45.2	-59.8	172.8	32 45.7	-59.8	172.9	31 46.1	-59.8	173.0	30 46.6	-59.9	173.1	7
8	36 43.5	-59.8	172.6	35 44.0	-59.7	172.7	34 44.5	-59.8	172.8	33 45.0	-59.8	172.8	32 45.4	-59.8	172.9	31 45.9	-59.8	173.0	30 46.3	-59.8	173.1	29 46.8	-59.9	173.2	8
9	35 43.8	-59.8	172.7	34 44.3	-59.8	172.8	33 44.7	-59.7	172.9	32 45.2	-59.8	172.9	31 45.6	-59.8	173.0	30 46.1	-59.8	173.1	29 46.5	-59.8	173.2	28 46.9	-59.8	173.2	9
10	34 44.0	-59.7	172.8	33 44.5	-59.8	172.9	32 44.9	-59.7	173.0	31 45.4	-59.8	173.0	30 45.8	-59.8	173.1	29 46.3	-59.9	173.2	28 46.7	-59.9	173.3	27 47.1	-59.9	173.4	10
11	33 44.3	-59.8	172.9	32 44.7	-59.7	173.0	31 45.2	-59.8	173.1	30 45.6	-59.8	173.1	29 46.0	-59.8	173.2	28 46.4	-59.8	173.3	27 46.8	-59.8	173.3	26 47.2	-59.8	173.4	11
12	32 44.5	-59.8	173.0	31 44.9	-59.8	173.1	30 45.4	-59.8	173.2	29 45.8	-59.8	173.2	28 46.2	-59.8	173.3	27 46.6	-59.8	173.4	26 47.0	-59.8	173.4	25 47.4	-59.9	173.5	12
13	31 44.7	-59.8	173.1	30 45.1	-59.7	173.2	29 45.6	-59.8	173.3	28 46.0	-59.8	173.3	27 46.4	-59.8	173.4	26 46.8	-59.8	173.4	25 47.2	-59.9	173.5	24 47.5	-59.8	173.6	13
14	30 44.9	-59.7	173.2	29 45.4	-59.8	173.3	28 45.8	-59.8	173.4	27 46.2	-59.8	173.4	26 46.6	-59.9	173.5	25 46.9	-59.8	173.5	24 47.3	-59.9	173.6	23 47.7	-59.9	173.6	14
15	29 45.2	-59.8	173.3	28 45.6	-59.8	173.4	27 46.0	-59.8	173.4	26 46.4	-59.9	173.5	25 46.7	-59.8	173.6	24 47.1	-59.8	173.6	23 47.5	-59.9	173.7	22 47.8	-59.8	173.7	15
16	28 45.4	-59.8	173.4	27 45.8	-59.8	173.5	26 46.2	-59.8	173.5	25 46.5	-59.8	173.6	24 46.9	-59.8	173.6	23 47.3	-59.9	173.7	22 47.6	-59.8	173.7	21 48.0	-59.9	173.8	16
17	27 45.6	-59.8	173.5	26 46.0	-59.8	173.6	25 46.3	-59.8	173.6	24 46.7	-59.8	173.7	23 47.1	-59.9	173.7	22 47.4	-59.8	173.8	21 47.8	-59.9	173.8	20 48.1	-59.9	173.9	17
18	26 45.8	-59.8	173.6	25 46.2	-59.8	173.7	24 46.5	-59.8	173.7	23 46.9	-59.8	173.8	22 47.2	-59.8	173.8	21 47.6	-59.9	173.9	20 47.9	-59.8	173.9	19 48.3	-59.9	173.9	18
19	25 46.0	-59.8	173.7	24 46.4	-59.8	173.8	23 46.7	-59.8	173.8	22 47.1	-59.9	173.8	21 47.4	-59.8	173.9	20 47.7	-59.8	173.9	19 48.1	-59.9	174.0	18 48.4	-59.9	174.0	19
20	24 46.2	-59.8	173.8	23 46.6	-59.8	173.8	22 46.9	-59.8	173.9	21 47.2	-59.8	173.9	20 47.6	-59.9	174.0	19 47.9	-59.8	174.0	18 48.2	-59.8	174.0	17 48.6	-59.9	174.1	20
21	23 46.4	-59.8	173.9	22 46.7	-59.8	173.9	21 47.1	-59.8	174.0	20 47.4	-59.8	174.0	19 47.7	-59.8	174.0	18 48.1	-59.9	174.1	17 48.4	-59.9	174.1	16 48.7	-59.9	174.1	21
22	22 46.6	-59.8	174.0	21 46.9	-59.8	174.0	20 47.3	-59.9	174.0	19 47.6	-59.9	174.1	18 47.9	-59.8	174.1	17 48.2	-59.8	174.2	16 48.5	-59.8	174.2	15 48.8	-59.8	174.2	22
23	21 46.8	-59.8	174.1	20 47.1	-59.8	174.1	19 47.4	-59.8	174.1	18 47.7	-59.8	174.2	17 48.0	-59.8	174.2	16 48.4	-59.9	174.2	15 48.7	-59.9	174.3	14 49.0	-59.9	174.3	23
24	20 47.0	-59.8	174.1	19 47.3	-59.8	174.2	18 47.6	-59.8	174.2	17 47.9	-59.8	174.2	16 48.2	-59.8	174.3	15 48.5	-59.8	174.3	14 48.8	-59.9	174.3	13 49.1	-59.9	174.4	24
25	19 47.2	-59.9	174.2	18 47.5	-59.8	174.3	17 47.8	-59.9	174.3	16 48.1	-59.9	174.3	15 48.4	-59.9	174.3	14 48.6	-59.8	174.4	13 48.9	-59.8	174.4	12 49.2	-59.9	174.4	25
26	18 47.3	-59.8	174.3	17 47.6	-59.8	174.3	16 47.9	-59.9	174.4	15 48.2	-59.9	174.4	14 48.5	-59.9	174.4	13 48.8	-59.9	174.4	12 49.1	-59.9	174.5	11 49.3	-59.8	174.5	26
27	17 47.5	-59.8	174.4	16 47.8	-59.8	174.4	15 48.1	-59.9	174.4	14 48.4	-59.9	174.5	13 48.7	-59.9	174.5	12 48.9	-59.8	174.5	11 49.2	-59.9	174.5	10 49.5	-59.9	174.6	27
28	16 47.7	-59.8	174.5	15 48.0	-59.8	174.5	14 48.3	-59.9	174.5	13 48.5	-59.8	174.5	12 48.8	-59.9	174.6	11 49.1	-59.9	174.6	10 49.3	-59.8	174.6	9 49.6	-59.9	174.6	28
29	15 47.9	-59.9	174.5	14 48.2	-59.9	174.6	13 48.4	-59.8	174.6	12 48.7	-59.9	174.6	11 49.0	-59.9	174.6	10 49.2	-59.8	174.7	9 49.5	-59.9	174.7	8 49.7	-59.9	174.7	29
30	14 48.1	-59.9	174.6	13 48.3	-59.8	174.7	12 48.6	-59.9	174.7	11 48.8	-59.8	174.7	10 49.1	-59.9	174.7	9 49.4	-59.9	174.7	8 49.6	-59.9	174.7	7 49.9	-59.9	174.8	30
31	13 48.2	-59.8	174.7	12 48.5	-59.9	174.7	11 48.7	-59.8	174.7	10 49.0	-59.9	174.8	9 49.2	-59.8	174.8	8 49.5	-59.9	174.8	7 49.7	-59.9	174.8	6 50.0	-59.9	174.8	31
32	12 48.4	-59.9	174.8	11 48.7	-59.9	174.8	10 48.9	-59.8	174.8	9 49.2	-59.9	174.8	8 49.4	-59.8	174.9	7 49.6	-59.8	174.9	6 49.9	-59.9	174.9	5 50.1	-59.9	174.9	32
33	11 48.6	-59.9	174.9	10 48.8	-59.8	174.9	9 49.1	-59.9	174.9	8 49.3	-59.8	174.9	7 49.5	-59.8	174.9	6 49.8	-59.9	174.9	5 50.0	-59.9	174.9	4 50.2	-59.8	175.0	33
34	10 48.8	-59.9	174.9	9 49.0	-59.8	175.0	8 49.2	-59.8	175.0	7 49.5	-59.9	175.0	6 49.7	-59.9	175.0	5 49.9	-59.8	175.0	4 50.1	-59.8	175.0	3 50.4	-59.9	175.0	34
35	9 48.9	-59.8	175.0	8 49.2	-59.9	175.0	7 49.4	-59.9	175.0	6 49.6	-59.8	175.1	5 49.8	-59.8	175.1	4 50.0	-59.8	175.1	3 50.3	-59.9	175.1	2 50.5	-59.9	175.1	35
36	8 49.1	-59.8	175.1	7 49.3	-59.8	175.1	6 49.5	-59.8	175.1	5 49.8	-59.9	175.1	4 50.0	-59.9	175.1	3 50.2	-59.9	175.1	2 50.4	-59.9	175.1	1 50.6	-59.9	175.1	36
37	7 49.3	-59.9	175.2	6 49.5	-59.9	175.2	5 49.7	-59.9	175.2	4 49.9	-59.9	175.2	3 50.1	-59.8	175.2	2 50.3	-59.9	175.2	1 50.5	-59.9	175.2	0 50.7	-59.8	175.2	37
38	6 49.4	-59.8	175.2	5 49.6	-59.8	175.3	4 49.8	-59.8	175.3	3 50.0	-59.8	175.3	2 50.3	-59.9	175.3	1 50.5	-59.9	175.3	0 50.7	-59.9	175.3	0 09.1	+59.9	4.7	38
39	5 49.6	-59.8	175.3	4 49.8	-59.8	175.3	3 50.0	-59.9	175.3	2 50.2	-59.9	175.3	1 50.4	-59.9	175.3	0 50.6	-59.8	175.3	0 09.2	+59.9	4.7	1 09.0	+59.9	4.7	39
40	4 49.8	-59.9	175.4	3 50.0	-59.9	175.4	2 50.1	-59.8	175.4	1 50.3	-59.8	175.4	0 50.5	-59.8	175.4	0 09.3	+59.8	4.6	1 09.1	+59.9	4.6	2 08.9	+59.9	4.6	40
41	3 49.9	-59.9	175.5	2 50.1	-59.9	175.5	1 50.3	-59.9	175.5	0 50.5	-59.9	175.5	0 09.3	+59.9	4.5	1 09.1	+59.9	4.5	2 09.0	+59.9	4.5	3 08.8	+59.8	4.5	41
42	2 50.1	-59.8	175.5	1 50.3	-59.9	175.5	0 50.5	-59.9	175.5	0 09.4	+59.8	4.5	1 09.2	+59.8	4.5	2 09.0	+59.9	4.5	3 08.8	+59.8	4.5	4 08.6	+59.8	4.5	42
43	1 50.3	-59.9	175.6	0 50.4	-59.8	175.6	0 09.4	+59.8	4.4	1 09.2	+59.9	4.4	2 09.0	+59.9	4.4	3 08.9	+59.8	4.4	4 08.7	+59.9	4.4	5 08.5	+59.9	4.4	43
44	0 50.4	-59.8	175.7	0 09.4	+59.8	4.3	1 09.2	+59.9	4.3	2 09.1	+59.9	4.3	3 08.9	+59.9	4.3	4 08.7	+59.9	4.3	5 08.6	+59.8	4.3	6 08.4	+59.9	4.3	44
45	0 09.4	+59.9	4.2	1 09.3	+59.8	4.2	2 09.1	+59.9	4.2	3 08.9	+59.9	4.2	4 08.8	+59.9	4.2	5 08.6	+59.9	4.3	6 08.4	+59.9	4.3	7 08.3	+59.9	4.3	45
46	1 09.3	+59.8	4.2	2 09.1	+59.8	4.2	3 08.9	+59.9	4.2	4 08.8	+59.9	4.2	5 08.6	+59.9	4.2	6 08.5	+59.9	4.2	7 08.3	+59.9	4.2	8 08.1	+59.9	4.2	46
47	2 09.1	+59.8	4.1	3 08.9	+59.9	4.1	4 08.8	+59.9	4.1	5 08.6	+59.9	4.1	6 08.5	+59.9	4.1	7 08.3	+59.9	4.1	8 08.2	+59.9	4.1	9 08.0	+59.9	4.1	47
48	3 08.9	+59.9	4.0	4 08.8	+59.9	4.0	5 08.6	+59.9	4.0	6 08.5	+59.9	4.0	7 08.3	+59.9	4.0	8 08.2	+59.9	4.1	9 08.0	+59.9	4.1	10 07.9	+59.9	4.1	48
49	4 08.8	+59.8	3.9	5 08.6	+59.9	3.9	6 08.5	+59.8	4.0	7 08.3	+59.9	4.0	8 08.2	+59.8	4.0	9 08.0	+59.9	4.0	10 07.9	+59.9	4.0	11 07.8	+59.8	4.0	49
50	5 08.6	+59.8	3.9	6 08.5	+59.8	3.9	7 08.3	+59.9	3.9	8 08.2	+59.9	3.9	9 08.0	+59.9	3.9	10 07.9	+59.9	3.9	11 07.8	+59.9	3.9	12 07.6	+59.9	3.9	50
51	6 08.4	+59.9	3.8	7 08.3	+59.9	3.8	8 08.2	+59.9	3.8	9 08.0	+59.9	3.8	10 07.9	+59.8	3.8	11 07.8	+59.9	3.8	12 07.6	+59.9	3.9	13 07.5	+59.9	3.9	51
52	7 08.3	+59.8	3.7	8 08.1	+59.9	3.7	9 08.0	+59.8	3.7	10 07.9	+59.8	3.7	11 07.8	+59.9	3.8	12 07.6	+59.9	3.8	13 07.5	+59.9	3.8	14 07.4	+59.9	3.8	52
53	8 08.1	+59.8	3.6	9 08.0	+59.8	3.7	10 07.9	+59.9	3.7	11 07.7	+59.8	3.7	12 07.6	+59.9	3.7	13 07.5	+59.9	3.7	14 07.4	+59.9	3.7	15 07.2	+59.9	3.7	53
54	9 07.9	+59.9	3.6	10 07.8	+59.9	3.6	11 07.7	+59.8	3.6	12 07.6	+59.9	3.6	13 07.5	+59.8	3.6	14 07.3	+59.9	3.6	15 07.2	+59.9	3.6	16 07.1	+59.9	3.7	54
55	10 07.8	+59.8	3.5	11 07.6	+59.9	3.5	12 07.5	+59.9	3.5	13 07.4	+59.9	3.5	14 07.3	+59.9	3.5	15 07.2	+59.9	3.6	16 07.1	+59.8	3.6	17 07.0	+59.8	3.6	55
56	11 07.6	+59.8	3.4	12 07.5	+59.9	3.4	13 07.4	+59.8	3.4	14 07.3	+59.9	3.5	15 07.2	+59.8	3.5	16 07.0	+59.9	3.5	17 06.9	+59.9	3.5	18 06.8	+59.9	3.5	56
57	12 07.4	+59.9	3.3	13 07.3	+59.9	3.4	14 07.2	+59.9	3.4	15 07.1	+59.8	3.4	16 07.0	+59.9	3.4	17 06.9	+59.9	3.4	18 06.8	+59.9	3.4	19 06.7	+59.9	3.5	57
58	13 07.2	+59.9	3.3	14 07.1	+59.9	3.3	15 07.0	+59.9	3.3	16 06.9	+59.9	3.3	17 06.8	+59.9	3.3	18 06.7	+59.9	3.3	19 06.6	+59.9	3.4	20 06.5	+59.9	3.4	58
59	14 07.1	+59.9	3.2	15 07.0	+59.9	3.2	16 06.9	+59.9	3.2	17 06.8	+59.9	3.2	18 06.7	+59.9	3.2	19 06.6	+59.8	3.3	20 06.5	+59.9	3.3	21 06.4	+59.9	3.3	59
60	15 06.9	+59.8	3.1	16 06.8	+59.9	3.1	17 06.7	+59.9	3.1	18 06.6	+59.9	3.2	19 06.5	+59.9	3.2	20 06.4	+59.9	3.2	21 06.3	+59.9	3.2	22 06.3	+59.8	3.2	60
61	16 06.7	+59.8	3.0	17 06.6	+59.9	3.0	18 06.5	+59.9	3.1	19 06.5	+59.9	3.1	20 06.4	+59.8	3.1	21 06.3	+59.9	3.1	22 06.2	+59.9	3.1	23 06.1	+59.9	3.2	61
62	17 06.5	+59.9	2.9	18 06.5	+59.9	3.0	19 06.4	+59.9	3.0	20 06.3	+59.8	3.0	21 06.2	+59.9	3.0	22 06.1	+59.9	3.0	23 06.0	+59.9	3.1	24 06.0	+59.9	3.1	62
63	18 06.4	+59.8	2.9	19 06.3	+59.9	2.9	20 06.2	+59.8	2.9	21 06.1	+59.9	2.9	22 06.1	+59.9	2.9	23 06.0	+59.9	3.0	24 05.9	+59.9	3.0	25 05.8	+59.9	3.0	63
64	19 06.2	+59.8	2.8	20 06.1	+59.8	2.8	21 06.0	+59.9	2.8	22 06.0	+59.9	2.8	23 05.9	+59.8	2.9	24 05.8	+59.9	2.9	25 05.7	+59.9	2.9	26 05.7	+59.8	2.9	64
65	20 06.0	+59.8	2.7	21 05.9	+59.9	2.7	22 05.9	+59.9	2.7	23 05.8	+59.8	2.8	24 05.7	+59.9	2.8	25 05.6	+59.9	2.8	26 05.6	+59.9	2.8	27 05.5	+59.9	2.8	65
66	21 05.8	+59.9	2.6	22 05.7	+59.9	2.6	23 05.7	+59.9	2.6	24 05.6	+59.8	2.7	25 05.5	+59.9	2.7	26 05.5	+59.9	2.7	27 05.4	+59.9	2.7	28 05.3	+59.9	2.8	66
67	22 05.6	+59.8	2.5	23 05.6	+59.9	2.5	24 05.5	+59.9	2.6	25 05.4	+59.9	2.6	26 05.4	+59.9	2.6	27 05.3	+59.9	2.6	28 05.2	+59.9	2.7	29 05.2	+59.9	2.7	67
68	23 05.4	+59.8	2.4	24 05.4	+59.8	2.5	25 05.3	+59.9	2.5	26 05.2	+59.8	2.5	27 05.2	+59.9	2.5	28 05.1	+59.9	2.6	29 05.1	+59.9	2.6	30 05.0	+59.9	2.6	68
69	24 05.2	+59.8	2.4	25 05.2	+59.8	2.4	26 05.1	+59.8	2.4	27 05.1	+59.8	2.4	28 05.0	+59.9	2.4	29 05.0	+59.9	2.5	30 04.9	+59.9	2.5	31 04.8	+59.9	2.5	69
70	25 05.0	+59.8	2.3	26 05.0	+59.9	2.3	27 04.9	+59.8	2.3	28 04.9	+59.9	2.3	29 04.8	+59.9	2.3	30 04.8	+59.9	2.4	31 04.7	+59.9	2.4	32 04.7	+59.9	2.4	70
71	26 04.8	+59.8	2.2	27 04.8	+59.8	2.2	28 04.7	+59.8	2.2	29 04.7	+59.9	2.2	30 04.6	+59.9	2.3	31 04.6	+59.9	2.3	32 04.6	+59.9	2.3	33 04.5	+59.9	2.3	71
72	27 04.6	+59.8	2.1	28 04.6	+59.9	2.1	29 04.5	+59.8	2.1	30 04.5	+59.8	2.1	31 04.5	+59.9	2.2	32 04.4	+59.9	2.2	33 04.4	+59.9	2.2	34 04.3	+59.8	2.2	72
73	28 04.4	+59.8	2.0	29 04.4	+59.8	2.0	30 04.3	+59.8	2.0	31 04.3	+59.8	2.0	32 04.3	+59.9	2.1	33 04.2	+59.8	2.1	34 04.2	+59.9	2.1	35 04.1	+59.9	2.1	73
74	29 04.2	+59.8	1.9	30 04.2	+59.8	1.9	31 04.1	+59.8	1.9	32 04.1	+59.9	1.9	33 04.1	+59.8	2.0	34 04.0	+59.8	2.0	35 04.0	+59.9	2.0	36 04.0	+59.9	2.0	74
75	30 04.0	+59.8	1.8	31 04.0	+59.7	1.8	32 03.9	+59.8	1.8	33 03.9	+59.8	1.8	34 03.9	+59.9	1.9	35 03.8	+59.9	1.9	36 03.8	+59.9	1.9	37 03.8	+59.9	1.9	75
76	31 03.8	+59.7	1.7	32 03.7	+59.8	1.7	33 03.7	+59.8	1.7	34 03.7	+59.8	1.7	35 03.7	+59.7	1.8	36 03.6	+59.8	1.8	37 03.6	+59.8	1.8	38 03.6	+59.9	1.8	76
77	32 03.5	+59.7	1.6	33 03.5	+59.8	1.6	34 03.5	+59.8	1.6	35 03.5	+59.7	1.6	36 03.4	+59.8	1.7	37 03.4	+59.8	1.7	38 03.4	+59.8	1.7	39 03.4	+59.7	1.7	77
78	33 03.3	+59.7	1.5	34 03.3	+59.7	1.5	35 03.3	+59.7	1.5	36 03.2	+59.7	1.5	37 03.2	+59.8	1.6	38 03.2	+59.8	1.6	39 03.2	+59.8	1.6	40 03.1	+59.8	1.6	78
79	34 03.1	+59.7	1.4	35 03.0	+59.7	1.4	36 03.0	+59.7	1.4	37 03.0	+59.7	1.4	38 03.0	+59.8	1.5	39 03.0	+59.8	1.5	40 03.0	+59.7	1.5	41 02.9	+59.8	1.5	79
80	35 02.8	+59.8	1.3	36 02.8	+59.7	1.3	37 02.8	+59.7	1.3	38 02.8	+59.7	1.3	39 02.8	+59.7	1.3	40 02.7	+59.8	1.4	41 02.7	+59.8	1.4	42 02.7	+59.8	1.4	80
81	36 02.6	+59.7	1.2	37 02.6	+59.7	1.2	38 02.5	+59.8	1.2	39 02.5	+59.7	1.2	40 02.5	+59.7	1.2	41 02.5	+59.7	1.2	42 02.5	+59.8	1.3	43 02.5	+59.7	1.3	81
82	37 02.3	+59.7	1.0	38 02.3	+59.7	1.1	39 02.3	+59.7	1.1	40 02.3	+59.7	1.1	41 02.3	+59.7	1.1	42 02.3	+59.7	1.1	43 02.3	+59.7	1.1	44 02.2	+59.8	1.2	82
83	38 02.1	+59.7	0.9	39 02.1	+59.7	0.9	40 02.0	+59.8	1.0	41 02.0	+59.7	1.0	42 02.0	+59.7	1.0	43 02.0	+59.7	1.0	44 02.0	+59.7	1.0	45 02.0	+59.7	1.0	83
84	39 01.8	+59.7	0.8	40 01.8	+59.7	0.8	41 01.8	+59.7	0.8	42 01.8	+59.7	0.8	43 01.8	+59.7	0.9	44 01.8	+59.7	0.9	45 01.8	+59.7	0.9	46 01.7	+59.8	0.9	84
85	40 01.5	+59.7	0.7	41 01.5	+59.7	0.7	42 01.5	+59.7	0.7	43 01.5	+59.7	0.7	44 01.5	+59.7	0.7	45 01.5	+59.7	0.7	46 01.5	+59.7	0.7	47 01.5	+59.7	0.8	85
86	41 01.2	+59.7	0.6	42 01.2	+59.7	0.6	43 01.2	+59.7	0.6	44 01.2	+59.7	0.6	45 01.2	+59.7	0.6	46 01.2	+59.7	0.6	47 01.2	+59.7	0.6	48 01.2	+59.7	0.6	86
87	42 00.9	+59.7	0.4	43 00.9	+59.7	0.4	44 00.9	+59.7	0.4	45 00.9	+59.7	0.4	46 00.9	+59.7	0.4	47 00.9	+59.7	0.5	48 00.9	+59.7	0.5	49 00.9	+59.7	0.5	87
88	43 00.6	+59.7	0.3	44 00.6	+59.7	0.3	45 00.6	+59.7	0.3	46 00.6	+59.7	0.3	47 00.6	+59.7	0.3	48 00.6	+59.7	0.3	49 00.6	+59.7	0.3	50 00.6	+59.7	0.3	88
89	44 00.3	+59.7	0.1	45 00.3	+59.7	0.1	46 00.3	+59.7	0.2	47 00.3	+59.7	0.2	48 00.3	+59.7	0.2	49 00.3	+59.7	0.2	50 00.3	+59.7	0.2	51 00.3	+59.7	0.2	89
90	45 00.0	+59.7	0.0	46 00.0	+59.7	0.0	47 00.0	+59.7	0.0	48 00.0	+59.7	0.0	49 00.0	+59.7	0.0	50 00.0	+59.7	0.0	51 00.0	+59.7	0.0	52 00.0	+59.7	0.0	90

	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 174°, 186°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Each latitude cell lists: Hc d Z

Dec.	45°	46°	47°	48°	49°	50°	51°	52°	Dec.
0	44 34.5 +59.5 170.1	43 35.5 +59.6 170.3	42 36.2 +59.6 170.5	41 37.0 +59.6 170.6	40 37.8 +59.6 170.8	39 38.6 +59.6 170.9	38 39.3 +59.7 171.0	37 40.0 +59.8 171.1	0
1	45 34.0 +59.6 170.0	44 34.9 +59.6 170.1	43 35.8 +59.6 170.3	42 36.6 +59.7 170.5	41 37.4 +59.7 170.6	40 38.2 +59.7 170.8	39 39.0 +59.7 170.9	38 39.8 +59.7 171.0	1
2	46 33.6 +59.5 169.8	45 34.5 +59.5 170.0	44 35.4 +59.6 170.2	43 36.3 +59.6 170.3	42 37.1 +59.7 170.5	41 37.9 +59.7 170.6	40 38.7 +59.7 170.8	39 39.5 +59.7 170.9	2
3	47 33.1 +59.6 169.6	46 34.0 +59.6 169.8	45 35.0 +59.5 170.0	44 35.9 +59.6 170.2	43 36.7 +59.7 170.3	42 37.6 +59.6 170.5	41 38.4 +59.7 170.7	40 39.2 +59.7 170.8	3
4	48 32.6 +59.5 169.4	47 33.6 +59.5 169.6	46 34.5 +59.6 169.8	45 35.5 +59.6 170.0	44 36.4 +59.6 170.2	43 37.2 +59.7 170.3	42 38.1 +59.6 170.5	41 38.9 +59.7 170.6	4
5	49 32.1 +59.4 169.2	48 33.1 +59.5 169.4	47 34.1 +59.5 169.6	46 35.1 +59.5 169.8	45 36.0 +59.6 170.0	44 36.9 +59.6 170.2	43 37.7 +59.7 170.3	42 38.6 +59.7 170.5	5
6	50 31.5 +59.4 169.0	49 32.6 +59.5 169.2	48 33.6 +59.5 169.4	47 34.6 +59.6 169.6	46 35.6 +59.6 169.8	45 36.5 +59.6 170.0	44 37.4 +59.6 170.2	43 38.3 +59.6 170.4	6
7	51 30.9 +59.5 168.8	50 32.1 +59.4 169.0	49 33.1 +59.5 169.3	48 34.2 +59.5 169.5	47 35.2 +59.5 169.7	46 36.1 +59.6 169.9	45 37.0 +59.7 170.0	44 37.9 +59.7 170.2	7
8	52 30.4 +59.3 168.6	51 31.5 +59.4 168.8	50 32.6 +59.5 169.1	49 33.7 +59.4 169.3	48 34.7 +59.4 169.5	47 35.7 +59.5 169.7	46 36.7 +59.6 169.9	45 37.6 +59.6 170.1	8
9	53 29.7 +59.4 168.3	52 30.9 +59.5 168.6	51 32.1 +59.5 168.8	50 33.2 +59.5 169.1	49 34.3 +59.5 169.3	48 35.3 +59.6 169.5	47 36.3 +59.6 169.7	46 37.2 +59.7 169.9	9
10	54 29.1 +59.3 168.1	53 30.4 +59.3 168.4	52 31.6 +59.4 168.6	51 32.7 +59.5 168.9	50 33.8 +59.5 169.1	49 34.9 +59.5 169.3	48 35.9 +59.6 169.5	47 36.9 +59.6 169.7	10
11	55 28.4 +59.3 167.8	54 29.7 +59.4 168.1	53 31.0 +59.4 168.4	52 32.2 +59.4 168.7	51 33.3 +59.5 168.9	50 34.4 +59.5 169.1	49 35.5 +59.6 169.4	48 36.5 +59.6 169.6	11
12	56 27.7 +59.2 167.5	55 29.1 +59.3 167.9	54 30.4 +59.3 168.2	53 31.6 +59.4 168.4	52 32.8 +59.5 168.7	51 34.0 +59.5 168.9	50 35.0 +59.6 169.2	49 36.1 +59.6 169.4	12
13	57 26.9 +59.2 167.3	56 28.4 +59.3 167.6	55 29.7 +59.4 167.9	54 31.0 +59.4 168.2	53 32.3 +59.4 168.5	52 33.5 +59.5 168.7	51 34.6 +59.5 169.0	50 35.7 +59.6 169.2	13
14	58 26.1 +59.2 166.9	57 27.7 +59.2 167.3	56 29.1 +59.3 167.6	55 30.4 +59.4 167.9	54 31.7 +59.4 168.2	53 33.0 +59.4 168.5	52 34.1 +59.5 168.8	51 35.3 +59.5 169.0	14
15	59 25.3 +59.1 166.6	58 26.9 +59.2 167.0	57 28.4 +59.2 167.4	56 29.8 +59.3 167.7	55 31.1 +59.4 168.0	54 32.4 +59.5 168.3	53 33.6 +59.5 168.6	52 34.8 +59.5 168.8	15
16	60 24.4 +59.1 166.3	59 26.1 +59.1 166.7	58 27.6 +59.3 167.1	57 29.1 +59.3 167.4	56 30.5 +59.4 167.7	55 31.9 +59.4 168.1	54 33.1 +59.5 168.3	53 34.3 +59.5 168.6	16
17	61 23.5 +58.9 165.9	60 25.2 +59.1 166.3	59 26.9 +59.1 166.7	58 28.4 +59.2 167.1	57 29.9 +59.3 167.5	56 31.3 +59.3 167.8	55 32.6 +59.4 168.1	54 33.8 +59.5 168.4	17
18	62 22.4 +59.0 165.5	61 24.3 +59.0 166.0	60 26.0 +59.1 166.4	59 27.6 +59.2 166.8	58 29.2 +59.3 167.2	57 30.6 +59.4 167.5	56 32.0 +59.4 167.9	55 33.3 +59.5 168.2	18
19	63 21.4 +58.8 165.1	62 23.3 +59.0 165.6	61 25.1 +59.1 166.1	60 26.8 +59.2 166.5	59 28.5 +59.2 166.9	58 30.0 +59.3 167.3	57 31.4 +59.4 167.6	56 32.8 +59.4 167.9	19
20	64 20.2 +58.8 164.7	63 22.3 +58.8 165.2	62 24.2 +59.0 165.7	61 26.0 +59.1 166.1	60 27.7 +59.2 166.6	59 29.3 +59.2 167.0	58 30.8 +59.3 167.3	57 32.2 +59.4 167.7	20
21	65 19.0 +58.6 164.2	64 21.1 +58.8 164.8	63 23.2 +58.9 165.3	62 25.1 +59.0 165.8	61 26.9 +59.1 166.2	60 28.5 +59.3 166.7	59 30.1 +59.3 167.0	58 31.6 +59.4 167.4	21
22	66 17.6 +58.6 163.7	65 19.9 +58.8 164.3	64 22.1 +58.8 164.9	63 24.1 +59.0 165.4	62 26.0 +59.1 165.9	61 27.8 +59.1 166.3	60 29.4 +59.2 166.7	59 31.0 +59.3 167.1	22
23	67 16.2 +58.4 163.1	66 18.7 +58.5 163.8	65 20.9 +58.8 164.4	64 23.1 +58.9 165.0	63 25.1 +59.0 165.5	62 26.9 +59.1 166.0	61 28.6 +59.2 166.4	60 30.3 +59.3 166.8	23
24	68 14.6 +58.3 162.5	67 17.2 +58.5 163.2	66 19.7 +58.6 163.9	65 22.0 +58.8 164.5	64 24.1 +58.9 165.1	63 26.0 +59.1 165.6	62 27.8 +59.2 166.1	61 29.6 +59.2 166.5	24
25	69 12.9 +58.1 161.9	68 15.7 +58.4 162.6	67 18.3 +58.6 163.4	66 20.8 +58.7 164.0	65 23.0 +58.8 164.6	64 25.1 +58.9 165.2	63 27.0 +59.1 165.7	62 28.8 +59.2 166.2	25
26	70 11.0 +57.9 161.1	69 14.1 +58.1 162.0	68 16.9 +58.4 162.8	67 19.5 +58.5 163.5	66 21.8 +58.8 164.1	65 24.0 +58.9 164.7	64 26.1 +59.0 165.3	63 28.0 +59.1 165.8	26
27	71 08.9 +57.7 160.4	70 12.2 +58.0 161.3	69 15.3 +58.2 162.1	68 18.0 +58.5 162.9	67 20.6 +58.6 163.6	66 22.9 +58.8 164.3	65 25.1 +58.9 164.9	64 27.1 +59.0 165.4	27
28	72 06.6 +57.5 159.5	71 10.2 +57.8 160.5	70 13.5 +58.1 161.5	69 16.5 +58.3 162.3	68 19.2 +58.5 163.1	67 21.7 +58.7 163.8	66 24.0 +58.8 164.4	65 26.1 +59.0 165.0	28
29	73 04.1 +57.1 158.5	72 08.0 +57.6 159.7	71 11.6 +57.8 160.7	70 14.8 +58.1 161.6	69 17.7 +58.3 162.5	68 20.4 +58.6 163.2	67 22.8 +58.8 163.9	66 25.1 +58.9 164.5	29
30	74 01.2 +56.8 157.5	73 05.6 +57.2 158.7	72 09.4 +57.7 159.9	71 12.9 +58.0 160.9	70 16.1 +58.2 161.8	69 19.0 +58.4 162.6	68 21.6 +58.6 163.4	67 24.0 +58.8 164.1	30
31	74 58.0 +56.4 156.2	74 02.8 +56.9 157.7	73 07.1 +57.3 158.9	72 10.9 +57.7 160.0	71 14.3 +58.0 161.0	70 17.4 +58.3 162.0	69 20.2 +58.5 162.8	68 22.8 +58.7 163.5	31
32	75 54.4 +55.8 154.9	74 59.7 +56.5 156.5	74 04.4 +57.0 157.9	73 08.6 +57.4 159.1	72 12.3 +57.8 160.2	71 15.7 +58.1 161.2	70 18.7 +58.4 162.1	69 21.5 +58.5 163.0	32
33	76 50.2 +55.2 153.3	75 56.2 +56.0 155.1	75 01.4 +56.6 156.7	74 06.0 +57.1 158.1	73 10.1 +57.5 159.3	72 13.8 +57.8 160.4	71 17.1 +58.1 161.4	70 20.0 +58.4 162.3	33
34	77 45.4 +54.4 151.5	76 52.2 +55.3 153.6	75 58.0 +56.0 155.4	75 03.1 +56.7 156.9	74 07.6 +57.2 158.3	73 11.6 +57.7 159.5	72 15.2 +58.0 160.6	71 18.4 +58.3 161.6	34
35	78 39.8 +53.4 149.5	77 47.5 +54.6 151.8	76 54.1 +55.5 153.9	75 59.8 +56.3 155.6	75 04.8 +56.9 157.2	74 09.3 +57.3 158.6	73 13.2 +57.7 159.8	72 16.7 +58.0 160.9	35
36	79 33.2 +52.1 147.1	78 42.1 +53.6 149.8	77 49.6 +54.7 152.1	76 56.1 +55.6 154.1	76 01.7 +56.3 155.9	75 06.6 +56.9 157.4	74 10.9 +57.4 158.8	73 14.7 +57.8 160.0	36
37	80 25.3 +50.4 144.2	79 35.7 +52.3 147.4	78 44.3 +53.8 150.1	77 51.7 +54.9 152.4	76 58.0 +55.8 154.4	76 03.5 +56.5 156.2	75 08.3 +57.1 157.7	74 12.5 +57.6 159.0	37
38	81 15.7 +48.2•140.8	80 28.0 +50.6 144.6	79 38.1 +52.6 147.7	78 46.6 +54.0 150.4	77 53.8 +55.1 152.7	77 00.0 +56.0 154.7	76 05.4 +56.6 156.5	75 10.1 +57.1 158.0	38
39	82 03.9 +45.3•136.7	81 18.6 +48.6•141.2	80 30.7 +50.9 144.9	79 40.6 +52.8 148.1	78 48.9 +54.2 150.8	77 56.0 +55.2 153.1	77 02.0 +56.1 155.0	76 07.2 +56.8 156.7	39
40	82 49.2 +41.2•131.7	82 07.2 +45.5•137.1	81 21.6 +48.8•141.6	80 33.4 +51.2 145.3	79 43.1 +53.0 148.5	78 51.2 +54.4 151.1	77 58.1 +55.5 153.4	77 04.0 +56.3 155.3	40
41	83 30.4 +35.9•125.6	82 52.7 +41.7•132.1	82 10.4 +46.0•137.5	81 24.6 +49.1•142.0	80 36.1 +51.5 145.7	79 45.6 +53.3 148.8	78 53.6 +54.5 151.5	78 00.3 +55.6 153.7	41
42	84 06.3 +28.8•118.1	83 34.4 +36.3•126.0	82 56.4 +42.0•132.5	82 13.7 +46.3•138.0	81 27.6 +49.4•142.4	80 38.9 +51.7 146.1	79 48.1 +53.5 149.2	78 55.9 +54.8 151.9	42
43	84 35.1 +19.5•109.2	84 10.7 +29.1•118.5	83 38.4 +36.7•126.4	83 00.0 +42.5•133.0	82 17.0 +46.7•138.4	81 30.6 +49.8•142.9	80 41.6 +52.0 146.6	79 50.7 +53.7 149.6	43
44	84 54.6 +8.5• 98.9	84 39.8 +19.9•109.5	84 15.1 +29.6•118.9	83 42.5 +37.1•126.9	83 03.7 +42.9•133.5	82 20.4 +47.0•138.9	81 33.6 +50.1•143.3	80 44.4 +52.3 147.0	44
45	85 03.1 −3.4• 87.5	84 59.7 +8.6• 99.0	84 44.7 +20.1•109.8	84 19.6 +30.0•119.3	83 46.6 +37.6•127.4	83 07.4 +43.3•134.0	82 23.7 +47.4•139.4	81 36.7 +50.4•143.8	45
46	84 59.7 −15.0• 76.0	85 08.3 −3.5• 87.5	85 04.8 +8.9• 99.2	84 49.6 +20.5•110.1	84 24.2 +30.4•119.8	83 50.7 +38.1•127.9	83 11.1 +43.8•134.5	82 27.1 +47.8•139.9	46
47	84 44.7 −24.5• 65.1	85 04.8 −15.2• 75.7	85 13.7 −3.6• 87.4	85 10.1 +9.0• 99.3	84 54.6 +20.8•110.5	84 28.8 +30.8•120.2	83 54.9 +38.5•128.4	83 14.4 +44.2•135.0	47
48	84 19.6 −33.0• 55.6	84 49.6 −25.4• 64.7	85 10.1 −15.5• 75.5	85 19.1 −3.7• 87.4	85 15.4 +9.2• 99.5	84 59.6 +21.2•110.9	84 33.4 +31.3•120.7	83 59.1 +39.0•128.9	48
49	83 46.6 −39.2• 47.5	84 24.2 −33.5• 55.1	84 54.6 −25.8• 64.3	85 15.4 −15.8• 75.2	85 24.6 −3.8• 87.4	85 20.8 +9.3• 99.7	85 04.7 +21.6•111.3	84 38.1 +31.8•121.2	49
50	83 07.4 −43.7• 40.9	83 50.7 −39.6• 46.9	84 28.8 −33.9• 54.5	84 54.6 −26.2• 63.9	85 20.8 −16.1• 74.9	85 30.1 −3.8• 87.3	85 26.3 +9.5• 99.9	85 09.9 +22.0•111.7	50
51	82 23.7 −47.0• 35.4	83 11.1 −44.0• 40.3	83 54.9 −40.0• 46.3	84 33.4 −34.3• 54.0	84 57.8 −26.6• 63.4	85 26.3 −16.4• 74.7	85 35.8 −3.9• 87.3	85 31.9 +9.6•100.2	51
52	81 36.7 −49.6• 31.0	82 27.1 −47.4• 34.8	83 14.9 −44.4• 39.7	83 59.1 −40.4• 45.7	84 31.1 −34.8• 53.4	85 09.9 −27.1• 62.9	85 31.9 −16.8• 74.4	85 41.5 −4.0• 87.2	52
53	80 47.1 −51.4• 27.3	81 39.7 −49.8• 30.4	82 30.5 −47.7• 34.2	83 18.7 −44.9• 39.0	83 56.3 −40.9• 45.1	84 42.8 −35.3• 52.7	85 15.1 −27.6• 62.4	85 37.5 −17.1• 74.0	53
54	79 55.7 −52.9 24.2	80 49.9 −51.7 26.7	81 42.8 −50.1• 29.8	82 33.8 −48.0• 33.6	83 15.4 −45.2• 38.4	84 07.5 −41.3• 44.4	84 47.5 −35.7• 52.1	85 20.4 −28.1• 61.8	54
55	79 02.8 −53.9 21.6	79 58.2 −53.0 23.7	80 52.7 −51.9 26.2	81 45.8 −50.4• 29.2	82 37.2 −48.3• 33.0	83 26.2 −45.6• 37.7	84 11.8 −41.8• 43.7	84 52.3 −36.3• 51.4	55
56	78 08.9 −54.9 19.4	79 05.2 −54.2 21.1	80 00.8 −53.3 23.1	80 55.4 −52.1 25.6	81 48.9 −50.7• 28.6	82 40.6 −48.7• 32.3	83 30.0 −46.0• 37.0	84 16.0 −42.2• 43.0	56
57	77 14.0 −55.6 17.5	78 11.0 −55.1 18.9	79 07.5 −54.4 20.6	80 03.3 −53.5 22.6	80 58.2 −52.4 25.0	81 51.9 −51.0• 28.0	82 44.0 −49.1• 31.6	83 33.8 −46.5• 36.3	57
58	76 18.4 −56.1 15.8	77 16.0 −55.8 17.0	78 13.1 −55.2 18.4	79 09.8 −54.6 20.1	80 05.8 −53.8 22.1	81 00.9 −52.7 24.4	81 54.9 −51.3 27.3	82 47.3 −49.4• 31.0	58
59	75 22.3 −56.7 14.4	76 20.2 −56.2 15.4	77 17.9 −55.8 16.6	78 15.2 −55.3 18.0	79 12.0 −54.7 19.6	80 08.2 −53.9 21.5	81 03.6 −52.9 23.8	81 57.9 −51.6 26.7	59
60	74 25.6 −57.0 13.1	75 24.0 −56.8 14.0	76 22.1 −56.4 15.0	77 19.9 −56.0 16.1	78 17.3 −55.5 17.5	79 14.3 −54.9 19.0	80 10.7 −54.2 20.9	81 06.3 −53.2 23.2	60
61	73 28.6 −57.3 12.0	74 27.2 −57.1 12.7	75 25.7 −56.9 13.6	76 23.9 −56.6 14.6	77 21.8 −56.1 15.7	78 19.4 −55.7 17.0	79 16.5 −55.1 18.5	80 13.1 −54.3 20.4	61
62	72 31.3 −57.6 11.0	73 30.1 −57.4 11.6	74 28.8 −57.2 12.3	75 27.3 −56.7 13.2	76 25.7 −56.7 14.1	77 23.7 −56.3 15.2	78 21.4 −55.8 16.5	79 18.8 −55.3 18.0	62
63	71 33.7 −57.9 10.1	72 32.7 −57.7 10.6	73 31.6 −57.5 11.3	74 30.4 −57.3 12.0	75 29.0 −57.0 12.8	76 27.4 −56.7 13.7	77 25.6 −56.4 14.7	78 23.5 −56.0 16.0	63
64	70 35.8 −58.0 9.3	71 35.0 −57.9 9.7	72 34.1 −57.8 10.3	73 33.1 −57.6 10.9	74 32.0 −57.4 11.6	75 30.7 −57.2 12.3	76 29.2 −56.9 13.2	77 27.5 −56.6 14.2	64
65	69 37.8 −58.2 8.5	70 37.1 −58.1 8.9	71 36.3 −57.9 9.4	72 35.5 −57.8 9.9	73 34.6 −57.7 10.5	74 33.5 −57.5 11.2	75 32.3 −57.3 11.9	76 30.9 −57.0 12.8	65
66	68 39.6 −58.4 7.8	69 39.0 −58.3 8.2	70 38.4 −58.2 8.6	71 37.7 −58.1 9.0	72 36.9 −58.0 9.5	73 36.0 −57.8 10.1	74 35.0 −57.6 10.7	75 33.9 −57.4 11.5	66
67	67 41.2 −58.5 7.2	68 40.7 −58.4 7.5	69 40.2 −58.3 7.9	70 39.6 −58.2 8.3	71 38.9 −58.1 8.7	72 38.2 −58.0 9.2	73 37.4 −57.9 9.7	74 36.5 −57.7 10.3	67
68	66 42.7 −58.6 6.6	67 42.3 −58.5 6.9	68 41.8 −58.5 7.2	69 41.4 −58.4 7.6	70 40.8 −58.3 7.9	71 40.2 −58.2 8.3	72 39.5 −58.0 8.8	73 38.8 −58.0 9.3	68
69	65 44.1 −58.7 6.1	66 43.8 −58.7 6.3	67 43.4 −58.6 6.6	68 43.0 −58.6 6.9	69 42.5 −58.4 7.2	70 42.0 −58.4 7.6	71 41.5 −58.3 8.0	72 40.8 −58.1 8.4	69
70	64 45.4 −58.8 5.6	65 45.1 −58.8 5.8	66 44.8 −58.7 6.1	67 44.4 −58.6 6.3	68 44.1 −58.6 6.6	69 43.6 −58.5 6.9	70 43.2 −58.5 7.3	71 42.7 −58.4 7.6	70
71	63 46.6 −58.9 5.2	64 46.3 −58.8 5.3	65 46.1 −58.8 5.5	66 45.8 −58.8 5.8	67 45.5 −58.7 6.0	68 45.1 −58.6 6.3	69 44.7 −58.5 6.6	70 44.3 −58.5 6.9	71
72	62 47.7 −59.1 4.7	63 47.5 −58.9 4.9	64 47.3 −58.9 5.1	65 47.0 −58.8 5.3	66 46.8 −58.8 5.5	67 46.5 −58.7 5.7	68 46.2 −58.7 6.0	69 45.8 −58.6 6.3	72
73	61 48.8 −59.1 4.3	62 48.6 −59.0 4.5	63 48.4 −59.0 4.6	64 48.2 −58.9 4.8	65 48.0 −58.9 5.0	66 47.7 −58.8 5.2	67 47.5 −58.8 5.4	68 47.2 −58.8 5.7	73
74	60 49.7 −59.1 4.0	61 49.6 −59.1 4.1	62 49.4 −59.0 4.2	63 49.3 −59.0 4.4	64 49.1 −59.0 4.5	65 48.9 −59.0 4.7	66 48.7 −58.9 4.9	67 48.4 −58.8 5.1	74
75	59 50.6 −59.1 3.6	60 50.5 −59.1 3.7	61 50.4 −59.1 3.8	62 50.3 −59.1 4.0	63 50.1 −59.0 4.1	64 49.9 −59.0 4.3	65 49.8 −58.9 4.4	66 49.6 −59.0 4.6	75
76	58 51.5 −59.2 3.3	59 51.4 −59.2 3.4	60 51.3 −59.1 3.5	61 51.2 −59.1 3.6	62 51.1 −59.1 3.7	63 50.9 −59.0 3.8	64 50.8 −59.1 4.0	65 50.6 −59.0 4.1	76
77	57 52.3 −59.2 3.0	58 52.2 −59.2 3.0	59 52.2 −59.2 3.1	60 52.1 −59.2 3.2	61 52.0 −59.1 3.3	62 51.9 −59.2 3.4	63 51.7 −59.1 3.6	64 51.6 −59.1 3.7	77
78	56 53.1 −59.3 2.7	57 53.0 −59.2 2.7	58 53.0 −59.3 2.8	59 52.9 −59.2 2.9	60 52.8 −59.2 3.0	61 52.7 −59.2 3.1	62 52.6 −59.1 3.2	63 52.5 −59.2 3.3	78
79	55 53.8 −59.3 2.4	56 53.8 −59.3 2.4	57 53.7 −59.3 2.5	58 53.7 −59.3 2.6	59 53.6 −59.3 2.7	60 53.5 −59.2 2.7	61 53.5 −59.3 2.8	62 53.4 −59.2 2.9	79
80	54 54.5 −59.3 2.1	55 54.5 −59.3 2.2	56 54.4 −59.3 2.2	57 54.4 −59.3 2.3	58 54.3 −59.3 2.3	59 54.3 −59.3 2.4	60 54.2 −59.2 2.5	61 54.2 −59.3 2.6	80
81	53 55.2 −59.4 1.9	54 55.2 −59.4 1.9	55 55.1 −59.3 1.9	56 55.1 −59.4 2.0	57 55.0 −59.3 2.1	58 55.0 −59.3 2.1	59 55.0 −59.4 2.2	60 54.9 −59.3 2.2	81
82	52 55.8 −59.4 1.6	53 55.8 −59.4 1.7	54 55.8 −59.4 1.7	55 55.7 −59.3 1.7	56 55.7 −59.3 1.8	57 55.7 −59.4 1.8	58 55.6 −59.3 1.9	59 55.6 −59.3 1.9	82
83	51 56.4 −59.4 1.4	52 56.4 −59.4 1.4	53 56.4 −59.4 1.4	54 56.4 −59.4 1.5	55 56.3 −59.4 1.5	56 56.3 −59.4 1.6	57 56.3 −59.4 1.6	58 56.3 −59.4 1.6	83
84	50 57.0 −59.5 1.2	51 57.0 −59.5 1.2	52 57.0 −59.5 1.2	53 57.0 −59.5 1.2	54 56.9 −59.4 1.3	55 56.9 −59.4 1.3	56 56.9 −59.4 1.4	57 56.9 −59.5 1.4	84
85	49 57.5 −59.4 0.9	50 57.5 −59.4 1.0	51 57.5 −59.5 1.0	52 57.5 −59.5 1.0	53 57.5 −59.5 1.0	54 57.5 −59.5 1.1	55 57.5 −59.5 1.1	56 57.5 −59.5 1.1	85
86	48 58.1 −59.5 0.7	49 58.1 −59.5 0.8	50 58.1 −59.5 0.8	51 58.1 −59.5 0.8	52 58.1 −59.5 0.8	53 58.0 −59.4 0.8	54 58.0 −59.4 0.8	55 58.0 −59.4 0.9	86
87	47 58.6 −59.5 0.5	48 58.6 −59.5 0.6	49 58.6 −59.6 0.6	50 58.6 −59.5 0.6	51 58.6 −59.5 0.6	52 58.6 −59.6 0.6	53 58.6 −59.6 0.6	54 58.6 −59.6 0.6	87
88	46 59.1 −59.6 0.4	47 59.1 −59.6 0.4	48 59.1 −59.6 0.4	49 59.1 −59.6 0.4	50 59.1 −59.6 0.4	51 59.1 −59.6 0.4	52 59.1 −59.6 0.4	53 59.1 −59.6 0.4	88
89	45 59.5 −59.5 0.2	46 59.5 −59.5 0.2	47 59.5 −59.5 0.2	48 59.5 −59.5 0.2	49 59.5 −59.5 0.2	50 59.5 −59.5 0.2	51 59.5 −59.5 0.2	52 59.5 −59.5 0.2	89
90	45 00.0 −59.6 0.0	46 00.0 −59.6 0.0	47 00.0 −59.6 0.0	48 00.0 −59.6 0.0	49 00.0 −59.6 0.0	50 00.0 −59.6 0.0	51 00.0 −59.6 0.0	52 00.0 −59.6 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 34.5	−59.6	170.1	43 35.3	−59.6	170.3	42 36.2	−59.6	170.5	41 37.0	−59.7	170.6	40 37.8	−59.7	170.8	39 38.6	−59.7	170.9	38 39.3	−59.7	171.0	37 40.0	−59.7	171.1	0
1	43 34.9	−59.6	170.3	42 35.7	−59.6	170.5	41 36.6	−59.6	170.6	40 37.3	−59.6	170.8	39 38.1	−59.7	170.9	38 38.9	−59.7	171.0	37 39.6	−59.7	171.1	36 40.3	−59.7	171.3	1
2	42 35.3	−59.6	170.5	41 36.1	−59.6	170.6	40 36.9	−59.6	170.8	39 37.7	−59.7	170.9	38 38.4	−59.7	171.0	37 39.2	−59.7	171.2	36 39.9	−59.8	171.3	35 40.6	−59.8	171.4	2
3	41 35.7	−59.6	170.6	40 36.5	−59.6	170.8	39 37.3	−59.7	170.9	38 38.0	−59.7	171.0	37 38.7	−59.7	171.2	36 39.5	−59.8	171.3	35 40.1	−59.7	171.4	34 40.8	−59.7	171.5	3
4	40 36.1	−59.6	170.8	39 36.9	−59.7	170.9	38 37.6	−59.6	171.0	37 38.3	−59.6	171.2	36 39.0	−59.7	171.3	35 39.7	−59.7	171.4	34 40.4	−59.7	171.5	33 41.1	−59.8	171.6	4
5	39 36.5	−59.6	170.9	38 37.2	−59.6	171.1	37 38.0	−59.7	171.2	36 38.7	−59.7	171.3	35 39.3	−59.7	171.4	34 40.0	−59.7	171.5	33 40.7	−59.8	171.6	32 41.3	−59.8	171.7	5
6	38 36.9	−59.7	171.1	37 37.6	−59.7	171.2	36 38.3	−59.7	171.3	35 39.0	−59.7	171.4	34 39.6	−59.7	171.5	33 40.3	−59.8	171.6	32 40.9	−59.7	171.7	31 41.5	−59.7	171.8	6
7	37 37.2	−59.6	171.2	36 37.9	−59.7	171.3	35 38.6	−59.7	171.4	34 39.3	−59.7	171.5	33 39.9	−59.7	171.6	32 40.5	−59.7	171.7	31 41.2	−59.8	171.8	30 41.8	−59.8	171.9	7
8	36 37.6	−59.7	171.4	35 38.3	−59.7	171.5	34 38.9	−59.7	171.6	33 39.6	−59.8	171.7	32 40.2	−59.7	171.8	31 40.8	−59.7	171.8	30 41.4	−59.7	171.9	29 42.0	−59.8	172.0	8
9	35 37.9	−59.6	171.5	34 38.6	−59.7	171.6	33 39.2	−59.7	171.7	32 39.8	−59.7	171.8	31 40.5	−59.8	171.9	30 41.1	−59.8	172.0	29 41.6	−59.7	172.0	28 42.2	−59.8	172.1	9
10	34 38.3	−59.7	171.6	33 38.9	−59.7	171.7	32 39.5	−59.7	171.8	31 40.1	−59.7	171.9	30 40.7	−59.7	172.0	29 41.3	−59.8	172.1	28 41.9	−59.8	172.1	27 42.4	−59.8	172.2	10
11	33 38.6	−59.7	171.7	32 39.2	−59.7	171.8	31 39.8	−59.7	171.9	30 40.4	−59.7	172.0	29 41.0	−59.8	172.1	28 41.5	−59.7	172.2	27 42.1	−59.8	172.2	26 42.6	−59.7	172.3	11
12	32 38.9	−59.7	171.9	31 39.5	−59.7	171.9	30 40.1	−59.7	172.0	29 40.7	−59.8	172.1	28 41.2	−59.7	172.2	27 41.8	−59.8	172.3	26 42.3	−59.8	172.3	25 42.9	−59.8	172.4	12
13	31 39.2	−59.7	172.0	30 39.8	−59.7	172.1	29 40.4	−59.7	172.2	28 40.9	−59.7	172.2	27 41.5	−59.8	172.3	26 42.0	−59.8	172.4	25 42.5	−59.7	172.4	24 43.1	−59.8	172.5	13
14	30 39.5	−59.7	172.1	29 40.1	−59.7	172.2	28 40.6	−59.7	172.3	27 41.2	−59.7	172.3	26 41.7	−59.7	172.4	25 42.2	−59.7	172.5	24 42.8	−59.8	172.5	23 43.3	−59.8	172.6	14
15	29 39.8	−59.7	172.2	28 40.4	−59.8	172.3	27 40.9	−59.7	172.4	26 41.4	−59.7	172.4	25 42.0	−59.8	172.5	24 42.5	−59.8	172.6	23 43.0	−59.8	172.6	22 43.5	−59.8	172.7	15
16	28 40.1	−59.7	172.3	27 40.6	−59.7	172.4	26 41.2	−59.8	172.5	25 41.7	−59.8	172.5	24 42.2	−59.8	172.6	23 42.7	−59.8	172.6	22 43.2	−59.8	172.7	21 43.7	−59.8	172.8	16
17	27 40.4	−59.7	172.4	26 40.9	−59.7	172.5	25 41.4	−59.7	172.6	24 41.9	−59.7	172.6	23 42.4	−59.7	172.7	22 42.9	−59.7	172.7	21 43.4	−59.8	172.8	20 43.9	−59.8	172.8	17
18	26 40.7	−59.7	172.5	25 41.2	−59.7	172.6	24 41.7	−59.7	172.7	23 42.2	−59.8	172.7	22 42.6	−59.7	172.8	21 43.1	−59.8	172.8	20 43.6	−59.7	172.9	19 44.0	−59.8	172.9	18
19	25 41.0	−59.8	172.7	24 41.5	−59.8	172.7	23 41.9	−59.7	172.8	22 42.4	−59.8	172.8	21 42.9	−59.8	172.9	20 43.3	−59.8	172.9	19 43.8	−59.8	173.0	18 44.2	−59.7	173.0	19
20	24 41.2	−59.7	172.8	23 41.7	−59.8	172.8	22 42.2	−59.8	172.9	21 42.6	−59.7	172.9	20 43.1	−59.8	173.0	19 43.5	−59.7	173.0	18 44.0	−59.8	173.1	17 44.4	−59.8	173.1	20
21	23 41.5	−59.7	172.9	22 42.0	−59.8	172.9	21 42.4	−59.7	173.0	20 42.9	−59.8	173.0	19 43.3	−59.8	173.1	18 43.8	−59.8	173.1	17 44.2	−59.8	173.1	16 44.6	−59.8	173.2	21
22	22 41.8	−59.8	173.0	21 42.2	−59.7	173.0	20 42.7	−59.8	173.1	19 43.1	−59.8	173.1	18 43.5	−59.8	173.1	17 44.0	−59.8	173.2	16 44.4	−59.8	173.2	15 44.8	−59.8	173.3	22
23	21 42.0	−59.7	173.1	20 42.5	−59.8	173.1	19 42.9	−59.8	173.2	18 43.3	−59.8	173.2	17 43.7	−59.7	173.2	16 44.2	−59.8	173.3	15 44.6	−59.8	173.3	14 45.0	−59.8	173.3	23
24	20 42.3	−59.8	173.2	19 42.7	−59.7	173.2	18 43.1	−59.7	173.2	17 43.5	−59.7	173.3	16 44.0	−59.8	173.3	15 44.4	−59.8	173.4	14 44.8	−59.9	173.4	13 45.2	−59.9	173.4	24
25	19 42.5	−59.7	173.3	18 43.0	−59.8	173.3	17 43.4	−59.8	173.4	16 43.8	−59.8	173.4	15 44.2	−59.8	173.4	14 44.6	−59.8	173.4	13 44.9	−59.8	173.5	12 45.3	−59.8	173.5	25
26	18 42.8	−59.8	173.4	17 43.2	−59.8	173.4	16 43.6	−59.8	173.4	15 44.0	−59.8	173.5	14 44.4	−59.8	173.5	13 44.8	−59.9	173.5	12 45.1	−59.8	173.6	11 45.5	−59.8	173.6	26
27	17 43.0	−59.7	173.5	16 43.4	−59.7	173.5	15 43.8	−59.8	173.5	14 44.2	−59.8	173.6	13 44.6	−59.8	173.6	12 44.9	−59.8	173.6	11 45.3	−59.9	173.6	10 45.7	−59.9	173.7	27
28	16 43.3	−59.8	173.5	15 43.7	−59.8	173.6	14 44.0	−59.7	173.6	13 44.4	−59.9	173.6	12 44.8	−59.8	173.7	11 45.1	−59.8	173.7	10 45.5	−59.9	173.7	9 45.9	−59.9	173.7	28
29	15 43.5	−59.7	173.6	14 43.9	−59.8	173.7	13 44.3	−59.8	173.7	12 44.6	−59.8	173.7	11 45.0	−59.8	173.7	10 45.3	−59.8	173.8	9 45.7	−59.9	173.8	8 46.0	−59.8	173.8	29
30	14 43.8	−59.8	173.7	13 44.1	−59.7	173.8	12 44.5	−59.8	173.8	11 44.8	−59.8	173.8	10 45.2	−59.8	173.8	9 45.5	−59.8	173.9	8 45.9	−59.9	173.9	7 46.2	−59.9	173.9	30
31	13 44.0	−59.8	173.8	12 44.3	−59.7	173.9	11 44.7	−59.8	173.9	10 45.0	−59.8	173.9	9 45.4	−59.9	173.9	8 45.7	−59.8	173.9	7 46.0	−59.8	173.9	6 46.4	−59.9	174.0	31
32	12 44.2	−59.7	173.9	11 44.6	−59.8	173.9	10 44.9	−59.8	174.0	9 45.2	−59.8	174.0	8 45.6	−59.8	174.0	7 45.9	−59.8	174.0	6 46.2	−59.8	174.0	5 46.6	−59.9	174.0	32
33	11 44.5	−59.8	174.0	10 44.8	−59.8	174.0	9 45.1	−59.8	174.0	8 45.4	−59.8	174.1	7 45.8	−59.8	174.1	6 46.1	−59.8	174.1	5 46.4	−59.8	174.1	4 46.7	−59.9	174.1	33
34	10 44.7	−59.8	174.1	9 45.0	−59.8	174.1	8 45.3	−59.8	174.1	7 45.6	−59.7	174.1	6 46.0	−59.8	174.2	5 46.3	−59.8	174.2	4 46.6	−59.8	174.2	3 46.9	−59.9	174.2	34
35	9 44.9	−59.8	174.2	8 45.2	−59.7	174.2	7 45.5	−59.7	174.2	6 45.9	−59.8	174.2	5 46.2	−59.9	174.2	4 46.5	−59.8	174.3	3 46.8	−59.9	174.3	2 47.1	−59.9	174.3	35
36	8 45.2	−59.8	174.3	7 45.5	−59.8	174.3	6 45.8	−59.8	174.3	5 46.1	−59.8	174.3	4 46.3	−59.8	174.3	3 46.6	−59.8	174.3	2 46.9	−59.8	174.3	1 47.2	−59.8	174.3	36
37	7 45.4	−59.8	174.4	6 45.7	−59.8	174.4	5 46.0	−59.8	174.4	4 46.3	−59.8	174.4	3 46.5	−59.8	174.4	2 46.8	−59.8	174.4	1 47.1	−59.8	174.4	0 47.4	−59.8	174.4	37
38	6 45.6	−59.8	174.5	5 45.9	−59.8	174.5	4 46.2	−59.8	174.5	3 46.5	−59.8	174.5	2 46.7	−59.8	174.5	1 47.0	−59.8	174.5	0 47.3	−59.8	174.5	0 12.4	+59.9	5.5	38
39	5 45.8	−59.7	174.5	4 46.1	−59.8	174.5	3 46.4	−59.8	174.6	2 46.7	−59.8	174.6	1 46.9	−59.8	174.6	0 47.2	−59.8	174.6	0 12.5	+59.9	5.4	1 12.3	+59.8	5.4	39
40	4 46.1	−59.8	174.6	3 46.3	−59.8	174.6	2 46.6	−59.8	174.6	1 46.9	−59.8	174.6	0 47.1	−59.8	174.6	0 12.6	+59.8	5.4	1 12.4	+59.8	5.4	2 12.1	+59.8	5.4	40
41	3 46.3	−59.8	174.7	2 46.5	−59.7	174.7	1 46.8	−59.8	174.7	0 47.1	−59.8	174.7	0 12.7	+59.8	5.3	1 12.4	+59.8	5.3	2 12.2	+59.8	5.3	3 11.9	+59.9	5.3	41
42	2 46.5	−59.8	174.8	1 46.8	−59.8	174.8	0 47.0	−59.8	174.8	0 12.7	+59.8	5.2	1 12.5	+59.8	5.2	2 12.2	+59.9	5.2	3 12.0	+59.8	5.2	4 11.8	+59.8	5.2	42
43	1 46.7	−59.7	174.9	0 47.0	−59.8	174.9	0 12.8	+59.8	5.1	1 12.5	+59.8	5.1	2 12.3	+59.8	5.1	3 12.1	+59.8	5.1	4 11.8	+59.8	5.1	5 11.6	+59.8	5.1	43
44	0 47.0	−59.8	175.0	0 12.8	+59.8	5.0	1 12.6	+59.8	5.0	2 12.3	+59.8	5.0	3 12.1	+59.8	5.0	4 11.9	+59.8	5.0	5 11.6	+59.9	5.1	6 11.4	+59.8	5.1	44
45	0 12.8	+59.8	4.9	1 12.6	+59.8	4.9	2 12.4	+59.8	4.9	3 12.1	+59.8	5.0	4 11.9	+59.8	5.0	5 11.7	+59.8	5.0	6 11.5	+59.8	5.0	7 11.2	+59.9	5.0	45
46	1 12.6	+59.8	4.9	2 12.4	+59.8	4.9	3 12.2	+59.7	4.9	4 11.9	+59.8	4.9	5 11.7	+59.8	4.9	6 11.5	+59.8	4.9	7 11.3	+59.8	4.9	8 11.1	+59.8	4.9	46
47	2 12.4	+59.7	4.8	3 12.2	+59.7	4.8	4 11.9	+59.8	4.8	5 11.7	+59.8	4.8	6 11.5	+59.8	4.8	7 11.3	+59.8	4.8	8 11.1	+59.8	4.8	9 10.9	+59.8	4.8	47
48	3 12.1	+59.8	4.7	4 11.9	+59.8	4.7	5 11.7	+59.8	4.7	6 11.5	+59.8	4.7	7 11.3	+59.8	4.7	8 11.1	+59.8	4.7	9 10.9	+59.9	4.7	10 10.7	+59.8	4.8	48
49	4 11.9	+59.8	4.6	5 11.7	+59.8	4.6	6 11.5	+59.8	4.6	7 11.3	+59.8	4.6	8 11.1	+59.8	4.6	9 10.9	+59.9	4.6	10 10.7	+59.9	4.7	11 10.5	+59.9	4.7	49
50	5 11.7	+59.8	4.5	6 11.5	+59.8	4.5	7 11.3	+59.8	4.5	8 11.1	+59.8	4.5	9 10.9	+59.8	4.6	10 10.8	+59.8	4.6	11 10.6	+59.8	4.6	12 10.4	+59.8	4.6	50
51	6 11.5	+59.7	4.4	7 11.3	+59.8	4.4	8 11.1	+59.8	4.4	9 10.9	+59.8	4.5	10 10.7	+59.8	4.5	11 10.6	+59.8	4.5	12 10.4	+59.8	4.5	13 10.2	+59.8	4.5	51
52	7 11.2	+59.8	4.3	8 11.1	+59.7	4.3	9 10.9	+59.8	4.4	10 10.7	+59.8	4.4	11 10.5	+59.8	4.4	12 10.4	+59.8	4.4	13 10.2	+59.8	4.4	14 10.0	+59.8	4.4	52
53	8 11.0	+59.8	4.2	9 10.8	+59.8	4.3	10 10.7	+59.8	4.3	11 10.5	+59.8	4.3	12 10.3	+59.8	4.3	13 10.1	+59.8	4.3	14 10.0	+59.9	4.3	15 09.8	+59.9	4.4	53
54	9 10.8	+59.8	4.2	10 10.6	+59.8	4.2	11 10.5	+59.8	4.2	12 10.3	+59.8	4.2	13 10.1	+59.8	4.2	14 10.0	+59.8	4.2	15 09.8	+59.8	4.3	16 09.7	+59.8	4.3	54
55	10 10.6	+59.7	4.1	11 10.4	+59.8	4.1	12 10.3	+59.7	4.1	13 10.1	+59.8	4.1	14 09.9	+59.8	4.1	15 09.8	+59.8	4.2	16 09.6	+59.8	4.2	17 09.5	+59.8	4.2	55
56	11 10.3	+59.8	4.0	12 10.2	+59.8	4.0	13 10.0	+59.8	4.0	14 09.9	+59.8	4.0	15 09.7	+59.8	4.0	16 09.6	+59.8	4.1	17 09.4	+59.8	4.1	18 09.3	+59.8	4.1	56
57	12 10.1	+59.8	3.9	13 10.0	+59.7	3.9	14 09.8	+59.8	3.9	15 09.7	+59.8	3.9	16 09.5	+59.8	4.0	17 09.4	+59.8	4.0	18 09.2	+59.8	4.0	19 09.1	+59.8	4.0	57
58	13 09.9	+59.7	3.8	14 09.7	+59.8	3.8	15 09.6	+59.8	3.8	16 09.5	+59.7	3.9	17 09.3	+59.8	3.9	18 09.2	+59.8	3.9	19 09.0	+59.8	3.9	20 08.9	+59.8	3.9	58
59	14 09.6	+59.8	3.7	15 09.5	+59.7	3.7	16 09.4	+59.7	3.7	17 09.2	+59.8	3.8	18 09.1	+59.8	3.8	19 09.0	+59.8	3.8	20 08.8	+59.8	3.8	21 08.7	+59.8	3.9	59
60	15 09.4	+59.7	3.6	16 09.3	+59.7	3.7	17 09.1	+59.8	3.7	18 09.0	+59.8	3.7	19 08.9	+59.8	3.7	20 08.8	+59.7	3.7	21 08.6	+59.8	3.7	22 08.5	+59.8	3.8	60
61	16 09.1	+59.7	3.5	17 09.0	+59.7	3.5	18 08.9	+59.8	3.6	19 08.8	+59.8	3.6	20 08.7	+59.8	3.6	21 08.6	+59.7	3.6	22 08.4	+59.8	3.7	23 08.3	+59.8	3.7	61
62	17 08.9	+59.8	3.4	18 08.8	+59.8	3.5	19 08.7	+59.8	3.5	20 08.6	+59.7	3.5	21 08.5	+59.7	3.5	22 08.3	+59.8	3.5	23 08.2	+59.8	3.5	24 08.1	+59.8	3.6	62
63	18 08.7	+59.7	3.3	19 08.6	+59.8	3.4	20 08.4	+59.8	3.4	21 08.3	+59.8	3.4	22 08.2	+59.8	3.4	23 08.1	+59.7	3.4	24 08.0	+59.8	3.5	25 07.9	+59.8	3.5	63
64	19 08.4	+59.8	3.2	20 08.3	+59.8	3.3	21 08.2	+59.8	3.3	22 08.1	+59.7	3.3	23 08.0	+59.8	3.3	24 07.9	+59.8	3.4	25 07.8	+59.8	3.4	26 07.7	+59.8	3.4	64
65	20 08.2	+59.7	3.1	21 08.1	+59.8	3.2	22 08.0	+59.7	3.2	23 07.9	+59.7	3.2	24 07.8	+59.7	3.2	25 07.7	+59.8	3.3	26 07.6	+59.8	3.3	27 07.5	+59.8	3.3	65
66	21 07.9	+59.7	3.0	22 07.8	+59.8	3.1	23 07.7	+59.8	3.1	24 07.6	+59.7	3.1	25 07.5	+59.8	3.1	26 07.5	+59.7	3.2	27 07.4	+59.7	3.2	28 07.3	+59.8	3.2	66
67	22 07.6	+59.8	2.9	23 07.6	+59.7	3.0	24 07.5	+59.7	3.0	25 07.4	+59.7	3.0	26 07.3	+59.8	3.0	27 07.2	+59.8	3.1	28 07.1	+59.7	3.1	29 07.1	+59.7	3.1	67
68	23 07.4	+59.7	2.8	24 07.3	+59.7	2.9	25 07.2	+59.8	2.9	26 07.1	+59.8	2.9	27 07.1	+59.7	2.9	28 07.0	+59.8	2.9	29 06.9	+59.8	3.0	30 06.8	+59.8	3.0	68
69	24 07.1	+59.7	2.7	25 07.0	+59.8	2.8	26 07.0	+59.7	2.8	27 06.9	+59.7	2.8	28 06.8	+59.8	2.8	29 06.8	+59.7	2.9	30 06.7	+59.7	2.9	31 06.6	+59.8	2.9	69
70	25 06.8	+59.8	2.6	26 06.8	+59.7	2.7	27 06.7	+59.7	2.7	28 06.6	+59.8	2.7	29 06.6	+59.7	2.7	30 06.5	+59.7	2.8	31 06.4	+59.8	2.8	32 06.4	+59.7	2.8	70
71	26 06.6	+59.7	2.5	27 06.5	+59.7	2.6	28 06.4	+59.8	2.6	29 06.4	+59.7	2.6	30 06.3	+59.8	2.6	31 06.2	+59.7	2.7	32 06.2	+59.7	2.7	33 06.1	+59.7	2.7	71
72	27 06.3	+59.7	2.4	28 06.2	+59.8	2.5	29 06.2	+59.7	2.5	30 06.1	+59.7	2.5	31 06.1	+59.7	2.5	32 06.0	+59.7	2.5	33 05.9	+59.8	2.6	34 05.9	+59.7	2.6	72
73	28 06.0	+59.7	2.3	29 06.0	+59.7	2.3	30 05.9	+59.7	2.4	31 05.9	+59.7	2.4	32 05.8	+59.7	2.4	33 05.7	+59.8	2.4	34 05.7	+59.7	2.5	35 05.6	+59.8	2.5	73
74	29 05.7	+59.7	2.2	30 05.7	+59.7	2.2	31 05.6	+59.7	2.2	32 05.6	+59.7	2.3	33 05.5	+59.8	2.3	34 05.5	+59.7	2.4	35 05.4	+59.8	2.4	36 05.4	+59.7	2.4	74
75	30 05.4	+59.7	2.1	31 05.4	+59.7	2.1	32 05.3	+59.7	2.1	33 05.3	+59.7	2.2	34 05.3	+59.7	2.2	35 05.2	+59.7	2.2	36 05.2	+59.8	2.3	37 05.1	+59.7	2.3	75
76	31 05.1	+59.7	2.0	32 05.1	+59.7	2.0	33 05.0	+59.7	2.0	34 05.0	+59.7	2.0	35 05.0	+59.7	2.1	36 04.9	+59.7	2.1	37 04.9	+59.7	2.1	38 04.8	+59.8	2.1	76
77	32 04.8	+59.7	1.9	33 04.8	+59.7	1.9	34 04.7	+59.7	1.9	35 04.7	+59.7	1.9	36 04.7	+59.7	1.9	37 04.6	+59.7	2.0	38 04.6	+59.7	2.0	39 04.6	+59.7	2.0	77
78	33 04.5	+59.7	1.7	34 04.5	+59.6	1.8	35 04.4	+59.7	1.8	36 04.4	+59.7	1.8	37 04.4	+59.7	1.8	38 04.3	+59.7	1.8	39 04.3	+59.7	1.9	40 04.3	+59.7	1.9	78
79	34 04.2	+59.6	1.6	35 04.1	+59.7	1.6	36 04.1	+59.7	1.6	37 04.1	+59.7	1.7	38 04.1	+59.7	1.7	39 04.0	+59.7	1.7	40 04.0	+59.7	1.7	41 04.0	+59.7	1.8	79
80	35 03.8	+59.7	1.5	36 03.8	+59.7	1.5	37 03.8	+59.7	1.5	38 03.8	+59.7	1.5	39 03.8	+59.6	1.6	40 03.7	+59.7	1.6	41 03.7	+59.7	1.6	42 03.7	+59.7	1.6	80
81	36 03.5	+59.7	1.4	37 03.5	+59.6	1.4	38 03.5	+59.6	1.4	39 03.5	+59.6	1.4	40 03.4	+59.7	1.4	41 03.4	+59.7	1.4	42 03.4	+59.7	1.5	43 03.4	+59.7	1.5	81
82	37 03.2	+59.6	1.2	38 03.1	+59.7	1.2	39 03.1	+59.7	1.3	40 03.1	+59.7	1.3	41 03.1	+59.7	1.3	42 03.1	+59.6	1.3	43 03.1	+59.6	1.3	44 03.1	+59.6	1.4	82
83	38 02.8	+59.6	1.1	39 02.8	+59.6	1.1	40 02.8	+59.6	1.1	41 02.8	+59.6	1.1	42 02.8	+59.6	1.1	43 02.7	+59.7	1.2	44 02.7	+59.7	1.2	45 02.7	+59.7	1.2	83
84	39 02.4	+59.7	0.9	40 02.4	+59.7	1.0	41 02.4	+59.6	1.0	42 02.4	+59.7	1.0	43 02.4	+59.6	1.0	44 02.4	+59.6	1.0	45 02.4	+59.6	1.1	46 02.4	+59.6	1.1	84
85	40 02.1	+59.6	0.8	41 02.1	+59.6	0.8	42 02.1	+59.6	0.8	43 02.0	+59.7	0.8	44 02.0	+59.7	0.8	45 02.0	+59.6	0.9	46 02.0	+59.6	0.9	47 02.0	+59.6	0.9	85
86	41 01.7	+59.6	0.6	42 01.7	+59.6	0.7	43 01.7	+59.6	0.7	44 01.7	+59.6	0.7	45 01.7	+59.6	0.7	46 01.7	+59.6	0.7	47 01.6	+59.7	0.7	48 01.6	+59.7	0.7	86
87	42 01.3	+59.6	0.5	43 01.3	+59.6	0.5	44 01.3	+59.6	0.5	45 01.3	+59.6	0.5	46 01.3	+59.6	0.5	47 01.3	+59.6	0.5	48 01.3	+59.6	0.6	49 01.3	+59.6	0.6	87
88	43 00.9	+59.5	0.3	44 00.9	+59.5	0.3	45 00.9	+59.5	0.3	46 00.9	+59.5	0.4	47 00.9	+59.5	0.4	48 00.9	+59.5	0.4	49 00.9	+59.5	0.4	50 00.9	+59.5	0.4	88
89	44 00.4	+59.6	0.2	45 00.4	+59.6	0.2	46 00.4	+59.6	0.2	47 00.4	+59.6	0.2	48 00.4	+59.6	0.2	49 00.4	+59.6	0.2	50 00.4	+59.6	0.2	51 00.4	+59.6	0.2	89
90	45 00.0	+59.5	0.0	46 00.0	+59.5	0.0	47 00.0	+59.5	0.0	48 00.0	+59.5	0.0	49 00.0	+59.5	0.0	50 00.0	+59.5	0.0	51 00.0	+59.5	0.0	52 00.0	+59.5	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 173°, 187°**

8°, 352° L.H.A. — LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	44 26.7	+59.4	168.8	43 27.8	+59.5	168.9	42 28.9	+59.5	169.1	41 30.0	+59.5	169.3	40 31.0	+59.6	169.5	39 32.0	+59.6	169.6	38 33.0	+59.6	169.7	37 33.9	+59.7	169.9	0
1	45 26.1	+59.4	168.6	44 27.3	+59.5	168.8	43 28.4	+59.5	168.9	42 29.5	+59.5	169.1	41 30.6	+59.5	169.3	40 31.6	+59.6	169.5	39 32.6	+59.6	169.6	38 33.6	+59.6	169.7	1
2	46 25.5	+59.4	168.4	45 26.7	+59.4	168.6	44 27.9	+59.5	168.8	43 29.0	+59.5	168.9	42 30.1	+59.5	169.1	41 31.2	+59.6	169.3	40 32.2	+59.6	169.5	39 33.2	+59.6	169.6	2
3	47 24.9	+59.3	168.1	46 26.1	+59.4	168.4	45 27.4	+59.4	168.6	44 28.5	+59.5	168.8	43 29.7	+59.5	169.0	42 30.8	+59.5	169.1	41 31.8	+59.6	169.3	40 32.8	+59.6	169.5	3
4	48 24.2	+59.4	167.9	47 25.5	+59.4	168.2	46 26.8	+59.4	168.4	45 28.0	+59.5	168.6	44 29.2	+59.5	168.8	43 30.3	+59.5	169.0	42 31.4	+59.6	169.1	41 32.4	+59.6	169.3	4
5	49 23.6	+59.3	167.7	48 24.9	+59.4	167.9	47 26.2	+59.4	168.2	46 27.5	+59.4	168.4	45 28.7	+59.5	168.6	44 29.8	+59.5	168.8	43 31.0	+59.6	169.0	42 32.0	+59.6	169.2	5
6	50 22.9	+59.2	167.5	49 24.3	+59.3	167.7	48 25.6	+59.4	168.0	47 26.9	+59.4	168.2	46 28.2	+59.4	168.4	45 29.4	+59.5	168.6	44 30.5	+59.5	168.8	43 31.6	+59.6	169.0	6
7	51 22.1	+59.3	167.2	50 23.6	+59.3	167.5	49 25.0	+59.3	167.7	48 26.3	+59.4	168.0	47 27.6	+59.5	168.2	46 28.9	+59.4	168.4	45 30.1	+59.5	168.6	44 31.2	+59.6	168.8	7
8	52 21.4	+59.2	167.0	51 22.9	+59.2	167.2	50 24.3	+59.3	167.5	49 25.7	+59.4	167.8	48 27.1	+59.4	168.0	47 28.3	+59.5	168.2	46 29.6	+59.5	168.5	45 30.8	+59.5	168.7	8
9	53 20.6	+59.1	166.7	52 22.1	+59.3	167.0	51 23.6	+59.3	167.3	50 25.1	+59.3	167.5	49 26.5	+59.4	167.8	48 27.8	+59.4	168.0	47 29.1	+59.4	168.3	46 30.3	+59.5	168.5	9
10	54 19.7	+59.1	166.4	53 21.4	+59.1	166.7	52 22.9	+59.2	167.0	51 24.4	+59.3	167.3	50 25.9	+59.3	167.6	49 27.2	+59.5	167.8	48 28.6	+59.4	168.1	47 29.8	+59.5	168.3	10
11	55 18.8	+59.1	166.1	54 20.5	+59.2	166.4	53 22.2	+59.2	166.8	52 23.7	+59.3	167.1	51 25.2	+59.3	167.3	50 26.7	+59.3	167.6	49 28.0	+59.5	167.9	48 29.3	+59.5	168.1	11
12	56 17.9	+59.0	165.8	55 19.7	+59.1	166.2	54 21.4	+59.2	166.5	53 23.0	+59.3	166.8	52 24.6	+59.3	167.1	51 26.0	+59.4	167.4	50 27.5	+59.4	167.7	49 28.8	+59.5	167.9	12
13	57 16.9	+59.0	165.5	56 18.8	+59.1	165.8	55 20.6	+59.1	166.2	54 22.3	+59.2	166.5	53 23.9	+59.3	166.9	52 25.4	+59.3	167.2	51 26.9	+59.4	167.4	50 28.3	+59.4	167.7	13
14	58 15.9	+58.9	165.1	57 17.9	+59.0	165.5	56 19.7	+59.1	165.9	55 21.5	+59.1	166.3	54 23.2	+59.2	166.6	53 24.7	+59.4	166.9	52 26.3	+59.3	167.2	51 27.7	+59.4	167.5	14
15	59 14.8	+58.9	164.8	58 16.9	+58.9	165.2	57 18.8	+59.0	165.6	56 20.6	+59.2	166.0	55 22.4	+59.2	166.3	54 24.1	+59.2	166.6	53 25.6	+59.4	167.0	52 27.1	+59.4	167.3	15
16	60 13.7	+58.7	164.4	59 15.8	+58.9	164.8	58 17.8	+59.0	165.3	57 19.8	+59.0	165.7	56 21.6	+59.1	166.0	55 23.3	+59.6	166.3	54 25.0	+59.3	166.6	53 26.5	+59.4	167.0	16
17	61 12.4	+58.7	164.0	60 14.7	+58.8	164.4	59 16.8	+59.0	164.9	58 18.8	+59.1	165.3	57 20.7	+59.2	165.7	56 22.6	+59.1	166.1	55 24.3	+59.2	166.4	54 25.9	+59.3	166.8	17
18	62 11.1	+58.6	163.5	61 13.5	+58.7	164.0	60 15.8	+58.8	164.5	59 17.9	+58.9	165.0	58 19.9	+59.0	165.4	57 21.7	+59.2	165.8	56 23.5	+59.3	166.2	55 25.2	+59.3	166.5	18
19	63 09.7	+58.5	163.1	62 12.2	+58.7	163.6	61 14.6	+58.8	164.1	60 16.8	+58.9	164.6	59 18.9	+59.0	165.1	58 20.9	+59.1	165.5	57 22.8	+59.1	165.9	56 24.5	+59.3	166.3	19
20	64 08.2	+58.4	162.6	63 10.9	+58.6	163.1	62 13.4	+58.7	163.7	61 15.7	+58.8	164.2	60 17.9	+59.0	164.7	59 20.0	+59.0	165.1	58 21.9	+59.2	165.6	57 23.8	+59.2	166.0	20
21	65 06.6	+58.3	162.0	64 09.5	+58.4	162.7	63 12.1	+58.6	163.3	62 14.6	+58.7	163.8	61 16.9	+58.8	164.3	60 19.0	+59.0	164.8	59 21.1	+59.0	165.2	58 23.0	+59.2	165.6	21
22	66 04.9	+58.1	161.4	65 07.9	+58.3	162.1	64 10.7	+58.5	162.8	63 13.3	+58.7	163.4	62 15.7	+58.8	163.9	61 18.0	+58.9	164.4	60 20.1	+59.1	164.9	59 22.2	+59.1	165.3	22
23	67 03.0	+58.0	160.8	66 06.2	+58.2	161.6	65 09.2	+58.4	162.2	64 12.0	+58.5	162.9	63 14.5	+58.7	163.5	62 16.9	+58.9	164.0	61 19.2	+58.9	164.5	60 21.3	+59.0	165.0	23
24	68 01.0	+57.8	160.1	67 04.4	+58.1	161.0	66 07.6	+58.3	161.7	65 10.5	+58.5	162.4	64 13.2	+58.6	163.0	63 15.8	+58.7	163.6	62 18.1	+58.9	164.1	61 20.3	+59.1	164.6	24
25	68 58.8	+57.6	159.4	68 02.5	+57.8	160.3	67 05.9	+58.1	161.1	66 09.0	+58.3	161.8	65 11.8	+58.6	162.5	64 14.5	+58.7	163.1	63 17.0	+58.8	163.7	62 19.4	+58.9	164.2	25
26	69 56.4	+57.3	158.6	69 00.3	+57.7	159.6	68 04.0	+57.9	160.4	67 07.3	+58.2	161.2	66 10.4	+58.4	162.0	65 13.2	+58.6	162.6	64 15.8	+58.8	163.3	63 18.3	+58.8	163.8	26
27	70 53.7	+57.1	157.7	69 58.0	+57.5	158.8	69 01.9	+57.8	159.7	68 05.5	+58.0	160.6	67 08.7	+58.3	161.4	66 11.8	+58.4	162.1	65 14.6	+58.6	162.8	64 17.1	+58.8	163.4	27
28	71 50.8	+56.8	156.8	70 55.5	+57.1	157.9	69 59.7	+57.5	158.9	69 03.5	+57.8	159.9	68 07.0	+58.1	160.8	67 10.2	+58.3	161.5	66 13.2	+58.5	162.3	65 15.9	+58.7	162.9	28
29	72 47.6	+56.4	155.7	71 52.6	+56.9	157.0	70 57.2	+57.3	158.1	70 01.3	+57.6	159.1	69 05.1	+57.9	160.1	68 08.5	+58.2	160.9	67 11.7	+58.4	161.7	66 14.6	+58.6	162.4	29
30	73 44.0	+55.9	154.5	72 49.5	+56.5	155.9	71 54.5	+56.9	157.2	70 58.9	+57.4	158.3	70 03.0	+57.7	159.3	69 06.7	+58.0	160.2	68 10.1	+58.2	161.1	67 13.2	+58.4	161.9	30
31	74 39.9	+55.4	153.2	73 46.0	+56.1	154.7	72 51.4	+56.6	156.1	71 56.3	+57.1	157.4	71 00.7	+57.5	158.5	70 04.7	+57.8	159.5	69 08.3	+58.1	160.4	68 11.6	+58.3	161.3	31
32	75 35.3	+54.8	151.7	74 42.1	+55.5	153.4	73 48.0	+56.2	155.0	72 53.4	+56.7	156.3	71 58.2	+57.1	157.6	71 02.5	+57.5	158.7	70 06.4	+57.8	159.7	69 09.9	+58.2	160.6	32
33	76 30.1	+54.0	150.0	75 37.6	+55.0	152.0	74 44.2	+55.7	153.7	73 50.1	+56.3	155.2	72 55.3	+56.9	156.6	72 00.0	+57.3	157.8	71 04.2	+57.7	158.9	70 08.1	+57.9	159.9	33
34	77 24.1	+53.0	148.1	76 32.6	+54.1	150.3	75 39.9	+55.1	152.2	74 46.4	+55.9	153.9	73 52.2	+56.4	155.5	72 57.3	+57.0	156.8	72 01.9	+57.4	158.0	71 06.0	+57.8	159.1	34
35	78 17.1	+51.9	145.8	77 26.7	+53.3	148.4	76 35.0	+54.4	150.6	75 42.3	+55.2	152.5	74 48.6	+56.0	154.2	73 54.3	+56.6	155.7	72 59.3	+57.1	157.1	72 03.8	+57.5	158.3	35
36	79 09.0	+50.3	143.3	78 20.0	+52.0	146.2	77 29.4	+53.4	148.7	76 37.5	+54.6	150.9	75 44.6	+55.5	152.8	74 50.9	+56.1	154.5	73 56.4	+56.7	156.0	73 01.3	+57.2	157.3	36
37	79 59.3	+48.4•	140.3	79 12.0	+50.6	143.6	78 22.8	+52.3	146.5	77 32.1	+53.6	149.0	76 40.1	+54.7	151.2	75 47.0	+55.6	153.0	74 53.1	+56.3	154.8	73 58.5	+56.8	156.2	37
38	80 47.7	+46.0•	136.7	80 02.6	+48.8•	140.6	79 15.1	+50.9	144.0	78 25.7	+52.6	146.9	77 34.8	+53.8	149.3	76 42.6	+54.9	151.5	75 49.4	+55.7	153.4	74 55.3	+56.5	155.1	38
39	81 33.7	+42.8•	132.5	80 51.4	+46.3•	137.1	80 06.0	+49.0•	141.0	79 18.3	+51.1	144.4	78 28.6	+52.8	147.2	77 37.5	+54.1	149.7	76 45.1	+55.1	151.8	75 51.8	+55.9	153.7	39
40	82 16.5	+38.6•	127.5	81 37.7	+43.1•	132.9	80 55.0	+46.7•	137.5	80 09.4	+49.4•	141.4	79 21.4	+51.4	144.7	78 31.6	+53.0	147.6	77 40.2	+54.3	150.0	76 47.7	+55.3	152.2	40
41	82 55.1	+33.2•	121.6	82 20.8	+39.0•	127.9	81 41.7	+43.5•	133.4	80 58.8	+46.9•	137.9	80 12.8	+49.7•	141.8	79 24.6	+51.7	145.1	78 34.5	+53.0	148.0	77 43.0	+54.5	150.4	41
42	83 28.3	+26.3•	114.5	82 59.8	+33.7•	122.0	82 25.2	+39.4•	128.4	81 45.7	+44.0•	133.8	81 02.5	+47.3•	138.4	80 16.3	+49.9	142.3	79 27.8	+51.9	145.6	78 37.5	+53.5	148.4	42
43	83 54.6	+18.0•	106.4	83 33.5	+26.7•	114.9	83 04.6	+34.1•	122.4	82 29.7	+39.8•	128.8	81 49.8	+44.4•	134.3	81 06.2	+47.8•	138.8	80 19.7	+50.3	142.7	79 31.0	+52.2	146.0	43
44	84 12.6	+8.1•	97.1	84 00.2	+18.2•	106.6	83 38.7	+27.1•	115.2	83 09.5	+34.5•	122.8	82 34.2	+40.2•	129.3	81 54.0	+44.7•	134.7	81 10.0	+48.1•	139.3	80 23.2	+50.6	143.2	44
45	84 20.7	−2.3•	87.2	84 18.4	+8.3•	97.2	84 05.8	+18.5•	106.9	83 44.0	+27.5•	115.6	83 14.4	+35.0•	123.3	82 38.7	+40.7•	129.8	81 58.1	+45.1•	135.2	81 13.8	+48.5•	139.8	45
46	84 18.4	−12.6•	77.0	84 26.7	−2.4•	87.1	84 24.3	+8.5•	97.4	84 11.5	+18.9•	107.2	83 49.4	+27.9•	116.0	83 19.4	+35.4•	123.7	82 43.2	+41.2•	130.3	82 02.3	+45.5•	135.7	46
47	84 05.8	−21.8•	67.4	84 24.3	−12.8•	76.8	84 32.8	−2.4•	87.1	84 30.4	+8.6•	97.5	84 17.3	+19.2•	107.5	83 54.8	+28.4•	116.5	83 24.4	+35.9•	124.2	82 47.8	+41.7•	130.8	47
48	83 44.0	−29.6•	58.6	84 11.5	−22.1•	67.0	84 30.4	−13.1•	76.6	84 39.0	−2.5•	87.0	84 36.5	+8.7•	97.7	84 23.2	+19.5•	107.8	84 00.3	+28.9•	116.9	83 29.5	+36.4•	124.8	48
49	83 14.4	−35.7•	50.9	83 49.4	−30.0•	58.1	84 17.3	−22.5•	66.6	84 36.5	−13.3•	76.3	84 45.2	−2.5•	87.0	84 42.7	+8.9•	97.8	84 29.2	+19.8•	108.2	84 05.9	+29.3•	117.4	49
50	82 38.7	−40.6•	44.3	83 19.4	−36.2•	50.3	83 54.8	−30.4•	57.5	84 23.2	−22.9•	66.2	84 42.7	−13.5•	76.1	84 51.6	−2.6•	86.9	84 49.0	+9.1•	98.0	84 37.2	+20.2•	108.5	50
51	81 58.1	−44.3•	38.8	82 43.2	−40.9•	43.7	83 24.4	−36.6•	49.7	84 00.3	−30.8•	57.0	84 29.2	−23.3•	65.7	84 49.0	−13.8•	75.8	84 58.1	−2.7•	86.9	84 55.4	+9.2•	98.2	51
52	81 13.8	−47.1•	34.2	82 02.3	−44.7•	38.2	82 47.8	−41.3•	43.1	83 29.5	−37.1•	49.1	84 05.9	−31.3•	56.4	84 35.2	−23.7•	65.3	84 55.4	−14.1•	75.5	85 04.6	−2.7•	86.8	52
53	80 26.7	−49.3•	30.3	81 17.6	−47.4•	33.6	82 06.5	−45.1•	37.6	82 52.4	−41.8•	42.5	83 34.6	−37.5•	48.5	84 11.5	−31.8•	55.8	84 41.3	−24.2•	64.8	85 01.9	−14.5•	75.2	53
54	79 37.4	−51.1	27.0	80 30.2	−49.6	29.7	81 21.4	−47.7•	33.0	82 10.6	−45.3•	36.9	82 57.1	−42.3•	41.8	83 39.7	−38.0•	47.8	84 17.1	−32.3•	55.2	84 47.4	−24.6•	64.3	54
55	78 46.3	−52.4	24.2	79 40.6	−51.3	26.5	80 33.7	−49.9	29.1	81 25.3	−48.2•	32.4	82 14.8	−45.7•	36.3	83 01.7	−42.7•	41.1	83 44.8	−38.4•	47.1	84 22.8	−32.8•	54.6	55
56	77 53.9	−53.4	21.8	78 49.3	−52.6	23.7	79 43.8	−51.5	25.9	80 37.1	−50.1	28.5	81 29.1	−48.5•	31.7	82 19.0	−46.1•	35.8	83 06.4	−43.2•	40.4	83 50.0	−39.0•	46.4	56
57	77 00.5	−54.4	19.7	77 56.7	−53.7	21.3	78 52.2	−52.8	23.1	79 47.0	−51.9	25.3	80 40.6	−50.5	27.9	81 32.9	−48.8•	31.0	82 23.2	−46.5•	34.9	83 11.0	−43.6•	39.7	57
58	76 06.1	−55.1	17.9	77 03.0	−54.5	19.2	77 59.4	−53.9	20.8	78 55.1	−53.0	22.6	79 50.1	−52.0	24.7	80 44.1	−50.8	27.3	81 36.7	−49.2•	30.4	82 27.4	−47.0•	34.2	58
59	75 11.0	−55.6	16.3	76 08.5	−55.3	17.4	77 05.5	−54.7	18.7	78 02.1	−54.1	20.2	78 58.1	−53.3	22.0	79 53.3	−52.3	24.1	80 47.5	−51.1	26.6	81 40.4	−49.5•	29.7	59
60	74 15.4	−56.2	14.9	75 13.2	−55.8	15.8	76 10.8	−55.4	16.9	77 08.0	−54.9	18.2	78 04.8	−54.3	19.7	79 01.0	−53.6	21.4	79 56.4	−52.6	23.5	80 50.9	−51.4	25.9	60
61	73 19.2	−56.5	13.6	74 17.4	−56.2	14.4	75 15.4	−55.9	15.4	76 13.1	−55.5	16.5	77 10.5	−55.1	17.7	78 07.4	−54.4	19.1	79 03.8	−53.7	20.8	79 59.5	−52.8	22.8	61
62	72 22.7	−56.9	12.5	73 21.2	−56.7	13.2	74 19.5	−56.4	14.0	75 17.6	−56.1	14.9	76 15.4	−55.7	16.0	77 13.0	−55.3	17.2	78 10.1	−54.7	18.6	79 06.7	−54.0	20.2	62
63	71 25.8	−57.2	11.4	72 24.5	−57.0	12.1	73 23.1	−56.8	12.8	74 21.5	−56.5	13.6	75 19.8	−56.3	14.4	76 17.7	−55.8	15.5	77 15.4	−55.4	16.6	78 12.7	−54.9	18.0	63
64	70 28.6	−57.5	10.5	71 27.5	−57.3	11.1	72 26.3	−57.1	11.7	73 25.0	−56.9	12.3	74 23.5	−56.6	13.1	75 21.9	−56.4	14.0	76 20.0	−56.0	15.0	77 17.8	−55.6	16.1	64
65	69 31.1	−57.7	9.7	70 30.2	−57.5	10.2	71 29.2	−57.4	10.7	72 28.1	−57.2	11.3	73 26.9	−57.0	11.9	74 25.5	−56.7	12.7	75 24.0	−56.5	13.5	76 22.2	−56.2	14.5	65
66	68 33.4	−57.9	8.9	69 32.7	−57.8	9.3	70 31.8	−57.6	9.8	71 30.9	−57.5	10.3	72 29.9	−57.3	10.8	73 28.8	−57.2	11.5	74 27.5	−56.9	12.2	75 26.0	−56.6	13.0	66
67	67 35.5	−58.0	8.2	68 34.9	−57.9	8.6	69 34.2	−57.8	9.0	70 33.4	−57.7	9.4	71 32.6	−57.6	9.9	72 31.6	−57.4	10.4	73 30.6	−57.2	11.0	74 29.4	−57.0	11.7	67
68	66 37.5	−58.2	7.6	67 37.0	−58.2	7.9	68 36.4	−58.1	8.2	69 35.7	−57.9	8.6	70 35.0	−57.8	8.9	71 34.2	−57.6	9.5	72 33.4	−57.6	10.0	73 32.4	−57.4	10.6	68
69	65 39.3	−58.3	6.9	66 38.8	−58.2	7.2	67 38.3	−58.1	7.5	68 37.8	−58.1	7.9	69 37.2	−58.0	8.2	70 36.6	−57.9	8.5	71 35.8	−57.7	9.1	72 35.0	−57.6	9.6	69
70	64 41.0	−58.5	6.4	65 40.6	−58.4	6.6	66 40.2	−58.4	6.9	67 39.7	−58.2	7.2	68 39.2	−58.1	7.5	69 38.7	−58.1	7.9	70 38.1	−58.0	8.3	71 37.4	−57.8	8.7	70
71	63 42.5	−58.5	5.9	64 42.2	−58.5	6.1	65 41.8	−58.4	6.3	66 41.5	−58.4	6.6	67 41.1	−58.4	6.9	68 40.6	−58.2	7.2	69 40.1	−58.1	7.5	70 39.6	−58.1	7.9	71
72	62 44.0	−58.7	5.4	63 43.7	−58.6	5.6	64 43.4	−58.5	5.8	65 43.1	−58.5	6.0	66 42.7	−58.4	6.3	67 42.4	−58.4	6.5	68 42.0	−58.3	6.8	69 41.5	−58.2	7.1	72
73	61 45.3	−58.7	4.9	62 45.1	−58.7	5.1	63 44.9	−58.7	5.3	64 44.6	−58.6	5.5	65 44.3	−58.6	5.7	66 44.0	−58.5	5.9	67 43.7	−58.5	6.2	68 43.3	−58.4	6.4	73
74	60 46.6	−58.8	4.5	61 46.4	−58.8	4.7	62 46.2	−58.7	4.8	63 46.0	−58.7	5.0	64 45.7	−58.6	5.2	65 45.5	−58.6	5.4	66 45.2	−58.5	5.6	67 44.9	−58.5	5.8	74
75	59 47.8	−58.9	4.1	60 47.6	−58.9	4.2	61 47.5	−58.8	4.4	62 47.3	−58.8	4.5	63 47.1	−58.8	4.7	64 46.9	−58.7	4.8	65 46.7	−58.7	5.0	66 46.4	−58.6	5.2	75
76	58 48.9	−58.9	3.7	59 48.8	−58.9	3.8	60 48.6	−58.8	4.0	61 48.5	−58.8	4.1	62 48.3	−58.8	4.2	63 48.2	−58.8	4.4	64 48.0	−58.7	4.5	65 47.8	−58.7	4.7	76
77	57 50.0	−59.0	3.4	58 49.9	−59.0	3.5	59 49.8	−59.0	3.6	60 49.6	−58.9	3.7	61 49.5	−58.9	3.8	62 49.4	−58.9	3.9	63 49.2	−58.8	4.1	64 49.1	−58.8	4.2	77
78	56 51.0	−59.1	3.0	57 50.9	−59.1	3.1	58 50.8	−59.1	3.2	59 50.7	−59.0	3.3	60 50.6	−59.0	3.4	61 50.5	−59.0	3.4	62 50.4	−58.9	3.6	63 50.3	−59.0	3.8	78
79	55 51.9	−59.1	2.7	56 51.9	−59.1	2.8	57 51.8	−59.1	2.9	58 51.7	−59.0	2.9	59 51.6	−59.0	3.0	60 51.6	−59.1	3.1	61 51.5	−59.0	3.2	62 51.4	−59.0	3.3	79
80	54 52.8	−59.1	2.4	55 52.8	−59.1	2.5	56 52.7	−59.1	2.5	57 52.7	−59.1	2.6	58 52.6	−59.1	2.7	59 52.5	−59.0	2.8	60 52.5	−59.1	2.8	61 52.4	−59.0	2.9	80
81	53 53.7	−59.2	2.1	54 53.7	−59.2	2.2	55 53.6	−59.1	2.2	56 53.5	−59.1	2.3	57 53.5	−59.1	2.3	58 53.5	−59.1	2.5	59 53.4	−59.1	2.5	60 53.4	−59.1	2.6	81
82	52 54.5	−59.2	1.8	53 54.5	−59.2	1.9	54 54.5	−59.2	1.9	55 54.4	−59.2	2.0	56 54.4	−59.2	2.0	57 54.4	−59.2	2.1	58 54.3	−59.1	2.1	59 54.3	−59.2	2.2	82
83	51 55.3	−59.2	1.6	52 55.3	−59.2	1.6	53 55.3	−59.3	1.7	54 55.2	−59.2	1.7	55 55.2	−59.2	1.7	56 55.2	−59.2	1.8	57 55.2	−59.2	1.8	58 55.1	−59.2	1.9	83
84	50 56.1	−59.3	1.3	51 56.1	−59.3	1.4	52 56.0	−59.2	1.4	53 56.0	−59.2	1.4	54 56.0	−59.3	1.5	55 56.0	−59.3	1.5	56 56.0	−59.3	1.6	57 56.0	−59.3	1.6	84
85	49 56.8	−59.3	1.1	50 56.8	−59.3	1.1	51 56.8	−59.3	1.1	52 56.8	−59.3	1.2	53 56.7	−59.3	1.2	54 56.7	−59.3	1.2	55 56.7	−59.3	1.2	56 56.7	−59.3	1.3	85
86	48 57.5	−59.4	0.8	49 57.5	−59.4	0.9	50 57.5	−59.4	0.9	51 57.5	−59.4	0.9	52 57.5	−59.4	0.9	53 57.4	−59.3	0.9	54 57.4	−59.4	1.0	55 57.4	−59.3	1.0	86
87	47 58.2	−59.4	0.6	48 58.1	−59.4	0.6	49 58.1	−59.4	0.6	50 58.1	−59.4	0.7	51 58.1	−59.3	0.7	52 58.1	−59.4	0.7	53 58.1	−59.4	0.7	54 58.1	−59.4	0.7	87
88	46 58.8	−59.4	0.4	47 58.8	−59.4	0.4	48 58.8	−59.4	0.4	49 58.8	−59.4	0.4	50 58.8	−59.4	0.5	51 58.8	−59.4	0.5	52 58.8	−59.4	0.5	53 58.8	−59.4	0.5	88
89	45 59.4	−59.4	0.2	46 59.4	−59.4	0.2	47 59.4	−59.4	0.2	48 59.4	−59.4	0.2	49 59.4	−59.4	0.2	50 59.4	−59.4	0.2	51 59.4	−59.4	0.2	52 59.4	−59.4	0.2	89
90	45 00.0	−59.4	0.0	46 00.0	−59.4	0.0	47 00.0	−59.4	0.0	48 00.0	−59.4	0.0	49 00.0	−59.4	0.0	50 00.0	−59.4	0.0	51 00.0	−59.4	0.0	52 00.0	−59.4	0.0	90

8°, 352° L.H.A. — LATITUDE SAME NAME AS DECLINATION

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 26.7	−59.4	168.8	43 27.8	−59.4	168.9	42 28.9	−59.5	169.1	41 30.0	−59.5	169.3	40 31.0	−59.5	169.5	39 32.0	−59.6	169.6	38 33.0	−59.6	169.7	37 33.9	−59.6	169.9	0
1	43 27.3	−59.5	168.9	42 28.4	−59.5	169.1	41 29.4	−59.5	169.3	40 30.5	−59.6	169.5	39 31.5	−59.6	169.6	38 32.4	−59.6	169.8	37 33.4	−59.7	169.9	36 34.3	−59.7	170.0	1
2	42 27.8	−59.5	169.1	41 28.9	−59.5	169.3	40 29.9	−59.6	169.5	39 30.9	−59.6	169.6	38 31.9	−59.6	169.8	37 32.8	−59.6	169.9	36 33.7	−59.7	170.0	35 34.6	−59.6	170.2	2
3	41 28.3	−59.4	169.3	40 29.4	−59.6	169.5	39 30.4	−59.6	169.6	38 31.3	−59.5	169.8	37 32.3	−59.6	169.9	36 33.2	−59.6	170.0	35 34.1	−59.7	170.2	34 35.0	−59.7	170.3	3
4	40 28.9	−59.6	169.5	39 29.8	−59.6	169.6	38 30.8	−59.6	169.8	37 31.8	−59.6	169.9	36 32.7	−59.7	170.0	35 33.6	−59.7	170.2	34 34.4	−59.7	170.3	33 35.3	−59.7	170.4	4
5	39 29.3	−59.5	169.7	38 30.3	−59.5	169.8	37 31.2	−59.5	169.9	36 32.2	−59.6	170.1	35 33.0	−59.6	170.2	34 33.9	−59.6	170.3	33 34.8	−59.7	170.4	32 35.6	−59.7	170.5	5
6	38 29.8	−59.5	169.8	37 30.8	−59.6	170.0	36 31.7	−59.6	170.1	35 32.6	−59.7	170.2	34 33.4	−59.6	170.3	33 34.3	−59.7	170.4	32 35.1	−59.7	170.5	31 35.9	−59.7	170.6	6
7	37 30.3	−59.5	170.0	36 31.2	−59.6	170.1	35 32.1	−59.6	170.2	34 32.9	−59.6	170.3	33 33.8	−59.7	170.5	32 34.6	−59.7	170.6	31 35.4	−59.7	170.7	30 36.2	−59.7	170.8	7
8	36 30.8	−59.6	170.1	35 31.6	−59.6	170.3	34 32.5	−59.6	170.4	33 33.3	−59.6	170.5	32 34.1	−59.6	170.6	31 34.9	−59.7	170.7	30 35.7	−59.7	170.8	29 36.5	−59.7	170.9	8
9	35 31.2	−59.6	170.3	34 32.1	−59.6	170.4	33 32.9	−59.6	170.5	32 33.7	−59.6	170.6	31 34.5	−59.7	170.7	30 35.3	−59.7	170.8	29 36.0	−59.7	170.9	28 36.8	−59.7	171.0	9
10	34 31.6	−59.5	170.4	33 32.5	−59.6	170.5	32 33.3	−59.6	170.7	31 34.1	−59.7	170.7	30 34.8	−59.6	170.9	29 35.6	−59.7	170.9	28 36.3	−59.7	171.0	27 37.1	−59.8	171.1	10
11	33 32.1	−59.6	170.6	32 32.9	−59.6	170.7	31 33.7	−59.7	170.8	30 34.4	−59.6	170.9	29 35.2	−59.7	171.0	28 35.9	−59.7	171.0	27 36.6	−59.7	171.1	26 37.3	−59.7	171.2	11
12	32 32.5	−59.6	170.7	31 33.3	−59.7	170.8	30 34.0	−59.6	170.9	29 34.8	−59.7	171.0	28 35.5	−59.7	171.1	27 36.2	−59.7	171.2	26 36.9	−59.7	171.2	25 37.6	−59.7	171.3	12
13	31 32.9	−59.6	170.8	30 33.6	−59.6	170.9	29 34.4	−59.7	171.1	28 35.1	−59.7	171.1	27 35.8	−59.7	171.3	26 36.5	−59.7	171.3	25 37.2	−59.7	171.4	24 37.9	−59.7	171.4	13
14	30 33.3	−59.6	171.0	29 34.0	−59.6	171.1	28 34.7	−59.6	171.2	27 35.4	−59.6	171.2	26 36.1	−59.6	171.3	25 36.8	−59.7	171.4	24 37.5	−59.7	171.5	23 38.2	−59.8	171.5	14
15	29 33.7	−59.6	171.1	28 34.4	−59.7	171.2	27 35.1	−59.7	171.3	26 35.8	−59.7	171.4	25 36.5	−59.7	171.4	24 37.1	−59.7	171.5	23 37.8	−59.8	171.6	22 38.4	−59.7	171.6	15
16	28 34.1	−59.7	171.2	27 34.7	−59.6	171.3	26 35.4	−59.6	171.5	25 36.1	−59.7	171.5	24 36.8	−59.7	171.5	23 37.4	−59.7	171.6	22 38.0	−59.7	171.7	21 38.7	−59.8	171.7	16
17	27 34.4	−59.6	171.4	26 35.1	−59.6	171.4	25 35.8	−59.7	171.5	24 36.4	−59.7	171.6	23 37.1	−59.7	171.6	22 37.7	−59.7	171.7	21 38.3	−59.7	171.8	20 38.9	−59.7	171.8	17
18	26 34.8	−59.6	171.5	25 35.5	−59.7	171.6	24 36.1	−59.7	171.6	23 36.7	−59.7	171.7	22 37.4	−59.8	171.8	21 38.0	−59.8	171.8	20 38.6	−59.8	171.9	19 39.2	−59.8	171.9	18
19	25 35.2	−59.7	171.6	24 35.8	−59.7	171.7	23 36.4	−59.7	171.7	22 37.0	−59.7	171.8	21 37.6	−59.7	171.9	20 38.2	−59.7	171.9	19 38.8	−59.8	172.0	18 39.4	−59.7	172.0	19
20	24 35.5	−59.6	171.7	23 36.1	−59.7	171.8	22 36.7	−59.7	171.9	21 37.3	−59.7	171.9	20 37.9	−59.7	172.0	19 38.5	−59.7	172.0	18 39.1	−59.7	172.1	17 39.7	−59.8	172.1	20
21	23 35.9	−59.7	171.8	22 36.5	−59.7	171.9	21 37.1	−59.7	172.0	20 37.6	−59.7	172.0	19 38.2	−59.7	172.1	18 38.8	−59.7	172.1	17 39.4	−59.8	172.2	16 39.9	−59.8	172.2	21
22	22 36.2	−59.7	172.0	21 36.8	−59.7	172.0	20 37.4	−59.7	172.1	19 37.9	−59.7	172.1	18 38.5	−59.7	172.2	17 39.1	−59.8	172.2	16 39.6	−59.7	172.3	15 40.1	−59.7	172.3	22
23	21 36.5	−59.7	172.1	20 37.1	−59.7	172.1	19 37.7	−59.7	172.2	18 38.2	−59.7	172.2	17 38.8	−59.7	172.3	16 39.3	−59.7	172.3	15 39.9	−59.8	172.4	14 40.4	−59.8	172.4	23
24	20 36.9	−59.7	172.2	19 37.4	−59.7	172.2	18 38.0	−59.7	172.3	17 38.5	−59.7	172.3	16 39.1	−59.8	172.4	15 39.6	−59.8	172.4	14 40.1	−59.8	172.4	13 40.6	−59.7	172.5	24
25	19 37.2	−59.7	172.3	18 37.7	−59.6	172.4	17 38.3	−59.7	172.4	16 38.8	−59.7	172.4	15 39.3	−59.7	172.5	14 39.8	−59.7	172.5	13 40.3	−59.7	172.5	12 40.9	−59.8	172.6	25
26	18 37.5	−59.7	172.4	17 38.1	−59.7	172.5	16 38.6	−59.7	172.5	15 39.1	−59.7	172.5	14 39.6	−59.7	172.6	13 40.1	−59.8	172.6	12 40.6	−59.7	172.6	11 41.1	−59.7	172.7	26
27	17 37.9	−59.7	172.5	16 38.4	−59.7	172.6	15 38.9	−59.7	172.6	14 39.4	−59.8	172.6	13 39.9	−59.8	172.7	12 40.3	−59.7	172.7	11 40.8	−59.7	172.7	10 41.3	−59.8	172.8	27
28	16 38.2	−59.7	172.6	15 38.7	−59.7	172.7	14 39.2	−59.8	172.7	13 39.6	−59.7	172.7	12 40.1	−59.7	172.8	11 40.6	−59.7	172.8	10 41.1	−59.8	172.8	9 41.5	−59.7	172.9	28
29	15 38.5	−59.7	172.7	14 39.0	−59.7	172.8	13 39.4	−59.7	172.8	12 39.9	−59.8	172.8	11 40.4	−59.8	172.9	10 40.8	−59.7	172.9	9 41.3	−59.7	172.9	8 41.8	−59.7	172.9	29
30	14 38.8	−59.7	172.8	13 39.3	−59.7	172.9	12 39.7	−59.7	172.9	11 40.2	−59.7	172.9	10 40.6	−59.7	173.0	9 41.1	−59.8	173.0	8 41.5	−59.7	173.0	7 42.0	−59.8	173.0	30
31	13 39.1	−59.7	172.9	12 39.6	−59.8	173.0	11 40.0	−59.7	173.0	10 40.5	−59.8	173.0	9 40.9	−59.7	173.0	8 41.3	−59.7	173.1	7 41.8	−59.8	173.1	6 42.2	−59.7	173.2	31
32	12 39.4	−59.7	173.1	11 39.9	−59.8	173.1	10 40.3	−59.7	173.1	9 40.7	−59.7	173.1	8 41.2	−59.8	173.1	7 41.6	−59.7	173.2	6 42.0	−59.7	173.2	5 42.4	−59.7	173.2	32
33	11 39.7	−59.7	173.2	10 40.2	−59.8	173.2	9 40.6	−59.7	173.2	8 41.0	−59.7	173.2	7 41.4	−59.7	173.2	6 41.8	−59.7	173.3	5 42.2	−59.7	173.3	4 42.7	−59.8	173.3	33
34	10 40.0	−59.7	173.3	9 40.4	−59.7	173.3	8 40.9	−59.8	173.3	7 41.3	−59.8	173.3	6 41.7	−59.7	173.3	5 42.1	−59.8	173.3	4 42.5	−59.8	173.4	3 42.9	−59.8	173.4	34
35	9 40.3	−59.7	173.4	8 40.7	−59.7	173.4	7 41.1	−59.7	173.4	6 41.5	−59.7	173.4	5 41.9	−59.7	173.4	4 42.3	−59.8	173.4	3 42.7	−59.8	173.4	2 43.1	−59.8	173.4	35
36	8 40.6	−59.7	173.5	7 41.0	−59.7	173.5	6 41.4	−59.7	173.5	5 41.8	−59.7	173.5	4 42.2	−59.8	173.5	3 42.6	−59.8	173.5	2 42.9	−59.7	173.5	1 43.3	−59.8	173.5	36
37	7 40.9	−59.7	173.6	6 41.3	−59.7	173.6	5 41.7	−59.7	173.6	4 42.1	−59.8	173.6	3 42.4	−59.7	173.6	2 42.8	−59.7	173.6	1 43.2	−59.8	173.6	0 43.5	−59.7	173.6	37
38	6 41.2	−59.7	173.7	5 41.6	−59.7	173.7	4 42.0	−59.8	173.7	3 42.3	−59.7	173.7	2 42.7	−59.7	173.7	1 43.0	−59.7	173.7	0 43.4	−59.8	173.7	0 16.2	+59.8	6.3	38
39	5 41.5	−59.7	173.8	4 41.9	−59.7	173.8	3 42.2	−59.7	173.8	2 42.6	−59.8	173.8	1 42.9	−59.7	173.8	0 43.3	−59.8	173.8	0 16.4	+59.7	6.2	1 16.0	+59.8	6.2	39
40	4 41.8	−59.7	173.9	3 42.2	−59.8	173.9	2 42.5	−59.7	173.9	1 42.8	−59.7	173.9	0 43.2	−59.8	173.9	0 16.5	+59.7	6.1	1 16.1	+59.8	6.1	2 15.8	+59.8	6.1	40
41	3 42.1	−59.7	174.0	2 42.4	−59.7	174.0	1 42.8	−59.8	174.0	0 43.1	−59.7	174.0	0 16.6	+59.8	6.0	1 16.2	+59.8	6.0	2 15.9	+59.8	6.0	3 15.6	+59.7	6.0	41
42	2 42.4	−59.7	174.1	1 42.7	−59.7	174.1	0 43.0	−59.7	174.1	0 16.6	+59.8	5.9	1 16.3	+59.8	5.9	2 16.0	+59.8	5.9	3 15.7	+59.7	5.9	4 15.3	+59.8	6.0	42
43	1 42.7	−59.7	174.2	0 43.0	−59.7	174.2	0 16.7	+59.7	5.8	1 16.4	+59.7	5.8	2 16.1	+59.7	5.8	3 15.8	+59.8	5.9	4 15.4	+59.8	5.9	5 15.1	+59.8	5.9	43
44	0 43.0	−59.7	174.3	0 16.7	+59.7	5.7	1 16.4	+59.7	5.7	2 16.1	+59.8	5.7	3 15.8	+59.8	5.8	4 15.5	+59.8	5.8	5 15.2	+59.8	5.8	6 14.9	+59.8	5.8	44
45	0 16.7	+59.7	5.6	1 16.4	+59.8	5.6	2 16.1	+59.8	5.7	3 15.9	+59.7	5.7	4 15.6	+59.7	5.7	5 15.3	+59.8	5.7	6 15.0	+59.7	5.7	7 14.7	+59.8	5.7	45
46	1 16.4	+59.7	5.5	2 16.2	+59.7	5.6	3 15.9	+59.7	5.6	4 15.6	+59.7	5.6	5 15.3	+59.8	5.6	6 15.0	+59.8	5.6	7 14.7	+59.8	5.6	8 14.5	+59.7	5.6	46
47	2 16.1	+59.8	5.5	3 15.9	+59.7	5.5	4 15.6	+59.7	5.5	5 15.3	+59.7	5.5	6 15.1	+59.7	5.5	7 14.8	+59.7	5.5	8 14.5	+59.8	5.5	9 14.2	+59.8	5.5	47
48	3 15.9	+59.7	5.4	4 15.6	+59.7	5.4	5 15.3	+59.8	5.4	6 15.1	+59.7	5.4	7 14.8	+59.7	5.4	8 14.5	+59.8	5.4	9 14.3	+59.7	5.4	10 14.0	+59.8	5.4	48
49	4 15.6	+59.7	5.3	5 15.3	+59.7	5.3	6 15.1	+59.7	5.3	7 14.8	+59.7	5.3	8 14.5	+59.8	5.3	9 14.3	+59.7	5.3	10 14.0	+59.8	5.3	11 13.8	+59.7	5.3	49
50	5 15.3	+59.7	5.2	6 15.0	+59.8	5.2	7 14.8	+59.7	5.2	8 14.5	+59.7	5.2	9 14.3	+59.7	5.2	10 14.0	+59.8	5.2	11 13.8	+59.8	5.3	12 13.5	+59.8	5.3	50
51	6 15.0	+59.7	5.1	7 14.7	+59.8	5.1	8 14.5	+59.7	5.1	9 14.3	+59.7	5.1	10 14.0	+59.8	5.1	11 13.8	+59.7	5.1	12 13.6	+59.7	5.1	13 13.3	+59.8	5.2	51
52	7 14.7	+59.7	5.0	8 14.5	+59.7	5.0	9 14.2	+59.7	5.0	10 14.0	+59.7	5.0	11 13.8	+59.7	5.0	12 13.5	+59.8	5.0	13 13.3	+59.7	5.0	14 13.1	+59.7	5.1	52
53	8 14.4	+59.7	4.9	9 14.2	+59.7	4.9	10 13.9	+59.8	4.9	11 13.7	+59.7	4.9	12 13.5	+59.7	4.9	13 13.2	+59.8	4.9	14 13.1	+59.7	5.0	15 12.8	+59.8	5.0	53
54	9 14.1	+59.7	4.8	10 13.9	+59.7	4.8	11 13.7	+59.7	4.8	12 13.5	+59.7	4.8	13 13.2	+59.8	4.8	14 13.0	+59.7	4.8	15 12.8	+59.8	4.9	16 12.6	+59.8	4.9	54
55	10 13.8	+59.7	4.7	11 13.6	+59.7	4.7	12 13.4	+59.7	4.7	13 13.2	+59.7	4.7	14 13.0	+59.7	4.7	15 12.8	+59.7	4.7	16 12.6	+59.7	4.8	17 12.4	+59.8	4.8	55
56	11 13.5	+59.7	4.6	12 13.3	+59.7	4.6	13 13.1	+59.7	4.6	14 12.9	+59.7	4.6	15 12.7	+59.8	4.6	16 12.5	+59.8	4.6	17 12.3	+59.8	4.7	18 12.1	+59.7	4.7	56
57	12 13.2	+59.7	4.4	13 13.0	+59.7	4.5	14 12.8	+59.7	4.5	15 12.6	+59.7	4.5	16 12.4	+59.8	4.5	17 12.3	+59.7	4.6	18 12.1	+59.7	4.6	19 11.9	+59.8	4.6	57
58	13 12.9	+59.7	4.3	14 12.7	+59.7	4.4	15 12.5	+59.8	4.4	16 12.3	+59.8	4.4	17 12.2	+59.7	4.4	18 12.0	+59.7	4.5	19 11.8	+59.7	4.5	20 11.6	+59.8	4.5	58
59	14 12.6	+59.7	4.2	15 12.4	+59.8	4.3	16 12.2	+59.7	4.3	17 12.1	+59.7	4.3	18 11.9	+59.7	4.3	19 11.7	+59.7	4.4	20 11.5	+59.8	4.4	21 11.4	+59.7	4.4	59
60	15 12.3	+59.6	4.1	16 12.1	+59.7	4.2	17 11.9	+59.7	4.2	18 11.8	+59.7	4.2	19 11.6	+59.7	4.2	20 11.4	+59.7	4.3	21 11.3	+59.7	4.3	22 11.1	+59.8	4.3	60
61	16 11.9	+59.7	4.0	17 11.8	+59.7	4.1	18 11.6	+59.7	4.1	19 11.5	+59.7	4.1	20 11.3	+59.7	4.1	21 11.2	+59.7	4.1	22 11.0	+59.7	4.2	23 10.9	+59.7	4.2	61
62	17 11.6	+59.7	3.9	18 11.5	+59.7	3.9	19 11.3	+59.7	4.0	20 11.2	+59.7	4.0	21 11.0	+59.8	4.0	22 10.9	+59.7	4.0	23 10.7	+59.8	4.0	24 10.6	+59.7	4.1	62
63	18 11.3	+59.7	3.8	19 11.2	+59.7	3.8	20 11.0	+59.7	3.9	21 10.9	+59.7	3.9	22 10.8	+59.7	3.9	23 10.6	+59.7	3.9	24 10.5	+59.7	4.0	25 10.3	+59.8	4.0	63
64	19 11.0	+59.6	3.7	20 10.8	+59.7	3.7	21 10.7	+59.7	3.8	22 10.6	+59.7	3.8	23 10.5	+59.7	3.8	24 10.3	+59.7	3.8	25 10.2	+59.7	3.9	26 10.1	+59.7	3.9	64
65	20 10.6	+59.7	3.6	21 10.5	+59.7	3.6	22 10.4	+59.7	3.6	23 10.3	+59.7	3.7	24 10.2	+59.7	3.7	25 10.0	+59.7	3.7	26 09.9	+59.7	3.8	27 09.8	+59.8	3.8	65
66	21 10.3	+59.6	3.5	22 10.2	+59.7	3.5	23 10.1	+59.7	3.5	24 10.0	+59.7	3.6	25 09.9	+59.7	3.6	26 09.7	+59.7	3.6	27 09.6	+59.7	3.7	28 09.5	+59.7	3.7	66
67	22 10.0	+59.6	3.4	23 09.9	+59.6	3.4	24 09.8	+59.6	3.4	25 09.7	+59.6	3.4	26 09.5	+59.7	3.5	27 09.4	+59.7	3.5	28 09.3	+59.7	3.5	29 09.2	+59.7	3.6	67
68	23 09.6	+59.5	3.3	24 09.5	+59.7	3.3	25 09.4	+59.7	3.3	26 09.3	+59.7	3.3	27 09.2	+59.7	3.4	28 09.1	+59.7	3.4	29 09.0	+59.7	3.4	30 08.9	+59.7	3.5	68
69	24 09.3	+59.6	3.1	25 09.2	+59.6	3.2	26 09.1	+59.7	3.2	27 09.0	+59.7	3.2	28 08.9	+59.7	3.2	29 08.8	+59.7	3.3	30 08.7	+59.7	3.3	31 08.6	+59.7	3.3	69
70	25 08.9	+59.7	3.0	26 08.8	+59.7	3.0	27 08.8	+59.6	3.1	28 08.7	+59.6	3.1	29 08.6	+59.7	3.1	30 08.5	+59.7	3.2	31 08.4	+59.7	3.2	32 08.3	+59.7	3.2	70
71	26 08.6	+59.6	2.9	27 08.5	+59.6	2.9	28 08.4	+59.7	2.9	29 08.3	+59.7	3.0	30 08.3	+59.6	3.0	31 08.2	+59.6	3.0	32 08.1	+59.7	3.1	33 08.0	+59.7	3.1	71
72	27 08.2	+59.6	2.8	28 08.1	+59.7	2.8	29 08.1	+59.6	2.8	30 08.0	+59.6	2.9	31 07.9	+59.7	2.9	32 07.8	+59.7	2.9	33 07.8	+59.6	2.9	34 07.7	+59.7	3.0	72
73	28 07.8	+59.7	2.6	29 07.8	+59.6	2.7	30 07.7	+59.6	2.7	31 07.6	+59.7	2.7	32 07.6	+59.6	2.8	33 07.5	+59.7	2.8	34 07.4	+59.6	2.8	35 07.4	+59.6	2.9	73
74	29 07.5	+59.6	2.5	30 07.4	+59.6	2.5	31 07.3	+59.7	2.6	32 07.3	+59.6	2.6	33 07.2	+59.7	2.6	34 07.2	+59.6	2.7	35 07.1	+59.6	2.7	36 07.0	+59.7	2.7	74
75	30 07.1	+59.6	2.4	31 07.0	+59.6	2.4	32 07.0	+59.6	2.4	33 06.9	+59.6	2.5	34 06.9	+59.6	2.5	35 06.8	+59.6	2.5	36 06.7	+59.7	2.6	37 06.7	+59.6	2.6	75
76	31 06.7	+59.6	2.3	32 06.6	+59.6	2.3	33 06.6	+59.7	2.3	34 06.5	+59.7	2.3	35 06.5	+59.6	2.4	36 06.4	+59.6	2.4	37 06.4	+59.6	2.4	38 06.3	+59.6	2.5	76
77	32 06.3	+59.6	2.1	33 06.2	+59.6	2.1	34 06.2	+59.6	2.2	35 06.2	+59.6	2.2	36 06.1	+59.6	2.2	37 06.1	+59.6	2.2	38 06.0	+59.6	2.3	39 06.0	+59.6	2.3	77
78	33 05.9	+59.6	2.0	34 05.8	+59.6	2.0	35 05.8	+59.6	2.0	36 05.8	+59.6	2.1	37 05.7	+59.6	2.1	38 05.7	+59.6	2.1	39 05.6	+59.6	2.1	40 05.6	+59.6	2.2	78
79	34 05.4	+59.6	1.8	35 05.4	+59.6	1.9	36 05.4	+59.5	1.9	37 05.4	+59.5	1.9	38 05.3	+59.6	1.9	39 05.3	+59.6	2.0	40 05.2	+59.6	2.0	41 05.2	+59.6	2.0	79
80	35 05.0	+59.6	1.7	36 05.0	+59.6	1.7	37 05.0	+59.5	1.7	38 04.9	+59.6	1.8	39 04.9	+59.6	1.8	40 04.9	+59.6	1.8	41 04.8	+59.6	1.8	42 04.8	+59.6	1.9	80
81	36 04.6	+59.5	1.5	37 04.6	+59.6	1.6	38 04.5	+59.6	1.6	39 04.5	+59.6	1.6	40 04.5	+59.5	1.6	41 04.5	+59.5	1.7	42 04.4	+59.6	1.7	43 04.4	+59.5	1.7	81
82	37 04.1	+59.5	1.4	38 04.1	+59.5	1.4	39 04.1	+59.5	1.4	40 04.1	+59.5	1.5	41 04.0	+59.6	1.5	42 04.0	+59.5	1.5	43 04.0	+59.5	1.5	44 04.0	+59.5	1.5	82
83	38 03.7	+59.5	1.2	39 03.6	+59.6	1.3	40 03.6	+59.6	1.3	41 03.6	+59.5	1.3	42 03.6	+59.5	1.3	43 03.6	+59.5	1.3	44 03.6	+59.5	1.4	45 03.6	+59.5	1.4	83
84	39 03.2	+59.6	1.1	40 03.2	+59.5	1.1	41 03.2	+59.5	1.1	42 03.1	+59.6	1.1	43 03.1	+59.5	1.1	44 03.1	+59.6	1.2	45 03.1	+59.5	1.2	46 03.1	+59.5	1.2	84
85	40 02.7	+59.5	0.9	41 02.7	+59.5	0.9	42 02.7	+59.5	0.9	43 02.7	+59.5	1.0	44 02.7	+59.5	1.0	45 02.7	+59.5	1.0	46 02.6	+59.5	1.0	47 02.6	+59.5	1.0	85
86	41 02.2	+59.5	0.7	42 02.2	+59.5	0.7	43 02.2	+59.5	0.8	44 02.2	+59.5	0.8	45 02.2	+59.5	0.8	46 02.2	+59.5	0.8	47 02.2	+59.4	0.8	48 02.1	+59.5	0.8	86
87	42 01.7	+59.4	0.6	43 01.7	+59.4	0.6	44 01.7	+59.4	0.6	45 01.7	+59.5	0.6	46 01.7	+59.5	0.6	47 01.7	+59.4	0.6	48 01.6	+59.5	0.6	49 01.6	+59.5	0.6	87
88	43 01.1	+59.5	0.4	44 01.1	+59.5	0.4	45 01.1	+59.4	0.4	46 01.1	+59.4	0.4	47 01.1	+59.5	0.4	48 01.1	+59.4	0.4	49 01.1	+59.5	0.4	50 01.1	+59.5	0.4	88
89	44 00.6	+59.4	0.2	45 00.6	+59.4	0.2	46 00.6	+59.4	0.2	47 00.6	+59.4	0.2	48 00.6	+59.4	0.2	49 00.6	+59.4	0.2	50 00.6	+59.4	0.2	51 00.6	+59.4	0.2	89
90	45 00.0	+59.4	0.0	46 00.0	+59.4	0.0	47 00.0	+59.4	0.0	48 00.0	+59.4	0.0	49 00.0	+59.4	0.0	50 00.0	+59.4	0.0	51 00.0	+59.4	0.0	52 00.0	+59.4	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Each latitude column lists: Hc (° ′) — d (′) — Z (°)

Dec.	45°	46°	47°	48°	49°	50°	51°	52°	Dec.
0	44 17.9 +59.3 167.4	43 19.4 +59.3 167.6	42 20.7 +59.4 167.8	41 22.1 +59.4 168.0	40 23.4 +59.4 168.1	39 24.6 +59.5 168.3	38 25.9 +59.5 168.5	37 27.1 +59.5 168.6	0
1	45 17.2 +59.2 167.2	44 18.7 +59.3 167.4	43 20.1 +59.3 167.6	42 21.5 +59.4 167.8	41 22.8 +59.4 168.0	40 24.1 +59.5 168.1	39 25.4 +59.5 168.3	38 26.6 +59.5 168.5	1
2	46 16.4 +59.3 166.9	45 18.0 +59.2 167.2	44 19.4 +59.4 167.4	43 20.9 +59.3 167.6	42 22.2 +59.5 167.8	41 23.6 +59.4 168.0	40 24.9 +59.5 168.2	39 26.1 +59.6 168.3	2
3	47 15.7 +59.1 166.7	46 17.2 +59.3 166.9	45 18.8 +59.3 167.2	44 20.2 +59.4 167.4	43 21.7 +59.3 167.6	42 23.0 +59.5 167.8	41 24.4 +59.4 168.0	40 25.7 +59.5 168.2	3
4	48 14.8 +59.2 166.4	47 16.5 +59.2 166.7	46 18.1 +59.2 166.9	45 19.6 +59.3 167.2	44 21.0 +59.4 167.4	43 22.5 +59.4 167.6	42 23.8 +59.5 167.8	41 25.2 +59.5 168.0	4
5	49 14.0 +59.1 166.2	48 15.7 +59.2 166.5	47 17.3 +59.3 166.7	46 18.9 +59.3 167.0	45 20.4 +59.4 167.2	44 21.9 +59.4 167.4	43 23.3 +59.5 167.6	42 24.7 +59.5 167.8	5
6	50 13.1 +59.1 165.9	49 14.9 +59.1 166.2	48 16.6 +59.2 166.5	47 18.2 +59.3 166.7	46 19.8 +59.3 167.0	45 21.3 +59.3 167.2	44 22.7 +59.5 167.4	43 24.2 +59.4 167.6	6
7	51 12.2 +59.0 165.7	50 14.0 +59.1 166.0	49 15.8 +59.1 166.2	48 17.5 +59.2 166.5	47 19.1 +59.3 166.8	46 20.6 +59.4 167.0	45 22.2 +59.4 167.3	44 23.6 +59.5 167.4	7
8	52 11.2 +59.0 165.4	51 13.1 +59.1 165.7	50 14.9 +59.2 166.0	49 16.7 +59.1 166.3	48 18.4 +59.3 166.5	47 20.0 +59.3 166.8	46 21.6 +59.3 167.0	45 23.1 +59.4 167.3	8
9	53 10.2 +59.0 165.1	52 12.2 +59.0 165.4	51 14.1 +59.1 165.7	50 15.9 +59.2 166.0	49 17.6 +59.3 166.3	48 19.3 +59.3 166.6	47 20.9 +59.4 166.8	46 22.5 +59.4 167.1	9
10	54 09.2 +58.8 164.7	53 11.2 +58.9 165.1	52 13.2 +59.0 165.4	51 15.1 +59.1 165.8	50 16.9 +59.2 166.0	49 18.6 +59.3 166.3	48 20.3 +59.3 166.6	47 21.9 +59.4 166.9	10
11	55 08.0 +58.9 164.4	54 10.2 +58.9 164.8	53 12.2 +59.1 165.1	52 14.2 +59.1 165.5	51 16.1 +59.2 165.8	50 17.9 +59.2 166.1	49 19.6 +59.3 166.4	48 21.3 +59.3 166.6	11
12	56 06.9 +58.8 164.1	55 09.1 +58.9 164.5	54 11.3 +58.9 164.8	53 13.3 +59.1 165.2	52 15.3 +59.1 165.5	51 17.1 +59.2 165.8	50 18.9 +59.3 166.1	49 20.6 +59.3 166.4	12
13	57 05.7 +58.7 163.7	56 08.0 +58.8 164.1	55 10.2 +59.0 164.5	54 12.4 +59.0 164.9	53 14.4 +59.1 165.2	52 16.3 +59.2 165.6	51 18.2 +59.2 165.9	50 19.9 +59.3 166.2	13
14	58 04.4 +58.6 163.3	57 06.8 +58.8 163.8	56 09.2 +58.8 164.2	55 11.4 +58.9 164.6	54 13.5 +59.0 165.0	53 15.5 +59.1 165.3	52 17.4 +59.2 165.6	51 19.2 +59.3 165.9	14
15	59 03.0 +58.6 162.9	58 05.6 +58.7 163.4	57 08.0 +58.8 163.8	56 10.3 +58.9 164.3	55 12.5 +59.0 164.6	54 14.6 +59.1 165.0	53 16.6 +59.2 165.4	52 18.5 +59.2 165.7	15
16	60 01.6 +58.4 162.5	59 04.3 +58.6 163.0	58 06.8 +58.7 163.5	57 09.2 +58.9 163.9	56 11.5 +59.0 164.3	55 13.7 +59.0 164.7	54 15.8 +59.1 165.1	53 17.7 +59.2 165.4	16
17	61 00.0 +58.5 162.0	60 02.9 +58.5 162.6	59 05.5 +58.7 163.1	58 08.1 +58.7 163.5	57 10.5 +58.9 164.0	56 12.7 +59.0 164.4	55 14.9 +59.1 164.8	54 16.9 +59.2 165.2	17
18	61 58.4 +58.2 161.5	61 01.4 +58.4 162.1	60 04.2 +58.6 162.7	59 06.8 +58.7 163.2	58 09.3 +58.9 163.6	57 11.7 +58.9 164.1	56 14.0 +59.0 164.5	55 16.1 +59.1 164.9	18
19	62 56.6 +58.2 161.0	61 59.8 +58.3 161.6	61 02.8 +58.4 162.2	60 05.5 +58.7 162.7	59 08.2 +58.7 163.2	58 10.6 +58.9 163.7	57 13.0 +59.0 164.1	56 15.2 +59.1 164.6	19
20	63 54.8 +58.0 160.5	62 58.1 +58.2 161.1	62 01.2 +58.4 161.7	61 04.2 +58.5 162.3	60 06.9 +58.7 162.8	59 09.5 +58.8 163.3	58 12.0 +58.9 163.8	57 14.3 +59.0 164.2	20
21	64 52.8 +57.8 159.9	63 56.3 +58.1 160.6	62 59.6 +58.3 161.2	62 02.7 +58.4 161.8	61 05.6 +58.6 162.4	60 08.3 +58.7 162.9	59 10.9 +58.8 163.4	58 13.3 +59.0 163.9	21
22	65 50.6 +57.7 159.2	64 54.4 +57.9 160.0	63 57.9 +58.1 160.7	63 01.1 +58.4 161.4	62 04.2 +58.5 162.0	61 07.0 +58.7 162.5	60 09.7 +58.8 163.1	59 12.3 +58.8 163.5	22
23	66 48.3 +57.5 158.6	65 52.3 +57.8 159.4	64 56.0 +58.0 160.1	63 59.5 +58.2 160.8	63 02.7 +58.4 161.5	62 05.7 +58.5 162.1	61 08.5 +58.7 162.6	60 11.1 +58.9 163.2	23
24	67 45.8 +57.3 157.8	66 50.1 +57.5 158.7	65 54.0 +57.8 159.5	64 57.7 +58.0 160.3	64 01.1 +58.2 161.0	63 04.2 +58.5 161.6	62 07.2 +58.6 162.2	61 10.0 +58.7 162.8	24
25	68 43.1 +57.0 157.0	67 47.6 +57.4 158.0	66 51.8 +57.7 158.8	65 55.7 +57.9 159.7	64 59.3 +58.2 160.4	64 02.7 +58.3 161.1	63 05.8 +58.5 161.7	62 08.7 +58.7 162.3	25
26	69 40.1 +56.7 156.1	68 45.0 +57.1 157.2	67 49.5 +57.4 158.1	66 53.6 +57.8 159.0	65 57.5 +58.0 159.8	65 01.0 +58.2 160.6	64 04.3 +58.4 161.2	63 07.4 +58.6 161.9	26
27	70 36.8 +56.4 155.2	69 42.1 +56.8 156.3	68 46.9 +57.2 157.3	67 51.4 +57.5 158.3	66 55.5 +57.8 159.2	65 59.2 +58.1 160.0	65 02.7 +58.3 160.7	64 06.0 +58.4 161.4	27
28	71 33.2 +56.0 154.1	70 38.9 +56.5 155.3	69 44.1 +57.0 156.4	68 48.9 +57.3 157.5	67 53.3 +57.6 158.5	66 57.3 +57.9 159.3	66 01.0 +58.1 160.1	65 04.4 +58.3 160.9	28
29	72 29.2 +55.6 153.0	71 35.4 +56.2 154.3	70 41.1 +56.6 155.6	69 46.2 +57.1 156.7	68 50.9 +57.4 157.7	67 55.2 +57.7 158.7	66 59.1 +58.0 159.5	66 02.8 +58.2 160.3	29
30	73 24.8 +55.0 151.7	72 31.6 +55.7 153.2	71 37.7 +56.3 154.5	70 43.3 +56.7 155.8	69 48.3 +57.2 156.9	68 52.9 +57.5 157.9	67 57.1 +57.8 158.8	67 01.0 +58.1 159.7	30
31	74 19.8 +54.4 150.2	73 27.3 +55.2 151.9	72 34.0 +55.8 153.4	71 40.0 +56.4 154.8	70 45.5 +56.8 156.0	69 50.4 +57.3 157.1	68 54.9 +57.6 158.1	67 59.1 +57.9 159.0	31
32	75 14.2 +53.7 148.6	74 22.5 +54.5 150.5	73 29.8 +55.4 152.2	72 36.4 +56.0 153.7	71 42.3 +56.5 155.0	70 47.7 +57.0 156.2	69 52.5 +57.4 157.3	68 57.0 +57.7 158.3	32
33	76 07.9 +52.7 146.8	75 17.0 +53.9 148.9	74 25.2 +54.7 150.8	73 32.4 +55.5 152.4	72 38.8 +56.2 153.9	71 44.7 +56.6 155.2	70 49.9 +57.1 156.4	69 54.7 +57.5 157.5	33
34	77 00.6 +51.7 144.8	76 10.9 +53.0 147.1	75 19.9 +54.1 149.2	74 27.9 +54.9 151.0	73 35.0 +55.6 152.7	72 41.3 +56.3 154.2	71 47.0 +56.8 155.6	70 52.1 +57.3 156.7	34
35	77 52.3 +50.2 142.4	77 03.9 +51.8 145.1	76 14.0 +53.1 147.4	75 22.8 +54.2 149.5	74 30.6 +55.1 151.3	73 37.6 +55.8 153.0	72 43.8 +56.4 154.4	71 49.4 +56.9 155.7	35
36	78 42.5 +48.6 139.7	77 55.7 +50.6 142.8	77 07.1 +52.1 145.4	76 17.0 +53.4 147.7	75 25.7 +54.4 149.8	74 33.4 +55.3 151.6	73 40.2 +56.0 153.2	72 46.3 +56.5 154.7	36
37	79 31.1 +46.5• 136.6	78 46.3 +48.9• 140.1	77 59.2 +50.9• 143.1	77 10.4 +52.4 145.8	76 20.1 +53.7 148.1	75 28.7 +54.6 150.1	74 36.2 +55.4 151.7	73 42.8 +56.1 153.5	37
38	80 17.6 +43.9• 133.0	79 35.2 +46.8• 137.0	78 50.1 +49.2 140.5	78 02.8 +51.1 143.5	77 13.8 +52.6 146.1	76 23.3 +53.8 148.4	75 31.6 +54.8 150.4	74 38.9 +55.7 152.2	38
39	81 01.5 +40.5• 128.8	80 22.0 +44.2• 133.4	79 39.3 +47.1• 137.4	78 53.9 +49.5 140.8	78 06.4 +51.3 143.9	77 17.1 +52.9 146.5	76 26.4 +54.1 148.8	75 34.6 +55.1 150.8	39
40	81 42.0 +36.3• 123.9	81 06.2 +40.9• 129.2	80 26.4 +44.6• 133.8	79 43.4 +47.5• 137.8	78 57.7 +49.8 141.3	78 10.0 +51.6 144.2	77 20.5 +53.1 146.9	76 29.6 +54.2 149.1	40
41	82 18.3 +30.9• 118.2	81 47.1 +36.7• 124.3	81 11.0 +41.3• 129.6	80 30.9 +45.0• 134.2	79 47.5 +47.9• 138.2	79 01.6 +50.1 141.7	78 13.6 +51.9 144.6	77 23.8 +53.4 147.2	41
42	82 49.2 +24.5• 111.5	82 23.8 +31.4• 118.5	81 52.3 +37.1• 124.7	81 15.9 +41.7• 130.1	80 35.4 +45.4• 134.7	79 51.7 +48.2• 138.7	79 05.5 +50.4 142.1	78 17.2 +52.2 145.1	42
43	83 13.7 +16.7• 104.0	82 55.2 +24.8• 111.8	82 29.4 +31.8• 118.9	81 57.6 +37.5• 125.1	81 20.8 +42.1• 130.5	80 39.9 +45.8• 135.1	79 55.9 +48.6• 139.1	79 09.4 +50.8 142.5	43
44	83 30.4 +8.0• 95.7	83 20.0 +17.0• 104.2	83 01.2 +25.2• 112.2	82 35.1 +32.3• 119.3	82 02.9 +38.0• 125.6	81 25.7 +42.5• 131.0	80 44.5 +46.1• 135.6	80 00.2 +48.9• 139.6	44
45	83 38.4 −1.4• 86.8	83 37.0 +8.1• 95.8	83 26.4 +17.3• 104.5	83 07.3 +25.6• 112.5	82 40.9 +32.6• 119.7	82 08.2 +38.5• 126.0	81 30.6 +43.0• 131.5	80 49.1 +46.5• 136.1	45
46	83 37.0 −10.6• 77.8	83 45.1 −1.4• 86.8	83 43.7 +8.2• 95.9	83 32.9 +17.6• 104.7	83 13.5 +26.0• 112.9	82 46.7 +33.1• 120.2	82 13.6 +39.0• 126.5	81 35.6 +43.5• 132.0	46
47	83 26.4 −19.1• 69.1	83 43.7 −10.8• 77.6	83 51.9 −1.4• 86.7	83 50.5 +8.4• 95.9	83 39.5 +17.9• 105.0	83 19.8 +26.4• 113.3	82 52.6 +33.6• 120.7	82 19.1 +39.4• 127.0	47
48	83 07.3 −26.4• 60.9	83 32.9 −19.4• 68.7	83 50.5 −11.0• 77.4	83 58.9 −1.5• 86.7	83 57.4 +8.5• 96.1	83 46.2 +18.2• 105.3	83 26.2 +26.8• 113.7	82 58.5 +34.1• 121.1	48
49	82 40.9 −32.7• 53.7	83 13.5 −26.8• 60.5	83 39.5 −19.7• 68.3	83 57.4 −11.2• 77.1	84 05.9 −1.5• 86.6	84 04.4 +8.7• 96.3	83 53.0 +18.5• 105.6	83 32.6 +27.3• 114.1	49
50	82 08.2 −37.6• 47.3	82 46.7 −33.1• 53.1	83 19.8 −27.2• 60.0	83 46.2 −20.0• 67.9	84 04.4 −11.4• 76.9	84 13.1 −1.6• 86.5	84 11.5 +8.9• 96.4	83 59.9 +18.9• 105.9	50
51	81 30.6 −41.5• 41.8	82 13.6 −38.0• 46.7	82 52.6 −33.5• 52.5	83 26.2 −27.7• 59.5	83 53.0 −20.4• 67.5	84 11.5 −11.6• 76.6	84 20.4 −1.6• 86.5	84 18.8 +9.0• 96.6	51
52	80 49.1 −44.7• 37.1	81 35.6 −41.9• 41.2	82 19.1 −38.5• 46.1	82 58.5 −33.9• 51.9	83 32.6 −28.1• 58.9	83 59.9 −20.8• 67.1	84 18.8 −12.0• 76.4	84 27.8 −1.7• 86.5	52
53	80 04.4 −47.2• 33.1	80 53.7 −45.1• 36.5	81 40.6 −42.3• 40.6	82 24.6 −38.9• 45.5	83 04.5 −34.4• 51.3	83 39.1 −28.6• 58.8	83 59.6 −21.2• 66.6	84 26.1 −12.2• 76.1	53
54	79 17.2 −49.1 29.6	80 08.6 −47.4• 32.5	80 58.3 −45.4• 35.9	81 45.7 −42.8• 39.9	82 30.1 −39.4• 44.8	83 10.5 −34.9• 50.7	83 45.6 −29.1• 57.8	84 13.9 −21.7• 66.2	54
55	78 28.1 −50.7 26.7	79 21.2 −49.5 29.1	80 12.9 −47.8• 31.9	81 02.9 −45.8• 35.2	81 50.7 −43.2• 39.2	82 35.6 −39.8• 44.1	83 16.5 −35.4• 50.0	83 52.2 −29.6• 57.2	55
56	77 37.4 −52.0 24.1	78 31.7 −50.9 26.1	79 25.1 −49.7 28.4	80 17.1 −47.9• 31.2	81 07.5 −46.1• 34.5	81 55.8 −43.6• 38.5	82 41.1 −40.3• 43.4	83 23.5 −35.9• 49.3	56
57	76 45.4 −53.0 21.8	77 40.8 −52.2 23.5	78 35.4 −51.3 25.5	79 29.0 −50.0 27.8	80 21.4 −48.5• 30.6	81 12.2 −46.6• 33.9	82 00.8 −44.0• 37.8	82 46.7 −40.8• 42.7	57
58	75 52.4 −53.9 19.9	76 48.6 −53.3 21.3	77 44.1 −52.4 23.0	78 39.0 −51.5 24.9	79 32.9 −50.3 27.2	80 25.6 −48.8• 29.9	81 16.8 −47.0• 33.1	82 05.9 −44.5• 37.1	58
59	74 58.5 −54.6 18.1	75 55.3 −54.1 19.3	76 51.7 −53.5 20.8	77 47.5 −52.7 22.4	78 42.6 −51.8 24.3	79 36.8 −50.6 26.5	80 29.2 −49.2 29.2	81 21.4 −47.4• 32.4	59
60	74 03.9 −55.2 16.6	75 01.2 −54.7 17.6	75 58.2 −54.2 18.8	76 54.8 −53.7 20.2	77 50.8 −52.9 21.8	78 46.2 −52.1 23.7	79 40.6 −50.9 25.9	80 34.0 −49.5 28.5	60
61	73 08.7 −55.7 15.2	74 06.5 −55.4 16.1	75 04.0 −55.0 17.1	76 01.1 −54.4 18.3	76 57.9 −53.9 19.6	77 54.1 −53.1 21.2	78 49.7 −52.3 23.0	79 44.5 −51.3 25.2	61
62	72 13.0 −56.1 13.9	73 11.1 −55.8 14.7	74 09.0 −55.4 15.6	75 06.7 −55.0 16.6	76 04.0 −54.6 17.8	77 01.0 −54.1 19.1	77 57.4 −53.4 20.6	78 53.2 −52.6 22.4	62
63	71 16.9 −56.5 12.8	72 15.3 −56.3 13.5	73 13.6 −56.0 14.2	74 11.6 −55.7 15.1	75 09.4 −55.3 16.1	76 06.9 −54.9 17.2	77 04.0 −54.3 18.5	78 00.6 −53.6 20.0	63
64	70 20.4 −56.9 11.8	71 19.0 −56.6 12.4	72 17.6 −56.4 13.0	73 15.9 −56.1 13.8	74 14.1 −55.8 14.6	75 12.0 −55.4 15.6	76 09.7 −55.0 16.7	77 07.0 −54.5 17.9	64
65	69 23.5 −57.0 10.8	70 22.4 −56.9 11.4	71 21.2 −56.7 11.9	72 19.8 −56.5 12.6	73 18.3 −56.2 13.3	74 16.6 −56.0 14.1	75 14.7 −55.6 15.0	76 12.5 −55.2 16.1	65
66	68 26.5 −57.4 10.0	69 25.5 −57.2 10.4	70 24.5 −57.1 10.9	71 23.3 −56.9 11.5	72 22.1 −56.7 12.1	73 20.6 −56.4 12.8	74 19.1 −56.2 13.6	75 17.3 −55.8 14.5	66
67	67 29.1 −57.5 9.2	68 28.3 −57.4 9.6	69 27.4 −57.2 10.0	70 26.5 −57.1 10.5	71 25.4 −56.9 11.1	72 24.2 −56.7 11.7	73 22.9 −56.5 12.3	74 21.5 −56.3 13.1	67
68	66 31.6 −57.7 8.5	67 30.9 −57.6 8.8	68 30.0 −57.5 9.2	69 29.4 −57.6 9.6	70 28.3 −57.5 10.1	71 27.1 −57.3 10.6	72 25.9 −57.2 11.2	73 24.9 −57.0 11.9	68
69	65 33.9 −57.9 7.8	66 33.3 −57.8 8.1	67 32.7 −57.8 8.4	68 32.0 −57.6 8.8	69 31.2 −57.4 9.2	70 30.4 −57.3 9.7	71 29.5 −57.2 10.2	72 28.5 −57.0 10.7	69
70	64 36.0 −58.1 7.2	65 35.5 −58.0 7.4	66 34.9 −57.8 7.7	67 34.4 −57.8 8.1	68 33.8 −57.7 8.4	69 33.1 −57.6 8.8	70 32.3 −57.4 9.2	71 31.5 −57.3 9.7	70
71	63 37.9 −58.2 6.6	64 37.5 −58.1 6.8	65 37.1 −58.1 7.1	66 36.6 −58.0 7.4	67 36.1 −57.9 7.7	68 35.5 −57.8 8.0	69 34.9 −57.7 8.4	70 34.2 −57.5 8.8	71
72	62 39.7 −58.4 6.0	63 39.4 −58.2 6.3	64 39.0 −58.1 6.5	65 38.6 −58.1 6.7	66 38.2 −58.0 7.0	67 37.7 −57.9 7.3	68 37.2 −57.8 7.6	69 36.7 −57.9 8.0	72
73	61 41.5 −58.4 5.5	62 41.2 −58.4 5.7	63 40.9 −58.3 5.9	64 40.5 −58.2 6.1	65 40.2 −58.2 6.4	66 39.8 −58.1 6.6	67 39.4 −58.1 6.9	68 38.9 −57.9 7.2	73
74	60 43.1 −58.5 5.1	61 42.8 −58.4 5.2	62 42.6 −58.4 5.4	63 42.3 −58.4 5.6	64 42.0 −58.3 5.8	65 41.7 −58.3 6.0	66 41.3 −58.2 6.3	67 41.0 −58.2 6.5	74
75	59 44.6 −58.6 4.6	60 44.4 −58.6 4.8	61 44.2 −58.6 4.9	62 43.9 −58.4 5.1	63 43.7 −58.4 5.4	64 43.4 −58.3 5.4	65 43.1 −58.5 5.7	66 42.6 −58.4 5.9	75
76	58 46.0 −58.7 4.2	59 45.8 −58.6 4.3	60 45.7 −58.6 4.4	61 45.5 −58.6 4.6	62 45.3 −58.6 4.7	63 45.1 −58.5 4.9	64 44.8 −58.4 5.1	65 44.6 −58.4 5.3	76
77	57 47.3 −58.7 3.8	58 47.2 −58.7 3.9	59 47.1 −58.7 4.0	60 46.9 −58.6 4.1	61 46.7 −58.6 4.3	62 46.6 −58.6 4.4	63 46.4 −58.6 4.6	64 46.2 −58.5 4.7	77
78	56 48.6 −58.8 3.4	57 48.5 −58.8 3.5	58 48.4 −58.8 3.6	59 48.3 −58.8 3.7	60 48.1 −58.7 3.9	61 48.0 −58.7 3.9	62 47.8 −58.7 4.1	63 47.7 −58.6 4.2	78
79	55 49.8 −58.8 3.0	56 49.7 −58.8 3.1	57 49.6 −58.8 3.2	58 49.5 −58.8 3.3	59 49.4 −58.7 3.4	60 49.3 −58.7 3.5	61 49.2 −58.7 3.6	62 49.1 −58.7 3.7	79
80	54 51.0 −59.0 2.7	55 50.9 −58.9 2.8	56 50.8 −58.9 2.8	57 50.7 −58.8 2.9	58 50.7 −58.8 3.0	59 50.6 −58.8 3.1	60 50.5 −58.8 3.2	61 50.4 −58.8 3.3	80
81	53 52.0 −58.9 2.4	54 52.0 −59.0 2.4	55 51.9 −59.0 2.5	56 51.9 −59.0 2.6	57 51.8 −58.9 2.6	58 51.8 −59.0 2.7	59 51.7 −58.9 2.8	60 51.6 −59.0 2.9	81
82	52 53.1 −59.1 2.1	53 53.0 −59.0 2.1	54 53.0 −59.0 2.2	55 53.0 −59.0 2.2	56 52.9 −59.0 2.3	57 52.9 −59.1 2.3	58 52.8 −59.0 2.4	59 52.8 −59.0 2.5	82
83	51 54.1 −59.1 1.8	52 54.1 −59.1 1.8	53 54.0 −59.0 1.9	54 54.0 −59.0 1.9	55 54.0 −59.1 1.9	56 53.9 −59.0 2.0	57 53.9 −59.1 2.1	58 53.8 −58.9 2.1	83
84	50 55.0 −59.1 1.5	51 55.0 −59.1 1.5	52 55.0 −59.1 1.6	53 55.0 −59.1 1.6	54 54.9 −59.0 1.6	55 54.9 −59.1 1.7	56 54.9 −59.1 1.7	57 54.9 −59.1 1.8	84
85	49 55.9 −59.1 1.2	50 55.9 −59.2 1.2	51 55.9 −59.1 1.3	52 55.9 −59.1 1.3	53 55.9 −59.1 1.3	54 55.9 −59.1 1.4	55 55.9 −59.1 1.4	56 55.9 −59.0 1.4	85
86	48 56.8 −59.1 1.0	49 56.8 −59.1 1.0	50 56.8 −59.1 1.0	51 56.8 −59.2 1.0	52 56.8 −59.2 1.0	53 56.8 −59.2 1.1	54 56.8 −59.2 1.1	55 56.8 −59.2 1.1	86
87	47 57.7 −59.2 0.7	48 57.7 −59.2 0.7	49 57.7 −59.2 0.7	50 57.6 −59.1 0.7	51 57.6 −59.1 0.8	52 57.6 −59.1 0.8	53 57.6 −59.1 0.8	54 57.6 −59.1 0.8	87
88	46 58.5 −59.3 0.5	47 58.5 −59.3 0.5	48 58.5 −59.3 0.5	49 58.5 −59.3 0.5	50 58.5 −59.3 0.5	51 58.5 −59.3 0.5	52 58.5 −59.3 0.5	53 58.5 −59.3 0.5	88
89	45 59.2 −59.2 0.2	46 59.2 −59.2 0.2	47 59.2 −59.2 0.2	48 59.2 −59.2 0.2	49 59.2 −59.2 0.2	50 59.2 −59.2 0.2	51 59.2 −59.3 0.3	52 59.2 −59.2 0.3	89
90	45 00.0 −59.3 0.0	46 00.0 −59.3 0.0	47 00.0 −59.3 0.0	48 00.0 −59.3 0.0	49 00.0 −59.3 0.0	50 00.0 −59.3 0.0	51 00.0 −59.3 0.0	52 00.0 −59.3 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

LATITUDE CONTRARY NAME TO DECLINATION

L.H.A. 9°, 351°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 17.9	−59.3	167.4	43 19.4	−59.4	167.6	42 20.7	−59.3	167.8	41 22.1	−59.4	168.0	40 23.4	−59.5	168.1	39 24.6	−59.5	168.3	38 25.9	−59.6	168.5	37 27.1	−59.6	168.6	0
1	43 18.6	−59.3	167.6	42 20.0	−59.3	167.8	41 21.4	−59.4	168.0	40 22.7	−59.5	168.2	39 23.9	−59.5	168.3	38 25.1	−59.5	168.5	37 26.3	−59.5	168.6	36 27.5	−59.6	168.8	1
2	42 19.3	−59.3	167.8	41 20.7	−59.4	168.0	40 22.0	−59.5	168.2	39 23.2	−59.4	168.3	38 24.4	−59.4	168.5	37 25.6	−59.5	168.6	36 26.8	−59.6	168.8	35 27.9	−59.6	168.9	2
3	41 20.0	−59.4	168.0	40 21.3	−59.4	168.2	39 22.5	−59.4	168.3	38 23.8	−59.5	168.5	37 25.0	−59.6	168.7	36 26.1	−59.5	168.8	35 27.2	−59.5	168.9	34 28.3	−59.6	169.1	3
4	40 20.6	−59.4	168.2	39 21.9	−59.4	168.4	38 23.1	−59.4	168.5	37 24.3	−59.5	168.7	36 25.4	−59.5	168.8	35 26.6	−59.6	169.0	34 27.7	−59.6	169.1	33 28.7	−59.6	169.2	4
5	39 21.3	−59.4	168.4	38 22.5	−59.5	168.5	37 23.7	−59.5	168.7	36 24.8	−59.5	168.8	35 25.9	−59.5	169.0	34 27.0	−59.5	169.1	33 28.1	−59.6	169.2	32 29.1	−59.6	169.4	5
6	38 21.9	−59.4	168.6	37 23.0	−59.5	168.7	36 24.2	−59.5	168.9	35 25.3	−59.5	169.0	34 26.4	−59.5	169.1	33 27.5	−59.6	169.3	32 28.5	−59.6	169.4	31 29.5	−59.6	169.5	6
7	37 22.5	−59.5	168.7	36 23.6	−59.5	168.9	35 24.7	−59.5	169.0	34 25.8	−59.5	169.1	33 26.9	−59.6	169.3	32 27.9	−59.5	169.4	31 28.9	−59.6	169.5	30 29.9	−59.6	169.6	7
8	36 23.0	−59.4	168.9	35 24.1	−59.4	169.0	34 25.2	−59.5	169.2	33 26.3	−59.6	169.3	32 27.3	−59.5	169.4	31 28.3	−59.6	169.5	30 29.3	−59.6	169.6	29 30.3	−59.7	169.7	8
9	35 23.6	−59.4	169.1	34 24.7	−59.5	169.2	33 25.7	−59.5	169.3	32 26.8	−59.6	169.5	31 27.8	−59.6	169.6	30 28.7	−59.6	169.7	29 29.7	−59.6	169.8	28 30.6	−59.6	169.9	9
10	34 24.2	−59.5	169.2	33 25.2	−59.5	169.4	32 26.2	−59.5	169.5	31 27.2	−59.5	169.6	30 28.2	−59.6	169.8	29 29.1	−59.6	169.8	28 30.1	−59.6	170.0	27 31.0	−59.6	170.0	10
11	33 24.7	−59.5	169.4	32 25.7	−59.5	169.5	31 26.7	−59.6	169.6	30 27.7	−59.6	169.7	29 28.6	−59.6	169.9	28 29.5	−59.5	169.9	27 30.5	−59.7	170.0	26 31.4	−59.7	170.1	11
12	32 25.2	−59.5	169.6	31 26.2	−59.6	169.7	30 27.2	−59.6	169.8	29 28.1	−59.6	169.9	28 29.0	−59.6	170.0	27 29.9	−59.6	170.1	26 30.8	−59.6	170.2	25 31.7	−59.7	170.2	12
13	31 25.7	−59.5	169.7	30 26.7	−59.6	169.8	29 27.6	−59.5	169.9	28 28.5	−59.5	170.1	27 29.4	−59.5	170.2	26 30.3	−59.6	170.2	25 31.2	−59.7	170.3	24 32.0	−59.6	170.4	13
14	30 26.2	−59.5	169.9	29 27.1	−59.5	170.0	28 28.1	−59.6	170.1	27 29.0	−59.6	170.1	26 29.8	−59.6	170.2	25 30.7	−59.6	170.3	24 31.5	−59.6	170.4	23 32.4	−59.7	170.5	14
15	29 26.7	−59.5	170.0	28 27.6	−59.5	170.1	27 28.5	−59.6	170.2	26 29.4	−59.6	170.3	25 30.2	−59.6	170.4	24 31.1	−59.7	170.4	23 31.9	−59.7	170.5	22 32.7	−59.7	170.6	15
16	28 27.2	−59.5	170.2	27 28.1	−59.6	170.2	26 28.9	−59.5	170.3	25 29.8	−59.6	170.4	24 30.6	−59.6	170.5	23 31.4	−59.6	170.6	22 32.2	−59.6	170.6	21 33.0	−59.7	170.7	16
17	27 27.7	−59.6	170.3	26 28.5	−59.5	170.4	25 29.4	−59.6	170.5	24 30.2	−59.6	170.5	23 31.0	−59.6	170.6	22 31.8	−59.7	170.7	21 32.6	−59.7	170.7	20 33.3	−59.6	170.8	17
18	26 28.1	−59.5	170.4	25 29.0	−59.6	170.5	24 29.8	−59.6	170.6	23 30.6	−59.6	170.7	22 31.4	−59.7	170.7	21 32.1	−59.6	170.8	20 32.9	−59.7	170.9	19 33.7	−59.7	170.9	18
19	25 28.6	−59.6	170.6	24 29.4	−59.6	170.6	23 30.2	−59.6	170.7	22 31.0	−59.7	170.8	21 31.7	−59.6	170.8	20 32.5	−59.7	170.9	19 33.2	−59.6	171.0	18 34.0	−59.7	171.0	19
20	24 29.0	−59.5	170.7	23 29.8	−59.6	170.8	22 30.6	−59.6	170.8	21 31.3	−59.6	170.9	20 32.1	−59.6	171.0	19 32.8	−59.7	171.0	18 33.6	−59.7	171.1	17 34.3	−59.7	171.1	20
21	23 29.5	−59.6	170.8	22 30.2	−59.6	170.9	21 31.0	−59.6	171.0	20 31.7	−59.6	171.0	19 32.5	−59.7	171.1	18 33.2	−59.7	171.1	17 33.9	−59.7	171.2	16 34.6	−59.7	171.2	21
22	22 29.9	−59.6	171.0	21 30.6	−59.5	171.0	20 31.4	−59.6	171.1	19 32.1	−59.6	171.1	18 32.8	−59.6	171.2	17 33.5	−59.7	171.2	16 34.2	−59.7	171.3	15 34.9	−59.7	171.3	22
23	21 30.3	−59.5	171.1	20 31.1	−59.6	171.2	19 31.8	−59.7	171.2	18 32.5	−59.7	171.3	17 33.2	−59.7	171.3	16 33.8	−59.6	171.4	15 34.5	−59.7	171.4	14 35.2	−59.7	171.4	23
24	20 30.8	−59.6	171.2	19 31.5	−59.6	171.3	18 32.1	−59.6	171.3	17 32.8	−59.6	171.4	16 33.5	−59.7	171.4	15 34.2	−59.7	171.5	14 34.8	−59.7	171.5	13 35.5	−59.7	171.5	24
25	19 31.2	−59.6	171.3	18 31.9	−59.6	171.4	17 32.5	−59.6	171.5	16 33.2	−59.7	171.5	15 33.8	−59.6	171.5	14 34.5	−59.7	171.6	13 35.1	−59.6	171.6	12 35.8	−59.7	171.6	25
26	18 31.6	−59.6	171.5	17 32.3	−59.7	171.5	16 32.9	−59.6	171.6	15 33.5	−59.6	171.6	14 34.2	−59.7	171.6	13 34.8	−59.7	171.7	12 35.5	−59.7	171.7	11 36.1	−59.7	171.7	26
27	17 32.0	−59.6	171.6	16 32.6	−59.6	171.6	15 33.3	−59.7	171.7	14 33.9	−59.6	171.7	13 34.5	−59.6	171.8	12 35.1	−59.6	171.8	11 35.8	−59.7	171.8	10 36.4	−59.7	171.8	27
28	16 32.4	−59.6	171.7	15 33.0	−59.6	171.7	14 33.6	−59.6	171.8	13 34.3	−59.7	171.8	12 34.9	−59.7	171.8	11 35.5	−59.7	171.9	10 36.1	−59.7	171.9	9 36.7	−59.8	171.9	28
29	15 32.8	−59.6	171.8	14 33.4	−59.6	171.9	13 34.0	−59.6	171.9	12 34.6	−59.7	171.9	11 35.2	−59.7	172.0	10 35.8	−59.7	172.0	9 36.4	−59.7	172.0	8 36.9	−59.7	172.0	29
30	14 33.2	−59.6	172.0	13 33.8	−59.6	172.0	12 34.4	−59.7	172.0	11 34.9	−59.6	172.1	10 35.5	−59.7	172.1	9 36.1	−59.7	172.1	8 36.7	−59.7	172.1	7 37.2	−59.7	172.1	30
31	13 33.6	−59.6	172.1	12 34.2	−59.7	172.1	11 34.7	−59.6	172.1	10 35.3	−59.7	172.2	9 35.8	−59.6	172.2	8 36.4	−59.7	172.2	7 37.0	−59.7	172.2	6 37.5	−59.7	172.2	31
32	12 34.0	−59.6	172.2	11 34.5	−59.6	172.2	10 35.1	−59.7	172.2	9 35.6	−59.6	172.3	8 36.2	−59.7	172.3	7 36.7	−59.7	172.3	6 37.3	−59.8	172.3	5 37.8	−59.7	172.3	32
33	11 34.4	−59.7	172.3	10 34.9	−59.6	172.3	9 35.4	−59.6	172.4	8 36.0	−59.7	172.4	7 36.5	−59.7	172.4	6 37.0	−59.7	172.4	5 37.5	−59.7	172.4	4 38.1	−59.8	172.4	33
34	10 34.7	−59.6	172.4	9 35.3	−59.7	172.4	8 35.8	−59.7	172.5	7 36.3	−59.7	172.5	6 36.8	−59.7	172.5	5 37.3	−59.7	172.5	4 37.8	−59.7	172.5	3 38.3	−59.7	172.5	34
35	9 35.1	−59.6	172.5	8 35.6	−59.6	172.6	7 36.1	−59.6	172.6	6 36.6	−59.6	172.6	5 37.1	−59.6	172.6	4 37.6	−59.6	172.6	3 38.1	−59.6	172.6	2 38.6	−59.7	172.6	35
36	8 35.5	−59.6	172.6	7 36.0	−59.6	172.7	6 36.5	−59.7	172.7	5 37.0	−59.7	172.7	4 37.5	−59.7	172.7	3 37.9	−59.7	172.7	2 38.4	−59.7	172.7	1 38.9	−59.7	172.7	36
37	7 35.9	−59.7	172.8	6 36.4	−59.7	172.8	5 36.8	−59.6	172.8	4 37.3	−59.7	172.8	3 37.8	−59.7	172.8	2 38.2	−59.6	172.8	1 38.7	−59.7	172.8	0 39.2	−59.7	172.8	37
38	6 36.2	−59.6	172.9	5 36.7	−59.7	172.9	4 37.2	−59.7	172.9	3 37.6	−59.6	172.9	2 38.1	−59.7	172.9	1 38.6	−59.7	172.9	0 39.0	−59.7	172.9	0 20.5	+59.8	7.1	38
39	5 36.6	−59.6	173.0	4 37.1	−59.7	173.0	3 37.5	−59.6	173.0	2 38.0	−59.7	173.0	1 38.4	−59.7	173.0	0 38.9	−59.7	173.0	0 20.7	+59.7	7.0	1 20.3	+59.7	7.0	39
40	4 37.0	−59.6	173.1	3 37.4	−59.6	173.1	2 37.9	−59.7	173.1	1 38.3	−59.7	173.1	0 38.7	−59.7	173.1	0 20.8	+59.7	6.9	1 20.4	+59.7	6.9	2 20.0	+59.7	6.9	40
41	3 37.4	−59.7	173.2	2 37.8	−59.7	173.2	1 38.2	−59.7	173.2	0 38.6	−59.7	173.2	0 21.0	+59.7	6.8	1 20.5	+59.7	6.8	2 20.1	+59.7	6.8	3 19.7	+59.7	6.8	41
42	2 37.7	−59.6	173.3	1 38.1	−59.7	173.3	0 38.5	−59.6	173.3	0 21.0	+59.7	6.7	1 20.6	+59.7	6.7	2 20.2	+59.7	6.7	3 19.8	+59.7	6.7	4 19.4	+59.7	6.7	42
43	1 38.1	−59.6	173.4	0 38.5	−59.6	173.4	0 21.1	+59.7	6.6	1 20.7	+59.7	6.6	2 20.3	+59.7	6.6	3 19.9	+59.7	6.6	4 19.5	+59.8	6.6	5 19.1	+59.8	6.6	43
44	0 38.5	−59.7	173.5	0 21.1	+59.7	6.5	1 20.8	+59.6	6.5	2 20.4	+59.7	6.5	3 20.0	+59.7	6.5	4 19.6	+59.7	6.5	5 19.2	+59.7	6.5	6 18.9	+59.7	6.5	44
45	0 21.2	+59.6	6.4	1 20.8	+59.6	6.4	2 20.4	+59.7	6.4	3 20.1	+59.6	6.4	4 19.7	+59.7	6.4	5 19.3	+59.7	6.4	6 18.9	+59.7	6.4	7 18.6	+59.7	6.4	45
46	1 20.8	+59.6	6.2	2 20.4	+59.7	6.2	3 20.1	+59.6	6.2	4 19.7	+59.7	6.3	5 19.4	+59.7	6.3	6 19.0	+59.7	6.3	7 18.6	+59.8	6.3	8 18.3	+59.7	6.3	46
47	2 20.4	+59.7	6.1	3 20.1	+59.6	6.1	4 19.7	+59.7	6.1	5 19.4	+59.7	6.2	6 19.0	+59.7	6.2	7 18.7	+59.7	6.2	8 18.4	+59.7	6.2	9 18.0	+59.7	6.2	47
48	3 20.1	+59.7	6.0	4 19.7	+59.7	6.0	5 19.4	+59.6	6.0	6 19.1	+59.6	6.0	7 18.7	+59.7	6.1	8 18.4	+59.7	6.1	9 18.1	+59.7	6.1	10 17.7	+59.7	6.1	48
49	4 19.7	+59.6	5.9	5 19.4	+59.6	5.9	6 19.0	+59.7	5.9	7 18.7	+59.7	5.9	8 18.4	+59.7	6.0	9 18.1	+59.7	6.0	10 17.8	+59.7	6.0	11 17.4	+59.7	6.0	49
50	5 19.3	+59.6	5.8	6 19.0	+59.6	5.8	7 18.7	+59.6	5.8	8 18.4	+59.7	5.8	9 18.1	+59.6	5.8	10 17.8	+59.7	5.9	11 17.5	+59.6	5.9	12 17.1	+59.7	5.9	50
51	6 18.9	+59.7	5.7	7 18.6	+59.7	5.7	8 18.4	+59.6	5.7	9 18.1	+59.6	5.7	10 17.8	+59.6	5.7	11 17.5	+59.6	5.8	12 17.1	+59.7	5.8	13 16.8	+59.7	5.8	51
52	7 18.6	+59.6	5.6	8 18.3	+59.6	5.6	9 18.0	+59.6	5.6	10 17.7	+59.7	5.6	11 17.4	+59.6	5.6	12 17.1	+59.7	5.7	13 16.8	+59.7	5.7	14 16.5	+59.7	5.7	52
53	8 18.2	+59.6	5.5	9 17.9	+59.7	5.5	10 17.6	+59.7	5.5	11 17.4	+59.6	5.5	12 17.1	+59.6	5.5	13 16.8	+59.7	5.6	14 16.5	+59.7	5.6	15 16.2	+59.7	5.6	53
54	9 17.8	+59.6	5.3	10 17.6	+59.6	5.4	11 17.3	+59.6	5.4	12 17.0	+59.7	5.4	13 16.8	+59.6	5.4	14 16.5	+59.7	5.4	15 16.2	+59.7	5.5	16 15.9	+59.7	5.5	54
55	10 17.4	+59.7	5.2	11 17.2	+59.6	5.2	12 16.9	+59.7	5.3	13 16.7	+59.6	5.3	14 16.4	+59.7	5.3	15 16.2	+59.6	5.3	16 15.9	+59.7	5.4	17 15.6	+59.7	5.4	55
56	11 17.1	+59.6	5.1	12 16.8	+59.6	5.1	13 16.6	+59.6	5.2	14 16.3	+59.7	5.2	15 16.1	+59.7	5.2	16 15.8	+59.7	5.2	17 15.6	+59.7	5.3	18 15.3	+59.7	5.3	56
57	12 16.7	+59.6	5.0	13 16.4	+59.7	5.0	14 16.2	+59.6	5.0	15 16.0	+59.6	5.1	16 15.7	+59.6	5.1	17 15.5	+59.7	5.1	18 15.3	+59.6	5.1	19 15.0	+59.7	5.2	57
58	13 16.3	+59.6	4.9	14 16.1	+59.6	4.9	15 15.8	+59.7	4.9	16 15.6	+59.7	5.0	17 15.4	+59.6	5.0	18 15.2	+59.6	5.0	19 14.9	+59.7	5.0	20 14.7	+59.7	5.1	58
59	14 15.9	+59.6	4.8	15 15.7	+59.6	4.8	16 15.5	+59.6	4.8	17 15.3	+59.7	4.8	18 15.0	+59.7	4.9	19 14.8	+59.7	4.9	20 14.6	+59.7	4.9	21 14.4	+59.7	5.0	59
60	15 15.5	+59.7	4.7	16 15.3	+59.6	4.7	17 15.1	+59.6	4.7	18 14.9	+59.6	4.7	19 14.7	+59.6	4.8	20 14.5	+59.6	4.8	21 14.3	+59.6	4.8	22 14.1	+59.6	4.8	60
61	16 15.1	+59.6	4.5	17 14.9	+59.6	4.6	18 14.7	+59.7	4.6	19 14.5	+59.7	4.6	20 14.3	+59.7	4.6	21 14.1	+59.7	4.7	22 13.9	+59.6	4.7	23 13.7	+59.5	4.7	61
62	17 14.7	+59.6	4.4	18 14.5	+59.6	4.4	19 14.3	+59.7	4.5	20 14.2	+59.6	4.5	21 14.0	+59.6	4.5	22 13.8	+59.6	4.6	23 13.6	+59.6	4.6	24 13.4	+59.7	4.6	62
63	18 14.3	+59.6	4.3	19 14.1	+59.6	4.3	20 14.0	+59.6	4.3	21 13.8	+59.6	4.4	22 13.6	+59.6	4.4	23 13.4	+59.6	4.4	24 13.2	+59.6	4.5	25 13.1	+59.6	4.5	63
64	19 13.9	+59.6	4.2	20 13.7	+59.6	4.2	21 13.6	+59.6	4.2	22 13.4	+59.6	4.2	23 13.2	+59.7	4.3	24 13.1	+59.6	4.3	25 12.9	+59.6	4.3	26 12.7	+59.7	4.4	64
65	20 13.5	+59.5	4.0	21 13.3	+59.6	4.1	22 13.2	+59.6	4.1	23 13.0	+59.6	4.1	24 12.9	+59.6	4.2	25 12.7	+59.6	4.2	26 12.5	+59.7	4.2	27 12.4	+59.6	4.3	65
66	21 13.0	+59.6	3.9	22 12.9	+59.6	3.9	23 12.8	+59.6	4.0	24 12.6	+59.6	4.0	25 12.5	+59.6	4.0	26 12.3	+59.6	4.1	27 12.2	+59.6	4.1	28 12.0	+59.7	4.1	66
67	22 12.6	+59.6	3.8	23 12.5	+59.6	3.8	24 12.4	+59.5	3.8	25 12.2	+59.6	3.9	26 12.1	+59.6	3.9	27 11.9	+59.7	3.9	28 11.8	+59.6	4.0	29 11.7	+59.6	4.0	67
68	23 12.2	+59.5	3.7	24 12.1	+59.6	3.7	25 11.9	+59.6	3.7	26 11.8	+59.6	3.7	27 11.7	+59.6	3.8	28 11.6	+59.6	3.8	29 11.4	+59.6	3.8	30 11.3	+59.6	3.9	68
69	24 11.7	+59.6	3.5	25 11.6	+59.6	3.6	26 11.5	+59.6	3.6	27 11.4	+59.6	3.6	28 11.3	+59.6	3.6	29 11.2	+59.6	3.7	30 11.0	+59.6	3.7	31 10.9	+59.6	3.8	69
70	25 11.3	+59.6	3.4	26 11.2	+59.6	3.4	27 11.1	+59.6	3.4	28 11.0	+59.6	3.5	29 10.9	+59.5	3.5	30 10.8	+59.6	3.5	31 10.6	+59.6	3.6	32 10.5	+59.6	3.6	70
71	26 10.8	+59.6	3.3	27 10.8	+59.5	3.3	28 10.7	+59.5	3.3	29 10.6	+59.6	3.3	30 10.4	+59.6	3.4	31 10.3	+59.6	3.4	32 10.2	+59.6	3.4	33 10.1	+59.6	3.5	71
72	27 10.4	+59.5	3.1	28 10.3	+59.6	3.1	29 10.2	+59.6	3.2	30 10.1	+59.6	3.2	31 10.0	+59.6	3.2	32 09.9	+59.6	3.3	33 09.8	+59.6	3.3	34 09.7	+59.6	3.3	72
73	28 09.9	+59.5	3.0	29 09.8	+59.6	3.0	30 09.8	+59.5	3.0	31 09.7	+59.5	3.1	32 09.6	+59.5	3.1	33 09.5	+59.6	3.1	34 09.4	+59.6	3.2	35 09.3	+59.6	3.2	73
74	29 09.4	+59.6	2.8	30 09.4	+59.5	2.9	31 09.3	+59.5	2.9	32 09.2	+59.5	2.9	33 09.1	+59.6	3.0	34 09.1	+59.5	3.0	35 09.0	+59.5	3.0	36 08.9	+59.6	3.1	74
75	30 09.0	+59.4	2.7	31 08.9	+59.5	2.7	32 08.8	+59.5	2.7	33 08.7	+59.5	2.8	34 08.7	+59.5	2.8	35 08.6	+59.5	2.8	36 08.5	+59.6	2.8	37 08.5	+59.5	2.9	75
76	31 08.5	+59.5	2.5	32 08.4	+59.5	2.6	33 08.3	+59.5	2.6	34 08.3	+59.5	2.6	35 08.2	+59.5	2.7	36 08.1	+59.5	2.7	37 08.1	+59.5	2.7	38 08.0	+59.5	2.8	76
77	32 07.9	+59.5	2.4	33 07.9	+59.5	2.4	34 07.8	+59.5	2.4	35 07.8	+59.5	2.5	36 07.7	+59.5	2.5	37 07.7	+59.5	2.5	38 07.6	+59.5	2.6	39 07.5	+59.6	2.6	77
78	33 07.4	+59.5	2.2	34 07.4	+59.4	2.3	35 07.3	+59.5	2.3	36 07.3	+59.5	2.3	37 07.2	+59.5	2.3	38 07.2	+59.4	2.4	39 07.1	+59.5	2.4	40 07.1	+59.5	2.4	78
79	34 06.9	+59.4	2.1	35 06.9	+59.4	2.1	36 06.8	+59.5	2.1	37 06.8	+59.4	2.1	38 06.7	+59.5	2.2	39 06.7	+59.4	2.2	40 06.6	+59.5	2.2	41 06.6	+59.5	2.3	79
80	35 06.3	+59.5	1.9	36 06.3	+59.5	1.9	37 06.3	+59.4	2.0	38 06.2	+59.5	2.0	39 06.2	+59.4	2.0	40 06.2	+59.4	2.0	41 06.1	+59.5	2.1	42 06.1	+59.4	2.1	80
81	36 05.8	+59.4	1.7	37 05.8	+59.4	1.8	38 05.7	+59.5	1.8	39 05.7	+59.4	1.8	40 05.7	+59.4	1.8	41 05.7	+59.4	1.8	42 05.6	+59.4	1.9	43 05.6	+59.4	1.9	81
82	37 05.2	+59.4	1.6	38 05.2	+59.4	1.6	39 05.2	+59.4	1.6	40 05.1	+59.5	1.6	41 05.1	+59.4	1.7	42 05.1	+59.4	1.7	43 05.1	+59.4	1.7	44 05.0	+59.4	1.7	82
83	38 04.6	+59.4	1.4	39 04.6	+59.4	1.4	40 04.6	+59.4	1.4	41 04.6	+59.4	1.4	42 04.6	+59.4	1.5	43 04.5	+59.5	1.5	44 04.5	+59.4	1.5	45 04.5	+59.4	1.5	83
84	39 04.0	+59.4	1.2	40 04.0	+59.4	1.2	41 04.0	+59.4	1.2	42 04.0	+59.4	1.3	43 04.0	+59.4	1.3	44 04.0	+59.4	1.3	45 03.9	+59.4	1.3	46 03.9	+59.4	1.4	84
85	40 03.4	+59.4	1.0	41 03.4	+59.4	1.0	42 03.4	+59.4	1.1	43 03.4	+59.3	1.1	44 03.4	+59.3	1.1	45 03.4	+59.3	1.1	46 03.3	+59.4	1.1	47 03.3	+59.4	1.1	85
86	41 02.8	+59.3	0.8	42 02.8	+59.3	0.8	43 02.8	+59.3	0.9	44 02.7	+59.4	0.9	45 02.7	+59.4	0.9	46 02.7	+59.4	0.9	47 02.7	+59.4	0.9	48 02.7	+59.4	0.9	86
87	42 02.1	+59.3	0.6	43 02.1	+59.3	0.6	44 02.1	+59.3	0.7	45 02.1	+59.3	0.7	46 02.1	+59.3	0.7	47 02.1	+59.3	0.7	48 02.1	+59.3	0.7	49 02.1	+59.3	0.7	87
88	43 01.4	+59.3	0.4	44 01.4	+59.3	0.4	45 01.4	+59.3	0.4	46 01.4	+59.3	0.5	47 01.4	+59.3	0.5	48 01.4	+59.3	0.5	49 01.4	+59.3	0.5	50 01.4	+59.3	0.5	88
89	44 00.7	+59.3	0.2	45 00.7	+59.3	0.2	46 00.7	+59.3	0.2	47 00.7	+59.3	0.2	48 00.7	+59.3	0.2	49 00.7	+59.3	0.2	50 00.7	+59.3	0.2	51 00.7	+59.3	0.2	89
90	45 00.0	+59.2	0.0	46 00.0	+59.2	0.0	47 00.0	+59.2	0.0	48 00.0	+59.2	0.0	49 00.0	+59.2	0.0	50 00.0	+59.2	0.0	51 00.0	+59.2	0.0	52 00.0	+59.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION

L.H.A. 171°, 189°

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	44 08.2	+59.1	166.0	43 09.9	+59.2	166.2	42 11.6	+59.2	166.4	41 13.3	+59.2	166.7	40 14.9	+59.3	166.8	39 16.4	+59.4	167.0	38 17.9	+59.4	167.2	37 19.4	+59.4	167.4	0
1	45 07.3	+59.0	165.8	44 09.1	+59.1	166.0	43 10.8	+59.2	166.2	42 12.5	+59.3	166.4	41 14.2	+59.3	166.7	40 15.8	+59.3	166.8	39 17.3	+59.4	167.0	38 18.8	+59.5	167.2	1
2	46 06.3	+59.1	165.5	45 08.2	+59.1	165.8	44 10.0	+59.2	166.0	43 11.8	+59.2	166.2	42 13.5	+59.3	166.4	41 15.1	+59.3	166.7	40 16.7	+59.4	166.9	39 18.3	+59.4	167.0	2
3	47 05.4	+59.0	165.2	46 07.3	+59.1	165.5	45 09.2	+59.1	165.8	44 11.0	+59.2	166.0	43 12.7	+59.3	166.2	42 14.4	+59.3	166.5	41 16.1	+59.3	166.7	40 17.7	+59.4	166.9	3
4	48 04.4	+58.9	165.0	47 06.4	+59.0	165.3	46 08.3	+59.1	165.5	45 10.2	+59.2	165.8	44 12.0	+59.2	166.0	43 13.7	+59.3	166.2	42 15.4	+59.3	166.5	41 17.1	+59.4	166.7	4
5	49 03.3	+58.9	164.7	48 05.4	+59.0	165.0	47 07.4	+59.1	165.3	46 09.4	+59.1	165.5	45 11.2	+59.2	165.8	44 13.0	+59.3	166.0	43 14.8	+59.3	166.3	42 16.5	+59.3	166.5	5
6	50 02.2	+58.9	164.4	49 04.4	+59.0	164.7	48 06.5	+59.0	165.0	47 08.5	+59.1	165.3	46 10.4	+59.2	165.6	45 12.3	+59.2	165.8	44 14.1	+59.3	166.1	43 15.8	+59.4	166.3	6
7	51 01.1	+58.8	164.1	50 03.4	+58.9	164.4	49 05.5	+59.0	164.7	48 07.6	+59.1	165.0	47 09.6	+59.1	165.3	46 11.5	+59.2	165.6	45 13.4	+59.2	165.8	44 15.2	+59.3	166.1	7
8	51 59.9	+58.8	163.8	51 02.3	+58.8	164.1	50 04.5	+59.0	164.5	49 06.7	+59.0	164.8	48 08.7	+59.1	165.1	47 10.7	+59.2	165.3	46 12.6	+59.3	165.6	45 14.5	+59.3	165.9	8
9	52 58.7	+58.7	163.5	52 01.1	+58.8	163.8	51 03.5	+58.9	164.2	50 05.7	+59.0	164.5	49 07.8	+59.1	164.8	48 09.9	+59.1	165.1	47 11.9	+59.2	165.4	46 13.8	+59.2	165.6	9
10	53 57.4	+58.6	163.1	52 59.9	+58.8	163.5	52 02.4	+58.8	163.9	51 04.7	+58.9	164.2	50 06.9	+59.0	164.5	49 09.0	+59.1	164.8	48 11.1	+59.1	165.1	47 13.0	+59.3	165.3	10
11	54 56.0	+58.6	162.7	53 58.7	+58.7	163.2	53 01.2	+58.8	163.5	52 03.6	+58.9	163.9	51 05.9	+59.0	164.3	50 08.1	+59.1	164.6	49 10.2	+59.2	164.9	48 12.3	+59.2	165.2	11
12	55 54.6	+58.5	162.4	54 57.4	+58.6	162.8	54 00.0	+58.7	163.2	53 02.5	+58.8	163.6	52 04.9	+58.9	164.0	51 07.2	+59.0	164.3	50 09.4	+59.1	164.6	49 11.5	+59.2	164.9	12
13	56 53.1	+58.4	162.0	55 56.0	+58.6	162.4	54 58.7	+58.7	162.9	54 01.3	+58.8	163.3	53 03.8	+58.9	163.6	52 06.2	+59.0	164.0	51 08.5	+59.0	164.3	50 10.7	+59.1	164.7	13
14	57 51.6	+58.3	161.5	56 54.6	+58.4	162.0	55 57.4	+58.6	162.5	55 00.1	+58.8	162.9	54 02.7	+58.8	163.3	53 05.2	+58.9	163.7	52 07.5	+59.1	164.1	51 09.8	+59.1	164.4	14
15	58 49.9	+58.2	161.1	57 53.0	+58.4	161.6	56 56.0	+58.6	162.1	55 58.9	+58.6	162.6	55 01.5	+58.8	163.0	54 04.1	+58.9	163.4	53 06.6	+58.9	163.8	52 08.9	+59.1	164.1	15
16	59 48.1	+58.2	160.6	58 51.4	+58.3	161.2	57 54.6	+58.4	161.7	56 57.5	+58.6	162.2	56 00.3	+58.7	162.6	55 03.0	+58.8	163.1	54 05.5	+59.0	163.5	53 08.0	+59.0	163.8	16
17	60 46.3	+58.0	160.1	59 49.7	+58.2	160.7	58 53.0	+58.4	161.3	57 56.1	+58.5	161.8	56 59.0	+58.7	162.3	56 01.8	+58.8	162.7	55 04.5	+58.9	163.1	54 07.0	+58.9	163.5	17
18	61 44.3	+57.8	159.6	60 47.9	+58.1	160.2	59 51.4	+58.2	160.8	58 54.6	+58.4	161.3	57 57.7	+58.5	161.9	57 00.6	+58.7	162.3	56 03.3	+58.8	162.8	55 05.9	+59.0	163.2	18
19	62 42.1	+57.7	159.0	61 46.0	+57.9	159.7	60 49.6	+58.2	160.3	59 53.0	+58.3	160.9	58 56.2	+58.5	161.4	57 59.3	+58.6	162.0	57 02.1	+58.8	162.4	56 04.9	+58.8	162.9	19
20	63 39.9	+57.6	158.4	62 43.9	+57.9	159.1	61 47.8	+58.0	159.8	60 51.3	+58.2	160.4	59 54.7	+58.4	161.0	58 57.9	+58.6	161.5	58 00.9	+58.6	162.1	57 03.7	+58.8	162.5	20
21	64 37.5	+57.3	157.8	63 41.8	+57.6	158.5	62 45.8	+57.9	159.3	61 49.5	+58.1	159.9	60 53.1	+58.3	160.5	59 56.4	+58.5	161.1	58 59.5	+58.6	161.7	58 02.5	+58.7	162.2	21
22	65 34.8	+57.2	157.1	64 39.4	+57.5	157.9	63 43.7	+57.7	158.7	62 47.6	+58.0	159.4	61 51.4	+58.1	160.0	60 54.9	+58.3	160.6	59 58.1	+58.5	161.2	59 01.2	+58.7	161.8	22
23	66 32.0	+57.0	156.3	65 36.9	+57.3	157.2	64 41.4	+57.6	158.0	63 45.6	+57.8	158.8	62 49.5	+58.1	159.5	61 53.2	+58.2	160.2	60 56.6	+58.5	160.8	59 59.9	+58.6	161.4	23
24	67 29.0	+56.7	155.5	66 34.2	+57.0	156.5	65 39.0	+57.3	157.4	64 43.4	+57.7	158.2	63 47.6	+57.9	158.9	62 51.4	+58.1	159.7	61 55.1	+58.3	160.3	60 58.5	+58.4	160.9	24
25	68 25.7	+56.4	154.7	67 31.2	+56.8	155.7	66 36.3	+57.2	156.6	65 41.1	+57.4	157.5	64 45.5	+57.7	158.3	63 49.5	+58.0	159.1	62 53.4	+58.2	159.8	61 56.9	+58.4	160.4	25
26	69 22.1	+56.0	153.7	68 28.0	+56.5	154.8	67 33.5	+56.9	155.9	66 38.5	+57.3	156.8	65 43.2	+57.6	157.7	64 47.5	+57.8	158.5	63 51.6	+58.1	159.3	62 55.3	+58.3	159.9	26
27	70 18.1	+55.7	152.7	69 24.5	+56.2	153.9	68 30.4	+56.6	155.0	67 35.8	+57.0	156.0	66 40.8	+57.3	157.0	65 45.3	+57.7	157.9	64 49.6	+57.9	158.7	63 53.6	+58.1	159.4	27
28	71 13.8	+55.2	151.5	70 20.7	+55.8	152.8	69 27.0	+56.4	154.1	68 32.8	+56.8	155.2	67 38.1	+57.1	156.2	66 43.0	+57.5	157.2	65 47.5	+57.8	158.0	64 51.7	+58.0	158.8	28
29	72 09.0	+54.7	150.3	71 16.5	+55.4	151.8	70 23.4	+55.9	153.1	69 29.6	+56.4	154.3	68 35.2	+56.9	155.4	67 40.5	+57.2	156.4	66 45.3	+57.5	157.4	65 49.7	+57.8	158.2	29
30	73 03.7	+54.1	148.9	72 11.9	+54.9	150.5	71 19.3	+55.5	152.0	70 26.0	+56.1	153.3	69 32.1	+56.6	154.5	68 37.7	+57.0	155.6	67 42.8	+57.4	156.6	66 47.5	+57.7	157.6	30
31	73 57.8	+53.4	147.4	73 06.8	+54.3	149.2	72 14.8	+54.9	150.8	71 22.1	+55.7	152.2	70 28.7	+56.2	153.5	69 34.7	+56.7	154.7	68 40.2	+57.1	155.8	67 45.2	+57.5	156.8	31
32	74 51.2	+52.5	145.7	74 01.1	+53.5	147.7	73 09.7	+54.4	149.4	72 17.8	+55.2	151.0	71 24.9	+55.8	152.5	70 31.4	+56.3	153.8	69 37.3	+56.8	155.0	68 42.7	+57.2	156.1	32
33	75 43.7	+51.5	143.8	74 54.6	+52.7	146.0	74 04.3	+53.8	147.9	73 13.0	+54.6	149.7	72 20.7	+55.4	151.3	71 27.7	+56.0	152.7	70 34.1	+56.5	154.0	69 39.9	+56.9	155.2	33
34	76 35.2	+50.2	141.6	75 47.3	+51.6	144.1	74 58.1	+52.9	146.3	74 07.6	+54.0	148.2	73 16.1	+54.8	150.0	72 23.7	+55.5	151.5	71 30.6	+56.1	153.0	70 36.8	+56.7	154.3	34
35	77 25.4	+48.8	139.2	76 39.1	+50.5	142.0	75 51.0	+52.0	144.4	75 01.6	+53.1	146.6	74 10.9	+54.2	148.5	73 19.2	+55.0	150.3	72 26.7	+55.7	151.9	71 33.5	+56.2	153.3	35
36	78 14.2	+46.9•	136.4	77 29.6	+49.0	139.6	76 43.0	+50.8	142.3	75 54.7	+52.2	144.7	75 05.1	+53.4	146.9	74 14.2	+54.4	148.9	73 22.4	+55.2	150.6	72 29.7	+55.9	152.2	36
37	79 01.1	+44.7•	133.3	78 18.6	+47.3•	136.8	77 33.8	+49.3	139.9	76 46.9	+51.1	142.7	75 58.5	+52.4	145.1	75 08.6	+53.6	147.3	74 17.6	+54.6	149.2	73 25.6	+55.4	150.9	37
38	79 45.8	+41.9•	129.7	79 05.9	+45.0•	133.7	78 23.1	+47.6	137.2	77 38.0	+49.7	140.3	76 50.9	+51.4	143.0	76 02.2	+52.7	145.5	75 12.2	+53.8	147.6	74 21.0	+54.7	149.5	38
39	80 27.7	+38.4•	125.5	79 50.9	+42.3•	130.0	79 10.7	+45.4•	134.0	78 27.7	+47.9•	137.6	77 42.3	+49.9	140.7	76 54.9	+51.7	143.4	76 06.0	+53.0	145.8	75 15.7	+54.1	148.0	39
40	81 06.1	+34.3•	120.7	80 33.2	+38.8•	125.9	79 56.1	+42.6•	130.4	79 15.6	+45.7•	134.5	78 32.2	+48.3	138.0	77 46.6	+50.2	141.1	76 59.0	+51.9	143.8	76 09.8	+53.2	146.2	40
41	81 40.4	+29.0•	115.2	81 12.0	+34.7•	121.1	80 38.7	+39.3•	126.3	80 01.3	+43.1•	130.9	79 20.5	+46.1•	134.9	78 36.8	+48.6	138.4	77 50.9	+50.5	141.5	77 03.0	+52.2	144.2	41
42	82 09.4	+23.0•	109.0	81 46.7	+29.5•	115.5	81 18.0	+35.1•	121.4	80 44.4	+39.7•	126.7	80 06.6	+43.5•	131.3	79 25.4	+46.5•	135.3	78 41.4	+49.0	138.8	77 55.2	+50.9	141.9	42
43	82 32.4	+15.7•	102.0	82 16.2	+23.2•	109.2	81 53.1	+29.9•	115.9	81 24.1	+35.5•	121.9	80 50.1	+40.1•	127.1	80 11.9	+43.9•	131.8	79 30.4	+46.9•	135.8	78 46.1	+49.3	139.3	43
44	82 48.1	+7.9•	94.5	82 39.4	+16.1•	102.2	82 23.0	+23.6•	109.5	81 59.6	+30.3•	116.3	81 30.2	+36.0•	122.3	80 55.8	+40.6•	127.6	80 17.3	+44.3•	132.2	79 35.4	+47.3•	136.3	44
45	82 56.0	–0.5•	86.5	82 55.5	+8.0•	94.5	82 46.6	+16.3•	102.4	82 29.9	+24.0•	109.9	82 06.2	+30.7•	116.7	81 36.4	+36.4•	122.7	81 01.6	+41.1•	128.1	80 22.7	+44.7•	132.7	45
46	82 55.5	–8.9•	78.3	83 03.5	–0.6•	86.4	83 02.9	+8.2•	94.6	82 53.9	+16.6•	102.6	82 36.9	+24.4•	110.2	82 12.8	+31.2•	117.1	81 42.7	+36.9•	123.2	81 07.4	+41.6•	128.6	46
47	82 46.6	–16.7•	70.4	83 02.9	–9.0•	78.1	83 11.1	–0.6•	86.3	83 10.5	+8.3•	94.7	83 01.3	+16.9•	102.9	82 44.0	+24.8•	110.6	82 19.6	+31.6•	117.5	81 49.0	+37.3•	123.8	47
48	82 29.9	–23.7•	62.9	82 53.9	–17.0•	70.0	83 10.5	–9.2•	77.9	83 18.8	–0.6•	86.3	83 18.2	+8.4•	94.8	83 08.8	+17.2•	103.1	82 51.2	+25.3•	110.9	82 26.3	+32.2•	118.0	48
49	82 06.2	–29.8•	56.0	82 36.9	–24.1•	62.4	83 01.3	–17.3•	69.7	83 18.2	–9.4•	77.7	83 26.6	–0.6•	86.2	83 26.0	+8.6•	94.9	83 16.5	+17.5•	103.4	82 58.5	+25.7•	111.3	49
50	81 36.4	–34.8•	49.9	82 12.8	–30.1•	55.5	82 44.0	–24.4•	61.9	83 08.8	–17.6•	69.3	83 26.0	–9.5•	77.5	83 34.6	–0.6•	86.2	83 34.0	+8.7•	95.0	83 24.2	+17.8•	103.7	50
51	81 01.6	–38.9•	44.5	81 42.7	–35.3•	49.3	82 19.6	–30.6•	54.9	82 52.1	–24.9•	61.5	83 16.5	–18.0•	68.9	83 34.0	–9.8•	77.2	83 42.7	–0.7•	86.1	83 42.0	+8.9•	95.2	51
52	80 22.7	–42.3•	39.8	81 07.4	–39.3•	43.9	81 49.0	–35.7•	48.7	82 26.3	–31.0•	54.3	82 58.5	–25.3•	60.9	83 23.4	–18.3•	68.5	83 42.0	–10.0•	77.0	83 50.9	–0.7•	86.1	52
53	79 40.4	–44.9•	35.7	80 28.1	–42.6•	39.1	81 13.3	–39.7•	43.2	81 55.3	–36.1•	48.0	82 33.2	–31.5•	53.7	83 05.9	–25.8•	60.4	83 32.0	–18.7•	68.1	83 50.2	–10.3•	76.7	53
54	78 55.5	–47.2•	32.1	79 45.5	–45.4•	35.0	80 33.6	–43.1•	38.5	81 19.2	–40.2•	42.6	82 01.7	–36.6•	47.4	82 40.1	–32.0•	53.1	83 13.3	–26.2•	59.9	83 39.9	–19.1•	67.7	54
55	78 08.3	–49.0	29.0	79 00.1	–47.4	31.5	79 50.5	–45.7•	34.4	80 39.0	–43.4•	37.8	81 25.1	–40.6•	41.9	82 08.1	–37.0•	46.7	82 47.1	–32.5•	52.5	83 20.8	–26.7•	59.3	55
56	77 19.3	–50.4	26.3	78 12.7	–49.3	28.6	79 04.8	–47.8	30.8	79 55.6	–46.1•	33.7	80 44.5	–43.9•	37.1	81 31.1	–41.1•	41.2	82 14.6	–37.6•	46.0	82 54.1	–33.1•	51.8	56
57	76 28.9	–51.6	23.9	77 23.4	–50.7	25.7	78 17.0	–49.5	27.8	79 09.5	–48.1	30.2	80 00.6	–46.4•	33.0	80 50.0	–44.3•	36.4	81 37.0	–41.6•	40.4	82 21.0	–38.1•	45.3	57
58	75 37.3	–52.6	21.8	76 32.7	–51.8	23.3	77 27.5	–51.0	25.1	78 21.4	–49.9	27.1	79 14.2	–48.5	29.5	80 05.7	–46.8•	32.3	80 55.4	–44.7•	35.7	81 42.9	–42.0•	39.7	58
59	74 44.7	–53.5	19.9	75 40.9	–52.9	21.2	76 36.5	–52.1	22.7	77 31.5	–51.2	24.5	78 25.7	–50.2	26.5	79 18.9	–48.9	28.8	80 10.7	–47.2•	31.6	81 00.9	–45.2•	34.9	59
60	73 51.2	–54.1	18.2	74 48.0	–53.6	19.3	75 44.4	–53.0	20.6	76 40.3	–52.4	22.1	77 35.5	–51.5	23.8	78 30.0	–50.5	25.8	79 23.5	–49.2	28.1	80 15.7	–47.6•	30.9	60
61	72 57.1	–54.8	16.7	73 54.4	–54.4	17.7	74 51.4	–53.9	18.8	75 47.9	–53.2	20.1	76 44.0	–52.6	21.5	77 39.5	–51.7	23.2	78 34.3	–50.8	25.1	79 28.1	–49.6	27.4	61
62	72 02.3	–55.3	15.3	73 00.0	–54.9	16.2	73 57.5	–54.5	17.2	74 54.7	–54.1	18.3	75 51.4	–53.5	19.5	76 47.8	–52.9	20.9	77 43.5	–52.1	22.5	78 38.5	–51.1	24.5	62
63	71 07.0	–55.7	14.1	72 05.1	–55.4	14.8	73 03.0	–55.1	15.7	74 00.6	–54.7	16.6	74 57.9	–54.2	17.7	75 54.9	–53.7	18.9	76 51.4	–53.1	20.3	77 47.4	–52.3	21.9	63
64	70 11.3	–56.1	13.0	71 09.7	–55.9	13.6	72 07.9	–55.6	14.4	73 05.9	–55.3	15.2	74 03.7	–54.9	16.1	75 01.2	–54.5	17.1	75 58.3	–53.9	18.3	76 55.1	–53.4	19.7	64
65	69 15.2	–56.5	12.0	70 13.8	–56.2	12.5	71 12.3	–56.0	13.2	72 10.6	–55.7	13.9	73 08.8	–55.4	14.7	74 06.7	–55.1	15.5	75 04.4	–54.7	16.6	76 01.7	–54.2	17.7	65
66	68 18.7	–56.7	11.0	69 17.6	–56.6	11.5	70 16.3	–56.4	12.1	71 14.9	–56.1	12.7	72 13.4	–55.9	13.4	73 11.6	–55.5	14.1	74 09.7	–55.2	15.0	75 07.5	–54.8	16.0	66
67	67 22.0	–57.0	10.2	68 21.0	–56.8	10.6	69 19.9	–56.6	11.1	70 18.8	–56.5	11.6	71 17.5	–56.3	12.2	72 16.1	–56.1	12.9	73 14.5	–55.8	13.6	74 12.7	–55.5	14.4	67
68	66 25.0	–57.2	9.4	67 24.2	–57.1	9.7	68 23.3	–57.0	10.2	69 22.3	–56.8	10.6	70 21.2	–56.6	11.2	71 20.0	–56.4	11.7	72 18.7	–56.2	12.4	73 17.2	–55.9	13.1	68
69	65 27.8	–57.4	8.6	66 27.1	–57.3	9.0	67 26.3	–57.2	9.3	68 25.5	–57.0	9.7	69 24.6	–56.9	10.2	70 23.6	–56.7	10.7	71 22.5	–56.5	11.2	72 21.3	–56.3	11.8	69
70	64 30.4	–57.6	7.9	65 29.8	–57.5	8.2	66 29.1	–57.4	8.6	67 28.5	–57.3	8.9	68 27.7	–57.2	9.3	69 26.9	–57.1	9.7	70 26.0	–56.9	10.2	71 25.0	–56.7	10.7	70
71	63 32.8	–57.8	7.3	64 32.3	–57.7	7.6	65 31.7	–57.5	7.8	66 31.2	–57.5	8.2	67 30.5	–57.4	8.5	68 29.8	–57.2	8.9	69 29.1	–57.1	9.3	70 28.3	–57.0	9.7	71
72	62 35.0	–57.9	6.7	63 34.6	–57.8	6.9	64 34.2	–57.7	7.2	65 33.7	–57.7	7.5	66 33.1	–57.5	7.8	67 32.6	–57.5	8.1	68 32.0	–57.3	8.4	69 31.3	–57.3	8.8	72
73	61 37.1	–58.0	6.1	62 36.8	–58.0	6.3	63 36.4	–57.9	6.6	64 36.0	–57.8	6.8	65 35.6	–57.8	7.1	66 35.1	–57.7	7.3	67 34.6	–57.6	7.6	68 34.0	–57.5	8.0	73
74	60 39.1	–58.1	5.6	61 38.8	–58.1	5.8	62 38.5	–58.0	6.0	63 38.2	–58.0	6.2	64 37.8	–57.9	6.4	65 37.4	–57.8	6.7	66 37.0	–57.8	6.9	67 36.5	–57.6	7.2	74
75	59 41.0	–58.3	5.1	60 40.7	–58.2	5.3	61 40.5	–58.2	5.4	62 40.2	–58.1	5.6	63 39.9	–58.1	5.8	64 39.6	–58.0	6.0	65 39.2	–57.9	6.3	66 38.9	–57.9	6.5	75
76	58 42.7	–58.3	4.6	59 42.5	–58.3	4.8	60 42.3	–58.3	4.9	61 42.1	–58.2	5.1	62 41.8	–58.1	5.3	63 41.6	–58.2	5.4	64 41.3	–58.1	5.6	65 41.0	–58.0	5.9	76
77	57 44.4	–58.5	4.2	58 44.2	–58.4	4.3	59 44.0	–58.3	4.4	60 43.9	–58.4	4.6	61 43.7	–58.3	4.7	62 43.4	–58.2	4.9	63 43.2	–58.2	5.1	64 43.0	–58.2	5.2	77
78	56 45.9	–58.5	3.8	57 45.8	–58.5	3.9	58 45.7	–58.5	4.0	59 45.5	–58.4	4.1	60 45.4	–58.4	4.2	61 45.2	–58.4	4.3	62 45.0	–58.3	4.5	63 44.8	–58.3	4.7	78
79	55 47.4	–58.6	3.4	56 47.3	–58.5	3.5	57 47.2	–58.5	3.6	58 47.1	–58.5	3.7	59 47.0	–58.5	3.8	60 46.8	–58.4	3.9	61 46.7	–58.4	4.0	62 46.5	–58.4	4.2	79
80	54 48.8	–58.6	3.0	55 48.8	–58.7	3.1	56 48.7	–58.6	3.2	57 48.6	–58.6	3.2	58 48.5	–58.6	3.3	59 48.4	–58.6	3.4	60 48.3	–58.6	3.5	61 48.1	–58.4	3.7	80
81	53 50.2	–58.7	2.6	54 50.1	–58.7	2.7	55 50.1	–58.7	2.8	56 50.0	–58.7	2.8	57 49.9	–58.6	2.9	58 49.8	–58.6	3.0	59 49.7	–58.6	3.1	60 49.7	–58.6	3.2	81
82	52 51.5	–58.8	2.3	53 51.4	–58.7	2.3	54 51.4	–58.8	2.4	55 51.3	–58.7	2.5	56 51.3	–58.8	2.5	57 51.2	–58.7	2.6	58 51.1	–58.6	2.7	59 51.1	–58.7	2.8	82
83	51 52.7	–58.8	2.0	52 52.7	–58.8	2.0	53 52.6	–58.8	2.1	54 52.6	–58.8	2.1	55 52.5	–58.7	2.2	56 52.5	–58.8	2.2	57 52.5	–58.8	2.3	58 52.4	–58.7	2.3	83
84	50 53.9	–58.8	1.6	51 53.8	–58.8	1.7	52 53.8	–58.8	1.7	53 53.8	–58.9	1.8	54 53.8	–58.9	1.8	55 53.7	–58.8	1.9	56 53.7	–58.8	1.9	57 53.7	–58.8	2.0	84
85	49 55.0	–58.9	1.3	50 55.0	–58.9	1.4	51 55.0	–58.9	1.4	52 54.9	–58.9	1.4	53 54.9	–58.9	1.5	54 54.9	–58.9	1.5	55 54.9	–58.9	1.5	56 54.9	–58.9	1.6	85
86	48 56.1	–59.0	1.1	49 56.1	–59.0	1.1	50 56.1	–59.0	1.1	51 56.0	–58.9	1.1	52 56.0	–59.0	1.2	53 56.0	–58.9	1.2	54 56.0	–59.0	1.2	55 56.0	–58.9	1.2	86
87	47 57.1	–59.0	0.8	48 57.1	–59.0	0.8	49 57.1	–59.0	0.8	50 57.1	–59.0	0.8	51 57.1	–59.0	0.9	52 57.1	–59.0	0.9	53 57.1	–59.0	0.9	54 57.1	–59.0	0.9	87
88	46 58.1	–59.1	0.5	47 58.1	–59.0	0.5	48 58.1	–59.0	0.5	49 58.1	–59.0	0.5	50 58.1	–59.0	0.6	51 58.1	–59.0	0.6	52 58.1	–59.1	0.6	53 58.1	–59.0	0.6	88
89	45 59.1	–59.1	0.2	46 59.1	–59.1	0.3	47 59.1	–59.1	0.3	48 59.1	–59.1	0.3	49 59.1	–59.1	0.3	50 59.1	–59.1	0.3	51 59.1	–59.1	0.3	52 59.1	–59.1	0.3	89
90	45 00.0	–59.1	0.0	46 00.0	–59.1	0.0	47 00.0	–59.1	0.0	48 00.0	–59.1	0.0	49 00.0	–59.1	0.0	50 00.0	–59.1	0.0	51 00.0	–59.1	0.0	52 00.0	–59.1	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	44 08.2	−59.2	166.0	43 09.9	−59.2	166.2	42 11.6	−59.2	166.4	41 13.3	−59.3	166.7	40 14.9	−59.4	166.8	39 16.4	−59.4	167.0	38 17.9	−59.4	167.2	37 19.4	−59.5	167.4	0
1	43 09.0	−59.1	166.2	42 10.7	−59.2	166.5	41 12.4	−59.3	166.7	40 14.0	−59.3	166.9	39 15.5	−59.3	167.0	38 17.0	−59.4	167.2	37 18.5	−59.4	167.4	36 19.9	−59.5	167.6	1
2	42 09.9	−59.2	166.5	41 11.5	−59.2	166.7	40 13.1	−59.3	166.9	39 14.7	−59.4	167.1	38 16.2	−59.4	167.2	37 17.6	−59.4	167.4	36 19.1	−59.5	167.6	35 20.4	−59.4	167.7	2
3	41 10.7	−59.2	166.7	40 12.3	−59.3	166.9	39 13.8	−59.3	167.1	38 15.3	−59.3	167.2	37 16.8	−59.4	167.4	36 18.2	−59.5	167.6	35 19.6	−59.5	167.7	34 21.0	−59.5	167.9	3
4	40 11.5	−59.3	166.9	39 13.0	−59.3	167.1	38 14.5	−59.3	167.3	37 16.0	−59.4	167.4	36 17.4	−59.5	167.6	35 18.8	−59.5	167.7	34 20.1	−59.4	167.9	33 21.5	−59.6	168.0	4
5	39 12.3	−59.3	167.1	38 13.7	−59.3	167.3	37 15.2	−59.3	167.4	36 16.6	−59.4	167.6	35 18.0	−59.4	167.8	34 19.3	−59.4	167.9	33 20.7	−59.5	168.0	32 21.9	−59.5	168.2	5
6	38 13.0	−59.3	167.3	37 14.4	−59.3	167.5	36 15.9	−59.4	167.6	35 17.2	−59.4	167.8	34 18.6	−59.5	167.9	33 19.9	−59.5	168.1	32 21.2	−59.5	168.2	31 22.4	−59.5	168.3	6
7	37 13.7	−59.3	167.5	36 15.1	−59.3	167.7	35 16.5	−59.4	167.7	34 17.8	−59.4	168.0	33 19.1	−59.4	168.1	32 20.4	−59.5	168.2	31 21.7	−59.5	168.4	30 22.9	−59.6	168.5	7
8	36 14.4	−59.3	167.7	35 15.8	−59.4	167.8	34 17.1	−59.4	168.0	33 18.4	−59.4	168.1	32 19.7	−59.5	168.3	31 20.9	−59.5	168.4	30 22.2	−59.6	168.5	29 23.3	−59.6	168.6	8
9	35 15.1	−59.3	167.9	34 16.4	−59.3	168.0	33 17.7	−59.4	168.2	32 19.0	−59.4	168.3	31 20.2	−59.4	168.4	30 21.4	−59.5	168.5	29 22.6	−59.5	168.6	28 23.8	−59.6	168.8	9
10	34 15.8	−59.3	168.1	33 17.1	−59.4	168.2	32 18.3	−59.4	168.3	31 19.6	−59.5	168.5	30 20.8	−59.5	168.6	29 21.9	−59.5	168.7	28 23.1	−59.5	168.8	27 24.2	−59.5	168.9	10
11	33 16.5	−59.4	168.2	32 17.7	−59.4	168.4	31 18.9	−59.4	168.5	30 20.1	−59.4	168.6	29 21.3	−59.5	168.7	28 22.4	−59.5	168.8	27 23.6	−59.6	168.9	26 24.7	−59.5	169.0	11
12	32 17.1	−59.4	168.4	31 18.3	−59.4	168.5	30 19.5	−59.4	168.7	29 20.7	−59.5	168.8	28 21.8	−59.5	168.9	27 22.9	−59.5	169.0	26 24.0	−59.5	169.1	25 25.1	−59.6	169.2	12
13	31 17.7	−59.4	168.6	30 18.9	−59.4	168.7	29 20.1	−59.5	168.8	28 21.2	−59.5	168.9	27 22.3	−59.5	169.0	26 23.4	−59.5	169.1	25 24.5	−59.6	169.2	24 25.5	−59.5	169.3	13
14	30 18.3	−59.3	168.7	29 19.5	−59.5	168.9	28 20.6	−59.5	169.0	27 21.7	−59.5	169.1	26 22.8	−59.5	169.2	25 23.9	−59.6	169.3	24 24.9	−59.5	169.3	23 25.9	−59.6	169.4	14
15	29 19.0	−59.5	168.9	28 20.1	−59.5	169.0	27 21.1	−59.4	169.1	26 22.2	−59.5	169.2	25 23.3	−59.6	169.3	24 24.3	−59.5	169.4	23 25.3	−59.5	169.5	22 26.3	−59.6	169.5	15
16	28 19.5	−59.5	169.1	27 20.6	−59.4	169.2	26 21.7	−59.5	169.3	25 22.7	−59.5	169.4	24 23.7	−59.5	169.4	23 24.8	−59.6	169.5	22 25.7	−59.5	169.6	21 26.7	−59.6	169.6	16
17	27 20.1	−59.4	169.2	26 21.2	−59.5	169.3	25 22.2	−59.5	169.4	24 23.2	−59.5	169.5	23 24.2	−59.5	169.6	22 25.2	−59.6	169.7	21 26.2	−59.5	169.7	20 27.1	−59.6	169.8	17
18	26 20.7	−59.4	169.4	25 21.7	−59.5	169.5	24 22.7	−59.5	169.6	23 23.7	−59.5	169.6	22 24.7	−59.6	169.7	21 25.6	−59.5	169.8	20 26.6	−59.6	169.8	19 27.5	−59.6	169.9	18
19	25 21.3	−59.6	169.5	24 22.2	−59.4	169.6	23 23.2	−59.5	169.7	22 24.2	−59.5	169.7	21 25.1	−59.5	169.8	20 26.1	−59.6	169.9	19 27.0	−59.6	170.0	18 27.9	−59.6	170.0	19
20	24 21.8	−59.4	169.7	23 22.8	−59.5	169.8	22 23.7	−59.5	169.8	21 24.7	−59.6	169.9	20 25.6	−59.5	170.0	19 26.5	−59.6	170.0	18 27.4	−59.6	170.1	17 28.3	−59.6	170.2	20
21	23 22.4	−59.5	169.8	22 23.3	−59.5	169.9	21 24.2	−59.5	170.0	20 25.1	−59.5	170.0	19 26.0	−59.5	170.1	18 26.9	−59.6	170.2	17 27.8	−59.6	170.2	16 28.7	−59.7	170.3	21
22	22 22.9	−59.5	170.0	21 23.8	−59.5	170.0	20 24.7	−59.5	170.1	19 25.6	−59.6	170.2	18 26.5	−59.6	170.2	17 27.3	−59.5	170.3	16 28.2	−59.6	170.3	15 29.0	−59.6	170.4	22
23	21 23.4	−59.5	170.1	20 24.3	−59.5	170.2	19 25.2	−59.6	170.2	18 26.0	−59.5	170.3	17 26.9	−59.6	170.4	16 27.7	−59.6	170.4	15 28.6	−59.6	170.5	14 29.4	−59.6	170.5	23
24	20 23.9	−59.5	170.3	19 24.8	−59.5	170.3	18 25.6	−59.5	170.4	17 26.5	−59.6	170.4	16 27.3	−59.6	170.5	15 28.1	−59.6	170.5	14 29.0	−59.7	170.6	13 29.8	−59.7	170.6	24
25	19 24.4	−59.4	170.4	18 25.3	−59.5	170.5	17 26.1	−59.5	170.5	16 26.9	−59.5	170.6	15 27.7	−59.5	170.6	14 28.5	−59.6	170.6	13 29.3	−59.6	170.7	12 30.1	−59.6	170.7	25
26	18 25.0	−59.5	170.5	17 25.8	−59.5	170.6	16 26.6	−59.5	170.6	15 27.4	−59.6	170.7	14 28.2	−59.6	170.7	13 28.9	−59.6	170.8	12 29.7	−59.6	170.8	11 30.5	−59.7	170.8	26
27	17 25.5	−59.5	170.7	16 26.2	−59.5	170.7	15 27.0	−59.5	170.8	14 27.8	−59.6	170.8	13 28.6	−59.6	170.8	12 29.3	−59.6	170.9	11 30.1	−59.6	170.9	10 30.8	−59.6	170.9	27
28	16 26.0	−59.5	170.8	15 26.7	−59.5	170.8	14 27.5	−59.6	170.9	13 28.2	−59.5	170.9	12 29.0	−59.6	171.0	11 29.7	−59.6	171.0	10 30.5	−59.7	171.0	9 31.2	−59.7	171.1	28
29	15 26.4	−59.5	170.9	14 27.2	−59.6	171.0	13 27.9	−59.5	171.0	12 28.7	−59.6	171.1	11 29.4	−59.6	171.1	10 30.1	−59.6	171.1	9 30.8	−59.6	171.1	8 31.5	−59.6	171.2	29
30	14 26.9	−59.5	171.1	13 27.7	−59.6	171.1	12 28.4	−59.6	171.1	11 29.1	−59.6	171.2	10 29.8	−59.6	171.2	9 30.5	−59.7	171.2	8 31.2	−59.7	171.3	7 31.9	−59.7	171.3	30
31	13 27.4	−59.5	171.2	12 28.1	−59.5	171.2	11 28.8	−59.5	171.3	10 29.5	−59.6	171.3	9 30.2	−59.6	171.3	8 30.9	−59.6	171.3	7 31.6	−59.7	171.4	6 32.2	−59.6	171.4	31
32	12 27.9	−59.5	171.3	11 28.6	−59.5	171.4	10 29.3	−59.6	171.4	9 29.9	−59.5	171.4	8 30.6	−59.6	171.4	7 31.3	−59.7	171.5	6 31.9	−59.6	171.5	5 32.6	−59.7	171.5	32
33	11 28.4	−59.5	171.5	10 29.0	−59.5	171.5	9 29.7	−59.6	171.5	8 30.3	−59.5	171.5	7 31.0	−59.6	171.6	6 31.6	−59.6	171.6	5 32.3	−59.6	171.6	4 32.9	−59.6	171.6	33
34	10 28.8	−59.5	171.6	9 29.5	−59.6	171.6	8 30.1	−59.5	171.7	7 30.8	−59.6	171.7	6 31.4	−59.6	171.7	5 32.0	−59.6	171.7	4 32.7	−59.7	171.7	3 33.3	−59.7	171.7	34
35	9 29.3	−59.5	171.7	8 29.9	−59.5	171.7	7 30.6	−59.6	171.8	6 31.2	−59.6	171.8	5 31.8	−59.6	171.8	4 32.4	−59.6	171.8	3 33.0	−59.6	171.8	2 33.6	−59.6	171.8	35
36	8 29.8	−59.6	171.8	7 30.4	−59.6	171.9	6 31.0	−59.6	171.9	5 31.6	−59.6	171.9	4 32.2	−59.6	171.9	3 32.8	−59.6	171.9	2 33.4	−59.7	171.9	1 34.0	−59.7	171.9	36
37	7 30.2	−59.5	172.0	6 30.8	−59.5	172.0	5 31.4	−59.6	172.0	4 32.0	−59.6	172.0	3 32.6	−59.6	172.0	2 33.2	−59.7	172.0	1 33.7	−59.6	172.0	0 34.3	−59.7	172.0	37
38	6 30.7	−59.6	172.1	5 31.3	−59.6	172.1	4 31.8	−59.6	172.1	3 32.4	−59.6	172.1	2 33.0	−59.6	172.1	1 33.5	−59.6	172.1	0 34.1	−59.6	172.1	0 25.3	+59.7	7.9	38
39	5 31.2	−59.6	172.2	4 31.7	−59.6	172.2	3 32.3	−59.6	172.2	2 32.8	−59.6	172.2	1 33.4	−59.7	172.2	0 33.9	−59.6	172.2	0 25.5	+59.7	7.8	1 25.0	+59.6	7.8	39
40	4 31.6	−59.5	172.3	3 32.1	−59.5	172.3	2 32.7	−59.6	172.3	1 33.2	−59.6	172.4	0 33.7	−59.6	172.4	0 25.7	+59.6	7.6	1 25.2	+59.6	7.6	2 24.6	+59.7	7.7	40
41	3 32.1	−59.5	172.5	2 32.6	−59.5	172.5	1 33.1	−59.5	172.5	0 33.6	−59.6	172.5	0 25.9	+59.6	7.5	1 25.3	+59.7	7.5	2 24.8	+59.7	7.5	3 24.3	+59.7	7.5	41
42	2 32.5	−59.5	172.6	1 33.0	−59.5	172.6	0 33.5	−59.6	172.6	0 26.0	+59.6	7.4	1 25.5	+59.6	7.4	2 25.0	+59.6	7.4	3 24.5	+59.6	7.4	4 24.0	+59.6	7.4	42
43	1 33.0	−59.6	172.7	0 33.5	−59.6	172.7	0 26.1	+59.5	7.3	1 25.6	+59.6	7.3	2 25.1	+59.6	7.3	3 24.6	+59.6	7.3	4 24.1	+59.6	7.3	5 23.6	+59.7	7.3	43
44	0 33.4	−59.6	172.8	0 26.1	+59.6	7.2	1 25.6	+59.6	7.2	2 25.2	+59.5	7.2	3 24.7	+59.6	7.2	4 24.2	+59.6	7.2	5 23.7	+59.7	7.2	6 23.3	+59.6	7.2	44
45	0 26.1	+59.6	7.1	1 25.7	+59.5	7.1	2 25.2	+59.6	7.1	3 24.7	+59.6	7.1	4 24.3	+59.6	7.1	5 23.8	+59.7	7.1	6 23.4	+59.7	7.1	7 22.9	+59.7	7.1	45
46	1 25.7	+59.5	6.9	2 25.2	+59.6	6.9	3 24.8	+59.5	6.9	4 24.3	+59.6	6.9	5 23.9	+59.6	7.0	6 23.5	+59.6	7.0	7 23.0	+59.6	7.0	8 22.6	+59.5	7.0	46
47	2 25.2	+59.5	6.8	3 24.8	+59.5	6.8	4 24.4	+59.5	6.8	5 23.9	+59.6	6.8	6 23.5	+59.6	6.8	7 23.1	+59.6	6.9	8 22.6	+59.7	6.9	9 22.2	+59.7	6.9	47
48	3 24.7	+59.4	6.7	4 24.3	+59.6	6.7	5 23.9	+59.6	6.7	6 23.5	+59.6	6.7	7 23.1	+59.6	6.7	8 22.7	+59.6	6.7	9 22.3	+59.6	6.8	10 21.9	+59.6	6.8	48
49	4 24.3	+59.5	6.6	5 23.9	+59.6	6.6	6 23.5	+59.6	6.6	7 23.1	+59.6	6.6	8 22.7	+59.6	6.6	9 22.3	+59.6	6.6	10 21.9	+59.6	6.7	11 21.5	+59.6	6.7	49
50	5 23.8	+59.6	6.4	6 23.5	+59.5	6.4	7 23.1	+59.6	6.5	8 22.7	+59.6	6.5	9 22.3	+59.6	6.5	10 21.9	+59.6	6.5	11 21.5	+59.7	6.5	12 21.1	+59.6	6.6	50
51	6 23.4	+59.5	6.3	7 23.0	+59.5	6.3	8 22.6	+59.6	6.3	9 22.3	+59.5	6.4	10 21.9	+59.6	6.4	11 21.5	+59.6	6.4	12 21.2	+59.6	6.4	13 20.8	+59.6	6.4	51
52	7 22.9	+59.6	6.2	8 22.6	+59.5	6.2	9 22.2	+59.6	6.2	10 21.9	+59.5	6.2	11 21.5	+59.6	6.3	12 21.1	+59.6	6.3	13 20.8	+59.7	6.3	14 20.4	+59.6	6.3	52
53	8 22.5	+59.5	6.1	9 22.1	+59.6	6.1	10 21.8	+59.5	6.1	11 21.4	+59.6	6.1	12 21.1	+59.6	6.1	13 20.7	+59.7	6.2	14 20.4	+59.6	6.2	15 20.0	+59.6	6.2	53
54	9 22.0	+59.5	5.9	10 21.7	+59.6	6.0	11 21.3	+59.6	6.0	12 21.0	+59.6	6.0	13 20.7	+59.6	6.0	14 20.4	+59.6	6.0	15 20.0	+59.6	6.1	16 19.7	+59.6	6.1	54
55	10 21.5	+59.6	5.8	11 21.2	+59.6	5.8	12 20.9	+59.6	5.9	13 20.6	+59.6	5.9	14 20.3	+59.6	5.9	15 20.0	+59.6	5.9	16 19.6	+59.6	6.0	17 19.3	+59.6	6.0	55
56	11 21.1	+59.5	5.7	12 20.8	+59.5	5.7	13 20.5	+59.5	5.7	14 20.2	+59.6	5.8	15 19.9	+59.6	5.8	16 19.5	+59.6	5.8	17 19.2	+59.6	5.8	18 18.9	+59.6	5.9	56
57	12 20.6	+59.5	5.6	13 20.3	+59.5	5.6	14 20.0	+59.5	5.6	15 19.7	+59.5	5.6	16 19.4	+59.6	5.7	17 19.1	+59.6	5.7	18 18.8	+59.6	5.7	19 18.5	+59.7	5.8	57
58	13 20.1	+59.5	5.4	14 19.8	+59.6	5.4	15 19.6	+59.5	5.5	16 19.3	+59.5	5.5	17 19.0	+59.6	5.5	18 18.7	+59.6	5.6	19 18.4	+59.6	5.6	20 18.2	+59.6	5.6	58
59	14 19.6	+59.5	5.3	15 19.4	+59.6	5.3	16 19.1	+59.5	5.3	17 18.8	+59.6	5.4	18 18.6	+59.5	5.4	19 18.3	+59.6	5.4	20 18.0	+59.6	5.4	21 17.8	+59.6	5.5	59
60	15 19.1	+59.5	5.2	16 18.9	+59.5	5.2	17 18.6	+59.5	5.2	18 18.4	+59.5	5.2	19 18.1	+59.6	5.3	20 17.9	+59.6	5.3	21 17.6	+59.6	5.3	22 17.4	+59.5	5.4	60
61	16 18.6	+59.5	5.0	17 18.4	+59.5	5.1	18 18.2	+59.5	5.1	19 17.9	+59.6	5.1	20 17.7	+59.6	5.1	21 17.5	+59.6	5.2	22 17.2	+59.6	5.2	23 17.0	+59.5	5.3	61
62	17 18.1	+59.4	4.9	18 17.9	+59.4	4.9	19 17.7	+59.5	5.0	20 17.5	+59.5	5.0	21 17.3	+59.6	5.0	22 17.0	+59.6	5.1	23 16.8	+59.6	5.1	24 16.5	+59.6	5.1	62
63	18 17.6	+59.5	4.8	19 17.4	+59.5	4.8	20 17.2	+59.5	4.8	21 17.0	+59.6	4.9	22 16.8	+59.6	4.9	23 16.6	+59.6	4.9	24 16.4	+59.6	5.0	25 16.1	+59.6	5.0	63
64	19 17.1	+59.5	4.6	20 16.9	+59.5	4.7	21 16.7	+59.6	4.7	22 16.5	+59.6	4.7	23 16.3	+59.6	4.8	24 16.1	+59.6	4.8	25 15.9	+59.6	4.8	26 15.7	+59.6	4.9	64
65	20 16.6	+59.5	4.5	21 16.4	+59.5	4.5	22 16.3	+59.5	4.5	23 16.1	+59.5	4.6	24 15.9	+59.5	4.6	25 15.7	+59.7	4.7	26 15.5	+59.6	4.7	27 15.3	+59.5	4.7	65
66	21 16.1	+59.4	4.3	22 15.9	+59.4	4.4	23 15.8	+59.4	4.4	24 15.6	+59.5	4.4	25 15.4	+59.5	4.5	26 15.2	+59.5	4.5	27 15.0	+59.6	4.5	28 14.8	+59.6	4.6	66
67	22 15.6	+59.4	4.2	23 15.4	+59.5	4.2	24 15.2	+59.5	4.3	25 15.1	+59.5	4.3	26 14.9	+59.5	4.3	27 14.7	+59.6	4.4	28 14.6	+59.5	4.4	29 14.4	+59.5	4.5	67
68	23 15.0	+59.5	4.1	24 14.9	+59.5	4.1	25 14.7	+59.5	4.1	26 14.6	+59.5	4.2	27 14.4	+59.5	4.2	28 14.3	+59.5	4.2	29 14.1	+59.6	4.3	30 13.9	+59.6	4.3	68
69	24 14.5	+59.4	3.9	25 14.4	+59.5	3.9	26 14.2	+59.5	4.0	27 14.1	+59.5	4.0	28 13.9	+59.5	4.1	29 13.8	+59.5	4.1	30 13.6	+59.5	4.1	31 13.5	+59.5	4.2	69
70	25 13.9	+59.4	3.8	26 13.8	+59.4	3.8	27 13.7	+59.4	3.8	28 13.6	+59.4	3.9	29 13.4	+59.5	3.9	30 13.3	+59.5	3.9	31 13.1	+59.5	4.0	32 13.0	+59.4	4.0	70
71	26 13.4	+59.4	3.6	27 13.3	+59.4	3.6	28 13.1	+59.5	3.7	29 13.0	+59.5	3.7	30 12.9	+59.5	3.8	31 12.8	+59.4	3.8	32 12.6	+59.5	3.8	33 12.5	+59.5	3.9	71
72	27 12.8	+59.4	3.5	28 12.7	+59.4	3.5	29 12.6	+59.4	3.5	30 12.5	+59.4	3.6	31 12.4	+59.4	3.6	32 12.2	+59.5	3.6	33 12.1	+59.5	3.7	34 12.0	+59.4	3.7	72
73	28 12.2	+59.4	3.3	29 12.1	+59.5	3.3	30 12.0	+59.4	3.4	31 11.9	+59.5	3.4	32 11.8	+59.5	3.4	33 11.7	+59.5	3.5	34 11.6	+59.4	3.5	35 11.5	+59.4	3.6	73
74	29 11.6	+59.4	3.1	30 11.6	+59.4	3.2	31 11.5	+59.4	3.2	32 11.4	+59.4	3.2	33 11.3	+59.4	3.3	34 11.2	+59.4	3.3	35 11.1	+59.4	3.4	36 11.0	+59.4	3.4	74
75	30 11.0	+59.4	3.0	31 11.0	+59.4	3.0	32 10.9	+59.4	3.0	33 10.8	+59.4	3.1	34 10.7	+59.4	3.1	35 10.6	+59.4	3.2	36 10.5	+59.4	3.2	37 10.4	+59.4	3.2	75
76	31 10.4	+59.4	2.8	32 10.4	+59.3	2.8	33 10.3	+59.4	2.9	34 10.2	+59.4	2.9	35 10.1	+59.4	2.9	36 10.0	+59.4	3.0	37 10.0	+59.4	3.0	38 09.9	+59.4	3.1	76
77	32 09.8	+59.4	2.6	33 09.7	+59.4	2.7	34 09.7	+59.3	2.7	35 09.6	+59.4	2.7	36 09.5	+59.4	2.8	37 09.5	+59.4	2.8	38 09.4	+59.4	2.8	39 09.3	+59.4	2.9	77
78	33 09.2	+59.3	2.5	34 09.1	+59.4	2.5	35 09.0	+59.4	2.5	36 09.0	+59.3	2.6	37 08.9	+59.4	2.6	38 08.9	+59.4	2.6	39 08.8	+59.4	2.7	40 08.7	+59.4	2.7	78
79	34 08.5	+59.3	2.3	35 08.5	+59.3	2.3	36 08.4	+59.4	2.4	37 08.4	+59.3	2.4	38 08.3	+59.4	2.4	39 08.3	+59.3	2.4	40 08.2	+59.4	2.5	41 08.1	+59.4	2.5	79
80	35 07.8	+59.3	2.1	36 07.8	+59.3	2.1	37 07.8	+59.3	2.2	38 07.7	+59.3	2.2	39 07.7	+59.3	2.2	40 07.6	+59.4	2.3	41 07.6	+59.3	2.3	42 07.5	+59.4	2.3	80
81	36 07.1	+59.3	1.9	37 07.1	+59.3	2.0	38 07.1	+59.3	2.0	39 07.0	+59.4	2.0	40 07.0	+59.3	2.0	41 07.0	+59.3	2.1	42 06.9	+59.4	2.1	43 06.9	+59.3	2.1	81
82	37 06.4	+59.3	1.7	38 06.4	+59.3	1.8	39 06.4	+59.3	1.8	40 06.4	+59.2	1.8	41 06.3	+59.3	1.8	42 06.3	+59.3	1.9	43 06.3	+59.3	1.9	44 06.2	+59.3	1.9	82
83	38 05.7	+59.3	1.5	39 05.7	+59.3	1.6	40 05.7	+59.2	1.6	41 05.6	+59.3	1.6	42 05.6	+59.3	1.6	43 05.6	+59.3	1.7	44 05.6	+59.3	1.7	45 05.5	+59.3	1.7	83
84	39 05.0	+59.2	1.3	40 05.0	+59.3	1.4	41 04.9	+59.3	1.4	42 04.9	+59.3	1.4	43 04.9	+59.2	1.4	44 04.9	+59.2	1.4	45 04.9	+59.2	1.5	46 04.8	+59.3	1.5	84
85	40 04.2	+59.2	1.1	41 04.2	+59.2	1.2	42 04.2	+59.2	1.2	43 04.2	+59.2	1.2	44 04.2	+59.2	1.2	45 04.1	+59.3	1.2	46 04.1	+59.3	1.2	47 04.1	+59.3	1.3	85
86	41 03.4	+59.2	0.9	42 03.4	+59.2	0.9	43 03.4	+59.2	0.9	44 03.4	+59.2	1.0	45 03.4	+59.2	1.0	46 03.4	+59.2	1.0	47 03.4	+59.2	1.0	48 03.4	+59.2	1.0	86
87	42 02.6	+59.2	0.7	43 02.6	+59.2	0.7	44 02.6	+59.2	0.7	45 02.6	+59.2	0.7	46 02.6	+59.2	0.7	47 02.6	+59.2	0.8	48 02.6	+59.3	0.8	49 02.6	+59.2	0.8	87
88	43 01.8	+59.1	0.5	44 01.8	+59.1	0.5	45 01.8	+59.1	0.5	46 01.8	+59.1	0.5	47 01.8	+59.1	0.5	48 01.8	+59.1	0.5	49 01.7	+59.2	0.5	50 01.7	+59.2	0.5	88
89	44 00.9	+59.1	0.2	45 00.9	+59.1	0.2	46 00.9	+59.1	0.3	47 00.9	+59.1	0.3	48 00.9	+59.1	0.3	49 00.9	+59.1	0.3	50 00.9	+59.1	0.3	51 00.9	+59.1	0.3	89
90	45 00.0	+59.1	0.0	46 00.0	+59.1	0.0	47 00.0	+59.1	0.0	48 00.0	+59.1	0.0	49 00.0	+59.1	0.0	50 00.0	+59.1	0.0	51 00.0	+59.1	0.0	52 00.0	+59.1	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z **LATITUDE SAME NAME AS DECLINATION** **L.H.A. 170°, 190°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° ..... Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 57.4	+58.9	164.6	42 59.5	+59.0	164.9	42 01.6	+59.0	165.1	41 03.5	+59.2	165.3	40 05.5	+59.1	165.6	39 07.3	+59.3	165.8	38 09.2	+59.2	166.0	37 10.9	+59.4	166.1	0
1	44 56.3	+58.9	164.4	43 58.5	+59.0	164.6	43 00.6	+59.0	164.9	42 02.7	+59.1	165.1	41 04.6	+59.2	165.3	40 06.6	+59.2	165.6	39 08.4	+59.3	165.8	38 10.3	+59.3	166.0	1
2	45 55.2	+58.8	164.1	44 57.5	+58.9	164.4	43 59.6	+59.0	164.6	43 01.8	+59.0	164.9	42 03.8	+59.1	165.1	41 05.8	+59.2	165.3	40 07.7	+59.3	165.6	39 09.6	+59.3	165.8	2
3	46 54.0	+58.8	163.8	45 56.4	+58.9	164.1	44 58.6	+59.0	164.4	44 00.8	+59.1	164.6	43 02.9	+59.1	164.9	42 05.0	+59.1	165.1	41 07.0	+59.2	165.3	40 08.9	+59.3	165.6	3
4	47 52.8	+58.8	163.5	46 55.3	+58.8	163.8	45 57.6	+58.9	164.1	44 59.9	+59.0	164.4	44 02.0	+59.1	164.6	43 04.1	+59.2	164.9	42 06.2	+59.2	165.1	41 08.2	+59.2	165.4	4
5	48 51.6	+58.7	163.2	47 54.1	+58.8	163.5	46 56.5	+58.9	163.8	45 58.8	+59.0	164.1	45 01.1	+59.0	164.4	44 03.3	+59.1	164.7	43 05.4	+59.1	164.9	42 07.4	+59.2	165.2	5
6	49 50.3	+58.6	162.9	48 52.9	+58.7	163.2	47 55.4	+58.8	163.6	46 57.8	+58.9	163.9	46 00.1	+59.0	164.1	45 02.4	+59.0	164.4	44 04.5	+59.2	164.7	43 06.6	+59.2	164.9	6
7	50 48.9	+58.6	162.6	49 51.6	+58.7	162.9	48 54.2	+58.8	163.3	47 56.7	+58.9	163.6	46 59.1	+59.0	163.9	46 01.4	+59.1	164.2	45 03.7	+59.1	164.4	44 05.8	+59.2	164.7	7
8	51 47.5	+58.5	162.2	50 50.3	+58.7	162.6	49 53.0	+58.8	162.9	48 55.6	+58.8	163.3	47 58.1	+58.9	163.6	47 00.5	+59.0	163.9	46 02.8	+59.1	164.2	45 05.0	+59.2	164.5	8
9	52 46.0	+58.5	161.9	51 49.0	+58.5	162.3	50 51.8	+58.6	162.6	49 54.4	+58.8	163.0	48 57.0	+58.9	163.3	47 59.5	+59.0	163.6	47 01.9	+59.0	163.9	46 04.2	+59.1	164.2	9
10	53 44.5	+58.4	161.5	52 47.5	+58.5	161.9	51 50.4	+58.7	162.3	50 53.2	+58.8	162.7	49 55.9	+58.8	163.0	48 58.5	+58.9	163.4	48 00.9	+59.0	163.7	47 03.3	+59.1	164.0	10
11	54 42.9	+58.3	161.1	53 46.0	+58.5	161.5	52 49.1	+58.5	161.9	51 52.0	+58.6	162.3	50 54.7	+58.7	162.7	49 57.4	+58.8	163.1	48 59.9	+58.9	163.4	48 02.4	+59.0	163.7	11
12	55 41.2	+58.2	160.7	54 44.5	+58.3	161.1	53 47.6	+58.5	161.6	52 50.6	+58.6	162.0	51 53.5	+58.7	162.4	50 56.2	+58.9	162.8	49 58.9	+58.9	163.1	49 01.4	+59.0	163.5	12
13	56 39.4	+58.1	160.2	55 42.8	+58.3	160.7	54 46.1	+58.4	161.2	53 49.2	+58.6	161.6	52 52.2	+58.7	162.1	51 55.1	+58.8	162.5	50 57.8	+58.9	162.8	50 00.4	+59.0	163.2	13
14	57 37.5	+58.0	159.8	56 41.1	+58.2	160.3	55 44.5	+58.4	160.8	54 47.8	+58.5	161.3	53 50.9	+58.6	161.7	52 53.9	+58.7	162.1	51 56.7	+58.8	162.5	50 59.4	+58.9	162.9	14
15	58 35.5	+57.9	159.3	57 39.3	+58.1	159.8	56 42.9	+58.2	160.4	55 46.3	+58.4	160.9	54 49.5	+58.5	161.3	53 52.6	+58.6	161.8	52 55.5	+58.8	162.2	51 58.3	+58.9	162.6	15
16	59 33.4	+57.8	158.8	58 37.4	+57.9	159.3	57 41.1	+58.1	159.9	56 44.7	+58.3	160.5	55 48.0	+58.5	161.0	54 51.2	+58.6	161.4	53 54.3	+58.7	161.9	52 57.2	+58.8	162.3	16
17	60 31.2	+57.6	158.2	59 35.3	+57.9	158.9	58 39.2	+58.1	159.5	57 43.0	+58.2	160.0	56 46.5	+58.3	160.5	55 49.8	+58.5	161.0	54 53.0	+58.6	161.3	53 56.0	+58.8	161.9	17
18	61 28.8	+57.5	157.7	60 33.2	+57.7	158.3	59 37.3	+57.9	159.0	58 41.2	+58.1	159.6	57 44.8	+58.3	160.1	56 48.3	+58.5	160.6	55 51.6	+58.6	161.1	54 54.8	+58.7	161.6	18
19	62 26.3	+57.3	157.1	61 30.9	+57.5	157.8	60 35.2	+57.8	158.4	59 39.3	+58.0	159.1	58 43.1	+58.2	159.7	57 46.8	+58.3	160.2	56 50.2	+58.5	160.7	55 53.5	+58.6	161.2	19
20	63 23.6	+57.1	156.4	62 28.4	+57.4	157.2	61 33.0	+57.6	157.9	60 37.3	+57.8	158.6	59 41.3	+58.1	159.2	58 45.1	+58.3	159.8	57 48.7	+58.4	160.3	56 52.1	+58.6	160.8	20
21	64 20.7	+56.9	155.7	63 25.8	+57.2	156.5	62 30.6	+57.5	157.3	61 35.1	+57.8	158.0	60 39.4	+57.9	158.7	59 43.4	+58.1	159.3	58 47.1	+58.3	159.9	57 50.7	+58.5	160.4	21
22	65 17.6	+56.7	155.0	64 23.0	+57.0	155.8	63 28.1	+57.3	156.7	62 32.9	+57.5	157.4	61 37.3	+57.8	158.1	60 41.5	+58.0	158.8	59 45.4	+58.3	159.5	58 49.2	+58.3	160.0	22
23	66 14.3	+56.4	154.2	65 20.0	+56.8	155.1	64 25.4	+57.1	156.0	63 30.4	+57.4	156.8	62 35.1	+57.7	157.6	61 39.5	+57.9	158.3	60 43.7	+58.1	158.9	59 47.5	+58.3	159.6	23
24	67 10.7	+56.1	153.3	66 16.8	+56.5	154.3	65 22.5	+56.9	155.3	64 27.8	+57.2	156.1	63 32.8	+57.5	157.0	62 37.4	+57.8	157.7	61 41.8	+57.9	158.4	60 45.8	+58.2	159.1	24
25	68 06.8	+55.7	152.4	67 13.3	+56.3	153.5	66 19.4	+56.6	154.5	65 25.0	+57.0	155.4	64 30.3	+57.3	156.3	63 35.2	+57.6	157.1	62 39.7	+57.9	157.9	61 44.0	+58.1	158.6	25
26	69 02.5	+55.4	151.3	68 09.6	+55.8	152.5	67 16.0	+56.4	153.7	66 22.0	+56.8	154.7	65 27.6	+57.1	155.6	64 32.8	+57.4	156.5	63 37.6	+57.7	157.3	62 42.1	+57.9	158.0	26
27	69 57.9	+54.9	150.2	69 05.4	+55.6	151.6	68 12.4	+56.0	152.7	67 18.8	+56.5	153.8	66 24.7	+56.9	154.9	65 30.2	+57.2	155.8	64 35.3	+57.5	156.7	63 40.0	+57.8	157.5	27
28	70 52.8	+54.4	149.0	70 01.0	+55.0	150.5	69 08.4	+55.7	151.8	68 15.3	+56.1	153.0	67 21.6	+56.6	154.0	66 27.4	+57.0	155.1	65 32.8	+57.3	156.0	64 37.9	+57.6	156.8	28
29	71 47.2	+53.8	147.7	70 56.0	+54.6	149.3	70 04.1	+55.2	150.7	69 11.4	+55.8	152.0	68 18.2	+56.3	153.2	67 24.4	+56.7	154.3	66 30.1	+57.1	155.3	65 35.4	+57.4	156.2	29
30	72 41.0	+53.1	146.3	71 50.6	+54.0	148.0	70 59.3	+54.8	149.5	70 07.2	+55.4	150.9	69 14.5	+55.9	152.2	68 21.1	+56.4	153.4	67 27.2	+56.8	154.5	66 32.8	+57.2	155.5	30
31	73 34.1	+52.3	144.7	72 44.6	+53.3	146.4	71 54.1	+54.1	148.2	71 02.6	+54.9	149.8	70 10.4	+55.6	151.2	69 17.5	+56.1	152.6	68 24.0	+56.6	153.7	67 30.0	+57.0	154.7	31
32	74 26.4	+51.4	142.9	73 37.9	+52.6	145.0	72 48.2	+53.6	146.8	71 57.5	+54.4	148.5	71 06.0	+55.1	150.0	70 13.6	+55.7	151.4	69 20.6	+56.3	152.7	68 27.0	+56.7	153.9	32
33	75 17.8	+50.2	140.9	74 30.5	+51.6	143.2	73 41.8	+52.7	145.2	72 51.9	+53.8	147.1	72 01.1	+54.6	148.8	71 09.3	+55.3	150.3	70 16.9	+55.8	151.7	69 23.7	+56.4	153.0	33
34	76 08.0	+48.9	138.7	75 22.1	+50.5	141.2	74 34.5	+51.9	143.5	73 45.7	+52.9	145.6	72 55.6	+54.0	147.4	72 04.6	+54.8	149.1	71 12.7	+55.5	150.6	70 20.1	+56.1	152.0	34
35	76 56.9	+47.2	136.2	76 12.6	+49.1	139.0	75 26.4	+50.7	141.6	74 38.6	+52.1	143.8	73 49.6	+53.2	145.9	72 59.4	+54.1	147.7	72 08.2	+54.9	149.4	71 16.2	+55.6	150.9	35
36	77 44.1	+45.3•	133.4	77 01.7	+47.6	136.6	76 17.1	+49.5	139.4	75 30.7	+51.1	141.9	74 42.8	+52.3	144.2	73 53.5	+53.5	146.2	73 03.1	+54.4	148.0	72 11.8	+55.1	149.7	36
37	78 29.4	+43.0•	130.2	77 49.3	+45.7•	133.8	77 06.6	+47.7	136.9	76 21.8	+49.7	139.7	75 35.1	+51.4	142.3	74 47.0	+52.6	144.5	73 57.5	+53.7	146.5	73 06.9	+54.6	148.4	37
38	79 12.4	+40.1•	126.6	78 35.0	+43.3•	130.6	77 54.5	+46.0•	134.1	77 11.5	+48.3	137.3	76 26.5	+50.0	140.1	75 39.6	+51.6	142.6	74 51.2	+52.8	144.9	74 01.5	+53.9	146.9	38
39	79 52.5	+36.6•	122.5	79 18.3	+40.5•	127.0	78 40.5	+43.7•	131.0	77 59.8	+46.3•	134.5	77 16.5	+48.6	137.7	76 31.2	+50.3	140.5	75 44.0	+51.9	143.0	74 55.4	+53.1	145.2	39
40	80 29.1	+32.5•	117.8	79 58.8	+37.0•	122.9	79 24.2	+40.9•	127.4	78 46.1	+44.1•	131.4	78 05.1	+46.7•	134.9	77 21.5	+49.0	138.1	76 35.9	+50.7	140.9	75 48.5	+52.2	143.4	40
41	81 01.6	+27.4•	112.6	80 35.8	+32.9•	118.2	80 05.1	+37.5•	123.2	79 30.2	+41.4•	127.8	78 51.8	+44.1•	131.8	78 10.5	+47.1•	135.4	77 26.6	+49.3	138.5	76 40.7	+51.0	141.3	41
42	81 29.0	+21.7•	106.8	81 08.7	+27.8•	112.9	80 42.6	+33.3•	118.6	80 11.6	+37.8•	123.6	79 36.3	+41.8•	128.2	78 57.6	+44.9•	132.2	78 15.9	+47.4•	135.8	77 31.7	+49.6	139.0	42
43	81 50.7	+15.1•	100.3	81 36.5	+22.1•	107.0	81 15.9	+28.3•	113.2	80 49.4	+33.8•	118.9	80 18.1	+38.3•	124.1	79 42.5	+42.1•	128.6	79 03.3	+45.3•	132.7	78 21.3	+47.8	136.3	43
44	82 05.8	+7.9•	93.4	81 58.6	+15.3•	100.5	81 44.2	+22.3•	107.3	81 23.2	+28.7•	113.6	80 56.4	+34.2•	119.3	80 24.6	+38.8•	124.5	79 48.6	+42.7•	129.1	79 09.1	+45.8•	133.2	44
45	82 13.7	+0.2	86.1	82 13.9	+8.0•	93.4	82 06.5	+15.6•	100.7	81 51.9	+22.7•	107.6	81 30.6	+29.1•	114.0	81 03.4	+34.7•	119.8	80 31.3	+39.2•	125.0	79 54.9	+43.0•	129.6	45
46	82 13.9	-7.4•	78.7	82 21.9	+0.2•	86.0	82 22.1	+8.2•	93.5	82 14.6	+15.9•	100.9	81 59.7	+23.1•	107.9	81 38.1	+29.5•	114.3	81 10.5	+35.2•	120.2	80 37.9	+39.8•	125.5	46
47	82 06.5	-14.6•	71.4	82 22.1	-7.5•	78.5	82 30.3	+0.2•	86.0	82 30.5	+8.2•	93.6	82 22.8	+16.2•	101.1	82 07.6	+23.6•	108.2	81 45.7	+30.0•	114.8	81 17.7	+35.6•	120.7	47
48	81 51.9	-21.3•	64.5	82 14.6	-14.9•	71.1	82 30.5	-7.7•	78.3	82 38.7	+0.3•	85.9	82 39.0	+8.4•	93.7	82 31.2	+16.4•	101.3	82 15.7	+23.9•	108.5	81 53.3	+30.5•	115.2	48
49	81 30.6	-27.2•	58.0	81 59.7	-21.6•	64.0	82 22.8	-15.2•	70.8	82 39.0	-7.8•	78.1	82 47.4	+0.2•	85.8	82 47.6	+8.5•	93.8	82 39.6	+16.7•	101.5	82 23.8	+24.3•	108.9	49
50	81 03.4	-32.1•	52.1	81 38.1	-27.6•	57.5	82 07.6	-21.9•	63.6	82 31.4	-15.5•	70.4	82 47.6	-8.0•	77.9	82 56.1	+0.2•	85.8	82 56.3	+8.7•	93.9	82 48.1	+17.1•	101.8	50
51	80 31.3	-36.4•	46.8	81 10.5	-32.6•	51.5	81 45.7	-28.0•	56.9	82 15.7	-22.4•	63.1	82 39.6	-15.8•	70.0	82 56.3	-8.2•	77.6	83 05.0	+0.2•	85.7	83 05.2	+8.9•	94.0	51
52	79 54.9	-39.9•	42.1	80 37.9	-36.8•	46.2	81 17.7	-33.0•	50.9	81 53.3	-28.4•	56.4	82 23.8	-22.8•	62.6	82 48.1	-16.1•	69.7	83 05.2	-8.4•	77.4	83 14.1	+0.1•	85.7	52
53	79 15.0	-42.8•	38.0	80 01.1	-40.3•	41.5	80 44.7	-37.3•	45.6	81 24.9	-33.5•	50.3	82 01.0	-28.6•	55.8	82 32.0	-23.2•	62.1	82 56.8	-16.5•	69.3	83 14.2	-8.3•	77.2	53
54	78 32.2	-45.2•	34.4	79 20.8	-43.1•	37.4	80 07.4	-40.7•	40.8	80 51.4	-37.6•	44.9	81 32.2	-34.0•	49.6	82 08.8	-29.3•	55.2	82 40.3	-23.6•	61.6	83 05.6	-16.9•	68.8	54
55	77 47.0	-47.1	31.1	78 37.7	-45.5•	33.7	79 26.7	-43.5•	36.7	80 13.8	-41.2•	40.2	80 58.2	-38.1•	44.2	81 39.5	-34.4•	49.0	82 16.7	-29.8•	54.5	82 48.7	-24.1•	61.0	55
56	76 59.9	-48.8	28.3	77 52.2	-47.5	30.5	78 43.2	-45.9•	33.1	79 32.6	-43.9•	36.0	80 20.1	-41.6•	39.5	81 05.1	-38.7•	43.5	81 46.9	-35.0•	48.3	82 24.6	-30.3•	53.9	56
57	76 11.1	-50.1	25.8	77 04.7	-49.1	27.7	77 57.3	-47.8	29.9	78 48.7	-46.3•	32.4	79 38.5	-44.4•	35.3	80 26.4	-42.0•	38.7	81 11.9	-39.1•	42.8	81 54.3	-35.5•	47.6	57
58	75 21.0	-51.3	23.6	76 15.6	-50.4	25.2	77 09.5	-49.4	27.1	78 02.4	-48.1	29.2	78 54.1	-46.6•	31.7	79 44.4	-44.8•	34.6	80 32.8	-42.5•	38.0	81 18.8	-39.7•	42.0	58
59	74 29.7	-52.3	21.6	75 25.2	-51.5	23.0	76 20.1	-50.7	24.6	77 14.3	-49.7	26.4	78 07.5	-48.5	28.5	78 59.6	-47.0•	31.0	79 50.3	-45.2•	33.8	80 39.1	-43.0•	37.2	59
60	73 37.4	-53.1	19.8	74 33.7	-52.5	21.0	75 29.4	-51.8	22.4	76 24.6	-51.0	24.0	77 19.0	-50.0	25.8	78 12.6	-48.8	27.8	79 05.1	-47.4•	30.3	79 56.1	-45.6•	33.1	60
61	72 44.3	-53.7	18.2	73 41.2	-53.3	19.2	74 37.6	-52.7	20.4	75 33.6	-52.0	21.8	76 29.0	-51.2	23.3	77 23.8	-50.4	25.1	78 17.7	-49.2	27.1	79 10.5	-47.8•	29.5	61
62	71 50.6	-54.4	16.7	72 47.9	-54.0	17.6	73 44.9	-53.5	18.7	74 41.6	-53.0	19.8	75 37.8	-52.3	21.2	76 33.4	-51.5	22.7	77 28.5	-50.7	24.4	78 22.7	-49.6	26.4	62
63	70 56.2	-54.9	15.4	71 53.9	-54.5	16.2	72 51.4	-54.1	17.1	73 48.6	-53.7	18.1	74 45.5	-53.2	19.2	75 41.9	-52.6	20.5	76 37.8	-51.8	22.0	77 33.1	-50.9	23.7	63
64	70 01.3	-55.3	14.2	70 59.4	-55.0	14.9	71 57.3	-54.7	15.7	72 54.9	-54.3	16.5	73 52.3	-53.9	17.5	74 49.3	-53.4	18.6	75 46.0	-52.8	19.9	76 42.2	-52.2	21.3	64
65	69 06.0	-55.8	13.1	70 04.4	-55.5	13.7	71 02.6	-55.2	14.4	72 00.6	-54.9	15.1	72 58.4	-54.5	16.0	73 55.9	-54.1	16.9	74 53.2	-53.7	18.0	75 50.0	-53.1	19.2	65
66	68 10.2	-56.0	12.0	69 08.9	-55.9	12.6	70 07.4	-55.7	13.2	71 05.7	-55.4	13.9	72 03.9	-55.1	14.6	73 01.8	-54.7	15.4	73 59.5	-54.3	16.3	74 56.9	-53.8	17.4	66
67	67 14.2	-56.4	11.1	68 13.0	-56.2	11.6	69 11.7	-56.0	12.1	70 10.3	-55.8	12.7	71 08.8	-55.6	13.3	72 07.1	-55.3	14.1	73 05.2	-55.0	14.8	74 03.1	-54.6	15.7	67
68	66 17.8	-56.6	10.2	67 16.8	-56.5	10.7	68 15.7	-56.3	11.1	69 14.5	-56.1	11.6	70 13.2	-55.9	12.1	71 11.8	-55.7	12.7	72 10.2	-55.4	13.5	73 08.5	-55.1	14.3	68
69	65 21.1	-56.8	9.4	66 20.3	-56.8	9.8	67 19.4	-56.6	10.2	68 18.4	-56.5	10.7	69 17.3	-56.3	11.1	70 16.1	-56.1	11.7	71 14.8	-55.8	12.3	72 13.4	-55.6	12.9	69
70	64 24.3	-57.1	8.7	65 23.5	-57.0	9.0	66 22.8	-56.9	9.4	67 21.9	-56.7	9.8	68 21.0	-56.6	10.2	69 20.0	-56.4	10.7	70 19.0	-56.3	11.2	71 17.8	-56.1	11.7	70
71	63 27.2	-57.3	8.0	64 26.5	-57.1	8.3	65 25.9	-57.0	8.6	66 25.2	-57.0	8.9	67 24.4	-56.8	9.3	68 23.6	-56.7	9.7	69 22.7	-56.5	10.2	70 21.7	-56.4	10.7	71
72	62 29.9	-57.5	7.3	63 29.4	-57.4	7.6	64 28.8	-57.3	7.9	65 28.2	-57.2	8.2	66 27.6	-57.1	8.5	67 26.9	-57.0	8.8	68 26.2	-56.9	9.2	69 25.3	-56.7	9.7	72
73	61 32.4	-57.6	6.7	62 32.0	-57.6	6.9	63 31.5	-57.5	7.2	64 31.0	-57.4	7.5	65 30.5	-57.3	7.7	66 29.9	-57.2	8.0	67 29.3	-57.1	8.4	68 28.6	-56.9	8.7	73
74	60 34.8	-57.8	6.1	61 34.4	-57.7	6.3	62 34.0	-57.6	6.6	63 33.6	-57.5	6.8	64 33.2	-57.5	7.0	65 32.7	-57.4	7.3	66 32.2	-57.3	7.6	67 31.7	-57.2	7.9	74
75	59 37.0	-57.9	5.6	60 36.7	-57.8	5.8	61 36.4	-57.8	6.0	62 36.1	-57.8	6.2	63 35.7	-57.6	6.4	64 35.3	-57.6	6.6	65 34.9	-57.5	6.9	66 34.5	-57.4	7.1	75
76	58 39.1	-58.0	5.1	59 38.9	-58.0	5.2	60 38.6	-57.9	5.4	61 38.3	-57.8	5.6	62 38.1	-57.8	5.8	63 37.7	-57.7	6.0	64 37.4	-57.7	6.2	65 37.0	-57.6	6.4	76
77	57 41.1	-58.1	4.6	58 40.9	-58.0	4.7	59 40.7	-58.0	4.9	60 40.5	-58.0	5.0	61 40.3	-58.0	5.2	62 40.0	-57.9	5.4	63 39.7	-57.8	5.6	64 39.4	-57.7	5.8	77
78	56 43.0	-58.2	4.1	57 42.9	-58.2	4.3	58 42.7	-58.2	4.4	59 42.5	-58.1	4.5	60 42.3	-58.1	4.7	61 42.1	-58.0	4.8	62 41.9	-58.0	5.0	63 41.7	-58.0	5.1	78
79	55 44.8	-58.3	3.7	56 44.7	-58.3	3.8	57 44.5	-58.2	3.9	58 44.4	-58.2	4.0	59 44.2	-58.1	4.1	60 44.1	-58.2	4.3	61 43.9	-58.1	4.4	62 43.7	-58.0	4.6	79
80	54 46.5	-58.4	3.3	55 46.4	-58.3	3.4	56 46.3	-58.3	3.5	57 46.2	-58.3	3.6	58 46.1	-58.3	3.7	59 45.9	-58.2	3.8	60 45.8	-58.2	3.9	61 45.7	-58.2	4.0	80
81	53 48.1	-58.4	2.9	54 48.1	-58.5	3.0	55 47.9	-58.4	3.1	56 47.9	-58.4	3.2	57 47.8	-58.4	3.2	58 47.7	-58.3	3.4	59 47.6	-58.3	3.4	60 47.5	-58.3	3.5	81
82	52 49.7	-58.5	2.5	53 49.6	-58.5	2.6	54 49.6	-58.5	2.6	55 49.5	-58.5	2.7	56 49.4	-58.4	2.8	57 49.4	-58.4	2.9	58 49.3	-58.4	2.9	59 49.2	-58.4	3.0	82
83	51 51.2	-58.6	2.2	52 51.1	-58.5	2.2	53 51.1	-58.6	2.3	54 51.0	-58.5	2.3	55 51.0	-58.5	2.4	56 50.9	-58.5	2.4	57 50.9	-58.5	2.5	58 50.8	-58.5	2.6	83
84	50 52.6	-58.7	1.8	51 52.6	-58.7	1.9	52 52.5	-58.6	1.9	53 52.5	-58.7	1.9	54 52.5	-58.6	1.9	55 52.4	-58.6	2.0	56 52.4	-58.6	2.1	57 52.3	-58.5	2.1	84
85	49 54.0	-58.7	1.5	50 53.9	-58.7	1.5	51 53.9	-58.7	1.5	52 53.9	-58.7	1.6	53 53.9	-58.7	1.6	54 53.8	-58.7	1.7	55 53.8	-58.6	1.7	56 53.8	-58.6	1.7	85
86	48 55.3	-58.8	1.2	49 55.2	-58.7	1.2	50 55.2	-58.7	1.2	51 55.2	-58.7	1.2	52 55.2	-58.7	1.3	53 55.2	-58.7	1.3	54 55.2	-58.7	1.3	55 55.2	-58.7	1.4	86
87	47 56.5	-58.8	0.9	48 56.5	-58.8	0.9	49 56.5	-58.8	0.9	50 56.5	-58.8	0.9	51 56.5	-58.8	0.9	52 56.5	-58.8	0.9	53 56.5	-58.7	1.0	54 56.5	-58.7	1.0	87
88	46 57.7	-58.8	0.6	47 57.7	-58.8	0.6	48 57.7	-58.8	0.6	49 57.7	-58.8	0.6	50 57.7	-58.8	0.6	51 57.7	-58.8	0.6	52 57.7	-58.8	0.6	53 57.7	-58.8	0.6	88
89	45 58.9	-58.9	0.3	46 58.9	-58.9	0.3	47 58.9	-58.9	0.3	48 58.9	-58.9	0.3	49 58.9	-58.9	0.3	50 58.9	-58.9	0.3	51 58.9	-58.9	0.3	52 58.9	-58.9	0.3	89
90	45 00.0	-58.9	0.0	46 00.0	-58.9	0.0	47 00.0	-58.9	0.0	48 00.0	-58.9	0.0	49 00.0	-58.9	0.0	50 00.0	-58.9	0.0	51 00.0	-58.9	0.0	52 00.0	-58.9	0.0	90

Column footer latitudes: 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52°

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 11°, 349°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 57.4	−58.9	164.6	42 59.5	−59.0	164.9	42 01.6	−59.1	165.1	41 03.5	−59.1	165.3	40 05.5	−59.2	165.6	39 07.3	−59.2	165.8	38 09.2	−59.4	166.0	37 10.9	−59.3	166.1	0
1	42 58.5	−59.0	164.9	42 00.5	−59.1	165.1	41 02.5	−59.1	165.3	40 04.4	−59.2	165.6	39 06.3	−59.3	165.8	38 08.1	−59.3	166.0	37 09.8	−59.3	166.1	36 11.6	−59.4	166.3	1
2	41 59.5	−59.1	165.1	41 01.4	−59.1	165.4	40 03.4	−59.2	165.6	39 05.2	−59.2	165.8	38 07.0	−59.2	166.0	37 08.8	−59.3	166.2	36 10.5	−59.4	166.3	35 12.2	−59.4	166.5	2
3	41 00.4	−59.0	165.4	40 02.4	−59.1	165.6	39 04.2	−59.1	165.8	38 06.0	−59.2	166.0	37 07.8	−59.3	166.2	36 09.5	−59.3	166.3	35 11.2	−59.4	166.5	34 12.8	−59.4	166.7	3
4	40 01.4	−59.1	165.6	39 03.3	−59.2	165.8	38 05.1	−59.2	166.0	37 06.8	−59.2	166.2	36 08.5	−59.3	166.4	35 10.2	−59.3	166.5	34 11.8	−59.4	166.7	33 13.4	−59.4	166.8	4
5	39 02.3	−59.1	165.8	38 04.1	−59.1	166.0	37 05.9	−59.2	166.2	36 07.6	−59.3	166.4	35 09.2	−59.3	166.6	34 10.9	−59.4	166.7	33 12.5	−59.4	166.9	32 14.0	−59.4	167.0	5
6	38 03.2	−59.1	166.1	37 05.0	−59.2	166.2	36 06.7	−59.3	166.4	35 08.3	−59.2	166.6	34 09.9	−59.3	166.7	33 11.5	−59.3	166.9	32 13.1	−59.4	167.0	31 14.6	−59.5	167.2	6
7	37 04.1	−59.1	166.3	36 05.8	−59.2	166.4	35 07.4	−59.2	166.6	34 09.1	−59.3	166.6	33 10.6	−59.3	166.9	32 12.2	−59.4	167.1	31 13.7	−59.4	167.2	30 15.1	−59.4	167.3	7
8	36 05.0	−59.2	166.5	35 06.6	−59.2	166.6	34 08.2	−59.3	166.8	33 09.8	−59.2	167.0	32 11.3	−59.4	167.1	31 12.8	−59.4	167.2	30 14.3	−59.5	167.4	29 15.7	−59.5	167.5	8
9	35 05.8	−59.2	166.7	34 07.4	−59.3	166.8	33 08.9	−59.2	167.0	32 10.5	−59.4	167.1	31 11.9	−59.3	167.3	30 13.4	−59.4	167.4	29 14.8	−59.4	167.5	28 16.2	−59.4	167.6	9
10	34 06.6	−59.2	166.9	33 08.1	−59.2	167.0	32 09.7	−59.3	167.2	31 11.1	−59.3	167.3	30 12.6	−59.4	167.4	29 14.0	−59.4	167.6	28 15.4	−59.4	167.7	27 16.8	−59.5	167.8	10
11	33 07.4	−59.2	167.1	32 08.9	−59.3	167.2	31 10.4	−59.3	167.4	30 11.8	−59.3	167.5	29 13.2	−59.3	167.6	28 14.6	−59.3	167.7	27 16.0	−59.5	167.8	26 17.3	−59.5	167.9	11
12	32 08.2	−59.3	167.3	31 09.6	−59.3	167.4	30 11.1	−59.4	167.5	29 12.5	−59.4	167.7	28 13.8	−59.4	167.8	27 15.2	−59.5	167.9	26 16.5	−59.5	168.0	25 17.8	−59.5	168.1	12
13	31 08.9	−59.2	167.5	30 10.3	−59.3	167.6	29 11.7	−59.3	167.7	28 13.1	−59.4	167.9	27 14.4	−59.4	167.9	26 15.7	−59.4	168.0	25 17.0	−59.4	168.1	24 18.3	−59.5	168.2	13
14	30 09.7	−59.3	167.6	29 11.0	−59.3	167.8	28 12.4	−59.4	167.9	27 13.7	−59.4	168.0	26 15.0	−59.4	168.1	25 16.3	−59.4	168.2	24 17.6	−59.5	168.3	23 18.8	−59.5	168.4	14
15	29 10.4	−59.3	167.8	28 11.7	−59.3	167.9	27 13.0	−59.4	168.0	26 14.3	−59.4	168.1	25 15.6	−59.4	168.2	24 16.9	−59.5	168.3	23 18.1	−59.5	168.4	22 19.3	−59.5	168.5	15
16	28 11.1	−59.3	168.0	27 12.4	−59.3	168.1	26 13.7	−59.4	168.2	25 14.9	−59.4	168.3	24 16.2	−59.5	168.4	23 17.4	−59.5	168.5	22 18.6	−59.5	168.6	21 19.8	−59.5	168.6	16
17	27 11.8	−59.3	168.2	26 13.1	−59.4	168.3	25 14.3	−59.4	168.4	24 15.5	−59.4	168.5	23 16.7	−59.4	168.5	22 17.9	−59.4	168.6	21 19.1	−59.5	168.7	20 20.3	−59.5	168.8	17
18	26 12.5	−59.3	168.3	25 13.7	−59.3	168.4	24 14.9	−59.4	168.5	23 16.1	−59.4	168.6	22 17.3	−59.5	168.7	21 18.5	−59.5	168.8	20 19.6	−59.5	168.8	19 20.7	−59.5	168.9	18
19	25 13.2	−59.4	168.5	24 14.4	−59.4	168.6	23 15.5	−59.4	168.7	22 16.7	−59.4	168.8	21 17.8	−59.4	168.8	20 19.0	−59.5	168.9	19 20.1	−59.5	169.0	18 21.2	−59.6	169.0	19
20	24 13.8	−59.4	168.7	23 15.0	−59.4	168.7	22 16.1	−59.4	168.8	21 17.3	−59.5	168.9	20 18.4	−59.5	169.0	19 19.5	−59.5	169.0	18 20.6	−59.5	169.1	17 21.6	−59.5	169.2	20
21	23 14.5	−59.4	168.8	22 15.6	−59.4	168.9	21 16.7	−59.4	169.0	20 17.8	−59.5	169.1	19 18.9	−59.5	169.1	18 20.0	−59.5	169.2	17 21.1	−59.6	169.2	16 22.1	−59.5	169.3	21
22	22 15.1	−59.3	169.0	21 16.2	−59.4	169.1	20 17.3	−59.4	169.1	19 18.4	−59.5	169.2	18 19.4	−59.4	169.3	17 20.5	−59.5	169.3	16 21.5	−59.5	169.4	15 22.6	−59.6	169.4	22
23	21 15.8	−59.4	169.1	20 16.8	−59.4	169.2	19 17.9	−59.4	169.3	18 18.9	−59.4	169.3	17 20.0	−59.5	169.4	16 21.0	−59.5	169.5	15 22.0	−59.5	169.5	14 23.0	−59.6	169.6	23
24	20 16.4	−59.4	169.3	19 17.4	−59.4	169.4	18 18.5	−59.5	169.4	17 19.5	−59.5	169.5	16 20.5	−59.5	169.5	15 21.5	−59.5	169.6	14 22.5	−59.6	169.6	13 23.4	−59.5	169.7	24
25	19 17.0	−59.4	169.4	18 18.0	−59.4	169.5	17 19.0	−59.4	169.6	16 20.0	−59.5	169.6	15 21.0	−59.5	169.7	14 22.0	−59.6	169.7	13 22.9	−59.5	169.8	12 23.9	−59.6	169.8	25
26	18 17.6	−59.4	169.6	17 18.6	−59.4	169.7	16 19.6	−59.4	169.7	15 20.5	−59.4	169.8	14 21.5	−59.5	169.8	13 22.4	−59.5	169.8	12 23.4	−59.6	169.9	11 24.3	−59.6	169.9	26
27	17 18.2	−59.4	169.7	16 19.2	−59.4	169.8	15 20.1	−59.4	169.8	14 21.1	−59.5	169.9	13 22.0	−59.5	169.9	12 22.9	−59.5	170.0	11 23.8	−59.5	170.0	10 24.7	−59.5	170.0	27
28	16 18.8	−59.4	169.9	15 19.8	−59.5	169.9	14 20.7	−59.5	170.0	13 21.6	−59.5	170.0	12 22.5	−59.5	170.1	11 23.4	−59.5	170.1	10 24.3	−59.6	170.1	9 25.2	−59.6	170.2	28
29	15 19.4	−59.4	170.0	14 20.3	−59.4	170.1	13 21.2	−59.4	170.1	12 22.1	−59.5	170.2	11 23.0	−59.5	170.2	10 23.9	−59.6	170.2	9 24.7	−59.4	170.3	8 25.6	−59.6	170.3	29
30	14 20.0	−59.4	170.2	13 20.9	−59.4	170.2	12 21.8	−59.5	170.3	11 22.6	−59.4	170.3	10 23.5	−59.5	170.3	9 24.3	−59.5	170.4	8 25.2	−59.6	170.4	7 26.0	−59.6	170.4	30
31	13 20.6	−59.4	170.3	12 21.5	−59.5	170.4	11 22.3	−59.5	170.4	10 23.1	−59.4	170.5	9 24.0	−59.6	170.5	8 24.8	−59.5	170.5	7 25.6	−59.5	170.5	6 26.4	−59.5	170.5	31
32	12 21.2	−59.4	170.5	11 22.0	−59.4	170.5	10 22.8	−59.4	170.5	9 23.6	−59.4	170.6	8 24.4	−59.5	170.6	7 25.3	−59.6	170.6	6 26.1	−59.6	170.6	5 26.9	−59.6	170.6	32
33	11 21.8	−59.5	170.6	10 22.6	−59.5	170.6	9 23.4	−59.5	170.7	8 24.1	−59.4	170.7	7 24.9	−59.5	170.7	6 25.7	−59.6	170.7	5 26.5	−59.6	170.7	4 27.3	−59.6	170.8	33
34	10 22.3	−59.4	170.7	9 23.1	−59.4	170.8	8 23.9	−59.5	170.8	7 24.6	−59.5	170.8	6 25.4	−59.5	170.8	5 26.2	−59.6	170.9	4 26.9	−59.5	170.9	3 27.7	−59.6	170.9	34
35	9 22.9	−59.5	170.9	8 23.6	−59.4	170.9	7 24.4	−59.5	170.9	6 25.1	−59.4	171.0	5 25.9	−59.5	171.0	4 26.6	−59.5	171.0	3 27.4	−59.6	171.0	2 28.1	−59.6	171.0	35
36	8 23.4	−59.4	171.0	7 24.2	−59.5	171.0	6 24.9	−59.5	171.1	5 25.6	−59.5	171.1	4 26.4	−59.6	171.1	3 27.1	−59.6	171.1	2 27.8	−59.5	171.1	1 28.5	−59.6	171.1	36
37	7 24.0	−59.4	171.2	6 24.7	−59.4	171.2	5 25.4	−59.5	171.2	4 26.1	−59.5	171.2	3 26.8	−59.5	171.2	2 27.5	−59.5	171.2	1 28.2	−59.5	171.2	0 28.9	−59.5	171.2	37
38	6 24.6	−59.4	171.3	5 25.3	−59.4	171.3	4 25.9	−59.4	171.3	3 26.6	−59.4	171.3	2 27.3	−59.5	171.3	1 28.0	−59.5	171.3	0 28.7	−59.6	171.4	0 30.6	+59.6	8.6	38
39	5 25.1	−59.4	171.4	4 25.8	−59.5	171.4	3 26.5	−59.5	171.5	2 27.1	−59.4	171.5	1 27.8	−59.5	171.5	0 28.4	−59.5	171.5	0 30.9	+59.6	8.5	1 30.2	+59.6	8.5	39
40	4 25.7	−59.5	171.6	3 26.3	−59.5	171.6	2 27.0	−59.5	171.6	1 27.6	−59.5	171.6	0 28.3	−59.6	171.6	0 31.1	+59.5	8.4	1 30.5	+59.5	8.4	2 29.8	+59.6	8.4	40
41	3 26.2	−59.4	171.7	2 26.8	−59.4	171.7	1 27.5	−59.5	171.7	0 28.1	−59.5	171.7	0 31.3	+59.5	8.3	1 30.6	+59.6	8.3	2 30.0	+59.6	8.3	3 29.4	+59.6	8.3	41
42	2 26.8	−59.5	171.8	1 27.4	−59.5	171.8	0 28.0	−59.5	171.8	0 31.4	+59.5	8.2	1 30.8	+59.5	8.2	2 30.2	+59.6	8.2	3 29.6	+59.6	8.2	4 29.0	+59.6	8.2	42
43	1 27.3	−59.4	172.0	0 27.9	−59.5	172.0	0 31.5	+59.5	8.0	1 30.9	+59.5	8.0	2 30.3	+59.6	8.0	3 29.7	+59.6	8.0	4 29.2	+59.6	8.0	5 28.6	+59.5	8.1	43
44	0 27.9	−59.5	172.1	0 31.6	+59.4	7.9	1 31.0	+59.5	7.9	2 30.4	+59.5	7.9	3 29.9	+59.5	7.9	4 29.3	+59.5	7.9	5 28.7	+59.6	7.9	6 28.1	+59.6	7.9	44
45	0 31.6	+59.5	7.8	1 31.0	+59.5	7.8	2 30.5	+59.5	7.8	3 29.9	+59.5	7.8	4 29.4	+59.5	7.8	5 28.8	+59.6	7.8	6 28.3	+59.6	7.8	7 27.7	+59.6	7.8	45
46	1 31.0	+59.5	7.6	2 30.5	+59.5	7.6	3 30.0	+59.4	7.6	4 29.4	+59.5	7.6	5 28.9	+59.5	7.7	6 28.4	+59.6	7.7	7 27.8	+59.6	7.7	8 27.3	+59.6	7.7	46
47	2 30.5	+59.4	7.5	3 30.0	+59.4	7.5	4 29.5	+59.4	7.5	5 28.9	+59.5	7.5	6 28.4	+59.5	7.5	7 27.9	+59.5	7.5	8 27.4	+59.6	7.6	9 26.9	+59.6	7.6	47
48	3 29.9	+59.5	7.3	4 29.4	+59.5	7.4	5 28.9	+59.5	7.4	6 28.4	+59.5	7.4	7 27.9	+59.6	7.4	8 27.4	+59.6	7.4	9 26.9	+59.5	7.4	10 26.4	+59.6	7.5	48
49	4 29.4	+59.4	7.2	5 28.9	+59.5	7.2	6 28.4	+59.5	7.2	7 27.9	+59.5	7.3	8 27.5	+59.5	7.3	9 27.0	+59.5	7.3	10 26.5	+59.6	7.3	11 26.0	+59.6	7.3	49
50	5 28.8	+59.5	7.1	6 28.4	+59.4	7.1	7 27.9	+59.5	7.1	8 27.4	+59.5	7.1	9 27.0	+59.5	7.1	10 26.5	+59.5	7.2	11 26.0	+59.6	7.2	12 25.6	+59.6	7.2	50
51	6 28.3	+59.4	6.9	7 27.8	+59.5	7.0	8 27.4	+59.4	7.0	9 26.9	+59.5	7.0	10 26.5	+59.5	7.0	11 26.0	+59.6	7.0	12 25.6	+59.5	7.1	13 25.1	+59.6	7.1	51
52	7 27.7	+59.5	6.8	8 27.3	+59.5	6.8	9 26.9	+59.4	6.8	10 26.4	+59.5	6.9	11 26.0	+59.5	6.9	12 25.5	+59.5	6.9	13 25.1	+59.6	6.9	14 24.7	+59.6	7.0	52
53	8 27.2	+59.4	6.7	9 26.8	+59.4	6.7	10 26.3	+59.5	6.7	11 25.9	+59.4	6.7	12 25.5	+59.5	6.8	13 25.1	+59.5	6.8	14 24.7	+59.5	6.8	15 24.3	+59.6	6.8	53
54	9 26.6	+59.4	6.5	10 26.2	+59.4	6.5	11 25.8	+59.5	6.6	12 25.4	+59.5	6.6	13 25.0	+59.5	6.6	14 24.6	+59.5	6.6	15 24.2	+59.5	6.7	16 23.8	+59.5	6.7	54
55	10 26.0	+59.5	6.4	11 25.7	+59.4	6.4	12 25.3	+59.4	6.4	13 24.9	+59.5	6.5	14 24.5	+59.5	6.5	15 24.1	+59.5	6.5	16 23.7	+59.6	6.6	17 23.3	+59.6	6.6	55
56	11 25.5	+59.4	6.2	12 25.1	+59.4	6.3	13 24.7	+59.5	6.3	14 24.4	+59.5	6.3	15 24.0	+59.5	6.4	16 23.6	+59.5	6.4	17 23.3	+59.5	6.5	18 22.9	+59.6	6.5	56
57	12 24.9	+59.4	6.1	13 24.5	+59.5	6.1	14 24.2	+59.5	6.2	15 23.9	+59.4	6.2	16 23.5	+59.5	6.2	17 23.1	+59.5	6.3	18 22.8	+59.6	6.3	19 22.4	+59.6	6.3	57
58	13 24.3	+59.4	6.0	14 24.0	+59.4	6.0	15 23.7	+59.4	6.0	16 23.3	+59.5	6.0	17 23.0	+59.4	6.1	18 22.6	+59.5	6.1	19 22.3	+59.5	6.2	20 22.0	+59.5	6.2	58
59	14 23.7	+59.4	5.8	15 23.4	+59.4	5.9	16 23.1	+59.4	5.9	17 22.8	+59.4	5.9	18 22.5	+59.4	5.9	19 22.1	+59.5	6.0	20 21.8	+59.5	6.0	21 21.5	+59.6	6.1	59
60	15 23.1	+59.4	5.7	16 22.8	+59.5	5.7	17 22.5	+59.5	5.7	18 22.2	+59.4	5.8	19 21.9	+59.4	5.8	20 21.6	+59.5	5.8	21 21.3	+59.5	5.9	22 21.0	+59.5	5.9	60
61	16 22.5	+59.4	5.5	17 22.3	+59.4	5.6	18 22.0	+59.4	5.6	19 21.7	+59.4	5.6	20 21.4	+59.5	5.7	21 21.1	+59.5	5.7	22 20.8	+59.5	5.7	23 20.5	+59.5	5.8	61
62	17 21.9	+59.4	5.4	18 21.7	+59.4	5.4	19 21.4	+59.4	5.4	20 21.1	+59.5	5.5	21 20.9	+59.4	5.5	22 20.6	+59.4	5.6	23 20.3	+59.5	5.6	24 20.0	+59.5	5.6	62
63	18 21.3	+59.4	5.2	19 21.1	+59.4	5.3	20 20.8	+59.4	5.3	21 20.6	+59.5	5.3	22 20.3	+59.4	5.4	23 20.0	+59.5	5.4	24 19.8	+59.5	5.5	25 19.5	+59.5	5.5	63
64	19 20.7	+59.4	5.1	20 20.5	+59.4	5.1	21 20.2	+59.5	5.2	22 20.0	+59.4	5.2	23 19.8	+59.4	5.2	24 19.5	+59.5	5.3	25 19.3	+59.4	5.3	26 19.0	+59.5	5.4	64
65	20 20.1	+59.4	4.9	21 19.9	+59.4	5.0	22 19.7	+59.4	5.0	23 19.4	+59.4	5.0	24 19.2	+59.4	5.1	25 19.0	+59.4	5.1	26 18.7	+59.5	5.2	27 18.5	+59.4	5.2	65
66	21 19.5	+59.3	4.8	22 19.3	+59.3	4.8	23 19.1	+59.4	4.8	24 18.8	+59.4	4.9	25 18.6	+59.4	4.9	26 18.4	+59.4	5.0	27 18.2	+59.4	5.0	28 17.9	+59.4	5.1	66
67	22 18.8	+59.4	4.6	23 18.6	+59.4	4.7	24 18.4	+59.4	4.7	25 18.2	+59.4	4.7	26 18.0	+59.4	4.8	27 17.8	+59.4	4.8	28 17.6	+59.4	4.9	29 17.4	+59.4	4.9	67
68	23 18.2	+59.3	4.5	24 18.0	+59.4	4.5	25 17.8	+59.4	4.5	26 17.6	+59.4	4.6	27 17.4	+59.4	4.6	28 17.2	+59.5	4.7	29 17.0	+59.4	4.7	30 16.8	+59.4	4.7	68
69	24 17.5	+59.3	4.3	25 17.4	+59.3	4.3	26 17.2	+59.4	4.4	27 17.0	+59.4	4.4	28 16.8	+59.4	4.5	29 16.7	+59.4	4.5	30 16.5	+59.4	4.5	31 16.3	+59.4	4.6	69
70	25 16.9	+59.3	4.1	26 16.7	+59.4	4.2	27 16.6	+59.3	4.2	28 16.4	+59.4	4.2	29 16.2	+59.4	4.3	30 16.1	+59.3	4.3	31 15.9	+59.4	4.4	32 15.7	+59.4	4.4	70
71	26 16.2	+59.3	4.0	27 16.1	+59.4	4.0	28 15.9	+59.3	4.0	29 15.8	+59.3	4.1	30 15.6	+59.4	4.1	31 15.4	+59.4	4.2	32 15.3	+59.4	4.2	33 15.1	+59.4	4.3	71
72	27 15.5	+59.3	3.8	28 15.4	+59.3	3.9	29 15.2	+59.4	3.9	30 15.1	+59.3	3.9	31 15.0	+59.3	4.0	32 14.8	+59.4	4.0	33 14.7	+59.3	4.0	34 14.5	+59.4	4.1	72
73	28 14.8	+59.3	3.6	29 14.7	+59.3	3.7	30 14.6	+59.3	3.7	31 14.4	+59.4	3.7	32 14.3	+59.3	3.8	33 14.2	+59.3	3.8	34 14.0	+59.4	3.9	35 13.9	+59.4	3.9	73
74	29 14.1	+59.3	3.5	30 14.0	+59.3	3.5	31 13.9	+59.3	3.5	32 13.8	+59.3	3.6	33 13.6	+59.4	3.6	34 13.5	+59.3	3.6	35 13.4	+59.3	3.7	36 13.3	+59.3	3.7	74
75	30 13.4	+59.2	3.3	31 13.3	+59.2	3.3	32 13.2	+59.2	3.4	33 13.1	+59.2	3.4	34 13.0	+59.3	3.4	35 12.8	+59.3	3.5	36 12.7	+59.3	3.5	37 12.6	+59.4	3.6	75
76	31 12.6	+59.3	3.1	32 12.5	+59.2	3.1	33 12.4	+59.2	3.2	34 12.3	+59.2	3.2	35 12.3	+59.2	3.2	36 12.2	+59.3	3.3	37 12.1	+59.3	3.3	38 12.0	+59.3	3.4	76
77	32 11.9	+59.2	2.9	33 11.8	+59.2	2.9	34 11.7	+59.2	3.0	35 11.6	+59.3	3.0	36 11.5	+59.3	3.0	37 11.4	+59.3	3.1	38 11.4	+59.2	3.1	39 11.3	+59.3	3.2	77
78	33 11.1	+59.2	2.7	34 11.0	+59.2	2.7	35 10.9	+59.2	2.8	36 10.9	+59.2	2.8	37 10.8	+59.2	2.8	38 10.7	+59.3	2.9	39 10.6	+59.3	2.9	40 10.6	+59.2	3.0	78
79	34 10.3	+59.2	2.5	35 10.2	+59.2	2.6	36 10.2	+59.2	2.6	37 10.1	+59.2	2.6	38 10.0	+59.3	2.7	39 10.0	+59.2	2.7	40 09.9	+59.3	2.7	41 09.8	+59.3	2.8	79
80	35 09.5	+59.1	2.3	36 09.4	+59.2	2.4	37 09.4	+59.2	2.4	38 09.3	+59.2	2.4	39 09.3	+59.2	2.4	40 09.2	+59.2	2.5	41 09.2	+59.2	2.5	42 09.1	+59.2	2.6	80
81	36 08.6	+59.2	2.1	37 08.6	+59.1	2.1	38 08.6	+59.1	2.2	39 08.5	+59.2	2.2	40 08.5	+59.1	2.2	41 08.4	+59.2	2.3	42 08.4	+59.2	2.3	43 08.3	+59.2	2.3	81
82	37 07.8	+59.1	1.9	38 07.8	+59.1	1.9	39 07.7	+59.2	2.0	40 07.7	+59.1	2.0	41 07.6	+59.2	2.0	42 07.6	+59.1	2.1	43 07.6	+59.1	2.1	44 07.5	+59.2	2.1	82
83	38 06.9	+59.1	1.7	39 06.9	+59.1	1.7	40 06.9	+59.1	1.7	41 06.8	+59.1	1.8	42 06.8	+59.1	1.8	43 06.8	+59.1	1.8	44 06.7	+59.1	1.9	45 06.7	+59.2	1.9	83
84	39 06.0	+59.1	1.5	40 06.0	+59.1	1.5	41 06.0	+59.1	1.5	42 05.9	+59.1	1.5	43 05.9	+59.1	1.6	44 05.9	+59.1	1.6	45 05.9	+59.1	1.6	46 05.9	+59.1	1.6	84
85	40 05.1	+59.0	1.2	41 05.1	+59.0	1.3	42 05.1	+59.1	1.3	43 05.0	+59.1	1.3	44 05.0	+59.1	1.3	45 05.0	+59.1	1.3	46 05.0	+59.1	1.4	47 05.0	+59.1	1.4	85
86	41 04.1	+59.0	1.0	42 04.1	+59.0	1.0	43 04.1	+59.0	1.0	44 04.1	+59.0	1.1	45 04.1	+59.0	1.1	46 04.1	+59.0	1.1	47 04.1	+59.1	1.1	48 04.1	+59.0	1.1	86
87	42 03.1	+59.0	0.8	43 03.1	+59.0	0.8	44 03.1	+59.0	0.8	45 03.1	+59.0	0.8	46 03.1	+59.0	0.8	47 03.1	+59.0	0.8	48 03.1	+59.0	0.9	49 03.1	+59.0	0.9	87
88	43 02.1	+59.0	0.5	44 02.1	+59.0	0.5	45 02.1	+59.0	0.5	46 02.1	+59.0	0.5	47 02.1	+59.0	0.6	48 02.1	+59.0	0.6	49 02.1	+59.0	0.6	50 02.1	+59.0	0.6	88
89	44 01.1	+58.9	0.3	45 01.1	+58.9	0.3	46 01.1	+58.9	0.3	47 01.1	+58.9	0.3	48 01.1	+58.9	0.3	49 01.1	+58.9	0.3	50 01.1	+58.9	0.3	51 01.1	+58.9	0.3	89
90	45 00.0	+58.9	0.0	46 00.0	+58.9	0.0	47 00.0	+58.9	0.0	48 00.0	+58.9	0.0	49 00.0	+58.9	0.0	50 00.0	+58.9	0.0	51 00.0	+58.9	0.0	52 00.0	+58.9	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

12°, 348° L.H.A.

LATITUDE SAME NAME AS DECLINATION — N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 45.7	+58.7	163.3	42 48.2	+58.8	163.5	41 50.6	+58.9	163.8	40 52.9	+59.0	164.0	39 55.2	+59.1	164.3	38 57.4	+59.1	164.5	37 59.6	+59.1	164.7	37 01.7	+59.2	164.9	0
1	44 44.4	+58.7	163.0	43 47.0	+58.7	163.3	42 49.5	+58.8	163.5	41 51.9	+58.9	163.8	40 54.3	+59.0	164.0	39 56.5	+59.1	164.3	38 58.7	+59.2	164.7	38 00.9	+59.2	164.7	1
2	45 43.1	+58.6	162.7	44 45.7	+58.8	163.0	43 48.3	+58.8	163.3	42 50.8	+58.9	163.5	41 53.3	+58.9	163.8	40 55.6	+59.0	164.0	39 57.9	+59.1	164.3	39 00.1	+59.2	164.5	2
3	46 41.7	+58.6	162.4	45 44.5	+58.6	162.7	44 47.1	+58.8	163.0	43 49.7	+58.9	163.3	42 52.2	+59.0	163.5	41 54.6	+59.0	163.8	40 57.0	+59.1	164.3	39 59.3	+59.1	164.3	3
4	47 40.3	+58.5	162.1	46 43.1	+58.7	162.4	45 45.9	+58.7	162.7	44 48.6	+58.8	163.0	43 51.2	+58.9	163.3	42 53.6	+59.0	163.6	41 56.1	+59.0	163.8	40 58.4	+59.1	164.1	4
5	48 38.8	+58.5	161.7	47 41.8	+58.6	162.1	46 44.6	+58.7	162.4	45 47.4	+58.8	162.7	44 50.1	+58.8	163.0	43 52.6	+58.9	163.3	42 55.1	+59.0	163.6	41 57.5	+59.1	163.8	5
6	49 37.3	+58.4	161.4	48 40.4	+58.5	161.8	47 43.3	+58.6	162.1	46 46.2	+58.7	162.4	45 48.9	+58.8	162.7	44 51.6	+58.9	163.0	43 54.1	+59.0	163.3	42 56.6	+59.1	163.6	6
7	50 35.7	+58.3	161.0	49 38.9	+58.4	161.4	48 41.9	+58.6	161.8	47 44.9	+58.7	162.1	46 47.7	+58.8	162.4	45 50.5	+58.8	162.7	44 53.1	+59.0	163.1	43 55.7	+59.0	163.3	7
8	51 34.0	+58.3	160.7	50 37.3	+58.4	161.1	49 40.5	+58.5	161.4	48 43.6	+58.6	161.8	47 46.5	+58.7	162.2	46 49.3	+58.9	162.5	45 52.1	+58.9	162.8	44 54.7	+59.0	163.1	8
9	52 32.3	+58.2	160.3	51 35.7	+58.3	160.7	50 39.0	+58.5	161.1	49 42.2	+58.6	161.5	48 45.2	+58.7	161.9	47 48.2	+58.7	162.2	46 51.0	+58.9	162.5	45 53.7	+59.0	162.8	9
10	53 30.5	+58.0	159.9	52 34.0	+58.1	160.3	51 37.5	+58.3	160.7	50 40.8	+58.5	161.1	49 43.9	+58.6	161.5	48 46.9	+58.7	161.9	47 49.9	+58.8	162.2	46 52.7	+58.9	162.6	10
11	54 28.5	+58.0	159.4	53 32.3	+58.1	159.9	52 35.8	+58.4	160.0	51 39.3	+58.4	160.8	50 42.5	+58.6	161.2	49 45.7	+58.6	161.6	48 48.7	+58.8	161.9	47 51.6	+58.9	162.3	11
12	55 26.5	+57.9	159.0	54 30.4	+58.1	159.5	53 34.2	+58.2	160.0	52 37.7	+58.4	160.4	51 41.1	+58.5	160.9	50 44.3	+58.7	161.3	49 47.5	+58.7	161.6	48 50.5	+58.8	162.0	12
13	56 24.4	+57.8	158.5	55 28.5	+58.0	159.1	54 32.4	+58.1	159.6	53 36.1	+58.3	160.0	52 39.6	+58.4	160.5	51 43.0	+58.5	160.9	50 46.2	+58.7	161.3	49 49.3	+58.8	161.7	13
14	57 22.2	+57.7	158.0	56 26.5	+57.8	158.6	55 30.5	+58.0	159.1	54 34.4	+58.2	159.6	53 38.0	+58.3	160.1	52 41.5	+58.5	160.6	51 44.9	+58.6	161.0	50 48.1	+58.7	161.4	14
15	58 19.9	+57.5	157.5	57 24.3	+57.8	158.1	56 28.5	+58.0	158.7	55 32.6	+58.1	159.2	54 36.4	+58.2	159.7	53 40.0	+58.4	160.2	52 43.5	+58.5	160.6	51 46.8	+58.7	161.1	15
16	59 17.4	+57.4	157.0	58 22.1	+57.6	157.6	57 26.5	+57.8	158.2	56 30.7	+58.0	158.8	55 34.6	+58.2	159.3	54 38.4	+58.3	159.8	53 42.0	+58.5	160.3	52 45.5	+58.6	160.7	16
17	60 14.8	+57.2	156.4	59 19.7	+57.5	157.1	58 24.3	+57.7	157.7	57 28.7	+57.9	158.3	56 32.8	+58.1	158.9	55 36.8	+58.2	159.4	54 40.5	+58.4	159.9	53 44.1	+58.5	160.4	17
18	61 12.0	+57.1	155.8	60 17.2	+57.3	156.5	59 22.0	+57.6	157.2	58 26.6	+57.8	157.8	57 30.9	+58.0	158.4	56 35.0	+58.2	159.0	55 38.9	+58.3	159.5	54 42.6	+58.5	160.0	18
19	62 09.1	+56.8	155.1	61 14.5	+57.1	155.8	60 19.6	+57.4	156.6	59 24.4	+57.6	157.3	58 28.9	+57.8	157.9	57 33.2	+58.0	158.5	56 37.2	+58.3	159.1	55 41.1	+58.4	159.6	19
20	63 05.9	+56.7	154.4	62 11.6	+57.0	155.2	61 17.0	+57.2	156.0	60 22.0	+57.5	156.7	59 26.7	+57.8	157.4	58 31.2	+58.0	158.0	57 35.5	+58.1	158.6	56 39.5	+58.3	159.2	20
21	64 02.6	+56.3	153.7	63 08.6	+56.7	154.6	62 14.2	+57.1	155.4	61 19.5	+57.3	156.1	60 24.5	+57.6	156.9	59 29.2	+57.8	157.5	58 33.6	+58.0	158.2	57 37.8	+58.2	158.7	21
22	64 58.9	+56.2	152.9	64 05.3	+56.5	153.8	63 11.3	+56.8	154.7	62 16.8	+57.2	155.5	61 22.1	+57.4	156.3	60 27.0	+57.7	157.0	59 31.6	+57.9	157.7	58 36.0	+58.1	158.3	22
23	65 55.1	+55.8	152.0	65 01.8	+56.3	153.0	64 08.1	+56.6	154.0	63 14.0	+57.0	154.9	62 19.5	+57.3	155.7	61 24.7	+57.5	156.4	60 29.5	+57.8	157.1	59 34.1	+58.0	157.8	23
24	66 50.9	+55.4	151.1	65 58.1	+55.9	152.2	65 04.7	+56.4	153.2	64 11.0	+56.7	154.1	63 16.8	+57.0	155.0	62 22.2	+57.4	155.8	61 27.3	+57.6	156.6	60 32.1	+57.9	157.3	24
25	67 46.3	+55.1	150.1	66 54.0	+55.6	151.3	66 01.1	+56.1	152.4	65 07.7	+56.5	153.4	64 13.8	+56.9	154.3	63 19.6	+57.2	155.2	62 24.9	+57.5	156.0	61 30.0	+57.7	156.7	25
26	68 41.4	+54.7	149.1	67 49.6	+55.3	150.3	66 57.2	+55.7	151.5	66 04.2	+56.2	152.6	65 10.7	+56.6	153.6	64 16.8	+56.9	154.5	63 22.4	+57.3	155.4	62 27.7	+57.6	156.2	26
27	69 36.1	+54.1	147.9	68 44.9	+54.8	149.3	67 52.9	+55.4	150.5	67 00.4	+55.9	151.7	66 07.3	+56.4	152.8	65 13.7	+56.8	153.8	64 19.7	+57.1	154.7	63 25.3	+57.4	155.5	27
28	70 30.2	+53.6	146.6	69 39.7	+54.3	148.1	68 48.3	+54.9	149.5	67 56.3	+55.1	150.7	67 03.7	+56.0	151.9	66 10.5	+56.5	153.0	65 16.8	+56.9	154.0	64 22.7	+57.2	154.9	28
29	71 23.8	+52.9	145.2	70 34.0	+53.7	146.9	69 43.3	+54.5	148.4	68 51.9	+55.1	149.7	67 59.7	+55.7	151.0	67 07.0	+56.2	152.1	66 13.7	+56.6	153.2	65 19.9	+57.0	154.2	29
30	72 16.7	+52.1	143.7	71 27.7	+53.2	145.5	70 37.8	+54.0	147.1	69 47.0	+54.7	148.6	68 55.4	+55.3	150.0	68 03.2	+55.8	151.2	67 10.3	+56.3	152.3	66 16.9	+56.7	153.4	30
31	73 08.8	+51.3	142.1	72 20.9	+52.3	144.0	71 31.8	+53.3	145.8	70 41.7	+54.1	147.4	69 50.7	+54.9	148.9	68 59.0	+55.5	150.2	68 06.6	+56.0	151.4	67 13.6	+56.5	152.6	31
32	74 00.1	+50.2	140.2	73 13.2	+51.5	142.4	72 25.1	+52.6	144.3	71 35.8	+53.6	146.0	70 45.6	+54.4	147.7	69 54.5	+55.0	149.1	69 02.6	+55.7	150.5	68 10.1	+56.2	151.7	32
33	74 50.3	+48.9	138.2	74 04.7	+50.5	140.5	73 17.7	+51.7	142.7	72 29.4	+52.8	144.6	71 40.0	+53.7	146.3	70 49.5	+54.6	147.9	69 58.3	+55.2	149.4	69 06.3	+55.8	150.7	33
34	75 39.2	+47.6	135.9	74 54.9	+49.3	138.5	74 09.4	+50.8	140.8	73 22.2	+52.0	143.0	72 33.7	+53.1	144.9	71 44.1	+54.0	146.6	70 53.5	+54.8	148.2	70 02.1	+55.4	149.7	34
35	76 26.8	+45.8	133.4	75 44.5	+47.8	136.3	75 00.2	+49.6	138.8	74 14.2	+51.0	141.2	73 26.8	+52.2	143.3	72 38.1	+53.3	145.2	71 48.3	+54.2	146.9	70 57.5	+55.0	148.5	35
36	77 12.6	+43.8•	130.6	76 32.3	+46.2	133.7	75 49.8	+48.1	136.6	75 05.2	+49.9	139.2	74 19.0	+51.3	141.5	73 31.4	+52.5	143.6	72 42.5	+53.5	145.5	71 52.5	+54.4	147.3	36
37	77 56.4	+41.3•	127.4	77 18.5	+44.1•	130.9	76 37.9	+46.4	134.1	75 55.1	+48.5	137.0	75 10.3	+50.2	139.5	74 23.9	+51.5	141.9	73 36.0	+52.7	144.0	72 46.9	+53.7	145.9	37
38	78 37.7	+38.5•	123.8	78 02.6	+41.8•	127.7	77 24.4	+44.6•	131.3	76 43.6	+46.9	134.5	76 00.5	+48.8	137.3	75 15.4	+50.5	139.9	74 28.7	+51.9	142.2	73 40.6	+53.1	144.3	38
39	79 16.2	+35.0•	119.8	78 44.4	+38.8•	124.2	78 09.0	+42.1•	128.1	77 30.5	+44.9•	131.7	76 49.3	+47.2	134.9	76 05.9	+49.2	137.7	75 20.6	+50.8	140.3	74 33.7	+52.1	142.6	39
40	79 51.2	+30.9•	115.3	79 23.2	+35.4•	120.1	78 51.1	+39.3•	124.5	78 15.4	+42.5•	128.5	77 36.5	+45.3•	132.1	76 55.1	+47.6	135.3	76 11.4	+49.5	138.1	75 25.8	+51.1	140.7	40
41	80 22.1	+26.1•	110.3	79 58.6	+31.3•	115.6	79 30.4	+35.8•	120.5	78 57.9	+39.7•	124.9	78 21.8	+43.0•	128.9	77 42.7	+45.7•	132.5	77 00.9	+48.0	135.7	76 16.9	+49.8	138.5	41
42	80 48.2	+20.7•	104.8	80 29.9	+26.6•	110.6	80 06.2	+31.7•	116.0	79 37.6	+36.3•	120.9	79 04.8	+40.1•	125.4	78 28.4	+43.3•	129.4	77 48.9	+46.0•	132.9	77 06.7	+48.4	136.2	42
43	81 08.9	+14.6•	98.8	80 56.5	+21.0•	105.0	80 37.9	+27.0•	110.9	80 13.9	+32.2•	116.3	79 44.9	+36.8•	121.3	79 11.7	+40.6•	125.8	78 34.9	+43.9•	129.8	77 55.1	+46.5•	133.4	43
44	81 23.5	+7.8•	92.4	81 17.5	+14.8•	99.0	81 04.9	+21.3•	105.3	80 46.1	+27.3•	111.2	80 21.7	+32.6•	116.7	79 52.3	+37.2•	121.7	79 18.8	+41.0•	126.2	78 41.6	+44.2•	130.3	44
45	81 31.3	+1.0•	85.7	81 32.3	+8.0•	92.5	81 26.2	+15.1•	99.1	81 13.4	+21.7•	105.5	80 54.3	+27.7•	111.6	80 29.5	+33.1•	117.1	79 59.8	+37.7•	122.2	79 25.8	+41.5•	126.7	45
46	81 32.3	−6.1•	79.0	81 40.3	+1.0•	85.7	81 41.3	+8.1•	92.5	81 35.1	+15.3•	99.3	81 22.0	+22.1•	105.8	81 02.6	+28.2•	111.9	80 37.5	+33.5•	117.6	80 07.3	+38.2•	122.7	46
47	81 26.2	−12.8•	72.2	81 41.3	−6.2•	78.8	81 49.4	+1.0•	85.6	81 50.4	+8.3•	92.6	81 44.1	+15.6•	99.5	81 30.8	+22.4•	106.1	81 11.0	+28.7•	112.3	80 45.5	+34.0•	118.0	47
48	81 13.4	−19.1•	65.7	81 35.1	−13.1•	71.9	81 50.4	−6.3•	78.6	81 58.7	+1.0•	85.5	81 59.7	+8.4•	92.6	81 53.2	+15.9•	99.7	81 39.7	+22.8•	106.4	81 19.5	+29.1•	112.7	48
49	80 54.3	−24.8•	59.6	81 22.0	−19.4•	65.3	81 44.1	−13.3•	71.6	81 59.7	−6.5•	78.4	82 08.1	+1.0•	85.5	82 09.1	+8.6•	92.7	82 02.5	+16.1•	99.9	81 48.6	+23.3•	106.7	49
50	80 29.5	−29.7•	54.0	81 02.6	−25.1•	59.1	81 30.8	−19.8•	64.9	81 53.2	−13.5•	71.3	82 09.1	−6.6•	78.1	82 17.7	+0.9•	85.4	82 18.6	+8.8•	92.8	82 16.9	+16.4•	100.1	50
51	79 59.8	−34.0•	48.9	80 37.5	−30.2•	53.4	81 11.0	−25.5•	58.6	81 39.7	−20.2•	64.4	82 02.5	−13.9•	70.9	82 18.6	−6.7•	77.9	82 27.4	+0.9•	85.3	82 28.3	+8.9•	92.9	51
52	79 25.8	−37.6•	44.3	80 07.3	−34.4•	48.3	80 45.5	−30.6•	52.8	81 19.5	−25.9•	58.1	81 48.6	−20.5•	64.0	82 11.9	−14.2•	70.5	82 28.3	−6.9•	77.7	82 37.2	+0.9•	85.3	52
53	78 48.2	−40.6•	40.1	79 32.9	−38.0•	43.6	80 14.9	−34.8•	47.6	80 53.6	−31.0•	52.2	81 28.1	−26.3•	57.5	81 57.7	−20.9•	63.5	82 21.4	−14.5•	70.2	82 38.1	−7.1•	77.5	53
54	78 07.6	−43.2•	36.4	78 54.9	−41.0•	39.5	79 40.1	−38.4•	43.0	80 22.6	−35.3•	47.0	81 01.8	−31.5•	51.6	81 36.8	−26.8•	56.9	82 06.9	−21.3•	63.0	82 31.0	−14.8•	69.8	54
55	77 24.4	−45.3	33.2	78 13.9	−43.5•	35.8	79 01.7	−41.5•	38.8	79 47.3	−38.9•	42.3	80 30.3	−35.8•	46.3	81 10.0	−32.0•	50.9	81 45.6	−27.4•	56.3	82 16.2	−21.8•	62.4	55
56	76 39.1	−47.1	30.2	77 30.4	−45.7•	32.5	78 20.2	−43.9•	35.1	79 08.4	−41.8•	38.1	79 54.5	−39.3•	41.6	80 38.0	−36.3•	45.6	81 18.2	−32.4•	50.3	81 54.4	−27.8•	55.7	56
57	75 52.0	−48.6	27.6	76 44.7	−47.4	29.6	77 36.3	−46.0	31.8	78 26.6	−44.4•	34.4	79 15.2	−42.3•	37.4	80 01.7	−39.8•	40.8	80 45.8	−36.8•	44.9	81 26.6	−33.1•	49.6	57
58	75 03.4	−49.9	25.3	75 57.3	−48.9	27.0	76 50.3	−47.8	28.9	77 42.2	−46.4	31.2	78 32.9	−44.8•	33.7	79 21.9	−42.7•	36.7	80 09.0	−40.3•	40.1	80 53.5	−37.3•	44.1	58
59	74 13.5	−51.0	23.2	75 08.4	−50.2	24.7	76 02.5	−49.2	26.4	76 55.8	−48.1	28.3	77 48.1	−46.7	30.5	78 39.2	−45.2•	33.0	79 28.7	−43.2•	35.9	80 16.2	−40.8•	39.3	59
60	73 22.5	−51.9	21.3	74 18.2	−51.3	22.6	75 13.3	−50.5	24.0	76 07.7	−49.5	25.7	77 01.4	−48.5	27.6	77 54.0	−47.1	29.7	78 45.5	−45.6•	32.2	79 35.4	−43.7•	35.1	60
61	72 30.6	−52.7	19.6	73 26.9	−52.1	20.7	74 22.8	−51.5	22.0	75 18.2	−50.8	23.4	76 12.9	−49.8	25.0	77 06.9	−48.8	26.9	77 59.9	−47.6	29.0	78 51.7	−46.0•	31.5	61
62	71 37.9	−53.4	18.0	72 34.8	−52.9	19.0	73 31.3	−52.4	20.1	74 27.4	−51.7	21.4	75 23.1	−51.1	22.8	76 18.1	−50.2	24.3	77 12.3	−49.1	26.2	78 05.7	−47.9	28.2	62
63	70 44.5	−54.0	16.6	71 41.9	−53.6	17.5	72 38.9	−53.1	18.5	73 35.7	−52.6	19.5	74 32.0	−52.0	20.7	75 27.9	−51.3	22.1	76 23.2	−50.5	23.6	77 17.8	−49.6	25.4	63
64	69 50.5	−54.5	15.3	70 48.3	−54.2	16.1	71 45.8	−53.8	16.9	72 43.1	−53.4	17.9	73 40.0	−52.9	18.9	74 36.6	−52.3	20.1	75 32.7	−51.7	21.4	76 28.2	−50.8	22.9	64
65	68 56.0	−55.0	14.1	69 54.1	−54.7	14.8	70 52.0	−54.4	15.5	71 49.7	−54.0	16.4	72 47.1	−53.6	17.3	73 44.3	−53.2	18.3	74 41.0	−52.5	19.4	75 37.4	−51.9	20.7	65
66	68 01.0	−55.3	13.1	68 59.4	−55.1	13.6	69 57.6	−54.8	14.3	70 55.7	−54.6	15.0	71 53.5	−54.2	15.8	72 51.1	−53.8	16.7	73 48.5	−53.4	17.7	74 45.5	−52.9	18.8	66
67	67 05.7	−55.8	12.0	68 04.3	−55.5	12.6	69 02.8	−55.3	13.1	70 01.1	−55.0	13.8	70 59.3	−54.7	14.4	71 57.3	−54.4	15.2	72 55.1	−54.0	16.1	73 52.6	−53.6	17.0	67
68	66 09.9	−56.0	11.1	67 08.8	−55.9	11.6	68 07.5	−55.7	12.1	69 06.1	−55.4	12.6	70 04.6	−55.2	13.2	71 02.9	−54.9	13.9	72 01.1	−54.6	14.6	72 58.9	−54.2	15.4	68
69	65 13.9	−56.3	10.2	66 12.9	−56.2	10.6	67 11.8	−56.0	11.1	68 10.7	−55.9	11.6	69 09.4	−55.5	12.1	70 08.0	−55.4	12.7	71 06.5	−55.2	13.3	72 04.8	−54.9	14.0	69
70	64 17.6	−56.6	9.4	65 16.7	−56.4	9.8	66 15.8	−56.3	10.2	67 14.8	−56.1	10.6	68 13.8	−56.0	11.1	69 12.6	−55.8	11.6	70 11.3	−55.5	12.1	71 09.9	−55.3	12.7	70
71	63 21.0	−56.8	8.7	64 20.3	−56.7	9.0	65 19.5	−56.5	9.3	66 18.7	−56.4	9.7	67 17.8	−56.3	10.1	68 16.8	−56.1	10.5	69 15.8	−56.0	11.0	70 14.6	−55.7	11.6	71
72	62 24.2	−57.0	8.0	63 23.6	−56.9	8.2	64 23.0	−56.8	8.5	65 22.3	−56.7	8.9	66 21.5	−56.5	9.2	67 20.7	−56.4	9.6	68 19.8	−56.2	10.0	69 18.9	−56.1	10.5	72
73	61 27.2	−57.2	7.3	62 26.7	−57.1	7.6	63 26.2	−57.0	7.8	64 25.6	−56.9	8.1	65 25.0	−56.8	8.4	66 24.3	−56.7	8.7	67 23.6	−56.6	9.1	68 22.8	−56.4	9.5	73
74	60 30.0	−57.3	6.7	61 29.6	−57.3	6.9	62 29.2	−57.2	7.1	63 28.7	−57.1	7.4	64 28.2	−57.1	7.6	65 27.6	−56.9	7.9	66 27.0	−56.8	8.2	67 26.4	−56.7	8.6	74
75	59 32.7	−57.5	6.1	60 32.3	−57.4	6.3	61 32.0	−57.4	6.5	62 31.6	−57.3	6.7	63 31.1	−57.2	6.9	64 30.7	−57.1	7.2	65 30.2	−57.0	7.5	66 29.7	−57.0	7.8	75
76	58 35.2	−57.6	5.5	59 34.9	−57.6	5.7	60 34.6	−57.5	5.9	61 34.3	−57.5	6.1	62 33.9	−57.4	6.3	63 33.6	−57.3	6.5	64 33.2	−57.3	6.7	65 32.7	−57.1	7.0	76
77	57 37.6	−57.8	5.0	58 37.3	−57.7	5.2	59 37.1	−57.7	5.3	60 36.8	−57.6	5.5	61 36.5	−57.5	5.6	62 36.2	−57.5	5.8	63 35.9	−57.4	6.0	64 35.6	−57.4	6.3	77
78	56 39.8	−57.9	4.5	57 39.6	−57.8	4.6	58 39.4	−57.8	4.8	59 39.2	−57.7	4.9	60 39.0	−57.7	5.1	61 38.7	−57.6	5.4	62 38.5	−57.6	5.4	63 38.2	−57.5	5.6	78
79	55 41.9	−57.9	4.0	56 41.8	−57.9	4.1	57 41.6	−57.9	4.3	58 41.5	−57.9	4.4	59 41.3	−57.9	4.5	60 41.1	−57.8	4.6	61 40.9	−57.8	4.8	62 40.7	−57.7	5.0	79
80	54 44.0	−58.1	3.6	55 43.9	−58.1	3.7	56 43.7	−58.0	3.8	57 43.6	−58.0	3.9	58 43.4	−57.9	4.0	59 43.3	−57.9	4.1	60 43.1	−57.8	4.2	61 43.0	−57.9	4.4	80
81	53 45.9	−58.2	3.2	54 45.8	−58.1	3.2	55 45.7	−58.1	3.3	56 45.6	−58.1	3.4	57 45.5	−58.1	3.4	58 45.4	−58.0	3.6	59 45.3	−58.0	3.7	60 45.1	−57.9	3.8	81
82	52 47.7	−58.2	2.7	53 47.7	−58.2	2.8	54 47.6	−58.2	2.9	55 47.5	−58.2	3.0	56 47.4	−58.1	3.0	57 47.4	−58.2	3.1	58 47.3	−58.1	3.2	59 47.2	−58.1	3.3	82
83	51 49.5	−58.3	2.3	52 49.5	−58.3	2.4	53 49.4	−58.3	2.5	54 49.3	−58.2	2.5	55 49.3	−58.3	2.6	56 49.2	−58.2	2.7	57 49.2	−58.3	2.7	58 49.1	−58.2	2.8	83
84	50 51.2	−58.4	2.0	51 51.2	−58.4	2.0	52 51.1	−58.3	2.1	53 51.1	−58.4	2.1	54 51.0	−58.3	2.2	55 51.0	−58.3	2.2	56 50.9	−58.3	2.3	57 50.9	−58.3	2.3	84
85	49 52.8	−58.4	1.6	50 52.8	−58.5	1.6	51 52.8	−58.5	1.7	52 52.7	−58.4	1.7	53 52.7	−58.4	1.8	54 52.7	−58.4	1.8	55 52.6	−58.3	1.9	56 52.6	−58.4	1.9	85
86	48 54.4	−58.6	1.3	49 54.3	−58.5	1.3	50 54.3	−58.5	1.3	51 54.3	−58.5	1.3	52 54.3	−58.5	1.4	53 54.3	−58.5	1.4	54 54.3	−58.5	1.4	55 54.2	−58.4	1.5	86
87	47 55.8	−58.5	0.9	48 55.8	−58.5	0.9	49 55.8	−58.6	1.0	50 55.8	−58.6	1.0	51 55.8	−58.6	1.0	52 55.8	−58.6	1.0	53 55.8	−58.6	1.1	54 55.8	−58.6	1.1	87
88	46 57.3	−58.6	0.6	47 57.3	−58.6	0.6	48 57.3	−58.6	0.6	49 57.3	−58.6	0.6	50 57.3	−58.6	0.7	51 57.3	−58.6	0.7	52 57.3	−58.6	0.7	53 57.3	−58.6	0.7	88
89	45 58.7	−58.7	0.3	46 58.7	−58.7	0.3	47 58.7	−58.7	0.3	48 58.7	−58.7	0.3	49 58.7	−58.7	0.3	50 58.7	−58.7	0.3	51 58.7	−58.7	0.3	52 58.7	−58.7	0.3	89
90	45 00.0	−58.7	0.0	46 00.0	−58.7	0.0	47 00.0	−58.7	0.0	48 00.0	−58.7	0.0	49 00.0	−58.7	0.0	50 00.0	−58.7	0.0	51 00.0	−58.7	0.0	52 00.0	−58.7	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 45.7	−58.8	163.3	42 48.2	−58.9	163.5	41 50.6	−58.9	163.8	40 52.9	−58.9	164.0	39 55.2	−59.0	164.3	38 57.4	−59.1	164.5	37 59.6	−59.2	164.7	37 01.7	−59.2	164.9	0
1	42 46.9	−58.8	163.5	41 49.3	−58.9	164.0	40 51.7	−59.0	164.0	39 54.0	−59.1	164.3	38 56.2	−59.1	164.5	37 58.3	−59.1	164.7	37 00.4	−59.2	164.9	36 02.5	−59.3	165.1	1
2	41 48.1	−58.8	163.8	40 50.4	−59.0	164.1	39 52.7	−59.0	164.3	38 54.9	−59.0	164.5	37 57.1	−59.1	164.7	36 59.2	−59.2	164.9	36 01.2	−59.2	165.1	35 03.2	−59.3	165.3	2
3	40 49.3	−58.9	164.1	39 51.5	−58.9	164.3	38 53.7	−59.0	164.5	37 55.9	−59.1	164.7	36 58.0	−59.2	164.9	36 00.0	−59.2	165.1	35 02.0	−59.3	165.3	34 03.9	−59.3	165.5	3
4	39 50.4	−58.9	164.3	38 52.6	−59.0	164.5	37 54.7	−59.0	164.8	36 56.8	−59.1	165.0	35 58.8	−59.1	165.1	35 00.8	−59.2	165.3	34 02.8	−59.3	165.5	33 04.6	−59.3	165.7	4
5	38 51.5	−58.9	164.6	37 53.6	−59.0	164.8	36 55.7	−59.1	165.0	35 57.7	−59.1	165.2	34 59.7	−59.2	165.4	34 01.6	−59.2	165.5	33 03.5	−59.3	165.7	32 05.3	−59.3	165.8	5
6	37 52.6	−59.0	164.8	36 54.6	−59.0	165.0	35 56.6	−59.0	165.2	34 58.6	−59.1	165.4	34 00.5	−59.2	165.6	33 02.4	−59.2	165.7	32 04.2	−59.3	165.9	31 06.0	−59.3	166.0	6
7	36 53.6	−59.0	165.0	35 55.6	−59.1	165.2	34 57.6	−59.2	165.4	33 59.5	−59.2	165.6	33 01.3	−59.2	165.8	32 03.2	−59.3	165.9	31 04.9	−59.3	166.1	30 06.7	−59.4	166.2	7
8	35 54.6	−59.0	165.3	34 56.5	−59.1	165.5	33 58.4	−59.1	165.6	33 00.3	−59.2	165.8	32 02.1	−59.2	165.9	31 03.9	−59.2	166.1	30 05.6	−59.3	166.2	29 07.3	−59.4	166.4	8
9	34 55.6	−59.1	165.5	33 57.5	−59.1	165.7	32 59.3	−59.1	165.8	32 01.1	−59.2	166.0	31 02.9	−59.2	166.1	30 04.6	−59.3	166.3	29 06.3	−59.3	166.4	28 08.0	−59.4	166.5	9
10	33 56.5	−59.1	165.7	32 58.4	−59.1	165.9	32 00.2	−59.2	166.0	31 01.9	−59.2	166.2	30 03.7	−59.3	166.3	29 05.3	−59.3	166.4	28 07.0	−59.4	166.6	27 08.6	−59.4	166.7	10
11	32 57.5	−59.1	165.9	31 59.3	−59.2	166.1	31 01.0	−59.2	166.2	30 02.7	−59.2	166.4	29 04.4	−59.3	166.5	28 06.0	−59.3	166.6	27 07.6	−59.4	166.7	26 09.2	−59.4	166.9	11
12	31 58.4	−59.1	166.1	31 00.1	−59.1	166.3	30 01.8	−59.2	166.4	29 03.5	−59.3	166.5	28 05.1	−59.3	166.7	27 06.7	−59.3	166.8	26 08.3	−59.4	166.9	25 09.8	−59.4	167.0	12
13	30 59.3	−59.1	166.3	30 01.0	−59.2	166.5	29 02.6	−59.2	166.6	28 04.2	−59.2	166.7	27 05.8	−59.3	166.8	26 07.4	−59.3	167.0	25 08.9	−59.3	167.1	24 10.4	−59.4	167.2	13
14	30 00.2	−59.2	166.5	29 01.8	−59.2	166.7	28 03.4	−59.2	166.8	27 05.0	−59.3	166.9	26 06.5	−59.3	167.0	25 08.1	−59.4	167.1	24 09.6	−59.4	167.2	23 11.0	−59.4	167.3	14
15	29 01.0	−59.1	166.7	28 02.6	−59.3	166.8	27 04.2	−59.3	167.0	26 05.7	−59.3	167.1	25 07.2	−59.3	167.2	24 08.7	−59.3	167.3	23 10.2	−59.4	167.4	22 11.6	−59.4	167.5	15
16	28 01.9	−59.2	166.9	27 03.4	−59.2	167.0	26 04.9	−59.2	167.1	25 06.4	−59.3	167.3	24 07.9	−59.3	167.3	23 09.4	−59.4	167.4	22 10.8	−59.4	167.5	21 12.2	−59.5	167.6	16
17	27 02.7	−59.2	167.1	26 04.2	−59.2	167.2	25 05.7	−59.3	167.3	24 07.1	−59.3	167.4	23 08.6	−59.4	167.5	22 10.0	−59.3	167.6	21 11.4	−59.4	167.7	20 12.7	−59.4	167.8	17
18	26 03.5	−59.2	167.3	25 05.0	−59.2	167.4	24 06.4	−59.2	167.5	23 07.8	−59.3	167.6	22 09.2	−59.3	167.7	21 10.6	−59.4	167.8	20 12.0	−59.5	167.8	19 13.3	−59.4	167.9	18
19	25 04.3	−59.2	167.5	24 05.8	−59.3	167.7	23 07.2	−59.3	167.7	22 08.5	−59.3	167.7	21 09.9	−59.4	167.8	20 11.2	−59.4	167.9	19 12.5	−59.4	168.0	18 13.9	−59.5	168.1	19
20	24 05.1	−59.2	167.6	23 06.5	−59.3	167.7	22 07.9	−59.3	167.8	21 09.2	−59.3	167.9	20 10.5	−59.3	168.0	19 11.8	−59.4	168.1	18 13.1	−59.4	168.1	17 14.4	−59.5	168.2	20
21	23 05.9	−59.2	167.8	22 07.2	−59.2	167.9	21 08.6	−59.3	168.0	20 09.9	−59.4	168.1	19 11.2	−59.4	168.1	18 12.4	−59.4	168.2	17 13.7	−59.4	168.3	16 14.9	−59.4	168.3	21
22	22 06.7	−59.3	168.0	21 08.0	−59.3	168.1	20 09.3	−59.4	168.2	19 10.5	−59.3	168.2	18 11.8	−59.4	168.3	17 13.0	−59.4	168.4	16 14.3	−59.5	168.4	15 15.5	−59.5	168.5	22
23	21 07.4	−59.2	168.2	20 08.7	−59.3	168.2	19 09.9	−59.3	168.3	18 11.2	−59.4	168.4	17 12.4	−59.4	168.4	16 13.6	−59.4	168.5	15 14.8	−59.4	168.6	14 16.0	−59.5	168.6	23
24	20 08.2	−59.3	168.3	19 09.4	−59.3	168.4	18 10.6	−59.3	168.5	17 11.8	−59.3	168.5	16 13.0	−59.4	168.6	15 14.2	−59.4	168.6	14 15.4	−59.5	168.7	13 16.5	−59.5	168.7	24
25	19 08.9	−59.3	168.5	18 10.1	−59.3	168.6	17 11.3	−59.4	168.6	16 12.5	−59.4	168.7	15 13.6	−59.4	168.7	14 14.8	−59.5	168.8	13 15.9	−59.4	168.8	12 17.0	−59.4	168.9	25
26	18 09.6	−59.3	168.7	17 10.8	−59.3	168.7	16 11.9	−59.4	168.8	15 13.1	−59.4	168.8	14 14.2	−59.4	168.9	13 15.3	−59.4	168.9	12 16.5	−59.5	169.0	11 17.6	−59.5	169.0	26
27	17 10.3	−59.2	168.8	16 11.5	−59.3	168.9	15 12.6	−59.3	168.9	14 13.7	−59.4	169.0	13 14.8	−59.4	169.0	12 15.9	−59.4	169.1	11 17.0	−59.5	169.1	10 18.1	−59.5	169.1	27
28	16 11.1	−59.3	169.0	15 12.2	−59.4	169.0	14 13.3	−59.4	169.1	13 14.3	−59.3	169.1	12 15.4	−59.4	169.2	11 16.5	−59.5	169.2	10 17.5	−59.4	169.2	9 18.6	−59.5	169.3	28
29	15 11.8	−59.3	169.1	14 12.8	−59.3	169.2	13 13.9	−59.4	169.2	12 14.9	−59.3	169.3	11 16.0	−59.4	169.3	10 17.0	−59.4	169.3	9 18.1	−59.4	169.4	8 19.1	−59.4	169.4	29
30	14 12.5	−59.3	169.3	13 13.5	−59.3	169.3	12 14.5	−59.3	169.4	11 15.6	−59.4	169.4	10 16.6	−59.5	169.5	9 17.6	−59.5	169.5	8 18.6	−59.5	169.5	7 19.6	−59.5	169.5	30
31	13 13.2	−59.4	169.5	12 14.2	−59.4	169.5	11 15.2	−59.4	169.6	10 16.2	−59.4	169.6	9 17.1	−59.4	169.6	8 18.1	−59.4	169.6	7 19.1	−59.5	169.6	6 20.1	−59.5	169.7	31
32	12 13.8	−59.3	169.6	11 14.8	−59.3	169.6	10 15.8	−59.4	169.7	9 16.8	−59.4	169.7	8 17.7	−59.4	169.7	7 18.7	−59.5	169.8	6 19.6	−59.4	169.8	5 20.6	−59.5	169.8	32
33	11 14.5	−59.3	169.8	10 15.5	−59.4	169.8	9 16.4	−59.4	169.8	8 17.4	−59.4	169.9	7 18.3	−59.4	169.9	6 19.2	−59.4	169.9	5 20.2	−59.5	169.9	4 21.1	−59.5	169.9	33
34	10 15.2	−59.3	169.9	9 16.1	−59.3	169.9	8 17.0	−59.3	170.0	7 18.0	−59.5	170.0	6 18.9	−59.4	170.0	5 19.8	−59.4	170.0	4 20.7	−59.4	170.0	3 21.6	−59.5	170.1	34
35	9 15.9	−59.4	170.1	8 16.8	−59.4	170.1	7 17.7	−59.4	170.1	6 18.5	−59.4	170.1	5 19.4	−59.4	170.2	4 20.3	−59.4	170.2	3 21.2	−59.5	170.2	2 22.1	−59.5	170.2	35
36	8 16.5	−59.3	170.2	7 17.4	−59.4	170.2	6 18.3	−59.4	170.3	5 19.1	−59.4	170.3	4 20.0	−59.4	170.3	3 20.9	−59.5	170.3	2 21.7	−59.5	170.3	1 22.6	−59.5	170.3	36
37	7 17.2	−59.3	170.4	6 18.0	−59.3	170.4	5 18.9	−59.4	170.4	4 19.7	−59.4	170.4	3 20.6	−59.5	170.4	2 21.4	−59.5	170.4	1 22.2	−59.5	170.4	0 23.1	−59.5	170.4	37
38	6 17.9	−59.4	170.5	5 18.7	−59.4	170.5	4 19.5	−59.4	170.5	3 20.3	−59.4	170.6	2 21.1	−59.4	170.6	1 21.9	−59.4	170.6	0 22.7	−59.5	170.6	0 36.4	+59.6	9.4	38
39	5 18.5	−59.3	170.7	4 19.3	−59.4	170.7	3 20.1	−59.4	170.7	2 20.9	−59.4	170.7	1 21.7	−59.5	170.7	0 22.5	−59.5	170.7	0 36.7	+59.5	9.3	1 36.0	+59.5	9.3	39
40	4 19.2	−59.4	170.8	3 19.9	−59.3	170.8	2 20.7	−59.4	170.8	1 21.5	−59.4	170.8	0 22.2	−59.4	170.8	0 37.0	+59.5	9.2	1 36.2	+59.5	9.2	2 35.5	+59.5	9.2	40
41	3 19.8	−59.3	171.0	2 20.6	−59.4	171.0	1 21.3	−59.4	171.0	0 22.1	−59.5	171.0	0 37.2	+59.4	9.0	1 36.5	+59.5	9.0	2 35.7	+59.5	9.0	3 35.0	+59.5	9.0	41
42	2 20.5	−59.4	171.1	1 21.2	−59.3	171.1	0 21.9	−59.5	171.1	0 37.4	+59.4	8.9	1 36.6	+59.5	8.9	2 35.9	+59.4	8.9	3 35.2	+59.5	8.9	4 34.5	+59.5	8.9	42
43	1 21.1	−59.3	171.3	0 21.8	−59.3	171.3	0 37.5	+59.4	8.7	1 36.8	+59.4	8.7	2 36.1	+59.4	8.8	3 35.4	+59.4	8.8	4 34.7	+59.5	8.8	5 34.0	+59.5	8.8	43
44	0 21.8	−59.4	171.4	0 37.5	+59.4	8.5	1 36.9	+59.4	8.6	2 36.2	+59.4	8.6	3 35.5	+59.4	8.6	4 34.8	+59.5	8.6	5 34.2	+59.4	8.6	6 33.5	+59.5	8.7	44
45	0 37.6	+59.3	8.5	1 36.9	+59.4	8.5	2 36.3	+59.3	8.5	3 35.6	+59.4	8.5	4 34.9	+59.5	8.5	5 34.3	+59.4	8.5	6 33.6	+59.5	8.5	7 33.0	+59.4	8.5	45
46	1 36.9	+59.4	8.3	2 36.3	+59.3	8.3	3 35.6	+59.4	8.3	4 35.0	+59.4	8.3	5 34.4	+59.4	8.3	6 33.7	+59.4	8.4	7 33.1	+59.5	8.4	8 32.5	+59.5	8.4	46
47	2 36.3	+59.3	8.2	3 35.6	+59.4	8.2	4 35.0	+59.4	8.2	5 34.4	+59.4	8.2	6 33.8	+59.4	8.2	7 33.2	+59.5	8.2	8 32.6	+59.5	8.2	9 32.0	+59.5	8.3	47
48	3 35.6	+59.4	8.0	4 35.0	+59.4	8.0	5 34.4	+59.4	8.0	6 33.8	+59.4	8.1	7 33.2	+59.5	8.1	8 32.7	+59.4	8.1	9 32.1	+59.4	8.1	10 31.5	+59.4	8.1	48
49	4 34.9	+59.4	7.9	5 34.4	+59.3	7.9	6 33.8	+59.4	7.9	7 33.2	+59.5	7.9	8 32.7	+59.4	7.9	9 32.1	+59.5	8.0	10 31.5	+59.5	8.0	11 30.9	+59.5	8.0	49
50	5 34.3	+59.3	7.7	6 33.7	+59.4	7.7	7 33.2	+59.4	7.7	8 32.7	+59.4	7.8	9 32.1	+59.4	7.8	10 31.5	+59.5	7.8	11 31.0	+59.4	7.8	12 30.4	+59.5	7.9	50
51	6 33.6	+59.4	7.6	7 33.1	+59.4	7.6	8 32.6	+59.4	7.6	9 32.1	+59.4	7.6	10 31.5	+59.4	7.6	11 31.0	+59.5	7.7	12 30.4	+59.5	7.7	13 29.9	+59.5	7.7	51
52	7 33.0	+59.3	7.4	8 32.5	+59.3	7.4	9 32.0	+59.3	7.5	10 31.5	+59.3	7.5	11 30.9	+59.5	7.5	12 30.4	+59.5	7.5	13 29.9	+59.4	7.6	14 29.4	+59.4	7.6	52
53	8 32.3	+59.3	7.3	9 31.8	+59.4	7.3	10 31.3	+59.4	7.3	11 30.8	+59.4	7.3	12 30.4	+59.4	7.4	13 29.9	+59.4	7.4	14 29.3	+59.4	7.4	15 28.8	+59.4	7.5	53
54	9 31.6	+59.4	7.1	10 31.2	+59.3	7.1	11 30.7	+59.4	7.2	12 30.2	+59.4	7.2	13 29.8	+59.4	7.2	14 29.3	+59.4	7.3	15 28.8	+59.4	7.3	16 28.3	+59.5	7.3	54
55	10 31.0	+59.3	7.0	11 30.5	+59.4	7.0	12 30.1	+59.3	7.0	13 29.6	+59.4	7.0	14 29.2	+59.4	7.1	15 28.7	+59.5	7.1	16 28.2	+59.5	7.1	17 27.8	+59.4	7.2	55
56	11 30.3	+59.3	6.8	12 29.9	+59.3	6.9	13 29.4	+59.4	6.9	14 29.0	+59.4	6.9	15 28.6	+59.4	6.9	16 28.1	+59.4	7.0	17 27.7	+59.4	7.0	18 27.2	+59.5	7.0	56
57	12 29.6	+59.3	6.7	13 29.2	+59.3	6.7	14 28.8	+59.3	6.7	15 28.4	+59.3	6.7	16 28.0	+59.3	6.8	17 27.5	+59.5	6.8	18 27.1	+59.4	6.9	19 26.7	+59.4	6.9	57
58	13 28.9	+59.3	6.5	14 28.5	+59.4	6.5	15 28.1	+59.4	6.6	16 27.7	+59.4	6.6	17 27.3	+59.4	6.6	18 26.9	+59.4	6.7	19 26.5	+59.4	6.7	20 26.1	+59.5	6.8	58
59	14 28.2	+59.3	6.3	15 27.9	+59.3	6.4	16 27.5	+59.4	6.4	17 27.1	+59.4	6.4	18 26.7	+59.4	6.5	19 26.3	+59.4	6.5	20 25.9	+59.5	6.5	21 25.6	+59.4	6.6	59
60	15 27.5	+59.3	6.2	16 27.2	+59.3	6.2	17 26.8	+59.3	6.3	18 26.5	+59.3	6.3	19 26.1	+59.4	6.3	20 25.7	+59.4	6.4	21 25.4	+59.4	6.4	22 25.0	+59.4	6.5	60
61	16 26.8	+59.3	6.0	17 26.5	+59.3	6.1	18 26.1	+59.4	6.1	19 25.8	+59.3	6.1	20 25.5	+59.3	6.2	21 25.1	+59.4	6.2	22 24.8	+59.3	6.3	23 24.4	+59.4	6.3	61
62	17 26.1	+59.4	5.9	18 25.8	+59.3	5.9	19 25.5	+59.3	5.9	20 25.1	+59.4	6.0	21 24.8	+59.4	6.0	22 24.5	+59.4	6.1	23 24.1	+59.4	6.1	24 23.8	+59.4	6.2	62
63	18 25.4	+59.3	5.7	19 25.1	+59.4	5.7	20 24.8	+59.3	5.8	21 24.5	+59.3	5.8	22 24.2	+59.3	5.9	23 23.9	+59.3	5.9	24 23.5	+59.4	5.9	25 23.2	+59.4	6.0	63
64	19 24.7	+59.2	5.5	20 24.4	+59.3	5.6	21 24.1	+59.3	5.6	22 23.8	+59.3	5.7	23 23.5	+59.3	5.7	24 23.2	+59.4	5.7	25 22.9	+59.4	5.8	26 22.6	+59.4	5.8	64
65	20 23.9	+59.3	5.4	21 23.7	+59.2	5.4	22 23.4	+59.3	5.5	23 23.1	+59.3	5.5	24 22.8	+59.4	5.5	25 22.6	+59.3	5.6	26 22.3	+59.4	5.6	27 22.0	+59.3	5.7	65
66	21 23.2	+59.2	5.2	22 22.9	+59.3	5.2	23 22.7	+59.2	5.3	24 22.4	+59.3	5.3	25 22.2	+59.3	5.4	26 21.9	+59.3	5.4	27 21.6	+59.4	5.5	28 21.3	+59.3	5.5	66
67	22 22.4	+59.2	5.0	23 22.2	+59.2	5.1	24 21.9	+59.3	5.1	25 21.7	+59.3	5.2	26 21.5	+59.3	5.2	27 21.2	+59.3	5.2	28 21.0	+59.3	5.3	29 20.7	+59.3	5.3	67
68	23 21.6	+59.3	4.9	24 21.4	+59.3	4.9	25 21.2	+59.3	4.9	26 21.0	+59.2	5.0	27 20.8	+59.2	5.0	28 20.5	+59.3	5.1	29 20.3	+59.3	5.1	30 20.0	+59.4	5.2	68
69	24 20.9	+59.2	4.7	25 20.7	+59.2	4.7	26 20.5	+59.2	4.8	27 20.2	+59.3	4.8	28 20.0	+59.3	4.9	29 19.8	+59.3	4.9	30 19.6	+59.3	5.0	31 19.4	+59.3	5.0	69
70	25 20.1	+59.2	4.5	26 19.9	+59.2	4.6	27 19.7	+59.2	4.6	28 19.5	+59.2	4.6	29 19.3	+59.3	4.7	30 19.1	+59.3	4.7	31 18.9	+59.3	4.8	32 18.7	+59.3	4.8	70
71	26 19.3	+59.1	4.3	27 19.1	+59.2	4.4	28 18.9	+59.2	4.4	29 18.7	+59.3	4.5	30 18.6	+59.2	4.5	31 18.4	+59.2	4.5	32 18.2	+59.3	4.6	33 18.0	+59.3	4.6	71
72	27 18.4	+59.2	4.1	28 18.3	+59.2	4.2	29 18.1	+59.2	4.2	30 18.0	+59.2	4.3	31 17.8	+59.2	4.3	32 17.6	+59.3	4.3	33 17.4	+59.3	4.4	34 17.3	+59.2	4.5	72
73	28 17.6	+59.2	4.0	29 17.5	+59.1	4.0	30 17.3	+59.2	4.0	31 17.2	+59.2	4.1	32 17.0	+59.2	4.1	33 16.9	+59.2	4.2	34 16.7	+59.3	4.2	35 16.5	+59.3	4.3	73
74	29 16.8	+59.1	3.8	30 16.6	+59.2	3.8	31 16.5	+59.2	3.8	32 16.4	+59.1	3.9	33 16.2	+59.2	3.9	34 16.1	+59.2	3.9	35 15.9	+59.2	4.0	36 15.8	+59.2	4.1	74
75	30 15.9	+59.1	3.6	31 15.8	+59.1	3.6	32 15.7	+59.1	3.6	33 15.6	+59.1	3.7	34 15.4	+59.2	3.7	35 15.3	+59.2	3.7	36 15.1	+59.2	3.8	37 15.0	+59.2	3.9	75
76	31 15.0	+59.1	3.4	32 14.9	+59.1	3.4	33 14.8	+59.1	3.4	34 14.7	+59.1	3.5	35 14.6	+59.1	3.5	36 14.5	+59.1	3.6	37 14.3	+59.2	3.6	38 14.2	+59.1	3.7	76
77	32 14.1	+59.1	3.2	33 14.0	+59.1	3.2	34 13.9	+59.1	3.2	35 13.8	+59.1	3.3	36 13.7	+59.1	3.3	37 13.6	+59.1	3.4	38 13.5	+59.2	3.4	39 13.4	+59.2	3.5	77
78	33 13.2	+59.0	3.0	34 13.1	+59.1	3.0	35 13.0	+59.1	3.0	36 12.9	+59.1	3.1	37 12.8	+59.0	3.1	38 12.7	+59.1	3.2	39 12.7	+59.1	3.2	40 12.6	+59.1	3.2	78
79	34 12.2	+59.1	2.7	35 12.2	+59.0	2.8	36 12.1	+59.1	2.8	37 12.0	+59.1	2.9	38 12.0	+59.0	2.9	39 11.9	+59.1	2.9	40 11.8	+59.1	3.0	41 11.7	+59.1	3.0	79
80	35 11.3	+59.0	2.5	36 11.2	+59.0	2.6	37 11.2	+59.0	2.6	38 11.1	+59.0	2.6	39 11.0	+59.1	2.7	40 11.0	+59.0	2.7	41 10.9	+59.1	2.7	42 10.8	+59.1	2.8	80
81	36 10.3	+59.0	2.3	37 10.2	+59.0	2.3	38 10.2	+59.0	2.4	39 10.1	+59.0	2.4	40 10.1	+59.0	2.4	41 10.0	+59.0	2.5	42 10.0	+59.0	2.5	43 09.9	+59.1	2.6	81
82	37 09.3	+58.9	2.1	38 09.2	+59.0	2.1	39 09.2	+59.0	2.1	40 09.1	+59.0	2.2	41 09.1	+59.0	2.2	42 09.1	+59.0	2.2	43 09.0	+59.0	2.3	44 09.0	+59.0	2.3	82
83	38 08.2	+59.0	1.8	39 08.2	+58.9	1.9	40 08.2	+58.9	1.9	41 08.1	+59.0	1.9	42 08.1	+59.0	2.0	43 08.1	+58.9	2.0	44 08.0	+59.0	2.0	45 08.0	+59.0	2.1	83
84	39 07.2	+58.8	1.6	40 07.1	+58.9	1.6	41 07.1	+58.9	1.7	42 07.1	+58.9	1.7	43 07.1	+58.9	1.7	44 07.0	+59.0	1.7	45 07.0	+58.9	1.8	46 07.0	+58.9	1.8	84
85	40 06.0	+58.9	1.4	41 06.0	+58.9	1.4	42 06.0	+58.9	1.4	43 06.0	+58.9	1.4	44 06.0	+58.9	1.4	45 06.0	+58.9	1.5	46 05.9	+58.9	1.5	47 05.9	+58.9	1.5	85
86	41 04.9	+58.8	1.1	42 04.9	+58.8	1.1	43 04.9	+58.8	1.1	44 04.9	+58.8	1.2	45 04.9	+58.8	1.2	46 04.9	+58.8	1.2	47 04.8	+58.9	1.2	48 04.8	+58.9	1.2	86
87	42 03.7	+58.8	0.8	43 03.7	+58.8	0.9	44 03.7	+58.8	0.9	45 03.7	+58.8	0.9	46 03.7	+58.8	0.9	47 03.7	+58.8	0.9	48 03.7	+58.8	0.9	49 03.7	+58.8	1.0	87
88	43 02.5	+58.8	0.6	44 02.5	+58.8	0.6	45 02.5	+58.8	0.6	46 02.5	+58.8	0.6	47 02.5	+58.8	0.6	48 02.5	+58.8	0.6	49 02.5	+58.8	0.6	50 02.5	+58.8	0.6	88
89	44 01.3	+58.7	0.3	45 01.3	+58.7	0.3	46 01.3	+58.7	0.3	47 01.3	+58.7	0.3	48 01.3	+58.7	0.3	49 01.3	+58.7	0.3	50 01.3	+58.7	0.3	51 01.3	+58.7	0.3	89
90	45 00.0	+58.7	0.0	46 00.0	+58.7	0.0	47 00.0	+58.7	0.0	48 00.0	+58.7	0.0	49 00.0	+58.7	0.0	50 00.0	+58.7	0.0	51 00.0	+58.7	0.0	52 00.0	+58.7	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }   LATITUDE **SAME** NAME AS DECLINATION   L.H.A. **168°**, **192°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 33.0	+58.5	161.9	42 35.9	+58.6	162.2	41 38.7	+58.7	162.5	40 41.5	+58.8	162.7	39 44.1	+58.9	163.0	38 46.7	+59.0	163.2	37 49.2	+59.1	163.5	36 51.7	+59.1	163.7	0
1	44 31.5	+58.5	161.6	43 34.5	+58.6	161.9	42 37.4	+58.7	162.2	41 40.3	+58.7	162.5	40 43.0	+58.8	162.7	39 45.7	+58.9	163.0	38 48.3	+58.9	163.2	37 50.8	+59.0	163.5	1
2	45 30.0	+58.4	161.3	44 33.1	+58.5	161.6	43 36.1	+58.6	161.9	42 39.0	+58.7	162.2	41 41.8	+58.8	162.5	40 44.6	+58.9	162.7	39 47.2	+59.0	163.0	38 49.8	+59.1	163.2	2
3	46 28.4	+58.3	161.0	45 31.6	+58.4	161.3	44 34.7	+58.6	161.6	43 37.7	+58.7	161.9	42 40.6	+58.8	162.2	41 43.5	+58.8	162.5	40 46.2	+58.9	162.7	39 48.9	+59.0	163.0	3
4	47 26.7	+58.3	160.6	46 30.0	+58.5	161.0	45 33.3	+58.5	161.3	44 36.4	+58.6	161.6	43 39.4	+58.7	161.9	42 42.3	+58.8	162.2	41 45.1	+58.9	162.5	40 47.9	+58.9	162.8	4
5	48 25.0	+58.2	160.3	47 28.5	+58.3	160.6	46 31.8	+58.4	161.0	45 35.0	+58.6	161.3	44 38.1	+58.7	161.6	43 41.1	+58.8	161.9	42 44.0	+58.9	162.2	41 46.8	+59.0	162.5	5
6	49 23.2	+58.2	159.9	48 26.8	+58.3	160.3	47 30.2	+58.4	160.7	46 33.6	+58.5	161.0	45 36.8	+58.6	161.3	44 39.9	+58.7	161.7	43 42.9	+58.8	162.0	42 45.8	+58.9	162.3	6
7	50 21.4	+58.0	159.5	49 25.1	+58.2	159.9	48 28.6	+58.4	160.3	47 32.1	+58.4	160.7	46 35.4	+58.6	161.0	45 38.6	+58.7	161.4	44 41.7	+58.8	161.7	43 44.7	+58.9	162.0	7
8	51 19.4	+58.0	159.1	50 23.3	+58.1	159.6	49 27.0	+58.3	160.0	48 30.5	+58.4	160.4	47 34.0	+58.5	160.7	46 37.3	+58.6	161.1	45 40.5	+58.7	161.4	44 43.5	+58.9	161.7	8
9	52 17.4	+57.9	158.7	51 21.4	+58.1	159.2	50 25.3	+58.2	159.6	49 28.9	+58.4	160.0	48 32.5	+58.5	160.4	47 35.9	+58.6	160.8	46 39.2	+58.7	161.1	45 42.4	+58.8	161.4	9
10	53 15.3	+57.8	158.3	52 19.5	+57.9	158.7	51 23.5	+58.1	159.2	50 27.3	+58.2	159.6	49 31.0	+58.4	160.0	48 34.5	+58.5	160.4	47 37.9	+58.6	160.8	46 41.2	+58.7	161.2	10
11	54 13.1	+57.7	157.8	53 17.4	+57.9	158.3	52 21.6	+58.0	158.8	51 25.5	+58.2	159.3	50 29.4	+58.3	159.7	49 33.0	+58.5	160.1	48 36.5	+58.6	160.5	47 39.9	+58.7	160.9	11
12	55 10.8	+57.5	157.3	54 15.3	+57.7	157.9	53 19.6	+57.9	158.4	52 23.7	+58.1	158.9	51 27.7	+58.2	159.3	50 31.5	+58.4	159.8	49 35.1	+58.5	160.2	48 38.6	+58.6	160.5	12
13	56 08.3	+57.5	156.8	55 13.0	+57.7	157.4	54 17.5	+57.9	157.9	53 21.8	+58.0	158.5	52 25.9	+58.2	158.9	51 29.9	+58.3	159.4	50 33.6	+58.5	159.8	49 37.2	+58.6	160.2	13
14	57 05.8	+57.3	156.3	56 10.7	+57.5	156.9	55 15.4	+57.7	157.5	54 19.8	+58.0	158.0	53 24.1	+58.1	158.5	52 28.2	+58.2	159.0	51 32.1	+58.4	159.5	50 35.8	+58.5	159.9	14
15	58 03.1	+57.1	155.8	57 08.2	+57.4	156.4	56 13.1	+57.6	157.0	55 17.8	+57.8	157.6	54 22.2	+58.0	158.1	53 26.4	+58.2	158.6	52 30.5	+58.3	159.1	51 34.3	+58.5	159.5	15
16	59 00.2	+57.0	155.2	58 05.6	+57.2	155.9	57 10.7	+57.5	156.5	56 15.6	+57.7	157.1	55 20.2	+57.9	157.7	54 24.6	+58.1	158.2	53 28.8	+58.2	158.7	52 32.8	+58.4	159.2	16
17	59 57.2	+56.8	154.6	59 02.8	+57.1	155.3	58 08.2	+57.3	156.0	57 13.3	+57.5	156.6	56 18.1	+57.7	157.2	55 22.7	+57.9	157.8	54 27.0	+58.2	158.3	53 31.2	+58.3	158.8	17
18	60 54.0	+56.6	153.9	59 59.9	+56.9	154.7	59 05.5	+57.2	155.4	58 10.8	+57.5	156.1	57 15.9	+57.6	156.7	56 20.6	+57.9	157.3	55 25.2	+58.0	157.9	54 29.5	+58.2	158.4	18
19	61 50.6	+56.4	153.2	60 56.8	+56.7	154.0	60 02.7	+57.0	154.8	59 08.3	+57.3	155.5	58 13.5	+57.6	156.2	57 18.5	+57.8	156.8	56 23.2	+58.0	157.4	55 27.7	+58.2	158.0	19
20	62 47.0	+56.1	152.5	61 53.5	+56.5	153.3	60 59.7	+56.8	154.2	60 05.6	+57.1	154.9	59 11.1	+57.4	155.6	58 16.3	+57.6	156.3	57 21.2	+57.8	156.9	56 25.9	+58.0	157.5	20
21	63 43.1	+55.8	151.7	62 50.0	+56.3	152.6	61 56.5	+56.7	153.5	61 02.7	+56.9	154.3	60 08.4	+57.3	155.1	59 13.9	+57.5	155.8	58 19.0	+57.7	156.4	57 23.9	+57.9	157.1	21
22	64 38.9	+55.6	150.8	63 46.3	+56.0	151.8	62 53.2	+56.3	152.8	61 59.6	+56.7	153.6	61 05.7	+57.0	154.4	60 11.4	+57.3	155.2	59 16.7	+57.6	155.9	58 21.8	+57.8	156.6	22
23	65 34.5	+55.2	149.9	64 42.3	+55.7	151.0	63 49.5	+56.2	152.0	62 56.3	+56.5	152.9	62 02.7	+56.8	153.8	61 08.7	+57.1	154.6	60 14.3	+57.4	155.3	59 19.6	+57.7	156.1	23
24	66 29.7	+54.8	149.0	65 38.0	+55.3	150.1	64 45.7	+55.8	151.2	63 52.8	+56.3	152.2	62 59.5	+56.7	153.1	62 05.8	+57.0	154.0	61 11.7	+57.3	154.8	60 17.3	+57.5	155.5	24
25	67 24.5	+54.4	147.9	66 33.3	+55.0	149.2	65 41.5	+55.5	150.3	64 49.1	+56.0	151.4	63 56.2	+56.4	152.4	63 02.8	+56.8	153.3	62 09.0	+57.1	154.1	61 14.8	+57.4	154.9	25
26	68 18.9	+53.9	146.8	67 28.3	+54.6	148.1	66 37.0	+55.1	149.4	65 45.1	+55.6	150.5	64 52.6	+56.1	151.6	63 59.6	+56.5	152.5	63 06.1	+56.9	153.4	62 12.2	+57.2	154.3	26
27	69 12.8	+53.4	145.6	68 22.9	+54.1	147.0	67 32.1	+54.8	148.4	66 40.7	+55.3	149.6	65 48.7	+55.8	150.7	64 56.1	+56.2	151.8	64 03.0	+56.6	152.7	63 09.4	+57.0	153.6	27
28	70 06.2	+52.7	144.3	69 17.0	+53.5	145.8	68 26.9	+54.3	147.3	67 36.0	+55.0	148.6	66 44.5	+55.5	149.8	65 52.3	+56.0	150.9	64 59.6	+56.4	152.0	64 06.4	+56.8	152.9	28
29	70 58.9	+52.0	142.9	70 10.5	+52.9	144.5	69 21.2	+53.7	146.1	68 31.0	+54.4	147.5	67 40.0	+55.1	148.8	66 48.3	+55.7	150.0	65 56.0	+56.2	151.2	65 03.2	+56.6	152.2	29
30	71 50.9	+51.1	141.3	71 03.4	+52.3	143.1	70 14.9	+53.2	144.8	69 25.4	+54.0	146.3	68 35.1	+54.6	147.8	67 44.0	+55.2	149.1	66 52.2	+55.8	150.3	65 59.8	+56.2	151.4	30
31	72 42.0	+50.2	139.6	71 55.7	+51.4	141.6	71 08.1	+52.4	143.4	70 19.4	+53.3	145.1	69 29.7	+54.2	146.6	68 39.2	+54.9	148.0	67 48.0	+55.4	149.3	66 56.0	+56.0	150.5	31
32	73 32.2	+49.1	137.7	72 47.1	+50.4	139.9	72 00.5	+51.7	141.9	71 12.7	+52.7	143.7	70 23.9	+53.6	145.3	69 34.1	+54.3	146.9	68 43.4	+55.0	148.3	67 52.0	+55.6	149.6	32
33	74 21.3	+47.7	135.6	73 37.5	+49.4	138.0	72 52.2	+50.7	140.2	72 05.4	+51.9	142.2	71 17.5	+52.9	144.0	70 28.4	+53.8	145.6	69 38.4	+54.6	147.2	68 47.6	+55.3	148.6	33
34	75 09.0	+46.3	133.3	74 26.9	+48.1	135.9	73 42.9	+49.7	138.3	72 57.3	+51.0	140.5	72 10.4	+52.2	142.5	71 22.2	+53.2	144.3	70 33.0	+54.0	145.9	69 42.9	+54.7	147.5	34
35	75 55.3	+44.4	130.8	75 15.0	+46.5	133.6	74 32.6	+48.4	136.3	73 48.3	+50.0	138.6	73 02.6	+51.2	140.8	72 15.4	+52.4	142.8	71 27.0	+53.4	144.6	70 37.6	+54.3	146.3	35
36	76 39.7	+42.4•	127.9	76 01.5	+44.9	131.1	75 21.0	+46.9	134.0	74 38.3	+48.7	136.6	73 53.8	+50.3	139.0	73 07.8	+51.6	141.2	72 20.4	+52.7	143.1	71 31.9	+53.6	144.9	36
37	77 22.1	+39.8•	124.8	76 46.4	+42.7•	128.3	76 07.9	+45.1	131.8	75 27.0	+47.3	134.3	74 44.1	+49.1	137.0	73 59.4	+50.6	139.4	73 13.1	+51.9	141.5	72 25.5	+53.0	143.5	37
38	78 01.9	+37.0•	121.3	77 29.1	+40.3•	125.1	76 53.1	+43.1•	128.6	76 14.3	+45.5	131.8	75 33.2	+47.6	134.7	74 50.0	+49.3	137.4	74 05.0	+50.8	139.7	73 18.5	+52.1	141.9	38
39	78 38.9	+33.5•	117.4	78 09.4	+37.3•	121.6	77 36.2	+40.7•	125.5	76 59.9	+43.5•	129.0	76 20.8	+45.9	132.2	75 39.3	+48.0	135.1	74 55.8	+49.8	137.7	74 10.6	+51.2	140.1	39
40	79 12.4	+29.6•	113.0	78 46.7	+34.0•	117.7	78 16.9	+37.8•	122.0	77 43.4	+41.1•	125.9	77 06.7	+43.9•	129.4	76 27.3	+46.3	132.6	75 45.6	+48.3	135.5	75 01.8	+50.0	138.2	40
41	79 42.0	+25.0•	108.3	79 20.7	+30.0•	113.3	78 54.7	+34.4•	118.0	78 24.5	+38.2•	122.3	77 50.6	+41.6•	126.3	77 13.6	+44.4•	129.8	76 33.9	+46.7	133.1	75 51.8	+48.7	135.9	41
42	80 07.0	+19.9•	103.1	79 50.7	+25.4•	108.5	79 29.1	+30.4•	113.7	79 02.7	+34.8•	118.4	78 32.2	+38.6•	122.7	77 58.0	+41.9•	126.7	77 20.6	+44.8•	130.3	76 40.5	+47.2	133.5	42
43	80 26.9	+14.2•	97.5	80 16.1	+20.1•	103.3	79 59.5	+25.7•	108.8	79 37.5	+30.9•	114.0	79 10.8	+35.3•	118.8	78 39.9	+39.2•	123.2	78 05.4	+42.4•	127.1	77 27.7	+45.1•	130.7	43
44	80 41.1	+7.9•	91.6	80 36.2	+14.4•	97.6	80 25.2	+20.2•	103.5	80 08.4	+26.1•	109.1	79 46.1	+31.3•	114.4	79 19.1	+35.7•	119.2	78 47.8	+39.6•	123.6	78 12.8	+42.9•	127.6	44
45	80 49.0	+1.6•	85.4	80 50.6	+8.2•	91.6	80 45.7	+14.7•	97.7	80 34.5	+20.9•	103.7	80 17.4	+26.6•	109.4	79 54.8	+31.8•	114.7	79 27.4	+36.2•	119.6	78 55.7	+40.1•	124.1	45
46	80 50.6	−4.9•	79.1	80 58.8	+1.6•	85.3	81 00.4	+8.3•	91.6	80 55.4	+14.9•	97.9	80 44.0	+21.2•	104.0	80 26.6	+27.0•	109.8	80 03.6	+32.2•	115.1	79 35.8	+36.7•	120.1	46
47	80 45.7	−11.2•	72.9	81 00.4	−5.0•	78.9	81 08.7	+1.6•	85.2	81 10.3	+8.4•	91.7	81 05.2	+15.1•	98.1	80 53.6	+21.5•	104.2	80 35.8	+27.5•	110.1	80 12.5	+32.7•	115.1	47
48	80 34.5	−17.1•	66.8	80 55.4	−11.4•	72.6	81 10.3	−5.1•	78.7	81 18.7	+1.6•	85.2	81 20.3	+8.6•	91.7	81 15.1	+15.4•	98.2	81 03.3	+21.9•	104.5	80 45.2	+27.9•	110.5	48
49	80 17.4	−22.6•	61.0	80 44.0	−17.4•	66.4	81 05.2	−11.6•	72.3	81 20.3	−5.2•	78.5	81 28.9	+1.6•	85.1	81 30.5	+8.8•	91.8	81 25.2	+15.7•	98.4	81 13.1	+22.3•	104.8	49
50	79 54.8	−27.4•	55.7	80 26.6	−23.0•	60.6	80 53.6	−17.8•	66.0	81 15.1	−11.8•	71.9	81 30.5	−5.3•	78.3	81 39.3	+1.6•	85.1	81 40.9	+8.9•	91.8	81 35.4	+16.0•	98.6	50
51	79 27.4	−31.7•	50.7	80 03.6	−27.8•	55.1	80 35.8	−23.3•	60.1	81 03.3	−18.1•	65.6	81 25.2	−12.1•	71.6	81 40.9	−5.5•	78.1	81 49.8	+1.6•	84.9	81 51.4	+9.0•	91.9	51
52	78 55.7	−35.3•	46.2	79 35.8	−32.1•	50.1	80 12.5	−28.2•	54.5	80 45.2	−23.7•	59.5	81 13.1	−18.4•	65.1	81 35.4	−12.4•	71.3	81 51.4	−5.6•	77.9	82 00.4	+1.7•	84.9	52
53	78 20.4	−38.4•	42.1	79 03.7	−35.8•	45.5	79 44.3	−32.6•	49.5	80 21.5	−28.7•	53.9	80 54.7	−24.2•	59.0	81 23.0	−18.8•	64.6	81 45.8	−12.7•	70.9	82 02.1	−5.8•	77.7	53
54	77 41.8	−41.1•	38.4	78 27.9	−38.9•	41.4	79 11.7	−36.2•	44.9	79 52.8	−33.0•	48.8	80 30.5	−29.1•	53.3	81 04.2	−24.5•	58.4	81 33.1	−19.2•	64.2	81 56.3	−13.0•	70.5	54
55	77 00.7	−43.5•	35.0	77 49.0	−41.6•	37.7	78 35.5	−39.4•	40.7	79 19.8	−36.7•	44.2	80 01.4	−33.5•	48.1	80 39.7	−29.7•	52.7	81 13.9	−25.1•	57.8	81 43.3	−19.7•	63.6	55
56	76 17.2	−45.4	32.0	77 07.4	−43.8•	34.4	77 56.1	−42.0•	37.0	78 43.1	−39.8•	40.0	79 27.9	−37.2•	43.5	80 10.0	−34.0•	47.8	80 48.8	−30.1•	52.0	81 23.6	−25.5•	57.2	56
57	75 31.8	−47.1	29.4	76 23.6	−45.8	31.4	77 14.1	−44.2•	33.7	78 03.3	−42.4•	36.3	78 50.7	−40.2•	39.3	79 36.0	−37.6•	42.7	80 18.7	−34.5•	46.7	80 58.1	−30.7•	51.3	57
58	74 44.7	−48.4	26.9	75 37.8	−47.4	28.7	76 29.9	−46.1	30.7	77 20.9	−44.6•	33.0	78 10.5	−42.9•	35.6	78 58.4	−40.7•	38.6	79 44.2	−38.2•	42.0	80 27.4	−35.0•	46.0	58
59	73 56.3	−49.7	24.8	74 50.4	−48.8	26.3	75 43.8	−47.7	28.0	76 36.3	−46.5	30.0	77 27.6	−45.0•	32.3	78 17.7	−43.3•	34.8	79 06.0	−41.2•	37.8	79 52.4	−38.7•	41.2	59
60	73 06.6	−50.7	22.8	74 01.6	−49.9	24.1	74 56.1	−49.1	25.6	75 49.8	−48.1	27.4	76 42.6	−46.9	29.3	77 34.4	−45.5	31.5	78 24.8	−43.7•	34.1	79 13.7	−41.7•	37.0	60
61	72 15.9	−51.6	21.0	73 11.7	−51.0	22.2	74 07.0	−50.2	23.5	75 01.7	−49.4	25.0	75 55.7	−48.4	26.7	76 48.9	−47.2	28.6	77 41.1	−45.9	30.8	78 32.0	−44.3•	33.3	61
62	71 24.3	−52.4	19.3	72 20.7	−51.8	20.4	73 16.8	−51.1	21.5	74 12.3	−50.5	22.8	75 07.3	−49.7	24.3	76 01.7	−48.8	25.9	76 55.2	−47.6	27.8	77 47.7	−46.3	30.0	62
63	70 31.9	−53.0	17.8	71 28.9	−52.6	18.8	72 25.5	−52.0	19.8	73 21.8	−51.5	20.9	74 17.6	−50.8	22.2	75 12.9	−50.0	23.6	76 07.6	−49.2	25.2	77 01.4	−48.0	27.1	63
64	69 38.9	−53.7	16.5	70 36.3	−53.3	17.3	71 33.5	−52.9	18.2	72 30.3	−52.3	19.1	73 26.8	−51.8	20.3	74 22.9	−51.2	21.5	75 18.4	−50.3	22.9	76 13.4	−49.5	24.5	64
65	68 45.2	−54.1	15.2	69 43.0	−53.8	15.9	70 40.6	−53.4	16.7	71 38.0	−53.1	17.6	72 35.0	−52.6	18.5	73 31.7	−52.0	19.6	74 28.1	−51.5	20.8	75 23.9	−50.7	22.2	65
66	67 51.1	−54.6	14.0	68 49.2	−54.3	14.7	69 47.2	−54.1	15.4	70 44.9	−53.7	16.1	71 42.4	−53.3	16.9	72 39.7	−52.8	17.9	73 36.6	−52.3	18.9	74 33.2	−51.8	20.1	66
67	66 56.5	−55.1	13.0	67 54.9	−54.8	13.5	68 53.1	−54.5	14.1	69 51.2	−54.2	14.8	70 49.1	−53.9	15.5	71 46.9	−53.6	16.3	72 44.3	−53.1	17.2	73 41.4	−52.6	18.2	67
68	66 01.4	−55.3	12.0	67 00.1	−55.2	12.5	67 58.6	−54.9	13.0	68 57.0	−54.7	13.6	69 55.5	−54.5	14.2	70 53.3	−54.1	14.9	71 51.2	−53.8	15.7	72 48.8	−53.3	16.6	68
69	65 06.1	−55.8	11.0	66 04.9	−55.5	11.5	67 03.7	−55.4	11.9	68 02.5	−55.1	12.4	69 00.8	−54.9	13.0	69 59.2	−54.6	13.6	70 57.4	−54.3	14.3	71 55.5	−54.0	15.1	69
70	64 10.3	−56.0	10.2	65 09.4	−55.9	10.6	66 08.3	−55.7	11.0	67 07.2	−55.5	11.4	68 05.9	−55.3	11.9	69 04.6	−55.1	12.4	70 03.1	−54.8	13.0	71 01.5	−54.6	13.7	70
71	63 14.3	−56.2	9.4	64 13.5	−56.1	9.7	65 12.6	−56.0	10.1	66 11.7	−55.9	10.5	67 10.6	−55.6	10.9	68 09.5	−55.5	11.4	69 08.3	−55.3	11.9	70 06.9	−55.0	12.4	71
72	62 18.1	−56.5	8.6	63 17.4	−56.4	8.9	64 16.6	−56.2	9.2	65 15.8	−56.1	9.6	66 15.0	−56.0	9.9	67 14.0	−55.8	10.3	68 13.0	−55.6	10.8	69 11.9	−55.4	11.3	72
73	61 21.6	−56.7	7.9	62 21.0	−56.6	8.1	63 20.4	−56.5	8.4	64 19.7	−56.4	8.7	65 19.0	−56.3	9.1	66 18.2	−56.1	9.4	67 17.4	−56.0	9.8	68 16.5	−55.9	10.2	73
74	60 24.9	−56.9	7.2	61 24.4	−56.8	7.4	62 23.9	−56.7	7.7	63 23.3	−56.6	8.0	64 22.7	−56.5	8.2	65 22.1	−56.4	8.6	66 21.4	−56.3	8.9	67 20.6	−56.1	9.3	74
75	59 28.0	−57.1	6.6	60 27.6	−57.0	6.8	61 27.2	−57.0	7.0	62 26.7	−56.8	7.2	63 26.2	−56.7	7.5	64 25.7	−56.7	7.8	65 25.1	−56.5	8.0	66 24.5	−56.4	8.4	75
76	58 30.9	−57.2	6.0	59 30.6	−57.2	6.2	60 30.2	−57.1	6.3	61 29.9	−57.1	6.5	62 29.5	−57.0	6.8	63 29.0	−56.8	7.0	64 28.6	−56.8	7.3	65 28.1	−56.7	7.5	76
77	57 33.7	−57.4	5.4	58 33.4	−57.3	5.6	59 33.1	−57.2	5.7	60 32.8	−57.2	5.9	61 32.5	−57.1	6.1	62 32.2	−57.1	6.3	63 31.8	−57.0	6.5	64 31.4	−56.9	6.8	77
78	56 36.3	−57.5	4.9	57 36.1	−57.4	5.0	58 35.9	−57.4	5.1	59 35.6	−57.3	5.3	60 35.4	−57.3	5.4	61 35.1	−57.3	5.6	62 34.8	−57.2	5.8	63 34.5	−57.2	6.0	78
79	55 38.8	−57.6	4.4	56 38.7	−57.6	4.5	57 38.5	−57.6	4.6	58 38.3	−57.5	4.7	59 38.1	−57.5	4.9	60 37.8	−57.4	5.0	61 37.6	−57.4	5.2	62 37.3	−57.3	5.4	79
80	54 41.2	−57.7	3.9	55 41.1	−57.7	4.0	56 40.9	−57.6	4.1	57 40.8	−57.7	4.2	58 40.6	−57.6	4.3	59 40.4	−57.5	4.4	60 40.2	−57.5	4.6	61 40.0	−57.4	4.7	80
81	53 43.5	−57.9	3.4	54 43.4	−57.9	3.5	55 43.3	−57.8	3.6	56 43.1	−57.9	3.7	57 43.0	−57.7	3.8	58 42.9	−57.7	3.9	59 42.7	−57.6	4.0	60 42.6	−57.6	4.1	81
82	52 45.6	−57.9	3.0	53 45.5	−57.9	3.0	54 45.5	−57.9	3.1	55 45.4	−57.9	3.2	56 45.3	−57.9	3.3	57 45.2	−57.9	3.3	58 45.1	−57.8	3.4	59 45.0	−57.8	3.6	82
83	51 47.7	−58.0	2.5	52 47.6	−58.0	2.6	53 47.6	−58.0	2.7	54 47.5	−58.0	2.7	55 47.4	−57.9	2.8	56 47.4	−58.0	2.9	57 47.3	−57.9	2.9	58 47.2	−57.9	3.0	83
84	50 49.7	−58.1	2.1	51 49.6	−58.1	2.2	52 49.6	−58.1	2.2	53 49.5	−58.0	2.3	54 49.5	−58.1	2.3	55 49.4	−58.0	2.4	56 49.4	−58.0	2.5	57 49.3	−58.0	2.5	84
85	49 51.6	−58.2	1.7	50 51.5	−58.1	1.8	51 51.5	−58.2	1.8	52 51.5	−58.2	1.9	53 51.4	−58.1	1.9	54 51.4	−58.1	2.0	55 51.4	−58.1	2.0	56 51.3	−58.1	2.1	85
86	48 53.4	−58.3	1.4	49 53.4	−58.3	1.4	50 53.3	−58.2	1.4	51 53.3	−58.2	1.5	52 53.3	−58.2	1.5	53 53.3	−58.2	1.5	54 53.3	−58.2	1.6	55 53.2	−58.1	1.6	86
87	47 55.1	−58.3	1.0	48 55.1	−58.3	1.0	49 55.1	−58.3	1.0	50 55.1	−58.3	1.1	51 55.1	−58.3	1.1	52 55.1	−58.3	1.1	53 55.1	−58.3	1.1	54 55.1	−58.3	1.2	87
88	46 56.8	−58.4	0.7	47 56.8	−58.4	0.7	48 56.8	−58.4	0.7	49 56.8	−58.4	0.7	50 56.8	−58.4	0.7	51 56.8	−58.4	0.7	52 56.8	−58.4	0.7	53 56.8	−58.4	0.8	88
89	45 58.4	−58.4	0.3	46 58.4	−58.4	0.3	47 58.4	−58.4	0.3	48 58.4	−58.4	0.3	49 58.4	−58.4	0.3	50 58.4	−58.4	0.4	51 58.4	−58.4	0.4	52 58.4	−58.4	0.4	89
90	45 00.0	−58.5	0.0	46 00.0	−58.5	0.0	47 00.0	−58.5	0.0	48 00.0	−58.5	0.0	49 00.0	−58.5	0.0	50 00.0	−58.5	0.0	51 00.0	−58.5	0.0	52 00.0	−58.5	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 33.0	−58.6	161.9	42 35.9	−58.7	162.2	41 38.7	−58.7	162.5	40 41.5	−58.9	162.7	39 44.1	−58.9	163.0	38 46.7	−59.0	163.2	37 49.2	−59.0	163.5	36 51.7	−59.1	163.7	0
1	42 34.4	−58.6	162.2	41 37.2	−58.6	162.5	40 40.0	−58.8	162.8	39 42.6	−58.8	163.0	38 45.2	−58.9	163.2	37 47.7	−59.0	163.5	36 50.2	−59.1	163.7	35 52.6	−59.1	163.9	1
2	41 35.8	−58.6	162.5	40 38.6	−58.8	162.8	39 41.2	−58.8	163.0	38 43.8	−58.9	163.3	37 46.3	−59.0	163.5	36 48.7	−59.0	163.7	35 51.1	−59.1	163.9	34 53.5	−59.2	164.1	2
3	40 37.2	−58.7	162.8	39 39.8	−58.8	163.0	38 42.4	−58.9	163.3	37 44.9	−58.9	163.5	36 47.3	−58.9	163.7	35 49.7	−59.0	163.9	34 52.0	−59.1	164.1	33 54.3	−59.2	164.3	3
4	39 38.5	−58.7	163.1	38 41.0	−58.8	163.3	37 43.5	−58.9	163.5	36 46.0	−59.0	163.7	35 48.4	−59.0	163.9	34 50.7	−59.1	164.1	33 52.9	−59.1	164.3	32 55.1	−59.2	164.5	4
5	38 39.8	−58.8	163.3	37 42.2	−58.8	163.5	36 44.7	−58.9	163.8	35 47.0	−58.9	164.0	34 49.3	−59.0	164.2	33 51.6	−59.1	164.3	32 53.8	−59.2	164.5	31 55.9	−59.2	164.7	5
6	37 41.0	−58.8	163.6	36 43.4	−58.8	163.8	35 45.8	−59.0	164.0	34 48.1	−59.0	164.2	33 50.3	−59.0	164.4	32 52.5	−59.1	164.6	31 54.6	−59.1	164.7	30 56.7	−59.2	164.9	6
7	36 42.2	−58.8	163.8	35 44.6	−59.0	164.0	34 46.8	−58.9	164.2	33 49.1	−59.0	164.4	32 51.3	−59.1	164.6	31 53.4	−59.1	164.8	30 55.5	−59.2	164.9	29 57.5	−59.2	165.1	7
8	35 43.4	−58.9	164.1	34 45.7	−58.9	164.3	33 47.9	−59.0	164.5	32 50.1	−59.1	164.6	31 52.2	−59.1	164.8	30 54.3	−59.2	165.0	29 56.3	−59.2	165.1	28 58.3	−59.3	165.2	8
9	34 44.5	−58.8	164.3	33 46.7	−58.9	164.5	32 48.9	−59.0	164.7	31 51.0	−59.0	164.8	30 53.1	−59.1	165.0	29 55.1	−59.2	165.1	28 57.1	−59.2	165.3	27 59.0	−59.2	165.4	9
10	33 45.7	−58.9	164.5	32 47.8	−59.0	164.7	31 49.9	−59.0	164.9	30 52.0	−59.1	165.0	29 54.0	−59.2	165.2	28 55.9	−59.1	165.3	27 57.9	−59.3	165.5	26 59.8	−59.3	165.6	10
11	32 46.8	−58.9	164.8	31 48.8	−59.0	164.9	30 50.9	−59.1	165.1	29 52.9	−59.1	165.2	28 54.8	−59.1	165.4	27 56.8	−59.2	165.5	26 58.6	−59.2	165.7	26 00.5	−59.3	165.8	11
12	31 47.8	−58.9	165.0	30 49.8	−59.0	165.2	29 51.8	−59.1	165.3	28 53.8	−59.1	165.4	27 55.7	−59.2	165.6	26 57.6	−59.3	165.7	25 59.4	−59.3	165.8	25 01.2	−59.3	165.9	12
13	30 48.9	−59.0	165.2	29 50.8	−59.0	165.4	28 52.8	−59.1	165.5	27 54.7	−59.2	165.6	26 56.5	−59.2	165.8	25 58.3	−59.2	165.9	25 00.1	−59.2	166.0	24 01.9	−59.3	166.1	13
14	29 49.9	−59.0	165.4	28 51.8	−59.0	165.6	27 53.7	−59.1	165.7	26 55.5	−59.1	165.8	25 57.3	−59.2	166.0	24 59.1	−59.2	166.1	24 00.9	−59.3	166.2	23 02.6	−59.3	166.3	14
15	28 50.9	−59.0	165.6	27 52.8	−59.1	165.8	26 54.6	−59.1	165.9	25 56.4	−59.2	166.0	24 58.1	−59.2	166.1	23 59.9	−59.3	166.2	23 01.6	−59.3	166.3	22 03.3	−59.4	166.4	15
16	27 51.9	−59.0	165.8	26 53.7	−59.1	166.0	25 55.5	−59.2	166.1	24 57.2	−59.2	166.3	23 58.9	−59.2	166.3	23 00.6	−59.2	166.4	22 02.3	−59.3	166.5	21 03.9	−59.3	166.6	16
17	26 52.9	−59.1	166.0	25 54.6	−59.1	166.2	24 56.3	−59.1	166.3	23 58.0	−59.1	166.4	22 59.7	−59.3	166.5	22 01.4	−59.3	166.6	21 03.0	−59.3	166.7	20 04.6	−59.3	166.8	17
18	25 53.8	−59.0	166.2	24 55.5	−59.1	166.4	23 57.2	−59.1	166.5	22 58.9	−59.2	166.6	22 00.5	−59.2	166.7	21 02.1	−59.3	166.7	20 03.7	−59.3	166.8	19 05.3	−59.4	166.9	18
19	24 54.8	−59.1	166.4	23 56.4	−59.1	166.5	22 58.1	−59.2	166.6	21 59.7	−59.2	166.7	21 01.3	−59.3	166.8	20 02.8	−59.3	166.9	19 04.4	−59.4	167.0	18 05.9	−59.4	167.1	19
20	23 55.7	−59.1	166.6	22 57.3	−59.1	166.7	21 58.9	−59.2	166.8	21 00.5	−59.3	166.9	20 02.0	−59.3	167.0	19 03.5	−59.2	167.1	18 05.0	−59.3	167.2	17 06.5	−59.4	167.2	20
21	22 56.6	−59.1	166.8	21 58.2	−59.2	166.9	20 59.7	−59.2	167.0	20 01.2	−59.3	167.1	19 02.7	−59.2	167.2	18 04.2	−59.3	167.2	17 05.7	−59.4	167.3	16 07.2	−59.4	167.4	21
22	21 57.5	−59.1	167.0	20 59.0	−59.1	167.1	20 00.5	−59.2	167.2	19 02.0	−59.2	167.3	18 03.5	−59.3	167.3	17 04.9	−59.3	167.4	16 06.4	−59.4	167.5	15 07.8	−59.4	167.5	22
23	20 58.4	−59.2	167.2	19 59.9	−59.2	167.3	19 01.3	−59.2	167.3	18 02.8	−59.3	167.4	17 04.2	−59.3	167.5	16 05.6	−59.3	167.6	15 07.0	−59.3	167.6	14 08.4	−59.4	167.7	23
24	19 59.2	−59.1	167.4	19 00.7	−59.2	167.4	18 02.1	−59.2	167.5	17 03.5	−59.2	167.6	16 04.9	−59.3	167.7	15 06.3	−59.3	167.7	14 07.7	−59.4	167.8	13 09.0	−59.4	167.8	24
25	19 00.1	−59.2	167.5	18 01.5	−59.2	167.6	17 02.9	−59.2	167.7	16 04.3	−59.3	167.7	15 05.6	−59.3	167.8	14 07.0	−59.4	167.9	13 08.3	−59.4	167.9	12 09.6	−59.4	168.0	25
26	18 00.9	−59.1	167.7	17 02.3	−59.3	167.8	16 03.7	−59.3	167.9	15 05.0	−59.3	167.9	14 06.3	−59.3	168.0	13 07.6	−59.3	168.0	12 08.9	−59.3	168.1	11 10.2	−59.4	168.1	26
27	17 01.8	−59.2	167.9	16 03.1	−59.2	168.0	15 04.4	−59.2	168.0	14 05.7	−59.2	168.1	13 07.0	−59.3	168.1	12 08.3	−59.3	168.2	11 09.6	−59.4	168.2	10 10.8	−59.4	168.3	27
28	16 02.6	−59.2	168.1	15 03.9	−59.2	168.1	14 05.2	−59.3	168.2	13 06.5	−59.3	168.2	12 07.7	−59.3	168.3	11 09.0	−59.4	168.3	10 10.2	−59.4	168.4	9 11.4	−59.4	168.4	28
29	15 03.4	−59.1	168.2	14 04.7	−59.3	168.3	13 05.9	−59.2	168.3	12 07.2	−59.3	168.4	11 08.4	−59.3	168.4	10 09.6	−59.3	168.5	9 10.8	−59.3	168.5	8 12.0	−59.4	168.5	29
30	14 04.3	−59.2	168.4	13 05.5	−59.2	168.5	12 06.7	−59.2	168.5	11 07.9	−59.3	168.5	10 09.1	−59.3	168.6	9 10.3	−59.4	168.6	8 11.4	−59.3	168.6	7 12.6	−59.4	168.7	30
31	13 05.1	−59.2	168.6	12 06.3	−59.3	168.6	11 07.4	−59.2	168.7	10 08.6	−59.3	168.7	9 09.8	−59.4	168.7	8 10.9	−59.4	168.8	7 12.0	−59.3	168.8	6 13.2	−59.4	168.8	31
32	12 05.9	−59.2	168.7	11 07.0	−59.2	168.8	10 08.2	−59.3	168.8	9 09.3	−59.3	168.9	8 10.4	−59.3	168.9	7 11.5	−59.3	168.9	6 12.7	−59.4	168.9	5 13.8	−59.4	169.0	32
33	11 06.7	−59.2	168.9	10 07.8	−59.3	169.0	9 08.9	−59.2	169.0	8 10.0	−59.3	169.0	7 11.1	−59.3	169.0	6 12.2	−59.4	169.1	5 13.3	−59.4	169.1	4 14.4	−59.5	169.1	33
34	10 07.5	−59.3	169.1	9 08.5	−59.2	169.1	8 09.6	−59.3	169.1	7 10.7	−59.3	169.2	6 11.8	−59.4	169.2	5 12.8	−59.4	169.2	4 13.9	−59.4	169.2	3 14.9	−59.4	169.2	34
35	9 08.2	−59.2	169.2	8 09.3	−59.3	169.3	7 10.3	−59.2	169.3	6 11.4	−59.3	169.3	5 12.4	−59.3	169.3	4 13.5	−59.4	169.4	3 14.5	−59.4	169.4	2 15.5	−59.4	169.4	35
36	8 09.0	−59.2	169.4	7 10.0	−59.2	169.4	6 11.1	−59.3	169.5	5 12.1	−59.3	169.5	4 13.1	−59.4	169.5	3 14.1	−59.4	169.5	2 15.1	−59.4	169.5	1 16.1	−59.4	169.5	36
37	7 09.8	−59.2	169.6	6 10.8	−59.3	169.6	5 11.8	−59.3	169.6	4 12.8	−59.4	169.6	3 13.7	−59.3	169.6	2 14.7	−59.3	169.6	1 15.7	−59.4	169.6	0 16.7	−59.4	169.6	37
38	6 10.6	−59.3	169.7	5 11.5	−59.2	169.7	4 12.5	−59.3	169.8	3 13.4	−59.3	169.8	2 14.4	−59.3	169.8	1 15.4	−59.4	169.8	0 16.3	−59.4	169.8	0 42.7	+59.5	10.2	38
39	5 11.3	−59.2	169.9	4 12.3	−59.3	169.9	3 13.2	−59.3	169.9	2 14.1	−59.3	169.9	1 15.1	−59.4	169.9	0 16.0	−59.4	169.9	0 43.1	+59.4	10.1	1 42.2	+59.4	10.1	39
40	4 12.1	−59.2	170.1	3 13.0	−59.1	170.1	2 13.9	−59.3	170.1	1 14.8	−59.3	170.1	0 15.7	−59.3	170.1	0 43.4	+59.4	9.9	1 42.5	+59.4	9.9	2 41.6	+59.4	9.9	40
41	3 12.9	−59.2	170.2	2 13.8	−59.3	170.2	1 14.6	−59.3	170.2	0 15.5	−59.3	170.2	0 43.6	+59.4	9.8	1 42.8	+59.3	9.8	2 41.9	+59.4	9.8	3 41.0	+59.4	9.8	41
42	2 13.7	−59.3	170.4	1 14.5	−59.3	170.4	0 15.3	−59.2	170.4	0 43.8	+59.3	9.6	1 43.0	+59.3	9.6	2 42.1	+59.4	9.6	3 41.3	+59.4	9.6	4 40.4	+59.4	9.7	42
43	1 14.4	−59.2	170.5	0 15.2	−59.2	170.5	0 43.9	+59.3	9.5	1 43.1	+59.3	9.5	2 42.3	+59.4	9.5	3 41.5	+59.4	9.5	4 40.7	+59.4	9.5	5 39.8	+59.5	9.5	43
44	0 15.2	−59.3	170.7	0 44.0	+59.3	9.3	1 43.2	+59.3	9.3	2 42.4	+59.4	9.3	3 41.7	+59.3	9.3	4 40.9	+59.3	9.3	5 40.1	+59.4	9.4	6 39.3	+59.4	9.4	44
45	0 44.1	+59.2	9.2	1 43.3	+59.3	9.2	2 42.5	+59.3	9.2	3 41.8	+59.3	9.2	4 41.0	+59.3	9.2	5 40.2	+59.3	9.2	6 39.4	+59.4	9.2	7 38.7	+59.4	9.2	45
46	1 43.3	+59.2	9.0	2 42.6	+59.2	9.0	3 41.8	+59.3	9.0	4 41.1	+59.3	9.0	5 40.3	+59.3	9.0	6 39.6	+59.3	9.1	7 38.8	+59.4	9.1	8 38.1	+59.4	9.1	46
47	2 42.5	+59.3	8.8	3 41.8	+59.3	8.8	4 41.1	+59.3	8.9	5 40.4	+59.3	8.9	6 39.7	+59.3	8.9	7 38.9	+59.4	8.9	8 38.2	+59.4	8.9	9 37.5	+59.4	9.0	47
48	3 41.8	+59.2	8.7	4 41.1	+59.2	8.7	5 40.4	+59.3	8.7	6 39.7	+59.3	8.7	7 39.0	+59.3	8.7	8 38.3	+59.4	8.8	9 37.6	+59.4	8.8	10 36.9	+59.4	8.8	48
49	4 41.0	+59.2	8.5	5 40.3	+59.3	8.5	6 39.7	+59.2	8.5	7 39.0	+59.3	8.6	8 38.3	+59.4	8.6	9 37.7	+59.3	8.6	10 37.0	+59.3	8.6	11 36.3	+59.4	8.7	49
50	5 40.2	+59.2	8.4	6 39.6	+59.2	8.4	7 38.9	+59.3	8.4	8 38.3	+59.3	8.4	9 37.7	+59.3	8.4	10 37.0	+59.3	8.5	11 36.3	+59.4	8.5	12 35.7	+59.4	8.5	50
51	6 39.4	+59.3	8.2	7 38.8	+59.3	8.2	8 38.2	+59.3	8.2	9 37.6	+59.3	8.3	10 37.0	+59.3	8.3	11 36.3	+59.4	8.3	12 35.7	+59.4	8.3	13 35.1	+59.4	8.4	51
52	7 38.7	+59.2	8.0	8 38.1	+59.2	8.1	9 37.5	+59.3	8.1	10 36.9	+59.3	8.1	11 36.3	+59.3	8.1	12 35.7	+59.3	8.2	13 35.1	+59.3	8.2	14 34.5	+59.3	8.2	52
53	8 37.9	+59.2	7.9	9 37.3	+59.2	7.9	10 36.8	+59.2	7.9	11 36.2	+59.3	7.9	12 35.6	+59.3	8.0	13 35.0	+59.4	8.0	14 34.4	+59.3	8.0	15 33.8	+59.4	8.1	53
54	9 37.1	+59.2	7.7	10 36.5	+59.2	7.7	11 36.0	+59.3	7.8	12 35.5	+59.2	7.8	13 34.9	+59.3	7.8	14 34.4	+59.3	7.9	15 33.8	+59.4	7.9	16 33.2	+59.3	7.9	54
55	10 36.3	+59.2	7.5	11 35.8	+59.2	7.6	12 35.3	+59.2	7.6	13 34.7	+59.3	7.6	14 34.2	+59.3	7.7	15 33.7	+59.3	7.7	16 33.1	+59.4	7.7	17 32.6	+59.3	7.8	55
56	11 35.5	+59.2	7.4	12 35.0	+59.3	7.4	13 34.5	+59.2	7.4	14 34.0	+59.3	7.5	15 33.5	+59.3	7.5	16 33.0	+59.3	7.5	17 32.5	+59.3	7.6	18 31.9	+59.4	7.6	56
57	12 34.7	+59.2	7.2	13 34.3	+59.2	7.2	14 33.8	+59.2	7.3	15 33.3	+59.2	7.3	16 32.8	+59.3	7.3	17 32.3	+59.4	7.4	18 31.8	+59.3	7.4	19 31.3	+59.3	7.5	57
58	13 33.9	+59.2	7.0	14 33.5	+59.2	7.1	15 33.0	+59.2	7.1	16 32.5	+59.3	7.1	17 32.1	+59.3	7.2	18 31.6	+59.3	7.2	19 31.1	+59.3	7.3	20 30.6	+59.4	7.3	58
59	14 33.1	+59.2	6.9	15 32.7	+59.2	6.9	16 32.2	+59.3	6.9	17 31.8	+59.2	7.0	18 31.4	+59.2	7.0	19 30.9	+59.3	7.1	20 30.4	+59.3	7.1	21 30.0	+59.3	7.2	59
60	15 32.3	+59.2	6.7	16 31.9	+59.2	6.7	17 31.5	+59.2	6.8	18 31.0	+59.3	6.8	19 30.6	+59.3	6.9	20 30.2	+59.2	6.9	21 29.7	+59.3	6.9	22 29.3	+59.3	7.0	60
61	16 31.5	+59.1	6.5	17 31.1	+59.2	6.6	18 30.7	+59.2	6.6	19 30.3	+59.2	6.6	20 29.9	+59.2	6.7	21 29.5	+59.3	6.7	22 29.0	+59.3	6.8	23 28.6	+59.3	6.8	61
62	17 30.6	+59.2	6.4	18 30.3	+59.1	6.4	19 29.9	+59.2	6.4	20 29.5	+59.2	6.5	21 29.1	+59.3	6.5	22 28.7	+59.3	6.5	23 28.3	+59.3	6.6	24 27.9	+59.3	6.7	62
63	18 29.8	+59.1	6.2	19 29.4	+59.2	6.2	20 29.1	+59.2	6.3	21 28.7	+59.2	6.3	22 28.4	+59.2	6.3	23 28.0	+59.2	6.4	24 27.6	+59.3	6.4	25 27.2	+59.3	6.5	63
64	19 28.9	+59.2	6.0	20 28.6	+59.2	6.0	21 28.3	+59.1	6.1	22 27.9	+59.2	6.1	23 27.6	+59.2	6.2	24 27.2	+59.3	6.2	25 26.9	+59.3	6.3	26 26.5	+59.3	6.3	64
65	20 28.1	+59.1	5.8	21 27.8	+59.1	5.9	22 27.4	+59.2	5.9	23 27.1	+59.2	5.9	24 26.8	+59.2	6.0	25 26.5	+59.2	6.0	26 26.1	+59.3	6.1	27 25.8	+59.2	6.1	65
66	21 27.2	+59.1	5.6	22 26.9	+59.1	5.7	23 26.6	+59.1	5.7	24 26.3	+59.2	5.8	25 26.0	+59.2	5.8	26 25.7	+59.2	5.9	27 25.4	+59.2	5.9	28 25.0	+59.3	6.0	66
67	22 26.3	+59.1	5.5	23 26.0	+59.1	5.5	24 25.7	+59.2	5.5	25 25.5	+59.1	5.6	26 25.2	+59.1	5.6	27 24.9	+59.2	5.7	28 24.6	+59.2	5.7	29 24.3	+59.2	5.8	67
68	23 25.4	+59.1	5.3	24 25.1	+59.1	5.3	25 24.9	+59.1	5.4	26 24.6	+59.1	5.4	27 24.3	+59.2	5.4	28 24.1	+59.1	5.5	29 23.8	+59.2	5.6	30 23.5	+59.2	5.6	68
69	24 24.5	+59.0	5.1	25 24.2	+59.1	5.1	26 24.0	+59.1	5.2	27 23.8	+59.1	5.2	28 23.5	+59.1	5.3	29 23.2	+59.2	5.3	30 23.0	+59.2	5.4	31 22.7	+59.2	5.4	69
70	25 23.5	+59.1	4.9	26 23.3	+59.1	4.9	27 23.1	+59.1	5.0	28 22.9	+59.1	5.0	29 22.6	+59.2	5.1	30 22.4	+59.1	5.1	31 22.2	+59.1	5.2	32 21.9	+59.2	5.2	70
71	26 22.6	+59.0	4.7	27 22.4	+59.1	4.7	28 22.2	+59.1	4.8	29 22.0	+59.1	4.8	30 21.8	+59.1	4.9	31 21.6	+59.1	4.9	32 21.3	+59.2	5.0	33 21.1	+59.2	5.0	71
72	27 21.6	+59.1	4.5	28 21.5	+59.0	4.5	29 21.3	+59.0	4.6	30 21.1	+59.0	4.6	31 20.9	+59.1	4.7	32 20.7	+59.1	4.7	33 20.5	+59.1	4.8	34 20.3	+59.1	4.8	72
73	28 20.7	+59.0	4.3	29 20.5	+59.0	4.3	30 20.3	+59.1	4.4	31 20.1	+59.1	4.4	32 20.0	+59.0	4.5	33 19.8	+59.1	4.5	34 19.6	+59.1	4.6	35 19.4	+59.1	4.6	73
74	29 19.7	+58.9	4.1	30 19.5	+59.0	4.1	31 19.4	+59.0	4.2	32 19.2	+59.0	4.2	33 19.0	+59.1	4.3	34 18.9	+59.0	4.3	35 18.7	+59.1	4.4	36 18.5	+59.1	4.4	74
75	30 18.6	+59.0	3.9	31 18.5	+59.0	3.9	32 18.4	+59.0	3.9	33 18.2	+59.0	4.0	34 18.1	+59.0	4.0	35 17.9	+59.1	4.1	36 17.8	+59.0	4.1	37 17.6	+59.1	4.2	75
76	31 17.6	+59.0	3.7	32 17.5	+58.9	3.7	33 17.4	+58.9	3.7	34 17.2	+59.0	3.8	35 17.1	+59.0	3.8	36 17.0	+59.0	3.9	37 16.8	+59.1	3.9	38 16.7	+59.0	4.0	76
77	32 16.6	+58.9	3.4	33 16.4	+59.0	3.5	34 16.3	+59.0	3.5	35 16.2	+59.0	3.6	36 16.1	+59.0	3.6	37 16.0	+59.0	3.6	38 15.9	+59.0	3.7	39 15.7	+59.0	3.7	77
78	33 15.5	+58.9	3.2	34 15.4	+58.9	3.2	35 15.3	+58.9	3.3	36 15.2	+58.9	3.3	37 15.1	+58.9	3.4	38 15.0	+58.9	3.4	39 14.9	+58.9	3.5	40 14.7	+59.0	3.5	78
79	34 14.4	+58.8	3.0	35 14.3	+58.9	3.0	36 14.2	+58.9	3.1	37 14.1	+58.9	3.1	38 14.0	+58.9	3.1	39 13.9	+59.0	3.2	40 13.8	+58.9	3.2	41 13.7	+59.0	3.3	79
80	35 13.2	+58.9	2.7	36 13.2	+58.8	2.8	37 13.1	+58.8	2.8	38 13.0	+58.9	2.8	39 12.9	+58.9	2.9	40 12.9	+58.8	2.9	41 12.8	+58.9	3.0	42 12.7	+58.9	3.0	80
81	36 12.1	+58.8	2.5	37 12.0	+58.8	2.5	38 11.9	+58.9	2.6	39 11.9	+58.8	2.6	40 11.8	+58.9	2.6	41 11.8	+58.8	2.7	42 11.7	+58.9	2.7	43 11.6	+58.9	2.8	81
82	37 10.9	+58.7	2.3	38 10.8	+58.8	2.3	39 10.8	+58.8	2.3	40 10.7	+58.8	2.3	41 10.7	+58.8	2.4	42 10.6	+58.8	2.4	43 10.6	+58.8	2.5	44 10.5	+58.9	2.5	82
83	38 09.6	+58.7	2.0	39 09.6	+58.7	2.0	40 09.6	+58.7	2.1	41 09.5	+58.8	2.1	42 09.5	+58.8	2.1	43 09.4	+58.8	2.2	44 09.4	+58.8	2.2	45 09.4	+58.8	2.2	83
84	39 08.4	+58.7	1.7	40 08.4	+58.7	1.8	41 08.3	+58.8	1.8	42 08.3	+58.7	1.8	43 08.3	+58.7	1.8	44 08.2	+58.8	1.9	45 08.2	+58.8	1.9	46 08.2	+58.7	1.9	84
85	40 07.1	+58.7	1.5	41 07.1	+58.6	1.5	42 07.1	+58.6	1.5	43 07.0	+58.7	1.5	44 07.0	+58.7	1.6	45 07.0	+58.7	1.6	46 07.0	+58.7	1.6	47 06.9	+58.7	1.7	85
86	41 05.8	+58.6	1.2	42 05.7	+58.7	1.2	43 05.7	+58.7	1.2	44 05.7	+58.7	1.3	45 05.7	+58.7	1.3	46 05.7	+58.6	1.3	47 05.7	+58.6	1.3	48 05.7	+58.6	1.3	86
87	42 04.4	+58.6	0.9	43 04.4	+58.6	0.9	44 04.4	+58.6	0.9	45 04.4	+58.5	1.0	46 04.4	+58.5	1.0	47 04.3	+58.7	1.0	48 04.3	+58.6	1.0	49 04.3	+58.6	1.0	87
88	43 03.0	+58.5	0.6	44 03.0	+58.5	0.6	45 03.0	+58.5	0.6	46 03.0	+58.5	0.6	47 03.0	+58.5	0.7	48 03.0	+58.5	0.7	49 03.0	+58.5	0.7	50 02.9	+58.6	0.7	88
89	44 01.5	+58.5	0.3	45 01.5	+58.5	0.3	46 01.5	+58.5	0.3	47 01.5	+58.5	0.3	48 01.5	+58.5	0.3	49 01.5	+58.5	0.3	50 01.5	+58.5	0.4	51 01.5	+58.5	0.4	89
90	45 00.0	+58.4	0.0	46 00.0	+58.4	0.0	47 00.0	+58.4	0.0	48 00.0	+58.4	0.0	49 00.0	+58.4	0.0	50 00.0	+58.4	0.0	51 00.0	+58.4	0.0	52 00.0	+58.4	0.0	90

| | **45°** | **46°** | **47°** | **48°** | **49°** | **50°** | **51°** | **52°** |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z
LATITUDE SAME NAME AS DECLINATION   L.H.A. 167°, 193°

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	Hc (45°)	d	Z	Hc (46°)	d	Z	Hc (47°)	d	Z	Hc (48°)	d	Z	Hc (49°)	d	Z	Hc (50°)	d	Z	Hc (51°)	d	Z	Hc (52°)	d	Z	Dec.
0	43 19.3	+58.3	160.6	42 22.7	+58.4	160.9	41 26.0	+58.5	161.2	40 29.1	+58.6	161.5	39 32.2	+58.7	161.7	38 35.2	+58.8	162.0	37 38.1	+58.9	162.2	36 40.9	+59.0	162.4	0
1	44 17.6	+58.3	160.2	43 21.1	+58.4	160.6	42 24.5	+58.4	160.9	41 27.7	+58.6	161.2	40 30.9	+58.7	161.4	39 34.0	+58.7	161.7	38 37.0	+58.8	162.0	37 39.9	+58.9	162.2	1
2	45 15.9	+58.1	159.9	44 19.5	+58.2	160.2	43 22.9	+58.4	160.6	42 26.3	+58.5	160.9	41 29.6	+58.6	161.2	40 32.7	+58.7	161.4	39 35.8	+58.8	161.7	38 38.8	+58.9	162.0	2
3	46 14.0	+58.1	159.6	45 17.7	+58.3	160.0	44 21.3	+58.4	160.3	43 24.8	+58.5	160.6	42 28.2	+58.5	160.9	41 31.4	+58.7	161.2	40 34.6	+58.8	161.5	39 37.7	+58.8	161.7	3
4	47 12.1	+58.1	159.2	46 16.0	+58.1	159.6	45 19.7	+58.3	159.9	44 23.3	+58.4	160.3	43 26.7	+58.5	160.6	42 30.1	+58.6	160.9	41 33.4	+58.7	161.2	40 36.5	+58.8	161.5	4
5	48 10.2	+57.9	158.8	47 14.1	+58.1	159.2	46 18.0	+58.2	159.6	45 21.7	+58.3	159.9	44 25.3	+58.4	160.3	43 28.7	+58.6	160.6	42 32.1	+58.7	160.9	41 35.3	+58.8	161.2	5
6	49 08.1	+57.9	158.4	48 12.2	+58.1	158.8	47 16.2	+58.2	159.2	46 20.0	+58.3	159.6	45 23.7	+58.5	160.0	44 27.3	+58.5	160.3	43 30.8	+58.6	160.6	42 34.1	+58.7	160.9	6
7	50 06.0	+57.8	157.9	49 10.3	+57.9	158.5	48 14.4	+58.1	158.9	47 18.3	+58.3	159.3	46 22.2	+58.3	159.6	45 25.8	+58.5	160.0	44 29.4	+58.6	160.3	43 32.8	+58.7	160.6	7
8	51 03.8	+57.7	157.6	50 08.2	+57.9	158.1	49 12.5	+58.0	158.5	48 16.6	+58.1	158.9	47 20.5	+58.3	159.3	46 24.3	+58.5	159.7	45 28.0	+58.5	160.0	44 31.5	+58.7	160.4	8
9	52 01.5	+57.5	157.2	51 06.1	+57.7	157.6	50 10.5	+57.9	158.1	49 14.7	+58.1	158.5	48 18.8	+58.3	158.9	47 22.8	+58.3	159.3	46 26.5	+58.5	159.7	45 30.2	+58.6	160.1	9
10	52 59.0	+57.5	156.7	52 03.8	+57.7	157.2	51 08.4	+57.9	157.7	50 12.8	+58.0	158.1	49 17.1	+58.1	158.6	48 21.1	+58.3	159.0	47 25.0	+58.5	159.4	46 28.8	+58.6	159.8	10
11	53 56.5	+57.4	156.2	53 01.5	+57.5	156.7	52 06.3	+57.7	157.3	51 10.8	+58.0	157.7	50 15.2	+58.1	158.2	49 19.4	+58.2	158.6	48 23.5	+58.3	159.0	47 27.4	+58.5	159.4	11
12	54 53.9	+57.2	155.7	53 59.0	+57.5	156.3	53 04.0	+57.6	156.8	52 08.8	+57.8	157.3	51 13.3	+58.0	157.8	50 17.6	+58.2	158.3	49 21.8	+58.3	158.7	48 25.9	+58.4	159.1	12
13	55 51.1	+57.0	155.2	54 56.5	+57.3	155.8	54 01.6	+57.6	156.3	53 06.6	+57.7	156.9	52 11.3	+57.9	157.4	51 15.8	+58.1	157.9	50 20.1	+58.3	158.3	49 24.3	+58.4	158.8	13
14	56 48.1	+57.0	154.6	55 53.8	+57.2	155.3	54 59.2	+57.4	155.9	54 04.3	+57.6	156.4	53 09.2	+57.8	157.0	52 13.9	+58.0	157.5	51 18.4	+58.1	157.9	50 22.7	+58.3	158.4	14
15	57 45.1	+56.7	154.0	56 51.0	+57.0	154.7	55 56.6	+57.2	155.3	55 01.9	+57.5	155.9	54 07.0	+57.7	156.5	53 11.9	+57.9	157.0	52 16.5	+58.1	157.5	51 21.0	+58.2	158.0	15
16	58 41.8	+56.6	153.4	57 48.0	+56.8	154.1	56 53.8	+57.2	154.8	55 59.4	+57.4	155.4	55 04.7	+57.6	156.0	54 09.8	+57.8	156.6	53 14.6	+58.0	157.1	52 19.2	+58.2	157.6	16
17	59 38.4	+56.3	152.8	58 44.8	+56.7	153.5	57 51.0	+56.9	154.2	56 56.8	+57.2	154.9	56 02.3	+57.5	155.5	55 07.6	+57.6	156.1	54 12.6	+57.9	156.7	53 17.4	+58.0	157.2	17
18	60 34.7	+56.1	152.1	59 41.5	+56.5	152.9	58 47.9	+56.8	153.6	57 54.0	+57.1	154.3	56 59.8	+57.3	155.0	56 05.2	+57.6	155.6	55 10.5	+57.7	156.2	54 15.4	+58.0	156.8	18
19	61 30.8	+55.9	151.3	60 38.0	+56.2	152.2	59 44.7	+56.6	153.0	58 51.1	+56.9	153.8	57 57.1	+57.2	154.5	57 02.8	+57.4	155.1	56 08.2	+57.7	155.8	55 13.4	+57.9	156.4	19
20	62 26.7	+55.6	150.6	61 34.2	+56.0	151.5	60 41.3	+56.4	152.3	59 48.0	+56.7	153.1	58 54.3	+57.0	153.9	58 00.2	+57.3	154.6	57 05.9	+57.5	155.3	56 11.3	+57.7	155.9	20
21	63 22.3	+55.3	149.7	62 30.2	+55.8	150.7	61 37.7	+56.1	151.6	60 44.7	+56.5	152.5	59 51.3	+56.8	153.3	58 57.5	+57.1	154.0	58 03.4	+57.4	154.7	57 09.0	+57.6	155.4	21
22	64 17.6	+55.0	148.9	63 26.0	+55.4	149.9	62 33.8	+55.9	150.9	61 41.2	+56.3	151.8	60 48.1	+56.6	152.6	59 54.6	+57.0	153.4	59 00.8	+57.2	154.2	58 06.6	+57.5	154.9	22
23	65 12.6	+54.6	147.9	64 21.4	+55.2	149.0	63 29.7	+55.6	150.1	62 37.5	+56.0	151.0	61 44.7	+56.5	151.9	60 51.6	+56.7	152.8	59 58.0	+57.1	153.6	59 04.1	+57.4	154.3	23
24	66 07.2	+54.1	146.9	65 16.6	+54.7	148.1	64 25.3	+55.3	149.2	63 33.5	+55.7	150.2	62 41.2	+56.1	151.2	61 48.3	+56.6	152.1	60 55.1	+56.9	153.0	60 01.5	+57.2	153.7	24
25	67 01.3	+53.7	145.8	66 11.3	+54.4	147.1	65 20.6	+54.9	148.3	64 29.2	+55.5	149.4	63 37.3	+55.9	150.4	62 44.9	+56.3	151.4	61 52.0	+56.7	152.3	60 58.7	+57.0	153.1	25
26	67 55.0	+53.2	144.7	67 05.7	+53.8	146.0	66 15.5	+54.5	147.3	65 24.7	+55.1	148.5	64 33.2	+55.6	149.6	63 41.2	+56.1	150.6	62 48.7	+56.4	151.6	61 55.7	+56.8	152.5	26
27	68 48.2	+52.5	143.4	67 59.5	+53.4	144.9	67 10.0	+54.1	146.3	66 19.8	+54.7	147.5	65 28.8	+55.3	148.7	64 37.3	+55.7	149.8	63 45.1	+56.2	150.8	62 52.5	+56.6	151.8	27
28	69 40.7	+51.9	142.0	68 52.9	+52.8	143.6	68 04.1	+53.6	145.1	67 14.5	+54.3	146.5	66 24.1	+54.9	147.8	65 33.0	+55.5	148.9	64 41.3	+56.0	150.0	63 49.1	+56.3	151.0	28
29	70 32.6	+51.0	140.6	69 45.7	+52.1	142.3	68 57.7	+53.0	143.9	68 08.8	+53.7	145.4	67 19.0	+54.4	146.7	66 28.5	+55.0	148.0	65 37.3	+55.6	149.2	64 45.4	+56.1	150.3	29
30	71 23.6	+50.2	139.0	70 37.8	+51.3	140.8	69 50.7	+52.3	142.6	69 02.5	+53.2	144.1	68 13.4	+54.0	145.6	67 23.5	+54.7	147.0	66 32.9	+55.2	148.2	65 41.5	+55.8	149.4	30
31	72 13.8	+49.2	137.2	71 29.1	+50.4	139.2	70 43.0	+51.4	141.1	69 55.7	+52.6	142.8	69 07.4	+53.5	144.4	68 18.2	+54.2	145.9	67 28.1	+54.9	147.2	66 37.3	+55.4	148.5	31
32	73 03.0	+47.9	135.3	72 19.5	+49.5	137.5	71 34.6	+50.7	139.5	70 48.3	+51.9	141.4	70 00.9	+52.8	143.1	69 12.4	+53.6	144.7	68 23.0	+54.4	146.2	67 32.7	+55.1	147.5	32
33	73 50.9	+46.6	133.2	73 09.0	+48.3	135.6	72 25.3	+49.7	137.8	71 40.2	+51.0	139.8	70 53.7	+52.1	141.7	70 06.0	+53.1	143.4	69 17.4	+53.9	145.0	68 27.8	+54.6	146.4	33
34	74 37.5	+45.0	130.8	73 57.3	+46.9	133.5	73 15.0	+48.6	135.9	72 31.2	+50.0	138.1	71 45.8	+51.3	140.1	70 59.1	+52.4	142.0	70 11.3	+53.3	143.7	69 22.4	+54.1	145.3	34
35	75 22.5	+43.2•	128.3	74 44.2	+45.3	131.2	74 03.6	+47.3	133.8	73 21.2	+48.9	136.2	72 37.1	+50.3	138.4	71 51.5	+51.5	140.5	71 04.6	+52.6	142.3	70 16.5	+53.6	144.0	35
36	76 05.7	+41.0•	125.5	75 29.5	+43.6	128.6	74 50.9	+45.7	131.5	74 10.1	+47.6	134.2	73 27.4	+49.2	136.6	72 43.0	+50.7	138.8	71 57.2	+51.8	140.8	71 10.1	+52.8	142.7	36
37	76 46.7	+38.5•	122.4	76 13.1	+41.4•	125.8	75 36.6	+44.0•	129.0	74 57.7	+46.1	131.9	74 16.6	+48.0	134.5	73 33.7	+49.5	136.9	72 49.0	+51.0	139.2	72 02.9	+52.2	141.2	37
38	77 25.2	+35.6•	118.9	76 54.5	+38.9•	122.7	76 20.6	+41.8•	126.2	75 43.8	+44.3	129.3	75 04.6	+46.5	132.2	74 23.2	+48.3	134.9	73 40.0	+49.9	137.3	72 55.1	+51.2	139.5	38
39	78 00.8	+32.3•	115.1	77 33.4	+36.0•	119.2	77 02.4	+39.3•	123.0	76 28.1	+42.2•	126.5	75 51.1	+44.7	129.7	75 11.5	+46.9	132.6	74 29.9	+48.6	135.3	73 46.3	+50.3	137.7	39
40	78 33.1	+28.4•	111.0	78 09.4	+32.7•	115.4	77 41.7	+36.5•	119.6	77 10.3	+39.8•	123.4	76 35.8	+42.6•	126.9	75 58.4	+45.1	130.1	75 18.5	+47.3	133.1	74 36.6	+49.0	135.7	40
41	79 01.5	+24.1•	106.4	78 42.1	+28.8•	111.3	78 18.2	+33.1•	115.8	77 50.1	+36.9•	120.0	77 18.4	+40.2•	123.8	76 43.5	+43.1•	127.3	76 05.8	+45.5	130.6	75 25.6	+47.6	133.4	41
42	79 25.6	+19.2•	101.5	79 10.9	+24.5•	106.7	78 51.3	+29.2•	111.6	78 27.0	+33.6•	116.1	77 58.6	+37.4•	120.3	77 26.6	+40.6•	124.2	76 51.3	+43.5•	127.8	76 13.2	+45.9	131.0	42
43	79 44.8	+13.8•	96.3	79 35.4	+19.5•	101.7	79 20.5	+24.8•	106.9	79 00.6	+29.6•	111.9	78 36.0	+34.0•	116.5	78 07.2	+37.8•	120.7	77 34.8	+41.1•	124.7	76 59.1	+44.0•	128.2	43
44	79 58.6	+8.2•	90.8	79 54.9	+14.1•	96.4	79 45.3	+19.8•	101.9	79 30.2	+25.2•	107.2	79 10.0	+30.1•	112.2	78 45.0	+34.5•	116.9	78 15.9	+38.3•	121.2	77 43.1	+41.6•	125.1	44
45	80 06.8	+2.2•	85.0	80 09.0	+8.2•	90.8	80 05.1	+14.4•	96.5	79 55.4	+20.2•	102.1	79 40.1	+25.6•	107.5	79 19.5	+30.5•	112.6	78 54.2	+34.9•	117.3	78 24.7	+38.7•	121.6	45
46	80 09.0	–3.9•	79.2	80 17.2	+2.3•	85.0	80 19.5	+8.4•	90.8	80 15.6	+14.5•	96.6	80 05.7	+20.5•	102.3	79 50.0	+26.1•	107.8	79 29.1	+31.0•	112.9	79 03.4	+35.5•	117.7	46
47	80 05.1	–9.7•	73.4	80 15.5	–3.9•	79.0	80 27.9	+2.2•	84.9	80 30.1	+8.3•	90.9	80 26.2	+14.8•	96.8	80 16.1	+20.8•	102.6	80 00.1	+25.5•	108.1	79 38.9	+31.5•	113.3	47
48	79 55.4	–15.3•	67.7	80 15.6	–9.9•	73.1	80 30.1	–3.9•	78.8	80 38.7	+2.3•	84.8	80 41.0	+8.7•	90.9	80 36.9	+15.1•	96.9	80 26.6	+21.2•	102.8	80 10.4	+26.9•	108.5	48
49	79 40.1	–20.6•	62.2	80 05.7	–15.7•	67.3	80 26.2	–10.1•	72.8	80 41.0	–4.1•	78.6	80 49.7	+2.3•	84.7	80 52.0	+8.8•	90.9	80 47.8	+15.4•	97.1	80 37.3	+21.5•	103.1	49
50	79 19.5	–25.3•	57.1	79 50.0	–20.9•	61.8	80 16.1	–16.0•	66.9	80 36.9	–10.3•	72.5	80 52.0	–4.2•	78.4	81 00.8	+2.4•	84.6	81 03.2	+9.0•	91.0	80 58.8	+15.7•	97.3	50
51	78 54.2	–29.5•	52.3	79 29.1	–25.7•	56.5	80 00.1	–21.2•	61.3	80 26.6	–16.2•	66.5	80 47.8	–10.5•	72.2	81 03.2	–4.4•	78.2	81 12.2	+2.3•	84.5	81 14.5	+9.1•	91.0	51
52	78 24.7	–33.2•	47.9	79 03.4	–29.9•	51.7	79 38.9	–26.1•	56.0	80 10.4	–21.7•	60.8	80 37.3	–16.6•	66.1	80 58.8	–10.7•	71.8	81 14.5	–4.5•	78.0	81 23.6	+2.4•	84.5	52
53	77 51.5	–36.9•	43.8	78 33.5	–33.6•	47.2	79 12.8	–30.0•	51.1	79 48.7	–26.5•	55.4	80 20.7	–22.0•	60.2	80 48.1	–16.9•	65.6	81 10.0	–11.0•	71.5	81 26.0	–4.6•	77.8	53
54	77 15.0	–39.2•	40.1	77 59.9	–36.9•	43.1	78 42.4	–34.1•	46.6	79 22.2	–30.8•	50.4	79 58.7	–27.0•	54.8	80 31.2	–22.5•	59.7	80 59.0	–17.3•	65.1	81 21.4	–11.4•	71.1	54
55	76 35.8	–41.7•	36.8	77 23.0	–39.6•	39.4	78 08.3	–37.3•	42.5	78 51.4	–34.6•	45.9	79 31.7	–31.3•	49.8	80 08.7	–27.5•	54.2	80 41.7	–22.9•	59.1	81 10.0	–17.7•	64.6	55
56	75 54.1	–43.7•	33.7	76 43.4	–42.1•	36.1	77 31.0	–40.1•	38.7	78 16.8	–37.7•	41.8	79 00.4	–35.0•	45.2	79 41.2	–31.8•	49.1	80 18.8	–28.0•	53.5	80 52.3	–23.4•	58.5	56
57	75 10.4	–45.4•	31.0	76 01.3	–44.0•	33.1	76 50.9	–42.4•	35.4	77 39.1	–40.6•	38.0	78 25.4	–38.3•	41.0	79 09.4	–35.5•	44.5	79 50.8	–32.3•	48.4	80 28.9	–28.4•	52.8	57
58	74 25.0	–47.0	28.5	75 17.3	–45.9	30.3	76 08.5	–44.4	32.4	76 58.5	–42.8•	34.7	77 47.1	–41.0•	37.3	78 33.9	–38.7•	40.3	79 18.5	–36.1•	43.7	80 00.5	–32.9•	47.6	58
59	73 38.0	–48.3	26.2	74 31.4	–47.2	27.8	75 24.1	–45.9•	29.6	76 15.7	–44.8	31.6	77 06.1	–43.2•	33.9	77 55.2	–41.5•	36.5	78 42.4	–39.2•	39.5	79 27.6	–36.2•	42.9	59
60	72 49.7	–49.5	24.2	73 44.1	–48.6	25.6	74 37.9	–47.7	27.2	75 30.9	–46.6	28.9	76 22.9	–45.3	30.9	77 13.7	–43.7•	33.2	78 03.2	–41.9•	35.8	78 51.0	–39.8•	38.7	60
61	72 00.2	–50.4	22.3	72 55.5	–49.7	23.5	73 50.2	–48.9	24.9	74 44.3	–48.0	26.5	75 37.6	–46.9	28.2	76 30.0	–45.7	30.2	77 21.3	–44.2•	32.4	78 11.2	–42.4•	35.0	61
62	71 09.8	–51.3	20.6	72 05.8	–50.7	21.7	73 01.3	–50.0	22.9	73 56.3	–49.3	24.2	74 50.7	–48.4	25.7	75 44.3	–47.3	27.5	76 37.1	–46.1	29.4	77 28.8	–44.6•	31.6	62
63	70 18.5	–52.0	19.0	71 15.1	–51.6	20.0	72 11.3	–51.0	21.0	73 07.0	–50.3	22.2	74 02.3	–49.5	23.5	74 57.0	–48.7	25.0	75 51.0	–47.7	26.7	76 44.2	–46.5	28.6	63
64	69 26.5	–52.8	17.6	70 23.5	–52.3	18.4	71 20.3	–51.8	19.4	72 16.7	–51.2	20.4	73 12.8	–50.7	21.5	74 08.3	–49.9	22.8	75 03.3	–49.1	24.3	75 57.7	–48.1	25.9	64
65	68 33.7	–53.3	16.2	69 31.2	–52.9	17.0	70 28.5	–52.5	17.8	71 25.5	–52.1	18.7	72 22.1	–51.5	19.7	73 18.4	–50.9	20.9	74 14.2	–50.2	22.1	75 09.6	–49.5	23.5	65
66	67 40.4	–53.8	15.0	68 38.3	–53.5	15.7	69 36.0	–53.2	16.4	70 33.4	–52.8	17.2	71 30.6	–52.3	18.1	72 27.5	–51.8	19.1	73 24.0	–51.2	20.1	74 20.1	–50.6	21.4	66
67	66 46.6	–54.3	13.9	67 44.8	–54.0	14.5	68 42.8	–53.7	15.1	69 40.6	–53.3	15.8	70 38.3	–53.0	16.6	71 35.7	–52.6	17.4	72 32.8	–52.2	18.4	73 29.5	–51.5	19.4	67
68	65 52.3	–54.7	12.8	66 50.8	–54.5	13.3	67 49.1	–54.2	13.9	68 47.3	–53.9	14.5	69 45.3	–53.6	15.2	70 43.1	–53.3	15.9	71 40.6	–52.8	16.8	72 38.0	–52.4	17.7	68
69	64 57.6	–55.0	11.8	65 56.3	–54.8	12.3	66 54.9	–54.6	12.8	67 53.4	–54.4	13.3	68 51.7	–54.1	13.9	69 49.8	–53.8	14.6	70 47.8	–53.5	15.3	71 45.6	–53.1	16.1	69
70	64 02.6	–55.4	10.9	65 01.5	–55.2	11.3	66 00.3	–55.1	11.7	66 59.0	–54.9	12.2	67 57.5	–54.6	12.7	68 56.0	–54.3	13.3	69 54.3	–54.0	13.9	70 52.5	–53.8	14.6	70
71	63 07.2	–55.7	10.0	64 06.3	–55.6	10.4	65 05.2	–55.3	10.8	66 04.1	–55.2	11.2	67 02.9	–55.0	11.7	68 01.7	–54.8	12.2	69 00.3	–54.6	12.7	69 58.7	–54.3	13.3	71
72	62 11.5	–55.9	9.2	63 10.7	–55.8	9.5	64 09.9	–55.7	9.9	65 08.9	–55.5	10.2	66 07.9	–55.3	10.6	67 06.9	–55.2	11.1	68 05.7	–55.0	11.6	69 04.4	–54.7	12.1	72
73	61 15.6	–56.2	8.5	62 14.9	–56.1	8.7	63 14.2	–56.0	9.0	64 13.4	–55.8	9.4	65 12.6	–55.7	9.7	66 11.7	–55.6	10.1	67 10.7	–55.4	10.5	68 09.7	–55.2	11.0	73
74	60 19.4	–56.4	7.7	61 18.8	–56.3	8.0	62 18.2	–56.2	8.2	63 17.6	–56.1	8.5	64 16.9	–56.0	8.8	65 16.1	–55.8	9.2	66 15.3	–55.7	9.5	67 14.5	–55.6	9.9	74
75	59 23.0	–56.6	7.1	60 22.5	–56.5	7.3	61 22.0	–56.4	7.5	62 21.5	–56.4	7.7	63 20.9	–56.2	8.0	64 20.3	–56.1	8.3	65 19.6	–56.0	8.6	66 19.0	–55.9	9.0	75
76	58 26.4	–56.8	6.4	59 26.0	–56.8	6.6	60 25.6	–56.7	6.8	61 25.1	–56.6	7.0	62 24.7	–56.5	7.3	63 24.2	–56.4	7.5	64 23.6	–56.3	7.8	65 23.1	–56.2	8.1	76
77	57 29.6	–57.0	5.8	58 29.2	–56.9	6.0	59 28.9	–56.8	6.2	60 28.6	–56.8	6.3	61 28.2	–56.7	6.5	62 27.8	–56.6	6.8	63 27.3	–56.5	7.0	64 26.9	–56.5	7.2	77
78	56 32.6	–57.1	5.2	57 32.3	–57.0	5.4	58 32.1	–57.0	5.5	59 31.8	–57.0	5.7	60 31.5	–56.9	5.8	61 31.2	–56.8	6.1	62 30.8	–56.7	6.3	63 30.4	–56.9	6.5	78
79	55 35.5	–57.3	4.7	56 35.3	–57.2	4.8	57 35.1	–57.2	4.9	58 34.8	–57.1	5.1	59 34.6	–57.1	5.2	60 34.3	–57.0	5.4	61 34.1	–57.0	5.6	62 33.8	–56.9	5.7	79
80	54 38.2	–57.3	4.2	55 38.1	–57.4	4.3	56 37.9	–57.3	4.4	57 37.7	–57.2	4.5	58 37.5	–57.2	4.6	59 37.3	–57.1	4.8	60 37.1	–57.1	4.9	61 36.9	–57.1	5.1	80
81	53 40.9	–57.5	3.7	54 40.7	–57.4	3.8	55 40.6	–57.4	3.9	56 40.5	–57.4	3.9	57 40.3	–57.4	4.1	58 40.2	–57.4	4.2	59 40.0	–57.3	4.3	60 39.8	–57.3	4.4	81
82	52 43.4	–57.7	3.2	53 43.3	–57.6	3.3	54 43.2	–57.6	3.3	55 43.1	–57.6	3.4	56 42.9	–57.5	3.5	57 42.8	–57.4	3.6	58 42.7	–57.4	3.7	59 42.6	–57.4	3.8	82
83	51 45.7	–57.7	2.7	52 45.7	–57.7	2.8	53 45.6	–57.7	2.9	54 45.5	–57.6	2.9	55 45.4	–57.6	3.0	56 45.4	–57.6	3.1	57 45.3	–57.6	3.2	58 45.2	–57.6	3.3	83
84	50 48.0	–57.8	2.3	51 48.0	–57.7	2.3	52 47.9	–57.7	2.4	53 47.9	–57.7	2.5	54 47.9	–57.7	2.5	55 47.8	–57.8	2.6	56 47.7	–57.7	2.6	57 47.6	–57.6	2.7	84
85	49 50.2	–57.9	1.9	50 50.2	–57.9	1.9	51 50.2	–57.8	2.0	52 50.1	–57.8	2.0	53 50.1	–57.8	2.0	54 50.0	–57.8	2.1	55 50.0	–57.8	2.2	56 50.0	–57.8	2.2	85
86	48 52.3	–57.9	1.5	49 52.3	–58.0	1.5	50 52.3	–58.0	1.5	51 52.3	–58.0	1.6	52 52.2	–57.9	1.6	53 52.2	–57.9	1.6	54 52.2	–57.9	1.7	55 52.2	–57.9	1.7	86
87	47 54.4	–58.1	1.1	48 54.3	–58.0	1.1	49 54.3	–58.1	1.1	50 54.3	–58.0	1.2	51 54.3	–58.0	1.2	52 54.3	–58.0	1.2	53 54.3	–58.0	1.2	54 54.3	–58.0	1.3	87
88	46 56.3	–58.1	0.7	47 56.3	–58.1	0.7	48 56.3	–58.1	0.7	49 56.3	–58.1	0.8	50 56.3	–58.1	0.8	51 56.3	–58.1	0.8	52 56.3	–58.1	0.8	53 56.3	–58.1	0.8	88
89	45 58.2	–58.2	0.3	46 58.2	–58.2	0.4	47 58.2	–58.2	0.4	48 58.2	–58.2	0.4	49 58.2	–58.2	0.4	50 58.2	–58.2	0.4	51 58.2	–58.2	0.4	52 58.2	–58.3	0.4	89
90	45 00.0	–58.2	0.0	46 00.0	–58.2	0.0	47 00.0	–58.2	0.0	48 00.0	–58.3	0.0	49 00.0	–58.3	0.0	50 00.0	–58.3	0.0	51 00.0	–58.3	0.0	52 00.0	–58.3	0.0	90

Dec.	45° Hc d Z	46° Hc d Z	47° Hc d Z	48° Hc d Z	49° Hc d Z	50° Hc d Z	51° Hc d Z	52° Hc d Z	Dec.
0	43 19.3 −58.3 160.6	42 22.7 −58.4 160.9	41 26.0 −58.6 161.2	40 29.1 −58.6 161.5	39 32.2 −58.7 161.7	38 35.2 −58.8 162.0	37 38.1 −58.9 162.2	36 40.9 −58.9 162.4	0
1	42 21.0 −58.4 160.9	41 24.3 −58.5 161.2	40 27.4 −58.6 161.5	39 30.5 −58.7 161.7	38 33.5 −58.8 162.0	37 36.4 −58.9 162.2	36 39.2 −58.9 162.5	35 42.0 −59.0 162.7	1
2	41 22.6 −58.4 161.2	40 25.8 −58.6 161.5	39 28.8 −58.6 161.7	38 31.8 −58.7 162.0	37 34.7 −58.8 162.3	36 37.5 −58.9 162.5	35 40.3 −59.0 162.7	34 43.0 −59.1 162.9	2
3	40 24.2 −58.5 161.5	39 27.2 −58.6 161.8	38 30.2 −58.7 162.0	37 33.1 −58.8 162.3	36 35.9 −58.8 162.5	35 38.6 −58.9 162.7	34 41.3 −59.0 162.9	33 43.9 −59.0 163.1	3
4	39 25.7 −58.6 161.8	38 28.6 −58.6 162.0	37 31.5 −58.7 162.3	36 34.3 −58.8 162.5	35 37.1 −58.9 162.7	34 39.7 −58.9 162.9	33 42.3 −59.0 163.1	32 44.9 −59.1 163.3	4
5	38 27.1 −58.5 162.1	37 30.0 −58.6 162.3	36 32.8 −58.7 162.5	35 35.5 −58.8 162.8	34 38.2 −58.9 163.0	33 40.8 −58.9 163.2	32 43.3 −59.0 163.4	31 45.8 −59.1 163.5	5
6	37 28.6 −58.6 162.4	36 31.4 −58.7 162.6	35 34.1 −58.8 162.8	34 36.7 −58.8 163.0	33 39.3 −58.9 163.2	32 41.9 −59.0 163.4	31 44.3 −59.0 163.6	30 46.8 −59.1 163.7	6
7	36 30.0 −58.7 162.6	35 32.7 −58.8 162.8	34 35.3 −58.8 163.0	33 37.9 −58.9 163.2	32 40.4 −58.9 163.4	31 42.9 −59.0 163.6	30 45.3 −59.1 163.8	29 47.7 −59.2 163.9	7
8	35 31.3 −58.7 162.9	34 33.9 −58.7 163.1	33 36.5 −58.8 163.3	32 39.0 −58.9 163.4	31 41.5 −59.0 163.6	30 43.9 −59.0 163.8	29 46.2 −59.1 164.0	28 48.5 −59.1 164.1	8
9	34 32.6 −58.7 163.1	33 35.2 −58.8 163.3	32 37.7 −58.9 163.5	31 40.1 −58.9 163.7	30 42.5 −59.0 163.9	29 44.9 −59.1 164.0	28 47.1 −59.0 164.2	27 49.4 −59.2 164.3	9
10	33 33.9 −58.7 163.4	32 36.4 −58.8 163.6	31 38.8 −58.8 163.7	30 41.2 −58.9 163.9	29 43.5 −59.0 164.1	28 45.8 −59.0 164.2	27 48.1 −59.2 164.4	26 50.2 −59.1 164.5	10
11	32 35.2 −58.8 163.6	31 37.6 −58.8 163.8	30 40.0 −59.0 164.0	29 42.3 −59.0 164.1	28 44.5 −59.0 164.3	27 46.8 −59.1 164.4	26 48.9 −59.1 164.6	25 51.1 −59.2 164.7	11
12	31 36.4 −58.8 163.9	30 38.8 −59.0 164.0	29 41.1 −59.0 164.2	28 43.3 −59.0 164.3	27 45.5 −59.0 164.5	26 47.7 −59.1 164.6	25 49.8 −59.1 164.8	24 51.9 −59.2 164.9	12
13	30 37.6 −58.8 164.1	29 39.9 −58.9 164.3	28 42.1 −58.9 164.4	27 44.3 −59.0 164.6	26 46.5 −59.1 164.7	25 48.6 −59.1 164.8	24 50.7 −59.2 164.9	23 52.7 −59.2 165.1	13
14	29 38.8 −58.8 164.3	28 41.0 −58.9 164.5	27 43.2 −59.0 164.6	26 45.3 −59.0 164.8	25 47.4 −59.0 164.9	24 49.5 −59.1 165.0	23 51.5 −59.2 165.1	22 53.5 −59.2 165.2	14
15	28 40.0 −58.9 164.6	27 42.1 −58.9 164.7	26 44.2 −58.9 164.8	25 46.3 −59.0 165.0	24 48.4 −59.1 165.1	23 50.4 −59.2 165.2	22 52.3 −59.1 165.3	21 54.3 −59.2 165.4	15
16	27 41.1 −58.8 164.8	26 43.2 −58.9 164.9	25 45.3 −59.0 165.0	24 47.3 −59.1 165.2	23 49.3 −59.1 165.3	22 51.2 −59.1 165.4	21 53.2 −59.3 165.5	20 55.1 −59.3 165.6	16
17	26 42.3 −58.9 165.0	25 44.3 −58.9 165.1	24 46.3 −59.0 165.2	23 48.2 −59.0 165.4	22 50.2 −59.1 165.5	21 52.1 −59.2 165.6	20 54.0 −59.2 165.7	19 55.8 −59.3 165.8	17
18	25 43.4 −59.0 165.2	24 45.3 −58.9 165.3	23 47.3 −59.1 165.4	22 49.2 −59.1 165.5	21 51.1 −59.2 165.6	20 52.9 −59.1 165.7	19 54.8 −59.2 165.8	18 56.6 −59.3 165.9	18
19	24 44.4 −58.9 165.4	23 46.4 −59.0 165.5	22 48.2 −59.0 165.6	21 50.1 −59.1 165.7	20 51.9 −59.1 165.8	19 53.8 −59.2 165.9	18 55.6 −59.3 166.0	17 57.3 −59.2 166.1	19
20	23 45.5 −58.9 165.6	22 47.4 −59.0 165.7	21 49.2 −59.0 165.8	20 51.0 −59.1 165.9	19 52.8 −59.1 166.0	18 54.6 −59.2 166.1	17 56.3 −59.2 166.2	16 58.1 −59.3 166.3	20
21	22 46.6 −59.0 165.8	21 48.4 −59.0 165.9	20 50.2 −59.1 166.0	19 51.9 −59.1 166.1	18 53.7 −59.2 166.2	17 55.4 −59.2 166.3	16 57.1 −59.3 166.3	15 58.8 −59.3 166.4	21
22	21 47.6 −59.0 166.0	20 49.4 −59.1 166.1	19 51.1 −59.1 166.2	18 52.8 −59.1 166.3	17 54.5 −59.1 166.4	16 56.2 −59.2 166.4	15 57.9 −59.3 166.5	14 59.5 −59.3 166.6	22
23	20 48.6 −59.0 166.2	19 50.3 −59.1 166.3	18 52.0 −59.1 166.4	17 53.7 −59.1 166.5	16 55.4 −59.2 166.5	15 57.0 −59.2 166.6	14 58.6 −59.2 166.7	14 00.2 −59.3 166.7	23
24	19 49.6 −59.0 166.4	18 51.3 −59.1 166.5	17 52.9 −59.1 166.6	16 54.6 −59.2 166.6	15 56.2 −59.2 166.7	14 57.8 −59.2 166.8	13 59.4 −59.3 166.8	13 00.9 −59.3 166.9	24
25	18 50.6 −59.0 166.6	17 52.2 −59.0 166.7	16 53.8 −59.1 166.8	15 55.4 −59.1 166.8	14 57.0 −59.2 166.9	13 58.6 −59.3 166.9	13 00.1 −59.3 167.0	12 01.6 −59.3 167.0	25
26	17 51.6 −59.0 166.8	16 53.2 −59.1 166.9	15 54.7 −59.1 166.9	14 56.3 −59.2 167.0	13 57.8 −59.2 167.1	12 59.3 −59.2 167.1	12 00.8 −59.3 167.2	11 02.3 −59.3 167.2	26
27	16 52.6 −59.1 167.0	15 54.1 −59.1 167.0	14 55.6 −59.1 167.1	13 57.1 −59.1 167.2	12 58.6 −59.2 167.2	12 00.1 −59.2 167.3	11 01.6 −59.3 167.3	10 03.0 −59.3 167.4	27
28	15 53.5 −59.1 167.2	14 55.0 −59.1 167.2	13 56.5 −59.1 167.3	12 58.0 −59.2 167.4	11 59.4 −59.2 167.4	11 00.9 −59.3 167.4	10 02.3 −59.3 167.5	9 03.7 −59.3 167.5	28
29	14 54.5 −59.1 167.4	13 55.9 −59.1 167.4	12 57.4 −59.2 167.5	11 58.8 −59.2 167.5	11 00.2 −59.2 167.6	10 01.6 −59.2 167.6	9 03.0 −59.3 167.6	8 04.4 −59.3 167.7	29
30	13 55.4 −59.0 167.5	12 56.8 −59.1 167.6	11 58.2 −59.1 167.6	10 59.6 −59.2 167.7	10 01.0 −59.2 167.7	9 02.4 −59.3 167.8	8 03.7 −59.3 167.8	7 05.1 −59.3 167.8	30
31	12 56.4 −59.1 167.7	11 57.7 −59.1 167.8	10 59.1 −59.2 167.8	10 00.4 −59.2 167.8	9 01.8 −59.2 167.9	8 03.1 −59.2 167.9	7 04.4 −59.3 167.9	6 05.8 −59.4 167.9	31
32	11 57.3 −59.1 167.9	10 58.6 −59.1 167.9	9 59.9 −59.1 168.0	9 01.2 −59.1 168.0	8 02.6 −59.3 168.0	7 03.9 −59.3 168.1	6 05.1 −59.3 168.1	5 06.4 −59.3 168.1	32
33	10 58.2 −59.1 168.1	9 59.5 −59.1 168.1	9 00.8 −59.2 168.1	8 02.1 −59.1 168.2	7 03.3 −59.2 168.2	6 04.6 −59.3 168.2	5 05.8 −59.2 168.2	4 07.1 −59.3 168.3	33
34	9 59.1 −59.1 168.2	9 00.4 −59.2 168.3	8 01.6 −59.1 168.3	7 02.9 −59.2 168.3	6 04.1 −59.2 168.4	5 05.3 −59.2 168.4	4 06.6 −59.3 168.4	3 07.8 −59.4 168.4	34
35	9 00.0 −59.1 168.4	8 01.2 −59.1 168.5	7 02.5 −59.2 168.5	6 03.7 −59.2 168.5	5 04.9 −59.3 168.5	4 06.1 −59.3 168.5	3 07.3 −59.3 168.6	2 08.4 −59.3 168.6	35
36	8 00.9 −59.1 168.6	7 02.1 −59.1 168.6	6 03.3 −59.2 168.6	5 04.5 −59.2 168.7	4 05.6 −59.2 168.7	3 06.8 −59.3 168.7	2 08.0 −59.3 168.7	1 09.1 −59.3 168.7	36
37	7 01.8 −59.1 168.8	6 03.0 −59.2 168.8	5 04.1 −59.2 168.8	4 05.3 −59.2 168.8	3 06.4 −59.2 168.8	2 07.5 −59.2 168.9	1 08.7 −59.3 168.9	0 09.8 −59.3 168.9	37
38	6 02.7 −59.1 168.9	5 03.8 −59.1 169.0	4 04.9 −59.1 169.0	3 06.1 −59.3 169.0	2 07.2 −59.3 169.0	1 08.3 −59.3 169.0	0 09.4 −59.3 169.0	0 49.5 +59.4 11.0	38
39	5 03.6 −59.1 169.1	4 04.7 −59.1 169.1	3 05.8 −59.2 169.1	2 06.8 −59.2 169.2	1 07.9 −59.2 169.2	0 09.0 −59.3 169.2	0 49.9 +59.3 10.8	1 48.9 +59.3 10.8	39
40	4 04.5 −59.1 169.3	3 05.6 −59.2 169.3	2 06.6 −59.2 169.3	1 07.6 −59.2 169.3	0 08.7 −59.3 169.3	0 50.3 +59.3 10.7	1 49.2 +59.3 10.7	2 48.2 +59.3 10.7	40
41	3 05.4 −59.1 169.5	2 06.4 −59.1 169.5	1 07.4 −59.2 169.5	0 08.4 −59.2 169.5	0 50.6 +59.2 10.5	1 49.6 +59.2 10.5	2 48.5 +59.3 10.5	3 47.5 +59.4 10.5	41
42	2 06.3 −59.1 169.6	1 07.3 −59.2 169.6	0 08.2 −59.1 169.6	0 50.8 +59.2 10.4	1 49.8 +59.2 10.4	2 48.8 +59.3 10.4	3 47.8 +59.3 10.4	4 46.9 +59.3 10.4	42
43	1 07.2 −59.1 169.8	0 08.1 −59.1 169.8	0 50.9 +59.2 10.2	1 50.0 +59.2 10.2	2 49.0 +59.3 10.2	3 48.1 +59.3 10.2	4 47.1 +59.3 10.2	5 46.2 +59.3 10.2	43
44	0 08.1 −59.2 170.0	0 51.0 +59.1 10.0	1 50.1 +59.2 10.0	2 49.2 +59.2 10.0	3 48.3 +59.3 10.0	4 47.4 +59.2 10.1	5 46.4 +59.3 10.1	6 45.5 +59.3 10.1	44
45	0 51.1 +59.1 9.9	1 50.2 +59.1 9.9	2 49.3 +59.2 9.9	3 48.4 +59.2 9.9	4 47.5 +59.2 9.9	5 46.6 +59.3 9.9	6 45.7 +59.3 9.9	7 44.8 +59.3 9.9	45
46	1 50.2 +59.1 9.7	2 49.3 +59.2 9.7	3 48.5 +59.1 9.7	4 47.6 +59.2 9.7	5 46.7 +59.3 9.7	6 45.9 +59.2 9.7	7 45.0 +59.4 9.8	8 44.1 +59.4 9.8	46
47	2 49.3 +59.1 9.5	3 48.5 +59.1 9.5	4 47.6 +59.2 9.5	5 46.8 +59.2 9.5	6 46.0 +59.2 9.6	7 45.1 +59.3 9.6	8 44.3 +59.3 9.6	9 43.5 +59.3 9.6	47
48	3 48.4 +59.1 9.3	4 47.6 +59.1 9.3	5 46.8 +59.2 9.4	6 46.0 +59.1 9.4	7 45.2 +59.2 9.4	8 44.4 +59.3 9.4	9 43.6 +59.3 9.5	10 42.8 +59.3 9.5	48
49	4 47.5 +59.1 9.2	5 46.7 +59.2 9.2	6 46.0 +59.1 9.2	7 45.2 +59.2 9.2	8 44.4 +59.2 9.2	9 43.6 +59.3 9.3	10 42.9 +59.2 9.3	11 42.1 +59.3 9.3	49
50	5 46.6 +59.1 9.0	6 45.9 +59.1 9.0	7 45.1 +59.2 9.0	8 44.4 +59.2 9.1	9 43.6 +59.3 9.1	10 42.9 +59.2 9.1	11 42.1 +59.3 9.1	12 41.4 +59.3 9.2	50
51	6 45.7 +59.1 8.8	7 45.0 +59.1 8.8	8 44.3 +59.2 8.9	9 43.6 +59.2 8.9	10 42.9 +59.2 8.9	11 42.1 +59.3 8.9	12 41.4 +59.3 9.0	13 40.7 +59.3 9.0	51
52	7 44.8 +59.1 8.6	8 44.1 +59.2 8.7	9 43.5 +59.1 8.7	10 42.8 +59.1 8.7	11 42.1 +59.2 8.7	12 41.4 +59.2 8.8	13 40.7 +59.2 8.8	14 39.9 +59.3 8.9	52
53	8 43.9 +59.1 8.5	9 43.3 +59.1 8.5	10 42.6 +59.2 8.5	11 41.9 +59.2 8.6	12 41.3 +59.2 8.6	13 40.6 +59.2 8.6	14 39.9 +59.3 8.7	15 39.2 +59.3 8.7	53
54	9 43.0 +59.1 8.3	10 42.4 +59.1 8.3	11 41.8 +59.1 8.3	12 41.1 +59.2 8.4	13 40.5 +59.2 8.4	14 39.8 +59.2 8.5	15 39.2 +59.2 8.5	16 38.5 +59.3 8.5	54
55	10 42.1 +59.1 8.1	11 41.5 +59.1 8.1	12 40.9 +59.1 8.2	13 40.3 +59.1 8.2	14 39.7 +59.1 8.2	15 39.0 +59.2 8.3	16 38.4 +59.2 8.3	17 37.8 +59.2 8.4	55
56	11 41.2 +59.1 7.9	12 40.6 +59.1 8.0	13 40.0 +59.1 8.0	14 39.4 +59.2 8.0	15 38.8 +59.2 8.1	16 38.2 +59.2 8.1	17 37.6 +59.3 8.2	18 37.0 +59.3 8.2	56
57	12 40.3 +59.0 7.8	13 39.7 +59.1 7.8	14 39.1 +59.2 7.8	15 38.6 +59.1 7.9	16 38.0 +59.2 7.9	17 37.4 +59.2 7.9	18 36.9 +59.2 8.0	19 36.3 +59.3 8.0	57
58	13 39.3 +59.1 7.6	14 38.8 +59.1 7.6	15 38.3 +59.1 7.7	16 37.7 +59.2 7.7	17 37.2 +59.1 7.7	18 36.6 +59.2 7.8	19 36.1 +59.2 7.8	20 35.5 +59.3 7.9	58
59	14 38.4 +59.1 7.4	15 37.9 +59.1 7.5	16 37.4 +59.1 7.5	17 36.9 +59.1 7.5	18 36.3 +59.2 7.6	19 35.8 +59.2 7.6	20 35.3 +59.2 7.7	21 34.8 +59.2 7.7	59
60	15 37.4 +59.1 7.2	16 37.0 +59.0 7.3	17 36.5 +59.1 7.3	18 36.0 +59.1 7.3	19 35.5 +59.1 7.4	20 35.0 +59.2 7.4	21 34.5 +59.2 7.5	22 34.0 +59.2 7.5	60
61	16 36.5 +59.0 7.0	17 36.0 +59.1 7.1	18 35.6 +59.0 7.1	19 35.1 +59.1 7.2	20 34.6 +59.1 7.2	21 34.2 +59.1 7.2	22 33.7 +59.1 7.3	23 33.2 +59.2 7.4	61
62	17 35.5 +59.0 6.8	18 35.1 +59.0 6.9	19 34.6 +59.1 6.9	20 34.2 +59.1 7.0	21 33.8 +59.1 7.0	22 33.3 +59.1 7.1	23 32.8 +59.2 7.1	24 32.4 +59.2 7.2	62
63	18 34.5 +59.0 6.7	19 34.1 +59.0 6.7	20 33.7 +59.1 6.7	21 33.3 +59.1 6.8	22 32.9 +59.1 6.8	23 32.4 +59.2 6.9	24 32.0 +59.1 6.9	25 31.6 +59.1 7.0	63
64	19 33.5 +59.0 6.5	20 33.2 +59.0 6.5	21 32.8 +59.0 6.5	22 32.4 +59.0 6.6	23 32.0 +59.1 6.6	24 31.6 +59.1 6.7	25 31.1 +59.2 6.7	26 30.7 +59.2 6.8	64
65	20 32.5 +59.0 6.3	21 32.2 +59.0 6.3	22 31.8 +59.0 6.4	23 31.4 +59.1 6.4	24 31.1 +59.0 6.5	25 30.7 +59.1 6.5	26 30.3 +59.1 6.6	27 29.9 +59.1 6.6	65
66	21 31.5 +59.0 6.1	22 31.2 +59.0 6.1	23 30.8 +59.0 6.2	24 30.5 +59.0 6.2	25 30.1 +59.1 6.3	26 29.8 +59.0 6.3	27 29.4 +59.1 6.4	28 29.0 +59.1 6.4	66
67	22 30.5 +58.9 5.9	23 30.2 +58.9 5.9	24 29.8 +59.0 6.0	25 29.5 +59.0 6.0	26 29.2 +59.0 6.1	27 28.8 +59.1 6.1	28 28.5 +59.1 6.2	29 28.2 +59.1 6.2	67
68	23 29.4 +58.9 5.7	24 29.1 +59.0 5.7	25 28.8 +59.0 5.8	26 28.5 +59.0 5.8	27 28.2 +59.0 5.9	28 27.9 +59.1 5.9	29 27.6 +59.0 6.0	30 27.3 +59.0 6.0	68
69	24 28.4 +58.9 5.5	25 28.1 +58.9 5.5	26 27.8 +59.0 5.6	27 27.5 +59.0 5.6	28 27.2 +59.1 5.7	29 27.0 +59.0 5.7	30 26.7 +59.0 5.8	31 26.3 +59.1 5.8	69
70	25 27.3 +58.9 5.3	26 27.0 +59.0 5.3	27 26.8 +58.9 5.3	28 26.5 +59.0 5.4	29 26.3 +58.9 5.5	30 26.0 +59.0 5.5	31 25.7 +59.0 5.6	32 25.4 +59.1 5.6	70
71	26 26.2 +58.9 5.0	27 26.0 +58.9 5.1	28 25.7 +58.9 5.1	29 25.5 +58.9 5.2	30 25.2 +59.0 5.2	31 25.0 +59.0 5.3	32 24.7 +59.0 5.4	33 24.5 +59.0 5.4	71
72	27 25.1 +58.8 4.8	28 24.9 +58.8 4.9	29 24.7 +58.9 4.9	30 24.4 +59.0 5.0	31 24.2 +58.9 5.0	32 24.0 +58.9 5.1	33 23.7 +59.0 5.1	34 23.5 +59.0 5.2	72
73	28 24.0 +58.8 4.6	29 23.8 +58.8 4.7	30 23.6 +58.8 4.7	31 23.4 +58.9 4.8	32 23.1 +59.0 4.8	33 22.9 +59.0 4.9	34 22.7 +59.0 4.9	35 22.5 +59.0 5.0	73
74	29 22.8 +58.8 4.4	30 22.6 +58.8 4.4	31 22.4 +58.9 4.5	32 22.3 +58.8 4.5	33 22.1 +58.9 4.6	34 21.9 +58.9 4.6	35 21.7 +58.9 4.7	36 21.5 +58.9 4.7	74
75	30 21.6 +58.8 4.2	31 21.5 +58.8 4.2	32 21.3 +58.8 4.3	33 21.1 +58.8 4.3	34 21.0 +58.8 4.3	35 20.8 +58.9 4.4	36 20.6 +58.9 4.5	37 20.4 +58.9 4.5	75
76	31 20.4 +58.8 3.9	32 20.3 +58.8 4.0	33 20.1 +58.8 4.0	34 20.0 +58.8 4.1	35 19.8 +58.9 4.1	36 19.7 +58.8 4.2	37 19.5 +58.9 4.2	38 19.3 +58.9 4.3	76
77	32 19.2 +58.7 3.7	33 19.1 +58.7 3.7	34 18.9 +58.8 3.8	35 18.8 +58.8 3.8	36 18.7 +58.8 3.9	37 18.5 +58.9 3.9	38 18.4 +58.8 4.0	39 18.2 +58.9 4.0	77
78	33 17.9 +58.7 3.5	34 17.8 +58.7 3.5	35 17.7 +58.8 3.5	36 17.6 +58.7 3.6	37 17.5 +58.8 3.6	38 17.4 +58.7 3.7	39 17.2 +58.8 3.7	40 17.1 +58.8 3.8	78
79	34 16.6 +58.7 3.2	35 16.6 +58.7 3.2	36 16.5 +58.7 3.3	37 16.4 +58.7 3.3	38 16.3 +58.7 3.4	39 16.1 +58.8 3.4	40 16.0 +58.8 3.5	41 15.9 +58.8 3.5	79
80	35 15.3 +58.7 2.9	36 15.3 +58.6 3.0	37 15.2 +58.6 3.0	38 15.1 +58.7 3.1	39 15.0 +58.7 3.1	40 14.9 +58.7 3.2	41 14.8 +58.8 3.2	42 14.7 +58.8 3.3	80
81	36 14.0 +58.6 2.7	37 13.9 +58.6 2.7	38 13.8 +58.7 2.8	39 13.8 +58.6 2.8	40 13.7 +58.7 2.8	41 13.6 +58.7 2.9	42 13.6 +58.6 2.9	43 13.5 +58.7 3.0	81
82	37 12.6 +58.6 2.4	38 12.5 +58.6 2.5	39 12.5 +58.6 2.5	40 12.4 +58.6 2.5	41 12.4 +58.6 2.6	42 12.3 +58.7 2.6	43 12.2 +58.7 2.6	44 12.2 +58.7 2.7	82
83	38 11.2 +58.5 2.1	39 11.1 +58.6 2.2	40 11.1 +58.6 2.2	41 11.0 +58.6 2.2	42 11.0 +58.6 2.3	43 11.0 +58.6 2.3	44 10.9 +58.6 2.4	45 10.9 +58.6 2.4	83
84	39 09.7 +58.5 1.9	40 09.7 +58.5 1.9	41 09.7 +58.5 1.9	42 09.6 +58.6 2.0	43 09.6 +58.5 2.0	44 09.6 +58.5 2.0	45 09.5 +58.6 2.1	46 09.5 +58.5 2.1	84
85	40 08.2 +58.5 1.6	41 08.2 +58.5 1.6	42 08.2 +58.4 1.6	43 08.2 +58.4 1.7	44 08.1 +58.5 1.7	45 08.1 +58.5 1.7	46 08.1 +58.4 1.7	47 08.0 +58.6 1.8	85
86	41 06.7 +58.4 1.3	42 06.7 +58.4 1.3	43 06.6 +58.5 1.3	44 06.6 +58.5 1.3	45 06.6 +58.5 1.4	46 06.6 +58.4 1.4	47 06.6 +58.4 1.4	48 06.6 +58.4 1.4	86
87	42 05.1 +58.3 1.0	43 05.1 +58.3 1.0	44 05.1 +58.3 1.0	45 05.1 +58.3 1.0	46 05.1 +58.3 1.0	47 05.0 +58.4 1.0	48 05.0 +58.3 1.1	49 05.0 +58.3 1.1	87
88	43 03.4 +58.4 0.7	44 03.4 +58.4 0.7	45 03.4 +58.4 0.7	46 03.4 +58.3 0.7	47 03.4 +58.3 0.7	48 03.4 +58.3 0.7	49 03.4 +58.3 0.7	50 03.4 +58.3 0.8	88
89	44 01.8 +58.2 0.3	45 01.8 +58.2 0.3	46 01.8 +58.3 0.3	47 01.7 +58.3 0.4	48 01.7 +58.3 0.4	49 01.7 +58.3 0.4	50 01.7 +58.3 0.4	51 01.7 +58.3 0.4	89
90	45 00.0 +58.2 0.0	46 00.0 +58.2 0.0	47 00.0 +58.2 0.0	48 00.0 +58.2 0.0	49 00.0 +58.2 0.0	50 00.0 +58.2 0.0	51 00.0 +58.2 0.0	52 00.0 +58.2 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 166°, 194°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z }

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	43 04.8	+58.0	159.2	42 08.6	+58.2	159.6	41 12.3	+58.3	159.9	40 15.9	+58.4	160.2	39 19.4	+58.6	160.5	38 22.8	+58.7	160.7	37 26.2	+58.7	161.0	36 29.4	+58.8	161.2	0
1	44 02.8	+58.0	158.9	43 06.8	+58.1	159.2	42 10.6	+58.3	159.6	41 14.3	+58.4	159.9	40 18.0	+58.4	160.2	39 21.5	+58.5	160.4	38 24.9	+58.6	160.7	37 28.2	+58.8	161.0	1
2	45 00.8	+57.9	158.5	44 04.9	+58.1	158.9	43 08.9	+58.2	159.2	42 12.7	+58.3	159.6	41 16.4	+58.4	159.9	40 20.0	+58.6	160.2	39 23.5	+58.7	160.4	38 27.0	+58.7	160.7	2
3	45 58.7	+57.9	158.2	45 03.0	+58.0	158.5	44 07.1	+58.1	158.9	43 11.0	+58.3	159.2	42 14.8	+58.4	159.6	41 18.6	+58.5	159.9	40 22.2	+58.6	160.2	39 25.7	+58.7	160.5	3
4	46 56.6	+57.7	157.8	46 01.0	+57.9	158.2	45 05.2	+58.0	158.6	44 09.3	+58.2	158.9	43 13.2	+58.3	159.2	42 17.1	+58.4	159.6	41 20.8	+58.5	159.9	40 24.4	+58.6	160.2	4
5	47 54.3	+57.7	157.4	46 58.9	+57.8	157.8	46 03.2	+58.0	158.2	45 07.5	+58.1	158.6	44 11.5	+58.3	158.9	43 15.5	+58.4	159.3	42 19.3	+58.5	159.6	41 23.0	+58.6	159.9	5
6	48 52.0	+57.6	157.0	47 56.7	+57.8	157.4	47 01.2	+57.9	157.8	46 05.6	+58.1	158.2	45 09.8	+58.2	158.6	44 13.9	+58.3	158.9	43 17.8	+58.5	159.3	42 21.6	+58.6	159.6	6
7	49 49.6	+57.5	156.5	48 54.5	+57.6	157.0	47 59.1	+57.9	157.4	47 03.7	+58.0	157.8	46 08.0	+58.1	158.2	45 12.2	+58.3	158.6	44 16.3	+58.4	159.0	43 20.2	+58.5	159.3	7
8	50 47.1	+57.4	156.1	49 52.1	+57.6	156.6	48 57.0	+57.7	157.0	48 01.7	+57.9	157.5	47 06.1	+58.1	157.9	46 10.5	+58.2	158.3	45 14.7	+58.3	158.7	44 18.7	+58.5	159.0	8
9	51 44.5	+57.2	155.6	50 49.7	+57.5	156.1	49 54.7	+57.7	156.6	48 59.6	+57.8	157.1	48 04.2	+58.0	157.5	47 08.7	+58.1	157.9	46 13.0	+58.3	158.3	45 17.2	+58.4	158.7	9
10	52 41.7	+57.1	155.1	51 47.2	+57.3	155.7	50 52.4	+57.5	156.2	49 57.4	+57.7	156.7	49 02.2	+57.9	157.1	48 06.8	+58.1	157.6	47 11.3	+58.2	158.0	46 15.6	+58.4	158.4	10
11	53 38.9	+57.0	154.6	52 44.5	+57.2	155.2	51 49.9	+57.5	155.7	50 55.1	+57.7	156.2	50 00.1	+57.8	156.7	49 04.9	+58.0	157.2	48 09.5	+58.2	157.6	47 14.0	+58.3	158.0	11
12	54 35.9	+56.8	154.1	53 41.7	+57.1	154.7	52 47.4	+57.3	155.3	51 52.8	+57.5	155.8	50 57.9	+57.8	156.3	50 02.9	+57.9	156.8	49 07.7	+58.0	157.2	48 12.3	+58.2	157.7	12
13	55 32.7	+56.7	153.5	54 38.8	+57.0	154.2	53 44.7	+57.2	154.8	52 50.3	+57.5	155.3	51 55.7	+57.6	155.9	51 00.8	+57.8	156.4	50 05.7	+58.0	156.9	49 10.5	+58.1	157.3	13
14	56 29.4	+56.5	152.9	55 35.8	+56.8	153.6	54 41.9	+57.1	154.2	53 47.7	+57.3	154.8	52 53.3	+57.5	155.4	51 58.6	+57.7	155.9	51 03.7	+57.9	156.4	50 08.6	+58.1	156.9	14
15	57 25.9	+56.3	152.3	56 32.6	+56.6	153.0	55 39.0	+56.9	153.7	54 45.0	+57.2	154.3	53 50.8	+57.4	154.9	52 56.3	+57.7	155.5	52 01.6	+57.8	156.0	51 06.7	+58.0	156.5	15
16	58 22.2	+56.2	151.7	57 29.2	+56.5	152.4	56 35.9	+56.7	153.1	55 42.2	+57.0	153.8	54 48.2	+57.3	154.4	53 54.0	+57.5	155.0	52 59.4	+57.8	155.6	52 04.7	+57.9	156.1	16
17	59 18.4	+55.9	151.0	58 25.7	+56.2	151.8	57 32.6	+56.6	152.5	56 39.2	+56.9	153.2	55 45.5	+57.1	153.9	54 51.5	+57.3	154.5	53 57.2	+57.6	155.1	53 02.6	+57.8	155.7	17
18	60 14.3	+55.6	150.3	59 21.9	+56.1	151.1	58 29.2	+56.4	151.9	57 36.1	+56.7	152.7	56 42.6	+57.0	153.4	55 48.8	+57.3	154.0	54 54.8	+57.4	154.6	54 00.4	+57.7	155.2	18
19	61 09.9	+55.4	149.5	60 18.0	+55.7	150.4	59 25.6	+56.1	151.2	58 32.8	+56.5	152.0	57 39.6	+56.8	152.8	56 46.1	+57.1	153.5	55 52.2	+57.4	154.1	54 58.1	+57.6	154.8	19
20	62 05.3	+55.0	148.7	61 13.7	+55.6	149.6	60 21.7	+56.0	150.5	59 29.3	+56.3	151.4	58 36.4	+56.6	152.2	57 43.2	+56.9	152.9	56 49.6	+57.2	153.6	55 55.7	+57.4	154.3	20
21	63 00.3	+54.8	147.8	62 09.3	+55.2	148.8	61 17.7	+55.6	149.8	60 25.6	+56.0	150.7	59 33.0	+56.5	151.5	58 40.1	+56.8	152.3	57 46.8	+57.0	153.1	56 53.1	+57.4	153.7	21
22	63 55.1	+54.3	146.9	63 04.5	+54.9	148.0	62 13.3	+55.4	149.0	61 21.6	+55.9	150.0	60 29.5	+56.2	150.8	59 36.9	+56.5	151.6	58 43.8	+56.9	152.5	57 50.5	+57.1	153.2	22
23	64 49.4	+54.0	145.9	63 59.4	+54.5	147.1	63 08.7	+55.1	148.2	62 17.5	+55.5	149.2	61 25.7	+55.9	150.1	60 33.4	+56.4	151.0	59 40.7	+56.7	151.8	58 47.6	+57.0	152.6	23
24	65 43.4	+53.5	144.9	64 53.9	+54.2	146.1	64 03.8	+54.7	147.3	63 13.0	+55.2	148.4	62 21.6	+55.7	149.4	61 29.8	+56.1	150.3	60 37.4	+56.5	151.2	59 44.6	+56.9	152.0	24
25	66 36.9	+53.0	143.8	65 48.1	+53.7	145.1	64 58.5	+54.4	146.3	64 08.2	+54.9	147.5	63 17.3	+55.4	148.5	62 25.9	+55.8	149.5	61 33.9	+56.3	150.5	60 41.5	+56.6	151.4	25
26	67 29.9	+52.3	142.6	66 41.8	+53.1	144.0	65 52.8	+53.9	145.3	65 03.1	+54.5	146.5	64 12.7	+55.1	147.7	63 21.7	+55.6	148.7	62 30.2	+56.0	149.7	61 38.1	+56.4	150.7	26
27	68 22.2	+51.8	141.3	67 34.9	+52.7	142.8	66 46.7	+53.4	144.2	65 57.6	+54.1	145.5	65 07.8	+54.7	146.7	64 17.3	+55.3	147.9	63 26.2	+55.7	149.0	62 34.5	+56.2	150.0	27
28	69 14.0	+51.0	139.9	68 27.6	+51.9	141.5	67 40.1	+52.8	142.9	66 51.7	+53.6	144.4	66 02.5	+54.3	145.8	65 12.6	+54.8	147.0	64 21.9	+55.4	148.1	63 30.7	+55.9	149.2	28
29	70 05.0	+50.2	138.4	69 19.5	+51.3	140.1	68 32.9	+52.3	141.8	67 45.3	+53.1	143.3	66 56.8	+53.8	144.7	66 07.4	+54.5	146.0	65 17.3	+55.1	147.2	64 26.6	+55.6	148.4	29
30	70 55.2	+49.2	136.7	70 10.8	+50.4	138.6	69 25.2	+51.5	140.4	68 38.4	+52.5	142.0	67 50.6	+53.3	143.5	67 01.9	+54.1	144.9	66 12.4	+54.7	146.2	65 22.2	+55.3	147.5	30
31	71 44.4	+48.1	134.9	71 01.2	+49.8	137.0	70 16.7	+50.7	138.9	69 30.9	+51.8	140.7	68 43.9	+52.7	142.3	67 56.0	+53.5	143.8	67 07.1	+54.3	145.2	66 17.5	+54.8	146.5	31
32	72 32.5	+46.9	133.0	71 50.8	+48.4	135.2	71 07.4	+49.8	137.3	70 22.7	+51.0	139.2	69 36.6	+52.1	140.9	68 49.5	+53.0	142.6	68 01.4	+53.7	144.1	67 12.3	+54.5	145.5	32
33	73 19.4	+45.5	130.9	72 39.2	+47.2	133.3	71 57.2	+48.8	135.5	71 13.7	+50.1	137.6	70 28.7	+51.3	139.5	69 42.5	+52.3	141.3	68 55.1	+53.2	142.9	68 06.8	+54.0	144.4	33
34	74 04.9	+43.8	128.5	73 26.4	+45.9	131.2	72 46.0	+47.5	133.6	72 03.8	+49.0	135.8	71 20.0	+50.4	137.9	70 34.8	+51.5	139.8	69 48.3	+52.6	141.6	69 00.8	+53.5	143.2	34
35	74 48.7	+42.0•	126.0	74 12.3	+44.2	128.8	73 33.5	+46.2	131.5	72 52.8	+47.9	133.9	72 10.4	+49.4	136.2	71 26.3	+50.7	138.2	70 40.9	+51.9	140.1	69 54.3	+52.8	141.9	35
36	75 30.7	+39.7•	123.2	74 56.5	+42.3•	126.3	74 19.7	+44.6	129.2	73 40.7	+46.6	131.8	72 59.8	+48.2	134.3	72 17.0	+49.8	136.5	71 32.8	+51.0	138.6	70 47.1	+52.1	140.5	36
37	76 10.4	+37.3•	120.3	75 38.8	+40.2•	123.5	75 04.3	+42.7•	126.6	74 27.3	+44.9	129.5	73 48.0	+46.9	132.2	73 06.8	+48.6	134.6	72 23.8	+50.0	136.9	71 39.2	+51.3	139.0	37
38	76 47.7	+34.4•	116.8	76 19.0	+37.7•	120.4	75 47.0	+40.6•	123.9	75 12.2	+43.2	127.0	74 34.9	+45.4	129.9	73 55.4	+47.2	132.6	73 13.8	+49.0	135.0	72 30.5	+50.4	137.3	38
39	77 22.1	+31.2•	113.1	76 56.7	+34.8•	117.1	76 27.6	+38.1•	120.8	75 55.4	+41.0•	124.2	75 20.3	+43.5	127.4	74 42.6	+45.8	130.3	74 02.8	+47.6	133.0	73 20.9	+49.3	135.4	39
40	77 53.3	+27.4•	109.1	77 31.5	+31.5•	113.4	77 05.7	+35.3•	117.4	76 36.4	+38.5•	121.1	76 03.8	+41.5•	124.6	75 28.4	+43.9	127.8	74 50.4	+46.2	130.7	74 10.2	+48.1	133.4	40
41	78 20.7	+23.2•	104.8	78 03.0	+27.8•	109.4	77 41.0	+32.0•	113.7	77 14.9	+35.7•	117.7	76 45.3	+39.0•	121.5	76 12.3	+41.9•	125.0	75 36.6	+44.4	128.2	74 58.3	+46.5	131.1	41
42	78 43.9	+18.7•	100.1	78 30.8	+23.7•	105.0	78 13.0	+28.2•	109.6	77 50.6	+32.5•	114.0	77 24.3	+36.1•	118.1	76 54.2	+39.5•	121.9	76 21.0	+42.3•	125.4	75 44.8	+44.8	128.6	42
43	79 02.6	+13.6•	95.2	78 54.5	+18.9•	100.3	78 41.2	+24.0•	105.2	78 23.1	+28.6•	109.9	78 00.4	+32.9•	114.4	77 33.7	+36.6•	118.5	77 03.3	+39.9•	122.3	76 29.6	+42.8•	125.9	43
44	79 16.2	+8.3•	90.0	79 13.4	+13.9•	95.3	79 05.2	+19.2•	100.5	78 51.7	+24.4•	105.4	78 33.3	+29.0•	110.2	78 10.3	+33.3•	114.7	77 43.2	+37.1•	118.9	77 12.4	+40.4•	122.8	44
45	79 24.5	+2.8•	84.7	79 27.3	+8.4•	90.0	79 24.4	+14.1•	95.4	79 16.1	+19.5•	100.7	79 02.3	+24.8•	105.7	78 43.6	+29.5•	110.6	78 20.3	+33.8•	115.1	77 52.8	+37.6•	119.3	45
46	79 27.3	−2.9•	79.2	79 35.7	+2.8•	84.6	79 38.5	+8.6•	90.0	79 35.6	+14.4•	95.5	79 27.1	+19.9•	100.9	79 13.1	+25.2•	106.0	78 54.1	+30.0•	110.9	78 30.4	+34.3•	115.5	46
47	79 24.4	−8.3•	73.8	79 35.3	−2.9•	79.0	79 47.1	+2.9•	84.5	79 50.0	+8.7•	90.1	79 47.0	+14.6•	95.6	79 38.3	+20.3•	101.1	79 24.1	+25.6•	106.3	79 04.7	+30.5•	111.1	47
48	79 16.1	−13.8•	68.4	79 35.6	−8.5•	73.5	79 50.0	−3.0•	78.9	79 58.7	+2.9•	84.4	80 01.6	+8.9•	90.1	79 58.6	+14.8•	95.7	79 49.7	+20.6•	101.3	79 35.2	+26.0•	106.6	48
49	79 02.3	−18.7•	63.3	79 27.1	−14.0•	68.1	79 47.0	−8.7•	73.2	80 01.6	−3.0•	78.7	80 10.5	+2.9•	84.3	80 13.4	+9.1•	90.1	80 10.3	+15.1•	95.9	80 01.2	+21.0•	101.6	49
50	78 43.6	−23.3•	58.3	79 13.1	−19.0•	62.8	79 38.3	−14.2•	67.7	79 58.6	−8.9•	72.9	80 13.4	−3.1•	78.5	80 22.5	+2.9•	84.2	80 25.4	+9.2•	90.1	80 22.2	+15.4•	96.1	50
51	78 20.3	−27.5•	53.7	78 54.1	−23.7•	57.8	79 24.1	−19.4•	62.3	79 49.7	−14.5•	67.3	80 10.3	−9.1•	72.6	80 25.4	−3.2•	78.2	80 34.6	+3.0•	84.2	80 37.6	+9.3•	90.2	51
52	77 52.8	−31.1•	49.4	78 30.4	−27.9•	53.1	79 04.7	−24.1•	57.2	79 35.2	−19.8•	61.8	80 01.2	−14.8•	66.8	80 22.2	−9.4•	72.3	80 37.6	−3.4•	78.0	80 46.9	+3.0•	84.1	52
53	77 21.7	−34.5•	45.4	78 02.5	−31.6•	48.7	78 40.6	−28.3•	52.5	79 15.4	−24.5•	56.7	79 46.4	−20.2•	61.3	80 12.8	−15.1•	66.4	80 34.2	−9.6•	71.9	80 49.9	−3.5•	77.8	53
54	76 47.2	−37.3•	41.7	77 30.9	−34.8•	44.7	78 12.3	−32.0•	48.1	78 50.9	−28.7•	51.9	79 26.2	−24.9•	56.1	79 57.7	−20.5•	60.8	80 24.6	−15.5•	65.9	80 46.4	−9.9•	71.6	54
55	76 09.9	−39.8•	38.4	76 56.1	−37.8•	41.0	77 40.3	−35.3•	44.0	78 22.2	−32.5•	47.4	79 01.3	−29.2•	51.2	79 37.2	−25.4•	55.5	80 09.1	−20.9•	60.2	80 36.5	−15.8•	65.5	55
56	75 30.1	−42.0•	35.3	76 18.3	−40.2•	37.7	77 05.0	−38.2•	40.3	77 49.7	−35.8•	43.3	78 32.1	−33.0•	46.7	79 11.8	−29.8•	50.5	79 48.2	−25.9•	54.8	80 20.7	−21.5•	59.6	56
57	74 48.1	−43.8	32.5	75 38.1	−42.4•	34.6	76 26.8	−40.7•	37.0	77 13.9	−38.6•	39.6	77 59.1	−36.3•	42.6	78 42.0	−33.5•	46.0	79 22.3	−30.3•	49.8	79 59.2	−26.4•	54.2	57
58	74 04.3	−45.5	30.0	74 55.7	−44.2	31.8	75 46.1	−42.7	33.9	76 35.3	−41.1•	36.2	77 22.8	−39.1•	38.9	78 08.5	−36.7•	41.9	78 52.0	−34.0•	45.3	79 32.8	−30.7•	49.1	58
59	73 18.8	−46.9	27.7	74 11.5	−45.8	29.3	75 03.4	−44.6	31.1	75 54.2	−43.2	33.2	76 43.7	−41.5•	35.5	77 31.8	−39.6•	38.1	78 18.0	−37.3•	41.1	79 02.1	−34.4•	44.5	59
60	72 31.9	−48.2	25.5	73 25.7	−47.3	27.0	74 18.8	−46.3	28.6	75 11.0	−45.0	30.4	76 02.2	−43.6	32.4	76 52.2	−42.0•	34.7	77 40.7	−40.1•	37.3	78 27.5	−37.8•	40.3	60
61	71 43.7	−49.2	23.6	72 38.4	−48.4	24.9	73 32.5	−47.5	26.3	74 26.0	−46.6	27.9	75 18.6	−45.4	29.7	76 10.2	−44.1	31.7	77 00.6	−42.4•	33.9	77 49.7	−40.6•	36.5	61
62	70 54.5	−50.2	21.8	71 50.0	−49.6	22.9	72 45.0	−48.8	24.2	73 39.4	−47.9	25.6	74 33.2	−47.0	27.1	75 26.1	−45.8	28.9	76 18.2	−44.6	30.9	77 09.1	−43.0•	33.1	62
63	70 04.3	−51.0	20.2	71 00.4	−50.4	21.2	71 56.2	−49.9	22.3	72 51.5	−49.2	23.5	73 46.2	−48.3	24.9	74 40.3	−47.4	26.4	75 33.6	−46.2	28.1	76 26.1	−45.0	30.1	63
64	69 13.3	−51.8	18.7	70 10.0	−51.3	19.5	71 06.3	−50.7	20.5	72 02.3	−50.1	21.6	72 57.9	−49.4	22.8	73 52.9	−48.6	24.1	74 47.4	−47.8	25.6	75 41.1	−46.7	27.3	64
65	68 21.5	−52.4	17.3	69 18.7	−52.0	18.0	70 15.6	−51.5	18.9	71 12.2	−51.0	19.8	72 08.5	−50.5	20.9	73 04.3	−49.8	22.1	73 59.6	−49.0	23.4	74 54.4	−48.1	24.8	65
66	67 29.1	−53.0	16.0	68 26.7	−52.6	16.7	69 24.1	−52.3	17.4	70 21.2	−51.8	18.2	71 18.0	−51.3	19.2	72 14.5	−50.7	20.2	73 10.6	−50.1	21.3	74 06.3	−49.4	22.6	66
67	66 36.1	−53.5	14.8	67 34.1	−53.2	15.4	68 31.8	−52.8	16.0	69 29.4	−52.5	16.8	70 26.7	−52.1	17.6	71 23.8	−51.6	18.5	72 20.5	−51.1	19.5	73 16.9	−50.5	20.6	67
68	65 42.6	−53.9	13.6	66 40.9	−53.7	14.2	67 38.6	−53.3	14.8	68 36.9	−53.1	15.4	69 34.6	−52.7	16.1	70 32.2	−52.4	16.9	71 29.4	−51.9	17.8	72 26.4	−51.4	18.7	68
69	64 48.7	−54.4	12.6	65 47.2	−54.2	13.1	66 45.6	−53.9	13.6	67 43.8	−53.6	14.2	68 41.9	−53.3	14.8	69 39.8	−53.0	15.5	70 37.5	−52.6	16.2	71 35.0	−52.2	17.1	69
70	63 54.3	−54.7	11.6	64 53.0	−54.5	12.0	65 51.7	−54.4	12.5	66 50.2	−54.1	13.0	67 48.6	−53.9	13.6	68 46.8	−53.5	14.2	69 44.9	−53.2	14.8	70 42.8	−52.8	15.5	70
71	62 59.6	−55.1	10.7	63 58.5	−54.9	11.1	64 57.3	−54.7	11.5	65 56.1	−54.5	11.9	66 54.7	−54.3	12.4	67 53.3	−54.1	12.9	68 51.7	−53.8	13.5	69 50.0	−53.5	14.1	71
72	62 04.5	−55.4	9.8	63 03.6	−55.3	10.2	64 02.6	−55.1	10.5	65 01.6	−54.9	10.9	66 00.4	−54.7	11.3	66 59.2	−54.5	11.8	67 57.9	−54.3	12.3	68 56.5	−54.1	12.9	72
73	61 09.1	−55.6	9.0	62 08.4	−55.6	9.3	63 07.5	−55.4	9.6	64 06.7	−55.3	10.0	65 05.7	−55.1	10.4	66 04.7	−54.9	10.8	67 03.6	−54.7	11.2	68 02.4	−54.5	11.7	73
74	60 13.5	−55.9	8.3	61 12.8	−55.8	8.5	62 12.1	−55.6	8.8	63 11.4	−55.5	9.1	64 10.6	−55.4	9.4	65 09.8	−55.3	9.8	66 08.9	−55.1	10.2	67 07.9	−54.9	10.6	74
75	59 17.6	−56.1	7.5	60 17.0	−56.0	7.8	61 16.5	−56.0	8.0	62 15.9	−55.9	8.3	63 15.2	−55.7	8.6	64 14.5	−55.6	8.9	65 13.8	−55.5	9.2	66 13.0	−55.3	9.6	75
76	58 21.5	−56.4	6.9	59 21.0	−56.2	7.1	60 20.5	−56.1	7.3	61 20.0	−56.0	7.5	62 19.5	−56.0	7.7	63 18.9	−55.8	8.0	64 18.3	−55.7	8.3	65 17.7	−55.6	8.6	76
77	57 25.1	−56.5	6.2	58 24.8	−56.5	6.4	59 24.4	−56.4	6.6	60 24.0	−56.3	6.8	61 23.5	−56.2	7.0	62 23.1	−56.1	7.2	63 22.6	−56.0	7.5	64 22.1	−56.0	7.7	77
78	56 28.6	−56.7	5.6	57 28.3	−56.6	5.7	58 28.0	−56.6	5.9	59 27.7	−56.4	6.1	60 27.3	−56.4	6.3	61 27.0	−56.4	6.5	62 26.6	−56.3	6.7	63 26.1	−56.2	6.9	78
79	55 31.9	−56.8	5.0	56 31.7	−56.8	5.1	57 31.4	−56.7	5.3	58 31.2	−56.7	5.4	59 30.9	−56.7	5.6	60 30.6	−56.6	5.8	61 30.3	−56.5	5.9	62 29.9	−56.4	6.1	79
80	54 35.1	−57.0	4.4	55 34.9	−57.0	4.6	56 34.7	−56.9	4.7	57 34.5	−56.9	4.8	58 34.2	−56.8	4.9	59 34.0	−56.7	5.1	60 33.8	−56.7	5.2	61 33.5	−56.6	5.4	80
81	53 38.1	−57.2	3.9	54 37.9	−57.1	4.0	55 37.8	−57.1	4.1	56 37.6	−57.0	4.2	57 37.4	−57.0	4.3	58 37.3	−57.0	4.5	59 37.1	−56.9	4.6	60 36.9	−56.9	4.7	81
82	52 40.9	−57.2	3.4	53 40.8	−57.2	3.5	54 40.7	−57.2	3.6	55 40.6	−57.2	3.7	56 40.4	−57.1	3.8	57 40.3	−57.1	3.9	58 40.2	−57.1	4.0	59 40.0	−57.0	4.1	82
83	51 43.7	−57.4	2.9	52 43.6	−57.4	3.0	53 43.5	−57.3	3.1	54 43.4	−57.3	3.1	55 43.3	−57.3	3.2	56 43.2	−57.3	3.3	57 43.1	−57.2	3.4	58 43.0	−57.2	3.5	83
84	50 46.3	−57.5	2.5	51 46.2	−57.4	2.5	52 46.2	−57.5	2.6	53 46.1	−57.4	2.6	54 46.0	−57.4	2.7	55 46.0	−57.4	2.8	56 45.9	−57.4	2.8	57 45.8	−57.3	2.9	84
85	49 48.8	−57.6	2.1	50 48.8	−57.6	2.1	51 48.7	−57.5	2.1	52 48.7	−57.6	2.1	53 48.6	−57.5	2.2	54 48.6	−57.5	2.2	55 48.5	−57.4	2.3	56 48.5	−57.5	2.4	85
86	48 51.2	−57.7	1.6	49 51.2	−57.7	1.6	50 51.2	−57.7	1.6	51 51.1	−57.6	1.7	52 51.1	−57.6	1.7	53 51.1	−57.6	1.8	54 51.1	−57.7	1.8	55 51.0	−57.6	1.8	86
87	47 53.5	−57.7	1.2	48 53.5	−57.7	1.2	49 53.5	−57.7	1.2	50 53.5	−57.7	1.2	51 53.5	−57.8	1.2	52 53.5	−57.8	1.3	53 53.4	−57.7	1.3	54 53.4	−57.7	1.3	87
88	46 55.8	−57.9	0.8	47 55.8	−57.9	0.8	48 55.8	−57.9	0.8	49 55.7	−57.8	0.8	50 55.7	−57.8	0.8	51 55.7	−57.8	0.8	52 55.7	−57.8	0.9	53 55.7	−57.8	0.9	88
89	45 57.9	−57.9	0.4	46 57.9	−57.9	0.4	47 57.9	−57.9	0.4	48 57.9	−57.9	0.4	49 57.9	−57.9	0.4	50 57.9	−57.9	0.4	51 57.9	−57.9	0.4	52 57.9	−57.9	0.4	89
90	45 00.0	−58.0	0.0	46 00.0	−58.0	0.0	47 00.0	−58.0	0.0	48 00.0	−58.0	0.0	49 00.0	−58.0	0.0	50 00.0	−58.0	0.0	51 00.0	−58.0	0.0	52 00.0	−58.0	0.0	90

45° 46° 47° 48° 49° 50° 51° 52°

LATITUDE **CONTRARY** NAME TO DECLINATION — L.H.A. 15°, 345°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	43 04.8	−58.1	159.2	42 08.6	−58.2	159.6	41 12.3	−58.3	159.9	40 15.9	−58.4	160.2	39 19.4	−58.5	160.5	38 22.8	−58.6	160.7	37 26.2	−58.8	161.0	36 29.4	−58.8	161.2	0
1	42 06.7	−58.2	159.6	41 10.4	−58.3	159.9	40 14.0	−58.5	160.2	39 17.5	−58.5	160.5	38 20.9	−58.6	160.7	37 24.2	−58.7	161.0	36 27.4	−58.7	161.2	35 30.6	−58.9	161.5	1
2	41 08.5	−58.2	159.9	40 12.1	−58.4	160.2	39 15.6	−58.5	160.5	38 19.0	−58.6	160.8	37 22.3	−58.6	161.0	36 25.5	−58.7	161.2	35 28.7	−58.8	161.5	34 31.7	−58.9	161.7	2
3	40 10.3	−58.3	160.2	39 13.7	−58.3	160.5	38 17.1	−58.5	160.8	37 20.4	−58.5	161.1	36 23.7	−58.7	161.3	35 26.8	−58.8	161.5	34 29.9	−58.9	161.7	33 32.8	−58.9	161.9	3
4	39 12.0	−58.4	160.5	38 15.4	−58.5	160.8	37 18.6	−58.5	161.1	36 21.9	−58.7	161.3	35 25.0	−58.7	161.5	34 28.0	−58.8	161.7	33 31.0	−58.9	161.9	32 33.9	−58.9	162.2	4
5	38 13.6	−58.3	160.8	37 16.9	−58.4	161.1	36 20.1	−58.5	161.3	35 23.2	−58.6	161.6	34 26.3	−58.7	161.8	33 29.3	−58.8	162.0	32 32.2	−58.9	162.2	31 35.0	−58.9	162.4	5
6	37 15.3	−58.4	161.1	36 18.5	−58.5	161.4	35 21.6	−58.6	161.6	34 24.6	−58.7	161.8	33 27.6	−58.8	162.0	32 30.5	−58.9	162.2	31 33.3	−58.9	162.4	30 36.1	−59.0	162.6	6
7	36 16.9	−58.5	161.4	35 20.0	−58.6	161.6	34 23.0	−58.7	161.9	33 25.9	−58.7	162.1	32 28.8	−58.8	162.3	31 31.6	−58.8	162.5	30 34.4	−58.9	162.6	29 37.1	−59.0	162.8	7
8	35 18.4	−58.5	161.7	34 21.4	−58.6	161.9	33 24.3	−58.6	162.1	32 27.2	−58.7	162.3	31 30.0	−58.8	162.5	30 32.8	−58.9	162.7	29 35.5	−59.0	162.9	28 38.1	−59.0	163.0	8
9	34 19.9	−58.5	162.0	33 22.8	−58.6	162.2	32 25.7	−58.7	162.4	31 28.5	−58.8	162.6	30 31.2	−58.8	162.7	29 33.9	−58.9	162.9	28 36.5	−59.0	163.1	27 39.1	−59.1	163.2	9
10	33 21.4	−58.6	162.2	32 24.2	−58.6	162.5	31 27.0	−58.7	162.6	30 29.7	−58.8	162.8	29 32.4	−58.9	163.0	28 35.0	−58.9	163.1	27 37.5	−59.0	163.3	26 40.0	−59.0	163.4	10
11	32 22.8	−58.6	162.5	31 25.6	−58.7	162.7	30 28.3	−58.8	162.9	29 30.9	−58.8	163.0	28 33.5	−58.9	163.2	27 36.1	−59.0	163.3	26 38.5	−59.0	163.5	25 41.0	−59.1	163.6	11
12	31 24.2	−58.6	162.7	30 26.9	−58.7	162.9	29 29.5	−58.7	163.1	28 32.1	−58.8	163.3	27 34.6	−58.9	163.4	26 37.1	−59.0	163.6	25 39.5	−59.0	163.7	24 41.9	−59.0	163.8	12
13	30 25.6	−58.7	163.0	29 28.2	−58.7	163.2	28 30.8	−58.8	163.3	27 33.3	−58.9	163.5	26 35.7	−58.9	163.6	25 38.1	−58.9	163.8	24 40.5	−59.0	163.9	23 42.9	−59.1	164.0	13
14	29 27.0	−58.7	163.2	28 29.5	−58.7	163.4	27 32.0	−58.8	163.5	26 34.4	−58.9	163.7	25 36.8	−58.9	163.8	24 39.2	−58.9	164.0	23 41.5	−59.1	164.1	22 43.8	−59.1	164.2	14
15	28 28.3	−58.7	163.5	27 30.8	−58.8	163.6	26 33.2	−58.9	163.8	25 35.5	−58.8	163.9	24 37.9	−59.0	164.0	23 40.2	−59.0	164.2	22 42.4	−59.0	164.3	21 44.7	−59.1	164.4	15
16	27 29.6	−58.7	163.7	26 32.0	−58.8	163.9	25 34.3	−58.8	164.0	24 36.7	−59.0	164.1	23 38.9	−58.9	164.2	22 41.2	−59.1	164.4	21 43.4	−59.1	164.5	20 45.6	−59.2	164.6	16
17	26 30.9	−58.7	163.9	25 33.2	−58.8	164.1	24 35.5	−58.9	164.2	23 37.7	−58.9	164.3	22 40.0	−59.0	164.4	21 42.1	−59.0	164.6	20 44.3	−59.1	164.7	19 46.4	−59.1	164.8	17
18	25 32.2	−58.8	164.2	24 34.4	−58.8	164.3	23 36.6	−58.9	164.4	22 38.8	−58.9	164.5	21 41.0	−59.0	164.6	20 43.1	−59.0	164.7	19 45.2	−59.1	164.8	18 47.3	−59.2	164.9	18
19	24 33.4	−58.8	164.4	23 35.6	−58.9	164.5	22 37.7	−58.9	164.6	21 39.9	−59.0	164.7	20 42.0	−59.0	164.8	19 44.1	−59.1	164.9	18 46.1	−59.1	165.0	17 48.1	−59.1	165.1	19
20	23 34.6	−58.8	164.6	22 36.7	−58.9	164.7	21 38.8	−58.9	164.8	20 40.9	−58.9	164.9	19 43.0	−59.0	165.0	18 45.0	−59.1	165.1	17 47.0	−59.1	165.2	16 49.0	−59.2	165.3	20
21	22 35.8	−58.8	164.8	21 37.9	−58.9	164.9	20 39.9	−58.9	165.0	19 42.0	−59.0	165.1	18 44.0	−59.1	165.2	17 45.9	−59.1	165.3	16 47.9	−59.2	165.4	15 49.8	−59.2	165.5	21
22	21 37.0	−58.8	165.0	20 39.0	−58.9	165.1	19 41.0	−58.9	165.1	18 43.0	−59.0	165.2	17 44.9	−59.0	165.4	16 46.8	−59.0	165.5	15 48.7	−59.1	165.6	14 50.6	−59.1	165.6	22
23	20 38.2	−58.9	165.3	19 40.1	−58.9	165.3	18 42.1	−59.0	165.4	17 44.0	−59.0	165.5	16 45.9	−59.1	165.6	15 47.8	−59.2	165.7	14 49.6	−59.1	165.7	13 51.5	−59.2	165.8	23
24	19 39.3	−58.9	165.5	18 41.2	−58.9	165.5	17 43.1	−59.0	165.6	16 45.0	−59.0	165.7	15 46.8	−59.0	165.8	14 48.6	−59.1	165.8	13 50.5	−59.2	165.9	12 52.3	−59.2	166.0	24
25	18 40.4	−58.8	165.7	17 42.3	−58.9	165.7	16 44.1	−59.0	165.8	15 46.0	−59.1	165.9	14 47.8	−59.1	166.0	13 49.5	−59.1	166.0	12 51.3	−59.1	166.1	11 53.1	−59.2	166.1	25
26	17 41.6	−58.9	165.9	16 43.4	−58.9	165.9	15 45.2	−59.0	166.0	14 46.9	−59.0	166.1	13 48.7	−59.1	166.1	12 50.4	−59.0	166.2	11 52.2	−59.2	166.2	10 53.9	−59.2	166.3	26
27	16 42.7	−58.9	166.1	15 44.4	−58.9	166.1	14 46.2	−59.0	166.2	13 47.9	−59.0	166.3	12 49.6	−59.1	166.3	11 51.3	−59.1	166.4	10 53.0	−59.2	166.4	9 54.7	−59.3	166.5	27
28	15 43.8	−58.9	166.3	14 45.5	−59.0	166.3	13 47.2	−59.0	166.4	12 48.9	−59.1	166.4	11 50.5	−59.0	166.5	10 52.2	−59.2	166.5	9 53.8	−59.2	166.6	8 55.4	−59.2	166.6	28
29	14 44.9	−59.0	166.5	13 46.5	−59.0	166.5	12 48.2	−59.0	166.6	11 49.8	−59.1	166.6	10 51.4	−59.1	166.7	9 53.0	−59.1	166.7	8 54.6	−59.1	166.8	7 56.2	−59.2	166.8	29
30	13 45.9	−58.9	166.7	12 47.6	−59.0	166.7	11 49.2	−59.1	166.8	10 50.7	−59.0	166.8	9 52.3	−59.1	166.8	8 53.9	−59.2	166.9	7 55.5	−59.2	166.9	6 57.0	−59.2	166.9	30
31	12 47.0	−58.9	166.9	11 48.6	−59.0	166.9	10 50.1	−59.0	166.9	9 51.7	−59.1	167.0	8 53.2	−59.1	167.0	7 54.7	−59.1	167.1	6 56.3	−59.2	167.1	5 57.8	−59.2	167.1	31
32	11 48.1	−59.0	167.0	10 49.6	−59.0	167.1	9 51.1	−59.0	167.1	8 52.6	−59.1	167.2	7 54.1	−59.1	167.2	6 55.6	−59.2	167.2	5 57.1	−59.3	167.3	4 58.6	−59.3	167.3	32
33	10 49.1	−58.9	167.2	9 50.6	−59.0	167.3	8 52.1	−59.1	167.3	7 53.5	−59.0	167.3	6 55.0	−59.1	167.4	5 56.4	−59.1	167.4	4 57.9	−59.2	167.4	3 59.3	−59.2	167.4	33
34	9 50.2	−59.0	167.4	8 51.6	−59.0	167.5	7 53.0	−59.0	167.5	6 54.5	−59.1	167.5	5 55.9	−59.1	167.5	4 57.3	−59.2	167.6	3 58.7	−59.2	167.6	3 00.1	−59.2	167.6	34
35	8 51.2	−59.0	167.6	7 52.6	−59.0	167.6	6 54.0	−59.1	167.7	5 55.4	−59.1	167.7	4 56.8	−59.2	167.7	3 58.1	−59.1	167.7	2 59.5	−59.2	167.7	2 00.9	−59.3	167.8	35
36	7 52.3	−59.0	167.8	6 53.6	−59.0	167.8	5 55.0	−59.1	167.8	4 56.3	−59.1	167.9	3 57.6	−59.1	167.9	2 59.0	−59.2	167.9	2 00.3	−59.2	167.9	1 01.6	−59.2	167.9	36
37	6 53.3	−59.0	168.0	5 54.6	−59.0	168.0	4 55.9	−59.0	168.0	3 57.2	−59.1	168.0	2 58.5	−59.1	168.1	1 59.8	−59.2	168.1	1 01.1	−59.2	168.1	0 02.4	−59.2	168.1	37
38	5 54.3	−59.0	168.2	4 55.6	−59.0	168.2	3 56.9	−59.1	168.2	2 58.1	−59.1	168.2	1 59.4	−59.1	168.2	1 00.6	−59.1	168.2	0 01.9	−59.2	168.2	0 56.8	+59.3	11.8	38
39	4 55.3	−58.9	168.4	3 56.6	−59.0	168.4	2 57.8	−59.1	168.4	1 59.0	−59.1	168.4	1 00.3	−59.2	168.4	0 01.5	−59.2	168.4	0 57.3	+59.2	11.6	1 56.1	+59.2	11.6	39
40	3 56.4	−59.0	168.5	2 57.6	−59.1	168.5	1 58.7	−59.0	168.6	0 59.9	−59.1	168.6	0 01.1	−59.1	168.6	0 57.7	+59.1	11.4	1 56.5	+59.2	11.4	2 55.3	+59.2	11.5	40
41	2 57.4	−59.0	168.7	1 58.5	−59.0	168.7	0 59.7	−59.1	168.7	0 00.8	−59.1	168.7	0 58.0	+59.1	11.3	1 56.8	+59.2	11.3	2 55.7	+59.2	11.3	3 54.5	+59.3	11.3	41
42	1 58.4	−59.0	168.9	0 59.5	−59.0	168.9	0 00.6	−59.0	168.9	0 58.3	+59.0	11.1	1 57.1	+59.2	11.1	2 56.0	+59.1	11.1	3 54.9	+59.2	11.1	4 53.8	+59.2	11.1	42
43	0 59.4	−59.0	169.1	0 00.5	−59.0	169.1	0 58.4	+59.1	10.9	1 57.3	+59.1	10.9	2 56.3	+59.1	10.9	3 55.2	+59.1	10.9	4 54.1	+59.2	11.0	5 53.0	+59.2	11.0	43
44	0 00.4	−59.0	169.3	0 58.5	+59.1	10.7	1 57.5	+59.0	10.7	2 56.4	+59.1	10.7	3 55.4	+59.1	10.8	4 54.3	+59.2	10.8	5 53.3	+59.2	10.8	6 52.2	+59.0	10.8	44
45	0 58.6	+59.0	10.5	1 57.6	+58.9	10.6	2 56.5	+59.1	10.6	3 55.5	+59.1	10.6	4 54.5	+59.1	10.6	5 53.5	+59.1	10.6	6 52.5	+59.1	10.6	7 51.4	+59.2	10.6	45
46	1 57.6	+58.9	10.4	2 56.6	+59.0	10.4	3 55.6	+59.0	10.4	4 54.6	+59.1	10.4	5 53.6	+59.1	10.4	6 52.6	+59.2	10.4	7 51.6	+59.1	10.5	8 50.6	+59.3	10.5	46
47	2 56.5	+59.0	10.2	3 55.6	+59.0	10.2	4 54.6	+59.1	10.2	5 53.7	+59.1	10.2	6 52.7	+59.2	10.2	7 51.8	+59.1	10.3	8 50.8	+59.2	10.3	9 49.9	+59.2	10.3	47
48	3 55.5	+59.0	10.0	4 54.6	+59.0	10.0	5 53.7	+59.1	10.0	6 52.8	+59.1	10.0	7 51.9	+59.0	10.1	8 50.9	+59.2	10.1	9 50.0	+59.2	10.1	10 49.1	+59.2	10.2	48
49	4 54.5	+59.0	9.8	5 53.6	+59.0	9.8	6 52.7	+59.1	9.8	7 51.9	+59.0	9.9	8 51.0	+59.1	9.9	9 50.1	+59.1	9.9	10 49.2	+59.1	10.0	11 48.3	+59.2	10.0	49
50	5 53.5	+58.9	9.6	6 52.6	+59.0	9.6	7 51.8	+59.0	9.7	8 50.9	+59.1	9.7	9 50.1	+59.1	9.7	10 49.2	+59.1	9.8	11 48.3	+59.2	9.8	12 47.5	+59.2	9.8	50
51	6 52.5	+58.9	9.4	7 51.6	+59.0	9.5	8 50.8	+59.1	9.5	9 50.0	+59.1	9.5	10 49.2	+59.1	9.5	11 48.3	+59.1	9.6	12 47.5	+59.2	9.6	13 46.7	+59.1	9.7	51
52	7 51.4	+59.0	9.3	8 50.6	+59.0	9.3	9 49.9	+59.0	9.3	10 49.1	+59.0	9.3	11 48.3	+59.0	9.4	12 47.4	+59.0	9.4	13 46.7	+59.1	9.4	14 45.8	+59.2	9.5	52
53	8 50.4	+59.0	9.1	9 49.6	+59.0	9.1	10 48.9	+59.0	9.1	11 48.1	+59.1	9.2	12 47.4	+59.0	9.2	13 46.6	+59.1	9.2	14 45.8	+59.2	9.3	15 45.0	+59.2	9.3	53
54	9 49.4	+58.9	8.9	10 48.6	+59.0	8.9	11 47.9	+59.0	8.9	12 47.2	+59.0	9.0	13 46.4	+59.0	9.0	14 45.7	+59.1	9.1	15 44.9	+59.2	9.1	16 44.2	+59.1	9.1	54
55	10 48.3	+58.9	8.7	11 47.6	+59.0	8.7	12 46.9	+59.0	8.8	13 46.2	+59.0	8.8	14 45.5	+59.1	8.8	15 44.8	+59.1	8.9	16 44.1	+59.1	8.9	17 43.3	+59.2	9.0	55
56	11 47.2	+59.0	8.5	12 46.6	+59.0	8.5	13 45.9	+59.0	8.6	14 45.2	+59.0	8.6	15 44.6	+59.0	8.6	16 43.9	+59.1	8.7	17 43.2	+59.1	8.8	18 42.5	+59.1	8.8	56
57	12 46.2	+58.9	8.3	13 45.6	+58.9	8.3	14 44.9	+59.0	8.4	15 44.3	+59.0	8.4	16 43.6	+59.1	8.5	17 43.0	+59.0	8.5	18 42.3	+59.1	8.6	19 41.6	+59.2	8.6	57
58	13 45.1	+58.9	8.1	14 44.5	+59.0	8.2	15 43.9	+59.0	8.2	16 43.3	+59.0	8.2	17 42.7	+59.0	8.3	18 42.0	+59.1	8.3	19 41.4	+59.1	8.4	20 40.8	+59.1	8.4	58
59	14 44.0	+58.9	7.9	15 43.5	+58.9	8.0	16 42.9	+58.9	8.0	17 42.3	+59.0	8.0	18 41.7	+59.0	8.1	19 41.1	+59.0	8.1	20 40.5	+59.1	8.2	21 39.9	+59.1	8.2	59
60	15 42.9	+58.9	7.7	16 42.4	+58.9	7.8	17 41.8	+59.0	7.8	18 41.3	+59.0	7.9	19 40.7	+59.0	7.9	20 40.1	+59.0	8.0	21 39.6	+59.0	8.0	22 39.0	+59.1	8.1	60
61	16 41.8	+58.9	7.5	17 41.3	+58.9	7.6	18 40.8	+58.9	7.6	19 40.3	+58.9	7.7	20 39.7	+59.0	7.7	21 39.2	+59.0	7.8	22 38.6	+59.1	7.8	23 38.1	+59.1	7.9	61
62	17 40.7	+58.9	7.3	18 40.2	+58.9	7.4	19 39.7	+58.9	7.4	20 39.2	+59.0	7.5	21 38.7	+59.0	7.5	22 38.2	+59.0	7.6	23 37.7	+59.0	7.6	24 37.2	+59.0	7.7	62
63	18 39.6	+58.9	7.1	19 39.1	+58.9	7.2	20 38.7	+58.9	7.2	21 38.2	+58.9	7.3	22 37.7	+59.0	7.3	23 37.2	+59.0	7.4	24 36.7	+59.0	7.4	25 36.2	+59.1	7.5	63
64	19 38.5	+58.8	6.9	20 38.0	+58.9	7.0	21 37.6	+58.9	7.0	22 37.1	+59.0	7.1	23 36.7	+58.9	7.1	24 36.2	+59.0	7.2	25 35.7	+59.0	7.2	26 35.3	+59.0	7.3	64
65	20 37.3	+58.9	6.7	21 36.9	+58.9	6.8	22 36.5	+58.9	6.8	23 36.1	+58.9	6.9	24 35.6	+58.9	6.9	25 35.2	+59.0	7.0	26 34.7	+59.0	7.0	27 34.3	+59.0	7.1	65
66	21 36.2	+58.8	6.5	22 35.8	+58.8	6.6	23 35.4	+58.8	6.6	24 35.0	+58.9	6.6	25 34.6	+58.9	6.7	26 34.2	+58.9	6.8	27 33.7	+59.0	6.8	28 33.3	+59.0	6.9	66
67	22 35.0	+58.8	6.3	23 34.6	+58.8	6.3	24 34.2	+58.9	6.4	25 33.9	+58.8	6.4	26 33.5	+58.9	6.5	27 33.1	+58.9	6.5	28 32.7	+59.0	6.6	29 32.3	+59.0	6.7	67
68	23 33.8	+58.8	6.1	24 33.4	+58.8	6.1	25 33.1	+58.8	6.2	26 32.7	+58.9	6.2	27 32.4	+58.8	6.3	28 32.0	+58.9	6.3	29 31.7	+58.9	6.4	30 31.3	+58.9	6.5	68
69	24 32.6	+58.7	5.9	25 32.2	+58.8	5.9	26 31.9	+58.8	6.0	27 31.6	+58.8	6.0	28 31.3	+58.8	6.1	29 30.9	+58.9	6.1	30 30.6	+58.9	6.2	31 30.2	+59.0	6.2	69
70	25 31.3	+58.8	5.6	26 31.0	+58.8	5.7	27 30.7	+58.8	5.7	28 30.4	+58.8	5.8	29 30.1	+58.9	5.8	30 29.8	+58.9	5.9	31 29.5	+58.9	6.0	32 29.2	+58.9	6.0	70
71	26 30.1	+58.7	5.4	27 29.8	+58.7	5.5	28 29.5	+58.8	5.5	29 29.2	+58.8	5.6	30 29.0	+58.8	5.6	31 28.7	+58.8	5.7	32 28.4	+58.9	5.7	33 28.1	+58.9	5.8	71
72	27 28.8	+58.7	5.2	28 28.5	+58.7	5.3	29 28.3	+58.7	5.3	30 28.0	+58.8	5.4	31 27.8	+58.8	5.4	32 27.5	+58.9	5.4	33 27.2	+58.9	5.5	34 27.0	+58.8	5.6	72
73	28 27.5	+58.7	4.9	29 27.3	+58.7	5.0	30 27.0	+58.7	5.0	31 26.8	+58.7	5.1	32 26.6	+58.7	5.1	33 26.3	+58.8	5.2	34 26.1	+58.8	5.3	35 25.8	+58.8	5.3	73
74	29 26.2	+58.6	4.7	30 26.0	+58.6	4.7	31 25.7	+58.7	4.8	32 25.5	+58.7	4.8	33 25.3	+58.7	4.9	34 25.1	+58.7	4.9	35 24.9	+58.7	5.0	36 24.6	+58.8	5.1	74
75	30 24.8	+58.6	4.5	31 24.6	+58.6	4.5	32 24.4	+58.6	4.6	33 24.2	+58.7	4.6	34 24.0	+58.7	4.7	35 23.8	+58.8	4.7	36 23.6	+58.8	4.7	37 23.4	+58.8	4.8	75
76	31 23.4	+58.6	4.2	32 23.3	+58.6	4.3	33 23.1	+58.6	4.3	34 22.9	+58.7	4.4	35 22.7	+58.7	4.4	36 22.6	+58.7	4.5	37 22.4	+58.7	4.5	38 22.2	+58.7	4.6	76
77	32 22.0	+58.6	4.0	33 21.9	+58.5	4.0	34 21.7	+58.6	4.0	35 21.6	+58.6	4.1	36 21.4	+58.7	4.1	37 21.3	+58.6	4.2	38 21.1	+58.7	4.3	39 20.9	+58.7	4.3	77
78	33 20.6	+58.5	3.7	34 20.4	+58.6	3.8	35 20.3	+58.6	3.8	36 20.2	+58.6	3.8	37 20.1	+58.6	3.9	38 19.9	+58.6	3.9	39 19.8	+58.6	3.9	40 19.6	+58.7	4.0	78
79	34 19.1	+58.5	3.4	35 19.0	+58.5	3.5	36 18.9	+58.5	3.5	37 18.8	+58.5	3.6	38 18.6	+58.6	3.6	39 18.5	+58.6	3.7	40 18.4	+58.6	3.7	41 18.3	+58.6	3.8	79
80	35 17.6	+58.4	3.2	36 17.5	+58.5	3.2	37 17.4	+58.5	3.2	38 17.3	+58.5	3.3	39 17.2	+58.5	3.3	40 17.1	+58.5	3.4	41 17.0	+58.5	3.4	42 16.9	+58.6	3.5	80
81	36 16.0	+58.5	2.9	37 16.0	+58.4	2.9	38 15.9	+58.4	3.0	39 15.8	+58.5	3.0	40 15.7	+58.5	3.0	41 15.6	+58.5	3.1	42 15.5	+58.6	3.1	43 15.5	+58.5	3.2	81
82	37 14.5	+58.3	2.6	38 14.4	+58.4	2.6	39 14.3	+58.4	2.7	40 14.3	+58.4	2.7	41 14.2	+58.4	2.7	42 14.1	+58.5	2.8	43 14.1	+58.4	2.8	44 14.0	+58.5	2.9	82
83	38 12.8	+58.4	2.3	39 12.8	+58.3	2.3	40 12.7	+58.4	2.4	41 12.7	+58.3	2.4	42 12.6	+58.4	2.4	43 12.6	+58.4	2.5	44 12.5	+58.4	2.5	45 12.5	+58.4	2.6	83
84	39 11.2	+58.2	2.1	40 11.1	+58.3	2.0	41 11.1	+58.3	2.1	42 11.0	+58.4	2.1	43 11.0	+58.3	2.1	44 11.0	+58.4	2.2	45 10.9	+58.4	2.2	46 10.9	+58.4	2.2	84
85	40 09.4	+58.3	1.7	41 09.4	+58.2	1.7	42 09.4	+58.2	1.7	43 09.4	+58.2	1.8	44 09.3	+58.3	1.8	45 09.3	+58.3	1.8	46 09.3	+58.3	1.9	47 09.2	+58.3	1.9	85
86	41 07.7	+58.1	1.4	42 07.6	+58.2	1.4	43 07.6	+58.2	1.4	44 07.6	+58.2	1.4	45 07.6	+58.2	1.5	46 07.6	+58.2	1.5	47 07.5	+58.3	1.5	48 07.5	+58.3	1.5	86
87	42 05.8	+58.2	1.1	43 05.8	+58.1	1.1	44 05.8	+58.1	1.1	45 05.8	+58.1	1.1	46 05.8	+58.1	1.1	47 05.8	+58.1	1.1	48 05.8	+58.1	1.2	49 05.8	+58.1	1.2	87
88	43 04.0	+58.0	0.7	44 03.9	+58.1	0.7	45 03.9	+58.1	0.7	46 03.9	+58.1	0.7	47 03.9	+58.1	0.8	48 03.9	+58.1	0.8	49 03.9	+58.1	0.8	50 03.9	+58.1	0.8	88
89	44 02.0	+58.0	0.4	45 02.0	+58.0	0.4	46 02.0	+58.0	0.4	47 02.0	+58.0	0.4	48 02.0	+58.0	0.4	49 02.0	+58.0	0.4	50 02.0	+58.0	0.4	51 02.0	+58.0	0.4	89
90	45 00.0	+57.9	0.0	46 00.0	+57.9	0.0	47 00.0	+57.9	0.0	48 00.0	+57.9	0.0	49 00.0	+57.9	0.0	50 00.0	+57.9	0.0	51 00.0	+57.9	0.0	52 00.0	+57.9	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION — L.H.A. 165°, 195°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	42 49.3	+57.8	157.9	41 53.6	+58.0	158.3	40 57.8	+58.1	158.6	40 01.9	+58.2	158.9	39 05.9	+58.3	159.2	38 09.7	+58.5	159.5	37 13.5	+58.5	159.7	36 17.1	+58.7	160.0	0
1	43 47.1	+57.7	157.6	42 51.6	+57.8	157.9	41 55.9	+58.0	158.3	41 00.1	+58.2	158.6	40 04.2	+58.3	158.9	39 08.2	+58.3	159.2	38 12.0	+58.5	159.5	37 15.8	+58.6	159.7	1
2	44 44.8	+57.7	157.2	43 49.4	+57.9	157.6	42 53.9	+58.0	157.9	41 58.3	+58.0	158.3	41 02.5	+58.2	158.6	40 06.5	+58.4	158.9	39 10.5	+58.5	159.2	38 14.4	+58.5	159.5	2
3	45 42.5	+57.6	156.8	44 47.3	+57.7	157.2	43 51.9	+57.9	157.6	42 56.3	+58.1	157.9	42 00.7	+58.2	158.3	41 04.9	+58.3	158.6	40 09.0	+58.4	158.9	39 12.9	+58.6	159.2	3
4	46 40.1	+57.4	156.4	45 45.0	+57.6	156.8	44 49.8	+57.8	157.2	43 54.4	+57.9	157.6	42 58.9	+58.1	157.9	42 03.2	+58.2	158.3	41 07.4	+58.3	158.6	40 11.5	+58.4	158.9	4
5	47 37.5	+57.4	156.0	46 42.6	+57.6	156.4	45 47.6	+57.7	156.8	44 52.3	+57.9	157.2	43 57.0	+58.0	157.6	43 01.4	+58.2	157.9	42 05.7	+58.4	158.3	41 09.9	+58.5	158.6	5
6	48 34.9	+57.3	155.5	47 40.2	+57.5	156.0	46 45.3	+57.7	156.4	45 50.2	+57.9	156.8	44 55.0	+58.0	157.2	43 59.6	+58.1	157.6	43 04.1	+58.2	158.0	42 08.4	+58.4	158.3	6
7	49 32.2	+57.1	155.1	48 37.7	+57.4	155.5	47 43.0	+57.5	156.0	46 48.1	+57.7	156.4	45 53.0	+57.9	156.8	44 57.7	+58.1	157.3	44 02.3	+58.2	157.6	43 06.8	+58.3	158.0	7
8	50 29.4	+57.0	154.6	49 35.1	+57.2	155.1	48 40.5	+57.4	155.6	47 45.8	+57.5	156.0	46 50.9	+57.8	156.5	45 55.8	+58.0	156.9	45 00.5	+58.1	157.3	44 05.1	+58.3	157.7	8
9	51 26.4	+57.0	154.1	50 32.3	+57.2	154.6	49 38.0	+57.4	155.1	48 43.5	+57.5	155.6	47 48.7	+57.7	156.1	46 53.8	+57.9	156.5	45 58.6	+58.1	156.9	45 03.4	+58.2	157.3	9
10	52 23.4	+56.7	153.6	51 29.5	+57.0	154.2	50 35.4	+57.2	154.7	49 41.0	+57.5	155.2	48 46.4	+57.7	155.7	47 51.7	+57.8	156.2	46 56.7	+58.0	156.6	46 01.6	+58.1	157.0	10
11	53 20.1	+56.7	153.1	52 26.5	+56.9	153.6	51 32.6	+57.2	154.2	50 38.5	+57.4	154.7	49 44.1	+57.6	155.3	48 49.5	+57.7	155.7	47 54.7	+57.9	156.2	46 59.7	+58.1	156.6	11
12	54 16.8	+56.5	152.5	53 23.4	+56.8	153.1	52 29.8	+57.0	153.7	51 35.8	+57.3	154.3	50 41.7	+57.4	154.8	49 47.2	+57.7	155.3	48 52.6	+57.9	155.8	47 57.8	+58.0	156.3	12
13	55 13.3	+56.3	151.9	54 20.2	+56.6	152.6	53 26.8	+56.8	153.2	52 33.1	+57.1	153.8	51 39.1	+57.3	154.3	50 44.9	+57.5	154.9	49 50.5	+57.7	155.4	48 55.8	+57.9	155.9	13
14	56 09.6	+56.1	151.3	55 16.8	+56.4	152.0	54 23.6	+56.7	152.7	53 30.2	+56.9	153.3	52 36.4	+57.3	153.9	51 42.4	+57.5	154.4	50 48.2	+57.6	155.0	49 53.7	+57.9	155.5	14
15	57 05.7	+55.9	150.7	56 13.2	+56.2	151.4	55 20.3	+56.6	152.1	54 27.1	+56.9	152.7	53 33.7	+57.0	153.4	52 39.9	+57.3	154.0	51 45.8	+57.6	154.5	50 51.6	+57.7	155.1	15
16	58 01.6	+55.6	150.0	57 09.4	+56.0	150.7	56 16.9	+56.3	151.5	55 24.0	+56.6	152.2	54 30.7	+57.0	152.8	53 37.2	+57.2	153.5	52 43.4	+57.4	154.1	51 49.3	+57.6	154.6	16
17	58 57.2	+55.5	149.3	58 05.4	+55.9	150.1	57 13.2	+56.2	150.9	56 20.6	+56.5	151.6	55 27.7	+56.8	152.3	54 34.4	+57.1	153.0	53 40.8	+57.3	153.6	52 46.9	+57.6	154.2	17
18	59 52.7	+55.1	148.5	59 01.3	+55.5	149.4	58 09.4	+55.9	150.2	57 17.1	+56.3	151.0	56 24.5	+56.6	151.7	55 31.5	+56.9	152.4	54 38.1	+57.2	153.1	53 44.5	+57.4	153.7	18
19	60 47.8	+54.9	147.7	59 56.8	+55.3	148.5	59 05.3	+55.8	149.5	58 13.4	+56.1	150.3	57 21.1	+56.4	151.1	56 28.4	+56.7	151.8	55 35.3	+57.0	152.5	54 41.9	+57.3	153.2	19
20	61 42.7	+54.5	146.9	60 52.1	+55.0	147.9	60 01.1	+55.4	148.8	59 09.5	+55.9	149.7	58 17.5	+56.3	150.5	57 25.1	+56.6	151.2	56 32.3	+56.9	152.0	55 39.2	+57.1	152.7	20
21	62 37.2	+54.1	146.0	61 47.1	+54.7	147.0	60 56.5	+55.2	148.0	60 05.4	+55.6	148.9	59 13.8	+56.0	149.8	58 21.7	+56.4	150.6	57 29.2	+56.7	151.4	56 36.3	+57.0	152.1	21
22	63 31.3	+53.8	145.0	62 41.8	+54.1	146.1	61 51.7	+54.9	147.2	61 01.0	+55.3	148.2	60 09.8	+55.7	149.1	59 18.1	+56.1	150.0	58 25.9	+56.5	150.8	57 33.3	+56.9	151.6	22
23	64 25.1	+53.3	144.0	63 36.2	+53.9	145.2	62 46.6	+54.5	146.3	61 56.3	+55.1	147.4	61 05.5	+55.5	148.3	60 14.2	+55.9	149.3	59 22.4	+56.3	150.1	58 30.2	+56.6	150.9	23
24	65 18.4	+52.8	142.9	64 30.1	+53.5	144.2	63 41.1	+54.1	145.4	62 51.4	+54.7	146.5	62 01.0	+55.3	147.5	61 10.1	+55.7	148.5	60 18.7	+56.1	149.4	59 26.8	+56.5	150.3	24
25	66 11.2	+52.3	141.8	65 23.6	+53.1	143.1	64 35.2	+53.8	144.4	63 46.1	+54.3	145.6	62 56.3	+54.8	146.7	62 05.8	+54.8	147.7	61 14.8	+55.8	148.3	60 23.3	+56.2	149.6	25
26	67 03.5	+51.6	140.5	66 16.7	+52.5	142.0	65 29.0	+53.3	143.3	64 40.4	+53.9	144.6	63 51.1	+54.6	145.8	63 01.2	+55.1	146.9	62 10.6	+55.6	147.9	61 19.5	+56.0	148.9	26
27	67 55.1	+51.0	139.2	67 09.2	+51.8	140.8	66 22.2	+52.7	142.2	65 34.3	+53.5	143.6	64 45.7	+54.1	144.8	63 56.3	+54.7	146.0	63 06.2	+55.3	147.1	62 15.5	+55.8	148.2	27
28	68 46.1	+50.1	137.8	68 01.0	+51.2	139.4	67 14.9	+52.1	141.0	66 27.8	+53.0	142.5	65 39.8	+53.7	143.8	64 51.0	+54.3	145.1	64 01.5	+54.9	146.2	63 11.3	+55.4	147.3	28
29	69 36.2	+49.3	136.2	68 52.2	+50.5	138.0	68 07.0	+51.5	139.7	67 20.8	+52.3	141.3	66 33.5	+53.2	142.7	65 45.3	+53.9	144.0	64 56.4	+54.5	145.3	64 06.7	+55.1	146.5	29
30	70 25.5	+48.3	134.6	69 42.7	+49.5	136.5	68 58.5	+50.7	138.3	68 13.1	+51.8	140.0	67 26.7	+52.6	141.5	66 39.2	+53.5	143.0	65 50.9	+54.1	144.3	65 01.8	+54.8	145.6	30
31	71 13.8	+47.1	132.8	70 32.2	+48.6	134.8	69 49.2	+49.9	136.8	69 04.9	+51.0	138.6	68 19.3	+52.0	140.2	67 32.7	+52.8	141.8	66 45.0	+53.7	143.2	65 56.6	+54.3	144.6	31
32	72 00.9	+45.9	130.8	71 20.8	+47.5	133.0	70 39.1	+48.9	135.1	69 55.9	+50.1	137.1	69 11.3	+51.3	138.9	68 25.5	+52.3	140.5	67 38.7	+53.1	142.1	66 50.9	+53.9	143.5	32
33	72 46.8	+44.4	128.7	72 08.3	+46.2	131.1	71 28.0	+47.8	133.3	70 46.0	+49.2	135.4	70 02.6	+50.4	137.4	69 17.8	+51.5	139.2	68 31.8	+52.5	140.8	67 44.8	+53.4	142.4	33
34	73 31.2	+42.7	126.3	72 54.5	+44.8	129.0	72 15.8	+46.6	131.4	71 35.2	+48.2	133.7	70 53.0	+49.6	135.8	70 09.3	+50.8	137.7	69 24.3	+51.9	139.5	68 38.2	+52.7	141.2	34
35	74 13.9	+40.8•	123.8	73 39.3	+43.1	126.6	73 02.4	+45.1	129.3	72 23.4	+46.9	131.7	71 42.6	+48.5	134.0	71 00.1	+49.9	136.1	70 16.2	+51.0	138.0	69 30.9	+52.2	139.8	35
36	74 54.7	+38.7•	121.1	74 22.4	+41.2•	124.1	73 47.5	+43.5	127.0	73 10.3	+45.5	129.6	72 31.1	+47.2	132.1	71 50.0	+48.8	134.3	71 07.2	+50.2	136.4	70 23.1	+51.3	138.4	36
37	75 33.4	+36.1•	118.1	75 03.6	+39.1•	121.4	74 31.0	+41.6•	124.5	73 55.8	+43.9	127.3	73 18.3	+45.9	130.0	72 38.8	+47.6	132.4	71 57.4	+49.2	134.7	71 14.4	+50.6	136.8	37
38	76 09.5	+33.3•	114.8	75 42.7	+36.5•	118.4	75 12.6	+39.5•	121.7	74 39.7	+42.0•	124.8	74 04.2	+44.3	127.7	73 26.4	+46.3	130.3	72 46.6	+48.0	132.8	72 05.0	+49.5	135.1	38
39	76 42.8	+30.2•	111.2	76 19.2	+33.8•	115.1	75 52.1	+37.0•	118.7	75 21.7	+39.9•	122.0	74 48.5	+42.5•	125.2	74 12.7	+44.7	128.1	73 34.6	+46.7	130.7	72 54.5	+48.4	133.2	39
40	77 13.0	+26.5•	107.4	76 53.0	+30.5•	111.5	76 29.1	+34.2•	115.4	76 01.6	+37.5•	119.0	75 31.0	+40.3•	122.4	74 57.4	+42.9	125.6	74 21.3	+45.1	128.5	73 42.9	+47.1	131.2	40
41	77 39.5	+22.6•	103.3	77 23.5	+26.9•	107.6	77 03.3	+30.9•	111.8	76 39.1	+34.6•	115.7	76 11.3	+37.9•	119.4	75 40.3	+40.8•	122.8	75 06.4	+43.4	126.0	74 30.0	+45.5	128.9	41
42	78 02.1	+18.2•	98.9	77 50.4	+23.0•	103.5	77 34.2	+27.4•	107.9	77 13.7	+31.4•	112.1	76 49.2	+35.1•	116.1	76 21.1	+38.4•	119.8	75 49.8	+41.2•	123.2	75 15.5	+43.8	126.4	42
43	78 20.3	+13.5•	94.2	78 13.4	+18.5•	99.0	78 01.6	+23.3•	103.7	77 45.1	+27.8•	108.2	77 24.3	+31.8•	112.4	76 59.5	+35.5•	116.4	76 31.0	+38.8•	120.2	75 59.3	+41.7•	123.6	43
44	78 33.8	+8.5•	89.3	78 31.9	+13.7•	94.3	78 24.9	+18.8•	99.2	78 12.9	+23.6•	103.9	77 56.1	+28.2•	108.4	77 35.0	+32.3•	112.8	77 09.8	+36.0•	116.8	76 41.0	+39.3•	120.6	44
45	78 42.3	+3.3•	84.3	78 45.6	+8.7•	89.3	78 43.7	+13.9•	94.4	78 36.5	+19.1•	99.3	78 24.3	+24.1•	104.1	78 07.3	+28.6•	108.8	77 45.8	+32.8•	113.1	77 20.3	+36.5•	117.2	45
46	78 45.6	−1.9•	79.2	78 54.3	+3.3•	84.2	78 57.6	+8.8•	89.3	78 55.6	+14.2•	94.5	78 48.4	+19.4•	99.5	78 35.9	+24.5•	104.4	78 18.6	+29.1•	109.1	77 56.8	+33.3•	113.5	46
47	78 43.7	−7.2•	74.1	78 57.6	−2.0•	79.0	79 06.4	+3.4•	84.1	79 09.8	+9.0•	89.3	79 07.8	+14.5•	94.6	79 00.4	+19.8•	99.7	78 47.7	+24.8•	104.7	78 30.1	+29.5•	109.4	47
48	78 36.5	−12.2•	69.0	78 55.6	−7.2•	73.8	79 08.4	−2.0•	78.8	79 18.8	+3.5•	84.0	79 22.3	+9.1•	89.3	79 20.2	+14.7•	94.7	79 12.5	+20.2•	99.9	78 59.6	+25.3•	105.0	48
49	78 24.3	−17.0•	64.1	78 48.4	−12.5•	68.7	79 07.8	−7.4•	73.5	79 22.3	−2.1•	78.6	79 31.4	+3.5•	83.9	79 34.9	+9.2•	89.4	79 32.7	+14.9•	94.8	79 24.9	+20.5•	100.1	49
50	78 07.3	−21.5•	59.4	78 35.9	−17.3•	63.7	79 00.4	−12.9•	68.3	79 20.2	−7.7•	73.2	79 34.9	−2.2•	78.4	79 44.1	+3.5•	83.9	79 47.6	+9.4•	89.4	79 45.4	+15.2•	94.9	50
51	77 45.8	−25.5•	54.9	78 18.6	−21.8•	58.9	78 47.7	−17.6•	63.2	79 12.5	−12.9•	67.9	79 32.7	−7.8•	72.9	79 47.6	−2.2•	78.2	79 57.0	+3.6•	83.8	80 00.6	+9.6•	89.4	51
52	77 20.3	−29.2•	50.7	77 56.8	−25.9•	54.4	78 30.1	−22.2•	58.4	78 59.6	−17.9•	62.7	79 24.9	−13.2•	67.5	79 45.4	−8.0•	72.6	80 00.6	−2.3•	78.0	80 10.2	+3.6•	83.7	52
53	76 51.1	−32.5•	46.8	77 30.9	−29.7•	50.1	78 07.9	−26.4•	53.8	78 41.7	−22.6•	57.8	79 11.7	−18.3•	62.2	79 37.4	−13.5•	67.1	79 58.3	−8.3•	72.3	80 13.8	−2.5•	77.8	53
54	76 18.6	−35.5•	43.2	77 01.2	−32.9•	46.2	77 41.5	−30.0•	49.5	78 19.1	−26.8•	53.1	78 53.4	−23.1•	57.2	79 23.9	−18.7•	61.7	79 50.0	−13.8•	66.6	80 11.3	−8.5•	71.9	54
55	75 43.1	−38.0•	39.9	76 28.3	−35.9•	42.5	77 11.5	−33.4•	45.5	77 52.3	−30.6•	48.8	78 30.3	−27.2•	52.5	79 05.2	−23.5•	56.6	79 36.2	−19.1•	61.2	80 02.8	−14.2•	66.2	55
56	75 05.1	−40.3•	36.8	75 52.4	−38.4•	39.2	76 38.1	−36.4•	41.8	77 21.7	−33.8•	44.8	78 03.1	−31.0•	48.1	78 41.7	−27.7•	51.8	79 17.1	−24.0•	56.0	79 48.6	−19.5•	60.6	56
57	74 24.8	−42.2•	34.0	75 14.0	−40.7•	36.1	76 01.7	−38.8•	38.4	76 47.9	−36.8•	41.1	77 32.1	−34.4•	44.1	78 14.0	−31.6•	47.4	78 53.1	−28.2•	51.1	79 29.1	−24.5•	55.3	57
58	73 42.6	−44.0•	31.4	74 33.3	−42.6•	33.3	75 22.9	−41.1•	35.4	76 11.1	−39.3•	37.7	76 57.7	−37.2•	40.4	77 42.4	−34.8•	43.3	78 24.9	−32.1•	46.7	79 04.6	−28.7•	50.4	58
59	72 58.6	−45.5•	29.0	73 50.7	−44.4•	30.7	74 41.8	−43.1•	32.5	75 31.8	−41.6•	34.6	76 20.5	−39.8•	37.0	77 07.6	−37.8•	39.6	77 52.8	−35.4•	42.5	78 35.9	−32.7•	45.9	59
60	72 13.1	−46.8•	26.8	73 06.3	−45.8•	28.3	73 58.7	−44.7•	30.0	74 50.2	−43.4•	31.8	75 40.7	−42.0•	33.9	76 29.8	−40.3•	36.2	77 17.4	−38.2•	38.8	78 03.2	−35.9•	41.7	60
61	71 26.3	−48.0•	24.8	72 20.5	−47.2•	26.1	73 14.0	−46.2•	27.6	74 06.8	−45.2•	29.2	74 58.7	−43.9•	31.0	75 49.5	−42.4•	33.1	76 39.2	−40.8•	35.4	77 27.3	−38.8•	38.0	61
62	70 38.3	−49.0•	23.0	71 33.3	−48.3•	24.1	72 27.8	−47.5•	25.4	73 21.6	−46.5•	26.9	74 14.8	−45.4•	28.5	75 07.1	−44.3•	30.3	75 58.4	−42.9•	32.3	76 48.5	−41.3•	34.5	62
63	69 49.3	−50.0•	21.3	70 45.0	−49.3•	22.3	71 40.3	−48.7•	23.4	72 35.1	−47.9•	24.7	73 29.2	−46.9•	26.1	74 22.8	−46.0•	27.7	75 15.5	−44.8•	29.5	76 07.2	−43.4•	31.4	63
64	68 59.3	−50.7•	19.7	69 55.7	−50.3•	20.6	70 51.6	−49.6•	21.6	71 47.2	−49.0•	22.7	72 42.3	−48.2•	24.0	73 36.8	−47.4•	25.4	74 30.7	−46.4•	26.9	75 23.8	−45.3•	28.6	64
65	68 08.6	−51.5•	18.2	69 05.4	−51.0•	19.1	70 02.0	−50.5•	19.9	70 58.2	−49.9•	20.9	71 54.1	−49.3•	22.0	72 49.4	−48.5•	23.2	73 44.3	−47.8•	24.6	74 38.5	−46.8•	26.1	65
66	67 17.1	−52.1•	16.9	68 14.4	−51.7•	17.6	69 11.5	−51.3•	18.4	70 08.3	−50.8•	19.3	71 04.8	−50.3•	20.2	72 00.9	−49.7•	21.3	72 56.5	−48.9•	22.5	73 51.7	−48.1•	23.8	66
67	66 25.0	−52.7•	15.6	67 22.7	−52.3•	16.3	68 20.2	−52.0•	17.0	69 17.5	−51.6•	17.7	70 14.5	−51.1•	18.6	71 11.2	−50.6•	19.5	72 07.6	−50.0•	20.5	73 03.6	−49.4•	21.7	67
68	65 32.3	−53.1•	14.4	66 30.4	−52.9•	15.0	67 28.2	−52.5•	15.6	68 25.9	−52.2•	16.3	69 23.4	−51.8•	17.1	70 20.6	−51.4•	17.9	71 17.6	−50.9•	18.8	72 14.2	−50.3•	19.8	68
69	64 39.2	−53.7•	13.3	65 37.5	−53.4•	13.8	66 35.7	−53.2•	14.4	67 33.7	−52.8•	15.0	68 31.6	−52.5•	15.7	69 29.2	−52.1•	16.4	70 26.7	−51.7•	17.2	71 23.9	−51.2•	18.0	69
70	63 45.5	−54.0•	12.3	64 44.1	−53.9•	12.8	65 42.5	−53.6•	13.2	66 40.9	−53.4•	13.8	67 39.1	−53.1•	14.4	68 37.1	−52.7•	15.0	69 35.0	−52.4•	15.7	70 32.7	−52.0•	16.4	70
71	62 51.5	−54.5•	11.3	63 50.2	−54.2•	11.7	64 48.9	−54.0•	12.2	65 47.5	−53.8•	12.6	66 46.0	−53.5•	13.1	67 44.4	−53.3•	13.7	68 42.6	−53.0•	14.3	69 40.7	−52.7•	15.0	71
72	61 57.0	−54.7•	10.4	62 56.0	−54.6•	10.8	63 54.9	−54.4•	11.2	64 53.7	−54.2•	11.6	65 52.5	−54.1•	12.0	66 51.1	−53.8•	12.5	67 49.6	−53.5•	13.0	68 48.0	−53.3•	13.6	72
73	61 02.3	−55.1•	9.6	62 01.4	−54.9•	9.9	63 00.5	−54.8•	10.2	63 59.5	−54.6•	10.6	64 58.4	−54.4•	11.0	65 57.3	−54.3•	11.4	66 56.1	−54.1•	11.9	67 54.7	−53.8•	12.4	73
74	60 07.2	−55.4•	8.8	61 06.5	−55.3•	9.0	62 05.7	−55.1•	9.3	63 04.9	−55.0•	9.7	64 04.0	−54.8•	10.0	65 03.0	−54.6•	10.4	66 02.0	−54.4•	10.8	67 00.9	−54.2•	11.2	74
75	59 11.8	−55.6•	8.0	60 11.2	−55.5•	8.3	61 10.6	−55.4•	8.5	62 09.9	−55.3•	8.8	63 09.2	−55.2•	9.1	64 08.4	−55.0•	9.4	65 07.6	−54.9•	9.8	66 06.7	−54.7•	10.1	75
76	58 16.2	−55.8•	7.3	59 15.7	−55.7•	7.5	60 15.2	−55.7•	7.7	61 14.6	−55.5•	8.0	62 14.0	−55.4•	8.2	63 13.4	−55.3•	8.5	64 12.7	−55.2•	8.8	65 12.0	−55.1•	9.1	76
77	57 20.4	−56.1•	6.6	58 20.0	−56.0•	6.8	59 19.5	−55.8•	7.0	60 19.1	−55.8•	7.2	61 18.6	−55.7•	7.4	62 18.1	−55.6•	7.7	63 17.5	−55.5•	7.9	64 16.9	−55.3•	8.2	77
78	56 24.3	−56.2•	5.9	57 24.0	−56.2•	6.1	58 23.7	−56.3•	6.3	59 23.3	−56.1•	6.5	60 22.9	−56.0•	6.7	61 22.5	−55.9•	6.9	62 22.0	−55.8•	7.1	63 21.6	−55.7•	7.3	78
79	55 28.1	−56.4•	5.3	56 27.8	−56.4•	5.5	57 27.5	−56.3•	5.6	58 27.2	−56.2•	5.8	59 26.9	−56.2•	5.9	60 26.6	−56.1•	6.1	61 26.2	−56.0•	6.3	62 25.9	−56.0•	6.5	79
80	54 31.7	−56.6•	4.7	55 31.4	−56.5•	4.9	56 31.2	−56.5•	5.0	57 31.0	−56.4•	5.1	58 30.7	−56.3•	5.3	59 30.5	−56.3•	5.4	60 30.2	−56.3•	5.6	61 29.9	−56.2•	5.8	80
81	53 35.1	−56.8•	4.2	54 34.9	−56.7•	4.3	55 34.7	−56.6•	4.4	56 34.6	−56.7•	4.5	57 34.4	−56.6•	4.6	58 34.2	−56.6•	4.7	59 33.9	−56.4•	4.9	60 33.7	−56.5•	5.0	81
82	52 38.3	−56.9•	3.6	53 38.2	−56.9•	3.7	54 38.1	−56.9•	3.8	55 37.9	−56.8•	3.9	56 37.8	−56.8•	4.0	57 37.6	−56.7•	4.1	58 37.5	−56.7•	4.2	59 37.3	−56.6•	4.4	82
83	51 41.4	−57.0•	3.1	52 41.3	−57.0•	3.2	53 41.2	−56.9•	3.3	54 41.1	−56.9•	3.3	55 41.0	−56.9•	3.4	56 40.9	−56.8•	3.5	57 40.8	−56.8•	3.6	58 40.7	−56.8•	3.7	83
84	50 44.4	−57.1•	2.6	51 44.3	−57.1•	2.7	52 44.3	−57.1•	2.7	53 44.2	−57.1•	2.7	54 44.1	−57.0•	2.9	55 44.1	−57.1•	2.9	56 44.0	−57.0•	3.0	57 43.9	−57.0•	3.1	84
85	49 47.3	−57.3•	2.1	50 47.2	−57.2•	2.2	51 47.2	−57.2•	2.2	52 47.1	−57.2•	2.3	53 47.1	−57.1•	2.3	54 47.0	−57.1•	2.4	55 47.0	−57.2•	2.4	56 46.9	−57.1•	2.5	85
86	48 50.0	−57.4•	1.7	49 50.0	−57.4•	1.7	50 50.0	−57.4•	1.7	51 49.9	−57.3•	1.8	52 49.9	−57.3•	1.8	53 49.9	−57.3•	1.9	54 49.8	−57.3•	1.9	55 49.8	−57.3•	2.0	86
87	47 52.6	−57.4•	1.2	48 52.6	−57.4•	1.3	49 52.6	−57.4•	1.3	50 52.6	−57.4•	1.3	51 52.6	−57.4•	1.4	52 52.6	−57.4•	1.4	53 52.5	−57.4•	1.4	54 52.5	−57.4•	1.5	87
88	46 55.2	−57.6•	0.8	47 55.2	−57.6•	0.8	48 55.2	−57.6•	0.8	49 55.2	−57.6•	0.9	50 55.2	−57.5•	0.9	51 55.2	−57.5•	0.9	52 55.1	−57.5•	0.9	53 55.1	−57.5•	0.9	88
89	45 57.6	−57.6•	0.4	46 57.6	−57.6•	0.4	47 57.6	−57.6•	0.4	48 57.6	−57.6•	0.4	49 57.6	−57.6•	0.4	50 57.6	−57.6•	0.4	51 57.6	−57.6•	0.4	52 57.6	−57.6•	0.5	89
90	45 00.0	−57.7•	0.0	46 00.0	−57.7•	0.0	47 00.0	−57.7•	0.0	48 00.0	−57.7•	0.0	49 00.0	−57.7•	0.0	50 00.0	−57.7•	0.0	51 00.0	−57.7•	0.0	52 00.0	−57.7•	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	42 49.3	−57.9	157.9	41 53.6	−58.0	158.3	40 57.8	−58.1	158.6	40 01.9	−58.3	158.9	39 05.9	−58.4	159.2	38 09.7	−58.5	159.5	37 13.5	−58.6	159.7	36 17.1	−58.6	160.0	0
1	41 51.4	−57.9	158.3	40 55.6	−58.1	158.6	39 59.7	−58.2	158.9	39 03.6	−58.3	159.2	38 07.5	−58.4	159.5	37 11.2	−58.5	159.8	36 14.9	−58.6	160.3	35 18.5	−58.7	160.3	1
2	40 53.5	−58.0	158.6	39 57.5	−58.1	158.9	39 01.5	−58.3	159.2	38 05.3	−58.3	159.5	37 09.1	−58.5	159.8	36 12.7	−58.5	160.0	35 16.3	−58.7	160.3	34 19.8	−58.8	160.5	2
3	39 55.5	−58.1	159.0	38 59.4	−58.2	159.3	38 03.2	−58.3	159.5	37 07.0	−58.4	159.8	36 10.6	−58.5	160.1	35 14.2	−58.6	160.3	34 17.6	−58.6	160.5	33 21.0	−58.8	160.7	3
4	38 57.4	−58.1	159.3	38 01.2	−58.2	159.6	37 05.0	−58.4	159.8	36 08.6	−58.4	160.1	35 10.2	−58.5	160.4	34 13.6	−58.6	160.6	33 17.0	−58.7	160.8	32 22.3	−58.8	161.0	4
5	37 59.3	−58.2	159.6	37 03.0	−58.3	159.9	36 06.6	−58.4	160.1	35 10.2	−58.5	160.4	34 13.6	−58.6	160.6	33 17.0	−58.7	160.8	32 20.3	−58.8	161.0	31 23.5	−58.8	161.2	5
6	37 01.1	−58.2	159.9	36 04.7	−58.3	160.2	35 08.2	−58.4	160.4	34 11.7	−58.5	160.6	33 15.0	−58.6	160.9	32 18.3	−58.7	161.1	31 21.5	−58.7	161.3	30 24.7	−58.9	161.5	6
7	36 02.9	−58.2	160.2	35 06.4	−58.3	160.5	34 09.8	−58.4	160.7	33 13.2	−58.6	160.9	32 16.4	−58.6	161.1	31 19.6	−58.7	161.3	30 22.8	−58.8	161.5	29 25.8	−58.9	161.7	7
8	35 04.7	−58.3	160.5	34 08.1	−58.4	160.7	33 11.4	−58.5	161.0	32 14.6	−58.5	161.2	31 17.8	−58.6	161.4	30 20.9	−58.7	161.6	29 24.0	−58.8	161.7	28 27.0	−58.9	161.9	8
9	34 06.4	−58.4	160.8	33 09.7	−58.4	161.0	32 12.9	−58.5	161.2	31 16.1	−58.6	161.4	30 19.2	−58.7	161.6	29 22.2	−58.8	161.8	28 25.2	−58.9	162.0	27 28.1	−58.9	162.1	9
10	33 08.0	−58.3	161.1	32 11.3	−58.5	161.3	31 14.4	−58.6	161.5	30 17.5	−58.7	161.7	29 20.5	−58.7	161.9	28 23.4	−58.8	162.0	27 26.3	−58.8	162.2	26 29.2	−58.9	162.3	10
11	32 09.7	−58.4	161.4	31 12.8	−58.5	161.6	30 15.8	−58.5	161.7	29 18.8	−58.6	161.9	28 21.8	−58.8	162.1	27 24.6	−58.8	162.3	26 27.5	−58.9	162.4	25 30.3	−59.0	162.6	11
12	31 11.3	−58.5	161.6	30 14.3	−58.5	161.8	29 17.3	−58.6	162.0	28 20.2	−58.7	162.2	27 23.0	−58.7	162.3	26 25.8	−58.8	162.5	25 28.6	−58.9	162.6	24 31.3	−58.9	162.8	12
13	30 12.8	−58.5	161.9	29 15.8	−58.6	162.1	28 18.7	−58.7	162.2	27 21.5	−58.7	162.4	26 24.3	−58.8	162.6	25 27.0	−58.8	162.7	24 29.7	−58.9	162.8	23 32.4	−59.0	163.0	13
14	29 14.4	−58.5	162.2	28 17.2	−58.6	162.3	27 20.0	−58.6	162.5	26 22.8	−58.7	162.6	25 25.5	−58.8	162.8	24 28.2	−58.9	162.9	23 30.8	−58.9	163.0	22 33.4	−59.0	163.2	14
15	28 15.9	−58.6	162.4	27 18.6	−58.6	162.6	26 21.4	−58.7	162.7	25 24.1	−58.8	162.9	24 26.7	−58.8	163.0	23 29.3	−58.9	163.1	22 31.9	−59.0	163.2	21 34.4	−59.0	163.4	15
16	27 17.3	−58.5	162.7	26 20.0	−58.6	162.8	25 22.7	−58.7	163.0	24 25.3	−58.7	163.1	23 27.9	−58.8	163.2	22 30.4	−58.9	163.3	21 32.9	−58.9	163.4	20 35.4	−59.0	163.6	16
17	26 18.8	−58.5	162.9	25 21.4	−58.6	163.0	24 24.0	−58.7	163.2	23 26.6	−58.8	163.3	22 29.1	−58.9	163.4	21 31.5	−58.9	163.5	20 34.0	−59.0	163.6	19 36.4	−59.1	163.8	17
18	25 20.2	−58.6	163.1	24 22.8	−58.7	163.3	23 25.3	−58.7	163.4	22 27.8	−58.8	163.5	21 30.2	−58.8	163.6	20 32.6	−58.9	163.7	19 35.0	−59.0	163.8	18 37.4	−59.1	163.9	18
19	24 21.6	−58.6	163.4	23 24.1	−58.7	163.5	22 26.6	−58.8	163.6	21 29.0	−58.8	163.7	20 31.4	−58.9	163.9	19 33.7	−58.9	163.9	18 36.0	−59.0	164.0	17 38.3	−59.0	164.1	19
20	23 23.0	−58.7	163.6	22 25.4	−58.7	163.7	21 27.8	−58.8	163.8	20 30.2	−58.9	163.9	19 32.5	−58.9	164.0	18 34.8	−59.0	164.1	17 37.0	−59.0	164.2	16 39.3	−59.0	164.3	20
21	22 24.3	−58.6	163.8	21 26.7	−58.7	164.0	20 29.0	−58.8	164.1	19 31.3	−58.8	164.2	18 33.6	−58.9	164.2	17 35.8	−58.9	164.3	16 38.0	−59.0	164.4	15 40.2	−59.0	164.5	21
22	21 25.7	−58.7	164.1	20 28.0	−58.8	164.2	19 30.2	−58.8	164.3	18 32.5	−58.9	164.4	17 34.7	−59.0	164.4	16 36.9	−59.0	164.5	15 39.0	−59.0	164.6	14 41.2	−59.1	164.7	22
23	20 27.0	−58.7	164.3	19 29.2	−58.7	164.4	18 31.4	−58.8	164.5	17 33.6	−58.9	164.6	16 35.7	−59.0	164.6	15 37.9	−59.0	164.7	14 40.0	−59.0	164.8	13 42.1	−59.1	164.9	23
24	19 28.3	−58.7	164.5	18 30.5	−58.8	164.6	17 32.6	−58.8	164.7	16 34.7	−58.8	164.8	15 36.8	−58.9	164.8	14 38.9	−59.0	164.9	13 41.0	−59.1	165.0	12 43.0	−59.1	165.0	24
25	18 29.6	−58.7	164.7	17 31.7	−58.8	164.8	16 33.8	−58.8	164.9	15 35.9	−58.9	165.0	14 37.9	−58.9	165.0	13 39.9	−59.0	165.1	12 41.9	−59.0	165.2	11 43.9	−59.1	165.2	25
26	17 30.9	−58.8	164.9	16 32.9	−58.8	165.0	15 35.0	−58.9	165.1	14 37.0	−58.9	165.2	13 39.0	−59.0	165.2	12 40.9	−59.0	165.3	11 42.9	−59.1	165.3	10 44.8	−59.1	165.4	26
27	16 32.1	−58.7	165.2	15 34.1	−58.8	165.2	14 36.1	−58.9	165.3	13 38.1	−59.0	165.4	12 40.0	−59.0	165.4	11 41.9	−59.0	165.5	10 43.8	−59.0	165.5	9 45.7	−59.1	165.6	27
28	15 33.4	−58.8	165.4	14 35.3	−58.8	165.4	13 37.2	−58.8	165.5	12 39.1	−59.0	165.6	11 41.0	−59.0	165.6	10 42.9	−59.1	165.7	9 44.8	−59.1	165.7	8 46.6	−59.1	165.7	28
29	14 34.6	−58.8	165.6	13 36.5	−58.9	165.6	12 38.4	−58.9	165.7	11 40.2	−58.9	165.7	10 42.1	−59.0	165.8	9 43.9	−59.0	165.8	8 45.7	−59.1	165.9	7 47.5	−59.1	165.9	29
30	13 35.8	−58.7	165.8	12 37.7	−58.9	165.8	11 39.5	−58.9	165.9	10 41.3	−58.9	165.9	9 43.1	−59.0	166.0	8 44.9	−59.1	166.0	7 46.6	−59.0	166.1	6 48.4	−59.1	166.1	30
31	12 37.1	−58.8	166.0	11 38.8	−58.8	166.0	10 40.6	−58.9	166.1	9 42.4	−59.0	166.1	8 44.1	−59.0	166.2	7 45.8	−59.0	166.2	6 47.6	−59.1	166.2	5 49.3	−59.1	166.3	31
32	11 38.3	−58.9	166.2	10 40.0	−58.9	166.2	9 41.7	−58.9	166.3	8 43.4	−59.0	166.3	7 45.1	−59.0	166.4	6 46.8	−59.0	166.4	5 48.5	−59.1	166.4	4 50.2	−59.2	166.4	32
33	10 39.5	−58.9	166.4	9 41.1	−58.8	166.4	8 42.8	−58.9	166.5	7 44.5	−59.0	166.5	6 46.1	−59.0	166.5	5 47.8	−59.1	166.6	4 49.4	−59.1	166.6	3 51.0	−59.2	166.6	33
34	9 40.6	−58.8	166.6	8 42.3	−58.9	166.6	7 43.9	−58.9	166.7	6 45.5	−59.0	166.7	5 47.1	−59.0	166.7	4 48.7	−59.0	166.7	3 50.3	−59.1	166.8	2 51.9	−59.1	166.8	34
35	8 41.8	−58.8	166.8	7 43.4	−58.8	166.8	6 45.0	−58.9	166.9	5 46.5	−58.9	166.9	4 48.1	−59.0	166.9	3 49.7	−59.1	166.9	2 51.2	−59.0	166.9	1 52.8	−59.2	166.9	35
36	7 43.0	−58.8	167.0	6 44.5	−58.8	167.0	5 46.1	−59.0	167.0	4 47.6	−59.0	167.1	3 49.1	−59.0	167.1	2 50.6	−59.0	167.1	1 52.1	−59.1	167.1	0 53.6	−59.1	167.1	36
37	6 44.2	−58.9	167.2	5 45.7	−58.9	167.2	4 47.1	−58.9	167.2	3 48.6	−58.9	167.3	2 50.1	−59.0	167.3	1 51.6	−59.1	167.3	0 53.0	−59.0	167.3	0 05.5	+59.1	12.7	37
38	5 45.3	−58.9	167.4	4 46.8	−58.9	167.4	3 48.2	−58.9	167.4	2 49.7	−59.0	167.4	1 51.1	−59.0	167.4	0 52.5	−59.0	167.5	0 06.0	+59.1	12.5	1 04.6	+59.1	12.5	38
39	4 46.5	−58.9	167.6	3 47.9	−58.9	167.6	2 49.3	−58.9	167.6	1 50.7	−59.0	167.6	0 52.1	−59.0	167.6	0 06.5	+59.1	12.4	1 05.1	+59.1	12.4	2 03.7	+59.2	12.4	39
40	3 47.6	−58.8	167.8	2 49.0	−58.9	167.8	1 50.4	−59.0	167.8	0 51.7	−59.0	167.8	0 06.9	+59.0	12.2	1 05.6	+59.0	12.2	2 04.2	+59.1	12.2	3 02.9	+59.1	12.2	40
41	2 48.8	−58.9	168.0	1 50.1	−58.9	168.0	0 51.4	−58.9	168.0	0 07.3	+58.9	12.0	1 05.9	+59.1	12.0	2 04.6	+59.1	12.0	3 03.3	+59.1	12.0	4 02.0	+59.1	12.0	41
42	1 50.0	−58.9	168.2	0 51.2	−58.9	168.2	0 07.5	+58.9	11.8	1 06.2	+59.0	11.8	2 05.0	+59.0	11.8	3 03.7	+59.0	11.8	4 02.4	+59.1	11.8	5 01.1	+59.1	11.9	42
43	0 51.1	−58.8	168.4	0 07.7	+58.8	11.6	1 06.4	+59.0	11.6	2 05.2	+59.0	11.6	3 04.0	+59.0	11.6	4 02.7	+59.1	11.7	5 01.5	+59.1	11.7	6 00.2	+59.2	11.7	43
44	0 07.7	+58.9	11.4	1 06.5	+58.9	11.4	2 05.4	+58.9	11.4	3 04.2	+58.9	11.5	4 03.0	+59.0	11.5	5 01.8	+59.0	11.5	6 00.6	+59.0	11.5	6 59.4	+59.1	11.5	44
45	1 06.6	+58.8	11.2	2 05.4	+58.9	11.2	3 04.3	+58.9	11.3	4 03.1	+59.0	11.3	5 02.0	+59.0	11.3	6 00.8	+59.0	11.3	6 59.6	+59.1	11.3	7 58.5	+59.1	11.4	45
46	2 05.4	+58.9	11.0	3 04.3	+58.9	11.1	4 03.2	+58.9	11.1	5 02.1	+59.0	11.1	6 01.0	+59.0	11.1	6 59.8	+59.1	11.1	7 58.7	+59.1	11.1	8 57.6	+59.1	11.2	46
47	3 04.3	+58.8	10.9	4 03.2	+58.9	10.9	5 02.1	+59.0	10.9	6 01.1	+58.9	10.9	7 00.0	+59.0	10.9	7 58.9	+59.0	10.9	8 57.8	+59.1	11.0	9 56.7	+59.1	11.0	47
48	4 03.1	+58.9	10.7	5 02.1	+58.9	10.7	6 01.1	+58.9	10.7	7 00.0	+59.0	10.7	7 59.0	+59.0	10.7	8 57.9	+59.0	10.8	9 56.9	+59.0	10.8	10 55.8	+59.1	10.8	48
49	5 02.0	+58.8	10.5	6 01.0	+58.8	10.5	7 00.0	+58.9	10.5	7 59.0	+58.9	10.5	8 58.0	+58.9	10.5	9 56.9	+59.1	10.6	10 55.9	+59.1	10.6	11 54.9	+59.1	10.7	49
50	6 00.8	+58.9	10.3	6 59.8	+58.9	10.3	7 58.9	+58.9	10.3	8 57.9	+59.0	10.3	9 56.9	+59.0	10.4	10 56.0	+59.0	10.4	11 55.0	+59.0	10.4	12 54.0	+59.1	10.5	50
51	6 59.6	+58.9	10.1	7 58.7	+58.9	10.1	8 57.8	+58.9	10.1	9 56.9	+58.9	10.1	10 55.9	+59.0	10.2	11 55.0	+59.0	10.2	12 54.0	+59.1	10.3	13 53.1	+59.0	10.3	51
52	7 58.5	+58.8	9.9	8 57.6	+58.8	9.9	9 56.7	+58.9	9.9	10 55.8	+58.9	10.0	11 54.9	+58.9	10.0	12 54.0	+59.0	10.0	13 53.1	+59.0	10.1	14 52.1	+59.1	10.1	52
53	8 57.3	+58.8	9.7	9 56.4	+58.9	9.7	10 55.6	+58.9	9.7	11 54.7	+58.9	9.8	12 53.8	+59.0	9.8	13 53.0	+59.0	9.8	14 52.1	+59.0	9.9	15 51.2	+59.0	9.9	53
54	9 56.1	+58.8	9.5	10 55.3	+58.8	9.5	11 54.5	+58.8	9.5	12 53.6	+59.0	9.6	13 52.8	+58.9	9.6	14 52.0	+58.9	9.6	15 51.1	+59.0	9.7	16 50.2	+59.1	9.7	54
55	10 54.9	+58.8	9.3	11 54.1	+58.9	9.3	12 53.3	+58.9	9.3	13 52.6	+58.9	9.4	14 51.7	+59.0	9.4	15 50.9	+59.0	9.5	16 50.1	+59.0	9.5	17 49.3	+59.0	9.6	55
56	11 53.7	+58.8	9.1	12 53.0	+58.8	9.1	13 52.2	+58.9	9.1	14 51.5	+58.9	9.2	15 50.7	+58.9	9.2	16 49.9	+58.9	9.3	17 49.1	+59.0	9.3	18 48.3	+59.0	9.4	56
57	12 52.5	+58.8	8.9	13 51.8	+58.8	8.9	14 51.1	+58.8	8.9	15 50.3	+58.9	9.0	16 49.6	+58.9	9.0	17 48.9	+58.9	9.1	18 48.1	+59.1	9.1	19 47.3	+59.1	9.2	57
58	13 51.3	+58.8	8.7	14 50.6	+58.8	8.7	15 49.9	+58.9	8.7	16 49.2	+58.9	8.8	17 48.5	+58.9	8.8	18 47.8	+58.9	8.9	19 47.1	+58.9	8.9	20 46.4	+58.9	9.0	58
59	14 50.1	+58.7	8.4	15 49.4	+58.8	8.5	16 48.8	+58.8	8.5	17 48.1	+58.9	8.6	18 47.4	+58.9	8.6	19 46.7	+59.0	8.7	20 46.0	+59.0	8.7	21 45.3	+59.0	8.8	59
60	15 48.8	+58.8	8.2	16 48.2	+58.8	8.3	17 47.6	+58.8	8.3	18 47.0	+58.8	8.4	19 46.3	+58.9	8.4	20 45.7	+58.9	8.5	21 45.0	+58.9	8.5	22 44.3	+59.0	8.6	60
61	16 47.6	+58.7	8.0	17 47.0	+58.8	8.1	18 46.4	+58.8	8.1	19 45.8	+58.8	8.2	20 45.2	+58.8	8.2	21 44.6	+58.9	8.3	22 43.9	+58.9	8.3	23 43.3	+59.0	8.4	61
62	17 46.3	+58.7	7.8	18 45.8	+58.7	7.9	19 45.2	+58.8	7.9	20 44.6	+58.8	8.0	21 43.9	+58.9	8.0	22 43.5	+58.8	8.1	23 42.8	+58.9	8.1	24 42.3	+58.9	8.2	62
63	18 45.0	+58.6	7.6	19 44.5	+58.7	7.6	20 44.0	+58.7	7.7	21 43.4	+58.7	7.7	22 42.9	+58.8	7.8	23 42.3	+58.9	7.9	24 41.8	+58.9	7.9	25 41.2	+58.9	8.0	63
64	19 43.8	+58.6	7.4	20 43.3	+58.7	7.4	21 42.8	+58.7	7.5	22 42.2	+58.8	7.5	23 41.7	+58.8	7.6	24 41.2	+58.8	7.6	25 40.7	+58.8	7.7	26 40.1	+58.9	7.8	64
65	20 42.4	+58.7	7.2	21 42.0	+58.7	7.2	22 41.5	+58.7	7.3	23 41.0	+58.8	7.3	24 40.5	+58.8	7.4	25 40.0	+58.8	7.4	26 39.5	+58.9	7.5	27 39.0	+58.9	7.6	65
66	21 41.1	+58.7	6.9	22 40.7	+58.7	7.0	23 40.2	+58.7	7.1	24 39.8	+58.7	7.1	25 39.3	+58.8	7.1	26 38.8	+58.8	7.2	27 38.4	+58.8	7.3	28 37.9	+58.8	7.3	66
67	22 39.8	+58.6	6.7	23 39.4	+58.6	6.8	24 38.9	+58.7	6.8	25 38.5	+58.7	6.9	26 38.1	+58.7	6.9	27 37.6	+58.8	7.0	28 37.2	+58.8	7.0	29 36.7	+58.9	7.1	67
68	23 38.4	+58.6	6.5	24 38.0	+58.7	6.5	25 37.6	+58.7	6.6	26 37.2	+58.7	6.6	27 36.8	+58.7	6.7	28 36.4	+58.7	6.7	29 36.0	+58.8	6.8	30 35.6	+58.8	6.9	68
69	24 37.0	+58.6	6.2	25 36.7	+58.6	6.3	26 36.3	+58.7	6.4	27 35.9	+58.7	6.4	28 35.5	+58.7	6.5	29 35.2	+58.7	6.5	30 34.8	+58.7	6.6	31 34.4	+58.8	6.7	69
70	25 35.6	+58.6	6.0	26 35.3	+58.6	6.1	27 35.0	+58.6	6.1	28 34.6	+58.7	6.2	29 34.3	+58.6	6.2	30 33.9	+58.7	6.3	31 33.5	+58.8	6.4	32 33.2	+58.7	6.4	70
71	26 34.2	+58.5	5.8	27 33.9	+58.6	5.8	28 33.6	+58.6	5.9	29 33.3	+58.6	5.9	30 32.9	+58.7	6.0	31 32.6	+58.7	6.0	32 32.3	+58.7	6.1	33 31.9	+58.8	6.2	71
72	27 32.7	+58.5	5.5	28 32.5	+58.5	5.6	29 32.2	+58.5	5.6	30 31.9	+58.6	5.7	31 31.6	+58.6	5.7	32 31.3	+58.6	5.8	33 31.0	+58.6	5.9	34 30.7	+58.7	5.9	72
73	28 31.3	+58.4	5.3	29 31.0	+58.5	5.3	30 30.7	+58.6	5.4	31 30.5	+58.5	5.4	32 30.2	+58.6	5.5	33 29.9	+58.6	5.5	34 29.6	+58.7	5.6	35 29.4	+58.6	5.7	73
74	29 29.7	+58.5	5.0	30 29.5	+58.5	5.1	31 29.3	+58.5	5.1	32 29.0	+58.6	5.2	33 28.8	+58.5	5.2	34 28.5	+58.6	5.3	35 28.3	+58.6	5.4	36 28.0	+58.6	5.4	74
75	30 28.2	+58.4	4.7	31 28.0	+58.5	4.8	32 27.8	+58.5	4.9	33 27.6	+58.5	4.9	34 27.3	+58.6	5.0	35 27.1	+58.6	5.0	36 26.9	+58.6	5.2	37 26.6	+58.6	5.2	75
76	31 26.6	+58.4	4.5	32 26.5	+58.4	4.5	33 26.3	+58.4	4.6	34 26.1	+58.4	4.6	35 25.9	+58.5	4.7	36 25.7	+58.5	4.8	37 25.5	+58.5	4.8	38 25.2	+58.6	4.9	76
77	32 25.0	+58.4	4.2	33 24.9	+58.4	4.3	34 24.7	+58.4	4.3	35 24.5	+58.5	4.4	36 24.4	+58.4	4.4	37 24.2	+58.5	4.5	38 24.0	+58.5	4.5	39 23.8	+58.5	4.6	77
78	33 23.4	+58.3	3.9	34 23.3	+58.3	4.0	35 23.1	+58.4	4.0	36 23.0	+58.4	4.1	37 22.8	+58.4	4.1	38 22.6	+58.5	4.2	39 22.5	+58.4	4.2	40 22.3	+58.5	4.3	78
79	34 21.7	+58.3	3.7	35 21.6	+58.3	3.7	36 21.5	+58.3	3.7	37 21.3	+58.4	3.8	38 21.2	+58.4	3.8	39 21.1	+58.4	3.9	40 20.9	+58.4	4.0	41 20.8	+58.4	4.0	79
80	35 20.0	+58.2	3.4	36 19.9	+58.3	3.4	37 19.8	+58.3	3.5	38 19.7	+58.3	3.5	39 19.6	+58.3	3.5	40 19.5	+58.3	3.6	41 19.3	+58.4	3.7	42 19.2	+58.4	3.7	80
81	36 18.2	+58.2	3.1	37 18.2	+58.2	3.1	38 18.1	+58.2	3.1	39 18.0	+58.2	3.2	40 17.9	+58.2	3.2	41 17.8	+58.3	3.3	42 17.7	+58.3	3.4	43 17.6	+58.3	3.4	81
82	37 16.4	+58.1	2.8	38 16.4	+58.1	2.8	39 16.3	+58.2	2.8	40 16.2	+58.2	2.9	41 16.1	+58.3	2.9	42 16.1	+58.2	3.0	43 16.0	+58.3	3.0	44 15.9	+58.3	3.1	82
83	38 14.6	+58.1	2.5	39 14.5	+58.1	2.5	40 14.5	+58.1	2.5	41 14.4	+58.2	2.6	42 14.4	+58.1	2.6	43 14.3	+58.2	2.6	44 14.2	+58.2	2.7	45 14.2	+58.2	2.7	83
84	39 12.7	+58.0	2.1	40 12.6	+58.1	2.1	41 12.6	+58.1	2.2	42 12.6	+58.0	2.2	43 12.5	+58.1	2.3	44 12.5	+58.1	2.3	45 12.4	+58.1	2.4	46 12.4	+58.1	2.4	84
85	40 10.7	+58.0	1.8	41 10.7	+58.0	1.8	42 10.7	+58.0	1.9	43 10.6	+58.1	1.9	44 10.6	+58.0	1.9	45 10.6	+58.0	2.0	46 10.5	+58.1	2.0	47 10.5	+58.1	2.0	85
86	41 08.7	+57.9	1.5	42 08.7	+57.9	1.5	43 08.7	+57.9	1.5	44 08.7	+57.9	1.5	45 08.6	+58.0	1.6	46 08.6	+58.0	1.6	47 08.6	+58.0	1.6	48 08.6	+57.9	1.7	86
87	42 06.6	+57.9	1.1	43 06.6	+57.9	1.1	44 06.6	+57.9	1.2	45 06.6	+57.9	1.2	46 06.6	+57.9	1.2	47 06.6	+57.9	1.2	48 06.6	+57.9	1.2	49 06.5	+58.0	1.3	87
88	43 04.5	+57.8	0.8	44 04.5	+57.8	0.8	45 04.5	+57.8	0.8	46 04.5	+57.8	0.8	47 04.5	+57.8	0.8	48 04.5	+57.8	0.8	49 04.5	+57.8	0.8	50 04.5	+57.8	0.9	88
89	44 02.3	+57.7	0.4	45 02.3	+57.7	0.4	46 02.3	+57.7	0.4	47 02.3	+57.7	0.4	48 02.3	+57.7	0.4	49 02.3	+57.7	0.4	50 02.3	+57.7	0.4	51 02.3	+57.7	0.4	89
90	45 00.0	+57.6	0.0	46 00.0	+57.6	0.0	47 00.0	+57.6	0.0	48 00.0	+57.6	0.0	49 00.0	+57.6	0.0	50 00.0	+57.6	0.0	51 00.0	+57.6	0.0	52 00.0	+57.6	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z }

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	42 32.9	+57.5	156.6	41 37.7	+57.7	157.0	40 42.5	+57.8	157.3	39 47.0	+58.0	157.6	38 51.5	+58.1	157.9	37 55.8	+58.3	158.2	37 00.0	+58.4	158.5	36 04.1	+58.5	158.8	0
1	43 30.4	+57.5	156.2	42 35.4	+57.7	156.6	41 40.3	+57.8	157.0	40 45.0	+58.0	157.3	39 49.6	+58.1	157.6	38 54.1	+58.2	157.9	37 58.4	+58.3	158.2	37 02.6	+58.5	158.5	1
2	44 27.9	+57.4	155.8	43 33.1	+57.5	156.2	42 38.1	+57.7	156.6	41 43.0	+57.8	157.0	40 47.7	+58.0	157.3	39 52.3	+58.1	157.6	38 56.7	+58.3	157.9	38 01.1	+58.3	158.2	2
3	45 25.3	+57.3	155.4	44 30.6	+57.5	155.8	43 35.8	+57.7	156.2	42 40.8	+57.8	156.6	41 45.7	+57.9	157.0	40 50.4	+58.1	157.3	39 55.0	+58.2	157.6	38 59.4	+58.3	157.9	3
4	46 22.6	+57.2	155.0	45 28.1	+57.4	155.4	44 33.5	+57.5	155.8	43 38.6	+57.5	156.2	42 43.6	+57.9	156.6	41 48.5	+58.0	157.0	40 53.2	+58.2	157.3	39 57.8	+58.3	157.6	4
5	47 19.8	+57.1	154.5	46 25.5	+57.3	155.0	45 31.0	+57.5	155.4	44 36.4	+57.6	155.9	43 41.5	+57.8	156.2	42 46.5	+58.0	156.6	41 51.4	+58.1	157.0	40 56.1	+58.2	157.3	5
6	48 16.9	+56.9	154.1	47 22.8	+57.2	154.6	46 28.5	+57.4	155.0	45 34.0	+57.6	155.5	44 39.3	+57.8	155.9	43 44.5	+57.9	156.3	42 49.5	+58.0	156.6	41 54.3	+58.2	157.0	6
7	49 13.8	+56.9	153.6	48 20.0	+57.0	154.1	47 25.9	+57.3	154.6	46 31.6	+57.5	155.1	45 37.1	+57.6	155.5	44 42.4	+57.8	155.9	43 47.5	+58.0	156.3	42 52.5	+58.2	156.7	7
8	50 10.7	+56.7	153.1	49 17.0	+57.0	153.7	48 23.2	+57.1	154.2	47 29.1	+57.3	154.6	46 34.7	+57.5	155.1	45 40.2	+57.8	155.5	44 45.5	+57.9	155.9	43 50.7	+58.0	156.3	8
9	51 07.4	+56.6	152.6	50 14.0	+56.8	153.2	49 20.3	+57.1	153.7	48 26.4	+57.3	154.2	47 32.3	+57.5	154.7	46 38.0	+57.6	155.1	45 43.4	+57.9	155.5	44 48.7	+58.0	156.0	9
10	52 04.0	+56.4	152.1	51 10.8	+56.7	152.7	50 17.4	+56.9	153.2	49 23.7	+57.2	153.7	48 29.8	+57.4	154.2	47 35.6	+57.6	154.7	46 41.3	+57.7	155.2	45 46.7	+57.8	155.5	10
11	53 00.4	+56.3	151.5	52 07.5	+56.6	152.1	51 14.3	+56.8	152.7	50 20.9	+57.0	153.3	49 27.2	+57.2	153.8	48 33.2	+57.5	154.3	47 39.0	+57.7	154.8	46 44.5	+57.8	155.2	11
12	53 56.7	+56.1	150.9	53 04.1	+56.4	151.6	52 11.1	+56.7	152.2	51 17.9	+57.0	152.8	50 24.4	+57.2	153.3	49 30.7	+57.4	153.9	48 36.7	+57.6	154.4	47 42.5	+57.8	154.8	12
13	54 52.8	+55.9	150.3	54 00.5	+56.2	151.0	53 07.8	+56.5	151.7	52 14.9	+56.7	152.3	51 21.6	+57.0	152.9	50 28.1	+57.2	153.4	49 34.3	+57.5	153.9	48 40.3	+57.7	154.4	13
14	55 48.7	+55.6	149.7	54 56.7	+56.0	150.4	54 04.3	+56.4	151.1	53 11.6	+56.7	151.7	52 18.6	+56.9	152.4	51 25.3	+57.2	152.9	50 31.8	+57.4	153.5	49 38.0	+57.6	154.0	14
15	56 44.3	+55.5	149.0	55 52.7	+55.8	149.8	55 00.7	+56.1	150.5	54 08.3	+56.4	151.2	53 15.5	+56.8	151.8	52 22.5	+57.0	152.4	51 29.2	+57.2	153.0	50 35.6	+57.4	153.6	15
16	57 39.8	+55.2	148.3	56 48.5	+55.6	149.1	55 56.8	+56.0	149.9	55 04.7	+56.3	150.6	54 12.3	+56.6	151.3	53 19.5	+56.9	151.9	52 26.4	+57.2	152.5	51 33.0	+57.4	153.1	16
17	58 35.0	+54.9	147.6	57 44.1	+55.4	148.4	56 52.8	+55.7	149.2	56 01.0	+56.1	150.0	55 08.9	+56.4	150.7	54 16.4	+56.7	151.4	53 23.6	+57.0	152.0	52 30.4	+57.3	152.7	17
18	59 29.9	+54.7	146.8	58 39.5	+55.1	147.7	57 48.5	+55.6	148.5	56 57.1	+55.9	149.3	56 05.3	+56.3	150.1	55 13.1	+56.6	150.8	54 20.6	+56.8	151.5	53 27.7	+57.1	152.2	18
19	60 24.6	+54.3	146.0	59 34.6	+54.8	146.9	58 44.1	+55.2	147.8	57 53.0	+55.7	148.7	57 01.6	+56.0	149.5	56 09.7	+56.4	150.2	55 17.4	+56.7	151.0	54 24.8	+57.0	151.6	19
20	61 18.9	+54.0	145.1	60 29.4	+54.5	146.1	59 39.3	+55.0	147.1	58 48.7	+55.4	148.0	57 57.6	+55.9	148.8	57 06.1	+56.2	149.6	56 14.1	+56.5	150.4	55 21.8	+56.8	151.1	20
21	62 12.9	+53.6	144.2	61 23.9	+54.2	145.2	60 34.3	+54.7	146.3	59 44.1	+55.2	147.2	58 53.5	+55.5	148.1	58 02.3	+56.0	149.0	57 10.6	+56.4	149.8	56 18.6	+56.7	150.5	21
22	63 06.5	+53.1	143.2	62 18.1	+53.7	144.3	61 29.0	+54.3	145.4	60 39.3	+54.9	146.4	59 49.0	+55.4	147.4	58 58.3	+55.7	148.3	58 07.0	+56.1	149.1	57 15.3	+56.5	149.9	22
23	63 59.6	+52.7	142.1	63 11.8	+53.4	143.4	62 23.3	+54.0	144.5	61 34.2	+54.5	145.6	60 44.4	+55.0	146.6	59 54.0	+55.5	147.5	59 03.1	+55.9	148.4	58 11.8	+56.3	149.3	23
24	64 52.3	+52.1	141.0	64 05.2	+52.9	142.3	63 17.3	+53.6	143.5	62 28.7	+54.2	144.7	61 39.4	+54.7	145.8	60 49.5	+55.2	146.8	59 59.0	+55.7	147.7	59 08.1	+56.0	148.6	24
25	65 44.4	+51.5	139.8	64 58.1	+52.3	141.2	64 10.9	+53.1	142.5	63 22.9	+53.7	143.7	62 34.1	+54.4	144.9	61 44.7	+54.9	146.0	60 54.7	+55.4	147.0	60 04.1	+55.9	147.9	25
26	66 35.9	+50.9	138.6	65 50.4	+51.8	140.1	65 04.0	+52.6	141.4	64 16.6	+53.4	142.7	63 28.5	+54.0	144.0	62 39.6	+54.6	145.1	61 50.1	+55.1	146.2	61 00.0	+55.5	147.2	26
27	67 26.8	+50.2	137.2	66 42.2	+51.2	138.8	65 56.6	+52.0	140.3	65 10.0	+52.8	141.7	64 22.5	+53.5	143.0	63 34.2	+54.2	144.2	62 45.2	+54.8	145.3	61 55.5	+55.3	146.4	27
28	68 17.0	+49.3	135.8	67 33.4	+50.4	137.5	66 48.6	+51.4	139.0	66 02.8	+52.3	140.5	65 16.0	+53.1	141.9	64 28.4	+53.8	143.2	63 40.0	+54.4	144.4	62 50.8	+55.0	145.6	28
29	69 06.3	+48.4	134.2	68 23.8	+49.6	136.0	67 40.0	+50.7	137.7	66 55.1	+51.7	139.3	66 09.1	+52.6	140.8	65 22.2	+53.3	142.2	64 34.4	+54.0	143.4	63 45.8	+54.6	144.7	29
30	69 54.7	+47.4	132.5	69 13.4	+48.8	134.5	68 30.7	+50.0	136.3	67 46.8	+51.0	138.0	67 01.7	+51.9	139.6	66 15.5	+52.8	141.0	65 28.4	+53.5	142.4	64 40.4	+54.3	143.7	30
31	70 42.1	+46.2	130.7	70 02.2	+47.7	132.8	69 20.7	+49.0	134.7	68 37.8	+50.2	136.5	67 53.6	+51.3	138.2	67 08.3	+52.2	139.8	66 21.9	+53.1	141.3	65 34.7	+53.7	142.7	31
32	71 28.3	+44.9	128.7	70 49.9	+46.5	131.0	70 09.7	+48.0	133.1	69 28.0	+49.3	135.0	68 44.9	+50.5	136.8	68 00.5	+51.6	138.5	67 15.0	+52.5	140.1	66 28.4	+53.3	141.6	32
33	72 13.2	+43.4	126.6	71 36.4	+45.2	129.0	70 57.7	+46.9	131.3	70 17.3	+48.4	133.4	69 35.4	+49.7	135.3	68 52.1	+50.8	137.1	68 07.5	+51.8	138.8	67 21.7	+52.8	140.4	33
34	72 56.6	+41.6	124.3	72 21.6	+43.8	126.9	71 44.6	+45.6	129.3	71 05.7	+47.2	131.6	70 25.1	+48.7	133.7	69 42.9	+50.0	135.6	68 59.3	+51.1	137.5	68 15.0	+52.1	139.2	34
35	73 38.2	+39.8•	121.8	73 05.4	+42.1	124.6	72 30.2	+44.2	127.2	71 52.9	+46.0	129.6	71 13.8	+47.6	131.9	70 32.9	+49.0	134.0	69 50.4	+50.3	136.0	69 06.6	+51.4	137.8	35
36	74 18.0	+37.6•	119.1	73 47.5	+40.1•	122.1	73 14.4	+42.4	124.9	72 38.9	+44.5	127.5	72 01.4	+46.3	130.0	71 21.9	+48.0	132.2	70 40.7	+49.4	134.4	69 58.0	+50.7	136.3	36
37	74 55.6	+35.1•	116.1	74 27.6	+38.0•	119.4	73 56.8	+40.6	122.4	73 23.4	+42.9	125.2	72 47.7	+44.9	127.9	72 09.9	+46.7	130.3	71 30.1	+48.3	132.6	70 48.7	+49.7	134.7	37
38	75 30.7	+32.4•	112.9	75 05.6	+35.6•	116.4	74 37.4	+38.5•	119.7	74 06.3	+41.0•	122.7	73 32.6	+43.3	125.6	72 56.6	+45.3	128.2	72 18.4	+47.2	130.7	71 38.4	+48.7	133.0	38
39	76 03.1	+29.2•	109.5	75 41.2	+32.8•	113.2	75 15.9	+35.9•	116.7	74 47.3	+38.9•	120.0	74 15.9	+41.5•	123.1	73 41.9	+43.8	126.0	73 05.6	+45.7	128.6	72 27.1	+47.5	131.1	39
40	76 32.3	+25.8•	105.8	76 14.0	+29.6•	109.8	75 51.8	+33.2•	113.5	75 26.2	+36.4•	117.0	74 57.4	+39.3•	120.4	74 25.7	+41.8•	123.5	73 51.3	+44.2	126.3	73 14.6	+46.2	129.0	40
41	76 58.1	+22.0•	101.9	76 43.6	+26.2•	106.0	76 25.0	+30.1•	110.0	76 02.6	+33.7•	113.8	75 36.7	+36.9•	117.4	75 07.5	+39.8•	120.7	74 35.5	+42.3•	123.9	74 00.8	+44.6	126.8	41
42	77 20.1	+17.9•	97.7	77 09.8	+22.3•	102.1	76 55.1	+26.6•	106.3	76 36.3	+30.5•	110.3	76 13.6	+34.1•	114.1	75 47.3	+37.3•	117.7	75 17.8	+40.2•	121.1	74 45.4	+42.8	124.3	42
43	77 38.0	+13.4•	93.3	77 32.1	+18.2•	97.8	77 21.7	+22.7•	102.2	77 06.8	+27.0•	106.5	76 47.7	+30.9•	110.6	76 24.6	+34.6•	114.5	75 58.0	+37.8•	118.1	75 28.2	+40.7•	121.5	43
44	77 51.4	+8.7•	88.7	77 50.3	+13.6•	93.3	77 44.4	+18.4•	97.9	77 33.8	+23.0•	102.4	77 18.6	+27.4•	106.8	76 59.2	+31.4•	110.9	76 35.8	+35.1•	114.9	76 08.9	+38.3•	118.5	44
45	78 00.1	+3.8•	84.0	78 03.9	+8.9•	88.7	78 02.8	+13.9•	93.4	77 56.8	+18.8•	98.1	77 46.0	+23.5•	102.7	77 30.6	+27.8•	107.1	77 10.9	+31.9•	111.3	76 47.2	+35.5•	115.3	45
46	78 03.9	–1.1•	79.2	78 12.8	+3.9•	83.9	78 16.7	+9.0•	88.7	78 15.6	+14.1•	93.5	78 09.5	+19.0•	98.2	77 58.4	+23.9•	102.9	77 42.8	+28.2•	107.4	77 22.7	+32.4•	111.6	46
47	78 02.8	–6.0•	74.3	78 16.7	–1.1•	79.0	78 25.7	+4.0•	83.8	78 29.7	+9.2•	88.7	78 28.5	+14.4•	93.6	78 22.3	+19.4•	98.4	78 11.0	+24.3•	103.2	77 55.1	+28.7•	107.7	47
48	77 56.8	–10.8•	69.5	78 15.6	–6.1•	74.0	78 29.7	–1.2•	78.8	78 38.9	+4.0•	83.7	78 42.9	+9.3•	88.6	78 41.7	+14.6•	93.7	78 35.3	+19.7•	98.6	78 23.8	+24.7•	103.4	48
49	77 46.0	–15.4•	64.9	78 09.5	–11.1•	69.2	78 28.5	–6.2•	73.8	78 42.9	–1.2•	78.6	78 52.2	+4.1•	83.6	78 56.3	+9.5•	88.7	78 55.0	+14.9•	93.8	78 48.5	+20.1•	98.8	49
50	77 30.6	–19.7•	60.3	77 58.4	–15.6•	64.4	78 22.3	–11.3•	68.8	78 41.7	–6.4•	73.5	78 56.3	–1.3•	78.4	79 05.8	+4.1•	83.5	79 09.9	+9.6•	88.7	79 08.6	+15.1•	93.9	50
51	77 10.9	–23.7•	56.0	77 42.8	–20.1•	59.8	78 11.0	–15.9•	64.0	78 35.3	–11.5•	68.4	78 55.0	–6.5•	73.2	79 09.9	–1.3•	78.0	79 19.5	+4.2•	83.4	79 23.7	+9.8•	88.7	51
52	76 47.2	–27.4•	51.9	77 22.7	–24.1•	55.5	77 55.1	–20.5•	59.3	78 23.8	–16.3•	63.5	78 48.5	–11.8•	68.0	79 08.6	–6.8•	72.9	79 23.7	–1.4•	78.0	79 33.5	+4.1•	83.3	52
53	76 19.8	–30.6•	48.1	76 58.6	–27.8•	51.3	77 34.6	–24.4•	54.9	78 07.5	–20.8•	58.8	78 36.7	–16.6•	63.0	79 01.8	–12.0•	67.6	79 22.3	–7.0•	72.5	79 37.6	–1.5•	77.8	53
54	75 49.2	–33.7•	44.5	76 30.8	–31.0•	47.5	77 10.2	–28.3•	50.7	77 46.7	–24.9•	54.3	78 20.1	–21.2•	58.2	78 49.8	–17.0•	62.5	79 15.3	–12.3•	67.2	79 36.1	–7.1•	72.2	54
55	75 15.5	–36.2•	41.2	75 59.8	–34.1•	43.9	76 41.9	–31.5•	46.8	77 21.8	–28.7•	50.0	77 58.9	–25.4•	53.6	78 32.8	–21.7•	57.6	79 03.0	–17.4•	62.0	79 29.0	–12.7•	66.7	55
56	74 39.3	–38.6•	38.2	75 25.7	–36.7•	40.5	76 10.4	–34.3•	43.2	76 53.1	–32.0•	46.1	77 33.5	–29.1•	49.4	78 11.1	–25.8•	53.0	78 45.6	–22.1•	57.0	79 16.3	–17.8•	61.4	56
57	74 00.7	–40.6•	35.3	74 49.0	–39.0•	37.4	75 35.9	–37.1•	39.8	76 21.1	–34.9•	42.4	77 04.4	–32.5•	45.4	77 45.3	–29.6•	48.7	78 23.5	–26.4•	52.3	78 58.5	–22.6•	56.4	57
58	73 20.1	–42.5	32.7	74 10.0	–41.0	34.6	74 58.8	–39.4•	36.7	75 46.2	–37.6•	39.1	76 31.9	–35.5•	41.7	77 15.7	–33.0•	44.6	77 57.1	–30.1•	47.9	78 35.9	–26.9•	51.6	58
59	72 37.6	–44.0	30.3	73 29.0	–42.8	32.0	74 19.4	–41.5	33.9	75 08.6	–39.9•	36.0	75 56.4	–38.0•	38.3	76 42.7	–36.0•	40.9	77 27.0	–33.6•	43.9	78 09.0	–30.7•	47.2	59
60	71 53.6	–45.5	28.1	72 46.2	–44.5	29.6	73 37.9	–43.3	31.2	74 28.7	–41.9	33.1	75 18.4	–40.4•	35.2	76 06.7	–38.6•	37.5	76 53.4	–36.5•	40.1	77 38.3	–34.1•	43.1	60
61	71 08.1	–46.7	26.0	72 01.7	–45.8	27.3	72 54.6	–44.8	28.8	73 46.8	–43.7	30.5	74 38.0	–42.4	32.3	75 28.1	–40.8•	34.4	76 16.9	–39.0•	36.7	77 04.2	–37.0•	39.3	61
62	70 21.4	–47.9	24.1	71 15.9	–47.1	25.3	72 09.8	–46.2	26.6	73 03.1	–45.2	28.1	73 55.6	–44.1	29.7	74 47.3	–42.8	31.5	75 37.9	–41.4•	33.6	76 27.2	–39.6•	35.9	62
63	69 33.5	–48.8	22.3	70 28.8	–48.2	23.4	71 23.6	–47.4	24.6	72 17.9	–46.6	25.9	73 11.5	–45.6	27.3	74 04.5	–44.6	28.8	74 56.5	–43.3	30.7	75 47.6	–41.9•	32.7	63
64	68 44.7	–49.7	20.7	69 40.6	–49.1	21.7	70 36.2	–48.5	22.7	71 31.3	–47.8	23.9	72 25.9	–46.9	25.1	73 19.9	–46.0	26.5	74 13.2	–45.0	28.1	75 05.7	–43.8	29.9	64
65	67 55.0	–50.5	19.2	68 51.5	–50.0	20.0	69 47.7	–49.5	21.0	70 43.5	–48.8	22.0	71 39.0	–48.2	23.1	72 33.9	–47.4	24.4	73 28.2	–46.4	25.7	74 21.9	–45.4	27.3	65
66	67 04.5	–51.2	17.8	68 01.5	–50.8	18.5	68 58.2	–50.2	19.4	69 54.7	–49.8	20.3	70 50.8	–49.2	21.3	71 46.5	–48.5	22.3	72 41.8	–47.8	23.6	73 36.5	–46.9	24.9	66
67	66 13.3	–51.8	16.5	67 10.7	–51.4	17.1	68 08.0	–51.1	17.9	69 04.9	–50.5	18.7	70 01.6	–50.0	19.5	70 58.0	–49.5	20.5	71 54.0	–48.9	21.6	72 49.6	–48.2	22.8	67
68	65 21.5	–52.4	15.2	66 19.3	–52.1	15.8	67 16.9	–51.7	16.5	68 14.4	–51.4	17.2	69 11.6	–50.9	18.0	70 08.5	–50.4	18.7	71 05.1	–49.8	19.7	72 01.4	–49.2	20.8	68
69	64 29.1	–52.9	14.1	65 27.2	–52.6	14.6	66 25.2	–52.3	15.2	67 23.0	–51.9	15.8	68 20.7	–51.6	16.5	69 18.1	–51.2	17.2	70 15.3	–50.8	18.1	71 12.2	–50.3	19.0	69
70	63 36.2	–53.3	13.0	64 34.6	–53.1	13.5	65 32.9	–52.8	14.0	66 31.1	–52.6	14.5	67 29.1	–52.3	15.1	68 26.9	–51.9	15.8	69 24.5	–51.5	16.5	70 21.9	–51.0	17.3	70
71	62 42.9	–53.8	12.0	63 41.5	–53.5	12.4	64 40.1	–53.3	12.9	65 38.5	–53.1	13.3	66 36.8	–52.8	13.9	67 35.0	–52.5	14.5	68 33.0	–52.1	15.1	69 30.9	–51.8	15.8	71
72	61 49.1	–54.1	11.0	62 48.0	–54.0	11.4	63 46.8	–53.8	11.8	64 45.4	–53.5	12.2	65 44.0	–53.3	12.7	66 42.5	–53.0	13.2	67 40.9	–52.8	13.8	68 39.1	–52.5	14.4	72
73	60 55.0	–54.5	10.1	61 54.0	–54.3	10.5	62 53.0	–54.1	10.8	63 51.9	–54.0	11.2	64 50.7	–53.7	11.6	65 49.5	–53.6	12.0	66 48.1	–53.3	12.5	67 46.6	–53.1	13.1	73
74	60 00.5	–54.7	9.3	60 59.7	–54.6	9.6	61 58.9	–54.4	9.9	62 57.9	–54.3	10.2	63 57.0	–54.2	10.6	64 55.9	–54.0	11.0	65 54.8	–53.8	11.4	66 53.5	–53.5	11.8	74
75	59 05.8	–55.1	8.5	60 05.1	–55.0	8.7	61 04.4	–54.9	9.0	62 03.6	–54.7	9.3	63 02.8	–54.6	9.6	64 01.9	–54.4	9.9	65 01.0	–54.2	10.3	65 59.9	–54.4	10.7	75
76	58 10.7	–55.3	7.7	59 10.1	–55.2	7.9	60 09.5	–55.1	8.2	61 08.9	–54.9	8.4	62 08.2	–54.8	8.7	63 07.5	–54.7	9.0	64 06.8	–54.6	9.3	65 05.9	–54.4	9.7	76
77	57 15.4	–55.6	7.0	58 14.9	–55.5	7.2	59 14.4	–55.4	7.4	60 13.9	–55.3	7.6	61 13.4	–55.2	7.9	62 12.8	–55.1	8.1	63 12.2	–55.0	8.4	64 11.5	–54.8	8.7	77
78	56 19.8	–55.8	6.3	57 19.4	–55.7	6.5	58 19.0	–55.6	6.6	59 18.6	–55.5	6.8	60 18.2	–55.5	7.0	61 17.7	–55.3	7.2	62 17.2	–55.2	7.5	63 16.7	–55.1	7.8	78
79	55 24.0	–55.9	5.6	56 23.7	–55.9	5.8	57 23.4	–55.8	5.9	58 23.1	–55.8	6.1	59 22.7	–55.7	6.3	60 22.4	–55.7	6.5	61 22.0	–55.6	6.7	62 21.6	–55.5	6.9	79
80	54 28.1	–56.2	5.0	55 27.8	–56.1	5.1	56 27.6	–56.1	5.3	57 27.3	–56.0	5.4	58 27.0	–55.9	5.6	59 26.7	–55.8	5.7	60 26.4	–55.8	5.9	61 26.1	–55.7	6.1	80
81	53 31.9	–56.3	4.4	54 31.7	–56.3	4.5	55 31.5	–56.2	4.6	56 31.3	–56.2	4.8	57 31.1	–56.1	4.9	58 30.9	–56.1	5.0	59 30.6	–56.0	5.2	60 30.4	–56.0	5.3	81
82	52 35.6	–56.5	3.8	53 35.4	–56.4	3.9	54 35.3	–56.5	4.0	55 35.1	–56.4	4.1	56 35.0	–56.4	4.2	57 34.8	–56.3	4.4	58 34.6	–56.2	4.5	59 34.4	–56.2	4.6	82
83	51 39.1	–56.7	3.3	52 39.0	–56.7	3.4	53 38.8	–56.5	3.4	54 38.7	–56.5	3.5	55 38.6	–56.5	3.6	56 38.5	–56.5	3.7	57 38.4	–56.4	3.8	58 38.2	–56.4	3.9	83
84	50 42.4	–56.8	2.8	51 42.3	–56.7	2.8	52 42.3	–56.8	2.9	53 42.2	–56.7	3.0	54 42.1	–56.7	3.0	55 42.0	–56.6	3.1	56 41.9	–56.6	3.2	57 41.8	–56.6	3.3	84
85	49 45.6	–56.9	2.3	50 45.6	–56.9	2.3	51 45.5	–56.8	2.4	52 45.5	–56.9	2.4	53 45.4	–56.8	2.5	54 45.4	–56.8	2.6	55 45.3	–56.8	2.6	56 45.2	–56.7	2.7	85
86	48 48.7	–57.0	1.8	49 48.7	–57.0	1.8	50 48.7	–57.0	1.8	51 48.6	–56.9	1.9	52 48.6	–57.0	1.9	53 48.6	–57.0	2.0	54 48.5	–56.9	2.0	55 48.5	–56.9	2.1	86
87	47 51.7	–57.1	1.3	48 51.7	–57.1	1.3	49 51.7	–57.1	1.4	50 51.7	–57.2	1.4	51 51.6	–57.1	1.4	52 51.6	–57.1	1.5	53 51.6	–57.1	1.5	54 51.6	–57.2	1.5	87
88	46 54.6	–57.3	0.9	47 54.6	–57.3	0.9	48 54.6	–57.3	0.9	49 54.5	–57.2	0.9	50 54.5	–57.2	0.9	51 54.5	–57.2	0.9	52 54.5	–57.2	1.0	53 54.5	–57.2	1.0	88
89	45 57.3	–57.3	0.4	46 57.3	–57.3	0.4	47 57.3	–57.3	0.4	48 57.3	–57.3	0.4	49 57.3	–57.3	0.5	50 57.3	–57.3	0.5	51 57.3	–57.3	0.5	52 57.3	–57.3	0.5	89
90	45 00.0	–57.4	0.0	46 00.0	–57.4	0.0	47 00.0	–57.4	0.0	48 00.0	–57.4	0.0	49 00.0	–57.4	0.0	50 00.0	–57.4	0.0	51 00.0	–57.4	0.0	52 00.0	–57.4	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 17°, 343°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	42 32.9	−57.6	156.6	41 37.7	−57.7	157.0	40 42.5	−58.0	157.3	39 47.0	−58.0	157.6	38 51.5	−58.2	157.9	37 55.8	−58.3	158.2	37 00.0	−58.4	158.5	36 04.1	−58.5	158.8	0
1	41 35.3	−57.7	157.0	40 40.0	−57.9	157.3	39 44.5	−57.9	157.7	38 49.0	−58.1	158.0	37 53.3	−58.2	158.3	36 57.5	−58.3	158.5	36 01.6	−58.4	158.8	35 05.6	−58.5	159.1	1
2	40 37.6	−57.8	157.4	39 42.1	−57.9	157.7	38 46.6	−58.1	158.0	37 50.9	−58.2	158.3	36 55.1	−58.3	158.6	35 59.2	−58.4	158.8	35 03.2	−58.5	159.1	34 07.1	−58.6	159.3	2
3	39 39.8	−57.8	157.7	38 44.2	−57.9	158.0	37 48.5	−58.1	158.3	36 52.7	−58.2	158.6	35 56.8	−58.3	158.9	35 00.8	−58.4	159.1	34 04.7	−58.5	159.4	33 08.5	−58.6	159.6	3
4	38 42.0	−57.9	158.1	37 46.3	−58.0	158.3	36 50.4	−58.1	158.6	35 54.5	−58.2	158.9	34 58.5	−58.4	159.1	34 02.4	−58.5	159.4	33 06.2	−58.5	159.6	32 09.9	−58.7	159.8	4
5	37 44.1	−58.0	158.4	36 48.3	−58.1	158.7	35 52.3	−58.2	158.9	34 56.3	−58.3	159.2	34 00.1	−58.3	159.4	33 03.9	−58.5	159.7	32 07.6	−58.6	159.9	31 11.2	−58.6	160.1	5
6	36 46.1	−57.9	158.7	35 50.2	−58.1	159.0	34 54.1	−58.2	159.2	33 58.0	−58.3	159.5	33 01.8	−58.5	159.7	32 05.4	−58.5	159.9	31 09.0	−58.6	160.1	30 12.6	−58.7	160.3	6
7	35 48.2	−58.1	159.0	34 52.1	−58.2	159.3	33 55.9	−58.2	159.5	32 59.7	−58.4	159.8	32 03.3	−58.4	160.0	31 06.9	−58.5	160.2	30 10.4	−58.6	160.4	29 13.9	−58.7	160.6	7
8	34 50.1	−58.1	159.3	33 53.9	−58.2	159.6	32 57.7	−58.3	159.8	32 01.3	−58.4	160.0	31 04.9	−58.5	160.2	30 08.4	−58.6	160.4	29 11.8	−58.7	160.6	28 15.2	−58.7	160.8	8
9	33 52.0	−58.1	159.6	32 55.7	−58.2	159.9	31 59.4	−58.4	160.1	31 02.9	−58.4	160.3	30 06.4	−58.5	160.5	29 09.8	−58.6	160.7	28 13.1	−58.7	160.9	27 16.4	−58.8	161.0	9
10	32 53.9	−58.2	159.9	31 57.5	−58.3	160.2	31 01.0	−58.4	160.4	30 04.5	−58.5	160.6	29 07.9	−58.6	160.8	28 11.2	−58.7	160.9	27 14.4	−58.7	161.1	26 17.6	−58.7	161.3	10
11	31 55.7	−58.2	160.2	30 59.2	−58.3	160.4	30 02.6	−58.4	160.6	29 06.0	−58.5	160.8	28 09.3	−58.6	161.0	27 12.5	−58.6	161.2	26 15.7	−58.7	161.3	25 18.9	−58.8	161.5	11
12	30 57.5	−58.2	160.5	30 00.9	−58.3	160.7	29 04.2	−58.4	160.9	28 07.5	−58.5	161.1	27 10.7	−58.6	161.2	26 13.9	−58.7	161.4	25 17.0	−58.8	161.6	24 20.0	−58.8	161.7	12
13	29 59.3	−58.3	160.8	29 02.6	−58.4	161.0	28 05.8	−58.4	161.2	27 09.0	−58.5	161.3	26 12.1	−58.6	161.5	25 15.2	−58.7	161.6	24 18.2	−58.7	161.8	23 21.2	−58.9	161.9	13
14	29 01.0	−58.3	161.1	28 04.2	−58.4	161.2	27 07.4	−58.5	161.4	26 10.5	−58.6	161.6	25 13.5	−58.6	161.7	24 16.5	−58.7	161.9	23 19.5	−58.8	162.0	22 22.4	−58.9	162.1	14
15	28 02.7	−58.4	161.3	27 05.8	−58.4	161.5	26 08.9	−58.6	161.7	25 11.9	−58.6	161.8	24 14.9	−58.7	162.0	23 17.8	−58.8	162.1	22 20.7	−58.8	162.2	21 23.5	−58.9	162.3	15
16	27 04.3	−58.4	161.6	26 07.4	−58.5	161.8	25 10.3	−58.5	161.9	24 13.3	−58.6	162.1	23 16.2	−58.7	162.2	22 19.0	−58.7	162.3	21 21.9	−58.9	162.4	20 24.6	−58.8	162.6	16
17	26 05.9	−58.4	161.9	25 08.9	−58.5	162.0	24 11.8	−58.5	162.1	23 14.7	−58.7	162.3	22 17.5	−58.7	162.4	21 20.3	−58.8	162.5	20 23.0	−58.8	162.6	19 25.8	−59.0	162.8	17
18	25 07.5	−58.4	162.1	24 10.4	−58.5	162.3	23 13.3	−58.6	162.4	22 16.0	−58.6	162.5	21 18.8	−58.7	162.6	20 21.5	−58.8	162.7	19 24.2	−58.9	162.9	18 26.8	−58.9	163.0	18
19	24 09.1	−58.4	162.4	23 11.9	−58.5	162.5	22 14.7	−58.6	162.6	21 17.4	−58.7	162.7	20 20.1	−58.8	162.9	19 22.7	−58.8	163.0	18 25.3	−58.9	163.1	17 27.9	−58.9	163.2	19
20	23 10.7	−58.5	162.6	22 13.4	−58.5	162.7	21 16.1	−58.6	162.9	20 18.7	−58.7	163.0	19 21.3	−58.8	163.1	18 23.9	−58.8	163.2	17 26.5	−58.9	163.3	16 29.0	−58.9	163.4	20
21	22 12.2	−58.5	162.9	21 14.8	−58.5	163.0	20 17.5	−58.7	163.1	19 20.0	−58.7	163.2	18 22.6	−58.8	163.3	17 25.1	−58.8	163.4	16 27.6	−58.9	163.5	15 30.1	−59.0	163.5	21
22	21 13.7	−58.5	163.1	20 16.3	−58.6	163.2	19 18.8	−58.6	163.3	18 21.3	−58.7	163.4	17 23.8	−58.8	163.5	16 26.3	−58.9	163.6	15 28.7	−58.9	163.7	14 31.1	−58.9	163.7	22
23	20 15.2	−58.6	163.3	19 17.7	−58.6	163.4	18 20.2	−58.7	163.5	17 22.6	−58.7	163.6	16 25.0	−58.8	163.7	15 27.4	−58.8	163.8	14 29.8	−58.9	163.9	13 32.2	−59.0	163.9	23
24	19 16.6	−58.5	163.6	18 19.1	−58.6	163.7	17 21.5	−58.7	163.7	16 23.9	−58.8	163.8	15 26.2	−58.8	163.9	14 28.6	−58.9	164.0	13 30.9	−58.9	164.1	12 33.2	−59.0	164.1	24
25	18 18.1	−58.6	163.8	17 20.5	−58.7	163.9	16 22.8	−58.7	164.0	15 25.1	−58.7	164.0	14 27.4	−58.8	164.1	13 29.7	−58.9	164.2	12 32.0	−59.0	164.2	11 34.2	−59.0	164.3	25
26	17 19.5	−58.6	164.0	16 21.8	−58.6	164.1	15 24.1	−58.7	164.2	14 26.4	−58.8	164.3	13 28.6	−58.8	164.3	12 30.8	−58.9	164.4	11 33.0	−58.9	164.4	10 35.2	−59.0	164.5	26
27	16 20.9	−58.6	164.2	15 23.2	−58.7	164.3	14 25.4	−58.7	164.4	13 27.6	−58.8	164.5	12 29.8	−58.8	164.5	11 32.0	−58.9	164.6	10 34.1	−58.9	164.6	9 36.2	−58.9	164.7	27
28	15 22.3	−58.6	164.5	14 24.5	−58.6	164.5	13 26.7	−58.7	164.6	12 28.8	−58.8	164.7	11 31.0	−58.9	164.7	10 33.1	−58.9	164.8	9 35.2	−59.0	164.8	8 37.3	−59.0	164.9	28
29	14 23.7	−58.6	164.7	13 25.9	−58.7	164.8	12 28.0	−58.7	164.8	11 30.0	−58.8	164.9	10 32.1	−58.8	164.9	9 34.2	−58.9	165.0	8 36.2	−59.0	165.0	7 38.3	−59.1	165.0	29
30	13 25.1	−58.6	164.9	12 27.2	−58.7	165.0	11 29.2	−58.7	165.0	10 31.2	−58.8	165.1	9 33.3	−58.9	165.1	8 35.3	−58.9	165.2	7 37.3	−59.0	165.2	6 39.2	−59.0	165.2	30
31	12 26.5	−58.7	165.1	11 28.5	−58.7	165.2	10 30.5	−58.8	165.2	9 32.4	−58.8	165.3	8 34.4	−58.9	165.3	7 36.4	−59.0	165.4	6 38.3	−59.0	165.4	5 40.2	−59.0	165.5	31
32	11 27.8	−58.6	165.3	10 29.8	−58.7	165.4	9 31.7	−58.8	165.4	8 33.6	−58.8	165.5	7 35.5	−58.8	165.5	6 37.4	−58.9	165.5	5 39.3	−58.9	165.6	4 41.2	−59.0	165.6	32
33	10 29.2	−58.7	165.6	9 31.1	−58.8	165.6	8 32.9	−58.7	165.6	7 34.8	−58.8	165.7	6 36.7	−58.9	165.7	5 38.5	−58.9	165.7	4 40.4	−59.0	165.8	3 42.2	−59.0	165.8	33
34	9 30.5	−58.7	165.8	8 32.3	−58.7	165.8	7 34.2	−58.8	165.8	6 36.0	−58.8	165.9	5 37.8	−58.9	165.9	4 39.6	−58.9	165.9	3 41.4	−59.0	165.9	2 43.2	−59.0	166.0	34
35	8 31.8	−58.6	166.0	7 33.6	−58.7	166.0	6 35.4	−58.8	166.0	5 37.2	−58.9	166.1	4 38.9	−58.9	166.1	3 40.7	−59.0	166.1	2 42.4	−58.9	166.1	1 44.2	−59.0	166.1	35
36	7 33.2	−58.7	166.2	6 34.9	−58.7	166.2	5 36.6	−58.8	166.3	4 38.3	−58.8	166.3	3 40.0	−58.8	166.3	2 41.7	−58.9	166.3	1 43.5	−59.0	166.3	0 45.2	−59.1	166.3	36
37	6 34.5	−58.7	166.4	5 36.2	−58.8	166.4	4 37.8	−58.8	166.5	3 39.5	−58.9	166.5	2 41.2	−59.0	166.5	1 42.8	−58.9	166.5	0 44.5	−59.0	166.5	0 13.9	+59.0	13.5	37
38	5 35.8	−58.7	166.6	4 37.4	−58.7	166.6	3 39.0	−58.8	166.7	2 40.7	−58.9	166.7	1 42.3	−58.9	166.7	0 43.9	−58.9	166.7	0 14.5	+59.0	13.3	1 12.9	+59.0	13.3	38
39	4 37.1	−58.7	166.8	3 38.7	−58.8	166.8	2 40.2	−58.7	166.9	1 41.8	−58.8	166.9	0 43.4	−58.9	166.9	0 15.0	+59.0	13.1	1 13.5	+58.9	13.1	2 11.9	+59.0	13.1	39
40	3 38.4	−58.7	167.0	2 39.9	−58.7	167.0	1 41.5	−58.8	167.1	0 43.0	−58.9	167.1	0 15.5	+58.9	12.9	1 14.0	+58.9	12.9	2 12.4	+59.0	13.0	3 10.9	+59.0	13.0	40
41	2 39.7	−58.7	167.2	1 41.2	−58.8	167.2	0 42.7	−58.8	167.3	0 15.9	+58.8	12.7	1 14.4	+58.9	12.8	2 12.9	+58.9	12.8	3 11.4	+59.0	12.8	4 09.9	+59.0	12.8	41
42	1 41.0	−58.7	167.4	0 42.4	−58.7	167.5	0 16.1	+58.8	12.5	1 14.7	+58.8	12.6	2 13.3	+58.8	12.6	3 11.8	+59.0	12.6	4 10.4	+59.0	12.6	5 08.9	+59.1	12.6	42
43	0 42.3	−58.7	167.7	0 16.3	+58.8	12.3	1 14.9	+58.8	12.3	2 13.5	+58.9	12.4	3 12.1	+58.9	12.4	4 10.8	+58.9	12.4	5 09.4	+58.9	12.4	6 08.0	+59.0	12.4	43
44	0 16.4	+58.7	12.1	1 15.1	+58.7	12.1	2 13.7	+58.8	12.2	3 12.4	+58.8	12.2	4 11.0	+58.9	12.2	5 09.7	+58.9	12.2	6 08.3	+59.0	12.2	7 07.0	+59.0	12.2	44
45	1 15.1	+58.7	11.9	2 13.8	+58.8	11.9	3 12.5	+58.8	12.0	4 11.2	+58.8	12.0	5 09.9	+58.9	12.0	6 08.6	+58.9	12.0	7 07.3	+59.0	12.0	8 06.0	+59.0	12.1	45
46	2 13.8	+58.7	11.7	3 12.6	+58.7	11.7	4 11.3	+58.8	11.8	5 10.0	+58.9	11.8	6 08.8	+58.9	11.8	7 07.5	+58.9	11.8	8 06.2	+59.0	11.8	9 05.0	+59.0	11.9	46
47	3 12.5	+58.7	11.5	4 11.3	+58.7	11.5	5 10.1	+58.8	11.5	6 08.9	+58.8	11.6	7 07.7	+58.8	11.6	8 06.4	+58.9	11.6	9 05.2	+58.9	11.6	10 04.0	+58.9	11.7	47
48	4 11.2	+58.7	11.3	5 10.0	+58.8	11.3	6 08.9	+58.8	11.3	7 07.7	+58.8	11.4	8 06.5	+58.8	11.4	9 05.3	+58.9	11.4	10 04.1	+59.0	11.5	11 02.9	+59.0	11.5	48
49	5 09.9	+58.7	11.1	6 08.8	+58.7	11.1	7 07.7	+58.7	11.1	8 06.5	+58.8	11.2	9 05.4	+58.8	11.2	10 04.2	+58.9	11.2	11 03.1	+58.9	11.3	12 01.9	+59.0	11.3	49
50	6 08.6	+58.7	10.9	7 07.5	+58.7	10.9	8 06.4	+58.8	10.9	9 05.3	+58.8	11.0	10 04.2	+58.9	11.0	11 03.1	+58.9	11.0	12 02.0	+58.9	11.1	13 00.9	+59.0	11.1	50
51	7 07.3	+58.7	10.7	8 06.2	+58.8	10.7	9 05.2	+58.8	10.7	10 04.1	+58.8	10.8	11 03.1	+58.9	10.8	12 02.0	+58.9	10.8	13 00.9	+58.9	10.9	13 59.9	+58.9	10.9	51
52	8 06.0	+58.6	10.5	9 05.0	+58.7	10.5	10 04.0	+58.7	10.5	11 02.9	+58.8	10.6	12 01.9	+58.8	10.6	13 00.9	+58.9	10.6	13 59.9	+58.9	10.7	14 58.8	+58.9	10.7	52
53	9 04.6	+58.7	10.3	10 03.7	+58.7	10.3	11 02.7	+58.8	10.3	12 01.7	+58.8	10.4	13 00.7	+58.8	10.4	13 59.8	+58.8	10.4	14 58.8	+58.9	10.5	15 57.8	+58.9	10.5	53
54	10 03.3	+58.7	10.1	11 02.4	+58.7	10.1	12 01.5	+58.7	10.1	13 00.5	+58.8	10.2	13 59.6	+58.8	10.2	14 58.6	+58.9	10.2	15 57.7	+58.8	10.3	16 56.7	+58.9	10.3	54
55	11 02.0	+58.6	9.8	12 01.1	+58.7	9.9	13 00.2	+58.7	9.9	13 59.3	+58.8	10.0	14 58.4	+58.8	10.0	15 57.5	+58.8	10.0	16 56.5	+58.9	10.1	17 55.6	+58.9	10.2	55
56	12 00.6	+58.7	9.6	12 59.8	+58.6	9.7	13 58.9	+58.7	9.7	14 58.1	+58.7	9.7	15 57.2	+58.8	9.8	16 56.3	+58.8	9.8	17 55.4	+58.9	9.9	18 54.5	+58.9	10.0	56
57	12 59.3	+58.6	9.4	13 58.4	+58.7	9.4	14 57.6	+58.7	9.5	15 56.8	+58.7	9.5	16 56.0	+58.7	9.6	17 55.1	+58.8	9.6	18 54.3	+58.8	9.7	19 53.4	+58.9	9.7	57
58	13 57.9	+58.6	9.2	14 57.1	+58.7	9.2	15 56.3	+58.7	9.3	16 55.5	+58.8	9.3	17 54.7	+58.8	9.4	18 53.9	+58.8	9.4	19 53.1	+58.9	9.5	20 52.3	+58.9	9.5	58
59	14 56.5	+58.6	9.0	15 55.8	+58.6	9.1	16 55.0	+58.7	9.1	17 54.3	+58.7	9.1	18 53.5	+58.7	9.2	19 52.7	+58.8	9.2	20 52.0	+58.8	9.3	21 51.2	+58.9	9.3	59
60	15 55.1	+58.6	8.7	16 54.4	+58.6	8.8	17 53.7	+58.7	8.8	18 53.0	+58.7	8.9	19 52.3	+58.7	8.9	20 51.5	+58.8	9.0	21 50.8	+58.8	9.1	22 50.0	+58.9	9.1	60
61	16 53.7	+58.6	8.5	17 53.0	+58.6	8.6	18 52.4	+58.6	8.6	19 51.7	+58.7	8.7	20 51.0	+58.7	8.7	21 50.3	+58.7	8.8	22 49.6	+58.8	8.8	23 48.9	+58.8	8.9	61
62	17 52.3	+58.5	8.3	18 51.6	+58.6	8.4	19 51.0	+58.6	8.4	20 50.4	+58.6	8.4	21 49.7	+58.7	8.5	22 49.0	+58.8	8.6	23 48.4	+58.7	8.7	24 47.7	+58.8	8.7	62
63	18 50.8	+58.5	8.1	19 50.2	+58.6	8.1	20 49.6	+58.6	8.2	21 49.0	+58.6	8.2	22 48.4	+58.7	8.3	23 47.8	+58.7	8.3	24 47.1	+58.8	8.4	25 46.5	+58.8	8.5	63
64	19 49.4	+58.5	7.8	20 48.8	+58.6	7.9	21 48.2	+58.6	7.9	22 47.7	+58.6	8.0	23 47.1	+58.6	8.1	24 46.5	+58.7	8.1	25 45.9	+58.7	8.2	26 45.3	+58.7	8.3	64
65	20 47.9	+58.5	7.6	21 47.4	+58.5	7.6	22 46.8	+58.6	7.7	23 46.3	+58.6	7.8	24 45.7	+58.7	7.8	25 45.2	+58.6	7.9	26 44.6	+58.7	8.0	27 44.0	+58.7	8.0	65
66	21 46.4	+58.5	7.4	22 45.9	+58.5	7.4	23 45.4	+58.5	7.5	24 44.9	+58.6	7.5	25 44.4	+58.6	7.6	26 43.8	+58.7	7.7	27 43.3	+58.7	7.7	28 42.7	+58.8	7.8	66
67	22 44.9	+58.4	7.1	23 44.4	+58.5	7.2	24 43.9	+58.6	7.2	25 43.5	+58.5	7.3	26 43.0	+58.6	7.3	27 42.5	+58.6	7.4	28 42.0	+58.6	7.5	29 41.5	+58.6	7.6	67
68	23 43.3	+58.5	6.9	24 42.9	+58.5	7.0	25 42.5	+58.5	7.0	26 42.0	+58.5	7.0	27 41.6	+58.5	7.1	28 41.1	+58.6	7.2	29 40.6	+58.6	7.2	30 40.1	+58.7	7.3	68
69	24 41.8	+58.4	6.6	25 41.4	+58.4	6.7	26 41.0	+58.4	6.7	27 40.5	+58.6	6.8	28 40.1	+58.6	6.9	29 39.7	+58.6	6.9	30 39.2	+58.6	7.0	31 38.8	+58.6	7.1	69
70	25 40.2	+58.4	6.4	26 39.8	+58.4	6.4	27 39.4	+58.5	6.5	28 39.1	+58.4	6.5	29 38.7	+58.5	6.6	30 38.3	+58.5	6.7	31 37.8	+58.6	6.7	32 37.4	+58.6	6.8	70
71	26 38.6	+58.3	6.1	27 38.2	+58.4	6.2	28 37.9	+58.4	6.2	29 37.5	+58.5	6.3	30 37.2	+58.4	6.4	31 36.8	+58.5	6.4	32 36.4	+58.5	6.5	33 36.0	+58.6	6.6	71
72	27 36.9	+58.4	5.9	28 36.6	+58.4	6.0	29 36.3	+58.4	6.0	30 36.0	+58.4	6.0	31 35.6	+58.5	6.1	32 35.3	+58.5	6.2	33 34.9	+58.5	6.2	34 34.6	+58.5	6.3	72
73	28 35.3	+58.3	5.6	29 35.0	+58.3	5.6	30 34.7	+58.3	5.7	31 34.4	+58.4	5.8	32 34.1	+58.4	5.8	33 33.8	+58.4	5.9	34 33.4	+58.5	6.0	35 33.1	+58.5	6.0	73
74	29 33.6	+58.2	5.3	30 33.3	+58.3	5.4	31 33.0	+58.4	5.4	32 32.8	+58.3	5.5	33 32.5	+58.4	5.5	34 32.2	+58.4	5.6	35 31.9	+58.4	5.7	36 31.6	+58.5	5.8	74
75	30 31.8	+58.2	5.1	31 31.6	+58.2	5.1	32 31.4	+58.3	5.1	33 31.1	+58.3	5.2	34 30.9	+58.3	5.3	35 30.6	+58.4	5.3	36 30.3	+58.4	5.4	37 30.1	+58.4	5.5	75
76	31 30.1	+58.1	4.8	32 29.8	+58.3	4.8	33 29.6	+58.3	4.9	34 29.4	+58.3	4.9	35 29.2	+58.3	5.0	36 29.0	+58.3	5.0	37 28.7	+58.4	5.1	38 28.5	+58.4	5.2	76
77	32 28.2	+58.2	4.5	33 28.1	+58.1	4.5	34 27.9	+58.2	4.6	35 27.7	+58.2	4.6	36 27.5	+58.2	4.7	37 27.3	+58.2	4.8	38 27.1	+58.3	4.8	39 26.9	+58.3	4.9	77
78	33 26.4	+58.1	4.2	34 26.2	+58.2	4.2	35 26.1	+58.1	4.3	36 25.9	+58.2	4.3	37 25.7	+58.2	4.4	38 25.5	+58.3	4.4	39 25.4	+58.2	4.6	40 25.2	+58.3	4.6	78
79	34 24.5	+58.1	3.9	35 24.4	+58.1	3.9	36 24.2	+58.1	4.0	37 24.1	+58.1	4.0	38 23.9	+58.2	4.1	39 23.8	+58.2	4.1	40 23.6	+58.2	4.2	41 23.5	+58.2	4.3	79
80	35 22.6	+58.0	3.6	36 22.5	+58.0	3.6	37 22.3	+58.1	3.7	38 22.2	+58.1	3.7	39 22.1	+58.1	3.8	40 21.9	+58.2	3.8	41 21.8	+58.2	3.9	42 21.7	+58.1	3.9	80
81	36 20.6	+57.9	3.3	37 20.5	+58.0	3.3	38 20.4	+58.0	3.3	39 20.3	+58.0	3.4	40 20.2	+58.0	3.4	41 20.1	+58.0	3.5	42 20.0	+58.1	3.5	43 19.8	+58.1	3.6	81
82	37 18.5	+57.8	2.9	38 18.5	+57.9	3.0	39 18.4	+57.9	3.1	40 18.3	+58.0	3.1	41 18.2	+58.0	3.1	42 18.1	+58.0	3.2	43 18.0	+58.1	3.2	44 17.9	+58.1	3.3	82
83	38 16.5	+57.8	2.6	39 16.4	+57.9	2.6	40 16.3	+57.9	2.7	41 16.3	+57.9	2.7	42 16.2	+57.9	2.8	43 16.1	+58.0	2.8	44 16.1	+57.9	2.9	45 16.0	+57.9	2.9	83
84	39 14.3	+57.8	2.3	40 14.3	+57.8	2.3	41 14.2	+57.8	2.4	42 14.2	+57.9	2.4	43 14.1	+57.9	2.4	44 14.1	+57.8	2.5	45 14.0	+57.9	2.5	46 13.9	+57.9	2.5	84
85	40 12.1	+57.7	1.9	41 12.1	+57.7	1.9	42 12.0	+57.8	2.0	43 12.0	+57.8	2.0	44 12.0	+57.7	2.0	45 11.9	+57.8	2.1	46 11.9	+57.8	2.1	47 11.8	+57.9	2.1	85
86	41 09.8	+57.7	1.6	42 09.8	+57.7	1.6	43 09.8	+57.7	1.6	44 09.8	+57.6	1.6	45 09.7	+57.7	1.7	46 09.7	+57.7	1.7	47 09.7	+57.7	1.7	48 09.7	+57.7	1.8	86
87	42 07.5	+57.6	1.2	43 07.5	+57.6	1.2	44 07.5	+57.6	1.2	45 07.4	+57.7	1.2	46 07.4	+57.6	1.3	47 07.4	+57.6	1.3	48 07.4	+57.6	1.3	49 07.4	+57.6	1.3	87
88	43 05.1	+57.5	0.8	44 05.1	+57.5	0.8	45 05.1	+57.5	0.8	46 05.1	+57.5	0.8	47 05.0	+57.6	0.9	48 05.0	+57.6	0.9	49 05.0	+57.6	0.9	50 05.0	+57.6	0.9	88
89	44 02.6	+57.4	0.4	45 02.6	+57.4	0.4	46 02.6	+57.4	0.4	47 02.6	+57.4	0.4	48 02.6	+57.4	0.4	49 02.6	+57.4	0.4	50 02.6	+57.4	0.5	51 02.6	+57.4	0.5	89
90	45 00.0	+57.3	0.0	46 00.0	+57.3	0.0	47 00.0	+57.3	0.0	48 00.0	+57.3	0.0	49 00.0	+57.3	0.0	50 00.0	+57.3	0.0	51 00.0	+57.3	0.0	52 00.0	+57.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 163°, 197°

18°, 342° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	42 15.6	+57.3	155.3	41 21.0	+57.5	155.7	40 26.3	+57.6	156.0	39 31.3	+57.8	156.4	38 36.3	+57.9	156.7	37 41.1	+58.1	157.0	36 45.8	+58.2	157.3	35 50.4	+58.3	157.6	0
1	43 12.9	+57.2	154.9	42 18.5	+57.3	155.3	41 23.9	+57.5	155.7	40 29.1	+57.7	156.0	39 34.2	+57.9	156.4	38 39.2	+58.0	156.7	37 44.0	+58.1	157.0	36 48.7	+58.3	157.3	1
2	44 10.1	+57.1	154.5	43 15.8	+57.3	154.9	42 21.4	+57.5	155.3	41 26.8	+57.7	155.7	40 32.1	+57.8	156.0	39 37.2	+57.9	156.4	38 42.1	+58.1	156.7	37 47.0	+58.2	157.0	2
3	45 07.2	+57.0	154.1	44 13.1	+57.2	154.5	43 18.9	+57.4	154.9	42 24.5	+57.5	155.3	41 29.9	+57.7	155.7	40 35.1	+57.9	156.0	39 40.2	+58.1	156.4	38 45.2	+58.2	156.7	3
4	46 04.2	+56.9	153.6	45 10.3	+57.1	154.1	44 16.3	+57.3	154.5	43 22.0	+57.5	154.9	42 27.6	+57.7	155.3	41 33.0	+57.8	155.7	40 38.3	+57.9	156.0	39 43.4	+58.1	156.4	4
5	47 01.1	+56.8	153.2	46 07.4	+57.0	153.6	45 13.6	+57.2	154.1	44 19.5	+57.4	154.5	43 25.3	+57.5	154.9	42 30.8	+57.8	155.3	41 36.2	+57.9	155.7	40 41.5	+58.0	156.0	5
6	47 57.9	+56.6	152.7	47 04.4	+56.9	153.2	46 10.8	+57.1	153.7	45 16.9	+57.3	154.1	44 22.8	+57.5	154.5	43 28.6	+57.6	154.9	42 34.1	+57.9	155.3	41 39.5	+58.0	155.7	6
7	48 54.5	+56.5	152.2	48 01.3	+56.8	152.7	47 07.9	+57.0	153.2	46 14.2	+57.2	153.7	45 20.3	+57.4	154.1	44 26.2	+57.6	154.5	43 32.0	+57.7	155.0	42 37.5	+57.9	155.4	7
8	49 51.0	+56.4	151.7	48 58.1	+56.6	152.2	48 04.9	+56.8	152.7	47 11.4	+57.1	153.2	46 17.7	+57.3	153.7	45 23.8	+57.5	154.2	44 29.7	+57.7	154.6	43 35.4	+57.8	155.0	8
9	50 47.4	+56.2	151.1	49 54.7	+56.5	151.7	49 01.7	+56.8	152.3	48 08.5	+57.0	152.8	47 15.0	+57.2	153.3	46 21.3	+57.4	153.8	45 27.4	+57.6	154.2	44 33.3	+57.8	154.6	9
10	51 43.6	+56.1	150.6	50 51.2	+56.4	151.2	49 58.5	+56.6	151.8	49 05.5	+56.9	152.3	48 12.2	+57.1	152.8	47 18.7	+57.3	153.3	46 25.0	+57.5	153.8	45 31.1	+57.7	154.3	10
11	52 39.7	+55.9	150.0	51 47.6	+56.1	150.6	50 55.1	+56.5	151.2	50 02.4	+56.7	151.8	49 09.3	+57.0	152.4	48 16.1	+57.2	152.9	47 22.5	+57.3	153.4	46 28.8	+57.6	153.9	11
12	53 35.6	+55.7	149.4	52 43.7	+56.1	150.1	51 51.6	+56.3	150.7	50 59.1	+56.6	151.3	50 06.3	+56.9	151.9	49 13.3	+57.1	152.4	48 20.0	+57.3	153.0	47 26.4	+57.5	153.5	12
13	54 31.3	+55.4	148.8	53 39.8	+55.8	149.5	52 47.9	+56.2	150.1	51 55.7	+56.5	150.8	51 03.2	+56.7	151.4	50 10.4	+57.0	152.0	49 17.3	+57.2	152.5	48 23.9	+57.5	153.0	13
14	55 26.7	+55.3	148.1	54 35.6	+55.6	148.8	53 44.1	+55.9	149.5	52 52.2	+56.2	150.2	51 59.9	+56.6	150.9	51 07.4	+56.8	151.5	50 14.5	+57.1	152.0	49 21.4	+57.3	152.6	14
15	56 22.0	+55.0	147.4	55 31.2	+55.4	148.2	54 40.0	+55.8	148.9	53 48.4	+56.2	149.6	52 56.5	+56.4	150.3	52 04.2	+56.7	150.9	51 11.6	+57.0	151.6	50 18.7	+57.2	152.1	15
16	57 17.0	+54.7	146.7	56 26.6	+55.2	147.4	55 35.8	+55.6	148.3	54 44.6	+55.9	149.0	53 52.9	+56.3	149.7	53 00.9	+56.6	150.4	52 08.6	+56.8	151.1	51 15.9	+57.1	151.7	16
17	58 11.7	+54.5	145.9	57 21.8	+54.9	146.8	56 31.4	+55.3	147.6	55 40.5	+55.7	148.4	54 49.2	+56.0	149.1	53 57.5	+56.4	149.9	53 05.4	+56.7	150.5	52 13.0	+57.0	151.2	17
18	59 06.2	+54.1	145.1	58 16.7	+54.6	146.0	57 26.7	+55.1	146.9	56 36.2	+55.5	147.7	55 45.2	+55.9	148.5	54 53.9	+56.2	149.3	54 02.1	+56.5	150.0	53 10.0	+56.8	150.6	18
19	60 00.3	+53.8	144.2	59 11.3	+54.3	145.2	58 21.8	+54.8	146.1	57 31.7	+55.2	147.0	56 41.1	+55.7	147.9	55 50.1	+56.0	148.6	54 58.6	+56.4	149.4	54 06.8	+56.7	150.1	19
20	60 54.1	+53.4	143.3	60 05.6	+54.0	144.4	59 16.6	+54.5	145.4	58 26.9	+55.0	146.3	57 36.8	+55.4	147.2	56 46.1	+55.8	148.0	55 55.0	+56.2	148.8	55 03.5	+56.5	149.5	20
21	61 47.5	+53.0	142.4	60 59.6	+53.6	143.5	60 11.1	+54.1	144.5	59 21.9	+54.7	145.5	58 32.2	+55.1	146.4	57 41.9	+55.6	147.3	56 51.2	+55.9	148.2	56 00.0	+56.3	148.9	21
22	62 40.5	+52.5	141.4	61 53.2	+53.2	142.6	61 05.2	+53.9	143.7	60 16.6	+54.4	144.7	59 27.3	+54.9	145.7	58 37.5	+55.3	146.6	57 47.1	+55.8	147.5	56 56.3	+56.2	148.3	22
23	63 33.0	+52.0	140.3	62 46.4	+52.8	141.6	61 59.1	+53.4	142.7	61 11.0	+54.0	143.8	60 22.2	+54.6	144.9	59 32.8	+55.1	145.9	58 42.9	+55.5	146.8	57 52.5	+55.9	147.7	23
24	64 25.0	+51.5	139.2	63 39.2	+52.3	140.5	62 52.5	+53.0	141.7	62 05.0	+53.6	142.9	61 16.8	+54.2	144.0	60 27.9	+54.8	145.1	59 38.4	+55.3	146.0	58 48.4	+55.7	147.0	24
25	65 16.5	+50.8	138.0	64 31.5	+51.7	139.4	63 45.5	+52.5	140.7	62 58.6	+53.2	141.9	62 11.0	+53.8	143.1	61 22.7	+54.4	144.2	60 33.7	+54.9	145.3	59 44.1	+55.4	146.2	25
26	66 07.3	+50.2	136.7	65 23.2	+51.1	138.2	64 38.0	+51.9	139.6	63 51.8	+52.8	140.9	63 04.8	+53.5	142.2	62 17.1	+54.0	143.3	61 28.6	+54.6	144.4	60 39.5	+55.1	145.5	26
27	66 57.5	+49.4	135.3	66 14.3	+50.4	136.9	65 29.9	+51.4	138.4	64 44.6	+52.2	139.8	63 58.3	+52.9	141.1	63 11.1	+53.7	142.4	62 23.2	+54.3	143.6	61 34.6	+54.9	144.7	27
28	67 46.9	+48.5	133.8	67 04.7	+49.7	135.5	66 21.3	+50.7	137.1	65 36.8	+51.6	138.6	64 51.2	+52.5	140.1	64 04.8	+53.2	141.4	63 17.5	+53.9	142.6	62 29.5	+54.5	143.8	28
29	68 35.4	+47.6	132.2	67 54.4	+48.8	134.1	67 12.0	+50.0	135.8	66 28.4	+51.0	137.4	65 43.7	+51.9	138.9	64 58.0	+52.7	140.3	64 11.4	+53.5	141.6	63 24.0	+54.1	142.9	29
30	69 23.0	+46.5	130.5	68 43.2	+47.9	132.5	68 02.0	+49.1	134.3	67 19.4	+50.3	136.0	66 35.6	+51.3	137.6	65 50.7	+52.2	139.2	65 04.9	+52.9	140.6	64 18.1	+53.7	141.9	30
31	70 09.5	+45.3	128.7	69 31.1	+46.8	130.8	68 51.1	+48.2	132.8	68 09.7	+49.4	134.6	67 26.9	+50.6	136.3	66 42.9	+51.6	137.9	65 57.8	+52.5	139.4	65 11.8	+53.2	140.8	31
32	70 54.8	+43.9	126.7	70 17.9	+45.7	129.0	69 39.3	+47.2	131.1	68 59.1	+48.6	133.0	68 17.5	+49.7	134.9	67 34.5	+50.8	136.6	66 50.3	+51.8	138.2	66 05.0	+52.7	139.7	32
33	71 38.7	+42.4	124.6	71 03.6	+44.3	127.0	70 26.5	+46.0	129.3	69 47.7	+47.5	131.4	69 07.2	+48.9	133.4	68 25.3	+50.1	135.2	67 42.1	+51.2	136.9	66 57.7	+52.2	138.5	33
34	72 21.1	+40.7	122.3	71 47.9	+42.8	124.7	71 12.5	+44.7	127.3	70 35.2	+46.4	129.6	69 56.1	+47.9	131.7	69 15.4	+49.3	133.7	68 33.3	+50.5	135.5	67 49.9	+51.4	137.2	34
35	73 01.8	+38.8•	119.9	72 30.7	+41.1	122.6	71 57.2	+43.2	125.2	71 21.6	+45.1	127.6	70 44.0	+46.7	129.9	70 04.7	+48.2	132.0	69 23.7	+49.6	134.0	68 41.3	+50.8	135.9	35
36	73 40.6	+36.6•	117.2	73 11.8	+39.2•	120.1	72 40.4	+41.5	122.9	72 06.7	+43.6	125.5	71 30.7	+45.5	128.0	70 52.9	+47.1	130.2	70 13.3	+48.6	132.4	69 32.1	+49.9	134.4	36
37	74 17.2	+34.2•	114.3	73 51.0	+37.0•	117.5	73 21.9	+39.6•	120.4	72 50.3	+41.9	123.2	72 16.2	+44.0	125.9	71 40.0	+45.9	128.3	71 01.9	+47.5	130.6	70 22.0	+49.0	132.7	37
38	74 51.4	+31.5•	111.2	74 28.0	+34.6•	114.6	74 01.5	+37.5•	117.8	73 32.2	+40.0	120.8	73 00.2	+42.4	123.6	72 25.9	+44.4	126.2	71 49.4	+46.3	128.7	71 11.0	+47.8	131.0	38
39	75 22.9	+28.4•	107.9	75 02.6	+31.9•	111.5	74 39.0	+35.1•	114.9	74 12.2	+38.0•	118.1	73 42.6	+40.5•	121.1	73 10.3	+42.8	123.9	72 35.7	+44.8	126.6	71 58.8	+46.7	129.1	39
40	75 51.3	+25.2•	104.4	75 34.5	+28.9•	108.1	75 14.1	+32.3•	111.8	74 50.2	+35.4•	115.2	74 23.1	+38.3•	118.4	73 53.1	+41.0•	121.5	73 20.5	+43.3	124.3	72 45.5	+45.3	127.0	40
41	76 16.5	+21.5•	100.6	76 03.4	+25.4•	104.6	75 46.4	+29.3•	108.4	75 25.6	+32.8•	112.0	75 01.4	+36.0•	115.5	74 34.1	+38.8•	118.8	74 03.8	+41.3•	121.9	73 30.8	+43.7	124.7	41
42	76 38.0	+17.6•	96.6	76 28.9	+21.9•	100.7	76 15.7	+25.9•	104.8	75 58.4	+29.7•	108.6	75 37.4	+33.2•	112.4	75 12.9	+36.4•	115.9	74 45.1	+39.3•	119.2	74 14.5	+41.9•	122.3	42
43	76 55.6	+13.4•	92.4	76 50.8	+17.9•	96.7	76 41.6	+22.2•	100.9	76 28.1	+26.4•	105.0	76 10.6	+30.2•	108.9	75 49.3	+33.7•	112.7	75 24.4	+36.9•	116.2	74 56.4	+39.7•	119.6	43
44	77 09.0	+8.9•	88.1	77 08.7	+13.6•	92.5	77 03.8	+18.2•	96.8	76 54.5	+22.5•	101.1	76 40.8	+26.7•	105.2	76 23.0	+30.6•	109.2	76 01.3	+34.2•	113.0	75 36.1	+37.4•	116.6	44
45	77 17.9	+4.4•	83.6	77 22.3	+9.1•	88.0	77 22.0	+13.8•	92.5	77 17.0	+18.5•	96.9	77 07.5	+22.9•	101.3	76 53.6	+27.1•	105.5	76 35.5	+31.1•	109.6	76 13.5	+34.7•	113.4	45
46	77 22.3	–0.3•	79.1	77 31.4	+4.4•	83.5	77 35.8	+9.3•	88.0	77 35.5	+14.1•	92.6	77 30.4	+18.8•	97.1	77 20.7	+23.4•	101.5	77 06.6	+27.6•	105.8	76 48.2	+31.5•	109.9	46
47	77 22.0	–5.0•	74.5	77 35.8	–0.3•	78.9	77 45.1	+4.5•	83.4	77 49.6	+9.4•	88.0	77 49.2	+14.4•	92.6	77 44.1	+19.1•	97.2	77 34.2	+23.7•	101.7	77 19.7	+28.1•	106.1	47
48	77 17.0	–9.5•	69.9	77 35.5	–5.1•	74.2	77 49.6	–0.4•	78.7	77 59.0	+4.6•	83.3	78 03.6	+9.5•	88.0	78 03.2	+14.5•	92.7	77 57.9	+19.4•	97.4	77 47.8	+24.1•	102.0	48
49	77 07.5	–13.9•	65.5	77 30.4	–9.7•	69.6	77 49.2	–5.1•	73.9	78 03.6	–0.4•	78.5	78 13.1	+4.6•	83.2	78 17.7	+9.8•	88.0	78 17.3	+14.8•	92.8	78 11.9	+19.8•	97.6	49
50	76 53.6	–18.1•	61.2	77 20.7	–14.1•	65.1	77 44.1	–9.9•	69.2	78 03.2	–5.3•	73.6	78 17.7	–0.4•	78.3	78 27.5	+4.6•	83.1	78 32.1	+9.9•	88.0	78 31.7	+15.1•	92.9	50
51	76 35.5	–22.0•	57.0	77 06.6	–18.4•	60.7	77 34.2	–14.5•	64.6	77 57.9	–10.1•	68.9	78 17.3	–5.4•	73.4	78 32.1	–0.4•	78.1	78 42.0	+4.8•	83.0	78 46.8	+10.0•	88.0	51
52	76 13.5	–25.6•	53.0	76 48.2	–22.4•	56.4	77 19.7	–18.7•	60.1	77 47.8	–14.8•	64.2	78 11.9	–10.4•	68.5	78 31.7	–5.6•	73.1	78 46.8	–0.6•	77.9	78 56.8	+4.8•	82.9	52
53	75 47.9	–28.9•	49.3	76 25.8	–26.0•	52.4	77 01.0	–22.8•	55.9	77 33.0	–19.1•	59.6	78 01.5	–15.0•	63.7	78 26.1	–10.6•	68.1	78 46.2	–5.8•	72.7	79 01.6	–0.7•	77.7	53
54	75 19.1	–31.9•	45.8	75 59.8	–29.3•	48.6	76 38.2	–26.4•	51.8	77 13.9	–23.1•	55.3	77 46.5	–19.5•	59.1	78 15.5	–15.5•	63.2	78 40.4	–10.9•	67.6	79 00.9	–5.9•	72.4	54
55	74 47.2	–34.5•	42.5	75 30.5	–32.2•	45.1	76 11.8	–29.7•	48.0	76 50.8	–26.9•	51.2	77 27.0	–23.6•	54.7	78 00.0	–19.9•	58.5	78 29.5	–15.8•	62.7	78 55.0	–11.3•	67.2	55
56	74 12.7	–36.9•	39.4	74 58.3	–35.0•	41.8	75 42.1	–32.7•	44.4	76 23.9	–30.2•	47.3	77 03.4	–27.3•	50.5	77 40.1	–24.0•	54.0	78 13.7	–20.3•	57.9	78 43.7	–16.1•	62.1	56
57	73 35.8	–39.0•	36.6	74 23.3	–37.3•	38.7	75 09.4	–35.4•	41.1	75 53.7	–33.2•	43.7	76 36.1	–30.7•	46.6	77 16.1	–27.8•	49.8	77 53.4	–24.5•	53.3	78 27.6	–20.8•	57.3	57
58	72 56.8	–41.0	33.9	73 46.0	–39.5•	35.9	74 34.0	–37.8•	38.0	75 20.5	–35.9•	40.3	76 05.4	–33.7•	42.9	76 48.3	–31.2•	45.8	77 28.9	–28.4•	49.1	78 06.8	–25.1•	52.7	58
59	72 15.8	–42.6	31.5	73 06.5	–41.3	33.2	73 56.2	–39.8•	35.1	74 44.6	–38.2•	37.2	75 31.7	–36.4•	39.6	76 17.1	–34.2•	42.2	77 00.5	–31.7•	45.5	77 41.7	–28.9•	48.3	59
60	71 33.2	–44.1	29.2	72 25.2	–43.0	30.8	73 16.3	–41.8	32.5	74 06.4	–40.4	34.3	74 55.3	–38.7•	36.4	75 42.9	–36.9•	38.8	76 28.8	–34.8•	41.4	77 12.8	–32.3•	44.3	60
61	70 49.1	–45.4	27.1	71 42.2	–44.5	28.5	72 34.5	–43.4	30.0	73 26.0	–42.1	31.7	74 16.6	–40.8•	33.6	75 06.0	–39.2•	35.6	75 54.0	–37.4•	38.0	76 40.5	–35.3•	40.5	61
62	70 03.7	–46.7	25.2	70 57.7	–45.8	26.4	71 51.1	–44.9	27.8	72 43.9	–43.9	29.3	73 35.8	–42.7	30.9	74 26.8	–41.3	32.8	75 16.6	–39.7•	34.8	76 05.2	–37.9•	37.1	62
63	69 17.0	–47.7	23.4	70 11.9	–47.0	24.5	71 06.2	–46.1	25.7	72 00.0	–45.3	27.0	72 53.1	–44.2	28.5	73 45.5	–43.1	30.1	74 36.9	–41.8	31.9	75 27.3	–40.3•	34.0	63
64	68 29.3	–48.6	21.7	69 24.9	–48.0	22.7	70 20.1	–47.4	23.7	71 14.7	–46.5	24.9	72 08.9	–45.7	26.2	73 02.4	–44.8	27.7	73 55.1	–43.6	29.3	74 47.0	–42.3	31.1	64
65	67 40.7	–49.5	20.1	68 36.9	–49.0	21.0	69 32.7	–48.3	21.9	70 28.2	–47.7	23.0	71 23.2	–47.0	24.2	72 17.6	–46.1	25.4	73 11.5	–45.1	26.8	74 04.7	–44.1	28.4	65
66	66 51.2	–50.2	18.6	67 47.9	–49.7	19.4	68 44.4	–49.0	20.3	69 40.5	–48.7	21.2	70 36.2	–48.0	22.2	71 31.5	–47.3	23.4	72 26.4	–46.6	24.6	73 20.6	–45.6	26.0	66
67	66 01.0	–50.9	17.3	66 58.2	–50.6	18.0	67 55.1	–50.1	18.7	68 51.8	–49.6	19.6	69 48.2	–49.1	20.5	70 44.2	–48.4	21.5	71 39.8	–47.7	22.6	72 35.0	–47.0	23.8	67
68	65 10.1	–51.6	16.0	66 07.6	–51.1	16.6	67 05.0	–50.8	17.3	68 02.2	–50.4	18.0	68 59.1	–49.9	18.8	69 55.8	–49.4	19.7	70 52.1	–48.8	20.7	71 48.0	–48.1	21.8	68
69	64 18.5	–52.1	14.8	65 16.5	–51.8	15.4	66 14.2	–51.4	16.0	67 11.8	–51.1	16.6	68 09.2	–50.7	17.3	69 06.4	–50.3	18.1	70 03.3	–49.8	18.9	70 59.9	–49.2	19.9	69
70	63 26.4	–52.6	13.7	64 24.7	–52.4	14.2	65 22.8	–52.1	14.7	66 20.7	–51.7	15.3	67 18.5	–51.3	15.9	68 16.1	–51.0	16.6	69 13.5	–50.5	17.3	70 10.7	–50.1	18.2	70
71	62 33.8	–53.0	12.6	63 32.3	–52.8	13.0	64 30.7	–52.5	13.5	65 29.0	–52.3	14.0	66 27.2	–52.0	14.6	67 25.1	–51.6	15.2	68 23.0	–51.4	15.8	69 20.6	–50.9	16.6	71
72	61 40.8	–53.5	11.6	62 39.5	–53.2	12.0	63 38.2	–53.1	12.4	64 36.7	–52.8	12.9	65 35.2	–52.6	13.4	66 33.5	–52.3	13.9	67 31.6	–51.9	14.5	68 29.7	–51.7	15.1	72
73	60 47.3	–53.8	10.7	61 46.3	–53.7	11.0	62 45.1	–53.4	11.4	63 43.9	–53.3	11.8	64 42.6	–53.1	12.2	65 41.2	–52.8	12.7	66 39.7	–52.6	13.2	67 38.0	–52.2	13.7	73
74	59 53.5	–54.2	9.8	60 52.6	–54.0	10.1	61 51.7	–53.9	10.4	62 50.6	–53.7	10.8	63 49.5	–53.5	11.1	64 48.4	–53.3	11.5	65 47.1	–53.1	12.0	66 45.8	–52.9	12.5	74
75	58 59.3	–54.5	8.9	59 58.6	–54.4	9.2	60 57.8	–54.2	9.5	61 56.9	–54.0	9.8	62 56.0	–53.9	10.1	63 55.1	–53.8	10.5	64 54.0	–53.5	10.9	65 52.9	–53.3	11.3	75
76	58 04.8	–54.7	8.1	59 04.2	–54.6	8.4	60 03.6	–54.6	8.6	61 02.9	–54.4	8.9	62 02.1	–54.3	9.2	63 01.3	–54.1	9.5	64 00.5	–54.0	9.8	64 59.6	–53.8	10.2	76
77	57 10.1	–55.1	7.4	58 09.6	–55.0	7.6	59 09.0	–54.8	7.8	60 08.5	–54.8	8.0	61 07.8	–54.6	8.3	62 07.2	–54.5	8.5	63 06.5	–54.3	8.8	64 05.8	–54.2	9.2	77
78	56 15.0	–55.2	6.6	57 14.6	–55.2	6.8	58 14.2	–55.1	7.0	59 13.7	–55.0	7.2	60 13.2	–54.9	7.4	61 12.7	–54.8	7.7	62 12.2	–54.7	7.9	63 11.6	–54.9	8.2	78
79	55 19.8	–55.6	5.9	56 19.4	–55.4	6.1	57 19.1	–55.4	6.3	58 18.7	–55.3	6.4	59 18.3	–55.2	6.6	60 17.9	–55.1	6.8	61 17.5	–55.1	7.1	62 17.0	–54.9	7.3	79
80	54 24.2	–55.7	5.3	55 24.0	–55.7	5.4	56 23.7	–55.6	5.6	57 23.4	–55.5	5.7	58 23.1	–55.4	5.9	59 22.8	–55.4	6.0	60 22.4	–55.3	6.2	61 22.1	–55.2	6.4	80
81	53 28.5	–55.9	4.7	54 28.3	–55.8	4.8	55 28.1	–55.8	4.9	56 27.9	–55.7	5.0	57 27.7	–55.7	5.2	58 27.4	–55.6	5.3	59 27.1	–55.5	5.5	60 26.9	–55.5	5.6	81
82	52 32.6	–56.0	4.1	53 32.5	–56.1	4.2	54 32.3	–56.0	4.3	55 32.1	–55.9	4.4	56 32.0	–55.9	4.5	57 31.8	–55.9	4.6	58 31.6	–55.8	4.7	59 31.4	–55.8	4.9	82
83	51 36.6	–56.3	3.5	52 36.4	–56.2	3.6	53 36.3	–56.2	3.7	54 36.2	–56.1	3.7	55 36.1	–56.1	3.8	56 35.9	–56.0	3.9	57 35.8	–56.0	4.0	58 35.6	–55.9	4.1	83
84	50 40.3	–56.4	2.9	51 40.2	–56.4	3.0	52 40.1	–56.4	3.1	53 40.1	–56.4	3.1	54 40.0	–56.3	3.2	55 39.9	–56.3	3.3	56 39.8	–56.2	3.4	57 39.7	–56.2	3.5	84
85	49 43.9	–56.5	2.4	50 43.9	–56.6	2.4	51 43.8	–56.5	2.5	52 43.7	–56.4	2.5	53 43.7	–56.5	2.6	54 43.6	–56.4	2.7	55 43.6	–56.4	2.7	56 43.5	–56.4	2.8	85
86	48 47.4	–56.7	1.9	49 47.3	–56.6	1.9	50 47.3	–56.6	2.0	51 47.3	–56.6	2.0	52 47.2	–56.6	2.0	53 47.2	–56.6	2.1	54 47.2	–56.6	2.1	55 47.1	–56.5	2.2	86
87	47 50.7	–56.8	1.4	48 50.7	–56.8	1.4	49 50.7	–56.8	1.4	50 50.7	–56.7	1.5	51 50.6	–56.7	1.5	52 50.6	–56.7	1.5	53 50.6	–56.7	1.6	54 50.6	–56.7	1.6	87
88	46 53.9	–56.9	0.9	47 53.9	–56.9	0.9	48 53.9	–56.9	0.9	49 53.9	–56.9	1.0	50 53.9	–56.9	1.0	51 53.9	–56.9	1.0	52 53.9	–56.9	1.0	53 53.9	–56.9	1.0	88
89	45 57.0	–57.0	0.4	46 57.0	–57.0	0.5	47 57.0	–57.0	0.5	48 57.0	–57.0	0.5	49 57.0	–57.0	0.5	50 57.0	–57.0	0.5	51 57.0	–57.0	0.5	52 57.0	–57.0	0.5	89
90	45 00.0	–57.1	0.0	46 00.0	–57.1	0.0	47 00.0	–57.1	0.0	48 00.0	–57.1	0.0	49 00.0	–57.1	0.0	50 00.0	–57.1	0.0	51 00.0	–57.1	0.0	52 00.0	–57.1	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	42 15.6	−57.4	155.3	41 21.0	−57.5	155.7	40 26.3	−57.7	156.0	39 31.3	−57.8	156.4	38 36.3	−58.0	156.7	37 41.1	−58.1	157.0	36 45.8	−58.2	157.3	35 50.4	−58.3	157.6	0
1	41 18.2	−57.4	155.7	40 23.5	−57.6	156.1	39 28.6	−57.8	156.4	38 33.5	−57.9	156.7	37 38.3	−58.0	157.0	36 43.0	−58.1	157.3	35 47.6	−58.3	157.6	34 52.1	−58.4	157.9	1
2	40 20.8	−57.5	156.1	39 25.9	−57.7	156.4	38 30.8	−57.8	156.8	37 35.6	−57.9	157.1	36 40.3	−58.1	157.4	35 44.9	−58.2	157.6	34 49.3	−58.3	157.9	33 53.7	−58.4	158.2	2
3	39 23.3	−57.6	156.5	38 28.2	−57.7	156.8	37 33.0	−57.9	157.1	36 37.7	−58.0	157.4	35 42.2	−58.1	157.7	34 46.7	−58.3	157.9	33 51.0	−58.3	158.2	32 55.3	−58.5	158.4	3
4	38 25.7	−57.7	156.8	37 30.5	−57.8	157.1	36 35.1	−57.9	157.4	35 39.7	−58.1	157.7	34 44.1	−58.2	158.0	33 48.4	−58.3	158.2	32 52.7	−58.4	158.5	31 56.8	−58.5	158.7	4
5	37 28.0	−57.7	157.2	36 32.7	−57.9	157.5	35 37.2	−58.0	157.7	34 41.6	−58.1	158.0	33 45.9	−58.2	158.3	32 50.2	−58.4	158.5	31 54.3	−58.4	158.7	30 58.3	−58.5	159.0	5
6	36 30.3	−57.7	157.5	35 34.8	−57.9	157.8	34 39.2	−58.0	158.1	33 43.5	−58.1	158.3	32 47.7	−58.2	158.6	31 51.8	−58.3	158.8	30 55.9	−58.5	159.0	29 59.8	−58.5	159.2	6
7	35 32.6	−57.9	157.9	34 36.9	−57.9	158.1	33 41.2	−58.0	158.4	32 45.4	−58.2	158.6	31 49.5	−58.3	158.8	30 53.5	−58.4	159.1	29 57.4	−58.5	159.3	29 01.3	−58.6	159.5	7
8	34 34.7	−57.8	158.2	33 39.0	−58.0	158.4	32 43.2	−58.2	158.7	31 47.2	−58.2	158.9	30 51.2	−58.3	159.1	29 55.1	−58.4	159.3	28 58.9	−58.5	159.5	28 02.7	−58.6	159.7	8
9	33 36.9	−57.9	158.5	32 41.0	−58.0	158.7	31 45.0	−58.1	159.0	30 49.0	−58.3	159.2	29 52.9	−58.4	159.4	28 56.7	−58.5	159.6	28 00.4	−58.5	159.8	27 04.1	−58.6	160.0	9
10	32 39.0	−58.0	158.8	31 43.0	−58.1	159.1	30 46.9	−58.2	159.3	29 50.7	−58.3	159.5	28 54.5	−58.4	159.7	27 58.2	−58.5	159.8	27 01.9	−58.6	160.0	26 05.5	−58.7	160.2	10
11	31 41.0	−58.0	159.1	30 44.9	−58.1	159.3	29 48.7	−58.2	159.5	28 52.5	−58.4	159.7	27 56.1	−58.4	159.9	26 59.8	−58.5	160.1	26 03.3	−58.6	160.3	25 06.8	−58.7	160.4	11
12	30 43.0	−58.1	159.4	29 46.8	−58.2	159.6	28 50.5	−58.3	159.8	27 54.1	−58.3	160.0	26 57.7	−58.4	160.2	26 01.3	−58.6	160.3	25 04.7	−58.6	160.5	24 08.1	−58.7	160.7	12
13	29 44.9	−58.1	159.7	28 48.6	−58.2	159.9	27 52.2	−58.2	160.1	26 55.8	−58.4	160.3	25 59.3	−58.5	160.4	25 02.7	−58.5	160.6	24 06.1	−58.6	160.7	23 09.4	−58.7	160.9	13
14	28 46.8	−58.1	160.0	27 50.4	−58.2	160.2	26 54.0	−58.4	160.4	25 57.4	−58.4	160.5	25 00.8	−58.5	160.7	24 04.2	−58.6	160.8	23 07.5	−58.7	161.0	22 10.7	−58.7	161.1	14
15	27 48.7	−58.1	160.3	26 52.2	−58.2	160.5	25 55.6	−58.3	160.6	24 59.0	−58.4	160.8	24 02.3	−58.5	160.9	23 05.6	−58.6	161.1	22 08.8	−58.6	161.2	21 12.0	−58.7	161.3	15
16	26 50.6	−58.2	160.6	25 54.0	−58.3	160.7	24 57.3	−58.4	160.9	24 00.6	−58.5	161.0	23 03.8	−58.5	161.2	22 07.0	−58.6	161.3	21 10.2	−58.7	161.4	20 13.3	−58.8	161.5	16
17	25 52.4	−58.2	160.8	24 55.7	−58.3	161.0	23 58.9	−58.4	161.1	23 02.1	−58.5	161.3	22 05.3	−58.6	161.4	21 08.4	−58.6	161.5	20 11.5	−58.7	161.6	19 14.5	−58.8	161.8	17
18	24 54.2	−58.3	161.1	23 57.4	−58.4	161.2	23 00.5	−58.4	161.4	22 03.6	−58.5	161.5	21 06.7	−58.6	161.6	20 09.8	−58.7	161.8	19 12.8	−58.8	161.9	18 15.7	−58.8	162.0	18
19	23 55.9	−58.3	161.4	22 59.0	−58.3	161.5	22 02.1	−58.4	161.6	21 05.1	−58.5	161.8	20 08.1	−58.6	161.9	19 11.1	−58.7	162.0	18 14.0	−58.7	162.1	17 16.9	−58.8	162.2	19
20	22 57.6	−58.3	161.6	22 00.7	−58.3	161.7	21 03.7	−58.5	161.9	20 06.6	−58.5	162.0	19 09.6	−58.7	162.1	18 12.4	−58.7	162.2	17 15.3	−58.8	162.3	16 18.1	−58.8	162.4	20
21	21 59.3	−58.3	161.9	21 02.3	−58.4	162.0	20 05.2	−58.5	162.1	19 08.1	−58.6	162.2	18 10.9	−58.6	162.3	17 13.8	−58.7	162.4	16 16.5	−58.7	162.5	15 19.3	−58.8	162.6	21
22	21 01.0	−58.3	162.1	20 03.9	−58.4	162.2	19 06.7	−58.5	162.3	18 09.5	−58.5	162.5	17 12.3	−58.6	162.5	16 15.1	−58.7	162.6	15 17.8	−58.8	162.7	14 20.5	−58.9	162.8	22
23	20 02.7	−58.4	162.4	19 05.5	−58.5	162.5	18 08.2	−58.5	162.6	17 11.0	−58.6	162.7	16 13.7	−58.7	162.8	15 16.4	−58.7	162.9	14 19.0	−58.8	162.9	13 21.6	−58.8	163.0	23
24	19 04.3	−58.4	162.6	18 07.0	−58.4	162.7	17 09.7	−58.5	162.8	16 12.4	−58.6	162.9	15 15.0	−58.6	163.0	14 17.6	−58.7	163.1	13 20.2	−58.8	163.1	12 22.8	−58.9	163.2	24
25	18 05.9	−58.4	162.9	17 08.6	−58.5	163.0	16 11.2	−58.6	163.0	15 13.8	−58.6	163.1	14 16.4	−58.7	163.2	13 18.9	−58.7	163.3	12 21.4	−58.8	163.3	11 23.9	−58.9	163.4	25
26	17 07.5	−58.4	163.1	16 10.1	−58.5	163.2	15 12.6	−58.5	163.3	14 15.2	−58.7	163.3	13 17.7	−58.7	163.4	12 20.2	−58.8	163.5	11 22.6	−58.8	163.5	10 25.1	−58.9	163.6	26
27	16 09.1	−58.4	163.3	15 11.6	−58.5	163.4	14 14.1	−58.6	163.5	13 16.5	−58.6	163.6	12 19.0	−58.7	163.6	11 21.4	−58.8	163.7	10 23.8	−58.8	163.7	9 26.2	−58.9	163.8	27
28	15 10.7	−58.5	163.6	14 13.1	−58.5	163.7	13 15.5	−58.6	163.7	12 17.9	−58.6	163.8	11 20.3	−58.7	163.9	10 22.7	−58.8	163.9	9 25.0	−58.8	163.9	8 27.3	−58.9	164.0	28
29	14 12.2	−58.4	163.8	13 14.6	−58.5	163.9	12 16.9	−58.6	163.9	11 19.3	−58.7	164.0	10 21.6	−58.7	164.1	9 23.9	−58.8	164.1	8 26.2	−58.9	164.1	7 28.5	−58.9	164.2	29
30	13 13.8	−58.5	164.0	12 16.1	−58.6	164.1	11 18.3	−58.6	164.2	10 20.6	−58.7	164.2	9 22.9	−58.8	164.3	8 25.1	−58.8	164.3	7 27.3	−58.9	164.3	6 29.6	−58.9	164.4	30
31	12 15.3	−58.5	164.3	11 17.5	−58.5	164.3	10 19.7	−58.6	164.4	9 21.9	−58.6	164.4	8 24.1	−58.7	164.5	7 26.3	−58.8	164.5	6 28.5	−58.8	164.5	5 30.7	−58.9	164.6	31
32	11 16.8	−58.5	164.5	10 19.0	−58.6	164.6	9 21.1	−58.6	164.6	8 23.3	−58.7	164.6	7 25.4	−58.7	164.7	6 27.5	−58.7	164.7	5 29.7	−58.9	164.7	4 31.8	−58.9	164.8	32
33	10 18.3	−58.5	164.7	9 20.4	−58.6	164.8	8 22.5	−58.6	164.8	7 24.6	−58.7	164.9	6 26.7	−58.8	164.9	5 28.8	−58.8	164.9	4 30.8	−58.8	164.9	3 32.9	−58.9	165.0	33
34	9 19.8	−58.6	165.0	8 21.8	−58.5	165.0	7 23.9	−58.6	165.0	6 25.9	−58.7	165.1	5 27.9	−58.7	165.1	4 30.0	−58.8	165.1	3 32.0	−58.9	165.1	2 34.0	−58.9	165.1	34
35	8 21.3	−58.5	165.2	7 23.3	−58.6	165.2	6 25.3	−58.7	165.2	5 27.2	−58.7	165.3	4 29.2	−58.8	165.3	3 31.2	−58.8	165.3	2 33.1	−58.8	165.3	1 35.1	−58.9	165.3	35
36	7 22.8	−58.6	165.4	6 24.7	−58.6	165.4	5 26.6	−58.6	165.5	4 28.5	−58.7	165.5	3 30.4	−58.7	165.5	2 32.4	−58.9	165.5	1 34.3	−58.9	165.5	0 36.2	−58.9	165.5	36
37	6 24.2	−58.5	165.6	5 26.1	−58.6	165.6	4 28.0	−58.7	165.7	3 29.8	−58.7	165.7	2 31.7	−58.8	165.7	1 33.6	−58.8	165.7	0 35.4	−58.8	165.7	0 22.7	+58.9	14.3	37
38	5 25.7	−58.5	165.8	4 27.5	−58.5	165.9	3 29.3	−58.6	165.9	2 31.1	−58.7	165.9	1 32.9	−58.7	165.9	0 34.8	−58.9	165.9	0 23.4	+58.9	14.1	1 21.6	+58.9	14.1	38
39	4 27.2	−58.6	166.1	3 28.9	−58.6	166.1	2 30.7	−58.7	166.1	1 32.4	−58.7	166.1	0 34.2	−58.8	166.1	0 24.1	+58.8	13.9	1 22.3	+58.9	13.9	2 20.5	+58.9	13.9	39
40	3 28.6	−58.5	166.3	2 30.3	−58.6	166.3	1 32.0	−58.6	166.3	0 33.7	−58.7	166.3	0 24.6	+58.7	13.7	1 22.9	+58.8	13.7	2 21.2	+58.8	13.7	3 19.4	+58.9	13.7	40
41	2 30.1	−58.6	166.5	1 31.7	−58.6	166.5	0 33.4	−58.7	166.5	0 25.0	+58.7	13.5	1 23.3	+58.8	13.5	2 21.7	+58.8	13.5	3 20.0	+58.9	13.5	4 18.3	+58.9	13.5	41
42	1 31.5	−58.5	166.7	0 33.1	−58.6	166.7	0 25.3	+58.6	13.3	1 23.7	+58.7	13.3	2 22.1	+58.7	13.3	3 20.5	+58.8	13.3	4 18.9	+58.8	13.3	5 17.2	+58.9	13.3	42
43	0 33.0	−58.6	166.9	0 25.5	+58.6	13.1	1 23.9	+58.7	13.1	2 22.4	+58.7	13.1	3 20.8	+58.8	13.1	4 19.3	+58.8	13.1	5 17.7	+58.8	13.1	6 16.1	+58.9	13.1	43
44	0 25.6	+58.5	12.8	1 24.1	+58.6	12.9	2 22.6	+58.6	12.9	3 21.1	+58.7	12.9	4 19.6	+58.7	12.9	5 18.1	+58.7	12.9	6 16.5	+58.9	12.9	7 15.0	+58.9	12.9	44
45	1 24.1	+58.5	12.6	2 22.7	+58.6	12.6	3 21.2	+58.7	12.6	4 19.8	+58.7	12.7	5 18.3	+58.8	12.7	6 16.8	+58.8	12.7	7 15.4	+58.8	12.7	8 13.9	+58.9	12.8	45
46	2 22.7	+58.5	12.4	3 21.3	+58.6	12.4	4 19.9	+58.6	12.4	5 18.5	+58.7	12.4	6 17.1	+58.7	12.5	7 15.6	+58.8	12.5	8 14.2	+58.8	12.5	9 12.8	+58.9	12.6	46
47	3 21.2	+58.6	12.2	4 19.9	+58.6	12.2	5 18.5	+58.7	12.2	6 17.2	+58.6	12.2	7 15.8	+58.7	12.3	8 14.4	+58.8	12.3	9 13.0	+58.9	12.3	10 11.7	+58.8	12.4	47
48	4 19.8	+58.5	12.0	5 18.5	+58.6	12.0	6 17.2	+58.6	12.0	7 15.8	+58.7	12.0	8 14.5	+58.7	12.1	9 13.2	+58.8	12.1	10 11.9	+58.8	12.1	11 10.5	+58.9	12.2	48
49	5 18.3	+58.5	11.7	6 17.1	+58.5	11.8	7 15.8	+58.6	11.8	8 14.5	+58.7	11.8	9 13.2	+58.8	11.9	10 12.0	+58.7	11.9	11 10.7	+58.8	11.9	12 09.4	+58.8	12.0	49
50	6 16.8	+58.6	11.5	7 15.6	+58.6	11.6	8 14.4	+58.6	11.6	9 13.2	+58.7	11.6	10 12.0	+58.7	11.6	11 10.7	+58.8	11.7	12 09.5	+58.8	11.7	13 08.2	+58.9	11.7	50
51	7 15.4	+58.5	11.3	8 14.2	+58.6	11.3	9 13.0	+58.7	11.4	10 11.9	+58.6	11.4	11 10.7	+58.7	11.4	12 09.5	+58.7	11.5	13 08.3	+58.8	11.5	14 07.1	+58.8	11.6	51
52	8 13.9	+58.5	11.1	9 12.8	+58.5	11.1	10 11.7	+58.6	11.1	11 10.5	+58.7	11.2	12 09.4	+58.7	11.2	13 08.2	+58.8	11.3	14 07.1	+58.7	11.3	15 05.9	+58.8	11.4	52
53	9 12.4	+58.5	10.9	10 11.3	+58.5	10.9	11 10.3	+58.5	10.9	12 09.2	+58.6	11.0	13 08.1	+58.6	11.0	14 07.0	+58.7	11.1	15 05.8	+58.8	11.1	16 04.7	+58.8	11.2	53
54	10 10.9	+58.5	10.6	11 09.9	+58.5	10.7	12 08.8	+58.6	10.7	13 07.8	+58.6	10.7	14 06.7	+58.6	10.8	15 05.7	+58.7	10.8	16 04.6	+58.6	10.9	17 03.5	+58.8	11.0	54
55	11 09.4	+58.5	10.4	12 08.4	+58.6	10.4	13 07.4	+58.6	10.5	14 06.4	+58.6	10.5	15 05.4	+58.7	10.6	16 04.4	+58.6	10.6	17 03.4	+58.6	10.7	18 02.3	+58.8	10.7	55
56	12 07.9	+58.5	10.2	13 07.0	+58.5	10.3	14 06.0	+58.5	10.3	15 05.0	+58.6	10.3	16 04.1	+58.6	10.4	17 03.1	+58.7	10.4	18 02.1	+58.7	10.5	19 01.1	+58.7	10.5	56
57	13 06.4	+58.5	10.0	14 05.5	+58.5	10.0	15 04.6	+58.5	10.0	16 03.6	+58.6	10.1	17 02.7	+58.6	10.1	18 01.8	+58.6	10.2	19 00.8	+58.7	10.3	19 59.9	+58.7	10.3	57
58	14 04.9	+58.4	9.7	15 04.0	+58.5	9.8	16 03.1	+58.5	9.8	17 02.2	+58.6	9.9	18 01.3	+58.7	9.9	19 00.4	+58.7	10.0	19 59.5	+58.7	10.0	20 58.6	+58.7	10.1	58
59	15 03.3	+58.4	9.5	16 02.5	+58.5	9.5	17 01.6	+58.5	9.6	18 00.8	+58.5	9.6	19 00.0	+58.5	9.7	19 59.1	+58.6	9.8	20 58.2	+58.7	9.8	21 57.3	+58.7	9.9	59
60	16 01.7	+58.5	9.3	17 01.0	+58.4	9.3	18 00.2	+58.5	9.3	18 59.4	+58.5	9.4	19 58.5	+58.5	9.5	20 57.7	+58.6	9.5	21 56.9	+58.7	9.6	22 56.0	+58.7	9.7	60
61	17 00.2	+58.4	9.0	17 59.4	+58.5	9.1	18 58.7	+58.4	9.1	19 57.9	+58.5	9.2	20 57.1	+58.6	9.2	21 56.3	+58.6	9.3	22 55.6	+58.6	9.4	23 54.7	+58.7	9.4	61
62	17 58.6	+58.3	8.8	18 57.9	+58.4	8.8	19 57.1	+58.5	8.9	20 56.4	+58.5	8.9	21 55.7	+58.5	9.0	22 54.9	+58.6	9.1	23 54.2	+58.6	9.1	24 53.4	+58.7	9.2	62
63	18 56.9	+58.4	8.5	19 56.3	+58.4	8.6	20 55.6	+58.4	8.6	21 54.9	+58.5	8.7	22 54.2	+58.5	8.8	23 53.5	+58.6	8.8	24 52.8	+58.6	8.9	25 52.1	+58.6	9.0	63
64	19 55.3	+58.4	8.3	20 54.7	+58.4	8.3	21 54.0	+58.5	8.4	22 53.4	+58.5	8.5	23 52.7	+58.5	8.5	24 52.1	+58.5	8.6	25 51.4	+58.6	8.7	26 50.7	+58.6	8.7	64
65	20 53.7	+58.3	8.0	21 53.1	+58.3	8.1	22 52.5	+58.4	8.1	23 51.9	+58.4	8.2	24 51.2	+58.5	8.3	25 50.6	+58.5	8.3	26 50.0	+58.5	8.4	27 49.3	+58.6	8.5	65
66	21 52.0	+58.3	7.8	22 51.4	+58.4	7.8	23 50.9	+58.3	7.9	24 50.3	+58.4	8.0	25 49.7	+58.5	8.0	26 49.1	+58.5	8.1	27 48.5	+58.5	8.1	28 47.9	+58.6	8.2	66
67	22 50.3	+58.3	7.5	23 49.8	+58.3	7.6	24 49.2	+58.4	7.6	25 48.7	+58.4	7.7	26 48.2	+58.4	7.8	27 47.6	+58.5	7.8	28 47.0	+58.5	7.9	29 46.5	+58.5	8.0	67
68	23 48.6	+58.2	7.3	24 48.1	+58.3	7.4	25 47.6	+58.3	7.4	26 47.1	+58.3	7.5	27 46.6	+58.4	7.5	28 46.1	+58.4	7.5	29 45.5	+58.4	7.7	30 45.0	+58.5	7.7	68
69	24 46.8	+58.2	7.0	25 46.4	+58.2	7.1	26 45.9	+58.3	7.1	27 45.4	+58.3	7.2	28 45.0	+58.3	7.3	29 44.5	+58.4	7.3	30 44.0	+58.4	7.4	31 43.5	+58.4	7.5	69
70	25 45.0	+58.2	6.7	26 44.6	+58.2	6.8	27 44.2	+58.3	6.9	28 43.8	+58.3	6.9	29 43.3	+58.3	7.0	30 42.9	+58.3	7.1	31 42.4	+58.4	7.1	32 41.9	+58.5	7.2	70
71	26 43.2	+58.2	6.5	27 42.8	+58.2	6.5	28 42.5	+58.2	6.6	29 42.1	+58.2	6.7	30 41.6	+58.3	6.7	31 41.2	+58.4	6.8	32 40.8	+58.4	6.9	33 40.4	+58.4	6.9	71
72	27 41.4	+58.1	6.2	28 41.0	+58.2	6.3	29 40.7	+58.2	6.3	30 40.3	+58.2	6.4	31 39.9	+58.3	6.4	32 39.6	+58.2	6.5	33 39.2	+58.3	6.5	34 38.8	+58.3	6.7	72
73	28 39.5	+58.1	5.9	29 39.2	+58.1	6.0	30 38.9	+58.1	6.0	31 38.5	+58.2	6.1	32 38.2	+58.2	6.2	33 37.8	+58.2	6.2	34 37.5	+58.3	6.3	35 37.1	+58.4	6.4	73
74	29 37.6	+58.1	5.6	30 37.3	+58.1	5.7	31 37.0	+58.1	5.7	32 36.7	+58.2	5.8	33 36.4	+58.2	5.9	34 36.1	+58.2	5.9	35 35.8	+58.2	6.0	36 35.4	+58.3	6.1	74
75	30 35.7	+58.0	5.3	31 35.4	+58.0	5.4	32 35.1	+58.0	5.4	33 34.9	+58.0	5.5	34 34.6	+58.1	5.6	35 34.3	+58.1	5.6	36 34.0	+58.2	5.7	37 33.7	+58.2	5.8	75
76	31 33.7	+58.0	5.0	32 33.4	+58.0	5.1	33 33.2	+58.0	5.1	34 33.0	+58.0	5.2	35 32.7	+58.1	5.3	36 32.5	+58.1	5.3	37 32.2	+58.1	5.4	38 31.9	+58.2	5.5	76
77	32 31.7	+57.9	4.7	33 31.4	+58.0	4.8	34 31.2	+58.0	4.8	35 31.0	+58.0	4.9	36 30.8	+58.0	4.9	37 30.6	+58.0	5.0	38 30.3	+58.1	5.1	39 30.1	+58.1	5.2	77
78	33 29.6	+57.8	4.4	34 29.4	+57.9	4.5	35 29.2	+57.9	4.5	36 29.0	+57.9	4.6	37 28.8	+57.9	4.6	38 28.6	+58.0	4.7	39 28.4	+58.1	4.8	40 28.2	+58.1	4.8	78
79	34 27.5	+57.8	4.1	35 27.3	+57.9	4.2	36 27.1	+57.9	4.2	37 27.0	+57.9	4.3	38 26.8	+57.9	4.3	39 26.6	+58.0	4.4	40 26.5	+57.9	4.4	41 26.3	+58.0	4.5	79
80	35 25.3	+57.8	3.8	36 25.2	+57.8	3.8	37 25.0	+57.8	3.9	38 24.9	+57.8	3.9	39 24.7	+57.9	4.0	40 24.6	+57.9	4.0	41 24.4	+58.0	4.1	42 24.3	+57.9	4.2	80
81	36 23.1	+57.7	3.4	37 23.0	+57.7	3.5	38 22.8	+57.8	3.5	39 22.7	+57.8	3.6	40 22.6	+57.8	3.6	41 22.5	+57.8	3.7	42 22.4	+57.8	3.7	43 22.2	+57.9	3.8	81
82	37 20.8	+57.6	3.1	38 20.7	+57.7	3.1	39 20.6	+57.7	3.2	40 20.5	+57.7	3.2	41 20.4	+57.7	3.3	42 20.3	+57.8	3.3	43 20.2	+57.8	3.4	44 20.1	+57.8	3.4	82
83	38 18.4	+57.6	2.8	39 18.4	+57.6	2.8	40 18.3	+57.6	2.8	41 18.2	+57.7	2.9	42 18.1	+57.7	2.9	43 18.1	+57.7	3.0	44 18.0	+57.7	3.0	45 17.9	+57.7	3.1	83
84	39 16.0	+57.6	2.4	40 16.0	+57.5	2.5	41 15.9	+57.6	2.5	42 15.9	+57.5	2.5	43 15.8	+57.6	2.5	44 15.8	+57.6	2.6	45 15.7	+57.6	2.7	46 15.6	+57.7	2.7	84
85	40 13.6	+57.4	2.0	41 13.5	+57.5	2.1	42 13.5	+57.5	2.1	43 13.4	+57.5	2.1	44 13.4	+57.5	2.2	45 13.4	+57.5	2.2	46 13.3	+57.5	2.2	47 13.3	+57.5	2.3	85
86	41 11.0	+57.4	1.6	42 11.0	+57.4	1.7	43 11.0	+57.4	1.7	44 10.9	+57.4	1.7	45 10.9	+57.4	1.8	46 10.9	+57.4	1.8	47 10.8	+57.5	1.8	48 10.8	+57.5	1.9	86
87	42 08.4	+57.3	1.2	43 08.4	+57.3	1.3	44 08.4	+57.3	1.3	45 08.4	+57.3	1.3	46 08.3	+57.4	1.3	47 08.3	+57.3	1.4	48 08.3	+57.3	1.4	49 08.3	+57.3	1.4	87
88	43 05.7	+57.2	0.8	44 05.7	+57.2	0.9	45 05.7	+57.2	0.9	46 05.7	+57.2	0.9	47 05.7	+57.2	0.9	48 05.6	+57.3	0.9	49 05.6	+57.3	0.9	50 05.6	+57.3	1.0	88
89	44 02.9	+57.1	0.4	45 02.9	+57.1	0.4	46 02.9	+57.1	0.4	47 02.9	+57.1	0.5	48 02.9	+57.1	0.5	49 02.9	+57.1	0.5	50 02.9	+57.1	0.5	51 02.9	+57.1	0.5	89
90	45 00.0	+57.0	0.0	46 00.0	+57.0	0.0	47 00.0	+57.0	0.0	48 00.0	+57.0	0.0	49 00.0	+57.0	0.0	50 00.0	+57.0	0.0	51 00.0	+57.0	0.0	52 00.0	+57.0	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 162°, 198°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	41 57.5	+57.0	154.0	41 03.4	+57.2	154.4	40 09.2	+57.4	154.8	39 14.9	+57.5	155.1	38 20.4	+57.7	155.5	37 25.7	+57.8	155.8	36 30.9	+58.0	156.1	35 36.0	+58.1	156.4	0
1	42 54.5	+56.9	153.6	42 00.6	+57.1	154.0	41 06.6	+57.3	154.4	40 12.4	+57.5	154.8	39 18.1	+57.6	155.1	38 23.5	+57.8	155.5	37 28.9	+57.9	155.8	36 34.1	+58.1	156.1	1
2	43 51.4	+56.8	153.2	42 57.7	+57.1	153.6	42 03.9	+57.2	154.0	41 09.9	+57.4	154.4	40 15.7	+57.5	154.8	39 21.3	+57.8	155.1	38 26.8	+57.9	155.5	37 32.2	+58.0	155.8	2
3	44 48.2	+56.7	152.7	43 54.8	+56.9	153.2	43 01.1	+57.1	153.6	42 07.3	+57.3	154.0	41 13.3	+57.4	154.4	40 19.1	+57.6	154.8	39 24.7	+57.8	155.1	38 30.2	+58.0	155.5	3
4	45 44.9	+56.6	152.3	44 51.7	+56.8	152.7	43 58.2	+57.1	153.2	43 04.6	+57.2	153.6	42 10.7	+57.5	154.0	41 16.7	+57.6	154.4	40 22.5	+57.8	154.8	39 28.2	+57.9	155.1	4
5	46 41.5	+56.4	151.8	45 48.5	+56.7	152.3	44 55.3	+56.9	152.7	44 01.8	+57.1	153.2	43 08.2	+57.3	153.6	42 14.3	+57.5	154.0	41 20.3	+57.7	154.4	40 26.1	+57.8	154.8	5
6	47 37.9	+56.3	151.3	46 45.2	+56.5	151.8	45 52.2	+56.8	152.3	44 58.9	+57.1	152.8	44 05.5	+57.2	153.2	43 11.8	+57.5	153.6	42 18.0	+57.6	154.0	41 23.9	+57.8	154.4	6
7	48 34.2	+56.2	150.8	47 41.7	+56.5	151.3	46 49.0	+56.7	151.8	45 56.0	+56.9	152.3	45 02.7	+57.2	152.8	44 09.3	+57.3	153.2	43 15.6	+57.5	153.7	42 21.7	+57.7	154.1	7
8	49 30.4	+56.0	150.2	48 38.2	+56.3	150.8	47 45.7	+56.5	151.3	46 52.9	+56.8	151.9	45 59.9	+57.0	152.3	45 06.6	+57.3	152.8	44 13.1	+57.3	153.3	43 19.4	+57.7	153.7	8
9	50 26.4	+55.9	149.7	49 34.5	+56.2	150.3	48 42.2	+56.5	150.8	47 49.7	+56.7	151.4	46 56.9	+56.9	151.9	46 03.9	+57.1	152.4	45 10.6	+57.3	152.9	44 17.1	+57.5	153.3	9
10	51 22.3	+55.7	149.1	50 30.7	+56.0	149.7	49 38.7	+56.3	150.3	48 46.4	+56.6	150.9	47 53.8	+56.9	151.4	47 01.0	+57.1	151.9	46 07.9	+57.3	152.4	45 14.6	+57.5	152.9	10
11	52 18.0	+55.5	148.5	51 26.7	+55.8	149.2	50 35.0	+56.1	149.8	49 43.0	+56.4	150.4	48 50.7	+56.6	150.9	47 58.1	+56.9	151.5	47 05.2	+57.2	152.0	46 12.1	+57.4	152.5	11
12	53 13.5	+55.3	147.9	52 22.5	+55.6	148.6	51 31.1	+56.0	149.2	50 39.4	+56.3	149.8	49 47.3	+56.6	150.4	48 55.0	+56.8	151.0	48 02.4	+57.0	151.6	47 09.5	+57.3	152.1	12
13	54 08.8	+55.0	147.2	53 18.1	+55.4	147.9	52 27.1	+55.8	148.6	51 35.7	+56.1	149.3	50 43.9	+56.4	149.9	49 51.8	+56.7	150.5	48 59.4	+57.0	151.1	48 06.8	+57.2	151.6	13
14	55 03.8	+54.8	146.5	54 13.5	+55.3	147.3	53 22.9	+55.5	148.0	52 31.8	+55.9	148.7	51 40.3	+56.3	149.4	50 48.5	+56.5	150.0	49 56.4	+56.8	150.6	49 04.0	+57.0	151.2	14
15	55 58.6	+54.6	145.8	55 08.8	+54.9	146.6	54 18.4	+55.4	147.4	53 27.7	+55.7	148.1	52 36.6	+56.0	148.8	51 45.0	+56.4	149.5	50 53.2	+56.7	150.1	50 01.0	+57.0	150.7	15
16	56 53.2	+54.2	145.0	56 03.7	+54.8	145.9	55 13.8	+55.2	146.7	54 23.4	+55.6	147.5	53 32.6	+55.9	148.2	52 41.4	+56.3	148.9	51 49.9	+56.5	149.6	50 58.0	+56.8	150.2	16
17	57 47.4	+54.0	144.3	56 58.5	+54.4	145.2	56 09.0	+54.9	146.0	55 19.0	+55.4	146.8	54 28.5	+55.7	147.6	53 37.7	+56.0	148.3	52 46.4	+56.4	149.0	51 54.8	+56.7	149.7	17
18	58 41.4	+53.6	143.4	57 52.9	+54.2	144.4	57 03.9	+54.6	145.3	56 14.3	+55.1	146.1	55 24.2	+55.5	147.0	54 33.7	+55.9	147.7	53 42.8	+56.2	148.5	52 51.5	+56.5	149.1	18
19	59 35.0	+53.3	142.6	58 47.1	+53.8	143.6	57 58.5	+54.3	144.5	57 09.4	+54.8	145.4	56 19.7	+55.3	146.3	55 29.6	+55.6	147.1	54 39.0	+56.0	147.9	53 48.0	+56.3	148.6	19
20	60 28.3	+52.8	141.6	59 40.9	+53.4	142.7	58 52.8	+54.0	143.7	58 04.2	+54.5	144.7	57 15.0	+55.0	145.6	56 25.2	+55.4	146.4	55 35.0	+55.8	147.2	54 44.3	+56.2	148.0	20
21	61 21.1	+52.4	140.7	60 34.3	+53.1	141.8	59 46.8	+53.7	142.9	58 58.7	+54.2	143.9	58 10.0	+54.7	144.8	57 20.6	+55.2	145.7	56 30.8	+55.6	146.6	55 40.5	+56.0	147.4	21
22	62 13.5	+51.9	139.6	61 27.4	+52.6	140.8	60 40.5	+53.3	142.0	59 52.9	+53.9	143.0	59 04.7	+54.4	144.0	58 15.8	+54.9	145.0	57 26.4	+55.4	145.9	56 36.5	+55.8	146.7	22
23	63 05.4	+51.4	138.5	62 20.0	+52.2	139.8	61 33.8	+52.9	141.0	60 46.8	+53.5	142.1	59 59.1	+54.1	143.2	59 10.7	+54.6	144.2	58 21.8	+55.1	145.2	57 32.3	+55.5	146.1	23
24	63 56.8	+50.8	137.4	63 12.2	+51.6	138.7	62 26.7	+52.4	140.0	61 40.3	+53.1	141.2	60 53.2	+53.7	142.3	60 05.3	+54.3	143.4	59 16.9	+54.8	144.4	58 27.8	+55.3	145.3	24
25	64 47.6	+50.1	136.1	64 03.8	+51.1	137.6	63 19.1	+51.8	138.9	62 33.4	+52.6	140.2	61 46.9	+53.3	141.4	60 59.6	+54.0	142.5	60 11.7	+54.5	143.6	59 23.1	+55.0	144.6	25
26	65 37.7	+49.5	134.8	64 54.9	+50.4	136.4	64 10.9	+51.4	137.8	63 26.0	+52.2	139.1	62 40.2	+52.9	140.4	61 53.6	+53.5	141.6	61 06.2	+54.2	142.7	60 18.1	+54.7	143.8	26
27	66 27.2	+48.6	133.4	65 45.3	+49.7	135.1	65 02.3	+50.7	136.6	64 18.2	+51.6	138.0	63 33.1	+52.4	139.4	62 47.1	+53.2	140.6	62 00.4	+53.7	141.8	61 12.8	+54.4	143.0	27
28	67 15.8	+47.7	131.9	66 35.0	+48.9	133.7	65 53.0	+50.0	135.3	65 09.8	+50.9	136.8	64 25.5	+51.9	138.2	63 40.3	+52.6	139.6	62 54.1	+53.4	140.9	62 07.2	+54.0	142.1	28
29	68 03.5	+46.8	130.4	67 23.9	+48.1	132.2	66 43.0	+49.2	133.9	66 00.7	+50.4	135.5	65 17.4	+51.2	137.1	64 32.9	+52.2	138.5	63 47.5	+52.9	139.9	63 01.2	+53.6	141.1	29
30	68 50.3	+45.6	128.6	68 12.0	+47.1	130.6	67 32.2	+48.4	132.4	66 51.1	+49.5	134.2	66 08.6	+50.6	135.8	65 25.1	+51.5	137.3	64 40.4	+52.4	138.8	63 54.8	+53.2	140.1	30
31	69 35.9	+44.4	126.8	68 59.1	+46.0	128.9	68 20.6	+47.3	130.9	67 40.6	+48.7	132.7	66 59.2	+49.9	134.5	66 16.6	+50.9	136.1	65 32.8	+51.9	137.6	64 48.0	+52.7	139.0	31
32	70 20.3	+43.1	124.9	69 45.1	+44.8	127.1	69 08.0	+46.4	129.2	68 29.3	+47.8	131.2	67 49.1	+49.1	133.0	67 07.5	+50.2	134.7	66 24.7	+51.2	136.4	65 40.7	+52.1	137.9	32
33	71 03.4	+41.5	122.7	70 29.9	+43.4	125.1	69 54.4	+45.2	127.4	69 17.1	+46.7	129.5	68 38.2	+48.1	131.5	67 57.7	+49.4	133.3	67 15.9	+50.5	135.0	66 32.8	+51.5	136.7	33
34	71 44.9	+39.8	120.5	71 13.3	+41.9	123.0	70 39.6	+43.8	125.4	70 03.8	+45.6	127.7	69 26.3	+47.1	129.8	68 47.1	+48.5	131.8	68 06.4	+49.7	133.6	67 24.3	+50.9	135.4	34
35	72 24.7	+37.9•	118.0	71 55.2	+40.2	120.8	71 23.4	+42.3	123.3	70 49.4	+44.2	125.7	70 13.4	+45.9	128.0	69 35.6	+47.4	130.1	68 56.1	+48.9	132.1	68 15.2	+50.0	134.0	35
36	73 02.6	+35.7•	115.4	72 35.4	+38.3•	118.3	72 05.7	+40.6	121.0	71 33.6	+42.7	123.6	70 59.3	+44.6	126.0	70 23.0	+46.4	128.3	69 45.0	+47.8	130.5	69 05.2	+49.2	132.4	36
37	73 38.3	+33.3•	112.6	73 13.7	+36.2•	115.7	72 46.3	+38.7•	118.6	72 16.3	+41.1	121.4	71 43.9	+43.2	124.0	71 09.4	+45.0	126.4	70 32.8	+46.7	128.7	69 54.4	+48.3	130.8	37
38	74 11.6	+30.7•	109.6	73 49.9	+33.7•	112.9	73 25.0	+36.6•	116.0	72 57.4	+39.1•	118.9	72 27.1	+41.5	121.7	71 54.4	+43.6	124.3	71 19.5	+45.5	126.8	70 42.7	+47.1	129.0	38
39	74 42.3	+27.8•	106.4	74 23.6	+31.2•	109.9	74 01.6	+34.2•	113.2	73 36.5	+37.1•	116.3	73 08.6	+39.6•	119.2	72 38.0	+41.9	122.0	72 05.0	+44.0	124.7	71 29.8	+45.8	127.1	39
40	75 10.1	+24.6•	103.0	74 54.8	+28.1•	106.6	74 35.8	+31.6•	110.1	74 13.6	+34.6•	113.4	73 48.2	+37.5•	116.6	73 19.9	+40.1•	119.6	72 49.0	+42.4	122.4	72 15.6	+44.5	125.1	40
41	75 34.7	+21.1•	99.4	75 22.9	+25.0•	103.2	75 07.4	+28.6•	106.9	74 48.2	+32.0•	110.4	74 25.7	+35.1•	113.8	74 00.0	+37.9•	117.0	73 31.4	+40.5•	120.0	73 00.1	+42.8	122.9	41
42	75 55.8	+17.4•	95.6	75 47.9	+21.5•	99.5	75 36.0	+25.3•	103.4	75 20.2	+29.0•	107.1	75 00.8	+32.4•	110.7	74 37.9	+35.6•	114.1	74 11.9	+38.4•	117.3	73 42.9	+41.0	120.4	42
43	76 13.2	+13.4•	91.6	76 09.4	+17.6•	95.7	76 01.3	+21.8•	99.7	75 49.2	+25.8•	103.6	75 33.2	+29.5•	107.6	75 13.5	+32.9•	111.0	74 50.3	+36.1•	114.4	74 23.9	+38.9•	117.7	43
44	76 26.6	+9.2•	87.5	76 27.0	+13.6•	91.6	76 23.1	+18.0•	95.8	76 15.0	+22.1•	99.8	76 02.7	+26.1•	103.8	75 46.4	+29.9•	107.6	75 26.4	+33.3•	111.3	75 02.8	+36.6•	114.8	44
45	76 35.8	+4.8•	83.3	76 40.6	+9.4•	87.4	76 41.1	+13.8•	91.7	76 37.1	+18.3•	95.9	76 28.8	+22.5•	100.0	76 16.3	+26.6•	104.1	75 59.7	+30.4•	108.0	75 39.4	+33.9•	111.7	45
46	76 40.6	+0.5•	78.9	76 50.0	+4.9•	83.1	76 54.9	+9.5•	87.4	76 55.4	+14.1•	91.7	76 51.3	+18.6•	96.0	76 42.9	+22.9•	100.2	76 30.1	+27.0•	104.3	76 13.3	+30.8•	108.3	46
47	76 41.1	-4.0•	74.6	76 54.9	+0.5•	78.7	77 04.4	+5.1•	83.0	77 09.5	+9.6•	87.4	77 09.9	+14.3•	91.8	77 05.8	+18.8•	96.1	76 57.1	+23.3•	100.4	76 44.1	+27.4•	104.6	47
48	76 37.1	-8.3•	70.3	76 55.4	-4.1•	74.3	77 09.5	+0.4•	78.6	77 19.1	+5.1•	82.9	77 24.2	+9.9•	87.4	77 24.6	+14.6•	91.8	77 20.4	+19.2•	96.3	77 11.5	+23.7•	100.7	48
49	76 28.8	-12.5•	66.0	76 51.3	-8.4•	69.9	77 09.9	-4.1•	74.1	77 24.2	+0.4•	78.4	77 34.1	+5.1•	82.8	77 39.2	+10.0•	87.3	77 39.6	+14.8•	91.9	77 35.2	+19.6•	96.5	49
50	76 16.3	-16.6•	61.9	76 42.9	-12.8•	65.6	77 05.8	-8.7•	69.6	77 24.6	-4.2•	73.8	77 39.2	+0.4•	78.2	77 49.2	+5.2•	82.7	77 54.4	+10.0•	87.3	77 54.8	+15.0•	92.0	50
51	75 59.7	-20.3•	57.9	76 30.1	-16.8•	61.4	76 57.1	-13.0•	65.2	77 20.4	-8.9•	69.2	77 39.6	-4.4•	73.5	77 54.4	+0.4•	78.0	78 04.6	+5.2•	82.6	78 09.8	+10.3•	87.3	51
52	75 39.4	-23.9•	54.0	76 13.3	-20.7•	57.3	76 44.1	-17.2•	60.9	77 11.5	-13.3•	64.7	77 35.2	-9.0•	68.8	77 54.8	-4.6•	73.2	78 09.8	+0.3•	77.8	78 20.1	+5.4•	82.5	52
53	75 15.5	-27.1•	50.4	75 52.6	-24.3•	53.4	76 26.9	-21.0•	56.7	76 58.2	-17.5•	60.4	77 26.2	-13.6•	64.3	77 50.2	-9.3•	68.4	78 10.1	-4.6•	72.9	78 25.5	+0.2•	77.5	53
54	74 48.4	-30.2•	46.9	75 28.3	-27.6•	49.7	76 05.9	-24.7•	52.8	76 40.7	-21.4•	56.2	77 12.6	-17.9•	59.8	77 40.9	-13.9•	63.8	78 05.5	-9.6•	68.0	78 25.7	-4.9•	72.6	54
55	74 18.2	-32.8•	43.7	75 00.7	-30.5•	46.2	75 41.2	-28.0•	49.1	76 19.3	-25.2•	52.2	76 54.7	-21.9•	55.5	77 27.0	-18.3•	59.3	77 55.9	-14.3•	63.3	78 20.8	-9.8•	67.6	55
56	73 45.4	-35.2•	40.6	74 30.2	-33.3•	43.0	75 13.2	-31.0•	45.5	75 54.1	-28.4•	48.4	76 32.8	-25.6•	51.5	77 08.7	-22.3•	54.7	77 41.6	-18.7•	58.7	78 11.0	-14.6•	62.8	56
57	73 10.2	-37.5•	37.8	73 56.9	-35.7•	39.9	74 42.2	-33.7•	42.2	75 25.7	-31.5•	44.8	76 07.2	-28.9•	47.7	76 46.4	-26.1•	50.8	77 22.9	-22.8•	54.3	77 56.4	-19.2•	58.1	57
58	72 32.7	-39.4	35.1	73 21.2	-37.8•	37.0	74 08.5	-36.2•	39.1	74 54.2	-34.2•	41.5	75 38.3	-32.0•	44.1	76 20.3	-29.4•	46.9	77 00.1	-26.6•	50.1	77 37.2	-23.3•	53.6	58
59	71 53.3	-41.1	32.6	72 43.4	-39.9	34.4	73 32.3	-38.3•	36.3	74 20.0	-36.6•	38.4	75 06.3	-34.7•	40.7	75 50.9	-32.5•	43.3	76 33.5	-29.9•	46.2	77 13.9	-27.1•	49.3	59
60	71 12.2	-42.8	30.3	72 03.5	-41.6	31.9	72 54.0	-40.3	33.6	73 43.4	-38.8•	35.5	74 31.6	-37.1•	37.6	75 18.4	-35.2•	39.9	76 03.6	-33.1•	42.5	76 46.8	-30.6•	45.4	60
61	70 29.4	-44.1	28.2	71 21.9	-43.1	29.6	72 13.7	-42.0	31.1	73 04.6	-40.7	32.8	73 54.5	-39.3•	34.7	74 43.2	-37.6•	36.8	75 30.5	-35.7•	39.1	76 16.2	-33.6•	41.7	61
62	69 45.3	-45.4	26.2	70 38.8	-44.5	27.5	71 31.7	-43.5	28.8	72 23.9	-42.4	30.4	73 15.2	-41.2	32.0	74 05.6	-39.8•	33.9	74 54.8	-38.2•	36.0	75 42.6	-36.3•	38.3	62
63	68 59.9	-46.6	24.4	69 54.3	-45.8	25.5	70 48.2	-44.9	26.7	71 41.5	-44.0	28.1	72 34.0	-42.9	29.6	73 25.8	-41.7	31.2	74 16.6	-40.3•	33.1	75 06.3	-38.7•	35.1	63
64	68 13.3	-47.5	22.6	69 08.5	-46.9	23.6	70 03.3	-46.2	24.7	70 57.5	-45.3	25.9	71 51.1	-44.3	27.3	72 44.1	-43.3	28.7	73 36.3	-42.2	30.4	74 27.6	-40.8•	32.2	64
65	67 25.8	-48.4	21.0	68 21.6	-47.8	21.9	69 17.1	-47.2	22.9	70 12.2	-46.5	24.0	71 06.8	-45.8	25.2	72 00.8	-44.9	26.5	72 54.1	-43.8	27.9	73 46.8	-42.7	29.5	65
66	66 37.4	-49.3	19.5	67 33.8	-48.8	20.3	68 29.9	-48.2	21.2	69 25.7	-47.6	22.1	70 21.0	-46.8	23.2	71 15.9	-46.1	24.3	72 10.3	-45.3	25.6	73 04.1	-44.3	27.0	66
67	65 48.1	-50.0	18.1	66 45.0	-49.5	18.8	67 41.7	-49.1	19.6	68 38.1	-48.6	20.4	69 34.1	-48.0	21.4	70 29.8	-47.3	22.4	71 25.0	-46.5	23.5	72 19.8	-45.8	24.8	67
68	64 58.1	-50.7	16.8	65 55.5	-50.3	17.4	66 52.6	-49.9	18.1	67 49.5	-49.4	18.9	68 46.1	-48.9	19.8	69 42.5	-48.4	20.6	70 38.5	-47.7	21.6	71 34.0	-47.0	22.7	68
69	64 07.4	-51.2	15.5	65 05.2	-51.0	16.1	66 02.7	-50.5	16.7	67 00.1	-50.2	17.4	67 57.2	-49.7	18.1	68 54.1	-49.2	18.9	69 50.8	-48.8	19.8	70 47.0	-48.1	20.8	69
70	63 16.2	-51.8	14.3	64 14.2	-51.5	14.8	65 12.2	-51.3	15.4	66 09.9	-50.8	16.0	67 07.5	-50.5	16.6	68 04.9	-50.1	17.4	69 02.0	-49.6	18.1	69 58.9	-49.1	19.0	70
71	62 24.4	-52.3	13.2	63 22.7	-52.0	13.7	64 20.9	-51.7	14.2	65 19.1	-51.5	14.7	66 17.0	-51.2	15.3	67 14.8	-50.8	15.9	68 12.4	-50.4	16.6	69 09.8	-50.0	17.3	71
72	61 32.1	-52.8	12.2	62 30.7	-52.6	12.6	63 29.2	-52.3	13.0	64 27.6	-52.1	13.5	65 25.8	-51.7	14.0	66 24.0	-51.5	14.6	67 22.0	-51.1	15.2	68 19.8	-50.8	15.8	72
73	60 39.3	-53.2	11.2	61 38.1	-53.0	11.6	62 36.9	-52.8	11.9	63 35.5	-52.5	12.4	64 34.1	-52.3	12.8	65 32.5	-52.0	13.3	66 30.9	-51.8	13.8	67 29.0	-51.4	14.4	73
74	59 46.1	-53.5	10.3	60 45.1	-53.3	10.6	61 44.1	-53.2	10.9	62 43.0	-53.1	11.3	63 41.8	-52.8	11.7	64 40.5	-52.6	12.1	65 39.1	-52.4	12.6	66 37.6	-52.1	13.1	74
75	58 52.6	-53.9	9.4	59 51.8	-53.8	9.7	60 50.9	-53.6	10.0	61 49.9	-53.4	10.3	62 49.0	-53.3	10.6	63 47.9	-53.1	11.0	64 46.7	-52.8	11.4	65 45.5	-52.6	11.8	75
76	57 58.7	-54.2	8.5	58 58.0	-54.1	8.8	59 57.3	-54.0	9.1	60 56.5	-53.8	9.3	61 55.7	-53.7	9.6	62 54.8	-53.5	10.0	63 53.9	-53.3	10.3	64 52.9	-53.1	10.7	76
77	57 04.5	-54.5	7.7	58 03.9	-54.4	8.0	59 03.3	-54.2	8.2	60 02.7	-54.1	8.4	61 02.0	-54.0	8.7	62 01.3	-53.9	9.0	63 00.6	-53.8	9.3	63 59.8	-53.6	9.6	77
78	56 10.0	-54.8	7.0	57 09.5	-54.7	7.2	58 09.1	-54.6	7.4	59 08.6	-54.5	7.6	60 08.0	-54.4	7.8	61 07.4	-54.2	8.1	62 06.8	-54.1	8.3	63 06.2	-54.0	8.6	78
79	55 15.2	-55.0	6.3	56 14.9	-55.0	6.4	57 14.5	-54.9	6.6	58 14.1	-54.8	6.8	59 13.6	-54.6	7.0	60 13.2	-54.6	7.2	61 12.7	-54.5	7.4	62 12.2	-54.4	7.7	79
80	54 20.2	-55.2	5.6	55 19.9	-55.1	5.7	56 19.6	-55.1	5.9	57 19.3	-55.0	6.0	58 19.0	-55.0	6.2	59 18.6	-54.8	6.4	60 18.2	-54.7	6.6	61 17.8	-54.7	6.8	80
81	53 25.0	-55.4	4.9	54 24.8	-55.4	5.0	55 24.5	-55.3	5.1	56 24.3	-55.3	5.3	57 24.0	-55.2	5.4	58 23.8	-55.2	5.6	59 23.5	-55.1	5.7	60 23.1	-54.9	5.9	81
82	52 29.6	-55.7	4.3	53 29.4	-55.6	4.4	54 29.2	-55.5	4.5	55 29.0	-55.5	4.6	56 28.8	-55.4	4.7	57 28.6	-55.4	4.8	58 28.4	-55.3	5.0	59 28.2	-55.3	5.1	82
83	51 33.9	-55.8	3.7	52 33.8	-55.8	3.7	53 33.7	-55.8	3.8	54 33.5	-55.7	3.9	55 33.4	-55.7	4.0	56 33.2	-55.6	4.1	57 33.1	-55.6	4.2	58 32.9	-55.5	4.4	83
84	50 38.1	-56.0	3.1	51 38.0	-56.0	3.1	52 37.9	-55.9	3.2	53 37.7	-55.9	3.4	54 37.7	-55.8	3.4	55 37.6	-55.8	3.5	56 37.5	-55.8	3.5	57 37.4	-55.8	3.6	84
85	49 42.1	-56.1	2.5	50 42.0	-56.1	2.6	51 42.0	-56.1	2.6	52 41.9	-56.1	2.7	53 41.8	-56.0	2.7	54 41.8	-56.0	2.8	55 41.7	-56.0	2.9	56 41.6	-55.9	3.0	85
86	48 46.0	-56.3	2.0	49 45.9	-56.3	2.0	50 45.9	-56.3	2.1	51 45.8	-56.2	2.1	52 45.8	-56.2	2.2	53 45.8	-56.2	2.2	54 45.7	-56.2	2.3	55 45.7	-56.2	2.3	86
87	47 49.7	-56.5	1.5	48 49.6	-56.4	1.5	49 49.6	-56.5	1.5	50 49.6	-56.5	1.5	51 49.6	-56.4	1.6	52 49.6	-56.4	1.6	53 49.5	-56.4	1.7	54 49.5	-56.5	1.7	87
88	46 53.2	-56.5	1.0	47 53.2	-56.5	1.0	48 53.2	-56.5	1.0	49 53.2	-56.5	1.0	50 53.2	-56.5	1.0	51 53.2	-56.5	1.1	52 53.2	-56.5	1.1	53 53.2	-56.5	1.1	88
89	45 56.7	-56.7	0.5	46 56.7	-56.7	0.5	47 56.7	-56.7	0.5	48 56.7	-56.7	0.5	49 56.7	-56.7	0.5	50 56.7	-56.7	0.5	51 56.7	-56.7	0.5	52 56.7	-56.7	0.5	89
90	45 00.0	-56.8	0.0	46 00.0	-56.8	0.0	47 00.0	-56.8	0.0	48 00.0	-56.8	0.0	49 00.0	-56.8	0.0	50 00.0	-56.8	0.0	51 00.0	-56.8	0.0	52 00.0	-56.8	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	41 57.5	−57.1	154.0	41 03.4	−57.2	154.4	40 09.2	−57.4	154.8	39 14.9	−57.6	155.1	38 20.4	−57.8	155.5	37 25.7	−57.9	155.8	36 30.9	−58.0	156.1	35 36.0	−58.2	156.4	0
1	41 00.4	−57.2	154.4	40 06.2	−57.4	154.8	39 11.8	−57.5	155.2	38 17.3	−57.7	155.5	37 22.6	−57.8	155.8	36 27.8	−58.0	156.1	35 32.9	−58.1	156.4	34 37.8	−58.2	156.7	1
2	40 03.2	−57.3	154.8	39 08.8	−57.4	155.2	38 14.3	−57.6	155.5	37 19.6	−57.7	155.8	36 24.8	−57.9	156.2	35 29.8	−58.0	156.4	34 34.8	−58.2	156.7	33 39.6	−58.3	157.0	2
3	39 05.9	−57.3	155.2	38 11.4	−57.5	155.6	37 16.7	−57.7	155.9	36 21.8	−57.7	156.2	35 26.9	−57.9	156.5	34 31.8	−58.0	156.8	33 36.6	−58.1	157.0	32 41.3	−58.2	157.3	3
4	38 08.6	−57.4	155.6	37 13.9	−57.6	155.9	36 19.0	−57.7	156.2	35 24.1	−57.9	156.5	34 29.0	−58.0	156.8	33 33.8	−58.1	157.1	32 38.5	−58.3	157.3	31 43.1	−58.4	157.6	4
5	37 11.2	−57.5	156.0	36 16.3	−57.6	156.3	35 21.3	−57.7	156.6	34 26.2	−57.9	156.8	33 31.0	−58.0	157.1	32 35.7	−58.2	157.4	31 40.2	−58.3	157.6	30 44.7	−58.3	157.8	5
6	36 13.7	−57.5	156.3	35 18.7	−57.7	156.6	34 23.6	−57.8	156.9	33 28.3	−57.9	157.2	32 33.0	−58.1	157.4	31 37.5	−58.1	157.7	30 42.0	−58.3	157.9	29 46.4	−58.4	158.1	6
7	35 16.2	−57.6	156.7	34 21.0	−57.7	157.0	33 25.8	−57.9	157.2	32 30.4	−58.0	157.5	31 34.9	−58.1	157.7	30 39.4	−58.3	157.9	29 43.7	−58.3	158.2	28 48.0	−58.5	158.4	7
8	34 18.6	−57.7	157.0	33 23.3	−57.8	157.3	32 27.9	−57.9	157.5	31 32.4	−58.0	157.8	30 36.8	−58.1	158.0	29 41.1	−58.2	158.2	28 45.4	−58.4	158.4	27 49.5	−58.4	158.6	8
9	33 20.9	−57.7	157.4	32 25.5	−57.8	157.6	31 30.0	−58.0	157.8	30 34.4	−58.1	158.1	29 38.7	−58.2	158.3	28 42.9	−58.3	158.5	27 47.0	−58.4	158.7	26 51.1	−58.5	158.9	9
10	32 23.2	−57.7	157.7	31 27.7	−57.9	157.9	30 32.0	−58.0	158.1	29 36.3	−58.1	158.4	28 40.5	−58.2	158.6	27 44.6	−58.3	158.8	26 48.6	−58.4	158.9	25 52.6	−58.5	159.1	10
11	31 25.5	−57.8	158.0	30 29.8	−57.9	158.2	29 34.0	−58.0	158.4	28 38.2	−58.1	158.6	27 42.3	−58.3	158.8	26 46.3	−58.4	159.0	25 50.2	−58.4	159.2	24 54.1	−58.5	159.4	11
12	30 27.7	−57.9	158.3	29 31.9	−58.0	158.5	28 36.0	−58.1	158.7	27 40.1	−58.2	158.9	26 44.0	−58.2	159.1	25 47.9	−58.3	159.3	24 51.8	−58.5	159.5	23 55.6	−58.6	159.6	12
13	29 29.8	−57.9	158.6	28 33.9	−58.0	158.8	27 37.9	−58.1	159.0	26 41.9	−58.2	159.2	25 45.8	−58.4	159.4	24 49.6	−58.4	159.5	23 53.3	−58.5	159.7	22 57.0	−58.5	159.8	13
14	28 32.0	−58.0	158.9	27 35.9	−58.1	159.1	26 39.8	−58.3	159.3	25 43.7	−58.3	159.5	24 47.5	−58.4	159.6	23 51.2	−58.4	159.8	22 54.8	−58.5	159.9	21 58.5	−58.6	160.1	14
15	27 34.0	−57.9	159.2	26 37.9	−58.1	159.4	25 41.7	−58.2	159.6	24 45.4	−58.2	159.7	23 49.1	−58.3	159.9	22 52.8	−58.5	160.0	21 56.3	−58.5	160.2	20 59.9	−58.6	160.3	15
16	26 36.1	−58.0	159.5	25 39.8	−58.1	159.7	24 43.5	−58.2	159.8	23 47.2	−58.3	160.0	22 50.8	−58.4	160.1	21 54.3	−58.4	160.3	20 57.8	−58.5	160.4	20 01.3	−58.7	160.5	16
17	25 38.1	−58.0	159.8	24 41.7	−58.1	160.0	23 45.3	−58.2	160.1	22 48.9	−58.3	160.3	21 52.4	−58.4	160.4	20 55.9	−58.5	160.5	19 59.3	−58.6	160.7	19 02.6	−58.6	160.8	17
18	24 40.1	−58.1	160.1	23 43.6	−58.1	160.2	22 47.1	−58.2	160.4	21 50.6	−58.4	160.5	20 54.0	−58.4	160.6	19 57.4	−58.5	160.8	19 00.7	−58.6	160.9	18 04.0	−58.7	161.0	18
19	23 42.0	−58.1	160.4	22 45.5	−58.2	160.5	21 48.9	−58.3	160.6	20 52.2	−58.3	160.8	19 55.6	−58.5	160.9	18 58.9	−58.6	161.0	18 02.1	−58.6	161.1	17 05.3	−58.6	161.2	19
20	22 43.9	−58.1	160.6	21 47.3	−58.2	160.8	20 50.6	−58.3	160.9	19 53.9	−58.4	161.0	18 57.1	−58.4	161.1	18 00.3	−58.5	161.2	17 03.5	−58.6	161.3	16 06.7	−58.7	161.4	20
21	21 45.8	−58.1	160.9	20 49.1	−58.3	161.0	19 52.3	−58.3	161.1	18 55.5	−58.4	161.3	17 58.7	−58.5	161.4	17 01.8	−58.5	161.5	16 04.9	−58.6	161.6	15 08.0	−58.7	161.6	21
22	20 47.7	−58.2	161.2	19 50.8	−58.2	161.3	18 54.0	−58.3	161.4	17 57.1	−58.4	161.5	17 00.2	−58.5	161.6	16 03.3	−58.6	161.7	15 06.3	−58.7	161.8	14 09.3	−58.7	161.9	22
23	19 49.5	−58.2	161.4	18 52.6	−58.3	161.5	17 55.7	−58.4	161.6	16 58.7	−58.4	161.7	16 01.7	−58.5	161.8	15 04.7	−58.6	161.9	14 07.6	−58.6	162.0	13 10.6	−58.8	162.1	23
24	18 51.3	−58.2	161.7	17 54.3	−58.3	161.8	16 57.3	−58.4	161.9	16 00.3	−58.5	162.0	15 03.2	−58.5	162.1	14 06.1	−58.6	162.1	13 09.0	−58.7	162.2	12 11.8	−58.7	162.3	24
25	17 53.1	−58.2	161.9	16 56.0	−58.3	162.0	15 58.9	−58.3	162.1	15 01.8	−58.5	162.2	14 04.7	−58.6	162.3	13 07.5	−58.6	162.4	12 10.3	−58.6	162.4	11 13.1	−58.7	162.5	25
26	16 54.9	−58.3	162.2	15 57.7	−58.3	162.3	15 00.6	−58.4	162.4	14 03.4	−58.5	162.4	13 06.1	−58.6	162.5	12 08.9	−58.6	162.6	11 11.7	−58.7	162.6	10 14.4	−58.8	162.7	26
27	15 56.6	−58.2	162.4	14 59.4	−58.3	162.5	14 02.2	−58.5	162.6	13 04.9	−58.5	162.7	12 07.6	−58.6	162.7	11 10.3	−58.6	162.8	10 13.0	−58.7	162.9	9 15.6	−58.7	162.9	27
28	14 58.4	−58.3	162.7	14 01.1	−58.4	162.8	13 03.7	−58.4	162.9	12 06.4	−58.5	163.0	11 09.0	−58.5	163.0	10 11.7	−58.7	163.0	9 14.3	−58.7	163.1	8 16.9	−58.8	163.1	28
29	14 00.1	−58.3	162.9	13 02.7	−58.4	163.0	12 05.3	−58.4	163.1	11 07.9	−58.5	163.1	10 10.5	−58.6	163.2	9 13.0	−58.6	163.2	8 15.6	−58.7	163.3	7 18.1	−58.7	163.3	29
30	13 01.8	−58.3	163.2	12 04.3	−58.3	163.2	11 06.9	−58.5	163.3	10 09.4	−58.5	163.4	9 11.9	−58.6	163.4	8 14.4	−58.6	163.4	7 16.9	−58.7	163.5	6 19.4	−58.8	163.5	30
31	12 03.5	−58.3	163.4	11 06.0	−58.4	163.5	10 08.4	−58.5	163.5	9 10.9	−58.6	163.6	8 13.3	−58.6	163.6	7 15.8	−58.7	163.7	6 18.2	−58.7	163.7	5 20.6	−58.7	163.7	31
32	11 05.2	−58.4	163.7	10 07.6	−58.4	163.7	9 10.0	−58.5	163.8	8 12.4	−58.6	163.8	7 14.7	−58.6	163.8	6 17.1	−58.7	163.9	5 19.5	−58.7	163.9	4 21.8	−58.8	163.9	32
33	10 06.8	−58.3	163.9	9 09.2	−58.4	163.9	8 11.5	−58.5	164.0	7 13.8	−58.5	164.0	6 16.1	−58.6	164.1	5 18.4	−58.6	164.1	4 20.7	−58.7	164.1	3 23.0	−58.7	164.1	33
34	9 08.5	−58.4	164.1	8 10.8	−58.5	164.2	7 13.0	−58.5	164.2	6 15.3	−58.6	164.2	5 17.5	−58.6	164.3	4 19.8	−58.7	164.3	3 22.0	−58.7	164.3	2 24.3	−58.8	164.3	34
35	8 10.1	−58.4	164.4	7 12.3	−58.4	164.4	6 14.5	−58.4	164.4	5 16.7	−58.5	164.5	4 18.9	−58.6	164.5	3 21.1	−58.7	164.5	2 23.3	−58.7	164.5	1 25.5	−58.7	164.5	35
36	7 11.8	−58.4	164.6	6 13.9	−58.4	164.6	5 16.1	−58.5	164.7	4 18.2	−58.6	164.7	3 20.3	−58.6	164.7	2 22.4	−58.6	164.7	1 24.6	−58.8	164.7	0 26.7	−58.8	164.7	36
37	6 13.4	−58.4	164.8	5 15.5	−58.4	164.9	4 17.6	−58.5	164.9	3 19.6	−58.5	164.9	2 21.7	−58.6	164.9	1 23.8	−58.7	164.9	0 25.8	−58.7	164.9	0 32.1	+58.8	15.1	37
38	5 15.0	−58.3	165.1	4 17.1	−58.5	165.1	3 19.1	−58.5	165.1	2 21.1	−58.6	165.1	1 23.1	−58.6	165.1	0 25.1	−58.7	165.1	0 32.9	+58.7	14.9	1 30.9	+58.7	14.9	38
39	4 16.7	−58.4	165.3	3 18.6	−58.5	165.3	2 20.6	−58.5	165.3	1 22.5	−58.5	165.3	0 24.5	−58.6	165.3	0 33.6	+58.6	14.7	1 31.6	+58.7	14.7	2 29.7	+58.7	14.7	39
40	3 18.3	−58.4	165.5	2 20.2	−58.5	165.5	1 22.1	−58.5	165.6	0 24.0	−58.6	165.6	0 34.1	+58.6	14.4	1 32.2	+58.7	14.4	2 30.3	+58.8	14.5	3 28.4	+58.8	14.5	40
41	2 20.4	−58.4	165.8	1 21.7	−58.5	165.8	0 23.6	−58.5	165.8	0 34.6	+58.5	14.2	1 32.7	+58.7	14.2	2 30.9	+58.7	14.2	3 29.1	+58.7	14.3	4 27.2	+58.8	14.3	41
42	1 21.5	−58.4	166.0	0 23.3	−58.5	166.0	0 34.9	+58.5	14.0	1 33.1	+58.6	14.0	2 31.4	+58.6	14.0	3 29.6	+58.6	14.0	4 27.8	+58.7	14.0	5 26.0	+58.8	14.1	42
43	0 23.1	−58.4	166.2	0 35.2	+58.4	13.8	1 33.4	+58.5	13.8	2 31.7	+58.6	13.8	3 30.0	+58.6	13.8	4 28.2	+58.7	13.8	5 26.5	+58.7	13.8	6 24.8	+58.7	13.9	43
44	0 35.3	+58.4	13.5	1 33.6	+58.4	13.6	2 31.9	+58.5	13.6	3 30.3	+58.5	13.6	4 28.6	+58.6	13.6	5 26.9	+58.7	13.6	6 25.2	+58.7	13.6	7 23.5	+58.8	13.7	44
45	1 33.7	+58.3	13.3	2 32.0	+58.5	13.3	3 30.4	+58.5	13.3	4 28.8	+58.6	13.4	5 27.2	+58.6	13.4	6 25.6	+58.6	13.4	7 23.9	+58.7	13.4	8 22.3	+58.8	13.5	45
46	2 32.0	+58.4	13.1	3 30.5	+58.4	13.1	4 28.9	+58.5	13.1	5 27.4	+58.5	13.1	6 25.9	+58.6	13.1	7 24.2	+58.7	13.2	8 22.6	+58.7	13.2	9 21.0	+58.8	13.3	46
47	3 30.4	+58.4	12.9	4 28.9	+58.5	12.9	5 27.4	+58.5	12.9	6 25.9	+58.6	12.9	7 24.4	+58.6	12.9	8 22.9	+58.6	13.0	9 21.3	+58.7	13.0	10 19.8	+58.7	13.0	47
48	4 28.8	+58.4	12.6	5 27.4	+58.4	12.6	6 25.9	+58.5	12.7	7 24.4	+58.6	12.7	8 23.0	+58.5	12.7	9 21.5	+58.6	12.8	10 20.0	+58.7	12.8	11 18.5	+58.7	12.8	48
49	5 27.2	+58.4	12.4	6 25.8	+58.4	12.4	7 24.4	+58.5	12.4	8 23.0	+58.5	12.5	9 21.5	+58.6	12.5	10 20.1	+58.6	12.5	11 18.7	+58.7	12.6	12 17.2	+58.8	12.6	49
50	6 25.6	+58.3	12.2	7 24.2	+58.4	12.2	8 22.9	+58.5	12.2	9 21.5	+58.5	12.2	10 20.1	+58.6	12.3	11 18.7	+58.7	12.3	12 17.4	+58.6	12.3	13 16.0	+58.7	12.4	50
51	7 23.9	+58.4	11.9	8 22.6	+58.4	12.0	9 21.3	+58.4	12.0	10 20.0	+58.5	12.0	11 18.7	+58.5	12.1	12 17.4	+58.6	12.1	13 16.0	+58.7	12.2	14 14.7	+58.7	12.2	51
52	8 22.3	+58.3	11.7	9 21.0	+58.4	11.7	10 19.8	+58.4	11.8	11 18.5	+58.5	11.8	12 17.2	+58.6	11.8	13 16.0	+58.6	11.9	14 14.7	+58.6	11.9	15 13.4	+58.7	12.0	52
53	9 20.6	+58.4	11.5	10 19.4	+58.4	11.5	11 18.2	+58.5	11.5	12 17.0	+58.5	11.6	13 15.8	+58.5	11.6	14 14.6	+58.5	11.7	15 13.3	+58.6	11.7	16 12.1	+58.6	11.8	53
54	10 19.0	+58.3	11.2	11 17.8	+58.3	11.3	12 16.7	+58.4	11.3	13 15.5	+58.5	11.3	14 14.3	+58.5	11.4	15 13.1	+58.6	11.4	16 11.9	+58.6	11.5	17 10.7	+58.7	11.6	54
55	11 17.3	+58.3	11.0	12 16.2	+58.4	11.0	13 15.1	+58.4	11.1	14 14.0	+58.4	11.1	15 12.8	+58.5	11.2	16 11.7	+58.5	11.2	17 10.5	+58.6	11.3	18 09.4	+58.6	11.3	55
56	12 15.6	+58.3	10.7	13 14.6	+58.3	10.8	14 13.5	+58.4	10.8	15 12.4	+58.5	10.9	16 11.3	+58.5	10.9	17 10.2	+58.5	11.0	18 09.1	+58.6	11.0	19 08.0	+58.6	11.1	56
57	13 13.9	+58.3	10.5	14 12.9	+58.3	10.5	15 11.9	+58.4	10.6	16 10.9	+58.4	10.6	17 09.8	+58.5	10.7	18 08.8	+58.5	10.8	19 07.7	+58.6	10.8	20 06.6	+58.7	10.9	57
58	14 12.2	+58.3	10.3	15 11.2	+58.4	10.3	16 10.3	+58.3	10.3	17 09.3	+58.4	10.4	18 08.3	+58.5	10.5	19 07.3	+58.5	10.5	20 06.3	+58.5	10.6	21 05.3	+58.5	10.7	58
59	15 10.5	+58.2	10.0	16 09.6	+58.3	10.1	17 08.6	+58.4	10.1	18 07.7	+58.4	10.2	19 06.8	+58.4	10.2	20 05.8	+58.5	10.3	21 04.8	+58.6	10.4	22 03.8	+58.6	10.4	59
60	16 08.7	+58.3	9.8	17 07.9	+58.3	9.8	18 07.0	+58.3	9.9	19 06.1	+58.4	9.9	20 05.2	+58.4	10.0	21 04.3	+58.4	10.0	22 03.4	+58.5	10.1	23 02.4	+58.6	10.2	60
61	17 07.0	+58.2	9.5	18 06.2	+58.2	9.6	19 05.3	+58.3	9.6	20 04.5	+58.3	9.7	21 03.6	+58.4	9.7	22 02.7	+58.5	9.8	23 01.9	+58.4	9.9	24 01.0	+58.5	10.0	61
62	18 05.2	+58.2	9.3	19 04.4	+58.3	9.3	20 03.6	+58.3	9.4	21 02.8	+58.4	9.4	22 01.8	+58.3	9.4	23 01.2	+58.4	9.5	24 00.3	+58.5	9.6	24 59.5	+58.5	9.7	62
63	19 03.4	+58.2	9.0	20 02.7	+58.2	9.1	21 01.9	+58.3	9.1	22 01.2	+58.3	9.2	23 00.4	+58.3	9.2	23 59.6	+58.4	9.3	24 58.8	+58.4	9.4	25 58.0	+58.5	9.5	63
64	20 01.6	+58.2	8.7	21 00.9	+58.2	8.8	22 00.2	+58.2	8.9	22 59.5	+58.2	8.9	23 58.7	+58.4	9.0	24 58.0	+58.4	9.1	25 57.2	+58.4	9.1	26 56.5	+58.4	9.2	64
65	20 59.8	+58.1	8.5	21 59.1	+58.2	8.5	22 58.4	+58.2	8.6	23 57.7	+58.3	8.7	24 57.1	+58.3	8.7	25 56.4	+58.3	8.7	26 55.6	+58.4	8.9	27 54.9	+58.4	9.0	65
66	21 57.9	+58.1	8.2	22 57.3	+58.1	8.3	23 56.6	+58.2	8.3	24 56.0	+58.2	8.4	25 55.4	+58.2	8.5	26 54.7	+58.3	8.5	27 54.0	+58.4	8.6	28 53.3	+58.4	8.7	66
67	22 56.0	+58.1	7.9	23 55.4	+58.1	8.0	24 54.8	+58.2	8.1	25 54.2	+58.2	8.1	26 53.6	+58.3	8.2	27 53.0	+58.3	8.3	28 52.4	+58.3	8.4	29 51.7	+58.4	8.4	67
68	23 54.1	+58.0	7.7	24 53.5	+58.1	7.8	25 53.0	+58.1	7.8	26 52.4	+58.2	7.9	27 51.9	+58.2	7.9	28 51.3	+58.2	8.0	29 50.7	+58.3	8.1	30 50.1	+58.3	8.2	68
69	24 52.1	+58.0	7.4	25 51.6	+58.1	7.4	26 51.1	+58.1	7.5	27 50.6	+58.1	7.6	28 50.1	+58.1	7.7	29 49.5	+58.2	7.7	30 49.0	+58.2	7.8	31 48.4	+58.3	7.9	69
70	25 50.2	+57.9	7.1	26 49.7	+58.0	7.2	27 49.2	+58.1	7.2	28 48.7	+58.1	7.3	29 48.2	+58.2	7.4	30 47.7	+58.2	7.4	31 47.2	+58.2	7.5	32 46.7	+58.3	7.6	70
71	26 48.1	+58.0	6.8	27 47.7	+58.0	6.9	28 47.3	+58.0	6.9	29 46.8	+58.1	7.0	30 46.4	+58.1	7.1	31 45.9	+58.1	7.2	32 45.4	+58.2	7.2	33 45.0	+58.2	7.3	71
72	27 46.1	+57.9	6.5	28 45.7	+57.9	6.6	29 45.3	+58.0	6.7	30 44.9	+58.0	6.7	31 44.5	+58.0	6.8	32 44.0	+58.1	6.8	33 43.6	+58.1	6.9	34 43.2	+58.1	7.0	72
73	28 44.0	+57.8	6.2	29 43.6	+58.0	6.3	30 43.3	+57.9	6.4	31 42.9	+58.0	6.4	32 42.5	+58.0	6.5	33 42.1	+58.1	6.6	34 41.7	+58.1	6.6	35 41.3	+58.2	6.7	73
74	29 41.9	+57.8	5.9	30 41.6	+57.8	6.0	31 41.2	+57.9	6.1	32 40.9	+57.9	6.1	33 40.5	+58.0	6.2	34 40.2	+58.0	6.3	35 39.8	+58.1	6.3	36 39.5	+58.0	6.4	74
75	30 39.7	+57.6	5.6	31 39.4	+57.8	5.7	32 39.1	+57.9	5.7	33 38.8	+57.9	5.8	34 38.5	+57.9	5.9	35 38.2	+57.9	5.9	36 37.9	+57.9	6.0	37 37.5	+58.0	6.1	75
76	31 37.5	+57.7	5.3	32 37.2	+57.8	5.4	33 37.0	+57.8	5.4	34 36.7	+57.8	5.5	35 36.4	+57.9	5.6	36 36.1	+57.9	5.6	37 35.8	+57.9	5.7	38 35.5	+58.0	5.8	76
77	32 35.2	+57.7	5.0	33 35.0	+57.7	5.0	34 34.8	+57.7	5.1	35 34.5	+57.8	5.2	36 34.3	+57.8	5.2	37 34.0	+57.9	5.3	38 33.8	+57.9	5.4	39 33.5	+57.9	5.5	77
78	33 32.9	+57.7	4.7	34 32.7	+57.7	4.7	35 32.5	+57.7	4.8	36 32.3	+57.7	4.8	37 32.1	+57.8	4.9	38 31.9	+57.7	4.9	39 31.7	+57.8	5.0	40 31.4	+57.9	5.1	78
79	34 30.6	+57.6	4.3	35 30.4	+57.7	4.4	36 30.2	+57.7	4.4	37 30.0	+57.7	4.5	38 29.9	+57.6	4.6	39 29.7	+57.7	4.6	40 29.5	+57.7	4.7	41 29.3	+57.7	4.8	79
80	35 28.2	+57.5	4.0	36 28.0	+57.6	4.0	37 27.9	+57.5	4.1	38 27.7	+57.6	4.1	39 27.5	+57.7	4.2	40 27.4	+57.6	4.3	41 27.2	+57.7	4.3	42 27.0	+57.7	4.4	80
81	36 25.7	+57.4	3.6	37 25.6	+57.4	3.7	38 25.4	+57.5	3.7	39 25.3	+57.5	3.8	40 25.2	+57.5	3.8	41 25.0	+57.6	3.9	42 24.9	+57.6	3.9	43 24.7	+57.7	4.0	81
82	37 23.1	+57.4	3.3	38 23.0	+57.4	3.3	39 22.9	+57.4	3.4	40 22.8	+57.4	3.4	41 22.7	+57.5	3.5	42 22.6	+57.5	3.5	43 22.5	+57.5	3.6	44 22.4	+57.5	3.6	82
83	38 20.5	+57.4	2.9	39 20.5	+57.3	2.9	40 20.4	+57.3	3.0	41 20.3	+57.4	3.0	42 20.2	+57.4	3.1	43 20.1	+57.4	3.1	44 20.0	+57.5	3.2	45 19.9	+57.5	3.2	83
84	39 17.9	+57.2	2.5	40 17.8	+57.3	2.6	41 17.7	+57.3	2.6	42 17.7	+57.2	2.6	43 17.6	+57.3	2.7	44 17.5	+57.4	2.7	45 17.5	+57.3	2.8	46 17.4	+57.4	2.8	84
85	40 15.1	+57.2	2.1	41 15.1	+57.1	2.2	42 15.0	+57.2	2.2	43 15.0	+57.2	2.2	44 14.9	+57.2	2.3	45 14.9	+57.2	2.3	46 14.8	+57.3	2.4	47 14.8	+57.2	2.4	85
86	41 12.3	+57.0	1.7	42 12.2	+57.1	1.8	43 12.2	+57.1	1.8	44 12.2	+57.1	1.8	45 12.1	+57.2	1.8	46 12.1	+57.2	1.9	47 12.1	+57.1	1.9	48 12.0	+57.2	2.0	86
87	42 09.3	+57.0	1.3	43 09.3	+57.0	1.3	44 09.3	+57.0	1.4	45 09.3	+57.0	1.4	46 09.3	+57.0	1.4	47 09.3	+57.0	1.4	48 09.2	+57.1	1.5	49 09.2	+57.1	1.5	87
88	43 06.3	+56.9	0.9	44 06.3	+56.9	0.9	45 06.3	+56.9	0.9	46 06.3	+56.9	0.9	47 06.3	+56.9	1.0	48 06.3	+56.9	1.0	49 06.3	+56.9	1.0	50 06.3	+56.9	1.0	88
89	44 03.2	+56.8	0.5	45 03.2	+56.8	0.5	46 03.2	+56.8	0.5	47 03.2	+56.8	0.5	48 03.2	+56.8	0.5	49 03.2	+56.8	0.5	50 03.2	+56.8	0.5	51 03.2	+56.8	0.5	89
90	45 00.0	+56.7	0.0	46 00.0	+56.7	0.0	47 00.0	+56.7	0.0	48 00.0	+56.7	0.0	49 00.0	+56.7	0.0	50 00.0	+56.7	0.0	51 00.0	+56.7	0.0	52 00.0	+56.7	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z } **LATITUDE SAME NAME AS DECLINATION** **L.H.A. 161°, 199°**

20°, 340° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	41 38.5	+56.7	152.8	40 45.0	+57.0	153.2	39 51.4	+57.1	153.5	38 57.6	+57.3	153.9	38 03.6	+57.5	154.3	37 09.5	+57.7	154.6	36 15.2	+57.8	154.9	35 20.8	+58.0	155.2	0
1	42 35.2	+56.6	152.3	41 42.0	+56.8	152.7	40 48.5	+57.1	153.1	39 54.9	+57.2	153.5	39 01.1	+57.4	153.9	38 07.2	+57.5	154.2	37 13.0	+57.8	154.6	36 18.8	+57.9	154.9	1
2	43 31.8	+56.5	151.9	42 38.8	+56.7	152.3	41 45.6	+56.9	152.7	40 52.1	+57.2	153.1	39 58.5	+57.3	153.5	39 04.7	+57.5	153.9	38 10.8	+57.7	154.2	37 16.7	+57.8	154.6	2
3	44 28.3	+56.4	151.4	43 35.5	+56.6	151.9	42 42.5	+56.8	152.3	41 49.3	+57.0	152.7	40 55.8	+57.3	153.1	40 02.2	+57.5	153.5	39 08.5	+57.6	153.9	38 14.5	+57.8	154.2	3
4	45 24.7	+56.3	150.9	44 32.1	+56.6	151.4	43 39.3	+56.8	151.9	42 46.3	+57.0	152.3	41 53.1	+57.2	152.7	40 59.7	+57.3	153.1	40 06.1	+57.5	153.5	39 12.3	+57.7	153.9	4
5	46 21.0	+56.1	150.4	45 28.7	+56.3	150.9	44 36.1	+56.6	151.4	43 43.3	+56.9	151.9	42 50.3	+57.1	152.3	41 57.0	+57.3	152.7	41 03.6	+57.5	153.1	40 10.0	+57.6	153.5	5
6	47 17.1	+56.0	149.9	46 25.0	+56.3	150.4	45 32.7	+56.5	150.9	44 40.2	+56.7	151.4	43 47.3	+57.0	151.9	42 54.3	+57.2	152.3	42 01.1	+57.4	152.8	41 07.6	+57.6	153.2	6
7	48 13.1	+55.8	149.4	47 21.3	+56.1	149.9	46 29.2	+56.4	150.5	45 36.9	+56.6	151.0	44 44.3	+56.9	151.5	43 51.5	+57.1	151.9	42 58.5	+57.3	152.4	42 05.2	+57.5	152.8	7
8	49 08.9	+55.7	148.8	48 17.4	+56.0	149.4	47 25.6	+56.3	150.0	46 33.5	+56.6	150.5	45 41.2	+56.8	151.0	44 48.6	+57.0	151.5	43 55.8	+57.2	151.9	43 02.7	+57.4	152.4	8
9	50 04.6	+55.5	148.2	49 13.4	+55.8	148.9	48 21.9	+56.1	149.4	47 30.1	+56.3	150.0	46 38.0	+56.6	150.5	45 45.6	+56.9	151.0	44 53.0	+57.1	151.5	44 00.1	+57.3	152.0	9
10	51 00.1	+55.3	147.6	50 09.2	+55.6	148.3	49 18.0	+55.9	148.9	48 26.4	+56.3	149.5	47 34.6	+56.5	150.0	46 42.5	+56.8	150.6	45 50.1	+57.0	151.1	44 57.4	+57.3	151.5	10
11	51 55.4	+55.0	147.0	51 04.8	+55.5	147.7	50 13.9	+55.8	148.3	49 22.7	+56.1	149.0	48 31.1	+56.4	149.5	47 39.3	+56.6	150.1	46 47.1	+56.9	150.6	45 54.7	+57.1	151.1	11
12	52 50.4	+54.9	146.4	52 00.3	+55.2	147.1	51 09.7	+55.6	147.8	50 18.8	+55.9	148.4	49 27.5	+56.2	149.0	48 35.9	+56.5	149.6	47 44.0	+56.8	150.2	46 51.8	+57.0	150.7	12
13	53 45.3	+54.6	145.7	52 55.5	+55.1	146.4	52 05.3	+55.4	147.2	51 14.7	+55.8	147.8	50 23.7	+56.1	148.5	49 32.4	+56.4	149.1	48 40.8	+56.6	149.7	47 48.8	+57.0	150.2	13
14	54 39.9	+54.4	145.0	53 50.6	+54.8	145.8	53 00.7	+55.2	146.5	52 10.5	+55.5	147.2	51 19.8	+55.9	147.9	50 28.8	+56.2	148.6	49 37.4	+56.6	149.2	48 45.8	+56.7	149.8	14
15	55 34.3	+54.1	144.2	54 45.4	+54.5	145.1	53 55.9	+55.0	145.9	53 06.0	+55.4	146.6	52 15.7	+55.8	147.3	51 25.0	+56.1	148.0	50 34.0	+56.3	148.7	49 42.5	+56.7	149.3	15
16	56 28.4	+53.8	143.5	55 39.9	+54.3	144.4	54 50.9	+54.7	145.2	54 01.4	+55.2	146.0	53 11.5	+55.5	146.7	52 21.1	+55.9	147.4	51 30.3	+56.3	148.1	50 39.2	+56.6	148.8	16
17	57 22.2	+53.4	142.7	56 34.2	+54.0	143.6	55 45.6	+54.5	144.5	54 56.6	+54.9	145.3	54 07.0	+55.4	146.1	53 17.0	+55.7	146.8	52 26.6	+56.0	147.5	51 35.7	+56.4	148.2	17
18	58 15.6	+53.1	141.8	57 28.2	+53.6	142.8	56 40.1	+54.2	143.7	55 51.5	+54.6	144.6	55 02.3	+55.1	145.4	54 12.7	+55.5	146.2	53 22.6	+55.9	147.0	52 32.1	+56.2	147.7	18
19	59 08.7	+52.7	140.9	58 21.8	+53.3	141.9	57 34.3	+53.8	142.9	56 46.1	+54.4	143.8	55 57.4	+54.8	144.7	55 08.2	+55.3	145.5	54 18.5	+55.6	146.3	53 28.3	+56.0	147.1	19
20	60 01.4	+52.3	140.0	59 15.1	+53.0	141.1	58 28.1	+53.6	142.1	57 40.5	+54.1	143.1	56 52.2	+54.6	144.0	56 03.5	+55.0	144.9	55 14.1	+55.5	145.7	54 24.3	+55.9	146.5	20
21	60 53.7	+51.8	139.0	60 08.1	+52.5	140.1	59 21.7	+53.1	141.2	58 34.6	+53.7	142.2	57 46.8	+54.3	143.2	56 58.5	+54.7	144.1	56 09.6	+55.2	145.0	55 20.2	+55.6	145.8	21
22	61 45.5	+51.4	137.9	61 00.6	+52.1	139.1	60 14.8	+52.8	140.3	59 28.3	+53.4	141.4	58 41.1	+54.0	142.4	57 53.2	+54.5	143.4	57 04.8	+55.0	144.3	56 15.8	+55.4	145.2	22
23	62 36.9	+50.7	136.8	61 52.7	+51.5	138.1	61 07.6	+52.3	139.3	60 21.7	+53.0	140.5	59 35.1	+53.6	141.5	58 47.7	+54.2	142.6	57 59.8	+54.7	143.6	57 11.2	+55.2	144.5	23
24	63 27.6	+50.1	135.6	62 44.2	+51.0	137.0	61 59.9	+51.8	138.3	61 14.7	+52.5	139.5	60 28.7	+53.2	140.6	59 41.9	+53.8	141.7	58 54.5	+54.3	142.8	58 06.4	+54.9	143.7	24
25	64 17.7	+49.5	134.4	63 35.2	+50.4	135.8	62 51.7	+51.3	137.2	62 07.2	+52.1	138.5	61 21.9	+52.8	139.7	60 35.7	+53.5	140.9	59 48.8	+54.1	141.9	59 01.3	+54.6	143.0	25
26	65 07.2	+48.7	133.1	64 25.6	+49.8	134.6	63 43.0	+50.7	136.0	62 59.3	+51.6	137.4	62 14.7	+52.3	138.7	61 29.2	+53.0	139.9	60 42.9	+53.7	141.1	59 55.9	+54.2	142.2	26
27	65 55.9	+47.9	131.6	65 15.4	+49.0	133.3	64 33.7	+50.0	134.8	63 50.9	+50.9	136.3	63 07.0	+51.8	137.6	62 22.2	+52.6	138.9	61 36.6	+53.3	140.1	60 50.1	+54.0	141.3	27
28	66 43.8	+47.0	130.1	66 04.4	+48.2	131.9	65 23.7	+49.4	133.5	64 41.8	+50.4	135.0	63 58.8	+51.3	136.5	63 14.8	+52.1	137.9	62 29.9	+52.8	139.2	61 44.1	+53.5	140.4	28
29	67 30.8	+45.9	128.5	66 52.6	+47.3	130.4	66 13.1	+48.5	132.1	65 32.2	+49.6	133.8	64 50.1	+50.7	135.3	64 06.9	+51.6	136.7	63 22.7	+52.4	138.1	62 37.6	+53.1	139.4	29
30	68 16.7	+44.9	126.8	67 39.9	+46.3	128.8	67 01.6	+47.6	130.6	66 21.8	+48.9	132.4	65 40.8	+49.9	134.0	64 58.5	+50.9	135.6	64 15.1	+51.9	137.0	63 30.7	+52.7	138.4	30
31	69 01.6	+43.5	125.0	68 26.2	+45.2	127.1	67 49.2	+46.5	129.0	67 10.7	+48.0	130.9	66 30.7	+49.2	132.6	65 49.4	+50.3	134.3	65 07.0	+51.2	135.8	64 23.4	+52.1	137.3	31
32	69 45.1	+42.2	123.1	69 11.4	+44.0	125.3	68 35.9	+45.6	127.4	67 58.7	+47.0	129.3	67 19.9	+48.3	131.2	66 39.7	+49.5	132.9	65 58.2	+50.6	134.6	65 15.5	+51.6	136.1	32
33	70 27.3	+40.7	121.0	69 55.4	+42.6	123.3	69 21.5	+44.3	125.5	68 45.7	+46.0	127.6	68 08.2	+47.4	129.6	67 29.2	+48.7	131.5	66 48.8	+49.9	133.2	66 07.1	+50.9	134.9	33
34	71 08.0	+38.9	118.7	70 38.0	+41.1	121.2	70 05.8	+43.0	123.6	69 31.7	+44.7	125.8	68 55.6	+46.4	127.9	68 17.9	+47.8	129.9	67 38.7	+49.0	131.8	66 58.0	+50.2	133.6	34
35	71 46.9	+37.1•	116.3	71 19.1	+39.3	119.0	70 48.8	+41.5	121.5	70 16.4	+43.4	123.9	69 42.0	+45.1	126.1	69 05.7	+46.7	128.3	68 27.7	+48.1	130.3	67 48.2	+49.4	132.1	35
36	72 24.0	+34.9•	113.8	71 58.4	+37.5•	116.6	71 30.3	+39.8	119.3	70 59.8	+41.9	121.8	70 27.1	+43.8	124.2	69 52.4	+45.6	126.5	69 15.8	+47.1	128.6	68 37.6	+48.5	130.6	36
37	72 58.9	+32.6•	111.1	72 35.9	+35.3•	114.0	72 10.1	+37.9•	116.9	71 41.7	+40.2	119.5	71 10.9	+42.4	122.1	70 30.8	+44.2	124.5	70 02.9	+46.0	126.8	69 26.1	+47.5	129.0	37
38	73 31.5	+30.0•	108.1	73 11.2	+33.1•	111.3	72 48.0	+35.8•	114.3	72 21.9	+38.4•	117.2	71 53.3	+40.6	119.9	71 22.2	+42.8	122.5	70 48.9	+44.7	124.9	70 13.6	+46.4	127.2	38
39	74 01.5	+27.2•	105.0	73 44.3	+30.4•	108.3	73 23.8	+33.4•	111.5	73 00.3	+36.2•	114.6	72 33.9	+38.8	117.5	72 05.0	+41.1	120.2	71 33.6	+43.2	122.8	71 00.0	+45.1	125.3	39
40	74 28.7	+24.1•	101.7	74 14.7	+27.6•	105.2	73 57.2	+30.9•	108.6	73 36.5	+33.9•	111.8	73 12.7	+36.7•	114.9	72 46.1	+39.2	117.8	72 16.8	+41.6	120.6	71 45.1	+43.6	123.2	40
41	74 52.8	+20.8•	98.3	74 42.3	+24.4•	101.9	74 28.1	+28.0•	105.4	74 10.4	+31.3•	108.8	73 49.4	+34.4•	112.1	73 25.3	+37.2•	115.2	72 58.4	+39.7•	118.2	72 28.7	+42.1	121.0	41
42	75 13.6	+17.2•	94.6	75 06.7	+21.2•	98.4	74 56.1	+24.8•	102.1	74 41.7	+28.4•	105.7	74 23.8	+31.7•	109.1	74 02.5	+34.8•	112.4	73 38.1	+37.6•	115.4	73 10.8	+40.2•	118.6	42
43	75 30.8	+13.4•	90.9	75 27.9	+17.4•	94.7	75 20.9	+21.5•	98.5	75 10.1	+25.3•	102.3	74 55.5	+28.8•	105.9	74 37.3	+32.2•	109.4	74 15.7	+35.3•	112.8	73 51.0	+38.1•	115.9	43
44	75 44.2	+9.4•	86.9	75 45.3	+13.7•	90.9	75 42.4	+17.8•	94.8	75 35.4	+21.8•	98.7	75 24.3	+25.7•	102.5	75 09.5	+29.3•	106.2	74 51.0	+32.7•	109.7	74 29.1	+35.8•	113.1	44
45	75 53.6	+5.4•	82.9	75 59.0	+9.6•	86.9	76 00.2	+13.9•	90.9	75 57.2	+18.0•	94.9	75 50.0	+22.2•	98.8	75 38.8	+26.0•	102.7	75 23.7	+29.7•	106.4	75 04.9	+33.1•	110.1	45
46	75 59.0	+1.2•	78.8	76 08.6	+5.5•	82.8	76 14.1	+9.7•	86.8	76 15.2	+14.2•	90.9	76 12.2	+18.4•	95.0	76 04.8	+22.6•	99.0	75 53.4	+26.5•	102.9	75 38.0	+30.2•	106.8	46
47	76 00.2	–3.0•	74.7	76 14.1	+1.1•	78.6	76 23.8	+5.6•	82.7	76 29.4	+9.9•	86.8	76 30.6	+14.3•	90.9	76 27.4	+18.7•	95.1	76 19.9	+22.9•	99.2	76 08.2	+27.0•	103.2	47
48	75 57.2	–7.2•	70.5	76 15.2	–3.0•	74.4	76 29.4	+1.2•	78.4	76 39.3	+5.6•	82.5	76 44.9	+10.1•	86.7	76 46.1	+14.6•	91.0	76 42.8	+19.1•	95.2	76 35.2	+23.3•	99.4	48
49	75 50.0	–11.2•	66.5	76 12.2	–7.4•	70.2	76 30.6	–3.2•	74.1	76 44.9	+1.2•	78.2	76 55.0	+5.7•	82.4	77 00.7	+10.3•	86.7	77 01.9	+14.8•	91.1	76 58.5	+19.3•	95.4	49
50	75 38.8	–15.1•	62.5	76 00.8	–11.4•	66.1	76 27.4	–7.5•	69.8	76 46.1	–3.3•	73.8	77 00.7	+1.2•	78.0	77 11.0	+5.7•	82.3	77 16.7	+10.4•	86.7	77 17.8	+15.2•	91.1	50
51	75 23.7	–18.8•	58.6	75 53.4	–15.4•	62.0	76 19.9	–11.7•	65.6	76 42.8	–7.6•	69.5	77 01.9	–3.4•	73.6	77 16.7	+1.1•	77.8	77 27.1	+5.9•	82.2	77 33.0	+10.5•	86.7	51
52	75 04.9	–22.3•	54.9	75 38.0	–19.1•	58.1	76 08.2	–15.6•	61.5	76 35.2	–12.0•	65.2	76 58.5	–7.9•	69.1	77 17.8	–3.5•	73.3	77 33.0	+1.1•	77.6	77 43.5	+5.9•	82.1	52
53	74 42.6	–25.5•	51.3	75 18.9	–22.6•	54.3	75 52.6	–19.5•	57.5	76 23.2	–16.0•	61.0	76 50.6	–12.2•	64.7	77 14.3	–8.0•	68.7	77 34.1	–3.7•	73.0	77 49.4	+1.1•	77.4	53
54	74 17.1	–28.4•	47.9	74 56.3	–25.9•	50.7	75 33.1	–23.1•	53.7	76 07.2	–19.8•	56.9	76 38.4	–16.3•	60.5	77 06.3	–12.5•	64.3	77 30.4	–8.3•	68.3	77 50.5	–3.8•	72.6	54
55	73 48.7	–31.2•	44.7	74 30.4	–28.9•	47.3	75 10.0	–26.3•	50.0	75 47.4	–23.5•	53.0	76 22.1	–20.3•	56.3	76 53.8	–16.8•	59.9	77 22.1	–12.8•	63.8	77 46.7	–8.6•	67.9	55
56	73 17.5	–33.9•	41.7	74 01.5	–31.6•	44.0	74 43.7	–29.3•	46.6	75 23.9	–26.8•	49.3	76 01.8	–23.9•	52.4	76 37.0	–20.7•	55.7	77 09.3	–17.2•	59.3	77 38.1	–13.2•	63.3	56
57	72 43.9	–35.9•	38.9	73 29.9	–34.1•	41.0	74 14.4	–32.1•	43.3	74 57.1	–29.8•	45.8	75 37.9	–27.3•	48.6	76 16.3	–24.4•	51.7	76 52.1	–21.2•	55.1	77 24.9	–17.6•	58.7	57
58	72 08.0	–37.9	36.2	72 55.8	–36.3•	38.1	73 42.3	–34.5•	40.2	74 27.3	–32.5•	42.6	75 10.6	–30.3•	45.1	75 51.9	–27.7•	47.9	76 30.9	–24.8•	51.0	77 07.3	–21.6•	54.4	58
59	71 30.1	–39.7	33.7	72 19.5	–38.3•	35.5	73 07.8	–36.8•	37.4	73 54.8	–35.0•	39.5	74 40.3	–33.0•	41.8	75 24.2	–30.8•	44.3	76 06.1	–28.3•	47.2	76 45.7	–25.5•	50.3	59
60	70 50.4	–41.4	31.4	71 41.2	–40.2	33.0	72 31.0	–38.8	34.7	73 19.8	–37.3•	36.6	74 07.3	–35.5•	38.7	74 53.4	–33.6•	41.0	75 37.8	–31.4•	43.6	76 20.2	–28.8•	46.4	60
61	70 09.0	–42.8	29.2	71 01.0	–41.7	30.6	71 52.2	–40.5	32.2	72 42.5	–39.2	33.9	73 31.8	–37.8•	35.8	74 19.8	–36.0•	37.9	75 06.4	–34.1•	40.2	75 51.4	–31.9•	42.7	61
62	69 26.2	–44.1	27.2	70 19.3	–43.3	28.5	71 11.7	–42.2	29.9	72 03.3	–41.1	31.4	72 54.0	–39.7	33.1	73 43.8	–38.3•	35.0	74 32.3	–36.6•	37.0	75 19.5	–34.7•	39.3	62
63	68 42.1	–45.4	25.3	69 36.0	–44.5	26.5	70 29.5	–43.7	27.7	71 22.2	–42.6	29.1	72 14.3	–41.5	30.6	73 05.5	–40.2	32.3	73 55.7	–38.8•	34.1	74 44.8	–37.2•	36.2	63
64	67 56.7	–46.4	23.5	68 51.5	–45.7	24.6	69 45.8	–44.9	25.7	70 39.6	–44.0	26.9	71 32.8	–43.1	28.3	72 25.3	–42.0	29.8	73 16.9	–40.7	31.4	74 07.6	–39.3•	33.2	64
65	67 10.3	–47.4	21.9	68 05.8	–46.8	22.8	69 00.9	–46.1	23.8	69 55.6	–45.4	24.9	70 49.7	–44.5	26.1	71 43.3	–43.6	27.4	72 36.2	–42.5	28.9	73 28.3	–41.3	30.5	65
66	66 22.9	–48.2	20.3	67 19.0	–47.7	21.1	68 14.8	–47.1	22.0	69 10.2	–46.4	23.0	70 05.2	–45.7	24.1	70 59.7	–44.9	25.3	71 53.7	–44.0	26.6	72 47.0	–43.0	28.0	66
67	65 34.7	–49.1	18.9	66 31.3	–48.6	19.6	67 27.7	–48.1	20.4	68 23.8	–47.5	21.3	69 19.5	–46.9	22.2	70 14.8	–46.1	23.3	71 09.7	–45.4	24.4	72 04.0	–44.5	25.7	67
68	64 45.6	–49.8	17.5	65 42.7	–49.3	18.1	66 39.6	–48.9	18.9	67 36.3	–48.4	19.7	68 32.6	–47.8	20.5	69 28.7	–47.3	21.4	70 24.3	–46.6	22.5	71 19.5	–45.8	23.6	68
69	63 55.8	–50.4	16.2	64 53.4	–50.1	16.8	65 50.7	–49.6	17.4	66 47.9	–49.3	18.1	67 44.8	–48.8	18.9	68 41.4	–48.3	19.7	69 37.7	–47.7	20.6	70 33.7	–47.0	21.6	69
70	63 05.4	–51.0	15.0	64 03.3	–50.7	15.5	65 01.1	–50.4	16.1	65 58.6	–50.0	16.7	66 56.0	–49.6	17.4	67 53.1	–49.1	18.1	68 50.0	–48.6	18.9	69 46.7	–48.1	19.8	70
71	62 14.4	–51.5	13.8	63 12.6	–51.2	14.3	64 10.7	–51.0	14.8	65 08.6	–50.6	15.4	66 06.4	–50.3	16.0	67 04.0	–49.9	16.6	68 01.4	–49.5	17.3	68 58.6	–49.1	18.1	71
72	61 22.9	–52.0	12.7	62 21.4	–51.8	13.2	63 19.7	–51.5	13.6	64 18.0	–51.3	14.1	65 16.1	–50.9	14.6	66 14.1	–50.6	15.2	67 11.9	–50.3	15.8	68 09.5	–49.8	16.5	72
73	60 30.9	–52.5	11.7	61 29.6	–52.3	12.1	62 28.2	–52.0	12.5	63 26.7	–51.8	12.9	64 25.2	–51.6	13.4	65 23.5	–51.3	13.9	66 21.6	–50.9	14.4	67 19.7	–50.7	15.0	73
74	59 38.4	–52.9	10.7	60 37.3	–52.7	11.1	61 36.2	–52.6	11.4	62 34.9	–52.3	11.8	63 33.6	–52.1	12.2	64 32.2	–51.8	12.7	65 30.7	–51.6	13.1	66 29.0	–51.2	13.7	74
75	58 45.5	–53.3	9.8	59 44.6	–53.1	10.1	60 43.6	–52.9	10.4	61 42.6	–52.7	10.8	62 41.5	–52.5	11.1	63 40.4	–52.4	11.5	64 39.1	–52.1	11.9	65 37.8	–51.9	12.3	75
76	57 52.2	–53.6	9.0	58 51.5	–53.5	9.2	59 50.7	–53.3	9.5	60 49.9	–53.2	9.8	61 49.0	–53.0	10.1	62 48.0	–52.8	10.4	63 47.0	–52.7	10.8	64 45.9	–52.5	11.2	76
77	56 58.6	–53.9	8.1	57 58.0	–53.8	8.3	58 57.4	–53.7	8.6	59 56.7	–53.6	8.8	60 55.9	–53.4	9.1	61 55.2	–53.3	9.4	62 54.3	–53.1	9.7	63 53.4	–52.9	10.1	77
78	56 04.7	–54.2	7.3	57 04.2	–54.1	7.5	58 03.7	–54.0	7.7	59 03.1	–53.9	7.9	60 02.5	–53.7	8.2	61 01.9	–53.6	8.4	62 01.2	–53.5	8.7	63 00.5	–53.4	9.0	78
79	55 10.5	–54.5	6.6	56 10.1	–54.4	6.7	57 09.7	–54.3	6.9	58 09.2	–54.2	7.1	59 08.8	–54.1	7.3	60 08.3	–54.1	7.5	61 07.7	–53.9	7.8	62 07.1	–53.7	8.0	79
80	54 16.0	–54.7	5.8	55 15.7	–54.7	6.0	56 15.4	–54.6	6.1	57 15.0	–54.5	6.3	58 14.6	–54.4	6.5	59 14.2	–54.3	6.7	60 13.8	–54.2	6.9	61 13.4	–54.2	7.1	80
81	53 21.3	–55.0	5.1	54 21.0	–54.9	5.3	55 20.8	–54.9	5.4	56 20.5	–54.8	5.5	57 20.2	–54.7	5.7	58 19.9	–54.6	5.8	59 19.6	–54.6	6.0	60 19.2	–54.4	6.2	81
82	52 26.3	–55.2	4.5	53 26.1	–55.1	4.6	54 25.9	–55.0	4.7	55 25.7	–55.0	4.8	56 25.5	–55.0	4.9	57 25.3	–54.9	5.1	58 25.0	–54.8	5.2	59 24.8	–54.8	5.4	82
83	51 31.1	–55.3	3.8	52 31.0	–55.3	3.9	53 30.9	–55.3	4.0	54 30.7	–55.2	4.1	55 30.5	–55.2	4.2	56 30.4	–55.2	4.3	57 30.2	–55.1	4.4	58 30.0	–55.0	4.6	83
84	50 35.8	–55.6	3.2	51 35.7	–55.6	3.3	52 35.6	–55.5	3.4	53 35.5	–55.5	3.5	54 35.3	–55.4	3.5	55 35.2	–55.4	3.6	56 35.1	–55.3	3.7	57 35.0	–55.3	3.8	84
85	49 40.2	–55.7	2.6	50 40.1	–55.7	2.7	51 40.1	–55.7	2.8	52 40.0	–55.7	2.8	53 39.9	–55.6	2.9	54 39.8	–55.6	3.0	55 39.8	–55.6	3.0	56 39.7	–55.6	3.1	85
86	48 44.5	–55.9	2.1	49 44.4	–55.9	2.1	50 44.4	–55.9	2.2	51 44.3	–55.8	2.2	52 44.3	–55.8	2.3	53 44.2	–55.8	2.3	54 44.2	–55.8	2.4	55 44.1	–55.7	2.4	86
87	47 48.6	–56.1	1.5	48 48.5	–56.1	1.6	49 48.5	–56.0	1.6	50 48.5	–56.2	1.6	51 48.5	–56.0	1.7	52 48.4	–55.9	1.7	53 48.4	–56.0	1.7	54 48.4	–56.0	1.8	87
88	46 52.5	–56.2	1.0	47 52.5	–56.2	1.0	48 52.5	–56.2	1.0	49 52.5	–56.2	1.1	50 52.5	–56.2	1.1	51 52.5	–56.2	1.1	52 52.4	–56.1	1.1	53 52.4	–56.1	1.2	88
89	45 56.3	–56.3	0.5	46 56.3	–56.3	0.5	47 56.3	–56.3	0.5	48 56.3	–56.3	0.5	49 56.3	–56.3	0.5	50 56.3	–56.3	0.5	51 56.3	–56.3	0.6	52 56.3	–56.3	0.6	89
90	45 00.0	–56.4	0.0	46 00.0	–56.4	0.0	47 00.0	–56.4	0.0	48 00.0	–56.4	0.0	49 00.0	–56.5	0.0	50 00.0	–56.5	0.0	51 00.0	–56.5	0.0	52 00.0	–56.5	0.0	90

Dec	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec
0	41 38.5	−56.9	152.8	40 45.0	−57.0	153.2	39 51.4	−57.2	153.5	38 57.6	−57.4	153.9	38 03.6	−57.5	154.3	37 09.5	−57.7	154.6	36 15.2	−57.8	154.9	35 20.8	−57.9	155.2	0
1	40 41.6	−56.9	153.2	39 48.0	−57.1	153.6	38 54.2	−57.3	153.9	38 00.2	−57.4	154.3	37 06.1	−57.6	154.6	36 11.8	−57.7	154.9	35 17.4	−57.9	155.2	34 22.9	−58.1	155.5	1
2	39 44.7	−57.0	153.6	38 50.9	−57.2	154.0	37 56.9	−57.3	154.3	37 02.8	−57.5	154.6	36 08.5	−57.7	155.0	35 14.1	−57.9	155.3	34 19.5	−58.0	155.6	33 24.8	−58.1	155.8	2
3	38 47.7	−57.0	154.0	37 53.7	−57.2	154.4	36 59.6	−57.5	154.7	36 05.3	−57.6	155.0	35 10.8	−57.7	155.3	34 16.2	−57.8	155.6	33 21.5	−58.0	155.9	32 26.7	−58.1	156.1	3
4	37 50.7	−57.2	154.4	36 56.5	−57.3	154.7	36 02.1	−57.4	155.0	35 07.7	−57.5	155.3	34 13.1	−57.8	155.6	33 18.4	−57.9	155.9	32 23.5	−58.0	156.2	31 28.6	−58.1	156.4	4
5	36 53.5	−57.2	154.8	35 59.2	−57.4	155.1	35 04.7	−57.6	155.4	34 10.1	−57.7	155.7	33 15.3	−57.8	156.0	32 20.5	−58.0	156.2	31 25.5	−58.1	156.5	30 30.5	−58.2	156.7	5
6	35 56.3	−57.3	155.2	35 01.8	−57.5	155.5	34 07.1	−57.6	155.7	33 12.4	−57.8	156.0	32 17.5	−57.9	156.3	31 22.5	−58.0	156.5	30 27.4	−58.1	156.8	29 32.3	−58.3	157.0	6
7	34 59.0	−57.4	155.5	34 04.3	−57.5	155.8	33 09.5	−57.6	156.1	32 14.6	−57.8	156.3	31 19.6	−57.9	156.6	30 24.5	−58.0	156.9	29 29.3	−58.1	157.0	28 34.0	−58.2	157.3	7
8	34 01.6	−57.5	155.9	33 06.8	−57.6	156.1	32 11.9	−57.7	156.4	31 16.8	−57.8	156.7	30 21.7	−57.9	156.9	29 26.5	−58.1	157.1	28 31.2	−58.2	157.3	27 35.8	−58.3	157.5	8
9	33 04.2	−57.5	156.2	32 09.2	−57.6	156.5	31 14.2	−57.8	156.7	30 19.0	−57.9	157.0	29 23.8	−58.0	157.2	28 28.4	−58.1	157.4	27 33.0	−58.3	157.6	26 37.5	−58.4	157.8	9
10	32 06.7	−57.5	156.6	31 11.6	−57.6	156.8	30 16.4	−57.8	157.0	29 21.1	−57.9	157.3	28 25.8	−58.1	157.5	27 30.3	−58.2	157.7	26 34.7	−58.2	157.9	25 39.1	−58.3	158.1	10
11	31 09.2	−57.6	156.9	30 14.0	−57.7	157.1	29 18.6	−57.8	157.3	28 23.2	−57.9	157.6	27 27.7	−58.1	157.8	26 32.1	−58.1	158.0	25 36.5	−58.3	158.1	24 40.8	−58.4	158.3	11
12	30 11.6	−57.6	157.2	29 16.3	−57.8	157.4	28 20.8	−57.9	157.7	27 25.3	−58.0	157.9	26 29.7	−58.1	158.0	25 34.0	−58.2	158.2	24 38.2	−58.3	158.4	23 42.4	−58.4	158.6	12
13	29 14.0	−57.7	157.5	28 18.5	−57.8	157.8	27 22.9	−57.9	158.1	26 27.3	−58.0	158.1	25 31.6	−58.2	158.3	24 35.8	−58.3	158.5	23 39.9	−58.3	158.7	22 44.0	−58.4	158.8	13
14	28 16.3	−57.7	157.9	27 20.7	−57.8	158.1	26 25.0	−57.9	158.3	25 29.3	−58.1	158.4	24 33.4	−58.1	158.6	23 37.5	−58.2	158.8	22 41.6	−58.4	158.9	21 45.6	−58.5	159.1	14
15	27 18.6	−57.7	158.2	26 22.9	−57.9	158.4	25 27.1	−58.0	158.5	24 31.2	−58.1	158.7	23 35.3	−58.2	158.9	22 39.3	−58.3	159.0	21 43.2	−58.4	159.2	20 47.1	−58.4	159.3	15
16	26 20.9	−57.8	158.5	25 25.0	−57.9	158.7	24 29.1	−58.0	158.8	23 33.1	−58.1	159.0	22 37.1	−58.2	159.1	21 41.0	−58.3	159.3	20 44.8	−58.4	159.4	19 48.7	−58.5	159.6	16
17	25 23.1	−57.9	158.8	24 27.1	−58.0	158.9	23 31.1	−58.1	159.1	22 35.0	−58.1	159.3	21 38.9	−58.3	159.4	20 42.7	−58.3	159.5	19 46.4	−58.4	159.7	18 50.2	−58.5	159.8	17
18	24 25.2	−57.8	159.1	23 29.2	−58.0	159.2	22 33.0	−58.0	159.4	21 36.9	−58.2	159.5	20 40.6	−58.2	159.7	19 44.4	−58.4	159.8	18 48.0	−58.4	159.9	17 51.7	−58.6	160.0	18
19	23 27.4	−57.9	159.4	22 31.2	−58.0	159.5	21 35.0	−58.1	159.6	20 38.7	−58.2	159.8	19 42.4	−58.3	159.9	18 46.0	−58.4	160.0	17 49.6	−58.5	160.1	16 53.1	−58.5	160.2	19
20	22 29.5	−57.9	159.6	21 33.2	−58.0	159.8	20 36.9	−58.1	159.9	19 40.5	−58.2	160.0	18 44.1	−58.3	160.2	17 47.6	−58.4	160.3	16 51.1	−58.4	160.4	15 54.6	−58.5	160.5	20
21	21 31.6	−58.0	159.9	20 35.2	−58.1	160.1	19 38.8	−58.2	160.2	18 42.3	−58.2	160.3	17 45.8	−58.3	160.4	16 49.2	−58.5	160.5	15 52.7	−58.5	160.6	14 56.0	−58.5	160.7	21
22	20 33.6	−58.0	160.2	19 37.1	−58.0	160.3	18 40.6	−58.1	160.4	17 44.1	−58.3	160.6	16 47.5	−58.4	160.7	15 50.8	−58.4	160.8	14 54.2	−58.5	160.8	13 57.5	−58.6	160.9	22
23	19 35.6	−58.0	160.5	18 39.1	−58.1	160.6	17 42.5	−58.2	160.7	16 45.8	−58.3	160.8	15 49.1	−58.3	160.9	14 52.4	−58.4	161.0	13 55.7	−58.5	161.1	12 58.9	−58.6	161.2	23
24	18 37.6	−58.0	160.7	17 41.0	−58.1	160.9	16 44.3	−58.2	161.0	15 47.5	−58.2	161.1	14 50.8	−58.4	161.1	13 54.0	−58.5	161.2	12 57.2	−58.6	161.3	12 00.3	−58.6	161.4	24
25	17 39.6	−58.0	161.0	16 42.9	−58.2	161.1	15 46.1	−58.2	161.2	14 49.3	−58.3	161.3	13 52.4	−58.4	161.4	12 55.5	−58.5	161.5	11 58.6	−58.5	161.5	11 01.7	−58.6	161.6	25
26	16 41.6	−58.1	161.3	15 44.7	−58.1	161.4	14 47.9	−58.3	161.5	13 51.0	−58.4	161.5	12 54.0	−58.4	161.6	11 57.1	−58.5	161.7	11 00.1	−58.5	161.8	10 03.1	−58.6	161.8	26
27	15 43.5	−58.1	161.5	14 46.6	−58.2	161.6	13 49.6	−58.2	161.7	12 52.6	−58.4	161.8	11 55.6	−58.4	161.9	10 58.6	−58.5	161.9	10 01.6	−58.6	162.0	9 04.5	−58.6	162.0	27
28	14 45.4	−58.1	161.8	13 48.4	−58.2	161.9	12 51.4	−58.3	162.0	11 54.3	−58.3	162.0	10 57.2	−58.4	162.1	10 00.1	−58.5	162.1	9 03.0	−58.6	162.2	8 05.9	−58.7	162.2	28
29	13 47.3	−58.1	162.1	12 50.2	−58.3	162.1	11 53.1	−58.3	162.2	10 56.0	−58.4	162.3	9 58.8	−58.4	162.3	9 01.6	−58.5	162.4	8 04.4	−58.6	162.4	7 07.2	−58.7	162.5	29
30	12 49.2	−58.1	162.3	11 52.0	−58.3	162.4	10 54.8	−58.3	162.4	9 57.6	−58.3	162.5	9 00.4	−58.5	162.5	8 03.1	−58.5	162.6	7 05.9	−58.6	162.6	6 08.6	−58.6	162.7	30
31	11 51.1	−58.2	162.6	10 53.8	−58.2	162.6	9 56.5	−58.3	162.7	8 59.3	−58.4	162.7	8 01.9	−58.4	162.8	7 04.6	−58.5	162.8	6 07.3	−58.6	162.9	5 10.0	−58.7	162.9	31
32	10 52.9	−58.2	162.8	9 55.6	−58.2	162.9	8 58.2	−58.3	162.9	8 00.9	−58.4	163.0	7 03.5	−58.4	163.0	6 06.1	−58.5	163.0	5 08.7	−58.6	163.1	4 11.3	−58.7	163.1	32
33	9 54.8	−58.2	163.1	8 57.4	−58.3	163.1	7 59.9	−58.3	163.2	7 02.5	−58.4	163.2	6 05.1	−58.5	163.2	5 07.6	−58.5	163.3	4 10.1	−58.6	163.3	3 12.7	−58.7	163.3	33
34	8 56.6	−58.2	163.3	7 59.1	−58.2	163.4	7 01.6	−58.3	163.4	6 04.1	−58.4	163.4	5 06.6	−58.5	163.5	4 09.1	−58.5	163.5	3 11.6	−58.6	163.5	2 14.0	−58.6	163.5	34
35	7 58.4	−58.2	163.6	7 00.9	−58.3	163.6	6 03.3	−58.4	163.6	5 05.7	−58.4	163.7	4 08.1	−58.4	163.7	3 10.6	−58.6	163.7	2 13.0	−58.6	163.7	1 15.4	−58.7	163.7	35
36	7 00.2	−58.2	163.8	6 02.6	−58.3	163.8	5 05.0	−58.4	163.9	4 07.3	−58.4	163.9	3 09.7	−58.5	163.9	2 12.0	−58.5	163.9	1 14.4	−58.6	163.9	0 16.7	−58.6	163.9	36
37	6 02.0	−58.2	164.1	5 04.3	−58.2	164.1	4 06.6	−58.3	164.1	3 08.9	−58.4	164.1	2 11.2	−58.5	164.1	1 13.5	−58.5	164.1	0 15.8	−58.6	164.1	0 41.9	+58.7	15.9	37
38	5 03.8	−58.2	164.3	4 06.1	−58.3	164.3	3 08.3	−58.3	164.3	2 10.5	−58.4	164.4	1 12.7	−58.4	164.4	0 15.0	−58.6	164.4	0 42.8	+58.6	15.6	1 40.6	+58.7	15.6	38
39	4 05.6	−58.2	164.5	3 07.8	−58.3	164.6	2 10.0	−58.4	164.6	1 12.1	−58.4	164.6	0 14.3	−58.5	164.6	0 43.6	+58.5	15.4	1 41.4	+58.6	15.4	2 39.2	+58.7	15.4	39
40	3 07.4	−58.2	164.8	2 09.5	−58.3	164.8	1 11.6	−58.3	164.8	0 13.7	−58.4	164.8	0 44.2	+58.5	15.2	1 42.1	+58.5	15.2	2 40.0	+58.6	15.2	3 37.9	+58.6	15.2	40
41	2 09.2	−58.2	165.0	1 11.2	−58.3	165.0	0 13.3	−58.4	165.0	0 44.7	+58.4	15.0	1 42.7	+58.4	15.0	2 40.6	+58.6	15.0	3 38.6	+58.6	15.0	4 36.5	+58.7	15.0	41
42	1 11.0	−58.2	165.3	0 12.9	−58.2	165.3	0 45.1	+58.3	14.7	1 43.1	+58.4	14.7	2 41.1	+58.5	14.7	3 39.2	+58.5	14.8	4 37.2	+58.6	14.8	5 35.2	+58.6	14.8	42
43	0 12.8	−58.3	165.5	0 45.3	+58.3	14.5	1 43.4	+58.3	14.5	2 41.5	+58.4	14.5	3 39.6	+58.5	14.5	4 37.7	+58.5	14.5	5 35.8	+58.6	14.6	6 33.8	+58.7	14.6	43
44	0 45.5	+58.2	14.2	1 43.6	+58.3	14.2	2 41.8	+58.3	14.3	3 39.9	+58.4	14.3	4 38.1	+58.4	14.3	5 36.2	+58.5	14.3	6 34.3	+58.6	14.3	7 32.5	+58.6	14.4	44
45	1 43.7	+58.2	14.0	2 41.9	+58.3	14.0	3 40.1	+58.3	14.0	4 38.3	+58.4	14.0	5 36.5	+58.5	14.1	6 34.7	+58.5	14.1	7 32.9	+58.6	14.1	8 31.1	+58.6	14.2	45
46	2 41.9	+58.2	13.8	3 40.2	+58.2	13.8	4 38.4	+58.3	13.8	5 36.7	+58.4	13.8	6 35.0	+58.4	13.8	7 33.2	+58.5	13.9	8 31.5	+58.5	13.9	9 29.7	+58.6	13.9	46
47	3 40.1	+58.2	13.5	4 38.4	+58.3	13.5	5 36.8	+58.3	13.6	6 35.1	+58.4	13.6	7 33.4	+58.5	13.6	8 31.7	+58.5	13.6	9 30.0	+58.6	13.7	10 28.3	+58.6	13.7	47
48	4 38.3	+58.2	13.3	5 36.7	+58.3	13.3	6 35.1	+58.3	13.3	7 33.5	+58.4	13.3	8 31.9	+58.4	13.4	9 30.2	+58.5	13.4	10 28.6	+58.5	13.5	11 26.9	+58.6	13.5	48
49	5 36.5	+58.2	13.0	6 35.0	+58.2	13.1	7 33.4	+58.3	13.1	8 31.9	+58.3	13.1	9 30.3	+58.4	13.2	10 28.7	+58.5	13.2	11 27.1	+58.6	13.2	12 25.5	+58.6	13.3	49
50	6 34.7	+58.2	12.8	7 33.2	+58.2	12.8	8 31.7	+58.3	12.8	9 30.2	+58.4	12.9	10 28.7	+58.4	12.9	11 27.2	+58.5	13.0	12 25.7	+58.5	13.0	13 24.1	+58.6	13.1	50
51	7 32.9	+58.2	12.5	8 31.5	+58.2	12.6	9 30.0	+58.2	12.6	10 28.6	+58.3	12.6	11 27.1	+58.4	12.7	12 25.7	+58.4	12.7	13 24.2	+58.5	12.8	14 22.7	+58.5	12.8	51
52	8 31.1	+58.2	12.3	9 29.7	+58.2	12.3	10 28.3	+58.3	12.4	11 26.9	+58.4	12.4	12 25.5	+58.4	12.5	13 24.1	+58.4	12.5	14 22.7	+58.5	12.6	15 21.2	+58.6	12.6	52
53	9 29.3	+58.1	12.0	10 27.9	+58.2	12.1	11 26.6	+58.3	12.1	12 25.3	+58.3	12.2	13 23.9	+58.4	12.2	14 22.5	+58.4	12.3	15 21.2	+58.4	12.3	16 19.8	+58.5	12.4	53
54	10 27.4	+58.1	11.8	11 26.2	+58.2	11.8	12 24.9	+58.2	11.9	13 23.6	+58.3	11.9	14 22.3	+58.3	12.0	15 21.0	+58.4	12.0	16 19.6	+58.5	12.1	17 18.3	+58.5	12.2	54
55	11 25.6	+58.1	11.5	12 24.4	+58.2	11.6	13 23.1	+58.3	11.6	14 21.9	+58.3	11.7	15 20.6	+58.4	11.7	16 19.4	+58.4	11.8	17 18.1	+58.5	11.9	18 16.8	+58.5	11.9	55
56	12 23.7	+58.1	11.3	13 22.6	+58.1	11.3	14 21.4	+58.2	11.4	15 20.2	+58.3	11.4	16 19.0	+58.3	11.5	17 17.8	+58.4	11.6	18 16.6	+58.4	11.6	19 15.3	+58.5	11.7	56
57	13 21.8	+58.1	11.0	14 20.7	+58.1	11.1	15 19.6	+58.2	11.1	16 18.5	+58.2	11.2	17 17.3	+58.3	11.3	18 16.2	+58.3	11.3	19 15.0	+58.4	11.4	20 13.8	+58.5	11.5	57
58	14 20.0	+58.0	10.8	15 18.9	+58.1	10.8	16 17.8	+58.2	10.9	17 16.7	+58.3	10.9	18 15.6	+58.3	11.0	19 14.5	+58.4	11.1	20 13.4	+58.4	11.1	21 12.3	+58.4	11.2	58
59	15 18.0	+58.0	10.5	16 17.0	+58.0	10.6	17 16.0	+58.2	10.6	18 15.0	+58.2	10.7	19 13.9	+58.3	10.8	20 12.9	+58.3	10.8	21 11.8	+58.4	10.9	22 10.7	+58.4	11.0	59
60	16 16.1	+58.0	10.3	17 15.2	+58.1	10.3	18 14.2	+58.1	10.4	19 13.2	+58.2	10.4	20 12.2	+58.2	10.5	21 11.2	+58.3	10.6	22 10.2	+58.3	10.6	23 09.1	+58.4	10.7	60
61	17 14.2	+58.0	10.0	18 13.3	+58.0	10.1	19 12.3	+58.2	10.1	20 11.4	+58.2	10.2	21 10.4	+58.3	10.2	22 09.5	+58.3	10.3	23 08.5	+58.3	10.4	24 07.5	+58.4	10.5	61
62	18 12.2	+58.0	9.7	19 11.3	+58.1	9.8	20 10.5	+58.1	9.8	21 09.6	+58.1	9.9	22 08.7	+58.2	10.0	23 07.8	+58.2	10.1	24 06.8	+58.3	10.1	25 05.9	+58.3	10.2	62
63	19 10.2	+58.0	9.5	20 09.4	+58.0	9.5	21 08.6	+58.0	9.6	22 07.7	+58.1	9.6	23 06.9	+58.1	9.7	24 06.0	+58.2	9.8	25 05.1	+58.3	9.9	26 04.2	+58.3	10.0	63
64	20 08.2	+58.0	9.2	21 07.4	+58.0	9.2	22 06.6	+58.1	9.3	23 05.8	+58.1	9.4	24 05.0	+58.2	9.5	25 04.2	+58.2	9.5	26 03.4	+58.2	9.6	27 02.5	+58.3	9.7	64
65	21 06.2	+57.9	9.0	22 05.4	+58.0	9.0	23 04.7	+58.0	9.0	24 03.9	+58.1	9.1	25 03.2	+58.1	9.2	26 02.4	+58.2	9.3	27 01.6	+58.2	9.3	28 00.8	+58.3	9.4	65
66	22 04.1	+57.9	8.6	23 03.4	+58.0	8.7	24 02.7	+58.0	8.8	25 02.0	+58.1	8.8	26 01.3	+58.1	8.9	27 00.6	+58.1	9.0	27 59.8	+58.2	9.1	28 59.1	+58.2	9.2	66
67	23 02.0	+57.9	8.3	24 01.4	+57.9	8.4	25 00.7	+58.0	8.5	26 00.1	+58.0	8.6	26 59.4	+58.0	8.6	27 58.7	+58.1	8.7	28 58.0	+58.1	8.8	29 57.3	+58.2	8.9	67
68	23 59.9	+57.8	8.1	24 59.3	+57.9	8.1	25 58.7	+57.9	8.2	26 58.1	+57.9	8.3	27 57.4	+58.0	8.3	28 56.8	+58.0	8.4	29 56.1	+58.1	8.5	30 55.5	+58.1	8.6	68
69	24 57.7	+57.8	7.8	25 57.2	+57.8	7.8	26 56.6	+57.9	7.9	27 56.0	+57.9	8.0	28 55.4	+58.0	8.0	29 54.8	+58.1	8.1	30 54.2	+58.1	8.2	31 53.6	+58.1	8.3	69
70	25 55.5	+57.8	7.5	26 55.0	+57.8	7.5	27 54.5	+57.8	7.6	28 54.0	+57.9	7.7	29 53.4	+58.0	7.8	30 52.9	+57.9	7.8	31 52.3	+58.0	7.9	32 51.7	+58.1	8.0	70
71	26 53.3	+57.7	7.2	27 52.8	+57.8	7.2	28 52.3	+57.9	7.3	29 51.9	+57.8	7.4	30 51.4	+57.8	7.5	31 50.8	+58.0	7.5	32 50.3	+58.0	7.6	33 49.8	+58.0	7.7	71
72	27 51.0	+57.7	6.9	28 50.6	+57.7	7.0	29 50.2	+57.7	7.0	30 49.7	+57.8	7.1	31 49.2	+57.9	7.1	32 48.8	+57.9	7.2	33 48.3	+57.9	7.3	34 47.8	+58.0	7.4	72
73	28 48.7	+57.7	6.6	29 48.3	+57.7	6.6	30 47.9	+57.8	6.7	31 47.5	+57.8	6.8	32 47.1	+57.9	6.8	33 46.7	+57.8	6.9	34 46.2	+57.9	7.0	35 45.8	+57.9	7.1	73
74	29 46.4	+57.6	6.2	30 46.0	+57.7	6.3	31 45.7	+57.6	6.4	32 45.3	+57.7	6.4	33 44.9	+57.7	6.5	34 44.5	+57.8	6.6	35 44.1	+57.8	6.7	36 43.7	+57.9	6.8	74
75	30 44.0	+57.5	5.9	31 43.7	+57.6	6.0	32 43.3	+57.6	6.0	33 42.9	+57.7	6.1	34 42.6	+57.7	6.1	35 42.3	+57.7	6.2	36 41.9	+57.7	6.3	37 41.6	+57.7	6.4	75
76	31 41.5	+57.5	5.6	32 41.2	+57.6	5.6	33 40.9	+57.6	5.7	34 40.6	+57.6	5.8	35 40.3	+57.7	5.8	36 40.0	+57.7	5.9	37 39.7	+57.7	6.0	38 39.4	+57.7	6.1	76
77	32 39.0	+57.5	5.2	33 38.8	+57.4	5.3	34 38.5	+57.5	5.4	35 38.2	+57.6	5.4	36 38.0	+57.5	5.5	37 37.7	+57.6	5.6	38 37.4	+57.7	5.7	39 37.1	+57.7	5.7	77
78	33 36.5	+57.4	4.9	34 36.2	+57.5	5.0	35 36.0	+57.5	5.0	36 35.8	+57.5	5.1	37 35.5	+57.6	5.1	38 35.3	+57.5	5.2	39 35.1	+57.5	5.3	40 34.8	+57.6	5.3	78
79	34 33.9	+57.3	4.5	35 33.7	+57.3	4.6	36 33.5	+57.3	4.7	37 33.3	+57.4	4.7	38 33.1	+57.4	4.8	39 32.8	+57.5	4.9	40 32.6	+57.5	4.9	41 32.4	+57.5	5.0	79
80	35 31.2	+57.2	4.2	36 31.0	+57.3	4.2	37 30.8	+57.4	4.3	38 30.7	+57.3	4.4	39 30.5	+57.4	4.4	40 30.3	+57.4	4.5	41 30.1	+57.5	4.5	42 29.9	+57.5	4.6	80
81	36 28.4	+57.2	3.8	37 28.3	+57.2	3.9	38 28.2	+57.2	3.9	39 28.0	+57.3	4.0	40 27.9	+57.3	4.0	41 27.7	+57.3	4.1	42 27.6	+57.3	4.1	43 27.4	+57.4	4.2	81
82	37 25.6	+57.1	3.4	38 25.5	+57.1	3.5	39 25.4	+57.2	3.5	40 25.3	+57.2	3.6	41 25.2	+57.2	3.6	42 25.0	+57.3	3.7	43 24.9	+57.3	3.8	44 24.8	+57.4	3.8	82
83	38 22.7	+57.1	3.0	39 22.6	+57.1	3.1	40 22.6	+57.0	3.1	41 22.5	+57.1	3.2	42 22.4	+57.1	3.2	43 22.3	+57.1	3.3	44 22.2	+57.1	3.3	45 22.1	+57.2	3.4	83
84	39 19.8	+56.9	2.7	40 19.7	+57.0	2.7	41 19.6	+57.0	2.7	42 19.6	+57.0	2.8	43 19.5	+57.1	2.8	44 19.4	+57.1	2.9	45 19.3	+57.1	2.9	46 19.3	+57.1	3.0	84
85	40 16.7	+56.9	2.2	41 16.7	+56.8	2.3	42 16.6	+56.9	2.3	43 16.6	+56.9	2.3	44 16.5	+56.9	2.4	45 16.5	+56.9	2.4	46 16.4	+57.0	2.4	47 16.4	+56.9	2.5	85
86	41 13.6	+56.7	1.8	42 13.5	+56.8	1.8	43 13.5	+56.8	1.9	44 13.5	+56.8	1.9	45 13.4	+56.9	1.9	46 13.4	+56.8	2.0	47 13.4	+56.8	2.0	48 13.3	+56.9	2.1	86
87	42 10.3	+56.7	1.4	43 10.3	+56.7	1.4	44 10.3	+56.7	1.4	45 10.3	+56.6	1.5	46 10.3	+56.7	1.5	47 10.2	+56.8	1.5	48 10.2	+56.7	1.5	49 10.2	+56.7	1.6	87
88	43 07.0	+56.6	0.9	44 07.0	+56.6	1.0	45 07.0	+56.6	1.0	46 07.0	+56.6	1.0	47 07.0	+56.7	1.0	48 07.0	+56.6	1.0	49 06.9	+56.6	1.0	50 06.9	+56.6	1.1	88
89	44 03.6	+56.4	0.5	45 03.6	+56.4	0.5	46 03.6	+56.4	0.5	47 03.6	+56.4	0.5	48 03.5	+56.5	0.5	49 03.5	+56.5	0.5	50 03.5	+56.5	0.5	51 03.5	+56.5	0.5	89
90	45 00.0	+56.3	0.0	46 00.0	+56.3	0.0	47 00.0	+56.3	0.0	48 00.0	+56.3	0.0	49 00.0	+56.3	0.0	50 00.0	+56.3	0.0	51 00.0	+56.3	0.0	52 00.0	+56.3	0.0	90

Latitude headings (bottom): 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52°

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	41 18.6	+56.5	151.5	40 25.8	+56.7	151.9	39 32.8	+56.8	152.3	38 39.6	+57.0	152.7	37 46.2	+57.2	153.0	36 52.6	+57.4	153.4	35 58.9	+57.6	153.7	35 05.0	+57.8	154.0	0
1	42 15.1	+56.3	151.0	41 22.5	+56.5	151.5	40 29.6	+56.8	151.9	39 36.6	+57.0	152.3	38 43.4	+57.2	152.7	37 50.0	+57.4	153.0	36 56.5	+57.5	153.4	36 02.8	+57.7	153.7	1
2	43 11.4	+56.2	150.6	42 19.0	+56.4	151.0	41 26.4	+56.7	151.5	40 33.6	+56.9	151.9	39 40.6	+57.1	152.3	38 47.4	+57.3	152.6	37 54.0	+57.5	153.0	37 00.5	+57.6	153.4	2
3	44 07.6	+56.1	150.1	43 15.4	+56.4	150.6	42 23.1	+56.5	151.0	41 30.5	+56.8	151.5	40 37.7	+57.0	151.9	39 44.7	+57.2	152.3	38 51.5	+57.4	152.6	37 58.1	+57.6	153.0	3
4	45 03.7	+55.9	149.6	44 11.8	+56.2	150.1	43 19.6	+56.5	150.6	42 27.3	+56.7	151.0	41 34.7	+56.9	151.5	40 41.9	+57.1	151.9	39 48.9	+57.3	152.3	38 55.7	+57.5	152.6	4
5	45 59.6	+55.8	149.1	45 08.0	+56.1	149.6	44 16.1	+56.3	150.1	43 24.0	+56.5	150.6	42 31.6	+56.8	151.0	41 39.0	+57.0	151.5	40 46.2	+57.2	151.9	39 53.2	+57.4	152.3	5
6	46 55.4	+55.6	148.5	46 04.1	+55.9	149.1	45 12.4	+56.2	149.6	44 20.5	+56.5	150.1	43 28.4	+56.7	150.6	42 36.0	+57.0	151.0	41 43.4	+57.2	151.5	40 50.6	+57.3	151.9	6
7	47 51.0	+55.5	148.0	47 00.0	+55.8	148.6	46 08.6	+56.1	149.1	45 17.0	+56.4	149.6	44 25.1	+56.6	150.1	43 33.0	+56.8	150.6	42 40.6	+57.0	151.1	41 47.9	+57.3	151.5	7
8	48 46.5	+55.3	147.4	47 55.8	+55.6	148.0	47 04.7	+55.9	148.6	46 13.4	+56.2	149.1	45 21.7	+56.5	149.7	44 29.8	+56.7	150.2	43 37.6	+57.0	150.7	42 45.2	+57.2	151.1	8
9	49 41.8	+55.1	146.8	48 51.4	+55.4	147.5	48 00.6	+55.8	148.1	47 09.6	+56.0	148.6	46 18.2	+56.3	149.2	45 26.5	+56.6	149.7	44 34.6	+56.8	150.2	43 42.4	+57.1	150.7	9
10	50 36.9	+54.9	146.2	49 46.8	+55.3	146.9	48 56.4	+55.7	147.5	48 05.6	+56.0	148.1	47 14.5	+56.3	148.7	46 23.1	+56.5	149.2	45 31.4	+56.8	149.8	44 39.5	+57.0	150.3	10
11	51 31.8	+54.7	145.6	50 42.1	+55.1	146.3	49 52.0	+55.5	146.9	49 01.6	+55.7	147.6	48 10.8	+56.1	148.2	47 19.6	+56.4	148.8	46 28.2	+56.6	149.3	45 36.5	+56.9	149.8	11
12	52 26.5	+54.4	144.9	51 37.2	+54.8	145.6	50 47.5	+55.2	146.3	49 57.3	+55.6	147.0	49 06.8	+56.0	147.6	48 16.0	+56.2	148.2	47 24.8	+56.5	148.8	46 33.4	+56.7	149.4	12
13	53 20.9	+54.4	144.2	52 32.0	+54.7	145.0	51 42.7	+55.0	145.7	50 52.9	+55.4	146.4	50 02.8	+55.7	147.1	49 12.2	+56.1	147.7	48 21.3	+56.4	148.3	47 30.1	+56.7	148.9	13
14	54 15.1	+54.0	143.5	53 26.7	+54.3	144.3	52 37.7	+54.8	145.0	51 48.3	+55.2	145.8	50 58.5	+55.6	146.5	50 08.3	+55.9	147.1	49 17.7	+56.2	147.8	48 26.8	+56.5	148.4	14
15	55 09.1	+53.6	142.7	54 21.0	+54.2	143.6	53 32.5	+54.6	144.4	52 43.5	+55.0	145.1	51 54.1	+55.3	145.9	51 04.2	+55.7	146.6	50 13.9	+56.1	147.2	49 23.3	+56.4	147.9	15
16	56 02.7	+53.3	141.9	55 15.2	+53.8	142.8	54 27.1	+54.3	143.7	53 38.5	+54.8	144.5	52 49.4	+55.2	145.2	51 59.9	+55.6	146.0	51 10.0	+55.9	146.7	50 19.7	+56.2	147.3	16
17	56 56.0	+52.9	141.1	56 09.0	+53.5	142.0	55 21.4	+54.0	142.9	54 33.3	+54.5	143.8	53 44.6	+54.9	144.6	52 55.5	+55.3	145.4	52 05.9	+55.7	146.1	51 15.9	+56.1	146.8	17
18	57 48.9	+52.6	140.2	57 02.5	+53.2	141.2	56 15.4	+53.8	142.2	55 27.8	+54.2	143.0	54 39.5	+54.7	143.9	53 50.8	+55.1	144.7	53 01.6	+55.5	145.5	52 12.0	+55.8	146.2	18
19	58 41.5	+52.2	139.3	57 55.7	+52.8	140.3	57 09.2	+53.1	141.3	56 22.0	+53.9	142.3	55 34.2	+54.5	143.2	54 45.9	+54.9	144.0	53 57.1	+55.3	144.8	53 07.8	+55.7	145.5	19
20	59 33.7	+51.7	138.3	58 48.5	+52.4	139.4	58 02.5	+53.1	140.5	57 15.9	+53.6	141.5	56 28.7	+54.1	142.4	55 40.8	+54.7	143.3	54 52.4	+55.1	144.2	54 03.5	+55.5	145.0	20
21	60 25.4	+51.3	137.3	59 40.9	+52.0	138.5	58 55.6	+52.6	139.6	58 09.5	+53.3	140.6	57 22.8	+53.8	141.6	56 35.5	+54.3	142.6	55 47.5	+54.9	143.5	54 59.0	+55.3	144.3	21
22	61 16.7	+50.7	136.3	60 32.9	+51.5	137.5	59 48.2	+52.2	138.7	59 02.8	+52.9	139.8	58 16.6	+53.5	140.8	57 29.8	+54.1	141.8	56 42.4	+54.5	142.7	55 54.3	+55.0	143.6	22
23	62 07.4	+50.1	135.1	61 24.4	+50.9	136.4	60 40.4	+51.8	137.7	59 55.7	+52.5	138.8	59 10.1	+53.2	139.9	58 23.9	+53.7	141.0	57 36.9	+54.3	142.0	56 49.3	+54.8	142.9	23
24	62 57.5	+49.5	133.9	62 15.3	+50.4	135.3	61 32.2	+51.3	136.6	60 48.2	+52.0	137.8	60 03.3	+52.7	139.0	59 17.6	+53.4	140.1	58 31.2	+53.9	141.2	57 44.1	+54.5	142.2	24
25	63 47.0	+48.8	132.7	63 05.7	+49.8	134.1	62 23.5	+50.6	135.5	61 40.2	+51.5	136.8	60 56.0	+52.3	138.0	60 11.0	+52.9	139.2	59 25.1	+53.6	140.3	58 38.6	+54.2	141.4	25
26	64 35.8	+48.0	131.3	63 55.5	+49.1	132.9	63 14.1	+50.1	134.3	62 31.7	+51.0	135.7	61 48.3	+51.8	137.0	61 03.9	+52.6	138.3	60 18.7	+53.3	139.4	59 32.8	+53.8	140.5	26
27	65 23.8	+47.2	129.9	64 44.6	+48.4	131.6	64 04.2	+49.4	133.1	63 22.7	+50.3	134.6	62 40.1	+51.2	135.9	61 56.5	+52.0	137.2	61 12.0	+52.8	138.5	60 26.6	+53.5	139.7	27
28	66 11.0	+46.2	128.4	65 33.0	+47.5	130.1	64 53.6	+48.7	131.8	64 13.0	+49.8	133.3	63 31.3	+50.7	134.8	62 48.5	+51.6	136.2	62 04.8	+52.3	137.5	61 20.1	+53.1	138.7	28
29	66 57.2	+45.2	126.8	66 20.5	+46.6	128.6	65 42.3	+47.8	130.4	65 02.8	+49.0	132.0	64 22.0	+50.0	133.6	63 40.1	+51.0	135.0	62 57.1	+51.9	136.4	62 13.2	+52.6	137.7	29
30	67 42.4	+44.0	125.1	67 07.1	+45.5	127.0	66 30.1	+47.0	128.9	65 51.8	+48.1	130.6	65 12.0	+49.4	132.3	64 31.1	+50.3	133.8	63 49.0	+51.2	135.3	63 05.8	+52.1	136.7	30
31	68 26.4	+42.8	123.3	67 52.6	+44.5	125.3	67 17.1	+45.9	127.3	66 39.9	+47.3	129.1	66 01.4	+48.5	130.9	65 21.4	+49.7	132.5	64 40.2	+50.7	134.1	63 57.9	+51.6	135.6	31
32	69 09.2	+41.4	121.3	68 37.1	+43.1	123.5	68 03.0	+44.8	125.6	67 27.2	+46.3	127.6	66 49.9	+47.6	129.4	66 11.1	+48.8	131.2	65 30.9	+50.0	132.8	64 49.5	+51.0	134.4	32
33	69 50.6	+39.9	119.3	69 20.2	+41.9	121.6	68 47.8	+43.6	123.8	68 13.5	+45.3	125.9	67 37.5	+46.7	127.9	66 59.9	+48.1	129.7	66 20.9	+49.2	131.5	65 40.5	+50.3	133.1	33
34	70 30.5	+38.2	117.1	70 02.1	+40.2	119.5	69 31.4	+42.2	121.9	68 58.8	+43.9	124.1	68 24.2	+45.6	126.2	67 48.0	+47.0	128.2	67 10.1	+48.4	130.0	66 31.5	+49.6	131.8	34
35	71 08.7	+36.2•	114.7	70 42.3	+38.6	117.3	70 13.6	+40.7	119.8	69 42.7	+42.7	122.2	69 09.8	+44.4	124.4	68 35.0	+46.0	126.5	67 58.5	+47.5	128.3	67 20.4	+48.8	130.4	35
36	71 44.9	+34.2•	112.2	71 20.9	+36.7•	115.0	70 54.3	+39.0	117.6	70 25.4	+41.1	120.1	69 54.2	+43.1	122.5	69 21.0	+44.9	124.7	68 46.0	+46.4	126.8	68 09.2	+47.8	128.8	36
37	72 19.1	+31.9•	109.6	71 57.6	+34.6•	112.5	71 33.3	+37.2•	115.2	71 06.5	+39.5	117.9	70 37.3	+41.5	120.4	70 05.9	+43.4	122.8	69 32.4	+45.2	125.2	68 57.0	+46.8	127.2	37
38	72 51.0	+29.4•	106.9	72 32.2	+32.3•	109.8	72 10.5	+35.0•	112.7	71 46.0	+37.5•	115.5	71 18.8	+39.9	118.2	70 49.3	+42.0	120.7	70 17.6	+43.9	123.1	69 43.8	+45.7	125.4	38
39	73 20.4	+26.7•	103.7	73 04.5	+29.8•	106.9	72 45.5	+32.8•	110.0	72 23.5	+35.5•	113.0	71 58.7	+38.1•	115.8	71 31.3	+40.4	118.5	71 01.5	+42.5	121.1	70 29.5	+44.4	123.5	39
40	73 47.1	+23.6•	100.6	73 34.3	+27.1•	103.9	73 18.3	+30.2•	107.1	72 59.0	+33.2•	110.3	72 36.8	+35.9•	113.3	72 11.7	+38.5•	116.1	71 44.0	+40.8	118.9	71 13.9	+42.9	121.4	40
41	74 10.7	+20.5•	97.2	74 01.4	+24.1•	100.7	73 48.5	+27.5•	104.1	73 32.2	+30.7•	107.4	73 12.7	+33.7•	110.5	72 50.2	+36.4•	113.6	72 24.8	+39.0	116.5	71 56.8	+41.3	119.2	41
42	74 31.2	+17.1•	93.7	74 25.5	+20.8•	97.3	74 16.0	+24.4•	100.9	74 02.9	+27.9•	104.3	73 46.4	+31.1•	107.6	73 26.6	+34.2•	110.8	73 03.8	+36.9•	113.9	72 38.1	+39.4	116.8	42
43	74 48.3	+13.5•	90.1	74 46.3	+17.4•	93.8	74 40.4	+21.2•	97.4	74 30.8	+24.8•	101.0	74 17.5	+28.3•	104.5	74 00.8	+31.5•	107.9	73 40.7	+34.6•	111.2	73 17.5	+37.4•	114.3	43
44	75 01.8	+9.8•	86.4	75 03.7	+13.7•	90.1	75 01.6	+17.7•	93.9	74 55.6	+21.5•	97.6	74 45.8	+25.2•	101.2	74 32.3	+28.8•	104.8	74 15.3	+32.0•	108.2	73 54.9	+35.1•	111.5	44
45	75 11.6	+5.8•	82.5	75 17.4	+9.9•	86.3	75 19.3	+13.9•	90.1	75 17.1	+18.0•	93.9	75 11.0	+21.9•	97.7	75 01.1	+25.6•	101.4	74 47.3	+29.2•	105.0	74 30.0	+32.5•	108.5	45
46	75 17.4	+1.9•	78.6	75 27.3	+5.9•	82.4	75 33.2	+10.1•	86.3	75 35.1	+14.2•	90.1	75 32.9	+18.3•	94.0	75 26.7	+22.2•	97.9	75 16.5	+26.1•	101.6	75 02.5	+29.7•	105.3	46
47	75 19.3	-2.2•	74.7	75 33.2	+1.9•	78.4	75 43.3	+6.0•	82.3	75 49.3	+10.2•	86.2	75 51.2	+14.4•	90.2	75 48.9	+18.6•	94.1	75 42.6	+22.6•	98.0	75 32.2	+26.5•	101.9	47
48	75 17.1	-6.1•	70.7	75 35.1	-2.2•	74.4	75 49.3	+1.9•	78.2	75 59.5	+6.1•	82.2	76 05.6	+10.4•	86.2	76 07.5	+14.7•	90.2	76 05.2	+18.9•	94.2	75 58.7	+23.0•	98.2	48
49	75 11.0	-9.9•	66.8	75 32.9	-6.2•	70.4	75 51.2	-2.3•	74.1	76 05.6	+1.9•	78.0	76 16.0	+6.2•	82.0	76 22.2	+10.6•	86.1	76 24.1	+14.9•	90.3	76 21.7	+19.2•	94.4	49
50	75 01.1	-13.8•	63.0	75 26.7	-10.2•	66.4	75 48.9	-6.3•	70.1	76 07.5	-2.3•	73.9	76 22.2	+1.9•	77.8	76 32.8	+6.2•	81.9	76 39.0	+10.7•	86.1	76 40.9	+15.2•	90.3	50
51	74 47.3	-17.3•	59.3	75 16.5	-14.0•	62.5	75 42.6	-10.4•	66.0	76 05.2	-6.5•	69.7	76 24.1	-2.4•	73.6	76 39.0	+1.9•	77.6	76 49.7	+6.4•	81.8	76 56.1	+10.9•	86.1	51
52	74 30.0	-20.7•	55.7	75 02.5	-17.6•	58.7	75 32.2	-14.3•	62.1	75 58.7	-10.7•	65.6	76 21.7	-6.7•	69.3	76 40.9	-2.5•	73.3	76 56.1	+1.8•	77.4	77 07.0	+6.4•	81.7	52
53	74 09.3	-23.9•	52.2	74 44.9	-21.1•	55.1	75 17.9	-18.0•	58.2	75 48.0	-14.5•	61.5	76 15.0	-10.9•	65.5	76 38.4	-6.9•	69.0	76 57.9	-2.6•	73.0	77 13.4	+1.8•	77.2	53
54	73 45.4	-26.8•	48.9	74 23.8	-24.3•	51.5	74 59.9	-21.4•	54.5	75 33.5	-18.4•	57.6	76 04.1	-14.9•	61.0	76 31.5	-11.2•	64.7	76 55.3	-7.1•	68.6	77 15.2	-2.8•	72.7	54
55	73 18.6	-29.6•	45.7	73 59.5	-27.2•	48.2	74 38.5	-24.7•	50.9	75 15.1	-21.9•	53.8	75 49.2	-18.8•	57.0	76 20.3	-15.3•	60.5	76 48.2	-11.5•	64.2	77 12.4	-7.4•	68.2	55
56	72 49.0	-32.1•	42.7	73 32.3	-30.0•	45.0	74 13.8	-27.5•	47.5	74 53.2	-25.1•	50.2	75 30.4	-22.3•	53.2	76 05.0	-19.1•	56.4	76 36.7	-15.7•	59.9	77 05.0	-11.8•	63.7	56
57	72 16.9	-34.3•	39.9	73 02.3	-32.5•	42.0	73 46.1	-30.5•	44.3	74 28.1	-28.2•	46.8	75 08.1	-25.6•	49.5	75 45.9	-22.8•	52.5	76 21.0	-19.6•	55.8	76 53.2	-16.1•	59.3	57
58	71 42.6	-36.4	37.2	72 29.8	-34.8•	39.2	73 15.6	-32.9•	41.2	73 59.9	-30.9•	43.5	74 42.5	-28.6•	46.1	75 23.1	-26.1•	48.8	76 01.4	-23.2•	51.8	76 37.1	-20.0•	55.1	58
59	71 06.2	-38.2	34.7	71 55.0	-36.8	36.5	72 42.7	-35.1•	38.4	73 29.0	-33.4•	40.5	74 13.9	-31.5•	42.8	74 57.0	-29.2•	45.3	75 38.2	-26.7•	48.1	76 17.1	-23.8•	51.1	59
60	70 28.0	-40.0	32.4	71 18.2	-38.7	34.0	72 07.4	-37.3	35.7	72 55.6	-35.8•	37.6	73 42.4	-33.9•	39.7	74 27.8	-31.9•	42.0	75 11.5	-29.7•	44.5	75 53.3	-27.2•	47.3	60
61	69 48.0	-41.5	30.2	70 39.5	-40.4	31.6	71 30.1	-39.1	33.2	72 19.8	-37.7	34.9	73 08.5	-36.3•	36.8	73 55.9	-34.5•	38.9	74 41.8	-32.5•	41.2	75 26.1	-30.3•	43.7	61
62	69 06.5	-42.9	28.2	69 59.1	-41.9	29.4	70 51.0	-40.9	30.9	71 42.1	-39.7	32.4	72 32.2	-38.3	34.1	73 21.4	-36.8•	36.0	74 09.3	-35.0•	38.0	74 55.8	-33.1•	40.3	62
63	68 23.6	-44.1	26.2	69 17.2	-43.3	27.4	70 10.1	-42.3	28.7	71 02.4	-41.3	30.1	71 54.0	-40.1	31.6	72 44.6	-38.8	33.3	73 34.3	-37.3•	35.1	74 22.7	-35.6•	37.2	63
64	67 39.5	-45.3	24.4	68 33.9	-44.5	25.5	69 27.8	-43.7	26.6	70 21.1	-42.7	27.9	71 13.9	-41.8	29.2	72 05.8	-40.6	30.7	72 57.0	-39.3	32.4	73 47.1	-37.8•	34.2	64
65	66 54.2	-46.3	22.7	67 49.4	-45.7	23.7	68 44.1	-44.6	24.7	69 38.4	-44.1	25.8	70 32.1	-43.2	27.0	71 25.2	-42.2	28.4	72 17.7	-41.2	29.9	73 09.3	-39.9	31.5	65
66	66 07.9	-47.2	21.1	67 03.7	-46.6	22.0	67 59.2	-46.0	22.9	68 54.3	-45.4	23.9	69 48.9	-44.6	25.0	70 43.0	-43.7	26.2	71 36.5	-42.7	27.5	72 29.4	-41.7	29.0	66
67	65 20.7	-48.1	19.6	66 17.1	-47.6	20.4	67 13.2	-47.1	21.2	68 08.9	-46.4	22.1	69 04.3	-45.7	23.1	69 59.3	-45.0	24.2	70 53.8	-44.2	25.3	71 47.7	-43.2	26.6	67
68	64 32.6	-48.8	18.2	65 29.5	-48.4	18.9	66 26.1	-47.9	19.6	67 22.5	-47.4	20.4	68 18.6	-46.8	21.3	69 14.3	-46.2	22.3	70 09.6	-45.4	23.3	71 04.5	-44.7	24.5	68
69	63 43.8	-49.6	16.9	64 41.1	-49.2	17.5	65 38.2	-48.7	18.1	66 35.1	-48.2	18.9	67 31.8	-47.7	19.6	68 28.1	-47.2	20.5	69 24.2	-46.6	21.4	70 19.8	-45.9	22.4	69
70	62 54.2	-50.1	15.6	63 51.9	-49.8	16.2	64 49.5	-49.5	16.7	65 46.9	-49.1	17.4	66 44.0	-48.6	18.1	67 40.9	-48.1	18.8	68 37.6	-47.7	19.7	69 33.9	-47.0	20.6	70
71	62 04.1	-50.8	14.4	63 02.1	-50.4	14.9	64 00.0	-50.1	15.4	64 57.8	-49.8	16.0	65 55.4	-49.4	16.6	66 52.8	-49.0	17.3	67 49.9	-48.5	18.0	68 46.9	-48.1	18.8	71
72	61 13.3	-51.2	13.3	62 11.7	-51.0	13.7	63 09.9	-50.7	14.2	64 08.0	-50.4	14.7	65 06.0	-50.2	15.2	66 03.8	-49.8	15.8	67 01.4	-49.4	16.5	67 58.8	-49.0	17.2	72
73	60 22.1	-51.8	12.2	61 20.7	-51.6	12.6	62 19.2	-51.3	13.0	63 17.6	-51.1	13.5	64 15.8	-50.7	14.0	65 14.0	-50.4	14.5	66 12.0	-50.1	15.0	67 09.8	-49.8	15.7	73
74	59 30.3	-52.2	11.2	60 29.1	-52.0	11.6	61 27.9	-51.8	11.9	62 26.5	-51.5	12.3	63 25.1	-51.3	12.8	64 23.6	-51.1	13.2	65 21.9	-50.8	13.7	66 20.1	-50.4	14.2	74
75	58 38.1	-52.6	10.3	59 37.1	-52.4	10.6	60 36.1	-52.3	10.9	61 35.0	-52.1	11.2	62 33.8	-51.9	11.6	63 32.5	-51.6	12.0	64 31.1	-51.4	12.4	65 29.7	-51.2	12.9	75
76	57 45.5	-53.0	9.4	58 44.7	-52.9	9.6	59 43.8	-52.7	9.9	60 42.9	-52.5	10.2	61 41.9	-52.3	10.5	62 40.9	-52.2	10.9	63 39.7	-51.9	11.3	64 38.5	-51.7	11.7	76
77	56 52.5	-53.3	8.5	57 51.8	-53.2	8.7	58 51.1	-53.0	9.0	59 50.4	-52.9	9.2	60 49.6	-52.8	9.5	61 48.7	-52.6	9.8	62 47.8	-52.4	10.2	63 46.8	-52.2	10.5	77
78	55 59.2	-53.7	7.7	56 58.6	-53.5	7.9	57 58.1	-53.4	8.1	58 57.5	-53.4	8.3	59 56.8	-53.2	8.6	60 56.1	-53.0	8.8	61 55.4	-52.9	9.1	62 54.6	-52.7	9.4	78
79	55 05.5	-53.9	6.9	56 05.1	-53.8	7.0	57 04.6	-53.7	7.2	58 04.1	-53.6	7.4	59 03.6	-53.5	7.6	60 03.1	-53.4	7.9	61 02.5	-53.3	8.1	62 01.9	-53.2	8.4	79
80	54 11.6	-54.2	6.1	55 11.3	-54.2	6.3	56 10.9	-54.1	6.4	57 10.5	-54.0	6.6	58 10.1	-53.9	6.8	59 09.7	-53.8	7.0	60 09.2	-53.7	7.2	61 08.7	-53.5	7.4	80
81	53 17.4	-54.5	5.4	54 17.1	-54.4	5.5	55 16.8	-54.3	5.6	56 16.5	-54.2	5.8	57 16.2	-54.2	6.0	58 15.9	-54.1	6.1	59 15.5	-54.0	6.3	60 15.2	-54.0	6.5	81
82	52 22.9	-54.7	4.7	53 22.7	-54.6	4.8	54 22.5	-54.6	4.9	55 22.3	-54.5	5.0	56 22.0	-54.4	5.2	57 21.8	-54.4	5.3	58 21.5	-54.3	5.3	59 21.2	-54.2	5.6	82
83	51 28.2	-54.9	4.0	52 28.1	-54.9	4.1	53 27.9	-54.8	4.2	54 27.8	-54.8	4.3	55 27.6	-54.7	4.4	56 27.4	-54.7	4.5	57 27.2	-54.6	4.7	58 27.0	-54.6	4.8	83
84	50 33.3	-55.1	3.4	51 33.2	-55.3	3.5	52 33.1	-55.1	3.5	53 33.0	-55.0	3.6	54 32.9	-55.0	3.7	55 32.7	-54.9	3.9	56 32.6	-54.9	3.9	57 32.4	-54.9	4.0	84
85	49 38.2	-55.3	2.8	50 38.1	-55.3	2.8	51 38.0	-55.2	2.9	52 38.0	-55.3	2.9	53 37.9	-55.2	3.0	54 37.8	-55.2	3.1	55 37.7	-55.1	3.2	56 37.6	-55.1	3.3	85
86	48 42.9	-55.5	2.2	49 42.8	-55.4	2.2	50 42.8	-55.5	2.3	51 42.7	-55.4	2.3	52 42.7	-55.4	2.4	53 42.6	-55.3	2.4	54 42.6	-55.4	2.5	55 42.5	-55.3	2.5	86
87	47 47.4	-55.7	1.6	48 47.4	-55.7	1.6	49 47.3	-55.6	1.7	50 47.3	-55.6	1.7	51 47.3	-55.5	1.7	52 47.3	-55.6	1.8	53 47.2	-55.5	1.8	54 47.2	-55.5	1.9	87
88	46 51.7	-55.8	1.0	47 51.7	-55.8	1.1	48 51.7	-55.8	1.1	49 51.7	-55.8	1.1	50 51.7	-55.8	1.1	51 51.7	-55.8	1.2	52 51.7	-55.8	1.2	53 51.7	-55.8	1.2	88
89	45 55.9	-55.9	0.5	46 55.9	-55.9	0.5	47 55.9	-55.9	0.5	48 55.9	-55.9	0.5	49 55.9	-55.9	0.6	50 55.9	-55.9	0.6	51 55.9	-55.9	0.6	52 55.9	-55.9	0.6	89
90	45 00.0	-56.1	0.0	46 00.0	-56.1	0.0	47 00.0	-56.1	0.0	48 00.0	-56.1	0.0	49 00.0	-56.1	0.0	50 00.0	-56.1	0.0	51 00.0	-56.1	0.0	52 00.0	-56.1	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	41 18.6	−56.5	151.5	40 25.8	−56.7	151.9	39 32.8	−57.0	152.3	38 39.6	−57.2	152.7	37 46.2	−57.4	153.0	36 52.6	−57.5	153.4	35 58.9	−57.7	153.7	35 05.0	−57.8	154.0	0
1	40 22.1	−56.6	151.9	39 29.1	−56.9	152.3	38 35.8	−57.0	152.7	37 42.4	−57.2	153.1	36 48.8	−57.3	153.4	35 55.1	−57.5	153.7	35 01.2	−57.7	154.1	34 07.2	−57.8	154.4	1
2	39 25.5	−56.8	152.4	38 32.2	−56.9	152.8	37 38.8	−57.1	153.1	36 45.2	−57.3	153.4	35 51.5	−57.5	153.8	34 57.6	−57.7	154.1	34 03.5	−57.7	154.4	33 09.4	−58.0	154.7	2
3	38 28.7	−56.8	152.8	37 35.3	−57.0	153.2	36 41.7	−57.2	153.5	35 47.9	−57.3	153.8	34 54.0	−57.5	154.1	33 59.9	−57.6	154.4	33 05.8	−57.8	154.7	32 11.4	−57.9	155.0	3
4	37 31.9	−56.9	153.2	36 38.3	−57.1	153.5	35 44.5	−57.2	153.9	34 50.6	−57.4	154.2	33 56.5	−57.5	154.5	33 02.3	−57.7	154.8	32 08.0	−57.9	155.0	31 13.5	−58.0	155.3	4
5	36 35.0	−56.9	153.6	35 41.2	−57.1	153.9	34 47.3	−57.4	154.2	33 53.2	−57.5	154.5	32 58.9	−57.6	154.8	32 04.6	−57.8	155.1	31 10.1	−57.9	155.3	30 15.5	−58.0	155.6	5
6	35 38.1	−57.1	154.0	34 44.1	−57.2	154.3	33 49.9	−57.3	154.6	32 55.7	−57.5	154.9	32 01.3	−57.7	155.1	31 06.8	−57.8	155.4	30 12.2	−57.9	155.6	29 17.5	−58.1	155.9	6
7	34 41.0	−57.1	154.4	33 46.9	−57.3	154.7	32 52.6	−57.5	154.9	31 58.2	−57.6	155.2	31 03.6	−57.7	155.5	30 09.0	−57.9	155.7	29 14.3	−58.0	155.9	28 19.4	−58.1	156.2	7
8	33 43.9	−57.2	154.7	32 49.6	−57.4	155.0	31 55.1	−57.4	155.3	31 00.6	−57.7	155.5	30 05.9	−57.8	155.8	29 11.1	−57.9	156.0	28 16.3	−58.0	156.2	27 21.3	−58.1	156.4	8
9	32 46.7	−57.2	155.1	31 52.2	−57.3	155.4	30 57.7	−57.6	155.6	30 02.9	−57.6	155.9	29 08.1	−57.8	156.1	28 13.2	−57.9	156.3	27 18.3	−58.1	156.5	26 23.2	−58.2	156.7	9
10	31 49.5	−57.3	155.5	30 54.9	−57.5	155.7	30 00.1	−57.6	156.0	29 05.3	−57.7	156.2	28 10.3	−57.8	156.4	27 15.3	−58.0	156.6	26 20.2	−58.1	156.8	25 25.0	−58.2	157.0	10
11	30 52.2	−57.4	155.8	29 57.4	−57.5	156.0	29 02.5	−57.6	156.3	28 07.6	−57.8	156.5	27 12.5	−57.9	156.7	26 17.3	−58.0	156.9	25 22.1	−58.1	157.1	24 26.8	−58.2	157.3	11
12	29 54.8	−57.4	156.1	28 59.9	−57.5	156.4	28 04.9	−57.7	156.6	27 09.8	−57.8	156.8	26 14.6	−57.9	157.0	25 19.3	−58.0	157.2	24 24.0	−58.1	157.4	23 28.6	−58.3	157.5	12
13	28 57.4	−57.5	156.5	28 02.4	−57.6	156.7	27 07.2	−57.7	156.9	26 12.0	−57.8	157.1	25 16.7	−58.0	157.3	24 21.3	−58.1	157.5	23 25.9	−58.2	157.6	22 30.3	−58.3	157.8	13
14	28 00.0	−57.5	156.8	27 04.8	−57.6	157.0	26 09.5	−57.7	157.2	25 14.2	−57.9	157.4	24 18.7	−57.9	157.6	23 23.2	−58.1	157.7	22 27.7	−58.2	157.9	21 32.1	−58.3	158.0	14
15	27 02.5	−57.6	157.1	26 07.2	−57.7	157.3	25 11.8	−57.8	157.5	24 16.3	−57.9	157.7	23 20.8	−58.1	157.9	22 25.1	−58.1	158.0	21 29.5	−58.2	158.2	20 33.8	−58.4	158.3	15
16	26 04.9	−57.5	157.4	25 09.5	−57.7	157.6	24 14.0	−57.8	157.8	23 18.4	−57.9	158.0	22 22.7	−58.0	158.1	21 27.0	−58.1	158.3	20 31.3	−58.3	158.4	19 35.4	−58.3	158.6	16
17	25 07.4	−57.7	157.8	24 11.8	−57.7	157.9	23 16.2	−57.9	158.1	22 20.5	−58.0	158.3	21 24.7	−58.1	158.4	20 28.9	−58.2	158.5	19 33.0	−58.3	158.7	18 37.1	−58.4	158.8	17
18	24 09.7	−57.6	158.1	23 14.1	−57.8	158.2	22 18.3	−57.9	158.4	21 22.5	−58.0	158.5	20 26.6	−58.1	158.7	19 30.7	−58.2	158.8	18 34.7	−58.2	158.9	17 38.7	−58.3	159.0	18
19	23 12.1	−57.7	158.4	22 16.3	−57.8	158.5	21 20.4	−57.9	158.7	20 24.5	−58.0	158.9	19 28.5	−58.1	158.9	18 32.5	−58.2	159.1	17 36.5	−58.3	159.2	16 40.4	−58.4	159.3	19
20	22 14.4	−57.7	158.7	21 18.5	−57.8	158.8	20 22.5	−57.9	158.9	19 26.5	−58.1	159.1	18 30.4	−58.1	159.2	17 34.3	−58.3	159.3	16 38.2	−58.4	159.4	15 42.0	−58.4	159.5	20
21	21 16.7	−57.8	159.0	20 20.6	−57.8	159.1	19 24.6	−58.0	159.2	18 28.4	−58.0	159.3	17 32.3	−58.2	159.5	16 36.1	−58.3	159.6	15 39.8	−58.3	159.7	14 43.6	−58.5	159.8	21
22	20 18.9	−57.8	159.2	19 22.8	−57.9	159.4	18 26.6	−58.0	159.5	17 30.4	−58.1	159.7	16 34.1	−58.1	159.7	15 37.8	−58.2	159.8	14 41.5	−58.4	159.9	13 45.1	−58.4	160.0	22
23	19 21.1	−57.8	159.5	18 24.9	−57.9	159.7	17 28.6	−58.0	159.8	16 32.3	−58.1	159.9	15 36.0	−58.2	160.0	14 39.6	−58.3	160.1	13 43.1	−58.3	160.1	12 46.7	−58.5	160.2	23
24	18 23.3	−57.8	159.8	17 27.0	−57.9	159.9	16 30.6	−58.0	160.0	15 34.2	−58.1	160.1	14 37.8	−58.3	160.2	13 41.3	−58.3	160.3	12 44.8	−58.4	160.4	11 48.2	−58.4	160.5	24
25	17 25.5	−57.9	160.1	16 29.1	−58.0	160.2	15 32.6	−58.1	160.3	14 36.1	−58.2	160.4	13 39.5	−58.2	160.5	12 43.0	−58.3	160.6	11 46.4	−58.4	160.6	10 49.8	−58.5	160.7	25
26	16 27.6	−57.8	160.4	15 31.1	−58.0	160.5	14 34.5	−58.0	160.6	13 37.9	−58.1	160.6	12 41.3	−58.2	160.7	11 44.7	−58.3	160.8	10 48.0	−58.4	160.9	9 51.3	−58.5	160.9	26
27	15 29.8	−57.9	160.6	14 33.1	−58.0	160.7	13 36.5	−58.1	160.8	12 39.8	−58.2	160.9	11 43.1	−58.3	161.0	10 46.4	−58.4	161.0	9 49.6	−58.4	161.1	8 52.8	−58.5	161.1	27
28	14 31.9	−57.9	160.9	13 35.1	−58.0	161.0	12 38.4	−58.1	161.1	11 41.6	−58.2	161.2	10 44.8	−58.2	161.2	9 48.0	−58.3	161.3	8 51.2	−58.4	161.4	7 54.3	−58.5	161.4	28
29	13 33.9	−57.9	161.2	12 37.1	−58.0	161.3	11 40.3	−58.1	161.3	10 43.4	−58.1	161.4	9 46.6	−58.3	161.5	8 49.7	−58.4	161.5	7 52.8	−58.5	161.6	6 55.8	−58.5	161.6	29
30	12 36.0	−57.9	161.5	11 39.1	−58.0	161.5	10 42.2	−58.1	161.6	9 45.3	−58.2	161.6	8 48.3	−58.3	161.7	7 51.3	−58.3	161.7	6 54.3	−58.4	161.8	5 57.3	−58.5	161.8	30
31	11 38.1	−58.0	161.7	10 41.1	−58.1	161.8	9 44.1	−58.2	161.9	8 47.1	−58.3	161.9	7 50.0	−58.3	161.9	6 53.0	−58.4	162.0	5 55.9	−58.4	162.0	4 58.8	−58.5	162.0	31
32	10 40.1	−57.9	162.0	9 43.0	−58.0	162.0	8 45.9	−58.1	162.1	7 48.8	−58.2	162.1	6 51.7	−58.3	162.2	5 54.6	−58.4	162.2	4 57.5	−58.5	162.2	4 00.3	−58.5	162.3	32
33	9 42.1	−58.0	162.2	8 45.0	−58.1	162.3	7 47.8	−58.1	162.3	6 50.6	−58.2	162.4	5 53.4	−58.3	162.4	4 56.2	−58.3	162.4	3 59.0	−58.4	162.5	3 01.8	−58.5	162.5	33
34	8 44.1	−58.0	162.5	7 46.9	−58.1	162.6	6 49.7	−58.2	162.6	5 52.4	−58.2	162.7	4 55.1	−58.3	162.7	3 57.9	−58.4	162.7	3 00.6	−58.5	162.7	2 03.3	−58.5	162.7	34
35	7 46.1	−58.0	162.8	6 48.8	−58.1	162.8	5 51.5	−58.2	162.8	4 54.2	−58.3	162.9	3 56.8	−58.3	162.9	2 59.5	−58.4	162.9	2 02.1	−58.4	162.9	1 04.8	−58.6	162.9	35
36	6 48.1	−58.0	163.0	5 50.7	−58.1	163.1	4 53.3	−58.1	163.1	3 55.9	−58.2	163.1	2 58.5	−58.3	163.1	2 01.1	−58.4	163.1	1 03.7	−58.5	163.1	0 06.2	−58.5	163.1	36
37	5 50.1	−58.0	163.3	4 52.6	−58.1	163.3	3 55.2	−58.2	163.3	2 57.7	−58.3	163.3	2 00.2	−58.3	163.4	1 02.7	−58.4	163.4	0 05.2	−58.4	163.4	0 52.3	+58.5	16.6	37
38	4 52.1	−58.1	163.5	3 54.5	−58.1	163.6	2 57.0	−58.2	163.6	1 59.4	−58.3	163.6	1 01.9	−58.3	163.6	0 04.3	−58.4	163.6	0 53.2	+58.5	16.4	1 50.8	+58.5	16.4	38
39	3 54.0	−58.0	163.8	2 56.4	−58.1	163.8	1 58.8	−58.2	163.8	1 01.2	−58.3	163.8	0 03.6	−58.4	163.8	0 54.1	+58.4	16.2	1 51.7	+58.4	16.2	2 49.3	+58.5	16.2	39
40	2 56.0	−58.0	164.0	1 58.3	−58.1	164.1	1 00.6	−58.2	164.1	0 02.9	−58.2	164.1	0 54.8	+58.3	15.9	1 52.5	+58.3	15.9	2 50.1	+58.5	16.0	3 47.8	+58.5	16.0	40
41	1 58.0	−58.1	164.3	1 00.2	−58.1	164.3	0 02.4	−58.1	164.3	0 55.3	+58.3	15.7	1 53.1	+58.3	15.7	2 50.8	+58.4	15.7	3 48.6	+58.4	15.7	4 46.3	+58.6	15.7	41
42	0 59.9	−58.0	164.6	0 02.1	−58.1	164.6	0 55.7	+58.2	15.4	1 53.6	+58.2	15.5	2 51.4	+58.3	15.5	3 49.2	+58.4	15.5	4 47.0	+58.5	15.5	5 44.9	+58.5	15.5	42
43	0 01.9	−58.0	164.8	0 56.0	+58.1	15.2	1 53.9	+58.2	15.2	2 51.8	+58.3	15.2	3 49.7	+58.3	15.2	4 47.6	+58.4	15.2	5 45.5	+58.4	15.3	6 43.4	+58.5	15.3	43
44	0 56.1	+58.1	14.9	1 54.1	+58.1	14.9	2 52.1	+58.2	15.0	3 50.1	+58.2	15.0	4 48.0	+58.3	15.0	5 46.0	+58.3	15.0	6 43.9	+58.4	15.0	7 41.9	+58.4	15.1	44
45	1 54.2	+58.0	14.7	2 52.2	+58.1	14.7	3 50.3	+58.1	14.7	4 48.3	+58.2	14.7	5 46.3	+58.2	14.8	6 44.3	+58.3	14.8	7 42.3	+58.5	14.8	8 40.3	+58.5	14.9	45
46	2 52.2	+58.1	14.4	3 50.3	+58.1	14.5	4 48.4	+58.2	14.5	5 46.5	+58.3	14.5	6 44.6	+58.3	14.5	7 42.7	+58.3	14.5	8 40.8	+58.4	14.6	9 38.8	+58.5	14.6	46
47	3 50.3	+58.0	14.2	4 48.4	+58.1	14.2	5 46.6	+58.2	14.2	6 44.8	+58.2	14.2	7 42.9	+58.3	14.3	8 41.0	+58.4	14.3	9 39.2	+58.4	14.4	10 37.3	+58.5	14.4	47
48	4 48.3	+58.0	13.9	5 46.5	+58.1	13.9	6 44.8	+58.1	14.0	7 43.0	+58.2	14.0	8 41.2	+58.3	14.0	9 39.4	+58.3	14.1	10 37.6	+58.4	14.1	11 35.8	+58.4	14.2	48
49	5 46.3	+58.0	13.7	6 44.6	+58.1	13.7	7 42.9	+58.1	13.7	8 41.2	+58.2	13.8	9 39.5	+58.2	13.8	10 37.7	+58.3	13.8	11 36.0	+58.4	13.9	12 34.2	+58.5	13.9	49
50	6 44.3	+58.0	13.4	7 42.7	+58.1	13.4	8 41.0	+58.2	13.5	9 39.4	+58.2	13.5	10 37.7	+58.3	13.6	11 36.0	+58.4	13.6	12 34.4	+58.3	13.7	13 32.7	+58.4	13.7	50
51	7 42.3	+58.0	13.2	8 40.8	+58.0	13.2	9 39.2	+58.1	13.2	10 37.6	+58.2	13.3	11 36.0	+58.3	13.3	12 34.4	+58.3	13.4	13 32.7	+58.3	13.4	14 31.1	+58.4	13.5	51
52	8 40.3	+58.0	12.9	9 38.8	+58.1	12.9	10 37.3	+58.1	13.0	11 35.8	+58.1	13.0	12 34.2	+58.2	13.1	13 32.7	+58.2	13.1	14 31.1	+58.3	13.2	15 29.5	+58.4	13.2	52
53	9 38.3	+58.0	12.6	10 36.9	+58.0	12.7	11 35.4	+58.1	12.7	12 33.9	+58.2	12.8	13 32.4	+58.3	12.8	14 30.9	+58.3	12.9	15 29.4	+58.3	12.9	16 27.9	+58.4	13.0	53
54	10 36.3	+58.0	12.4	11 34.9	+58.0	12.4	12 33.5	+58.1	12.5	13 32.1	+58.1	12.5	14 30.7	+58.1	12.6	15 29.2	+58.3	12.6	16 27.8	+58.3	12.7	17 26.3	+58.3	12.8	54
55	11 34.3	+57.9	12.1	12 32.9	+58.0	12.2	13 31.6	+58.0	12.2	14 30.2	+58.1	12.3	15 28.8	+58.2	12.3	16 27.5	+58.2	12.4	17 26.1	+58.2	12.4	18 24.6	+58.4	12.5	55
56	12 32.2	+58.0	11.8	13 30.9	+58.0	11.9	14 29.6	+58.1	11.9	15 28.3	+58.1	12.0	16 27.0	+58.2	12.1	17 25.7	+58.2	12.1	18 24.3	+58.3	12.2	19 23.0	+58.3	12.3	56
57	13 30.2	+57.9	11.6	14 28.9	+58.0	11.6	15 27.7	+58.0	11.7	16 26.4	+58.1	11.7	17 25.2	+58.1	11.8	18 23.9	+58.3	11.9	19 22.6	+58.3	11.9	20 21.3	+58.3	12.0	57
58	14 28.1	+57.9	11.3	15 26.9	+58.0	11.4	16 25.7	+58.0	11.4	17 24.5	+58.1	11.5	18 23.3	+58.1	11.5	19 22.1	+58.2	11.6	20 20.9	+58.2	11.7	21 19.6	+58.3	11.8	58
59	15 26.0	+57.9	11.0	16 24.9	+58.0	11.1	17 23.7	+58.0	11.2	18 22.6	+58.0	11.2	19 21.4	+58.1	11.3	20 20.3	+58.1	11.4	21 19.1	+58.2	11.4	22 17.9	+58.3	11.5	59
60	16 23.9	+57.9	10.8	17 22.8	+57.9	10.8	18 21.7	+58.0	10.9	19 20.6	+58.1	10.9	20 19.5	+58.1	11.0	21 18.4	+58.1	11.1	22 17.3	+58.2	11.2	23 16.2	+58.2	11.2	60
61	17 21.7	+57.9	10.5	18 20.7	+57.9	10.5	19 19.7	+57.9	10.6	20 18.7	+57.9	10.7	21 17.6	+58.1	10.7	22 16.6	+58.0	10.8	23 15.5	+58.1	10.9	24 14.4	+58.2	11.0	61
62	18 19.6	+57.8	10.2	19 18.6	+57.9	10.3	20 17.6	+57.9	10.3	21 16.6	+58.0	10.4	22 15.7	+58.0	10.5	23 14.6	+58.1	10.6	24 13.6	+58.1	10.7	25 12.6	+58.2	10.7	62
63	19 17.4	+57.7	9.9	20 16.5	+57.8	10.0	21 15.5	+57.9	10.1	22 14.6	+58.0	10.1	23 13.7	+58.0	10.2	24 12.7	+58.0	10.3	25 11.7	+58.1	10.4	26 10.8	+58.1	10.4	63
64	20 15.1	+57.8	9.6	21 14.3	+57.8	9.7	22 13.4	+57.9	9.8	23 12.6	+57.9	9.8	24 11.7	+57.9	9.9	25 10.8	+58.0	10.0	26 09.8	+58.1	10.1	27 08.9	+58.1	10.2	64
65	21 12.9	+57.7	9.4	22 12.1	+57.8	9.4	23 11.3	+57.8	9.5	24 10.5	+57.8	9.6	25 09.6	+57.9	9.6	26 08.8	+57.9	9.7	27 07.9	+58.0	9.8	28 07.0	+58.1	9.9	65
66	22 10.6	+57.7	9.1	23 09.9	+57.7	9.2	24 09.1	+57.8	9.2	25 08.3	+57.8	9.3	26 07.5	+57.9	9.3	27 06.7	+57.9	9.4	28 05.9	+58.0	9.5	29 05.1	+58.0	9.6	66
67	23 08.3	+57.7	8.8	24 07.6	+57.7	8.8	25 06.9	+57.8	8.9	26 06.2	+57.8	9.0	27 05.4	+57.9	9.0	28 04.7	+57.9	9.1	29 03.9	+58.0	9.2	30 03.1	+58.0	9.3	67
68	24 06.0	+57.6	8.5	25 05.3	+57.7	8.5	26 04.7	+57.7	8.6	27 04.0	+57.7	8.7	28 03.3	+57.8	8.7	29 02.6	+57.9	8.8	30 01.9	+57.9	8.9	31 01.1	+58.0	9.0	68
69	25 03.6	+57.6	8.2	26 03.0	+57.6	8.3	27 02.4	+57.6	8.3	28 01.7	+57.8	8.4	29 01.1	+57.8	8.4	30 00.4	+57.9	8.5	30 59.8	+57.8	8.6	31 59.1	+57.9	8.7	69
70	26 01.2	+57.5	7.8	27 00.6	+57.6	7.9	28 00.0	+57.7	8.0	28 59.5	+57.6	8.1	29 58.9	+57.7	8.1	30 58.3	+57.7	8.2	31 57.6	+57.8	8.3	32 57.0	+57.9	8.4	70
71	26 58.7	+57.5	7.5	27 58.2	+57.6	7.6	28 57.7	+57.6	7.7	29 57.1	+57.7	7.7	30 56.6	+57.7	7.8	31 56.0	+57.7	7.9	32 55.4	+57.8	8.0	33 54.9	+57.8	8.1	71
72	27 56.2	+57.4	7.2	28 55.8	+57.5	7.3	29 55.3	+57.5	7.3	30 54.8	+57.6	7.4	31 54.3	+57.6	7.5	32 53.7	+57.7	7.6	33 53.2	+57.7	7.7	34 52.7	+57.7	7.8	72
73	28 53.7	+57.4	6.9	29 53.3	+57.4	6.9	30 52.8	+57.5	7.0	31 52.4	+57.5	7.1	32 51.9	+57.6	7.2	33 51.4	+57.6	7.2	34 50.9	+57.7	7.3	35 50.4	+57.7	7.4	73
74	29 51.1	+57.4	6.6	30 50.7	+57.4	6.6	31 50.3	+57.4	6.7	32 49.9	+57.5	6.8	33 49.5	+57.5	6.8	34 49.0	+57.6	6.9	35 48.6	+57.6	7.0	36 48.1	+57.7	7.1	74
75	30 48.5	+57.3	6.2	31 48.1	+57.3	6.3	32 47.7	+57.4	6.3	33 47.4	+57.4	6.4	34 47.0	+57.4	6.5	35 46.6	+57.5	6.5	36 46.2	+57.5	6.6	37 45.8	+57.6	6.7	75
76	31 45.8	+57.2	5.9	32 45.4	+57.3	5.9	33 45.1	+57.3	6.0	34 44.8	+57.3	6.1	35 44.4	+57.4	6.1	36 44.1	+57.4	6.2	37 43.7	+57.5	6.3	38 43.4	+57.5	6.4	76
77	32 43.0	+57.2	5.5	33 42.7	+57.2	5.6	34 42.4	+57.3	5.6	35 42.1	+57.3	5.7	36 41.8	+57.4	5.8	37 41.5	+57.4	5.8	38 41.2	+57.4	5.9	39 40.9	+57.4	6.0	77
78	33 40.2	+57.1	5.1	34 39.9	+57.2	5.2	35 39.7	+57.2	5.3	36 39.4	+57.3	5.3	37 39.2	+57.2	5.4	38 38.9	+57.3	5.4	39 38.6	+57.4	5.6	40 38.3	+57.4	5.6	78
79	34 37.3	+57.0	4.8	35 37.1	+57.1	4.8	36 36.9	+57.1	4.9	37 36.7	+57.1	5.0	38 36.4	+57.2	5.0	39 36.2	+57.2	5.1	40 36.0	+57.2	5.2	41 35.7	+57.3	5.2	79
80	35 34.3	+57.0	4.4	36 34.2	+57.0	4.4	37 34.0	+57.0	4.5	38 33.8	+57.1	4.6	39 33.6	+57.1	4.6	40 33.4	+57.1	4.7	41 33.2	+57.2	4.8	42 33.0	+57.2	4.8	80
81	36 31.3	+56.9	4.0	37 31.2	+56.9	4.1	38 31.0	+57.0	4.1	39 30.9	+57.0	4.2	40 30.7	+57.0	4.2	41 30.5	+57.1	4.3	42 30.4	+57.0	4.4	43 30.2	+57.1	4.4	81
82	37 28.2	+56.8	3.6	38 28.1	+56.8	3.7	39 28.0	+56.8	3.7	40 27.9	+56.8	3.8	41 27.7	+56.9	3.8	42 27.6	+56.9	3.9	43 27.4	+57.0	3.9	44 27.3	+57.0	4.0	82
83	38 25.0	+56.8	3.2	39 24.9	+56.8	3.2	40 24.8	+56.8	3.3	41 24.7	+56.9	3.3	42 24.6	+56.9	3.4	43 24.5	+56.9	3.4	44 24.4	+56.9	3.5	45 24.3	+56.9	3.6	83
84	39 21.8	+56.6	2.9	40 21.7	+56.7	2.9	41 21.6	+56.7	2.9	42 21.6	+56.7	2.9	43 21.5	+56.7	3.0	44 21.4	+56.7	3.0	45 21.3	+56.8	3.1	46 21.2	+56.8	3.1	84
85	40 18.4	+56.6	2.3	41 18.4	+56.5	2.4	42 18.3	+56.6	2.4	43 18.3	+56.6	2.5	44 18.2	+56.6	2.5	45 18.1	+56.7	2.5	46 18.1	+56.6	2.6	47 18.0	+56.7	2.6	85
86	41 15.0	+56.4	1.9	42 14.9	+56.5	1.9	43 14.9	+56.4	2.0	44 14.8	+56.5	2.0	45 14.8	+56.5	2.0	46 14.8	+56.5	2.1	47 14.7	+56.6	2.1	48 14.7	+56.5	2.2	86
87	42 11.4	+56.3	1.5	43 11.4	+56.3	1.5	44 11.3	+56.4	1.5	45 11.3	+56.4	1.5	46 11.3	+56.4	1.6	47 11.3	+56.4	1.6	48 11.3	+56.4	1.6	49 11.2	+56.4	1.6	87
88	43 07.7	+56.2	1.0	44 07.7	+56.2	1.0	45 07.7	+56.2	1.0	46 07.7	+56.2	1.0	47 07.7	+56.2	1.1	48 07.7	+56.2	1.1	49 07.7	+56.2	1.1	50 07.6	+56.3	1.1	88
89	44 03.9	+56.1	0.5	45 03.9	+56.1	0.5	46 03.9	+56.1	0.5	47 03.9	+56.1	0.5	48 03.9	+56.1	0.5	49 03.9	+56.1	0.5	50 03.9	+56.1	0.6	51 03.9	+56.1	0.6	89
90	45 00.0	+55.9	0.0	46 00.0	+55.9	0.0	47 00.0	+55.9	0.0	48 00.0	+55.9	0.0	49 00.0	+55.9	0.0	50 00.0	+55.9	0.0	51 00.0	+55.9	0.0	52 00.0	+55.9	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 159°, 201°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	40 58.0	+56.1	150.3	40 05.8	+56.4	150.7	39 13.4	+56.6	151.1	38 20.8	+56.8	151.5	37 27.9	+57.1	151.8	36 35.0	+57.2	152.2	35 41.8	+57.4	152.5	34 48.5	+57.5	152.9	0
1	41 54.1	+56.0	149.8	41 02.2	+56.2	150.2	40 10.0	+56.5	150.7	39 17.6	+56.7	151.1	38 25.0	+56.9	151.4	37 32.2	+57.1	151.8	36 39.2	+57.3	152.2	35 46.0	+57.5	152.5	1
2	42 50.1	+55.9	149.3	41 58.4	+56.2	149.8	41 06.5	+56.4	150.2	40 14.3	+56.6	150.6	39 21.9	+56.8	151.0	38 29.3	+57.0	151.4	37 36.5	+57.3	151.8	36 43.5	+57.5	152.2	2
3	43 46.0	+55.8	148.8	42 54.6	+56.0	149.3	42 02.9	+56.2	149.8	41 10.9	+56.5	150.2	40 18.7	+56.8	150.6	39 26.3	+57.0	151.0	38 33.8	+57.1	151.4	37 41.0	+57.3	151.8	3
4	44 41.8	+55.6	148.3	43 50.6	+55.9	148.8	42 59.1	+56.2	149.3	42 07.4	+56.4	149.7	41 15.5	+56.6	150.2	40 23.3	+56.9	150.6	39 30.9	+57.1	151.0	38 38.3	+57.3	151.4	4
5	45 37.4	+55.4	147.8	44 46.5	+55.7	148.3	43 55.3	+56.0	148.8	43 03.8	+56.3	149.3	42 12.1	+56.6	149.8	41 20.2	+56.8	150.2	40 28.0	+57.0	150.6	39 35.6	+57.3	151.0	5
6	46 32.8	+55.3	147.2	45 42.2	+55.6	147.8	44 51.3	+55.9	148.3	44 00.1	+56.2	148.8	43 08.7	+56.4	149.3	42 17.0	+56.7	149.8	41 25.0	+56.9	150.2	40 32.8	+57.2	150.6	6
7	47 28.1	+55.1	146.6	46 37.8	+55.5	147.2	45 47.2	+55.8	147.8	44 56.3	+56.1	148.3	44 05.1	+56.3	148.8	43 13.7	+56.5	149.3	42 21.9	+56.8	149.8	41 30.0	+57.0	150.2	7
8	48 23.2	+54.9	146.0	47 33.3	+55.2	146.7	46 43.0	+55.6	147.2	45 52.4	+55.9	147.8	45 01.4	+56.2	148.3	44 10.2	+56.5	148.9	43 18.7	+56.8	149.3	42 27.0	+56.9	149.8	8
9	49 18.1	+54.8	145.4	48 28.5	+55.1	146.1	47 38.6	+55.4	146.7	46 48.3	+55.7	147.3	45 57.6	+56.1	147.8	45 06.7	+56.3	148.4	44 15.5	+56.6	148.9	43 23.9	+56.9	149.4	9
10	50 12.9	+54.5	144.8	49 23.6	+54.9	145.5	48 34.0	+55.3	146.1	47 44.0	+55.6	146.7	46 53.7	+55.9	147.3	46 03.0	+56.2	147.9	45 12.1	+56.4	148.4	44 20.8	+56.7	148.9	10
11	51 07.4	+54.3	144.1	50 18.5	+54.7	144.8	49 29.3	+55.0	145.5	48 39.6	+55.4	146.2	47 49.6	+55.8	146.8	46 59.2	+56.1	147.4	46 08.5	+56.4	147.9	45 17.5	+56.7	148.5	11
12	52 01.7	+54.0	143.4	51 13.2	+54.5	144.2	50 24.3	+54.9	144.9	49 35.0	+55.3	145.6	48 45.4	+55.5	146.2	47 55.3	+55.9	146.9	47 04.9	+56.2	147.4	46 14.2	+56.5	148.0	12
13	52 55.7	+53.7	142.7	52 07.7	+54.2	143.5	51 19.2	+54.7	144.3	50 30.3	+55.0	145.0	49 40.9	+55.5	145.7	48 51.2	+55.8	146.3	48 01.1	+56.1	146.9	47 10.7	+56.3	147.5	13
14	53 49.4	+53.5	142.0	53 01.9	+54.0	142.8	52 13.9	+54.4	143.6	51 25.3	+54.9	144.3	50 36.4	+55.2	145.1	49 47.0	+55.6	145.7	48 57.2	+55.9	146.4	48 07.0	+56.3	147.0	14
15	54 42.9	+53.2	141.2	53 55.9	+53.6	142.1	53 08.3	+54.1	142.9	52 20.2	+54.6	143.7	51 31.6	+55.0	144.4	50 42.6	+55.3	145.2	49 53.1	+55.8	145.8	49 03.3	+56.1	146.5	15
16	55 36.1	+52.8	140.4	54 49.5	+53.4	141.3	54 02.4	+53.9	142.2	53 14.8	+54.3	143.0	52 26.6	+54.8	143.8	51 37.9	+55.2	144.5	50 48.9	+55.5	145.3	49 59.4	+55.9	145.9	16
17	56 28.9	+52.5	139.6	55 42.9	+53.1	140.5	54 56.3	+53.6	141.4	54 09.1	+54.1	142.3	53 21.4	+54.5	143.1	52 33.1	+55.0	143.9	51 44.4	+55.4	144.7	50 55.3	+55.7	145.4	17
18	57 21.4	+52.0	138.7	56 36.0	+52.6	139.7	55 49.9	+53.3	140.6	55 03.2	+53.8	141.5	54 15.9	+54.3	142.4	53 28.1	+54.8	143.2	52 39.8	+55.2	144.0	51 51.0	+55.6	144.8	18
19	58 13.4	+51.7	137.7	57 28.6	+52.4	138.8	56 43.2	+52.9	139.8	55 57.0	+53.5	140.8	55 10.2	+54.1	141.7	54 22.9	+54.5	142.5	53 35.0	+54.9	143.4	52 46.6	+55.4	144.2	19
20	59 05.1	+51.1	136.8	58 21.0	+51.8	137.9	57 36.1	+52.5	138.9	56 50.5	+53.2	139.9	56 04.3	+53.7	140.9	55 17.4	+54.2	141.8	54 29.9	+54.8	142.7	53 42.0	+55.1	143.5	20
21	59 56.2	+50.7	135.7	59 12.8	+51.5	136.9	58 28.6	+52.2	138.0	57 43.7	+52.7	139.1	56 58.0	+53.4	140.1	56 11.6	+54.0	141.1	55 24.7	+54.4	142.0	54 37.1	+54.9	142.8	21
22	60 46.9	+50.1	134.6	60 04.3	+50.9	135.9	59 20.8	+51.7	137.1	58 36.4	+52.4	138.2	57 51.4	+53.0	139.2	57 05.6	+53.6	140.3	56 19.1	+54.2	141.3	55 32.0	+54.7	142.1	22
23	61 37.0	+49.5	133.5	60 55.2	+50.4	134.8	60 12.5	+51.2	136.1	59 28.8	+52.0	137.2	58 44.4	+52.6	138.4	57 59.2	+53.3	139.4	57 13.3	+53.8	140.4	56 26.7	+54.4	141.4	23
24	62 26.5	+48.9	132.3	61 45.6	+49.8	133.7	61 03.7	+50.7	135.0	60 20.8	+51.5	136.2	59 37.0	+52.3	137.4	58 52.5	+52.9	138.5	58 07.1	+53.5	139.6	57 21.1	+54.1	140.6	24
25	63 15.4	+48.1	131.0	62 35.4	+49.2	132.5	61 54.4	+50.1	133.9	61 12.3	+51.0	135.2	60 29.3	+51.7	136.4	59 45.4	+52.4	137.6	59 00.6	+53.2	138.7	58 15.2	+53.7	139.8	25
26	64 03.5	+47.3	129.7	63 24.6	+48.4	131.2	62 44.5	+49.4	132.7	62 03.3	+50.4	134.1	61 21.0	+51.3	135.4	60 37.8	+52.1	136.6	59 53.8	+52.7	137.8	59 08.9	+53.4	139.0	26
27	64 50.8	+46.5	128.3	64 13.0	+47.7	129.9	63 33.9	+48.8	131.4	62 53.7	+49.7	132.9	62 12.3	+50.7	134.3	61 29.9	+51.5	135.6	60 46.5	+52.4	136.9	60 02.3	+53.0	138.1	27
28	65 37.3	+45.5	126.7	65 00.7	+46.8	128.5	64 22.7	+48.0	130.1	63 43.4	+49.1	131.7	63 03.0	+50.1	133.1	62 21.4	+51.0	134.5	61 38.9	+51.8	135.9	60 55.3	+52.6	137.1	28
29	66 22.8	+44.5	125.1	65 47.5	+45.9	127.0	65 10.7	+47.2	128.7	64 32.5	+48.4	130.3	63 53.1	+49.4	131.9	63 12.4	+50.5	133.4	62 30.7	+51.3	134.8	61 47.9	+52.2	136.1	29
30	67 07.3	+43.3	123.4	66 33.4	+44.9	125.4	65 57.9	+46.3	127.2	65 20.9	+47.5	128.9	64 42.5	+48.7	130.6	64 02.9	+49.7	132.2	63 22.0	+50.7	133.6	62 40.1	+51.6	135.0	30
31	67 50.6	+42.1	121.6	67 18.3	+43.7	123.7	66 44.2	+45.2	125.6	66 08.4	+46.7	127.5	65 31.2	+47.9	129.2	64 52.6	+49.1	130.9	64 12.7	+50.1	132.4	63 31.7	+51.0	133.9	31
32	68 32.7	+40.7	119.7	68 02.0	+42.4	121.9	67 29.4	+44.1	123.9	66 55.1	+45.6	125.9	66 19.1	+47.0	127.7	65 41.7	+48.2	129.5	65 02.8	+49.4	131.1	64 22.7	+50.5	132.7	32
33	69 13.4	+39.1	117.7	68 44.4	+41.1	120.0	68 13.5	+42.9	122.1	67 40.7	+44.5	124.2	67 06.1	+46.0	126.2	66 29.9	+47.4	128.0	65 52.2	+48.7	129.8	65 13.2	+49.7	131.4	33
34	69 52.5	+37.4	115.5	69 25.5	+39.5	117.9	68 56.4	+41.4	120.2	68 25.2	+43.2	122.4	67 52.1	+44.9	124.5	67 17.3	+46.4	126.5	66 40.9	+47.7	128.3	66 02.9	+49.0	130.1	34
35	70 29.9	+35.5	113.2	70 05.0	+37.9	115.7	69 37.8	+40.0	118.2	69 08.4	+41.7	120.5	68 37.0	+43.7	122.7	68 03.7	+45.3	124.8	67 28.6	+46.8	126.8	66 51.9	+48.1	128.6	35
36	71 05.4	+33.6•	110.7	70 42.9	+36.0•	113.4	70 17.8	+38.3	116.0	69 50.4	+40.4	118.4	69 20.7	+42.3	120.8	68 49.0	+44.1	123.0	68 15.4	+45.7	125.1	67 40.0	+47.2	127.1	36
37	71 39.0	+31.2•	108.1	71 18.9	+33.9•	111.0	70 56.1	+36.3•	113.6	70 30.8	+38.7	116.3	70 03.0	+40.9	118.7	69 33.1	+42.8	121.1	69 01.1	+44.6	123.3	68 27.2	+46.2	125.4	37
38	72 10.2	+28.9•	105.4	71 52.8	+31.7•	108.3	71 32.5	+34.4•	111.2	71 09.5	+36.9	113.9	70 43.9	+39.2	116.6	70 15.9	+41.3	119.0	69 45.7	+43.2	121.4	69 13.4	+45.0	123.7	38
39	72 39.1	+26.2•	102.5	72 24.5	+29.3•	105.6	72 06.9	+32.1•	108.6	71 46.4	+34.8•	111.4	71 23.1	+37.3	114.2	70 57.2	+39.6	116.9	70 28.9	+41.8	119.4	69 58.4	+43.6	121.8	39
40	73 05.3	+23.3•	99.4	72 53.8	+26.6•	102.6	72 39.0	+29.7•	105.8	72 21.2	+32.6•	108.8	72 00.4	+35.3•	111.7	71 36.8	+37.8	114.5	71 10.7	+40.1	117.2	70 42.0	+42.3	119.7	40
41	73 28.6	+20.3•	96.2	73 20.4	+23.7•	99.6	73 08.7	+27.0•	102.8	72 53.8	+30.1•	106.0	72 35.7	+33.0•	109.1	72 14.6	+35.8•	112.0	71 50.8	+38.3	114.9	71 24.3	+40.6	117.6	41
42	73 48.9	+17.0•	92.9	73 44.1	+20.6•	96.3	73 35.7	+24.1•	99.7	73 23.9	+27.4•	103.0	73 08.7	+30.6•	106.2	72 50.4	+33.5•	109.3	72 29.1	+36.2•	112.3	72 04.9	+38.7	115.2	42
43	74 05.9	+13.6•	89.4	74 04.7	+17.3•	92.9	73 59.8	+20.9•	96.4	73 51.3	+24.5•	99.9	73 39.3	+27.8•	103.2	73 23.9	+31.0•	106.5	73 05.3	+34.0•	109.6	72 43.6	+36.8•	112.7	43
44	74 19.5	+10.0•	85.8	74 22.0	+13.8•	89.4	74 20.7	+17.6•	93.0	74 15.8	+21.3•	96.5	74 07.1	+24.9•	100.0	73 54.9	+28.3•	103.4	73 39.3	+31.5•	106.8	73 20.4	+34.4•	110.0	44
45	74 29.5	+6.3•	82.2	74 35.8	+10.2•	85.8	74 38.3	+14.1•	89.4	74 37.1	+17.9•	93.0	74 32.0	+21.6•	96.7	74 23.2	+25.2•	100.2	74 10.8	+28.7•	103.7	73 54.8	+32.0•	107.1	45
46	74 35.8	+2.5•	78.4	74 46.0	+6.4•	82.0	74 52.4	+10.3•	85.7	74 55.0	+14.2•	89.4	74 53.6	+18.2•	93.1	74 48.4	+22.1•	96.8	74 39.5	+25.6•	100.4	74 26.8	+29.2•	104.0	46
47	74 38.3	−1.2•	74.7	74 52.4	+2.6•	78.2	75 02.7	+6.5•	81.9	75 09.2	+10.6•	85.6	75 11.8	+14.6•	89.4	75 10.5	+18.5•	93.2	75 05.1	+22.4•	97.0	74 56.0	+26.1•	100.6	47
48	74 37.1	−5.1•	70.9	74 55.0	−1.4•	74.4	75 09.2	+2.6•	78.0	75 19.8	+6.6•	81.8	75 26.4	+10.6•	85.6	75 29.0	+14.7•	89.4	75 27.5	+18.8•	93.3	75 22.1	+22.7•	97.1	48
49	74 32.0	−8.8•	67.2	74 53.6	−5.2•	70.6	75 11.8	−1.3•	74.1	75 26.4	+2.6•	77.8	75 37.0	+6.7•	81.7	75 43.7	+10.9•	85.5	75 46.3	+15.1•	89.5	75 44.8	+19.2•	93.4	49
50	74 23.2	−12.4•	63.5	74 48.4	−8.9•	66.8	75 10.5	−5.4•	70.2	75 29.0	−1.5•	73.9	75 43.7	+2.6•	77.6	75 54.6	+6.8•	81.5	76 01.4	+11.0•	85.5	76 04.0	+15.3•	89.5	50
51	74 10.8	−16.0•	59.9	74 39.5	−12.7•	63.0	75 05.1	−9.1•	66.3	75 27.5	−5.4•	69.9	75 46.3	−1.5•	73.6	76 01.4	+2.6•	77.4	76 12.4	+6.9•	81.4	76 19.3	+11.1•	85.5	51
52	73 54.8	−19.2•	56.3	74 26.8	−16.2•	59.3	74 56.0	−13.0•	62.5	75 22.1	−9.4•	65.9	75 44.8	−5.6•	69.5	76 04.0	−1.6•	73.3	76 19.3	+2.5•	77.2	76 30.4	+7.0•	81.3	52
53	73 35.6	−22.4•	53.0	74 10.6	−19.6•	55.8	74 43.0	−16.5•	58.8	75 12.7	−13.3•	62.0	75 39.2	−9.6•	65.5	76 02.4	−5.8•	69.1	76 21.8	−1.7•	73.0	76 37.4	+2.9•	77.0	53
54	73 13.2	−25.2•	49.7	73 51.0	−22.7•	52.3	74 26.5	−20.0•	55.2	74 59.4	−16.9•	58.2	75 29.6	−13.6•	61.5	75 56.6	−10.0•	65.0	76 20.1	−6.0•	68.8	76 39.9	−1.8•	72.7	54
55	72 48.0	−28.0•	46.6	73 28.3	−25.7•	49.0	74 06.5	−23.1•	51.7	74 42.5	−20.3•	54.6	75 16.0	−17.2•	57.7	75 46.6	−13.8•	61.0	76 14.1	−10.2•	64.6	76 38.1	−6.3•	68.4	55
56	72 20.0	−30.5•	43.6	73 02.6	−28.5•	45.9	73 43.4	−26.1•	48.4	74 22.2	−23.6•	51.0	74 58.8	−20.8•	53.9	75 32.8	−17.7•	57.1	76 03.9	−14.2•	60.4	76 31.8	−10.5•	64.1	56
57	71 49.5	−32.8•	40.8	72 34.1	−30.9•	42.9	73 17.3	−28.9•	45.2	73 58.6	−26.6•	47.7	74 38.0	−24.0•	50.3	75 15.1	−21.2•	53.3	75 49.7	−18.1•	56.4	76 21.3	−14.6•	59.9	57
58	71 16.7	−34.9•	38.2	72 03.2	−33.3•	40.1	72 48.4	−31.4•	42.2	73 32.0	−29.3•	44.5	74 14.0	−27.1•	46.9	74 53.9	−24.5•	49.6	75 31.6	−21.7•	52.6	76 06.7	−18.5•	55.8	58
59	70 41.8	−36.9•	35.7	71 29.9	−35.3•	37.4	72 17.0	−33.7•	39.3	73 02.7	−31.9•	41.4	73 46.9	−29.9•	43.7	74 29.4	−27.6•	46.2	75 09.9	−25.0•	48.9	75 48.2	−22.2•	51.9	59
60	70 04.9	−38.6	33.4	70 54.6	−37.3	34.9	71 43.3	−35.9•	36.7	72 30.8	−34.2•	38.6	73 17.0	−32.4•	40.6	74 01.8	−30.4•	42.9	74 44.9	−28.2•	45.4	75 26.0	−25.6•	48.1	60
61	69 26.3	−40.1	31.1	70 17.3	−39.0	32.6	71 07.4	−37.7	34.1	71 56.6	−36.3•	35.9	72 44.6	−34.7•	37.8	73 31.4	−32.9•	39.8	74 16.7	−30.9•	42.1	75 00.4	−28.7•	44.6	61
62	68 46.2	−41.6	29.1	69 38.3	−40.6	30.4	70 29.7	−39.5	31.8	71 20.3	−38.2	33.3	72 09.9	−36.8•	35.0	72 58.5	−35.3•	36.9	73 45.8	−33.5•	39.0	74 31.7	−31.6•	41.2	62
63	68 04.6	−42.9	27.1	68 57.7	−42.0	28.3	69 50.2	−41.0	29.6	70 42.1	−40.0	31.0	71 33.1	−38.7	32.5	72 23.2	−37.3•	34.2	73 12.3	−35.8•	36.1	74 00.0	−34.1•	38.1	63
64	67 21.7	−44.2	25.3	68 15.7	−43.3	26.3	69 09.2	−42.5	27.5	70 02.1	−41.5	28.7	70 54.4	−40.5	30.1	71 45.9	−39.3	31.7	72 36.5	−37.9•	33.3	73 26.1	−36.4•	35.2	64
65	66 37.5	−45.2	23.5	67 32.4	−44.5	24.5	68 26.7	−43.7	25.5	69 20.6	−42.9	26.7	70 13.9	−41.9	27.9	71 06.6	−40.9	29.3	71 58.6	−39.8	30.8	72 49.7	−38.5	32.4	65
66	65 52.3	−46.1	21.9	66 47.9	−45.6	22.8	67 43.0	−44.9	23.7	68 37.7	−44.1	24.7	69 32.0	−43.4	25.8	70 25.7	−42.4	27.1	71 18.8	−41.4	28.4	72 11.2	−40.3	29.9	66
67	65 06.2	−47.1	20.3	66 02.3	−46.5	21.1	66 58.1	−45.9	22.0	67 53.6	−45.3	22.9	68 48.6	−44.6	23.9	69 43.3	−43.9	25.0	70 37.4	−43.0	26.2	71 30.9	−41.9	27.5	67
68	64 19.1	−47.9	18.9	65 15.8	−47.5	19.6	66 12.2	−47.0	20.4	67 08.3	−46.4	21.2	68 04.0	−45.7	22.1	68 59.4	−45.0	23.0	69 54.4	−44.3	24.1	70 49.0	−43.5	25.3	68
69	63 31.2	−48.6	17.5	64 28.3	−48.2	18.2	65 25.2	−47.7	18.8	66 21.9	−47.3	19.6	67 18.3	−46.7	20.4	68 14.4	−46.2	21.2	69 10.1	−45.5	22.2	70 05.5	−44.8	23.2	69
70	62 42.6	−49.3	16.2	63 40.1	−48.9	16.8	64 37.5	−48.6	17.4	65 34.6	−48.1	18.1	66 31.6	−47.7	18.8	67 28.2	−47.1	19.5	68 24.6	−46.5	20.4	69 20.7	−45.9	21.3	70
71	61 53.3	−49.9	15.0	62 51.2	−49.6	15.5	63 48.9	−49.2	16.0	64 46.5	−48.9	16.6	65 43.9	−48.5	17.3	66 41.1	−48.1	17.9	67 38.1	−47.6	18.7	68 34.8	−47.1	19.5	71
72	61 03.4	−50.5	13.8	62 01.6	−50.2	14.3	62 59.7	−50.0	14.8	63 57.6	−49.6	15.3	64 55.4	−49.2	15.9	65 53.0	−48.8	16.5	66 50.5	−48.5	17.1	67 47.7	−48.0	17.8	72
73	60 12.9	−51.0	12.7	61 11.4	−50.8	13.1	62 09.7	−50.5	13.6	63 08.0	−50.2	14.0	64 06.2	−50.0	14.5	65 04.2	−49.6	15.1	66 02.0	−49.2	15.6	66 59.7	−48.8	16.3	73
74	59 21.9	−51.5	11.7	60 20.6	−51.3	12.0	61 19.2	−51.0	12.4	62 17.8	−50.8	12.8	63 16.2	−50.5	13.3	64 14.6	−50.3	13.7	65 12.8	−50.0	14.3	66 10.9	−49.7	14.8	74
75	58 30.4	−51.9	10.7	59 29.3	−51.7	11.0	60 28.2	−51.6	11.3	61 27.0	−51.4	11.7	62 25.7	−51.1	12.1	63 24.3	−50.9	12.5	64 22.8	−50.6	13.0	65 21.2	−50.3	13.4	75
76	57 38.5	−52.4	9.7	58 37.6	−52.2	10.0	59 36.6	−52.0	10.3	60 35.6	−51.8	10.6	61 34.6	−51.7	11.0	62 33.4	−51.4	11.3	63 32.2	−51.2	11.7	64 30.9	−50.9	12.2	76
77	56 46.1	−52.7	8.8	57 45.4	−52.6	9.1	58 44.6	−52.4	9.3	59 43.8	−52.3	9.6	60 42.9	−52.1	9.9	61 42.0	−51.9	10.2	62 41.0	−51.7	10.6	63 40.0	−51.6	11.0	77
78	55 53.4	−53.0	8.0	56 52.8	−52.9	8.2	57 52.2	−52.8	8.4	58 51.5	−52.7	8.7	59 50.8	−52.5	8.9	60 50.1	−52.4	9.2	61 49.3	−52.2	9.5	62 48.4	−52.0	9.8	78
79	55 00.4	−53.4	7.2	55 59.9	−53.3	7.3	56 59.4	−53.2	7.5	57 58.8	−53.0	7.7	58 58.3	−53.0	8.0	59 57.7	−52.8	8.2	60 57.1	−52.7	8.5	61 56.4	−52.5	8.7	79
80	54 07.0	−53.7	6.4	55 06.6	−53.6	6.5	56 06.2	−53.5	6.7	57 05.8	−53.4	6.9	58 05.4	−53.3	7.1	59 04.9	−53.2	7.3	60 04.4	−53.1	7.5	61 03.9	−53.0	7.7	80
81	53 13.3	−53.9	5.6	54 13.0	−53.8	5.8	55 12.7	−53.8	5.9	56 12.4	−53.7	6.0	57 12.1	−53.7	6.2	58 11.7	−53.6	6.4	59 11.3	−53.4	6.6	60 10.9	−53.3	6.8	81
82	52 19.4	−54.2	4.9	53 19.2	−54.2	5.0	54 18.9	−54.0	5.1	55 18.7	−54.0	5.3	56 18.4	−53.9	5.4	57 18.1	−53.8	5.5	58 17.9	−53.8	5.7	59 17.6	−53.8	5.9	82
83	51 25.2	−54.4	4.2	52 25.0	−54.4	4.3	53 24.9	−54.4	4.4	54 24.7	−54.3	4.5	55 24.5	−54.2	4.6	56 24.3	−54.2	4.7	57 24.1	−54.1	4.9	58 23.8	−54.0	5.0	83
84	50 30.8	−54.7	3.5	51 30.6	−54.6	3.6	52 30.5	−54.6	3.7	53 30.4	−54.5	3.8	54 30.3	−54.5	3.9	55 30.1	−54.4	4.0	56 30.0	−54.4	4.1	57 29.8	−54.3	4.2	84
85	49 36.1	−54.9	2.9	50 36.0	−54.8	2.9	51 35.9	−54.8	3.0	52 35.9	−54.8	3.1	53 35.8	−54.8	3.2	54 35.7	−54.7	3.2	55 35.6	−54.7	3.3	56 35.5	−54.6	3.4	85
86	48 41.2	−55.0	2.3	49 41.2	−55.0	2.3	50 41.1	−55.0	2.4	51 41.1	−55.0	2.4	52 41.0	−54.9	2.5	53 41.0	−55.0	2.5	54 40.9	−54.9	2.6	55 40.9	−54.9	2.7	86
87	47 46.2	−55.2	1.7	48 46.2	−55.3	1.7	49 46.1	−55.2	1.7	50 46.1	−55.2	1.7	51 46.1	−55.2	1.8	52 46.0	−55.1	1.9	53 46.0	−55.1	1.9	54 46.0	−55.1	1.9	87
88	46 51.0	−55.4	1.1	47 50.9	−55.3	1.1	48 50.9	−55.3	1.1	49 50.9	−55.4	1.2	50 50.9	−55.4	1.2	51 50.9	−55.4	1.2	52 50.9	−55.4	1.2	53 50.9	−55.4	1.3	88
89	45 55.6	−55.6	0.5	46 55.6	−55.6	0.5	47 55.6	−55.6	0.6	48 55.5	−55.5	0.6	49 55.5	−55.5	0.6	50 55.5	−55.5	0.6	51 55.5	−55.5	0.6	52 55.5	−55.5	0.6	89
90	45 00.0	−55.7	0.0	46 00.0	−55.7	0.0	47 00.0	−55.7	0.0	48 00.0	−55.7	0.0	49 00.0	−55.7	0.0	50 00.0	−55.7	0.0	51 00.0	−55.7	0.0	52 00.0	−55.7	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	40 58.0	−56.3	150.3	40 05.8	−56.5	150.7	39 13.4	−56.7	151.1	38 20.8	−56.9	151.5	37 27.9	−57.0	151.8	36 35.0	−57.3	152.2	35 41.8	−57.4	152.5	34 48.5	−57.6	152.9	0
1	40 01.7	−56.3	150.7	39 09.3	−56.6	151.1	38 16.7	−56.8	151.5	37 23.9	−57.0	151.9	36 30.9	−57.2	152.2	35 37.7	−57.4	152.6	34 44.4	−57.5	152.9	33 50.9	−57.7	153.2	1
2	39 05.4	−56.4	151.2	38 12.7	−56.6	151.5	37 19.9	−56.9	151.9	36 26.9	−57.1	152.3	35 33.7	−57.2	152.6	34 40.3	−57.4	152.9	33 46.9	−57.6	153.2	32 53.2	−57.7	153.5	2
3	38 09.0	−56.6	151.6	37 16.1	−56.8	152.0	36 23.0	−56.9	152.3	35 29.8	−57.1	152.6	34 36.5	−57.3	153.0	33 42.9	−57.5	153.3	32 49.3	−57.6	153.6	31 55.5	−57.8	153.8	3
4	37 12.4	−56.6	152.0	36 19.3	−56.8	152.4	35 26.1	−57.0	152.7	34 32.7	−57.2	153.0	33 39.2	−57.4	153.3	32 45.5	−57.5	153.6	31 51.7	−57.7	153.9	30 57.7	−57.8	154.2	4
5	36 15.8	−56.7	152.4	35 22.5	−56.9	152.8	34 29.1	−57.1	153.1	33 35.5	−57.2	153.4	32 41.8	−57.4	153.7	31 48.0	−57.6	154.0	30 54.0	−57.7	154.2	29 59.9	−57.8	154.5	5
6	35 19.1	−56.8	152.8	34 25.6	−56.9	153.1	33 32.0	−57.1	153.5	32 38.3	−57.3	153.7	31 44.4	−57.5	154.0	30 50.4	−57.6	154.3	29 56.3	−57.8	154.5	29 02.1	−57.9	154.8	6
7	34 22.3	−56.9	153.2	33 28.7	−57.1	153.5	32 34.9	−57.2	153.8	31 41.0	−57.4	154.1	30 46.9	−57.5	154.4	29 52.8	−57.7	154.6	28 58.5	−57.8	154.8	28 04.2	−58.0	155.1	7
8	33 25.4	−56.9	153.6	32 31.6	−57.1	153.9	31 37.7	−57.3	154.2	30 43.6	−57.4	154.4	29 49.4	−57.5	154.7	28 55.1	−57.7	154.9	28 00.7	−57.8	155.2	27 06.2	−57.9	155.4	8
9	32 28.5	−57.0	154.0	31 34.5	−57.2	154.3	30 40.4	−57.3	154.5	29 46.2	−57.5	154.8	28 51.9	−57.7	155.0	27 57.4	−57.7	155.2	27 02.9	−57.9	155.5	26 08.3	−58.0	155.7	9
10	31 31.5	−57.1	154.4	30 37.3	−57.2	154.6	29 43.1	−57.4	154.9	28 48.7	−57.5	155.1	27 54.2	−57.6	155.3	26 59.7	−57.8	155.5	26 05.0	−57.9	155.7	25 10.3	−58.1	155.9	10
11	30 34.4	−57.1	154.7	29 40.1	−57.2	155.0	28 45.7	−57.4	155.2	27 51.2	−57.6	155.4	26 56.6	−57.7	155.6	26 01.9	−57.8	155.8	25 07.1	−57.9	156.0	24 12.2	−58.0	156.2	11
12	29 37.3	−57.2	155.1	28 42.9	−57.4	155.3	27 48.3	−57.5	155.5	26 53.6	−57.6	155.7	25 58.9	−57.7	155.9	25 04.1	−57.9	156.1	24 09.2	−58.0	156.3	23 14.2	−58.1	156.5	12
13	28 40.1	−57.2	155.4	27 45.5	−57.3	155.6	26 50.8	−57.5	155.8	25 56.0	−57.6	156.1	25 01.2	−57.8	156.2	24 06.2	−57.9	156.4	23 11.2	−58.0	156.6	22 16.1	−58.1	156.8	13
14	27 42.9	−57.3	155.8	26 48.2	−57.5	156.0	25 53.3	−57.5	156.2	24 58.4	−57.7	156.4	24 03.4	−57.8	156.5	23 08.3	−57.9	156.7	22 13.2	−58.1	156.9	21 18.0	−58.2	157.0	14
15	26 45.6	−57.3	156.1	25 50.7	−57.4	156.3	24 55.8	−57.6	156.5	24 00.7	−57.7	156.7	23 05.6	−57.8	156.8	22 10.4	−58.0	157.0	21 15.1	−58.0	157.2	20 19.8	−58.2	157.3	15
16	25 48.3	−57.4	156.4	24 53.3	−57.6	156.6	23 58.2	−57.6	156.8	23 03.0	−57.7	157.0	22 07.8	−57.9	157.1	21 12.4	−57.9	157.3	20 17.1	−58.1	157.4	19 21.6	−58.2	157.6	16
17	24 51.0	−57.5	156.7	23 55.8	−57.5	156.9	23 00.6	−57.7	157.1	22 05.3	−57.8	157.3	21 09.9	−57.9	157.4	20 14.5	−58.0	157.6	19 19.0	−58.1	157.7	18 23.4	−58.2	157.8	17
18	23 53.5	−57.4	157.1	22 58.3	−57.6	157.2	22 02.9	−57.7	157.4	21 07.5	−57.8	157.5	20 12.0	−57.9	157.7	19 16.5	−58.1	157.8	18 20.9	−58.2	158.0	17 25.2	−58.2	158.1	18
19	22 56.1	−57.5	157.4	22 00.7	−57.6	157.5	21 05.2	−57.7	157.7	20 09.7	−57.9	157.8	19 14.1	−58.0	158.0	18 18.4	−58.1	158.1	17 22.7	−58.1	158.2	16 27.0	−58.3	158.3	19
20	21 58.6	−57.5	157.7	21 03.1	−57.7	157.8	20 07.5	−57.8	158.0	19 11.8	−57.9	158.1	18 16.1	−57.9	158.2	17 20.4	−58.1	158.4	16 24.6	−58.2	158.5	15 28.8	−58.3	158.6	20
21	21 01.1	−57.5	158.0	20 05.4	−57.6	158.1	19 09.7	−57.7	158.3	18 14.0	−57.9	158.4	17 18.2	−58.0	158.5	16 22.3	−58.1	158.6	15 26.4	−58.2	158.7	14 30.5	−58.3	158.8	21
22	20 03.6	−57.6	158.3	19 07.8	−57.7	158.4	18 12.0	−57.8	158.5	17 16.1	−57.9	158.7	16 20.2	−58.0	158.8	15 24.2	−58.1	158.9	14 28.2	−58.2	159.0	13 32.2	−58.3	159.1	22
23	19 06.0	−57.6	158.6	18 10.1	−57.8	158.7	17 14.2	−57.9	158.8	16 18.2	−57.9	158.9	15 22.2	−58.1	159.0	14 26.1	−58.1	159.1	13 30.0	−58.2	159.2	12 33.9	−58.3	159.3	23
24	18 08.4	−57.7	158.9	17 12.4	−57.8	159.0	16 16.3	−57.8	159.1	15 20.3	−58.0	159.2	14 24.1	−58.0	159.3	13 28.0	−58.1	159.4	12 31.8	−58.2	159.5	11 35.6	−58.3	159.6	24
25	17 10.7	−57.6	159.2	16 14.6	−57.8	159.3	15 18.5	−57.9	159.4	14 22.3	−58.0	159.5	13 26.1	−58.1	159.6	12 29.9	−58.2	159.7	11 33.6	−58.3	159.7	10 37.3	−58.3	159.8	25
26	16 13.1	−57.7	159.5	15 16.9	−57.8	159.6	14 20.6	−57.9	159.7	13 24.3	−57.9	159.7	12 28.1	−58.0	159.8	11 31.7	−58.2	159.9	10 35.3	−58.2	160.0	9 39.0	−58.4	160.0	26
27	15 15.4	−57.7	159.8	14 19.1	−57.8	159.9	13 22.7	−57.9	159.9	12 26.4	−58.0	160.0	11 30.0	−58.1	160.1	10 33.5	−58.1	160.2	9 37.1	−58.3	160.2	8 40.6	−58.3	160.3	27
28	14 17.7	−57.7	160.0	13 21.3	−57.9	160.1	12 24.8	−57.9	160.2	11 28.4	−58.0	160.2	10 31.9	−58.1	160.3	9 35.4	−58.2	160.4	8 38.8	−58.2	160.5	7 42.3	−58.4	160.5	28
29	13 20.0	−57.8	160.3	12 23.4	−57.8	160.4	11 26.9	−57.9	160.5	10 30.4	−58.1	160.5	9 33.8	−58.1	160.6	8 37.2	−58.2	160.6	7 40.6	−58.3	160.7	6 43.9	−58.3	160.7	29
30	12 22.2	−57.7	160.6	11 25.6	−57.8	160.7	10 29.0	−58.0	160.7	9 32.3	−58.1	160.8	8 35.7	−58.2	160.8	7 39.0	−58.2	160.9	6 42.3	−58.3	160.9	5 45.6	−58.4	161.0	30
31	11 24.5	−57.8	160.9	10 27.8	−57.9	160.9	9 31.0	−57.9	161.0	8 34.3	−58.1	161.1	7 37.5	−58.1	161.1	6 40.8	−58.2	161.1	5 44.0	−58.3	161.2	4 47.2	−58.4	161.2	31
32	10 26.7	−57.8	161.2	9 29.9	−57.9	161.2	8 33.1	−58.0	161.3	7 36.2	−58.0	161.3	6 39.4	−58.1	161.3	5 42.6	−58.3	161.4	4 45.7	−58.3	161.4	3 48.8	−58.4	161.4	32
33	9 28.9	−57.8	161.4	8 32.0	−57.9	161.5	7 35.1	−58.0	161.5	6 38.2	−58.1	161.6	5 41.3	−58.2	161.6	4 44.3	−58.2	161.6	3 47.4	−58.3	161.6	2 50.4	−58.3	161.7	33
34	8 31.1	−57.8	161.7	7 34.1	−57.9	161.7	6 37.1	−58.0	161.8	5 40.1	−58.0	161.8	4 43.1	−58.1	161.9	3 46.1	−58.2	161.9	2 49.1	−58.3	161.9	1 52.1	−58.4	161.9	34
35	7 33.3	−57.8	162.0	6 36.2	−57.9	162.0	5 39.1	−57.9	162.0	4 42.1	−58.1	162.1	3 45.0	−58.2	162.1	2 47.9	−58.3	162.1	1 50.8	−58.3	162.1	0 53.7	−58.4	162.1	35
36	6 35.5	−57.8	162.2	5 38.3	−57.9	162.3	4 41.2	−58.0	162.3	3 44.0	−58.1	162.3	2 46.8	−58.1	162.3	1 49.6	−58.2	162.3	0 52.5	−58.3	162.4	0 04.7	+58.4	17.6	36
37	5 37.6	−57.8	162.5	4 40.4	−57.9	162.5	3 43.2	−58.0	162.5	2 45.9	−58.1	162.6	1 48.7	−58.2	162.6	0 51.4	−58.2	162.6	0 05.8	+58.3	17.4	1 03.1	+58.4	17.4	37
38	4 39.8	−57.9	162.8	3 42.5	−58.0	162.8	2 45.2	−58.1	162.8	1 47.8	−58.1	162.8	0 50.5	−58.2	162.8	0 06.8	+58.3	17.2	1 04.1	+58.4	17.2	2 01.5	+58.3	17.2	38
39	3 41.9	−57.8	163.0	2 44.5	−57.9	163.1	1 47.1	−58.0	163.1	0 49.7	−58.0	163.1	0 07.7	+58.1	16.9	1 05.1	+58.2	16.9	2 02.5	+58.3	16.9	2 59.8	+58.4	16.9	39
40	2 44.1	−57.9	163.3	1 46.6	−57.9	163.3	0 49.1	−58.0	163.3	0 08.3	+58.1	16.7	1 05.8	+58.2	16.7	2 03.3	+58.2	16.7	3 00.8	+58.3	16.7	3 58.2	+58.4	16.7	40
41	1 46.2	−57.8	163.6	0 48.7	−57.9	163.6	0 08.9	+58.0	16.4	1 06.4	+58.1	16.4	2 04.0	+58.1	16.4	3 01.5	+58.2	16.4	3 59.1	+58.3	16.5	4 56.6	+58.4	16.5	41
42	0 48.4	−57.9	163.8	0 09.2	+58.0	16.2	1 06.9	+58.0	16.2	2 04.5	+58.1	16.2	3 02.1	+58.2	16.2	3 59.7	+58.3	16.2	4 57.4	+58.3	16.2	5 55.0	+58.3	16.3	42
43	0 09.5	+57.8	15.9	1 07.2	+57.9	15.9	2 04.9	+58.0	15.9	3 02.6	+58.1	15.9	4 00.3	+58.1	15.9	4 58.0	+58.2	16.0	5 55.7	+58.2	16.0	6 53.3	+58.4	16.0	43
44	1 07.3	+57.9	15.6	2 05.1	+57.9	15.7	3 02.9	+58.0	15.7	4 00.7	+58.0	15.7	4 58.4	+58.2	15.7	5 56.2	+58.2	15.7	6 53.9	+58.3	15.7	7 51.7	+58.3	15.8	44
45	2 05.2	+57.8	15.4	3 03.0	+58.0	15.4	4 00.9	+58.0	15.4	4 58.7	+58.1	15.4	5 56.6	+58.1	15.4	6 54.4	+58.2	15.5	7 52.2	+58.3	15.5	8 50.0	+58.4	15.5	45
46	3 03.0	+57.9	15.1	4 01.0	+57.9	15.1	4 58.9	+58.0	15.1	5 56.8	+58.1	15.2	6 54.7	+58.1	15.2	7 52.6	+58.2	15.2	8 50.5	+58.3	15.3	9 48.4	+58.3	15.3	46
47	4 00.9	+57.8	14.8	4 58.9	+57.9	14.9	5 56.9	+58.0	14.9	6 54.9	+58.0	14.9	7 52.8	+58.2	14.9	8 50.8	+58.2	15.0	9 48.8	+58.2	15.0	10 46.7	+58.3	15.1	47
48	4 58.7	+57.9	14.6	5 56.8	+57.9	14.6	6 54.9	+57.9	14.6	7 52.9	+58.1	14.7	8 51.0	+58.0	14.7	9 49.0	+58.2	14.7	10 47.0	+58.2	14.8	11 45.0	+58.3	14.8	48
49	5 56.6	+57.8	14.3	6 54.7	+57.9	14.3	7 52.8	+58.0	14.4	8 51.0	+58.0	14.4	9 49.1	+58.1	14.4	10 47.2	+58.1	14.5	11 45.2	+58.3	14.5	12 43.3	+58.3	14.6	49
50	6 54.4	+57.8	14.0	7 52.6	+57.9	14.1	8 50.8	+57.9	14.1	9 49.0	+58.0	14.1	10 47.2	+58.0	14.2	11 45.3	+58.2	14.2	12 43.5	+58.2	14.3	13 41.6	+58.3	14.3	50
51	7 52.2	+57.9	13.8	8 50.5	+57.9	13.8	9 48.8	+57.9	13.8	10 47.0	+58.0	13.9	11 45.2	+58.1	13.9	12 43.5	+58.1	14.0	13 41.7	+58.2	14.0	14 39.9	+58.2	14.1	51
52	8 50.0	+57.8	13.5	9 48.4	+57.8	13.5	10 46.7	+57.9	13.6	11 45.0	+58.0	13.6	12 43.3	+58.1	13.7	13 41.6	+58.1	13.7	14 39.9	+58.2	13.8	15 38.1	+58.3	13.9	52
53	9 47.8	+57.8	13.2	10 46.2	+57.9	13.3	11 44.6	+57.9	13.3	12 43.0	+58.0	13.4	13 41.4	+58.0	13.4	14 39.7	+58.1	13.5	15 38.1	+58.1	13.5	16 36.4	+58.2	13.6	53
54	10 45.6	+57.8	13.0	11 44.1	+57.8	13.0	12 42.5	+57.9	13.0	13 41.0	+57.9	13.1	14 39.4	+58.0	13.2	15 37.8	+58.1	13.2	16 36.2	+58.2	13.3	17 34.6	+58.2	13.4	54
55	11 43.4	+57.7	12.7	12 41.9	+57.8	12.7	13 40.4	+57.9	12.8	14 38.9	+58.0	12.8	15 37.4	+58.0	12.9	16 35.9	+58.1	13.0	17 34.4	+58.1	13.0	18 32.8	+58.2	13.1	55
56	12 41.1	+57.6	12.4	13 39.7	+57.8	12.5	14 38.3	+57.9	12.5	15 36.9	+57.9	12.6	16 35.4	+58.0	12.6	17 34.0	+58.0	12.7	18 32.5	+58.1	12.8	19 31.0	+58.2	12.8	56
57	13 38.9	+57.7	12.1	14 37.5	+57.8	12.2	15 36.2	+57.8	12.2	16 34.8	+57.9	12.3	17 33.4	+58.0	12.4	18 32.0	+58.0	12.4	19 30.6	+58.1	12.5	20 29.2	+58.1	12.6	57
58	14 36.6	+57.7	11.8	15 35.3	+57.8	11.9	16 34.0	+57.8	12.0	17 32.7	+57.9	12.0	18 31.4	+57.9	12.1	19 30.0	+58.0	12.2	20 28.7	+58.1	12.2	21 27.3	+58.1	12.3	58
59	15 34.3	+57.7	11.6	16 33.1	+57.7	11.6	17 31.8	+57.8	11.7	18 30.6	+57.8	11.7	19 29.3	+57.9	11.8	20 28.0	+58.0	11.9	21 26.8	+58.0	11.9	22 25.4	+58.1	12.1	59
60	16 32.0	+57.6	11.3	17 30.8	+57.7	11.3	18 29.6	+57.8	11.4	19 28.4	+57.9	11.5	20 27.2	+57.9	11.5	21 26.0	+58.0	11.6	22 24.8	+58.0	11.7	23 23.5	+58.1	11.8	60
61	17 29.6	+57.6	11.0	18 28.5	+57.7	11.0	19 27.4	+57.7	11.1	20 26.3	+57.8	11.2	21 25.1	+57.9	11.2	22 24.0	+57.9	11.3	23 22.8	+58.0	11.4	24 21.6	+58.0	11.5	61
62	18 27.2	+57.6	10.7	19 26.2	+57.7	10.7	20 25.1	+57.8	10.8	21 24.1	+57.7	10.9	22 23.0	+57.8	11.0	23 21.9	+57.9	11.0	24 20.8	+57.9	11.1	25 19.6	+58.0	11.2	62
63	19 24.8	+57.6	10.4	20 23.9	+57.6	10.5	21 22.9	+57.6	10.5	22 21.8	+57.8	10.6	23 20.8	+57.8	10.7	24 19.8	+57.8	10.8	25 18.7	+57.9	10.8	26 17.6	+58.0	10.9	63
64	20 22.4	+57.6	10.1	21 21.5	+57.6	10.2	22 20.5	+57.7	10.2	23 19.6	+57.7	10.3	24 18.6	+57.8	10.4	25 17.6	+57.8	10.5	26 16.6	+57.9	10.6	27 15.6	+57.9	10.6	64
65	21 20.0	+57.5	9.8	22 19.1	+57.6	9.9	23 18.2	+57.6	9.9	24 17.3	+57.6	10.0	25 16.4	+57.7	10.1	26 15.4	+57.8	10.1	27 14.5	+57.8	10.2	28 13.5	+57.9	10.4	65
66	22 17.5	+57.4	9.5	23 16.6	+57.6	9.6	24 15.8	+57.6	9.6	25 14.9	+57.7	9.7	26 14.1	+57.7	9.8	27 13.2	+57.7	9.9	28 12.3	+57.8	10.0	29 11.4	+57.8	10.1	66
67	23 14.9	+57.5	9.2	24 14.2	+57.4	9.2	25 13.4	+57.5	9.3	26 12.6	+57.6	9.4	27 11.8	+57.6	9.5	28 10.9	+57.7	9.6	29 10.1	+57.7	9.6	30 09.2	+57.8	9.7	67
68	24 12.4	+57.4	8.9	25 11.6	+57.5	8.9	26 10.9	+57.5	9.0	27 10.2	+57.5	9.1	28 09.4	+57.6	9.2	29 08.6	+57.7	9.2	30 07.8	+57.9	9.3	31 07.0	+57.8	9.4	68
69	25 09.8	+57.3	8.5	26 09.1	+57.4	8.6	27 08.4	+57.5	8.7	28 07.7	+57.5	8.8	29 07.0	+57.6	8.8	30 06.3	+57.6	8.9	31 05.6	+57.6	9.0	32 04.8	+57.7	9.1	69
70	26 07.1	+57.3	8.2	27 06.5	+57.3	8.3	28 05.9	+57.4	8.4	29 05.2	+57.5	8.4	30 04.6	+57.5	8.5	31 03.9	+57.5	8.6	32 03.2	+57.6	8.7	33 02.5	+57.7	8.8	70
71	27 04.4	+57.3	7.9	28 03.8	+57.4	7.9	29 03.3	+57.3	8.0	30 02.7	+57.4	8.1	31 02.1	+57.4	8.2	32 01.4	+57.6	8.3	33 00.8	+57.6	8.4	34 00.2	+57.6	8.5	71
72	28 01.7	+57.2	7.5	29 01.2	+57.2	7.6	30 00.6	+57.3	7.7	31 00.1	+57.3	7.8	31 59.5	+57.4	7.8	32 59.0	+57.4	7.9	33 58.4	+57.5	8.0	34 57.8	+57.5	8.1	72
73	28 58.9	+57.1	7.2	29 58.4	+57.2	7.3	30 57.9	+57.3	7.3	31 57.4	+57.3	7.4	32 56.9	+57.4	7.5	33 56.4	+57.4	7.6	34 55.9	+57.4	7.7	35 55.3	+57.5	7.8	73
74	29 56.0	+57.1	6.8	30 55.6	+57.2	6.9	31 55.2	+57.2	7.0	32 54.7	+57.2	7.1	33 54.3	+57.2	7.1	34 53.8	+57.3	7.2	35 53.3	+57.4	7.3	36 52.8	+57.4	7.4	74
75	30 53.1	+57.0	6.5	31 52.8	+57.0	6.6	32 52.4	+57.1	6.6	33 51.9	+57.2	6.7	34 51.5	+57.2	6.8	35 51.1	+57.2	6.8	36 50.7	+57.3	7.0	37 50.2	+57.4	7.1	75
76	31 50.2	+57.0	6.1	32 49.8	+57.0	6.2	33 49.5	+57.0	6.3	34 49.1	+57.1	6.3	35 48.7	+57.2	6.4	36 48.4	+57.2	6.5	37 48.0	+57.2	6.6	38 47.6	+57.2	6.7	76
77	32 47.2	+56.9	5.8	33 46.8	+57.0	5.8	34 46.5	+57.0	5.9	35 46.2	+57.0	6.0	36 45.9	+57.1	6.0	37 45.6	+57.1	6.1	38 45.2	+57.2	6.2	39 44.8	+57.2	6.3	77
78	33 44.1	+56.8	5.5	34 43.8	+56.9	5.5	35 43.5	+56.9	5.5	36 43.2	+57.0	5.6	37 43.0	+56.9	5.7	38 42.7	+57.0	5.7	39 42.4	+57.0	5.8	40 42.0	+57.1	5.9	78
79	34 40.9	+56.8	5.0	35 40.7	+56.8	5.0	36 40.4	+56.9	5.1	37 40.2	+56.9	5.2	38 39.9	+56.9	5.3	39 39.7	+56.9	5.3	40 39.4	+57.0	5.4	41 39.2	+57.0	5.5	79
80	35 37.7	+56.7	4.6	36 37.5	+56.7	4.6	37 37.3	+56.7	4.7	38 37.1	+56.8	4.8	39 36.9	+56.8	4.8	40 36.6	+56.9	4.9	41 36.4	+56.9	5.0	42 36.2	+56.9	5.1	80
81	36 34.4	+56.6	4.2	37 34.2	+56.6	4.3	38 34.0	+56.7	4.3	39 33.9	+56.6	4.4	40 33.7	+56.7	4.4	41 33.5	+56.8	4.5	42 33.3	+56.8	4.6	43 33.1	+56.8	4.6	81
82	37 31.0	+56.5	3.8	38 30.8	+56.6	3.8	39 30.7	+56.6	3.9	40 30.5	+56.6	3.9	41 30.4	+56.6	4.0	42 30.3	+56.6	4.1	43 30.1	+56.7	4.1	44 29.9	+56.8	4.2	82
83	38 27.5	+56.4	3.3	39 27.4	+56.4	3.4	40 27.3	+56.4	3.4	41 27.1	+56.5	3.5	42 27.0	+56.5	3.5	43 26.9	+56.6	3.6	44 26.8	+56.6	3.7	45 26.7	+56.6	3.7	83
84	39 23.9	+56.3	2.9	40 23.8	+56.3	3.0	41 23.7	+56.4	3.0	42 23.6	+56.4	3.0	43 23.5	+56.4	3.1	44 23.5	+56.4	3.1	45 23.4	+56.4	3.2	46 23.3	+56.5	3.3	84
85	40 20.2	+56.2	2.5	41 20.1	+56.3	2.5	42 20.1	+56.2	2.5	43 20.0	+56.3	2.6	44 20.0	+56.2	2.6	45 19.9	+56.3	2.7	46 19.8	+56.4	2.7	47 19.8	+56.3	2.8	85
86	41 16.4	+56.1	2.0	42 16.4	+56.1	2.0	43 16.3	+56.1	2.1	44 16.3	+56.1	2.1	45 16.2	+56.2	2.1	46 16.2	+56.2	2.2	47 16.2	+56.1	2.2	48 16.1	+56.2	2.2	86
87	42 12.5	+56.0	1.5	43 12.5	+55.9	1.5	44 12.4	+56.0	1.6	45 12.4	+56.0	1.6	46 12.4	+56.0	1.6	47 12.4	+56.0	1.6	48 12.3	+56.1	1.7	49 12.3	+56.1	1.7	87
88	43 08.5	+55.8	1.0	44 08.4	+55.9	1.0	45 08.4	+55.9	1.1	46 08.4	+55.9	1.1	47 08.4	+55.9	1.1	48 08.4	+55.9	1.1	49 08.4	+55.9	1.1	50 08.4	+55.9	1.2	88
89	44 04.3	+55.7	0.5	45 04.3	+55.7	0.5	46 04.3	+55.7	0.5	47 04.3	+55.7	0.5	48 04.3	+55.7	0.6	49 04.3	+55.7	0.6	50 04.3	+55.7	0.6	51 04.3	+55.7	0.6	89
90	45 00.0	+55.6	0.0	46 00.0	+55.6	0.0	47 00.0	+55.6	0.0	48 00.0	+55.5	0.0	49 00.0	+55.5	0.0	50 00.0	+55.5	0.0	51 00.0	+55.5	0.0	52 00.0	+55.5	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 158°, 202°**

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z }

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	40 36.5	+55.9	149.0	39 45.0	+56.1	149.5	38 53.2	+56.3	149.9	38 01.2	+56.6	150.3	37 09.0	+56.8	150.6	36 16.6	+57.0	151.0	35 24.0	+57.2	151.4	34 31.3	+57.4	151.7	0
1	41 32.4	+55.7	148.5	40 41.1	+55.9	149.0	39 49.5	+56.2	149.4	38 57.8	+56.4	149.8	38 05.8	+56.7	150.2	37 13.6	+56.9	150.6	36 21.2	+57.1	151.0	35 28.7	+57.2	151.3	1
2	42 28.1	+55.5	148.0	41 37.0	+55.9	148.5	40 45.7	+56.2	149.0	39 54.2	+56.4	149.4	39 02.5	+56.6	149.8	38 10.5	+56.8	150.2	37 18.3	+57.0	150.6	36 25.9	+57.3	151.0	2
3	43 23.6	+55.5	147.5	42 32.9	+55.7	148.0	41 41.9	+55.9	148.5	40 50.6	+56.2	148.9	39 59.1	+56.4	148.9	39 07.3	+56.7	149.8	38 15.3	+57.0	150.2	37 23.2	+57.1	150.6	3
4	44 19.1	+55.2	147.0	43 28.6	+55.6	147.5	42 37.8	+55.9	148.0	41 46.8	+56.2	148.5	40 55.5	+56.4	148.9	40 04.0	+56.7	149.4	39 12.3	+56.8	149.8	38 20.3	+57.1	150.2	4
5	45 14.3	+55.1	146.4	44 24.2	+55.4	147.0	43 33.7	+55.7	147.5	42 43.0	+56.0	148.0	41 51.9	+56.3	148.5	41 00.7	+56.5	148.9	40 09.1	+56.8	149.4	39 17.4	+57.0	149.8	5
6	46 09.4	+55.0	145.9	45 19.6	+55.3	146.4	44 29.4	+55.6	147.0	43 39.0	+55.8	147.5	42 48.2	+56.2	148.0	41 57.2	+56.4	148.5	41 05.9	+56.7	149.0	40 14.4	+56.9	149.4	6
7	47 04.4	+54.7	145.3	46 14.9	+55.1	145.9	45 25.0	+55.4	146.5	44 34.8	+55.8	147.0	43 44.4	+56.0	147.5	42 53.6	+56.3	148.0	42 02.6	+56.5	148.5	41 11.3	+56.8	149.0	7
8	47 59.1	+54.6	144.7	47 10.0	+54.9	145.3	46 20.4	+55.3	145.9	45 30.6	+55.6	146.5	44 40.4	+55.9	147.0	43 49.9	+56.2	147.6	42 59.1	+56.5	148.1	42 08.1	+56.7	148.5	8
9	48 53.7	+54.3	144.1	48 04.9	+54.7	144.7	47 15.7	+55.1	145.3	46 26.2	+55.4	145.9	45 36.3	+55.8	146.5	44 46.1	+56.0	147.1	43 55.6	+56.3	147.6	43 04.8	+56.6	148.1	9
10	49 48.0	+54.1	143.4	48 59.6	+54.5	144.1	48 10.8	+54.9	144.8	47 21.6	+55.3	145.4	46 32.1	+55.6	146.0	45 42.1	+56.0	146.6	44 51.9	+56.2	147.1	44 01.4	+56.5	147.6	10
11	50 42.1	+53.9	142.7	49 54.1	+54.3	143.5	49 05.7	+54.7	144.1	48 16.9	+55.1	144.8	47 27.7	+55.4	145.4	46 38.1	+55.7	146.0	45 48.1	+56.1	146.6	44 57.9	+56.3	147.2	11
12	51 36.0	+53.6	142.0	50 48.4	+54.1	142.8	50 00.4	+54.5	143.5	49 12.0	+54.8	144.2	48 23.1	+55.2	144.9	47 33.8	+55.6	145.5	46 44.2	+55.9	146.1	45 54.2	+56.3	146.7	12
13	52 29.6	+53.3	141.3	51 42.5	+53.8	142.1	50 54.9	+54.3	142.9	50 06.8	+54.7	143.6	49 18.3	+55.1	144.3	48 29.4	+55.5	144.9	47 40.1	+55.8	145.6	46 50.5	+56.1	146.2	13
14	53 22.9	+53.0	140.5	52 36.3	+53.5	141.4	51 49.2	+54.0	142.2	51 01.5	+54.5	142.9	50 13.4	+54.9	143.7	49 24.9	+55.2	144.4	48 35.9	+55.6	145.0	47 46.6	+55.9	145.7	14
15	54 15.9	+52.7	139.7	53 29.8	+53.3	140.6	52 43.2	+53.7	141.5	51 56.0	+54.2	142.3	51 08.3	+54.6	143.0	50 20.1	+55.1	143.8	49 31.5	+55.5	144.4	48 42.5	+55.8	145.1	15
16	55 08.6	+52.4	138.9	54 23.1	+52.9	139.8	53 36.9	+53.5	140.7	52 50.2	+54.0	141.6	52 02.9	+54.5	142.4	51 15.2	+54.8	143.1	50 27.0	+55.2	143.9	49 38.3	+55.6	144.6	16
17	56 01.0	+51.9	138.0	55 16.0	+52.6	139.0	54 30.4	+53.1	139.9	53 44.2	+53.6	140.8	52 57.4	+54.1	141.7	52 10.0	+54.7	142.5	51 22.2	+55.1	143.2	50 33.9	+55.5	144.0	17
18	56 52.9	+51.6	137.1	56 08.6	+52.2	138.2	55 23.5	+52.8	139.1	54 37.8	+53.4	140.1	53 51.5	+53.9	140.9	53 04.7	+54.3	141.8	52 17.3	+54.8	142.6	51 29.4	+55.2	143.4	18
19	57 44.5	+51.1	136.2	57 00.8	+51.8	137.3	56 16.3	+52.5	138.3	55 31.2	+53.1	139.3	54 45.4	+53.6	140.2	53 59.0	+54.2	141.1	53 12.1	+54.6	141.9	52 24.6	+55.0	142.7	19
20	58 35.6	+50.6	135.2	57 52.6	+51.4	136.3	57 08.8	+52.1	137.4	56 24.3	+52.7	138.4	55 39.0	+53.3	139.4	54 53.2	+53.8	140.3	54 06.7	+54.3	141.2	53 19.6	+54.8	142.1	20
21	59 26.2	+50.1	134.2	58 44.0	+50.9	135.3	58 00.9	+51.6	136.5	57 17.0	+52.3	137.6	56 32.3	+53.0	138.6	55 47.0	+53.5	139.6	55 01.0	+54.1	140.5	54 14.4	+54.6	141.4	21
22	60 16.3	+49.5	133.1	59 34.9	+50.3	134.3	58 52.5	+51.2	135.5	58 09.3	+51.9	136.6	57 25.3	+52.5	137.7	56 40.5	+53.2	138.7	55 55.1	+53.7	139.7	55 09.0	+54.3	140.7	22
23	61 05.8	+48.9	131.9	60 25.2	+49.9	133.2	59 43.7	+50.6	134.5	59 01.2	+51.4	135.7	58 17.8	+52.2	136.8	57 33.7	+52.8	137.9	56 48.8	+53.5	138.9	56 03.3	+54.0	139.9	23
24	61 54.7	+48.3	130.7	61 15.1	+49.2	132.1	60 34.3	+50.2	133.4	59 52.6	+51.0	134.7	59 10.0	+51.7	135.9	58 26.5	+52.5	137.0	57 42.3	+53.1	138.1	56 57.3	+53.6	139.1	24
25	62 43.0	+47.5	129.4	62 04.3	+48.5	130.9	61 24.5	+49.5	132.3	60 43.6	+50.4	133.6	60 01.7	+51.3	134.9	59 19.0	+52.0	136.1	58 35.4	+52.7	137.2	57 50.9	+53.4	138.3	25
26	63 30.5	+46.7	128.1	62 52.8	+47.9	129.6	62 14.0	+48.9	131.1	61 34.0	+49.9	132.5	60 53.0	+50.7	133.8	60 11.0	+51.5	135.1	59 28.1	+52.3	136.3	58 44.3	+53.0	137.4	26
27	64 17.2	+45.8	126.6	63 40.7	+47.0	128.3	63 02.9	+48.1	129.8	62 23.9	+49.2	131.3	61 43.7	+50.2	132.7	61 02.5	+51.1	134.0	60 20.4	+51.8	135.3	59 37.3	+52.5	136.5	27
28	65 03.0	+44.8	125.1	64 27.7	+46.2	126.8	63 51.0	+47.4	128.5	63 13.1	+48.5	130.0	62 33.9	+49.5	131.5	61 53.6	+50.4	132.9	61 12.2	+51.3	134.3	60 29.8	+52.2	135.5	28
29	65 47.8	+43.8	123.5	65 13.9	+45.2	125.3	64 38.4	+46.6	127.1	64 01.6	+47.7	128.7	63 23.4	+48.9	130.3	62 44.0	+49.9	131.8	62 03.5	+50.8	133.2	61 22.0	+51.6	134.5	29
30	66 31.6	+42.6	121.8	65 59.1	+44.2	123.8	65 25.0	+45.6	125.6	64 49.3	+46.9	127.3	64 12.3	+48.1	129.0	63 33.9	+49.2	130.5	62 54.3	+50.2	132.0	62 13.6	+51.1	133.4	30
31	67 14.2	+41.4	120.0	66 43.3	+43.0	122.1	66 10.6	+44.5	124.0	65 36.2	+46.0	125.8	65 00.4	+47.2	127.6	64 23.1	+48.4	129.2	63 44.5	+49.6	130.8	63 04.7	+50.5	132.3	31
32	67 55.6	+39.9	118.1	67 26.3	+41.7	120.3	66 55.1	+43.4	122.3	66 22.2	+44.9	124.2	65 47.6	+46.4	126.1	65 11.5	+47.7	127.8	64 34.1	+48.8	129.5	63 55.2	+49.9	131.1	32
33	68 35.5	+38.4	116.1	68 08.0	+40.4	118.4	67 38.5	+42.2	120.5	67 07.1	+43.9	122.6	66 34.0	+45.3	124.5	65 59.2	+46.7	126.4	65 22.9	+48.0	128.1	64 45.1	+49.2	129.8	33
34	69 13.9	+36.8	114.0	68 48.4	+38.9	116.3	68 20.7	+40.8	118.6	67 51.0	+42.6	120.8	67 19.3	+44.3	122.8	66 45.9	+45.8	124.8	66 10.9	+47.1	126.7	65 34.3	+48.4	128.4	34
35	69 50.7	+34.9	111.7	69 27.3	+37.1	114.2	69 01.5	+39.3	116.6	68 33.6	+41.2	118.9	68 03.6	+43.0	121.1	67 31.7	+44.7	123.1	66 58.0	+46.2	125.1	66 22.7	+47.6	127.0	35
36	70 25.6	+32.9•	109.3	70 04.4	+35.4	111.9	69 40.8	+37.6	114.5	69 14.8	+39.7	116.9	68 46.6	+41.7	119.2	68 16.4	+43.4	121.4	67 44.2	+45.1	123.5	67 10.3	+46.5	125.4	36
37	70 58.5	+30.7•	106.8	70 39.8	+33.3•	109.5	70 18.4	+35.8	112.2	69 54.5	+38.1	114.7	69 28.3	+40.1	117.1	68 59.8	+42.1	119.5	68 29.3	+43.9	121.7	67 56.8	+45.5	123.8	37
38	71 29.2	+28.4•	104.1	71 13.1	+31.1•	107.0	70 54.2	+33.8•	109.8	70 32.6	+36.2	112.4	70 08.4	+38.6	115.0	69 41.9	+40.7	117.4	69 13.2	+42.5	119.8	68 42.4	+44.3	122.0	38
39	71 57.6	+25.8•	101.3	71 44.2	+28.8•	104.3	71 28.0	+31.5•	107.2	71 08.8	+34.2•	110.0	70 47.0	+36.7•	112.7	70 22.6	+38.9	115.3	69 55.7	+41.1	117.8	69 26.7	+43.0	120.1	39
40	72 23.4	+23.0•	98.4	72 13.0	+26.2•	101.5	71 59.5	+29.2•	104.5	71 43.0	+32.1•	107.4	71 23.7	+34.6•	110.3	71 01.5	+37.2	113.0	70 36.8	+39.5	115.6	70 09.7	+41.6	118.1	40
41	72 46.4	+20.1•	95.3	72 39.2	+23.4•	98.5	72 28.7	+26.6•	101.6	72 15.1	+29.6•	104.7	71 58.3	+32.5•	107.7	71 38.7	+35.2•	110.5	71 16.3	+37.6	113.3	70 51.3	+39.9	116.0	41
42	73 06.5	+17.0•	92.1	73 02.6	+20.4•	95.4	72 55.3	+23.8•	98.6	72 44.7	+27.0•	101.8	72 30.8	+30.1•	104.9	72 13.9	+32.9•	107.9	71 53.9	+35.7•	110.8	71 31.2	+38.2	113.6	42
43	73 23.5	+13.7•	88.8	73 23.0	+17.3•	92.1	73 19.1	+20.8•	95.4	73 11.7	+24.1•	98.7	73 00.9	+27.4•	102.0	72 46.8	+30.5•	105.1	72 29.6	+33.4•	108.2	72 09.4	+36.1•	111.2	43
44	73 37.2	+10.3•	85.3	73 40.3	+14.0•	88.7	73 39.9	+17.5•	92.1	73 35.8	+21.1•	95.5	73 28.3	+24.5•	98.9	73 17.3	+27.9•	102.2	73 03.0	+31.0•	105.4	72 45.5	+33.9•	108.5	44
45	73 47.5	+6.8•	81.8	73 54.3	+10.4•	85.2	73 57.4	+14.2•	88.7	73 56.9	+17.9•	92.2	73 52.8	+21.5•	95.6	73 45.2	+24.9•	99.1	73 34.0	+28.3•	102.4	73 19.4	+31.4•	105.7	45
46	73 54.3	+3.1•	78.2	74 04.7	+6.9•	81.7	74 11.6	+10.6•	85.2	74 14.8	+14.4•	88.7	74 14.3	+18.2•	92.2	74 10.1	+21.8•	95.8	74 02.3	+25.3•	99.3	73 50.8	+28.8•	102.7	46
47	73 57.4	−0.5•	74.6	74 11.6	+3.2•	78.0	74 22.2	+7.0•	81.5	74 29.2	+11.0•	85.1	74 32.5	+14.6•	88.7	74 31.9	+18.5•	92.3	74 27.6	+22.2•	95.9	74 19.6	+25.8•	99.5	47
48	73 56.9	−4.1•	71.0	74 14.8	−0.5•	74.4	74 29.2	+3.3•	77.8	74 40.0	+7.1•	81.4	74 47.1	+11.0•	85.0	74 50.4	+14.9•	88.7	74 49.8	+18.8•	92.4	74 45.4	+22.5•	96.1	48
49	73 52.8	−7.6•	67.4	74 14.3	−4.2•	70.7	74 32.5	−0.6•	74.1	74 47.1	+3.3•	77.6	74 58.1	+7.2•	81.3	75 05.3	+11.2•	85.0	75 08.6	+15.1•	88.7	75 07.9	+19.1•	92.5	49
50	73 45.2	−11.2•	63.9	74 10.1	−7.8•	67.0	74 31.9	−4.3•	70.3	74 50.4	−0.6•	73.8	75 05.3	+3.3•	77.4	75 16.5	+7.2•	81.1	75 23.7	+11.4•	84.9	75 27.0	+15.4•	88.8	50
51	73 34.0	−14.6•	60.4	74 02.3	−11.5•	63.4	74 27.6	−8.0•	66.6	74 49.8	−4.4•	70.0	75 08.6	−0.7•	73.5	75 23.7	+3.3•	77.2	75 35.1	+7.3•	81.0	75 42.4	+11.5•	84.9	51
52	73 19.4	−17.8•	57.0	73 50.8	−14.8•	59.8	74 19.6	−11.7•	62.9	74 45.4	−8.3•	66.2	75 07.9	−4.6•	69.6	75 27.0	−0.7•	73.3	75 42.4	+3.3•	77.0	75 53.9	+7.5•	80.9	52
53	73 01.6	−20.9•	53.7	73 36.0	−18.2•	56.4	74 07.9	−15.1•	59.3	74 37.1	−11.9•	62.4	75 03.3	−8.4•	65.8	75 26.3	−4.8•	69.3	75 45.7	−0.8•	73.0	76 01.4	+3.3•	76.8	53
54	72 40.7	−23.8•	50.5	73 17.8	−21.2•	53.0	73 52.8	−18.5•	55.8	74 25.2	−15.5•	58.8	74 54.9	−12.2•	61.9	75 21.5	−8.7•	65.3	75 44.9	−4.9•	68.9	76 04.7	−1.0•	72.7	54
55	72 16.9	−26.5•	47.4	72 56.6	−24.2•	49.8	73 34.3	−21.7•	52.4	74 09.7	−18.9•	55.2	74 42.7	−15.9•	58.2	75 12.8	−12.5•	61.4	75 40.0	−9.0•	64.9	76 03.7	−5.1•	68.5	55
56	71 50.4	−28.9•	44.5	72 32.4	−26.9•	46.7	73 12.6	−24.6•	49.1	73 50.8	−22.0•	51.8	74 26.8	−19.3•	54.6	75 00.3	−16.2•	57.6	75 31.0	−12.9•	60.9	75 58.6	−9.3•	64.4	56
57	71 21.5	−31.3•	41.7	72 05.5	−29.4•	43.8	72 48.0	−27.3•	46.0	73 28.8	−25.1•	48.4	74 07.5	−22.5•	51.1	74 44.1	−19.7•	53.9	75 18.1	−16.6•	57.0	75 49.3	−13.3•	60.3	57
58	70 50.2	−33.5•	39.1	71 36.1	−31.8•	41.0	72 20.7	−29.9•	43.1	73 03.7	−27.8•	45.3	73 45.0	−25.5•	47.7	74 24.4	−23.0•	50.4	75 01.5	−20.2•	53.3	75 36.0	−17.0•	56.4	58
59	70 16.7	−35.4•	36.6	71 04.3	−33.9•	38.3	71 50.8	−32.2•	40.2	72 35.9	−30.4•	42.3	73 19.5	−28.3•	44.5	74 01.4	−26.1•	47.0	74 41.3	−23.5•	49.6	75 19.0	−20.7•	52.6	59
60	69 41.3	−37.2	34.3	70 30.4	−35.8	35.8	71 18.6	−34.4•	37.6	72 05.5	−32.7•	39.4	72 51.2	−30.9•	41.5	73 35.3	−28.8•	43.7	74 17.8	−26.6•	46.2	74 58.3	−24.0•	48.9	60
61	69 04.1	−38.8	32.0	69 54.6	−37.6	33.5	70 44.2	−36.3	35.0	71 32.8	−34.9•	36.8	72 20.3	−33.3•	38.6	73 06.5	−31.4•	40.7	73 51.2	−29.4•	42.9	74 34.3	−27.2•	45.4	61
62	68 25.3	−40.3	29.9	69 17.0	−39.3	31.2	70 07.9	−38.1	32.7	70 57.9	−36.8	34.2	71 47.0	−35.3•	35.9	72 35.1	−33.8•	37.8	73 21.8	−32.0•	39.8	74 07.1	−30.0•	42.1	62
63	67 45.0	−41.7	27.9	68 37.7	−40.8	29.1	69 29.8	−39.8	30.4	70 21.1	−38.6	31.8	71 11.7	−37.3	33.4	72 01.3	−35.9•	35.1	72 49.8	−34.3•	36.9	73 37.1	−32.5•	39.0	63
64	67 03.3	−43.0	26.1	67 56.9	−42.1	27.1	68 50.0	−41.2	28.3	69 42.5	−40.2	29.6	70 34.4	−39.1	31.0	71 25.4	−37.9	32.5	72 15.5	−36.5•	34.2	73 04.6	−35.0•	36.0	64
65	66 20.3	−44.0	24.3	67 14.8	−43.3	25.3	68 08.8	−42.5	26.3	69 02.3	−41.6	27.5	69 55.3	−40.7	28.7	70 47.5	−39.6	30.1	71 39.0	−38.4	31.6	72 29.6	−37.0•	33.3	65
66	65 36.3	−45.1	22.6	66 31.5	−44.5	23.5	67 26.3	−43.8	24.5	68 20.7	−43.0	25.5	69 14.6	−42.2	26.6	70 07.9	−41.2	27.9	71 00.6	−40.1	29.2	71 52.6	−39.0	30.7	66
67	64 51.2	−46.1	21.1	65 47.0	−45.5	21.9	66 42.5	−44.8	22.7	67 37.7	−44.2	23.6	68 32.4	−43.4	24.7	69 26.7	−42.6	25.8	70 20.5	−41.7	27.0	71 13.6	−40.6	28.3	67
68	64 05.1	−46.9	19.6	65 01.5	−46.4	20.3	65 57.7	−45.9	21.1	66 53.5	−45.3	21.9	67 49.0	−44.6	22.8	68 44.1	−43.9	23.8	69 38.8	−43.1	24.9	70 33.0	−42.3	26.1	68
69	63 18.2	−47.7	18.2	64 15.1	−47.2	18.8	65 11.8	−46.8	19.5	66 08.2	−46.2	20.3	67 04.4	−45.7	21.1	68 00.2	−45.1	22.0	68 55.7	−44.4	22.9	69 50.7	−43.6	24.0	69
70	62 30.5	−48.4	16.8	63 27.9	−48.1	17.4	64 25.0	−47.6	18.0	65 22.0	−47.2	18.7	66 18.7	−46.7	19.4	67 15.1	−46.1	20.2	68 11.3	−45.6	21.1	69 07.1	−44.9	22.0	70
71	61 42.1	−49.1	15.6	62 39.8	−48.7	16.1	63 37.4	−48.4	16.6	64 34.8	−48.0	17.2	65 32.0	−47.5	17.9	66 29.0	−47.1	18.6	67 25.7	−46.5	19.4	68 22.2	−46.0	20.2	71
72	60 53.0	−49.6	14.4	61 51.1	−49.3	14.8	62 49.0	−49.0	15.3	63 46.8	−48.7	15.9	64 44.5	−48.4	16.4	65 41.9	−47.9	17.1	66 39.2	−47.5	17.7	67 36.2	−47.0	18.5	72
73	60 03.4	−50.3	13.2	61 01.7	−50.0	13.6	62 00.0	−49.7	14.1	62 58.1	−49.4	14.6	63 56.1	−49.1	15.1	64 54.0	−48.8	15.6	65 51.7	−48.4	16.2	66 49.2	−47.9	16.9	73
74	59 13.1	−50.7	12.2	60 11.7	−50.5	12.5	61 10.3	−50.3	12.9	62 08.7	−50.0	13.3	63 07.0	−49.7	13.8	64 05.2	−49.4	14.3	65 03.3	−49.1	14.8	66 01.3	−48.8	15.4	74
75	58 22.4	−51.3	11.1	59 21.2	−51.0	11.4	60 20.0	−50.8	11.8	61 18.7	−50.6	12.2	62 17.3	−50.4	12.6	63 15.8	−50.1	13.0	64 14.2	−49.8	13.5	65 12.5	−49.5	14.0	75
76	57 31.1	−51.6	10.1	58 30.2	−51.5	10.4	59 29.2	−51.4	10.7	60 28.1	−51.1	11.1	61 26.9	−50.9	11.4	62 25.7	−50.7	11.8	63 24.4	−50.5	12.2	64 23.0	−50.2	12.6	76
77	56 39.5	−52.1	9.2	57 38.7	−51.9	9.5	58 37.8	−51.7	9.7	59 37.0	−51.6	10.0	60 36.0	−51.4	10.3	61 35.0	−51.2	10.6	62 33.9	−51.0	11.0	63 32.8	−50.8	11.4	77
78	55 47.4	−52.4	8.3	56 46.8	−52.4	8.5	57 46.1	−52.2	8.8	58 45.4	−52.1	9.0	59 44.6	−51.9	9.3	60 43.8	−51.7	9.6	61 42.9	−51.5	9.9	62 41.9	−51.3	10.2	78
79	54 55.0	−52.8	7.5	55 54.4	−52.6	7.6	56 53.9	−52.6	7.8	57 53.3	−52.4	8.1	58 52.7	−52.3	8.3	59 52.1	−52.2	8.5	60 51.4	−52.0	8.8	61 50.7	−51.9	9.1	79
80	54 02.2	−53.1	6.6	55 01.8	−53.0	6.8	56 01.3	−52.9	7.0	57 00.9	−52.8	7.2	58 00.4	−52.7	7.4	58 59.9	−52.6	7.6	59 59.4	−52.5	7.8	60 58.8	−52.3	8.0	80
81	53 09.1	−53.4	5.8	54 08.8	−53.4	6.0	55 08.4	−53.2	6.1	56 08.1	−53.2	6.3	57 07.7	−53.1	6.5	58 07.3	−53.0	6.6	59 06.9	−52.9	6.8	60 06.5	−52.8	7.0	81
82	52 15.7	−53.7	5.1	53 15.4	−53.6	5.2	54 15.2	−53.5	5.3	55 14.9	−53.4	5.5	56 14.6	−53.4	5.6	57 14.3	−53.3	5.7	58 14.0	−53.2	5.9	59 13.7	−53.1	6.1	82
83	51 22.0	−53.9	4.4	52 21.8	−53.8	4.5	53 21.7	−53.9	4.6	54 21.5	−53.8	4.7	55 21.2	−53.7	4.8	56 21.0	−53.6	4.9	57 20.8	−53.6	5.1	58 20.6	−53.5	5.2	83
84	50 28.1	−54.2	3.7	51 28.0	−54.2	3.8	52 27.8	−54.1	3.8	53 27.7	−54.0	3.9	54 27.5	−53.9	4.0	55 27.4	−53.9	4.1	56 27.2	−53.9	4.2	57 27.1	−53.8	4.4	84
85	49 33.9	−54.4	3.0	50 33.8	−54.3	3.1	51 33.7	−54.3	3.1	52 33.7	−54.3	3.2	53 33.6	−54.3	3.3	54 33.5	−54.3	3.4	55 33.3	−54.1	3.5	56 33.2	−54.1	3.5	85
86	48 39.5	−54.6	2.4	49 39.5	−54.6	2.4	50 39.4	−54.5	2.5	51 39.4	−54.6	2.5	52 39.3	−54.5	2.6	53 39.2	−54.4	2.6	54 39.2	−54.5	2.7	55 39.1	−54.4	2.8	86
87	47 44.9	−54.8	1.7	48 44.9	−54.8	1.8	49 44.9	−54.8	1.8	50 44.8	−54.7	1.9	51 44.8	−54.7	1.9	52 44.8	−54.7	1.9	53 44.7	−54.7	2.0	54 44.7	−54.7	2.0	87
88	46 50.1	−55.0	1.1	47 50.1	−55.0	1.2	48 50.1	−55.0	1.2	49 50.1	−55.0	1.2	50 50.1	−55.0	1.2	51 50.1	−55.0	1.3	52 50.0	−54.9	1.3	53 50.0	−54.9	1.3	88
89	45 55.1	−55.1	0.6	46 55.1	−55.1	0.6	47 55.1	−55.1	0.6	48 55.1	−55.1	0.6	49 55.1	−55.1	0.6	50 55.1	−55.1	0.6	51 55.1	−55.1	0.6	52 55.1	−55.1	0.6	89
90	45 00.0	−55.3	0.0	46 00.0	−55.3	0.0	47 00.0	−55.3	0.0	48 00.0	−55.3	0.0	49 00.0	−55.3	0.0	50 00.0	−55.3	0.0	51 00.0	−55.3	0.0	52 00.0	−55.3	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	40 36.5	−55.9	149.0	39 45.0	−56.2	149.5	38 53.2	−56.4	149.9	38 01.2	−56.6	150.3	37 09.0	−56.8	150.6	36 16.6	−57.0	151.0	35 24.0	−57.2	151.4	34 31.3	−57.4	151.7	0
1	39 40.6	−56.1	149.5	38 48.8	−56.3	149.9	37 56.8	−56.5	150.3	37 04.6	−56.8	150.7	36 12.2	−57.0	151.0	35 19.6	−57.2	151.4	34 26.8	−57.3	151.7	33 33.9	−57.5	152.0	1
2	38 44.5	−56.1	150.0	37 52.5	−56.4	150.3	37 00.3	−56.6	150.7	36 07.8	−56.8	151.1	35 15.2	−57.0	151.4	34 22.4	−57.1	151.8	33 29.5	−57.4	152.1	32 36.4	−57.5	152.4	2
3	37 48.4	−56.3	150.4	36 56.1	−56.5	150.8	36 03.7	−56.7	151.1	35 11.0	−56.9	151.5	34 18.2	−57.0	151.8	33 25.3	−57.3	152.1	32 32.1	−57.4	152.4	31 38.9	−57.6	152.7	3
4	36 52.1	−56.3	150.8	35 59.6	−56.5	151.2	35 07.0	−56.8	151.5	34 14.1	−56.9	151.9	33 21.2	−57.2	152.2	32 28.0	−57.3	152.5	31 34.7	−57.4	152.8	30 41.3	−57.6	153.0	4
5	35 55.8	−56.5	151.3	35 03.1	−56.7	151.6	34 10.2	−56.8	151.9	33 17.2	−57.0	152.2	32 24.0	−57.2	152.5	31 30.7	−57.4	152.8	30 37.3	−57.6	153.1	29 43.7	−57.7	153.4	5
6	34 59.3	−56.5	151.7	34 06.4	−56.7	152.0	33 13.4	−56.9	152.3	32 20.2	−57.1	152.6	31 26.8	−57.2	152.9	30 33.3	−57.4	153.2	29 39.7	−57.5	153.4	28 46.0	−57.7	153.7	6
7	34 02.8	−56.5	152.1	33 09.7	−56.8	152.4	32 16.5	−57.0	152.7	31 23.1	−57.2	153.0	30 29.6	−57.3	153.3	29 35.9	−57.5	153.5	28 42.2	−57.7	153.8	27 48.3	−57.8	154.0	7
8	33 06.2	−56.7	152.5	32 12.9	−56.9	152.8	31 19.5	−57.1	153.1	30 25.9	−57.2	153.3	29 32.2	−57.3	153.6	28 38.5	−57.6	153.8	27 44.5	−57.6	154.1	26 50.5	−57.8	154.3	8
9	32 09.5	−56.7	152.9	31 16.0	−56.9	153.2	30 22.4	−57.0	153.4	29 28.7	−57.2	153.7	28 34.9	−57.4	153.9	27 40.9	−57.5	154.2	26 46.9	−57.7	154.4	25 52.7	−57.8	154.6	9
10	31 12.8	−56.8	153.3	30 19.1	−57.0	153.5	29 25.4	−57.2	153.8	28 31.5	−57.3	154.0	27 37.5	−57.5	154.3	26 43.4	−57.6	154.5	25 49.2	−57.8	154.7	24 54.9	−57.9	154.9	10
11	30 16.0	−56.9	153.6	29 22.1	−57.0	153.9	28 28.2	−57.2	154.1	27 34.2	−57.4	154.4	26 40.0	−57.4	154.6	25 45.8	−57.7	154.8	24 51.4	−57.7	155.0	23 57.0	−57.9	155.2	11
12	29 19.1	−57.0	154.0	28 25.1	−57.1	154.2	27 31.0	−57.2	154.5	26 36.8	−57.4	154.7	25 42.5	−57.5	154.9	24 48.1	−57.6	155.1	23 53.7	−57.8	155.3	22 59.1	−57.9	155.5	12
13	28 22.1	−57.0	154.4	27 28.0	−57.2	154.6	26 33.8	−57.3	154.8	25 39.4	−57.4	155.0	24 45.0	−57.6	155.2	23 50.5	−57.7	155.4	22 55.9	−57.9	155.6	22 01.2	−58.0	155.8	13
14	27 25.1	−57.0	154.7	26 30.8	−57.1	154.9	25 36.5	−57.4	155.1	24 42.0	−57.5	155.3	23 47.4	−57.6	155.5	22 52.8	−57.8	155.7	21 58.0	−57.8	155.9	21 03.2	−57.9	156.0	14
15	26 28.1	−57.1	155.1	25 33.7	−57.3	155.3	24 39.1	−57.4	155.5	23 44.5	−57.5	155.6	22 49.8	−57.7	155.8	21 55.0	−57.8	156.0	21 00.2	−57.9	156.2	20 05.3	−58.1	156.3	15
16	25 31.0	−57.1	155.4	24 36.4	−57.3	155.6	23 41.7	−57.5	155.8	22 47.0	−57.6	156.0	21 52.1	−57.6	156.1	20 57.2	−57.8	156.3	20 02.3	−57.9	156.4	19 07.2	−58.0	156.6	16
17	24 33.9	−57.2	155.7	23 39.1	−57.3	155.9	22 44.3	−57.5	156.1	21 49.4	−57.6	156.2	20 54.5	−57.8	156.4	19 59.4	−57.8	156.6	19 04.4	−58.0	156.7	18 09.2	−58.0	156.8	17
18	23 36.7	−57.2	156.1	22 41.8	−57.4	156.2	21 46.8	−57.4	156.4	20 51.8	−57.6	156.6	19 56.7	−57.7	156.7	19 01.6	−57.9	156.9	18 06.4	−58.0	157.0	17 11.2	−58.1	157.1	18
19	22 39.5	−57.3	156.4	21 44.4	−57.4	156.6	20 49.4	−57.6	156.7	19 54.2	−57.6	156.9	18 59.0	−57.8	157.0	18 03.7	−57.8	157.1	17 08.4	−58.0	157.3	16 13.1	−58.1	157.4	19
20	21 42.2	−57.3	156.7	20 47.0	−57.4	156.9	19 51.8	−57.5	157.0	18 56.6	−57.7	157.2	18 01.2	−57.8	157.3	17 05.9	−57.9	157.4	16 10.4	−58.0	157.5	15 15.0	−58.1	157.6	20
21	20 44.9	−57.4	157.0	19 49.6	−57.5	157.2	18 54.3	−57.6	157.3	17 58.9	−57.7	157.4	17 03.4	−57.8	157.6	16 08.0	−58.0	157.7	15 12.4	−58.0	157.8	14 16.9	−58.2	157.9	21
22	19 47.5	−57.3	157.4	18 52.1	−57.5	157.5	17 56.7	−57.6	157.6	17 01.2	−57.7	157.7	16 05.6	−57.8	157.8	15 10.0	−57.9	158.0	14 14.4	−58.0	158.1	13 18.7	−58.1	158.1	22
23	18 50.2	−57.4	157.7	17 54.6	−57.5	157.8	16 59.1	−57.7	157.9	16 03.5	−57.8	158.0	15 07.8	−57.9	158.1	14 12.1	−58.0	158.2	13 16.4	−58.1	158.3	12 20.6	−58.2	158.4	23
24	17 52.8	−57.5	158.0	16 57.1	−57.5	158.1	16 01.4	−57.6	158.2	15 05.7	−57.8	158.3	14 09.9	−57.8	158.4	13 14.1	−57.9	158.5	12 18.3	−58.1	158.6	11 22.4	−58.1	158.6	24
25	16 55.3	−57.4	158.3	15 59.6	−57.6	158.4	15 03.8	−57.7	158.5	14 07.9	−57.7	158.6	13 12.1	−57.9	158.7	12 16.2	−58.0	158.8	11 20.2	−58.1	158.8	10 24.3	−58.2	158.9	25
26	15 57.9	−57.5	158.6	15 02.0	−57.6	158.7	14 06.1	−57.7	158.8	13 10.2	−57.9	158.9	12 14.2	−57.9	158.9	11 18.2	−58.0	159.0	10 22.1	−58.1	159.1	9 26.1	−58.2	159.1	26
27	15 00.4	−57.5	158.9	14 04.4	−57.6	159.0	13 08.4	−57.7	159.1	12 12.3	−57.8	159.1	11 16.3	−58.0	159.2	10 20.2	−58.1	159.3	9 24.0	−58.1	159.3	8 27.9	−58.2	159.4	27
28	14 02.9	−57.5	159.2	13 06.8	−57.6	159.3	12 10.7	−57.8	159.3	11 14.5	−57.8	159.4	10 18.3	−57.9	159.5	9 22.1	−58.0	159.5	8 25.9	−58.1	159.6	7 29.7	−58.2	159.6	28
29	13 05.4	−57.6	159.5	12 09.2	−57.7	159.5	11 12.9	−57.7	159.6	10 16.7	−57.9	159.7	9 20.4	−57.9	159.7	8 24.1	−58.0	159.8	7 27.8	−58.1	159.8	6 31.5	−58.2	159.9	29
30	12 07.8	−57.5	159.8	11 11.5	−57.6	159.8	10 15.2	−57.8	159.9	9 18.8	−57.8	159.9	8 22.5	−58.0	160.0	7 26.1	−58.1	160.0	6 29.7	−58.2	160.1	5 33.3	−58.3	160.1	30
31	11 10.3	−57.6	160.0	10 13.9	−57.7	160.1	9 17.4	−57.7	160.2	8 21.0	−57.9	160.2	7 24.5	−58.0	160.3	6 28.0	−58.0	160.3	5 31.5	−58.1	160.3	4 35.0	−58.2	160.4	31
32	10 12.7	−57.6	160.3	9 16.2	−57.7	160.4	8 19.7	−57.8	160.4	7 23.1	−57.9	160.5	6 26.5	−57.9	160.5	5 30.0	−58.1	160.6	4 33.4	−58.2	160.6	3 36.8	−58.2	160.6	32
33	9 15.1	−57.6	160.6	8 18.5	−57.7	160.7	7 21.9	−57.8	160.7	6 25.2	−57.9	160.7	5 28.6	−58.0	160.8	4 31.9	−58.1	160.8	3 35.2	−58.1	160.8	2 38.6	−58.3	160.8	33
34	8 17.5	−57.6	160.9	7 20.8	−57.7	160.8	6 24.1	−57.8	161.0	5 27.3	−57.9	161.0	4 30.6	−58.0	161.0	3 33.8	−58.0	161.1	2 37.1	−58.2	161.1	1 40.3	−58.2	161.1	34
35	7 19.9	−57.7	161.2	6 23.1	−57.8	161.2	5 26.3	−57.9	161.2	4 29.4	−57.9	161.3	3 32.6	−58.0	161.3	2 35.8	−58.1	161.3	1 38.9	−58.1	161.3	0 42.1	−58.2	161.3	35
36	6 22.2	−57.6	161.5	5 25.3	−57.7	161.5	4 28.4	−57.8	161.5	3 31.5	−57.9	161.5	2 34.6	−58.0	161.6	1 37.7	−58.1	161.6	0 40.8	−58.2	161.6	0 16.1	+58.3	18.4	36
37	5 24.6	−57.7	161.7	4 27.6	−57.8	161.8	3 30.6	−57.8	161.8	2 33.6	−57.9	161.8	1 36.6	−58.0	161.8	0 39.6	−58.0	161.8	0 17.4	+58.1	18.2	1 14.4	+58.2	18.2	37
38	4 26.9	−57.6	162.0	3 29.9	−57.8	162.0	2 32.8	−57.8	162.0	1 35.7	−57.9	162.1	0 38.6	−58.0	162.1	0 18.4	+58.1	17.9	1 15.5	+58.2	17.9	2 12.6	+58.3	17.9	38
39	3 29.3	−57.7	162.3	2 32.1	−57.7	162.3	1 35.0	−57.9	162.3	0 37.8	−57.9	162.3	0 19.4	+58.0	17.7	1 16.5	+58.1	17.7	2 13.7	+58.1	17.7	3 10.9	+58.2	17.7	39
40	2 31.6	−57.6	162.6	1 34.4	−57.8	162.6	0 37.1	−57.8	162.6	0 20.1	+57.9	17.4	1 17.4	+57.9	17.4	2 14.6	+58.1	17.4	3 11.8	+58.2	17.4	4 09.1	+58.2	17.5	40
41	1 34.0	−57.7	162.8	0 36.6	−57.7	162.8	0 20.7	+57.8	17.2	1 18.0	+57.9	17.2	2 15.3	+58.0	17.2	3 12.7	+58.0	17.2	4 10.0	+58.1	17.2	5 07.3	+58.2	17.2	41
42	0 36.3	−57.7	163.1	0 21.1	+57.7	16.9	1 18.5	+57.8	16.9	2 15.9	+57.9	16.9	3 13.3	+58.0	16.9	4 10.7	+58.1	16.9	5 08.1	+58.2	17.0	6 05.5	+58.2	17.0	42
43	0 21.4	+57.6	16.6	1 18.8	+57.8	16.6	2 16.3	+57.9	16.6	3 13.8	+57.9	16.6	4 11.3	+58.0	16.7	5 08.8	+58.1	16.7	6 06.3	+58.1	16.7	7 03.7	+58.2	16.7	43
44	1 19.0	+57.7	16.3	2 16.6	+57.7	16.3	3 14.2	+57.8	16.4	4 11.7	+57.9	16.4	5 09.3	+58.0	16.4	6 06.9	+58.0	16.4	7 04.4	+58.1	16.5	8 01.9	+58.2	16.5	44
45	2 16.7	+57.6	16.1	3 14.3	+57.8	16.1	4 12.0	+57.8	16.1	5 09.6	+57.9	16.1	6 07.3	+57.9	16.1	7 04.9	+58.1	16.2	8 02.5	+58.2	16.2	9 00.1	+58.2	16.2	45
46	3 14.3	+57.7	15.8	4 12.1	+57.7	15.8	5 09.8	+57.8	15.8	6 07.5	+57.9	15.8	7 05.2	+58.0	15.9	8 03.0	+58.0	15.9	9 00.7	+58.1	16.0	9 58.3	+58.2	16.0	46
47	4 12.0	+57.6	15.5	5 09.8	+57.7	15.5	6 07.6	+57.8	15.5	7 05.4	+57.9	15.6	8 03.2	+58.0	15.6	9 01.0	+58.0	15.7	9 58.8	+58.1	15.7	10 56.5	+58.2	15.7	47
48	5 09.6	+57.7	15.2	6 07.5	+57.7	15.2	7 05.4	+57.8	15.3	8 03.3	+57.9	15.3	9 01.2	+57.9	15.4	9 59.0	+58.0	15.4	10 56.9	+58.0	15.4	11 54.7	+58.1	15.5	48
49	6 07.3	+57.6	14.9	7 05.2	+57.8	15.0	8 03.2	+57.8	15.0	9 01.2	+57.8	15.0	9 59.1	+57.9	15.1	10 57.0	+58.0	15.1	11 54.9	+58.1	15.2	12 52.8	+58.2	15.2	49
50	7 04.9	+57.6	14.7	8 03.0	+57.7	14.7	9 01.0	+57.8	14.7	9 59.0	+57.9	14.8	10 57.0	+57.9	14.8	11 55.0	+58.0	14.9	12 53.0	+58.1	14.9	13 51.0	+58.1	15.0	50
51	8 02.5	+57.6	14.4	9 00.7	+57.6	14.4	9 58.8	+57.7	14.5	10 56.9	+57.8	14.5	11 54.9	+57.9	14.6	12 53.0	+58.0	14.6	13 51.1	+58.0	14.7	14 49.1	+58.1	14.7	51
52	9 00.1	+57.6	14.1	9 58.3	+57.7	14.1	10 56.5	+57.8	14.2	11 54.7	+57.8	14.2	12 52.8	+57.9	14.3	13 51.0	+57.9	14.3	14 49.1	+58.0	14.4	15 47.2	+58.1	14.5	52
53	9 57.7	+57.6	13.8	10 56.0	+57.7	13.9	11 54.3	+57.7	13.9	12 52.5	+57.8	14.0	13 50.7	+57.9	14.0	14 48.9	+57.9	14.1	15 47.1	+58.0	14.1	16 45.3	+58.0	14.2	53
54	10 55.3	+57.6	13.5	11 53.7	+57.6	13.6	12 52.0	+57.7	13.6	13 50.3	+57.8	13.7	14 48.6	+57.8	13.7	15 46.8	+58.0	13.8	16 45.1	+58.0	13.9	17 43.3	+58.1	14.0	54
55	11 52.9	+57.5	13.2	12 51.3	+57.6	13.3	13 49.7	+57.7	13.3	14 48.1	+57.7	13.4	15 46.4	+57.8	13.5	16 44.8	+57.8	13.5	17 43.1	+57.9	13.6	18 41.4	+58.0	13.7	55
56	12 50.4	+57.6	12.9	13 48.9	+57.6	13.1	14 47.4	+57.6	13.1	15 45.8	+57.7	13.1	16 44.2	+57.8	13.2	17 42.6	+57.9	13.3	18 41.0	+58.0	13.3	19 39.4	+58.0	13.4	56
57	13 48.0	+57.5	12.7	14 46.5	+57.6	12.7	15 45.0	+57.7	12.8	16 43.5	+57.7	12.8	17 42.0	+57.8	12.9	18 40.5	+57.8	13.0	19 39.0	+57.9	13.1	20 37.4	+58.0	13.1	57
58	14 45.5	+57.5	12.4	15 44.1	+57.5	12.4	16 42.7	+57.6	12.5	17 41.2	+57.7	12.6	18 39.8	+57.8	12.6	19 38.3	+57.9	12.7	20 36.9	+57.8	12.8	21 35.4	+57.9	12.9	58
59	15 43.0	+57.4	12.1	16 41.6	+57.5	12.1	17 40.3	+57.6	12.3	18 38.9	+57.7	12.3	19 37.6	+57.7	12.3	20 36.2	+57.7	12.4	21 34.7	+57.9	12.5	22 33.3	+57.9	12.6	59
60	16 40.4	+57.4	11.8	17 39.2	+57.5	11.8	18 37.9	+57.6	11.9	19 36.6	+57.6	12.0	20 35.3	+57.7	12.0	21 33.9	+57.8	12.1	22 32.6	+57.8	12.2	23 31.2	+57.9	12.3	60
61	17 37.9	+57.4	11.5	18 36.7	+57.4	11.5	19 35.5	+57.5	11.6	20 34.2	+57.6	11.7	21 33.0	+57.6	11.8	22 31.7	+57.7	11.8	23 30.4	+57.8	11.9	24 29.1	+57.9	12.0	61
62	18 35.3	+57.4	11.2	19 34.1	+57.5	11.2	20 33.0	+57.5	11.3	21 31.8	+57.5	11.4	22 30.6	+57.7	11.5	23 29.4	+57.7	11.5	24 28.2	+57.8	11.6	25 27.0	+57.8	11.7	62
63	19 32.7	+57.3	10.8	20 31.6	+57.4	10.9	21 30.5	+57.5	11.0	22 29.4	+57.5	11.1	23 28.3	+57.5	11.2	24 27.1	+57.7	11.2	25 26.0	+57.7	11.3	26 24.8	+57.7	11.4	63
64	20 30.0	+57.3	10.5	21 29.0	+57.4	10.6	22 28.0	+57.4	10.7	23 26.9	+57.5	10.8	24 25.8	+57.6	10.8	25 24.8	+57.6	10.9	26 23.7	+57.6	11.0	27 22.6	+57.7	11.1	64
65	21 27.3	+57.3	10.2	22 26.4	+57.3	10.4	23 25.4	+57.4	10.4	24 24.4	+57.5	10.4	25 23.4	+57.5	10.5	26 22.4	+57.6	10.6	27 21.3	+57.7	10.7	28 20.3	+57.7	10.8	65
66	22 24.6	+57.2	9.9	23 23.7	+57.3	10.0	24 22.8	+57.3	10.1	25 21.9	+57.4	10.1	26 20.9	+57.5	10.2	27 20.0	+57.5	10.3	28 19.0	+57.6	10.4	29 18.0	+57.6	10.5	66
67	23 21.8	+57.2	9.6	24 21.0	+57.2	9.6	25 20.1	+57.4	9.7	26 19.3	+57.3	9.8	27 18.4	+57.4	9.9	28 17.5	+57.5	10.0	29 16.6	+57.5	10.1	30 15.6	+57.6	10.2	67
68	24 19.0	+57.2	9.2	25 18.2	+57.3	9.3	26 17.5	+57.2	9.4	27 16.6	+57.4	9.5	28 15.8	+57.4	9.6	29 15.0	+57.4	9.7	30 14.1	+57.5	9.8	31 13.2	+57.6	9.9	68
69	25 16.2	+57.1	8.9	26 15.5	+57.1	9.0	27 14.7	+57.2	9.1	28 14.0	+57.2	9.1	29 13.2	+57.3	9.2	30 12.4	+57.4	9.3	31 11.6	+57.4	9.4	32 10.8	+57.5	9.5	69
70	26 13.3	+57.1	8.6	27 12.6	+57.1	8.6	28 11.9	+57.2	8.7	29 11.2	+57.3	8.8	30 10.5	+57.3	8.9	31 09.8	+57.3	9.0	32 09.0	+57.4	9.1	33 08.3	+57.4	9.2	70
71	27 10.4	+57.0	8.2	28 09.7	+57.1	8.4	29 09.1	+57.1	8.4	30 08.5	+57.1	8.5	31 07.8	+57.2	8.5	32 07.1	+57.3	8.6	33 06.4	+57.3	8.7	34 05.7	+57.4	8.8	71
72	28 07.4	+56.9	7.9	29 06.8	+57.0	7.9	30 06.2	+57.1	8.0	31 05.6	+57.1	8.1	32 05.0	+57.2	8.2	33 04.4	+57.2	8.3	34 03.8	+57.2	8.3	35 03.1	+57.3	8.5	72
73	29 04.3	+56.9	7.5	30 03.8	+56.9	7.6	31 03.3	+57.0	7.7	32 02.7	+57.1	7.7	33 02.2	+57.1	7.8	34 01.6	+57.1	7.9	35 01.0	+57.2	8.0	36 00.4	+57.3	8.1	73
74	30 01.2	+56.8	7.1	31 00.7	+56.9	7.2	32 00.3	+56.9	7.3	32 59.8	+56.9	7.4	33 59.3	+57.0	7.5	34 58.7	+57.1	7.6	35 58.2	+57.1	7.6	36 57.7	+57.2	7.7	74
75	30 58.0	+56.8	6.8	31 57.6	+56.8	6.9	32 57.2	+56.8	6.9	33 56.7	+56.9	7.0	34 56.3	+56.9	7.1	35 55.8	+57.0	7.2	36 55.3	+57.1	7.3	37 54.9	+57.1	7.4	75
76	31 54.8	+56.7	6.4	32 54.4	+56.8	6.5	33 54.0	+56.8	6.5	34 53.6	+56.9	6.6	35 53.2	+56.9	6.7	36 52.8	+57.0	6.8	37 52.4	+57.0	6.9	38 52.0	+57.0	7.0	76
77	32 51.5	+56.6	6.0	33 51.2	+56.6	6.1	34 50.8	+56.7	6.1	35 50.5	+56.7	6.2	36 50.1	+56.8	6.3	37 49.8	+56.8	6.4	38 49.4	+56.9	6.5	39 49.0	+56.9	6.6	77
78	33 48.1	+56.5	5.7	34 47.8	+56.6	5.7	35 47.5	+56.7	5.7	36 47.2	+56.7	5.8	37 46.9	+56.7	5.9	38 46.6	+56.8	6.0	39 46.3	+56.8	6.1	40 45.9	+56.9	6.2	78
79	34 44.7	+56.4	5.2	35 44.4	+56.5	5.3	36 44.2	+56.5	5.3	37 43.9	+56.6	5.4	38 43.6	+56.7	5.5	39 43.4	+56.6	5.6	40 43.1	+56.7	5.6	41 42.8	+56.7	5.7	79
80	35 41.1	+56.4	4.8	36 40.9	+56.4	4.9	37 40.7	+56.5	4.9	38 40.5	+56.5	5.0	39 40.3	+56.5	5.1	40 40.0	+56.6	5.1	41 39.8	+56.6	5.2	42 39.5	+56.7	5.3	80
81	36 37.5	+56.3	4.4	37 37.3	+56.4	4.4	38 37.2	+56.3	4.5	39 37.0	+56.4	4.6	40 36.8	+56.4	4.6	41 36.6	+56.4	4.7	42 36.4	+56.5	4.8	43 36.2	+56.6	4.8	81
82	37 33.8	+56.2	3.9	38 33.7	+56.2	4.0	39 33.5	+56.3	4.1	40 33.4	+56.2	4.1	41 33.2	+56.3	4.2	42 33.0	+56.4	4.2	43 32.9	+56.4	4.3	44 32.7	+56.4	4.4	82
83	38 30.0	+56.1	3.5	39 29.9	+56.1	3.5	40 29.8	+56.1	3.6	41 29.6	+56.2	3.6	42 29.5	+56.2	3.7	43 29.4	+56.2	3.8	44 29.3	+56.2	3.8	45 29.1	+56.3	3.9	83
84	39 26.1	+55.9	3.0	40 26.0	+56.0	3.1	41 25.9	+56.0	3.1	42 25.8	+56.1	3.2	43 25.7	+56.1	3.2	44 25.6	+56.1	3.3	45 25.5	+56.1	3.3	46 25.4	+56.2	3.4	84
85	40 22.0	+55.9	2.6	41 22.0	+55.9	2.6	42 21.9	+55.9	2.6	43 21.9	+55.9	2.7	44 21.8	+55.9	2.7	45 21.7	+56.0	2.8	46 21.6	+56.0	2.8	47 21.6	+56.0	2.9	85
86	41 17.9	+55.7	2.1	42 17.9	+55.7	2.1	43 17.8	+55.8	2.1	44 17.8	+55.8	2.2	45 17.7	+55.8	2.2	46 17.7	+55.8	2.3	47 17.6	+55.9	2.3	48 17.6	+55.9	2.3	86
87	42 13.6	+55.6	1.6	43 13.6	+55.6	1.6	44 13.6	+55.6	1.6	45 13.5	+55.7	1.7	46 13.5	+55.7	1.7	47 13.5	+55.7	1.7	48 13.5	+55.7	1.7	49 13.5	+55.7	1.8	87
88	43 09.2	+55.5	1.1	44 09.2	+55.5	1.1	45 09.2	+55.5	1.1	46 09.2	+55.5	1.1	47 09.1	+55.5	1.1	48 09.2	+55.5	1.2	49 09.2	+55.5	1.2	50 09.1	+55.6	1.2	88
89	44 04.7	+55.3	0.5	45 04.7	+55.3	0.6	46 04.7	+55.3	0.6	47 04.7	+55.3	0.6	48 04.7	+55.3	0.6	49 04.7	+55.3	0.6	50 04.7	+55.3	0.6	51 04.7	+55.3	0.6	89
90	45 00.0	+55.1	0.0	46 00.0	+55.1	0.0	47 00.0	+55.1	0.0	48 00.0	+55.1	0.0	49 00.0	+55.1	0.0	50 00.0	+55.1	0.0	51 00.0	+55.1	0.0	52 00.0	+55.1	0.0	90

	45°	46°	47°	48°	49°	50°	51°	52°	

24°, 336° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z }

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	40 14.3	+55.5	147.8	39 23.4	+55.8	148.2	38 32.3	+56.0	148.7	37 40.9	+56.3	149.1	36 49.4	+56.5	149.5	35 57.6	+56.7	149.8	35 05.6	+57.0	150.2	34 13.5	+57.1	150.5	0
1	41 09.8	+55.4	147.3	40 19.2	+55.7	147.8	39 28.3	+56.0	148.2	38 37.2	+56.2	148.6	37 45.9	+56.4	149.0	36 54.3	+56.7	149.4	36 02.6	+56.8	149.8	35 10.6	+57.1	150.2	1
2	42 05.2	+55.3	146.8	41 14.9	+55.5	147.3	40 24.3	+55.8	147.7	39 33.4	+56.1	148.2	38 42.3	+56.3	148.6	37 51.0	+56.6	149.0	36 59.4	+56.8	149.4	36 07.7	+57.0	149.8	2
3	43 00.5	+55.0	146.3	42 10.4	+55.4	146.8	41 20.1	+55.7	147.3	40 29.5	+56.0	147.7	39 38.6	+56.3	148.2	38 47.6	+56.4	148.6	37 56.2	+56.7	149.0	37 04.7	+56.9	149.4	3
4	43 55.5	+55.0	145.7	43 05.8	+55.3	146.2	42 15.8	+55.5	146.8	41 25.5	+55.8	147.2	40 34.9	+56.1	147.7	39 44.0	+56.4	148.2	38 52.9	+56.7	148.6	38 01.6	+56.9	149.0	4
5	44 50.5	+54.7	145.1	44 01.1	+55.1	145.7	43 11.3	+55.5	146.2	42 21.3	+55.7	146.7	41 31.0	+56.0	147.2	40 40.4	+56.3	147.7	39 49.6	+56.5	148.2	38 58.5	+56.7	148.6	5
6	45 45.2	+54.6	144.6	44 56.2	+54.9	145.2	44 06.8	+55.2	145.7	43 17.0	+55.6	146.2	42 27.0	+55.9	146.8	41 36.7	+56.1	147.2	40 46.1	+56.4	147.7	39 55.2	+56.7	148.2	6
7	46 39.8	+54.4	144.0	45 51.1	+54.7	144.6	45 02.0	+55.1	145.2	44 12.6	+55.4	145.7	43 22.9	+55.7	146.3	42 32.8	+56.1	146.8	41 42.5	+56.3	147.3	40 51.9	+56.6	147.7	7
8	47 34.2	+54.1	143.3	46 45.8	+54.6	144.0	45 57.1	+55.0	144.6	45 08.0	+55.3	145.2	44 18.6	+55.6	145.7	43 28.9	+55.9	146.3	42 38.8	+56.2	146.8	41 48.5	+56.4	147.3	8
9	48 28.3	+54.0	142.7	47 40.4	+54.4	143.4	46 52.1	+54.7	144.0	46 03.3	+55.1	144.6	45 14.2	+55.5	145.2	44 24.8	+55.7	145.8	43 35.0	+56.1	146.3	42 44.9	+56.4	146.8	9
10	49 22.3	+53.7	142.0	48 34.8	+54.1	142.7	47 46.8	+54.5	143.4	46 58.4	+54.9	144.1	46 09.7	+55.2	144.7	45 20.5	+55.6	145.3	44 31.1	+55.9	145.8	43 41.3	+56.2	146.4	10
11	50 16.0	+53.5	141.3	49 28.9	+53.9	142.1	48 41.3	+54.4	142.8	47 53.3	+54.8	143.5	47 04.9	+55.2	144.1	46 16.1	+55.5	144.7	45 27.0	+55.8	145.3	44 37.5	+56.1	145.9	11
12	51 09.5	+53.1	140.6	50 22.8	+53.7	141.4	49 35.7	+54.1	142.1	48 48.1	+54.5	142.8	48 00.1	+54.9	143.5	47 11.6	+55.3	144.2	46 22.8	+55.6	144.8	45 33.6	+55.9	145.4	12
13	52 02.6	+52.9	139.9	51 16.5	+53.4	140.7	50 29.8	+53.9	141.5	49 42.6	+54.3	142.2	48 55.0	+54.7	142.9	48 06.9	+55.1	143.6	47 18.4	+55.5	144.2	46 29.5	+55.9	144.9	13
14	52 55.5	+52.6	139.1	52 09.9	+53.1	140.0	51 23.7	+53.6	140.8	50 36.9	+54.1	141.5	49 49.7	+54.5	142.3	49 02.0	+54.9	143.0	48 13.9	+55.3	143.7	47 25.4	+55.6	144.3	14
15	53 48.1	+52.2	138.3	53 03.0	+52.8	139.2	52 17.3	+53.3	140.0	51 31.0	+53.8	140.9	50 44.2	+54.3	141.6	49 56.9	+54.8	142.4	49 09.2	+55.1	143.1	48 21.0	+55.5	143.8	15
16	54 40.3	+51.9	137.5	53 55.8	+52.5	138.4	53 10.6	+53.0	139.3	52 24.8	+53.6	140.1	51 38.5	+54.1	140.9	50 51.7	+54.5	141.7	50 04.3	+54.9	142.5	49 16.5	+55.3	143.2	16
17	55 32.2	+51.5	136.6	54 48.3	+52.1	137.6	54 03.6	+52.8	138.5	53 18.4	+53.3	139.4	52 32.6	+53.7	140.2	51 46.2	+54.2	141.1	50 59.2	+54.7	141.8	50 11.8	+55.1	142.6	17
18	56 23.7	+51.0	135.7	55 40.4	+51.7	136.7	54 56.4	+52.3	137.7	54 11.7	+52.9	138.6	53 26.3	+53.5	139.5	52 40.4	+54.0	140.4	51 53.9	+54.5	141.2	51 06.9	+55.0	142.0	18
19	57 14.7	+50.6	134.7	56 32.1	+51.3	135.8	55 48.7	+52.0	136.8	55 04.6	+52.6	137.8	54 19.8	+53.2	138.7	53 34.4	+53.8	139.6	52 48.4	+54.3	140.5	52 01.9	+54.7	141.3	19
20	58 05.3	+50.1	133.7	57 23.4	+50.9	134.8	56 40.7	+51.6	135.9	55 57.2	+52.3	136.9	55 13.0	+52.9	137.9	54 28.2	+53.4	138.9	53 42.7	+53.9	139.8	52 56.6	+54.4	140.6	20
21	58 55.4	+49.5	132.6	58 14.3	+50.3	133.8	57 32.3	+51.1	135.0	56 49.5	+51.8	136.1	56 05.9	+52.5	137.1	55 21.6	+53.1	138.1	54 36.6	+53.7	139.0	53 51.0	+54.2	139.9	21
22	59 44.9	+49.0	131.5	59 04.6	+49.9	132.8	58 23.4	+50.7	134.0	57 41.3	+51.4	135.1	56 58.4	+52.1	136.2	56 14.7	+52.8	137.2	55 30.3	+53.4	138.2	54 45.2	+53.9	139.2	22
23	60 33.9	+48.3	130.4	59 54.5	+49.3	131.7	59 14.1	+50.1	133.0	58 32.7	+51.0	134.2	57 50.5	+51.7	135.3	57 07.5	+52.4	136.4	56 23.7	+53.0	137.4	55 39.1	+53.6	138.4	23
24	61 22.2	+47.6	129.2	60 43.8	+48.6	130.5	60 04.2	+49.6	131.9	59 23.7	+50.4	133.1	58 42.2	+51.3	134.3	57 59.9	+51.9	135.5	57 16.7	+52.6	136.6	56 32.7	+53.3	137.6	24
25	62 09.8	+46.9	127.9	61 32.4	+48.0	129.3	60 53.8	+49.0	130.7	60 14.1	+49.9	132.1	59 33.5	+50.7	133.3	58 51.8	+51.6	134.5	58 09.3	+52.3	135.7	57 26.0	+52.9	136.8	25
26	62 56.7	+46.1	126.5	62 20.4	+47.2	128.0	61 42.8	+48.3	129.5	61 04.0	+49.3	130.9	60 24.2	+50.2	132.3	59 43.4	+51.0	133.5	59 01.6	+51.8	134.7	58 18.9	+52.6	135.9	26
27	63 42.8	+45.1	125.1	63 07.6	+46.4	126.7	62 31.1	+47.6	128.2	61 53.3	+48.7	129.7	61 14.4	+49.7	131.1	60 34.4	+50.6	132.5	59 53.4	+51.4	133.7	59 11.5	+52.1	135.0	27
28	64 27.9	+44.2	123.6	63 54.0	+45.6	125.3	63 18.7	+46.7	126.9	62 42.0	+47.9	128.5	62 04.1	+48.9	129.9	61 25.0	+49.9	131.4	60 44.8	+50.8	132.7	60 03.6	+51.7	134.0	28
29	65 12.1	+43.2	122.0	64 39.6	+44.5	123.8	64 05.4	+46.0	125.5	63 29.9	+47.2	127.1	62 53.0	+48.3	128.7	62 14.9	+49.3	130.2	61 35.6	+50.3	131.6	60 55.3	+51.1	132.9	29
30	65 55.3	+41.9	120.3	65 24.1	+43.5	122.2	64 51.4	+44.9	124.0	64 17.1	+46.2	125.7	63 41.3	+47.5	127.4	63 04.2	+48.7	128.9	62 25.9	+49.7	130.4	61 46.4	+50.7	131.9	30
31	66 37.2	+40.7	118.5	66 07.6	+42.4	120.5	65 36.3	+43.9	122.4	65 03.3	+45.4	124.2	64 28.8	+46.7	126.0	63 52.9	+47.9	127.6	63 15.6	+49.0	129.2	62 37.1	+50.0	130.7	31
32	67 17.9	+39.3	116.7	66 50.0	+41.1	118.7	66 20.2	+42.8	120.7	65 48.7	+44.3	122.7	65 15.5	+45.7	124.5	64 40.8	+47.0	126.2	64 04.6	+48.2	127.9	63 27.1	+49.3	129.5	32
33	67 57.2	+37.8	114.7	67 31.1	+39.7	116.9	67 03.0	+41.5	119.0	66 33.0	+43.2	121.0	66 01.2	+44.8	122.9	65 27.8	+46.2	124.8	64 52.8	+47.5	126.5	64 16.4	+48.7	128.2	33
34	68 35.0	+36.1	112.6	68 10.8	+38.2	114.9	67 44.5	+40.2	117.1	67 16.2	+42.0	119.2	66 46.0	+43.6	121.3	66 14.0	+45.1	123.2	65 40.3	+46.5	125.1	65 05.1	+47.8	126.8	34
35	69 11.1	+34.3	110.3	68 49.0	+36.6	112.8	68 24.7	+38.6	115.1	67 58.2	+40.5	117.3	67 29.6	+42.4	119.5	66 59.1	+44.1	121.5	66 26.8	+45.6	123.5	65 52.9	+47.0	125.4	35
36	69 45.4	+32.3•	108.0	69 25.6	+34.7	110.5	69 03.3	+37.0	113.0	68 38.7	+39.1	115.4	68 12.0	+41.0	117.6	67 43.2	+42.8	119.8	67 12.4	+44.5	121.9	66 39.9	+46.0	123.8	36
37	70 17.7	+30.3•	105.5	70 00.3	+32.8•	108.2	69 40.3	+35.2	110.8	69 17.8	+37.5	113.2	68 53.0	+39.6	115.6	68 26.0	+41.5	117.9	67 56.9	+43.3	120.1	67 25.9	+44.9	122.2	37
38	70 48.0	+27.9•	102.9	70 33.1	+30.7•	105.7	70 15.5	+33.2•	108.4	69 55.3	+35.5	111.0	69 32.6	+37.9	113.5	69 07.5	+40.0	115.9	68 40.2	+41.9	118.2	68 10.8	+43.7	120.4	38
39	71 15.9	+25.4•	100.2	71 03.8	+28.3•	103.1	70 48.7	+31.1•	105.9	70 30.9	+33.7•	108.6	70 10.5	+36.1	111.3	69 47.5	+38.3	113.8	69 22.1	+40.5	116.2	68 54.5	+42.4	118.6	39
40	71 41.3	+22.8•	97.4	71 32.1	+25.8•	100.3	71 19.8	+28.8•	103.3	71 04.6	+31.5•	106.1	70 46.6	+34.1•	108.9	70 25.8	+36.6	111.5	70 02.6	+38.8	114.1	69 36.9	+41.0	116.6	40
41	72 04.1	+20.0•	94.4	71 57.9	+23.2•	97.5	71 48.6	+26.2•	100.5	71 36.1	+29.2•	103.4	71 20.7	+32.0•	106.3	71 02.4	+34.6•	109.1	70 41.4	+37.1	111.8	70 17.9	+39.3	114.4	41
42	72 24.1	+17.0•	91.3	72 21.1	+20.3•	94.5	72 14.8	+23.5•	97.6	72 05.3	+26.6•	100.6	71 52.7	+29.6•	103.6	71 37.0	+32.5•	106.6	71 18.5	+35.1•	109.4	70 57.2	+37.5	112.1	42
43	72 41.1	+13.8•	88.1	72 41.4	+17.3•	91.3	72 38.3	+20.7•	94.5	72 31.9	+23.9•	97.7	72 22.3	+27.0•	100.8	72 09.5	+30.0•	103.9	71 53.6	+32.9•	106.8	71 34.7	+35.6•	109.7	43
44	72 54.9	+10.6•	84.8	72 58.7	+14.0•	88.1	72 59.0	+17.5•	91.3	72 55.8	+21.0•	94.6	72 49.3	+24.3•	97.8	72 39.5	+27.5•	101.0	72 26.5	+30.5•	104.1	72 10.3	+33.4•	107.1	44
45	73 05.5	+7.2•	81.5	73 12.7	+10.8•	84.7	73 16.5	+14.3•	88.0	73 16.8	+17.9•	91.4	73 13.6	+21.4•	94.7	73 07.0	+24.7•	98.0	72 57.0	+27.9•	101.2	72 43.7	+31.0•	104.4	45
46	73 12.7	+3.8•	78.0	73 23.5	+7.3•	81.3	73 30.8	+11.0•	84.6	73 34.7	+14.5•	88.0	73 35.0	+18.1•	91.4	73 31.7	+21.7•	94.8	73 24.9	+25.1•	98.2	73 14.7	+28.4•	101.4	46
47	73 16.5	+0.3•	74.6	73 30.8	+3.9•	77.8	73 41.8	+7.4•	81.2	73 49.2	+11.2•	84.6	73 53.1	+14.6•	88.0	73 53.4	+18.4•	91.5	73 50.0	+22.1•	94.9	73 43.1	+25.5•	98.3	47
48	73 16.8	−3.2•	71.1	73 34.7	+0.3•	74.3	73 49.2	+3.9•	77.6	74 00.4	+7.5•	81.0	74 07.9	+11.3•	84.5	74 11.8	+15.1•	88.0	74 12.1	+18.7•	91.6	74 08.6	+22.4•	95.1	48
49	73 13.6	−6.6•	67.6	73 35.0	−3.3•	70.8	73 53.1	+0.3•	74.0	74 07.9	+3.9•	77.4	74 19.2	+7.7•	80.9	74 26.9	+11.5•	84.4	74 30.8	+15.3•	88.0	74 31.0	+19.1•	91.6	49
50	73 07.0	−10.0•	64.2	73 31.7	−6.8•	67.2	73 53.4	−3.4•	70.4	74 11.8	+0.3•	73.8	74 26.9	+3.9•	77.2	74 38.4	+7.7•	80.8	74 46.1	+11.7•	84.4	74 50.1	+15.6•	88.1	50
51	72 57.0	−13.3•	60.8	73 24.9	−10.2•	63.7	73 50.0	−6.9•	66.8	74 12.1	−3.5•	70.1	74 30.8	+0.2•	73.5	74 46.1	+4.0•	77.0	74 57.8	+7.9•	80.6	75 05.7	+11.8•	84.3	51
52	72 43.7	−16.4•	57.5	73 14.7	−13.5•	60.3	73 43.1	−10.5•	63.3	74 08.6	−7.1•	66.4	74 31.0	−3.6•	69.7	74 50.1	+0.1•	73.2	75 05.7	+3.9•	76.8	75 17.5	+7.9•	80.5	52
53	72 27.3	−19.5•	54.3	73 01.2	−16.8•	56.9	73 32.6	−13.8•	59.8	74 01.5	−10.7•	62.8	74 27.4	−7.0•	66.0	74 50.2	−3.7•	69.4	75 09.6	+0.1•	72.9	75 25.4	+4.0•	76.6	53
54	72 07.8	−22.3•	51.2	72 44.4	−19.8•	53.7	73 18.8	−17.1•	56.4	73 50.8	−14.2•	59.2	74 20.1	−11.0•	62.3	74 46.5	−7.6•	65.6	75 09.7	−4.0•	69.0	75 29.4	−0.1•	72.6	54
55	71 45.5	−25.0•	48.2	72 24.6	−22.7•	50.5	73 01.7	−20.2•	53.1	73 36.6	−17.4•	55.8	74 09.1	−14.5•	58.7	74 38.9	−11.3•	61.8	75 05.7	−7.8•	65.1	75 29.3	−4.1•	68.6	55
56	71 20.5	−27.5•	45.3	72 01.9	−25.4•	47.5	72 41.5	−23.1•	49.9	73 19.2	−20.7•	52.4	73 54.6	−17.8•	55.2	74 27.6	−14.8•	58.1	74 57.9	−11.6•	61.3	75 25.2	−8.0•	64.6	56
57	70 53.0	−29.8•	42.6	71 36.5	−28.0•	44.6	72 18.4	−25.9•	46.8	72 58.5	−23.5•	49.2	73 36.8	−21.1•	51.7	74 12.8	−18.3•	54.5	74 46.3	−15.2•	57.5	75 17.2	−12.0•	60.7	57
58	70 23.2	−32.0•	39.9	71 08.5	−30.3•	41.8	71 52.5	−28.4•	43.9	72 35.0	−26.3•	46.1	73 15.7	−24.0•	48.5	73 54.5	−21.5•	51.0	74 31.1	−18.7•	53.8	75 05.2	−15.7•	56.9	58
59	69 51.2	−34.0•	37.5	70 38.2	−32.4•	39.2	71 24.1	−30.7•	41.1	72 08.7	−28.9•	43.1	72 51.7	−26.8•	45.3	73 33.0	−24.5•	47.7	74 12.4	−22.0•	50.3	74 49.5	−19.2•	53.2	59
60	69 17.2	−35.8•	35.1	70 05.8	−34.4•	36.7	70 53.4	−33.0•	38.4	71 39.8	−31.3•	40.3	72 24.9	−29.4•	42.3	73 08.5	−27.4•	44.5	73 50.4	−25.1•	46.9	74 30.3	−22.5•	49.6	60
61	68 41.4	−37.5	32.9	69 31.4	−36.3	34.3	70 20.4	−34.9	35.9	71 08.5	−33.4•	37.6	71 55.5	−31.8•	39.5	72 41.1	−29.9•	41.5	73 25.3	−27.9•	43.7	74 07.8	−25.6•	46.1	61
62	68 03.9	−39.1	30.7	68 55.1	−38.0	32.1	69 45.5	−36.7	33.5	70 35.1	−35.3	35.1	71 23.7	−33.9•	36.8	72 11.2	−32.3•	38.6	72 57.4	−30.5•	40.7	73 42.2	−28.5•	42.9	62
63	67 24.8	−40.4	28.7	68 17.1	−39.4	29.9	69 08.8	−38.4	31.2	69 59.7	−37.2	32.7	70 49.8	−36.0	34.2	71 38.9	−34.5•	35.9	72 26.9	−32.9•	37.8	73 13.7	−31.1•	39.8	63
64	66 44.4	−41.8	26.8	67 37.7	−40.9	27.9	68 30.4	−40.0	29.1	69 22.5	−38.9	30.4	70 13.8	−37.7	31.8	71 04.4	−36.5	33.3	71 54.0	−35.0•	35.0	72 42.6	−33.5•	36.9	64
65	66 02.6	−42.9	25.0	66 56.8	−42.2	26.0	67 50.4	−41.3	27.1	68 43.6	−40.3	28.3	69 36.1	−39.4	29.5	70 27.9	−38.3	30.9	71 19.0	−37.0	32.5	72 09.1	−35.6•	34.1	65
66	65 19.7	−44.0	23.3	66 14.6	−43.3	24.2	67 09.1	−42.6	25.2	68 03.2	−41.8	26.3	68 56.7	−40.9	27.4	69 49.6	−39.9	28.7	70 42.0	−38.9	30.0	71 33.5	−37.6	31.5	66
67	64 35.7	−45.0	21.7	65 31.3	−44.4	22.6	66 26.5	−43.8	23.4	67 21.4	−43.1	24.4	68 15.8	−42.3	25.4	69 09.7	−41.4	26.5	70 03.1	−40.4	27.8	70 55.9	−39.4	29.1	67
68	63 50.7	−45.9	20.2	64 46.9	−45.4	21.0	65 42.7	−44.8	21.7	66 38.3	−44.2	22.6	67 33.5	−43.5	23.5	68 28.3	−42.7	24.5	69 22.7	−42.0	25.6	70 16.5	−41.0	26.8	68
69	63 04.8	−46.8	18.8	64 01.5	−46.3	19.4	64 57.9	−45.7	20.1	65 54.1	−45.2	20.9	66 50.0	−44.6	21.7	67 45.6	−44.0	22.7	68 40.7	−43.2	23.6	69 35.5	−42.5	24.7	69
70	62 18.0	−47.5	17.4	63 15.2	−47.1	18.0	64 12.2	−46.7	18.6	65 08.9	−46.2	19.3	66 05.4	−45.7	20.1	67 01.6	−45.1	20.9	67 57.5	−44.5	21.8	68 53.0	−43.7	22.7	70
71	61 30.5	−48.2	16.1	62 28.1	−47.9	16.6	63 25.5	−47.5	17.2	64 22.7	−47.0	17.8	65 19.7	−46.6	18.5	66 16.5	−46.1	19.2	67 13.0	−45.5	20.0	68 09.3	−45.0	20.8	71
72	60 42.3	−48.8	14.9	61 40.2	−48.5	15.4	62 38.0	−48.1	15.9	63 35.7	−47.9	16.4	64 33.1	−47.4	17.0	65 30.4	−47.0	17.6	66 27.5	−46.6	18.3	67 24.3	−46.0	19.1	72
73	59 53.5	−49.5	13.7	60 51.7	−49.2	14.1	61 49.8	−48.8	14.6	62 47.8	−48.5	15.1	63 45.7	−48.1	15.6	64 43.4	−47.8	16.2	65 40.9	−47.4	16.8	66 38.3	−47.0	17.5	73
74	59 04.0	−50.0	12.6	60 02.5	−49.7	13.0	61 01.0	−49.5	13.4	61 59.3	−49.2	13.8	62 57.5	−48.9	14.3	63 55.6	−48.6	14.8	64 53.5	−48.2	15.3	65 51.3	−47.9	15.9	74
75	58 14.0	−50.6	11.5	59 12.8	−50.3	11.9	60 11.5	−50.1	12.2	61 10.1	−49.9	12.6	62 08.6	−49.6	13.0	63 07.0	−49.3	13.5	64 05.3	−49.0	13.9	65 03.4	−48.6	14.5	75
76	57 23.5	−50.9	10.5	58 22.5	−50.8	10.8	59 21.4	−50.6	11.1	60 20.2	−50.4	11.5	61 19.0	−50.2	11.8	62 17.7	−49.9	12.2	63 16.3	−49.7	12.6	64 14.8	−49.4	13.1	76
77	56 32.6	−51.4	9.6	57 31.7	−51.2	9.8	58 30.8	−51.1	10.1	59 29.8	−50.8	10.4	60 28.8	−50.7	10.7	61 27.8	−50.5	11.0	62 26.6	−50.3	11.4	63 25.4	−50.1	11.8	77
78	55 41.2	−51.7	8.6	56 40.5	−51.7	8.9	57 39.7	−51.5	9.1	58 39.0	−51.4	9.4	59 38.1	−51.2	9.6	60 37.3	−51.1	9.9	61 36.3	−50.8	10.2	62 35.3	−50.7	10.6	78
79	54 49.4	−52.2	7.7	55 48.8	−52.1	7.9	56 48.2	−51.9	8.1	57 47.6	−51.8	8.4	58 46.9	−51.6	8.6	59 46.2	−51.5	8.9	60 45.5	−51.4	9.1	61 44.7	−51.2	9.4	79
80	53 57.2	−52.5	6.9	54 56.7	−52.4	7.1	55 56.3	−52.3	7.2	56 55.8	−52.2	7.4	57 55.3	−52.1	7.6	58 54.7	−51.9	7.9	59 54.1	−51.8	8.1	60 53.5	−51.7	8.3	80
81	53 04.7	−52.9	6.1	54 04.3	−52.7	6.2	55 04.0	−52.7	6.4	56 03.6	−52.6	6.5	57 03.2	−52.5	6.7	58 02.8	−52.4	6.9	59 02.3	−52.2	7.1	60 01.8	−52.1	7.3	81
82	52 11.8	−53.1	5.3	53 11.6	−53.1	5.4	54 11.3	−52.9	5.6	55 11.0	−52.9	5.7	56 10.7	−52.8	5.8	57 10.4	−52.7	6.0	58 10.1	−52.7	6.2	59 09.7	−52.6	6.3	82
83	51 18.7	−53.4	4.5	52 18.5	−53.3	4.7	53 18.3	−53.3	4.8	54 18.1	−53.2	4.9	55 17.9	−53.2	5.0	56 17.7	−53.1	5.1	57 17.4	−53.0	5.2	58 17.1	−52.9	5.4	83
84	50 25.3	−53.7	3.8	51 25.2	−53.6	3.9	52 25.0	−53.5	4.0	53 24.9	−53.5	4.1	54 24.7	−53.4	4.2	55 24.6	−53.5	4.3	56 24.4	−53.4	4.4	57 24.3	−53.3	4.5	84
85	49 31.6	−53.9	3.1	50 31.6	−53.9	3.2	51 31.5	−53.8	3.3	52 31.4	−53.8	3.3	53 31.3	−53.8	3.4	54 31.1	−53.7	3.5	55 31.0	−53.6	3.6	56 30.9	−53.6	3.7	85
86	48 37.7	−54.1	2.5	49 37.7	−54.1	2.5	50 37.6	−54.1	2.6	51 37.6	−54.1	2.6	52 37.5	−54.0	2.7	53 37.4	−54.0	2.7	54 37.4	−54.0	2.8	55 37.3	−53.9	2.9	86
87	47 43.6	−54.3	1.8	48 43.6	−54.3	1.8	49 43.5	−54.3	1.9	50 43.5	−54.3	1.9	51 43.5	−54.3	1.9	52 43.4	−54.2	2.0	53 43.4	−54.3	2.1	54 43.4	−54.2	2.1	87
88	46 49.3	−54.6	1.2	47 49.3	−54.6	1.2	48 49.2	−54.5	1.2	49 49.2	−54.5	1.3	50 49.2	−54.5	1.3	51 49.2	−54.5	1.3	52 49.2	−54.5	1.3	53 49.2	−54.5	1.4	88
89	45 54.7	−54.7	0.6	46 54.7	−54.7	0.6	47 54.7	−54.7	0.6	48 54.7	−54.7	0.6	49 54.7	−54.7	0.6	50 54.7	−54.7	0.6	51 54.7	−54.7	0.7	52 54.7	−54.7	0.7	89
90	45 00.0	−54.9	0.0	46 00.0	−54.9	0.0	47 00.0	−54.9	0.0	48 00.0	−54.9	0.0	49 00.0	−54.9	0.0	50 00.0	−54.9	0.0	51 00.0	−54.9	0.0	52 00.0	−54.9	0.0	90

24°, 336° L.H.A.   LATITUDE SAME NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 24°, 336°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	40 14.3	−55.6	147.8	39 23.4	−55.9	148.2	38 32.3	−56.2	148.7	37 40.9	−56.4	149.1	36 49.4	−56.7	149.5	35 57.6	−56.8	149.8	35 05.6	−57.0	150.2	34 13.5	−57.3	150.5	0
1	39 18.7	−55.8	148.3	38 27.5	−56.0	148.7	37 36.1	−56.2	149.1	36 44.5	−56.4	149.5	35 52.7	−56.6	149.9	35 00.8	−56.9	150.2	34 08.6	−57.1	150.6	33 16.2	−57.2	150.9	1
2	38 22.9	−55.8	148.8	37 31.5	−56.1	149.2	36 39.9	−56.4	149.6	35 48.1	−56.6	149.9	34 56.1	−56.8	150.3	34 03.9	−57.0	150.6	33 11.5	−57.2	150.9	32 19.0	−57.4	151.2	2
3	37 27.1	−56.0	149.2	36 35.4	−56.2	149.6	35 43.5	−56.4	149.9	34 51.5	−56.6	150.3	33 59.3	−56.9	150.7	33 06.9	−57.0	151.0	32 14.3	−57.2	151.3	31 21.6	−57.4	151.6	3
4	36 31.1	−56.1	149.7	35 39.2	−56.3	150.0	34 47.1	−56.5	150.4	33 54.9	−56.8	150.7	33 02.4	−56.9	151.1	32 09.9	−57.1	151.4	31 17.1	−57.2	151.7	30 24.2	−57.4	151.9	4
5	35 35.0	−56.2	150.1	34 42.9	−56.4	150.5	33 50.6	−56.6	150.8	32 58.1	−56.7	151.1	32 05.5	−57.0	151.4	31 12.8	−57.2	151.7	30 19.9	−57.4	152.0	29 26.8	−57.5	152.3	5
6	34 38.8	−56.2	150.5	33 46.5	−56.5	150.9	32 54.0	−56.7	151.2	32 01.4	−56.9	151.5	31 08.5	−57.0	151.8	30 15.6	−57.2	152.1	29 22.5	−57.4	152.3	28 29.3	−57.5	152.6	6
7	33 42.6	−56.4	151.0	32 50.0	−56.5	151.3	31 57.3	−56.7	151.6	31 04.5	−56.9	151.9	30 11.5	−57.1	152.2	29 18.4	−57.3	152.4	28 25.1	−57.4	152.7	27 31.8	−57.6	153.0	7
8	32 46.2	−56.4	151.4	31 53.5	−56.6	151.7	31 00.6	−56.8	152.0	30 07.6	−57.0	152.2	29 14.4	−57.1	152.5	28 21.1	−57.3	152.8	27 27.7	−57.5	153.0	26 34.2	−57.6	153.2	8
9	31 49.8	−56.5	151.8	30 56.9	−56.7	152.1	30 03.8	−56.9	152.3	29 10.6	−57.1	152.6	28 17.3	−57.2	152.9	27 23.8	−57.4	153.1	26 30.2	−57.5	153.3	25 36.6	−57.7	153.5	9
10	30 53.3	−56.5	152.2	30 00.2	−56.8	152.4	29 06.9	−56.9	152.7	28 13.6	−57.1	153.0	27 20.1	−57.3	153.2	26 26.4	−57.4	153.4	25 32.7	−57.5	153.6	24 38.9	−57.7	153.7	10
11	29 56.8	−56.7	152.6	29 03.4	−56.8	152.8	28 10.0	−57.0	153.1	27 16.5	−57.2	153.3	26 22.8	−57.3	153.5	25 29.0	−57.5	153.7	24 35.2	−57.6	154.0	23 41.2	−57.7	154.2	11
12	29 00.1	−56.7	152.9	28 06.6	−56.8	153.2	27 13.0	−57.0	153.4	26 19.3	−57.2	153.6	25 25.5	−57.3	153.9	24 31.6	−57.5	154.1	23 37.6	−57.6	154.3	22 43.5	−57.8	154.4	12
13	28 03.4	−56.8	153.3	27 09.8	−57.0	153.5	26 16.0	−57.1	153.8	25 22.1	−57.3	154.0	24 28.2	−57.4	154.2	23 34.1	−57.5	154.4	22 40.0	−57.7	154.6	21 45.7	−57.8	154.7	13
14	27 06.7	−56.8	153.7	26 12.8	−56.9	153.9	25 18.9	−57.1	154.1	24 24.9	−57.3	154.3	23 30.8	−57.4	154.5	22 36.6	−57.5	154.7	21 42.3	−57.7	154.9	20 47.9	−57.8	155.0	14
15	26 09.9	−56.9	154.0	25 15.9	−57.0	154.3	24 21.8	−57.2	154.5	23 27.6	−57.3	154.6	22 33.4	−57.5	154.8	21 39.0	−57.6	155.0	20 44.6	−57.7	155.2	19 50.1	−57.8	155.3	15
16	25 13.0	−56.9	154.4	24 18.9	−57.1	154.6	23 24.6	−57.2	154.8	22 30.3	−57.4	155.0	21 35.9	−57.5	155.1	20 41.4	−57.6	155.3	19 46.9	−57.8	155.4	18 52.3	−57.9	155.6	16
17	24 16.1	−57.0	154.7	23 21.8	−57.1	154.9	22 27.4	−57.2	155.1	21 32.9	−57.4	155.3	20 38.4	−57.5	155.4	19 43.8	−57.7	155.6	18 49.1	−57.7	155.7	17 54.4	−57.9	155.9	17
18	23 19.1	−57.0	155.1	22 24.7	−57.2	155.3	21 30.2	−57.3	155.4	20 35.5	−57.4	155.6	19 40.9	−57.6	155.7	18 46.1	−57.6	155.9	17 51.4	−57.9	156.0	16 56.5	−57.9	156.1	18
19	22 22.1	−57.0	155.4	21 27.5	−57.2	155.6	20 32.9	−57.4	155.8	19 38.1	−57.5	155.9	18 43.3	−57.6	156.0	17 48.5	−57.7	156.2	16 53.5	−57.8	156.3	15 58.6	−58.0	156.4	19
20	21 25.1	−57.1	155.8	20 30.3	−57.2	155.9	19 35.5	−57.3	156.1	18 40.7	−57.5	156.2	17 45.7	−57.6	156.3	16 50.8	−57.8	156.5	15 55.7	−57.9	156.6	15 00.6	−57.9	156.7	20
21	20 28.0	−57.1	156.1	19 33.1	−57.2	156.2	18 38.2	−57.4	156.4	17 43.2	−57.5	156.5	16 48.1	−57.6	156.6	15 53.0	−57.7	156.7	14 57.9	−57.9	156.9	14 02.7	−58.0	157.0	21
22	19 30.9	−57.2	156.4	18 35.9	−57.3	156.6	17 40.8	−57.4	156.7	16 45.7	−57.6	156.8	15 50.5	−57.7	156.9	14 55.3	−57.8	157.0	14 00.0	−57.9	157.1	13 04.7	−58.0	157.2	22
23	18 33.7	−57.2	156.7	17 38.6	−57.3	156.9	16 43.4	−57.5	157.0	15 48.1	−57.5	157.1	14 52.8	−57.6	157.2	13 57.5	−57.8	157.3	13 02.1	−57.9	157.4	12 06.7	−58.0	157.5	23
24	17 36.5	−57.2	157.1	16 41.3	−57.4	157.2	15 45.9	−57.4	157.3	14 50.6	−57.6	157.4	13 55.2	−57.7	157.5	12 59.7	−57.8	157.6	12 04.2	−57.9	157.7	11 08.7	−58.0	157.7	24
25	16 39.3	−57.2	157.4	15 43.9	−57.3	157.5	14 48.5	−57.5	157.6	13 53.0	−57.6	157.7	12 57.5	−57.8	157.8	12 01.9	−57.8	157.9	11 06.3	−57.9	157.9	10 10.7	−58.0	158.0	25
26	15 42.1	−57.3	157.7	14 46.6	−57.4	157.8	13 51.0	−57.5	157.9	12 55.4	−57.6	158.0	11 59.7	−57.7	158.1	11 04.1	−57.9	158.1	10 08.4	−58.0	158.2	9 12.7	−58.1	158.3	26
27	14 44.8	−57.3	158.0	13 49.2	−57.5	158.1	12 53.5	−57.6	158.2	11 57.8	−57.7	158.3	11 02.0	−57.7	158.3	10 06.2	−57.8	158.4	9 10.4	−58.0	158.5	8 14.6	−58.0	158.5	27
28	13 47.5	−57.3	158.3	12 51.7	−57.4	158.4	11 55.9	−57.5	158.5	11 00.1	−57.6	158.5	10 04.3	−57.8	158.6	9 08.4	−57.9	158.7	8 12.5	−58.0	158.7	7 16.6	−58.1	158.8	28
29	12 50.2	−57.4	158.6	11 54.3	−57.4	158.7	10 58.4	−57.6	158.8	10 02.5	−57.7	158.8	9 06.5	−57.8	158.9	8 10.5	−57.8	158.9	7 14.5	−57.9	159.0	6 18.5	−58.1	159.0	29
30	11 52.8	−57.3	158.9	10 56.9	−57.5	159.0	10 00.8	−57.5	159.0	9 04.8	−57.7	159.1	8 08.7	−57.7	159.2	7 12.7	−57.9	159.2	6 16.6	−58.0	159.2	5 20.4	−58.0	159.3	30
31	10 55.5	−57.4	159.2	9 59.4	−57.5	159.3	9 03.3	−57.6	159.3	8 07.1	−57.7	159.4	7 11.0	−57.8	159.4	6 14.8	−57.9	159.5	5 18.6	−58.0	159.5	4 22.4	−58.1	159.5	31
32	9 58.1	−57.4	159.5	9 01.9	−57.5	159.6	8 05.7	−57.6	159.6	7 09.4	−57.7	159.7	6 13.2	−57.8	159.7	5 16.9	−57.9	159.7	4 20.6	−58.0	159.8	3 24.3	−58.1	159.8	32
33	9 00.7	−57.4	159.8	8 04.4	−57.5	159.8	7 08.1	−57.6	159.9	6 11.7	−57.7	159.9	5 15.4	−57.9	160.0	4 19.0	−57.9	160.0	3 22.6	−58.0	160.0	2 26.2	−58.1	160.0	33
34	8 03.3	−57.4	160.1	7 06.9	−57.5	160.1	6 10.5	−57.7	160.2	5 14.0	−57.7	160.2	4 17.5	−57.8	160.2	3 21.1	−57.9	160.3	2 24.6	−58.0	160.3	1 28.1	−58.1	160.3	34
35	7 05.9	−57.4	160.4	6 09.4	−57.5	160.4	5 12.8	−57.6	160.5	4 16.3	−57.7	160.5	3 19.7	−57.8	160.5	2 23.2	−57.9	160.5	1 26.6	−58.0	160.5	0 30.0	−58.1	160.5	35
36	6 08.5	−57.5	160.7	5 11.8	−57.5	160.7	4 15.2	−57.6	160.7	3 18.6	−57.8	160.8	2 21.9	−57.8	160.8	1 25.3	−58.0	160.8	0 28.6	−58.0	160.8	0 28.1	+58.0	19.2	36
37	5 11.0	−57.4	161.0	4 14.3	−57.5	161.0	3 17.6	−57.7	161.0	2 20.8	−57.7	161.0	1 24.1	−57.8	161.0	0 27.3	−57.9	161.0	0 29.4	+58.0	19.0	1 26.1	+58.1	19.0	37
38	4 13.6	−57.4	161.3	3 16.8	−57.5	161.3	2 19.9	−57.6	161.3	1 23.1	−57.7	161.3	0 26.3	−57.9	161.3	0 30.6	+57.9	18.7	1 27.4	+58.0	18.7	2 24.2	+58.1	18.7	38
39	3 16.1	−57.4	161.5	2 19.2	−57.5	161.6	1 22.3	−57.7	161.6	0 25.4	−57.8	161.6	0 31.6	+57.8	18.4	1 28.5	+58.0	18.4	2 25.4	+58.0	18.4	3 22.3	+58.1	18.5	39
40	2 18.7	−57.5	161.8	1 21.7	−57.6	161.8	0 24.6	−57.6	161.8	0 32.4	+57.7	18.2	1 29.4	+57.8	18.2	2 26.4	+57.9	18.2	3 23.4	+58.0	18.2	4 20.4	+58.1	18.2	40
41	1 21.2	−57.5	162.1	0 24.1	−57.6	162.1	0 33.0	+57.6	17.9	1 30.1	+57.7	17.9	2 27.2	+57.8	17.9	3 24.3	+57.9	17.9	4 21.4	+58.0	17.9	5 18.5	+58.0	18.0	41
42	0 23.7	−57.4	162.4	0 33.5	+57.5	17.6	1 30.6	+57.7	17.6	2 27.8	+57.8	17.6	3 25.0	+57.8	17.6	4 22.2	+57.9	17.6	5 19.4	+58.0	17.7	6 16.5	+58.1	17.7	42
43	0 33.7	+57.5	17.3	1 31.0	+57.6	17.3	2 28.3	+57.6	17.3	3 25.6	+57.7	17.3	4 22.8	+57.8	17.4	5 20.1	+57.9	17.4	6 17.4	+57.9	17.4	7 14.6	+58.1	17.4	43
44	1 31.2	+57.5	17.0	2 28.6	+57.5	17.0	3 25.9	+57.7	17.0	4 23.3	+57.7	17.1	5 20.6	+57.8	17.1	6 18.0	+57.9	17.1	7 15.3	+58.0	17.2	8 12.7	+58.0	17.2	44
45	2 28.7	+57.5	16.7	3 26.1	+57.6	16.7	4 23.6	+57.6	16.8	5 21.0	+57.7	16.8	6 18.4	+57.8	16.8	7 15.9	+57.8	16.9	8 13.3	+57.9	16.9	9 10.7	+58.0	16.9	45
46	3 26.1	+57.5	16.4	4 23.7	+57.5	16.5	5 21.2	+57.6	16.5	6 18.7	+57.7	16.5	7 16.2	+57.8	16.5	8 13.7	+57.9	16.6	9 11.2	+58.0	16.6	10 08.7	+58.0	16.7	46
47	4 23.6	+57.4	16.2	5 21.2	+57.5	16.2	6 18.8	+57.6	16.2	7 16.4	+57.7	16.2	8 14.0	+57.8	16.3	9 11.6	+57.9	16.3	10 09.2	+57.9	16.4	11 06.7	+58.1	16.4	47
48	5 21.0	+57.4	15.9	6 18.7	+57.5	15.9	7 16.4	+57.6	15.9	8 14.1	+57.7	16.0	9 11.8	+57.8	16.0	10 09.5	+57.8	16.1	11 07.1	+57.9	16.1	12 04.8	+57.9	16.2	48
49	6 18.4	+57.5	15.6	7 16.2	+57.5	15.6	8 14.0	+57.6	15.6	9 11.8	+57.7	15.7	10 09.6	+57.7	15.7	11 07.3	+57.8	15.8	12 05.0	+57.9	15.8	13 02.7	+58.0	15.9	49
50	7 15.9	+57.4	15.3	8 13.7	+57.5	15.3	9 11.6	+57.5	15.4	10 09.5	+57.6	15.4	11 07.3	+57.7	15.5	12 05.1	+57.8	15.5	13 02.9	+57.9	15.6	14 00.7	+58.0	15.6	50
51	8 13.3	+57.4	15.0	9 11.2	+57.5	15.0	10 09.2	+57.5	15.1	11 07.1	+57.6	15.1	12 05.0	+57.7	15.2	13 02.9	+57.8	15.2	14 00.8	+57.9	15.3	14 58.7	+57.9	15.4	51
52	9 10.7	+57.4	14.7	10 08.7	+57.5	14.7	11 06.7	+57.6	14.8	12 04.8	+57.6	14.8	13 02.7	+57.7	14.9	14 00.7	+57.8	15.0	14 58.7	+57.8	15.0	15 56.6	+57.9	15.1	52
53	10 08.1	+57.4	14.4	11 06.2	+57.4	14.4	12 04.3	+57.5	14.5	13 02.4	+57.6	14.6	14 00.4	+57.7	14.6	14 58.5	+57.7	14.7	15 56.5	+57.8	14.7	16 54.5	+57.9	14.8	53
54	11 05.5	+57.3	14.1	12 03.6	+57.5	14.2	13 01.8	+57.5	14.2	14 00.0	+57.6	14.3	14 58.1	+57.7	14.3	15 56.2	+57.8	14.4	16 54.3	+57.8	14.5	17 52.4	+57.9	14.5	54
55	12 02.8	+57.4	13.8	13 01.1	+57.4	13.9	13 59.3	+57.5	13.9	14 57.6	+57.5	14.0	15 55.8	+57.6	14.0	16 54.0	+57.7	14.1	17 52.1	+57.8	14.2	18 50.3	+57.9	14.3	55
56	13 00.2	+57.3	13.5	13 58.5	+57.4	13.6	14 56.8	+57.5	13.6	15 55.1	+57.5	13.7	16 53.4	+57.6	13.8	17 51.7	+57.7	13.8	18 49.9	+57.8	13.9	19 48.2	+57.8	14.0	56
57	13 57.5	+57.3	13.2	14 55.9	+57.3	13.3	15 54.3	+57.4	13.3	16 52.6	+57.5	13.4	17 51.0	+57.6	13.5	18 49.4	+57.6	13.5	19 47.7	+57.7	13.6	20 46.0	+57.8	13.7	57
58	14 54.8	+57.2	12.9	15 53.2	+57.4	12.9	16 51.7	+57.4	13.0	17 50.2	+57.4	13.1	18 48.6	+57.5	13.2	19 47.0	+57.6	13.2	20 45.4	+57.7	13.3	21 43.8	+57.7	13.4	58
59	15 52.0	+57.2	12.6	16 50.6	+57.3	12.7	17 49.1	+57.4	12.7	18 47.6	+57.5	12.8	19 46.1	+57.6	12.9	20 44.6	+57.6	12.9	21 43.1	+57.7	13.0	22 41.5	+57.8	13.1	59
60	16 49.3	+57.2	12.3	17 47.9	+57.3	12.3	18 46.5	+57.4	12.4	19 45.1	+57.4	12.5	20 43.7	+57.5	12.6	21 42.2	+57.6	12.6	22 40.8	+57.6	12.7	23 39.3	+57.7	12.8	60
61	17 46.5	+57.2	12.0	18 45.2	+57.2	12.0	19 43.9	+57.3	12.1	20 42.5	+57.4	12.2	21 41.2	+57.4	12.3	22 39.8	+57.5	12.3	23 38.4	+57.6	12.4	24 37.0	+57.6	12.5	61
62	18 43.7	+57.1	11.6	19 42.4	+57.2	11.7	20 41.2	+57.3	11.8	21 39.9	+57.4	11.9	22 38.6	+57.4	11.9	23 37.3	+57.5	12.0	24 36.0	+57.6	12.1	25 34.6	+57.6	12.2	62
63	19 40.8	+57.1	11.3	20 39.6	+57.2	11.4	21 38.5	+57.2	11.5	22 37.3	+57.3	11.5	23 36.0	+57.4	11.6	24 34.8	+57.4	11.7	25 33.5	+57.5	11.8	26 32.2	+57.6	11.9	63
64	20 37.9	+57.1	11.0	21 36.8	+57.2	11.1	22 35.7	+57.2	11.1	23 34.6	+57.2	11.2	24 33.4	+57.3	11.3	25 32.2	+57.4	11.4	26 31.0	+57.5	11.5	27 29.8	+57.6	11.6	64
65	21 35.0	+57.0	10.7	22 34.0	+57.1	10.7	23 32.9	+57.2	10.8	24 31.8	+57.3	10.9	25 30.7	+57.3	11.0	26 29.6	+57.4	11.1	27 28.5	+57.4	11.2	28 27.4	+57.5	11.3	65
66	22 32.0	+57.0	10.3	23 31.1	+57.0	10.4	24 30.1	+57.1	10.5	25 29.1	+57.2	10.6	26 28.0	+57.3	10.6	27 27.0	+57.3	10.7	28 25.9	+57.3	10.8	29 24.9	+57.4	10.9	66
67	23 29.0	+57.0	10.0	24 28.1	+57.0	10.1	25 27.2	+57.1	10.1	26 26.3	+57.1	10.2	27 25.3	+57.2	10.3	28 24.3	+57.3	10.4	29 23.3	+57.3	10.5	30 22.3	+57.4	10.6	67
68	24 26.0	+56.9	9.6	25 25.1	+57.0	9.7	26 24.3	+57.0	9.8	27 23.4	+57.1	9.9	28 22.5	+57.1	10.0	29 21.6	+57.2	10.1	30 20.6	+57.3	10.2	31 19.7	+57.3	10.3	68
69	25 22.9	+56.8	9.3	26 22.1	+56.9	9.4	27 21.3	+57.0	9.4	28 20.5	+57.0	9.5	29 19.6	+57.1	9.6	30 18.8	+57.1	9.7	31 17.9	+57.2	9.8	32 17.0	+57.3	9.9	69
70	26 19.7	+56.8	8.9	27 19.0	+56.9	9.0	28 18.3	+56.9	9.1	29 17.5	+57.0	9.2	30 16.7	+57.1	9.3	31 15.9	+57.1	9.4	32 15.1	+57.2	9.5	33 14.3	+57.2	9.6	70
71	27 16.5	+56.8	8.6	28 15.9	+56.8	8.6	29 15.2	+56.8	8.7	30 14.5	+56.9	8.8	31 13.8	+56.9	8.9	32 13.0	+57.1	9.0	33 12.3	+57.1	9.1	34 11.5	+57.2	9.2	71
72	28 13.3	+56.7	8.2	29 12.7	+56.7	8.3	30 12.0	+56.8	8.4	31 11.4	+56.9	8.4	32 10.7	+56.9	8.5	33 10.1	+56.9	8.6	34 09.4	+57.0	8.7	35 08.7	+57.1	8.8	72
73	29 10.0	+56.6	7.8	30 09.4	+56.7	7.9	31 08.8	+56.8	8.0	32 08.2	+56.8	8.1	33 07.6	+56.9	8.2	34 07.0	+56.9	8.3	35 06.4	+56.9	8.4	36 05.8	+57.0	8.5	73
74	30 06.6	+56.5	7.4	31 06.1	+56.6	7.5	32 05.6	+56.6	7.6	33 05.0	+56.7	7.7	34 04.5	+56.7	7.8	35 03.9	+56.8	7.9	36 03.3	+56.9	8.0	37 02.8	+56.9	8.1	74
75	31 03.1	+56.4	7.1	32 02.7	+56.5	7.2	33 02.2	+56.6	7.2	34 01.7	+56.6	7.3	35 01.2	+56.7	7.4	36 00.7	+56.8	7.5	37 00.2	+56.8	7.6	37 59.7	+56.8	7.7	75
76	31 59.6	+56.4	6.7	32 59.2	+56.5	6.7	33 58.8	+56.5	6.8	34 58.4	+56.5	6.9	35 57.9	+56.6	7.0	36 57.5	+56.6	7.1	37 57.0	+56.7	7.2	38 56.5	+56.8	7.3	76
77	32 56.0	+56.4	6.3	33 55.7	+56.3	6.3	34 55.3	+56.4	6.4	35 54.9	+56.5	6.5	36 54.5	+56.5	6.6	37 54.1	+56.6	6.7	38 53.7	+56.6	6.8	39 53.3	+56.7	6.8	77
78	33 52.4	+56.2	5.9	34 52.0	+56.3	5.9	35 51.7	+56.4	6.0	36 51.4	+56.4	6.1	37 51.0	+56.5	6.1	38 50.7	+56.5	6.2	39 50.3	+56.6	6.3	40 50.0	+56.6	6.4	78
79	34 48.6	+56.2	5.4	35 48.3	+56.2	5.5	36 48.1	+56.2	5.6	37 47.8	+56.2	5.6	38 47.5	+56.3	5.7	39 47.2	+56.3	5.8	40 46.9	+56.4	5.9	41 46.5	+56.5	6.0	79
80	35 44.8	+56.0	5.0	36 44.5	+56.1	5.1	37 44.3	+56.1	5.1	38 44.0	+56.2	5.2	39 43.8	+56.2	5.3	40 43.5	+56.3	5.3	41 43.3	+56.3	5.4	42 43.0	+56.3	5.5	80
81	36 40.8	+56.0	4.6	37 40.6	+56.0	4.6	38 40.4	+56.1	4.7	39 40.2	+56.1	4.7	40 40.0	+56.1	4.8	41 39.8	+56.1	4.9	42 39.6	+56.2	5.0	43 39.3	+56.3	5.0	81
82	37 36.8	+55.8	4.1	38 36.6	+55.9	4.2	39 36.5	+55.9	4.2	40 36.3	+55.9	4.3	41 36.1	+56.0	4.3	42 35.9	+56.1	4.4	43 35.8	+56.1	4.5	44 35.6	+56.1	4.6	82
83	38 32.6	+55.8	3.6	39 32.5	+55.8	3.7	40 32.4	+55.8	3.7	41 32.2	+55.9	3.8	42 32.1	+55.9	3.9	43 32.0	+55.9	3.9	44 31.8	+56.0	4.0	45 31.7	+55.9	4.1	83
84	39 28.4	+55.6	3.2	40 28.3	+55.6	3.2	41 28.2	+55.6	3.3	42 28.1	+55.7	3.3	43 28.0	+55.7	3.4	44 27.9	+55.7	3.4	45 27.8	+55.8	3.5	46 27.6	+55.9	3.5	84
85	40 24.0	+55.5	2.7	41 23.9	+55.5	2.7	42 23.8	+55.6	2.8	43 23.8	+55.5	2.8	44 23.7	+55.6	2.8	45 23.6	+55.6	2.9	46 23.6	+55.6	2.9	47 23.5	+55.6	3.0	85
86	41 19.5	+55.3	2.2	42 19.4	+55.4	2.2	43 19.4	+55.4	2.2	44 19.3	+55.5	2.3	45 19.3	+55.4	2.3	46 19.2	+55.5	2.4	47 19.2	+55.5	2.4	48 19.1	+55.5	2.4	86
87	42 14.8	+55.1	1.6	43 14.8	+55.2	1.7	44 14.8	+55.2	1.7	45 14.8	+55.2	1.7	46 14.7	+55.3	1.8	47 14.7	+55.3	1.8	48 14.7	+55.3	1.8	49 14.6	+55.4	1.9	87
88	43 10.0	+55.1	1.1	44 10.0	+55.1	1.1	45 10.0	+55.1	1.2	46 10.0	+55.1	1.2	47 10.0	+55.1	1.2	48 10.0	+55.1	1.2	49 10.0	+55.1	1.2	50 10.0	+55.1	1.3	88
89	44 05.1	+54.9	0.6	45 05.1	+54.9	0.6	46 05.1	+54.9	0.6	47 05.1	+54.9	0.6	48 05.1	+54.9	0.6	49 05.1	+54.9	0.6	50 05.1	+54.9	0.6	51 05.1	+54.9	0.6	89
90	45 00.0	+54.7	0.0	46 00.0	+54.7	0.0	47 00.0	+54.7	0.0	48 00.0	+54.7	0.0	49 00.0	+54.7	0.0	50 00.0	+54.7	0.0	51 00.0	+54.7	0.0	52 00.0	+54.7	0.0	90

| 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 156°, 204°

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45°			46°			47°			48°			49°			50°			51°			52°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	39 51.3	+55.2	146.6	39 01.1	+55.5	147.0	38 10.7	+55.7	147.5	37 19.9	+56.1	147.9	36 29.0	+56.3	148.3	35 37.9	+56.5	148.7	34 46.5	+56.7	149.0	33 55.0	+56.9	149.4	0
1	40 46.5	+55.1	146.1	39 56.6	+55.4	146.6	39 06.4	+55.7	147.0	38 16.0	+55.9	147.4	37 25.3	+56.2	147.8	36 34.4	+56.4	148.3	35 43.2	+56.7	148.6	34 51.9	+56.9	149.0	1
2	41 41.6	+54.9	145.6	40 52.0	+55.2	146.0	40 02.1	+55.5	146.5	39 11.9	+55.8	147.0	38 21.5	+56.0	147.4	37 30.8	+56.3	147.8	36 39.9	+56.6	148.2	35 48.8	+56.8	148.6	2
3	42 36.5	+54.8	145.0	41 47.2	+55.1	145.5	40 57.6	+55.4	146.0	40 07.7	+55.7	146.5	39 17.5	+56.0	147.0	38 27.1	+56.2	147.4	37 36.5	+56.4	147.8	36 45.6	+56.7	148.2	3
4	43 31.3	+54.5	144.5	42 42.3	+54.9	145.0	41 53.0	+55.2	145.5	41 03.4	+55.5	146.0	40 13.5	+55.8	146.5	39 23.3	+56.2	146.9	38 32.9	+56.4	147.4	37 42.3	+56.6	147.8	4
5	44 25.8	+54.4	143.9	43 37.2	+54.8	144.4	42 48.2	+55.1	145.0	41 58.9	+55.5	145.5	41 09.3	+55.8	146.0	40 19.5	+56.0	146.5	39 29.3	+56.3	146.9	38 38.9	+56.5	147.4	5
6	45 20.2	+54.3	143.3	44 32.0	+54.6	143.9	43 43.3	+55.0	144.4	42 54.4	+55.2	145.0	42 05.1	+55.5	145.5	41 15.5	+55.8	146.0	40 25.6	+56.1	146.5	39 35.4	+56.4	146.9	6
7	46 14.5	+54.1	142.7	45 26.6	+54.4	143.3	44 38.3	+54.7	143.9	43 49.6	+55.1	144.4	43 00.6	+55.5	145.0	42 11.3	+55.8	145.5	41 21.7	+56.1	146.0	40 31.8	+56.4	146.5	7
8	47 08.5	+53.7	142.0	46 21.0	+54.2	142.7	45 33.0	+54.6	143.3	44 44.7	+55.0	143.9	43 56.1	+55.3	144.5	43 07.1	+55.6	145.0	42 17.8	+55.9	145.5	41 28.2	+56.2	146.0	8
9	48 02.2	+53.6	141.4	47 15.2	+53.9	142.1	46 27.6	+54.4	142.7	45 39.7	+54.8	143.3	44 51.4	+55.1	143.9	44 02.7	+55.5	144.5	43 13.7	+55.8	145.0	42 24.4	+56.1	145.6	9
10	48 55.8	+53.3	140.7	48 09.1	+53.8	141.4	47 22.0	+54.2	142.1	46 34.5	+54.7	142.7	45 46.5	+55.0	143.4	44 58.2	+55.3	144.0	44 09.5	+55.7	144.5	43 20.5	+55.9	145.1	10
11	49 49.1	+53.1	140.0	49 02.9	+53.5	140.7	48 16.2	+54.0	141.4	47 29.1	+54.4	142.1	46 41.5	+54.8	142.8	45 53.5	+55.2	143.4	45 05.2	+55.5	144.0	44 16.4	+55.9	144.6	11
12	50 42.2	+52.7	139.3	49 56.4	+53.3	140.0	49 10.2	+53.7	140.8	48 23.5	+54.1	141.5	47 36.3	+54.6	142.2	46 48.7	+55.0	142.8	46 00.7	+55.3	143.5	45 12.3	+55.6	144.1	12
13	51 34.9	+52.5	138.5	50 49.7	+53.0	139.3	50 03.9	+53.5	140.1	49 17.6	+54.0	140.8	48 30.9	+54.4	141.6	47 43.7	+54.7	142.3	46 56.0	+55.2	142.9	46 07.9	+55.6	143.5	13
14	52 27.4	+52.1	137.7	51 42.7	+52.7	138.6	50 57.4	+53.2	139.4	50 11.6	+53.7	140.2	49 25.3	+54.1	140.9	48 38.4	+54.6	141.6	47 51.2	+55.0	142.3	47 03.5	+55.3	143.0	14
15	53 19.5	+51.7	136.9	52 35.4	+52.3	137.8	51 50.6	+52.9	138.6	51 05.3	+53.4	139.5	50 19.4	+54.0	140.3	49 33.0	+54.4	141.0	48 46.2	+54.8	141.7	47 58.8	+55.2	142.4	15
16	54 11.2	+51.4	136.0	53 27.7	+52.0	137.0	52 43.5	+52.6	137.9	51 58.7	+53.2	138.7	51 13.4	+53.6	139.6	50 27.4	+54.2	140.4	49 41.0	+54.6	141.1	48 54.0	+55.0	141.8	16
17	55 02.6	+51.0	135.1	54 19.7	+51.7	136.1	53 36.1	+52.3	137.1	52 51.9	+52.8	138.0	52 07.0	+53.4	138.8	51 21.6	+53.9	139.7	50 35.6	+54.3	140.5	49 49.0	+54.8	141.2	17
18	55 53.6	+50.6	134.2	55 11.4	+51.2	135.2	54 28.4	+51.9	136.2	53 44.7	+52.6	137.2	53 00.4	+53.1	138.1	52 15.5	+53.6	139.0	51 29.9	+54.1	139.8	50 43.8	+54.6	140.6	18
19	56 44.2	+50.0	133.2	56 02.6	+50.9	134.3	55 20.3	+51.5	135.3	54 37.3	+52.2	136.4	53 53.5	+52.8	137.3	53 09.1	+53.3	138.2	52 24.0	+53.9	139.1	51 38.4	+54.4	139.9	19
20	57 34.2	+49.6	132.2	56 53.5	+50.3	133.4	56 11.9	+51.1	134.5	55 29.5	+51.7	135.5	54 46.3	+52.4	136.5	54 02.4	+53.1	137.4	53 17.9	+53.6	138.4	52 32.8	+54.1	139.2	20
21	58 23.8	+49.0	131.2	57 43.8	+49.9	132.4	57 03.0	+50.6	133.5	56 21.2	+51.4	134.6	55 38.7	+52.1	135.6	54 55.5	+52.7	136.6	54 11.5	+53.3	137.6	53 26.9	+53.8	138.5	21
22	59 12.8	+48.4	130.0	58 33.7	+49.3	131.3	57 53.6	+50.2	132.5	57 12.6	+51.0	133.7	56 30.8	+51.7	134.7	55 48.2	+52.3	135.8	55 04.8	+53.0	136.8	54 20.7	+53.5	137.8	22
23	60 01.2	+47.8	128.9	59 23.0	+48.7	130.2	58 43.8	+49.6	131.5	58 03.6	+50.4	132.7	57 22.5	+51.2	133.8	56 40.5	+52.0	134.9	55 57.8	+52.6	136.0	55 14.2	+53.3	137.0	23
24	60 49.0	+47.0	127.6	60 11.7	+48.1	129.0	59 33.4	+49.1	130.4	58 54.0	+50.0	131.6	58 13.7	+50.8	132.8	57 32.5	+51.5	134.0	56 50.4	+52.2	135.1	56 07.5	+52.9	136.2	24
25	61 36.0	+46.3	126.4	60 59.8	+47.4	127.8	60 22.5	+48.4	129.2	59 44.0	+49.4	130.5	59 04.5	+50.2	131.8	58 24.0	+51.1	133.0	57 42.6	+51.8	134.2	57 00.4	+52.5	135.3	25
26	62 22.3	+45.4	125.0	61 47.2	+46.7	126.5	61 10.9	+47.7	128.0	60 33.4	+48.7	129.4	59 54.7	+49.7	130.7	59 15.1	+50.5	132.0	58 34.4	+51.4	133.2	57 52.9	+52.1	134.4	26
27	63 07.7	+44.6	123.6	62 33.9	+45.8	125.2	61 58.6	+47.0	126.7	61 22.1	+48.1	128.2	60 44.4	+49.1	129.6	60 05.6	+50.1	131.0	59 25.8	+50.9	132.2	58 45.0	+51.7	133.5	27
28	63 52.3	+43.6	122.1	63 19.7	+44.9	123.8	62 45.6	+46.2	125.4	62 10.2	+47.4	126.9	61 33.5	+48.5	128.4	60 55.7	+49.4	129.8	60 16.7	+50.4	131.2	59 36.7	+51.2	132.5	28
29	64 35.9	+42.5	120.5	64 04.6	+44.0	122.3	63 31.8	+45.3	124.0	62 57.6	+46.6	125.6	62 22.0	+47.7	127.2	61 45.1	+48.8	128.6	61 07.1	+49.8	130.1	60 27.9	+50.7	131.4	29
30	65 18.4	+41.3	118.8	64 48.6	+42.9	120.7	64 17.1	+44.4	122.5	63 44.2	+45.7	124.2	63 09.7	+47.0	125.8	62 33.9	+48.1	127.4	61 56.9	+49.1	128.9	61 18.6	+50.1	130.3	30
31	65 59.7	+40.0	117.1	65 31.5	+41.7	119.0	65 01.5	+43.3	120.9	64 29.9	+44.7	122.7	63 56.7	+46.1	124.4	63 22.0	+47.4	126.1	62 46.0	+48.5	127.7	62 08.7	+49.5	129.2	31
32	66 39.7	+38.7	115.2	66 13.2	+40.5	117.3	65 44.8	+42.2	119.2	65 14.6	+43.7	121.1	64 42.8	+45.1	123.0	64 09.4	+46.4	124.7	63 34.5	+47.7	126.4	62 58.2	+48.9	127.9	32
33	67 18.4	+37.2	113.3	66 53.7	+39.1	115.4	66 27.0	+40.9	117.5	65 58.3	+42.6	119.5	65 27.9	+44.2	121.4	64 55.8	+45.6	123.2	64 22.2	+46.9	125.0	63 47.1	+48.1	126.6	33
34	67 55.6	+35.5	111.2	67 32.8	+37.6	113.5	67 07.9	+39.5	115.6	66 40.9	+41.4	117.7	66 12.1	+43.0	119.7	65 41.4	+44.6	121.6	65 09.1	+46.0	123.5	64 35.2	+47.3	125.3	34
35	68 31.1	+33.8	109.0	68 10.4	+36.0	111.4	67 47.4	+38.1	113.7	67 22.3	+39.9	115.9	66 55.1	+41.8	118.0	66 26.0	+43.4	120.0	65 55.1	+45.0	122.0	65 22.5	+46.4	123.8	35
36	69 04.9	+31.9•	106.7	68 46.4	+34.2	109.2	68 25.5	+36.4	111.6	68 02.2	+38.5	113.9	67 36.9	+40.4	116.1	67 09.4	+42.3	118.3	66 40.1	+43.9	120.3	66 08.9	+45.4	122.3	36
37	69 36.8	+29.7•	104.9	69 20.6	+32.3•	106.9	69 01.9	+34.6	109.4	68 40.7	+36.9	111.8	68 17.3	+39.0	114.2	67 51.7	+40.9	116.4	67 24.0	+42.7	118.6	66 54.3	+44.3	120.6	37
38	70 06.5	+27.6•	101.8	69 52.9	+30.2•	104.5	69 36.5	+32.8•	107.1	69 17.6	+35.1	109.6	68 56.3	+37.3	112.1	68 32.6	+39.4	114.4	68 06.7	+41.3	116.7	67 38.7	+43.1	118.9	38
39	70 34.1	+25.1•	99.2	70 23.1	+27.9•	101.9	70 09.3	+30.6•	104.7	69 52.7	+33.2•	107.3	69 33.6	+35.6	109.9	69 12.0	+37.8	112.3	68 48.0	+39.9	114.7	68 21.8	+41.8	117.0	39
40	70 59.2	+22.6•	96.4	70 51.0	+25.6•	99.3	70 39.9	+28.4•	102.1	70 25.9	+31.1•	104.8	70 09.2	+33.6•	107.5	69 49.8	+36.0	110.1	69 27.9	+38.3	112.6	69 03.6	+40.4	115.1	40
41	71 21.8	+19.9•	93.5	71 16.6	+22.9•	96.5	71 08.3	+25.9•	99.4	70 57.0	+28.8•	102.3	70 42.8	+31.5•	105.1	70 25.8	+34.1•	107.8	70 06.2	+36.5	110.4	69 44.0	+38.8	113.0	41
42	71 41.7	+17.0•	90.6	71 39.5	+20.2•	93.6	71 34.2	+23.3•	96.6	71 25.8	+26.3•	99.5	71 14.3	+29.3•	102.4	70 59.9	+32.0•	105.3	70 42.7	+34.6•	108.0	70 22.8	+37.0	110.7	42
43	71 58.7	+14.0•	87.5	71 59.7	+17.3•	90.6	71 57.5	+20.5•	93.6	71 52.1	+23.7•	96.7	71 43.6	+26.7•	99.7	71 31.9	+29.7•	102.7	71 17.3	+32.5•	105.5	70 59.8	+35.1•	108.3	43
44	72 12.7	+10.9•	84.3	72 17.0	+14.3•	87.4	72 18.0	+17.6•	90.6	72 15.8	+20.9•	93.8	72 10.3	+24.1•	96.8	72 01.6	+27.2•	99.9	71 49.8	+30.1•	102.9	71 34.9	+32.9•	105.8	44
45	72 23.6	+7.7•	81.1	72 31.3	+11.0•	84.2	72 35.6	+14.5•	87.4	72 36.7	+17.9•	90.6	72 34.4	+21.2•	93.8	72 28.8	+24.4•	96.9	72 19.9	+27.6•	100.1	72 07.8	+30.6•	103.1	45
46	72 31.3	+4.3•	77.8	72 42.3	+7.8•	80.9	72 50.1	+11.3•	84.1	72 54.6	+14.7•	87.4	72 55.6	+18.2•	90.6	72 53.2	+21.6•	93.9	72 47.5	+24.9•	97.1	72 38.4	+28.1•	100.3	46
47	72 35.6	+1.1•	74.5	72 50.1	+4.5•	77.6	73 01.4	+7.9•	80.8	73 09.3	+11.4•	84.0	73 13.8	+15.0•	87.3	73 14.8	+18.5•	90.7	73 12.4	+21.9•	94.0	73 06.5	+25.3•	97.3	47
48	72 36.7	−2.3•	71.1	72 54.6	+1.0•	74.2	73 09.3	+4.5•	77.4	73 20.7	+8.1•	80.6	73 28.8	+11.6•	84.0	73 33.3	+15.2•	87.3	73 34.3	+18.8•	90.7	73 31.8	+22.3•	94.1	48
49	72 34.4	−5.6•	67.8	72 55.6	−2.4•	70.8	73 13.8	+1.0•	73.9	73 28.8	+4.5•	77.2	73 40.4	+8.1•	80.5	73 48.5	+11.8•	83.9	73 53.1	+15.5•	87.3	73 54.1	+19.1•	90.8	49
50	72 28.8	−8.9•	64.5	72 53.2	−5.7•	67.4	73 14.8	−2.4•	70.5	73 33.3	+1.0•	73.5	73 48.5	+4.6•	77.0	74 00.3	+8.3•	80.4	74 08.6	+12.0•	83.8	74 13.2	+15.7•	87.4	50
51	72 19.9	−12.1•	61.2	72 47.5	−9.1•	64.0	73 12.4	−5.9•	67.0	73 34.3	−2.5•	70.1	73 53.1	+1.0•	73.4	74 08.6	+4.6•	76.8	74 20.6	+8.3•	80.2	74 28.9	+12.2•	83.8	51
52	72 07.8	−15.1•	58.0	72 38.4	−12.3•	60.7	73 06.5	−9.3•	63.6	73 31.8	−6.1•	66.6	73 54.1	−2.7•	69.8	74 13.2	+0.9•	73.1	74 28.9	+4.7•	76.5	74 41.1	+8.4•	80.1	52
53	71 52.7	−18.1•	54.9	72 26.1	−15.4•	57.4	72 57.2	−12.5•	60.2	73 25.7	−9.5•	63.1	73 51.4	−6.2•	66.2	74 14.1	−2.8•	69.4	74 33.6	+0.8•	72.8	74 49.5	+4.5•	76.3	53
54	71 34.6	−20.9•	51.8	72 10.7	−18.4•	54.3	72 44.6	−15.7•	56.9	73 16.2	−12.9•	59.6	73 45.2	−9.8•	62.6	74 11.3	−6.4•	65.7	74 34.4	−2.9•	69.0	74 54.2	+0.7•	72.5	54
55	71 13.7	−23.6•	48.9	71 52.3	−21.3•	51.2	72 28.9	−18.8•	53.6	73 03.3	−16.1•	56.3	73 35.4	−13.2•	59.1	74 04.9	−10.1•	62.1	74 31.5	−6.7•	65.3	74 54.9	−3.1•	68.7	55
56	70 50.1	−26.0•	46.0	71 31.0	−24.0•	48.2	72 10.1	−21.7•	50.5	72 47.2	−19.2•	53.0	73 22.2	−16.5•	55.7	73 54.8	−13.5•	58.5	74 24.8	−10.4•	61.6	74 51.8	−6.9•	64.8	56
57	70 24.1	−28.4•	43.3	71 07.0	−26.5•	45.3	71 48.4	−24.4•	47.5	72 28.0	−22.1•	49.8	73 05.7	−19.6•	52.3	73 41.3	−16.9•	55.0	74 14.4	−13.9•	57.9	74 44.9	−10.7•	61.0	57
58	69 55.7	−30.6•	40.7	70 40.5	−28.8•	42.6	71 24.0	−27.0•	44.6	72 05.9	−24.9•	46.8	72 46.1	−22.6•	49.1	73 24.4	−20.1•	51.6	74 00.5	−17.3•	54.4	74 34.2	−14.3•	57.3	58
59	69 25.1	−32.6•	38.3	70 11.7	−31.0•	40.0	70 57.0	−29.4•	41.9	71 41.0	−27.4•	43.8	72 23.5	−25.3•	46.0	73 04.3	−23.1•	48.4	73 43.2	−20.6•	50.9	74 19.9	−17.8•	53.7	59
60	68 52.5	−34.4	35.9	69 40.7	−33.1	37.5	70 27.7	−31.5•	39.2	71 13.6	−29.8•	41.0	71 58.2	−27.9•	43.1	72 41.2	−25.8•	45.2	73 22.6	−23.6•	47.6	74 02.1	−21.1•	50.2	60
61	68 18.1	−36.2	33.7	69 07.6	−34.9	35.1	69 56.2	−33.5	36.7	70 43.8	−32.0•	38.4	71 30.3	−30.4•	40.2	72 15.4	−28.5•	42.2	72 59.0	−26.4•	44.4	73 41.0	−24.1•	46.8	61
62	67 41.9	−37.7	31.5	68 32.7	−36.6	32.9	69 22.7	−35.4	34.3	70 11.8	−34.0	35.8	70 59.9	−32.5•	37.5	71 46.9	−30.8•	39.4	72 32.6	−29.0•	41.4	73 16.9	−27.0•	43.6	62
63	67 04.2	−39.2	29.5	67 56.1	−38.2	30.7	68 47.3	−37.1	32.0	69 37.8	−35.9	33.4	70 27.4	−34.5•	35.0	71 16.1	−33.1•	36.7	72 03.6	−31.4•	38.5	72 49.9	−29.6•	40.5	63
64	66 25.0	−40.6	27.6	67 17.9	−39.7	28.7	68 10.2	−38.6	29.9	69 01.9	−37.6	31.2	69 52.9	−36.5	32.6	70 43.0	−35.1	34.1	71 32.2	−33.7•	35.8	72 20.3	−32.1•	37.6	64
65	65 44.4	−41.7	25.8	66 38.2	−40.9	26.8	67 31.6	−40.2	27.9	68 24.3	−39.1	29.0	69 16.4	−38.1	30.3	70 07.9	−37.0	31.7	70 58.5	−35.7	33.2	71 48.2	−34.2•	34.9	65
66	65 02.7	−42.9	24.0	65 57.3	−42.2	25.0	66 51.4	−41.4	25.9	67 45.2	−40.5	27.0	68 38.3	−39.6	28.2	69 30.9	−38.6	29.4	70 22.8	−37.5	30.8	71 14.0	−36.3	32.3	66
67	64 19.8	−44.0	22.4	65 15.1	−43.4	23.2	66 10.0	−42.6	24.1	67 04.6	−41.9	25.1	67 58.7	−41.1	26.1	68 52.3	−40.2	27.3	69 45.3	−39.2	28.5	70 37.7	−38.1	29.9	67
68	63 35.8	−44.9	20.9	64 31.7	−44.3	21.6	65 27.4	−43.8	22.4	66 22.7	−43.1	23.3	67 17.6	−42.4	24.2	68 12.1	−41.6	25.2	69 06.1	−40.7	26.3	69 59.6	−39.8	27.6	68
69	62 50.9	−45.8	19.4	63 47.4	−45.3	20.1	64 43.6	−44.7	20.8	65 39.6	−44.2	21.6	66 35.2	−43.5	22.4	67 30.5	−42.9	23.3	68 25.4	−42.1	24.3	69 19.8	−41.2	25.4	69
70	62 05.1	−46.5	18.0	63 02.1	−46.1	18.6	63 58.9	−45.7	19.2	64 55.4	−45.2	19.9	65 51.7	−44.7	20.7	66 47.6	−44.0	21.5	67 43.3	−43.4	22.4	68 38.6	−42.7	23.4	70
71	61 18.6	−47.4	16.7	62 16.0	−47.0	17.2	63 13.2	−46.5	17.8	64 10.2	−46.1	18.4	65 07.0	−45.6	19.1	66 03.6	−45.1	19.8	66 59.9	−44.5	20.6	67 55.9	−43.9	21.5	71
72	60 31.2	−48.0	15.4	61 29.0	−47.6	15.9	62 26.7	−47.2	16.4	63 24.1	−46.9	17.0	64 21.4	−46.5	17.6	65 18.5	−46.0	18.2	66 15.4	−45.5	18.9	67 12.0	−45.0	19.7	72
73	59 43.2	−48.6	14.2	60 41.4	−48.4	14.6	61 39.4	−48.1	15.1	62 37.2	−47.7	15.6	63 34.9	−47.3	16.1	64 32.5	−46.9	16.7	65 29.9	−46.5	17.3	66 27.0	−46.0	18.0	73
74	58 54.6	−49.2	13.0	59 53.0	−48.9	13.4	60 51.3	−48.7	13.8	61 49.5	−48.4	14.3	62 47.6	−48.1	14.8	63 45.6	−47.8	15.3	64 43.4	−47.4	15.8	65 41.0	−46.9	16.4	74
75	58 05.4	−49.8	11.9	59 04.1	−49.6	12.3	60 02.6	−49.3	12.7	61 01.1	−49.1	13.0	61 59.5	−48.7	13.5	62 57.8	−48.4	13.9	63 56.0	−48.1	14.4	64 54.1	−47.8	14.9	75
76	57 15.6	−50.2	10.9	58 14.5	−50.0	11.2	59 13.4	−49.9	11.5	60 12.1	−49.6	11.9	61 10.8	−49.4	12.2	62 09.4	−49.2	12.6	63 07.9	−48.9	13.1	64 06.3	−48.6	13.5	76
77	56 25.4	−50.7	9.9	57 24.5	−50.6	10.2	58 23.5	−50.4	10.5	59 22.5	−50.2	10.8	60 21.4	−50.0	11.1	61 20.2	−49.7	11.4	62 19.0	−49.5	11.8	63 17.7	−49.3	12.2	77
78	55 34.7	−51.2	8.9	56 33.9	−51.0	9.2	57 33.1	−50.8	9.4	58 32.3	−50.7	9.7	59 31.4	−50.5	10.0	60 30.5	−50.3	10.3	61 29.5	−50.1	10.6	62 28.4	−49.9	11.0	78
79	54 43.5	−51.5	8.2	55 42.9	−51.4	8.4	56 42.3	−51.3	8.6	57 41.6	−51.1	8.7	58 40.9	−51.0	8.9	59 40.2	−50.7	9.2	60 39.4	−50.7	9.5	61 38.5	−50.4	9.8	79
80	53 52.0	−51.9	7.1	54 51.5	−51.8	7.3	55 51.0	−51.7	7.5	56 50.5	−51.6	7.7	57 49.9	−51.4	7.9	58 49.3	−51.3	8.1	59 48.7	−51.1	8.4	60 48.1	−51.0	8.7	80
81	53 00.1	−52.2	6.3	53 59.7	−52.1	6.5	54 59.3	−52.0	6.6	55 58.9	−51.9	6.8	56 58.5	−51.9	7.0	57 58.0	−51.7	7.2	58 57.6	−51.7	7.4	59 57.1	−51.6	7.6	81
82	52 07.9	−52.6	5.5	53 07.6	−52.5	5.6	54 07.3	−52.4	5.8	55 07.0	−52.4	5.9	56 06.6	−52.2	6.1	57 06.3	−52.2	6.2	58 05.9	−52.0	6.4	59 05.5	−51.9	6.6	82
83	51 15.3	−52.9	4.7	52 15.1	−52.8	4.8	53 14.9	−52.8	4.9	54 14.6	−52.6	5.1	55 14.4	−52.6	5.2	56 14.1	−52.5	5.3	57 13.9	−52.5	5.5	58 13.6	−52.4	5.6	83
84	50 22.4	−53.1	4.0	51 22.3	−53.1	4.1	52 22.1	−53.0	4.1	53 22.0	−53.0	4.2	54 21.8	−52.9	4.3	55 21.6	−52.9	4.5	56 21.4	−52.8	4.6	57 21.2	−52.7	4.7	84
85	49 29.3	−53.4	3.3	50 29.2	−53.4	3.3	51 29.1	−53.3	3.4	52 29.0	−53.3	3.5	53 28.9	−53.3	3.5	54 28.7	−53.2	3.7	55 28.6	−53.1	3.7	56 28.5	−53.1	3.8	85
86	48 35.9	−53.7	2.6	49 35.8	−53.6	2.6	50 35.8	−53.6	2.7	51 35.7	−53.6	2.7	52 35.6	−53.5	2.8	53 35.5	−53.4	2.8	54 35.5	−53.5	2.9	55 35.4	−53.4	3.0	86
87	47 42.2	−53.8	1.9	48 42.2	−53.8	1.9	49 42.2	−53.8	2.0	50 42.1	−53.8	2.0	51 42.1	−53.8	2.1	52 42.1	−53.8	2.1	53 42.0	−53.7	2.2	54 42.0	−53.7	2.2	87
88	46 48.4	−54.1	1.2	47 48.4	−54.1	1.3	48 48.3	−54.0	1.3	49 48.3	−54.0	1.3	50 48.3	−54.0	1.3	51 48.3	−54.0	1.4	52 48.3	−54.0	1.4	53 48.3	−54.0	1.4	88
89	45 54.3	−54.3	0.6	46 54.3	−54.3	0.6	47 54.3	−54.3	0.6	48 54.3	−54.3	0.6	49 54.3	−54.3	0.7	50 54.3	−54.3	0.7	51 54.3	−54.3	0.7	52 54.3	−54.3	0.7	89
90	45 00.0	−54.5	0.0	46 00.0	−54.5	0.0	47 00.0	−54.5	0.0	48 00.0	−54.5	0.0	49 00.0	−54.5	0.0	50 00.0	−54.5	0.0	51 00.0	−54.5	0.0	52 00.0	−54.5	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	39 51.3	−55.3	146.6	39 01.1	−55.6	147.0	38 10.7	−55.9	147.5	37 19.9	−56.1	147.9	36 29.0	−56.4	148.3	35 37.9	−56.6	148.7	34 46.5	−56.8	149.0	33 55.0	−57.0	149.4	0
1	38 56.0	−55.4	147.1	38 05.5	−55.7	147.5	37 14.8	−56.0	147.9	36 23.8	−56.2	148.3	35 32.6	−56.4	148.7	34 41.3	−56.7	149.1	33 49.7	−56.9	149.4	32 58.0	−57.1	149.8	1
2	38 00.6	−55.5	147.6	37 09.8	−55.8	148.0	36 18.8	−56.1	148.4	35 27.6	−56.3	148.8	34 36.2	−56.5	149.1	33 44.6	−56.7	149.5	32 52.8	−56.9	149.8	32 00.9	−57.1	150.1	2
3	37 05.0	−55.7	148.1	36 14.0	−56.0	148.5	35 22.7	−56.2	148.8	34 31.3	−56.4	149.2	33 39.7	−56.6	149.5	32 47.9	−56.9	149.9	31 55.9	−57.0	150.2	31 03.8	−57.2	150.5	3
4	36 09.3	−55.8	148.5	35 18.0	−56.0	148.9	34 26.5	−56.2	149.3	33 34.9	−56.5	149.6	32 43.0	−56.6	149.9	31 51.0	−56.8	150.2	30 58.9	−57.1	150.5	30 06.6	−57.3	150.8	4
5	35 13.5	−55.9	149.0	34 22.0	−56.1	149.3	33 30.3	−56.4	149.7	32 38.4	−56.5	150.0	31 46.4	−56.8	150.3	30 54.2	−57.0	150.6	30 01.8	−57.1	150.9	29 09.3	−57.3	151.2	5
6	34 17.6	−56.0	149.4	33 25.9	−56.2	149.8	32 33.9	−56.4	150.1	31 41.9	−56.7	150.4	30 49.6	−56.8	150.7	29 57.2	−57.0	151.0	29 04.7	−57.2	151.3	28 12.0	−57.3	151.5	6
7	33 21.6	−56.1	149.9	32 29.7	−56.3	150.2	31 37.5	−56.5	150.5	30 45.2	−56.7	150.8	29 52.8	−56.9	151.1	29 00.2	−57.1	151.3	28 07.5	−57.2	151.6	27 14.7	−57.4	151.8	7
8	32 25.6	−56.2	150.3	31 33.4	−56.4	150.6	30 41.0	−56.5	150.9	29 48.5	−56.7	151.2	28 55.9	−56.9	151.4	28 03.2	−57.2	151.7	27 10.3	−57.3	151.9	26 17.3	−57.4	152.2	8
9	31 29.4	−56.2	150.7	30 37.0	−56.4	151.0	29 44.5	−56.7	151.3	28 51.8	−56.8	151.5	27 59.0	−57.0	151.8	27 06.0	−57.1	152.0	26 13.0	−57.3	152.3	25 19.8	−57.5	152.5	9
10	30 33.2	−56.3	151.1	29 40.6	−56.5	151.4	28 47.8	−56.7	151.6	27 55.0	−56.9	151.9	27 02.0	−57.1	152.1	26 08.9	−57.2	152.4	25 15.7	−57.4	152.6	24 22.3	−57.5	152.8	10
11	29 36.9	−56.4	151.5	28 44.1	−56.6	151.8	27 51.1	−56.7	152.0	26 58.1	−56.9	152.3	26 04.9	−57.1	152.5	25 11.7	−57.3	152.7	24 18.3	−57.4	152.9	23 24.8	−57.5	153.1	11
12	28 40.5	−56.5	151.9	27 47.5	−56.6	152.1	26 54.4	−56.8	152.4	26 01.2	−57.0	152.6	25 07.8	−57.1	152.8	24 14.4	−57.3	153.0	23 20.9	−57.5	153.2	22 27.3	−57.6	153.4	12
13	27 44.0	−56.5	152.3	26 50.9	−56.7	152.5	25 57.6	−56.9	152.7	25 04.2	−57.0	153.0	24 10.7	−57.2	153.2	23 17.1	−57.3	153.4	22 23.4	−57.5	153.6	21 29.7	−57.6	153.7	13
14	26 47.5	−56.5	152.7	25 54.2	−56.8	152.9	25 00.7	−56.9	153.1	24 07.2	−57.1	153.3	23 13.5	−57.2	153.5	22 19.8	−57.4	153.7	21 26.0	−57.6	153.9	20 32.1	−57.7	154.0	14
15	25 51.0	−56.7	153.0	24 57.4	−56.8	153.2	24 03.8	−56.9	153.4	23 10.1	−57.1	153.6	22 16.3	−57.3	153.8	21 22.4	−57.4	154.0	20 28.4	−57.5	154.2	19 34.4	−57.7	154.3	15
16	24 54.3	−56.6	153.4	24 00.6	−56.8	153.6	23 06.9	−57.0	153.8	22 13.0	−57.2	154.0	21 18.9	−57.3	154.1	20 25.0	−57.4	154.3	19 30.9	−57.6	154.5	18 36.7	−57.7	154.6	16
17	23 57.7	−56.8	153.8	23 03.8	−56.9	153.9	22 09.9	−57.1	154.1	21 15.8	−57.2	154.3	20 21.7	−57.3	154.5	19 27.6	−57.5	154.6	18 33.3	−57.6	154.8	17 39.0	−57.7	154.9	17
18	23 00.9	−56.7	154.1	22 06.9	−56.9	154.3	21 12.8	−57.1	154.5	20 18.6	−57.2	154.6	19 24.4	−57.4	154.8	18 30.1	−57.5	154.9	17 35.7	−57.6	155.1	16 41.3	−57.8	155.2	18
19	22 04.2	−56.8	154.5	21 10.0	−57.0	154.6	20 15.7	−57.1	154.8	19 21.4	−57.2	154.9	18 27.0	−57.4	155.1	17 32.6	−57.5	155.2	16 38.1	−57.7	155.3	15 43.5	−57.7	155.5	19
20	21 07.4	−56.9	154.8	20 13.0	−57.0	155.0	19 18.6	−57.1	155.1	18 24.2	−57.3	155.3	17 29.6	−57.4	155.4	16 35.1	−57.5	155.5	15 40.4	−57.6	155.6	14 45.8	−57.8	155.8	20
21	20 10.5	−56.9	155.1	19 16.0	−57.0	155.3	18 21.5	−57.2	155.4	17 26.9	−57.3	155.6	16 32.2	−57.4	155.7	15 37.5	−57.6	155.8	14 42.8	−57.7	155.9	13 48.0	−57.9	156.0	21
22	19 13.6	−56.9	155.5	18 19.0	−57.1	155.6	17 24.3	−57.2	155.8	16 29.6	−57.4	155.9	15 34.8	−57.5	156.0	14 39.9	−57.6	156.1	13 45.1	−57.8	156.2	12 50.1	−57.8	156.3	22
23	18 16.7	−57.0	155.8	17 21.9	−57.1	155.9	16 27.1	−57.3	156.1	15 32.2	−57.4	156.2	14 37.3	−57.5	156.3	13 42.3	−57.6	156.4	12 47.3	−57.7	156.5	11 52.3	−57.8	156.6	23
24	17 19.7	−57.0	156.1	16 24.8	−57.1	156.3	15 29.8	−57.2	156.4	14 34.8	−57.3	156.5	13 39.8	−57.5	156.6	12 44.7	−57.6	156.7	11 49.6	−57.7	156.8	10 54.5	−57.9	156.8	24
25	16 22.7	−57.0	156.4	15 27.7	−57.2	156.6	14 32.6	−57.3	156.7	13 37.5	−57.5	156.9	12 42.3	−57.5	156.9	11 47.1	−57.7	157.0	10 51.9	−57.8	157.0	9 56.6	−57.9	157.1	25
26	15 25.7	−57.1	156.8	14 30.5	−57.2	156.9	13 35.3	−57.3	157.0	12 40.0	−57.4	157.1	11 44.8	−57.6	157.2	10 49.4	−57.6	157.2	9 54.1	−57.8	157.3	8 58.7	−57.9	157.4	26
27	14 28.6	−57.1	157.1	13 33.3	−57.2	157.2	12 38.0	−57.4	157.3	11 42.6	−57.4	157.4	10 47.2	−57.6	157.5	9 51.8	−57.7	157.5	8 56.3	−57.8	157.6	8 00.8	−57.9	157.6	27
28	13 31.5	−57.1	157.4	12 36.1	−57.2	157.5	11 40.6	−57.3	157.7	10 45.2	−57.5	157.7	9 49.6	−57.5	157.7	8 54.1	−57.7	157.8	7 58.5	−57.8	157.9	7 02.9	−57.9	157.9	28
29	12 34.4	−57.1	157.7	11 38.9	−57.3	157.8	10 43.3	−57.4	157.9	9 47.7	−57.5	158.0	8 52.1	−57.6	158.0	7 56.4	−57.7	158.1	7 00.7	−57.8	158.1	6 05.0	−57.9	158.2	29
30	11 37.3	−57.2	158.1	10 41.6	−57.3	158.1	9 45.9	−57.4	158.2	8 50.2	−57.5	158.3	7 54.5	−57.6	158.3	6 58.7	−57.7	158.4	6 02.9	−57.8	158.4	5 07.1	−57.9	158.4	30
31	10 40.1	−57.1	158.4	9 44.3	−57.2	158.4	8 48.5	−57.4	158.5	7 52.7	−57.5	158.5	6 56.9	−57.7	158.6	6 01.0	−57.7	158.7	5 05.1	−57.8	158.7	4 09.2	−57.9	158.7	31
32	9 43.0	−57.2	158.7	8 47.1	−57.3	158.7	7 51.1	−57.4	158.8	6 55.2	−57.5	158.8	5 59.2	−57.6	158.9	5 03.3	−57.8	158.9	4 07.3	−57.8	158.9	3 11.3	−58.0	159.0	32
33	8 45.8	−57.2	159.0	7 49.8	−57.3	159.0	6 53.7	−57.4	159.1	5 57.7	−57.6	159.1	5 01.6	−57.6	159.2	4 05.5	−57.7	159.2	3 09.4	−57.8	159.2	2 13.3	−57.9	159.2	33
34	7 48.6	−57.2	159.3	6 52.5	−57.3	159.3	5 56.3	−57.4	159.4	5 00.1	−57.5	159.4	4 04.0	−57.7	159.4	3 07.8	−57.7	159.5	2 11.6	−57.8	159.5	1 15.4	−57.9	159.5	34
35	6 51.4	−57.2	159.6	5 55.1	−57.3	159.6	4 58.9	−57.5	159.7	4 02.6	−57.5	159.7	3 06.3	−57.6	159.7	2 10.1	−57.8	159.7	1 13.8	−57.9	159.7	0 17.5	−58.0	159.7	35
36	5 54.2	−57.3	159.9	4 57.8	−57.3	159.9	4 01.4	−57.4	160.0	3 05.1	−57.6	160.0	2 08.7	−57.6	160.0	1 12.3	−57.7	160.0	0 15.9	−57.8	160.0	0 40.5	+57.9	20.0	36
37	4 56.9	−57.2	160.2	4 00.5	−57.4	160.2	3 04.0	−57.5	160.2	2 07.5	−57.5	160.3	1 11.1	−57.7	160.3	0 14.6	−57.8	160.3	0 41.9	+57.8	19.7	1 38.4	+57.9	19.7	37
38	3 59.7	−57.2	160.5	3 03.1	−57.3	160.5	2 06.5	−57.4	160.5	1 10.0	−57.6	160.5	0 13.4	−57.6	160.5	0 43.2	+57.7	19.5	1 39.7	+57.9	19.5	2 36.3	+57.9	19.5	38
39	3 02.4	−57.2	160.8	2 05.8	−57.4	160.8	1 09.1	−57.5	160.8	0 12.4	−57.5	160.8	0 44.2	+57.7	19.2	1 40.9	+57.7	19.2	2 37.6	+57.9	19.2	3 34.2	+58.0	19.2	39
40	2 05.2	−57.3	161.1	1 08.4	−57.3	161.1	0 11.6	−57.4	161.1	0 45.1	+57.6	18.9	1 41.9	+57.6	18.9	2 38.7	+57.7	18.9	3 35.4	+57.8	18.9	4 32.2	+57.9	19.0	40
41	1 07.9	−57.2	161.4	0 11.1	−57.2	161.4	0 45.8	+57.5	18.6	1 42.7	+57.5	18.6	2 39.5	+57.7	18.6	3 36.4	+57.7	18.6	4 33.2	+57.9	18.7	5 30.1	+57.9	18.7	41
42	0 10.7	−57.3	161.7	0 46.3	+57.4	18.3	1 43.3	+57.4	18.3	2 40.2	+57.6	18.3	3 37.2	+57.6	18.3	4 34.1	+57.7	18.4	5 31.1	+57.8	18.4	6 28.0	+57.9	18.4	42
43	0 46.6	+57.2	18.0	1 43.7	+57.3	18.0	2 40.7	+57.5	18.0	3 37.8	+57.5	18.0	4 34.8	+57.6	18.1	5 31.8	+57.8	18.1	6 28.9	+57.8	18.1	7 25.9	+57.9	18.2	43
44	1 43.8	+57.3	17.7	2 41.0	+57.4	17.7	3 38.2	+57.4	17.7	4 35.3	+57.5	17.8	5 32.4	+57.7	17.8	6 29.6	+57.7	17.8	7 26.7	+57.8	17.9	8 23.8	+57.9	17.9	44
45	2 41.1	+57.3	17.4	3 38.4	+57.3	17.4	4 35.6	+57.4	17.4	5 32.8	+57.6	17.5	6 30.1	+57.6	17.5	7 27.3	+57.7	17.5	8 24.5	+57.8	17.6	9 21.7	+57.8	17.6	45
46	3 38.4	+57.2	17.1	4 35.7	+57.3	17.1	5 33.0	+57.4	17.2	6 30.4	+57.5	17.2	7 27.7	+57.6	17.2	8 25.0	+57.7	17.3	9 22.3	+57.7	17.3	10 19.5	+57.9	17.4	46
47	4 35.6	+57.2	16.8	5 33.0	+57.4	16.8	6 30.5	+57.4	16.9	7 27.9	+57.5	16.9	8 25.3	+57.6	16.9	9 22.7	+57.6	17.0	10 20.0	+57.8	17.0	11 17.4	+57.9	17.1	47
48	5 32.8	+57.2	16.5	6 30.4	+57.3	16.5	7 27.9	+57.4	16.6	8 25.4	+57.5	16.6	9 22.9	+57.4	16.7	10 20.3	+57.6	16.7	11 17.8	+57.8	16.8	12 15.2	+57.9	16.8	48
49	6 30.1	+57.2	16.2	7 27.7	+57.3	16.2	8 25.3	+57.4	16.3	9 22.9	+57.4	16.3	10 20.4	+57.6	16.4	11 18.0	+57.6	16.4	12 15.5	+57.8	16.5	13 13.1	+57.8	16.5	49
50	7 27.3	+57.2	15.9	8 25.0	+57.3	15.9	9 22.7	+57.3	16.0	10 20.3	+57.5	16.0	11 18.0	+57.5	16.1	12 15.6	+57.6	16.1	13 13.3	+57.7	16.2	14 10.9	+57.8	16.3	50
51	8 24.5	+57.2	15.6	9 22.3	+57.2	15.6	10 20.0	+57.4	15.7	11 17.8	+57.4	15.7	12 15.5	+57.6	15.8	13 13.3	+57.6	15.9	14 11.0	+57.7	15.9	15 08.7	+57.7	16.0	51
52	9 21.7	+57.1	15.3	10 19.5	+57.3	15.3	11 17.4	+57.3	15.4	12 15.2	+57.5	15.4	13 13.1	+57.5	15.5	14 10.9	+57.6	15.6	15 08.7	+57.6	15.6	16 06.4	+57.8	15.7	52
53	10 18.8	+57.2	15.0	11 16.8	+57.2	15.0	12 14.7	+57.4	15.1	13 12.7	+57.4	15.1	14 10.6	+57.5	15.2	15 08.5	+57.5	15.3	16 06.3	+57.7	15.4	17 04.2	+57.7	15.4	53
54	11 16.0	+57.1	14.7	12 14.0	+57.2	14.7	13 12.1	+57.3	14.8	14 10.1	+57.3	14.8	15 08.1	+57.4	14.9	16 06.0	+57.6	15.0	17 04.0	+57.6	15.1	18 01.9	+57.7	15.1	54
55	12 13.1	+57.2	14.4	13 11.3	+57.2	14.4	14 09.4	+57.2	14.5	15 07.4	+57.4	14.5	16 05.5	+57.4	14.6	17 03.6	+57.5	14.7	18 01.6	+57.6	14.8	18 59.6	+57.7	14.9	55
56	13 10.3	+57.1	14.0	14 08.5	+57.1	14.2	15 06.6	+57.3	14.2	16 04.8	+57.3	14.2	17 02.9	+57.4	14.3	18 01.1	+57.5	14.4	18 59.2	+57.5	14.5	19 57.3	+57.6	14.6	56
57	14 07.3	+57.1	13.7	15 05.6	+57.2	13.8	16 03.9	+57.3	13.9	17 02.1	+57.3	13.9	18 00.4	+57.3	14.0	18 58.6	+57.4	14.1	19 56.7	+57.6	14.2	20 54.9	+57.6	14.3	57
58	15 04.4	+57.1	13.4	16 02.8	+57.1	13.5	17 01.1	+57.2	13.5	17 59.4	+57.3	13.6	18 57.7	+57.4	13.7	19 56.0	+57.4	13.8	20 54.3	+57.5	13.9	21 52.5	+57.6	14.0	58
59	16 01.5	+57.1	13.1	16 59.9	+57.1	13.2	17 58.3	+57.2	13.2	18 56.7	+57.3	13.3	19 55.1	+57.3	13.4	20 53.4	+57.4	13.5	21 51.8	+57.4	13.5	22 50.1	+57.5	13.5	59
60	16 58.5	+56.9	12.8	17 57.0	+57.0	12.8	18 55.5	+57.1	12.9	19 53.9	+57.2	13.0	20 52.4	+57.3	13.1	21 50.8	+57.3	13.2	22 49.2	+57.5	13.3	23 47.6	+57.5	13.4	60
61	17 55.4	+57.0	12.4	18 54.0	+57.0	12.5	19 52.6	+57.1	12.6	20 51.1	+57.2	12.7	21 49.7	+57.2	12.8	22 48.2	+57.3	12.8	23 46.7	+57.4	12.9	24 45.1	+57.5	13.0	61
62	18 52.4	+56.9	12.1	19 51.0	+57.0	12.2	20 49.7	+57.0	12.3	21 48.3	+57.1	12.3	22 46.9	+57.2	12.4	23 45.5	+57.3	12.5	24 44.1	+57.3	12.6	25 42.6	+57.4	12.7	62
63	19 49.3	+56.9	11.8	20 48.0	+57.0	11.8	21 46.7	+57.1	11.9	22 45.4	+57.1	12.0	23 44.1	+57.2	12.1	24 42.8	+57.2	12.2	25 41.4	+57.3	12.3	26 40.0	+57.4	12.4	63
64	20 46.2	+56.8	11.4	21 45.0	+56.9	11.5	22 43.8	+56.9	11.6	23 42.5	+57.1	11.7	24 41.3	+57.1	11.8	25 40.0	+57.2	11.9	26 38.7	+57.3	12.0	27 37.4	+57.3	12.1	64
65	21 43.0	+56.8	11.2	22 41.9	+56.8	11.2	23 40.7	+56.9	11.2	24 39.6	+57.0	11.3	25 38.4	+57.1	11.4	26 37.2	+57.1	11.5	27 36.0	+57.2	11.6	28 34.7	+57.3	11.7	65
66	22 39.8	+56.7	10.7	23 38.7	+56.8	10.8	24 37.7	+56.8	10.9	25 36.6	+56.9	11.0	26 35.5	+57.0	11.1	27 34.3	+57.1	11.2	28 33.2	+57.1	11.3	29 32.0	+57.2	11.4	66
67	23 36.5	+56.7	10.4	24 35.5	+56.8	10.5	25 34.5	+56.9	10.5	26 33.5	+56.9	10.6	27 32.5	+56.9	10.7	28 31.4	+57.1	10.8	29 30.3	+57.1	10.9	30 29.2	+57.2	11.0	67
68	24 33.2	+56.7	10.2	25 32.3	+56.7	10.2	26 31.4	+56.7	10.2	27 30.4	+56.9	10.3	28 29.4	+57.0	10.4	29 28.5	+56.9	10.5	30 27.4	+57.1	10.6	31 26.4	+57.1	10.7	68
69	25 29.9	+56.6	9.7	26 29.0	+56.7	9.7	27 28.1	+56.8	9.8	28 27.3	+56.7	9.9	29 26.4	+56.8	10.0	30 25.4	+57.0	10.1	31 24.5	+57.0	10.2	32 23.5	+57.1	10.3	69
70	26 26.5	+56.5	9.3	27 25.7	+56.6	9.4	28 24.9	+56.6	9.5	29 24.0	+56.8	9.6	30 23.2	+56.8	9.6	31 22.3	+56.9	9.7	32 21.5	+56.9	9.9	33 20.6	+57.0	10.0	70
71	27 23.0	+56.5	8.9	28 22.3	+56.5	9.0	29 21.5	+56.6	9.1	30 20.8	+56.6	9.2	31 20.0	+56.7	9.3	32 19.2	+56.8	9.3	33 18.4	+56.8	9.5	34 17.6	+56.9	9.6	71
72	28 19.5	+56.4	8.5	29 18.8	+56.5	8.5	30 18.1	+56.5	8.7	31 17.4	+56.6	8.8	32 16.7	+56.6	8.8	33 16.0	+56.7	8.9	34 15.2	+56.8	9.0	35 14.5	+56.8	9.2	72
73	29 15.9	+56.3	8.1	30 15.3	+56.3	8.2	31 14.6	+56.5	8.3	32 14.0	+56.5	8.4	33 13.3	+56.6	8.5	34 12.7	+56.6	8.6	35 12.0	+56.7	8.7	36 11.3	+56.8	8.8	73
74	30 12.2	+56.3	7.7	31 11.6	+56.4	7.8	32 11.1	+56.4	7.9	33 10.5	+56.4	8.0	34 09.9	+56.5	8.1	35 09.3	+56.6	8.2	36 08.7	+56.6	8.3	37 08.1	+56.6	8.4	74
75	31 08.5	+56.1	7.3	32 08.0	+56.2	7.5	33 07.5	+56.3	7.5	34 06.9	+56.4	7.6	35 06.4	+56.4	7.7	36 05.9	+56.4	7.8	37 05.3	+56.5	7.9	38 04.7	+56.6	8.0	75
76	32 04.6	+56.2	6.9	33 04.2	+56.2	7.0	34 03.8	+56.2	7.1	35 03.3	+56.2	7.2	36 02.8	+56.3	7.3	37 02.3	+56.4	7.4	38 01.8	+56.5	7.5	39 01.3	+56.5	7.6	76
77	33 00.8	+56.0	6.5	34 00.4	+56.0	6.6	35 00.0	+56.1	6.7	35 59.5	+56.2	6.7	36 59.1	+56.2	6.8	37 58.7	+56.3	6.9	38 58.3	+56.3	7.0	39 57.8	+56.4	7.1	77
78	33 56.8	+55.9	6.1	34 56.4	+56.0	6.2	35 56.1	+56.0	6.2	36 55.7	+56.1	6.3	37 55.3	+56.2	6.4	38 55.0	+56.1	6.4	39 54.6	+56.2	6.5	40 54.2	+56.3	6.7	78
79	34 52.7	+55.8	5.6	35 52.4	+55.9	5.7	36 52.1	+55.9	5.8	37 51.8	+56.0	5.9	38 51.5	+56.0	5.9	39 51.1	+56.1	6.0	40 50.8	+56.1	6.1	41 50.5	+56.1	6.2	79
80	35 48.5	+55.7	5.2	36 48.3	+55.7	5.3	37 48.0	+55.8	5.3	38 47.8	+55.8	5.4	39 47.5	+55.9	5.5	40 47.2	+56.0	5.6	41 46.9	+56.0	5.6	42 46.6	+56.1	5.7	80
81	36 44.2	+55.5	4.7	37 44.0	+55.7	4.7	38 43.8	+55.7	4.9	39 43.6	+55.7	4.9	40 43.4	+55.8	5.0	41 43.2	+55.9	5.1	42 42.9	+55.9	5.2	43 42.7	+55.9	5.2	81
82	37 39.9	+55.5	4.3	38 39.7	+55.5	4.3	39 39.5	+55.6	4.4	40 39.3	+55.7	4.4	41 39.2	+55.6	4.5	42 39.0	+55.7	4.6	43 38.8	+55.7	4.7	44 38.6	+55.7	4.7	82
83	38 35.4	+55.3	3.8	39 35.2	+55.4	3.8	40 35.1	+55.4	3.9	41 35.0	+55.4	3.9	42 34.8	+55.5	4.0	43 34.7	+55.5	4.1	44 34.5	+55.6	4.1	45 34.3	+55.7	4.2	83
84	39 30.7	+55.3	3.4	40 30.6	+55.3	3.4	41 30.5	+55.4	3.4	42 30.4	+55.4	3.4	43 30.3	+55.4	3.5	44 30.2	+55.4	3.5	45 30.1	+55.4	3.6	46 30.0	+55.4	3.7	84
85	40 26.0	+55.1	2.8	41 25.9	+55.2	2.8	42 25.8	+55.2	2.9	43 25.8	+55.2	2.9	44 25.7	+55.2	3.0	45 25.6	+55.3	3.0	46 25.5	+55.3	3.1	47 25.4	+55.3	3.1	85
86	41 21.1	+55.0	2.3	42 21.1	+54.9	2.3	43 21.0	+55.0	2.3	44 21.0	+55.0	2.4	45 20.9	+55.1	2.4	46 20.9	+55.0	2.4	47 20.8	+55.1	2.5	48 20.7	+55.2	2.5	86
87	42 16.1	+54.8	1.7	43 16.0	+54.9	1.7	44 16.0	+54.9	1.8	45 16.0	+54.8	1.8	46 16.0	+54.8	1.8	47 15.9	+54.9	1.9	48 15.9	+54.9	1.9	49 15.9	+54.9	1.9	87
88	43 10.9	+54.6	1.2	44 10.9	+54.6	1.2	45 10.9	+54.6	1.2	46 10.8	+54.7	1.2	47 10.8	+54.7	1.2	48 10.8	+54.7	1.3	49 10.8	+54.7	1.3	50 10.8	+54.7	1.3	88
89	44 05.5	+54.5	0.6	45 05.5	+54.5	0.6	46 05.5	+54.5	0.6	47 05.5	+54.5	0.6	48 05.5	+54.5	0.6	49 05.5	+54.5	0.6	50 05.5	+54.5	0.7	51 05.5	+54.5	0.7	89
90	45 00.0	+54.3	0.0	46 00.0	+54.3	0.0	47 00.0	+54.3	0.0	48 00.0	+54.3	0.0	49 00.0	+54.3	0.0	50 00.0	+54.3	0.0	51 00.0	+54.3	0.0	52 00.0	+54.3	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z } LATITUDE **SAME** NAME AS DECLINATION **L.H.A. 155°, 205°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	39 27.6	+54.9	145.4	38 38.1	+55.2	145.9	37 48.3	+55.5	146.3	36 58.3	+55.7	146.7	36 08.0	+56.0	147.1	35 17.5	+56.2	147.5	34 26.8	+56.5	147.9	33 35.8	+56.8	148.2	0
1	40 22.5	+54.7	144.9	39 33.3	+55.0	145.4	38 43.8	+55.3	145.8	37 54.0	+55.7	146.3	37 04.0	+55.9	146.7	36 13.7	+56.2	147.1	35 23.3	+56.4	147.5	34 32.6	+56.6	147.9	1
2	41 17.2	+54.6	144.3	40 28.3	+54.9	144.8	39 39.1	+55.3	145.3	38 49.7	+55.5	145.8	37 59.9	+55.8	146.2	37 09.9	+56.1	146.6	36 19.7	+56.3	147.1	35 29.2	+56.6	147.4	2
3	42 11.8	+54.4	143.8	41 23.2	+54.8	144.3	40 34.4	+55.0	144.8	39 45.2	+55.4	145.3	38 55.7	+55.7	145.8	38 06.0	+56.0	146.2	37 16.0	+56.2	146.6	36 25.8	+56.5	147.0	3
4	43 06.2	+54.3	143.2	42 18.0	+54.6	143.8	41 29.4	+55.0	144.3	40 40.6	+55.2	144.8	39 51.4	+55.5	145.3	39 02.0	+55.8	145.7	38 12.2	+56.2	146.2	37 22.3	+56.3	146.6	4
5	44 00.5	+54.0	142.6	43 12.6	+54.4	143.2	42 24.4	+54.8	143.7	41 35.8	+55.2	144.3	40 47.0	+55.4	144.8	39 57.8	+55.8	145.3	39 08.4	+56.0	145.7	38 18.6	+56.3	146.2	5
6	44 54.5	+53.8	142.0	44 07.0	+54.3	142.6	43 19.2	+54.6	143.2	42 31.0	+54.9	143.7	41 42.4	+55.3	144.3	40 53.6	+55.6	144.8	40 04.4	+55.9	145.3	39 14.9	+56.2	145.7	6
7	45 48.3	+53.7	141.4	45 01.3	+54.0	142.0	44 13.8	+54.4	142.6	43 25.9	+54.8	143.2	42 37.7	+55.2	143.7	41 49.2	+55.4	144.3	41 00.3	+55.8	144.8	40 11.1	+56.1	145.3	7
8	46 42.0	+53.4	140.7	45 55.3	+53.8	141.4	45 08.2	+54.3	142.0	44 20.7	+54.7	142.6	43 32.9	+55.0	143.2	42 44.6	+55.4	143.8	41 56.1	+55.6	144.3	41 07.2	+56.0	144.8	8
9	47 35.4	+53.1	140.1	46 49.1	+53.7	140.7	46 02.5	+54.0	141.4	45 15.4	+54.4	142.0	44 27.9	+54.8	142.7	43 40.0	+55.2	143.2	42 51.7	+55.6	143.8	42 03.2	+55.8	144.3	9
10	48 28.5	+53.0	139.4	47 42.8	+53.4	140.1	46 56.5	+53.8	140.8	46 09.8	+54.1	141.4	45 22.7	+54.6	142.1	44 35.2	+55.0	142.7	43 47.3	+55.3	143.3	42 59.0	+55.7	143.8	10
11	49 21.5	+52.6	138.6	48 36.2	+53.1	139.4	47 50.3	+53.6	140.1	47 04.1	+54.0	140.8	46 17.3	+54.5	141.5	45 30.2	+54.8	142.1	44 42.6	+55.2	142.7	43 54.7	+55.5	143.3	11
12	50 14.1	+52.3	137.9	49 29.3	+52.8	138.7	48 43.9	+53.4	139.5	47 58.1	+53.8	140.2	47 11.8	+54.3	140.9	46 25.0	+54.7	141.5	45 37.8	+55.1	142.2	44 50.2	+55.5	142.8	12
13	51 06.4	+52.0	137.1	50 22.1	+52.6	138.0	49 37.3	+53.1	138.8	48 51.9	+53.6	139.5	48 06.1	+54.0	140.2	47 19.7	+54.5	140.9	46 32.9	+54.9	141.5	45 45.7	+55.2	142.2	13
14	51 58.4	+51.7	136.3	51 14.7	+52.3	137.2	50 30.4	+52.8	138.0	49 45.5	+53.3	138.8	49 00.1	+53.8	139.6	48 14.2	+54.2	140.3	47 27.8	+54.6	141.0	46 40.9	+55.1	141.7	14
15	52 50.1	+51.3	135.5	52 07.0	+51.9	136.4	51 23.2	+52.5	137.3	50 38.8	+53.1	138.1	49 53.9	+53.6	138.9	49 08.4	+54.1	139.7	48 22.4	+54.5	140.4	47 36.0	+54.9	141.1	15
16	53 41.4	+50.9	134.6	52 58.9	+51.5	135.6	51 55.7	+52.2	136.5	51 31.9	+52.4	137.4	50 47.5	+53.3	138.2	50 02.5	+53.8	139.0	49 16.9	+54.3	139.8	48 30.9	+54.7	140.5	16
17	54 32.3	+50.5	133.7	53 50.5	+51.2	134.7	53 07.9	+51.9	135.7	52 24.7	+52.4	136.6	51 40.8	+53.0	137.5	50 56.3	+53.5	138.3	50 11.2	+54.0	139.1	49 25.6	+54.4	139.9	17
18	55 22.8	+50.1	132.8	54 41.7	+50.8	133.8	53 59.8	+51.4	134.8	53 17.1	+52.1	135.8	52 33.8	+52.7	136.7	51 49.8	+53.2	137.6	51 05.2	+53.8	138.4	50 20.0	+54.3	139.2	18
19	56 12.9	+49.6	131.8	55 32.5	+50.3	132.8	54 51.2	+51.1	133.9	54 09.2	+51.8	134.9	53 26.5	+52.3	135.9	52 43.0	+53.0	136.8	51 59.0	+53.5	137.7	51 14.3	+54.0	138.5	19
20	57 02.5	+49.0	130.8	56 22.8	+49.9	131.9	55 42.3	+50.6	133.0	55 01.0	+51.3	134.1	54 18.8	+52.1	135.1	53 36.0	+52.6	136.0	52 52.5	+53.2	137.0	52 08.3	+53.8	137.8	20
21	57 51.5	+48.5	129.7	57 12.7	+49.3	130.9	56 32.9	+50.2	132.1	55 52.3	+50.9	133.2	55 10.9	+51.6	134.2	54 28.6	+52.3	135.2	53 45.7	+52.9	136.2	53 02.1	+53.4	137.1	21
22	58 40.0	+47.8	128.6	58 02.0	+48.8	129.8	57 23.1	+49.7	131.1	56 43.2	+50.5	132.2	56 02.5	+51.2	133.3	55 20.9	+52.0	134.4	54 38.6	+52.6	135.4	53 55.5	+53.2	136.3	22
23	59 27.8	+47.2	127.4	58 50.8	+48.2	128.7	58 12.8	+49.1	130.0	57 33.7	+50.0	131.2	56 53.7	+50.8	132.4	56 12.9	+51.5	133.5	55 31.2	+52.2	134.5	54 48.7	+52.9	135.6	23
24	60 15.0	+46.5	126.2	59 39.0	+47.6	127.6	59 01.9	+48.5	128.9	58 23.7	+49.4	130.2	57 44.5	+50.3	131.4	57 04.4	+51.1	132.5	56 23.4	+51.8	133.7	55 41.6	+52.5	134.7	24
25	61 01.5	+45.7	124.9	60 26.6	+46.8	126.4	59 50.4	+47.9	127.7	59 13.1	+48.9	129.1	58 34.8	+49.8	130.3	57 55.5	+50.6	131.6	57 15.2	+51.4	132.7	56 34.1	+52.1	133.9	25
26	61 47.2	+44.9	123.5	61 13.4	+46.1	125.1	60 38.3	+47.2	126.5	60 02.0	+48.3	127.9	59 24.6	+49.2	129.3	58 46.1	+50.1	130.5	58 06.6	+50.9	131.8	57 26.2	+51.7	133.0	26
27	62 32.1	+44.0	122.1	61 59.5	+45.2	123.7	61 25.5	+46.5	125.3	60 50.3	+47.5	126.7	60 13.8	+48.6	128.1	59 36.2	+49.5	129.5	58 57.5	+50.5	130.8	58 17.9	+51.2	132.0	27
28	63 16.1	+42.9	120.6	62 44.7	+44.4	122.3	62 12.0	+45.6	123.9	61 37.8	+46.8	125.5	61 02.4	+47.9	126.9	60 25.7	+49.0	128.3	59 48.0	+49.9	129.7	59 09.1	+50.8	131.0	28
29	63 59.0	+41.9	119.1	63 29.1	+43.4	120.8	62 57.6	+44.7	122.5	62 24.6	+46.1	124.1	61 50.3	+47.2	125.7	61 14.7	+48.3	127.2	60 37.9	+49.3	128.6	59 59.9	+50.2	129.9	29
30	64 40.9	+40.8	117.4	64 12.5	+42.3	119.2	63 42.3	+43.8	121.0	63 10.7	+45.1	122.7	62 37.5	+46.4	124.3	62 03.0	+47.6	125.9	61 27.2	+48.6	127.4	60 50.1	+49.7	128.8	30
31	65 21.7	+39.4	115.7	64 54.8	+41.1	117.6	64 26.1	+42.7	119.5	63 55.8	+44.2	121.2	63 23.9	+45.6	122.9	62 50.6	+46.8	124.6	62 15.8	+48.0	126.2	61 39.8	+49.0	127.7	31
32	66 01.1	+38.1	113.8	65 35.9	+39.9	115.9	65 08.8	+41.6	117.8	64 40.0	+43.1	119.7	64 09.5	+44.6	121.5	63 37.4	+45.9	123.2	63 03.8	+47.2	124.9	62 28.8	+48.4	126.4	32
33	66 39.2	+36.7	111.9	66 15.8	+38.6	114.0	65 50.4	+40.4	116.1	65 23.1	+42.0	118.0	64 54.1	+43.5	119.9	64 23.3	+45.0	121.7	63 51.0	+46.3	123.5	63 17.2	+47.6	125.1	33
34	67 15.9	+35.0	109.9	66 54.4	+37.0	112.1	66 30.8	+39.0	114.2	66 05.1	+40.8	116.3	65 37.6	+42.5	118.3	65 08.3	+44.0	120.2	64 37.3	+45.5	122.0	64 04.8	+46.7	123.8	34
35	67 50.9	+33.2	107.8	67 31.4	+35.5	110.1	67 09.7	+37.5	112.3	66 45.9	+39.4	114.5	66 20.1	+41.2	116.5	65 52.3	+42.9	118.5	65 22.8	+44.4	120.5	64 51.5	+45.9	122.3	35
36	68 24.1	+31.4	105.5	68 06.9	+33.7	107.9	67 47.2	+35.9	110.3	67 25.3	+38.0	112.5	67 01.3	+39.9	114.7	66 35.2	+41.7	116.8	66 07.2	+43.4	118.8	65 37.4	+44.9	120.8	36
37	68 55.5	+29.4	103.2	68 40.6	+31.8	105.7	68 23.1	+34.2	108.1	68 03.3	+36.4	110.5	67 41.2	+38.4	112.8	67 16.9	+40.4	115.0	66 50.6	+42.1	117.1	66 23.3	+43.8	119.1	37
38	69 24.9	+27.2	100.7	69 12.4	+29.8	103.3	68 57.3	+32.3	105.9	68 39.7	+34.6	108.3	68 19.6	+36.8	110.7	67 57.3	+38.8	113.0	67 32.7	+40.8	115.3	67 06.1	+42.6	117.4	38
39	69 52.1	+24.9	98.2	69 42.2	+27.6	100.8	69 29.6	+30.2	103.5	69 14.3	+32.7	106.0	68 56.4	+35.1	108.5	68 36.1	+37.3	111.0	68 13.5	+39.4	113.3	67 48.7	+41.3	115.6	39
40	70 17.0	+22.4	95.5	70 09.8	+25.3	98.3	69 59.8	+28.0	101.0	69 47.0	+30.7	103.7	69 31.5	+33.2	106.3	69 13.4	+35.6	108.8	68 52.9	+37.8	111.2	68 30.0	+39.8	113.6	40
41	70 39.4	+19.9	92.7	70 35.1	+22.8	95.6	70 27.8	+25.7	98.4	70 17.7	+28.4	101.1	70 04.7	+31.1	103.8	69 49.0	+33.6	106.5	69 30.7	+36.0	109.1	69 09.8	+38.1	111.5	41
42	70 59.3	+17.0	89.9	70 57.9	+20.1	92.8	70 53.5	+23.2	95.6	70 46.1	+26.1	98.5	70 35.8	+28.9	101.3	70 22.6	+31.6	104.1	70 06.7	+34.1	106.7	69 48.1	+36.5	109.3	42
43	71 16.3	+14.2	86.9	71 18.0	+17.4	89.8	71 16.7	+20.4	92.8	71 12.2	+23.5	95.7	71 04.7	+26.5	98.6	70 54.2	+29.3	101.5	70 40.8	+32.1	104.3	70 24.6	+34.6	107.0	43
44	71 30.5	+11.2	83.8	71 35.4	+14.4	86.8	71 37.1	+17.7	89.8	71 35.7	+20.8	92.8	71 31.2	+23.9	95.8	71 23.5	+27.0	98.8	71 12.9	+29.8	101.7	70 59.2	+32.6	104.5	44
45	71 41.7	+8.1	80.7	71 49.8	+11.4	83.7	71 54.8	+14.6	86.8	71 56.5	+18.0	89.8	71 55.1	+21.1	92.9	71 50.5	+24.3	96.0	71 42.7	+27.3	99.0	71 31.8	+30.2	101.9	45
46	71 49.8	+5.0	77.6	72 01.2	+8.2	80.6	72 09.4	+11.6	83.6	72 14.5	+14.9	86.7	72 16.2	+18.3	89.9	72 14.8	+21.5	93.0	72 10.0	+24.7	96.1	72 02.0	+27.8	99.2	46
47	71 54.8	+1.7	74.4	72 09.4	+5.1	77.3	72 21.0	+8.4	80.4	72 29.4	+11.7	83.5	72 34.5	+15.1	86.7	72 36.3	+18.5	89.9	72 34.7	+21.9	93.1	72 29.8	+25.1	96.3	47
48	71 56.5	−1.4	71.1	72 14.5	+1.7	74.1	72 29.4	+5.1	77.1	72 41.1	+8.5	80.3	72 49.6	+12.0	83.5	72 54.8	+15.4	86.7	72 56.6	+18.8	89.9	72 54.9	+22.2	93.2	48
49	71 55.1	−4.6	67.9	72 16.2	−1.4	70.8	72 34.5	+1.8	73.8	72 49.6	+5.2	76.9	73 01.6	+8.6	80.1	73 10.2	+12.1	83.4	73 15.4	+15.7	86.7	73 17.1	+19.2	90.0	49
50	71 50.5	−7.8	64.7	72 11.6	−4.8	67.5	72 36.3	−1.6	70.5	72 54.8	+1.7	73.6	73 10.2	+5.2	76.7	73 22.3	+8.8	80.0	73 31.1	+12.3	83.3	73 36.3	+15.9	86.7	50
51	71 42.7	−10.9	61.5	72 10.0	−8.0	64.3	72 34.7	−4.9	67.1	72 56.6	−1.7	70.1	73 15.4	+1.7	73.3	73 31.1	+5.2	76.5	73 43.4	+8.8	79.8	73 52.2	+12.5	83.2	51
52	71 31.8	−13.9	58.4	72 02.0	−11.1	61.0	72 29.8	−8.2	63.8	72 54.9	−5.0	66.7	73 17.1	−1.7	69.8	73 36.3	+1.7	73.0	73 52.2	+5.3	76.3	74 04.7	+9.0	79.7	52
53	71 17.9	−16.8	54.8	71 50.9	−14.2	57.9	72 21.6	−11.3	60.5	72 49.9	−8.4	63.5	73 15.4	−5.2	66.5	73 38.0	−1.8	69.4	73 57.5	+1.7	72.6	74 13.4	+5.3	76.1	53
54	71 01.1	−19.5	52.4	71 36.7	−17.1	54.8	72 10.3	−14.5	57.3	72 41.5	−11.7	60.0	73 10.2	−8.6	62.9	73 36.2	−5.5	65.9	73 59.1	−2.0	69.1	74 19.0	+1.5	72.4	54
55	70 41.6	−22.2	49.5	71 19.6	−19.9	51.8	71 55.8	−17.4	54.2	72 29.8	−14.8	56.7	73 01.6	−12.0	59.5	73 30.7	−8.8	62.4	73 57.1	−5.6	65.4	74 20.5	−2.1	68.7	55
56	70 19.4	−24.6	46.7	70 59.7	−22.5	48.8	71 38.4	−20.3	51.1	72 15.0	−17.8	53.5	72 49.6	−15.1	56.1	73 21.9	−12.3	58.9	73 51.5	−9.2	61.9	74 18.4	−5.9	65.0	56
57	69 54.8	−27.0	44.0	70 37.2	−25.1	46.0	71 18.1	−23.0	48.1	71 57.2	−20.7	50.4	72 34.5	−18.3	52.9	73 09.6	−15.6	55.5	73 42.3	−12.6	58.3	74 12.5	−9.5	61.3	57
58	69 27.8	−29.2	41.5	70 12.1	−27.4	43.3	70 55.1	−25.5	45.3	71 36.5	−23.4	47.4	72 16.2	−21.1	49.7	72 54.0	−18.7	52.2	73 29.7	−16.0	54.9	74 03.0	−13.0	57.7	58
59	68 58.6	−31.2	39.0	69 44.7	−29.6	40.7	70 29.6	−27.9	42.5	71 13.1	−26.4	44.5	71 55.1	−24.0	46.7	72 35.3	−21.6	49.0	73 13.7	−19.1	51.5	73 50.0	−16.4	54.2	59
60	68 27.4	−33.0	36.6	69 15.1	−31.7	38.2	70 01.7	−30.1	39.9	70 47.1	−28.4	41.8	71 31.1	−26.5	43.7	72 13.7	−24.4	45.9	72 54.6	−22.2	48.2	73 33.6	−19.7	50.8	60
61	67 54.4	−34.9	34.4	68 43.4	−33.5	35.9	69 31.6	−32.2	37.4	70 18.7	−30.6	39.1	71 04.6	−28.8	40.9	71 49.3	−27.0	42.9	72 32.4	−24.9	45.1	73 13.9	−22.7	47.4	61
62	67 19.5	−36.4	32.3	68 09.9	−35.3	33.6	68 59.4	−34.0	35.0	69 48.1	−32.2	36.6	70 35.8	−31.2	38.3	71 22.3	−29.5	40.1	72 07.5	−27.6	42.1	72 52.5	−25.5	44.3	62
63	66 43.1	−38.0	30.2	67 34.6	−37.0	31.4	68 25.4	−35.8	32.8	69 15.5	−34.6	34.2	70 04.6	−33.2	35.7	70 52.8	−31.7	37.4	71 39.9	−30.0	39.2	72 25.7	−28.2	41.2	63
64	66 05.1	−39.3	28.3	66 57.6	−38.4	29.4	67 49.6	−37.4	30.6	68 40.9	−36.3	31.9	69 31.4	−35.0	33.3	70 21.1	−33.7	34.9	71 09.9	−32.3	36.5	71 57.5	−30.6	38.4	64
65	65 25.8	−40.7	26.5	66 19.2	−39.8	27.5	67 12.2	−39.0	28.6	68 04.6	−37.9	29.7	68 56.4	−36.9	31.0	69 47.4	−35.6	32.4	70 37.6	−34.3	34.0	71 26.9	−32.9	35.6	65
66	64 45.1	−41.7	24.7	65 39.4	−41.0	25.6	66 33.3	−40.2	26.6	67 26.7	−39.4	27.7	68 19.5	−38.4	28.9	69 11.8	−37.4	30.1	70 03.3	−36.2	31.5	70 54.0	−34.9	33.0	66
67	64 03.4	−42.9	23.0	64 58.4	−42.2	23.9	65 53.1	−41.5	24.8	66 47.3	−40.7	25.8	67 41.1	−39.9	26.8	68 34.4	−39.0	28.0	69 27.1	−37.9	29.2	70 19.1	−36.8	30.6	67
68	63 20.5	−43.9	21.5	64 16.2	−43.3	22.2	65 11.6	−42.7	23.0	66 06.6	−42.0	23.9	67 01.2	−41.2	24.9	67 55.4	−40.4	25.9	68 49.2	−39.6	27.0	69 42.3	−38.5	28.3	68
69	62 36.6	−44.8	20.0	63 32.9	−44.3	20.7	64 28.9	−43.7	21.4	65 24.6	−43.1	22.2	66 20.0	−42.4	23.0	67 15.0	−41.7	24.0	68 09.6	−40.9	25.0	69 03.8	−40.1	26.1	69
70	61 51.8	−45.6	18.5	62 48.6	−45.1	19.2	63 45.2	−44.7	19.8	64 41.5	−44.1	20.5	65 37.6	−43.6	21.3	66 33.3	−42.9	22.1	67 28.7	−42.3	23.0	68 23.7	−41.5	24.0	70
71	61 06.2	−46.4	17.2	62 03.5	−46.1	17.7	63 00.5	−45.6	18.3	63 57.4	−45.1	19.0	64 54.0	−44.6	19.7	65 50.4	−44.1	20.4	66 46.4	−43.4	21.2	67 42.2	−42.8	22.1	71
72	60 19.8	−47.1	15.9	61 17.4	−46.7	16.4	62 14.9	−46.4	16.9	63 12.3	−46.0	17.5	64 09.4	−45.5	18.1	65 06.3	−45.1	18.8	66 03.0	−44.6	19.5	66 59.4	−44.0	20.3	72
73	59 32.7	−47.8	14.6	60 30.7	−47.5	15.1	61 28.5	−47.1	15.6	62 26.3	−46.8	16.1	63 23.8	−46.4	16.6	64 21.2	−46.0	17.2	65 18.4	−45.5	17.9	66 15.4	−45.0	18.6	73
74	58 44.9	−48.4	13.5	59 43.2	−48.2	13.9	60 41.4	−47.9	14.3	61 39.5	−47.6	14.7	62 37.4	−47.2	15.2	63 35.2	−46.8	15.8	64 32.9	−46.4	16.3	65 30.4	−46.0	16.9	74
75	57 56.5	−49.0	12.3	58 55.0	−48.7	12.7	59 53.5	−48.5	13.1	60 51.9	−48.2	13.5	61 50.2	−47.9	13.9	62 48.4	−47.6	14.4	63 46.5	−47.3	14.9	64 44.4	−46.9	15.4	75
76	57 07.5	−49.5	11.3	58 06.3	−49.3	11.6	59 05.0	−49.0	11.9	60 03.7	−48.8	12.3	61 02.3	−48.6	12.7	62 00.8	−48.3	13.1	62 59.2	−48.0	13.5	63 57.5	−47.7	14.0	76
77	56 18.0	−50.0	10.2	57 17.0	−49.8	10.5	58 16.0	−49.7	10.8	59 14.9	−49.5	11.1	60 13.7	−49.2	11.5	61 12.5	−49.0	11.8	62 11.2	−48.8	12.2	63 09.8	−48.5	12.6	77
78	55 28.0	−50.5	9.3	56 27.2	−50.3	9.5	57 26.3	−50.1	9.7	58 25.4	−49.9	10.0	59 24.5	−49.8	10.3	60 23.5	−49.6	10.6	61 22.4	−49.3	11.0	62 21.3	−49.1	11.3	78
79	54 37.5	−50.9	8.3	55 36.9	−50.8	8.5	56 36.2	−50.6	8.7	57 35.5	−50.5	9.0	58 34.7	−50.3	9.2	59 33.9	−50.1	9.5	60 33.1	−50.0	9.8	61 32.2	−49.8	10.1	79
80	53 46.6	−51.2	7.4	54 46.1	−51.1	7.6	55 45.6	−51.1	7.8	56 45.0	−50.9	8.0	57 44.4	−50.8	8.2	58 43.8	−50.6	8.4	59 43.1	−50.5	8.7	60 42.4	−50.3	9.0	80
81	52 55.4	−51.7	6.5	53 55.0	−51.6	6.7	54 54.5	−51.4	6.9	55 54.1	−51.3	7.0	56 53.6	−51.2	7.2	57 53.2	−51.1	7.4	58 52.6	−50.9	7.6	59 52.1	−50.9	7.9	81
82	52 03.7	−51.9	5.7	53 03.4	−51.9	5.8	54 03.1	−51.8	6.0	55 02.8	−51.8	6.1	56 02.4	−51.6	6.3	57 02.0	−51.5	6.4	58 01.7	−51.5	6.6	59 01.2	−51.3	6.8	82
83	51 11.7	−52.3	4.9	52 11.5	−52.2	5.0	53 11.3	−52.2	5.1	54 11.0	−52.1	5.2	55 10.8	−52.0	5.4	56 10.5	−51.9	5.5	57 10.2	−51.8	5.7	58 09.9	−51.7	5.8	83
84	50 19.4	−52.6	4.1	51 19.3	−52.6	4.2	52 19.1	−52.5	4.3	53 18.9	−52.4	4.4	54 18.8	−52.4	4.6	55 18.6	−52.3	4.7	56 18.4	−52.3	4.8	57 18.2	−52.2	4.9	84
85	49 26.8	−52.8	3.4	50 26.7	−52.8	3.4	51 26.6	−52.8	3.5	52 26.5	−52.7	3.6	53 26.4	−52.7	3.7	54 26.3	−52.7	3.8	55 26.1	−52.6	3.9	56 26.0	−52.6	4.0	85
86	48 34.0	−53.2	2.6	49 33.9	−53.1	2.7	50 33.8	−53.1	2.8	51 33.8	−53.1	2.8	52 33.7	−53.0	2.9	53 33.6	−53.0	3.0	54 33.5	−52.9	3.0	55 33.4	−52.9	3.1	86
87	47 40.8	−53.4	2.0	48 40.8	−53.4	2.0	49 40.7	−53.3	2.0	50 40.7	−53.3	2.1	51 40.7	−53.3	2.1	52 40.6	−53.2	2.2	53 40.6	−53.2	2.2	54 40.5	−53.2	2.3	87
88	46 47.4	−53.6	1.3	47 47.4	−53.6	1.3	48 47.4	−53.6	1.3	49 47.4	−53.6	1.4	50 47.4	−53.6	1.4	51 47.4	−53.5	1.4	52 47.3	−53.5	1.4	53 47.3	−53.5	1.5	88
89	45 53.8	−53.8	0.6	46 53.8	−53.8	0.6	47 53.8	−53.8	0.7	48 53.8	−53.8	0.7	49 53.8	−53.8	0.7	50 53.8	−53.8	0.7	51 53.8	−53.8	0.7	52 53.8	−53.8	0.7	89
90	45 00.0	−54.0	0.0	46 00.0	−54.0	0.0	47 00.0	−54.0	0.0	48 00.0	−54.0	0.0	49 00.0	−54.0	0.0	50 00.0	−54.0	0.0	51 00.0	−54.0	0.0	52 00.0	−54.1	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 26°, 334°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	39 27.6	−55.0	145.4	38 38.1	−55.3	145.9	37 48.3	−55.6	146.3	36 58.3	−55.9	146.7	36 08.0	−56.1	147.1	35 17.5	−56.4	147.5	34 26.8	−56.6	147.9	33 35.8	−56.8	148.2	0
1	38 32.6	−55.2	145.9	37 42.8	−55.5	146.4	36 52.7	−55.7	146.8	36 02.4	−56.0	147.2	35 11.9	−56.2	147.6	34 21.1	−56.3	148.3	33 30.2	−56.7	148.3	32 39.0	−56.8	148.6	1
2	37 37.4	−55.4	146.4	36 47.3	−55.5	146.8	35 57.0	−55.8	147.2	35 06.4	−56.0	147.6	34 15.7	−56.3	148.0	33 24.7	−56.5	148.3	32 33.5	−56.7	148.7	31 42.2	−57.0	149.0	2
3	36 42.2	−55.4	146.9	35 51.8	−55.7	147.3	35 01.2	−55.9	147.7	34 10.4	−56.2	148.1	33 19.4	−56.4	148.4	32 28.2	−56.6	148.7	31 36.8	−56.8	149.1	30 45.2	−57.0	149.4	3
4	35 46.8	−55.5	147.4	34 56.1	−55.7	147.8	34 05.3	−56.0	148.1	33 14.2	−56.2	148.5	32 23.0	−56.5	148.8	31 31.6	−56.7	149.1	30 40.0	−56.9	149.4	29 48.2	−57.0	149.7	4
5	34 51.3	−55.6	147.8	34 00.4	−55.9	148.2	33 09.3	−56.1	148.6	32 18.0	−56.3	148.9	31 26.5	−56.5	149.2	30 34.9	−56.7	149.5	29 43.1	−56.9	149.8	28 51.2	−57.1	150.1	5
6	33 55.7	−55.7	148.3	33 04.5	−55.9	148.6	32 13.2	−56.2	149.0	31 21.7	−56.4	149.3	30 30.0	−56.6	149.6	29 38.2	−56.8	149.9	28 46.2	−57.0	150.2	27 54.1	−57.2	150.4	6
7	33 00.0	−55.8	148.7	32 08.6	−56.0	149.1	31 17.0	−56.2	149.4	30 25.3	−56.5	149.7	29 33.4	−56.6	150.0	28 41.4	−56.9	150.3	27 49.2	−57.0	150.5	26 56.9	−57.2	150.8	7
8	32 04.2	−55.9	149.2	31 12.6	−56.1	149.5	30 20.8	−56.3	149.8	29 28.8	−56.5	150.1	28 36.8	−56.8	150.4	27 44.5	−56.9	150.6	26 52.2	−57.1	150.9	25 59.7	−57.2	151.1	8
9	31 08.3	−56.0	149.6	30 16.5	−56.2	149.9	29 24.5	−56.4	150.2	28 32.3	−56.6	150.5	27 40.0	−56.7	150.7	26 47.6	−56.9	151.0	25 55.1	−57.1	151.2	25 02.5	−57.3	151.5	9
10	30 12.3	−56.0	150.0	29 20.3	−56.3	150.3	28 28.1	−56.5	150.6	27 35.7	−56.6	150.8	26 43.3	−56.9	151.1	25 50.7	−57.0	151.3	24 58.0	−57.2	151.6	24 05.2	−57.4	151.8	10
11	29 16.3	−56.1	150.4	28 24.0	−56.3	150.7	27 31.6	−56.5	151.0	26 39.1	−56.7	151.2	25 46.4	−56.8	151.5	24 53.7	−57.1	151.7	24 00.8	−57.2	151.9	23 07.8	−57.3	152.1	11
12	28 20.2	−56.2	150.8	27 27.7	−56.4	151.1	26 35.1	−56.6	151.3	25 42.4	−56.8	151.6	24 49.6	−57.0	151.8	23 56.6	−57.1	152.0	23 03.6	−57.3	152.2	22 10.5	−57.5	152.4	12
13	27 24.0	−56.3	151.2	26 31.3	−56.4	151.5	25 38.5	−56.6	151.7	24 45.6	−56.8	151.9	23 52.6	−57.0	152.2	22 59.5	−57.1	152.4	22 06.3	−57.3	152.5	21 13.0	−57.4	152.7	13
14	26 27.7	−56.3	151.6	25 34.9	−56.6	151.9	24 41.9	−56.7	152.1	23 48.8	−56.8	152.3	22 55.6	−57.0	152.5	22 02.4	−57.2	152.7	21 09.0	−57.3	152.9	20 15.6	−57.5	153.0	14
15	25 31.4	−56.4	152.0	24 38.3	−56.5	152.2	23 45.2	−56.7	152.4	22 52.0	−56.9	152.6	21 58.6	−57.0	152.8	21 05.2	−57.2	153.0	20 11.7	−57.4	153.2	19 18.1	−57.5	153.3	15
16	24 35.0	−56.4	152.4	23 41.8	−56.6	152.6	22 48.5	−56.8	152.8	21 55.1	−57.0	153.0	21 01.6	−57.1	153.2	20 08.0	−57.3	153.3	19 14.3	−57.4	153.5	18 20.6	−57.5	153.6	16
17	23 38.6	−56.5	152.8	22 45.2	−56.7	153.0	21 51.7	−56.8	153.1	20 58.1	−57.0	153.3	20 04.5	−57.2	153.5	19 10.7	−57.3	153.7	18 16.9	−57.4	153.8	17 23.1	−57.6	153.9	17
18	22 42.1	−56.5	153.1	21 48.5	−56.7	153.3	20 54.9	−56.9	153.5	20 01.1	−57.0	153.7	19 07.3	−57.1	153.8	18 13.5	−57.4	154.0	17 19.5	−57.4	154.1	16 25.5	−57.6	154.2	18
19	21 45.6	−56.5	153.5	20 51.8	−56.7	153.7	19 58.0	−56.9	153.8	19 04.1	−57.0	154.0	18 10.2	−57.2	154.1	17 16.1	−57.3	154.3	16 22.1	−57.5	154.4	15 27.9	−57.6	154.5	19
20	20 49.0	−56.7	153.9	19 55.1	−56.8	154.0	19 01.1	−56.9	154.2	18 07.1	−57.1	154.3	17 13.0	−57.3	154.5	16 18.8	−57.4	154.6	15 24.6	−57.5	154.7	14 30.3	−57.6	154.8	20
21	19 52.3	−56.6	154.2	18 58.3	−56.8	154.4	18 04.2	−57.0	154.5	17 10.0	−57.1	154.6	16 15.7	−57.2	154.8	15 21.4	−57.4	154.9	14 27.1	−57.5	155.0	13 32.7	−57.7	155.1	21
22	18 55.7	−56.7	154.6	18 01.5	−56.9	154.7	17 07.2	−57.0	154.8	16 12.9	−57.2	155.0	15 18.5	−57.3	155.1	14 24.0	−57.4	155.2	13 29.6	−57.6	155.3	12 35.0	−57.6	155.4	22
23	17 59.0	−56.8	154.9	17 04.6	−56.9	155.0	16 10.2	−57.1	155.2	15 15.7	−57.2	155.3	14 21.2	−57.3	155.4	13 26.6	−57.4	155.5	12 32.0	−57.6	155.6	11 37.4	−57.7	155.7	23
24	17 02.2	−56.7	155.2	16 07.7	−56.9	155.4	15 13.2	−57.1	155.5	14 18.5	−57.2	155.6	13 23.9	−57.3	155.7	12 29.2	−57.5	155.8	11 34.4	−57.5	155.9	10 39.7	−57.7	156.0	24
25	16 05.5	−56.9	155.6	15 10.8	−57.0	155.7	14 16.1	−57.1	155.9	13 21.3	−57.2	155.9	12 26.6	−57.4	156.0	11 31.7	−57.4	156.1	10 36.9	−57.6	156.2	9 42.0	−57.7	156.2	25
26	15 08.6	−56.8	155.9	14 13.8	−56.9	156.0	13 19.0	−57.1	156.1	12 24.1	−57.2	156.2	11 29.2	−57.4	156.3	10 34.3	−57.5	156.4	9 39.3	−57.6	156.4	8 44.3	−57.8	156.5	26
27	14 11.8	−56.9	156.2	13 16.9	−57.0	156.3	12 21.9	−57.1	156.4	11 26.9	−57.3	156.5	10 31.8	−57.3	156.6	9 36.8	−57.5	156.7	8 41.7	−57.7	156.7	7 46.5	−57.7	156.8	27
28	13 14.9	−56.8	156.6	12 19.9	−57.0	156.7	11 24.8	−57.2	156.7	10 29.6	−57.2	156.8	9 34.5	−57.4	156.9	8 39.3	−57.5	157.0	7 44.0	−57.6	157.0	6 48.8	−57.8	157.1	28
29	12 18.1	−57.0	156.9	11 22.9	−57.1	157.0	10 27.6	−57.2	157.1	9 32.4	−57.3	157.1	8 37.1	−57.5	157.2	7 41.7	−57.5	157.2	6 46.4	−57.6	157.3	5 51.0	−57.7	157.3	29
30	11 21.1	−56.9	157.2	10 25.8	−57.0	157.3	9 30.4	−57.1	157.4	8 35.1	−57.3	157.4	7 39.6	−57.4	157.5	6 44.2	−57.5	157.5	5 48.8	−57.6	157.6	4 53.3	−57.8	157.6	30
31	10 24.2	−56.9	157.5	9 28.8	−57.1	157.6	8 33.3	−57.2	157.7	7 37.8	−57.4	157.7	6 42.2	−57.4	157.8	5 46.7	−57.6	157.8	4 51.1	−57.6	157.8	3 55.5	−57.7	157.9	31
32	9 27.3	−57.0	157.9	8 31.7	−57.1	157.9	7 36.1	−57.2	158.0	6 40.4	−57.4	158.0	5 44.8	−57.5	158.1	4 49.1	−57.5	158.1	3 53.5	−57.7	158.1	2 57.8	−57.8	158.1	32
33	8 30.3	−57.0	158.2	7 34.6	−57.1	158.2	6 38.9	−57.3	158.3	5 43.1	−57.3	158.3	4 47.3	−57.4	158.3	3 51.6	−57.7	158.4	2 55.8	−57.7	158.4	2 00.0	−57.8	158.4	33
34	7 33.3	−57.0	158.5	6 37.5	−57.1	158.5	5 41.6	−57.2	158.6	4 47.8	−57.4	158.6	3 49.9	−57.5	158.6	2 54.0	−57.6	158.7	1 58.1	−57.6	158.7	1 02.2	−57.7	158.7	34
35	6 36.3	−57.0	158.8	5 40.4	−57.2	158.8	4 44.4	−57.2	158.9	3 48.4	−57.3	158.9	2 52.4	−57.4	158.9	1 56.4	−57.6	158.9	1 00.5	−57.7	159.0	0 04.5	−57.8	159.0	35
36	5 39.3	−57.0	159.1	4 43.2	−57.1	159.2	3 47.2	−57.3	159.2	2 51.1	−57.4	159.2	1 55.0	−57.5	159.2	0 58.9	−57.6	159.2	0 02.8	−57.7	159.2	0 53.3	+57.8	20.8	36
37	4 42.3	−57.0	159.4	3 46.1	−57.1	159.5	2 49.9	−57.2	159.5	1 53.7	−57.3	159.5	0 57.5	−57.5	159.5	0 01.3	−57.6	159.5	0 54.9	+57.7	20.5	1 51.1	+57.8	20.5	37
38	3 45.3	−57.1	159.7	2 49.0	−57.2	159.8	1 52.7	−57.3	159.8	0 56.4	−57.4	159.8	0 00.0	−57.4	159.8	0 56.3	+57.6	20.2	1 52.6	+57.6	20.2	2 48.9	+57.7	20.2	38
39	2 48.2	−57.0	160.1	1 51.8	−57.1	160.1	0 55.4	−57.3	160.1	0 01.0	+57.4	19.9	0 57.4	+57.5	19.9	1 53.8	+57.6	19.9	2 50.2	+57.7	19.9	3 46.6	+57.8	20.0	39
40	1 51.2	−57.1	160.4	0 54.7	−57.2	160.4	0 01.9	+57.2	19.6	0 58.4	+57.3	19.6	1 54.9	+57.4	19.6	2 51.4	+57.5	19.6	3 47.9	+57.7	19.7	4 44.4	+57.7	19.7	40
41	0 54.1	−57.0	160.7	0 02.5	+57.1	19.3	0 59.1	+57.3	19.3	1 55.7	+57.4	19.3	2 52.3	+57.5	19.3	3 48.9	+57.6	19.4	4 45.6	+57.6	19.4	5 42.1	+57.8	19.4	41
42	0 02.9	+57.1	19.0	0 59.6	+57.2	19.0	1 56.4	+57.2	19.0	2 53.1	+57.3	19.0	3 49.8	+57.4	19.1	4 46.5	+57.4	19.1	5 43.2	+57.6	19.1	6 39.9	+57.7	19.1	42
43	1 00.0	+57.0	18.7	1 56.8	+57.1	18.7	2 53.6	+57.3	18.7	3 50.4	+57.4	18.7	4 47.2	+57.5	18.8	5 44.1	+57.5	18.8	6 40.8	+57.7	18.8	7 37.6	+57.8	18.9	43
44	1 57.0	+57.0	18.4	2 53.9	+57.2	18.4	3 50.9	+57.2	18.4	4 47.8	+57.3	18.4	5 44.7	+57.4	18.5	6 41.6	+57.5	18.5	7 38.5	+57.6	18.6	8 35.4	+57.7	18.6	44
45	2 54.0	+57.1	18.1	3 51.1	+57.1	18.1	4 48.1	+57.2	18.1	5 45.1	+57.3	18.2	6 42.1	+57.4	18.2	7 39.1	+57.5	18.2	8 36.1	+57.6	18.3	9 33.1	+57.7	18.3	45
46	3 51.1	+57.0	17.8	4 48.2	+57.1	17.8	5 45.3	+57.2	17.8	6 42.4	+57.4	17.9	7 39.5	+57.5	17.9	8 36.6	+57.5	17.9	9 33.7	+57.6	18.0	10 30.8	+57.7	18.0	46
47	4 48.1	+57.0	17.5	5 45.3	+57.1	17.5	6 42.5	+57.3	17.5	7 39.8	+57.3	17.6	8 37.0	+57.4	17.6	9 34.1	+57.5	17.6	10 31.3	+57.7	17.7	11 28.5	+57.6	17.8	47
48	5 45.1	+57.0	17.1	6 42.4	+57.1	17.2	7 39.8	+57.2	17.2	8 37.1	+57.3	17.3	9 34.4	+57.3	17.3	10 31.6	+57.5	17.4	11 28.9	+57.6	17.4	12 26.1	+57.7	17.5	48
49	6 42.1	+57.0	16.8	7 39.5	+57.1	16.9	8 37.0	+57.1	16.9	9 34.4	+57.2	17.0	10 31.7	+57.4	17.0	11 29.1	+57.5	17.1	12 26.5	+57.5	17.1	13 23.8	+57.6	17.2	49
50	7 39.1	+57.0	16.5	8 36.6	+57.1	16.6	9 34.1	+57.2	16.6	10 31.6	+57.3	16.7	11 29.1	+57.4	16.7	12 26.6	+57.4	16.8	13 24.0	+57.6	16.8	14 21.4	+57.6	16.9	50
51	8 36.1	+57.0	16.2	9 33.7	+57.1	16.2	10 31.3	+57.2	16.3	11 28.9	+57.2	16.4	12 26.5	+57.3	16.4	13 24.0	+57.4	16.5	14 21.5	+57.5	16.5	15 19.0	+57.6	16.6	51
52	9 33.1	+56.9	15.9	10 30.8	+57.0	15.9	11 28.5	+57.1	16.0	12 26.1	+57.2	16.0	13 23.8	+57.3	16.1	14 21.4	+57.4	16.2	15 19.0	+57.5	16.2	16 16.6	+57.6	16.3	52
53	10 30.0	+56.9	15.6	11 27.8	+57.0	15.6	12 25.6	+57.1	15.7	13 23.3	+57.2	15.7	14 21.1	+57.3	15.8	15 18.8	+57.4	15.8	16 16.5	+57.5	16.0	17 14.2	+57.5	16.0	53
54	11 26.9	+57.0	15.2	12 24.8	+57.0	15.3	13 22.7	+57.1	15.4	14 20.5	+57.2	15.4	15 18.4	+57.2	15.5	16 16.2	+57.3	15.6	17 14.0	+57.4	15.7	18 11.7	+57.5	15.7	54
55	12 23.9	+56.8	14.9	13 21.8	+57.0	15.0	14 19.8	+57.0	15.0	15 17.7	+57.2	15.1	16 15.6	+57.3	15.2	17 13.5	+57.3	15.3	18 11.4	+57.4	15.3	19 09.2	+57.5	15.4	55
56	13 20.7	+56.9	14.6	14 18.8	+56.9	14.7	15 16.8	+57.1	14.7	16 14.9	+57.1	14.8	17 12.9	+57.2	14.9	18 10.8	+57.3	15.0	19 08.8	+57.4	15.0	20 06.7	+57.5	15.1	56
57	14 17.6	+56.8	14.3	15 15.7	+56.9	14.3	16 13.9	+57.1	14.4	17 12.0	+57.1	14.5	18 10.1	+57.1	14.6	19 08.1	+57.3	14.6	20 06.2	+57.3	14.7	21 04.2	+57.4	14.8	57
58	15 14.4	+56.8	13.9	16 12.7	+56.9	14.0	17 10.9	+56.9	14.1	18 09.1	+57.0	14.2	19 07.2	+57.2	14.2	20 05.4	+57.2	14.3	21 03.5	+57.3	14.4	22 01.6	+57.4	14.5	58
59	16 11.2	+56.8	13.6	17 09.6	+56.8	13.7	18 07.8	+57.0	13.7	19 06.1	+57.0	13.8	20 04.4	+57.1	13.9	21 02.6	+57.2	14.0	22 00.8	+57.3	14.1	22 59.0	+57.3	14.2	59
60	17 08.0	+56.8	13.3	18 06.4	+56.8	13.3	19 04.8	+56.9	13.4	20 03.1	+57.0	13.5	21 01.5	+57.0	13.6	21 59.8	+57.1	13.7	22 58.1	+57.2	13.8	23 56.3	+57.3	13.9	60
61	18 04.8	+56.7	12.9	19 03.2	+56.8	13.0	20 01.7	+56.8	13.1	21 00.1	+57.0	13.2	21 58.5	+57.1	13.2	22 56.9	+57.1	13.3	23 55.3	+57.2	13.4	24 53.6	+57.3	13.6	61
62	19 01.5	+56.6	12.6	20 00.0	+56.8	12.7	20 58.5	+56.9	12.7	21 57.1	+56.9	12.8	22 55.6	+56.9	12.9	23 54.0	+57.1	13.0	24 52.5	+57.1	13.1	25 50.9	+57.2	13.2	62
63	19 58.1	+56.6	12.2	20 56.8	+56.6	12.3	21 55.4	+56.7	12.4	22 54.0	+56.8	12.5	23 52.5	+57.0	12.6	24 51.1	+57.0	12.7	25 49.6	+57.1	12.8	26 48.1	+57.2	12.9	63
64	20 54.7	+56.6	11.9	21 53.4	+56.7	12.0	22 52.1	+56.8	12.0	23 50.8	+56.8	12.1	24 49.5	+56.8	12.2	25 48.1	+56.9	12.3	26 46.7	+57.0	12.4	27 45.3	+57.1	12.5	64
65	21 51.3	+56.6	11.5	22 50.1	+56.6	11.6	23 48.9	+56.6	11.7	24 47.6	+56.8	11.8	25 46.3	+56.9	11.9	26 45.0	+57.0	12.0	27 43.7	+57.0	12.1	28 42.4	+57.1	12.2	65
66	22 47.9	+56.4	11.2	23 46.7	+56.6	11.2	24 45.5	+56.7	11.3	25 44.4	+56.7	11.4	26 43.2	+56.8	11.5	27 42.0	+56.8	11.6	28 40.7	+56.9	11.7	29 39.5	+57.0	11.8	66
67	23 44.3	+56.5	10.8	24 43.3	+56.5	10.9	25 42.2	+56.6	11.0	26 41.1	+56.6	11.1	27 40.0	+56.7	11.2	28 38.8	+56.8	11.3	29 37.6	+56.9	11.4	30 36.5	+56.9	11.5	67
68	24 40.8	+56.3	10.4	25 39.8	+56.4	10.5	26 38.8	+56.5	10.6	27 37.7	+56.6	10.7	28 36.7	+56.6	10.8	29 35.6	+56.7	10.9	30 34.5	+56.8	11.0	31 33.4	+56.9	11.1	68
69	25 37.1	+56.3	10.0	26 36.2	+56.4	10.1	27 35.3	+56.4	10.2	28 34.3	+56.5	10.3	29 33.3	+56.6	10.4	30 32.3	+56.7	10.5	31 31.3	+56.8	10.6	32 30.3	+56.8	10.7	69
70	26 33.4	+56.3	9.6	27 32.6	+56.3	9.7	28 31.7	+56.4	9.8	29 30.8	+56.5	9.9	30 29.9	+56.5	10.0	31 29.0	+56.6	10.1	32 28.1	+56.6	10.2	33 27.1	+56.7	10.4	70
71	27 29.7	+56.2	9.3	28 28.9	+56.3	9.3	29 28.1	+56.3	9.4	30 27.3	+56.4	9.5	31 26.4	+56.5	9.6	32 25.6	+56.5	9.7	33 24.7	+56.6	9.8	34 23.8	+56.7	10.0	71
72	28 25.9	+56.1	8.9	29 25.2	+56.1	9.0	30 24.4	+56.3	9.0	31 23.7	+56.3	9.1	32 22.9	+56.4	9.2	33 22.1	+56.5	9.3	34 21.3	+56.5	9.4	35 20.5	+56.6	9.6	72
73	29 22.0	+56.0	8.5	30 21.3	+56.1	8.5	31 20.7	+56.1	8.6	32 20.0	+56.2	8.7	33 19.3	+56.3	8.8	34 18.6	+56.3	8.9	35 17.8	+56.4	9.0	36 17.1	+56.5	9.1	73
74	30 18.0	+56.0	8.0	31 17.4	+56.1	8.1	32 16.8	+56.1	8.2	33 16.2	+56.1	8.3	34 15.6	+56.2	8.4	35 14.9	+56.3	8.5	36 14.2	+56.4	8.6	37 13.6	+56.4	8.7	74
75	31 14.0	+55.9	7.6	32 13.5	+55.9	7.7	33 12.9	+56.0	7.8	34 12.3	+56.1	7.9	35 11.8	+56.1	8.0	36 11.2	+56.2	8.1	37 10.6	+56.2	8.3	38 10.0	+56.3	8.3	75
76	32 09.9	+55.8	7.2	33 09.4	+55.8	7.3	34 08.9	+55.9	7.4	35 08.4	+56.0	7.5	36 07.9	+56.0	7.5	37 07.4	+56.0	7.6	38 06.8	+56.2	7.7	39 06.3	+56.2	7.9	76
77	33 05.7	+55.6	6.8	34 05.2	+55.8	6.8	35 04.8	+55.8	6.9	36 04.4	+55.8	7.0	37 03.9	+55.9	7.1	38 03.4	+56.0	7.2	39 03.0	+56.0	7.3	40 02.5	+56.1	7.4	77
78	34 01.3	+55.6	6.3	35 01.0	+55.6	6.4	36 00.6	+55.7	6.5	37 00.2	+55.8	6.6	37 59.8	+55.8	6.6	38 59.4	+55.7	6.8	39 59.0	+55.9	6.8	40 58.6	+55.9	6.9	78
79	34 56.9	+55.5	5.9	35 56.6	+55.6	5.9	36 56.3	+55.6	6.1	37 56.0	+55.6	6.1	38 55.6	+55.7	6.2	39 55.3	+55.7	6.3	40 54.9	+55.8	6.4	41 54.5	+55.9	6.5	79
80	35 52.4	+55.4	5.4	36 52.2	+55.4	5.5	37 51.9	+55.5	5.5	38 51.6	+55.5	5.6	39 51.3	+55.6	5.7	40 51.0	+55.6	5.8	41 50.7	+55.7	5.9	42 50.4	+55.7	6.0	80
81	36 47.8	+55.3	4.9	37 47.6	+55.3	5.0	38 47.4	+55.3	5.0	39 47.1	+55.4	5.1	40 46.9	+55.4	5.2	41 46.6	+55.5	5.2	42 46.4	+55.5	5.4	43 46.1	+55.6	5.4	81
82	37 43.1	+55.1	4.4	38 42.9	+55.2	4.5	39 42.7	+55.2	4.6	40 42.5	+55.3	4.6	41 42.3	+55.3	4.7	42 42.1	+55.4	4.8	43 41.9	+55.4	4.8	44 41.7	+55.4	4.9	82
83	38 38.2	+55.0	3.9	39 38.1	+55.0	4.0	40 37.9	+55.1	4.0	41 37.8	+55.1	4.1	42 37.6	+55.2	4.2	43 37.5	+55.1	4.2	44 37.3	+55.2	4.3	45 37.1	+55.3	4.4	83
84	39 33.2	+54.9	3.5	40 33.1	+54.9	3.5	41 33.0	+54.9	3.5	42 32.9	+54.9	3.6	43 32.8	+55.0	3.6	44 32.6	+55.1	3.7	45 32.5	+55.1	3.8	46 32.4	+55.1	3.8	84
85	40 28.1	+54.7	2.9	41 28.0	+54.8	2.9	42 27.9	+54.8	3.0	43 27.8	+54.8	3.0	44 27.8	+54.8	3.1	45 27.7	+54.8	3.1	46 27.6	+54.9	3.2	47 27.5	+54.9	3.2	85
86	41 22.8	+54.6	2.3	42 22.8	+54.5	2.4	43 22.7	+54.6	2.4	44 22.6	+54.7	2.5	45 22.6	+54.6	2.5	46 22.5	+54.7	2.5	47 22.5	+54.7	2.6	48 22.4	+54.7	2.6	86
87	42 17.4	+54.4	1.8	43 17.3	+54.4	1.8	44 17.3	+54.4	1.8	45 17.3	+54.4	1.9	46 17.2	+54.5	1.9	47 17.2	+54.5	1.9	48 17.2	+54.5	2.0	49 17.1	+54.6	2.0	87
88	43 11.8	+54.2	1.2	44 11.7	+54.3	1.2	45 11.7	+54.3	1.2	46 11.7	+54.3	1.3	47 11.7	+54.3	1.3	48 11.7	+54.3	1.3	49 11.7	+54.3	1.3	50 11.7	+54.2	1.4	88
89	44 06.0	+54.0	0.6	45 06.0	+54.0	0.6	46 06.0	+54.0	0.6	47 06.0	+54.0	0.6	48 06.0	+54.0	0.7	49 06.0	+54.0	0.7	50 06.0	+54.0	0.7	51 05.9	+54.1	0.7	89
90	45 00.0	+53.8	0.0	46 00.0	+53.8	0.0	47 00.0	+53.8	0.0	48 00.0	+53.8	0.0	49 00.0	+53.8	0.0	50 00.0	+53.8	0.0	51 00.0	+53.8	0.0	52 00.0	+53.8	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 154°, 206°

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	39 03.2	+54.5	144.2	38 14.3	+54.9	144.7	37 25.3	+55.1	145.1	36 35.9	+55.5	145.6	35 46.3	+55.7	146.0	34 56.4	+56.1	146.4	34 06.4	+56.2	146.7	33 16.1	+56.5	147.1	0
1	39 57.7	+54.4	143.7	39 09.2	+54.8	144.2	38 20.4	+55.1	144.6	37 31.4	+55.3	145.1	36 42.0	+55.7	145.5	35 52.5	+55.9	145.9	35 02.6	+56.2	146.3	34 12.6	+56.4	146.7	1
2	40 52.1	+54.3	143.1	40 04.0	+54.6	143.6	39 15.5	+54.9	144.1	38 26.7	+55.3	144.6	37 37.7	+55.5	145.0	36 48.4	+55.8	145.5	35 58.8	+56.1	145.9	35 09.0	+56.4	146.3	2
3	41 46.4	+54.0	142.6	40 58.6	+54.3	143.1	40 10.4	+54.8	143.6	39 22.0	+55.1	144.1	38 33.2	+55.4	144.6	37 44.2	+55.7	145.0	36 54.9	+56.0	145.5	36 05.4	+56.2	145.9	3
4	42 40.4	+53.9	142.0	41 53.0	+54.3	142.5	41 05.2	+54.6	143.1	40 17.1	+54.9	143.6	39 28.6	+55.3	144.1	38 39.9	+55.6	144.5	37 50.9	+55.9	145.0	37 01.6	+56.2	145.4	4
5	43 34.3	+53.7	141.4	42 47.3	+54.1	142.0	41 59.8	+54.5	142.5	41 12.0	+54.9	143.1	40 23.9	+55.2	143.6	39 35.5	+55.5	144.1	38 46.8	+55.7	144.5	37 57.8	+56.0	145.0	5
6	44 28.0	+53.5	140.8	43 41.4	+53.8	141.4	42 54.3	+54.3	141.9	42 06.9	+54.6	142.5	41 19.1	+55.0	143.0	40 31.0	+55.3	143.6	39 42.5	+55.7	144.1	38 53.8	+56.0	144.5	6
7	45 21.5	+53.3	140.1	44 35.2	+53.7	140.7	43 48.6	+54.1	141.4	43 01.5	+54.5	141.9	42 14.1	+54.8	142.5	41 26.3	+55.2	143.1	40 38.2	+55.5	143.6	39 49.8	+55.8	144.1	7
8	46 14.8	+53.0	139.5	45 28.9	+53.5	140.1	44 42.7	+53.9	140.8	43 56.0	+54.3	141.4	43 08.9	+54.7	142.0	42 21.5	+55.1	142.5	41 33.7	+55.4	143.1	40 45.6	+55.7	143.6	8
9	47 07.8	+52.8	138.8	46 22.4	+53.3	139.5	45 36.6	+53.7	140.1	44 50.3	+54.1	140.8	44 03.6	+54.5	141.4	43 16.6	+54.8	142.0	42 29.1	+55.2	142.6	41 41.3	+55.6	143.1	9
10	48 00.6	+52.5	138.1	47 15.7	+53.0	138.8	46 30.3	+53.5	139.5	45 44.4	+54.0	140.2	44 58.1	+54.4	140.8	44 11.4	+54.8	141.4	43 24.3	+55.1	142.0	42 36.9	+55.4	142.6	10
11	48 53.1	+52.2	137.3	48 08.7	+52.7	138.1	47 23.8	+53.2	138.8	46 38.4	+53.6	139.5	45 52.5	+54.1	140.2	45 06.2	+54.5	140.8	44 19.4	+54.9	141.5	43 32.3	+55.3	142.1	11
12	49 45.3	+51.9	136.6	49 01.4	+52.5	137.4	48 17.0	+53.0	138.1	47 32.0	+53.5	138.9	46 46.6	+53.9	139.6	46 00.7	+54.4	140.3	45 14.4	+54.7	140.9	44 27.6	+55.1	141.5	12
13	50 37.2	+51.6	135.8	49 53.9	+52.1	136.6	49 10.0	+52.7	137.4	48 25.5	+53.2	138.2	47 40.5	+53.7	138.9	46 55.1	+54.1	139.6	46 09.1	+54.6	140.3	45 22.7	+55.0	141.0	13
14	51 28.8	+51.2	135.0	50 46.0	+51.9	135.9	50 02.7	+52.4	136.7	49 18.7	+53.0	137.5	48 34.2	+53.5	138.3	47 49.2	+53.9	139.0	47 03.7	+54.3	139.7	46 17.7	+54.8	140.4	14
15	52 20.0	+50.9	134.1	51 37.9	+51.5	135.1	50 55.1	+52.1	135.9	50 11.7	+52.7	136.8	49 27.7	+53.2	137.6	48 43.1	+53.7	138.3	47 58.0	+54.2	139.1	47 12.5	+54.5	139.8	15
16	53 10.9	+50.4	133.3	52 29.4	+51.1	134.2	51 47.2	+51.8	135.1	51 04.4	+52.3	136.0	50 20.9	+52.9	136.9	49 36.8	+53.5	137.7	48 52.2	+53.9	138.4	48 07.0	+54.3	139.2	16
17	54 01.3	+50.1	132.4	53 20.5	+50.8	133.3	52 39.0	+51.4	134.3	51 56.7	+52.1	135.2	51 13.8	+52.6	136.1	50 30.3	+53.1	137.0	49 46.1	+53.7	137.8	49 01.4	+54.2	138.5	17
18	54 51.4	+49.5	131.4	54 11.3	+50.3	132.4	53 30.4	+51.0	133.4	52 48.8	+51.7	134.4	52 06.4	+52.3	135.3	51 23.4	+52.9	136.2	50 39.8	+53.4	137.1	49 55.6	+53.9	137.9	18
19	55 40.9	+49.1	130.4	55 01.6	+49.9	131.5	54 21.4	+50.6	132.6	53 40.5	+51.3	133.6	52 58.7	+52.0	134.3	52 16.3	+52.6	135.3	51 33.2	+53.2	136.3	50 49.5	+53.7	137.2	19
20	56 30.0	+48.5	129.4	55 51.5	+49.3	130.5	55 12.0	+50.2	131.6	54 31.8	+50.9	132.7	53 50.7	+51.6	133.7	53 08.9	+52.2	134.7	52 26.4	+52.8	135.6	51 43.2	+53.4	136.5	20
21	57 18.5	+48.0	128.3	56 40.8	+48.9	129.5	56 02.2	+49.7	130.7	55 22.7	+50.5	131.8	54 42.3	+51.2	132.8	54 01.1	+51.9	133.8	53 19.2	+52.6	134.8	52 36.6	+53.1	135.7	21
22	58 06.5	+47.3	127.2	57 29.7	+48.3	128.4	56 51.9	+49.2	129.6	56 13.2	+50.0	130.8	55 33.5	+50.8	131.9	54 53.0	+51.6	133.0	54 11.8	+52.1	134.0	53 29.7	+52.8	135.0	22
23	58 53.8	+46.7	126.0	58 18.0	+47.7	127.3	57 41.1	+48.6	128.6	57 03.2	+49.5	129.8	56 24.3	+50.3	131.0	55 44.6	+51.0	132.1	55 03.9	+51.8	133.1	54 22.5	+52.5	134.2	23
24	59 40.5	+45.9	124.8	59 05.7	+47.0	126.1	58 29.7	+48.0	127.5	57 52.7	+49.0	128.7	57 14.6	+49.9	130.0	56 35.6	+50.7	131.1	55 55.7	+51.4	132.2	55 15.0	+52.1	133.3	24
25	60 26.4	+45.2	123.5	59 52.7	+46.3	124.9	59 17.7	+47.4	126.3	58 41.7	+48.3	127.6	58 04.5	+49.3	128.9	57 26.3	+50.2	130.1	56 47.1	+51.0	131.3	56 07.1	+51.7	132.4	25
26	61 11.6	+44.3	122.1	60 39.0	+45.5	123.6	60 05.1	+46.7	125.1	59 30.0	+47.8	126.5	58 53.8	+48.7	127.8	58 16.5	+49.6	129.1	57 38.1	+50.5	130.3	56 58.8	+51.3	131.5	26
27	61 55.9	+43.4	120.7	61 24.5	+44.7	122.3	60 51.8	+45.9	123.8	60 17.8	+47.0	125.3	59 42.5	+48.1	126.7	59 06.1	+49.1	128.0	58 28.6	+50.0	129.3	57 50.1	+50.8	130.5	27
28	62 39.3	+42.4	119.2	62 09.2	+43.8	120.9	61 37.7	+45.1	122.5	61 04.8	+46.3	124.0	60 30.6	+47.4	125.5	59 55.2	+48.5	126.9	59 18.6	+49.4	128.2	58 40.9	+50.4	129.5	28
29	63 21.7	+41.3	117.7	62 53.0	+42.8	119.4	62 22.8	+44.2	121.1	61 51.1	+45.5	122.7	61 18.0	+46.7	124.2	60 43.7	+47.8	125.7	60 08.0	+48.9	127.1	59 31.3	+49.8	128.5	29
30	64 03.0	+40.2	116.0	63 35.8	+41.8	117.9	63 07.0	+43.2	119.6	62 36.6	+44.6	121.3	62 04.7	+45.9	122.9	61 31.5	+47.0	124.5	60 56.9	+48.2	125.9	60 21.1	+49.2	127.4	30
31	64 43.2	+38.9	114.3	64 17.6	+40.6	116.2	63 50.2	+42.2	118.0	63 21.2	+43.7	119.8	62 50.6	+45.0	121.5	62 18.5	+46.3	123.1	61 45.1	+47.4	124.7	61 10.3	+48.5	126.2	31
32	65 22.1	+37.6	112.5	64 58.2	+39.4	114.5	64 32.4	+41.1	116.4	64 04.9	+42.6	118.3	63 35.6	+44.1	120.0	63 04.8	+45.5	121.7	62 32.5	+46.7	123.4	61 58.8	+47.9	125.0	32
33	65 59.7	+36.1	110.6	65 37.6	+38.0	112.7	65 13.5	+39.7	114.7	64 47.5	+41.4	116.6	64 19.7	+43.0	118.5	63 50.3	+44.5	120.3	63 19.2	+45.9	122.0	62 46.7	+47.1	123.7	33
34	66 35.8	+34.5	108.6	66 15.6	+36.5	110.7	65 53.2	+38.5	112.7	65 28.9	+40.3	114.9	65 02.7	+42.0	116.9	64 34.8	+43.4	118.7	64 05.1	+44.9	120.6	63 33.8	+46.3	122.3	34
35	67 10.3	+32.9	106.6	66 52.1	+35.0	108.8	66 31.7	+37.0	111.0	66 09.2	+38.9	113.1	65 44.7	+40.7	115.1	65 18.2	+42.4	117.1	64 50.0	+43.9	119.0	64 20.1	+45.3	120.8	35
36	67 43.2	+30.9	104.4	67 27.1	+33.2	106.7	67 08.7	+35.4	109.0	66 48.1	+37.4	111.2	66 25.4	+39.3	113.3	66 00.6	+41.2	115.4	65 33.9	+42.8	117.4	65 05.4	+44.4	119.3	36
37	68 14.1	+29.1•	102.1	68 00.3	+31.5	104.5	67 44.1	+33.7	106.9	67 25.5	+35.9	109.2	67 04.7	+37.9	111.4	66 41.8	+39.8	113.6	66 16.7	+41.7	115.7	65 49.8	+43.3	117.7	37
38	68 43.2	+26.9•	99.7	68 31.8	+29.4•	102.2	68 17.8	+31.9	104.7	68 01.4	+34.2	107.1	67 42.6	+36.4	109.4	67 21.6	+38.4	111.7	66 58.4	+40.3	113.9	66 33.1	+42.1	116.0	38
39	69 10.1	+24.7•	97.2	69 01.2	+27.3•	99.8	68 49.7	+29.9•	102.3	68 35.6	+32.3	104.8	68 19.0	+34.6	107.3	68 00.0	+36.8	109.6	67 38.7	+38.8	111.9	67 15.2	+40.8	114.2	39
40	69 34.8	+22.2•	94.6	69 28.5	+25.1•	97.3	69 19.6	+27.7•	99.9	69 07.9	+30.3•	102.5	68 53.6	+32.8	105.0	68 36.8	+35.1	107.5	68 17.5	+37.3	109.9	67 56.0	+39.3	112.2	40
41	69 57.0	+19.8•	91.9	69 53.6	+22.6•	94.7	69 47.3	+25.4•	97.4	69 38.2	+28.2•	100.1	69 26.4	+30.7•	102.7	69 11.9	+33.2	105.3	68 54.8	+35.6	107.8	68 35.3	+37.8	110.2	41
42	70 16.8	+17.2•	89.2	70 16.2	+20.1•	92.0	70 12.7	+23.1•	94.7	70 06.4	+25.8•	97.5	69 57.1	+28.6•	100.2	69 45.1	+31.2•	102.9	69 30.4	+33.7	105.5	69 13.1	+36.1	108.0	42
43	70 34.0	+14.3•	86.3	70 36.3	+17.5•	89.1	70 35.8	+20.4•	92.0	70 32.2	+23.4•	94.8	70 25.7	+26.3•	97.6	70 16.3	+29.1•	100.4	70 04.1	+31.7•	103.1	69 49.2	+34.2	105.7	43
44	70 48.3	+11.5•	83.4	70 53.8	+14.6•	86.2	70 56.2	+17.7•	89.1	70 55.6	+20.8•	92.0	70 52.0	+23.8•	94.9	70 45.4	+26.7•	97.8	70 35.8	+29.5•	100.6	70 23.4	+32.2•	103.3	44
45	70 59.8	+8.6•	80.4	71 08.4	+11.7•	83.3	71 13.9	+14.9•	86.2	71 16.4	+18.0•	89.1	71 15.8	+21.1•	92.1	71 12.1	+24.1•	95.0	71 05.3	+27.1•	97.9	70 55.6	+29.9•	100.8	45
46	71 08.4	+5.5•	77.3	71 20.1	+8.7•	80.2	71 28.8	+11.9•	83.1	71 34.4	+15.1•	86.1	71 36.9	+18.3•	89.1	71 36.2	+21.5•	92.1	71 32.4	+24.6•	95.1	71 25.5	+27.6•	98.1	46
47	71 13.9	+2.5•	74.2	71 28.8	+5.6•	77.1	71 40.7	+8.8•	80.0	71 49.5	+12.1•	83.0	71 55.2	+15.4•	86.1	71 57.7	+18.6•	89.1	71 57.0	+21.8•	92.2	71 53.1	+24.9•	95.3	47
48	71 16.4	–0.6•	71.1	71 34.4	+2.5•	74.0	71 49.5	+5.7•	76.9	72 01.6	+9.0•	79.9	72 10.6	+12.2•	82.9	72 16.3	+15.6•	86.1	72 18.8	+18.9•	89.2	72 18.0	+22.2•	92.3	48
49	71 15.8	–3.7•	68.0	71 36.9	–0.7•	70.8	71 55.2	+2.5•	73.7	72 10.6	+5.7•	76.7	72 22.8	+9.1•	79.7	72 31.9	+12.5•	82.9	72 37.7	+15.9•	86.0	72 40.2	+19.2•	89.2	49
50	71 12.1	–6.8•	64.9	71 36.2	–3.8•	67.6	71 57.7	–0.7•	70.5	72 16.3	+2.5•	73.4	72 31.9	+5.8•	76.5	72 44.4	+9.2•	79.6	72 53.6	+12.6•	82.8	72 59.4	+16.2•	86.0	50
51	71 05.3	–9.7•	61.8	71 32.4	–6.9•	64.5	71 57.0	–3.9•	67.2	72 18.8	–0.8•	70.1	72 37.7	+2.5•	73.1	72 53.6	+5.8•	76.2	73 06.2	+9.4•	79.4	73 15.6	+12.8•	82.7	51
52	70 55.6	–12.7•	58.8	71 25.5	–10.0•	61.3	71 53.1	–7.1•	64.0	72 18.0	–4.0•	66.8	72 40.2	–0.9•	69.8	72 59.4	+2.5•	72.8	73 15.6	+5.9•	76.0	73 28.4	+9.4•	79.3	52
53	70 42.9	–15.5•	55.8	71 15.5	–12.9•	58.3	71 46.0	–10.2•	60.8	72 14.0	–7.3•	63.6	72 39.3	–4.2•	66.4	73 01.9	–1.0•	69.4	73 21.5	+2.4•	72.6	73 37.8	+6.0•	75.8	53
54	70 27.4	–18.2•	52.9	71 02.6	–15.8•	55.2	71 35.8	–13.3•	57.7	72 06.7	–10.5•	60.3	72 35.1	–7.5•	63.1	73 00.9	–4.4•	66.0	73 23.9	–1.1•	69.1	73 43.8	+2.3•	72.3	54
55	70 09.2	–20.8•	50.1	70 46.8	–18.6•	52.3	71 22.5	–16.1•	54.6	71 56.2	–13.5•	57.1	72 27.6	–10.7•	59.8	72 56.5	–7.7•	62.6	73 22.8	–4.6•	65.6	73 46.1	–1.2•	68.7	55
56	69 48.4	–23.3•	47.3	70 28.2	–21.2•	49.4	71 06.4	–19.0•	51.6	71 42.7	–16.6•	54.0	72 16.9	–13.9•	56.5	72 48.8	–11.1•	59.2	73 18.2	–8.0•	62.1	73 44.9	–4.8•	65.1	56
57	69 25.1	–25.6•	44.7	70 07.0	–23.6•	46.6	70 47.4	–21.6•	48.7	71 26.1	–19.3•	51.0	72 03.0	–16.9•	53.3	72 37.7	–14.3•	55.9	73 10.2	–11.5•	58.6	73 40.1	–8.4•	61.6	57
58	68 59.5	–27.8•	42.1	69 43.4	–26.1•	44.0	70 25.8	–24.1•	45.9	71 06.8	–22.1•	48.0	71 46.1	–19.8•	50.3	72 23.4	–17.3•	52.7	72 58.7	–14.6•	55.3	73 31.7	–11.7•	58.0	58
59	68 31.7	–29.8	39.7	69 17.3	–28.4•	41.4	70 01.7	–26.5•	43.2	70 44.7	–24.5•	45.2	71 26.3	–22.5•	47.3	72 06.1	–20.2•	49.5	72 44.1	–17.8•	52.0	73 19.9	–15.1•	54.6	59
60	68 01.9	–31.7	37.4	68 49.1	–30.3•	38.9	69 35.2	–28.7•	40.6	70 20.2	–27.0•	42.4	71 03.8	–25.1•	44.4	71 45.9	–23.1•	46.5	72 26.3	–20.8•	48.8	73 04.9	–18.3•	51.3	60
61	67 30.2	–33.6	35.1	68 18.8	–32.2	36.6	69 06.5	–30.8•	38.1	69 53.2	–29.2•	39.8	70 38.7	–27.5•	41.6	71 22.8	–25.6•	43.6	72 05.5	–23.5•	45.7	72 46.6	–21.3•	48.0	61
62	66 56.6	–35.1	33.0	67 46.6	–34.0	34.3	68 35.7	–32.7	35.7	69 24.0	–31.3•	37.3	70 11.2	–29.8•	39.0	70 57.2	–28.0•	40.8	71 42.0	–26.2•	42.7	72 25.3	–24.1•	44.9	62
63	66 21.5	–36.7	30.9	67 12.6	–35.6	32.1	68 03.0	–34.4	33.5	68 52.7	–33.2	34.9	69 41.4	–31.8	36.4	70 29.2	–30.3•	38.1	71 15.8	–28.6•	39.9	72 01.2	–26.8•	41.9	63
64	65 44.8	–38.2	29.0	66 37.0	–37.2	30.1	67 28.6	–36.2	31.3	68 19.5	–35.0	32.6	69 09.6	–33.7	34.0	69 58.9	–32.4•	35.5	70 47.2	–30.9•	37.2	71 34.4	–29.2•	39.0	64
65	65 06.6	–39.4	27.1	65 59.8	–38.6	28.1	66 52.4	–37.4	29.2	67 44.5	–36.7	30.4	68 35.9	–35.6	31.7	69 26.5	–34.3	33.1	70 16.3	–32.9•	34.6	71 05.2	–31.5•	36.3	65
66	64 27.2	–40.7	25.4	65 21.2	–39.9	26.3	66 14.8	–39.1	27.3	67 07.8	–38.1	28.4	68 00.3	–37.1	29.5	68 52.2	–36.1	30.8	69 43.4	–34.9	32.2	70 33.7	–33.6•	33.7	66
67	63 46.5	–41.7	23.7	64 41.3	–41.1	24.5	65 35.7	–40.4	25.4	66 29.7	–39.6	26.4	67 23.2	–38.7	27.5	68 16.1	–37.7	28.6	69 08.5	–36.7	29.9	70 00.1	–35.5	31.2	67
68	63 04.8	–42.9	22.1	64 00.2	–42.2	22.8	64 55.3	–41.5	23.7	65 50.1	–40.8	24.5	66 44.5	–40.1	25.5	67 38.4	–39.2	26.6	68 31.8	–38.3	27.7	69 24.6	–37.2	28.9	68
69	62 21.9	–43.7	20.5	63 18.0	–43.2	21.2	64 13.8	–42.7	22.0	65 09.3	–42.1	22.8	66 04.4	–41.3	23.7	66 59.2	–40.6	24.6	67 53.5	–39.8	25.6	68 47.4	–38.9	26.7	69
70	61 38.2	–44.7	19.1	62 34.8	–44.2	19.7	63 31.1	–43.6	20.4	64 27.2	–43.1	21.1	65 23.1	–42.5	21.9	66 18.6	–41.9	22.7	67 13.7	–41.1	23.7	68 08.5	–40.4	24.6	70
71	60 53.5	–45.5	17.7	61 50.6	–45.1	18.3	62 47.5	–44.6	18.9	63 44.1	–44.1	19.5	64 40.6	–43.6	20.2	65 36.7	–43.0	21.0	66 32.6	–42.4	21.8	67 28.1	–41.7	22.7	71
72	60 08.0	–46.2	16.4	61 05.5	–45.8	16.9	62 02.9	–45.5	17.4	63 00.0	–45.0	18.0	63 57.0	–44.6	18.6	64 53.7	–44.0	19.3	65 50.2	–43.5	20.0	66 46.4	–42.9	20.8	72
73	59 21.8	–47.0	15.1	60 19.7	–46.7	15.6	61 17.4	–46.3	16.0	62 15.0	–45.9	16.6	63 12.4	–45.5	17.1	64 09.7	–45.1	17.7	65 06.7	–44.6	18.4	66 03.5	–44.0	19.1	73
74	58 34.8	–47.5	13.9	59 33.0	–47.3	14.3	60 31.1	–47.0	14.7	61 29.1	–46.7	15.2	62 26.9	–46.3	15.7	63 24.6	–45.9	16.2	64 22.1	–45.5	16.8	65 19.5	–45.1	17.4	74
75	57 47.3	–48.2	12.7	58 45.7	–47.9	13.1	59 44.1	–47.6	13.5	60 42.4	–47.4	13.9	61 40.6	–47.1	14.3	62 38.7	–46.8	14.8	63 36.6	–46.4	15.3	64 34.4	–46.0	15.9	75
76	56 59.1	–48.8	11.6	57 57.8	–48.5	11.9	58 56.5	–48.3	12.3	59 55.0	–48.0	12.7	60 53.5	–47.7	13.0	61 51.9	–47.5	13.5	62 50.2	–47.1	13.9	63 48.4	–46.8	14.4	76
77	56 10.3	–49.3	10.6	57 09.3	–49.1	10.9	58 08.2	–48.9	11.2	59 07.0	–48.7	11.5	60 05.8	–48.5	11.8	61 04.4	–48.1	12.2	62 03.1	–48.0	12.6	63 01.6	–47.7	13.0	77
78	55 21.0	–49.7	9.6	56 20.2	–49.6	9.8	57 19.3	–49.4	10.1	58 18.3	–49.2	10.3	59 17.3	–49.0	10.7	60 16.3	–48.9	11.0	61 15.1	–48.6	11.3	62 13.9	–48.3	11.7	78
79	54 31.3	–50.2	8.6	55 30.6	–50.1	8.8	56 29.9	–49.9	9.0	57 29.1	–49.8	9.3	58 28.3	–49.6	9.5	59 27.4	–49.4	9.8	60 26.5	–49.2	10.1	61 25.6	–49.0	10.4	79
80	53 41.1	–50.7	7.6	54 40.5	–50.5	7.8	55 40.0	–50.4	8.0	56 39.3	–50.2	8.2	57 38.7	–50.1	8.5	58 38.0	–49.9	8.7	59 37.3	–49.8	9.0	60 36.6	–49.6	9.2	80
81	52 50.4	–51.0	6.8	53 50.0	–50.9	6.9	54 49.6	–50.6	7.1	55 49.1	–50.7	7.3	56 48.6	–50.6	7.5	57 48.1	–50.5	7.7	58 47.5	–50.3	7.9	59 47.0	–50.2	8.1	81
82	51 59.4	–51.3	5.9	52 59.1	–51.3	6.0	53 58.8	–51.2	6.2	54 58.4	–51.1	6.3	55 58.0	–51.1	6.5	56 57.6	–50.9	6.7	57 57.2	–50.8	6.8	58 56.8	–50.7	7.0	82
83	51 08.1	–51.8	5.1	52 07.8	–51.6	5.2	53 07.6	–51.6	5.3	54 07.3	–51.5	5.4	55 07.0	–51.4	5.6	56 06.7	–51.3	5.7	57 06.4	–51.2	5.8	58 06.1	–51.1	6.0	83
84	50 16.3	–52.0	4.3	51 16.2	–52.0	4.3	52 16.0	–51.9	4.4	53 15.8	–51.8	4.6	54 15.6	–51.8	4.7	55 15.4	–51.7	4.8	56 15.2	–51.7	4.9	57 15.0	–51.6	5.0	84
85	49 24.3	–52.3	3.5	50 24.2	–52.3	3.6	51 24.1	–52.3	3.6	52 23.9	–52.2	3.7	53 23.8	–52.1	3.8	54 23.7	–52.1	3.9	55 23.5	–52.0	4.0	56 23.4	–52.0	4.1	85
86	48 32.0	–52.7	2.7	49 31.9	–52.6	2.8	50 31.8	–52.5	2.9	51 31.7	–52.5	2.9	52 31.7	–52.5	3.0	53 31.6	–52.5	3.1	54 31.5	–52.4	3.1	55 31.4	–52.4	3.2	86
87	47 39.3	–52.8	2.0	48 39.3	–52.8	2.1	49 39.3	–52.7	2.1	50 39.2	–52.7	2.1	51 39.2	–52.7	2.2	52 39.1	–52.7	2.2	53 39.1	–52.7	2.3	54 39.1	–52.7	2.4	87
88	46 46.5	–53.1	1.3	47 46.5	–53.2	1.4	48 46.4	–53.1	1.4	49 46.4	–53.1	1.4	50 46.4	–53.1	1.4	51 46.4	–53.1	1.5	52 46.4	–53.1	1.5	53 46.3	–53.0	1.5	88
89	45 53.4	–53.4	0.7	46 53.3	–53.3	0.7	47 53.3	–53.3	0.7	48 53.3	–53.3	0.7	49 53.3	–53.3	0.7	50 53.3	–53.3	0.7	51 53.3	–53.3	0.7	52 53.3	–53.3	0.8	89
90	45 00.0	–53.6	0.0	46 00.0	–53.6	0.0	47 00.0	–53.6	0.0	48 00.0	–53.6	0.0	49 00.0	–53.6	0.0	50 00.0	–53.6	0.0	51 00.0	–53.6	0.0	52 00.0	–53.6	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

LATITUDE **CONTRARY** NAME TO DECLINATION   **L.H.A. 27°, 333°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	39 03.2	−54.7	144.2	38 14.3	−55.0	144.7	37 25.3	−55.4	145.1	36 35.9	−55.6	145.6	35 46.3	−55.9	146.0	34 56.4	−56.1	146.4	34 06.4	−56.4	146.7	33 16.1	−56.6	147.1	0
1	38 08.5	−54.9	144.7	37 19.3	−55.1	145.2	36 29.9	−55.5	145.6	35 40.3	−55.7	146.0	34 50.4	−55.9	146.4	34 00.3	−56.2	146.8	33 10.0	−56.4	147.2	32 19.5	−56.7	147.5	1
2	37 13.6	−54.9	145.3	36 24.2	−55.3	145.7	35 34.5	−55.5	146.1	34 44.6	−55.8	146.5	33 54.5	−56.1	146.9	33 04.1	−56.3	147.2	32 13.6	−56.5	147.6	31 22.8	−56.7	147.9	2
3	36 18.7	−55.1	145.8	35 28.9	−55.3	146.2	34 39.0	−55.7	146.6	33 48.8	−55.9	146.9	32 58.4	−56.1	147.3	32 07.8	−56.3	147.6	31 17.1	−56.6	148.0	30 26.1	−56.8	148.3	3
4	35 23.6	−55.2	146.3	34 33.6	−55.5	146.6	33 43.3	−55.7	147.0	32 52.9	−56.0	147.4	32 02.3	−56.2	147.7	31 11.5	−56.5	148.0	30 20.5	−56.7	148.3	29 29.3	−56.8	148.6	4
5	34 28.4	−55.4	146.7	33 38.1	−55.6	147.1	32 47.6	−55.8	147.5	31 56.9	−56.0	147.8	31 06.1	−56.3	148.1	30 15.0	−56.5	148.4	29 23.8	−56.7	148.7	28 32.5	−56.9	149.0	5
6	33 33.0	−55.4	147.2	32 42.5	−55.7	147.5	31 51.8	−55.9	147.9	31 00.9	−56.2	148.2	30 09.8	−56.4	148.5	29 18.5	−56.5	148.8	28 27.1	−56.9	149.1	27 35.6	−57.0	149.4	6
7	32 37.6	−55.5	147.7	31 46.8	−55.7	148.0	30 55.9	−56.0	148.3	30 04.7	−56.2	148.6	29 13.4	−56.4	148.9	28 22.0	−56.7	149.2	27 30.3	−56.8	149.5	26 38.6	−57.0	149.7	7
8	31 42.1	−55.6	148.1	30 51.1	−55.9	148.4	29 59.9	−56.1	148.7	29 08.5	−56.3	149.0	28 17.0	−56.5	149.3	27 25.3	−56.7	149.6	26 33.5	−56.9	149.8	25 41.6	−57.1	150.1	8
9	30 46.5	−55.7	148.5	29 55.2	−55.9	148.8	29 03.8	−56.2	149.1	28 12.2	−56.3	149.4	27 20.5	−56.6	149.7	26 28.6	−56.7	149.9	25 36.6	−56.9	150.2	24 44.5	−57.1	150.4	9
10	29 50.8	−55.8	149.0	28 59.3	−56.0	149.3	28 07.6	−56.2	149.5	27 15.9	−56.5	149.8	26 23.9	−56.6	150.1	25 31.9	−56.8	150.3	24 39.7	−57.0	150.5	23 47.4	−57.1	150.8	10
11	28 55.0	−55.9	149.4	28 03.3	−56.1	149.7	27 11.4	−56.2	149.9	26 19.4	−56.4	150.2	25 27.3	−56.6	150.4	24 35.1	−56.9	150.7	23 42.7	−57.0	150.9	22 50.3	−57.2	151.1	11
12	27 59.1	−55.9	149.8	27 07.2	−56.1	150.1	26 15.2	−56.4	150.3	25 23.0	−56.6	150.6	24 30.7	−56.8	150.8	23 38.2	−56.9	151.0	22 45.7	−57.1	151.2	21 53.1	−57.3	151.4	12
13	27 03.2	−56.0	150.2	26 11.1	−56.2	150.5	25 18.8	−56.4	150.7	24 26.4	−56.6	150.9	23 33.9	−56.7	151.1	22 41.3	−56.9	151.3	21 48.6	−57.1	151.5	20 55.8	−57.2	151.7	13
14	26 07.2	−56.0	150.6	25 14.9	−56.3	150.9	24 22.4	−56.4	151.1	23 29.8	−56.6	151.3	22 37.2	−56.8	151.5	21 44.4	−57.0	151.7	20 51.5	−57.1	151.9	19 58.6	−57.3	152.0	14
15	25 11.2	−56.2	151.0	24 18.6	−56.3	151.2	23 26.0	−56.5	151.4	22 33.2	−56.7	151.7	21 40.4	−56.9	151.8	20 47.4	−57.0	152.0	19 54.4	−57.2	152.2	19 01.3	−57.4	152.4	15
16	24 15.0	−56.2	151.4	23 22.3	−56.4	151.6	22 29.5	−56.6	151.8	21 36.5	−56.7	152.0	20 43.5	−56.9	152.2	19 50.4	−57.1	152.4	18 57.2	−57.2	152.5	18 03.9	−57.3	152.7	16
17	23 18.8	−56.2	151.8	22 25.9	−56.4	152.0	21 32.9	−56.6	152.2	20 39.8	−56.8	152.4	19 46.6	−56.9	152.5	18 53.3	−57.1	152.7	18 00.0	−57.2	152.8	17 06.6	−57.4	153.0	17
18	22 22.6	−56.3	152.2	21 29.5	−56.5	152.4	20 36.3	−56.6	152.5	19 43.0	−56.8	152.7	18 49.7	−57.0	152.9	17 56.2	−57.1	153.0	17 02.7	−57.2	153.2	16 09.2	−57.4	153.3	18
19	21 26.3	−56.3	152.5	20 33.0	−56.5	152.7	19 39.7	−56.7	152.9	18 46.2	−56.8	153.0	17 52.7	−57.0	153.2	16 59.1	−57.1	153.3	16 05.5	−57.3	153.5	15 11.8	−57.5	153.6	19
20	20 30.0	−56.4	152.9	19 36.5	−56.6	153.1	18 43.0	−56.8	153.2	17 49.4	−56.9	153.4	16 55.7	−57.0	153.5	16 02.0	−57.2	153.6	15 08.2	−57.4	153.8	14 14.3	−57.5	153.9	20
21	19 33.6	−56.5	153.3	18 39.9	−56.6	153.4	17 46.2	−56.7	153.6	16 52.5	−56.9	153.7	15 58.7	−57.1	153.8	15 04.8	−57.2	154.0	14 10.8	−57.3	154.1	13 16.9	−57.5	154.2	21
22	18 37.1	−56.4	153.6	17 43.3	−56.6	153.8	16 49.5	−56.8	153.9	15 55.6	−57.0	154.0	15 01.6	−57.1	154.2	14 07.6	−57.3	154.3	13 13.5	−57.4	154.4	12 19.4	−57.5	154.5	22
23	17 40.7	−56.5	154.0	16 46.7	−56.7	154.1	15 52.7	−56.8	154.2	14 58.6	−56.9	154.4	14 04.5	−57.1	154.5	13 10.3	−57.3	154.6	12 16.1	−57.4	154.7	11 21.9	−57.5	154.8	23
24	16 44.2	−56.6	154.3	15 50.0	−56.7	154.5	14 55.9	−56.9	154.6	14 01.7	−57.0	154.7	13 07.4	−57.1	154.8	12 13.1	−57.3	154.9	11 18.7	−57.4	155.0	10 24.4	−57.6	155.1	24
25	15 47.6	−56.6	154.7	14 53.3	−56.7	154.8	13 59.0	−56.8	154.9	13 04.7	−57.1	155.0	12 10.3	−57.2	155.1	11 15.8	−57.3	155.2	10 21.3	−57.4	155.3	9 26.8	−57.5	155.3	25
26	14 51.0	−56.6	155.0	13 56.6	−56.7	155.1	13 02.2	−56.9	155.2	12 07.6	−57.0	155.3	11 13.1	−57.3	155.4	10 18.5	−57.3	155.5	9 23.9	−57.4	155.6	8 29.3	−57.5	155.6	26
27	13 54.4	−56.6	155.4	12 59.9	−56.8	155.5	12 05.3	−57.0	155.6	11 10.6	−57.1	155.6	10 15.9	−57.2	155.7	9 21.2	−57.3	155.8	8 26.5	−57.5	155.9	7 31.7	−57.6	155.9	27
28	12 57.8	−56.7	155.7	12 03.1	−56.8	155.8	11 08.3	−56.9	155.9	10 13.5	−57.0	156.0	9 18.7	−57.2	156.0	8 23.9	−57.4	156.1	7 29.0	−57.4	156.2	6 34.1	−57.5	156.2	28
29	12 01.1	−56.7	156.0	11 06.3	−56.9	156.1	10 11.4	−57.0	156.2	9 16.5	−57.1	156.3	8 21.5	−57.2	156.3	7 26.6	−57.4	156.4	6 31.6	−57.5	156.4	5 36.6	−57.6	156.5	29
30	11 04.4	−56.7	156.4	10 09.4	−56.8	156.5	9 14.4	−57.0	156.5	8 19.4	−57.1	156.6	7 24.3	−57.2	156.6	6 29.2	−57.3	156.7	5 34.1	−57.5	156.7	4 39.0	−57.6	156.8	30
31	10 07.7	−56.7	156.7	9 12.6	−56.9	156.8	8 17.4	−57.0	156.8	7 22.3	−57.2	156.9	6 27.1	−57.3	156.9	5 31.9	−57.4	157.0	4 36.6	−57.5	157.0	3 41.4	−57.6	157.0	31
32	9 11.0	−56.8	157.0	8 15.7	−56.9	157.1	7 20.4	−57.0	157.2	6 25.1	−57.2	157.2	5 29.8	−57.2	157.2	4 34.5	−57.4	157.3	3 39.1	−57.5	157.3	2 43.8	−57.6	157.3	32
33	8 14.2	−56.7	157.4	7 18.9	−56.9	157.4	6 23.4	−57.0	157.5	5 28.0	−57.1	157.5	4 32.6	−57.3	157.5	3 37.1	−57.4	157.6	2 41.6	−57.5	157.6	1 46.2	−57.6	157.6	33
34	7 17.5	−56.8	157.7	6 22.0	−56.9	157.7	5 26.4	−57.0	157.8	4 30.9	−57.2	157.8	3 35.3	−57.3	157.8	2 39.7	−57.4	157.9	1 44.1	−57.5	157.9	0 48.6	−57.6	157.9	34
35	6 20.7	−56.8	158.0	5 25.1	−57.0	158.1	4 29.4	−57.0	158.1	3 33.7	−57.1	158.1	2 38.0	−57.2	158.1	1 42.3	−57.3	158.2	0 46.6	−57.4	158.2	0 09.0	+57.7	21.8	35
36	5 23.9	−56.8	158.4	4 28.1	−56.9	158.4	3 32.4	−57.1	158.4	2 36.6	−57.2	158.4	1 40.8	−57.3	158.4	0 45.0	−57.4	158.4	0 10.8	+57.5	21.5	1 06.7	+57.6	21.6	36
37	4 27.1	−56.8	158.7	3 31.2	−56.9	158.7	2 35.3	−57.0	158.7	1 39.4	−57.2	158.7	0 43.5	−57.3	158.7	0 12.4	+57.4	21.3	1 08.3	+57.5	21.3	2 04.3	+57.6	21.3	37
38	3 30.3	−56.8	159.0	2 34.3	−56.9	159.0	1 38.3	−57.1	159.0	0 42.2	−57.1	159.0	0 13.8	+57.2	21.0	1 09.8	+57.4	21.0	2 05.8	+57.5	21.0	3 01.9	+57.6	21.0	38
39	2 33.5	−56.8	159.3	1 37.4	−57.0	159.3	0 41.2	−57.0	159.3	0 14.9	+57.2	20.7	1 11.1	+57.2	20.7	2 07.2	+57.4	20.7	3 03.3	+57.5	20.7	3 59.5	+57.6	20.7	39
40	1 36.7	−56.9	159.6	0 40.4	−56.9	159.6	0 15.8	+57.1	20.4	1 12.1	+57.2	20.4	2 08.3	+57.3	20.4	3 04.6	+57.4	20.4	4 00.8	+57.5	20.4	4 57.1	+57.5	20.4	40
41	0 39.8	−56.9	160.0	0 16.5	+57.0	20.0	1 12.9	+57.0	20.0	2 09.3	+57.1	20.1	3 05.6	+57.3	20.1	4 02.0	+57.3	20.1	4 58.3	+57.5	20.1	5 54.6	+57.6	20.1	41
42	0 17.0	+56.8	19.7	1 13.5	+56.9	19.7	2 09.9	+57.1	19.7	3 06.4	+57.1	19.7	4 02.9	+57.2	19.8	4 59.3	+57.4	19.8	5 55.8	+57.5	19.8	6 52.2	+57.6	19.9	42
43	1 13.8	+56.8	19.4	2 10.4	+56.9	19.4	3 07.0	+57.0	19.4	4 03.6	+57.1	19.4	5 00.1	+57.3	19.5	5 56.7	+57.4	19.5	6 53.3	+57.4	19.5	7 49.8	+57.5	19.6	43
44	2 10.6	+56.8	19.1	3 07.3	+57.0	19.1	4 04.0	+57.1	19.1	5 00.7	+57.1	19.1	5 57.4	+57.2	19.2	6 54.1	+57.3	19.2	7 50.7	+57.5	19.2	8 47.3	+57.6	19.3	44
45	3 07.4	+56.9	18.8	4 04.3	+56.9	18.8	5 01.1	+57.0	18.8	5 57.8	+57.2	18.8	6 54.6	+57.3	18.9	7 51.4	+57.3	18.9	8 48.2	+57.4	19.0	9 44.9	+57.5	19.0	45
46	4 04.3	+56.8	18.4	5 01.2	+56.9	18.5	5 58.1	+57.0	18.5	6 55.0	+57.1	18.5	7 51.9	+57.2	18.6	8 48.7	+57.3	18.6	9 45.6	+57.4	18.7	10 42.4	+57.5	18.7	46
47	5 01.1	+56.7	18.1	5 58.1	+56.9	18.1	6 55.1	+57.0	18.2	7 52.1	+57.1	18.2	8 49.1	+57.2	18.3	9 46.0	+57.3	18.3	10 43.0	+57.4	18.4	11 39.9	+57.5	18.4	47
48	5 57.8	+56.8	17.8	6 55.0	+56.9	17.8	7 52.1	+57.0	17.9	8 49.2	+57.1	17.9	9 46.3	+57.2	18.0	10 43.3	+57.3	18.0	11 40.4	+57.4	18.1	12 37.4	+57.5	18.1	48
49	6 54.6	+56.8	17.5	7 51.9	+56.8	17.5	8 49.1	+56.9	17.5	9 46.3	+57.0	17.6	10 43.5	+57.1	17.6	11 40.6	+57.3	17.7	12 37.8	+57.3	17.8	13 34.9	+57.5	17.8	49
50	7 51.4	+56.8	17.1	8 48.7	+56.9	17.2	9 46.0	+57.0	17.3	10 43.3	+57.1	17.3	11 40.6	+57.2	17.3	12 37.9	+57.2	17.4	13 35.1	+57.4	17.5	14 32.4	+57.4	17.5	50
51	8 48.2	+56.7	16.8	9 45.6	+56.9	16.9	10 43.0	+56.9	16.9	11 40.4	+57.0	17.0	12 37.8	+57.1	17.0	13 35.1	+57.3	17.1	14 32.5	+57.3	17.2	15 29.8	+57.4	17.2	51
52	9 44.9	+56.7	16.5	10 42.4	+56.8	16.5	11 39.9	+56.9	16.6	12 37.4	+57.0	16.6	13 34.9	+57.1	16.7	14 32.4	+57.2	16.8	15 29.8	+57.3	16.9	16 27.2	+57.4	16.9	52
53	10 41.6	+56.7	16.1	11 39.2	+56.8	16.2	12 36.8	+56.9	16.3	13 34.4	+57.0	16.3	14 32.0	+57.1	16.4	15 29.6	+57.1	16.5	16 27.1	+57.2	16.5	17 24.6	+57.3	16.6	53
54	11 38.3	+56.7	15.8	12 36.0	+56.8	15.9	13 33.7	+56.9	15.9	14 31.4	+57.0	16.0	15 29.1	+57.0	16.1	16 26.7	+57.1	16.2	17 24.3	+57.3	16.2	18 21.9	+57.4	16.3	54
55	12 35.0	+56.6	15.5	13 32.8	+56.7	15.5	14 30.6	+56.8	15.6	15 28.4	+56.9	15.7	16 26.1	+57.0	15.8	17 23.9	+57.1	15.8	18 21.6	+57.2	15.9	19 19.3	+57.3	16.0	55
56	13 31.6	+56.6	15.1	14 29.5	+56.8	15.2	15 27.4	+56.8	15.3	16 25.3	+56.9	15.3	17 23.1	+57.0	15.4	18 21.0	+57.1	15.5	19 18.8	+57.1	15.6	20 16.6	+57.2	15.7	56
57	14 28.2	+56.6	14.8	15 26.3	+56.6	14.9	16 24.2	+56.8	14.9	17 22.2	+56.9	15.0	18 20.1	+57.0	15.1	19 18.1	+57.0	15.2	20 15.9	+57.2	15.3	21 13.8	+57.2	15.4	57
58	15 24.8	+56.6	14.5	16 22.9	+56.7	14.5	17 21.0	+56.7	14.6	18 19.1	+56.8	14.7	19 17.1	+56.9	14.8	20 15.1	+57.0	14.9	21 13.1	+57.1	15.0	22 11.0	+57.2	15.1	58
59	16 21.4	+56.5	14.1	17 19.6	+56.6	14.2	18 17.7	+56.7	14.3	19 15.9	+56.8	14.3	20 14.0	+56.9	14.4	21 12.1	+57.0	14.5	22 10.2	+57.0	14.6	23 08.2	+57.2	14.7	59
60	17 17.9	+56.5	13.8	18 16.2	+56.6	13.8	19 14.4	+56.7	13.9	20 12.7	+56.7	14.0	21 10.9	+56.8	14.1	22 09.1	+56.9	14.2	23 07.2	+57.0	14.3	24 05.4	+57.0	14.4	60
61	18 14.4	+56.5	13.4	19 12.8	+56.5	13.5	20 11.1	+56.6	13.6	21 09.4	+56.7	13.7	22 07.7	+56.8	13.7	23 06.0	+56.9	13.8	24 04.2	+57.0	13.9	25 02.4	+57.1	14.1	61
62	19 10.9	+56.4	13.0	20 09.3	+56.5	13.1	21 07.7	+56.6	13.2	22 06.1	+56.7	13.3	23 04.5	+56.8	13.4	24 02.9	+56.8	13.5	25 01.2	+56.9	13.6	25 59.5	+57.0	13.7	62
63	20 07.3	+56.3	12.7	21 05.8	+56.4	12.8	22 04.3	+56.5	12.9	23 02.8	+56.6	12.9	24 01.3	+56.6	13.0	24 59.7	+56.8	13.1	25 58.1	+56.9	13.3	26 56.5	+56.9	13.4	63
64	21 03.6	+56.3	12.3	22 02.2	+56.4	12.4	23 00.8	+56.5	12.5	23 59.4	+56.6	12.6	24 57.9	+56.7	12.7	25 56.5	+56.7	12.8	26 55.0	+56.8	12.9	27 53.4	+56.9	13.0	64
65	21 59.9	+56.3	11.9	22 58.6	+56.4	12.0	23 57.3	+56.4	12.1	24 56.0	+56.5	12.2	25 54.6	+56.6	12.3	26 53.2	+56.7	12.4	27 51.8	+56.7	12.5	28 50.3	+56.9	12.7	65
66	22 56.2	+56.2	11.6	23 55.0	+56.3	11.7	24 53.7	+56.4	11.7	25 52.5	+56.4	11.8	26 51.2	+56.5	11.9	27 49.9	+56.6	12.1	28 48.5	+56.7	12.2	29 47.2	+56.7	12.3	66
67	23 52.4	+56.2	11.2	24 51.3	+56.2	11.3	25 50.1	+56.3	11.4	26 48.9	+56.4	11.5	27 47.7	+56.5	11.6	28 46.5	+56.5	11.7	29 45.2	+56.6	11.8	30 43.9	+56.7	11.9	67
68	24 48.6	+56.1	10.8	25 47.5	+56.2	10.9	26 46.4	+56.3	11.0	27 45.3	+56.3	11.1	28 44.2	+56.4	11.2	29 43.0	+56.5	11.3	30 41.8	+56.6	11.4	31 40.6	+56.7	11.5	68
69	25 44.7	+56.0	10.4	26 43.7	+56.1	10.5	27 42.7	+56.1	10.6	28 41.6	+56.3	10.7	29 40.6	+56.3	10.8	30 39.5	+56.4	10.9	31 38.4	+56.5	11.0	32 37.3	+56.5	11.1	69
70	26 40.7	+55.9	10.0	27 39.8	+56.0	10.1	28 38.8	+56.1	10.2	29 37.9	+56.2	10.3	30 36.9	+56.3	10.4	31 35.9	+56.3	10.5	32 34.9	+56.4	10.6	33 33.8	+56.5	10.7	70
71	27 36.6	+55.9	9.6	28 35.8	+56.0	9.7	29 34.9	+56.1	9.8	30 34.1	+56.1	9.9	31 33.2	+56.1	10.0	32 32.2	+56.3	10.1	33 31.3	+56.3	10.2	34 30.3	+56.4	10.3	71
72	28 32.5	+55.8	9.2	29 31.8	+55.8	9.3	30 31.0	+55.9	9.4	31 30.2	+56.0	9.5	32 29.3	+56.1	9.6	33 28.5	+56.1	9.7	34 27.6	+56.3	9.8	35 26.7	+56.3	9.9	72
73	29 28.3	+55.8	8.8	30 27.6	+55.8	8.9	31 26.9	+55.9	9.0	32 26.2	+55.9	9.0	33 25.4	+56.0	9.2	34 24.6	+56.1	9.3	35 23.9	+56.1	9.4	36 23.0	+56.3	9.5	73
74	30 24.1	+55.6	8.3	31 23.4	+55.7	8.4	32 22.8	+55.8	8.5	33 22.1	+55.8	8.6	34 21.4	+55.9	8.7	35 20.7	+56.0	8.8	36 20.0	+56.1	8.9	37 19.3	+56.1	9.1	74
75	31 19.7	+55.6	7.9	32 19.1	+55.7	8.0	33 18.6	+55.6	8.1	34 18.0	+55.7	8.2	35 17.3	+55.8	8.3	36 16.7	+55.9	8.4	37 16.1	+55.9	8.5	38 15.4	+56.0	8.6	75
76	32 15.3	+55.4	7.5	33 14.8	+55.5	7.5	34 14.2	+55.6	7.6	35 13.7	+55.6	7.7	36 13.1	+55.8	7.8	37 12.6	+55.8	7.9	38 12.0	+55.9	8.0	39 11.4	+55.9	8.1	76
77	33 10.7	+55.4	7.0	34 10.3	+55.4	7.1	35 09.8	+55.5	7.2	36 09.3	+55.6	7.3	37 08.9	+55.6	7.4	38 08.4	+55.6	7.5	39 07.8	+55.8	7.6	40 07.3	+55.8	7.7	77
78	34 06.1	+55.3	6.6	35 05.7	+55.3	6.6	36 05.3	+55.4	6.7	37 04.9	+55.4	6.8	38 04.5	+55.4	6.9	39 04.0	+55.6	7.0	40 03.6	+55.6	7.1	41 03.1	+55.7	7.2	78
79	35 01.4	+55.1	6.1	36 01.0	+55.2	6.1	37 00.7	+55.2	6.2	38 00.3	+55.3	6.3	38 59.9	+55.4	6.4	39 59.6	+55.4	6.5	40 59.2	+55.4	6.6	41 58.8	+55.5	6.7	79
80	35 56.5	+55.0	5.6	36 56.2	+55.1	5.7	37 55.9	+55.1	5.7	38 55.6	+55.2	5.8	39 55.3	+55.2	5.9	40 55.0	+55.2	6.0	41 54.6	+55.4	6.1	42 54.3	+55.4	6.2	80
81	36 51.5	+54.9	5.1	37 51.3	+54.9	5.2	38 51.0	+55.0	5.2	39 50.8	+55.0	5.3	40 50.5	+55.1	5.4	41 50.2	+55.1	5.5	42 50.0	+55.1	5.6	43 49.7	+55.2	5.6	81
82	37 46.4	+54.8	4.6	38 46.2	+54.8	4.6	39 46.0	+54.9	4.7	40 45.8	+54.9	4.8	41 45.6	+54.9	4.9	42 45.4	+55.0	4.9	43 45.1	+55.1	5.0	44 44.9	+55.1	5.1	82
83	38 41.2	+54.6	4.1	39 41.0	+54.7	4.1	40 40.9	+54.7	4.2	41 40.7	+54.7	4.2	42 40.5	+54.8	4.3	43 40.4	+54.8	4.4	44 40.2	+54.8	4.5	45 40.0	+54.9	4.5	83
84	39 35.8	+54.5	3.5	40 35.7	+54.5	3.6	41 35.6	+54.5	3.6	42 35.4	+54.6	3.7	43 35.3	+54.6	3.8	44 35.2	+54.6	3.8	45 35.0	+54.7	3.9	46 34.9	+54.7	4.0	84
85	40 30.3	+54.4	3.0	41 30.2	+54.3	3.0	42 30.1	+54.4	3.1	43 30.0	+54.4	3.1	44 29.9	+54.4	3.2	45 29.8	+54.5	3.2	46 29.7	+54.5	3.3	47 29.6	+54.5	3.4	85
86	41 24.6	+54.1	2.4	42 24.5	+54.2	2.5	43 24.5	+54.1	2.5	44 24.4	+54.2	2.5	45 24.3	+54.3	2.6	46 24.3	+54.2	2.6	47 24.2	+54.3	2.7	48 24.1	+54.4	2.7	86
87	42 18.7	+54.0	1.8	43 18.7	+54.0	1.9	44 18.6	+54.0	1.9	45 18.6	+54.0	1.9	46 18.6	+54.0	2.0	47 18.5	+54.1	2.0	48 18.5	+54.1	2.0	49 18.5	+54.1	2.1	87
88	43 12.7	+53.7	1.2	44 12.7	+53.7	1.3	45 12.6	+53.8	1.3	46 12.6	+53.8	1.3	47 12.6	+53.8	1.3	48 12.6	+53.8	1.4	49 12.6	+53.8	1.4	50 12.6	+53.8	1.4	88
89	44 06.4	+53.6	0.6	45 06.4	+53.6	0.6	46 06.4	+53.6	0.7	47 06.4	+53.6	0.7	48 06.4	+53.7	0.7	49 06.4	+53.7	0.7	50 06.4	+53.7	0.7	51 06.4	+53.8	0.7	89
90	45 00.0	+53.4	0.0	46 00.0	+53.3	0.0	47 00.0	+53.3	0.0	48 00.0	+53.3	0.0	49 00.0	+53.3	0.0	50 00.0	+53.3	0.0	51 00.0	+53.3	0.0	52 00.0	+53.3	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 153°, 207°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° (Hc d Z)	46° (Hc d Z)	47° (Hc d Z)	48° (Hc d Z)	49° (Hc d Z)	50° (Hc d Z)	51° (Hc d Z)	52° (Hc d Z)	Dec.
0	38 38.0 +54.3 143.1	37 49.9 +54.6 143.5	37 01.5 +54.9 144.0	36 12.9 +55.2 144.4	35 23.9 +55.5 144.8	34 34.8 +55.7 145.2	33 45.4 +56.0 145.6	32 55.7 +56.3 146.0	0
1	39 32.3 +54.0 142.5	38 44.5 +54.4 143.0	37 56.4 +54.8 143.5	37 08.1 +55.0 143.9	36 19.4 +55.4 144.4	35 30.5 +55.7 144.8	34 41.4 +55.9 145.2	33 52.0 +56.2 145.6	1
2	40 26.3 +53.9 141.9	39 38.9 +54.3 142.5	38 51.2 +54.6 143.0	38 03.1 +55.0 143.4	37 14.8 +55.3 143.9	36 26.2 +55.6 144.3	35 37.3 +55.9 144.7	34 48.2 +56.1 145.2	2
3	41 20.2 +53.8 141.4	40 33.2 +54.1 141.9	39 45.8 +54.5 142.4	38 58.1 +54.8 142.9	38 10.1 +55.1 143.4	37 21.8 +55.4 143.8	36 33.2 +55.7 144.3	35 44.3 +56.1 144.7	3
4	42 14.0 +53.5 140.8	41 27.3 +53.9 141.3	40 40.3 +54.3 141.9	39 52.9 +54.7 142.4	39 05.2 +55.0 142.9	38 17.2 +55.3 143.4	37 28.9 +55.7 143.8	36 40.4 +55.9 144.3	4
5	43 07.5 +53.3 140.1	42 21.2 +53.8 140.7	41 34.6 +54.1 141.3	40 47.6 +54.5 141.8	40 00.2 +54.9 142.4	39 12.5 +55.2 142.9	38 24.6 +55.5 143.4	37 36.3 +55.8 143.8	5
6	44 00.8 +53.1 139.5	43 15.0 +53.5 140.1	42 28.7 +54.0 140.7	41 42.1 +54.3 141.3	40 55.1 +54.7 141.8	40 07.7 +55.1 142.4	39 20.1 +55.4 142.9	38 32.1 +55.7 143.4	6
7	44 53.9 +52.9 138.9	44 08.5 +53.4 139.5	43 22.7 +53.8 140.1	42 36.4 +54.2 140.7	41 49.8 +54.6 141.3	41 02.8 +54.9 141.8	40 15.5 +55.2 142.4	39 27.8 +55.6 142.9	7
8	45 46.8 +52.7 138.2	45 01.9 +53.1 138.9	44 16.5 +53.5 139.5	43 30.6 +54.0 140.1	42 44.4 +54.3 140.7	41 57.7 +54.8 141.3	41 10.7 +55.1 141.9	40 23.4 +55.4 142.4	8
9	46 39.5 +52.4 137.5	45 55.0 +52.9 138.2	45 10.0 +53.4 138.9	44 24.6 +53.8 139.5	43 38.7 +54.2 140.1	42 52.5 +54.6 140.7	42 05.8 +55.0 141.3	41 18.8 +55.3 141.9	9
10	47 31.9 +52.1 136.8	46 47.9 +52.6 137.5	46 03.4 +53.1 138.2	45 18.4 +53.6 138.9	44 32.9 +54.1 139.6	43 47.1 +54.4 140.2	43 00.8 +54.8 140.8	42 14.1 +55.2 141.4	10
11	48 24.0 +51.8 136.0	47 40.5 +52.3 136.8	46 56.5 +52.8 137.5	46 12.0 +53.3 138.3	45 27.0 +53.8 138.9	44 41.5 +54.2 139.6	43 55.6 +54.6 140.2	43 09.3 +55.0 140.8	11
12	49 15.8 +51.5 135.3	48 32.8 +52.1 136.1	47 49.3 +52.6 136.8	47 05.3 +53.1 137.6	46 20.8 +53.5 138.3	45 35.7 +54.0 139.0	44 50.2 +54.5 139.6	44 04.3 +54.8 140.3	12
13	50 07.3 +51.1 134.5	49 24.9 +51.8 135.3	48 41.9 +52.4 136.1	47 58.4 +52.9 136.9	47 14.3 +53.4 137.6	46 29.7 +53.9 138.4	45 44.7 +54.2 139.0	44 59.1 +54.7 139.7	13
14	50 58.4 +50.8 133.7	50 16.7 +51.4 134.5	49 34.3 +52.0 135.4	48 51.3 +52.5 136.2	48 07.7 +53.1 137.0	47 23.6 +53.6 137.7	46 38.9 +54.1 138.4	45 53.8 +54.5 139.1	14
15	51 49.2 +50.4 132.8	51 08.1 +51.1 133.7	50 26.3 +51.7 134.6	49 43.8 +52.3 135.4	49 00.8 +52.8 136.3	48 17.2 +53.3 137.0	47 33.0 +53.8 137.8	46 48.3 +54.3 138.5	15
16	52 39.6 +50.0 131.9	51 59.2 +50.7 132.9	51 18.0 +51.4 133.8	50 36.1 +52.0 134.7	49 53.6 +52.6 135.5	49 10.5 +53.1 136.3	48 26.8 +53.6 137.1	47 42.6 +54.1 137.9	16
17	53 29.6 +49.6 131.0	52 49.9 +50.3 132.0	52 09.4 +51.0 133.0	51 28.1 +51.7 133.9	50 46.2 +52.2 134.8	50 03.6 +52.8 135.6	49 20.4 +53.4 136.4	48 36.7 +53.8 137.2	17
18	54 19.2 +49.1 130.0	53 40.2 +49.9 131.1	53 00.4 +50.6 132.1	52 19.8 +51.2 133.1	51 38.4 +52.0 134.0	50 56.4 +52.5 134.9	50 13.8 +53.0 135.7	49 30.5 +53.6 136.6	18
19	55 08.3 +48.6 129.1	54 30.1 +49.4 130.1	53 51.0 +50.1 131.2	53 11.0 +50.9 132.2	52 30.4 +51.5 133.2	51 48.9 +52.2 134.1	51 06.8 +52.8 135.0	50 24.1 +53.3 135.9	19
20	55 56.9 +48.0 128.0	55 19.5 +48.9 129.2	54 41.1 +49.8 130.3	54 01.9 +50.5 131.3	53 21.9 +51.2 132.3	52 41.1 +51.9 133.3	51 59.6 +52.5 134.2	51 17.4 +53.1 135.1	20
21	56 44.9 +47.5 126.9	56 08.4 +48.3 128.1	55 30.9 +49.2 129.3	54 52.4 +50.1 130.4	54 13.1 +50.8 131.4	53 33.0 +51.5 132.5	52 52.1 +52.2 133.4	52 10.5 +52.8 134.4	21
22	57 32.4 +46.8 125.8	56 56.7 +47.8 127.1	56 20.1 +48.7 128.3	55 42.5 +49.5 129.4	55 03.9 +50.4 130.5	54 24.5 +51.1 131.6	53 44.3 +51.8 132.6	53 03.3 +52.4 133.6	22
23	58 19.2 +46.1 124.6	57 44.5 +47.2 125.9	57 08.8 +48.1 127.2	56 32.0 +49.1 128.4	55 54.3 +49.9 129.6	55 15.6 +50.7 130.7	54 36.1 +51.4 131.8	53 55.7 +52.1 132.8	23
24	59 05.3 +45.5 123.4	58 31.7 +46.5 124.8	57 56.9 +47.6 126.1	57 21.1 +48.5 127.3	56 44.2 +49.4 128.6	56 06.3 +50.2 129.7	55 27.5 +51.0 130.9	54 47.8 +51.7 131.9	24
25	59 50.8 +44.6 122.1	59 18.2 +45.8 123.5	58 44.5 +46.9 124.9	58 09.6 +47.9 126.2	57 33.6 +48.8 127.5	56 56.5 +49.7 128.7	56 18.5 +50.5 129.9	55 39.5 +51.4 131.0	25
26	60 35.4 +43.8 120.8	60 04.0 +45.0 122.3	59 31.4 +46.1 123.7	58 57.5 +47.2 125.1	58 22.4 +48.3 126.4	57 46.2 +49.2 127.7	57 09.0 +50.1 128.9	56 30.9 +50.8 130.1	26
27	61 19.2 +42.8 119.4	60 49.0 +44.2 120.9	60 17.5 +45.4 122.4	59 44.7 +46.6 123.9	59 10.7 +47.6 125.3	58 35.4 +48.7 126.6	57 59.1 +49.6 127.9	57 21.7 +50.5 129.1	27
28	62 02.0 +41.9 117.9	61 33.2 +43.3 119.5	61 02.9 +44.5 121.0	60 31.3 +45.8 122.6	59 58.3 +46.9 124.1	59 24.1 +48.0 125.5	58 48.7 +48.9 126.8	58 12.2 +49.9 128.1	28
29	62 43.9 +40.8 116.3	62 16.5 +42.3 118.0	61 47.5 +43.7 119.7	61 17.1 +44.9 121.3	60 45.2 +46.2 122.8	60 12.1 +47.3 124.3	59 37.6 +48.4 125.7	59 02.1 +49.3 127.1	29
30	63 24.7 +39.7 114.7	62 58.8 +41.2 116.5	62 31.2 +42.7 118.2	62 02.0 +44.1 119.9	61 31.4 +45.4 121.5	60 59.4 +46.6 123.0	60 26.0 +47.7 124.5	59 51.4 +48.8 125.9	30
31	64 04.4 +38.4 113.0	63 40.0 +40.1 114.9	63 13.9 +41.7 116.7	62 46.1 +43.2 118.4	62 16.8 +44.5 120.1	61 46.0 +45.8 121.7	61 13.7 +47.0 123.3	60 40.2 +48.1 124.8	31
32	64 42.8 +37.0 111.2	64 20.1 +38.8 113.2	63 55.6 +40.5 115.1	63 29.3 +42.1 116.9	63 01.3 +43.6 118.6	62 31.8 +44.9 120.3	62 00.7 +46.3 122.0	61 28.3 +47.4 123.5	32
33	65 19.8 +35.7 109.4	64 58.9 +37.5 111.4	64 36.1 +39.3 113.4	64 11.4 +40.9 115.3	63 44.9 +42.5 117.1	63 16.7 +44.0 118.9	62 47.0 +45.3 120.6	62 15.7 +46.6 122.2	33
34	65 55.5 +34.0 107.4	65 36.4 +36.1 109.5	65 15.4 +38.0 111.6	64 52.3 +39.8 113.6	64 27.4 +41.4 115.5	64 00.7 +43.0 117.3	63 32.3 +44.5 119.1	63 02.3 +45.8 120.9	34
35	66 29.5 +32.5 105.4	66 12.5 +34.5 107.6	65 53.3 +36.6 109.7	65 32.1 +38.4 111.8	65 08.8 +40.2 113.8	64 43.7 +41.9 115.7	64 16.8 +43.4 117.6	63 48.1 +44.9 119.4	35
36	67 02.0 +30.6 103.3	66 47.0 +32.9 105.5	66 29.9 +34.9 107.7	66 10.5 +37.0 109.9	65 49.0 +38.9 112.0	65 25.6 +40.6 114.0	65 00.2 +42.3 116.0	64 33.0 +43.9 117.9	36
37	67 32.6 +28.7•101.0	67 19.9 +31.0 103.5	67 04.8 +33.3 105.7	66 47.5 +35.4 107.9	66 27.9 +37.5 110.1	66 06.2 +39.4 112.2	65 42.5 +41.2 114.3	65 16.9 +42.8 116.3	37
38	68 01.3 +26.6• 98.7	67 50.9 +29.2•101.1	67 38.1 +31.5 103.5	67 22.9 +33.8 105.9	67 05.4 +35.9 108.1	66 45.6 +37.9 110.4	66 23.7 +39.8 112.5	65 59.7 +41.6 114.6	38
39	68 27.9 +24.5• 96.3	68 20.1 +27.0• 98.8	68 09.6 +29.6•101.3	67 56.7 +31.9 103.7	67 41.3 +34.2 106.1	67 23.5 +36.4 108.4	67 03.5 +38.4 110.6	66 41.3 +40.3 112.8	39
40	68 52.4 +22.2• 93.8	68 47.1 +24.9• 96.4	68 39.2 +27.5• 98.9	68 28.6 +30.0•101.4	68 15.5 +32.4 103.9	67 59.9 +34.7 106.3	67 41.9 +36.8 108.6	67 21.6 +38.9 110.9	40
41	69 14.6 +19.8• 91.2	69 12.0 +22.6• 93.8	69 06.7 +25.2• 96.4	68 58.6 +27.9• 99.0	68 47.9 +30.4•101.6	68 34.6 +32.8 104.1	68 18.7 +35.2 106.5	68 00.5 +37.4 108.8	41
42	69 34.4 +17.2• 88.5	69 34.6 +20.1• 91.2	69 31.9 +23.0• 93.9	69 26.5 +25.7• 96.5	69 18.3 +28.4• 99.2	69 07.4 +30.9•101.7	68 53.9 +33.4 104.3	68 37.9 +35.6 106.8	42
43	69 51.6 +14.6• 85.7	69 54.7 +17.5• 88.5	69 54.9 +20.4• 91.2	69 52.2 +23.3• 93.9	69 46.7 +26.0• 96.6	69 38.3 +28.8• 99.3	69 27.3 +31.3•101.9	69 13.5 +33.9 104.5	43
44	70 06.2 +11.8• 82.9	70 12.2 +14.8• 85.7	70 15.3 +17.8• 88.4	70 15.5 +20.7• 91.2	70 12.7 +23.7• 94.0	70 07.1 +26.5• 96.8	69 58.6 +29.3• 99.5	69 47.4 +31.8•102.2	44
45	70 18.0 +9.0• 80.0	70 27.0 +12.0• 82.8	70 33.1 +15.1• 85.6	70 36.2 +18.2• 88.4	70 36.4 +21.1• 91.3	70 33.6 +24.1• 94.1	70 27.9 +26.9• 96.9	70 19.2 +29.7• 99.7	45
46	70 27.0 +6.1• 77.1	70 39.0 +9.2• 79.8	70 48.2 +12.2• 82.7	70 54.4 +15.3• 85.5	70 57.5 +18.4• 88.4	70 57.7 +21.4• 91.3	70 54.8 +24.4• 94.2	70 48.9 +27.3• 97.1	46
47	70 33.1 +3.1• 74.1	70 48.2 +6.2• 76.8	71 00.4 +9.3• 79.7	71 09.7 +12.4• 82.5	71 15.9 +15.6• 85.5	71 19.1 +18.7• 88.4	71 19.2 +21.9• 91.4	71 16.2 +24.9• 94.3	47
48	70 36.2 +0.2• 71.1	70 54.4 +3.1• 73.8	71 09.7 +6.2• 76.6	71 22.1 +9.4• 79.5	71 31.5 +12.6• 82.4	71 37.8 +15.9• 85.4	71 41.1 +19.0• 88.4	71 41.1 +22.2• 91.5	48
49	70 36.4 −2.8• 68.1	70 57.5 +0.2• 70.7	71 15.9 +3.2• 73.5	71 31.5 +6.3• 76.4	71 44.1 +9.6• 79.3	71 53.7 +12.8• 82.3	72 00.1 +16.0• 85.4	72 03.3 +19.3• 88.5	49
50	70 33.6 −5.7• 65.1	70 57.7 −2.9• 67.7	71 19.1 +0.1• 70.4	71 37.8 +3.3• 73.3	71 53.7 +6.4• 76.2	72 06.5 +9.6• 79.2	72 16.1 +13.0• 82.3	72 22.6 +16.3• 85.4	50
51	70 27.9 −8.7• 62.1	70 54.8 −5.9• 64.6	71 19.2 −3.0• 67.3	71 41.1 0.0• 70.1	72 00.1 +3.2• 73.0	72 16.1 +6.5• 76.0	72 29.1 +9.8• 79.0	72 38.9 +13.2• 82.2	51
52	70 19.2 −11.5• 59.1	70 48.9 −8.9• 61.6	71 16.2 −6.0• 64.2	71 41.1 −3.1• 66.9	72 03.3 0.0• 69.7	72 22.6 +3.2• 72.7	72 38.9 +6.6• 75.7	72 52.1 +9.9• 78.9	52
53	70 07.7 −14.3• 56.2	70 40.0 −11.7• 58.6	71 10.2 −9.1• 61.1	71 38.0 −6.3• 63.7	72 03.3 −3.3• 66.5	72 25.8 −0.1• 69.4	72 45.5 +3.1• 72.4	73 02.0 +6.6• 75.5	53
54	69 53.4 −16.9• 53.4	70 28.3 −14.6• 55.6	71 01.1 −12.0• 58.0	71 31.7 −9.3• 60.6	72 00.0 −6.4• 63.3	72 25.7 −3.4• 66.1	72 48.6 −0.2• 69.0	73 08.6 +3.1• 72.1	54
55	69 36.5 −19.5• 50.6	70 13.7 −17.2• 52.8	70 49.1 −14.9• 55.0	71 22.4 −12.3• 57.5	71 53.6 −9.6• 60.0	72 22.3 −6.7• 62.8	72 48.4 −3.6• 65.6	73 11.7 −0.3• 68.7	55
56	69 17.0 −21.9• 47.9	69 56.5 −19.9• 49.9	70 34.2 −17.6• 52.1	71 10.1 −15.2• 54.4	71 44.0 −12.7• 56.9	72 15.6 −9.9• 59.5	72 44.8 −6.9• 62.3	73 11.4 −3.8• 65.2	56
57	68 55.1 −24.2• 45.3	69 36.6 −22.3• 47.2	70 16.6 −20.3• 49.3	70 54.9 −18.1• 51.4	71 31.3 −15.6• 53.8	72 05.7 −13.0• 56.3	72 37.9 −10.3• 58.9	73 07.6 −7.3• 61.7	57
58	68 30.9 −26.5• 42.8	69 14.3 −24.7• 44.6	69 56.3 −22.8• 46.5	70 36.8 −20.7• 48.5	71 15.7 −18.5• 50.8	71 52.7 −16.0• 53.1	72 27.6 −13.4• 55.6	73 00.3 −10.5• 58.3	58
59	68 04.4 −28.4• 40.4	68 49.6 −26.9• 42.0	69 33.5 −25.1• 43.9	70 16.1 −23.2• 45.7	70 57.2 −21.1• 47.8	71 36.7 −18.9• 50.0	72 14.2 −16.4• 52.4	72 49.8 −13.9• 55.0	59
60	67 36.0 −30.4• 38.0	68 22.7 −28.9• 39.6	69 08.4 −27.3• 41.2	69 52.9 −25.6• 43.0	70 36.1 −23.7• 45.0	71 17.8 −21.7• 47.1	71 57.8 −19.4• 49.3	72 35.9 −16.9• 51.7	60
61	67 05.6 −32.3 35.8	67 53.8 −30.9 37.2	68 41.1 −29.4• 38.8	69 27.3 −27.8• 40.4	70 12.4 −26.1• 42.2	70 56.1 −24.2• 44.2	71 38.4 −22.2• 46.3	72 19.0 −19.9• 48.5	61
62	66 33.3 −33.8 33.6	67 22.9 −32.7 35.0	68 11.7 −31.3 36.4	68 59.5 −30.0• 37.9	69 46.3 −28.4• 39.6	70 31.9 −26.7• 41.4	71 16.2 −24.8• 43.3	71 59.1 −22.7• 45.5	62
63	65 59.5 −35.5 31.6	66 50.2 −34.3 32.8	67 40.3 −33.2 34.1	68 29.5 −31.9 35.5	69 17.9 −30.5• 37.1	70 05.2 −28.9• 38.7	70 51.4 −27.2• 40.5	71 36.4 −25.4• 42.5	63
64	65 24.0 −36.9 29.6	66 15.9 −36.0 30.7	67 07.1 −34.9 32.0	67 57.6 −33.7 33.3	68 47.4 −32.4 34.7	69 36.3 −31.0• 36.2	70 24.2 −29.5• 37.9	71 11.0 −27.8• 39.6	64
65	64 47.1 −38.3 27.8	65 39.9 −37.4 28.8	66 32.2 −36.4 29.9	67 23.9 −35.3 31.1	68 15.0 −34.3 32.4	69 05.3 −33.0 33.8	69 54.7 −31.6• 35.3	70 43.2 −30.1• 36.9	65
66	64 08.8 −39.5 26.0	65 02.5 −38.7 26.9	65 55.8 −37.9 27.9	66 48.6 −37.0 29.0	67 40.7 −35.9 30.2	68 32.3 −34.8 31.5	69 23.1 −33.6 32.8	70 13.1 −32.3• 34.3	66
67	63 29.3 −40.7 24.3	64 23.8 −40.0 25.1	65 17.9 −39.2 26.0	66 11.6 −38.4 27.0	67 04.8 −37.5 28.1	67 57.5 −36.5 29.3	68 49.5 −35.4 30.5	69 40.8 −34.2 31.9	67
68	62 48.6 −41.7 22.6	63 43.8 −41.1 23.4	64 38.7 −40.4 24.2	65 33.2 −39.7 25.1	66 27.3 −38.9 26.1	67 21.0 −38.1 27.2	68 14.1 −37.1 28.3	69 06.6 −36.0 29.6	68
69	62 06.9 −42.6 21.1	63 02.7 −42.2 21.8	63 58.3 −41.6 22.5	64 53.5 −40.9 23.4	65 48.4 −40.2 24.2	66 42.9 −39.4 25.2	67 37.0 −38.6 26.2	68 30.6 −37.7 27.3	69
70	61 24.1 −43.7 19.6	62 20.5 −43.1 20.2	63 16.7 −42.6 20.9	64 12.6 −42.1 21.7	65 08.2 −41.4 22.5	66 03.5 −40.7 23.3	66 58.4 −40.0 24.2	67 52.9 −39.2 25.2	70
71	60 40.4 −44.5 18.2	61 37.4 −44.1 18.8	62 34.1 −43.7 19.4	63 30.5 −43.1 20.0	64 26.8 −42.6 20.8	65 22.8 −42.0 21.5	66 18.4 −41.3 22.4	67 13.7 −40.6 23.3	71
72	59 55.9 −45.3 17.0	60 53.3 −45.0 17.3	61 50.4 −44.5 17.9	62 47.4 −44.0 18.5	63 44.2 −43.5 19.1	64 40.8 −43.1 19.8	65 37.1 −42.5 20.6	66 33.1 −41.8 21.4	72
73	59 10.6 −46.1 15.5	60 08.3 −45.7 16.0	61 05.9 −45.3 16.5	62 03.4 −45.0 17.0	63 00.7 −44.6 17.6	63 57.7 −44.0 18.2	64 54.6 −43.5 18.9	65 51.3 −43.0 19.6	73
74	58 24.5 −46.7 14.3	59 22.6 −46.4 14.7	60 20.6 −46.1 15.2	61 18.4 −45.8 15.6	62 16.1 −45.4 16.1	63 13.7 −45.0 16.7	64 11.1 −44.6 17.3	65 08.3 −44.1 17.9	74
75	57 37.8 −47.4 13.1	58 36.2 −47.2 13.5	59 34.5 −46.9 13.9	60 32.6 −46.5 14.3	61 30.7 −46.2 14.8	62 28.7 −45.9 15.3	63 26.5 −45.5 15.8	64 24.2 −45.1 16.3	75
76	56 50.4 −48.0 12.0	57 49.0 −47.7 12.3	58 47.6 −47.5 12.7	59 46.1 −47.2 13.0	60 44.5 −46.9 13.4	61 42.8 −46.6 13.9	62 41.0 −46.3 14.3	63 39.1 −46.0 14.8	76
77	56 02.4 −48.5 10.9	57 01.3 −48.3 11.2	58 00.1 −48.1 11.5	58 58.9 −47.9 11.8	59 57.6 −47.7 12.2	60 56.2 −47.4 12.6	61 54.7 −47.1 13.0	62 53.1 −46.8 13.4	77
78	55 13.9 −49.1 9.9	56 13.0 −48.9 10.1	57 12.0 −48.7 10.4	58 11.0 −48.5 10.7	59 09.9 −48.2 11.0	60 08.8 −48.0 11.3	61 07.6 −47.8 11.7	62 06.3 −47.5 12.0	78
79	54 24.8 −49.5 8.9	55 24.1 −49.3 9.1	56 23.3 −49.2 9.3	57 22.5 −49.0 9.6	58 21.7 −48.8 9.8	59 20.8 −48.7 10.1	60 19.8 −48.5 10.4	61 18.8 −48.3 10.8	79
80	53 35.3 −49.9 7.9	54 34.8 −49.9 8.1	55 34.1 −49.6 8.3	56 33.5 −49.5 8.5	57 32.8 −49.4 8.7	58 32.1 −49.2 9.0	59 31.3 −49.0 9.2	60 30.5 −48.8 9.5	80
81	52 45.4 −50.4 7.0	53 44.9 −50.2 7.1	54 44.5 −50.1 7.3	55 44.0 −49.9 7.5	56 43.4 −49.9 7.7	57 42.9 −49.8 7.9	58 42.3 −49.6 8.1	59 41.7 −49.5 8.4	81
82	51 55.0 −50.7 6.1	52 54.7 −50.7 6.2	53 54.3 −50.6 6.4	54 53.9 −50.4 6.5	55 53.5 −50.3 6.7	56 53.1 −50.2 6.8	57 52.7 −50.2 7.1	58 52.2 −50.0 7.3	82
83	51 04.3 −51.2 5.2	52 04.0 −51.0 5.3	53 03.7 −50.9 5.5	54 03.5 −50.9 5.6	55 03.2 −50.8 5.7	56 02.9 −50.8 5.9	57 02.5 −50.6 6.0	58 02.2 −50.5 6.2	83
84	50 13.1 −51.4 4.4	51 13.0 −51.3 4.5	52 12.8 −51.3 4.6	53 12.6 −51.3 4.7	54 12.4 −51.2 4.8	55 12.1 −51.1 4.9	56 11.9 −51.0 5.1	57 11.7 −51.0 5.2	84
85	49 21.7 −51.8 3.6	50 21.6 −51.8 3.7	51 21.4 −51.7 3.8	52 21.3 −51.6 3.8	53 21.2 −51.6 3.9	54 21.0 −51.5 4.0	55 20.9 −51.5 4.1	56 20.7 −51.4 4.2	85
86	48 29.9 −52.1 2.8	49 29.8 −52.0 2.9	50 29.7 −52.0 3.0	51 29.7 −52.0 3.0	52 29.6 −51.9 3.1	53 29.5 −51.9 3.2	54 29.4 −51.8 3.2	55 29.3 −51.8 3.3	86
87	47 37.8 −52.3 2.1	48 37.8 −52.3 2.1	49 37.7 −52.3 2.2	50 37.7 −52.3 2.2	51 37.7 −52.3 2.2	52 37.6 −52.2 2.3	53 37.6 −52.2 2.4	54 37.5 −52.2 2.4	87
88	46 45.5 −52.6 1.4	47 45.5 −52.6 1.4	48 45.4 −52.5 1.4	49 45.4 −52.6 1.5	50 45.4 −52.6 1.5	51 45.4 −52.6 1.5	52 45.4 −52.6 1.6	53 45.3 −52.5 1.6	88
89	45 52.9 −52.9 0.7	46 52.9 −52.9 0.7	47 52.9 −52.9 0.7	48 52.8 −52.8 0.7	49 52.8 −52.8 0.7	50 52.8 −52.8 0.7	51 52.8 −52.8 0.8	52 52.8 −52.8 0.8	89
90	45 00.0 −53.1 0.0	46 00.0 −53.1 0.0	47 00.0 −53.1 0.0	48 00.0 −53.1 0.0	49 00.0 −53.1 0.0	50 00.0 −53.1 0.0	51 00.0 −53.1 0.0	52 00.0 −53.1 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 28°, 332°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	38 38.0	−54.4	143.1	37 49.9	−54.7	143.5	37 01.5	−55.0	144.0	36 12.9	−55.4	144.4	35 23.9	−55.6	144.8	34 34.8	−55.9	145.2	33 45.4	−56.2	145.6	32 55.7	−56.3	146.0	0
1	37 43.6	−54.5	143.6	36 55.2	−54.8	144.0	36 06.5	−55.1	144.5	35 17.5	−55.4	144.9	34 28.3	−55.7	145.3	33 38.9	−56.0	145.7	32 49.2	−56.2	146.0	31 59.4	−56.5	146.5	1
2	36 49.1	−54.7	144.1	36 00.4	−55.0	144.6	35 11.4	−55.3	145.0	34 22.1	−55.5	145.4	33 32.6	−55.8	145.7	32 42.9	−56.0	146.1	31 53.0	−56.3	146.5	31 02.9	−56.5	146.8	2
3	35 54.4	−54.8	144.6	35 05.4	−55.1	145.0	34 16.1	−55.4	145.4	33 26.6	−55.7	145.8	32 36.8	−55.9	146.2	31 46.9	−56.2	146.5	30 56.7	−56.3	146.9	30 06.4	−56.5	147.2	3
4	34 59.6	−54.9	145.1	34 10.3	−55.2	145.5	33 20.7	−55.4	145.9	32 30.9	−55.7	146.3	31 40.9	−55.9	146.6	30 50.7	−56.2	146.9	30 00.4	−56.5	147.3	29 09.8	−56.6	147.6	4
5	34 04.7	−55.0	145.6	33 15.1	−55.3	146.0	32 25.3	−55.6	146.4	31 35.2	−55.8	146.7	30 45.0	−56.1	147.0	29 54.5	−56.2	147.3	29 03.9	−56.5	147.7	28 13.2	−56.7	147.9	5
6	33 09.7	−55.1	146.1	32 19.8	−55.4	146.5	31 29.7	−55.7	146.8	30 39.4	−55.9	147.1	29 48.9	−56.1	147.4	28 58.3	−56.4	147.7	28 07.4	−56.5	148.0	27 16.5	−56.8	148.3	6
7	32 14.6	−55.3	146.6	31 24.4	−55.5	146.9	30 34.0	−55.7	147.2	29 43.5	−56.0	147.5	28 52.8	−56.2	147.8	28 01.9	−56.4	148.1	27 10.9	−56.7	148.4	26 19.7	−56.8	148.7	7
8	31 19.3	−55.3	147.0	30 28.9	−55.6	147.4	29 38.3	−55.9	147.7	28 47.5	−56.0	148.0	27 56.6	−56.3	148.2	27 05.5	−56.5	148.5	26 14.2	−56.6	148.8	25 22.9	−56.9	149.0	8
9	30 24.0	−55.4	147.5	29 33.3	−55.6	147.8	28 42.5	−55.9	148.1	27 51.5	−56.1	148.4	27 00.3	−56.3	148.6	26 09.0	−56.5	148.9	25 17.6	−56.8	149.1	24 26.0	−56.9	149.4	9
10	29 28.6	−55.5	147.9	28 37.7	−55.8	148.2	27 46.6	−56.0	148.5	26 55.4	−56.2	148.8	26 04.0	−56.4	149.0	25 12.5	−56.6	149.3	24 20.8	−56.7	149.5	23 29.1	−57.0	149.7	10
11	28 33.1	−55.6	148.4	27 41.9	−55.8	148.6	26 50.6	−56.0	148.9	25 59.2	−56.3	149.2	25 07.6	−56.5	149.4	24 15.9	−56.7	149.6	23 24.1	−56.9	149.9	22 32.1	−57.0	150.1	11
12	27 37.5	−55.7	148.8	26 46.1	−55.9	149.0	25 54.6	−56.1	149.3	25 02.9	−56.3	149.5	24 11.1	−56.5	149.8	23 19.2	−56.7	150.0	22 27.2	−56.9	150.2	21 35.1	−57.0	150.4	12
13	26 41.8	−55.7	149.2	25 50.2	−55.9	149.5	24 58.5	−56.2	149.7	24 06.6	−56.3	149.9	23 14.6	−56.5	150.1	22 22.5	−56.7	150.4	21 30.3	−56.9	150.5	20 38.1	−57.1	150.7	13
14	25 46.1	−55.8	149.6	24 54.3	−56.1	149.9	24 02.3	−56.2	150.1	23 10.3	−56.5	150.3	22 18.1	−56.6	150.5	21 25.8	−56.8	150.7	20 33.4	−57.0	150.9	19 41.0	−57.2	151.1	14
15	24 50.3	−55.9	150.0	23 58.2	−56.0	150.2	23 06.1	−56.3	150.5	22 13.8	−56.4	150.7	21 21.5	−56.7	150.9	20 29.0	−56.8	151.0	19 36.5	−57.0	151.2	18 43.8	−57.1	151.4	15
16	23 54.4	−55.9	150.4	23 02.2	−56.2	150.6	22 09.8	−56.3	150.8	21 17.4	−56.5	151.0	20 24.8	−56.7	151.2	19 32.2	−56.9	151.4	18 39.5	−57.0	151.6	17 46.7	−57.2	151.7	16
17	22 58.5	−56.0	150.8	22 06.0	−56.2	151.0	21 13.5	−56.4	151.2	20 20.9	−56.6	151.4	19 28.1	−56.7	151.6	18 35.3	−56.8	151.7	17 42.5	−57.1	151.9	16 49.5	−57.2	152.0	17
18	22 02.5	−56.1	151.2	21 09.8	−56.2	151.4	20 17.1	−56.4	151.6	19 24.3	−56.6	151.7	18 31.4	−56.7	151.9	17 38.5	−57.0	152.1	16 45.4	−57.1	152.2	15 52.3	−57.2	152.3	18
19	21 06.4	−56.1	151.6	20 13.6	−56.3	151.8	19 20.7	−56.5	151.9	18 27.7	−56.6	152.1	17 34.7	−56.8	152.2	16 41.5	−56.9	152.4	15 48.3	−57.1	152.5	14 55.1	−57.3	152.7	19
20	20 10.3	−56.1	152.0	19 17.3	−56.3	152.1	18 24.2	−56.5	152.3	17 31.1	−56.7	152.4	16 37.9	−56.9	152.6	15 44.6	−57.0	152.7	14 51.2	−57.1	152.8	13 57.8	−57.3	153.0	20
21	19 14.2	−56.2	152.3	18 21.0	−56.4	152.5	17 27.7	−56.5	152.6	16 34.4	−56.7	152.8	15 41.0	−56.8	152.9	14 47.6	−57.0	153.0	13 54.1	−57.2	153.2	13 00.5	−57.3	153.3	21
22	18 18.0	−56.2	152.7	17 24.6	−56.4	152.9	16 31.2	−56.6	153.0	15 37.7	−56.7	153.1	14 44.2	−56.9	153.3	13 50.6	−57.1	153.4	12 56.9	−57.2	153.5	12 03.2	−57.3	153.6	22
23	17 21.8	−56.3	153.1	16 28.2	−56.4	153.2	15 34.6	−56.6	153.3	14 41.0	−56.8	153.5	13 47.3	−56.9	153.6	12 53.5	−57.0	153.7	11 59.7	−57.2	153.8	11 05.9	−57.4	153.9	23
24	16 25.5	−56.3	153.4	15 31.8	−56.5	153.6	14 38.0	−56.6	153.7	13 44.2	−56.8	153.8	12 50.4	−57.0	153.9	11 56.5	−57.1	154.0	11 02.5	−57.2	154.1	10 08.5	−57.3	154.2	24
25	15 29.2	−56.4	153.8	14 35.3	−56.5	153.9	13 41.4	−56.7	154.0	12 47.4	−56.8	154.1	11 53.4	−56.9	154.2	10 59.4	−57.1	154.3	10 05.3	−57.3	154.4	9 11.2	−57.4	154.5	25
26	14 32.8	−56.4	154.2	13 38.8	−56.5	154.3	12 44.7	−56.6	154.4	11 50.6	−56.9	154.5	10 56.5	−57.0	154.5	10 02.3	−57.2	154.6	9 08.0	−57.2	154.7	8 13.8	−57.4	154.8	26
27	13 36.5	−56.5	154.5	12 42.3	−56.6	154.6	11 48.0	−56.7	154.7	10 53.8	−56.9	154.8	9 59.5	−57.0	154.9	9 05.1	−57.1	154.9	8 10.8	−57.3	155.0	7 16.4	−57.4	155.1	27
28	12 40.0	−56.4	154.9	11 45.7	−56.6	155.0	10 51.3	−56.7	155.0	9 56.9	−56.9	155.1	9 02.5	−57.0	155.2	8 08.0	−57.1	155.2	7 13.5	−57.3	155.3	6 19.0	−57.4	155.4	28
29	11 43.6	−56.4	155.2	10 49.1	−56.6	155.3	9 54.6	−56.8	155.4	9 00.0	−56.8	155.4	8 05.5	−57.1	155.5	7 10.9	−57.2	155.6	6 16.2	−57.3	155.6	5 21.6	−57.4	155.6	29
30	10 47.2	−56.5	155.6	9 52.5	−56.6	155.6	8 57.8	−56.7	155.7	8 03.2	−57.0	155.8	7 08.4	−57.0	155.8	6 13.7	−57.2	155.9	5 18.9	−57.3	155.9	4 24.2	−57.5	155.9	30
31	9 50.7	−56.5	155.9	8 55.9	−56.7	155.9	8 01.1	−56.8	156.0	7 06.2	−56.9	156.1	6 11.4	−57.0	156.1	5 16.5	−57.2	156.2	4 21.6	−57.3	156.2	3 26.7	−57.4	156.2	31
32	8 54.2	−56.5	156.2	7 59.2	−56.6	156.3	7 04.3	−56.8	156.3	6 09.3	−56.9	156.4	5 14.3	−57.0	156.4	4 19.3	−57.2	156.5	3 24.3	−57.3	156.5	2 29.3	−57.4	156.5	32
33	7 57.7	−56.6	156.6	7 02.6	−56.7	156.6	6 07.5	−56.8	156.7	5 12.4	−56.9	156.7	4 17.3	−57.1	156.7	3 22.1	−57.1	156.8	2 27.0	−57.3	156.8	1 31.9	−57.5	156.8	33
34	7 01.1	−56.6	156.9	6 05.9	−56.7	157.0	5 10.7	−56.8	157.0	4 15.5	−57.0	157.0	3 20.2	−57.1	157.1	2 25.0	−57.2	157.1	1 29.7	−57.3	157.1	0 34.4	−57.4	157.1	34
35	6 04.6	−56.6	157.2	5 09.2	−56.7	157.3	4 13.9	−56.9	157.3	3 18.5	−57.0	157.3	2 23.1	−57.0	157.4	1 27.8	−57.3	157.4	0 32.4	−57.4	157.4	0 23.0	+57.5	22.6	35
36	5 08.0	−56.6	157.6	4 12.5	−56.7	157.6	3 17.0	−56.8	157.6	2 21.5	−56.9	157.7	1 26.1	−57.1	157.7	0 30.5	−57.2	157.7	0 25.0	+57.3	22.3	1 20.5	+57.3	22.3	36
37	4 11.4	−56.6	157.9	3 15.8	−56.7	157.9	2 20.2	−56.8	158.0	1 24.6	−57.0	158.0	0 29.0	−57.1	158.0	0 26.7	+57.2	22.0	1 22.3	+57.3	22.0	2 17.9	+57.4	22.0	37
38	3 14.8	−56.5	158.3	2 19.1	−56.7	158.3	1 23.4	−56.9	158.3	0 27.6	−56.9	158.3	0 28.1	+57.1	21.7	1 23.9	+57.2	21.7	2 19.6	+57.3	21.7	3 15.3	+57.5	21.7	38
39	2 18.3	−56.6	158.6	1 22.4	−56.7	158.6	0 26.5	−56.8	158.6	0 29.3	+57.0	21.4	1 25.2	+57.1	21.4	2 21.1	+57.2	21.4	3 16.9	+57.3	21.4	4 12.8	+57.4	21.5	39
40	1 21.7	−56.6	158.9	0 25.7	−56.7	158.9	0 30.3	+56.9	21.1	1 26.3	+57.0	21.1	2 22.3	+57.1	21.1	3 18.3	+57.1	21.1	4 14.2	+57.3	21.1	5 10.2	+57.4	21.2	40
41	0 25.1	−56.6	159.2	0 31.0	+56.8	20.8	1 27.2	+56.8	20.8	2 23.3	+56.9	20.8	3 19.4	+57.0	20.8	4 15.4	+57.2	20.8	5 11.5	+57.3	20.8	6 07.6	+57.4	20.9	41
42	0 31.5	+56.6	20.4	1 27.8	+56.7	20.4	2 24.0	+56.8	20.4	3 20.2	+57.0	20.5	4 16.4	+57.1	20.5	5 12.6	+57.2	20.5	6 08.8	+57.3	20.5	7 05.0	+57.4	20.6	42
43	1 28.1	+56.6	20.1	2 24.5	+56.7	20.1	3 20.8	+56.8	20.1	4 17.2	+56.9	20.1	5 13.5	+57.0	20.2	6 09.8	+57.2	20.2	7 06.1	+57.3	20.2	8 02.4	+57.4	20.3	43
44	2 24.7	+56.6	19.8	3 21.2	+56.9	19.8	4 17.6	+56.9	19.8	5 14.1	+56.9	19.8	6 10.5	+57.1	19.9	7 07.0	+57.1	19.9	8 03.4	+57.2	19.9	8 59.8	+57.3	20.0	44
45	3 21.3	+56.6	19.4	4 17.9	+56.7	19.4	5 14.5	+56.9	19.5	6 11.0	+57.0	19.5	7 07.6	+57.0	19.5	8 04.1	+57.0	19.6	9 00.6	+57.1	19.6	9 57.1	+57.4	19.7	45
46	4 17.9	+56.6	19.1	5 14.6	+56.7	19.1	6 11.3	+56.8	19.1	7 08.0	+56.9	19.2	8 04.6	+57.0	19.2	9 01.3	+57.1	19.3	9 57.9	+57.2	19.3	10 54.5	+57.3	19.4	46
47	5 14.5	+56.5	18.8	6 11.3	+56.7	18.8	7 08.1	+56.8	18.8	8 04.9	+56.8	18.9	9 01.6	+57.0	18.9	9 58.4	+57.1	19.0	10 55.1	+57.2	19.0	11 51.8	+57.3	19.1	47
48	6 11.0	+56.6	18.4	7 08.0	+56.6	18.5	8 04.9	+56.7	18.5	9 01.7	+56.9	18.5	9 58.7	+57.0	18.6	10 55.5	+57.1	18.7	11 52.3	+57.2	18.7	12 49.1	+57.3	18.8	48
49	7 07.6	+56.5	18.1	8 04.6	+56.7	18.1	9 01.6	+56.8	18.2	9 58.6	+56.9	18.2	10 55.6	+57.0	18.3	11 52.6	+57.0	18.3	12 49.5	+57.2	18.4	13 46.4	+57.3	18.5	49
50	8 04.1	+56.5	17.7	9 01.3	+56.6	17.8	9 58.4	+56.7	17.8	10 55.5	+56.8	17.9	11 52.6	+56.9	18.0	12 49.6	+57.1	18.0	13 46.7	+57.1	18.1	14 43.7	+57.2	18.2	50
51	9 00.6	+56.5	17.4	9 57.9	+56.6	17.5	10 55.1	+56.7	17.5	11 52.3	+56.8	17.6	12 49.5	+56.9	17.6	13 46.7	+57.0	17.7	14 43.8	+57.1	17.8	15 40.9	+57.2	17.9	51
52	9 57.1	+56.5	17.1	10 54.5	+56.6	17.1	11 51.8	+56.7	17.2	12 49.1	+56.8	17.2	13 46.4	+56.9	17.3	14 43.7	+57.0	17.4	15 40.9	+57.1	17.5	16 38.2	+57.1	17.6	52
53	10 53.6	+56.5	16.7	11 51.1	+56.5	16.8	12 48.5	+56.6	16.9	13 45.9	+56.8	16.9	14 43.3	+56.8	17.0	15 40.7	+56.9	17.1	16 38.0	+57.1	17.1	17 35.3	+57.2	17.2	53
54	11 50.1	+56.4	16.4	12 47.6	+56.5	16.4	13 45.2	+56.6	16.5	14 42.7	+56.7	16.6	15 40.2	+56.8	16.7	16 37.6	+57.0	16.7	17 35.1	+57.0	16.8	18 32.5	+57.1	16.9	54
55	12 46.5	+56.4	16.0	13 44.2	+56.5	16.1	14 41.8	+56.6	16.2	15 39.4	+56.7	16.2	16 37.0	+56.8	16.3	17 34.6	+56.9	16.4	18 32.1	+57.0	16.5	19 29.6	+57.1	16.6	55
56	13 42.9	+56.4	15.7	14 40.7	+56.4	15.7	15 38.4	+56.6	15.8	16 36.1	+56.7	15.9	17 33.8	+56.8	16.0	18 31.5	+56.8	16.1	19 29.1	+57.0	16.1	20 26.7	+57.1	16.3	56
57	14 39.3	+56.3	15.3	15 37.1	+56.5	15.4	16 35.0	+56.5	15.5	17 32.8	+56.6	15.6	18 30.6	+56.7	15.6	19 28.3	+56.9	15.7	20 26.1	+56.9	15.8	21 23.8	+57.0	15.9	57
58	15 35.6	+56.3	15.0	16 33.6	+56.4	15.0	17 31.5	+56.5	15.1	18 29.4	+56.6	15.2	19 27.3	+56.7	15.3	20 25.2	+56.7	15.4	21 23.0	+56.9	15.5	22 20.8	+57.0	15.6	58
59	16 31.9	+56.3	14.6	17 30.0	+56.3	14.7	18 28.0	+56.5	14.8	19 26.0	+56.5	14.9	20 24.0	+56.6	14.9	21 21.9	+56.8	15.0	22 19.9	+56.8	15.1	23 17.8	+56.9	15.3	59
60	17 28.2	+56.2	14.2	18 26.3	+56.4	14.3	19 24.5	+56.4	14.4	20 22.6	+56.5	14.5	21 20.6	+56.6	14.6	22 18.7	+56.7	14.7	23 16.7	+56.8	14.8	24 14.7	+56.9	14.9	60
61	18 24.4	+56.2	13.9	19 22.7	+56.2	14.0	20 20.9	+56.3	14.0	21 19.1	+56.4	14.1	22 17.2	+56.6	14.2	23 15.4	+56.6	14.3	24 13.5	+56.7	14.5	25 11.6	+56.8	14.6	61
62	19 20.6	+56.1	13.5	20 18.9	+56.3	13.6	21 17.2	+56.4	13.7	22 15.5	+56.4	13.8	23 13.8	+56.5	13.9	24 12.0	+56.6	14.0	25 10.2	+56.7	14.1	26 08.4	+56.8	14.2	62
63	20 16.7	+56.1	13.1	21 15.2	+56.1	13.2	22 13.6	+56.2	13.3	23 11.9	+56.4	13.4	24 10.3	+56.4	13.5	25 08.6	+56.6	13.6	26 06.9	+56.6	13.7	27 05.2	+56.7	13.9	63
64	21 12.8	+56.1	12.8	22 11.3	+56.2	12.8	23 09.8	+56.3	12.9	24 08.3	+56.3	13.0	25 06.7	+56.4	13.1	26 05.2	+56.4	13.2	27 03.5	+56.6	13.4	28 01.9	+56.7	13.5	64
65	22 08.9	+56.0	12.4	23 07.5	+56.0	12.5	24 06.1	+56.1	12.6	25 04.6	+56.3	12.7	26 03.1	+56.4	12.8	27 01.6	+56.5	12.9	28 00.1	+56.5	13.0	28 58.6	+56.6	13.1	65
66	23 04.9	+56.0	12.0	24 03.5	+56.1	12.1	25 02.2	+56.1	12.2	26 00.9	+56.1	12.3	26 59.5	+56.2	12.4	27 58.1	+56.3	12.5	28 56.6	+56.5	12.6	29 55.2	+56.5	12.7	66
67	24 00.8	+55.9	11.6	24 59.6	+55.9	11.7	25 58.3	+56.0	11.8	26 57.0	+56.2	11.9	27 55.7	+56.2	12.0	28 54.4	+56.3	12.1	29 53.1	+56.3	12.2	30 51.7	+56.5	12.3	67
68	24 56.7	+55.7	11.2	25 55.5	+55.9	11.3	26 54.3	+56.0	11.4	27 53.2	+56.0	11.5	28 52.0	+56.1	11.6	29 50.7	+56.2	11.7	30 49.4	+56.3	11.8	31 48.2	+56.3	11.9	68
69	25 52.5	+55.7	10.8	26 51.4	+55.8	10.9	27 50.3	+55.9	11.0	28 49.2	+56.0	11.1	29 48.1	+56.0	11.2	30 46.9	+56.1	11.3	31 45.7	+56.3	11.4	32 44.5	+56.4	11.5	69
70	26 48.2	+55.6	10.4	27 47.2	+55.7	10.5	28 46.2	+55.8	10.6	29 45.2	+55.9	10.7	30 44.1	+56.0	10.8	31 43.1	+56.0	10.9	32 42.0	+56.1	11.0	33 40.9	+56.2	11.1	70
71	27 43.8	+55.6	9.9	28 42.9	+55.7	10.0	29 42.0	+55.7	10.1	30 41.1	+55.8	10.2	31 40.1	+55.9	10.3	32 39.1	+56.0	10.5	33 38.1	+56.1	10.6	34 37.1	+56.1	10.7	71
72	28 39.4	+55.4	9.5	29 38.6	+55.6	9.6	30 37.7	+55.7	9.7	31 36.9	+55.7	9.8	32 36.0	+55.8	9.9	33 35.1	+55.9	10.0	34 34.2	+55.9	10.1	35 33.2	+56.0	10.3	72
73	29 34.9	+55.4	9.1	30 34.2	+55.5	9.2	31 33.4	+55.6	9.3	32 32.6	+55.6	9.4	33 31.8	+55.7	9.5	34 31.0	+55.7	9.6	35 30.1	+55.9	9.7	36 29.2	+56.0	9.8	73
74	30 30.3	+55.4	8.6	31 29.7	+55.3	8.7	32 29.0	+55.4	8.8	33 28.2	+55.6	8.9	34 27.5	+55.6	9.0	35 26.7	+55.7	9.1	36 26.0	+55.7	9.3	37 25.2	+55.8	9.4	74
75	31 25.7	+55.2	8.2	32 25.0	+55.3	8.3	33 24.4	+55.4	8.4	34 23.8	+55.4	8.5	35 23.1	+55.5	8.6	36 22.4	+55.6	8.7	37 21.7	+55.7	8.8	38 21.0	+55.7	8.9	75
76	32 20.9	+55.1	7.7	33 20.3	+55.2	7.8	34 19.8	+55.2	7.9	35 19.2	+55.3	8.0	36 18.6	+55.4	8.1	37 18.0	+55.5	8.2	38 17.4	+55.5	8.3	39 16.7	+55.6	8.4	76
77	33 16.0	+55.0	7.3	34 15.5	+55.1	7.3	35 15.0	+55.2	7.4	36 14.5	+55.2	7.5	37 14.0	+55.3	7.6	38 13.5	+55.3	7.7	39 12.9	+55.4	7.8	40 12.3	+55.5	7.9	77
78	34 11.0	+54.9	6.8	35 10.6	+55.0	6.9	36 10.2	+55.0	6.9	37 09.7	+55.1	7.0	38 09.3	+55.1	7.1	39 08.8	+55.2	7.1	40 08.3	+55.3	7.3	41 07.8	+55.3	7.4	78
79	35 05.9	+54.8	6.3	36 05.6	+54.8	6.4	37 05.2	+54.9	6.4	38 04.8	+54.9	6.5	39 04.4	+55.0	6.6	40 04.0	+55.1	6.7	41 03.6	+55.1	6.8	42 03.1	+55.2	6.9	79
80	36 00.7	+54.6	5.8	37 00.4	+54.7	5.9	38 00.1	+54.7	5.9	38 59.7	+54.9	6.0	39 59.4	+54.9	6.1	40 59.1	+54.9	6.2	41 58.7	+55.0	6.3	42 58.3	+55.1	6.4	80
81	36 55.3	+54.6	5.3	37 55.1	+54.6	5.4	38 54.8	+54.6	5.4	39 54.6	+54.5	5.5	40 54.3	+54.7	5.6	41 54.0	+54.8	5.6	42 53.7	+54.8	5.8	43 53.4	+54.9	5.8	81
82	37 49.9	+54.3	4.7	38 49.7	+54.4	4.8	39 49.4	+54.5	5.0	40 49.2	+54.5	5.0	41 49.0	+54.5	5.0	42 48.8	+54.6	5.1	43 48.5	+54.7	5.2	44 48.3	+54.7	5.3	82
83	38 44.2	+54.2	4.2	39 44.1	+54.2	4.3	40 43.9	+54.3	4.3	41 43.7	+54.4	4.4	42 43.5	+54.4	4.5	43 43.4	+54.4	4.5	44 43.2	+54.4	4.6	45 43.0	+54.5	4.7	83
84	39 38.4	+54.1	3.7	40 38.3	+54.1	3.8	41 38.2	+54.1	3.8	42 38.1	+54.1	3.8	43 37.9	+54.2	3.9	44 37.8	+54.2	3.9	45 37.6	+54.3	4.0	46 37.5	+54.3	4.1	84
85	40 32.5	+53.9	3.1	41 32.4	+53.9	3.1	42 32.3	+54.0	3.2	43 32.2	+54.0	3.2	44 32.1	+54.0	3.3	45 32.0	+54.1	3.3	46 31.9	+54.1	3.4	47 31.8	+54.1	3.5	85
86	41 26.4	+53.7	2.5	42 26.3	+53.8	2.5	43 26.3	+53.7	2.6	44 26.2	+53.8	2.6	45 26.1	+53.8	2.7	46 26.1	+53.8	2.7	47 26.0	+53.9	2.8	48 25.9	+53.9	2.8	86
87	42 20.1	+53.5	1.9	43 20.1	+53.5	1.9	44 20.0	+53.6	2.0	45 20.0	+53.6	2.0	46 19.9	+53.6	2.0	47 19.9	+53.6	2.1	48 19.9	+53.6	2.1	49 19.8	+53.7	2.2	87
88	43 13.6	+53.3	1.3	44 13.6	+53.3	1.3	45 13.6	+53.3	1.3	46 13.6	+53.3	1.4	47 13.5	+53.4	1.4	48 13.5	+53.4	1.4	49 13.5	+53.4	1.4	50 13.5	+53.4	1.5	88
89	44 06.9	+53.1	0.7	45 06.9	+53.1	0.7	46 06.9	+53.1	0.7	47 06.9	+53.1	0.7	48 06.9	+53.1	0.7	49 06.9	+53.1	0.7	50 06.9	+53.1	0.7	51 06.9	+53.1	0.7	89
90	45 00.0	+52.9	0.0	46 00.0	+52.9	0.0	47 00.0	+52.9	0.0	48 00.0	+52.8	0.0	49 00.0	+52.8	0.0	50 00.0	+52.8	0.0	51 00.0	+52.8	0.0	52 00.0	+52.8	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 152°, 208°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	38 12.2	+53.9	141.9	37 24.8	+54.3	142.4	36 37.1	+54.6	142.8	35 49.2	+54.9	143.3	35 00.9	+55.3	143.7	34 12.5	+55.5	144.1	33 23.7	+55.8	144.5	32 34.8	+56.0	144.9	0
1	39 06.1	+53.7	141.3	38 19.1	+54.1	141.8	37 31.7	+54.5	142.3	36 44.1	+54.8	142.8	35 56.2	+55.1	143.2	35 08.0	+55.4	143.6	34 19.5	+55.7	144.1	33 30.8	+56.0	144.5	1
2	39 59.8	+53.6	140.8	39 13.2	+53.9	141.3	38 26.2	+54.3	141.8	37 38.9	+54.7	142.3	36 51.3	+55.0	142.7	36 03.4	+55.3	143.2	35 15.2	+55.6	143.6	34 26.8	+55.9	144.0	2
3	40 53.4	+53.4	140.2	40 07.1	+53.8	140.7	39 20.5	+54.2	141.2	38 33.6	+54.5	141.7	37 46.3	+54.9	142.2	36 58.7	+55.2	142.7	36 10.8	+55.5	143.1	35 22.7	+55.8	143.6	3
4	41 46.8	+53.2	139.6	41 00.9	+53.6	140.1	40 14.7	+54.0	140.7	39 28.1	+54.4	141.2	38 41.2	+54.7	141.7	37 53.9	+55.1	142.2	37 06.3	+55.4	142.7	36 18.5	+55.7	143.1	4
5	42 40.0	+52.9	138.9	41 54.5	+53.4	139.5	41 08.7	+53.8	140.1	40 22.5	+54.2	140.7	39 35.9	+54.5	141.2	38 49.0	+54.9	141.7	38 01.7	+55.3	142.2	37 14.2	+55.5	142.7	5
6	43 32.9	+52.8	138.3	42 47.9	+53.2	138.9	42 02.5	+53.6	139.5	41 16.7	+54.0	140.1	40 30.4	+54.5	140.6	39 43.9	+54.8	141.2	38 57.0	+55.1	141.7	38 09.7	+55.5	142.2	6
7	44 25.7	+52.5	137.6	43 41.1	+53.0	138.3	42 56.1	+53.5	138.9	42 10.7	+53.8	139.5	41 24.9	+54.2	140.1	40 38.7	+54.6	140.6	39 52.1	+55.0	141.2	39 05.2	+55.3	141.7	7
8	45 18.2	+52.3	137.0	44 34.1	+52.8	137.6	43 49.6	+53.2	138.3	43 04.5	+53.7	138.9	42 19.1	+54.1	139.5	41 33.3	+54.5	140.1	40 47.1	+54.8	140.6	40 00.5	+55.2	141.2	8
9	46 10.5	+52.0	136.3	45 26.9	+52.5	137.0	44 42.8	+53.0	137.6	43 58.2	+53.5	138.3	43 13.2	+53.9	138.9	42 27.8	+54.3	139.5	41 41.9	+54.7	140.1	40 55.7	+55.0	140.7	9
10	47 02.5	+51.7	135.5	46 19.4	+52.2	136.3	45 35.8	+52.7	137.0	44 51.7	+53.2	137.7	44 07.1	+53.7	138.3	43 22.1	+54.1	138.9	42 36.6	+54.5	139.6	41 50.7	+54.9	140.1	10
11	47 54.2	+51.4	134.8	47 11.6	+52.0	135.5	46 28.5	+52.5	136.3	45 44.9	+53.0	137.0	45 00.8	+53.4	137.7	44 16.2	+53.9	138.3	43 31.1	+54.4	139.0	42 45.6	+54.8	139.6	11
12	48 45.6	+51.1	134.0	48 03.6	+51.7	134.8	47 21.0	+52.3	135.6	46 37.9	+52.8	136.3	45 54.2	+53.3	137.0	45 10.1	+53.7	137.7	44 25.5	+54.1	138.4	43 40.4	+54.5	139.0	12
13	49 36.7	+50.7	133.2	48 55.3	+51.3	134.0	48 13.3	+51.9	134.8	47 30.7	+52.4	135.6	46 47.5	+53.0	136.4	46 03.8	+53.5	137.1	45 19.6	+54.0	137.8	44 34.9	+54.4	138.5	13
14	50 27.4	+50.4	132.4	49 46.6	+51.1	133.2	49 05.2	+51.6	134.1	48 23.1	+52.3	134.9	47 40.5	+52.8	135.7	46 57.3	+53.3	136.4	46 13.6	+53.7	137.2	45 29.3	+54.2	137.9	14
15	51 17.8	+50.0	131.5	50 37.7	+50.6	132.4	49 56.8	+51.3	133.3	49 15.4	+51.9	134.2	48 33.3	+52.4	135.0	47 50.6	+53.0	135.8	47 07.3	+53.5	136.5	46 23.5	+54.0	137.2	15
16	52 07.8	+49.5	130.6	51 28.3	+50.3	131.6	50 48.1	+51.0	132.5	50 07.3	+51.6	133.4	49 25.7	+52.2	134.2	48 43.6	+52.7	135.1	48 00.8	+53.3	135.8	47 17.5	+53.8	136.6	16
17	52 57.3	+49.1	129.7	52 18.6	+49.9	130.7	51 39.1	+50.6	131.6	50 58.9	+51.2	132.6	50 17.9	+51.9	133.5	49 36.3	+52.5	134.3	48 54.1	+53.0	135.1	48 11.3	+53.5	135.9	17
18	53 46.4	+48.6	128.7	53 08.5	+49.4	129.8	52 29.7	+50.1	130.8	51 50.1	+50.9	131.7	51 09.8	+51.5	132.7	50 28.8	+52.1	133.6	49 47.1	+52.7	134.4	49 04.8	+53.3	135.3	18
19	54 35.0	+48.2	127.7	53 57.9	+48.9	128.8	53 19.8	+49.9	129.9	52 41.0	+50.5	130.9	52 01.3	+51.2	131.8	51 20.9	+51.9	132.8	50 39.8	+52.5	133.7	49 58.1	+53.0	134.5	19
20	55 23.2	+47.5	126.7	54 46.8	+48.5	127.8	54 09.6	+49.3	128.9	53 31.5	+50.0	130.0	52 52.5	+50.8	131.0	52 12.8	+51.5	132.0	51 32.3	+52.1	132.9	50 51.1	+52.7	133.8	20
21	56 10.7	+47.0	125.6	55 35.3	+47.9	126.8	54 58.9	+48.8	127.9	54 21.5	+49.6	129.0	53 43.3	+50.4	130.1	53 04.3	+51.1	131.1	52 24.4	+51.8	132.1	51 43.8	+52.4	133.0	21
22	56 57.7	+46.3	124.5	56 23.2	+47.3	125.7	55 47.7	+48.2	126.9	55 11.1	+49.2	128.1	54 33.7	+49.9	129.2	53 55.4	+50.7	130.2	53 16.2	+51.4	131.3	52 36.2	+52.1	132.3	22
23	57 44.0	+45.7	123.3	57 10.5	+46.7	124.6	56 35.9	+47.7	125.8	56 00.3	+48.6	127.0	55 23.6	+49.5	128.2	54 46.1	+50.2	129.3	54 07.6	+51.0	130.4	53 28.3	+51.7	131.4	23
24	58 29.7	+44.9	122.1	57 57.2	+46.0	123.4	57 23.6	+47.1	124.7	56 48.9	+48.0	126.0	56 13.1	+49.0	127.2	55 36.3	+49.8	128.4	54 58.6	+50.6	129.5	54 20.0	+51.4	130.6	24
25	59 14.6	+44.1	120.8	58 43.2	+45.3	122.2	58 10.7	+46.4	123.6	57 36.9	+47.4	124.9	57 02.1	+48.4	126.1	56 26.1	+49.3	127.4	55 49.2	+50.2	128.5	55 11.4	+50.9	129.7	25
26	59 58.7	+43.3	119.4	59 28.5	+44.5	120.9	58 57.1	+45.6	122.3	58 24.3	+46.8	123.7	57 50.5	+47.8	125.1	57 15.4	+48.8	126.3	56 39.4	+49.6	127.6	56 02.3	+50.5	128.7	26
27	60 42.0	+42.3	118.0	60 13.0	+43.7	119.6	59 42.7	+44.9	121.1	59 11.1	+46.1	122.5	58 38.3	+47.1	123.9	58 04.2	+48.2	125.2	57 29.0	+49.2	126.5	56 52.8	+50.0	127.8	27
28	61 24.3	+41.4	116.6	60 56.7	+42.8	118.2	60 27.6	+44.1	119.7	59 57.2	+45.3	121.2	59 25.4	+46.5	122.7	58 52.4	+47.5	124.1	58 18.2	+48.5	125.4	57 42.8	+49.5	126.7	28
29	62 05.7	+40.3	115.0	61 39.5	+41.8	116.7	61 11.7	+43.2	118.4	60 42.5	+44.5	119.9	60 11.9	+45.7	121.4	59 39.9	+46.9	122.9	59 06.7	+48.0	124.3	58 32.3	+48.9	125.7	29
30	62 46.0	+39.1	113.4	62 21.3	+40.7	115.2	61 54.9	+42.2	116.9	61 27.0	+43.6	118.5	60 57.6	+44.9	120.1	60 26.8	+46.1	121.7	59 54.7	+47.2	123.1	59 21.2	+48.4	124.5	30
31	63 25.1	+38.0	111.8	63 02.0	+39.6	113.6	62 37.1	+41.2	115.4	62 10.6	+42.7	117.1	61 42.5	+44.0	118.7	61 12.9	+45.4	120.3	60 41.9	+46.6	121.9	60 09.6	+47.6	123.4	31
32	64 03.1	+36.6	110.0	63 41.6	+38.4	111.9	63 18.3	+40.0	113.8	62 53.3	+41.6	115.6	62 26.5	+43.1	117.3	61 58.3	+44.4	119.0	61 28.5	+45.7	120.6	60 57.2	+47.0	122.1	32
33	64 39.7	+35.2	108.2	64 20.0	+37.0	110.2	63 58.3	+38.9	112.1	63 34.9	+40.5	114.0	63 09.6	+42.1	115.8	62 42.7	+43.6	117.5	62 14.2	+44.9	119.2	61 44.2	+46.2	120.8	33
34	65 14.9	+33.6	106.3	64 57.0	+35.7	108.3	64 37.2	+37.5	110.3	64 15.4	+39.2	112.3	63 51.7	+40.9	114.2	63 26.3	+42.5	116.0	62 59.1	+44.0	117.8	62 30.4	+45.3	119.5	34
35	65 48.5	+32.1	104.3	65 32.7	+34.1	106.4	65 14.7	+36.1	108.5	64 54.6	+38.0	110.5	64 32.6	+39.8	112.5	64 08.8	+41.4	114.4	63 43.1	+43.0	116.2	63 15.7	+44.4	118.0	35
36	66 20.6	+30.3	102.2	66 06.8	+32.5	104.4	65 50.8	+34.5	106.6	65 32.6	+36.6	108.7	65 12.4	+38.4	110.7	64 50.2	+40.2	112.7	64 26.1	+41.8	114.7	64 00.1	+43.5	116.5	36
37	66 50.9	+28.4	100.0	66 39.3	+30.7	102.3	66 25.3	+33.0	104.5	66 09.2	+35.0	106.7	65 50.8	+37.0	108.8	65 30.4	+38.9	111.0	65 07.9	+40.7	113.0	64 43.6	+42.3	114.9	37
38	67 19.3	+26.4•	97.8	67 10.0	+28.8	100.1	66 58.3	+31.1	102.4	66 44.2	+33.4	104.7	66 27.8	+35.5	106.9	66 09.3	+37.5	109.1	65 48.6	+39.4	111.2	65 25.9	+41.2	113.2	38
39	67 45.7	+24.4•	95.4	67 38.8	+26.9•	97.8	67 29.4	+29.3	100.2	67 17.6	+31.6	102.6	67 03.3	+33.9	104.9	66 46.8	+35.9	107.1	66 28.0	+38.0	109.3	66 07.1	+39.9	111.5	39
40	68 10.1	+22.1•	93.0	68 05.7	+24.7•	95.5	67 58.7	+27.3•	97.9	67 49.2	+29.7	100.3	67 37.2	+32.0	102.7	67 22.7	+34.4	105.1	67 06.0	+36.4	107.4	66 47.0	+38.4	109.6	40
41	68 32.2	+19.8•	90.4	68 30.4	+22.5•	93.0	68 26.0	+25.1•	95.5	68 18.9	+27.7•	98.0	68 09.2	+30.1	100.5	67 57.1	+32.5	102.9	67 42.4	+34.8	105.3	67 25.4	+37.0	107.6	41
42	68 52.0	+17.3•	87.8	68 52.9	+20.1•	90.4	68 51.1	+22.8•	93.0	68 46.6	+25.5•	95.6	68 39.4	+28.1•	98.1	68 29.6	+30.6	100.7	68 17.2	+33.1	103.1	68 02.4	+35.3	105.5	42
43	69 09.3	+14.8•	85.2	69 13.0	+17.7•	87.8	69 13.9	+20.5•	90.4	69 12.1	+23.2•	93.1	69 07.5	+26.0•	95.7	69 00.2	+28.6•	98.3	68 50.3	+31.0•100.8	68 37.7	+33.5	103.4	43
44	69 24.1	+12.2•	82.4	69 30.7	+15.0•	85.1	69 34.4	+17.9•	87.8	69 35.3	+20.8•	90.4	69 33.5	+23.6•	93.1	69 28.8	+26.3•	95.8	69 21.3	+29.0•	98.4	69 11.2	+31.5•101.0	44
45	69 36.3	+9.4•	79.6	69 45.7	+12.3•	82.3	69 52.3	+15.3•	85.0	69 56.1	+18.2•	87.7	69 57.1	+21.1•	90.5	69 55.1	+24.0•	93.2	69 50.3	+26.8•	95.9	69 42.7	+29.5•	98.6	45
46	69 45.7	+6.6•	76.8	69 58.0	+9.6•	79.5	70 07.6	+12.6•	82.2	70 14.3	+15.6•	84.9	70 18.2	+18.5•	87.7	70 19.1	+21.5•	90.5	70 17.1	+24.4•	93.3	70 12.2	+27.2•	96.1	46
47	69 52.3	+3.8•	73.9	70 07.6	+6.7•	76.6	70 20.2	+9.7•	79.3	70 29.9	+12.7•	82.1	70 36.7	+15.8•	84.9	70 40.6	+18.8•	87.7	70 41.5	+21.8•	90.6	70 39.4	+24.8•	93.4	47
48	69 56.1	+1.0•	71.0	70 14.3	+3.9•	73.6	70 29.9	+6.8•	76.3	70 42.6	+9.9•	79.1	70 52.5	+13.0•	82.0	70 59.4	+16.1•	84.8	71 03.3	+19.2•	87.7	71 04.2	+22.2•	90.6	48
49	69 57.1	–2.0•	68.1	70 18.2	+0.9•	70.7	70 36.7	+3.9•	73.4	70 52.5	+6.9•	76.1	71 05.5	+10.0•	79.0	71 15.5	+13.1•	81.8	71 22.5	+16.3•	84.8	71 26.4	+19.4•	87.8	49
50	69 55.1	–4.8•	65.2	70 19.1	–2.0•	67.7	70 40.6	+0.9•	70.3	70 59.4	+3.9•	73.1	71 15.5	+7.0•	75.9	71 28.6	+10.2•	78.8	71 38.8	+13.3•	81.8	71 45.8	+16.6•	84.8	50
51	69 50.3	–7.6•	62.3	70 17.1	–4.9•	64.7	70 41.5	–2.1•	67.3	71 03.3	+0.9•	70.0	71 22.5	+3.9•	72.8	71 38.8	+7.0•	75.7	71 52.1	+10.3•	78.6	72 02.4	+13.5•	81.7	51
52	69 42.7	–10.3•	59.4	70 12.2	–7.8•	61.8	70 39.4	–5.1•	64.3	71 04.2	–2.2•	66.9	71 26.4	+0.8•	69.7	71 45.8	+3.9•	72.5	72 02.4	+7.1•	75.5	72 15.9	+10.4•	78.5	52
53	69 32.4	–13.1•	56.6	70 04.4	–10.6•	58.9	70 34.3	–8.0•	61.3	71 02.0	–5.3•	63.9	71 27.2	–2.4•	66.5	71 49.7	+0.7•	69.3	72 09.9	+3.9•	72.2	72 26.3	+7.2•	75.2	53
54	69 19.3	–15.7•	53.8	69 53.8	–13.4•	56.0	70 26.3	–10.8•	58.3	70 56.7	–8.2•	60.8	71 24.8	–5.4•	63.4	71 50.4	–2.4•	66.1	72 13.4	+0.6•	69.0	72 33.5	+3.8•	71.9	54
55	69 03.6	–18.2•	51.1	69 40.4	–16.0•	53.2	70 15.5	–13.7•	55.4	70 48.5	–11.1•	57.8	71 19.4	–8.5•	60.3	71 48.0	–5.7•	62.9	72 14.0	–2.6•	65.7	72 37.3	+0.5•	68.6	55
56	68 45.4	–20.6•	48.4	69 24.4	–18.5•	50.4	70 01.8	–16.4•	52.5	70 37.4	–14.0•	54.8	71 10.9	–11.4•	57.2	71 42.3	–8.7•	59.7	72 11.4	–5.9•	62.4	72 37.8	–2.8•	65.2	56
57	68 24.8	–22.9•	45.9	69 05.9	–21.0•	47.7	69 45.4	–18.9•	49.7	70 23.4	–16.8•	51.9	70 59.5	–14.4•	54.2	71 33.6	–11.8•	56.6	72 05.5	–9.1•	59.2	72 35.0	–6.1•	61.9	57
58	68 01.9	–25.1•	43.4	68 44.9	–23.4•	45.1	69 26.5	–21.4•	47.0	70 06.6	–19.4•	49.0	70 45.1	–17.1•	51.2	71 21.8	–14.8•	53.5	71 56.4	–12.2•	56.0	72 28.9	–9.5•	58.6	58
59	67 36.8	–27.2	41.0	68 21.5	–25.5•	42.6	69 05.1	–23.8•	44.4	69 47.2	–21.8•	46.3	70 28.0	–19.9•	48.3	71 07.0	–17.6•	50.5	71 44.2	–15.1•	52.8	72 19.4	–12.5•	55.3	59
60	67 09.6	–29.0	38.6	67 56.0	–27.6•	40.2	68 41.3	–26.0•	41.8	69 25.4	–24.3•	43.6	70 08.1	–22.3•	45.5	70 49.4	–20.3•	47.6	71 29.1	–18.1•	49.8	72 06.9	–15.7•	52.1	60
61	66 40.6	–31.0	36.4	67 28.4	–29.6	37.8	68 15.3	–28.1•	39.4	69 01.1	–26.5•	41.0	69 45.8	–24.8•	42.8	70 29.1	–22.9•	44.7	71 11.0	–20.8•	46.8	71 51.2	–18.5•	49.0	61
62	66 09.6	–32.6	34.3	66 58.8	–31.4	35.6	67 47.2	–29.9	37.0	68 34.6	–28.4•	38.5	69 21.0	–27.0	40.1	70 06.2	–25.3•	42.0	70 50.2	–23.4•	43.9	71 32.7	–21.4•	46.0	62
63	65 37.0	–34.2	32.2	66 27.4	–33.0	33.4	67 17.1	–31.8	34.8	68 06.0	–30.6	36.2	68 54.0	–29.2•	37.7	69 40.9	–27.5•	39.3	70 26.8	–25.9•	41.1	71 11.3	–24.0•	43.0	63
64	65 02.8	–35.7	30.2	65 54.4	–34.7	31.4	66 45.3	–33.6	32.6	67 35.4	–32.4	33.9	68 24.8	–31.1	35.3	69 13.4	–29.7•	36.8	70 00.9	–28.2•	38.4	70 47.3	–26.5•	40.2	64
65	64 27.1	–37.1	28.4	65 19.7	–36.2	29.4	66 11.7	–35.2	30.5	67 03.0	–34.1	31.7	67 53.7	–32.9	33.0	68 43.7	–31.7	34.4	69 32.7	–30.3•	35.9	70 20.8	–28.8•	37.5	65
66	63 50.0	–38.3	26.6	64 43.5	–37.6	27.5	65 36.5	–36.7	28.5	66 28.9	–35.7	29.6	67 20.8	–34.7	30.8	68 12.0	–33.6	32.1	69 02.4	–32.3	33.5	69 52.0	–30.9•	35.0	66
67	63 11.7	–39.6	24.8	64 05.9	–38.8	25.7	64 59.8	–38.1	26.6	65 53.2	–37.2	27.6	66 46.1	–36.3	28.7	67 38.4	–35.2	29.9	68 30.1	–34.1	31.1	69 21.1	–32.9	32.5	67
68	62 32.1	–40.7	23.2	63 27.1	–40.0	24.0	64 21.7	–39.3	24.8	65 16.0	–38.5	25.7	66 09.8	–37.7	26.7	67 03.2	–36.8	27.8	67 56.0	–35.8	28.9	68 48.2	–34.8	30.2	68
69	61 51.4	–41.7	21.6	62 47.1	–41.2	22.3	63 42.4	–40.5	23.1	64 37.4	–39.8	23.9	65 32.1	–39.1	24.8	66 26.4	–38.3	25.8	67 20.2	–37.5	26.8	68 13.4	–36.4	27.9	69
70	61 09.7	–42.7	20.1	62 05.9	–42.1	20.8	63 01.9	–41.6	21.4	63 57.6	–41.0	22.2	64 53.0	–40.3	23.0	65 48.1	–39.7	23.9	66 42.7	–38.8	24.8	67 37.0	–38.0	25.8	70
71	60 27.0	–43.5	18.7	61 23.8	–43.1	19.2	62 20.3	–42.6	19.9	63 16.6	–42.1	20.5	64 12.7	–41.5	21.3	65 08.4	–40.8	22.1	66 03.9	–40.2	22.9	66 59.0	–39.5	23.8	71
72	59 43.5	–44.4	17.3	60 40.7	–44.0	17.8	61 37.7	–43.5	18.4	62 34.5	–43.0	19.0	63 31.2	–42.6	19.6	64 27.6	–42.1	20.3	65 23.7	–41.4	21.1	66 19.5	–40.8	21.9	72
73	58 59.1	–45.2	16.0	59 56.7	–44.8	16.4	60 54.2	–44.5	16.9	61 51.5	–44.0	17.5	62 48.6	–43.6	18.1	63 45.5	–43.0	18.7	64 42.3	–42.6	19.4	65 38.7	–42.0	20.1	73
74	58 13.9	–45.9	14.7	59 11.9	–45.6	15.1	60 09.7	–45.2	15.6	61 07.5	–44.9	16.1	62 05.0	–44.4	16.6	63 02.5	–44.1	17.1	63 59.7	–43.6	17.7	64 56.7	–43.1	18.4	74
75	57 28.0	–46.6	13.5	58 26.3	–46.3	13.9	59 24.5	–46.0	14.3	60 22.6	–45.7	14.7	61 20.6	–45.3	15.2	62 18.4	–44.9	15.7	63 16.1	–44.6	16.3	64 13.6	–44.1	16.8	75
76	56 41.4	–47.1	12.3	57 40.0	–46.9	12.7	58 38.5	–46.6	13.0	59 36.9	–46.4	13.4	60 35.3	–46.1	13.8	61 33.5	–45.8	14.3	62 31.6	–45.5	14.7	63 29.5	–45.1	15.2	76
77	55 54.3	–47.8	11.2	56 53.1	–47.5	11.5	57 51.9	–47.4	11.8	58 50.5	–47.0	12.2	59 49.2	–46.9	12.5	60 47.7	–46.6	12.9	61 46.1	–46.2	13.3	62 44.4	–45.9	13.8	77
78	55 06.5	–48.3	10.1	56 05.6	–48.2	10.4	57 04.5	–47.9	10.7	58 03.5	–47.7	11.0	59 02.3	–47.4	11.3	60 01.1	–47.2	11.6	60 59.9	–47.0	12.0	61 58.5	–46.7	12.4	78
79	54 18.2	–48.8	9.1	55 17.4	–48.6	9.3	56 16.6	–48.4	9.6	57 15.8	–48.3	9.8	58 14.9	–48.1	10.1	59 13.9	–47.9	10.4	60 12.9	–47.7	10.7	61 11.8	–47.5	11.1	79
80	53 29.4	–49.2	8.1	54 28.8	–49.1	8.3	55 28.2	–49.0	8.5	56 27.5	–48.9	8.8	57 26.8	–48.7	9.0	58 26.0	–48.5	9.3	59 25.2	–48.3	9.5	60 24.3	–48.1	9.8	80
81	52 40.2	–49.9	7.2	53 39.7	–49.6	7.4	54 39.2	–49.6	7.5	55 38.6	–49.3	7.7	56 38.1	–49.2	7.9	57 37.5	–49.1	8.1	58 36.9	–48.9	8.4	59 36.2	–48.7	8.6	81
82	51 50.4	–50.1	6.3	52 50.1	–50.0	6.4	53 49.7	–49.9	6.6	54 49.3	–49.8	6.7	55 48.9	–49.7	6.9	56 48.4	–49.6	7.1	57 48.0	–49.5	7.3	58 47.5	–49.4	7.5	82
83	51 00.3	–50.5	5.4	52 00.1	–50.5	5.5	52 59.8	–50.4	5.6	53 59.5	–50.3	5.8	54 59.2	–50.2	5.9	55 58.8	–50.0	6.1	56 58.5	–50.0	6.2	57 58.1	–49.8	6.4	83
84	50 09.8	–50.8	4.5	51 09.6	–50.8	4.6	52 09.4	–50.7	4.7	53 09.2	–50.6	4.8	54 09.0	–50.6	4.9	55 08.8	–50.5	5.1	56 08.5	–50.4	5.2	57 08.3	–50.4	5.4	84
85	49 19.0	–51.2	3.7	50 18.8	–51.1	3.8	51 18.7	–51.1	3.9	52 18.6	–51.1	4.0	53 18.4	–51.0	4.1	54 18.3	–51.0	4.2	55 18.1	–50.9	4.3	56 17.9	–50.8	4.4	85
86	48 27.8	–51.5	2.9	49 27.7	–51.5	3.0	50 27.6	–51.4	3.0	51 27.5	–51.4	3.1	52 27.4	–51.3	3.2	53 27.3	–51.3	3.3	54 27.2	–51.2	3.3	55 27.1	–51.2	3.4	86
87	47 36.3	–51.9	2.2	48 36.2	–51.8	2.2	49 36.2	–51.9	2.2	50 36.1	–51.7	2.3	51 36.1	–51.7	2.4	52 36.0	–51.7	2.4	53 36.0	–51.7	2.5	54 35.9	–51.6	2.5	87
88	46 44.4	–52.1	1.4	47 44.4	–52.1	1.4	48 44.4	–52.1	1.5	49 44.4	–52.1	1.5	50 44.4	–52.1	1.5	51 44.3	–52.0	1.6	52 44.3	–52.0	1.6	53 44.3	–52.0	1.6	88
89	45 52.4	–52.4	0.7	46 52.3	–52.3	0.7	47 52.3	–52.3	0.7	48 52.3	–52.3	0.7	49 52.3	–52.3	0.8	50 52.3	–52.3	0.8	51 52.3	–52.3	0.8	52 52.3	–52.3	0.8	89
90	45 00.0	–52.6	0.0	46 00.0	–52.6	0.0	47 00.0	–52.6	0.0	48 00.0	–52.6	0.0	49 00.0	–52.6	0.0	50 00.0	–52.6	0.0	51 00.0	–52.6	0.0	52 00.0	–52.6	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	38 12.2	−54.1	141.9	37 24.8	−54.4	142.4	36 37.1	−54.7	142.8	35 49.2	−55.1	143.3	35 00.9	−55.3	143.7	34 12.5	−55.7	144.1	33 23.7	−55.9	144.5	32 34.8	−56.2	144.9	0
1	37 18.1	−54.2	142.5	36 30.4	−54.6	142.9	35 42.4	−54.9	143.3	34 54.1	−55.1	143.8	34 05.6	−55.4	144.2	33 16.8	−55.7	144.6	32 27.8	−56.0	145.0	31 38.6	−56.2	145.4	1
2	36 23.9	−54.4	143.0	35 35.8	−54.6	143.4	34 47.5	−54.9	143.8	33 59.0	−55.3	144.2	33 10.2	−55.6	144.6	32 21.1	−55.8	145.0	31 31.9	−56.1	145.4	30 42.4	−56.3	145.7	2
3	35 29.5	−54.4	143.5	34 41.2	−54.8	143.9	33 52.6	−55.1	144.3	33 03.7	−55.4	144.7	32 14.6	−55.6	145.1	31 25.3	−55.9	145.4	30 35.8	−56.2	145.8	29 46.1	−56.4	146.1	3
4	34 35.1	−54.7	144.0	33 46.4	−54.9	144.4	32 57.5	−55.2	144.8	32 08.3	−55.5	145.2	31 19.0	−55.8	145.5	30 29.4	−56.0	145.9	29 39.6	−56.2	146.2	28 49.7	−56.4	146.5	4
5	33 40.4	−54.7	144.5	32 51.5	−55.1	144.9	32 02.3	−55.3	145.3	31 12.8	−55.5	145.6	30 23.2	−55.8	146.0	29 33.4	−56.0	146.3	28 43.4	−56.3	146.6	27 53.3	−56.5	146.9	5
6	32 45.7	−54.8	145.0	31 56.4	−55.1	145.4	31 07.0	−55.4	145.7	30 17.3	−55.7	146.1	29 27.4	−55.9	146.4	28 37.4	−56.2	146.7	27 47.1	−56.3	147.0	26 56.8	−56.6	147.3	6
7	31 50.9	−55.0	145.5	31 01.3	−55.2	145.8	30 11.6	−55.6	146.2	29 21.6	−55.7	146.5	28 31.5	−55.9	146.8	27 41.2	−56.2	147.1	26 50.8	−56.4	147.4	26 00.2	−56.6	147.6	7
8	30 55.9	−55.0	146.0	30 06.1	−55.3	146.3	29 16.1	−55.6	146.6	28 25.9	−55.8	146.9	27 35.6	−56.1	147.2	26 45.0	−56.2	147.5	25 54.4	−56.5	147.7	25 03.6	−56.7	148.0	8
9	30 00.9	−55.2	146.4	29 10.8	−55.4	146.7	28 20.5	−55.6	147.0	27 30.1	−55.9	147.3	26 39.5	−56.1	147.6	25 48.8	−56.3	147.9	24 57.9	−56.5	148.1	24 06.9	−56.7	148.4	9
10	29 05.7	−55.2	146.9	28 15.4	−55.5	147.2	27 24.9	−55.7	147.5	26 34.2	−55.9	147.7	25 43.4	−56.1	148.0	24 52.5	−56.4	148.2	24 01.4	−56.6	148.5	23 10.2	−56.8	148.7	10
11	28 10.5	−55.3	147.3	27 19.9	−55.6	147.6	26 29.2	−55.8	147.9	25 38.3	−56.0	148.1	24 47.3	−56.3	148.4	23 56.1	−56.4	148.6	23 04.8	−56.6	148.8	22 13.4	−56.8	149.1	11
12	27 15.2	−55.4	147.8	26 24.3	−55.6	148.0	25 33.4	−55.9	148.3	24 42.3	−56.1	148.5	23 51.0	−56.3	148.8	22 59.7	−56.5	149.0	22 08.2	−56.7	149.2	21 16.6	−56.9	149.4	12
13	26 19.8	−55.5	148.2	25 28.7	−55.7	148.4	24 37.5	−55.9	148.7	23 46.2	−56.1	148.9	22 54.7	−56.3	149.1	22 03.2	−56.6	149.4	21 11.5	−56.7	149.6	20 19.7	−56.9	149.8	13
14	25 24.3	−55.5	148.6	24 33.0	−55.8	148.9	23 41.6	−56.0	149.1	22 50.1	−56.2	149.3	21 58.4	−56.4	149.5	21 06.6	−56.5	149.7	20 14.8	−56.8	149.9	19 22.8	−56.9	150.1	14
15	24 28.8	−55.7	149.0	23 37.2	−55.8	149.3	22 45.6	−56.0	149.5	21 53.9	−56.3	149.7	21 02.0	−56.4	149.9	20 10.1	−56.6	150.1	19 18.0	−56.8	150.3	18 25.9	−57.0	150.4	15
16	23 33.1	−55.6	149.4	22 41.4	−55.9	149.7	21 49.6	−56.1	149.9	20 57.6	−56.3	150.1	20 05.6	−56.5	150.2	19 13.5	−56.7	150.4	18 21.2	−56.8	150.6	17 28.9	−57.0	150.8	16
17	22 37.5	−55.8	149.8	21 45.5	−55.9	150.1	20 53.5	−56.2	150.2	20 01.3	−56.3	150.4	19 09.1	−56.5	150.6	18 16.8	−56.7	150.8	17 24.4	−56.9	150.9	16 31.9	−57.0	151.1	17
18	21 41.7	−55.8	150.2	20 49.6	−56.0	150.4	19 57.3	−56.1	150.6	19 05.0	−56.4	150.8	18 12.6	−56.6	151.0	17 20.1	−56.7	151.1	16 27.5	−56.9	151.3	15 34.9	−57.1	151.4	18
19	20 45.9	−55.8	150.6	19 53.6	−56.1	150.8	19 01.2	−56.3	151.0	18 08.6	−56.4	151.2	17 16.0	−56.5	151.3	16 23.4	−56.8	151.5	15 30.6	−56.9	151.6	14 37.8	−57.1	151.7	19
20	19 50.1	−55.9	151.0	18 57.5	−56.1	151.2	18 04.9	−56.3	151.4	17 12.2	−56.4	151.5	16 19.5	−56.7	151.7	15 26.6	−56.8	151.8	14 33.7	−57.0	151.9	13 40.7	−57.1	152.0	20
21	18 54.2	−56.0	151.4	18 01.5	−56.2	151.6	17 08.6	−56.3	151.7	16 15.8	−56.5	151.9	15 22.8	−56.6	152.0	14 29.8	−56.8	152.1	13 36.7	−56.9	152.2	12 43.6	−57.1	152.4	21
22	17 58.2	−56.0	151.8	17 05.3	−56.1	151.9	16 12.3	−56.3	152.1	15 19.3	−56.5	152.2	14 26.2	−56.7	152.3	13 33.0	−56.9	152.5	12 39.8	−57.0	152.6	11 46.5	−57.2	152.7	22
23	17 02.2	−56.0	152.2	16 09.2	−56.3	152.3	15 16.0	−56.4	152.4	14 22.8	−56.6	152.6	13 29.5	−56.7	152.7	12 36.1	−56.8	152.8	11 42.8	−57.1	152.9	10 49.3	−57.1	153.0	23
24	16 06.2	−56.1	152.5	15 12.9	−56.2	152.7	14 19.6	−56.4	152.8	13 26.2	−56.6	152.9	12 32.8	−56.8	153.0	11 39.3	−56.9	153.1	10 45.7	−57.0	153.2	9 52.2	−57.2	153.3	24
25	15 10.1	−56.1	152.9	14 16.7	−56.3	153.0	13 23.2	−56.4	153.1	12 29.6	−56.6	153.3	11 36.0	−56.7	153.3	10 42.4	−56.9	153.4	9 48.7	−57.1	153.5	8 55.0	−57.2	153.6	25
26	14 14.0	−56.1	153.3	13 20.4	−56.3	153.4	12 26.8	−56.5	153.5	11 33.0	−56.6	153.6	10 39.3	−56.8	153.7	9 45.5	−57.0	153.8	8 51.6	−57.1	153.8	7 57.8	−57.2	153.9	26
27	13 17.9	−56.2	153.6	12 24.1	−56.3	153.7	11 30.3	−56.5	153.8	10 36.4	−56.6	153.9	9 42.5	−56.8	154.0	8 48.5	−56.9	154.1	7 54.6	−57.1	154.1	7 00.6	−57.3	154.2	27
28	12 21.7	−56.2	154.0	11 27.8	−56.4	154.1	10 33.8	−56.5	154.2	9 39.8	−56.7	154.3	8 45.7	−56.8	154.3	7 51.6	−57.0	154.4	6 57.5	−57.1	154.5	6 03.3	−57.2	154.5	28
29	11 25.5	−56.2	154.4	10 31.4	−56.4	154.5	9 37.3	−56.6	154.5	8 43.1	−56.7	154.6	7 48.9	−56.9	154.7	6 54.6	−56.9	154.7	6 00.4	−57.1	154.8	5 06.1	−57.3	154.8	29
30	10 29.3	−56.2	154.7	9 35.0	−56.4	154.8	8 40.7	−56.5	154.9	7 46.4	−56.7	154.9	6 52.0	−56.8	155.0	5 57.7	−57.0	155.0	5 03.3	−57.2	155.1	4 08.8	−57.2	155.1	30
31	9 33.1	−56.3	155.1	8 38.6	−56.4	155.1	7 44.2	−56.6	155.2	6 49.7	−56.7	155.3	5 55.2	−56.9	155.3	5 00.7	−57.0	155.3	4 06.1	−57.1	155.4	3 11.6	−57.3	155.4	31
32	8 36.8	−56.3	155.4	7 42.2	−56.4	155.5	6 47.6	−56.6	155.5	5 53.0	−56.7	155.6	4 58.3	−56.8	155.6	4 03.7	−57.0	155.7	3 09.0	−57.1	155.7	2 14.3	−57.2	155.7	32
33	7 40.5	−56.3	155.8	6 45.8	−56.5	155.8	5 51.0	−56.6	155.9	4 56.3	−56.8	155.9	4 01.5	−56.9	155.9	3 06.7	−57.0	156.0	2 11.9	−57.2	156.0	1 17.1	−57.3	156.0	33
34	6 44.2	−56.3	156.1	5 49.3	−56.4	156.2	4 54.4	−56.6	156.2	3 59.5	−56.7	156.2	3 04.6	−56.9	156.3	2 09.7	−57.0	156.3	1 14.7	−57.1	156.3	0 19.8	−57.3	156.3	34
35	5 47.9	−56.3	156.5	4 52.9	−56.5	156.5	3 57.8	−56.6	156.5	3 02.8	−56.8	156.6	2 07.7	−56.8	156.6	1 12.7	−57.0	156.6	0 17.6	−57.1	156.6	0 37.5	+57.2	23.4	35
36	4 51.6	−56.4	156.8	3 56.4	−56.5	156.8	3 01.2	−56.6	156.9	2 06.0	−56.7	156.9	1 10.9	−56.9	156.9	0 15.7	−57.1	156.9	0 39.5	+57.2	23.1	1 34.7	+57.3	23.1	36
37	3 55.2	−56.3	157.2	2 59.9	−56.5	157.2	2 04.6	−56.6	157.2	1 09.3	−56.7	157.2	0 14.0	−56.9	157.2	0 41.4	+57.0	22.8	1 36.7	+57.1	22.8	2 32.0	+57.2	22.8	37
38	2 58.9	−56.4	157.5	2 03.4	−56.5	157.5	1 08.0	−56.6	157.5	0 12.5	−56.7	157.5	0 42.9	+56.8	22.5	1 38.4	+57.0	22.5	2 33.8	+57.1	22.5	3 29.2	+57.2	22.5	38
39	2 02.5	−56.4	157.9	1 06.9	−56.5	157.9	0 11.4	−56.7	157.9	0 44.2	+56.8	22.1	1 39.8	+56.9	22.1	2 35.4	+57.0	22.2	3 30.9	+57.2	22.2	4 26.5	+57.2	22.2	39
40	1 06.1	−56.3	158.2	0 10.4	−56.5	158.2	0 45.3	+56.6	21.8	1 41.0	+56.7	21.8	2 36.7	+56.9	21.8	3 32.4	+57.0	21.8	4 28.1	+57.1	21.9	5 23.7	+57.3	21.9	40
41	0 09.8	−56.4	158.5	0 46.1	+56.4	21.5	1 41.9	+56.6	21.5	2 37.7	+56.7	21.5	3 33.6	+56.8	21.5	4 29.4	+57.0	21.5	5 25.2	+57.1	21.6	6 21.0	+57.2	21.6	41
42	0 46.6	+56.3	21.1	1 42.5	+56.5	21.1	2 38.5	+56.6	21.1	3 34.5	+56.7	21.2	4 30.4	+56.9	21.2	5 26.4	+56.9	21.2	6 22.3	+57.1	21.3	7 18.2	+57.2	21.3	42
43	1 42.9	+56.4	20.8	2 39.0	+56.5	20.8	3 35.1	+56.6	20.8	4 31.2	+56.7	20.8	5 27.3	+56.8	20.9	6 23.3	+57.0	20.9	7 19.4	+57.1	20.9	8 15.4	+57.2	21.0	43
44	2 39.3	+56.4	20.4	3 35.5	+56.5	20.5	4 31.7	+56.6	20.5	5 27.9	+56.8	20.5	6 24.1	+56.8	20.5	7 20.3	+57.0	20.6	8 16.5	+57.0	20.6	9 12.6	+57.2	20.7	44
45	3 35.7	+56.3	20.1	4 32.0	+56.5	20.1	5 28.3	+56.6	20.1	6 24.7	+56.7	20.2	7 21.0	+56.8	20.2	8 17.3	+56.9	20.3	9 13.5	+57.1	20.3	10 09.8	+57.2	20.4	45
46	4 32.0	+56.3	19.7	5 28.5	+56.4	19.8	6 24.9	+56.6	19.8	7 21.4	+56.7	19.9	8 17.8	+56.8	19.9	9 14.2	+56.9	20.0	10 10.6	+57.0	20.0	11 07.0	+57.1	20.1	46
47	5 28.3	+56.4	19.4	6 24.9	+56.5	19.4	7 21.5	+56.6	19.5	8 18.1	+56.6	19.5	9 14.6	+56.8	19.6	10 11.1	+56.9	19.6	11 07.6	+57.0	19.7	12 04.1	+57.1	19.8	47
48	6 24.7	+56.4	19.1	7 21.4	+56.4	19.1	8 18.1	+56.5	19.1	9 14.7	+56.7	19.2	10 11.4	+56.8	19.2	11 08.0	+56.9	19.3	12 04.6	+57.0	19.4	13 01.2	+57.1	19.4	48
49	7 21.0	+56.3	18.7	8 17.8	+56.4	18.7	9 14.6	+56.5	18.8	10 11.4	+56.6	18.9	11 08.2	+56.7	18.9	12 04.9	+56.9	19.0	13 01.6	+57.0	19.1	13 58.3	+57.1	19.1	49
50	8 17.3	+56.2	18.4	9 14.2	+56.4	18.4	10 11.1	+56.5	18.5	11 08.0	+56.6	18.5	12 04.9	+56.7	18.6	13 01.8	+56.8	18.7	13 58.6	+56.9	18.7	14 55.4	+57.1	18.8	50
51	9 13.5	+56.2	18.0	10 10.6	+56.4	18.1	11 07.6	+56.5	18.1	12 04.6	+56.6	18.2	13 01.6	+56.7	18.2	13 58.6	+56.8	18.3	14 55.5	+57.0	18.4	15 52.5	+57.0	18.5	51
52	10 09.8	+56.2	17.7	11 07.0	+56.3	17.7	12 04.1	+56.5	17.8	13 01.2	+56.6	17.8	13 58.3	+56.7	17.9	14 55.4	+56.8	18.0	15 52.5	+56.9	18.1	16 49.5	+57.0	18.2	52
53	11 06.0	+56.2	17.3	12 03.3	+56.3	17.3	13 00.6	+56.4	17.4	13 57.8	+56.5	17.5	14 55.0	+56.6	17.6	15 52.2	+56.7	17.7	16 49.4	+56.8	17.7	17 46.5	+56.9	17.8	53
54	12 02.2	+56.2	16.9	12 59.6	+56.3	17.0	13 57.0	+56.4	17.1	14 54.3	+56.5	17.2	15 51.6	+56.6	17.2	16 48.9	+56.8	17.3	17 46.2	+56.8	17.4	18 43.4	+57.0	17.5	54
55	12 58.4	+56.2	16.6	13 55.9	+56.3	16.6	14 53.4	+56.3	16.7	15 50.8	+56.5	16.8	16 48.3	+56.5	16.9	17 45.7	+56.6	17.0	18 43.0	+56.8	17.1	19 40.4	+56.9	17.2	55
56	13 54.6	+56.1	16.2	14 52.2	+56.2	16.3	15 49.7	+56.4	16.4	16 47.3	+56.4	16.4	17 44.8	+56.5	16.5	18 42.3	+56.7	16.6	19 39.8	+56.7	16.7	20 37.3	+56.8	16.8	56
57	14 50.7	+56.1	15.9	15 48.4	+56.2	15.9	16 46.1	+56.3	16.0	17 43.7	+56.4	16.1	18 41.4	+56.5	16.2	19 39.0	+56.6	16.3	20 36.6	+56.7	16.4	21 34.1	+56.8	16.5	57
58	15 46.8	+56.0	15.5	16 44.6	+56.1	15.6	17 42.4	+56.2	15.6	18 40.1	+56.4	15.7	19 37.9	+56.4	15.8	20 35.6	+56.5	15.9	21 33.3	+56.6	16.0	22 30.9	+56.8	16.1	58
59	16 42.8	+56.0	15.1	17 40.7	+56.1	15.2	18 38.6	+56.2	15.3	19 36.5	+56.3	15.4	20 34.3	+56.4	15.5	21 32.1	+56.5	15.6	22 29.9	+56.6	15.7	23 27.7	+56.7	15.8	59
60	17 38.8	+56.0	14.7	18 36.8	+56.1	14.8	19 34.8	+56.2	14.9	20 32.8	+56.2	15.0	21 30.7	+56.4	15.1	22 28.6	+56.5	15.2	23 26.5	+56.6	15.3	24 24.4	+56.6	15.4	60
61	18 34.8	+55.9	14.4	19 32.9	+56.0	14.4	20 31.0	+56.1	14.5	21 29.0	+56.3	14.6	22 27.1	+56.3	14.7	23 25.1	+56.4	14.8	24 23.1	+56.5	15.0	25 21.0	+56.6	15.1	61
62	19 30.7	+55.8	14.0	20 28.9	+56.0	14.1	21 27.1	+56.0	14.2	22 25.3	+56.1	14.3	23 23.4	+56.2	14.4	24 21.5	+56.4	14.5	25 19.6	+56.4	14.6	26 17.6	+56.6	14.7	62
63	20 26.5	+55.9	13.6	21 24.9	+55.9	13.7	22 23.1	+56.0	13.8	23 21.4	+56.1	13.9	24 19.6	+56.2	14.0	25 17.9	+56.2	14.1	26 16.0	+56.4	14.2	27 14.2	+56.5	14.3	63
64	21 22.4	+55.7	13.2	22 20.8	+55.8	13.3	23 19.1	+56.0	13.4	24 17.5	+56.0	13.5	25 15.8	+56.2	13.6	26 14.1	+56.3	13.7	27 12.4	+56.4	13.8	28 10.7	+56.4	14.0	64
65	22 18.1	+55.7	12.8	23 16.6	+55.8	12.9	24 15.1	+55.9	13.0	25 13.5	+56.0	13.1	26 12.0	+56.0	13.2	27 10.4	+56.1	13.3	28 08.8	+56.2	13.4	29 07.1	+56.3	13.6	65
66	23 13.8	+55.7	12.4	24 12.4	+55.7	12.5	25 11.0	+55.8	12.6	26 09.5	+55.9	12.7	27 08.0	+56.1	12.8	28 06.5	+56.1	12.9	29 05.0	+56.2	13.0	30 03.4	+56.3	13.2	66
67	24 09.5	+55.5	12.0	25 08.1	+55.7	12.1	26 06.8	+55.7	12.2	27 05.4	+55.9	12.3	28 04.1	+55.9	12.4	29 02.6	+56.1	12.5	30 01.2	+56.1	12.6	30 59.7	+56.2	12.8	67
68	25 05.0	+55.5	11.6	26 03.8	+55.6	11.7	27 02.5	+55.7	11.8	28 01.3	+55.7	11.9	29 00.0	+55.8	12.0	29 58.7	+55.9	12.2	30 57.3	+56.0	12.2	31 55.9	+56.2	12.4	68
69	26 00.5	+55.5	11.1	26 59.4	+55.5	11.2	27 58.2	+55.6	11.3	28 57.0	+55.7	11.5	29 55.8	+55.8	11.6	30 54.6	+55.9	11.7	31 53.3	+56.0	11.8	32 52.1	+56.0	11.9	69
70	26 56.0	+55.3	10.7	27 54.9	+55.4	10.8	28 53.8	+55.5	10.9	29 52.7	+55.6	11.0	30 51.6	+55.7	11.1	31 50.5	+55.7	11.3	32 49.3	+55.9	11.4	33 48.1	+56.0	11.5	70
71	27 51.3	+55.3	10.3	28 50.3	+55.4	10.4	29 49.3	+55.5	10.5	30 48.3	+55.5	10.6	31 47.3	+55.6	10.7	32 46.2	+55.7	10.8	33 45.2	+55.7	10.9	34 44.1	+55.8	11.1	71
72	28 46.6	+55.1	9.8	29 45.7	+55.2	9.9	30 44.8	+55.3	10.0	31 43.8	+55.4	10.1	32 42.9	+55.5	10.3	33 41.9	+55.6	10.4	34 40.9	+55.7	10.5	35 39.9	+55.8	10.6	72
73	29 41.7	+55.1	9.4	30 40.9	+55.2	9.5	31 40.1	+55.2	9.6	32 39.2	+55.4	9.7	33 38.4	+55.4	9.8	34 37.5	+55.5	9.9	35 36.6	+55.6	10.0	36 35.7	+55.6	10.2	73
74	30 36.8	+55.0	8.9	31 36.1	+55.0	9.0	32 35.3	+55.2	9.1	33 34.6	+55.2	9.2	34 33.8	+55.3	9.3	35 33.0	+55.3	9.5	36 32.2	+55.4	9.6	37 31.3	+55.5	9.7	74
75	31 31.8	+54.9	8.5	32 31.1	+55.0	8.6	33 30.5	+55.0	8.7	34 29.8	+55.1	8.8	35 29.1	+55.1	8.9	36 28.3	+55.3	9.0	37 27.6	+55.3	9.1	38 26.8	+55.4	9.2	75
76	32 26.7	+54.8	8.0	33 26.1	+54.8	8.1	34 25.5	+54.9	8.2	35 24.9	+55.0	8.3	36 24.2	+55.1	8.4	37 23.6	+55.1	8.5	38 22.9	+55.2	8.6	39 22.2	+55.3	8.7	76
77	33 21.5	+54.6	7.5	34 20.9	+54.8	7.6	35 20.4	+54.8	7.7	36 19.9	+54.8	7.8	37 19.3	+54.9	7.9	38 18.7	+55.0	8.0	39 18.1	+55.1	8.1	40 17.5	+55.2	8.2	77
78	34 16.1	+54.6	7.1	35 15.7	+54.6	7.1	36 15.2	+54.7	7.2	37 14.7	+54.7	7.3	38 14.2	+54.8	7.4	39 13.7	+54.9	7.5	40 13.2	+54.9	7.7	41 12.7	+55.0	7.7	78
79	35 10.6	+54.4	6.5	36 10.3	+54.4	6.6	37 09.9	+54.5	6.7	38 09.4	+54.6	6.8	39 09.0	+54.7	6.9	40 08.6	+54.7	7.0	41 08.1	+54.8	7.1	42 07.7	+54.8	7.2	79
80	36 05.0	+54.3	6.0	37 04.7	+54.3	6.1	38 04.4	+54.4	6.1	39 04.0	+54.5	6.2	40 03.7	+54.5	6.3	41 03.3	+54.6	6.4	42 02.9	+54.6	6.5	43 02.5	+54.7	6.6	80
81	36 59.3	+54.1	5.4	37 59.0	+54.2	5.5	38 58.8	+54.2	5.6	39 58.5	+54.2	5.7	40 58.2	+54.3	5.8	41 57.9	+54.4	5.9	42 57.5	+54.5	6.0	43 57.2	+54.5	6.0	81
82	37 53.4	+54.0	4.9	38 53.2	+54.0	5.0	39 53.0	+54.0	5.0	40 52.7	+54.2	5.1	41 52.5	+54.2	5.2	42 52.2	+54.3	5.3	43 52.0	+54.3	5.4	44 51.7	+54.3	5.5	82
83	38 47.4	+53.8	4.3	39 47.2	+53.9	4.4	40 47.0	+53.9	4.5	41 46.9	+53.9	4.5	42 46.7	+53.9	4.6	43 46.5	+54.0	4.7	44 46.3	+54.0	4.8	45 46.0	+54.2	4.9	83
84	39 41.2	+53.6	3.8	40 41.1	+53.6	3.8	41 40.9	+53.7	3.9	42 40.8	+53.7	4.0	43 40.6	+53.8	4.0	44 40.5	+53.8	4.1	45 40.3	+53.9	4.2	46 40.2	+53.9	4.2	84
85	40 34.8	+53.5	3.2	41 34.7	+53.5	3.2	42 34.6	+53.5	3.3	43 34.5	+53.6	3.3	44 34.4	+53.6	3.4	45 34.3	+53.6	3.5	46 34.2	+53.7	3.5	47 34.1	+53.7	3.6	85
86	41 28.3	+53.2	2.6	42 28.2	+53.3	2.6	43 28.1	+53.4	2.7	44 28.1	+53.3	2.7	45 28.0	+53.4	2.8	46 27.9	+53.4	2.8	47 27.9	+53.4	2.9	48 27.8	+53.4	2.9	86
87	42 21.5	+53.1	2.0	43 21.5	+53.1	2.0	44 21.5	+53.1	2.0	45 21.4	+53.1	2.1	46 21.4	+53.1	2.1	47 21.3	+53.2	2.1	48 21.3	+53.2	2.2	49 21.2	+53.2	2.2	87
88	43 14.6	+52.8	1.3	44 14.6	+52.8	1.4	45 14.5	+52.9	1.4	46 14.5	+52.9	1.4	47 14.5	+52.9	1.4	48 14.5	+52.9	1.5	49 14.5	+52.9	1.5	50 14.4	+53.0	1.5	88
89	44 07.4	+52.6	0.7	45 07.4	+52.6	0.7	46 07.4	+52.6	0.7	47 07.4	+52.6	0.7	48 07.4	+52.6	0.7	49 07.4	+52.6	0.7	50 07.4	+52.6	0.8	51 07.4	+52.6	0.8	89
90	45 00.0	+52.4	0.0	46 00.0	+52.3	0.0	47 00.0	+52.3	0.0	48 00.0	+52.3	0.0	49 00.0	+52.3	0.0	50 00.0	+52.3	0.0	51 00.0	+52.3	0.0	52 00.0	+52.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION   L.H.A. 151°, 209°**

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Dec.	45° (Hc d Z)	46° (Hc d Z)	47° (Hc d Z)	48° (Hc d Z)	49° (Hc d Z)	50° (Hc d Z)	51° (Hc d Z)	52° (Hc d Z)	Dec.
0	37 45.7 +53.6 140.8	36 59.0 +54.0 141.2	36 12.1 +54.3 141.7	35 24.9 +54.6 142.2	34 37.3 +55.0 142.6	33 49.6 +55.2 143.0	33 01.5 +55.6 143.4	32 13.2 +55.9 143.8	0
1	38 39.3 +53.4 140.2	37 53.0 +53.8 140.7	37 06.4 +54.2 141.2	36 19.5 +54.5 141.6	35 32.3 +54.9 142.1	34 44.8 +55.2 142.5	33 57.1 +55.7 142.9	33 09.1 +55.7 143.3	1
2	39 32.7 +53.2 139.6	38 46.8 +53.6 140.1	38 00.6 +54.0 140.6	37 14.0 +54.4 141.1	36 27.2 +54.7 141.6	35 40.0 +55.0 142.0	34 52.5 +55.4 142.5	34 04.8 +55.7 142.9	2
3	40 25.9 +53.0 139.0	39 40.4 +53.5 139.6	38 54.6 +53.8 140.1	38 08.4 +54.1 140.6	37 21.9 +54.6 141.1	36 35.0 +55.0 141.6	35 47.9 +55.2 142.0	35 00.5 +55.5 142.4	3
4	41 18.9 +52.9 138.4	40 33.9 +53.2 139.0	39 48.4 +53.7 139.5	39 02.6 +54.1 140.0	38 16.5 +54.4 140.6	37 30.0 +54.7 141.0	36 43.1 +55.2 141.5	35 56.0 +55.5 142.0	4
5	42 11.8 +52.6 137.8	41 27.1 +53.1 138.4	40 42.1 +53.5 138.9	39 56.7 +53.9 139.5	39 10.9 +54.3 140.0	38 24.7 +54.7 140.5	37 38.3 +55.0 141.0	36 51.5 +55.3 141.5	5
6	43 04.4 +52.4 137.1	42 20.2 +52.9 137.7	41 35.6 +53.3 138.3	40 50.6 +53.7 138.9	40 05.2 +54.1 139.5	39 19.4 +54.5 140.0	38 33.3 +54.8 140.5	37 46.8 +55.2 141.0	6
7	43 56.8 +52.1 136.4	43 13.1 +52.6 137.1	42 28.9 +53.1 137.7	41 44.3 +53.5 138.3	40 59.3 +53.9 138.9	40 13.9 +54.3 139.5	39 28.1 +54.7 140.0	38 42.0 +55.1 140.5	7
8	44 48.9 +51.9 135.7	44 05.7 +52.4 136.4	43 22.0 +52.9 137.1	42 37.8 +53.4 137.7	41 53.2 +53.8 138.3	41 08.2 +54.2 138.9	40 22.8 +54.6 139.5	39 37.1 +54.9 140.0	8
9	45 40.8 +51.6 135.0	44 58.1 +52.1 135.7	44 14.9 +52.6 136.4	43 31.2 +53.1 137.1	42 47.0 +53.6 137.7	42 02.4 +54.0 138.3	41 17.4 +54.4 138.9	40 32.0 +54.8 139.5	9
10	46 32.4 +51.3 134.3	45 50.2 +51.9 135.0	45 07.5 +52.4 135.7	44 24.3 +52.9 136.4	43 40.6 +53.4 137.1	42 56.4 +53.8 137.7	42 11.8 +54.2 138.3	41 26.8 +54.6 138.8	10
11	47 23.7 +51.0 133.5	46 42.1 +51.6 134.3	45 59.9 +52.2 135.0	45 17.2 +52.7 135.8	44 34.0 +53.1 136.5	43 50.2 +53.6 137.1	43 06.0 +54.1 137.8	42 21.4 +54.5 138.4	11
12	48 14.7 +50.7 132.7	47 33.7 +51.3 133.6	46 52.1 +51.8 134.3	46 09.9 +52.4 135.1	45 27.1 +52.9 135.8	44 43.8 +53.4 136.5	44 00.1 +53.8 137.2	43 15.9 +54.2 137.8	12
13	49 05.4 +50.3 131.9	48 25.0 +51.0 132.8	47 43.9 +51.6 133.6	47 02.3 +52.1 134.4	46 20.0 +52.7 135.1	45 37.2 +53.2 135.8	44 53.9 +53.7 136.5	44 10.1 +54.1 137.2	13
14	49 55.7 +50.0 131.1	49 16.0 +50.6 132.0	48 35.5 +51.2 132.8	47 54.4 +51.8 133.6	47 12.7 +52.4 134.4	46 30.4 +53.0 135.2	45 47.6 +53.4 135.9	45 04.2 +53.9 136.6	14
15	50 45.7 +49.5 130.2	50 06.6 +50.2 131.1	49 26.7 +51.0 132.0	48 46.2 +51.6 132.9	48 05.1 +52.1 133.7	47 23.4 +52.6 134.5	46 41.0 +53.2 135.3	45 58.1 +53.7 136.0	15
16	51 35.2 +49.2 129.3	50 56.8 +49.9 130.3	50 17.7 +50.5 131.2	49 37.8 +51.2 132.1	48 57.2 +51.9 133.0	48 16.0 +52.4 133.8	47 34.2 +53.0 134.6	46 51.8 +53.5 135.3	16
17	52 24.4 +48.6 128.4	51 46.7 +49.4 129.4	51 08.2 +50.2 130.4	50 29.0 +50.8 131.3	49 49.1 +51.5 132.2	49 08.4 +52.1 133.0	48 27.2 +52.6 133.9	47 45.3 +53.2 134.7	17
18	53 13.0 +48.2 127.4	52 36.1 +49.0 128.5	51 58.4 +49.7 129.5	51 19.8 +50.5 130.4	50 40.6 +51.1 131.4	50 00.5 +51.8 132.3	49 19.8 +52.4 133.1	48 38.5 +53.0 134.0	18
19	54 01.2 +47.6 126.4	53 25.1 +48.5 127.5	52 48.1 +49.4 128.6	52 10.3 +50.1 129.6	51 31.7 +50.8 130.5	50 52.3 +51.5 131.5	50 12.2 +52.1 132.4	49 31.5 +52.6 133.3	19
20	54 48.8 +47.1 125.4	54 13.6 +48.0 126.5	53 37.5 +48.8 127.6	53 00.4 +49.7 128.7	52 22.5 +50.4 129.7	51 43.8 +51.1 130.7	51 04.3 +51.8 131.6	50 24.1 +52.4 132.5	20
21	55 35.9 +46.5 124.3	55 01.6 +47.5 125.5	54 26.3 +48.4 126.6	53 50.1 +49.2 127.7	53 12.9 +50.0 128.8	52 34.9 +50.7 129.8	51 56.1 +51.4 130.8	51 16.5 +52.1 131.7	21
22	56 22.4 +45.9 123.2	55 49.1 +46.8 124.5	55 14.7 +47.8 125.6	54 39.3 +48.6 126.7	54 02.9 +49.5 127.8	53 25.6 +50.3 128.9	52 47.5 +51.1 129.8	52 08.6 +51.7 130.9	22
23	57 08.3 +45.1 122.0	56 35.9 +46.3 123.3	56 02.5 +47.2 124.5	55 27.9 +48.2 125.7	54 52.4 +49.1 126.9	54 15.9 +49.9 128.0	53 38.6 +50.6 129.1	53 00.3 +51.4 130.1	23
24	57 53.4 +44.5 120.8	57 22.2 +45.5 122.1	56 49.7 +46.6 123.4	56 16.1 +47.6 124.7	55 41.5 +48.5 125.9	55 05.8 +49.4 127.0	54 29.2 +50.2 128.2	53 51.7 +51.0 129.2	24
25	58 37.9 +43.6 119.5	58 07.7 +44.8 120.9	57 36.3 +45.9 122.2	57 03.7 +47.0 123.5	56 30.0 +48.0 124.8	55 55.2 +48.9 126.0	55 19.4 +49.8 127.2	54 42.7 +50.5 128.3	25
26	59 21.5 +42.8 118.1	58 52.5 +44.1 119.6	58 22.2 +45.2 121.0	57 50.7 +46.3 122.4	57 18.0 +47.3 123.7	56 44.1 +48.3 125.0	56 09.2 +49.2 126.2	55 33.2 +50.1 127.4	26
27	60 04.3 +41.8 116.8	59 36.6 +43.2 118.3	59 07.4 +44.5 119.8	58 37.0 +45.6 121.2	58 05.3 +46.7 122.6	57 32.4 +47.8 123.9	56 58.4 +48.7 125.2	56 23.3 +49.7 126.4	27
28	60 46.1 +40.9 115.3	60 19.8 +42.2 116.9	59 51.9 +43.6 118.4	59 22.6 +44.9 119.9	58 52.0 +46.1 121.4	58 20.2 +47.1 122.8	57 47.1 +48.2 124.1	57 13.0 +49.0 125.4	28
29	61 27.0 +39.9 113.8	61 02.0 +41.4 115.4	60 35.5 +42.7 117.1	60 07.5 +44.0 118.6	59 38.1 +45.2 120.1	59 07.3 +46.4 121.6	58 35.3 +47.5 123.0	58 02.0 +48.6 124.3	29
30	62 06.9 +38.7 112.2	61 43.4 +40.2 113.9	61 18.2 +41.8 115.6	60 51.5 +43.2 117.2	60 23.3 +44.5 118.8	59 53.7 +45.7 120.3	59 22.8 +46.8 121.8	58 50.6 +47.9 123.2	30
31	62 45.6 +37.5 110.6	62 23.6 +39.2 112.3	62 00.0 +40.7 114.1	61 34.7 +42.1 115.8	61 07.8 +43.6 117.4	60 39.4 +44.9 119.0	60 09.6 +46.1 120.5	59 38.5 +47.2 122.0	31
32	63 23.1 +36.1 108.8	63 02.8 +37.9 110.7	62 40.7 +39.6 112.5	62 16.8 +41.2 114.3	61 51.4 +42.6 116.0	61 24.3 +44.0 117.6	60 55.7 +45.3 119.2	60 25.7 +46.6 120.8	32
33	63 59.2 +34.8 107.0	63 40.7 +36.6 109.0	63 20.3 +38.3 110.9	62 58.0 +40.0 112.7	62 34.0 +41.6 114.5	62 08.3 +43.1 116.2	61 41.0 +44.5 117.9	61 12.3 +45.7 119.5	33
34	64 34.0 +33.3 105.2	64 17.3 +35.3 107.2	63 58.6 +37.1 109.1	63 38.0 +39.0 111.0	63 15.6 +40.5 112.9	62 51.4 +42.1 114.7	62 25.5 +43.5 116.4	61 58.0 +44.9 118.1	34
35	65 07.3 +31.7 103.2	64 52.6 +33.7 105.3	64 35.7 +35.7 107.3	64 16.9 +37.5 109.3	63 56.1 +39.3 111.2	63 33.5 +40.9 113.1	63 09.0 +42.6 114.9	62 42.9 +44.0 116.7	35
36	65 39.0 +30.0 101.2	65 26.3 +32.2 103.3	65 11.4 +34.2 105.4	64 54.4 +36.2 107.5	64 35.4 +38.0 109.5	64 14.4 +39.8 111.4	63 51.6 +41.4 113.3	63 26.9 +43.0 115.2	36
37	66 09.0 +28.2 99.0	65 58.5 +30.4 101.3	65 45.6 +32.6 103.5	65 30.6 +34.5 105.6	65 13.4 +36.7 107.7	64 54.2 +38.5 109.7	64 33.0 +40.3 111.7	64 09.9 +41.9 113.6	37
38	66 37.2 +26.3 96.8	66 28.9 +28.6 99.1	66 18.1 +30.9 101.4	66 05.2 +33.1 103.6	65 50.1 +35.1 105.8	65 32.7 +37.1 107.9	65 13.3 +38.9 109.9	64 51.8 +40.8 111.9	38
39	67 03.5 +24.2 94.5	66 57.5 +26.7 96.9	66 49.1 +29.0 99.2	66 38.3 +31.3 101.5	66 25.2 +33.5 103.7	66 09.8 +35.6 105.9	65 52.2 +37.6 108.1	65 32.6 +39.4 110.2	39
40	67 27.7 +22.1 92.2	67 24.2 +24.6 94.6	67 18.1 +27.1 97.0	67 09.6 +29.5 99.3	66 58.7 +31.8 101.7	66 45.4 +34.0 103.9	66 29.8 +36.1 106.2	66 12.0 +38.1 108.3	40
41	67 49.8 +19.8 89.7	67 48.8 +22.4 92.2	67 45.2 +25.0 94.6	67 39.1 +27.5 97.1	67 30.5 +29.9 99.5	67 19.4 +32.2 101.8	67 05.9 +34.5 104.1	66 50.1 +36.6 106.4	41
42	68 09.6 +17.5 87.2	68 11.2 +20.2 89.7	68 10.2 +22.8 92.2	68 06.6 +25.4 94.7	68 00.4 +27.9 97.2	67 51.6 +30.4 99.6	67 40.4 +32.7 102.0	67 26.7 +35.0 104.4	42
43	68 27.1 +15.0 84.6	68 31.4 +17.7 87.2	68 33.0 +20.5 89.7	68 32.0 +23.2 92.2	68 28.3 +25.8 94.8	68 22.0 +28.4 97.3	68 13.1 +30.8 99.8	68 01.7 +33.2 102.2	43
44	68 42.1 +12.5 82.0	68 49.1 +15.3 84.5	68 53.5 +18.1 87.1	68 55.2 +20.8 89.7	68 54.1 +23.6 92.3	68 50.4 +26.2 94.9	68 43.9 +28.9 97.4	68 34.9 +31.3 100.0	44
45	68 54.6 +9.8 79.3	69 04.4 +12.7 81.8	69 11.6 +15.5 84.4	69 16.0 +18.4 87.1	69 17.7 +21.2 89.7	69 16.6 +23.9 92.4	69 12.8 +26.6 95.0	69 06.2 +29.2 97.6	45
46	69 04.4 +7.2 76.5	69 17.1 +10.0 79.1	69 27.1 +12.9 81.7	69 34.4 +15.8 84.4	69 38.9 +18.6 87.0	69 40.5 +21.6 89.7	69 39.4 +24.3 92.4	69 35.4 +27.1 95.1	46
47	69 11.6 +4.4 73.7	69 27.1 +7.3 76.3	69 40.0 +10.2 78.9	69 50.2 +13.0 81.6	69 57.5 +16.1 84.3	70 02.1 +18.9 87.0	70 03.7 +21.9 89.8	70 02.5 +24.7 92.5	47
48	69 16.0 +1.7 70.9	69 34.4 +4.5 73.5	69 50.2 +7.3 76.1	70 03.2 +10.4 78.7	70 13.6 +13.3 81.5	70 21.0 +16.3 84.2	70 25.6 +19.3 87.0	70 27.2 +22.3 89.8	48
49	69 17.7 –1.1 68.1	69 38.9 +1.6 70.6	69 57.5 +4.6 73.2	70 13.6 +7.4 75.8	70 26.9 +10.4 78.6	70 37.3 +13.5 81.4	70 44.9 +16.5 84.2	70 49.5 +19.5 87.0	49
50	69 16.6 –3.8 65.3	69 40.5 –1.1 67.7	70 02.1 +1.6 70.3	70 21.0 +4.6 72.9	70 37.3 +7.6 75.6	70 50.8 +10.6 78.4	71 01.4 +13.7 81.2	71 09.0 +16.8 84.1	50
51	69 12.8 –6.6 62.5	69 39.4 –4.0 64.8	70 03.7 –1.2 67.3	70 25.6 +1.6 69.9	70 44.9 +4.6 72.6	71 01.4 +7.6 75.4	71 15.1 +10.7 78.2	71 25.8 +13.9 81.2	51
52	69 06.2 –9.3 59.7	69 35.4 –6.7 62.0	70 02.5 –4.1 64.4	70 27.2 –1.3 66.9	70 49.5 +1.5 69.6	71 09.0 +4.6 72.3	71 25.8 +7.7 75.2	71 39.7 +10.9 78.1	52
53	68 56.9 –11.9 56.9	69 28.7 –9.5 59.1	69 58.4 –6.9 61.5	70 25.9 –4.2 64.0	70 51.0 –1.4 66.5	71 13.6 +1.6 69.2	71 33.5 +4.6 72.0	71 50.6 +7.8 74.9	53
54	68 45.0 –14.5 54.2	69 19.2 –12.2 56.3	69 51.5 –9.8 58.6	70 21.7 –7.2 61.0	70 49.6 –4.4 63.5	71 15.2 –1.6 66.1	71 38.1 +1.5 68.9	71 58.4 +4.5 71.7	54
55	68 30.5 –17.0 51.5	69 07.0 –14.8 53.6	69 41.7 –12.5 55.7	70 14.5 –10.0 58.0	70 45.2 –7.4 60.5	71 13.6 –4.6 63.0	71 39.6 –1.7 65.7	72 02.9 +1.4 68.5	55
56	68 13.5 –19.3 48.9	68 52.2 –17.3 50.9	69 29.2 –15.1 52.9	70 04.5 –12.8 55.1	70 37.8 –10.3 57.5	71 09.0 –7.7 59.9	71 37.9 –4.9 62.5	72 04.3 –1.9 65.3	56
57	67 54.2 –21.6 46.4	68 34.9 –19.7 48.2	69 14.1 –17.7 50.2	69 51.7 –15.5 52.3	70 27.5 –13.2 54.5	71 01.3 –10.6 56.9	71 33.0 –7.9 59.4	72 02.4 –5.1 62.0	57
58	67 32.6 –23.8 43.9	68 15.2 –22.0 45.7	68 56.4 –20.1 47.5	69 36.2 –18.1 49.5	70 14.3 –15.8 51.6	70 50.7 –13.5 53.9	71 25.1 –11.0 56.2	71 57.3 –8.3 58.8	58
59	67 08.8 –25.8 41.5	67 52.2 –24.3 43.2	68 36.3 –22.4 44.9	69 18.1 –20.4 46.8	69 58.5 –18.6 48.8	70 37.2 –16.4 50.9	71 14.1 –14.0 53.2	71 49.0 –11.4 55.6	59
60	66 43.0 –27.8 39.2	67 28.9 –26.2 40.8	68 13.8 –24.6 42.4	68 57.5 –22.9 44.1	69 39.9 –21.0 46.0	70 20.8 –18.9 48.0	71 00.1 –16.7 50.2	71 37.6 –14.3 52.5	60
61	66 15.2 –29.6 37.0	67 02.7 –28.3 38.4	67 49.2 –26.8 39.9	68 34.6 –25.2 41.6	69 18.9 –23.4 43.3	70 01.9 –21.6 45.2	70 43.4 –19.5 47.2	71 23.3 –17.3 49.4	61
62	65 45.6 –31.4 34.9	66 34.4 –30.1 36.2	67 22.4 –28.8 37.6	68 09.4 –27.2 39.1	68 55.5 –25.7 40.8	69 40.3 –24.0 42.5	70 23.9 –22.1 44.4	71 06.0 –20.0 46.4	62
63	65 14.2 –32.9 32.8	66 04.3 –31.8 34.0	66 53.6 –30.6 35.3	67 42.2 –29.3 36.7	68 29.8 –27.9 38.3	69 16.3 –26.2 39.9	70 01.8 –24.5 41.7	70 46.0 –22.7 43.6	63
64	64 41.3 –34.5 30.8	65 32.5 –33.5 32.0	66 23.0 –32.3 33.2	67 12.9 –31.1 34.5	68 01.9 –29.8 35.9	68 50.1 –28.4 37.4	69 37.3 –26.9 39.0	70 23.3 –25.1 40.8	64
65	64 06.8 –35.9 28.9	64 59.0 –34.9 30.0	65 50.7 –34.0 31.1	66 41.8 –32.9 32.3	67 32.1 –31.7 33.6	68 21.7 –30.4 35.0	69 10.4 –29.0 36.5	69 58.2 –27.5 38.1	65
66	63 30.9 –37.2 27.1	64 24.1 –36.4 28.1	65 16.7 –35.4 29.1	66 08.9 –34.5 30.2	67 00.4 –33.4 31.4	67 51.3 –32.2 32.7	68 41.4 –31.0 34.0	69 30.7 –29.6 35.5	66
67	62 53.7 –38.5 25.4	63 47.7 –37.7 26.3	64 41.3 –36.9 27.2	65 34.4 –36.0 28.2	66 27.0 –35.0 29.3	67 19.1 –34.1 30.4	68 10.4 –32.8 31.7	69 01.1 –31.6 33.1	67
68	62 15.2 –39.6 23.7	63 10.0 –38.9 24.5	64 04.4 –38.2 25.4	64 58.4 –37.4 26.3	65 52.0 –36.6 27.3	66 45.0 –35.6 28.3	67 37.6 –34.6 29.5	68 29.5 –33.5 30.7	68
69	61 35.6 –40.6 22.1	62 31.1 –40.1 22.8	63 26.2 –39.4 23.6	64 21.0 –38.7 24.5	65 15.4 –37.9 25.3	66 09.4 –37.1 26.3	67 03.0 –36.3 27.4	67 56.0 –35.3 28.5	69
70	60 55.0 –41.7 20.6	61 51.0 –41.1 21.3	62 46.8 –40.6 22.0	63 42.3 –39.9 22.7	64 37.5 –39.3 23.5	65 32.3 –38.5 24.4	66 26.7 –37.7 25.3	67 20.7 –36.8 26.4	70
71	60 13.3 –42.6 19.1	61 09.9 –42.1 19.7	62 06.2 –41.6 20.4	63 02.4 –41.1 21.0	63 58.2 –40.4 21.8	64 53.8 –39.8 22.6	65 49.0 –39.1 23.4	66 43.9 –38.3 24.3	71
72	59 30.7 –43.5 17.7	60 27.8 –43.1 18.3	61 24.6 –42.5 18.8	62 21.3 –42.1 19.5	63 17.8 –41.6 20.1	64 14.0 –41.0 20.8	65 09.9 –40.3 21.6	66 05.6 –39.7 22.4	72
73	58 47.2 –44.2 16.4	59 44.7 –43.8 16.9	60 42.1 –43.5 17.4	61 39.2 –43.0 17.9	62 36.2 –42.5 18.5	63 33.0 –42.0 19.2	64 29.6 –41.5 19.8	65 25.9 –41.0 20.6	73
74	58 03.0 –45.0 15.1	59 00.9 –44.7 15.5	59 58.6 –44.3 16.0	60 56.2 –43.9 16.5	61 53.7 –43.6 17.0	62 51.0 –43.1 17.6	63 48.1 –42.7 18.2	64 44.9 –42.1 18.8	74
75	57 18.0 –45.7 13.9	58 16.2 –45.4 14.2	59 14.3 –45.1 14.7	60 12.3 –44.8 15.1	61 10.1 –44.4 15.6	62 07.9 –44.1 16.1	63 05.4 –43.6 16.6	64 02.8 –43.1 17.2	75
76	56 32.3 –46.4 12.7	57 30.8 –46.1 13.0	58 29.2 –45.9 13.4	59 27.5 –45.5 13.8	60 25.7 –45.2 14.2	61 23.8 –44.9 14.6	62 21.8 –44.5 15.1	63 19.7 –44.2 15.6	76
77	55 45.9 –47.0 11.5	56 44.7 –46.8 11.8	57 43.3 –46.5 12.2	58 42.0 –46.3 12.5	59 40.5 –46.0 12.9	60 38.9 –45.6 13.3	61 37.3 –45.4 13.7	62 35.5 –45.0 14.1	77
78	54 58.9 –47.5 10.4	55 57.9 –47.3 10.7	56 56.8 –47.1 11.0	57 55.7 –46.9 11.3	58 54.5 –46.7 11.6	59 53.3 –46.5 12.0	60 51.9 –46.2 12.3	61 50.5 –45.9 12.7	78
79	54 11.4 –48.1 9.4	55 10.6 –47.9 9.6	56 09.7 –47.7 9.9	57 08.8 –47.5 10.1	58 07.8 –47.4 10.4	59 06.8 –47.1 10.7	60 05.7 –46.8 11.0	61 04.6 –46.6 11.4	79
80	53 23.3 –48.5 8.4	54 22.7 –48.4 8.6	55 22.0 –48.3 8.8	56 21.3 –48.1 9.0	57 20.5 –47.9 9.3	58 19.7 –47.8 9.5	59 18.9 –47.6 9.8	60 18.0 –47.4 10.1	80
81	52 34.8 –49.1 7.4	53 34.3 –48.9 7.6	54 33.7 –48.7 7.8	55 33.2 –48.7 7.9	56 32.6 –48.5 8.2	57 31.9 –48.3 8.4	58 31.3 –48.2 8.6	59 30.6 –48.0 8.9	81
82	51 45.7 –49.4 6.5	52 45.4 –49.4 6.6	53 44.9 –49.2 6.8	54 44.5 –49.1 6.9	55 44.1 –49.0 7.1	56 43.6 –48.9 7.3	57 43.1 –48.8 7.5	58 42.6 –48.6 7.7	82
83	50 56.3 –49.9 5.5	51 56.0 –49.8 5.7	52 55.7 –49.7 5.8	53 55.4 –49.6 5.9	54 55.1 –49.6 6.1	55 54.7 –49.4 6.2	56 54.3 –49.3 6.4	57 54.0 –49.2 6.6	83
84	50 06.4 –50.2 4.7	51 06.2 –50.2 4.8	52 06.0 –50.1 4.9	53 05.8 –50.0 5.0	54 05.5 –49.9 5.1	55 05.3 –49.9 5.2	56 05.0 –49.7 5.4	57 05.4 –49.7 5.5	84
85	49 16.2 –50.6 3.8	50 16.0 –50.5 3.9	51 15.9 –50.5 4.0	52 15.7 –50.4 4.1	53 15.6 –50.4 4.2	54 15.4 –50.3 4.3	55 15.3 –50.3 4.4	56 15.1 –50.2 4.5	85
86	48 25.6 –51.0 3.0	49 25.5 –50.9 3.1	50 25.4 –50.9 3.1	51 25.3 –50.8 3.2	52 25.2 –50.8 3.3	53 25.1 –50.7 3.4	54 25.0 –50.7 3.4	55 24.9 –50.6 3.5	86
87	47 34.6 –51.2 2.2	48 34.6 –51.2 2.3	49 34.5 –51.2 2.3	50 34.5 –51.2 2.4	51 34.4 –51.1 2.4	52 34.4 –51.1 2.5	53 34.3 –51.1 2.5	54 34.3 –51.1 2.6	87
88	46 43.4 –51.6 1.5	47 43.4 –51.6 1.5	48 43.3 –51.5 1.5	49 43.3 –51.5 1.5	50 43.3 –51.5 1.6	51 43.3 –51.5 1.6	52 43.2 –51.4 1.7	53 43.2 –51.4 1.7	88
89	45 51.8 –51.8 0.7	46 51.8 –51.8 0.7	47 51.8 –51.8 0.7	48 51.8 –51.8 0.8	49 51.8 –51.8 0.8	50 51.8 –51.8 0.8	51 51.8 –51.8 0.8	52 51.8 –51.8 0.8	89
90	45 00.0 –52.1 0.0	46 00.0 –52.1 0.0	47 00.0 –52.1 0.0	48 00.0 –52.1 0.0	49 00.0 –52.1 0.0	50 00.0 –52.1 0.0	51 00.0 –52.1 0.0	52 00.0 –52.1 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

LATITUDE CONTRARY NAME TO DECLINATION　　L.H.A. 30°, 330°

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	37 45.7	−53.8	140.8	36 59.0	−54.1	141.2	36 12.1	−54.5	141.7	35 24.9	−54.8	142.2	34 37.3	−55.0	142.6	33 49.6	−55.4	143.0	33 01.5	−55.7	143.4	32 13.2	−55.9	143.8	0
1	36 51.9	−53.9	141.3	36 04.9	−54.2	141.8	35 17.6	−54.5	142.2	34 30.1	−54.9	142.7	33 42.3	−55.2	143.1	32 54.2	−55.5	143.5	32 05.8	−55.7	143.8	31 17.3	−56.0	144.2	1
2	35 58.0	−54.0	141.9	35 10.7	−54.4	142.3	34 23.1	−54.7	142.7	33 35.2	−55.0	143.1	32 47.1	−55.3	143.5	31 58.7	−55.6	143.9	31 10.1	−55.8	144.3	30 21.3	−56.1	144.6	2
3	35 04.0	−54.2	142.4	34 16.3	−54.5	142.8	33 28.4	−54.8	143.2	32 40.2	−55.1	143.6	31 51.8	−55.4	144.0	31 03.1	−55.6	144.3	30 14.3	−56.0	144.7	29 25.2	−56.2	145.0	3
4	34 09.8	−54.3	142.9	33 21.8	−54.6	143.3	32 33.6	−55.0	143.7	31 45.1	−55.2	144.1	30 56.4	−55.5	144.4	30 07.5	−55.8	144.8	29 18.3	−56.0	145.1	28 29.0	−56.2	145.4	4
5	33 15.5	−54.4	143.4	32 27.2	−54.8	143.8	31 38.6	−55.0	144.2	30 49.9	−55.3	144.5	30 00.9	−55.6	144.9	29 11.7	−55.8	145.2	28 22.3	−56.0	145.5	27 32.8	−56.3	145.8	5
6	32 21.1	−54.6	143.9	31 32.4	−54.8	144.3	30 43.6	−55.1	144.7	29 54.6	−55.4	145.0	29 05.3	−55.6	145.3	28 15.9	−55.9	145.6	27 26.3	−56.2	145.9	26 36.5	−56.4	146.2	6
7	31 26.5	−54.8	144.4	30 37.6	−54.9	144.8	29 48.5	−55.2	145.1	28 59.2	−55.5	145.4	28 09.7	−55.8	145.7	27 20.0	−56.0	146.0	26 30.1	−56.2	146.3	25 40.1	−56.4	146.6	7
8	30 31.9	−54.8	144.9	29 42.7	−55.1	145.2	28 53.3	−55.3	145.6	28 03.7	−55.6	145.9	27 13.9	−55.8	146.2	26 24.0	−56.0	146.4	25 33.9	−56.2	146.7	24 43.7	−56.5	147.0	8
9	29 37.1	−54.9	145.4	28 47.6	−55.1	145.7	27 58.0	−55.4	146.0	27 08.1	−55.6	146.3	26 18.1	−55.8	146.6	25 28.0	−56.1	146.8	24 37.7	−56.3	147.1	23 47.2	−56.5	147.3	9
10	28 42.2	−54.9	145.8	27 52.5	−55.2	146.1	27 02.6	−55.5	146.4	26 12.5	−55.7	146.7	25 22.3	−56.0	147.0	24 31.9	−56.2	147.2	23 41.4	−56.4	147.5	22 50.7	−56.6	147.7	10
11	27 47.3	−55.1	146.3	26 57.3	−55.3	146.6	26 07.1	−55.5	146.9	25 16.8	−55.8	147.1	24 26.3	−56.0	147.4	23 35.7	−56.2	147.6	22 45.0	−56.4	147.8	21 54.1	−56.6	148.1	11
12	26 52.2	−55.1	146.8	26 02.0	−55.4	147.0	25 11.6	−55.6	147.3	24 21.0	−55.8	147.5	23 30.3	−56.0	147.8	22 39.5	−56.3	148.0	21 48.6	−56.5	148.2	20 57.5	−56.7	148.4	12
13	25 57.1	−55.2	147.2	25 06.6	−55.4	147.5	24 16.0	−55.7	147.7	23 25.2	−55.9	147.9	22 34.3	−56.1	148.2	21 43.2	−56.3	148.4	20 52.1	−56.5	148.6	20 00.8	−56.7	148.8	13
14	25 01.9	−55.3	147.6	24 11.2	−55.6	147.9	23 20.3	−55.8	148.1	22 29.3	−56.0	148.3	21 38.2	−56.2	148.5	20 46.9	−56.4	148.7	19 55.6	−56.6	148.9	19 04.1	−56.7	149.1	14
15	24 06.6	−55.3	148.1	23 15.6	−55.5	148.3	22 24.5	−55.8	148.5	21 33.3	−56.0	148.7	20 42.0	−56.2	148.9	19 50.5	−56.4	149.1	18 59.0	−56.6	149.3	18 07.4	−56.8	149.5	15
16	23 11.3	−55.5	148.5	22 20.1	−55.7	148.7	21 28.7	−55.8	148.9	20 37.3	−56.1	149.1	19 45.8	−56.3	149.3	18 54.1	−56.4	149.5	18 02.4	−56.6	149.8	17 10.6	−56.8	149.8	16
17	22 15.8	−55.6	148.9	21 24.4	−55.7	149.1	20 32.9	−55.9	149.3	19 41.2	−56.1	149.5	18 49.5	−56.3	149.7	17 57.7	−56.5	149.8	17 05.8	−56.7	150.0	16 13.8	−56.9	150.1	17
18	21 20.4	−55.6	149.3	20 28.7	−55.7	149.5	19 37.0	−56.0	149.7	18 45.1	−56.1	149.9	17 53.2	−56.3	150.0	17 01.2	−56.5	150.2	16 09.1	−56.7	150.3	15 16.9	−56.8	150.5	18
19	20 24.8	−55.6	149.7	19 33.0	−55.8	149.9	18 41.0	−56.0	150.1	17 49.0	−56.2	150.2	16 56.9	−56.4	150.4	16 04.7	−56.6	150.5	15 12.4	−56.7	150.7	14 20.1	−56.9	150.8	19
20	19 29.2	−55.6	150.1	18 37.2	−55.9	150.3	17 45.0	−56.0	150.4	16 52.8	−56.3	150.6	16 00.5	−56.4	150.7	15 08.1	−56.6	150.9	14 15.7	−56.8	151.0	13 23.2	−57.0	151.1	20
21	18 33.6	−55.7	150.5	17 41.3	−55.9	150.7	16 49.0	−56.1	150.8	15 56.6	−56.3	151.0	15 04.1	−56.5	151.1	14 11.5	−56.6	151.2	13 18.9	−56.8	151.3	12 26.2	−56.9	151.4	21
22	17 37.9	−55.7	150.9	16 45.4	−55.9	151.0	15 52.9	−56.1	151.2	15 00.3	−56.3	151.3	14 07.6	−56.5	151.4	13 14.9	−56.7	151.6	12 22.1	−56.8	151.7	11 29.3	−57.0	151.8	22
23	16 42.2	−55.8	151.3	15 49.5	−56.0	151.4	14 56.8	−56.2	151.6	14 04.0	−56.3	151.7	13 11.1	−56.5	151.8	12 18.2	−56.7	151.9	11 25.3	−56.8	152.0	10 32.3	−57.0	152.1	23
24	15 46.4	−55.9	151.7	14 53.5	−56.0	151.8	14 00.6	−56.2	151.9	13 07.7	−56.4	152.0	12 14.6	−56.5	152.1	11 21.6	−56.7	152.2	10 28.5	−56.9	152.3	9 35.3	−57.0	152.4	24
25	14 50.5	−55.8	152.0	13 57.5	−56.0	152.2	13 04.4	−56.2	152.4	12 11.3	−56.4	152.4	11 18.1	−56.5	152.5	10 24.9	−56.7	152.6	9 31.6	−56.9	152.6	8 38.3	−57.0	152.7	25
26	13 54.7	−55.9	152.4	13 01.5	−56.1	152.5	12 08.2	−56.2	152.6	11 14.9	−56.4	152.7	10 21.6	−56.6	152.8	9 28.2	−56.8	152.9	8 34.7	−56.9	153.0	7 41.3	−57.1	153.0	26
27	12 58.8	−55.9	152.8	12 05.4	−56.1	152.9	11 12.0	−56.3	153.0	10 18.5	−56.4	153.1	9 25.0	−56.6	153.2	8 31.4	−56.7	153.2	7 37.8	−56.9	153.3	6 44.2	−57.0	153.3	27
28	12 02.9	−56.0	153.2	11 09.3	−56.1	153.3	10 15.7	−56.3	153.4	9 22.1	−56.5	153.4	8 28.4	−56.6	153.5	7 34.7	−56.8	153.6	6 40.9	−56.9	153.6	5 47.2	−57.1	153.7	28
29	11 06.9	−56.0	153.5	10 13.2	−56.2	153.6	9 19.4	−56.3	153.7	8 25.6	−56.5	153.8	7 31.8	−56.7	153.8	6 37.9	−56.8	153.9	5 44.0	−56.9	153.9	4 50.1	−57.0	154.0	29
30	10 10.9	−56.0	153.9	9 17.0	−56.1	154.0	8 23.1	−56.3	154.0	7 29.1	−56.5	154.1	6 35.1	−56.6	154.2	5 41.1	−56.8	154.2	4 47.1	−56.9	154.2	3 53.1	−57.1	154.3	30
31	9 14.9	−56.0	154.3	8 20.9	−56.2	154.3	7 26.8	−56.4	154.4	6 32.6	−56.5	154.4	5 38.5	−56.6	154.5	4 44.3	−56.8	154.5	3 50.2	−57.0	154.6	2 56.0	−57.1	154.6	31
32	8 18.9	−56.1	154.6	7 24.7	−56.2	154.7	6 30.4	−56.3	154.7	5 36.1	−56.5	154.8	4 41.9	−56.7	154.8	3 47.5	−56.8	154.9	2 53.2	−56.9	154.9	1 58.9	−57.1	154.9	32
33	7 22.8	−56.0	155.0	6 28.5	−56.3	155.0	5 34.1	−56.4	155.1	4 39.6	−56.5	155.1	3 45.2	−56.7	155.2	2 50.7	−56.8	155.2	1 56.3	−57.0	155.2	1 01.8	−57.1	155.2	33
34	6 26.8	−56.1	155.3	5 32.2	−56.2	155.4	4 37.7	−56.4	155.4	3 43.1	−56.5	155.5	2 48.5	−56.7	155.5	1 53.9	−56.8	155.5	0 59.3	−56.9	155.5	0 04.7	−57.1	155.5	34
35	5 30.7	−56.1	155.7	4 36.0	−56.2	155.7	3 41.3	−56.4	155.8	2 46.6	−56.6	155.8	1 51.8	−56.6	155.8	0 57.1	−56.8	155.8	0 02.4	−57.0	155.8	0 52.4	+57.0	24.2	35
36	4 34.6	−56.1	156.1	3 39.8	−56.3	156.1	2 44.9	−56.4	156.1	1 50.0	−56.5	156.1	0 55.2	−56.7	156.1	0 00.3	−56.8	156.1	0 54.6	+56.9	23.9	1 49.4	+57.1	23.9	36
37	3 38.5	−56.1	156.4	2 43.5	−56.3	156.4	1 48.5	−56.4	156.5	0 53.5	−56.5	156.5	0 01.5	+56.7	23.5	0 56.5	+56.8	23.5	1 51.5	+57.0	23.5	2 46.5	+57.1	23.6	37
38	2 42.4	−56.1	156.8	1 47.2	−56.2	156.8	0 52.1	−56.4	156.8	0 03.0	+56.4	23.2	0 58.2	+56.7	23.2	1 53.3	+56.8	23.2	2 48.5	+56.9	23.2	3 43.6	+57.1	23.3	38
39	1 46.3	−56.2	157.1	0 51.0	−56.3	157.1	0 04.3	+56.4	22.9	0 59.6	+56.5	22.9	1 54.9	+56.6	22.9	2 50.1	+56.9	22.9	3 45.4	+56.9	22.9	4 40.7	+57.0	22.9	39
40	0 50.1	−56.1	157.5	0 05.3	+56.2	22.5	1 00.7	+56.4	22.5	1 56.1	+56.6	22.5	2 51.5	+56.7	22.6	3 47.0	+56.8	22.6	4 42.3	+57.0	22.6	5 37.7	+57.1	22.6	40
41	0 06.0	+56.1	22.2	1 01.5	+56.3	22.2	1 57.1	+56.4	22.2	2 52.7	+56.5	22.2	3 48.2	+56.7	22.2	4 43.8	+56.7	22.2	5 39.3	+56.9	22.3	6 34.8	+57.0	22.3	41
42	1 02.1	+56.1	21.8	1 57.8	+56.3	21.8	2 53.5	+56.4	21.8	3 49.2	+56.5	21.9	4 44.9	+56.6	21.9	5 40.5	+56.7	21.9	6 36.2	+56.9	22.0	7 31.8	+57.0	22.0	42
43	1 58.2	+56.1	21.5	2 54.1	+56.2	21.5	3 49.9	+56.4	21.5	4 45.7	+56.5	21.5	5 41.5	+56.7	21.6	6 37.3	+56.8	21.6	7 33.1	+56.9	21.6	8 28.9	+57.0	21.7	43
44	2 54.3	+56.2	21.1	3 50.3	+56.3	21.1	4 46.3	+56.4	21.2	5 42.2	+56.5	21.2	6 38.2	+56.6	21.2	7 34.1	+56.7	21.3	8 30.0	+56.9	21.3	9 25.9	+57.0	21.4	44
45	3 50.5	+56.1	20.8	4 46.6	+56.2	20.8	5 42.7	+56.3	20.8	6 38.7	+56.5	20.9	7 34.8	+56.6	20.9	8 30.8	+56.6	20.9	9 26.9	+56.8	21.0	10 22.9	+56.9	21.1	45
46	4 46.6	+56.1	20.4	5 42.8	+56.2	20.5	6 39.0	+56.4	20.5	7 35.2	+56.5	20.5	8 31.4	+56.6	20.6	9 27.6	+56.7	20.6	10 23.7	+56.9	20.7	11 19.8	+57.0	20.7	46
47	5 42.7	+56.0	20.0	6 39.0	+56.2	20.1	7 35.4	+56.3	20.1	8 31.7	+56.4	20.2	9 28.1	+56.5	20.2	10 24.3	+56.7	20.3	11 20.6	+56.8	20.3	12 16.8	+56.9	20.4	47
48	6 38.7	+56.1	19.7	7 35.2	+56.2	19.7	8 31.7	+56.3	19.8	9 28.1	+56.5	19.8	10 24.6	+56.5	19.9	11 21.0	+56.6	20.0	12 17.4	+56.8	20.0	13 13.7	+56.9	20.1	48
49	7 34.8	+56.0	19.3	8 31.4	+56.2	19.4	9 28.0	+56.3	19.4	10 24.6	+56.4	19.5	11 21.1	+56.6	19.5	12 17.7	+56.6	19.6	13 14.2	+56.7	19.7	14 10.6	+56.9	19.8	49
50	8 30.8	+56.1	19.0	9 27.6	+56.1	19.0	10 24.3	+56.3	19.1	11 21.0	+56.4	19.1	12 17.7	+56.5	19.2	13 14.3	+56.6	19.3	14 10.9	+56.8	19.4	15 07.5	+56.9	19.4	50
51	9 26.9	+56.0	18.6	10 23.7	+56.1	18.7	11 20.6	+56.2	18.7	12 17.4	+56.3	18.8	13 14.2	+56.4	18.9	14 10.9	+56.6	18.9	15 07.7	+56.7	19.0	16 04.4	+56.8	19.1	51
52	10 22.9	+55.9	18.2	11 19.8	+56.1	18.3	12 16.8	+56.2	18.4	13 13.7	+56.4	18.4	14 10.6	+56.5	18.5	15 07.5	+56.6	18.6	16 04.4	+56.6	18.7	17 01.2	+56.8	18.8	52
53	11 18.8	+56.0	17.9	12 15.9	+56.1	17.9	13 13.0	+56.2	18.1	14 10.1	+56.3	18.1	15 07.1	+56.4	18.2	16 04.1	+56.5	18.2	17 01.0	+56.7	18.3	17 58.0	+56.7	18.4	53
54	12 14.8	+55.9	17.5	13 12.0	+56.1	17.6	14 09.2	+56.1	17.6	15 06.4	+56.2	17.7	16 03.5	+56.4	17.8	17 00.6	+56.5	17.9	17 57.7	+56.6	18.0	18 54.7	+56.8	18.1	54
55	13 10.7	+55.9	17.1	14 08.0	+56.0	17.2	15 05.3	+56.2	17.3	16 02.6	+56.2	17.4	16 59.9	+56.3	17.5	17 57.1	+56.4	17.5	18 54.3	+56.6	17.6	19 51.5	+56.6	17.8	55
56	14 06.6	+55.8	16.8	15 04.0	+56.0	16.9	16 01.5	+56.0	16.9	16 58.8	+56.2	17.0	17 56.2	+56.3	17.1	18 53.5	+56.5	17.2	19 50.9	+56.5	17.3	20 48.1	+56.7	17.4	56
57	15 02.5	+55.8	16.4	16 00.0	+55.9	16.5	16 57.5	+56.1	16.5	17 55.0	+56.2	16.6	18 52.5	+56.3	16.7	19 50.0	+56.3	16.8	20 47.4	+56.5	16.9	21 44.8	+56.5	17.0	57
58	15 58.3	+55.7	16.0	16 55.9	+55.9	16.1	17 53.6	+56.0	16.2	18 51.2	+56.1	16.3	19 48.8	+56.2	16.4	20 46.3	+56.3	16.5	21 43.9	+56.4	16.6	22 41.3	+56.6	16.7	58
59	16 54.0	+55.8	15.6	17 51.8	+55.9	15.8	18 49.6	+55.9	15.8	19 47.3	+56.0	15.9	20 45.0	+56.2	16.0	21 42.6	+56.3	16.1	22 40.3	+56.4	16.3	23 37.9	+56.5	16.3	59
60	17 49.8	+55.7	15.2	18 47.7	+55.7	15.3	19 45.5	+55.9	15.4	20 43.3	+56.0	15.5	21 41.1	+56.2	15.6	22 38.9	+56.2	15.7	23 36.7	+56.3	15.8	24 34.4	+56.4	16.0	60
61	18 45.5	+55.6	14.8	19 43.4	+55.8	14.9	20 41.4	+55.9	15.0	21 39.3	+56.0	15.1	22 37.3	+56.0	15.2	23 35.1	+56.2	15.3	24 33.0	+56.2	15.5	25 30.8	+56.4	15.6	61
62	19 41.1	+55.6	14.4	20 39.2	+55.7	14.5	21 37.3	+55.7	14.6	22 35.3	+55.9	14.7	23 33.3	+56.0	14.8	24 31.3	+56.1	15.0	25 29.2	+56.3	15.1	26 27.2	+56.3	15.2	62
63	20 36.7	+55.5	14.0	21 34.9	+55.6	14.1	22 33.0	+55.8	14.3	23 31.2	+55.8	14.3	24 29.3	+55.9	14.4	25 27.4	+56.0	14.6	26 25.5	+56.1	14.7	27 23.5	+56.2	14.8	63
64	21 32.2	+55.5	13.6	22 30.5	+55.6	13.7	23 28.8	+55.6	13.8	24 27.0	+55.8	13.9	25 25.2	+55.9	14.0	26 23.4	+56.0	14.2	27 21.6	+56.1	14.3	28 19.7	+56.2	14.4	64
65	22 27.7	+55.4	13.2	23 26.1	+55.5	13.3	24 24.4	+55.6	13.4	25 22.8	+55.7	13.5	26 21.1	+55.8	13.6	27 19.4	+55.9	13.8	28 17.7	+56.0	13.9	29 15.9	+56.1	14.0	65
66	23 23.1	+55.3	12.8	24 21.6	+55.4	12.9	25 20.0	+55.6	13.1	26 18.5	+55.6	13.1	27 16.9	+55.7	13.2	28 15.3	+55.8	13.3	29 13.7	+55.9	13.5	30 12.0	+56.0	13.6	66
67	24 18.4	+55.3	12.4	25 17.0	+55.4	12.5	26 15.6	+55.4	12.6	27 14.1	+55.6	12.7	28 12.6	+55.7	12.8	29 11.1	+55.8	12.9	30 09.6	+55.8	13.1	31 08.0	+56.0	13.2	67
68	25 13.7	+55.2	11.9	26 12.4	+55.2	12.1	27 11.0	+55.4	12.2	28 09.7	+55.4	12.3	29 08.3	+55.6	12.4	30 06.9	+55.6	12.5	31 05.4	+55.8	12.8	32 04.0	+55.8	12.8	68
69	26 08.9	+55.1	11.5	27 07.6	+55.2	11.6	28 06.4	+55.3	11.7	29 05.1	+55.4	11.8	30 03.9	+55.4	11.9	31 02.5	+55.6	12.1	32 01.2	+55.7	12.2	32 59.8	+55.8	12.3	69
70	27 04.0	+55.0	11.1	28 02.8	+55.2	11.2	29 01.7	+55.2	11.3	30 00.5	+55.3	11.4	30 59.3	+55.4	11.5	31 58.1	+55.5	11.6	32 56.9	+55.5	11.8	33 55.6	+55.7	11.9	70
71	27 59.0	+54.9	10.6	28 58.0	+55.0	10.7	29 56.9	+55.1	10.8	30 55.8	+55.2	10.9	31 54.7	+55.3	11.1	32 53.6	+55.4	11.2	33 52.4	+55.5	11.3	34 51.3	+55.5	11.4	71
72	28 53.9	+54.9	10.2	29 53.0	+54.9	10.3	30 52.0	+55.0	10.4	31 51.0	+55.1	10.5	32 50.0	+55.2	10.6	33 49.0	+55.2	10.7	34 47.9	+55.4	10.8	35 46.8	+55.5	11.0	72
73	29 48.8	+54.7	9.7	30 47.9	+54.8	9.8	31 47.0	+54.9	9.9	32 46.1	+55.0	10.0	33 45.2	+55.1	10.1	34 44.2	+55.2	10.2	35 43.3	+55.2	10.4	36 42.3	+55.3	10.5	73
74	30 43.5	+54.7	9.2	31 42.7	+54.7	9.3	32 41.9	+54.8	9.4	33 41.1	+54.9	9.5	34 40.3	+54.9	9.6	35 39.4	+55.1	9.8	36 38.5	+55.2	9.9	37 37.6	+55.2	10.0	74
75	31 38.2	+54.5	8.7	32 37.4	+54.6	8.8	33 36.7	+54.7	8.9	34 36.0	+54.7	9.0	35 35.2	+54.9	9.2	36 34.5	+54.9	9.3	37 33.7	+55.0	9.4	38 32.8	+55.1	9.5	75
76	32 32.7	+54.4	8.3	33 32.0	+54.5	8.3	34 31.4	+54.6	8.4	35 30.7	+54.7	8.5	36 30.1	+54.7	8.7	37 29.4	+54.9	8.8	38 28.7	+54.9	8.9	39 27.9	+55.0	9.0	76
77	33 27.1	+54.3	7.7	34 26.5	+54.4	7.8	35 26.0	+54.4	7.9	36 25.4	+54.5	8.0	37 24.8	+54.6	8.1	38 24.2	+54.6	8.3	39 23.5	+54.8	8.4	40 22.9	+54.8	8.5	77
78	34 21.4	+54.1	7.2	35 20.9	+54.2	7.3	36 20.4	+54.3	7.4	37 19.9	+54.3	7.5	38 19.4	+54.4	7.6	39 18.8	+54.5	7.7	40 18.3	+54.5	7.8	41 17.7	+54.7	8.0	78
79	35 15.5	+54.0	6.7	36 15.1	+54.1	6.8	37 14.7	+54.1	6.9	38 14.2	+54.2	7.0	39 13.8	+54.3	7.1	40 13.3	+54.4	7.2	41 12.8	+54.5	7.3	42 12.4	+54.4	7.4	79
80	36 09.5	+53.9	6.2	37 09.2	+53.9	6.3	38 08.8	+54.0	6.3	39 08.4	+54.1	6.4	40 08.1	+54.1	6.5	41 07.7	+54.2	6.6	42 07.3	+54.2	6.7	43 06.8	+54.4	6.8	80
81	37 03.4	+53.7	5.6	38 03.1	+53.8	5.7	39 02.8	+53.8	5.8	40 02.5	+53.9	5.9	41 02.2	+53.9	6.0	42 01.9	+54.0	6.0	43 01.5	+54.1	6.1	44 01.2	+54.1	6.2	81
82	37 57.1	+53.6	5.1	38 56.9	+53.6	5.1	39 56.6	+53.7	5.2	40 56.4	+53.7	5.3	41 56.1	+53.8	5.4	42 55.9	+53.8	5.5	43 55.6	+53.9	5.5	44 55.3	+53.9	5.6	82
83	38 50.7	+53.3	4.5	39 50.5	+53.4	4.6	40 50.3	+53.4	4.6	41 50.1	+53.5	4.7	42 49.9	+53.5	4.8	43 49.7	+53.6	4.8	44 49.5	+53.6	4.9	45 49.2	+53.7	5.0	83
84	39 44.0	+53.2	3.9	40 43.9	+53.2	4.0	41 43.7	+53.3	4.0	42 43.6	+53.3	4.1	43 43.4	+53.4	4.1	44 43.3	+53.4	4.2	45 43.1	+53.5	4.3	46 42.9	+53.5	4.4	84
85	40 37.2	+53.0	3.3	41 37.1	+53.1	3.3	42 37.0	+53.1	3.4	43 36.9	+53.1	3.5	44 36.8	+53.1	3.5	45 36.7	+53.2	3.6	46 36.6	+53.3	3.6	47 36.4	+53.3	3.7	85
86	41 30.2	+52.8	2.7	42 30.2	+52.8	2.7	43 30.1	+52.8	2.8	44 30.0	+52.9	2.8	45 29.9	+52.9	2.9	46 29.9	+52.9	2.9	47 29.8	+53.0	3.0	48 29.7	+53.0	3.0	86
87	42 23.0	+52.6	2.0	43 23.0	+52.6	2.1	44 22.9	+52.6	2.1	45 22.9	+52.6	2.1	46 22.8	+52.7	2.2	47 22.8	+52.7	2.2	48 22.8	+52.7	2.3	49 22.7	+52.7	2.3	87
88	43 15.6	+52.3	1.4	44 15.6	+52.3	1.4	45 15.5	+52.4	1.4	46 15.5	+52.4	1.4	47 15.5	+52.4	1.5	48 15.5	+52.4	1.5	49 15.5	+52.4	1.5	50 15.4	+52.5	1.6	88
89	44 07.9	+52.1	0.7	45 07.9	+52.1	0.7	46 07.9	+52.1	0.7	47 07.9	+52.1	0.7	48 07.9	+52.1	0.7	49 07.9	+52.1	0.8	50 07.9	+52.1	0.8	51 07.9	+52.1	0.8	89
90	45 00.0	+51.8	0.0	46 00.0	+51.8	0.0	47 00.0	+51.8	0.0	48 00.0	+51.8	0.0	49 00.0	+51.8	0.0	50 00.0	+51.8	0.0	51 00.0	+51.8	0.0	52 00.0	+51.8	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION　　L.H.A. 150°, 210°

31°, 329° L.H.A.　　LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	37 18.5	+53.3	139.6	36 32.6	+53.7	140.1	35 46.4	+54.0	140.6	34 59.9	+54.4	141.0	34 13.1	+54.7	141.5	33 26.0	+55.1	141.9	32 38.7	+55.3	142.3	31 51.1	+55.6	142.7	0
1	38 11.8	+53.1	139.1	37 26.3	+53.5	139.6	36 40.4	+53.9	140.1	35 54.3	+54.2	140.5	35 07.8	+54.6	141.0	34 21.1	+54.9	141.4	33 34.0	+55.2	141.8	32 46.7	+55.5	142.2	1
2	39 04.9	+52.8	138.5	38 19.8	+53.3	139.0	37 34.3	+53.7	139.5	36 48.5	+54.1	140.0	36 02.4	+54.4	140.5	35 16.0	+54.8	140.9	34 29.2	+55.2	141.4	33 42.2	+55.5	141.8	2
3	39 57.7	+52.7	137.9	39 13.1	+53.1	138.4	38 28.0	+53.5	138.9	37 42.6	+53.9	139.4	36 56.8	+54.3	139.9	36 10.8	+54.6	140.4	35 24.4	+55.0	140.9	34 37.7	+55.3	141.3	3
4	40 50.4	+52.5	137.2	40 06.2	+52.9	137.8	39 21.5	+53.4	138.4	38 36.5	+53.8	138.9	37 51.1	+54.2	139.4	37 05.4	+54.5	139.9	36 19.4	+54.8	140.4	35 33.0	+55.2	140.8	4
5	41 42.9	+52.3	136.6	40 59.1	+52.8	137.2	40 14.9	+53.2	137.8	39 30.3	+53.6	138.3	38 45.3	+54.0	138.9	37 59.9	+54.4	139.4	37 14.2	+54.8	139.9	36 28.2	+55.1	140.4	5
6	42 35.2	+52.0	135.9	41 51.9	+52.5	136.5	41 08.1	+53.0	137.1	40 23.9	+53.4	137.7	39 39.3	+53.8	138.3	38 54.3	+54.2	138.8	38 09.0	+54.5	139.4	37 23.3	+54.9	139.9	6
7	43 27.2	+51.8	135.2	42 44.4	+52.2	135.8	42 01.1	+52.7	136.5	41 17.3	+53.2	137.1	40 33.1	+53.7	137.7	39 48.5	+54.1	138.3	39 03.5	+54.5	138.8	38 18.2	+54.8	139.4	7
8	44 19.0	+51.5	134.5	43 36.6	+52.1	135.2	42 53.8	+52.6	135.9	42 10.5	+53.0	136.5	41 26.8	+53.4	137.1	40 42.6	+53.9	137.7	39 58.0	+54.3	138.3	39 13.0	+54.7	138.8	8
9	45 10.5	+51.2	133.8	44 28.7	+51.8	134.5	43 46.4	+52.3	135.2	43 03.5	+52.8	135.9	42 20.2	+53.3	136.5	41 36.5	+53.7	137.1	40 52.3	+54.1	137.7	40 07.7	+54.5	138.3	9
10	46 01.7	+51.0	133.0	45 20.5	+51.5	133.8	44 38.7	+52.0	134.5	43 56.3	+52.6	135.2	43 13.5	+53.0	135.9	42 30.2	+53.5	136.5	41 46.4	+54.0	137.1	41 02.2	+54.4	137.7	10
11	46 52.7	+50.6	132.3	46 12.0	+51.2	133.1	45 30.7	+51.8	133.8	44 48.9	+52.3	134.5	44 06.5	+52.9	135.2	43 23.7	+53.3	135.9	42 40.4	+53.7	136.6	41 56.6	+54.2	137.2	11
12	47 43.3	+50.2	131.5	47 03.2	+50.9	132.3	46 22.5	+51.5	133.1	45 41.2	+52.1	133.9	44 59.4	+52.6	134.6	44 17.0	+53.1	135.3	43 34.1	+53.6	135.9	42 50.8	+54.0	136.6	12
13	48 33.5	+50.0	130.7	47 54.1	+50.6	131.5	47 14.0	+51.2	132.3	46 33.3	+51.7	133.1	45 52.0	+52.3	133.9	45 10.1	+52.8	134.6	44 27.7	+53.3	135.3	43 44.8	+53.6	136.0	13
14	49 23.5	+49.5	129.8	48 44.7	+50.2	130.7	48 05.2	+50.9	131.6	47 25.0	+51.5	132.4	46 44.3	+52.0	133.2	46 02.9	+52.6	133.9	45 21.0	+53.1	134.7	44 38.6	+53.6	135.4	14
15	50 13.0	+49.1	129.0	49 34.9	+49.8	129.9	48 56.1	+50.5	130.8	48 16.5	+51.2	131.6	47 36.3	+51.8	132.5	46 55.5	+52.4	133.2	46 14.1	+52.9	134.0	45 32.2	+53.4	134.7	15
16	51 02.1	+48.7	128.1	50 24.7	+49.5	129.0	49 46.6	+50.1	129.9	49 07.7	+50.8	130.8	48 28.1	+51.5	131.7	47 47.9	+52.1	132.5	47 07.0	+52.7	133.3	46 25.6	+53.1	134.1	16
17	51 50.8	+48.2	127.1	51 14.2	+49.0	128.1	50 36.7	+49.8	129.1	49 58.5	+50.5	130.0	49 19.6	+51.1	130.9	48 40.0	+51.7	131.8	47 59.7	+52.3	132.6	47 18.7	+52.9	133.4	17
18	52 39.0	+47.8	126.2	52 03.2	+48.6	127.2	51 26.5	+49.4	128.2	50 49.0	+50.1	129.2	50 10.7	+50.8	130.1	49 31.7	+51.5	131.0	48 52.0	+52.1	131.9	48 11.6	+52.7	132.7	18
19	53 26.8	+47.2	125.1	52 51.8	+48.0	126.2	52 15.9	+48.9	127.3	51 39.1	+49.7	128.3	51 01.5	+50.4	129.3	50 23.2	+51.1	130.2	49 44.1	+51.7	131.1	49 04.3	+52.3	132.0	19
20	54 14.0	+46.6	124.1	53 39.8	+47.6	125.2	53 04.8	+48.4	126.3	52 28.8	+49.2	127.4	51 51.9	+50.0	128.4	51 14.3	+50.7	129.4	50 35.8	+51.4	130.3	49 56.6	+52.1	131.2	20
21	55 00.6	+46.1	123.0	54 27.4	+47.0	124.2	53 53.2	+47.9	125.3	53 18.0	+48.8	126.4	52 41.9	+49.5	127.5	52 05.0	+50.4	128.5	51 27.2	+51.1	129.5	50 48.7	+51.7	130.5	21
22	55 46.7	+45.3	121.9	55 14.4	+46.4	123.1	54 41.1	+47.4	124.3	54 06.8	+48.3	125.4	53 31.5	+49.2	126.6	52 55.4	+49.9	127.6	52 18.3	+50.7	128.5	51 40.4	+51.4	129.6	22
23	56 32.0	+44.7	120.7	56 00.8	+45.8	122.0	55 28.5	+46.8	123.2	54 55.1	+47.7	124.4	54 20.7	+48.6	125.6	53 45.3	+49.5	126.7	53 09.0	+50.3	127.8	52 31.8	+51.0	128.8	23
24	57 16.7	+44.0	119.5	56 46.6	+45.1	120.8	56 15.3	+46.1	122.1	55 42.8	+47.2	123.4	55 09.3	+48.1	124.6	54 34.8	+49.0	125.7	53 59.3	+49.8	126.8	53 22.8	+50.6	127.9	24
25	58 00.7	+43.2	118.2	57 31.7	+44.4	119.6	57 01.4	+45.5	121.0	56 30.0	+46.5	122.3	55 57.4	+47.6	123.5	55 23.8	+48.5	124.7	54 49.1	+49.4	125.9	54 13.4	+50.2	127.0	25
26	58 43.9	+42.3	116.9	58 16.1	+43.5	118.3	57 46.9	+44.8	119.7	57 16.5	+45.9	121.1	56 45.0	+46.9	122.4	56 12.3	+47.9	123.7	55 38.5	+48.8	124.9	55 03.6	+49.8	126.1	26
27	59 26.2	+41.4	115.5	58 59.6	+42.8	117.0	58 31.7	+44.0	118.5	58 02.4	+45.2	119.9	57 31.9	+46.3	121.3	57 00.2	+47.3	122.6	56 27.3	+48.3	123.9	55 53.4	+49.2	125.1	27
28	60 07.6	+40.4	114.1	59 42.4	+41.8	115.6	59 15.7	+43.2	117.2	58 47.6	+44.4	118.6	58 18.2	+45.6	120.1	57 47.5	+46.7	121.4	57 15.6	+47.8	122.8	56 42.6	+48.7	124.1	28
29	60 48.0	+39.4	112.6	60 24.2	+40.9	114.2	59 58.9	+42.2	115.8	59 32.0	+43.6	117.3	59 03.8	+44.8	118.8	58 34.2	+46.0	120.2	58 03.4	+47.1	121.6	57 31.3	+48.1	123.0	29
30	61 27.4	+38.3	111.0	61 05.1	+39.8	112.7	60 41.1	+41.3	114.4	60 15.6	+42.7	116.0	59 48.6	+44.0	117.5	59 20.2	+45.3	119.0	58 50.5	+46.4	120.5	58 19.4	+47.5	121.9	30
31	62 05.7	+37.1	109.4	61 44.9	+38.7	111.1	61 22.4	+40.3	112.9	60 58.3	+41.8	114.5	60 32.6	+43.2	116.1	60 05.5	+44.4	117.7	59 36.9	+45.7	119.2	59 06.9	+46.9	120.7	31
32	62 42.8	+35.8	107.7	62 23.6	+37.5	109.5	62 02.7	+39.2	111.3	61 40.1	+40.7	113.0	61 15.8	+42.2	114.7	60 49.9	+43.6	116.3	60 22.6	+44.9	117.9	59 53.8	+46.1	119.4	32
33	63 18.6	+34.4	105.9	63 01.1	+36.3	107.8	62 41.9	+37.9	109.7	62 20.8	+39.6	111.5	61 58.0	+41.2	113.2	61 33.5	+42.7	114.9	61 07.5	+44.0	116.6	60 39.9	+45.3	118.2	33
34	63 53.0	+32.9	104.1	63 37.4	+34.9	106.0	63 19.8	+36.7	108.0	63 00.4	+38.5	109.8	62 39.2	+40.1	111.6	62 16.2	+41.6	113.4	61 51.5	+43.1	115.1	61 25.2	+44.5	116.8	34
35	64 25.9	+31.4	102.2	64 12.3	+33.4	104.2	63 56.5	+35.4	106.2	63 38.9	+37.1	108.1	63 19.3	+38.9	110.0	62 57.8	+40.6	111.9	62 34.6	+42.1	113.6	62 09.7	+43.6	115.4	35
36	64 57.3	+29.8	100.2	64 45.7	+31.8	102.3	64 31.9	+33.8	104.3	64 16.0	+35.8	106.3	63 58.2	+37.6	108.3	63 38.4	+39.4	110.2	63 16.7	+41.1	112.1	62 53.3	+42.6	113.9	36
37	65 27.1	+27.9	98.1	65 17.5	+30.2	100.2	65 05.7	+32.3	102.4	64 51.8	+34.3	104.5	64 35.8	+36.3	106.5	64 17.8	+38.1	108.5	63 57.8	+39.8	110.4	63 35.9	+41.5	112.3	37
38	65 55.0	+26.2	95.9	65 47.7	+28.4	98.2	65 38.0	+30.6	100.3	65 26.1	+32.8	102.5	65 12.1	+34.8	104.6	64 55.9	+36.7	106.7	64 37.6	+38.6	108.7	64 17.4	+40.3	110.7	38
39	66 21.2	+24.1•	93.7	66 16.1	+26.5	96.0	66 08.6	+28.9	98.2	65 58.9	+31.1	100.5	65 46.9	+33.2	102.7	65 32.6	+35.3	104.8	65 16.2	+37.3	106.9	64 57.7	+39.1	109.0	39
40	66 45.3	+22.1•	91.4	66 42.6	+24.5•	93.7	66 37.5	+26.9•	96.1	66 30.0	+29.2	98.3	66 20.1	+31.5	100.6	66 07.9	+33.7	102.8	65 53.5	+35.7	105.0	65 36.8	+37.8	107.1	40
41	67 07.4	+19.9•	89.0	67 07.1	+22.4•	91.4	67 04.4	+24.9•	93.8	66 59.2	+27.4	96.2	66 51.6	+29.7	98.5	66 41.6	+32.0	100.8	66 29.2	+34.2	103.0	66 14.6	+36.2	105.2	41
42	67 27.3	+17.6•	86.6	67 29.5	+20.3•	89.0	67 29.3	+22.8•	91.4	67 26.6	+25.3•	93.8	67 21.3	+27.8•	96.2	67 13.6	+30.1	98.6	67 03.4	+32.4	100.9	66 50.8	+34.7	103.2	42
43	67 44.9	+15.2•	84.1	67 49.8	+17.9•	86.5	67 52.1	+20.6•	89.0	67 51.9	+23.1•	91.4	67 49.1	+25.7•	93.9	67 43.7	+28.2	96.3	67 35.8	+30.7	98.8	67 25.5	+32.9	101.1	43
44	68 00.1	+12.8•	81.5	68 07.7	+15.5•	84.0	68 12.7	+18.2•	86.5	68 15.0	+20.9•	89.0	68 14.8	+23.5•	91.5	68 11.9	+26.2•	93.9	68 06.5	+28.6•	96.5	67 58.4	+31.1	98.9	44
45	68 12.9	+10.3•	78.9	68 23.2	+13.0•	81.4	68 30.9	+15.7•	83.9	68 35.9	+18.5•	86.4	68 38.3	+21.3•	89.0	68 38.1	+23.9•	91.5	68 35.1	+26.6•	94.1	68 29.5	+29.1•	96.6	45
46	68 23.2	+7.7•	76.2	68 36.2	+10.4•	78.7	68 46.6	+13.3•	81.2	68 54.4	+16.1•	83.8	68 59.6	+18.8•	86.4	69 02.0	+21.6•	89.0	69 01.7	+24.3•	91.6	68 58.6	+27.0•	94.2	46
47	68 30.9	+5.0•	73.5	68 46.6	+7.8•	76.0	68 59.9	+10.6•	78.5	69 10.5	+13.4•	81.1	69 18.4	+16.3•	83.7	69 23.6	+19.1•	86.4	69 26.0	+21.9•	89.0	69 25.6	+24.7•	91.7	47
48	68 35.9	+2.4•	70.8	68 54.4	+5.2•	73.3	69 10.5	+7.9•	75.8	69 23.9	+10.8•	78.4	69 34.7	+13.6•	81.0	69 42.7	+16.5•	83.7	69 47.9	+19.4•	86.4	69 50.3	+22.3•	89.1	48
49	68 38.3	-0.2•	68.1	68 59.6	+2.4•	70.5	69 18.4	+5.2•	73.0	69 34.7	+8.0•	75.5	69 48.3	+10.9•	78.2	69 59.2	+13.9•	80.9	70 07.3	+16.8•	83.6	70 12.6	+19.7•	86.4	49
50	68 38.1	-3.0•	65.3	69 02.0	-0.3•	67.7	69 23.6	+2.4•	70.2	69 42.7	+5.2•	72.7	69 59.2	+8.1•	75.3	70 13.1	+11.0•	78.0	70 24.1	+14.1•	80.8	70 32.3	+17.1•	83.5	50
51	68 35.1	-5.6•	62.6	69 01.7	-3.1•	64.9	69 26.0	-0.4•	67.3	69 47.9	+2.4•	69.8	70 07.3	+5.3•	72.4	70 24.1	+8.2•	75.1	70 38.2	+11.2•	77.8	70 49.4	+14.2•	80.6	51
52	68 29.5	-8.2•	59.9	68 58.6	-5.7•	62.1	69 25.6	-3.2•	64.5	69 50.3	-0.5•	66.9	70 12.6	+2.3•	69.5	70 32.3	+5.3•	72.1	70 49.4	+8.2•	74.9	71 03.6	+11.4•	77.7	52
53	68 21.3	-10.8•	57.2	68 52.9	-8.5•	59.3	69 22.4	-6.1•	61.6	69 49.8	-3.3•	64.0	70 14.9	-0.5•	66.5	70 37.6	+2.3•	69.1	70 57.6	+5.3•	71.8	71 15.0	+8.3•	74.6	53
54	68 10.5	-13.3•	54.5	68 44.4	-11.0•	56.6	69 16.5	-8.7•	58.8	69 46.5	-6.1•	61.1	70 14.4	-3.5•	63.6	70 39.9	-0.7•	66.1	71 02.9	+2.3•	68.8	71 23.3	+5.3•	71.5	54
55	67 57.2	-15.7•	51.9	68 33.4	-13.6•	53.9	69 07.8	-11.3•	56.0	69 40.4	-8.9•	58.3	70 10.9	-6.3•	60.6	70 39.2	-3.6•	63.1	71 05.2	-0.8•	65.7	71 28.6	+2.1•	68.4	55
56	67 41.5	-18.1•	49.4	68 19.8	-16.1•	51.3	68 56.5	-13.9•	53.3	69 31.5	-11.6•	55.4	70 04.6	-9.2•	57.7	70 35.6	-6.6•	60.1	71 04.4	-3.9•	62.6	71 30.7	-0.9•	65.3	56
57	67 23.4	-20.4•	46.9	68 03.7	-18.4•	48.7	68 42.6	-16.4•	50.6	69 19.9	-14.3•	52.6	69 55.4	-12.0•	54.8	70 29.0	-9.5•	57.1	71 00.5	-6.9•	59.5	71 29.8	-4.1•	62.1	57
58	67 03.0	-22.5•	44.4	67 45.3	-20.8•	46.1	68 26.2	-18.9•	48.0	69 05.6	-16.8•	49.9	69 43.4	-14.6•	52.0	70 19.5	-12.3•	54.2	70 53.6	-9.8•	56.5	71 25.7	-7.2•	59.0	58
59	66 40.5	-24.5•	42.1	67 24.5	-22.9•	43.7	68 07.3	-21.2•	45.4	68 48.8	-19.3•	47.2	69 28.8	-17.3•	49.2	70 07.2	-15.1•	51.3	70 43.8	-12.7•	53.5	71 18.5	-10.2•	55.9	59
60	66 16.0	-26.5	39.8	67 01.6	-25.0•	41.3	67 46.1	-23.4•	42.9	68 29.5	-21.7•	44.6	69 11.5	-19.8•	46.5	69 52.1	-17.7•	48.4	70 31.1	-15.6•	50.5	71 08.3	-13.2•	52.8	60
61	65 49.5	-28.4	37.6	66 36.6	-27.0	39.0	67 22.7	-25.4•	40.5	68 07.8	-23.8•	42.1	68 51.7	-22.1•	43.8	69 34.4	-20.3•	45.7	70 15.5	-18.2•	47.7	70 55.1	-16.0•	49.8	61
62	65 21.1	-30.1	35.4	66 09.6	-28.8	36.7	66 57.3	-27.5	38.1	67 44.0	-26.0	39.7	68 29.6	-24.4•	41.3	69 14.1	-22.6•	43.0	69 57.3	-20.7•	44.9	70 39.1	-18.7•	46.9	62
63	64 51.0	-31.7	33.4	65 40.8	-30.6	34.6	66 29.8	-29.3	35.9	67 18.0	-28.0	37.3	68 05.2	-26.5•	38.8	68 51.5	-25.0•	40.4	69 36.6	-23.2•	42.2	70 20.4	-21.3•	44.0	63
64	64 19.3	-33.2	31.4	65 10.2	-32.2	32.5	66 00.5	-31.1	33.7	66 50.0	-29.9	35.0	67 38.7	-28.5	36.4	68 26.5	-27.0•	37.9	69 13.4	-25.6•	39.5	69 59.1	-23.8•	41.3	64
65	63 46.1	-34.7	29.5	64 38.0	-33.7	30.5	65 29.4	-32.7	31.6	66 20.1	-31.6	32.8	67 10.2	-30.4	34.1	67 59.5	-29.1•	35.5	68 47.8	-27.6•	37.0	69 35.3	-26.2•	38.6	65
66	63 11.4	-36.1	27.7	64 04.3	-35.2	28.6	64 56.7	-34.3	29.6	65 48.5	-33.2	30.7	66 39.8	-32.2	31.9	67 30.4	-31.0	33.2	68 20.2	-29.7•	34.6	69 09.1	-28.3•	36.1	66
67	62 35.3	-37.3	25.9	63 29.1	-36.6	26.8	64 22.4	-35.7	27.7	65 15.3	-34.8	28.7	66 07.6	-33.8	29.8	66 59.4	-32.8	31.0	67 50.5	-31.7	32.2	68 40.8	-30.3•	33.6	67
68	61 58.0	-38.5	24.2	62 52.5	-37.8	25.0	63 46.7	-37.0	25.9	64 40.5	-36.3	26.8	65 33.8	-35.4	27.8	66 26.6	-34.4	28.9	67 18.8	-33.3	30.0	68 10.5	-32.3	31.3	68
69	61 19.5	-39.6	22.6	62 14.7	-39.0	23.3	63 09.6	-38.3	24.1	64 04.2	-37.6	25.0	64 58.4	-36.8	25.9	65 52.2	-36.0	26.8	66 45.5	-35.1	27.9	67 38.2	-34.0	29.0	69
70	60 39.9	-40.7	21.1	61 35.7	-40.1	21.7	62 31.3	-39.5	22.4	63 26.6	-38.8	23.2	64 21.6	-38.1	24.0	65 16.2	-37.4	24.9	66 10.4	-36.5	25.9	67 04.2	-35.7	26.9	70
71	59 59.2	-41.6	19.6	60 55.6	-41.1	20.2	61 51.8	-40.5	20.8	62 47.8	-40.0	21.5	63 43.5	-39.4	22.3	64 38.8	-38.7	23.1	65 33.9	-38.0	23.9	66 28.5	-37.2	24.8	71
72	59 17.6	-42.5	18.2	60 14.5	-42.0	18.7	61 11.3	-41.6	19.3	62 07.8	-41.1	19.9	63 04.1	-40.5	20.6	64 00.1	-39.9	21.3	64 55.9	-39.3	22.1	65 51.3	-38.5	22.9	72
73	58 35.1	-43.3	16.8	59 32.5	-42.9	17.3	60 29.7	-42.5	17.8	61 26.7	-42.0	18.4	62 23.6	-41.6	19.0	63 20.2	-41.0	19.6	64 16.6	-40.5	20.3	65 12.8	-39.9	21.0	73
74	57 51.8	-44.1	15.5	58 49.6	-43.8	15.9	59 47.2	-43.4	16.4	60 44.7	-43.0	16.9	61 42.0	-42.6	17.4	62 39.2	-42.1	18.0	63 36.1	-41.6	18.6	64 32.9	-41.1	19.3	74
75	57 07.7	-44.9	14.2	58 05.8	-44.5	14.6	59 03.8	-44.2	15.0	60 01.7	-43.9	15.5	60 59.4	-43.4	16.0	61 57.1	-43.1	16.5	62 54.5	-42.6	17.0	63 51.8	-42.2	17.6	75
76	56 22.8	-45.5	13.0	57 21.3	-45.3	13.4	58 19.6	-45.0	13.7	59 17.8	-44.6	14.1	60 16.0	-44.4	14.5	61 14.0	-44.0	15.0	62 11.9	-43.7	15.5	63 09.6	-43.2	16.0	76
77	55 37.3	-46.2	11.8	56 36.0	-45.9	12.1	57 34.6	-45.7	12.5	58 33.2	-45.4	12.8	59 31.6	-45.1	13.2	60 30.0	-44.8	13.6	61 28.2	-44.5	14.0	62 26.4	-44.2	14.5	77
78	54 51.1	-46.7	10.7	55 50.1	-46.6	11.0	56 48.9	-46.3	11.3	57 47.8	-46.2	11.6	58 46.5	-45.9	11.9	59 45.2	-45.6	12.3	60 43.7	-45.3	12.7	61 42.2	-45.0	13.1	78
79	54 04.4	-47.3	9.6	55 03.5	-47.1	9.9	56 02.6	-46.9	10.1	57 01.6	-46.7	10.4	58 00.6	-46.5	10.7	58 59.6	-46.4	11.0	59 58.4	-46.1	11.3	60 57.2	-45.8	11.7	79
80	53 17.1	-47.9	8.6	54 16.4	-47.7	8.8	55 15.7	-47.6	9.0	56 14.9	-47.4	9.3	57 14.1	-47.2	9.5	58 13.2	-46.9	9.8	59 12.3	-46.7	10.1	60 11.4	-46.6	10.4	80
81	52 29.2	-48.3	7.6	53 28.7	-48.2	7.8	54 28.1	-48.0	8.0	55 27.5	-47.9	8.2	56 26.9	-47.8	8.4	57 26.3	-47.7	8.6	58 25.6	-47.5	8.9	59 24.8	-47.2	9.1	81
82	51 40.9	-48.8	6.6	52 40.5	-48.7	6.8	53 40.1	-48.6	6.9	54 39.6	-48.4	7.1	55 39.1	-48.3	7.3	56 38.6	-48.1	7.5	57 38.1	-48.0	7.7	58 37.6	-47.9	7.9	82
83	50 52.1	-49.2	5.7	51 51.8	-49.1	5.8	52 51.5	-49.0	6.0	53 51.2	-49.0	6.1	54 50.8	-48.8	6.3	55 50.5	-48.8	6.4	56 50.1	-48.6	6.6	57 49.7	-48.5	6.8	83
84	50 02.9	-49.6	4.8	51 02.7	-49.5	4.9	52 02.5	-49.5	5.0	53 02.2	-49.4	5.1	54 02.0	-49.3	5.3	55 01.7	-49.2	5.4	56 01.5	-49.2	5.5	57 01.2	-49.1	5.7	84
85	49 13.3	-50.0	3.9	50 13.2	-50.0	4.0	51 13.0	-49.9	4.1	52 12.8	-49.8	4.2	53 12.7	-49.8	4.3	54 12.5	-49.7	4.4	55 12.3	-49.6	4.5	56 12.1	-49.5	4.6	85
86	48 23.3	-50.3	3.1	49 23.2	-50.3	3.2	50 23.1	-50.2	3.2	51 23.0	-50.2	3.3	52 22.9	-50.1	3.4	53 22.8	-50.1	3.5	54 22.7	-50.1	3.5	55 22.6	-50.0	3.6	86
87	47 33.0	-50.7	2.3	48 32.9	-50.6	2.3	49 32.9	-50.6	2.4	50 32.8	-50.6	2.4	51 32.8	-50.6	2.4	52 32.7	-50.5	2.5	53 32.6	-50.6	2.6	54 32.6	-50.5	2.7	87
88	46 42.3	-51.0	1.5	47 42.3	-51.0	1.5	48 42.2	-50.9	1.6	49 42.2	-50.9	1.6	50 42.2	-50.9	1.6	51 42.2	-50.8	1.7	52 42.1	-50.8	1.7	53 42.1	-50.9	1.7	88
89	45 51.3	-51.3	0.7	46 51.3	-51.3	0.8	47 51.3	-51.3	0.8	48 51.3	-51.3	0.8	49 51.3	-51.3	0.8	50 51.3	-51.3	0.8	51 51.3	-51.3	0.8	52 51.2	-51.2	0.8	89
90	45 00.0	-51.6	0.0	46 00.0	-51.6	0.0	47 00.0	-51.6	0.0	48 00.0	-51.6	0.0	49 00.0	-51.6	0.0	50 00.0	-51.6	0.0	51 00.0	-51.6	0.0	52 00.0	-51.6	0.0	90

45°　　46°　　47°　　48°　　49°　　50°　　51°　　52°

31°, 329° L.H.A.　　LATITUDE SAME NAME AS DECLINATION

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	37 18.5	−53.4	139.6	36 32.6	−53.8	140.1	35 46.4	−54.1	140.6	34 59.9	−54.5	141.0	34 13.1	−54.8	141.5	33 26.0	−55.1	141.9	32 38.7	−55.4	142.3	31 51.1	−55.7	142.7	0
1	36 25.1	−53.6	140.2	35 38.8	−53.9	140.7	34 52.3	−54.3	141.1	34 05.4	−54.6	141.6	33 18.3	−54.9	142.0	32 30.9	−55.2	142.4	31 43.3	−55.5	142.7	30 55.4	−55.8	143.1	1
2	35 31.5	−53.7	140.8	34 44.9	−54.1	141.2	33 58.0	−54.4	141.6	33 10.8	−54.7	142.0	32 23.4	−55.1	142.5	31 35.7	−55.3	142.8	30 47.8	−55.7	143.2	29 59.6	−55.9	143.5	2
3	34 37.8	−53.9	141.3	33 50.8	−54.2	141.7	33 03.6	−54.6	142.1	32 16.1	−54.9	142.5	31 28.3	−55.1	142.9	30 40.3	−55.4	143.3	29 52.1	−55.6	143.6	29 03.7	−55.9	144.0	3
4	33 43.9	−54.0	141.8	32 56.6	−54.3	142.2	32 09.0	−54.6	142.6	31 21.2	−54.9	143.0	30 33.2	−55.2	143.4	29 44.9	−55.5	143.7	28 56.5	−55.8	144.0	28 07.8	−56.0	144.4	4
5	32 49.9	−54.1	142.4	32 02.3	−54.5	142.8	31 14.4	−54.8	143.1	30 26.3	−55.1	143.5	29 38.0	−55.4	143.8	28 49.4	−55.6	144.2	28 00.7	−55.9	144.5	27 11.8	−56.1	144.8	5
6	31 55.8	−54.3	142.9	31 07.8	−54.5	143.2	30 19.6	−54.8	143.6	29 31.2	−55.1	143.9	28 42.6	−55.4	144.3	27 53.8	−55.6	144.6	27 04.8	−55.9	144.9	26 15.7	−56.2	145.2	6
7	31 01.5	−54.4	143.4	30 13.3	−54.7	143.7	29 24.8	−55.0	144.1	28 36.1	−55.2	144.4	27 47.2	−55.5	144.7	26 58.2	−55.8	145.0	26 08.9	−56.0	145.3	25 19.5	−56.2	145.5	7
8	30 07.1	−54.4	143.9	29 18.6	−54.8	144.2	28 29.8	−55.0	144.5	27 40.9	−55.4	144.8	26 51.7	−55.5	145.1	26 02.4	−55.8	145.4	25 12.9	−56.0	145.7	24 23.3	−56.3	145.9	8
9	29 12.7	−54.6	144.4	28 23.8	−54.8	144.7	27 34.8	−55.2	145.0	26 45.6	−55.4	145.3	25 56.2	−55.7	145.6	25 06.6	−55.9	145.8	24 16.9	−56.1	146.1	23 27.0	−56.3	146.3	9
10	28 18.1	−54.7	144.8	27 29.0	−55.0	145.1	26 39.6	−55.2	145.4	25 50.2	−55.5	145.7	25 00.5	−55.7	146.0	24 10.7	−55.9	146.2	23 20.8	−56.2	146.5	22 30.7	−56.4	146.7	10
11	27 23.4	−54.7	145.3	26 34.0	−55.0	145.6	25 44.4	−55.3	145.9	24 54.7	−55.5	146.1	24 04.8	−55.8	146.4	23 14.8	−56.0	146.6	22 24.6	−56.2	146.8	21 34.3	−56.4	147.1	11
12	26 28.7	−54.9	145.7	25 39.0	−55.1	146.0	24 49.1	−55.3	146.3	23 59.2	−55.6	146.5	23 09.0	−55.8	146.8	22 18.8	−56.1	147.0	21 28.4	−56.3	147.2	20 37.9	−56.5	147.4	12
13	25 33.8	−54.9	146.2	24 43.9	−55.2	146.5	23 53.8	−55.4	146.7	23 03.6	−55.7	146.9	22 13.2	−55.9	147.2	21 22.7	−56.1	147.4	20 32.1	−56.3	147.6	19 41.4	−56.5	147.8	13
14	24 38.9	−55.0	146.6	23 48.7	−55.3	146.9	22 58.4	−55.5	147.1	22 07.9	−55.7	147.4	21 17.3	−55.9	147.6	20 26.6	−56.1	147.8	19 35.8	−56.3	148.0	18 44.9	−56.6	148.1	14
15	23 43.9	−55.1	147.1	22 53.4	−55.3	147.3	22 02.9	−55.6	147.5	21 12.2	−55.8	147.8	20 21.4	−56.0	148.0	19 30.5	−56.2	148.1	18 39.5	−56.4	148.3	17 48.3	−56.5	148.5	15
16	22 48.8	−55.2	147.5	21 58.1	−55.4	147.7	21 07.3	−55.6	147.9	20 16.4	−55.8	148.1	19 25.4	−56.1	148.3	18 34.3	−56.3	148.5	17 43.1	−56.5	148.7	16 51.8	−56.7	148.8	16
17	21 53.6	−55.2	147.9	21 02.7	−55.5	148.1	20 11.7	−55.7	148.3	19 20.6	−55.9	148.5	18 29.3	−56.0	148.7	17 38.0	−56.3	148.9	16 46.6	−56.5	149.0	15 55.1	−56.6	149.2	17
18	20 58.4	−55.3	148.4	20 07.3	−55.5	148.6	19 16.0	−55.7	148.7	18 24.7	−55.9	148.9	17 33.3	−56.2	149.1	16 41.7	−56.3	149.2	15 50.1	−56.5	149.4	14 58.5	−56.7	149.5	18
19	20 03.1	−55.3	148.8	19 11.8	−55.6	149.0	18 20.3	−55.9	149.1	17 28.8	−56.0	149.3	16 37.1	−56.1	149.5	15 45.4	−56.3	149.6	14 53.6	−56.5	149.7	14 01.8	−56.7	149.9	19
20	19 07.8	−55.4	149.2	18 16.2	−55.6	149.4	17 24.6	−55.9	149.5	16 32.8	−56.0	149.7	15 41.0	−56.2	149.8	14 49.1	−56.4	150.0	13 57.1	−56.6	150.1	13 05.1	−56.8	150.2	20
21	18 12.4	−55.4	149.6	17 20.6	−55.6	149.8	16 28.7	−55.8	149.9	15 36.8	−56.1	150.0	14 44.8	−56.3	150.2	13 52.7	−56.4	150.3	13 00.5	−56.6	150.4	12 08.3	−56.8	150.5	21
22	17 17.0	−55.5	150.0	16 25.0	−55.7	150.1	15 32.9	−55.9	150.3	14 40.7	−56.0	150.4	13 48.5	−56.2	150.5	12 56.3	−56.5	150.7	12 03.9	−56.6	150.8	11 11.5	−56.7	150.9	22
23	16 21.5	−55.5	150.4	15 29.3	−55.8	150.5	14 37.0	−55.9	150.7	13 44.7	−56.1	150.8	12 52.3	−56.3	150.9	11 59.8	−56.5	151.0	11 07.3	−56.6	151.1	10 14.8	−56.9	151.2	23
24	15 25.9	−55.5	150.8	14 33.5	−55.7	150.9	13 41.1	−56.0	151.0	12 48.6	−56.2	151.1	11 56.0	−56.3	151.3	11 03.3	−56.5	151.4	10 10.7	−56.7	151.4	9 17.9	−56.8	151.5	24
25	14 30.4	−55.6	151.2	13 37.8	−55.8	151.3	12 45.1	−56.0	151.4	11 52.4	−56.2	151.5	10 59.7	−56.4	151.6	10 06.8	−56.5	151.7	9 14.0	−56.7	151.8	8 21.1	−56.8	151.9	25
26	13 34.8	−55.6	151.6	12 42.0	−55.9	151.7	11 49.1	−56.0	151.8	10 56.2	−56.2	151.9	10 03.3	−56.4	152.0	9 10.3	−56.6	152.0	8 17.3	−56.7	152.1	7 24.3	−56.9	152.2	26
27	12 39.1	−55.7	151.9	11 46.1	−55.8	152.0	10 53.1	−56.0	152.1	10 00.0	−56.2	152.2	9 06.9	−56.3	152.3	8 13.8	−56.6	152.4	7 20.6	−56.7	152.4	6 27.4	−56.9	152.5	27
28	11 43.4	−55.7	152.3	10 50.3	−55.9	152.4	9 57.1	−56.1	152.5	9 03.8	−56.2	152.6	8 10.6	−56.4	152.7	7 17.2	−56.5	152.7	6 23.9	−56.7	152.8	5 30.5	−56.9	152.8	28
29	10 47.7	−55.7	152.7	9 54.4	−55.9	152.8	9 01.0	−56.1	152.9	8 07.6	−56.3	152.9	7 14.2	−56.5	153.0	6 20.7	−56.6	153.0	5 27.2	−56.8	153.1	4 33.7	−56.9	153.1	29
30	9 52.0	−55.8	153.1	8 58.5	−56.0	153.2	8 04.9	−56.1	153.2	7 11.3	−56.2	153.3	6 17.7	−56.4	153.3	5 24.1	−56.6	153.4	4 30.4	−56.7	153.4	3 36.8	−56.9	153.5	30
31	8 56.2	−55.8	153.5	8 02.5	−55.9	153.5	7 08.8	−56.1	153.6	6 15.1	−56.3	153.6	5 21.3	−56.4	153.7	4 27.5	−56.6	153.7	3 33.7	−56.7	153.7	2 39.9	−56.9	153.8	31
32	8 00.4	−55.8	153.8	7 06.6	−56.0	153.9	6 12.7	−56.1	153.9	5 18.8	−56.3	154.0	4 24.9	−56.5	154.0	3 30.9	−56.5	154.0	2 37.0	−56.8	154.1	1 43.0	−56.9	154.1	32
33	7 04.6	−55.8	154.2	6 10.6	−56.0	154.2	5 16.6	−56.2	154.3	4 22.5	−56.3	154.3	3 28.4	−56.5	154.4	2 34.3	−56.6	154.4	1 40.2	−56.7	154.4	0 46.1	−56.9	154.4	33
34	6 08.8	−55.8	154.6	5 14.6	−56.0	154.6	4 20.4	−56.2	154.7	3 26.2	−56.3	154.7	2 31.9	−56.4	154.7	1 37.7	−56.6	154.7	0 43.4	−56.7	154.7	0 10.8	+56.9	25.3	34
35	5 13.0	−55.9	154.9	4 18.6	−56.0	155.0	3 24.2	−56.1	155.0	2 29.9	−56.4	155.0	1 35.5	−56.5	155.0	0 41.1	−56.6	155.0	0 13.3	+56.7	25.0	1 07.7	+56.9	25.0	35
36	4 17.1	−55.8	155.3	3 22.6	−56.0	155.3	2 28.1	−56.2	155.4	1 33.5	−56.3	155.4	0 39.0	−56.5	155.4	0 15.5	+56.7	24.6	1 10.1	+56.7	24.6	2 04.6	+56.9	24.6	36
37	3 21.3	−55.9	155.7	2 26.6	−56.0	155.7	1 31.9	−56.2	155.7	0 37.2	−56.3	155.7	0 17.5	+56.4	24.3	1 12.2	+56.6	24.3	2 06.8	+56.8	24.3	3 01.5	+56.9	24.3	37
38	2 25.4	−55.9	156.0	1 30.6	−56.1	156.0	0 35.7	−56.1	156.1	0 19.1	+56.3	23.9	1 13.9	+56.5	24.0	2 08.7	+56.6	24.0	3 03.6	+56.7	24.0	3 58.4	+56.9	24.0	38
39	1 29.5	−55.9	156.4	0 34.5	−56.0	156.4	0 20.4	+56.2	23.6	1 15.4	+56.3	23.6	2 10.4	+56.5	23.6	3 05.4	+56.6	23.6	4 00.3	+56.8	23.7	4 55.3	+56.9	23.7	39
40	0 33.6	−55.8	156.8	0 21.5	+56.0	23.2	1 16.6	+56.2	23.2	2 11.7	+56.4	23.3	3 06.9	+56.4	23.3	4 02.0	+56.6	23.3	4 57.1	+56.7	23.3	5 52.2	+56.9	23.4	40
41	0 22.2	+55.9	22.9	1 17.5	+56.0	22.9	2 12.8	+56.2	22.9	3 08.1	+56.3	22.9	4 03.3	+56.5	22.9	4 58.6	+56.6	23.0	5 53.8	+56.7	23.0	6 49.0	+56.9	23.0	41
42	1 18.1	+55.9	22.5	2 13.5	+56.1	22.5	3 09.0	+56.1	22.5	4 04.4	+56.3	22.6	4 59.8	+56.4	22.6	5 55.2	+56.5	22.6	6 50.5	+56.7	22.7	7 45.9	+56.8	22.7	42
43	2 14.0	+55.9	22.1	3 09.6	+56.0	22.2	4 05.1	+56.2	22.2	5 00.7	+56.3	22.2	5 56.2	+56.4	22.3	6 51.7	+56.6	22.3	7 47.2	+56.7	22.3	8 42.7	+56.8	22.4	43
44	3 09.9	+55.8	21.8	4 05.6	+56.0	21.8	5 01.3	+56.1	21.8	5 57.0	+56.2	21.9	6 52.6	+56.4	21.9	7 48.3	+56.5	22.0	8 43.9	+56.7	22.0	9 39.5	+56.8	22.1	44
45	4 05.7	+55.8	21.4	5 01.6	+55.9	21.4	5 57.4	+56.1	21.5	6 53.2	+56.3	21.5	7 49.0	+56.4	21.6	8 44.8	+56.5	21.6	9 40.6	+56.7	21.7	10 36.3	+56.8	21.7	45
46	5 01.6	+55.8	21.0	5 57.6	+55.9	21.1	6 53.5	+56.1	21.1	7 49.5	+56.2	21.2	8 45.4	+56.4	21.2	9 41.4	+56.5	21.3	10 37.3	+56.6	21.3	11 33.1	+56.8	21.4	46
47	5 57.4	+55.8	20.7	6 53.5	+56.0	20.7	7 49.6	+56.1	20.8	8 45.7	+56.3	20.8	9 41.8	+56.4	20.9	10 37.9	+56.4	20.9	11 33.9	+56.6	21.0	12 29.9	+56.7	21.1	47
48	6 53.2	+55.8	20.3	7 49.5	+55.9	20.4	8 45.7	+56.1	20.4	9 42.0	+56.2	20.5	10 38.2	+56.3	20.5	11 34.3	+56.5	20.6	12 30.5	+56.6	20.7	13 26.6	+56.7	20.8	48
49	7 49.0	+55.8	19.9	8 45.4	+56.0	20.0	9 41.8	+56.1	20.0	10 38.2	+56.1	20.1	11 34.5	+56.3	20.2	12 30.8	+56.4	20.3	13 27.1	+56.5	20.3	14 23.3	+56.7	20.4	49
50	8 44.8	+55.7	19.6	9 41.4	+55.9	19.6	10 37.9	+56.0	19.7	11 34.3	+56.2	19.8	12 30.8	+56.3	19.8	13 27.2	+56.4	19.9	14 23.6	+56.6	19.9	15 20.0	+56.7	20.1	50
51	9 40.6	+55.7	19.2	10 37.3	+55.8	19.3	11 33.9	+56.0	19.3	12 30.5	+56.1	19.4	13 27.1	+56.2	19.5	14 23.6	+56.4	19.5	15 20.2	+56.5	19.6	16 16.7	+56.6	19.7	51
52	10 36.3	+55.8	18.8	11 33.1	+55.9	18.9	12 29.9	+56.0	19.0	13 26.6	+56.1	19.0	14 23.3	+56.2	19.1	15 20.0	+56.3	19.2	16 16.7	+56.4	19.3	17 13.3	+56.5	19.4	52
53	11 32.1	+55.6	18.4	12 29.0	+55.8	18.5	13 25.9	+55.9	18.6	14 22.7	+56.1	18.7	15 19.5	+56.2	18.7	16 16.3	+56.3	18.8	17 13.1	+56.4	19.0	18 09.8	+56.6	19.0	53
54	12 27.7	+55.7	18.1	13 24.8	+55.8	18.1	14 21.8	+55.9	18.2	15 18.8	+56.0	18.3	16 15.7	+56.2	18.4	17 12.6	+56.3	18.5	18 09.5	+56.4	18.6	19 06.4	+56.5	18.7	54
55	13 23.4	+55.6	17.7	14 20.6	+55.7	17.8	15 17.7	+55.8	17.8	16 14.8	+56.0	17.9	17 11.9	+56.1	18.0	18 08.9	+56.2	18.1	19 05.9	+56.4	18.2	20 02.9	+56.4	18.3	55
56	14 19.0	+55.6	17.3	15 16.3	+55.7	17.5	16 13.5	+55.9	17.5	17 10.8	+55.9	17.5	18 08.0	+56.0	17.6	19 05.1	+56.2	17.7	20 02.3	+56.2	17.9	20 59.3	+56.5	18.0	56
57	15 14.6	+55.5	16.9	16 12.0	+55.7	17.0	17 09.4	+55.7	17.1	18 06.7	+55.9	17.2	19 04.0	+56.0	17.3	20 01.3	+56.1	17.4	20 58.5	+56.3	17.5	21 55.8	+56.3	17.6	57
58	16 10.1	+55.5	16.5	17 07.7	+55.6	16.6	18 05.1	+55.8	16.7	19 02.6	+55.8	16.8	20 00.0	+56.0	16.9	20 57.4	+56.1	17.0	21 54.8	+56.2	17.1	22 52.1	+56.3	17.2	58
59	17 05.6	+55.5	16.1	18 03.3	+55.6	16.3	19 00.9	+55.7	16.3	19 58.4	+55.8	16.4	20 56.0	+55.9	16.5	21 53.5	+56.0	16.6	22 51.0	+56.1	16.7	23 48.4	+56.3	16.9	59
60	18 01.1	+55.4	15.7	18 58.8	+55.5	15.8	19 56.6	+55.6	15.9	20 54.2	+55.8	16.0	21 51.9	+55.9	16.1	22 49.5	+56.0	16.2	23 47.1	+56.1	16.3	24 44.7	+56.2	16.5	60
61	18 56.5	+55.3	15.3	19 54.3	+55.5	15.4	20 52.2	+55.5	15.5	21 50.0	+55.7	15.6	22 47.8	+55.7	15.7	23 45.5	+55.9	15.8	24 43.2	+56.0	16.0	25 40.9	+56.1	16.1	61
62	19 51.8	+55.3	14.9	20 49.8	+55.4	15.0	21 47.7	+55.6	15.1	22 45.7	+55.6	15.2	23 43.5	+55.8	15.3	24 41.4	+55.8	15.4	25 39.2	+56.0	15.5	26 37.0	+56.1	15.7	62
63	20 47.1	+55.3	14.5	21 45.2	+55.3	14.6	22 43.3	+55.4	14.7	23 41.3	+55.5	14.8	24 39.3	+55.6	14.9	25 37.2	+55.8	15.0	26 35.2	+55.9	15.2	27 33.1	+56.0	15.3	63
64	21 42.4	+55.1	14.1	22 40.5	+55.3	14.2	23 38.7	+55.4	14.3	24 36.8	+55.5	14.4	25 34.9	+55.6	14.5	26 33.0	+55.7	14.6	27 31.1	+55.8	14.7	28 29.1	+55.9	14.9	64
65	22 37.5	+55.1	13.6	23 35.8	+55.2	13.7	24 34.1	+55.3	13.8	25 32.3	+55.4	14.0	26 30.5	+55.6	14.1	27 28.7	+55.7	14.2	28 26.9	+55.7	14.3	29 25.0	+55.8	14.5	65
66	23 32.6	+55.1	13.2	24 31.0	+55.1	13.3	25 29.4	+55.2	13.4	26 27.7	+55.4	13.5	27 26.1	+55.4	13.7	28 24.4	+55.5	13.8	29 22.6	+55.7	13.9	30 20.8	+55.8	14.0	66
67	24 27.6	+55.0	12.8	25 26.1	+55.1	12.9	26 24.6	+55.2	13.0	27 23.1	+55.2	13.1	28 21.5	+55.4	13.2	29 19.9	+55.5	13.3	30 18.3	+55.5	13.5	31 16.6	+55.7	13.6	67
68	25 22.6	+54.9	12.3	26 21.2	+55.0	12.5	27 19.8	+55.0	12.5	28 18.3	+55.2	12.7	29 16.9	+55.2	12.8	30 15.4	+55.3	12.9	31 13.8	+55.5	13.0	32 12.3	+55.5	13.2	68
69	26 17.5	+54.7	11.9	27 16.2	+54.8	12.0	28 14.8	+55.0	12.1	29 13.5	+55.1	12.2	30 12.1	+55.2	12.3	31 10.7	+55.3	12.5	32 09.3	+55.4	12.6	33 07.8	+55.5	12.7	69
70	27 12.2	+54.7	11.4	28 11.0	+54.8	11.5	29 09.8	+54.9	11.6	30 08.6	+55.0	11.8	31 07.3	+55.1	11.9	32 06.0	+55.2	12.0	33 04.7	+55.3	12.1	34 03.3	+55.4	12.3	70
71	28 06.9	+54.6	11.0	29 05.8	+54.7	11.1	30 04.7	+54.8	11.2	31 03.6	+54.8	11.3	32 02.4	+55.0	11.4	33 01.2	+55.1	11.5	34 00.0	+55.1	11.7	34 58.7	+55.3	11.8	71
72	29 01.5	+54.5	10.5	30 00.5	+54.6	10.6	30 59.5	+54.7	10.7	31 58.4	+54.8	10.8	32 57.4	+54.9	10.9	33 56.3	+54.9	11.1	34 55.1	+55.1	11.2	35 54.0	+55.1	11.3	72
73	29 56.0	+54.4	10.0	30 55.1	+54.5	10.1	31 54.2	+54.6	10.2	32 53.2	+54.7	10.3	33 52.3	+54.8	10.4	34 51.2	+54.9	10.6	35 50.2	+54.9	10.7	36 49.1	+55.1	10.8	73
74	30 50.4	+54.3	9.5	31 49.6	+54.4	9.6	32 48.7	+54.5	9.7	33 47.9	+54.5	9.8	34 47.0	+54.6	10.0	35 46.1	+54.7	10.1	36 45.1	+54.8	10.2	37 44.2	+54.9	10.3	74
75	31 44.7	+54.2	9.0	32 44.0	+54.2	9.2	33 43.2	+54.3	9.2	34 42.4	+54.4	9.3	35 41.6	+54.5	9.4	36 40.8	+54.6	9.6	37 39.9	+54.7	9.7	38 39.1	+54.7	9.8	75
76	32 38.9	+54.0	8.5	33 38.2	+54.1	8.6	34 37.5	+54.2	8.7	35 36.8	+54.3	8.8	36 36.1	+54.3	8.9	37 35.4	+54.4	9.0	38 34.6	+54.5	9.2	39 33.8	+54.6	9.3	76
77	33 32.9	+53.9	8.0	34 32.3	+54.0	8.1	35 31.7	+54.1	8.2	36 31.1	+54.1	8.3	37 30.4	+54.3	8.4	38 29.8	+54.3	8.5	39 29.1	+54.4	8.6	40 28.4	+54.5	8.8	77
78	34 26.8	+53.8	7.6	35 26.3	+53.8	7.6	36 25.8	+53.9	7.6	37 25.2	+54.0	7.7	38 24.7	+54.0	7.9	39 24.1	+54.1	8.0	40 23.5	+54.2	8.1	41 22.9	+54.3	8.2	78
79	35 20.6	+53.6	6.9	36 20.1	+53.7	7.0	37 19.7	+53.7	7.1	38 19.2	+53.8	7.2	39 18.7	+53.9	7.3	40 18.2	+54.0	7.4	41 17.7	+54.1	7.5	42 17.2	+54.1	7.6	79
80	36 14.2	+53.4	6.4	37 13.8	+53.5	6.4	38 13.4	+53.6	6.5	39 13.0	+53.7	6.6	40 12.6	+53.7	6.7	41 12.2	+53.8	6.8	42 11.8	+53.8	6.9	43 11.3	+53.9	7.0	80
81	37 07.6	+53.3	5.8	38 07.3	+53.4	5.9	39 07.0	+53.4	6.0	40 06.7	+53.4	6.0	41 06.3	+53.6	6.1	42 06.0	+53.6	6.2	43 05.6	+53.7	6.3	44 05.2	+53.8	6.4	81
82	38 00.9	+53.1	5.2	39 00.7	+53.1	5.3	40 00.4	+53.2	5.4	41 00.1	+53.3	5.5	41 59.9	+53.3	5.5	42 59.6	+53.4	5.6	43 59.3	+53.4	5.7	44 59.0	+53.5	5.8	82
83	38 54.0	+53.0	4.6	39 53.8	+53.0	4.7	40 53.6	+53.1	4.8	41 53.4	+53.1	4.8	42 53.2	+53.1	4.9	43 53.0	+53.2	5.0	44 52.7	+53.3	5.1	45 52.5	+53.3	5.2	83
84	39 47.0	+52.7	4.0	40 46.8	+52.8	4.1	41 46.7	+52.8	4.1	42 46.5	+52.9	4.2	43 46.3	+52.9	4.3	44 46.2	+52.9	4.3	45 46.0	+53.0	4.4	46 45.8	+53.1	4.5	84
85	40 39.7	+52.5	3.4	41 39.6	+52.6	3.4	42 39.5	+52.6	3.5	43 39.4	+52.6	3.6	44 39.2	+52.7	3.6	45 39.1	+52.7	3.7	46 39.0	+52.8	3.7	47 38.9	+52.8	3.8	85
86	41 32.2	+52.3	2.8	42 32.2	+52.3	2.8	43 32.1	+52.3	2.8	44 32.0	+52.4	2.9	45 31.9	+52.5	2.9	46 31.8	+52.5	3.0	47 31.8	+52.5	3.1	48 31.7	+52.5	3.1	86
87	42 24.5	+52.1	2.1	43 24.5	+52.1	2.1	44 24.4	+52.2	2.2	45 24.4	+52.1	2.2	46 24.4	+52.1	2.2	47 24.3	+52.2	2.3	48 24.3	+52.2	2.3	49 24.2	+52.3	2.4	87
88	43 16.6	+51.8	1.4	44 16.6	+51.8	1.4	45 16.6	+51.8	1.5	46 16.5	+51.9	1.5	47 16.5	+51.9	1.5	48 16.5	+51.9	1.5	49 16.5	+51.9	1.6	50 16.5	+51.9	1.6	88
89	44 08.4	+51.6	0.7	45 08.4	+51.6	0.7	46 08.4	+51.6	0.7	47 08.4	+51.6	0.8	48 08.4	+51.6	0.8	49 08.4	+51.6	0.8	50 08.4	+51.6	0.8	51 08.4	+51.6	0.8	89
90	45 00.0	+51.3	0.0	46 00.0	+51.3	0.0	47 00.0	+51.3	0.0	48 00.0	+51.3	0.0	49 00.0	+51.3	0.0	50 00.0	+51.3	0.0	51 00.0	+51.3	0.0	52 00.0	+51.2	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION   L.H.A. 149°, 211°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	36 50.7	+53.0	138.5	36 05.6	+53.3	139.0	35 20.1	+53.8	139.5	34 34.4	+54.1	139.9	33 48.3	+54.4	140.4	33 02.0	+54.7	140.8	32 15.3	+55.1	141.2	31 28.4	+55.4	141.6	0
1	37 43.7	+52.7	137.9	36 58.9	+53.2	138.4	36 13.9	+53.5	138.9	35 28.5	+53.9	139.4	34 42.7	+54.3	139.9	33 56.7	+54.7	140.3	33 10.4	+55.0	140.7	32 23.8	+55.3	141.1	1
2	38 36.4	+52.6	137.3	37 52.1	+53.0	137.9	37 07.4	+53.4	138.4	36 22.4	+53.8	138.9	35 37.0	+54.2	139.3	34 51.4	+54.5	139.8	34 05.4	+54.8	140.2	33 19.1	+55.2	140.7	2
3	39 29.0	+52.3	136.7	38 45.1	+52.8	137.3	38 00.8	+53.3	137.8	37 16.2	+53.6	138.3	36 31.2	+54.0	138.8	35 45.9	+54.4	139.3	35 00.2	+54.8	139.8	34 14.3	+55.1	140.2	3
4	40 21.3	+52.2	136.1	39 37.9	+52.6	136.7	38 54.1	+53.0	137.2	38 09.8	+53.5	137.8	37 25.2	+53.9	138.3	36 40.3	+54.2	138.8	35 55.0	+54.6	139.3	35 09.4	+54.9	139.7	4
5	41 13.5	+51.9	135.4	40 30.5	+52.4	136.0	39 47.1	+52.9	136.6	39 03.3	+53.3	137.2	38 19.1	+53.7	137.7	37 34.5	+54.1	138.2	36 49.6	+54.5	138.7	36 04.3	+54.9	139.2	5
6	42 05.4	+51.6	134.8	41 22.9	+52.2	135.4	40 40.0	+52.6	136.0	39 56.6	+53.1	136.6	39 12.8	+53.5	137.1	38 28.6	+54.0	137.7	37 44.1	+54.3	138.2	36 59.2	+54.7	138.7	6
7	42 57.0	+51.4	134.1	42 15.1	+51.9	134.7	41 32.6	+52.4	135.4	40 49.7	+52.9	136.0	40 06.3	+53.4	136.6	39 22.6	+53.7	137.1	38 38.4	+54.2	137.7	37 53.9	+54.5	138.2	7
8	43 48.4	+51.2	133.4	43 07.0	+51.7	134.0	42 25.0	+52.2	134.7	41 42.6	+52.7	135.3	40 59.7	+53.1	136.0	40 16.3	+53.6	136.5	39 32.6	+54.0	137.1	38 48.4	+54.4	137.7	8
9	44 39.6	+50.8	132.6	43 58.7	+51.4	133.3	43 17.2	+52.0	134.0	42 35.3	+52.5	134.7	41 52.8	+53.0	135.3	41 09.9	+53.5	136.0	40 26.6	+53.8	136.5	39 42.8	+54.3	137.1	9
10	45 30.4	+50.5	131.9	44 50.1	+51.1	132.6	44 09.2	+51.7	133.3	43 27.8	+52.2	134.0	42 45.8	+52.7	134.7	42 03.4	+53.2	135.3	41 20.4	+53.7	136.0	40 37.1	+54.1	136.6	10
11	46 21.0	+50.2	131.1	45 41.2	+50.9	131.9	45 00.9	+51.4	132.6	44 20.0	+52.0	133.3	43 38.5	+52.5	134.0	42 56.6	+53.0	134.7	42 14.1	+53.5	135.4	41 31.2	+53.9	136.0	11
12	47 11.2	+49.9	130.3	46 32.1	+50.5	131.1	45 52.3	+51.2	131.9	45 12.0	+51.7	132.6	44 31.0	+52.3	133.4	43 49.6	+52.7	134.1	43 07.6	+53.2	134.7	42 25.1	+53.7	135.4	12
13	48 01.1	+49.5	129.5	47 22.6	+50.2	130.3	46 43.5	+50.8	131.1	46 03.7	+51.4	131.9	45 23.3	+52.0	132.7	44 42.3	+52.6	133.4	44 00.8	+53.1	134.1	43 18.8	+53.6	134.8	13
14	48 50.6	+49.1	128.6	48 12.8	+49.8	129.5	47 34.3	+50.5	130.3	46 55.1	+51.1	131.2	46 15.3	+51.7	132.0	45 34.9	+52.3	132.7	44 53.9	+52.8	133.5	44 12.4	+53.3	134.2	14
15	49 39.7	+48.7	127.7	49 02.6	+49.5	128.7	48 24.8	+50.1	129.5	47 46.2	+50.8	130.4	47 07.0	+51.4	131.2	46 27.2	+52.0	132.0	45 46.7	+52.6	132.8	45 05.7	+53.1	133.5	15
16	50 28.4	+48.3	126.8	49 52.1	+49.0	127.8	49 14.9	+49.8	128.7	48 37.0	+50.5	129.6	47 58.4	+51.2	130.5	47 19.2	+51.7	131.3	46 39.3	+52.3	132.1	45 58.8	+52.8	132.9	16
17	51 16.7	+47.8	125.9	50 41.1	+48.6	126.9	50 04.7	+49.4	127.8	49 27.5	+50.1	128.8	48 49.6	+50.7	129.7	48 10.9	+51.4	130.5	47 31.6	+52.0	131.4	46 51.6	+52.6	132.2	17
18	52 04.5	+47.3	124.9	51 29.7	+48.2	126.0	50 54.1	+48.9	127.0	50 17.6	+49.7	127.9	49 40.3	+50.5	128.9	49 02.3	+51.1	129.8	48 23.6	+51.8	130.6	47 44.2	+52.3	131.5	18
19	52 51.8	+46.8	123.9	52 17.9	+47.6	125.0	51 43.0	+48.5	126.0	51 07.3	+49.3	127.0	50 30.8	+50.0	128.0	49 53.4	+50.8	128.9	49 15.4	+51.4	129.9	48 36.5	+52.1	130.7	19
20	53 38.6	+46.2	122.9	53 05.5	+47.2	124.0	52 31.5	+48.1	125.1	51 56.6	+48.9	126.1	51 20.8	+49.7	127.1	50 44.2	+50.4	128.1	50 06.8	+51.0	129.1	49 28.6	+51.7	130.0	20
21	54 24.8	+45.6	121.8	53 52.7	+46.6	122.9	53 19.6	+47.5	124.1	52 45.5	+48.3	125.2	52 10.5	+49.2	126.2	51 34.6	+49.9	127.2	50 57.8	+50.8	128.2	50 20.3	+51.4	129.2	21
22	55 10.4	+44.9	120.6	54 39.3	+45.9	121.8	54 07.1	+46.9	123.0	53 33.8	+47.9	124.2	52 59.7	+48.7	125.3	52 24.5	+49.6	126.3	51 48.6	+50.3	127.4	51 11.7	+51.1	128.4	22
23	55 55.3	+44.3	119.5	55 25.2	+45.4	120.7	54 54.0	+46.4	122.0	54 21.7	+47.4	123.2	53 48.4	+48.3	124.3	53 14.1	+49.1	125.4	52 38.9	+49.9	126.5	52 02.8	+50.6	127.5	23
24	56 39.6	+43.5	118.3	56 10.6	+44.6	119.6	55 40.4	+45.7	120.9	55 09.1	+46.7	122.1	54 36.6	+47.8	123.3	54 03.2	+48.6	124.4	53 28.8	+49.5	125.6	52 53.4	+50.3	126.6	24
25	57 23.1	+42.7	117.0	56 55.2	+44.0	118.4	56 26.1	+45.1	119.7	55 55.8	+46.1	121.0	55 24.4	+47.1	122.2	54 51.8	+48.1	123.4	54 18.3	+48.9	124.6	53 43.7	+49.8	125.7	25
26	58 05.8	+41.9	115.7	57 39.2	+43.1	117.1	57 11.2	+44.3	118.5	56 41.9	+45.5	119.8	56 11.5	+46.5	121.1	55 39.9	+47.6	122.4	55 07.2	+48.5	123.6	54 33.5	+49.4	124.8	26
27	58 47.7	+41.0	114.3	58 22.3	+42.3	115.8	57 55.5	+43.6	117.2	57 27.4	+44.8	118.6	56 58.0	+45.9	120.0	56 27.5	+46.9	121.3	55 55.7	+48.0	122.6	55 22.9	+48.9	123.8	27
28	59 28.7	+40.0	112.9	59 04.6	+41.4	114.4	58 39.1	+42.7	115.9	58 12.2	+44.0	117.4	57 43.9	+45.2	118.8	57 14.4	+46.3	120.2	56 43.7	+47.3	121.5	56 11.8	+48.3	122.8	28
29	60 08.7	+39.0	111.4	59 46.0	+40.5	113.0	59 21.8	+41.9	114.6	58 56.2	+43.1	116.1	58 29.1	+44.4	117.5	58 00.7	+45.6	119.0	57 31.0	+46.7	120.3	57 00.1	+47.7	121.7	29
30	60 47.7	+37.8	109.9	60 26.5	+39.4	111.5	60 03.7	+40.9	113.1	59 39.3	+42.3	114.7	59 13.5	+43.6	116.2	58 46.3	+44.8	117.7	58 17.7	+46.0	119.2	57 47.8	+47.1	120.6	30
31	61 25.5	+36.7	108.3	61 05.9	+38.3	110.0	60 44.6	+39.8	111.7	60 21.6	+41.4	113.3	59 57.1	+42.8	114.9	59 31.1	+44.1	116.4	59 03.7	+45.3	117.9	58 34.9	+46.5	119.4	31
32	62 02.2	+35.4	106.6	61 44.2	+37.1	108.4	61 24.4	+38.8	110.1	61 03.0	+40.3	111.8	60 39.9	+41.7	113.5	60 15.2	+43.2	115.1	59 49.0	+44.5	116.6	59 21.4	+45.7	118.2	32
33	62 37.6	+34.1	104.8	62 21.3	+35.9	106.7	62 03.2	+37.6	108.5	61 43.3	+39.2	110.3	61 21.6	+40.8	112.0	60 58.4	+42.2	113.7	60 33.5	+43.6	115.3	60 07.1	+45.0	116.9	33
34	63 11.7	+32.7	103.0	62 57.2	+34.6	104.9	62 40.8	+36.3	106.8	62 22.5	+38.1	108.7	62 02.4	+39.7	110.4	61 40.6	+41.3	112.2	61 17.1	+42.8	113.9	60 52.1	+44.1	115.5	34
35	63 44.4	+31.1	101.2	63 31.8	+33.1	103.1	63 17.1	+35.0	105.1	63 00.6	+36.8	107.0	62 42.1	+38.6	108.8	62 21.9	+40.1	110.6	61 59.9	+41.7	112.4	61 36.2	+43.2	114.1	35
36	64 15.5	+29.5	99.2	64 04.9	+31.5	101.2	63 52.1	+33.6	103.2	63 37.4	+35.4	105.2	63 20.7	+37.2	107.1	63 02.0	+39.1	109.0	62 41.6	+40.6	110.9	62 19.4	+42.2	112.6	36
37	64 45.0	+27.8	97.2	64 36.4	+30.0	99.3	64 25.7	+32.0	101.3	64 12.8	+34.1	103.4	63 57.9	+36.0	105.4	63 41.1	+37.7	107.3	63 22.2	+39.5	109.2	63 01.6	+41.1	111.1	37
38	65 12.8	+26.0	95.1	65 06.4	+28.2	97.2	64 57.7	+30.4	99.4	64 46.9	+32.4	101.5	64 33.9	+34.5	103.5	64 18.8	+36.4	105.5	64 01.7	+38.3	107.5	63 42.7	+40.0	109.5	38
39	65 38.8	+24.1	92.9	65 34.6	+26.4	95.1	65 28.1	+28.6	97.3	65 19.3	+30.9	99.5	65 08.4	+32.9	101.6	64 55.2	+35.0	103.7	64 40.0	+36.9	105.7	64 22.7	+38.7	107.8	39
40	66 02.9	+22.1•	90.7	66 01.0	+24.5•	92.9	65 56.7	+26.9	95.2	65 50.2	+29.1	97.4	65 41.3	+31.3	99.6	65 30.2	+33.4	101.8	65 16.9	+35.4	103.9	65 01.4	+37.4	106.0	40
41	66 25.0	+19.9•	88.4	66 25.5	+22.4•	90.7	66 23.6	+24.8•	93.0	66 19.3	+27.2	95.2	66 12.6	+29.5	97.5	66 03.6	+31.8	99.7	65 52.3	+33.9	101.9	65 38.8	+36.0	104.1	41
42	66 44.9	+17.8•	86.0	66 47.9	+20.3•	88.3	66 48.4	+22.8•	90.7	66 46.5	+25.2•	93.0	66 42.1	+27.7	95.3	66 35.4	+30.0	97.6	66 26.2	+32.3	99.9	66 14.8	+34.4	102.1	42
43	67 02.7	+15.5•	83.6	67 08.2	+18.0•	85.9	67 11.2	+20.6•	88.3	67 11.7	+23.2•	90.7	67 09.8	+25.6•	93.1	67 05.4	+28.0	95.4	66 58.5	+30.4	97.8	66 49.2	+32.7	100.1	43
44	67 18.2	+13.1•	81.1	67 26.2	+15.8•	83.5	67 31.8	+18.4•	85.9	67 34.9	+21.0•	88.3	67 35.4	+23.6•	90.7	67 33.4	+26.1•	93.1	67 28.9	+28.5	95.5	67 21.9	+30.9	97.9	44
45	67 31.3	+10.7•	78.5	67 42.0	+13.3•	80.9	67 50.2	+16.0•	83.4	67 55.9	+18.6•	85.8	67 59.0	+21.3•	88.3	67 59.5	+23.9•	90.7	67 57.4	+26.5•	93.2	67 52.8	+29.0	95.7	45
46	67 42.0	+8.2•	76.0	67 55.3	+10.9•	78.3	68 06.2	+13.6•	80.8	68 14.5	+16.3•	83.3	68 20.3	+19.0•	85.8	68 23.4	+21.7•	88.3	68 23.9	+24.3•	90.8	68 21.8	+26.9•	93.3	46
47	67 50.2	+5.7•	73.3	68 06.2	+8.3•	75.7	68 19.8	+11.0•	78.2	68 30.8	+13.8•	80.6	68 39.3	+16.5•	83.2	68 45.1	+19.3•	85.7	68 48.2	+22.0•	88.3	68 48.7	+24.7•	90.9	47
48	67 55.9	+3.1•	70.7	68 14.5	+5.8•	73.1	68 30.8	+8.5•	75.5	68 44.6	+11.2•	78.0	68 55.8	+14.0•	80.5	69 04.4	+16.8•	83.1	69 10.2	+19.6•	85.7	69 13.4	+22.3•	88.3	48
49	67 59.0	+0.5•	68.0	68 20.3	+3.1•	70.4	68 39.3	+5.8•	72.8	68 55.8	+8.6•	75.2	69 09.8	+11.4•	77.8	69 21.2	+14.2•	80.4	69 29.8	+17.1•	83.0	69 35.7	+19.9•	85.7	49
50	67 59.5	-2.1•	65.4	68 23.4	+0.5•	67.7	68 45.1	+3.1•	70.0	69 04.4	+5.8•	72.5	69 21.2	+8.6•	75.0	69 35.4	+11.5•	77.6	69 46.9	+14.4•	80.3	69 55.6	+17.3•	83.0	50
51	67 57.4	-4.6•	62.7	68 23.9	-2.1•	64.9	68 48.2	+0.5•	67.3	69 10.2	+3.2•	69.7	69 29.8	+5.9•	72.2	69 46.9	+8.7•	74.8	70 01.3	+11.6•	77.4	70 12.9	+14.7•	80.2	51
52	67 52.8	-7.2•	60.0	68 21.8	-4.8•	62.2	68 48.7	-2.3•	64.5	69 13.4	+0.3•	66.9	69 35.7	+3.1•	69.4	69 55.6	+6.0•	71.9	70 12.9	+8.9•	74.6	70 27.6	+11.8•	77.3	52
53	67 45.6	-9.7•	57.4	68 17.0	-7.4•	59.5	68 46.4	-4.9•	61.7	69 13.7	-2.4•	64.1	69 38.8	+0.3•	66.5	70 01.6	+3.0•	69.0	70 21.8	+5.9•	71.6	70 39.4	+8.9•	74.3	53
54	67 35.9	-12.2•	54.8	68 09.6	-10.0•	56.9	68 41.5	-7.6•	59.0	69 11.3	-5.1•	61.2	69 39.1	-2.5•	63.6	70 04.6	+0.2•	66.1	70 27.7	+3.1•	68.7	70 48.3	+5.9•	71.3	54
55	67 23.7	-14.5•	52.3	67 59.6	-12.4•	54.2	68 33.9	-10.3•	56.3	69 06.2	-7.8•	58.4	69 36.6	-5.3•	60.7	70 04.8	-2.7•	63.1	70 30.8	0.0•	65.7	70 54.2	+3.0•	68.3	55
56	67 09.2	-16.9•	49.7	67 47.2	-14.9•	51.6	68 23.6	-12.7•	53.6	68 58.4	-10.5•	55.7	69 31.3	-8.1•	57.9	70 02.1	-5.5•	60.2	70 30.8	-2.9•	62.7	70 57.2	-0.1•	65.2	56
57	66 52.3	-19.1•	47.3	67 32.3	-17.2•	49.1	68 10.9	-15.2•	50.9	68 47.9	-13.1•	52.9	69 23.2	-10.9•	55.1	69 56.6	-8.4•	57.3	70 27.9	-5.8•	59.7	70 57.1	-3.1•	62.2	57
58	66 33.2	-21.2•	44.9	67 15.1	-19.5•	46.6	67 55.7	-17.6•	48.4	68 34.8	-15.6•	50.3	69 12.3	-13.4•	52.3	69 48.2	-11.2•	54.4	70 22.1	-8.7•	56.7	70 54.0	-6.1•	59.1	58
59	66 12.0	-23.3•	42.6	66 55.6	-21.6•	44.1	67 38.1	-20.0•	46.0	68 19.2	-18.0•	47.6	68 58.9	-16.0•	49.5	69 37.0	-13.9•	51.6	70 13.4	-11.6•	53.8	70 47.9	-9.1•	56.1	59
60	65 48.7	-25.2	40.3	66 34.0	-23.8•	41.8	67 18.1	-22.1•	43.4	68 01.2	-20.4•	45.1	68 42.9	-18.5•	46.9	69 23.1	-16.4•	48.8	70 01.8	-14.3•	50.9	70 38.8	-12.0•	53.1	60
61	65 23.5	-27.1	38.1	66 10.2	-25.7	39.5	66 56.0	-24.2•	41.0	67 40.8	-22.6•	42.6	68 24.4	-20.9•	44.3	69 06.7	-19.0•	46.1	69 47.5	-16.9•	48.1	70 26.8	-14.7•	50.1	61
62	64 56.4	-28.9	36.0	65 44.5	-27.5	37.3	66 31.8	-26.1	38.7	67 18.2	-24.7•	40.1	68 03.5	-23.1•	41.7	68 47.7	-21.4•	43.5	69 30.6	-19.5•	45.3	70 12.1	-17.5•	47.3	62
63	64 27.5	-30.5	33.9	65 17.0	-29.3	35.1	66 05.7	-28.1	36.4	66 53.5	-26.7	37.8	67 40.4	-25.2•	39.3	68 26.3	-23.6•	40.9	69 11.1	-21.9•	42.6	69 54.6	-20.0•	44.5	63
64	63 57.0	-32.0	31.9	64 47.7	-31.0	33.1	65 37.6	-29.8	34.3	66 26.8	-28.6	35.5	67 15.2	-27.2•	36.9	68 02.7	-25.8•	38.4	68 49.2	-24.2•	40.0	69 34.6	-22.5•	41.7	64
65	63 25.0	-33.5	30.0	64 16.7	-32.6	31.1	65 07.8	-31.5	32.2	65 58.2	-30.3	33.4	66 48.0	-29.2	34.6	67 36.9	-27.8•	36.0	68 25.0	-26.4•	37.5	69 12.1	-24.8•	39.1	65
66	62 51.5	-34.9	28.2	63 44.1	-34.0	29.1	64 36.3	-33.1	30.2	65 27.9	-32.0	31.3	66 18.8	-30.9	32.4	67 09.1	-29.8	33.7	67 58.6	-28.4•	35.1	68 47.3	-27.1•	36.6	66
67	62 16.6	-36.2	26.4	63 10.1	-35.4	27.3	64 03.2	-34.5	28.2	64 55.9	-33.6	29.3	65 47.9	-32.6	30.3	66 39.3	-31.5	31.5	67 30.2	-30.4	32.8	68 20.2	-29.0•	34.1	67
68	61 40.4	-37.4	24.7	62 34.7	-36.5	25.5	63 28.7	-36.0	26.4	64 22.2	-35.1	27.3	65 15.3	-34.2	28.3	66 07.8	-33.2	29.4	66 59.8	-32.2	30.5	67 51.2	-31.1	31.8	68
69	61 03.0	-38.6	23.1	61 58.0	-37.9	23.8	62 52.7	-37.2	24.6	63 47.1	-36.4	25.5	64 41.1	-35.7	26.4	65 34.6	-34.8	27.3	66 27.6	-33.8	28.4	67 20.1	-32.8	29.5	69
70	60 24.4	-39.6	21.5	61 20.1	-39.0	22.2	62 15.5	-38.4	22.9	63 10.7	-37.8	23.7	64 05.4	-37.0	24.5	64 59.8	-36.2	25.4	65 53.8	-35.4	26.3	66 47.3	-34.4	27.4	70
71	59 44.8	-40.5	20.0	60 41.1	-40.1	20.6	61 37.1	-39.5	21.3	62 32.9	-38.9	22.0	63 28.4	-38.3	22.7	64 23.6	-37.6	23.5	65 18.4	-36.8	24.4	66 12.9	-36.1	25.3	71
72	59 04.3	-41.6	18.6	60 01.0	-41.0	19.1	60 57.6	-40.5	19.7	61 54.0	-40.0	20.3	62 50.1	-39.4	21.0	63 46.0	-38.9	21.7	64 41.6	-38.2	22.5	65 36.8	-37.4	23.4	72
73	58 22.7	-42.4	17.2	59 20.0	-42.0	17.7	60 17.1	-41.6	18.2	61 14.0	-41.1	18.8	62 10.7	-40.6	19.4	63 07.1	-40.0	20.0	64 03.4	-39.5	20.7	64 59.4	-38.9	21.5	73
74	57 40.3	-43.2	15.9	58 38.0	-42.8	16.3	59 35.5	-42.4	16.8	60 32.9	-42.1	17.3	61 30.1	-41.6	17.8	62 27.1	-41.1	18.4	63 23.9	-40.6	19.0	64 20.5	-40.0	19.7	74
75	56 57.1	-43.9	14.6	57 55.2	-43.7	15.0	58 53.1	-43.3	15.4	59 50.8	-42.9	15.8	60 48.5	-42.6	16.3	61 46.0	-42.1	16.9	62 43.3	-41.6	17.4	63 40.5	-41.2	18.0	75
76	56 13.2	-44.7	13.3	57 11.5	-44.4	13.7	58 09.8	-44.1	14.1	59 07.9	-43.8	14.5	60 05.9	-43.4	14.9	61 03.9	-43.1	15.4	62 01.7	-42.7	15.9	62 59.3	-42.3	16.4	76
77	55 28.5	-45.3	12.1	56 27.1	-45.1	12.5	57 25.7	-44.9	12.8	58 24.1	-44.5	13.2	59 22.5	-44.2	13.5	60 20.8	-43.9	13.9	61 19.0	-43.6	14.4	62 17.0	-43.2	14.9	77
78	54 43.2	-46.0	11.0	55 42.0	-45.7	11.3	56 40.8	-45.5	11.6	57 39.6	-45.3	11.9	58 38.3	-45.1	12.2	59 36.9	-44.8	12.6	60 35.4	-44.5	13.0	61 33.8	-44.1	13.4	78
79	53 57.2	-46.6	9.9	54 56.3	-46.4	10.1	55 55.3	-46.2	10.4	56 54.3	-46.0	10.7	57 53.2	-45.7	11.0	58 52.1	-45.5	11.3	59 50.9	-45.2	11.6	60 49.7	-45.0	12.0	79
80	53 10.6	-47.1	8.8	54 09.9	-46.9	9.0	55 09.1	-46.7	9.3	56 08.3	-46.5	9.5	57 07.5	-46.4	9.8	58 06.6	-46.2	10.0	59 05.7	-46.0	10.3	60 04.7	-45.8	10.6	80
81	52 23.5	-47.6	7.8	53 23.0	-47.5	8.0	54 22.4	-47.4	8.2	55 21.8	-47.2	8.4	56 21.1	-47.0	8.6	57 20.4	-46.9	8.8	58 19.7	-46.7	9.1	59 18.9	-46.5	9.3	81
82	51 35.9	-48.1	6.8	52 35.5	-48.0	7.0	53 35.0	-47.8	7.1	54 34.6	-47.8	7.3	55 34.1	-47.6	7.5	56 33.5	-47.4	7.7	57 33.0	-47.3	7.9	58 32.4	-47.2	8.1	82
83	50 47.8	-48.5	5.9	51 47.5	-48.4	6.0	52 47.2	-48.4	6.1	53 46.8	-48.2	6.3	54 46.5	-48.2	6.4	55 46.1	-48.0	6.6	56 45.7	-47.9	6.8	57 45.2	-47.7	7.0	83
84	49 59.3	-49.0	4.9	50 59.1	-48.9	5.0	51 58.8	-48.8	5.2	52 58.6	-48.7	5.3	53 58.3	-48.6	5.5	54 58.1	-48.6	5.5	55 57.5	-48.4	5.7	56 57.5	-48.4	5.8	84
85	49 10.3	-49.3	4.1	50 10.2	-49.3	4.1	51 10.0	-49.2	4.2	52 09.9	-49.2	4.3	53 09.7	-49.1	4.4	54 09.5	-49.0	4.5	55 09.3	-49.0	4.6	56 09.1	-48.9	4.8	85
86	48 21.0	-49.8	3.2	49 20.9	-49.7	3.3	50 20.8	-49.7	3.3	51 20.7	-49.6	3.4	52 20.6	-49.6	3.5	53 20.5	-49.5	3.5	54 20.3	-49.4	3.6	55 20.2	-49.4	3.7	86
87	47 31.2	-50.0	2.4	48 31.2	-50.0	2.4	49 31.1	-50.0	2.4	50 31.1	-50.0	2.5	51 31.0	-49.9	2.5	52 31.0	-50.0	2.6	53 30.9	-49.9	2.7	54 30.8	-49.9	2.7	87
88	46 41.2	-50.5	1.5	47 41.1	-50.4	1.6	48 41.1	-50.4	1.6	49 41.1	-50.4	1.6	50 41.1	-50.4	1.7	51 41.0	-50.3	1.7	52 41.0	-50.3	1.7	53 41.0	-50.3	1.8	88
89	45 50.7	-50.7	0.8	46 50.7	-50.7	0.8	47 50.7	-50.7	0.8	48 50.7	-50.7	0.8	49 50.7	-50.7	0.8	50 50.7	-50.7	0.8	51 50.7	-50.7	0.9	52 50.7	-50.7	0.9	89
90	45 00.0	-51.0	0.0	46 00.0	-51.0	0.0	47 00.0	-51.0	0.0	48 00.0	-51.0	0.0	49 00.0	-51.0	0.0	50 00.0	-51.1	0.0	51 00.0	-51.1	0.0	52 00.0	-51.1	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	36 50.7	−53.1	138.5	36 05.6	−53.5	139.0	35 20.1	−53.8	139.5	34 34.4	−54.2	139.9	33 48.3	−54.5	140.4	33 02.0	−54.9	140.8	32 15.3	−55.2	141.2	31 28.4	−55.4	141.6	0
1	35 57.6	−53.2	139.1	35 12.1	−53.6	139.6	34 26.3	−54.0	140.0	33 40.2	−54.4	140.5	32 53.8	−54.7	140.9	32 07.1	−55.0	141.3	31 20.1	−55.3	141.7	30 33.0	−55.6	142.0	1
2	35 04.4	−53.4	139.7	34 18.5	−53.8	140.1	33 32.3	−54.1	140.6	32 45.8	−54.4	141.0	31 59.1	−54.8	141.4	31 12.1	−55.1	141.7	30 24.8	−55.3	142.1	29 37.4	−55.7	142.5	2
3	34 11.0	−53.6	140.2	33 24.7	−53.9	140.7	32 38.2	−54.3	141.1	31 51.4	−54.6	141.5	31 04.3	−54.9	141.8	30 17.0	−55.2	142.2	29 29.5	−55.5	142.6	28 41.7	−55.7	142.9	3
4	33 17.4	−53.7	140.8	32 30.8	−54.1	141.2	31 43.9	−54.4	141.6	30 56.8	−54.7	141.9	30 09.4	−55.0	142.3	29 21.8	−55.3	142.7	28 34.0	−55.5	143.0	27 46.0	−55.8	143.3	4
5	32 23.7	−53.8	141.3	31 36.7	−54.1	141.7	30 49.5	−54.5	142.1	30 02.1	−54.8	142.4	29 14.4	−55.1	142.8	28 26.5	−55.3	143.1	27 38.5	−55.7	143.4	26 50.2	−55.9	143.7	5
6	31 29.9	−54.0	141.8	30 42.6	−54.3	142.2	29 55.0	−54.5	142.6	29 07.3	−54.9	142.9	28 19.3	−55.1	143.2	27 31.2	−55.4	143.5	26 42.8	−55.7	143.8	25 54.3	−55.9	144.1	6
7	30 35.9	−54.1	142.3	29 48.3	−54.4	142.7	29 00.5	−54.7	143.0	28 12.4	−55.0	143.4	27 24.2	−55.3	143.7	26 35.8	−55.6	144.0	25 47.1	−55.7	144.3	24 58.4	−56.1	144.5	7
8	29 41.8	−54.2	142.8	28 53.9	−54.5	143.2	28 05.8	−54.8	143.5	27 17.4	−55.0	143.8	26 28.9	−55.3	144.1	25 40.2	−55.5	144.4	24 51.4	−55.9	144.7	24 02.3	−56.0	144.9	8
9	28 47.6	−54.3	143.3	27 59.4	−54.6	143.6	27 11.0	−54.9	144.0	26 22.4	−55.2	144.3	25 33.6	−55.4	144.5	24 44.7	−55.7	144.8	23 55.5	−55.9	145.1	23 06.3	−56.2	145.3	9
10	27 53.3	−54.3	143.8	27 04.8	−54.6	144.1	26 16.1	−54.9	144.4	25 27.2	−55.2	144.7	24 38.2	−55.5	145.0	23 49.0	−55.7	145.2	22 59.6	−55.9	145.5	22 10.1	−56.1	145.7	10
11	26 59.0	−54.4	144.3	26 10.2	−54.8	144.6	25 21.2	−55.1	144.9	24 32.0	−55.3	145.1	23 42.7	−55.5	145.4	22 53.3	−55.8	145.6	22 03.7	−56.0	145.9	21 14.0	−56.3	146.1	11
12	26 04.5	−54.6	144.8	25 15.4	−54.9	145.0	24 26.1	−55.1	145.3	23 36.7	−55.3	145.5	22 47.2	−55.6	145.8	21 57.5	−55.8	146.0	21 07.7	−56.1	146.2	20 17.7	−56.2	146.5	12
13	25 09.9	−54.7	145.2	24 20.5	−54.9	145.5	23 31.0	−55.1	145.7	22 41.4	−55.4	146.0	21 51.6	−55.7	146.2	21 01.7	−55.9	146.4	20 11.6	−56.1	146.6	19 21.5	−56.4	146.8	13
14	24 15.2	−54.7	145.7	23 25.6	−55.0	145.9	22 35.9	−55.3	146.2	21 46.0	−55.5	146.4	20 55.9	−55.7	146.6	20 05.8	−56.0	146.8	19 15.5	−56.1	147.0	18 25.1	−56.3	147.2	14
15	23 20.5	−54.8	146.1	22 30.6	−55.0	146.4	21 40.6	−55.3	146.6	20 50.5	−55.6	146.8	20 00.2	−55.8	147.0	19 09.8	−55.9	147.2	18 19.4	−56.2	147.4	17 28.8	−56.4	147.5	15
16	22 25.7	−54.9	146.6	21 35.6	−55.2	146.8	20 45.3	−55.4	147.0	19 54.9	−55.6	147.2	19 04.4	−55.8	147.4	18 13.9	−56.1	147.6	17 23.2	−56.3	147.7	16 32.4	−56.5	147.9	16
17	21 30.8	−54.9	147.0	20 40.4	−55.2	147.2	19 49.9	−55.4	147.4	18 59.3	−55.6	147.6	18 08.6	−55.8	147.8	17 17.8	−56.0	147.9	16 26.9	−56.2	148.1	15 35.9	−56.4	148.3	17
18	20 35.9	−55.1	147.4	19 45.2	−55.2	147.6	18 54.5	−55.5	147.8	18 03.7	−55.7	148.0	17 12.8	−55.9	148.2	16 21.8	−56.2	148.3	15 30.7	−56.4	148.5	14 39.5	−56.5	148.6	18
19	19 40.8	−55.0	147.9	18 50.0	−55.3	148.0	17 59.0	−55.5	148.2	17 08.0	−55.7	148.4	16 16.9	−56.0	148.5	15 25.6	−56.1	148.7	14 34.3	−56.3	148.8	13 43.0	−56.6	149.0	19
20	18 45.8	−55.2	148.3	17 54.7	−55.4	148.4	17 03.5	−55.6	148.6	16 12.3	−55.8	148.8	15 20.9	−56.0	148.9	14 29.5	−56.2	149.0	13 38.0	−56.4	149.2	12 46.4	−56.5	149.3	20
21	17 50.6	−55.1	148.7	16 59.3	−55.4	148.8	16 07.9	−55.6	149.0	15 16.5	−55.8	149.1	14 24.9	−56.0	149.3	13 33.3	−56.2	149.4	12 41.6	−56.4	149.5	11 49.9	−56.6	149.6	21
22	16 55.5	−55.3	149.1	16 03.9	−55.4	149.2	15 12.3	−55.6	149.4	14 20.7	−55.9	149.5	13 28.9	−56.0	149.7	12 37.1	−56.2	149.8	11 45.2	−56.4	149.9	10 53.3	−56.6	150.0	22
23	16 00.2	−55.4	149.5	15 08.5	−55.5	149.6	14 16.7	−55.7	149.8	13 24.8	−55.9	149.9	12 32.9	−56.1	150.0	11 40.9	−56.3	150.1	10 48.8	−56.4	150.2	9 56.7	−56.6	150.3	23
24	15 05.0	−55.4	149.9	14 13.0	−55.5	150.0	13 21.0	−55.7	150.2	12 28.9	−55.9	150.3	11 36.8	−56.1	150.4	10 44.6	−56.3	150.5	9 52.4	−56.5	150.6	9 00.1	−56.7	150.7	24
25	14 09.6	−55.3	150.3	13 17.5	−55.6	150.5	12 25.3	−55.8	150.5	11 33.0	−55.9	150.6	10 40.7	−56.2	150.7	9 48.3	−56.3	150.8	8 55.9	−56.5	150.9	8 03.4	−56.6	151.0	25
26	13 14.3	−55.4	150.7	12 21.9	−55.6	150.8	11 29.5	−55.8	150.9	10 37.1	−56.0	151.0	9 44.5	−56.1	151.1	8 52.0	−56.3	151.2	7 59.4	−56.5	151.3	7 06.8	−56.7	151.3	26
27	12 18.9	−55.4	151.1	11 26.3	−55.6	151.2	10 33.7	−55.8	151.3	9 41.1	−56.0	151.4	8 48.4	−56.2	151.5	7 55.7	−56.4	151.5	7 02.9	−56.5	151.6	6 10.1	−56.7	151.6	27
28	11 23.5	−55.5	151.5	10 30.7	−55.6	151.6	9 37.9	−55.8	151.7	8 45.1	−56.0	151.7	7 52.2	−56.2	151.8	6 59.3	−56.3	151.9	6 06.4	−56.5	151.9	5 13.4	−56.7	152.0	28
29	10 28.0	−55.5	151.9	9 35.1	−55.7	152.0	8 42.1	−55.9	152.0	7 49.1	−56.1	152.1	6 56.0	−56.2	152.2	6 03.0	−56.4	152.2	5 09.9	−56.5	152.3	4 16.7	−56.7	152.3	29
30	9 32.5	−55.5	152.3	8 39.4	−55.7	152.3	7 46.2	−55.9	152.4	6 53.0	−56.1	152.5	5 59.8	−56.2	152.5	5 06.6	−56.4	152.6	4 13.3	−56.5	152.6	3 20.0	−56.7	152.6	30
31	8 37.0	−55.5	152.7	7 43.7	−55.7	152.7	6 50.3	−55.8	152.8	5 57.0	−56.1	152.8	5 03.6	−56.2	152.9	4 10.2	−56.4	152.9	3 16.8	−56.6	152.9	2 23.3	−56.7	153.0	31
32	7 41.5	−55.6	153.0	6 48.0	−55.8	153.1	5 54.5	−55.9	153.1	5 00.9	−56.1	153.2	4 07.4	−56.3	153.2	3 13.8	−56.4	153.2	2 20.2	−56.6	153.3	1 26.6	−56.7	153.3	32
33	6 45.9	−55.6	153.4	5 52.2	−55.7	153.5	4 58.6	−56.0	153.5	4 04.8	−56.0	153.5	3 11.1	−56.2	153.6	2 17.4	−56.4	153.6	1 23.6	−56.6	153.6	0 29.9	−56.7	153.6	33
34	5 50.3	−55.6	153.8	4 56.5	−55.8	153.8	4 02.6	−55.9	153.9	3 08.8	−56.1	153.9	2 14.9	−56.3	153.9	1 21.0	−56.4	153.9	0 27.1	−56.6	153.9	0 26.8	+56.7	26.1	34
35	4 54.7	−55.6	154.2	4 00.7	−55.7	154.2	3 06.7	−55.9	154.2	2 12.7	−56.1	154.3	1 18.6	−56.2	154.3	0 24.6	−56.4	154.3	0 29.5	+56.5	25.7	1 23.5	+56.7	25.7	35
36	3 59.1	−55.6	154.5	3 05.0	−55.8	154.6	2 10.8	−56.0	154.6	1 16.6	−56.1	154.6	0 22.4	−56.3	154.6	0 31.8	+56.5	25.4	1 26.0	+56.6	25.4	2 20.2	+56.8	25.4	36
37	3 03.5	−55.6	154.9	2 09.2	−55.8	154.9	1 14.8	−55.9	155.0	0 20.5	−56.1	155.0	0 33.9	+56.2	25.0	1 28.3	+56.4	25.0	2 22.6	+56.6	25.1	3 17.0	+56.7	25.1	37
38	2 07.9	−55.6	155.3	1 13.4	−55.8	155.3	0 18.9	−56.0	155.3	0 35.6	+55.9	24.7	1 30.1	+56.3	24.7	2 24.7	+56.4	24.7	3 19.2	+56.6	24.7	4 13.7	+56.7	24.8	38
39	1 12.3	−55.6	155.7	0 17.6	−55.8	155.7	0 37.1	+55.9	24.3	1 31.7	+56.1	24.3	2 26.4	+56.3	24.3	3 21.1	+56.4	24.4	4 15.7	+56.6	24.4	5 10.4	+56.6	24.4	39
40	0 16.7	−55.7	156.0	0 38.2	+55.8	24.0	1 33.0	+55.9	24.0	2 27.8	+56.1	24.0	3 22.6	+56.3	24.0	4 17.5	+56.3	24.0	5 12.3	+56.5	24.1	6 07.0	+56.7	24.1	40
41	0 39.0	+55.6	23.6	1 34.0	+55.7	23.6	2 28.9	+56.0	23.6	3 23.9	+56.1	23.6	4 18.9	+56.2	23.6	5 13.8	+56.4	23.7	6 08.8	+56.5	23.7	7 03.7	+56.7	23.8	41
42	1 34.6	+55.6	23.2	2 29.7	+55.8	23.2	3 24.9	+55.9	23.2	4 20.0	+56.1	23.3	5 15.1	+56.2	23.3	6 10.2	+56.4	23.3	7 05.3	+56.5	23.4	8 00.4	+56.6	23.4	42
43	2 30.2	+55.6	22.8	3 25.5	+55.8	22.9	4 20.8	+55.9	22.9	5 16.1	+56.0	22.9	6 11.3	+56.2	22.9	7 06.6	+56.3	23.0	8 01.8	+56.5	23.0	8 57.0	+56.6	23.1	43
44	3 25.8	+55.6	22.4	4 21.3	+55.7	22.5	5 16.7	+55.9	22.5	6 12.1	+56.1	22.5	7 07.5	+56.2	22.6	8 02.9	+56.4	22.6	8 58.3	+56.5	22.7	9 53.6	+56.6	22.8	44
45	4 21.4	+55.6	22.1	5 17.0	+55.8	22.1	6 12.6	+55.9	22.1	7 08.2	+56.0	22.2	8 03.7	+56.2	22.2	8 59.3	+56.3	22.3	9 54.8	+56.4	22.4	10 50.2	+56.6	22.4	45
46	5 17.0	+55.6	21.7	6 12.8	+55.7	21.7	7 08.5	+55.9	21.8	8 04.2	+56.0	21.8	8 59.9	+56.1	21.9	9 55.6	+56.3	21.9	10 51.2	+56.4	22.0	11 46.8	+56.6	22.1	46
47	6 12.6	+55.6	21.3	7 08.5	+55.7	21.4	8 04.4	+55.8	21.4	9 00.2	+56.0	21.5	9 56.0	+56.2	21.5	10 51.9	+56.2	21.6	11 47.6	+56.4	21.7	12 43.4	+56.5	21.7	47
48	7 08.2	+55.5	20.9	8 04.2	+55.7	21.0	9 00.2	+55.8	21.0	9 56.2	+56.0	21.1	10 52.2	+56.1	21.2	11 48.1	+56.3	21.2	12 44.0	+56.4	21.3	13 39.9	+56.5	21.4	48
49	8 03.7	+55.6	20.6	8 59.9	+55.7	20.6	9 56.0	+55.9	20.7	10 52.2	+55.9	20.7	11 48.3	+56.1	20.8	12 44.4	+56.2	20.9	13 40.4	+56.3	21.0	14 36.4	+56.5	21.1	49
50	8 59.3	+55.5	20.2	9 55.6	+55.6	20.2	10 51.9	+55.7	20.4	11 48.1	+55.9	20.4	12 44.4	+56.0	20.4	13 40.6	+56.1	20.5	14 36.7	+56.3	20.6	15 32.9	+56.4	20.7	50
51	9 54.8	+55.4	19.8	10 51.2	+55.6	19.9	11 47.6	+55.8	19.9	12 44.0	+55.9	20.0	13 40.4	+56.0	20.1	14 36.7	+56.2	20.2	15 33.0	+56.3	20.3	16 29.3	+56.4	20.4	51
52	10 50.2	+55.5	19.4	11 46.8	+55.6	19.5	12 43.4	+55.7	19.5	13 39.9	+55.8	19.6	14 36.4	+56.0	19.7	15 32.9	+56.1	19.8	16 29.3	+56.3	19.9	17 25.7	+56.4	20.0	52
53	11 45.7	+55.4	19.0	12 42.4	+55.5	19.1	13 39.1	+55.7	19.2	14 35.7	+55.8	19.2	15 32.4	+55.9	19.3	16 29.0	+56.1	19.4	17 25.6	+56.1	19.5	18 22.1	+56.3	19.6	53
54	12 41.1	+55.4	18.6	13 37.9	+55.6	18.7	14 34.8	+55.6	18.8	15 31.6	+55.7	18.9	16 28.3	+55.9	19.0	17 25.1	+56.0	19.1	18 21.7	+56.1	19.2	19 18.4	+56.3	19.3	54
55	13 36.5	+55.3	18.2	14 33.5	+55.4	18.3	15 30.4	+55.6	18.4	16 27.3	+55.8	18.5	17 24.2	+55.9	18.6	18 21.1	+56.0	18.7	19 17.9	+56.1	18.8	20 14.7	+56.2	18.9	55
56	14 31.8	+55.3	17.8	15 28.9	+55.5	17.9	16 26.0	+55.6	18.0	17 23.1	+55.6	18.1	18 20.1	+55.8	18.2	19 17.1	+55.9	18.3	20 14.0	+56.1	18.4	21 10.9	+56.2	18.5	56
57	15 27.1	+55.3	17.4	16 24.4	+55.3	17.5	17 21.6	+55.5	17.6	18 18.7	+55.7	17.7	19 15.9	+55.7	17.8	20 13.0	+55.9	17.9	21 10.1	+56.0	18.0	22 07.1	+56.1	18.2	57
58	16 22.4	+55.2	17.0	17 19.7	+55.4	17.1	18 17.1	+55.4	17.2	19 14.4	+55.6	17.3	20 11.6	+55.7	17.4	21 08.9	+55.8	17.5	22 06.1	+55.9	17.6	23 03.2	+56.1	17.8	58
59	17 17.6	+55.1	16.6	18 15.1	+55.3	16.7	19 12.5	+55.4	16.9	20 10.0	+55.5	16.9	21 07.3	+55.7	17.0	22 04.7	+55.8	17.1	23 02.0	+55.9	17.3	23 59.3	+56.0	17.4	59
60	18 12.7	+55.2	16.2	19 10.4	+55.2	16.3	20 07.9	+55.4	16.4	21 05.5	+55.4	16.5	22 03.0	+55.6	16.6	23 00.5	+55.7	16.7	23 57.9	+55.8	16.9	24 55.3	+56.0	17.0	60
61	19 07.9	+55.0	15.8	20 05.6	+55.2	15.9	21 03.3	+55.3	16.0	22 00.9	+55.5	16.1	22 58.6	+55.5	16.2	23 56.2	+55.6	16.3	24 53.7	+55.8	16.5	25 51.3	+55.8	16.6	61
62	20 02.9	+55.0	15.4	21 00.8	+55.1	15.5	21 58.6	+55.2	15.6	22 56.4	+55.3	15.7	23 54.1	+55.5	15.8	24 51.8	+55.6	15.9	25 49.5	+55.7	16.0	26 47.1	+55.9	16.2	62
63	20 57.9	+54.9	14.9	21 55.9	+55.0	15.0	22 53.8	+55.1	15.1	23 51.7	+55.3	15.3	24 49.6	+55.3	15.4	25 47.4	+55.5	15.5	26 45.2	+55.6	15.6	27 43.0	+55.7	15.8	63
64	21 52.8	+54.9	14.5	22 50.9	+55.0	14.6	23 48.9	+55.1	14.7	24 47.0	+55.2	14.8	25 44.9	+55.4	14.9	26 42.9	+55.4	15.1	27 40.8	+55.6	15.2	28 38.7	+55.7	15.3	64
65	22 47.7	+54.8	14.1	23 45.9	+54.9	14.3	24 44.0	+55.0	14.3	25 42.2	+55.1	14.4	26 40.3	+55.2	14.5	27 38.3	+55.4	14.6	28 36.4	+55.4	14.8	29 34.4	+55.5	14.9	65
66	23 42.5	+54.7	13.6	24 40.8	+54.8	13.7	25 39.0	+55.0	13.8	26 37.3	+55.0	14.0	27 35.5	+55.1	14.1	28 33.7	+55.2	14.2	29 31.8	+55.4	14.3	30 29.9	+55.5	14.5	66
67	24 37.2	+54.6	13.2	25 35.6	+54.7	13.3	26 34.0	+54.8	13.4	27 32.3	+55.0	13.5	28 30.6	+55.1	13.6	29 28.9	+55.2	13.8	30 27.2	+55.3	13.9	31 25.4	+55.4	14.0	67
68	25 31.8	+54.5	12.7	26 30.3	+54.7	12.9	27 28.8	+54.8	12.9	28 27.3	+54.9	13.0	29 25.7	+55.0	13.2	30 24.1	+55.1	13.3	31 22.5	+55.2	13.4	32 20.8	+55.3	13.6	68
69	26 26.3	+54.4	12.2	27 25.0	+54.6	12.4	28 23.6	+54.6	12.5	29 22.1	+54.8	12.6	30 20.7	+54.8	12.7	31 19.2	+55.0	12.8	32 17.7	+55.0	13.0	33 16.1	+55.2	13.1	69
70	27 20.8	+54.3	11.8	28 19.5	+54.5	11.9	29 18.2	+54.6	12.0	30 16.9	+54.6	12.1	31 15.5	+54.8	12.2	32 14.2	+54.8	12.4	33 12.7	+55.0	12.5	34 11.3	+55.1	12.7	70
71	28 15.1	+54.3	11.3	29 14.0	+54.3	11.4	30 12.8	+54.4	11.5	31 11.5	+54.6	11.6	32 10.3	+54.6	11.8	33 09.0	+54.8	11.9	34 07.7	+54.9	12.0	35 06.4	+54.9	12.2	71
72	29 09.4	+54.1	10.8	30 08.3	+54.2	10.9	31 07.2	+54.3	11.0	32 06.1	+54.4	11.1	33 04.9	+54.6	11.3	34 03.8	+54.6	11.4	35 02.6	+54.7	11.5	36 01.3	+54.9	11.7	72
73	30 03.5	+54.0	10.3	31 02.5	+54.2	10.4	32 01.5	+54.3	10.5	33 00.5	+54.4	10.6	33 59.5	+54.4	10.8	34 58.4	+54.6	10.9	35 57.3	+54.6	11.0	36 56.2	+54.7	11.2	73
74	30 57.5	+54.0	9.8	31 56.7	+54.0	9.9	32 55.8	+54.0	10.0	33 54.8	+54.2	10.1	34 53.9	+54.3	10.3	35 52.9	+54.4	10.4	36 51.9	+54.5	10.5	37 50.9	+54.6	10.7	74
75	31 51.5	+53.7	9.3	32 50.7	+53.8	9.4	33 49.8	+53.8	9.5	34 49.0	+54.1	9.6	35 48.2	+54.1	9.7	36 47.3	+54.2	9.9	37 46.4	+54.3	10.0	38 45.5	+54.4	10.1	75
76	32 45.2	+53.7	8.8	33 44.5	+53.8	8.9	34 43.8	+53.8	9.0	35 43.1	+53.9	9.1	36 42.3	+54.0	9.2	37 41.5	+54.1	9.3	38 40.7	+54.2	9.5	39 39.9	+54.2	9.6	76
77	33 38.9	+53.5	8.2	34 38.3	+53.5	8.3	35 37.6	+53.7	8.4	36 37.0	+53.7	8.5	37 36.3	+53.8	8.7	38 35.6	+53.9	8.8	39 34.9	+54.0	8.9	40 34.1	+54.1	9.0	77
78	34 32.4	+53.3	7.7	35 31.8	+53.5	7.8	36 31.3	+53.5	7.9	37 30.7	+53.6	8.0	38 30.1	+53.7	8.1	39 29.5	+53.8	8.2	40 28.9	+53.8	8.3	41 28.2	+54.0	8.5	78
79	35 25.7	+53.2	7.1	36 25.3	+53.3	7.2	37 24.8	+53.3	7.3	38 24.3	+53.4	7.4	39 23.8	+53.5	7.5	40 23.3	+53.5	7.6	41 22.7	+53.7	7.7	42 22.2	+53.7	7.9	79
80	36 18.9	+53.1	6.6	37 18.5	+53.1	6.6	38 18.1	+53.2	6.7	39 17.7	+53.3	6.8	40 17.3	+53.3	6.9	41 16.8	+53.4	7.0	42 16.4	+53.4	7.1	43 15.9	+53.5	7.3	80
81	37 12.0	+52.8	6.0	38 11.6	+53.0	6.1	39 11.3	+53.0	6.1	40 11.0	+53.0	6.2	41 10.6	+53.1	6.3	42 10.2	+53.2	6.4	43 09.8	+53.3	6.5	44 09.4	+53.4	6.6	81
82	38 04.8	+52.7	5.4	39 04.6	+52.7	5.5	40 04.3	+52.8	5.5	41 04.0	+52.9	5.6	42 03.7	+52.9	5.7	43 03.4	+53.0	5.8	44 03.1	+53.0	5.9	45 02.8	+53.1	6.0	82
83	38 57.5	+52.5	4.8	39 57.3	+52.5	4.8	40 57.1	+52.6	4.9	41 56.9	+52.6	5.0	42 56.6	+52.7	5.1	43 56.4	+52.7	5.1	44 56.1	+52.8	5.2	45 55.9	+52.9	5.3	83
84	39 50.0	+52.2	4.2	40 49.8	+52.3	4.2	41 49.7	+52.3	4.3	42 49.5	+52.4	4.3	43 49.3	+52.5	4.4	44 49.1	+52.5	4.5	45 48.9	+52.6	4.6	46 48.8	+52.6	4.6	84
85	40 42.2	+52.1	3.5	41 42.1	+52.1	3.5	42 42.0	+52.1	3.6	43 41.9	+52.2	3.7	44 41.8	+52.2	3.7	45 41.6	+52.3	3.8	46 41.5	+52.3	3.9	47 41.4	+52.3	3.9	85
86	41 34.3	+51.8	2.8	42 34.2	+51.9	2.9	43 34.1	+51.9	2.9	44 34.1	+51.9	3.0	45 34.0	+51.9	3.0	46 33.9	+52.0	3.1	47 33.8	+52.0	3.1	48 33.7	+52.1	3.2	86
87	42 26.1	+51.6	2.2	43 26.1	+51.6	2.2	44 26.0	+51.6	2.2	45 25.9	+51.7	2.3	46 25.9	+51.7	2.3	47 25.9	+51.7	2.3	48 25.8	+51.7	2.4	49 25.8	+51.7	2.4	87
88	43 17.7	+51.3	1.5	44 17.6	+51.4	1.5	45 17.6	+51.4	1.5	46 17.6	+51.4	1.5	47 17.6	+51.4	1.6	48 17.6	+51.3	1.6	49 17.5	+51.4	1.6	50 17.5	+51.4	1.7	88
89	44 09.0	+51.0	0.7	45 09.0	+51.0	0.8	46 09.0	+51.0	0.8	47 09.0	+51.0	0.8	48 09.0	+51.0	0.8	49 08.9	+51.1	0.8	50 08.9	+51.1	0.8	51 08.9	+51.1	0.8	89
90	45 00.0	+50.7	0.0	46 00.0	+50.7	0.0	47 00.0	+50.7	0.0	48 00.0	+50.7	0.0	49 00.0	+50.7	0.0	50 00.0	+50.7	0.0	51 00.0	+50.7	0.0	52 00.0	+50.7	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION　　**L.H.A. 148°, 212°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	36 22.3	+52.6	137.4	35 38.0	+53.0	137.9	34 53.3	+53.4	138.4	34 08.2	+53.8	138.9	33 22.9	+54.2	139.3	32 37.3	+54.5	139.7	31 51.4	+54.8	140.1	31 05.2	+55.2	140.5	0
1	37 14.9	+52.5	136.8	36 31.0	+52.8	137.3	35 46.7	+53.3	137.8	35 02.0	+53.7	138.3	34 17.1	+54.0	138.8	33 31.8	+54.4	139.2	32 46.2	+54.8	139.6	32 00.4	+55.0	140.0	1
2	38 07.4	+52.2	136.2	37 23.8	+52.7	136.8	36 40.0	+53.0	137.3	35 55.7	+53.5	137.8	35 11.1	+53.9	138.2	34 26.2	+54.3	138.7	33 41.0	+54.6	139.1	32 55.4	+55.0	139.6	2
3	38 59.6	+52.0	135.6	38 16.5	+52.5	136.1	37 33.0	+53.0	136.7	36 49.2	+53.3	137.2	36 05.0	+53.7	137.7	35 20.5	+54.1	138.2	34 35.6	+54.5	138.6	33 50.4	+54.8	139.1	3
4	39 51.6	+51.8	134.9	39 09.0	+52.3	135.5	38 26.0	+52.7	136.1	37 42.5	+53.2	136.6	36 58.7	+53.6	137.1	36 14.6	+54.0	137.7	35 30.1	+54.3	138.1	34 45.2	+54.7	138.6	4
5	40 43.4	+51.5	134.3	40 01.3	+52.0	134.9	39 18.7	+52.5	135.5	38 35.7	+53.0	136.0	37 52.3	+53.4	136.6	37 08.6	+53.8	137.1	36 24.4	+54.2	137.6	35 39.9	+54.6	138.1	5
6	41 34.9	+51.3	133.6	40 53.3	+51.8	134.2	40 11.2	+52.4	134.8	39 28.7	+52.8	135.4	38 45.7	+53.3	136.0	38 02.4	+53.6	136.5	37 18.6	+54.1	137.1	36 34.5	+54.5	137.6	6
7	42 26.2	+51.1	132.9	41 45.1	+51.6	133.6	41 03.6	+52.1	134.2	40 21.5	+52.6	134.8	39 39.0	+53.0	135.4	38 56.0	+53.5	136.0	38 12.7	+53.9	136.5	37 29.0	+54.3	137.1	7
8	43 17.3	+50.8	132.2	42 36.7	+51.4	132.9	41 55.7	+51.8	133.5	41 14.1	+52.4	134.2	40 32.0	+52.9	134.8	39 49.5	+53.3	135.4	39 06.6	+53.8	136.0	38 23.3	+54.1	136.5	8
9	44 08.1	+50.4	131.5	43 28.1	+51.0	132.2	42 47.5	+51.6	132.9	42 06.5	+52.1	133.5	41 24.9	+52.6	134.2	40 42.8	+53.2	134.8	40 00.4	+53.5	135.4	39 17.4	+54.0	136.0	9
10	44 58.5	+50.2	130.7	44 19.1	+50.8	131.4	43 39.1	+51.4	132.2	42 58.6	+51.9	132.9	42 17.5	+52.5	133.5	41 36.0	+52.9	134.2	40 53.9	+53.4	134.8	40 11.4	+53.8	135.4	10
11	45 48.7	+49.9	129.9	45 09.9	+50.5	130.7	44 30.5	+51.1	131.4	43 50.5	+51.6	132.2	43 10.0	+52.1	132.9	42 28.9	+52.7	133.5	41 47.3	+53.2	134.2	41 05.2	+53.4	134.8	11
12	46 38.6	+49.5	129.1	46 00.4	+50.1	129.9	45 21.6	+50.8	130.7	44 42.1	+51.4	131.5	44 02.1	+52.0	132.2	43 21.6	+52.5	132.9	42 40.5	+53.0	133.6	41 58.9	+53.4	134.2	12
13	47 28.1	+49.1	128.3	46 50.5	+49.9	129.1	46 12.4	+50.4	129.9	45 33.5	+51.1	130.7	44 54.1	+51.7	131.5	44 14.1	+52.2	132.2	43 33.5	+52.7	132.9	42 52.3	+53.3	133.6	13
14	48 17.2	+48.7	127.4	47 40.4	+49.4	128.3	47 02.8	+50.1	129.1	46 24.6	+50.8	130.0	45 45.8	+51.3	130.8	45 06.3	+51.9	131.5	44 26.2	+52.5	132.3	43 45.6	+53.0	133.0	14
15	49 05.9	+48.3	126.5	48 29.8	+49.1	127.4	47 52.9	+49.8	128.3	47 15.4	+50.4	129.2	46 37.1	+51.1	130.0	45 58.2	+51.7	130.8	45 18.7	+52.3	131.6	44 38.6	+52.8	132.3	15
16	49 54.2	+47.9	125.6	49 18.9	+48.6	126.5	48 42.7	+49.4	127.5	48 05.8	+50.1	128.4	47 28.2	+50.8	129.2	46 49.9	+51.4	130.1	46 11.0	+52.0	130.9	45 31.4	+52.6	131.6	16
17	50 42.1	+47.4	124.7	50 07.5	+48.2	125.7	49 32.1	+49.0	126.6	48 55.9	+49.8	127.6	48 19.0	+50.4	128.4	47 41.3	+51.1	129.3	47 03.0	+51.7	130.1	46 24.0	+52.3	131.0	17
18	51 29.5	+46.9	123.7	50 55.7	+47.8	124.7	50 21.1	+48.6	125.7	49 45.7	+49.3	126.7	49 09.4	+50.1	127.6	48 32.4	+50.8	128.5	47 54.7	+51.4	129.4	47 16.3	+52.0	130.2	18
19	52 16.4	+46.3	122.7	51 43.5	+47.2	123.7	51 09.7	+48.1	124.8	50 35.0	+48.9	125.8	49 59.5	+49.7	126.8	49 23.2	+50.4	127.7	48 46.1	+51.1	128.6	48 08.3	+51.7	129.5	19
20	53 02.7	+45.8	121.6	52 30.7	+46.8	122.8	51 57.8	+47.6	123.8	51 23.9	+48.5	124.9	50 49.2	+49.3	125.9	50 13.6	+50.0	126.9	49 37.2	+50.7	127.8	49 00.4	+51.4	128.7	20
21	53 48.5	+45.2	120.6	53 17.5	+46.1	121.7	52 45.4	+47.1	122.8	52 12.4	+48.0	123.9	51 38.4	+48.9	125.0	51 03.6	+49.6	126.0	50 27.9	+50.4	127.0	49 51.8	+51.1	127.9	21
22	54 33.7	+44.5	119.4	54 03.6	+45.6	120.6	53 32.5	+46.6	121.8	53 00.4	+47.5	122.9	52 27.3	+48.3	124.0	51 53.2	+49.2	125.1	51 18.3	+50.0	126.1	50 42.5	+50.7	127.1	22
23	55 18.2	+43.8	118.3	54 49.2	+44.9	119.5	54 19.1	+45.9	120.7	53 47.9	+46.9	121.9	53 15.6	+47.9	123.1	52 42.4	+48.8	124.2	52 08.3	+49.5	125.2	51 33.2	+50.4	126.3	23
24	56 02.0	+43.1	117.1	55 34.1	+44.3	118.4	55 05.0	+45.4	119.6	54 34.8	+46.4	120.9	54 03.5	+47.3	122.0	53 31.2	+48.2	123.2	52 57.8	+49.1	124.3	52 23.6	+49.9	125.4	24
25	56 45.1	+42.3	115.8	56 18.4	+43.5	117.2	55 50.4	+44.6	118.5	55 21.2	+45.7	119.7	54 50.8	+46.6	120.9	54 19.4	+47.7	122.2	53 46.9	+48.7	123.3	53 13.5	+49.5	124.5	25
26	57 27.4	+41.5	114.5	57 01.9	+42.7	115.9	56 35.0	+43.9	117.3	56 06.9	+44.9	118.6	55 37.6	+46.1	119.9	55 07.1	+47.2	121.1	54 35.6	+48.1	122.3	54 03.0	+49.0	123.5	26
27	58 08.9	+40.5	113.1	57 44.6	+41.9	114.6	57 18.9	+43.2	116.0	56 52.0	+44.3	117.4	56 23.7	+45.5	118.7	55 54.3	+46.5	120.0	55 23.7	+47.5	121.3	54 52.0	+48.5	122.5	27
28	58 49.4	+39.6	111.7	58 26.5	+41.0	113.2	58 02.1	+42.3	114.7	57 36.3	+43.6	116.2	57 09.2	+44.8	117.5	56 40.8	+45.9	118.9	56 11.2	+47.0	120.2	55 40.5	+47.9	121.5	28
29	59 29.0	+38.6	110.3	59 07.5	+40.0	111.8	58 44.4	+41.5	113.4	58 19.9	+42.8	114.9	57 54.0	+44.1	116.3	57 26.7	+45.3	117.7	56 58.2	+46.3	119.1	56 28.4	+47.4	120.4	29
30	60 07.6	+37.5	108.7	59 47.5	+39.1	110.4	59 25.9	+40.5	112.0	59 02.7	+41.9	113.5	58 38.0	+43.2	115.0	58 12.0	+44.4	116.5	57 44.5	+45.7	117.9	57 15.8	+46.8	119.3	30
31	60 45.1	+36.3	107.2	60 26.6	+37.9	108.8	60 06.4	+39.5	110.5	59 44.6	+40.9	112.1	59 21.2	+42.4	113.7	58 56.4	+43.7	115.2	58 30.2	+44.9	116.7	58 02.6	+46.1	118.1	31
32	61 21.4	+35.1	105.5	61 04.5	+36.8	107.3	60 45.9	+38.4	109.0	60 25.5	+40.0	110.6	60 03.6	+41.4	112.3	59 40.1	+42.8	113.9	59 15.1	+44.1	115.4	58 48.6	+45.4	116.9	32
33	61 56.5	+33.8	103.8	61 41.3	+35.6	105.6	61 24.3	+37.2	107.4	61 05.5	+38.8	109.1	60 45.0	+40.4	110.8	60 22.9	+41.9	112.4	59 59.2	+43.3	114.1	59 34.0	+44.6	115.6	33
34	62 30.3	+32.4	102.0	62 16.9	+34.2	103.9	62 01.5	+36.0	105.7	61 44.3	+37.6	107.5	61 25.4	+39.3	109.3	61 04.8	+40.8	111.0	60 42.5	+42.3	112.7	60 18.6	+43.7	114.3	34
35	63 02.7	+30.9	100.2	62 51.1	+32.8	102.1	62 37.5	+34.7	104.0	62 22.1	+36.4	105.9	62 04.7	+38.2	107.7	61 45.6	+39.9	109.5	61 24.8	+41.4	111.2	61 02.3	+42.8	112.9	35
36	63 33.6	+29.3	98.3	63 23.9	+31.3	100.3	63 12.2	+33.3	102.2	62 58.5	+35.2	104.1	62 42.9	+37.0	106.0	62 25.5	+38.6	107.9	62 06.2	+40.3	109.7	61 45.1	+41.9	111.4	36
37	64 02.9	+27.6	96.3	63 55.2	+29.8	98.3	63 45.5	+31.8	100.3	63 33.7	+33.7	102.3	63 19.9	+35.6	104.3	63 04.1	+37.5	106.2	62 46.5	+39.1	108.1	62 27.0	+40.7	109.9	37
38	64 30.5	+25.9	94.3	64 25.0	+28.1	96.3	64 17.3	+30.2	98.4	64 07.4	+32.2	100.5	63 55.5	+34.2	102.5	63 41.6	+36.1	104.4	63 25.6	+37.9	106.4	63 07.7	+39.7	108.3	38
39	64 56.4	+24.1	92.1	64 53.1	+26.2	94.3	64 47.5	+28.5	96.4	64 39.7	+30.6	98.5	64 29.7	+32.8	100.6	64 17.7	+34.7	102.6	64 03.5	+36.6	104.6	63 47.4	+38.4	106.6	39
40	65 20.5	+22.0•	90.0	65 19.3	+24.5	92.1	65 16.0	+26.7	94.3	65 10.3	+29.0	96.5	65 02.5	+31.0	98.6	64 52.4	+33.2	100.7	64 40.1	+35.2	102.8	64 25.8	+37.1	104.8	40
41	65 42.5	+20.1•	87.7	65 43.8	+22.4•	89.9	65 42.7	+24.8	92.2	65 39.3	+27.1	94.4	65 33.5	+29.4	96.6	65 25.6	+31.5	98.7	65 15.3	+33.7	100.9	65 02.9	+35.7	103.0	41
42	66 02.6	+17.9•	85.4	66 06.2	+20.4•	87.7	66 07.5	+22.8•	89.9	66 06.4	+25.2	92.2	66 02.9	+27.6	94.4	65 57.1	+29.8	96.7	65 49.0	+32.0	98.9	65 38.6	+34.1	101.1	42
43	66 20.5	+15.8•	83.1	66 26.6	+18.3•	85.3	66 30.3	+20.7•	87.6	66 31.6	+23.2•	89.9	66 30.5	+25.6•	92.2	66 26.9	+28.0	94.5	66 21.0	+30.3	96.8	66 12.7	+32.6	99.1	43
44	66 36.3	+13.4•	80.6	66 44.9	+16.0•	82.9	66 51.0	+18.6•	85.3	66 54.8	+21.1•	87.6	66 56.1	+23.5•	89.9	66 54.9	+26.0•	92.3	66 51.3	+28.4	94.6	66 45.3	+30.7	96.9	44
45	66 49.7	+11.2•	78.2	67 00.9	+13.7•	80.5	67 09.6	+16.3•	82.8	67 15.9	+18.8•	85.2	67 19.6	+21.5•	87.6	67 20.9	+24.0•	90.0	67 19.7	+26.5•	92.4	67 16.0	+28.9	94.7	45
46	67 00.9	+8.7•	75.7	67 14.6	+11.3•	78.0	67 25.9	+13.9•	80.3	67 34.7	+16.5•	82.7	67 41.1	+19.1•	85.1	67 44.9	+21.7•	87.6	67 46.2	+24.3•	90.0	67 44.9	+26.8•	92.5	46
47	67 09.6	+6.3•	73.1	67 25.9	+8.8•	75.4	67 39.8	+11.4•	77.8	67 51.2	+14.2•	80.2	68 00.2	+16.8•	82.6	68 06.6	+19.5•	85.1	68 10.5	+22.1•	87.6	68 11.7	+24.7•	90.1	47
48	67 15.9	+3.7•	70.6	67 34.7	+6.4•	72.8	67 51.2	+9.0•	75.2	68 05.4	+11.6•	77.6	68 17.0	+14.4•	80.0	68 26.1	+17.1•	82.5	68 32.6	+19.8•	85.1	68 36.4	+22.5•	87.6	48
49	67 19.6	+1.3•	68.0	67 41.1	+3.8•	70.2	68 00.2	+6.4•	72.6	68 17.0	+9.1•	74.9	68 31.4	+11.8•	77.4	68 43.2	+14.5•	79.9	68 52.4	+17.3•	82.5	68 58.9	+20.1•	85.0	49
50	67 20.9	−1.2•	65.4	67 44.9	+1.3•	67.6	68 06.6	+3.9•	69.9	68 26.1	+6.5•	72.3	68 43.2	+9.2•	74.7	68 57.7	+12.0•	77.2	69 09.7	+14.8•	79.8	69 19.0	+17.6•	82.4	50
51	67 19.7	−3.7•	62.8	67 46.2	−1.3•	65.0	68 10.5	+1.2•	67.2	68 32.6	+3.8•	69.6	68 52.4	+6.5•	72.0	69 09.7	+9.3•	74.5	69 24.5	+12.1•	77.0	69 36.6	+15.0•	79.7	51
52	67 16.0	−6.2•	60.2	67 44.9	−3.9•	62.3	68 11.7	−1.4•	64.5	68 36.4	+1.2•	66.8	68 58.9	+3.9•	69.2	69 19.0	+6.6•	71.7	69 36.6	+9.4•	74.2	69 51.6	+12.2•	76.9	52
53	67 09.8	−8.7•	57.6	67 41.0	−6.4•	59.7	68 10.3	−3.9•	61.8	68 37.6	−1.5•	64.1	69 02.8	+1.1•	66.4	69 25.6	+3.8•	68.9	69 46.0	+6.6•	71.4	70 03.8	+9.5•	74.0	53
54	67 01.1	−11.0•	55.1	67 34.6	−8.8•	57.1	68 06.4	−6.6•	59.1	68 36.1	−4.1•	61.3	69 03.9	−1.7•	63.6	69 29.4	+1.0•	66.0	69 52.6	+3.8•	68.5	70 13.3	+6.6•	71.1	54
55	66 50.1	−13.4•	52.6	67 25.8	−11.3•	54.5	67 59.8	−9.1•	56.5	68 32.0	−6.8•	58.6	69 02.2	−4.3•	60.8	69 30.4	−1.8•	63.2	69 56.4	+0.9•	65.6	70 19.9	+3.7•	68.2	55
56	66 36.7	−15.7•	50.1	67 14.5	−13.7•	51.9	67 50.7	−11.7•	53.9	68 25.2	−9.4•	55.9	68 57.9	−7.1•	58.0	69 28.6	−4.5•	60.3	69 57.3	−2.0•	62.7	70 23.6	+0.8•	65.2	56
57	66 21.0	−17.8•	47.7	67 00.8	−16.1•	49.4	67 39.0	−14.0•	51.3	68 15.8	−12.0•	53.2	68 50.8	−9.7•	55.3	69 24.1	−7.4•	57.5	69 55.3	−4.8•	59.8	70 24.4	−2.1•	62.2	57
58	66 03.2	−20.0•	45.3	66 44.7	−18.2•	47.0	67 25.0	−16.4•	48.7	68 03.8	−14.4•	50.6	68 41.1	−12.2•	52.6	69 16.7	−10.0•	54.7	69 50.5	−7.6•	56.9	70 22.3	−5.1•	59.2	58
59	65 43.2	−22.1•	43.0	66 26.5	−20.4•	44.6	67 08.6	−18.7•	46.2	67 49.4	−16.8•	48.0	68 28.9	−14.9•	49.9	69 06.7	−12.7•	51.9	69 42.9	−10.4•	54.0	70 17.2	−8.0•	56.3	59
60	65 21.1	−24.0	40.8	66 06.1	−22.5•	42.2	66 49.9	−20.8•	43.8	67 32.6	−19.1•	45.5	68 14.0	−17.2•	47.3	68 54.0	−15.2•	49.2	69 32.5	−13.1•	51.2	70 09.2	−10.8•	53.3	60
61	64 57.1	−25.8	38.6	65 43.6	−24.4	40.0	66 29.1	−23.0•	41.4	67 13.5	−21.3•	43.0	67 56.8	−19.6•	44.7	68 38.8	−17.7•	46.5	69 19.4	−15.7•	48.4	69 58.4	−13.5•	50.4	61
62	64 31.3	−27.6	36.5	65 19.2	−26.4	37.8	66 06.1	−24.9	39.1	66 52.2	−23.4•	40.6	67 37.2	−21.8•	42.2	68 21.1	−20.1•	43.9	69 03.7	−18.3•	45.7	69 44.9	−16.2•	47.6	62
63	64 03.7	−29.3	34.4	64 52.8	−28.0	35.6	65 41.2	−26.8	36.9	66 28.8	−25.5	38.3	67 15.4	−24.0•	39.8	68 01.0	−22.4•	41.3	68 45.4	−20.6•	43.0	69 28.7	−18.8•	44.9	63
64	63 34.4	−30.8	32.4	64 24.8	−29.8	33.6	65 14.4	−28.6	34.8	66 03.3	−27.3	36.0	66 51.4	−26.0	37.4	67 38.6	−24.5•	38.9	68 24.8	−22.9•	40.5	69 09.9	−21.2•	42.2	64
65	63 03.6	−32.3	30.5	64 15.0	−31.3	31.6	64 45.8	−30.3	32.7	65 36.0	−29.1	33.9	66 25.4	−27.9	35.1	67 14.1	−26.6	36.5	68 01.9	−25.1•	38.0	68 48.7	−23.6•	39.6	65
66	62 31.3	−33.8	28.7	63 23.7	−32.9	29.6	64 15.5	−31.8	30.7	65 06.9	−30.9	31.8	65 57.5	−29.7	32.9	66 47.5	−28.4	34.2	67 36.8	−27.2•	35.6	68 25.1	−25.7•	37.0	66
67	61 57.5	−35.0	26.9	62 50.8	−34.2	27.8	63 43.7	−33.4	28.7	64 36.0	−32.4	29.7	65 27.8	−31.4	30.8	66 19.1	−30.3	32.0	67 09.6	−29.1	33.2	67 59.4	−27.8•	34.6	67
68	61 22.5	−36.3	25.2	62 16.6	−35.6	26.0	63 10.3	−34.8	26.9	64 03.6	−33.9	27.8	64 56.4	−33.0	28.8	65 48.8	−32.1	29.9	66 40.5	−30.9	31.0	67 31.6	−29.8	32.3	68
69	60 46.2	−37.5	23.6	61 41.0	−36.8	24.3	62 35.5	−36.0	25.1	63 29.7	−35.3	25.9	64 23.4	−34.4	26.8	65 16.7	−33.6	27.8	66 09.6	−32.7	28.9	67 01.8	−31.6	30.0	69
70	60 08.7	−38.5	22.0	61 04.2	−37.9	22.6	61 59.5	−37.4	23.4	62 54.4	−36.7	24.1	63 49.0	−35.9	25.0	64 43.1	−35.0	25.9	65 36.9	−34.2	26.8	66 30.2	−33.3	27.9	70
71	59 30.2	−39.6	20.5	60 26.3	−39.1	21.1	61 22.1	−38.4	21.7	62 17.7	−37.8	22.4	63 13.1	−37.2	23.2	64 08.1	−36.5	24.0	65 02.7	−35.7	24.9	65 56.9	−34.9	25.8	71
72	58 50.6	−40.5	19.0	59 47.2	−40.0	19.5	60 43.7	−39.6	20.1	61 39.9	−39.0	20.8	62 35.9	−38.4	21.5	63 31.6	−37.8	22.2	64 27.0	−37.1	23.0	65 22.0	−36.3	23.8	72
73	58 10.1	−41.5	17.6	59 07.2	−41.0	18.1	60 04.1	−40.5	18.6	61 00.9	−40.1	19.2	61 57.5	−39.6	19.8	62 53.8	−39.0	20.5	63 49.9	−38.4	21.2	64 45.7	−37.7	21.9	73
74	57 28.6	−42.3	16.2	58 26.2	−41.9	16.7	59 23.6	−41.5	17.1	60 20.8	−41.0	17.7	61 17.9	−40.6	18.2	62 14.8	−40.1	18.8	63 11.5	−39.6	19.4	64 08.0	−39.1	20.1	74
75	56 46.3	−43.0	14.9	57 44.3	−42.8	15.3	58 42.1	−42.4	15.7	59 39.8	−42.0	16.2	60 37.3	−41.6	16.7	61 34.7	−41.2	17.2	62 31.9	−40.7	17.8	63 28.9	−40.1	18.4	75
76	56 03.3	−43.8	13.6	57 01.5	−43.5	14.0	57 59.7	−43.2	14.4	58 57.8	−42.9	14.8	59 55.7	−42.5	15.2	60 53.5	−42.2	15.7	61 51.2	−41.7	16.2	62 48.8	−41.3	16.8	76
77	55 19.5	−44.5	12.4	56 18.0	−44.2	12.8	57 16.5	−44.0	13.1	58 14.9	−43.7	13.5	59 13.2	−43.4	13.9	60 11.4	−43.0	14.3	61 09.5	−42.7	14.7	62 07.5	−42.3	15.2	77
78	54 35.0	−45.2	11.3	55 33.8	−45.0	11.6	56 32.5	−44.7	11.9	57 31.2	−44.4	12.2	58 29.8	−44.1	12.5	59 28.4	−43.8	12.9	60 26.8	−43.5	13.3	61 25.2	−43.2	13.7	78
79	53 49.8	−45.8	10.1	54 48.8	−45.5	10.4	55 47.8	−45.3	10.7	56 46.8	−45.2	10.9	57 45.7	−45.0	11.2	58 44.5	−44.7	11.6	59 43.2	−44.4	11.9	60 41.9	−44.1	12.3	79
80	53 04.0	−46.3	9.1	54 03.3	−46.2	9.3	55 02.5	−46.0	9.5	56 01.6	−45.8	9.7	57 00.7	−45.6	10.0	57 59.8	−45.4	10.3	58 58.8	−45.2	10.6	59 57.8	−45.0	10.9	80
81	52 17.7	−46.8	8.2	53 17.1	−46.7	8.2	54 16.5	−46.6	8.4	55 15.8	−46.4	8.6	56 15.1	−46.2	8.8	57 14.4	−46.1	9.1	58 13.6	−45.9	9.3	59 12.8	−45.7	9.6	81
82	51 30.8	−47.3	7.0	52 30.4	−47.3	7.2	53 29.7	−47.1	7.3	54 29.4	−47.0	7.5	55 28.9	−46.9	7.7	56 28.3	−46.7	7.9	57 27.7	−46.5	8.1	58 27.1	−46.4	8.3	82
83	50 43.5	−47.9	6.0	51 43.1	−47.7	6.2	52 42.6	−47.7	6.3	53 42.4	−47.5	6.4	54 42.0	−47.4	6.6	55 41.6	−47.3	6.8	56 41.2	−47.2	6.9	57 40.7	−47.0	7.1	83
84	49 55.6	−48.3	5.1	50 55.4	−48.3	5.2	51 55.1	−48.1	5.3	52 54.9	−48.1	5.4	53 54.6	−47.9	5.5	54 54.3	−47.9	5.7	55 54.2	−47.8	5.8	56 53.7	−47.7	6.0	84
85	49 07.3	−48.7	4.2	50 07.1	−48.6	4.2	51 07.0	−48.6	4.3	52 06.8	−48.5	4.4	53 06.6	−48.4	4.5	54 06.4	−48.4	4.6	55 06.2	−48.3	4.8	56 06.0	−48.2	4.9	85
86	48 18.6	−49.1	3.3	49 18.5	−49.1	3.3	50 18.4	−49.0	3.4	51 18.3	−49.0	3.5	52 18.2	−49.0	3.6	53 18.0	−48.8	3.6	54 17.9	−48.8	3.7	55 17.8	−48.8	3.8	86
87	47 29.5	−49.5	2.4	48 29.4	−49.5	2.5	49 29.4	−49.5	2.5	50 29.3	−49.4	2.6	51 29.2	−49.4	2.6	52 29.2	−49.4	2.7	53 29.1	−49.3	2.7	54 29.0	−49.3	2.8	87
88	46 40.0	−49.8	1.6	47 40.0	−49.8	1.6	48 39.9	−49.7	1.6	49 39.9	−49.8	1.7	50 39.8	−49.7	1.7	51 39.8	−49.7	1.8	52 39.8	−49.7	1.8	53 39.8	−49.7	1.8	88
89	45 50.2	−50.2	0.8	46 50.2	−50.2	0.8	47 50.2	−50.2	0.8	48 50.1	−50.1	0.8	49 50.1	−50.1	0.8	50 50.1	−50.1	0.9	51 50.1	−50.1	0.9	52 50.1	−50.1	0.9	89
90	45 00.0	−50.5	0.0	46 00.0	−50.5	0.0	47 00.0	−50.5	0.0	48 00.0	−50.5	0.0	49 00.0	−50.5	0.0	50 00.0	−50.5	0.0	51 00.0	−50.5	0.0	52 00.0	−50.5	0.0	90

Dec.	45° Hc d Z	46° Hc d Z	47° Hc d Z	48° Hc d Z	49° Hc d Z	50° Hc d Z	51° Hc d Z	52° Hc d Z	Dec.
0	36 22.3 −52.7 137.4	35 38.0 −53.2 137.9	34 53.3 −53.6 138.4	34 08.2 −53.9 138.9	33 22.9 −54.3 139.3	32 37.3 −54.6 139.7	31 51.4 −55.0 140.1	31 05.2 −55.2 140.5	0
1	35 29.6 −53.0 138.0	34 44.8 −53.3 138.5	33 59.7 −53.7 138.9	33 14.3 −54.1 139.4	32 28.6 −54.4 139.8	31 42.7 −54.8 140.2	30 56.4 −55.0 140.6	30 10.0 −55.4 141.0	1
2	34 36.6 −53.1 138.6	33 51.5 −53.5 139.0	33 06.0 −53.9 139.5	32 20.2 −54.2 139.9	31 34.2 −54.5 140.3	30 47.9 −54.8 140.7	30 01.4 −55.2 141.0	29 14.6 −55.4 141.4	2
3	33 43.5 −53.2 139.2	32 58.0 −53.7 139.6	32 12.1 −53.9 140.0	31 26.0 −54.3 140.4	30 39.7 −54.6 140.8	29 53.1 −55.0 141.1	29 06.2 −55.2 141.5	28 19.2 −55.5 141.8	3
4	32 50.3 −53.4 139.7	32 04.3 −53.7 140.1	31 18.2 −54.1 140.5	30 31.7 −54.4 140.9	29 45.1 −54.8 141.3	28 58.1 −55.0 141.6	28 11.0 −55.3 141.9	27 23.7 −55.6 142.3	4
5	31 56.9 −53.6 140.3	31 10.6 −53.9 140.6	30 24.1 −54.2 141.0	29 37.3 −54.5 141.4	28 50.3 −54.8 141.7	28 03.1 −55.1 142.1	27 15.7 −55.4 142.4	26 28.1 −55.7 142.7	5
6	31 03.3 −53.6 140.8	30 16.7 −54.0 141.2	29 29.9 −54.3 141.5	28 42.8 −54.6 141.9	27 55.5 −54.9 142.2	27 08.0 −55.2 142.5	26 20.3 −55.5 142.8	25 32.4 −55.7 143.1	6
7	30 09.7 −53.8 141.3	29 22.7 −54.1 141.7	28 35.6 −54.5 142.0	27 48.2 −54.7 142.3	27 00.6 −55.0 142.6	26 12.8 −55.3 142.9	25 24.8 −55.5 143.2	24 36.7 −55.8 143.5	7
8	29 15.9 −53.9 141.8	28 28.6 −54.2 142.2	27 41.1 −54.5 142.5	26 53.5 −54.8 142.8	26 05.6 −55.1 143.1	25 17.5 −55.4 143.4	24 29.3 −55.7 143.7	23 40.9 −55.9 143.9	8
9	28 22.0 −54.0 142.3	27 34.4 −54.3 142.6	26 46.6 −54.6 142.9	25 58.6 −54.8 143.2	25 10.5 −55.2 143.5	24 22.1 −55.4 143.8	23 33.6 −55.6 144.1	22 45.0 −55.9 144.3	9
10	27 28.0 −54.1 142.8	26 40.1 −54.4 143.1	25 52.0 −54.7 143.4	25 03.8 −55.0 143.7	24 15.3 −55.2 144.0	23 26.7 −55.5 144.2	22 38.0 −55.8 144.5	21 49.1 −56.0 144.7	10
11	26 33.9 −54.2 143.3	25 45.7 −54.5 143.6	24 57.3 −54.7 143.9	24 08.8 −55.1 144.1	23 20.1 −55.3 144.4	22 31.2 −55.6 144.6	21 42.2 −55.8 144.9	20 53.1 −56.0 145.1	11
12	25 39.7 −54.3 143.8	24 51.2 −54.6 144.0	24 02.6 −54.9 144.3	23 13.7 −55.1 144.6	22 24.8 −55.4 144.8	21 35.7 −55.6 145.0	20 46.4 −55.8 145.3	19 57.1 −56.1 145.5	12
13	24 45.4 −54.4 144.2	23 56.6 −54.6 144.5	23 07.7 −54.9 144.8	22 18.6 −55.2 145.0	21 29.4 −55.5 145.2	20 40.1 −55.7 145.4	19 50.6 −55.9 145.7	19 01.0 −56.1 145.9	13
14	23 51.0 −54.4 144.7	23 02.0 −54.8 145.0	22 12.8 −55.0 145.2	21 23.4 −55.2 145.4	20 34.0 −55.5 145.6	19 44.4 −55.7 145.8	18 54.7 −56.0 146.0	18 04.9 −56.2 146.2	14
15	22 56.6 −54.6 145.2	22 07.2 −54.8 145.4	21 17.8 −55.1 145.6	20 28.2 −55.3 145.8	19 38.5 −55.5 146.0	18 48.7 −55.8 146.2	17 58.7 −56.0 146.4	17 08.7 −56.2 146.6	15
16	22 02.0 −54.6 145.6	21 12.4 −54.8 145.8	20 22.7 −55.1 146.0	19 32.9 −55.4 146.3	18 43.0 −55.6 146.4	17 52.9 −55.8 146.6	17 02.7 −56.0 146.8	16 12.5 −56.2 147.0	16
17	21 07.4 −54.7 146.1	20 17.6 −55.0 146.3	19 27.6 −55.2 146.5	18 37.5 −55.4 146.7	17 47.4 −55.7 146.8	16 57.1 −55.9 147.0	16 06.7 −56.1 147.2	15 16.3 −56.3 147.3	17
18	20 12.7 −54.7 146.5	19 22.6 −55.0 146.7	18 32.4 −55.2 146.9	17 42.1 −55.4 147.1	16 51.7 −55.7 147.2	16 01.2 −55.9 147.4	15 10.6 −56.1 147.5	14 20.0 −56.3 147.7	18
19	19 18.0 −54.8 147.0	18 27.6 −55.0 147.1	17 37.2 −55.3 147.3	16 46.7 −55.5 147.5	15 56.0 −55.7 147.6	15 05.3 −55.9 147.8	14 14.5 −56.1 147.9	13 23.7 −56.4 148.0	19
20	18 23.2 −54.9 147.4	17 32.6 −55.1 147.5	16 41.9 −55.3 147.7	15 51.2 −55.6 147.9	15 00.3 −55.7 148.0	14 09.4 −56.0 148.1	13 18.4 −56.2 148.3	12 27.3 −56.3 148.4	20
21	17 28.3 −54.9 147.8	16 37.5 −55.2 148.0	15 46.6 −55.4 148.1	14 55.6 −55.6 148.2	14 04.6 −55.8 148.4	13 13.4 −56.0 148.5	12 22.2 −56.2 148.6	11 31.0 −56.4 148.7	21
22	16 33.4 −55.0 148.2	15 42.3 −55.1 148.4	14 51.2 −55.4 148.5	14 00.0 −55.6 148.6	13 08.8 −55.9 148.8	12 17.4 −56.0 148.9	11 26.0 −56.2 149.0	10 34.6 −56.4 149.1	22
23	15 38.4 −55.0 148.6	14 47.2 −55.3 148.8	13 55.8 −55.4 148.9	13 04.4 −55.7 149.0	12 12.9 −55.8 149.1	11 21.4 −56.1 149.2	10 29.8 −56.2 149.3	9 38.2 −56.5 149.4	23
24	14 43.4 −55.1 149.0	13 51.9 −55.3 149.2	13 00.4 −55.5 149.3	12 08.7 −55.6 149.4	11 17.1 −55.9 149.5	10 25.3 −56.0 149.6	9 33.6 −56.3 149.7	8 41.7 −56.4 149.8	24
25	13 48.3 −55.1 149.4	12 56.6 −55.3 149.6	12 04.9 −55.5 149.7	11 13.1 −55.8 149.8	10 21.2 −55.9 149.9	9 29.3 −56.1 150.0	8 37.3 −56.3 150.0	7 45.3 −56.5 150.1	25
26	12 53.2 −55.2 149.9	12 01.3 −55.3 150.0	11 09.4 −55.6 150.1	10 17.3 −55.7 150.2	9 25.3 −56.0 150.3	8 33.2 −56.2 150.3	7 41.0 −56.3 150.4	6 48.8 −56.5 150.5	26
27	11 58.1 −55.2 150.3	11 06.0 −55.4 150.4	10 13.8 −55.6 150.5	9 21.6 −55.8 150.5	8 29.3 −55.9 150.6	7 37.0 −56.1 150.7	6 44.7 −56.3 150.7	5 52.3 −56.5 150.8	27
28	11 02.9 −55.2 150.7	10 10.6 −55.4 150.8	9 18.2 −55.6 150.8	8 25.8 −55.8 150.9	7 33.4 −56.0 151.0	6 40.9 −56.2 151.0	5 48.4 −56.4 151.1	4 55.8 −56.5 151.1	28
29	10 07.7 −55.2 151.1	9 15.2 −55.4 151.1	8 22.6 −55.6 151.2	7 30.0 −55.8 151.3	6 37.4 −56.0 151.3	5 44.7 −56.1 151.4	4 52.0 −56.3 151.4	3 59.3 −56.5 151.5	29
30	9 12.5 −55.3 151.5	8 19.8 −55.5 151.5	7 27.0 −55.6 151.6	6 34.2 −55.8 151.7	5 41.4 −56.0 151.7	4 48.6 −56.2 151.7	3 55.7 −56.4 151.8	3 02.8 −56.5 151.8	30
31	8 17.2 −55.2 151.9	7 24.3 −55.4 151.9	6 31.4 −55.7 152.0	5 38.4 −55.7 152.0	4 45.4 −56.0 152.1	3 52.4 −56.2 152.1	2 59.3 −56.3 152.1	2 06.3 −56.5 152.1	31
32	7 22.0 −55.3 152.2	6 28.9 −55.5 152.3	5 35.7 −55.7 152.3	4 42.6 −55.9 152.4	3 49.4 −56.0 152.4	2 56.2 −56.2 152.5	2 03.0 −56.4 152.5	1 09.8 −56.5 152.5	32
33	6 26.7 −55.4 152.6	5 33.4 −55.5 152.7	4 40.0 −55.6 152.7	3 46.7 −55.8 152.8	2 53.4 −56.1 152.8	2 00.0 −56.2 152.8	1 06.6 −56.3 152.8	0 13.3 −56.6 152.8	33
34	5 31.3 −55.3 153.0	4 37.9 −55.6 153.1	3 44.4 −55.7 153.1	2 50.9 −55.9 153.1	1 57.3 −56.0 153.1	1 03.8 −56.2 153.2	0 10.3 −56.4 153.2	0 43.3 +56.5 26.8	34
35	4 36.0 −55.4 153.4	3 42.3 −55.5 153.4	2 48.7 −55.7 153.5	1 55.0 −55.9 153.5	1 01.3 −56.0 153.5	0 07.6 −56.2 153.5	0 46.1 +56.4 26.5	1 39.8 +56.5 26.5	35
36	3 40.7 −55.4 153.8	2 46.8 −55.5 153.8	1 53.0 −55.7 153.8	0 59.1 −55.9 153.9	0 05.3 −56.1 153.9	0 48.6 +56.2 26.1	1 42.5 +56.3 26.2	2 36.3 +56.5 26.2	36
37	2 45.3 −55.4 154.2	1 51.3 −55.5 154.2	0 57.3 −55.7 154.2	0 03.2 −55.8 154.2	0 50.8 +56.0 25.8	1 44.8 +56.2 25.8	2 38.8 +56.4 25.8	3 32.8 +56.5 25.8	37
38	1 49.9 −55.3 154.6	0 55.8 −55.5 154.6	0 01.6 −55.7 154.6	0 52.6 +55.9 25.4	1 46.8 +56.1 25.4	2 41.0 +56.2 25.4	3 35.2 +56.3 25.5	4 29.3 +56.5 25.5	38
39	0 54.6 −55.4 155.0	0 00.2 −55.5 155.0	0 54.1 +55.8 25.0	1 48.5 +55.9 25.1	2 42.9 +56.0 25.1	3 37.2 +56.2 25.1	4 31.5 +56.4 25.1	5 25.8 +56.5 25.2	39
40	0 00.8 +55.4 24.7	0 55.3 +55.6 24.7	1 49.9 +55.7 24.7	2 44.4 +55.8 24.7	3 38.9 +56.0 24.7	4 33.4 +56.2 24.7	5 27.9 +56.3 24.8	6 22.3 +56.5 24.8	40
41	0 56.2 +55.3 24.3	1 50.9 +55.5 24.3	2 45.6 +55.6 24.3	3 40.2 +55.9 24.3	4 34.9 +56.0 24.4	5 29.6 +56.1 24.4	6 24.2 +56.3 24.4	7 18.8 +56.5 24.5	41
42	1 51.5 +55.4 23.9	2 46.4 +55.5 23.9	3 41.2 +55.7 23.9	4 36.1 +55.8 24.0	5 30.9 +56.0 24.0	6 25.7 +56.1 24.0	7 20.5 +56.3 24.1	8 15.3 +56.4 24.1	42
43	2 46.9 +55.4 23.5	3 41.9 +55.5 23.5	4 36.9 +55.7 23.6	5 31.9 +55.8 23.6	6 26.9 +56.0 23.6	7 21.9 +56.1 23.7	8 16.8 +56.3 23.7	9 11.7 +56.4 23.8	43
44	3 42.3 +55.3 23.1	4 37.4 +55.5 23.1	5 32.6 +55.7 23.2	6 27.7 +55.9 23.2	7 22.9 +55.9 23.3	8 18.0 +56.1 23.3	9 13.1 +56.2 23.4	10 08.1 +56.4 23.5	44
45	4 37.6 +55.3 22.7	5 32.9 +55.4 22.8	6 28.3 +55.6 22.8	7 23.6 +55.8 22.9	8 18.8 +56.0 22.9	9 14.1 +56.1 23.0	10 09.3 +56.3 23.0	11 04.5 +56.4 23.1	45
46	5 32.9 +55.4 22.3	6 28.4 +55.5 22.4	7 23.9 +55.6 22.4	8 19.4 +55.7 22.5	9 14.8 +55.9 22.5	10 10.2 +56.0 22.6	11 05.6 +56.2 22.7	12 00.9 +56.4 22.8	46
47	6 28.3 +55.3 22.0	7 23.9 +55.5 22.0	8 19.5 +55.6 22.1	9 15.1 +55.8 22.1	10 10.7 +55.9 22.2	11 06.2 +56.1 22.2	12 01.8 +56.1 22.3	12 57.3 +56.3 22.4	47
48	7 23.6 +55.2 21.6	8 19.4 +55.4 21.6	9 15.1 +55.6 21.7	10 10.9 +55.7 21.7	11 06.6 +55.9 21.8	12 02.3 +56.0 21.9	12 57.9 +56.2 22.0	13 53.6 +56.3 22.1	48
49	8 18.8 +55.3 21.2	9 14.8 +55.4 21.2	10 10.7 +55.5 21.3	11 06.6 +55.7 21.4	12 02.5 +55.8 21.4	12 58.3 +56.0 21.5	13 54.1 +56.1 21.6	14 49.9 +56.2 21.7	49
50	9 14.1 +55.2 20.8	10 10.2 +55.4 20.8	11 06.2 +55.6 20.9	12 02.3 +55.6 21.0	12 58.3 +55.8 21.1	13 54.3 +55.9 21.1	14 50.2 +56.1 21.2	15 46.1 +56.2 21.3	50
51	10 09.3 +55.2 20.4	11 05.6 +55.3 20.4	12 01.8 +55.5 20.5	12 57.9 +55.7 20.6	13 54.1 +55.8 20.7	14 50.2 +55.9 20.8	15 46.3 +56.0 20.9	16 42.3 +56.2 21.0	51
52	11 04.5 +55.2 20.0	12 00.9 +55.3 20.0	12 57.3 +55.4 20.1	13 53.6 +55.6 20.2	14 49.9 +55.7 20.3	15 46.1 +55.9 20.4	16 42.3 +56.1 20.5	17 38.5 +56.2 20.6	52
53	11 59.7 +55.1 19.6	12 56.2 +55.3 19.7	13 52.7 +55.4 19.7	14 49.2 +55.5 19.8	15 45.6 +55.7 19.9	16 42.0 +55.8 20.0	17 38.4 +55.9 20.1	18 34.7 +56.1 20.2	53
54	12 54.8 +55.1 19.2	13 51.5 +55.2 19.3	14 48.1 +55.4 19.3	15 44.7 +55.5 19.4	16 41.3 +55.6 19.5	17 37.8 +55.8 19.6	18 34.3 +55.9 19.7	19 30.8 +56.0 19.9	54
55	13 49.9 +55.1 18.8	14 46.7 +55.2 18.8	15 43.5 +55.3 18.9	16 40.2 +55.5 19.0	17 36.9 +55.6 19.1	18 33.6 +55.7 19.2	19 30.2 +55.9 19.4	20 26.8 +56.0 19.5	55
56	14 45.0 +55.0 18.4	15 41.9 +55.2 18.5	16 38.8 +55.3 18.5	17 35.7 +55.4 18.6	18 32.5 +55.6 18.7	19 29.3 +55.7 18.8	20 26.1 +55.8 19.0	21 22.8 +56.0 19.1	56
57	15 40.0 +54.9 17.9	16 37.1 +55.1 18.0	17 34.1 +55.2 18.1	18 31.1 +55.4 18.2	19 28.1 +55.5 18.3	20 25.0 +55.7 18.5	21 21.9 +55.8 18.6	22 18.8 +55.9 18.7	57
58	16 35.0 +54.9 17.5	17 32.2 +55.0 17.6	18 29.3 +55.2 17.7	19 26.5 +55.3 17.8	20 23.6 +55.4 17.9	21 20.7 +55.5 18.1	22 17.7 +55.7 18.2	23 14.7 +55.8 18.3	58
59	17 29.9 +54.9 17.1	18 27.2 +55.0 17.2	19 24.5 +55.1 17.3	20 21.8 +55.2 17.4	21 19.0 +55.4 17.5	22 16.2 +55.5 17.6	23 13.4 +55.6 17.8	24 10.5 +55.8 17.9	59
60	18 24.8 +54.8 16.7	19 22.2 +55.0 16.8	20 19.6 +55.1 16.9	21 17.0 +55.2 17.0	22 14.4 +55.3 17.1	23 11.7 +55.5 17.2	24 09.0 +55.6 17.4	25 06.3 +55.7 17.5	60
61	19 19.6 +54.7 16.2	20 17.2 +54.8 16.4	21 14.7 +55.0 16.5	22 12.2 +55.2 16.6	23 09.7 +55.3 16.7	24 07.2 +55.4 16.8	25 04.6 +55.5 16.9	26 02.0 +55.6 17.1	61
62	20 14.3 +54.7 15.8	21 12.0 +54.8 15.9	22 09.7 +54.9 16.0	23 07.4 +55.0 16.1	24 05.0 +55.1 16.3	25 02.6 +55.3 16.4	26 00.1 +55.4 16.5	26 57.6 +55.5 16.7	62
63	21 09.0 +54.6 15.4	22 06.8 +54.8 15.5	23 04.6 +54.9 15.6	24 02.4 +55.0 15.7	25 00.1 +55.2 15.8	25 57.9 +55.2 16.0	26 55.5 +55.4 16.1	27 53.1 +55.5 16.2	63
64	22 03.6 +54.5 14.9	23 01.6 +54.6 15.0	23 59.5 +54.8 15.1	24 57.4 +54.9 15.3	25 55.3 +55.0 15.4	26 53.1 +55.1 15.5	27 50.9 +55.2 15.7	28 48.6 +55.4 15.8	64
65	22 58.1 +54.5 14.6	23 56.2 +54.6 14.6	24 54.3 +54.7 14.7	25 52.3 +54.8 14.8	26 50.3 +54.9 14.9	27 48.2 +55.1 15.1	28 46.1 +55.2 15.2	29 44.0 +55.3 15.4	65
66	23 52.6 +54.4 14.0	24 50.8 +54.5 14.1	25 49.0 +54.6 14.2	26 47.1 +54.7 14.4	27 45.2 +54.9 14.5	28 43.3 +54.9 14.6	29 41.3 +55.1 14.8	30 39.3 +55.2 14.9	66
67	24 47.0 +54.3 13.6	25 45.3 +54.4 13.7	26 43.6 +54.5 13.8	27 41.8 +54.7 13.9	28 40.1 +54.7 14.0	29 38.2 +54.9 14.2	30 36.4 +55.0 14.3	31 34.5 +55.1 14.5	67
68	25 41.3 +54.2 13.1	26 39.7 +54.3 13.2	27 38.1 +54.4 13.3	28 36.5 +54.5 13.4	29 34.8 +54.7 13.6	30 33.1 +54.8 13.7	31 31.4 +54.9 13.8	32 29.6 +55.0 14.0	68
69	26 35.5 +54.1 12.6	27 34.0 +54.2 12.7	28 32.5 +54.3 12.8	29 31.0 +54.4 13.0	30 29.5 +54.5 13.1	31 27.9 +54.6 13.2	32 26.3 +54.7 13.4	33 24.6 +54.9 13.5	69
70	27 29.6 +54.0 12.1	28 28.2 +54.1 12.2	29 26.8 +54.2 12.4	30 25.4 +54.4 12.5	31 24.0 +54.4 12.6	32 22.5 +54.6 12.7	33 21.0 +54.7 12.9	34 19.5 +54.8 13.0	70
71	28 23.6 +53.8 11.6	29 22.3 +54.0 11.7	30 21.0 +54.1 11.9	31 19.8 +54.2 12.0	32 18.4 +54.3 12.1	33 17.1 +54.4 12.2	34 15.7 +54.5 12.4	35 14.3 +54.6 12.5	71
72	29 17.4 +53.8 11.1	30 16.3 +53.9 11.2	31 15.1 +54.0 11.4	32 14.0 +54.1 11.5	33 12.7 +54.2 11.6	34 11.5 +54.3 11.7	35 10.2 +54.4 11.9	36 08.9 +54.5 12.0	72
73	30 11.2 +53.7 10.6	31 10.2 +53.7 10.7	32 09.1 +53.9 10.8	33 08.0 +54.0 11.0	34 06.9 +54.1 11.1	35 05.8 +54.2 11.2	36 04.6 +54.3 11.4	37 03.4 +54.4 11.5	73
74	31 04.9 +53.5 10.1	32 03.9 +53.7 10.2	33 03.0 +53.7 10.3	34 02.0 +53.8 10.4	35 01.0 +53.9 10.6	36 00.0 +54.0 10.7	36 58.9 +54.1 10.9	37 57.8 +54.3 11.0	74
75	31 58.4 +53.4 9.6	32 57.6 +53.4 9.7	33 56.7 +53.6 9.8	34 55.8 +53.7 9.9	35 54.9 +53.8 10.0	36 54.0 +53.9 10.2	37 53.0 +54.0 10.3	38 52.1 +54.0 10.4	75
76	32 51.8 +53.2 9.0	33 51.0 +53.4 9.1	34 50.3 +53.4 9.2	35 49.5 +53.5 9.4	36 48.7 +53.6 9.5	37 47.9 +53.7 9.6	38 47.0 +53.8 9.7	39 46.1 +53.9 9.9	76
77	33 45.0 +53.1 8.5	34 44.4 +53.2 8.6	35 43.7 +53.3 8.7	36 43.0 +53.4 8.8	37 42.3 +53.4 8.9	38 41.6 +53.5 9.0	39 40.8 +53.6 9.2	40 40.0 +53.8 9.3	77
78	34 38.1 +53.0 7.9	35 37.6 +53.0 8.0	36 37.0 +53.1 8.1	37 36.4 +53.2 8.2	38 35.7 +53.3 8.3	39 35.1 +53.4 8.3	40 34.4 +53.5 8.5	41 33.8 +53.5 8.7	78
79	35 31.1 +52.8 7.3	36 30.6 +52.8 7.4	37 30.1 +52.9 7.5	38 29.6 +53.0 7.6	39 29.0 +53.1 7.7	40 28.5 +53.1 7.9	41 27.9 +53.2 8.0	42 27.3 +53.3 8.1	79
80	36 23.9 +52.6 6.7	37 23.4 +52.7 6.8	38 23.0 +52.7 6.9	39 22.6 +52.8 7.0	40 22.1 +52.9 7.1	41 21.6 +53.0 7.2	42 21.1 +53.1 7.4	43 20.6 +53.2 7.5	80
81	37 16.5 +52.4 6.1	38 16.1 +52.5 6.2	39 15.7 +52.6 6.3	40 15.4 +52.6 6.4	41 15.0 +52.7 6.5	42 14.6 +52.8 6.6	43 14.2 +52.8 6.8	44 13.8 +52.9 6.8	81
82	38 08.9 +52.2 5.5	39 08.6 +52.3 5.6	40 08.3 +52.3 5.7	41 08.0 +52.4 5.8	42 07.7 +52.4 5.9	43 07.4 +52.5 6.0	44 07.0 +52.6 6.1	45 06.7 +52.7 6.2	82
83	39 01.1 +52.0 4.9	40 00.9 +52.0 5.0	41 00.6 +52.1 5.0	42 00.4 +52.2 5.1	43 00.1 +52.3 5.2	43 59.9 +52.3 5.3	44 59.6 +52.4 5.4	45 59.4 +52.4 5.5	83
84	39 53.1 +51.8 4.3	40 52.9 +51.8 4.3	41 52.7 +51.9 4.4	42 52.6 +51.9 4.5	43 52.4 +52.0 4.5	44 52.2 +52.0 4.6	45 52.0 +52.1 4.7	46 51.8 +52.1 4.8	84
85	40 44.9 +51.5 3.6	41 44.7 +51.6 3.6	42 44.6 +51.7 3.7	43 44.5 +51.7 3.8	44 44.4 +51.7 3.8	45 44.2 +51.8 3.9	46 44.1 +51.8 4.0	47 43.9 +51.9 4.0	85
86	41 36.4 +51.3 2.9	42 36.3 +51.4 3.0	43 36.3 +51.3 3.0	44 36.2 +51.4 3.1	45 36.1 +51.4 3.1	46 36.0 +51.5 3.2	47 35.9 +51.5 3.2	48 35.8 +51.6 3.3	86
87	42 27.7 +51.1 2.2	43 27.7 +51.1 2.3	44 27.6 +51.1 2.3	45 27.6 +51.1 2.3	46 27.5 +51.2 2.4	47 27.5 +51.1 2.4	48 27.4 +51.2 2.5	49 27.4 +51.2 2.5	87
88	43 18.8 +50.7 1.5	44 18.7 +50.8 1.5	45 18.7 +50.8 1.5	46 18.7 +50.8 1.6	47 18.7 +50.8 1.6	48 18.6 +50.9 1.6	49 18.6 +50.9 1.7	50 18.6 +50.9 1.7	88
89	44 09.5 +50.5 0.8	45 09.5 +50.5 0.8	46 09.5 +50.5 0.8	47 09.5 +50.5 0.8	48 09.5 +50.5 0.8	49 09.5 +50.5 0.8	50 09.5 +50.9 0.9	51 09.5 +50.5 0.9	89
90	45 00.0 +50.2 0.0	46 00.0 +50.2 0.0	47 00.0 +50.2 0.0	48 00.0 +50.1 0.0	49 00.0 +50.1 0.0	50 00.0 +50.1 0.0	51 00.0 +50.1 0.0	52 00.0 +50.1 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 147°, 213°**

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	35 53.3	+52.3	136.4	35 09.8	+52.7	136.8	34 25.8	+53.1	137.3	33 41.5	+53.6	137.8	32 57.0	+53.9	138.2	32 12.1	+54.2	138.6	31 26.9	+54.6	139.0	30 41.5	+54.9	139.4	0
1	36 45.6	+51.9	135.7	36 02.5	+52.5	136.3	35 18.9	+53.0	136.7	34 35.1	+53.3	137.2	33 50.9	+53.7	137.7	33 06.3	+54.2	138.1	32 21.5	+54.5	138.6	31 36.4	+54.8	139.0	1
2	37 37.7	+51.9	135.1	36 55.0	+52.3	135.7	36 11.9	+52.8	136.2	35 28.4	+53.2	136.7	34 44.6	+53.6	137.1	34 00.5	+54.0	137.6	33 16.0	+54.4	138.1	32 31.2	+54.7	138.5	2
3	38 29.6	+51.7	134.5	37 47.3	+52.2	135.0	37 04.7	+52.6	135.6	36 21.6	+53.1	136.1	35 38.2	+53.5	136.6	34 54.5	+53.8	137.1	34 10.4	+54.2	137.5	33 25.9	+54.6	138.0	3
4	39 21.3	+51.4	133.8	38 39.5	+51.9	134.4	37 57.3	+52.4	135.0	37 14.7	+52.9	135.5	36 31.7	+53.3	136.0	35 48.3	+53.7	136.5	35 04.6	+54.1	137.0	34 20.5	+54.5	137.5	4
5	40 12.7	+51.2	133.2	39 31.4	+51.8	133.8	38 49.7	+52.2	134.4	38 07.6	+52.6	134.9	37 25.0	+53.1	135.5	36 42.0	+53.6	136.0	35 58.7	+53.9	136.5	35 15.0	+54.3	137.0	5
6	41 03.9	+51.0	132.5	40 23.2	+51.5	133.1	39 41.9	+52.0	133.7	39 00.2	+52.5	134.3	38 18.1	+53.0	134.9	37 35.6	+53.4	135.4	36 52.6	+53.9	136.0	36 09.3	+54.2	136.5	6
7	41 54.9	+50.7	131.8	41 14.7	+51.2	132.4	40 33.9	+51.8	133.1	39 52.7	+52.3	133.7	39 11.1	+52.7	134.3	38 29.0	+53.2	134.8	37 46.5	+53.6	135.4	37 03.5	+54.1	135.9	7
8	42 45.6	+50.4	131.0	42 05.9	+51.0	131.7	41 25.7	+51.5	132.4	40 45.0	+52.1	133.0	40 03.8	+52.6	133.7	39 22.2	+53.0	134.2	38 40.1	+53.5	134.8	37 57.6	+53.9	135.4	8
9	43 36.0	+50.1	130.3	42 56.9	+50.7	131.0	42 17.2	+51.3	131.7	41 37.1	+51.8	132.4	40 56.4	+52.3	133.0	40 15.2	+52.8	133.6	39 33.6	+53.3	134.2	38 51.5	+53.7	134.8	9
10	44 26.1	+49.8	129.5	43 47.6	+50.4	130.3	43 08.5	+51.0	131.0	42 28.9	+51.6	131.7	41 48.7	+52.1	132.4	41 08.0	+52.7	133.0	40 26.9	+53.1	133.6	39 45.2	+53.6	134.3	10
11	45 15.9	+49.5	128.7	44 38.0	+50.1	129.5	43 59.5	+50.8	130.3	43 20.5	+51.3	131.0	42 40.8	+51.9	131.7	42 00.7	+52.4	132.4	41 20.0	+52.9	133.0	40 38.8	+53.4	133.7	11
12	46 05.4	+49.1	127.9	45 28.1	+49.8	128.7	44 50.3	+50.4	129.5	44 11.8	+51.0	130.3	43 32.7	+51.6	131.0	42 53.1	+52.1	131.7	42 12.9	+52.6	132.4	41 32.2	+53.1	133.1	12
13	46 54.5	+48.7	127.1	46 17.9	+49.5	127.9	45 40.7	+50.1	128.8	45 02.8	+50.8	129.5	44 24.3	+51.4	130.3	43 45.2	+51.9	131.0	43 05.5	+52.5	131.7	42 25.3	+53.0	132.4	13
14	47 43.2	+48.4	126.2	47 07.4	+49.1	127.1	46 30.8	+49.8	128.0	45 53.6	+50.4	128.8	45 15.7	+51.0	129.6	44 37.1	+51.7	130.3	43 58.0	+52.2	131.1	43 18.3	+52.8	131.8	14
15	48 31.6	+47.9	125.4	47 56.5	+48.6	126.3	47 20.6	+49.4	127.1	46 44.0	+50.1	128.0	46 06.7	+50.8	128.8	45 28.8	+51.4	129.6	44 50.2	+52.0	130.4	44 11.1	+52.5	131.1	15
16	49 19.5	+47.4	124.4	48 45.1	+48.3	125.4	48 10.0	+49.0	126.3	47 34.1	+49.8	127.2	46 57.5	+50.4	128.0	46 20.2	+51.0	128.8	45 42.2	+51.7	129.7	45 03.6	+52.2	130.4	16
17	50 06.9	+47.0	123.5	49 33.4	+47.8	124.5	48 59.0	+48.6	125.4	48 23.9	+49.3	126.4	47 47.9	+50.1	127.2	47 11.2	+50.8	128.1	46 33.9	+51.4	128.9	45 55.8	+52.0	129.7	17
18	50 53.9	+46.5	122.5	50 21.2	+47.4	123.5	49 47.6	+48.2	124.5	49 13.2	+49.0	125.5	48 38.0	+49.7	126.4	48 02.0	+50.4	127.3	47 25.3	+51.1	128.2	46 47.8	+51.7	129.0	18
19	51 40.4	+46.0	121.5	51 08.6	+46.9	122.5	50 35.8	+47.8	123.6	50 02.2	+48.6	124.6	49 27.7	+49.3	125.6	48 52.4	+50.1	126.5	48 16.4	+50.7	127.3	47 39.5	+51.5	128.3	19
20	52 26.4	+45.3	120.5	51 55.5	+46.3	121.6	51 23.6	+47.2	122.6	50 50.8	+48.1	123.7	50 17.0	+49.0	124.7	49 42.5	+49.7	125.7	49 07.1	+50.4	126.6	48 31.0	+51.1	127.5	20
21	53 11.7	+44.8	119.4	52 41.8	+45.7	120.5	52 10.8	+46.7	121.6	51 38.9	+47.6	122.7	51 06.0	+48.4	123.8	50 32.2	+49.2	124.8	49 57.5	+50.1	125.8	49 22.1	+50.7	126.7	21
22	53 56.5	+44.1	118.3	53 27.5	+45.2	119.4	52 57.5	+46.2	120.6	52 26.5	+47.1	121.7	51 54.4	+48.0	122.8	51 21.4	+48.9	123.9	50 47.6	+49.6	124.9	50 12.8	+50.4	125.9	22
23	54 40.6	+43.4	117.1	54 12.7	+44.5	118.3	53 43.7	+45.6	119.5	53 13.6	+46.5	120.7	52 42.4	+47.5	121.8	52 10.3	+48.4	122.9	51 37.2	+49.2	124.0	51 03.2	+50.0	125.0	23
24	55 24.0	+42.7	115.9	54 57.2	+43.9	117.2	54 29.3	+44.9	118.4	54 00.1	+46.0	119.6	53 29.9	+47.0	120.8	52 58.7	+47.9	122.0	52 26.4	+48.8	123.1	51 53.2	+49.6	124.1	24
25	56 06.7	+41.9	114.6	55 41.1	+43.1	116.0	55 14.2	+44.2	117.3	54 46.1	+45.4	118.5	54 16.9	+46.4	119.8	53 46.6	+47.3	121.0	53 15.2	+48.2	122.1	52 42.8	+49.1	123.2	25
26	56 48.6	+41.1	113.3	56 24.2	+42.3	114.7	55 58.4	+43.6	116.1	55 31.5	+44.6	117.4	55 03.3	+45.7	118.7	54 33.9	+46.8	119.9	54 03.4	+47.8	121.1	53 31.9	+48.7	122.3	26
27	57 29.7	+40.2	112.0	57 06.5	+41.5	113.4	56 42.0	+42.8	114.8	56 16.1	+44.0	116.2	55 49.0	+45.1	117.5	55 20.7	+46.2	118.8	54 51.2	+47.2	120.1	54 20.6	+48.2	121.3	27
28	58 09.9	+39.2	110.6	57 48.0	+40.6	112.1	57 24.8	+41.9	113.5	57 00.1	+43.2	115.0	56 34.1	+44.4	116.3	56 06.9	+45.5	117.7	55 38.4	+46.6	119.0	55 08.8	+47.6	120.2	28
29	58 49.1	+38.2	109.2	58 28.6	+39.7	110.7	58 06.7	+41.1	112.2	57 43.3	+42.4	113.7	57 18.5	+43.7	115.1	56 52.4	+44.9	116.5	56 25.0	+46.0	117.8	55 56.4	+47.0	119.2	29
30	59 27.3	+37.2	107.7	59 08.3	+38.7	109.3	58 47.8	+40.1	110.8	58 25.7	+41.5	112.3	58 02.2	+42.8	113.8	57 37.3	+44.0	115.3	57 11.0	+45.3	116.7	56 43.4	+46.4	118.0	30
31	60 04.5	+36.0	106.1	59 47.0	+37.6	107.7	59 27.9	+39.1	109.4	59 07.2	+40.6	110.9	58 45.0	+42.0	112.5	58 21.3	+43.3	114.0	57 56.3	+44.5	115.5	57 29.8	+45.7	116.9	31
32	60 40.5	+34.8	104.5	60 24.6	+36.5	106.2	60 07.0	+38.1	107.9	59 47.8	+39.6	109.5	59 27.0	+41.1	111.1	59 04.6	+42.5	112.7	58 40.8	+43.8	114.2	58 15.5	+45.0	115.7	32
33	61 15.3	+33.4	102.8	61 01.1	+35.2	104.6	60 45.1	+36.9	106.3	60 27.4	+38.5	108.0	60 08.1	+40.0	109.6	59 47.1	+41.5	111.3	59 24.6	+42.9	112.8	59 00.5	+44.2	114.4	33
34	61 48.7	+32.2	101.1	61 36.3	+34.0	102.9	61 22.0	+35.7	104.7	61 05.9	+37.4	106.4	60 48.1	+39.0	108.1	60 28.6	+40.6	109.8	60 07.5	+42.0	111.5	59 44.7	+43.4	113.1	34
35	62 20.9	+30.6	99.3	62 10.3	+32.5	101.1	61 57.7	+34.4	103.0	61 43.3	+36.2	104.8	61 27.1	+37.9	106.6	61 09.2	+39.4	108.3	60 49.5	+41.0	110.0	60 28.1	+42.5	111.7	35
36	62 51.5	+29.2	97.4	62 42.8	+31.2	99.3	62 32.1	+33.1	101.2	62 19.5	+34.9	103.1	62 05.0	+36.7	104.9	61 48.6	+38.4	106.7	61 30.5	+39.9	108.5	61 10.6	+41.5	110.2	36
37	63 20.7	+27.5	95.5	63 14.0	+29.5	97.4	63 05.2	+31.6	99.4	62 54.4	+33.5	101.3	62 41.7	+35.3	103.2	62 27.0	+37.1	105.1	62 10.4	+38.9	106.9	61 52.1	+40.5	108.7	37
38	63 48.2	+25.8	93.5	63 43.5	+28.0	95.5	63 36.8	+30.0	97.5	63 27.9	+32.0	99.5	63 17.0	+34.0	101.4	63 04.1	+35.9	103.4	62 49.3	+37.6	105.3	62 32.6	+39.3	107.1	38
39	64 14.0	+24.0	91.4	64 11.5	+26.2	93.5	64 06.8	+28.3	95.5	63 59.9	+30.5	97.6	63 51.0	+32.5	99.6	63 40.0	+34.4	101.6	63 26.9	+36.4	103.5	63 11.9	+38.1	105.5	39
40	64 38.0	+22.2	89.3	64 37.7	+24.4	91.4	64 35.1	+26.7	93.5	64 30.4	+28.8	95.6	64 23.5	+30.9	97.7	64 14.4	+33.0	99.7	64 03.3	+34.9	101.7	63 50.0	+36.8	103.7	40
41	65 00.2	+20.1•	87.1	65 02.1	+22.5	89.2	65 01.8	+24.8	91.4	64 59.2	+27.1	93.5	64 54.4	+29.3	95.7	64 47.4	+31.4	97.8	64 38.2	+33.4	99.9	64 26.8	+35.5	101.9	41
42	65 20.3	+18.2•	84.8	65 24.6	+20.5•	87.0	65 26.6	+22.8	89.2	65 26.3	+25.1	91.4	65 23.7	+27.4	93.6	65 18.8	+29.7	95.8	65 11.6	+31.9	97.9	65 02.3	+33.9	100.0	42
43	65 38.5	+16.0•	82.5	65 45.1	+18.4•	84.7	65 49.4	+20.9•	87.0	65 51.4	+23.3	89.2	65 51.1	+25.6	91.4	65 48.5	+27.9	93.6	65 43.5	+30.1	95.9	65 36.2	+32.3	98.1	43
44	65 54.5	+13.7•	80.2	66 03.5	+16.3•	82.4	66 10.3	+18.7•	84.7	66 14.7	+21.2•	86.9	66 16.7	+23.6•	89.2	66 16.4	+26.0	91.5	66 13.6	+28.4	93.7	66 08.5	+30.7	96.0	44
45	66 08.2	+11.6•	77.8	66 19.8	+14.0•	80.0	66 29.0	+16.5•	82.3	66 35.9	+19.0•	84.6	66 40.3	+21.6•	86.9	66 42.4	+24.0•	89.2	66 42.0	+26.4•	91.5	66 39.2	+28.7	93.8	45
46	66 19.8	+9.2•	75.4	66 33.8	+11.7•	77.6	66 45.5	+14.3•	79.9	66 54.9	+16.8•	82.2	67 01.9	+19.3•	84.5	67 06.4	+21.8•	86.9	67 08.4	+24.4•	89.2	67 07.9	+26.9•	91.6	46
47	66 29.0	+6.9•	72.9	66 45.5	+9.4•	75.1	66 59.8	+12.1•	77.4	67 11.7	+14.7•	79.7	67 21.2	+17.1•	82.1	67 28.2	+19.7•	84.5	67 32.8	+22.2•	86.9	67 34.8	+24.7•	89.3	47
48	66 35.9	+4.4•	70.4	66 54.9	+7.0•	72.6	67 11.7	+9.5•	74.9	67 26.2	+12.1•	77.2	67 38.3	+14.7•	79.6	67 47.9	+17.3•	82.0	67 55.0	+20.0•	84.4	67 59.5	+22.6•	86.9	48
49	66 40.3	+2.1•	67.9	67 01.9	+4.5•	70.1	67 21.2	+7.0•	72.3	67 38.3	+9.6•	74.6	67 53.0	+12.2•	77.0	68 05.2	+14.9•	79.4	68 15.0	+17.6•	81.9	68 22.1	+20.3•	84.4	49
50	66 42.4	−0.4•	65.4	67 06.4	+2.0•	67.5	67 28.2	+4.6•	69.7	67 47.9	+7.1•	72.0	68 05.2	+9.8•	74.4	68 20.1	+12.5•	76.8	68 32.6	+15.1•	79.3	68 42.4	+17.9•	81.8	50
51	66 42.0	−2.8•	62.8	67 08.4	−0.5•	64.9	67 32.8	+2.0•	67.1	67 55.0	+4.5•	69.4	68 15.0	+7.1•	71.7	68 32.6	+9.8•	74.2	68 47.7	+12.6•	76.6	69 00.3	+15.3•	79.2	51
52	66 39.2	−5.3•	60.3	67 07.9	−2.9•	62.4	67 34.8	−0.5•	64.5	67 59.5	+2.0•	66.7	68 22.1	+4.6•	69.1	68 42.4	+7.2•	71.4	69 00.3	+9.9•	73.9	69 15.6	+12.7•	76.5	52
53	66 33.9	−7.8•	57.8	67 05.0	−5.4•	59.8	67 34.3	−3.1•	61.9	68 01.5	−0.6•	64.1	68 26.7	+1.9•	66.3	68 49.6	+4.6•	68.7	69 10.2	+7.3•	71.2	69 28.3	+10.0•	73.7	53
54	66 26.3	−10.0•	55.3	66 59.6	−7.8•	57.2	67 31.2	−5.6•	59.3	68 00.9	−3.2•	61.4	68 28.6	−0.7•	63.6	68 54.2	+1.8•	65.9	69 17.5	+4.5•	68.4	69 38.4	+7.3•	70.9	54
55	66 16.3	−12.2•	52.9	66 51.8	−10.2•	54.7	67 25.6	−8.0•	56.7	67 57.7	−5.8•	58.7	68 27.9	−3.4•	60.9	68 56.0	−0.9•	63.2	69 22.0	+1.7•	65.5	69 45.7	+4.4•	68.0	55
56	66 04.1	−14.5•	50.4	66 41.6	−12.6•	52.2	67 17.6	−10.5•	54.1	67 51.9	−8.3•	56.1	68 24.5	−6.1•	58.2	68 55.1	−3.6•	60.4	69 23.7	−1.0•	62.7	69 50.1	+1.6•	65.1	56
57	65 49.6	−16.7•	48.0	66 29.0	−14.8•	49.8	67 07.1	−12.9•	51.6	67 43.6	−10.8•	53.5	68 18.4	−8.6•	55.5	68 51.5	−6.3•	57.6	69 22.7	−3.8•	59.9	69 51.7	−1.2•	62.2	57
58	65 32.9	−18.8•	45.7	66 14.2	−17.1•	47.3	66 54.2	−15.2•	49.1	67 32.8	−13.3•	50.9	68 09.8	−11.1•	52.8	68 45.2	−8.9•	54.9	69 18.9	−6.6•	57.0	69 50.5	−4.1•	59.3	58
59	65 14.1	−20.8•	43.4	65 57.1	−19.2•	45.0	66 39.0	−17.5•	46.6	67 19.5	−15.9•	48.4	67 58.7	−13.6•	50.1	68 36.3	−11.5•	52.1	69 12.3	−9.3•	54.2	69 46.4	−6.9•	56.4	59
60	64 53.3	−22.8•	41.2	65 37.9	−21.2•	42.7	66 21.5	−19.6•	44.2	67 03.9	−17.9•	45.8	67 45.1	−16.1•	47.6	68 24.8	−14.1•	49.5	69 03.0	−11.9•	51.4	69 39.5	−9.6•	53.5	60
61	64 30.5	−24.6	39.0	65 16.7	−23.2	40.4	66 01.9	−21.7•	41.9	66 46.0	−20.0•	43.4	67 29.0	−18.3•	45.1	68 10.7	−16.4•	46.8	68 51.1	−14.5•	48.7	69 29.9	−12.4•	50.7	61
62	64 05.9	−26.3	36.9	64 53.5	−25.1	38.2	65 40.2	−23.7	39.6	66 26.0	−22.2•	41.0	67 10.7	−20.6•	42.6	67 54.3	−18.9•	44.3	68 36.6	−17.0•	46.0	69 17.5	−15.0•	47.9	62
63	63 39.6	−28.1	34.9	64 28.4	−26.8	36.1	65 16.5	−25.5	37.4	66 03.8	−24.2	38.7	66 50.1	−22.7•	40.2	67 35.4	−21.1•	41.8	68 19.6	−19.4•	43.4	69 02.5	−17.5•	45.2	63
64	63 11.5	−29.6	32.9	64 01.6	−28.6	34.0	64 51.0	−27.4	35.2	65 39.6	−26.1	36.5	66 27.4	−24.7•	37.9	67 14.3	−23.3•	39.3	68 00.2	−21.7•	40.9	68 45.0	−20.0•	42.6	64
65	62 41.9	−31.2	31.0	63 33.0	−30.1	32.0	64 23.6	−29.1	33.1	65 13.5	−27.9	34.3	66 02.7	−26.7	35.6	66 51.0	−25.3	37.0	67 38.5	−23.8•	38.4	68 25.0	−22.2•	40.0	65
66	62 10.7	−32.5	29.2	63 02.9	−31.7	30.1	63 54.5	−30.6	31.1	64 45.6	−29.6	32.2	65 36.0	−28.5	33.4	66 25.7	−27.2	34.7	67 14.7	−25.9•	36.0	68 02.8	−24.5•	37.5	66
67	61 38.2	−33.9	27.4	62 31.2	−33.0	28.3	63 23.9	−32.2	29.2	64 16.0	−31.3	30.2	65 07.5	−30.2	31.3	65 58.5	−29.1	32.5	66 48.8	−27.9	33.7	67 38.3	−26.6•	35.1	67
68	61 04.3	−35.2	25.7	61 58.2	−34.5	26.5	62 51.7	−33.7	27.3	63 44.7	−32.7	28.3	64 37.3	−31.8	29.3	65 29.4	−30.8	30.3	66 20.9	−29.7	31.5	67 11.7	−28.5	32.7	68
69	60 29.1	−36.4	24.0	61 23.7	−35.7	24.7	62 18.0	−34.9	25.5	63 12.0	−34.2	26.4	64 05.5	−33.3	27.3	64 58.6	−32.4	28.3	65 51.2	−31.5	29.3	66 43.2	−30.4	30.5	69
70	59 52.7	−37.5	22.4	60 48.0	−36.8	23.1	61 43.1	−36.2	23.8	62 37.8	−35.5	24.6	63 32.2	−34.8	25.4	64 26.2	−34.0	26.3	65 19.7	−33.0	27.3	66 12.8	−32.1	28.3	70
71	59 15.2	−38.5	20.9	60 11.2	−38.0	21.5	61 06.9	−37.4	22.1	62 02.3	−36.8	22.8	62 57.4	−36.1	23.6	63 52.2	−35.3	24.4	64 46.7	−34.6	25.3	65 40.7	−33.7	26.2	71
72	58 36.7	−39.6	19.4	59 33.2	−39.1	19.9	60 29.5	−38.6	20.5	61 25.5	−37.9	21.2	62 21.3	−37.3	21.9	63 16.9	−36.7	22.6	64 12.1	−36.0	23.4	65 07.0	−35.2	24.2	72
73	57 57.1	−40.5	17.9	58 54.1	−40.0	18.5	59 50.9	−39.5	19.0	60 47.6	−39.1	19.6	61 44.0	−38.5	20.2	62 40.2	−37.9	20.9	63 36.1	−37.3	21.6	64 31.8	−36.7	22.3	73
74	57 16.6	−41.3	16.6	58 14.1	−41.0	17.0	59 11.4	−40.5	17.5	60 08.5	−40.1	18.0	61 05.5	−39.6	18.6	62 02.3	−39.1	19.2	62 58.8	−38.5	19.8	63 55.1	−37.9	20.5	74
75	56 35.3	−42.1	15.2	57 33.1	−41.8	15.6	58 30.9	−41.5	16.1	59 28.4	−41.0	16.6	60 25.9	−40.6	17.1	61 23.2	−40.2	17.6	62 20.3	−39.7	18.2	63 17.2	−39.2	18.8	75
76	55 53.2	−43.0	14.0	56 51.3	−42.6	14.3	57 49.4	−42.3	14.7	58 47.4	−42.0	15.1	59 45.3	−41.6	15.6	60 43.0	−41.2	16.1	61 40.6	−40.8	16.6	62 38.0	−40.3	17.1	76
77	55 10.2	−43.6	12.7	56 08.7	−43.4	13.0	57 07.1	−43.1	13.4	58 05.4	−42.7	13.8	59 03.7	−42.5	14.2	60 01.8	−42.1	14.6	60 59.8	−41.8	15.0	61 57.7	−41.4	15.5	77
78	54 26.6	−44.4	11.5	55 25.3	−44.1	11.8	56 24.0	−43.8	12.1	57 22.7	−43.5	12.5	58 21.2	−43.3	12.8	59 19.7	−43.0	13.2	60 18.0	−42.6	13.6	61 16.3	−42.4	14.0	78
79	53 42.2	−44.9	10.4	54 41.2	−44.7	10.6	55 40.2	−44.6	10.9	56 39.1	−44.3	11.2	57 37.9	−44.1	11.5	58 36.7	−43.9	11.8	59 35.4	−43.6	12.2	60 34.0	−43.3	12.5	79
80	52 57.3	−45.6	9.3	53 56.5	−45.4	9.5	54 55.6	−45.2	9.7	55 54.8	−45.1	10.0	56 53.8	−44.8	10.2	57 52.8	−44.5	10.5	58 51.8	−44.3	10.8	59 50.7	−44.1	11.1	80
81	52 11.7	−46.1	8.2	53 11.1	−46.0	8.4	54 10.4	−45.8	8.6	55 09.7	−45.6	8.8	56 09.0	−45.5	8.9	57 08.3	−45.3	9.3	58 07.5	−45.2	9.5	59 06.6	−44.9	9.8	81
82	51 25.6	−46.6	7.2	52 25.1	−46.5	7.3	53 24.6	−46.4	7.5	54 24.1	−46.3	7.7	55 23.5	−46.1	7.9	56 23.0	−46.0	8.1	57 22.3	−45.7	8.3	58 21.7	−45.6	8.5	82
83	50 39.0	−47.2	6.2	51 38.6	−47.0	6.3	52 38.2	−46.9	6.4	53 37.8	−46.8	6.6	54 37.4	−46.7	6.8	55 37.0	−46.6	6.9	56 36.6	−46.5	7.1	57 36.1	−46.3	7.3	83
84	49 51.8	−47.6	5.2	50 51.6	−47.6	5.3	51 51.3	−47.5	5.4	52 51.0	−47.3	5.6	53 50.7	−47.2	5.7	54 50.4	−47.1	5.8	55 50.1	−47.0	6.0	56 49.8	−47.0	6.1	84
85	49 04.2	−48.1	4.3	50 04.0	−48.0	4.4	51 03.8	−47.9	4.4	52 03.7	−47.9	4.5	53 03.5	−47.8	4.7	54 03.3	−47.7	4.8	55 03.0	−47.6	4.9	56 02.8	−47.5	5.0	85
86	48 16.1	−48.4	3.4	49 16.0	−48.4	3.4	50 15.9	−48.4	3.5	51 15.8	−48.3	3.6	52 15.7	−48.3	3.7	53 15.6	−48.2	3.7	54 15.4	−48.1	3.8	55 15.3	−48.1	3.9	86
87	47 27.7	−48.9	2.5	48 27.6	−48.8	2.5	49 27.5	−48.8	2.6	50 27.4	−48.7	2.6	51 27.4	−48.7	2.7	52 27.4	−48.7	2.8	53 27.3	−48.7	2.8	54 27.2	−48.6	2.9	87
88	46 38.8	−49.2	1.6	47 38.8	−49.2	1.7	48 38.8	−49.2	1.7	49 38.7	−49.1	1.7	50 38.7	−49.2	1.8	51 38.7	−49.1	1.8	52 38.6	−49.1	1.8	53 38.6	−49.1	1.9	88
89	45 49.6	−49.6	0.8	46 49.6	−49.6	0.8	47 49.6	−49.6	0.8	48 49.6	−49.6	0.8	49 49.5	−49.5	0.9	50 49.5	−49.5	0.9	51 49.5	−49.5	0.9	52 49.5	−49.5	0.9	89
90	45 00.0	−49.9	0.0	46 00.0	−49.9	0.0	47 00.0	−49.9	0.0	48 00.0	−49.9	0.0	49 00.0	−49.9	0.0	50 00.0	−49.9	0.0	51 00.0	−49.9	0.0	52 00.0	−49.9	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	35 53.3	−52.4	136.4	35 09.8	−52.9	136.8	34 25.8	−53.3	137.3	33 41.5	−53.6	137.8	32 57.0	−54.1	138.2	32 12.1	−54.4	138.6	31 26.9	−54.7	139.0	30 41.5	−55.1	139.4	0
1	35 00.9	−52.6	136.9	34 16.9	−53.1	137.4	33 32.5	−53.8	137.9	32 47.9	−53.8	138.3	32 02.9	−54.1	138.7	31 17.7	−54.5	139.1	30 32.2	−54.8	139.5	29 46.4	−55.1	139.8	1
2	34 08.3	−52.8	137.5	33 23.8	−53.1	138.0	32 39.1	−53.5	138.4	31 54.1	−53.9	138.8	31 08.8	−54.3	139.2	30 23.2	−54.6	139.6	29 37.4	−54.9	140.0	28 51.3	−55.2	140.4	2
3	33 15.5	−53.0	138.1	32 30.7	−53.4	138.5	31 45.6	−53.7	138.9	31 00.2	−54.1	139.3	30 14.5	−54.4	139.7	29 28.6	−54.7	140.1	28 42.5	−55.0	140.5	27 56.1	−55.3	140.8	3
4	32 22.5	−53.1	138.7	31 37.3	−53.4	139.1	30 51.9	−53.8	139.5	30 06.1	−54.1	139.8	29 20.1	−54.4	140.2	28 33.9	−54.8	140.6	27 47.5	−55.1	140.9	27 00.8	−55.4	141.2	4
5	31 29.4	−53.2	139.2	30 43.9	−53.6	139.6	29 58.1	−54.0	140.0	29 12.0	−54.3	140.3	28 25.7	−54.6	140.7	27 39.1	−54.9	141.0	26 52.4	−55.2	141.4	26 05.4	−55.4	141.7	5
6	30 36.2	−53.3	139.7	29 50.3	−53.7	140.1	29 04.1	−54.0	140.5	28 17.7	−54.3	140.8	27 31.1	−54.7	141.2	26 44.2	−54.9	141.5	25 57.2	−55.3	141.8	25 10.0	−55.6	142.1	6
7	29 42.9	−53.5	140.3	28 56.6	−53.8	140.6	28 10.1	−54.2	141.0	27 23.4	−54.5	141.3	26 36.4	−54.7	141.6	25 49.3	−55.1	141.9	25 01.9	−55.3	142.2	24 14.4	−55.6	142.5	7
8	28 49.4	−53.6	140.8	28 02.8	−54.0	141.1	27 15.9	−54.2	141.5	26 28.9	−54.6	141.8	25 41.7	−54.9	142.1	24 54.2	−55.2	142.4	24 06.6	−55.4	142.7	23 18.8	−55.6	142.9	8
9	27 55.8	−53.7	141.3	27 08.8	−54.0	141.6	26 21.7	−54.4	141.9	25 34.3	−54.6	142.2	24 46.8	−54.9	142.5	23 59.1	−55.2	142.8	23 11.2	−55.4	143.1	22 23.2	−55.7	143.3	9
10	27 02.1	−53.9	141.8	26 14.8	−54.1	142.1	25 27.3	−54.4	142.4	24 39.7	−54.7	142.7	23 51.9	−55.0	143.0	23 03.9	−55.3	143.2	22 15.8	−55.6	143.5	21 27.5	−55.8	143.7	10
11	26 08.2	−53.9	142.3	25 20.7	−54.2	142.6	24 32.9	−54.5	142.9	23 45.0	−54.8	143.2	22 56.9	−55.1	143.4	22 08.6	−55.3	143.7	21 20.2	−55.6	143.9	20 31.7	−55.8	144.1	11
12	25 14.3	−54.0	142.8	24 26.5	−54.4	143.1	23 38.4	−54.6	143.3	22 50.2	−54.9	143.6	22 01.8	−55.1	143.8	21 13.3	−55.4	144.1	20 24.7	−55.7	144.3	19 35.9	−55.9	144.5	12
13	24 20.3	−54.1	143.3	23 32.1	−54.3	143.5	22 43.8	−54.7	143.8	21 55.3	−54.9	144.0	21 06.7	−55.2	144.3	20 17.9	−55.4	144.5	19 29.0	−55.7	144.7	18 40.0	−55.9	144.9	13
14	23 26.2	−54.2	143.7	22 37.8	−54.5	144.0	21 49.1	−54.7	144.2	21 00.4	−55.0	144.5	20 11.5	−55.3	144.7	19 22.5	−55.5	144.9	18 33.3	−55.7	145.1	17 44.1	−56.0	145.3	14
15	22 32.0	−54.2	144.2	21 43.3	−54.5	144.4	20 54.4	−54.8	144.7	20 05.4	−55.1	144.9	19 16.2	−55.3	145.1	18 27.0	−55.6	145.3	17 37.6	−55.8	145.5	16 48.1	−56.0	145.7	15
16	21 37.8	−54.4	144.7	20 48.8	−54.7	144.9	19 59.6	−54.9	145.1	19 10.3	−55.1	145.3	18 20.9	−55.3	145.5	17 31.4	−55.6	145.7	16 41.8	−55.8	145.9	15 52.1	−56.0	146.0	16
17	20 43.4	−54.4	145.1	19 54.1	−54.6	145.3	19 04.7	−54.9	145.5	18 15.2	−55.2	145.7	17 25.6	−55.4	145.9	16 35.8	−55.6	146.1	15 46.0	−55.9	146.2	14 56.1	−56.1	146.4	17
18	19 49.0	−54.5	145.6	18 59.5	−54.8	145.8	18 09.8	−55.0	146.0	17 20.0	−55.2	146.1	16 30.2	−55.5	146.3	15 40.2	−55.7	146.5	14 50.1	−55.9	146.6	14 00.0	−56.1	146.8	18
19	18 54.5	−54.5	146.0	18 04.7	−54.8	146.2	17 14.8	−55.0	146.4	16 24.8	−55.3	146.6	15 34.7	−55.5	146.7	14 44.5	−55.7	146.9	13 54.2	−55.9	147.0	13 03.9	−56.2	147.1	19
20	18 00.0	−54.6	146.5	17 09.9	−54.8	146.6	16 19.8	−55.1	146.8	15 29.5	−55.3	147.0	14 39.2	−55.4	147.1	13 48.8	−55.8	147.2	12 58.3	−56.0	147.4	12 07.7	−56.1	147.5	20
21	17 05.4	−54.6	146.9	16 15.1	−54.9	147.1	15 24.7	−55.1	147.2	14 34.2	−55.3	147.4	13 43.7	−55.6	147.5	12 53.0	−55.8	147.6	12 02.3	−56.0	147.7	11 11.6	−56.2	147.8	21
22	16 10.8	−54.7	147.3	15 20.2	−54.9	147.5	14 29.6	−55.2	147.6	13 38.9	−55.4	147.8	12 48.1	−55.6	147.9	11 57.2	−55.8	148.0	11 06.3	−56.0	148.1	10 15.4	−56.3	148.2	22
23	15 16.1	−54.8	147.8	14 25.3	−55.0	147.9	13 34.4	−55.2	148.0	12 43.5	−55.4	148.1	11 52.5	−55.7	148.3	11 01.4	−55.8	148.4	10 10.3	−56.1	148.5	9 19.1	−56.2	148.6	23
24	14 21.3	−54.8	148.2	13 30.3	−55.0	148.3	12 39.2	−55.2	148.4	11 48.1	−55.5	148.5	10 56.8	−55.6	148.6	10 05.6	−55.9	148.7	9 14.3	−56.1	148.8	8 22.9	−56.3	148.9	24
25	13 26.5	−54.8	148.6	12 35.3	−55.1	148.7	11 44.0	−55.3	148.8	10 52.6	−55.5	148.9	10 01.2	−55.7	149.0	9 09.7	−55.9	149.1	8 18.2	−56.1	149.2	7 26.6	−56.2	149.3	25
26	12 31.7	−54.9	149.0	11 40.2	−55.1	149.1	10 48.7	−55.3	149.2	9 57.1	−55.5	149.3	9 05.5	−55.7	149.4	8 13.8	−55.9	149.5	7 22.1	−56.1	149.6	6 30.4	−56.3	149.6	26
27	11 36.8	−54.9	149.4	10 45.1	−55.1	149.5	9 53.4	−55.4	149.6	9 01.6	−55.5	149.7	8 09.8	−55.8	149.8	7 17.9	−55.9	149.8	6 26.0	−56.1	149.9	5 34.1	−56.3	150.0	27
28	10 41.9	−54.9	149.8	9 50.0	−55.2	149.9	8 58.0	−55.3	150.0	8 06.1	−55.6	150.1	7 14.0	−55.7	150.2	6 22.0	−56.0	150.2	5 29.9	−56.1	150.3	4 37.8	−56.3	150.3	28
29	9 46.9	−54.9	150.2	8 54.8	−55.1	150.3	8 02.7	−55.4	150.4	7 10.5	−55.6	150.5	6 18.3	−55.8	150.5	5 26.0	−55.9	150.6	4 33.8	−56.2	150.6	3 41.5	−56.4	150.7	29
30	8 52.0	−55.0	150.7	7 59.5	−55.3	150.7	7 07.3	−55.4	150.8	6 14.9	−55.6	150.8	5 22.5	−55.8	150.9	4 30.1	−56.0	150.9	3 37.6	−56.1	151.0	2 45.1	−56.3	151.0	30
31	7 57.0	−55.1	151.1	7 04.4	−55.2	151.1	6 11.9	−55.4	151.2	5 19.3	−55.6	151.2	4 26.7	−55.8	151.3	3 34.1	−56.0	151.3	2 41.5	−56.2	151.3	1 48.8	−56.3	151.3	31
32	7 01.9	−55.1	151.5	6 09.2	−55.3	151.5	5 16.5	−55.5	151.6	4 23.7	−55.6	151.6	3 30.9	−55.8	151.6	2 38.1	−56.0	151.7	1 45.3	−56.2	151.7	0 52.5	−56.3	151.7	32
33	6 06.9	−55.1	151.9	5 14.0	−55.3	151.9	4 21.0	−55.4	151.9	3 28.1	−55.6	152.0	2 35.1	−55.8	152.0	1 42.1	−56.0	152.0	0 49.1	−56.1	152.0	0 03.8	+56.4	28.0	33
34	5 11.8	−55.0	152.3	4 18.7	−55.2	152.3	3 25.6	−55.4	152.3	2 32.5	−55.7	152.4	1 39.3	−55.8	152.4	0 46.1	−55.9	152.4	0 07.0	+56.2	27.6	1 00.2	+56.3	27.6	34
35	4 16.8	−55.1	152.7	3 23.5	−55.3	152.7	2 30.2	−55.5	152.7	1 36.8	−55.6	152.7	0 43.5	−55.8	152.7	0 09.8	+56.0	27.3	1 03.2	+56.1	27.3	1 56.5	+56.3	27.3	35
36	3 21.7	−55.1	153.1	2 28.2	−55.3	153.1	1 34.7	−55.5	153.1	0 41.2	−55.7	153.1	0 12.3	+55.8	26.9	1 05.8	+56.0	26.9	1 59.3	+56.2	26.9	2 52.8	+56.3	26.9	36
37	2 26.6	−55.1	153.4	1 32.9	−55.3	153.5	0 39.2	−55.4	153.5	0 14.5	+55.6	26.5	1 08.1	+55.9	26.5	2 01.8	+56.0	26.5	2 55.5	+56.1	26.6	3 49.2	+56.3	26.6	37
38	1 31.5	−55.1	153.8	0 37.6	−55.3	153.9	0 16.2	+55.5	26.1	1 10.1	+55.6	26.2	2 04.0	+55.8	26.2	2 57.8	+56.0	26.2	3 51.6	+56.2	26.2	4 45.5	+56.3	26.2	38
39	0 36.4	−55.1	154.2	0 17.7	+55.3	25.8	1 11.7	+55.5	25.8	2 05.7	+55.7	25.8	2 59.8	+55.8	25.8	3 53.8	+55.9	25.8	4 47.8	+56.1	25.9	5 41.8	+56.2	25.9	39
40	0 18.7	+55.1	25.4	1 13.0	+55.2	25.4	2 07.2	+55.4	25.4	3 01.4	+55.6	25.4	3 55.6	+55.8	25.4	4 49.7	+56.0	25.5	5 43.9	+56.1	25.5	6 38.0	+56.3	25.5	40
41	1 13.8	+55.2	25.0	2 08.2	+55.3	25.0	3 02.6	+55.5	25.0	3 57.0	+55.6	25.0	4 51.4	+55.7	25.1	5 45.7	+55.9	25.1	6 40.0	+56.1	25.1	7 34.3	+56.3	25.2	41
42	2 09.0	+55.1	24.6	3 03.5	+55.3	24.6	3 58.1	+55.4	24.6	4 52.6	+55.6	24.6	5 47.1	+55.8	24.7	6 41.6	+56.0	24.7	7 36.1	+56.1	24.8	8 30.6	+56.2	24.8	42
43	3 04.1	+55.0	24.2	3 58.8	+55.2	24.2	4 53.5	+55.4	24.2	5 48.2	+55.6	24.3	6 42.9	+55.7	24.3	7 37.6	+55.9	24.4	8 32.2	+56.1	24.4	9 26.8	+56.2	24.5	43
44	3 59.1	+55.1	23.8	4 54.0	+55.3	23.8	5 48.9	+55.4	23.8	6 43.8	+55.6	23.9	7 38.6	+55.8	23.9	8 33.5	+55.9	24.0	9 28.3	+56.0	24.1	10 23.0	+56.2	24.1	44
45	4 54.2	+55.1	23.4	5 49.3	+55.2	23.4	6 44.3	+55.4	23.5	7 39.4	+55.5	23.5	8 34.4	+55.7	23.6	9 29.4	+55.9	23.6	10 24.3	+56.0	23.7	11 19.2	+56.2	23.8	45
46	5 49.3	+55.0	23.0	6 44.5	+55.2	23.0	7 39.7	+55.4	23.1	8 34.9	+55.5	23.1	9 30.1	+55.7	23.2	10 25.2	+55.8	23.3	11 20.3	+56.0	23.3	12 15.4	+56.1	23.4	46
47	6 44.3	+55.1	22.6	7 39.7	+55.2	22.6	8 35.1	+55.3	22.7	9 30.4	+55.5	22.7	10 25.8	+55.6	22.8	11 21.0	+55.9	22.9	12 16.3	+56.0	23.0	13 11.5	+56.1	23.1	47
48	7 39.4	+55.0	22.2	8 34.9	+55.2	22.2	9 30.4	+55.4	22.3	10 25.9	+55.5	22.4	11 21.4	+55.6	22.4	12 16.9	+55.7	22.5	13 12.3	+55.9	22.6	14 07.6	+56.1	22.7	48
49	8 34.4	+55.0	21.8	9 30.1	+55.1	21.8	10 25.8	+55.2	21.9	11 21.4	+55.5	22.0	12 17.0	+55.6	22.1	13 12.6	+55.8	22.1	14 08.2	+55.9	22.2	15 03.7	+56.1	22.3	49
50	9 29.4	+54.9	21.4	10 25.2	+55.1	21.4	11 21.0	+55.3	21.5	12 16.9	+55.4	21.6	13 12.6	+55.5	21.7	14 08.4	+55.7	21.8	15 04.1	+55.8	21.9	15 59.8	+56.0	22.0	50
51	10 24.3	+54.9	21.0	11 20.3	+55.1	21.0	12 16.3	+55.2	21.1	13 12.3	+55.3	21.2	14 08.1	+55.5	21.3	15 04.1	+55.6	21.4	15 59.9	+55.9	21.5	16 55.8	+55.9	21.6	51
52	11 19.2	+54.9	20.6	12 15.4	+55.0	20.6	13 11.5	+55.2	20.7	14 07.6	+55.4	20.8	15 03.7	+55.5	20.9	15 59.8	+55.6	21.0	16 55.8	+55.7	21.1	17 51.7	+55.9	21.2	52
53	12 14.1	+54.9	20.1	13 10.4	+55.0	20.2	14 06.7	+55.2	20.3	15 03.0	+55.3	20.4	15 59.2	+55.4	20.5	16 55.4	+55.6	20.6	17 51.5	+55.7	20.7	18 47.6	+55.9	20.8	53
54	13 09.0	+54.8	19.7	14 05.4	+54.9	19.8	15 01.9	+55.1	19.9	15 58.3	+55.2	20.0	16 54.6	+55.4	20.1	17 51.0	+55.5	20.2	18 47.2	+55.7	20.3	19 43.5	+55.8	20.4	54
55	14 03.8	+54.7	19.3	15 00.4	+54.9	19.4	15 57.0	+55.0	19.5	16 53.5	+55.2	19.6	17 50.0	+55.4	19.7	18 46.5	+55.5	19.8	19 42.9	+55.6	19.9	20 39.3	+55.8	20.0	55
56	14 58.5	+54.8	18.9	15 55.3	+54.9	19.1	16 52.0	+55.0	19.1	17 48.7	+55.2	19.2	18 45.4	+55.2	19.3	19 42.0	+55.4	19.4	20 38.5	+55.6	19.5	21 35.1	+55.7	19.7	56
57	15 53.3	+54.6	18.5	16 50.2	+54.8	18.6	17 47.0	+55.0	18.7	18 43.9	+55.0	18.8	19 40.6	+55.3	18.9	20 37.4	+55.4	19.0	21 34.1	+55.5	19.1	22 30.8	+55.6	19.2	57
58	16 47.9	+54.6	18.0	17 45.0	+54.7	18.1	18 42.0	+54.9	18.2	19 38.9	+55.1	18.3	20 35.9	+55.1	18.5	21 32.8	+55.3	18.6	22 29.6	+55.5	18.7	23 26.4	+55.6	18.8	58
59	17 42.5	+54.6	17.6	18 39.7	+54.7	17.7	19 36.9	+54.8	17.8	20 34.0	+54.9	17.9	21 31.0	+55.2	18.0	22 28.1	+55.2	18.2	23 25.1	+55.3	18.3	24 22.0	+55.5	18.4	59
60	18 37.1	+54.5	17.2	19 34.4	+54.6	17.3	20 31.7	+54.8	17.4	21 28.9	+54.9	17.5	22 26.2	+55.0	17.6	23 23.3	+55.2	17.7	24 20.4	+55.4	17.9	25 17.5	+55.5	18.0	60
61	19 31.6	+54.4	16.7	20 29.0	+54.6	16.8	21 26.5	+54.7	16.9	22 23.8	+54.9	17.1	23 21.2	+55.0	17.2	24 18.5	+55.1	17.3	25 15.8	+55.3	17.4	26 13.0	+55.3	17.6	61
62	20 26.0	+54.4	16.3	21 23.6	+54.5	16.4	22 21.2	+54.6	16.6	23 18.7	+54.7	16.6	24 16.2	+54.8	16.7	25 13.6	+55.0	16.9	26 11.0	+55.1	17.0	27 08.3	+55.3	17.2	62
63	21 20.4	+54.3	15.8	22 18.1	+54.4	15.9	23 15.8	+54.5	16.0	24 13.4	+54.7	16.2	25 11.0	+54.8	16.3	26 08.6	+55.0	16.4	27 06.1	+55.1	16.6	28 03.6	+55.2	16.7	63
64	22 14.7	+54.2	15.4	23 12.5	+54.4	15.5	24 10.3	+54.5	15.6	25 08.1	+54.6	15.7	26 05.8	+54.8	15.8	27 03.6	+54.8	16.0	28 01.2	+55.0	16.1	28 58.8	+55.1	16.3	64
65	23 08.9	+54.1	14.9	24 06.9	+54.2	15.0	25 04.8	+54.4	15.1	26 02.7	+54.5	15.3	27 00.6	+54.6	15.4	27 58.4	+54.8	15.5	28 56.2	+54.9	15.7	29 53.9	+55.1	15.8	65
66	24 03.0	+54.1	14.4	25 01.1	+54.2	14.5	25 59.2	+54.3	14.7	26 57.2	+54.4	14.8	27 55.2	+54.5	14.9	28 53.2	+54.6	15.1	29 51.1	+54.8	15.2	30 49.0	+54.9	15.4	66
67	24 57.1	+53.9	13.9	25 55.3	+54.0	14.1	26 53.5	+54.1	14.2	27 51.6	+54.3	14.3	28 49.7	+54.5	14.4	29 47.8	+54.6	14.6	30 45.9	+54.7	14.7	31 43.9	+54.8	14.9	67
68	25 51.0	+53.8	13.5	26 49.3	+54.0	13.6	27 47.6	+54.1	13.7	28 45.9	+54.2	13.8	29 44.2	+54.3	14.0	30 42.4	+54.4	14.1	31 40.6	+54.5	14.2	32 38.7	+54.7	14.4	68
69	26 44.8	+53.8	13.0	27 43.3	+53.9	13.1	28 41.7	+54.0	13.2	29 40.1	+54.1	13.3	30 38.5	+54.2	13.5	31 36.8	+54.4	13.6	32 35.1	+54.5	13.8	33 33.4	+54.5	13.9	69
70	27 38.6	+53.6	12.5	28 37.2	+53.7	12.6	29 35.7	+53.9	12.7	30 34.2	+54.0	12.8	31 32.7	+54.1	13.0	32 31.2	+54.2	13.1	33 29.6	+54.3	13.3	34 28.0	+54.4	13.4	70
71	28 32.2	+53.5	12.0	29 30.9	+53.6	12.1	30 29.6	+53.7	12.2	31 28.2	+53.9	12.3	32 26.8	+54.0	12.5	33 25.4	+54.1	12.6	34 23.9	+54.2	12.7	35 22.4	+54.3	12.9	71
72	29 25.7	+53.4	11.4	30 24.5	+53.6	11.6	31 23.3	+53.6	11.7	32 22.1	+53.7	11.8	33 20.8	+53.8	11.9	34 19.5	+53.9	12.1	35 18.1	+54.1	12.2	36 16.7	+54.2	12.4	72
73	30 19.1	+53.3	10.9	31 18.1	+53.3	11.0	32 16.9	+53.5	11.2	33 15.8	+53.6	11.3	34 14.6	+53.7	11.4	35 13.4	+53.8	11.5	36 12.2	+53.9	11.7	37 10.9	+54.1	11.8	73
74	31 12.4	+53.2	10.4	32 11.4	+53.3	10.5	33 10.4	+53.3	10.6	34 09.4	+53.4	10.7	35 08.3	+53.6	10.9	36 07.2	+53.7	11.0	37 06.1	+53.8	11.1	38 05.0	+53.8	11.3	74
75	32 05.6	+52.9	9.8	33 04.7	+53.0	9.9	34 03.7	+53.2	10.1	35 02.8	+53.3	10.2	36 01.9	+53.3	10.3	37 00.9	+53.5	10.4	37 59.9	+53.6	10.6	38 58.8	+53.7	10.7	75
76	32 58.5	+52.9	9.3	33 57.7	+53.0	9.4	34 56.9	+53.1	9.5	35 56.1	+53.1	9.6	36 55.2	+53.3	9.7	37 54.4	+53.3	9.9	38 53.5	+53.4	10.0	39 52.5	+53.6	10.2	76
77	33 51.4	+52.7	8.7	34 50.7	+52.8	8.8	35 50.0	+52.8	8.9	36 49.2	+53.0	9.0	37 48.5	+53.0	9.2	38 47.7	+53.1	9.3	39 46.9	+53.2	9.4	40 46.1	+53.3	9.6	77
78	34 44.1	+52.5	8.1	35 43.5	+52.6	8.2	36 42.8	+52.7	8.3	37 42.2	+52.8	8.5	38 41.5	+52.9	8.6	39 40.8	+53.0	8.7	40 40.1	+53.1	8.9	41 39.4	+53.2	9.0	78
79	35 36.6	+52.4	7.5	36 36.1	+52.4	7.6	37 35.5	+52.5	7.7	38 35.0	+52.5	7.8	39 34.4	+52.7	8.0	40 33.8	+52.8	8.1	41 33.2	+52.8	8.2	42 32.6	+52.9	8.3	79
80	36 28.9	+52.2	6.9	37 28.5	+52.2	7.0	38 28.0	+52.3	7.1	39 27.5	+52.4	7.2	40 27.1	+52.4	7.3	41 26.6	+52.5	7.4	42 26.0	+52.7	7.6	43 25.5	+52.7	7.7	80
81	37 21.1	+51.9	6.3	38 20.7	+52.0	6.4	39 20.3	+52.1	6.5	40 19.9	+52.2	6.6	41 19.5	+52.3	6.7	42 19.1	+52.4	6.7	43 18.7	+52.4	6.9	44 18.2	+52.5	7.0	81
82	38 13.0	+51.8	5.7	39 12.7	+51.8	5.8	40 12.4	+51.9	5.8	41 12.1	+51.9	5.9	42 11.8	+52.0	6.0	43 11.4	+52.1	6.1	44 11.1	+52.1	6.2	45 10.7	+52.2	6.3	82
83	39 04.8	+51.5	5.0	40 04.5	+51.6	5.1	41 04.3	+51.6	5.2	42 04.0	+51.7	5.3	43 03.8	+51.7	5.4	44 03.5	+51.8	5.4	45 03.2	+51.9	5.5	46 02.9	+52.0	5.6	83
84	39 56.3	+51.3	4.4	40 56.1	+51.3	4.4	41 55.9	+51.4	4.5	42 55.7	+51.5	4.6	43 55.5	+51.5	4.7	44 55.3	+51.6	4.7	45 55.1	+51.6	4.8	46 54.9	+51.7	4.9	84
85	40 47.6	+51.0	3.7	41 47.4	+51.1	3.7	42 47.3	+51.1	3.8	43 47.2	+51.1	3.9	44 47.0	+51.3	3.9	45 46.9	+51.3	4.0	46 46.7	+51.4	4.1	47 46.6	+51.4	4.2	85
86	41 38.6	+50.8	3.0	42 38.5	+50.8	3.0	43 38.4	+50.9	3.1	44 38.3	+50.9	3.1	45 38.3	+50.9	3.2	46 38.2	+50.9	3.3	47 38.1	+51.0	3.3	48 38.0	+51.0	3.4	86
87	42 29.4	+50.5	2.3	43 29.3	+50.6	2.3	44 29.3	+50.5	2.4	45 29.2	+50.6	2.4	46 29.2	+50.6	2.4	47 29.1	+50.7	2.5	48 29.1	+50.6	2.5	49 29.0	+50.7	2.6	87
88	43 19.9	+50.2	1.5	44 19.9	+50.2	1.6	45 19.8	+50.3	1.6	46 19.8	+50.3	1.6	47 19.8	+50.3	1.6	48 19.8	+50.3	1.7	49 19.7	+50.4	1.7	50 19.7	+50.4	1.8	88
89	44 10.1	+49.9	0.8	45 10.1	+49.9	0.8	46 10.1	+49.9	0.8	47 10.1	+49.9	0.8	48 10.1	+49.9	0.8	49 10.1	+49.9	0.9	50 10.1	+49.9	0.9	51 10.1	+49.9	0.9	89
90	45 00.0	+49.6	0.0	46 00.0	+49.6	0.0	47 00.0	+49.6	0.0	48 00.0	+49.6	0.0	49 00.0	+49.5	0.0	50 00.0	+49.5	0.0	51 00.0	+49.5	0.0	52 00.0	+49.5	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 146°, 214°**

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35°, 325° L.H.A. LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	35 23.8	+51.9	135.3	34 41.0	+52.4	135.8	33 57.8	+52.8	136.2	33 14.3	+53.2	136.7	32 30.5	+53.6	137.1	31 46.3	+54.0	137.6	31 01.9	+54.3	138.0	30 17.2	+54.7	138.4	0
1	36 15.7	+51.8	134.7	35 33.4	+52.2	135.2	34 50.6	+52.7	135.7	34 07.5	+53.1	136.1	33 24.1	+53.5	136.6	32 40.3	+53.9	137.1	31 56.2	+54.3	137.5	31 11.9	+54.6	137.9	1
2	37 07.5	+51.5	134.0	36 25.6	+52.0	134.6	35 43.3	+52.5	135.1	35 00.6	+52.9	135.6	34 17.6	+53.3	136.1	33 34.2	+53.7	136.5	32 50.5	+54.1	137.0	32 06.5	+54.4	137.4	2
3	37 59.0	+51.4	133.4	37 17.6	+51.8	133.9	36 35.8	+52.3	134.5	35 53.5	+52.8	135.0	35 10.9	+53.2	135.5	34 27.9	+53.6	136.0	33 44.6	+54.0	136.5	33 00.9	+54.4	136.9	3
4	38 50.4	+51.1	132.7	38 09.4	+51.7	133.3	37 28.1	+52.1	133.9	36 46.3	+52.6	134.4	36 04.1	+53.0	134.9	35 21.5	+53.5	135.4	34 38.6	+53.8	135.9	33 55.3	+54.2	136.4	4
5	39 41.5	+50.8	132.1	39 01.1	+51.4	132.7	38 20.2	+51.9	133.2	37 38.9	+52.3	133.8	36 57.1	+52.9	134.4	36 15.0	+53.2	134.9	35 32.4	+53.7	135.4	34 49.5	+54.1	135.9	5
6	40 32.3	+50.7	131.4	39 52.5	+51.1	132.0	39 12.1	+51.7	132.6	38 31.2	+52.2	133.2	37 50.0	+52.6	133.8	37 08.2	+53.2	134.3	36 26.1	+53.6	134.8	35 43.6	+54.0	135.4	6
7	41 23.0	+50.1	130.6	40 43.6	+50.9	131.3	40 03.8	+51.1	131.9	39 23.4	+52.0	132.6	38 42.6	+52.5	133.1	38 01.4	+52.9	133.7	37 19.7	+53.4	134.3	36 37.6	+53.8	134.8	7
8	42 13.3	+50.1	129.9	41 34.5	+50.7	130.6	40 55.2	+51.2	131.3	40 15.4	+51.7	131.9	39 35.1	+52.2	132.5	38 54.3	+52.7	133.1	38 13.1	+53.2	133.7	37 31.4	+53.6	134.3	8
9	43 03.4	+49.7	129.2	42 25.2	+50.3	129.9	41 46.4	+51.0	130.6	41 07.1	+51.5	131.2	40 27.3	+52.1	131.9	39 47.0	+52.6	132.5	39 06.3	+53.0	133.1	38 25.0	+53.5	133.7	9
10	43 53.1	+49.4	128.4	43 15.5	+50.1	129.1	42 37.4	+50.7	129.9	41 58.6	+51.3	130.6	41 19.4	+51.8	131.2	40 39.6	+52.3	131.9	39 59.3	+52.8	132.5	39 18.5	+53.3	133.2	10
11	44 42.5	+49.1	127.6	44 05.6	+49.8	128.4	43 28.1	+50.4	129.1	42 49.9	+51.0	129.8	42 11.2	+51.5	130.5	41 31.9	+52.1	131.2	40 52.1	+52.6	131.9	40 11.8	+53.1	132.5	11
12	45 31.6	+48.8	126.8	44 55.4	+49.4	127.6	44 18.5	+50.0	128.4	43 40.9	+50.7	129.1	43 02.7	+51.3	129.9	42 24.0	+51.9	130.6	41 44.7	+52.4	131.2	41 04.9	+52.9	131.9	12
13	46 20.4	+48.0	126.0	45 44.8	+49.1	126.8	45 08.5	+49.8	127.6	44 31.6	+50.4	128.4	43 54.0	+51.1	129.1	43 15.9	+51.6	129.9	42 37.1	+52.2	130.6	41 57.8	+52.7	131.3	13
14	47 08.7	+48.0	125.1	46 33.9	+48.7	126.0	45 58.3	+49.4	126.8	45 22.0	+50.1	127.6	44 45.1	+50.7	128.4	44 07.5	+51.3	129.2	43 29.3	+51.9	129.9	42 50.5	+52.5	130.6	14
15	47 56.7	+47.5	124.2	47 22.6	+48.3	125.1	46 47.7	+49.1	126.0	46 12.1	+49.8	126.8	45 35.8	+50.4	127.6	44 58.8	+51.1	128.4	44 21.2	+51.7	129.2	43 43.0	+52.2	130.0	15
16	48 44.2	+47.1	123.3	48 10.9	+47.9	124.2	47 36.8	+48.6	125.1	47 01.9	+49.4	126.0	46 26.2	+50.1	126.9	45 49.9	+50.7	127.7	45 12.9	+51.4	128.5	44 35.2	+52.0	129.3	16
17	49 31.3	+46.6	122.3	48 58.8	+47.5	123.3	48 25.4	+48.3	124.3	47 51.3	+49.0	125.2	47 16.3	+49.8	126.1	46 40.6	+50.5	126.9	46 04.3	+51.0	127.8	45 27.2	+51.7	128.6	17
18	50 17.9	+46.1	121.4	49 46.3	+46.9	122.4	49 13.7	+47.8	123.4	48 40.3	+48.6	124.3	48 06.1	+49.4	125.2	47 31.1	+50.1	126.1	46 55.3	+50.8	127.0	46 18.9	+51.4	127.8	18
19	51 04.0	+45.6	120.3	50 33.2	+46.5	121.4	50 01.5	+47.4	122.4	49 28.9	+48.2	123.4	48 55.5	+48.9	124.4	48 21.2	+49.7	125.3	47 46.1	+50.5	126.2	47 10.3	+51.1	127.1	19
20	51 49.6	+45.0	119.3	51 19.7	+46.0	120.4	50 48.9	+46.8	121.5	50 17.1	+47.8	122.5	49 44.4	+48.6	123.5	49 10.9	+49.4	124.5	48 36.6	+50.1	125.4	48 01.4	+50.8	126.3	20
21	52 34.6	+44.3	118.2	52 05.7	+45.3	119.4	51 35.7	+46.4	120.5	51 04.9	+47.2	121.5	50 33.0	+48.1	122.6	50 00.3	+48.9	123.6	49 26.7	+49.7	124.6	48 52.2	+50.5	125.5	21
22	53 18.9	+43.8	117.1	52 51.0	+44.8	118.3	52 22.1	+45.8	119.4	51 52.1	+46.7	120.5	51 21.1	+47.7	121.6	50 49.2	+48.5	122.7	50 16.4	+49.3	123.7	49 42.7	+50.0	124.7	22
23	54 02.7	+43.0	115.9	53 35.8	+44.2	117.2	53 07.9	+45.2	118.4	52 38.8	+46.2	119.5	52 08.8	+47.1	120.6	51 37.7	+48.0	121.7	51 05.7	+48.9	122.8	50 32.7	+49.7	123.8	23
24	54 45.7	+42.3	114.7	54 20.0	+43.4	116.0	53 53.1	+44.5	117.3	53 25.0	+45.6	118.5	52 55.9	+46.6	119.6	52 25.7	+47.6	120.8	51 54.6	+48.4	121.9	51 22.4	+49.3	122.9	24
25	55 28.0	+41.5	113.5	55 03.4	+42.8	114.8	54 37.6	+43.9	116.1	54 10.6	+45.0	117.4	53 42.5	+46.0	118.6	53 13.3	+47.0	119.7	52 43.0	+47.9	120.9	52 11.7	+48.8	122.0	25
26	56 09.5	+40.7	112.2	55 46.2	+41.9	113.6	55 21.5	+43.2	114.9	54 55.6	+44.3	116.2	54 28.5	+45.4	117.5	54 00.3	+46.4	118.7	53 30.9	+47.4	119.9	53 00.5	+48.3	121.0	26
27	56 50.2	+39.8	110.9	56 28.1	+41.2	112.3	56 04.7	+42.4	113.7	55 39.9	+43.6	115.0	55 13.9	+44.8	116.3	54 46.7	+45.8	117.6	54 18.3	+46.9	118.8	53 48.8	+47.8	120.0	27
28	57 30.0	+38.9	109.5	57 09.3	+40.2	111.0	56 47.1	+41.6	112.4	56 23.5	+42.9	113.8	55 58.7	+44.0	115.2	55 32.5	+45.2	116.5	55 05.2	+46.2	117.8	54 36.6	+47.3	119.0	28
29	58 08.9	+37.9	108.1	57 49.5	+39.3	109.6	57 28.7	+40.7	111.1	57 06.4	+42.0	112.5	56 42.7	+43.3	113.9	56 17.7	+44.5	115.3	55 51.4	+45.7	116.6	55 23.9	+46.7	117.9	29
30	58 46.8	+36.8	106.6	58 28.8	+38.4	108.2	58 09.4	+39.8	109.7	57 48.4	+41.2	111.2	57 26.0	+42.5	112.7	57 02.2	+43.8	114.1	56 37.1	+44.9	115.5	56 10.6	+46.1	116.8	30
31	59 23.6	+35.7	105.1	59 07.2	+37.3	106.7	58 49.2	+38.8	108.3	58 29.6	+40.2	109.8	58 08.5	+41.6	111.3	57 46.0	+42.9	112.8	57 22.0	+44.2	114.3	56 56.7	+45.4	115.7	31
32	59 59.3	+34.5	103.5	59 44.5	+36.1	105.1	59 28.0	+37.7	106.8	59 09.8	+39.3	108.4	58 50.1	+40.8	110.0	58 28.9	+42.1	111.5	58 06.2	+43.4	113.0	57 42.1	+44.6	114.5	32
33	60 33.8	+33.2	101.8	60 20.6	+35.0	103.5	60 05.7	+36.6	105.2	59 49.1	+38.2	106.9	59 30.9	+39.7	108.5	59 11.0	+41.2	110.1	58 49.6	+42.6	111.7	58 26.7	+43.9	113.2	33
34	61 07.0	+31.9	100.1	60 55.6	+33.7	101.9	60 42.3	+35.4	103.6	60 27.3	+37.1	105.3	60 10.6	+38.7	107.0	59 52.2	+40.2	108.7	59 32.2	+41.7	110.3	59 10.6	+43.0	111.9	34
35	61 38.9	+30.5	98.3	61 29.3	+32.4	100.2	61 17.8	+34.1	102.0	61 04.4	+35.9	103.7	60 49.3	+37.6	105.5	60 32.4	+39.2	107.2	60 13.9	+40.7	108.9	59 53.6	+42.2	110.5	35
36	62 09.4	+29.0	96.5	62 01.7	+30.9	98.4	61 51.9	+32.9	100.2	61 40.3	+34.7	102.1	61 26.9	+36.4	103.9	61 11.6	+38.1	105.6	60 54.6	+39.6	107.4	60 35.8	+41.2	109.1	36
37	62 38.4	+27.4	94.6	62 32.6	+29.5	96.5	62 24.8	+31.3	98.4	62 15.0	+33.3	100.3	62 03.3	+35.1	102.2	61 49.7	+36.8	104.0	61 34.2	+38.6	105.8	61 17.0	+40.1	107.6	37
38	63 05.8	+25.8	92.7	63 02.0	+27.9	94.6	62 56.1	+29.9	96.6	62 48.3	+31.8	98.5	62 38.4	+33.7	100.4	62 26.5	+35.6	102.3	62 12.8	+37.3	104.2	61 57.1	+39.1	106.0	38
39	63 31.6	+24.0	90.7	63 29.9	+26.1	92.7	63 26.0	+28.3	94.7	63 20.1	+30.3	96.7	63 12.1	+32.3	98.6	63 02.1	+34.3	100.6	62 50.1	+36.1	102.5	62 36.2	+37.9	104.4	39
40	63 55.6	+22.2	88.6	63 56.0	+24.4	90.6	63 54.3	+26.6	92.7	63 50.4	+28.7	94.7	63 44.4	+30.8	96.7	63 36.4	+32.7	98.7	63 26.2	+34.7	100.7	63 14.1	+36.5	102.7	40
41	64 17.8	+20.3	86.5	64 20.4	+22.6	88.5	64 20.9	+24.8	90.6	64 19.1	+27.0	92.7	64 15.2	+29.1	94.8	64 09.1	+31.3	96.8	64 00.9	+33.3	98.9	63 50.6	+35.3	100.9	41
42	64 38.1	+18.3•	84.3	64 43.0	+20.6•	86.4	64 45.7	+22.9	88.5	64 46.1	+25.2	90.6	64 44.3	+27.5	92.7	64 40.4	+29.6	94.9	64 34.2	+31.7	97.0	64 25.9	+33.7	99.0	42
43	64 56.4	+16.3•	82.0	65 03.6	+18.6•	84.2	65 08.6	+21.0•	86.3	65 11.3	+23.3	88.5	65 11.8	+25.6	90.6	65 10.0	+27.8	92.8	65 05.9	+30.0	95.0	64 59.6	+32.2	97.1	43
44	65 12.7	+14.1•	79.8	65 22.2	+16.6•	81.9	65 29.6	+18.9•	84.1	65 34.6	+21.3•	86.3	65 37.4	+23.6	88.5	65 37.8	+26.0	90.7	65 35.9	+28.3	92.9	65 31.8	+30.5	95.1	44
45	65 26.8	+12.0•	77.4	65 38.8	+14.3•	79.6	65 48.5	+16.8•	81.8	65 55.9	+19.3•	84.0	66 01.0	+21.7•	86.2	66 03.8	+24.1•	88.5	66 04.2	+26.4	90.7	66 02.3	+28.7	93.0	45
46	65 38.8	+9.7•	75.1	65 53.1	+12.2•	77.2	66 05.3	+14.6•	79.4	66 15.2	+17.0•	81.7	66 22.7	+19.5•	83.9	66 27.9	+22.0•	86.2	66 30.6	+24.5•	88.5	66 31.0	+26.8	90.8	46
47	65 48.5	+7.4•	72.7	66 05.3	+9.9•	74.8	66 19.9	+12.3•	77.0	66 32.2	+14.7•	79.3	66 42.2	+17.4•	81.5	66 49.9	+19.8•	83.9	66 55.1	+22.3•	86.2	66 57.8	+24.9•	88.5	47
48	65 55.9	+5.1•	70.2	66 15.2	+7.5•	72.4	66 32.2	+10.0•	74.6	66 47.1	+12.5•	76.8	66 59.6	+15.0•	79.1	67 09.7	+17.6•	81.4	67 17.4	+20.2•	83.8	67 22.7	+22.7•	86.2	48
49	66 01.0	+2.8•	67.8	66 22.7	+5.2•	69.9	66 42.2	+7.7•	72.1	66 59.6	+10.1•	74.3	67 14.6	+12.7•	76.6	67 27.3	+15.3•	79.0	67 37.6	+17.9•	81.3	67 45.4	+20.5•	83.8	49
50	66 03.8	+0.4•	65.3	66 27.9	+2.7•	67.4	66 49.9	+5.2•	69.6	67 09.7	+7.7•	71.8	67 27.3	+10.3•	74.1	67 42.6	+12.9•	76.5	67 55.5	+15.5•	78.8	68 05.9	+18.1•	81.3	50
51	66 04.2	−1.9•	62.9	66 30.6	+0.4•	64.9	66 55.1	+2.7•	67.0	67 17.4	+5.3•	69.2	67 37.6	+7.8•	71.5	67 55.5	+10.4•	73.8	68 11.0	+13.0•	76.2	68 24.0	+15.7•	78.7	51
52	66 02.3	−4.3•	60.4	66 31.0	−2.0•	62.4	66 57.8	+0.4•	64.5	67 22.7	+2.7•	66.6	67 45.4	+5.2•	68.9	68 05.9	+7.8•	71.2	68 24.0	+10.5•	73.6	68 39.7	+13.2•	76.0	52
53	65 58.0	−6.6•	57.9	66 29.0	−4.5•	59.9	66 58.2	−2.2•	61.9	67 25.4	+0.2•	64.0	67 50.6	+2.7•	66.2	68 13.7	+5.3•	68.5	68 34.5	+7.9•	70.9	68 52.9	+10.5•	73.4	53
54	65 51.4	−8.9•	55.5	66 24.5	−6.8•	57.4	66 56.0	−4.6•	59.4	67 25.6	−2.3•	61.4	67 53.3	+0.2•	63.6	68 19.0	+2.6•	65.8	68 42.4	+5.2•	68.2	69 03.5	+7.9•	70.6	54
55	65 42.5	−11.2•	53.1	66 17.7	−9.1•	54.9	66 51.4	−7.0•	56.8	67 23.3	−4.8•	58.8	67 53.5	−2.5•	60.9	68 21.6	0.0•	63.1	68 47.6	+2.6•	65.4	69 11.4	+5.2•	67.8	55
56	65 31.3	−13.4•	52.5	66 08.6	−11.5•	52.5	66 44.4	−9.5•	54.3	67 18.5	−7.2•	56.2	67 51.0	−5.0•	58.3	68 21.6	−2.7•	60.4	68 50.2	−0.2•	62.7	69 16.6	+2.5•	65.0	56
57	65 17.9	−15.5•	48.4	65 57.1	−13.7•	50.1	66 34.9	−11.7•	51.8	67 11.3	−9.7•	53.7	67 46.0	−7.6•	55.6	68 18.9	−5.2•	57.7	68 50.0	−2.8•	59.9	69 19.1	−0.4•	62.2	57
58	65 02.4	−17.6•	46.1	65 43.4	−15.8•	47.7	66 23.2	−14.1•	49.4	67 01.6	−12.1•	51.1	67 38.4	−10.0•	53.0	68 13.7	−7.9•	55.0	68 47.2	−5.6•	57.1	69 18.7	−3.1•	59.4	58
59	64 44.8	−19.6	43.8	65 27.6	−18.0•	45.3	66 09.1	−16.2•	46.9	66 49.5	−14.5•	48.8	67 28.4	−12.5•	50.5	68 05.8	−10.4•	52.4	68 41.6	−8.2•	54.4	69 15.6	−5.8•	56.5	59
60	64 25.2	−21.5	41.6	65 09.6	−20.0•	43.1	65 52.9	−18.4•	44.6	66 35.0	−16.7•	46.2	67 15.9	−14.8•	47.9	67 55.4	−12.9•	49.7	68 33.4	−10.8•	51.7	69 09.8	−8.6•	53.7	60
61	64 03.7	−23.4	39.5	64 49.6	−22.0	40.8	65 34.5	−20.5•	42.3	66 18.3	−18.8•	43.8	67 01.1	−17.2•	45.4	67 42.5	−15.3•	47.1	68 22.6	−13.3•	49.0	69 01.2	−11.2•	51.0	61
62	63 40.3	−25.1	37.4	64 27.6	−23.9	38.7	65 14.0	−22.4	40.0	65 59.5	−21.0•	41.4	66 43.9	−19.3•	43.0	67 27.2	−17.6•	44.6	68 09.3	−15.8•	46.4	68 50.0	−13.8•	48.2	62
63	63 15.2	−26.9	35.4	64 03.7	−25.6	36.5	64 51.6	−24.4	37.8	65 38.5	−22.9	39.2	66 24.6	−21.5•	40.6	67 09.6	−19.8•	42.1	67 53.5	−18.1•	43.8	68 36.2	−16.3•	45.5	63
64	62 48.3	−28.4	33.4	63 38.1	−27.3	34.5	64 27.2	−26.1	35.7	65 15.6	−24.9	36.9	66 03.1	−23.5	38.3	66 49.8	−22.1•	39.7	67 35.4	−20.4•	41.3	68 19.9	−18.7•	42.9	64
65	62 19.9	−30.0	31.5	63 10.8	−29.0	32.5	64 01.1	−27.9	33.6	64 50.7	−26.7	34.8	65 39.6	−25.4	36.0	66 27.7	−24.0	37.8	67 15.0	−22.6•	38.8	68 01.2	−21.0•	40.4	65
66	61 49.9	−31.4	29.6	62 41.8	−30.4	30.6	63 33.2	−29.5	31.6	64 24.0	−28.4	32.7	65 14.2	−27.2	33.8	66 03.7	−26.0	35.1	66 52.4	−24.7•	36.4	67 40.2	−23.2•	37.9	66
67	61 18.5	−32.8	27.8	62 11.4	−32.0	28.7	63 03.7	−31.0	29.7	63 55.6	−30.0	30.7	64 47.0	−29.0	31.7	65 37.7	−27.9	32.9	66 27.7	−26.6	34.1	67 17.0	−25.4•	35.5	67
68	60 45.7	−34.0	26.1	61 39.4	−33.3	26.9	62 32.7	−32.4	27.8	63 25.6	−31.4	28.7	64 18.0	−30.7	29.7	65 09.8	−29.6	30.8	66 01.1	−28.5	31.9	66 51.6	−27.2	33.1	68
69	60 11.7	−35.3	24.4	61 06.1	−34.5	25.2	62 00.3	−33.9	26.0	62 54.0	−33.0	26.8	63 47.3	−32.1	27.7	64 40.2	−31.2	28.7	65 32.6	−30.3	29.8	66 24.4	−29.2	30.9	69
70	59 36.4	−36.4	22.8	60 31.6	−35.8	23.5	61 26.4	−35.1	24.2	62 21.0	−34.4	25.0	63 15.2	−33.7	25.8	64 09.0	−32.8	26.7	65 02.3	−31.9	27.7	65 55.2	−30.9	28.7	70
71	59 00.0	−37.6	21.3	59 55.8	−37.0	21.9	60 51.3	−36.3	22.5	61 46.6	−35.7	23.3	62 41.5	−34.9	24.0	63 36.2	−34.3	24.8	64 30.4	−33.4	25.7	65 24.3	−32.6	26.7	71
72	58 22.4	−38.5	19.8	59 18.8	−38.0	20.3	60 15.0	−37.5	20.9	61 10.9	−36.9	21.6	62 06.6	−36.3	22.3	63 01.9	−35.6	23.1	63 57.0	−34.9	23.8	64 51.7	−34.1	24.7	72
73	57 43.9	−39.5	18.3	58 40.8	−39.0	18.8	59 37.5	−38.5	19.4	60 34.0	−38.0	20.0	61 30.3	−37.3	20.6	62 26.3	−36.8	21.2	63 22.1	−36.2	22.0	64 17.6	−35.5	22.7	73
74	57 04.4	−40.4	16.9	58 01.8	−40.0	17.4	58 59.0	−39.6	17.9	59 56.0	−39.1	18.4	60 53.0	−38.6	19.0	61 49.5	−38.1	19.6	62 45.9	−37.5	20.2	63 42.1	−36.9	20.9	74
75	56 24.0	−41.2	15.6	57 21.8	−40.9	16.0	58 19.4	−40.5	16.4	59 16.9	−40.1	16.9	60 14.2	−39.7	17.4	61 11.4	−39.2	17.9	62 08.4	−38.7	18.5	63 05.2	−38.2	19.1	75
76	55 42.8	−42.0	14.3	56 40.9	−41.7	14.6	57 38.9	−41.4	15.0	58 36.8	−41.0	15.5	59 34.6	−40.7	15.9	60 32.2	−40.2	16.4	61 29.7	−39.8	16.9	62 27.0	−39.3	17.5	76
77	55 00.8	−42.8	13.0	55 59.2	−42.5	13.3	56 57.5	−42.2	13.7	57 55.8	−41.9	14.1	58 53.9	−41.5	14.5	59 52.0	−41.2	14.9	60 49.9	−40.8	15.4	61 47.7	−40.4	15.8	77
78	54 18.0	−43.5	11.8	55 16.7	−43.2	12.1	56 15.3	−42.9	12.4	57 13.9	−42.6	12.7	58 12.4	−42.4	13.1	59 10.8	−42.1	13.5	60 09.1	−41.8	13.9	61 07.3	−41.4	14.3	78
79	53 34.5	−44.1	10.6	54 33.5	−44.0	10.9	55 32.4	−43.8	11.2	56 31.2	−43.5	11.4	57 30.0	−43.2	11.8	58 28.7	−43.0	12.1	59 27.3	−42.7	12.4	60 25.9	−42.4	12.8	79
80	52 50.4	−44.8	9.5	53 49.5	−44.6	9.7	54 48.6	−44.3	10.0	55 47.7	−44.2	10.2	56 46.7	−43.9	10.5	57 45.7	−43.7	10.8	58 44.6	−43.5	11.1	59 43.5	−43.3	11.4	80
81	52 05.6	−45.4	8.4	53 04.9	−45.2	8.6	54 04.3	−45.1	8.8	55 03.5	−44.9	9.0	56 02.8	−44.7	9.2	57 02.0	−44.5	9.5	58 01.1	−44.3	9.8	59 00.2	−44.0	10.0	81
82	51 20.2	−45.9	7.3	52 19.7	−45.7	7.5	53 19.2	−45.6	7.7	54 18.7	−45.5	7.9	55 18.1	−45.4	8.1	56 17.5	−45.2	8.3	57 16.8	−45.0	8.5	58 16.2	−44.9	8.7	82
83	50 34.3	−46.4	6.3	51 34.0	−46.4	6.5	52 33.6	−46.2	6.6	53 33.2	−46.1	6.8	54 32.7	−45.9	6.9	55 32.3	−45.8	7.1	56 31.8	−45.7	7.3	57 31.3	−45.5	7.5	83
84	49 47.9	−46.9	5.3	50 47.6	−46.8	5.4	51 47.4	−46.6	5.6	52 47.1	−46.5	5.7	53 46.8	−46.5	5.8	54 46.5	−46.5	6.0	55 46.1	−46.3	6.1	56 45.8	−46.2	6.3	84
85	49 01.0	−47.4	4.4	50 00.8	−47.3	4.5	51 00.6	−47.2	4.6	52 00.4	−47.1	4.7	53 00.2	−47.1	4.8	54 00.0	−47.0	4.9	54 59.8	−46.9	5.0	55 59.6	−46.9	5.1	85
86	48 13.6	−47.8	3.4	49 13.5	−47.8	3.5	50 13.4	−47.7	3.6	51 13.3	−47.7	3.7	52 13.1	−47.6	3.7	53 13.0	−47.5	3.8	54 12.9	−47.5	3.9	55 12.7	−47.4	4.0	86
87	47 25.8	−48.2	2.5	48 25.7	−48.1	2.6	49 25.7	−48.2	2.6	50 25.6	−48.1	2.7	51 25.5	−48.0	2.8	52 25.5	−48.1	2.8	53 25.4	−48.0	2.9	54 25.3	−48.0	3.0	87
88	46 37.6	−48.6	1.7	47 37.6	−48.6	1.7	48 37.5	−48.5	1.7	49 37.5	−48.5	1.8	50 37.5	−48.6	1.8	51 37.4	−48.5	1.8	52 37.4	−48.5	1.9	53 37.4	−48.5	1.9	88
89	45 49.0	−49.0	0.8	46 49.0	−49.0	0.8	47 49.0	−49.0	0.9	48 49.0	−49.0	0.9	49 48.9	−48.9	0.9	50 48.9	−48.9	0.9	51 48.9	−48.9	0.9	52 48.9	−48.9	0.9	89
90	45 00.0	−49.3	0.0	46 00.0	−49.3	0.0	47 00.0	−49.3	0.0	48 00.0	−49.3	0.0	49 00.0	−49.3	0.0	50 00.0	−49.4	0.0	51 00.0	−49.4	0.0	52 00.0	−49.4	0.0	90

45°   46°   47°   48°   49°   50°   51°   52°

35°, 325° L.H.A.   LATITUDE SAME NAME AS DECLINATION

Dec	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec
0	35 23.8	−52.2	135.3	34 41.0	−52.6	135.8	33 57.8	−53.0	136.2	33 14.3	−53.4	136.7	32 30.5	−53.8	137.1	31 46.3	−54.1	137.6	31 01.9	−54.5	138.0	30 17.2	−54.8	138.4	0
1	34 31.6	−52.3	135.9	33 48.4	−52.7	136.4	33 04.8	−53.1	136.8	32 20.9	−53.5	137.2	31 36.7	−53.9	137.7	30 52.2	−54.3	138.1	30 07.4	−54.6	138.5	29 22.4	−54.9	138.8	1
2	33 39.3	−52.4	136.5	32 55.7	−52.9	136.9	32 11.7	−53.3	137.4	31 27.4	−53.7	137.8	30 42.8	−54.0	138.2	29 58.0	−54.4	138.6	29 12.8	−54.6	138.9	28 27.5	−55.0	139.3	2
3	32 46.9	−52.7	137.1	32 02.8	−53.1	137.5	31 18.4	−53.4	137.9	30 33.7	−53.7	138.3	29 48.8	−54.1	138.7	29 03.6	−54.4	139.1	28 18.2	−54.8	139.4	27 32.5	−55.1	139.8	3
4	31 54.2	−52.8	137.6	31 09.7	−53.1	138.0	30 25.0	−53.5	138.4	29 40.0	−53.9	138.8	28 54.7	−54.2	139.2	28 09.2	−54.5	139.5	27 23.4	−54.9	139.9	26 37.4	−55.2	140.2	4
5	31 01.4	−52.9	138.2	30 16.6	−53.3	138.6	29 31.5	−53.7	139.0	28 46.1	−54.0	139.3	28 00.5	−54.4	139.7	27 14.6	−54.6	140.0	26 28.5	−54.9	140.3	25 42.2	−55.2	140.6	5
6	30 08.5	−53.0	138.7	29 23.3	−53.4	139.1	28 37.8	−53.8	139.5	27 52.1	−54.1	139.8	27 06.1	−54.4	140.1	26 20.0	−54.8	140.5	25 33.6	−55.0	140.8	24 47.0	−55.3	141.1	6
7	29 15.5	−53.2	139.3	28 29.9	−53.6	139.6	27 44.0	−53.8	140.0	26 58.0	−54.2	140.3	26 11.7	−54.5	140.6	25 25.2	−54.8	140.9	24 38.6	−55.1	141.2	23 51.7	−55.4	141.5	7
8	28 22.3	−53.3	139.8	27 36.3	−53.6	140.1	26 50.2	−54.0	140.5	26 03.8	−54.3	140.8	25 17.2	−54.6	141.1	24 30.4	−54.9	141.4	23 43.5	−55.2	141.7	22 56.3	−55.4	141.9	8
9	27 29.0	−53.5	140.3	26 42.7	−53.8	140.6	25 56.2	−54.1	141.0	25 09.5	−54.4	141.3	24 22.6	−54.7	141.5	23 35.5	−54.9	141.8	22 48.3	−55.3	142.1	22 00.9	−55.5	142.3	9
10	26 35.5	−53.6	140.8	25 48.9	−53.8	141.1	25 02.1	−54.2	141.4	24 15.1	−54.5	141.7	23 27.9	−54.7	142.0	22 40.6	−55.1	142.3	21 53.0	−55.3	142.5	21 05.4	−55.6	142.7	10
11	25 42.0	−53.6	141.3	24 55.1	−54.0	141.6	24 07.9	−54.2	141.9	23 20.6	−54.5	142.2	22 33.2	−54.9	142.4	21 45.5	−55.1	142.7	20 57.7	−55.3	142.9	20 09.8	−55.6	143.1	11
12	24 48.4	−53.7	141.8	24 01.1	−54.0	142.1	23 13.7	−54.3	142.4	22 26.1	−54.6	142.6	21 38.3	−54.9	142.9	20 50.4	−55.1	143.1	20 02.4	−55.5	143.3	19 14.2	−55.7	143.5	12
13	23 54.7	−53.9	142.3	23 07.1	−54.1	142.6	22 19.4	−54.4	142.8	21 31.5	−54.7	143.1	20 43.4	−54.9	143.3	19 55.3	−55.3	143.5	19 06.9	−55.4	143.7	18 18.5	−55.7	143.9	13
14	23 00.8	−53.9	142.8	22 13.0	−54.2	143.0	21 25.0	−54.5	143.3	20 36.8	−54.8	143.5	19 48.5	−55.0	143.7	19 00.0	−55.2	143.9	18 11.5	−55.6	144.1	17 22.8	−55.8	144.3	14
15	22 06.9	−53.9	143.3	21 18.8	−54.3	143.5	20 30.5	−54.6	143.7	19 42.0	−54.8	144.0	18 53.5	−55.1	144.2	18 04.8	−55.4	144.4	17 15.9	−55.5	144.5	16 27.0	−55.8	144.7	15
16	21 13.0	−54.1	143.7	20 24.5	−54.3	144.0	19 35.9	−54.6	144.2	18 47.2	−54.9	144.4	17 58.4	−55.2	144.6	17 09.4	−55.3	144.8	16 20.4	−55.6	144.9	15 31.2	−55.8	145.1	16
17	20 18.9	−54.1	144.2	19 30.2	−54.4	144.4	18 41.3	−54.7	144.6	17 52.3	−54.9	144.8	17 03.2	−55.1	145.0	16 14.1	−55.5	145.2	15 24.8	−55.7	145.3	14 35.4	−55.9	145.5	17
18	19 24.8	−54.2	144.7	18 35.8	−54.5	144.9	17 46.6	−54.7	145.1	16 57.4	−55.0	145.2	16 08.1	−55.3	145.4	15 18.6	−55.4	145.6	14 29.1	−55.7	145.7	13 39.5	−55.9	145.8	18
19	18 30.6	−54.3	145.1	17 41.3	−54.5	145.3	16 51.9	−54.8	145.5	16 02.4	−55.0	145.7	15 12.8	−55.3	145.8	14 23.2	−55.5	146.0	13 33.4	−55.7	146.1	12 43.6	−56.0	146.2	19
20	17 36.3	−54.3	145.6	16 46.8	−54.6	145.7	15 57.1	−54.8	145.9	15 07.4	−55.1	146.1	14 17.6	−55.3	146.2	13 27.7	−55.6	146.3	12 37.7	−55.8	146.5	11 47.6	−55.9	146.6	20
21	16 42.0	−54.4	146.0	15 52.2	−54.7	146.2	15 02.3	−54.9	146.3	14 12.3	−55.1	146.5	13 22.3	−55.4	146.6	12 32.1	−55.5	146.7	11 41.9	−55.8	146.8	10 51.7	−56.0	147.0	21
22	15 47.6	−54.5	146.4	14 57.5	−54.6	146.6	14 07.4	−54.9	146.7	13 17.2	−55.2	146.9	12 26.9	−55.4	147.0	11 36.6	−55.7	147.1	10 46.1	−55.8	147.2	9 55.7	−56.1	147.3	22
23	14 53.1	−54.5	146.9	14 02.9	−54.8	147.0	13 12.5	−55.0	147.2	12 22.0	−55.2	147.3	11 31.5	−55.4	147.4	10 40.9	−55.6	147.5	9 50.3	−55.8	147.6	8 59.6	−56.1	147.7	23
24	13 58.7	−54.6	147.3	13 08.1	−54.7	147.4	12 17.5	−55.0	147.6	11 26.8	−55.2	147.7	10 36.1	−55.4	147.8	9 45.3	−55.6	147.9	8 54.5	−55.9	148.0	8 03.6	−56.1	148.0	24
25	13 04.1	−54.5	147.7	12 13.4	−54.8	147.9	11 22.5	−55.0	148.0	10 31.6	−55.2	148.1	9 40.7	−55.5	148.2	8 49.7	−55.7	148.3	7 58.6	−55.9	148.3	7 07.5	−56.1	148.4	25
26	12 09.6	−54.7	148.2	11 18.6	−54.9	148.3	10 27.5	−55.1	148.4	9 36.4	−55.3	148.5	8 45.2	−55.5	148.6	7 54.0	−55.7	148.6	7 02.7	−55.9	148.7	6 11.4	−56.0	148.8	26
27	11 15.0	−54.7	148.6	10 23.7	−54.9	148.7	9 32.4	−55.1	148.8	8 41.1	−55.3	148.9	7 49.7	−55.5	148.9	6 58.3	−55.7	149.0	6 06.8	−55.9	149.1	5 15.4	−56.2	149.1	27
28	10 20.3	−54.7	149.0	9 28.8	−54.9	149.1	8 37.3	−55.1	149.2	7 45.8	−55.3	149.3	6 54.2	−55.5	149.3	6 02.6	−55.8	149.4	5 10.9	−55.9	149.4	4 19.2	−56.1	149.5	28
29	9 25.6	−54.7	149.4	8 33.9	−54.9	149.5	7 42.2	−55.1	149.6	6 50.5	−55.4	149.7	5 58.7	−55.6	149.7	5 06.8	−55.7	149.8	4 15.0	−55.9	149.8	3 23.1	−56.1	149.8	29
30	8 30.9	−54.7	149.8	7 39.0	−54.9	149.9	6 47.1	−55.2	150.0	5 55.1	−55.4	150.0	5 03.1	−55.5	150.1	4 11.1	−55.8	150.1	3 19.1	−56.0	150.2	2 27.0	−56.1	150.2	30
31	7 36.2	−54.8	150.3	6 44.1	−55.0	150.3	5 51.9	−55.2	150.4	4 59.7	−55.3	150.4	4 07.6	−55.6	150.5	3 15.3	−55.7	150.5	2 23.1	−55.9	150.5	1 30.9	−56.2	150.5	31
32	6 41.4	−54.8	150.7	5 49.1	−55.0	150.7	4 56.7	−55.1	150.8	4 04.4	−55.4	150.8	3 12.0	−55.6	150.8	2 19.6	−55.8	150.9	1 27.2	−56.0	150.9	0 34.7	−56.1	150.9	32
33	5 46.6	−54.8	151.1	4 54.1	−55.0	151.1	4 01.6	−55.2	151.2	3 09.0	−55.4	151.2	2 16.4	−55.6	151.2	1 23.8	−55.8	151.2	0 31.2	−55.9	151.2	0 21.4	+56.1	28.8	33
34	4 51.8	−54.8	151.5	3 59.1	−55.0	151.5	3 06.4	−55.3	151.6	2 13.6	−55.4	151.6	1 20.8	−55.6	151.6	0 28.0	−55.7	151.6	0 24.7	+56.0	28.4	1 17.5	+56.2	28.4	34
35	3 57.0	−54.8	151.9	3 04.1	−55.0	151.9	2 11.1	−55.2	152.0	1 18.2	−55.4	152.0	0 25.2	−55.6	152.0	0 27.7	+55.8	28.0	1 20.7	+55.9	28.0	2 13.7	+56.1	28.0	35
36	3 02.2	−54.8	152.3	2 09.1	−55.0	152.3	1 15.9	−55.2	152.3	0 22.8	−55.4	152.4	0 30.4	+55.5	27.6	1 23.5	+55.8	27.7	2 16.6	+56.0	27.7	3 09.8	+56.1	27.7	36
37	2 07.4	−54.9	152.7	1 14.1	−55.1	152.7	0 20.7	−55.2	152.7	0 32.6	+55.4	27.3	1 25.9	+55.6	27.3	2 19.3	+55.7	27.3	3 12.6	+55.9	27.3	4 05.9	+56.1	27.3	37
38	1 12.5	−54.8	153.1	0 19.0	−55.0	153.1	0 34.5	+55.2	26.9	1 28.0	+55.4	26.9	2 21.5	+55.6	26.9	3 15.0	+55.8	26.9	4 08.5	+56.0	26.9	5 02.0	+56.1	27.0	38
39	0 17.7	−54.8	153.5	0 36.0	+55.0	26.5	1 29.7	+55.2	26.5	2 23.4	+55.4	26.5	3 17.1	+55.6	26.5	4 10.8	+55.7	26.5	5 04.5	+56.0	26.6	5 58.1	+56.1	26.6	39
40	0 37.1	+54.9	26.1	1 31.0	+55.1	26.1	2 24.9	+55.2	26.1	3 18.8	+55.4	26.1	4 12.7	+55.5	26.1	5 06.5	+55.8	26.2	6 00.4	+55.9	26.2	6 54.2	+56.1	26.3	40
41	1 32.0	+54.8	25.7	2 26.1	+55.0	25.7	3 20.1	+55.2	25.7	4 14.2	+55.4	25.7	5 08.2	+55.6	25.8	6 02.3	+55.7	25.8	6 56.3	+55.9	25.9	7 50.3	+56.0	25.9	41
42	2 26.8	+54.8	25.3	3 21.1	+55.0	25.3	4 15.3	+55.2	25.3	5 09.6	+55.3	25.3	6 03.8	+55.5	25.4	6 58.0	+55.7	25.4	7 52.2	+55.9	25.5	8 46.3	+56.0	25.5	42
43	3 21.7	+54.8	24.8	4 16.1	+55.0	24.9	5 10.5	+55.2	24.9	6 04.9	+55.4	25.0	6 59.3	+55.5	25.0	7 53.7	+55.7	25.1	8 48.0	+55.9	25.1	9 42.3	+56.0	25.2	43
44	4 16.5	+54.8	24.4	5 11.1	+55.0	24.5	6 05.7	+55.1	24.5	7 00.3	+55.3	24.6	7 54.8	+55.5	24.6	8 49.4	+55.6	24.7	9 43.9	+55.8	24.7	10 38.3	+56.0	24.8	44
45	5 11.3	+54.8	24.0	6 06.1	+54.9	24.1	7 00.8	+55.1	24.1	7 55.6	+55.3	24.2	8 50.3	+55.5	24.2	9 45.0	+55.6	24.3	10 39.7	+55.8	24.4	11 34.3	+56.0	24.5	45
46	6 06.1	+54.7	23.6	7 01.0	+55.0	23.7	7 56.0	+55.1	23.7	8 50.9	+55.3	23.8	9 45.8	+55.4	23.8	10 40.6	+55.7	23.9	11 35.5	+55.7	24.0	12 30.3	+55.9	24.1	46
47	7 00.8	+54.8	23.2	7 56.0	+54.9	23.3	8 51.1	+55.1	23.3	9 46.2	+55.2	23.4	10 41.2	+55.4	23.5	11 36.3	+55.5	23.5	12 31.2	+55.8	23.6	13 26.2	+55.9	23.7	47
48	7 55.6	+54.7	22.8	8 50.9	+54.9	22.9	9 46.2	+55.0	22.9	10 41.4	+55.2	23.0	11 36.6	+55.4	23.1	12 31.8	+55.6	23.2	13 27.0	+55.7	23.2	14 22.1	+55.8	23.3	48
49	8 50.3	+54.7	22.4	9 45.8	+54.8	22.4	10 41.2	+55.1	22.5	11 36.6	+55.2	22.6	12 32.0	+55.4	22.7	13 27.4	+55.5	22.8	14 22.7	+55.6	22.9	15 17.9	+55.9	23.0	49
50	9 45.0	+54.7	22.0	10 40.6	+54.9	22.0	11 36.3	+54.9	22.1	12 31.8	+55.1	22.2	13 27.4	+55.2	22.3	14 22.9	+55.4	22.4	15 18.3	+55.6	22.5	16 13.8	+55.7	22.6	50
51	10 39.7	+54.6	21.5	11 35.5	+54.8	21.6	12 31.2	+55.0	21.7	13 27.0	+55.1	21.8	14 22.7	+55.2	21.9	15 18.3	+55.5	22.0	16 13.9	+55.6	22.1	17 09.5	+55.8	22.2	51
52	11 34.3	+54.6	21.1	12 30.3	+54.7	21.2	13 26.2	+54.9	21.3	14 22.1	+55.1	21.4	15 17.9	+55.3	21.5	16 13.8	+55.3	21.6	17 09.5	+55.6	21.7	18 05.3	+55.6	21.8	52
53	12 28.9	+54.6	20.7	13 25.0	+54.7	20.8	14 21.1	+54.9	20.9	15 17.2	+55.0	21.0	16 13.2	+55.1	21.1	17 09.1	+55.4	21.2	18 05.1	+55.4	21.3	19 00.9	+55.7	21.4	53
54	13 23.5	+54.5	20.3	14 19.7	+54.7	20.4	15 16.0	+54.8	20.5	16 12.2	+55.0	20.6	17 08.3	+55.2	20.7	18 04.5	+55.2	20.8	19 00.5	+55.5	20.9	19 56.6	+55.5	21.0	54
55	14 18.0	+54.5	19.8	15 14.4	+54.6	19.9	16 10.8	+54.8	20.0	17 07.2	+54.9	20.1	18 03.5	+55.0	20.2	18 59.7	+55.3	20.4	19 56.0	+55.3	20.5	20 52.1	+55.6	20.6	55
56	15 12.5	+54.4	19.4	16 09.0	+54.6	19.5	17 05.6	+54.7	19.6	18 02.1	+54.8	19.7	18 58.5	+55.1	19.8	19 55.0	+55.1	19.9	20 51.3	+55.3	20.1	21 47.7	+55.4	20.2	56
57	16 06.9	+54.3	19.0	17 03.6	+54.5	19.1	18 00.3	+54.6	19.2	18 56.9	+54.8	19.3	19 53.6	+54.9	19.4	20 50.1	+55.1	19.5	21 46.6	+55.3	19.7	22 43.1	+55.4	19.8	57
58	17 01.2	+54.3	18.5	17 58.1	+54.5	18.6	18 54.9	+54.6	18.7	19 51.7	+54.8	18.9	20 48.5	+54.9	19.0	21 45.2	+55.1	19.1	22 41.9	+55.2	19.2	23 38.5	+55.4	19.4	58
59	17 55.5	+54.3	18.1	18 52.6	+54.4	18.2	19 49.5	+54.6	18.4	20 46.5	+54.7	18.4	21 43.4	+54.8	18.5	22 40.3	+54.9	18.7	23 37.1	+55.1	18.8	24 33.9	+55.2	19.0	59
60	18 49.8	+54.2	17.6	19 47.0	+54.3	17.7	20 44.1	+54.4	17.9	21 41.2	+54.6	18.0	22 38.2	+54.8	18.1	23 35.2	+54.9	18.2	24 32.2	+55.0	18.4	25 29.1	+55.2	18.5	60
61	19 44.0	+54.1	17.2	20 41.3	+54.2	17.3	21 38.5	+54.4	17.4	22 35.8	+54.5	17.5	23 33.0	+54.6	17.7	24 30.1	+54.8	17.8	25 27.2	+55.0	17.9	26 24.3	+55.1	18.1	61
62	20 38.1	+54.0	16.7	21 35.5	+54.2	16.8	22 32.9	+54.3	17.0	23 30.3	+54.5	17.1	24 27.6	+54.6	17.2	25 24.9	+54.8	17.3	26 22.2	+54.9	17.5	27 19.4	+55.0	17.6	62
63	21 32.1	+54.0	16.3	22 29.7	+54.1	16.4	23 27.2	+54.3	16.5	24 24.8	+54.3	16.6	25 22.2	+54.5	16.7	26 19.7	+54.6	16.9	27 17.1	+54.7	17.0	28 14.4	+54.9	17.2	63
64	22 26.1	+53.8	15.8	23 23.8	+54.0	15.9	24 21.5	+54.1	16.0	25 19.1	+54.3	16.2	26 16.7	+54.5	16.3	27 14.3	+54.6	16.4	28 11.8	+54.7	16.6	29 09.3	+54.9	16.7	64
65	23 19.9	+53.8	15.3	24 17.8	+53.9	15.4	25 15.6	+54.1	15.5	26 13.4	+54.2	15.7	27 11.2	+54.3	15.8	28 08.9	+54.4	16.0	29 06.5	+54.6	16.1	30 04.2	+54.7	16.3	65
66	24 13.7	+53.7	14.8	25 11.7	+53.8	14.9	26 09.7	+53.9	15.1	27 07.6	+54.1	15.2	28 05.5	+54.2	15.3	29 03.3	+54.4	15.5	30 01.1	+54.5	15.6	30 58.9	+54.6	15.8	66
67	25 07.4	+53.6	14.3	26 05.5	+53.8	14.5	27 03.6	+53.9	14.6	28 01.7	+54.0	14.7	28 59.7	+54.1	14.8	29 57.7	+54.2	15.0	30 55.6	+54.4	15.1	31 53.5	+54.5	15.3	67
68	26 01.0	+53.5	13.8	26 59.3	+53.6	13.9	27 57.5	+53.7	14.1	28 55.7	+53.8	14.2	29 53.8	+54.0	14.4	30 51.9	+54.1	14.5	31 50.0	+54.2	14.6	32 48.0	+54.4	14.8	68
69	26 54.5	+53.4	13.3	27 52.9	+53.5	13.4	28 51.2	+53.6	13.6	29 49.5	+53.8	13.7	30 47.8	+53.9	13.8	31 46.0	+54.0	14.0	32 44.2	+54.2	14.1	33 42.4	+54.3	14.3	69
70	27 47.9	+53.2	12.8	28 46.4	+53.4	12.9	29 44.8	+53.5	13.1	30 43.3	+53.6	13.2	31 41.7	+53.7	13.3	32 40.0	+53.9	13.5	33 38.4	+54.0	13.6	34 36.7	+54.1	13.8	70
71	28 41.1	+53.2	12.3	29 39.8	+53.2	12.4	30 38.3	+53.4	12.5	31 36.9	+53.5	12.7	32 35.4	+53.6	12.8	33 33.9	+53.7	13.0	34 32.4	+53.8	13.1	35 30.8	+54.0	13.3	71
72	29 34.3	+52.9	11.8	30 33.0	+53.1	11.9	31 31.7	+53.0	12.1	32 30.4	+53.3	12.1	33 29.0	+53.3	12.3	34 27.6	+53.7	12.4	35 26.2	+53.7	12.5	36 24.8	+53.8	12.7	72
73	30 27.3	+52.9	11.2	31 26.1	+53.0	11.3	32 25.0	+53.0	11.5	33 23.7	+53.3	11.6	34 22.5	+53.3	11.7	35 21.2	+53.6	11.9	36 19.9	+53.6	12.0	37 18.6	+53.7	12.2	73
74	31 20.2	+52.7	10.7	32 19.1	+52.9	10.8	33 18.0	+53.0	10.9	34 17.0	+53.0	11.0	35 15.8	+53.2	11.2	36 14.7	+53.3	11.3	37 13.5	+53.4	11.5	38 12.3	+53.5	11.6	74
75	32 12.9	+52.6	10.1	33 12.0	+52.6	10.2	34 11.0	+52.8	10.3	35 10.0	+52.9	10.5	36 09.0	+53.0	10.6	37 08.0	+53.1	10.7	38 06.9	+53.2	10.9	39 05.8	+53.3	11.0	75
76	33 05.5	+52.4	9.5	34 04.6	+52.6	9.6	35 03.8	+52.6	9.8	36 02.9	+52.7	9.9	37 02.0	+52.8	10.0	38 01.1	+52.9	10.1	39 00.1	+53.1	10.3	39 59.1	+53.2	10.4	76
77	33 57.9	+52.2	8.9	34 57.2	+52.3	9.1	35 56.4	+52.4	9.2	36 55.6	+52.6	9.3	37 54.8	+52.7	9.4	38 54.0	+52.8	9.5	39 53.2	+52.8	9.7	40 52.3	+53.0	9.8	77
78	34 50.1	+52.1	8.4	35 49.5	+52.2	8.5	36 48.8	+52.3	8.6	37 48.2	+52.3	8.7	38 47.5	+52.4	8.8	39 46.8	+52.5	8.9	40 46.0	+52.7	9.0	41 45.3	+52.7	9.2	78
79	35 42.2	+51.9	7.7	36 41.7	+51.9	7.8	37 41.1	+52.1	7.9	38 40.5	+52.2	8.1	39 39.9	+52.2	8.2	40 39.3	+52.3	8.3	41 38.7	+52.4	8.4	42 38.0	+52.5	8.6	79
80	36 34.1	+51.7	7.1	37 33.6	+51.8	7.2	38 33.2	+51.8	7.3	39 32.7	+51.9	7.4	40 32.1	+52.1	7.5	41 31.6	+52.1	7.6	42 31.1	+52.2	7.8	43 30.5	+52.3	7.9	80
81	37 25.8	+51.5	6.5	38 25.4	+51.6	6.6	39 25.0	+51.6	6.7	40 24.6	+51.7	6.8	41 24.2	+51.8	6.9	42 23.7	+51.9	7.0	43 23.3	+51.9	7.1	44 22.8	+52.0	7.2	81
82	38 17.3	+51.2	5.8	39 17.0	+51.3	5.9	40 16.6	+51.4	6.0	41 16.3	+51.5	6.1	42 16.0	+51.5	6.2	43 15.6	+51.6	6.3	44 15.2	+51.7	6.4	45 14.8	+51.8	6.5	82
83	39 08.5	+51.1	5.2	40 08.3	+51.1	5.2	41 08.0	+51.2	5.3	42 07.8	+51.2	5.4	43 07.5	+51.3	5.5	44 07.2	+51.4	5.6	45 06.9	+51.4	5.7	46 06.6	+51.5	5.8	83
84	39 59.6	+50.7	4.6	40 59.4	+50.8	4.6	41 59.2	+50.9	4.6	42 59.0	+50.9	4.7	43 58.8	+51.0	4.7	44 58.6	+51.0	4.8	45 58.3	+51.2	4.9	46 58.1	+51.2	5.0	84
85	40 50.3	+50.5	3.8	41 50.2	+50.6	3.8	42 50.1	+50.6	3.9	43 49.9	+50.7	4.0	44 49.8	+50.7	4.0	45 49.6	+50.8	4.1	46 49.5	+50.8	4.2	47 49.3	+50.9	4.3	85
86	41 40.8	+50.3	3.1	42 40.8	+50.2	3.1	43 40.7	+50.3	3.2	44 40.6	+50.3	3.2	45 40.5	+50.4	3.3	46 40.4	+50.4	3.3	47 40.3	+50.5	3.4	48 40.2	+50.5	3.5	86
87	42 31.1	+49.9	2.3	43 31.0	+50.0	2.3	44 31.0	+50.0	2.4	45 30.9	+50.1	2.5	46 30.9	+50.1	2.5	47 30.8	+50.1	2.5	48 30.8	+50.1	2.6	49 30.7	+50.2	2.6	87
88	43 21.0	+49.7	1.6	44 21.0	+49.7	1.6	45 21.0	+49.7	1.6	46 21.0	+49.7	1.7	47 20.9	+49.8	1.7	48 20.9	+49.7	1.7	49 20.9	+49.7	1.8	50 20.9	+49.7	1.8	88
89	44 10.7	+49.3	0.8	45 10.7	+49.3	0.8	46 10.7	+49.3	0.8	47 10.7	+49.3	0.8	48 10.7	+49.3	0.9	49 10.6	+49.4	0.9	50 10.6	+49.4	0.9	51 10.6	+49.4	0.9	89
90	45 00.0	+49.0	0.0	46 00.0	+49.0	0.0	47 00.0	+49.0	0.0	48 00.0	+49.0	0.0	49 00.0	+48.9	0.0	50 00.0	+48.9	0.0	51 00.0	+48.9	0.0	52 00.0	+48.9	0.0	90

S. Lat. { L.H.A. greater than 180°....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION — **L.H.A. 145°, 215°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	34 53.6	+51.7	134.2	34 11.6	+52.1	134.7	33 29.2	+52.6	135.2	32 46.5	+52.9	135.6	32 03.4	+53.4	136.1	31 20.0	+53.8	136.5	30 36.4	+54.1	136.9	29 52.4	+54.5	137.3	0
1	35 45.3	+51.4	133.6	35 03.7	+51.9	134.1	34 21.8	+52.3	134.6	33 39.4	+52.8	135.1	32 56.8	+53.2	135.5	32 13.8	+53.6	136.0	31 30.5	+54.0	136.4	30 46.9	+54.3	136.8	1
2	36 36.7	+51.2	133.0	35 55.6	+51.7	133.5	35 14.1	+52.2	134.0	34 32.2	+52.7	134.5	33 50.0	+53.1	135.0	33 07.4	+53.5	135.5	32 24.5	+53.8	135.9	31 41.2	+54.3	136.3	2
3	37 27.9	+51.0	132.3	36 47.3	+51.5	132.9	36 06.3	+52.0	133.4	35 24.9	+52.4	133.9	34 43.1	+52.9	134.4	34 00.9	+53.3	134.9	33 18.3	+53.8	135.4	32 35.5	+54.1	135.8	3
4	38 18.9	+50.8	131.6	37 38.8	+51.3	132.2	36 58.3	+51.8	132.8	36 17.3	+52.3	133.3	35 36.0	+52.7	133.9	34 54.2	+53.2	134.4	34 12.1	+53.6	134.9	33 29.6	+54.0	135.3	4
5	39 09.7	+50.5	131.0	38 30.1	+51.1	131.6	37 50.1	+51.6	132.1	37 09.6	+52.1	132.7	36 28.7	+52.6	133.3	35 47.4	+53.0	133.8	35 05.7	+53.4	134.3	34 23.6	+53.8	134.8	5
6	40 00.2	+50.3	130.3	39 21.2	+50.8	130.9	38 41.7	+51.4	131.5	38 01.7	+51.9	132.1	37 21.3	+52.3	132.7	36 40.4	+52.8	133.2	35 59.1	+53.3	133.7	35 17.4	+53.7	134.3	6
7	40 50.5	+50.0	129.5	40 12.0	+50.6	130.2	39 33.1	+51.1	130.8	38 53.6	+51.7	131.4	38 13.6	+52.2	132.0	37 33.2	+52.7	132.6	36 52.4	+53.1	133.2	36 11.1	+53.6	133.7	7
8	41 40.5	+49.7	128.8	41 02.6	+50.3	129.5	40 24.2	+50.9	130.1	39 45.3	+51.4	130.8	39 05.8	+52.0	131.4	38 25.9	+52.4	132.0	37 45.5	+52.9	132.6	37 04.7	+53.4	133.1	8
9	42 30.2	+49.4	128.1	41 52.9	+50.1	128.8	41 15.1	+50.6	129.4	40 36.7	+51.2	130.1	39 57.8	+51.7	130.8	39 18.3	+52.3	131.4	38 38.4	+52.8	132.0	37 58.1	+53.2	132.6	9
10	43 19.6	+49.1	127.3	42 43.0	+49.7	128.0	42 05.7	+50.4	128.7	41 27.9	+50.9	129.4	40 49.5	+51.5	130.1	40 10.6	+52.0	130.7	39 31.2	+52.5	131.4	38 51.3	+53.0	132.0	10
11	44 08.7	+48.7	126.5	43 32.7	+49.4	127.2	42 56.1	+50.0	128.0	42 18.8	+50.7	128.7	41 41.0	+51.3	129.4	41 02.6	+51.9	130.1	40 23.7	+52.4	130.7	39 44.3	+52.9	131.4	11
12	44 57.4	+48.4	125.7	44 22.1	+49.1	126.5	43 46.1	+49.8	127.2	43 09.5	+50.4	128.0	42 32.3	+51.0	128.7	41 54.5	+51.5	129.4	41 16.1	+52.1	130.1	40 37.2	+52.6	130.8	12
13	45 45.8	+48.0	124.8	45 11.2	+48.7	125.6	44 35.9	+49.4	126.5	43 59.9	+50.1	127.2	43 23.3	+50.7	128.0	42 46.0	+51.3	128.7	42 08.2	+51.9	129.4	41 29.8	+52.4	130.1	13
14	46 33.8	+47.6	124.0	45 59.9	+48.4	124.8	45 25.3	+49.1	125.7	44 50.0	+49.7	126.5	44 14.0	+50.4	127.3	43 37.3	+51.1	128.0	43 00.1	+51.6	128.8	42 22.2	+52.2	129.5	14
15	47 21.4	+47.1	123.1	46 48.3	+47.9	124.0	46 14.4	+48.7	124.8	45 39.7	+49.5	125.7	45 04.4	+50.1	126.5	44 28.4	+50.7	127.3	43 51.7	+51.4	128.1	43 14.4	+52.0	128.8	15
16	48 08.5	+46.8	122.1	47 36.2	+47.5	123.1	47 03.1	+48.3	124.0	46 29.2	+49.0	124.9	45 54.5	+49.8	125.7	45 19.1	+50.5	126.5	44 43.1	+51.1	127.3	44 06.4	+51.7	128.1	16
17	48 55.3	+46.2	121.2	48 23.7	+47.1	122.2	47 51.4	+47.9	123.1	47 18.2	+48.7	124.0	46 44.3	+49.4	124.9	46 09.6	+50.1	125.8	45 34.2	+50.8	126.6	44 58.1	+51.4	127.4	17
18	49 41.5	+45.7	120.2	49 10.8	+46.6	121.2	48 39.3	+47.5	122.2	48 06.9	+48.3	123.1	47 33.7	+49.0	124.1	46 59.7	+49.8	125.0	46 25.0	+50.4	125.8	45 49.5	+51.1	126.7	18
19	50 27.2	+45.2	119.2	49 57.4	+46.2	120.2	49 26.8	+47.0	121.3	48 55.2	+47.8	122.2	48 22.7	+48.7	123.2	47 49.5	+49.4	124.1	47 15.4	+50.2	125.0	46 40.6	+50.8	125.9	19
20	51 12.4	+44.6	118.2	50 43.6	+45.5	119.2	50 13.8	+46.5	120.3	49 43.0	+47.4	121.3	49 11.4	+48.2	122.3	48 38.9	+49.0	123.3	48 05.6	+49.7	124.2	47 31.4	+50.5	125.1	20
21	51 57.0	+44.0	117.1	51 29.1	+45.0	118.2	51 00.3	+46.0	119.3	50 30.4	+46.9	120.4	49 59.6	+47.8	121.4	49 27.9	+48.6	122.4	48 55.3	+49.4	123.4	48 21.9	+50.2	124.3	21
22	52 41.0	+43.3	116.0	52 14.1	+44.5	117.1	51 46.3	+45.4	118.3	51 17.3	+46.4	119.4	50 47.4	+47.3	120.4	50 16.5	+48.2	121.5	49 44.7	+49.0	122.5	49 12.1	+49.7	123.5	22
23	53 24.3	+42.7	114.8	52 58.6	+43.7	116.0	52 31.7	+44.8	117.2	52 03.7	+45.8	118.4	51 34.7	+46.8	119.5	51 04.7	+47.7	120.5	50 33.7	+48.6	121.6	50 01.8	+49.4	122.6	23
24	54 07.0	+41.9	113.6	53 42.3	+43.1	114.9	53 16.5	+44.2	116.1	52 49.5	+45.3	117.3	52 21.5	+46.2	118.4	51 52.4	+47.2	119.6	51 22.3	+48.1	120.7	50 51.2	+48.9	121.7	24
25	54 48.9	+41.2	112.4	54 25.4	+42.4	113.7	54 00.7	+43.5	115.0	53 34.8	+44.6	116.2	53 07.7	+45.7	117.4	52 39.6	+46.7	118.6	52 10.4	+47.6	119.7	51 40.1	+48.5	120.8	25
26	55 30.1	+40.3	111.1	55 07.8	+41.6	112.5	54 44.2	+42.8	113.8	54 19.4	+44.0	115.1	53 53.4	+45.1	116.3	53 26.3	+46.1	117.5	52 58.0	+47.1	118.7	52 28.6	+48.1	119.8	26
27	56 10.4	+39.5	109.8	55 49.4	+40.8	111.2	55 27.0	+42.1	112.6	55 03.4	+43.2	113.9	54 38.5	+44.4	115.2	54 12.4	+45.4	116.4	53 45.1	+46.5	117.7	53 16.7	+47.5	118.9	27
28	56 49.9	+38.5	108.4	56 30.2	+39.9	109.8	56 09.1	+41.2	111.3	55 46.6	+42.5	112.7	55 22.9	+43.7	114.0	54 57.8	+44.9	115.3	54 31.6	+45.9	116.6	54 04.2	+46.9	117.8	28
29	57 28.4	+37.6	107.0	57 10.1	+39.0	108.5	56 50.3	+40.4	110.0	56 29.1	+41.7	111.4	56 06.6	+42.9	112.8	55 42.7	+44.1	114.1	55 17.5	+45.3	115.5	54 51.1	+46.4	116.7	29
30	58 06.0	+36.5	105.6	57 49.1	+38.1	107.1	57 30.7	+39.5	108.6	57 10.8	+40.9	110.1	56 49.5	+42.2	111.5	56 26.8	+43.5	112.9	56 02.8	+44.6	114.3	55 37.5	+45.7	115.6	30
31	58 42.5	+35.5	104.1	58 27.2	+36.9	105.6	58 10.2	+38.5	107.2	57 51.7	+39.9	108.7	57 31.7	+41.3	110.2	57 10.3	+42.6	111.7	56 47.4	+43.9	113.1	56 23.2	+45.1	114.5	31
32	59 18.0	+34.2	102.5	59 04.1	+35.9	104.1	58 48.7	+37.4	105.7	58 31.6	+39.0	107.3	58 13.0	+40.4	108.8	57 52.9	+41.8	110.4	57 31.3	+43.1	111.8	57 08.3	+44.3	113.3	32
33	59 52.2	+33.0	100.9	59 40.0	+34.7	102.5	59 26.1	+36.4	104.2	59 10.6	+37.9	105.8	58 53.4	+39.5	107.4	58 34.7	+40.8	109.0	58 14.4	+42.2	110.5	57 52.6	+43.6	112.0	33
34	60 25.2	+31.7	99.2	60 14.7	+33.5	100.9	60 02.5	+35.2	102.6	59 48.5	+36.8	104.3	59 32.9	+38.4	106.0	59 15.5	+40.0	107.6	58 56.6	+41.4	109.2	58 36.2	+42.7	110.7	34
35	60 56.9	+30.3	97.5	60 48.2	+32.2	99.2	60 37.7	+33.9	101.0	60 25.3	+35.7	102.7	60 11.3	+37.3	104.4	59 55.5	+38.9	106.1	59 38.0	+40.4	107.7	59 18.9	+41.9	109.4	35
36	61 27.2	+28.9	95.7	61 20.4	+30.7	97.5	61 11.6	+32.6	99.3	61 01.0	+34.4	101.1	60 48.6	+36.1	102.8	60 34.4	+37.8	104.6	60 18.4	+39.4	106.3	60 00.8	+40.9	107.9	36
37	61 56.1	+27.3	93.8	61 51.1	+29.3	95.7	61 44.2	+31.3	97.5	61 35.4	+33.1	99.4	61 24.7	+34.9	101.2	61 12.2	+36.6	103.0	60 57.8	+38.3	104.7	60 41.7	+39.8	106.5	37
38	62 23.4	+25.8	91.9	62 20.4	+27.8	93.8	62 15.5	+29.7	95.7	62 08.5	+31.7	97.6	61 59.6	+33.6	99.5	61 48.8	+35.3	101.3	61 36.1	+37.1	103.1	61 21.5	+38.8	104.9	38
39	62 49.2	+24.0	89.9	62 48.2	+26.1	91.9	62 45.2	+28.2	93.8	62 40.2	+30.2	95.8	62 33.2	+32.1	97.7	62 24.1	+34.1	99.6	62 13.2	+35.9	101.5	62 00.3	+37.6	103.3	39
40	63 13.2	+22.3	87.9	63 14.3	+24.5	89.9	63 13.4	+26.5	91.9	63 10.4	+28.6	93.9	63 05.3	+30.7	95.8	62 58.2	+32.6	97.8	62 49.1	+34.5	99.7	62 37.9	+36.4	101.6	40
41	63 35.5	+20.4	85.9	63 38.8	+22.6	87.9	63 39.9	+24.9	89.9	63 39.0	+27.0	91.9	63 36.0	+29.0	93.9	63 30.8	+31.1	95.9	63 23.6	+33.1	97.9	63 14.3	+35.0	99.9	41
42	63 55.9	+18.5	83.7	64 01.4	+20.8	85.8	64 04.8	+23.0	87.8	64 06.0	+25.2	89.9	64 05.0	+27.4	91.9	64 01.9	+29.5	94.0	63 56.7	+31.6	96.0	63 49.3	+33.6	98.1	42
43	64 14.4	+16.5•	81.5	64 22.2	+18.8•	83.6	64 27.8	+21.1	85.7	64 31.2	+23.4	87.8	64 32.4	+25.6	89.9	64 31.4	+27.8	92.0	64 28.3	+29.9	94.1	64 22.9	+32.1	96.2	43
44	64 30.9	+14.5•	79.3	64 41.0	+16.8•	81.4	64 48.9	+19.1•	83.5	64 54.6	+21.4	85.6	64 58.0	+23.8	87.8	64 59.2	+26.1	89.9	64 58.2	+28.3	92.0	64 55.0	+30.4	94.2	44
45	64 45.4	+12.4•	77.1	64 57.8	+14.7•	79.1	65 08.0	+17.1•	81.3	65 16.0	+19.5•	83.4	65 21.8	+21.8•	85.6	65 25.3	+24.1•	87.8	65 26.5	+26.4	89.9	65 25.4	+28.7	92.1	45
46	64 57.8	+10.2•	74.8	65 12.5	+12.6•	76.8	65 25.1	+14.9•	79.0	65 35.5	+17.3•	81.1	65 43.6	+19.7•	83.3	65 49.4	+22.1•	85.5	65 52.9	+24.5	87.8	65 54.1	+26.8	90.0	46
47	65 08.0	+8.0•	72.4	65 25.1	+10.4•	74.5	65 40.0	+12.8•	76.6	65 52.8	+15.2•	78.8	66 03.3	+17.7•	81.0	66 11.5	+20.1•	83.3	66 17.4	+22.5•	85.5	66 20.9	+24.9	87.8	47
48	65 16.0	+5.8•	70.1	65 35.5	+8.1•	72.1	65 52.8	+10.5•	74.3	66 08.0	+13.0•	76.4	66 21.0	+15.4•	78.6	66 31.6	+17.9•	80.9	66 39.9	+20.4•	83.2	66 45.8	+22.9•	85.5	48
49	65 21.8	+3.5•	67.7	65 43.6	+5.8•	69.7	66 03.3	+8.2•	71.8	66 21.0	+10.6•	74.0	66 36.4	+13.1•	76.2	66 49.5	+15.7•	78.5	67 00.3	+18.2•	80.8	67 08.7	+20.7•	83.1	49
50	65 25.3	+1.2•	65.3	65 49.4	+3.5•	67.3	66 11.5	+5.9•	69.4	66 31.6	+8.3•	71.5	66 49.5	+10.8•	73.8	67 05.2	+13.3•	76.0	67 18.5	+15.8•	78.3	67 29.4	+18.4•	80.7	50
51	65 26.5	–1.1•	62.9	65 52.9	+1.2•	64.9	66 17.4	+3.5•	66.9	66 39.9	+5.9•	69.0	67 00.3	+8.4•	71.2	67 18.5	+10.9•	73.5	67 34.3	+13.5•	75.8	67 47.8	+16.1•	78.2	51
52	65 25.4	–3.4•	60.5	65 54.1	–1.2•	62.4	66 20.9	+1.1•	64.4	66 45.8	+3.5•	66.5	67 08.7	+5.9•	68.7	67 29.4	+8.4•	70.9	67 47.8	+11.1•	73.3	68 03.9	+13.7•	75.6	52
53	65 22.0	–5.6•	58.1	65 52.9	–3.5•	60.0	66 22.0	–1.2•	61.9	66 49.3	+1.1•	64.0	67 14.6	+3.5•	66.1	67 37.8	+6.0•	68.4	67 58.9	+8.5•	70.7	68 17.6	+11.1•	73.0	53
54	65 16.4	–7.9•	55.7	65 49.4	–5.8•	57.5	66 20.8	–3.7•	59.4	66 50.4	–1.4•	61.5	67 18.1	+0.9•	63.6	67 43.8	+3.4•	65.7	68 07.4	+5.9•	68.0	68 28.7	+8.5•	70.4	54
55	65 08.5	–10.1•	53.3	65 43.6	–8.1•	55.1	66 17.1	–6.0•	57.0	66 49.0	–3.9•	58.9	67 19.0	–1.5•	61.0	67 47.2	+0.8•	63.1	68 13.3	+3.3•	65.3	68 37.2	+6.0•	67.6	55
56	64 58.4	–12.3•	51.0	65 35.5	–10.4•	52.7	66 11.1	–8.4•	54.5	66 45.1	–6.2•	56.4	67 17.5	–4.0•	58.4	67 48.0	–1.7•	60.5	68 16.6	+0.7•	62.6	68 43.2	+3.2•	64.9	56
57	64 46.1	–14.3•	48.7	65 25.1	–12.6•	50.3	66 02.7	–10.6•	52.0	66 38.9	–8.7•	53.9	67 13.5	–6.6•	55.8	67 46.3	–4.3•	57.8	68 17.3	–1.9•	59.9	68 46.4	+0.6•	62.2	57
58	64 31.8	–16.5•	46.4	65 12.5	–14.7•	48.0	65 52.1	–12.9•	49.6	66 30.2	–10.9•	51.4	67 06.9	–8.9•	53.2	67 42.0	–6.8•	55.2	68 15.4	–4.5•	57.2	68 47.0	–2.2•	59.4	58
59	64 15.3	–18.4	44.2	64 57.8	–16.8•	45.7	65 39.2	–15.1•	47.2	66 19.3	–13.3•	48.9	66 58.0	–11.4•	50.7	67 35.2	–9.3•	52.6	68 10.9	–7.1•	54.5	68 44.8	–4.8•	56.6	59
60	63 56.9	–20.3	42.0	64 41.0	–18.8•	43.4	65 24.1	–17.2•	44.9	66 06.0	–15.5•	46.5	66 46.6	–13.6•	48.2	67 25.9	–11.7•	50.0	68 03.8	–9.7•	51.9	68 40.0	–7.5•	53.9	60
61	63 36.6	–22.2	39.9	64 22.2	–20.8	41.2	65 06.9	–19.3•	42.6	65 50.5	–17.7•	44.1	66 33.0	–16.0•	45.7	67 14.2	–14.1•	47.4	67 54.1	–12.2•	49.2	68 32.5	–10.1•	51.2	61
62	63 14.4	–23.9	37.8	64 01.4	–22.6	39.1	64 47.6	–21.2	40.4	65 32.8	–19.7•	41.8	66 17.0	–18.1•	43.3	67 00.1	–16.4•	44.9	67 41.9	–14.6•	46.7	68 22.4	–12.6•	48.5	62
63	62 50.5	–25.6	35.8	63 38.8	–24.4	37.0	64 26.4	–23.2	38.2	65 13.1	–21.8	39.5	65 58.9	–20.3•	41.0	66 43.7	–18.7•	42.5	67 27.3	–16.9•	44.1	68 09.8	–15.1•	45.8	63
64	62 24.9	–27.3	33.8	63 14.4	–26.1	34.9	64 03.2	–24.9	36.1	64 51.3	–23.6	37.3	65 38.6	–22.2	38.7	66 25.0	–20.8•	40.1	67 10.4	–19.2•	41.6	67 54.7	–17.5•	43.3	64
65	61 57.6	–28.8	31.9	62 48.3	–27.8	32.9	63 38.3	–26.6	34.0	64 27.7	–25.5	35.2	65 16.4	–24.2	36.4	66 04.2	–22.8•	37.8	66 51.2	–21.4•	39.2	67 37.2	–19.8	40.7	65
66	61 28.8	–30.2	30.0	62 20.5	–29.3	31.0	63 11.7	–28.3	32.0	64 02.2	–27.2	33.1	64 52.2	–26.1	34.3	65 41.4	–24.8	35.5	66 29.8	–23.4•	36.8	67 17.4	–22.0•	38.3	66
67	60 58.6	–31.7	28.3	61 51.2	–30.8	29.1	62 43.4	–29.9	30.1	63 35.0	–28.8	31.1	64 26.1	–27.8	32.2	65 16.6	–26.6	33.3	66 06.4	–25.3•	34.5	66 55.4	–24.1•	35.9	67
68	60 26.9	–32.9	26.5	61 20.4	–32.1	27.3	62 13.5	–31.3	28.2	63 06.2	–30.4	29.1	63 58.3	–29.4	30.1	64 50.0	–28.4	31.2	65 41.1	–27.3	32.3	66 31.3	–26.0	33.6	68
69	59 54.0	–34.2	24.8	60 48.3	–33.5	25.6	61 42.2	–32.7	26.4	62 35.8	–31.9	27.2	63 28.9	–31.0	28.1	64 21.6	–30.1	29.1	65 13.7	–29.1	30.2	66 05.3	–28.0	31.3	69
70	59 19.8	–35.4	23.2	60 14.8	–34.7	23.9	61 09.5	–34.0	24.6	62 03.9	–33.3	25.4	62 57.9	–32.5	26.2	63 51.5	–31.6	27.1	64 44.6	–30.7	28.1	65 37.3	–29.7	29.1	70
71	58 44.4	–36.4	21.6	59 40.1	–35.9	22.3	60 35.5	–35.3	22.9	61 30.6	–34.6	23.7	62 25.4	–33.9	24.4	63 19.9	–33.2	25.2	64 13.9	–32.3	26.1	65 07.6	–31.4	27.1	71
72	58 08.0	–37.5	20.1	59 04.2	–37.0	20.7	60 00.2	–36.4	21.3	60 56.0	–35.8	22.0	61 51.5	–35.2	22.7	62 46.7	–34.5	23.4	63 41.6	–33.7	24.2	64 36.2	–33.0	25.1	72
73	57 30.5	–38.5	18.7	58 27.2	–38.0	19.2	59 23.8	–37.5	19.7	60 20.2	–37.0	20.3	61 16.3	–36.4	20.9	62 12.2	–35.8	21.6	63 07.9	–35.2	22.3	64 03.2	–34.4	23.1	73
74	56 52.0	–39.5	17.2	57 49.2	–39.0	17.7	58 46.3	–38.6	18.2	59 43.2	–38.1	18.7	60 39.9	–37.6	19.3	61 36.4	–37.0	19.9	62 32.7	–36.4	20.6	63 28.8	–35.9	21.3	74
75	56 12.5	–40.2	15.9	57 10.2	–39.9	16.3	58 07.7	–39.5	16.7	59 05.1	–39.1	17.2	60 02.3	–38.6	17.7	60 59.4	–38.2	18.3	61 56.3	–37.7	18.9	62 52.9	–37.1	19.5	75
76	55 32.3	–41.2	14.6	56 30.3	–40.8	14.9	57 28.2	–40.4	15.3	58 26.0	–40.1	15.8	59 23.7	–39.7	16.2	60 21.2	–39.2	16.7	61 18.6	–38.8	17.2	62 15.8	–38.3	17.8	76
77	54 51.1	–41.9	13.3	55 49.5	–41.6	13.6	56 47.8	–41.3	14.0	57 45.9	–40.9	14.4	58 44.0	–40.6	14.8	59 42.0	–40.3	15.2	60 39.8	–39.9	15.7	61 37.5	–39.4	16.2	77
78	54 09.2	–42.6	12.0	55 07.9	–42.4	12.3	56 06.5	–42.1	12.7	57 05.0	–41.9	13.0	58 03.4	–41.5	13.4	59 01.7	–41.2	13.7	59 59.9	–40.8	14.1	60 58.1	–40.5	14.6	78
79	53 26.6	–43.3	10.9	54 25.5	–43.1	11.1	55 24.4	–42.9	11.4	56 23.1	–42.6	11.7	57 21.9	–42.4	12.0	58 20.5	–42.1	12.3	59 19.1	–41.8	12.7	60 17.6	–41.5	13.1	79
80	52 43.3	–44.0	9.7	53 42.4	–43.8	9.9	54 41.5	–43.6	10.2	55 40.5	–43.3	10.4	56 39.5	–43.1	10.7	57 38.4	–42.9	11.0	58 37.3	–42.6	11.3	59 36.1	–42.4	11.6	80
81	51 59.3	–44.5	8.6	52 58.6	–44.4	8.8	53 57.9	–44.2	9.0	54 57.2	–44.1	9.2	55 56.4	–43.9	9.4	56 55.5	–43.6	9.7	57 54.7	–43.5	10.0	58 53.7	–43.2	10.3	81
82	51 14.8	–45.2	7.5	52 14.2	–45.0	7.7	53 13.7	–44.9	7.9	54 13.1	–44.7	8.0	55 12.5	–44.6	8.2	56 11.9	–44.4	8.5	57 11.2	–44.2	8.7	58 10.5	–44.0	8.9	82
83	50 29.6	–45.7	6.5	51 29.2	–45.6	6.6	52 28.8	–45.4	6.8	53 28.4	–45.3	6.9	54 27.9	–45.2	7.1	55 27.5	–45.1	7.3	56 27.0	–44.9	7.4	57 26.5	–44.8	7.6	83
84	49 43.9	–46.2	5.5	50 43.6	–46.1	5.6	51 43.4	–46.1	5.7	52 43.1	–46.0	5.8	53 42.7	–45.8	6.0	54 42.4	–45.7	6.1	55 41.7	–45.6	6.3	56 41.7	–45.5	6.4	84
85	48 57.7	–46.7	4.5	49 57.5	–46.6	4.6	50 57.3	–46.5	4.7	51 57.1	–46.4	4.8	52 56.9	–46.4	4.9	53 56.7	–46.3	5.0	54 56.5	–46.2	5.1	55 56.2	–46.1	5.2	85
86	48 11.0	–47.1	3.5	49 10.9	–47.1	3.6	50 10.8	–47.0	3.7	51 10.7	–47.0	3.8	52 10.5	–46.9	3.8	53 10.4	–46.8	3.9	54 10.3	–46.8	4.0	55 10.1	–46.7	4.1	86
87	47 23.9	–47.6	2.6	48 23.8	–47.5	2.7	49 23.8	–47.5	2.7	50 23.7	–47.5	2.7	51 23.6	–47.4	2.8	52 23.6	–47.4	2.9	53 23.5	–47.4	3.0	54 23.4	–47.3	3.0	87
88	46 36.3	–47.9	1.7	47 36.3	–47.9	1.7	48 36.3	–48.0	1.8	49 36.2	–47.9	1.8	50 36.2	–47.9	1.9	51 36.1	–47.9	1.9	52 36.1	–47.8	1.9	53 36.1	–47.8	2.0	88
89	45 48.4	–48.4	0.8	46 48.4	–48.4	0.9	47 48.3	–48.3	0.9	48 48.3	–48.3	0.9	49 48.3	–48.3	0.9	50 48.3	–48.3	0.9	51 48.3	–48.3	1.0	52 48.3	–48.3	1.0	89
90	45 00.0	–48.7	0.0	46 00.0	–48.7	0.0	47 00.0	–48.7	0.0	48 00.0	–48.7	0.0	49 00.0	–48.7	0.0	50 00.0	–48.8	0.0	51 00.0	–48.8	0.0	52 00.0	–48.8	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	34 53.6	-51.8	134.2	34 11.6	-52.3	134.7	33 29.2	-52.7	135.2	32 46.5	-53.1	135.6	32 03.4	-53.5	136.1	31 20.0	-53.8	136.5	30 36.4	-54.3	136.9	29 52.4	-54.6	137.3	0
1	34 01.8	-52.0	134.8	33 19.3	-52.4	135.3	32 36.5	-52.8	135.8	31 53.4	-53.3	136.2	31 09.9	-53.6	136.6	30 26.2	-54.0	137.0	29 42.1	-54.3	137.5	28 57.8	-54.7	137.8	1
2	33 09.8	-52.1	135.4	32 26.9	-52.6	135.9	31 43.7	-53.0	136.3	31 00.1	-53.3	136.7	30 16.3	-53.7	137.1	29 32.2	-54.1	137.5	28 47.8	-54.5	137.9	28 03.1	-54.7	138.3	2
3	32 17.7	-52.4	136.0	31 34.3	-52.7	136.5	30 50.7	-53.1	136.9	30 06.8	-53.5	137.3	29 22.6	-53.9	137.7	28 38.1	-54.2	138.0	27 53.3	-54.5	138.4	27 08.4	-54.9	138.7	3
4	31 25.3	-52.4	136.6	30 41.6	-52.9	137.0	29 57.6	-53.3	137.4	29 13.3	-53.7	137.8	28 28.7	-54.0	138.2	27 43.9	-54.3	138.5	26 58.8	-54.6	138.9	26 13.5	-54.9	139.2	4
5	30 32.9	-52.7	137.2	29 48.7	-53.0	137.6	29 04.3	-53.4	137.9	28 19.6	-53.7	138.3	27 34.7	-54.1	138.7	26 49.6	-54.4	139.0	26 04.2	-54.8	139.3	25 18.6	-55.1	139.6	5
6	29 40.2	-52.7	137.7	28 55.7	-53.1	138.1	28 10.9	-53.5	138.5	27 25.9	-53.8	138.8	26 40.6	-54.1	139.1	25 55.2	-54.5	139.5	25 09.4	-54.8	139.8	24 23.5	-55.1	140.1	6
7	28 47.5	-52.9	138.3	28 02.6	-53.3	138.6	27 17.4	-53.6	139.0	26 32.1	-54.0	139.3	25 46.5	-54.3	139.6	25 00.7	-54.6	139.9	24 14.6	-54.8	140.2	23 28.4	-55.1	140.5	7
8	27 54.6	-53.0	138.8	27 09.3	-53.3	139.1	26 23.8	-53.7	139.5	25 38.1	-54.0	139.8	24 52.2	-54.3	140.1	24 06.1	-54.7	140.4	23 19.8	-55.0	140.7	22 33.3	-55.3	140.9	8
9	27 01.6	-53.1	139.3	26 16.0	-53.5	139.7	25 30.1	-53.8	140.0	24 44.1	-54.1	140.3	23 57.9	-54.5	140.6	23 11.4	-54.7	140.8	22 24.8	-55.0	141.1	21 38.0	-55.3	141.4	9
10	26 08.5	-53.3	139.8	25 22.5	-53.6	140.2	24 36.3	-53.9	140.5	23 50.0	-54.2	140.7	23 03.4	-54.5	141.0	22 16.7	-54.8	141.3	21 29.8	-55.1	141.5	20 42.7	-55.3	141.8	10
11	25 15.2	-53.4	140.4	24 28.9	-53.6	140.7	23 42.4	-54.0	140.9	22 55.8	-54.3	141.2	22 08.9	-54.6	141.5	21 21.9	-54.9	141.7	20 34.7	-55.1	142.0	19 47.4	-55.4	142.2	11
12	24 21.9	-53.5	140.9	23 35.3	-53.8	141.1	22 48.4	-54.0	141.4	22 01.5	-54.4	141.7	21 14.3	-54.6	141.9	20 27.0	-54.9	142.1	19 39.6	-55.2	142.4	18 52.0	-55.5	142.6	12
13	23 28.4	-53.5	141.4	22 41.5	-53.9	141.6	21 54.4	-54.2	141.9	21 07.1	-54.5	142.1	20 19.7	-54.8	142.4	19 32.1	-55.0	142.6	18 44.4	-55.3	142.8	17 56.5	-55.5	143.0	13
14	22 34.9	-53.6	141.9	21 47.6	-53.9	142.1	21 00.2	-54.2	142.3	20 12.6	-54.5	142.6	19 24.9	-54.8	142.8	18 37.1	-55.1	143.0	17 49.1	-55.3	143.2	17 01.0	-55.6	143.4	14
15	21 41.3	-53.7	142.3	20 53.7	-54.0	142.6	20 06.0	-54.3	142.8	19 18.1	-54.5	143.0	18 30.1	-54.8	143.2	17 42.0	-55.1	143.4	16 53.8	-55.4	143.6	16 05.4	-55.6	143.8	15
16	20 47.6	-53.8	142.8	19 59.7	-54.1	143.0	19 11.7	-54.4	143.3	18 23.6	-54.7	143.5	17 35.3	-54.9	143.6	16 46.9	-55.1	143.8	15 58.4	-55.4	144.0	15 09.8	-55.6	144.2	16
17	19 53.8	-53.8	143.3	19 05.6	-54.1	143.5	18 17.3	-54.4	143.7	17 28.9	-54.7	143.9	16 40.4	-54.9	144.1	15 51.8	-55.2	144.2	15 03.0	-55.4	144.4	14 14.2	-55.7	144.6	17
18	19 00.0	-54.0	143.8	18 11.5	-54.2	144.0	17 22.9	-54.5	144.1	16 34.2	-54.7	144.3	15 45.5	-55.0	144.5	14 56.6	-55.3	144.6	14 07.6	-55.5	144.8	13 18.5	-55.7	144.9	18
19	18 06.0	-54.0	144.2	17 17.3	-54.3	144.4	16 28.4	-54.5	144.6	15 39.5	-54.8	144.7	14 50.5	-55.1	144.9	14 01.3	-55.3	145.1	13 12.1	-55.5	145.2	12 22.8	-55.7	145.4	19
20	17 12.0	-54.0	144.7	16 23.0	-54.3	144.9	15 33.9	-54.6	145.0	14 44.7	-54.8	145.2	13 55.4	-55.1	145.3	13 06.0	-55.3	145.5	12 16.6	-55.6	145.6	11 27.1	-55.8	145.7	20
21	16 18.0	-54.1	145.1	15 28.7	-54.4	145.3	14 39.3	-54.6	145.4	13 49.9	-54.9	145.6	13 00.3	-55.1	145.7	12 10.7	-55.3	145.8	11 21.0	-55.6	146.0	10 31.3	-55.8	146.1	21
22	15 23.9	-54.2	145.6	14 34.3	-54.4	145.7	13 44.7	-54.7	145.9	12 55.0	-54.9	146.0	12 05.2	-55.1	146.1	11 15.4	-55.4	146.2	10 25.4	-55.6	146.3	9 35.5	-55.8	146.4	22
23	14 29.7	-54.3	146.0	13 39.9	-54.5	146.2	12 50.0	-54.7	146.3	12 00.1	-55.0	146.4	11 10.1	-55.2	146.5	10 20.0	-55.4	146.6	9 29.8	-55.6	146.7	8 39.7	-55.9	146.8	23
24	13 35.5	-54.3	146.5	12 45.4	-54.5	146.6	11 55.3	-54.7	146.7	11 05.1	-55.0	146.8	10 14.9	-55.2	146.9	9 24.6	-55.5	147.0	8 34.2	-55.6	147.1	7 43.8	-55.9	147.2	24
25	12 41.2	-54.3	146.9	11 50.9	-54.5	147.0	11 00.6	-54.8	147.1	10 10.1	-55.0	147.2	9 19.7	-55.3	147.3	8 29.1	-55.4	147.4	7 38.6	-55.7	147.5	6 47.9	-55.8	147.6	25
26	11 46.9	-54.4	147.3	10 56.4	-54.6	147.4	10 05.8	-54.8	147.5	9 15.1	-55.0	147.6	8 24.4	-55.3	147.7	7 33.7	-55.5	147.8	6 42.9	-55.7	147.9	5 52.1	-55.9	147.9	26
27	10 52.6	-54.4	147.8	10 01.8	-54.6	147.9	9 11.0	-54.9	148.0	8 20.1	-55.1	148.0	7 29.2	-55.3	148.1	6 38.2	-55.5	148.2	5 47.2	-55.7	148.2	4 56.2	-55.9	148.3	27
28	9 58.2	-54.4	148.2	9 07.2	-54.7	148.3	8 16.1	-54.8	148.4	7 25.0	-55.1	148.5	6 33.9	-55.3	148.5	5 42.7	-55.5	148.6	4 51.5	-55.7	148.6	4 00.3	-56.0	148.7	28
29	9 03.8	-54.4	148.6	8 12.5	-54.6	148.7	7 21.3	-54.9	148.8	6 29.9	-55.1	148.8	5 38.6	-55.4	148.9	4 47.2	-55.5	148.9	3 55.8	-55.8	149.0	3 04.3	-55.9	149.0	29
30	8 09.4	-54.5	149.1	7 17.9	-54.7	149.1	6 26.4	-55.0	149.2	5 34.8	-55.1	149.2	4 43.2	-55.3	149.3	3 51.7	-55.6	149.3	3 00.0	-55.7	149.4	2 08.4	-55.9	149.4	30
31	7 14.9	-54.5	149.5	6 23.2	-54.7	149.6	5 31.4	-54.9	149.6	4 39.7	-55.1	149.6	3 47.9	-55.3	149.7	2 56.1	-55.5	149.7	2 04.3	-55.7	149.7	1 12.5	-55.9	149.7	31
32	6 20.4	-54.5	149.9	5 28.5	-54.8	150.0	4 36.5	-54.9	150.0	3 44.6	-55.2	150.0	2 52.6	-55.4	150.1	2 00.6	-55.6	150.1	1 08.6	-55.8	150.1	0 16.6	-56.0	150.1	32
33	5 25.9	-54.5	150.3	4 33.7	-54.7	150.4	3 41.6	-55.0	150.4	2 49.4	-55.1	150.4	1 57.2	-55.3	150.4	1 05.0	-55.5	150.5	0 12.8	-55.7	150.5	0 39.4	+55.9	29.5	33
34	4 31.4	-54.6	150.7	3 39.0	-54.8	150.8	2 46.6	-54.9	150.8	1 54.3	-55.2	150.8	1 01.9	-54.9	150.8	0 09.5	-54.5	150.8	0 42.9	+55.8	29.2	1 35.3	+55.9	29.2	34
35	3 36.8	-54.6	151.2	2 44.2	-54.7	151.2	1 51.7	-55.0	151.2	0 59.1	-55.2	151.2	0 06.5	-55.4	151.2	0 46.1	+55.5	28.8	1 38.7	+55.7	28.8	2 31.2	+56.0	28.8	35
36	2 42.3	-54.6	151.6	1 49.5	-54.8	151.6	0 56.7	-55.0	151.6	0 03.9	-55.1	151.6	0 48.9	+55.3	28.4	1 41.6	+55.6	28.4	2 34.4	+55.7	28.4	3 27.2	+55.9	28.5	36
37	1 47.7	-54.5	152.0	0 54.7	-54.8	152.0	0 01.7	-54.9	152.0	0 52.1	+55.2	28.0	1 44.2	+55.4	28.0	2 37.2	+55.5	28.0	3 30.1	+55.8	28.1	4 23.1	+55.9	28.1	37
38	0 53.1	-54.5	152.4	0 00.1	+54.7	27.6	0 53.2	+55.0	27.6	1 46.4	+55.2	27.6	2 39.6	+55.3	27.6	3 32.7	+55.5	27.6	4 25.9	+55.7	27.7	5 19.0	+55.9	27.7	38
39	0 01.4	+54.6	27.2	0 54.8	+54.8	27.2	1 48.2	+55.0	27.2	2 41.6	+55.1	27.2	3 34.9	+55.3	27.2	4 28.2	+55.6	27.3	5 21.6	+55.7	27.3	6 14.9	+55.8	27.4	39
40	0 56.0	+54.6	26.8	1 49.6	+54.8	26.8	2 43.2	+54.9	26.8	3 36.7	+55.1	26.8	4 30.2	+55.4	26.9	5 23.8	+55.5	26.9	6 17.3	+55.7	26.9	7 10.7	+55.9	27.0	40
41	1 50.6	+54.6	26.3	2 44.4	+54.7	26.4	3 38.1	+54.9	26.4	4 31.8	+55.2	26.4	5 25.6	+55.3	26.5	6 19.3	+55.5	26.5	7 13.0	+55.6	26.6	8 06.6	+55.8	26.6	41
42	2 45.2	+54.5	25.9	3 39.1	+54.7	26.0	4 33.0	+54.9	26.0	5 27.0	+55.1	26.0	6 20.9	+55.3	26.1	7 14.8	+55.4	26.1	8 08.6	+55.7	26.2	9 02.4	+55.9	26.3	42
43	3 39.7	+54.5	25.5	4 33.8	+54.8	25.6	5 28.0	+54.9	25.6	6 22.1	+55.1	25.6	7 16.2	+55.2	25.7	8 10.2	+55.5	25.7	9 04.3	+55.6	25.8	9 58.3	+55.7	25.9	43
44	4 34.2	+54.6	25.1	5 28.6	+54.7	25.1	6 22.9	+54.9	25.2	7 17.2	+55.0	25.2	8 11.4	+55.3	25.3	9 05.7	+55.4	25.4	9 59.9	+55.6	25.4	10 54.0	+55.8	25.5	44
45	5 28.8	+54.5	24.7	6 23.3	+54.7	24.7	7 17.8	+54.8	24.8	8 12.2	+55.1	24.8	9 06.7	+55.2	24.9	10 01.1	+55.4	25.0	10 55.5	+55.5	25.0	11 49.8	+55.7	25.1	45
46	6 23.3	+54.5	24.3	7 18.0	+54.6	24.3	8 12.6	+54.9	24.4	9 07.3	+55.0	24.4	10 01.9	+55.2	24.5	10 56.5	+55.4	24.6	11 51.0	+55.6	24.7	12 45.5	+55.7	24.7	46
47	7 17.8	+54.4	23.8	8 12.6	+54.7	23.9	9 07.5	+54.8	24.0	10 02.3	+55.0	24.0	10 57.1	+55.2	24.1	11 51.9	+55.3	24.2	12 46.6	+55.5	24.3	13 41.2	+55.7	24.4	47
48	8 12.2	+54.5	23.4	9 07.3	+54.6	23.5	10 02.3	+54.8	23.5	10 57.3	+55.0	23.6	11 52.3	+55.1	23.7	12 47.2	+55.3	23.8	13 42.1	+55.4	23.9	14 36.9	+55.6	24.0	48
49	9 06.7	+54.4	23.0	10 01.9	+54.6	23.1	10 57.1	+54.8	23.1	11 52.3	+54.9	23.2	12 47.4	+55.1	23.3	13 42.5	+55.2	23.4	14 37.5	+55.5	23.5	15 32.5	+55.6	23.6	49
50	10 01.1	+54.3	22.6	10 56.5	+54.5	22.6	11 51.9	+54.7	22.7	12 47.2	+54.9	22.8	13 42.5	+55.0	22.9	14 37.7	+55.3	23.1	15 33.0	+55.3	23.1	16 28.1	+55.6	23.2	50
51	10 55.5	+54.3	22.1	11 51.0	+54.5	22.2	12 46.6	+54.6	22.3	13 42.1	+54.8	22.4	14 37.5	+55.0	22.5	15 33.0	+55.1	22.6	16 28.3	+55.4	22.7	17 23.7	+55.5	22.8	51
52	11 49.8	+54.3	21.7	12 45.5	+54.5	21.8	13 41.2	+54.7	21.9	14 36.9	+54.8	22.0	15 32.5	+55.0	22.1	16 28.1	+55.1	22.2	17 23.7	+55.2	22.3	18 19.2	+55.4	22.4	52
53	12 44.1	+54.3	21.3	13 40.0	+54.4	21.4	14 35.9	+54.6	21.5	15 31.7	+54.8	21.5	16 27.5	+54.9	21.6	17 23.2	+55.1	21.8	18 18.9	+55.3	21.8	19 14.6	+55.4	22.0	53
54	13 38.4	+54.2	20.8	14 34.4	+54.4	20.9	15 30.5	+54.5	21.0	16 26.5	+54.7	21.1	17 22.4	+54.9	21.2	18 18.3	+55.0	21.3	19 14.2	+55.2	21.5	20 10.0	+55.3	21.6	54
55	14 32.6	+54.1	20.4	15 28.8	+54.3	20.5	16 25.0	+54.5	20.6	17 21.2	+54.6	20.7	18 17.3	+54.8	20.8	19 13.3	+55.0	20.9	20 09.4	+55.1	21.0	21 05.3	+55.3	21.2	55
56	15 26.7	+54.2	19.9	16 23.1	+54.3	20.0	17 19.5	+54.4	20.1	18 15.8	+54.6	20.3	19 12.1	+54.7	20.4	20 08.3	+54.9	20.5	21 04.5	+55.0	20.6	22 00.6	+55.2	20.8	56
57	16 20.9	+54.1	19.5	17 17.4	+54.2	19.6	18 13.9	+54.4	19.7	19 10.4	+54.5	19.8	20 06.8	+54.7	19.9	21 03.2	+54.8	20.1	21 59.5	+55.0	20.2	22 55.8	+55.1	20.3	57
58	17 14.9	+54.0	19.0	18 11.6	+54.1	19.1	19 08.3	+54.3	19.3	20 04.9	+54.4	19.4	21 01.5	+54.6	19.5	21 58.0	+54.8	19.6	22 54.5	+54.9	19.8	23 50.9	+55.1	19.9	58
59	18 08.9	+53.9	18.6	19 05.7	+54.1	18.7	20 02.6	+54.2	18.8	20 59.3	+54.4	18.9	21 56.1	+54.5	19.0	22 52.8	+54.7	19.2	23 49.4	+54.9	19.3	24 46.0	+55.0	19.5	59
60	19 02.8	+53.9	18.1	19 59.8	+54.0	18.2	20 56.8	+54.1	18.3	21 53.7	+54.3	18.5	22 50.6	+54.5	18.6	23 47.5	+54.6	18.7	24 44.3	+54.7	18.9	25 41.0	+54.9	19.0	60
61	19 56.7	+53.7	17.6	20 53.8	+54.0	17.8	21 50.9	+54.1	17.9	22 48.0	+54.3	18.0	23 45.1	+54.3	18.1	24 42.1	+54.5	18.3	25 39.0	+54.7	18.4	26 35.9	+54.8	18.6	61
62	20 50.4	+53.7	17.2	21 47.8	+53.8	17.3	22 45.0	+54.0	17.5	23 42.3	+54.1	17.5	24 39.4	+54.3	17.7	25 36.6	+54.4	17.8	26 33.7	+54.6	18.0	27 30.7	+54.8	18.1	62
63	21 44.1	+53.6	16.7	22 41.6	+53.8	16.8	23 39.0	+53.9	16.9	24 36.4	+54.0	17.1	25 33.7	+54.2	17.2	26 31.0	+54.4	17.4	27 28.3	+54.5	17.5	28 25.5	+54.6	17.7	63
64	22 37.8	+53.5	16.2	23 35.4	+53.6	16.3	24 32.9	+53.8	16.5	25 30.4	+54.0	16.6	26 27.9	+54.1	16.7	27 25.4	+54.2	16.9	28 22.8	+54.3	17.0	29 20.1	+54.5	17.2	64
65	23 31.3	+53.4	15.7	24 29.0	+53.5	15.8	25 26.7	+53.7	16.0	26 24.4	+53.9	16.1	27 22.0	+54.0	16.2	28 19.6	+54.1	16.4	29 17.1	+54.3	16.5	30 14.6	+54.5	16.7	65
66	24 24.7	+53.4	15.2	25 22.6	+53.5	15.3	26 20.4	+53.7	15.5	27 18.3	+53.7	15.6	28 16.0	+53.9	15.8	29 13.7	+54.1	15.9	30 11.4	+54.2	16.1	31 09.1	+54.3	16.2	66
67	25 18.1	+53.2	14.7	26 16.1	+53.3	14.8	27 14.1	+53.5	15.0	28 12.0	+53.6	15.1	29 09.9	+53.8	15.2	30 07.8	+53.9	15.4	31 05.6	+54.1	15.6	32 03.4	+54.2	15.7	67
68	26 11.3	+53.1	14.2	27 09.4	+53.3	14.3	28 07.6	+53.3	14.5	29 05.6	+53.6	14.6	30 03.7	+53.6	14.7	31 01.7	+53.8	14.9	31 59.7	+53.9	15.0	32 57.6	+54.0	15.2	68
69	27 04.4	+53.0	13.7	28 02.7	+53.1	13.8	29 00.9	+53.3	13.9	29 59.2	+53.3	14.1	30 57.3	+53.6	14.2	31 55.5	+53.6	14.4	32 53.6	+53.8	14.5	33 51.6	+54.0	14.7	69
70	27 57.4	+52.9	13.2	28 55.8	+53.0	13.3	29 54.2	+53.1	13.4	30 52.5	+53.3	13.5	31 50.9	+53.4	13.7	32 49.1	+53.6	13.8	33 47.4	+53.6	14.0	34 45.6	+53.8	14.2	70
71	28 50.3	+52.7	12.6	29 48.8	+52.9	12.7	30 47.3	+53.0	12.9	31 45.8	+53.1	13.0	32 44.3	+53.2	13.2	33 42.7	+53.3	13.3	34 41.0	+53.5	13.5	35 39.4	+53.6	13.6	71
72	29 43.0	+52.7	12.1	30 41.7	+52.7	12.2	31 40.3	+52.9	12.3	32 38.9	+53.0	12.5	33 37.5	+53.1	12.6	34 36.0	+53.2	12.7	35 34.5	+53.4	12.9	36 33.0	+53.5	13.1	72
73	30 35.7	+52.4	11.5	31 34.4	+52.6	11.6	32 33.2	+52.7	11.8	33 31.9	+52.8	11.9	34 30.6	+53.0	12.0	35 29.3	+53.0	12.2	36 27.9	+53.2	12.3	37 26.5	+53.3	12.5	73
74	31 28.1	+52.3	11.0	32 27.0	+52.4	11.1	33 25.9	+52.5	11.2	34 24.7	+52.7	11.3	35 23.6	+52.7	11.5	36 22.3	+52.9	11.6	37 21.1	+53.0	11.8	38 19.8	+53.2	11.9	74
75	32 20.4	+52.2	10.4	33 19.4	+52.3	10.5	34 18.4	+52.4	10.6	35 17.4	+52.5	10.7	36 16.3	+52.6	10.9	37 15.2	+52.8	11.0	38 14.1	+52.9	11.2	39 13.0	+52.9	11.3	75
76	33 12.6	+52.0	9.8	34 11.7	+52.1	9.9	35 10.8	+52.2	10.0	36 09.9	+52.3	10.1	37 08.9	+52.4	10.3	38 08.0	+52.5	10.4	39 07.0	+52.6	10.6	40 05.9	+52.8	10.7	76
77	34 04.6	+51.8	9.2	35 03.8	+51.9	9.3	36 03.0	+52.0	9.4	37 02.2	+52.1	9.5	38 01.3	+52.3	9.7	39 00.5	+52.3	9.8	39 59.6	+52.4	9.9	40 58.7	+52.5	10.1	77
78	34 56.4	+51.6	8.6	35 55.7	+51.7	8.7	36 55.0	+51.8	8.8	37 54.3	+51.9	8.9	38 53.6	+52.0	9.0	39 52.8	+52.1	9.2	40 52.0	+52.3	9.4	41 51.2	+52.4	9.4	78
79	35 48.0	+51.4	7.9	36 47.4	+51.5	8.1	37 46.8	+51.6	8.2	38 46.2	+51.7	8.3	39 45.6	+51.8	8.4	40 44.9	+51.9	8.5	41 44.3	+52.0	8.6	42 43.6	+52.1	8.8	79
80	36 39.4	+51.2	7.3	37 38.9	+51.3	7.4	38 38.4	+51.4	7.5	39 37.9	+51.5	7.6	40 37.4	+51.5	7.7	41 36.8	+51.7	7.8	42 36.3	+51.7	8.0	43 35.7	+51.8	8.1	80
81	37 30.6	+51.0	6.7	38 30.2	+51.1	6.7	39 29.8	+51.2	6.8	40 29.4	+51.2	6.9	41 28.9	+51.4	7.1	42 28.5	+51.4	7.2	43 28.0	+51.5	7.3	44 27.5	+51.6	7.4	81
82	38 21.6	+50.8	6.0	39 21.3	+50.8	6.1	40 21.0	+50.9	6.2	41 20.6	+51.0	6.3	42 20.3	+51.0	6.4	43 19.9	+51.1	6.5	44 19.5	+51.2	6.6	45 19.1	+51.3	6.7	82
83	39 12.4	+50.5	5.3	40 12.1	+50.6	5.4	41 11.9	+50.6	5.5	42 11.6	+50.7	5.5	43 11.3	+50.8	5.6	44 11.0	+50.9	5.7	45 10.7	+50.9	5.8	46 10.4	+51.0	5.9	83
84	40 02.9	+50.3	4.7	41 02.7	+50.3	4.7	42 02.5	+50.4	4.7	43 02.3	+50.4	4.8	44 02.1	+50.5	4.9	45 01.9	+50.5	4.9	46 01.6	+50.7	5.1	47 01.4	+50.7	5.2	84
85	40 53.2	+49.9	3.9	41 53.0	+50.1	3.9	42 52.9	+50.1	4.0	43 52.7	+50.2	4.1	44 52.6	+50.2	4.1	45 52.4	+50.3	4.2	46 52.3	+50.4	4.3	47 52.1	+50.3	4.4	85
86	41 43.1	+49.7	3.1	42 43.1	+49.7	3.2	43 43.0	+49.7	3.3	44 42.9	+49.8	3.3	45 42.8	+49.8	3.4	46 42.7	+49.9	3.4	47 42.5	+50.0	3.5	48 42.4	+50.0	3.6	86
87	42 32.8	+49.4	2.4	43 32.8	+49.4	2.4	44 32.7	+49.5	2.5	45 32.7	+49.4	2.5	46 32.6	+49.5	2.6	47 32.6	+49.5	2.6	48 32.5	+49.6	2.7	49 32.4	+49.6	2.7	87
88	43 22.2	+49.1	1.6	44 22.2	+49.1	1.6	45 22.2	+49.1	1.7	46 22.1	+49.2	1.7	47 22.1	+49.2	1.7	48 22.1	+49.1	1.8	49 22.1	+49.1	1.8	50 22.0	+49.2	1.8	88
89	44 11.3	+48.7	0.8	45 11.3	+48.7	0.8	46 11.3	+48.7	0.8	47 11.3	+48.7	0.9	48 11.3	+48.7	0.9	49 11.2	+48.8	0.9	50 11.2	+48.8	0.9	51 11.2	+48.8	0.9	89
90	45 00.0	+48.4	0.0	46 00.0	+48.4	0.0	47 00.0	+48.3	0.0	48 00.0	+48.3	0.0	49 00.0	+48.3	0.0	50 00.0	+48.3	0.0	51 00.0	+48.3	0.0	52 00.0	+48.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME** NAME AS DECLINATION   **L.H.A. 144°, 216°**

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LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	34 23.0	+51.3	133.2	33 41.7	+51.8	133.7	33 00.1	+52.3	134.1	32 18.2	+52.6	134.6	31 35.9	+53.1	135.0	30 53.2	+53.5	135.5	30 10.3	+53.9	135.9	29 27.1	+54.2	136.3	0
1	35 14.3	+51.1	132.5	34 33.5	+51.6	133.1	33 52.4	+52.0	133.6	33 10.8	+52.6	134.0	32 29.0	+52.9	134.5	31 46.7	+53.4	134.9	31 04.2	+53.7	135.4	30 21.3	+54.2	135.8	1
2	36 05.4	+50.9	131.9	35 25.1	+51.4	132.4	34 44.4	+51.9	133.0	34 03.4	+52.3	133.5	33 21.9	+52.8	133.9	32 40.1	+53.2	134.4	31 57.9	+53.7	134.9	31 15.5	+54.0	135.3	2
3	36 56.3	+50.7	131.2	36 16.5	+51.2	131.8	35 36.3	+51.7	132.3	34 55.7	+52.2	132.9	34 14.7	+52.6	133.3	33 33.3	+53.1	133.8	32 51.6	+53.5	134.3	32 09.5	+53.9	134.8	3
4	37 47.0	+50.4	130.6	37 07.7	+51.0	131.1	36 28.0	+51.5	131.7	35 47.9	+52.0	132.3	35 07.3	+52.5	132.8	34 26.4	+52.9	133.3	33 45.1	+53.3	133.8	33 03.4	+53.7	134.3	4
5	38 37.4	+50.2	129.9	37 58.7	+50.7	130.5	37 19.5	+51.3	131.1	36 39.9	+51.8	131.6	35 59.8	+52.3	132.2	35 19.3	+52.7	132.7	34 38.4	+53.2	133.2	33 57.1	+53.6	133.7	5
6	39 27.6	+49.9	129.2	38 49.4	+50.6	129.8	38 10.8	+51.0	130.4	37 31.7	+51.5	131.0	36 52.1	+52.1	131.6	36 12.0	+52.6	132.1	35 31.6	+53.0	132.7	34 50.7	+53.5	133.2	6
7	40 17.5	+49.7	128.5	39 40.0	+50.2	129.1	39 01.8	+50.9	129.7	38 23.2	+51.4	130.4	37 44.2	+51.8	130.9	37 04.6	+52.4	131.5	36 24.6	+52.9	132.1	35 44.2	+53.3	132.7	7
8	41 07.2	+49.3	127.7	40 30.2	+50.0	128.4	39 52.7	+50.5	129.1	39 14.6	+51.1	129.7	38 36.0	+51.7	130.3	37 57.0	+52.2	130.9	37 17.5	+52.6	131.5	36 37.5	+53.1	132.0	8
9	41 56.5	+49.1	127.0	41 20.2	+49.7	127.7	40 43.2	+50.3	128.3	40 05.7	+50.9	129.0	39 27.7	+51.5	129.7	38 49.2	+51.9	130.3	38 10.1	+52.5	130.9	37 30.6	+53.0	131.5	9
10	42 45.6	+48.7	126.2	42 09.9	+49.4	126.9	41 33.5	+50.1	127.6	40 56.6	+50.7	128.3	40 19.2	+51.2	129.0	39 41.1	+51.8	129.7	39 02.6	+52.3	130.3	38 23.6	+52.8	130.9	10
11	43 34.3	+48.4	125.4	42 59.3	+49.0	126.1	42 23.6	+49.7	126.9	41 47.3	+50.3	127.6	41 10.4	+50.9	128.3	40 32.9	+51.5	129.0	39 54.9	+52.1	129.6	39 16.4	+52.6	130.3	11
12	44 22.7	+48.0	124.6	43 48.3	+48.8	125.3	43 13.3	+49.4	126.1	42 37.6	+50.1	126.9	42 01.3	+50.7	127.6	41 24.4	+51.3	128.3	40 47.0	+51.8	129.0	40 09.0	+52.3	129.6	12
13	45 10.7	+47.7	123.7	44 37.1	+48.4	124.5	44 02.7	+49.1	125.3	43 27.7	+49.7	126.1	42 52.0	+50.4	126.9	42 15.7	+51.0	127.6	41 38.8	+51.6	128.3	41 01.3	+52.2	129.0	13
14	45 58.4	+47.2	122.8	45 25.5	+48.0	123.7	44 51.8	+48.7	124.5	44 17.4	+49.5	125.3	43 42.4	+50.1	126.1	43 06.7	+50.8	126.9	42 30.4	+51.4	127.6	41 53.5	+51.9	128.3	14
15	46 45.6	+46.8	121.9	46 13.5	+47.6	122.8	45 40.5	+48.4	123.7	45 06.9	+49.1	124.5	44 32.5	+49.8	125.4	43 57.5	+50.4	126.1	43 21.8	+51.0	126.9	42 45.4	+51.7	127.7	15
16	47 32.4	+46.3	121.0	47 01.1	+47.1	121.9	46 28.9	+48.0	122.8	45 56.0	+48.7	123.7	45 22.3	+49.5	124.6	44 47.9	+50.2	125.4	44 12.8	+50.8	126.2	43 37.1	+51.4	127.0	16
17	48 18.7	+45.9	120.1	47 48.2	+46.8	121.0	47 16.9	+47.6	122.0	46 44.7	+48.4	122.9	46 11.8	+49.1	123.8	45 38.1	+49.8	124.6	45 03.6	+50.5	125.4	44 28.5	+51.1	126.2	17
18	49 04.6	+45.4	119.1	48 35.0	+46.2	120.1	48 04.5	+47.1	121.1	47 33.1	+47.9	122.0	47 00.9	+48.7	122.9	46 27.9	+49.4	123.8	45 54.1	+50.2	124.7	45 19.6	+50.9	125.5	18
19	49 50.0	+44.8	118.1	49 21.2	+45.8	119.1	48 51.6	+46.6	120.1	48 21.0	+47.5	121.1	47 49.6	+48.3	122.1	47 17.3	+49.1	123.0	46 44.3	+49.8	123.9	46 10.5	+50.5	124.7	19
20	50 34.8	+44.2	117.1	50 07.0	+45.2	118.1	49 38.2	+46.2	119.2	49 08.5	+47.1	120.2	48 37.9	+47.9	121.2	48 06.4	+48.7	122.1	47 34.1	+49.5	123.1	47 01.0	+50.2	124.0	20
21	51 19.0	+43.7	116.0	50 52.2	+44.7	117.1	50 24.4	+45.6	118.2	49 55.6	+46.5	119.2	49 25.8	+47.5	120.2	48 55.1	+48.3	121.2	48 23.6	+49.1	122.2	47 51.2	+49.8	123.1	21
22	52 02.7	+43.0	114.9	51 36.9	+44.0	116.0	51 10.0	+45.1	117.1	50 42.1	+46.1	118.2	50 13.3	+46.9	119.3	49 43.4	+47.9	120.3	49 12.7	+48.7	121.3	48 41.0	+49.5	122.3	22
23	52 45.7	+42.3	113.7	52 20.9	+43.5	114.9	51 55.1	+44.5	116.1	51 28.2	+45.5	117.2	51 00.2	+46.5	118.3	50 31.3	+47.4	119.4	50 01.4	+48.2	120.4	49 30.5	+49.1	121.4	23
24	53 28.0	+41.6	112.6	53 04.4	+42.7	113.8	52 39.6	+43.8	115.0	52 13.7	+44.9	116.2	51 46.7	+45.9	117.3	51 18.7	+46.8	118.4	50 49.6	+47.8	119.5	50 19.6	+48.6	120.6	24
25	54 09.6	+40.8	111.3	53 47.1	+42.0	112.6	53 23.4	+43.2	113.9	52 58.6	+44.3	115.1	52 32.6	+45.4	116.3	52 05.5	+46.4	117.4	51 37.4	+47.3	118.5	51 08.2	+48.2	119.6	25
26	54 50.4	+40.0	110.1	54 29.1	+41.3	111.4	54 06.6	+42.5	112.7	53 42.9	+43.6	113.9	53 18.0	+44.7	115.2	52 51.9	+45.7	116.4	52 24.7	+46.7	117.5	51 56.4	+47.7	118.7	26
27	55 30.4	+39.1	108.8	55 10.4	+40.5	110.1	54 49.1	+41.7	111.5	54 26.5	+42.9	112.8	54 02.7	+44.1	114.0	53 37.6	+45.2	115.3	53 11.4	+46.3	116.5	52 44.1	+47.2	117.7	27
28	56 09.5	+38.3	107.4	55 50.9	+39.6	108.8	55 30.8	+41.0	110.2	55 09.4	+42.2	111.6	54 46.8	+43.3	112.9	54 22.8	+44.5	114.2	53 57.7	+45.6	115.4	53 31.3	+46.7	116.6	28
29	56 47.8	+37.2	106.0	56 30.5	+38.7	107.5	56 11.8	+40.0	108.9	55 51.6	+41.4	110.3	55 30.1	+42.7	111.7	55 07.3	+43.9	113.0	54 43.3	+44.9	114.3	54 18.0	+46.0	115.6	29
30	57 25.0	+36.3	104.6	57 09.2	+37.7	106.1	56 51.8	+39.2	107.6	56 33.0	+40.6	109.0	56 12.8	+41.8	110.4	55 51.2	+43.1	111.8	55 28.2	+44.3	113.2	55 04.0	+45.4	114.5	30
31	58 01.3	+35.2	103.1	57 46.9	+36.7	104.6	57 31.0	+38.2	106.2	57 13.6	+39.6	107.6	56 54.6	+41.0	109.1	56 34.3	+42.3	110.5	56 12.5	+43.6	111.9	55 49.4	+44.8	113.3	31
32	58 36.5	+34.0	101.5	58 23.6	+35.7	103.1	58 09.2	+37.2	104.7	57 53.2	+38.7	106.2	57 35.6	+40.2	107.8	57 16.6	+41.5	109.2	56 56.1	+42.8	110.7	56 34.2	+44.0	112.1	32
33	59 10.5	+32.8	99.9	58 59.3	+34.4	101.6	58 46.4	+36.1	103.2	58 31.9	+37.6	104.8	58 15.8	+39.1	106.4	57 58.1	+40.6	107.9	57 38.9	+42.0	109.4	57 18.2	+43.3	110.9	33
34	59 43.3	+31.5	98.3	59 33.7	+33.3	100.0	59 22.5	+34.9	101.6	59 09.5	+36.6	103.3	58 54.9	+38.2	104.9	58 38.7	+39.6	106.5	58 20.9	+41.0	108.1	58 01.5	+42.4	109.6	34
35	60 14.8	+30.2	96.6	60 07.0	+32.0	98.3	59 57.4	+33.8	100.0	59 46.1	+35.4	101.7	59 33.1	+37.2	103.4	59 18.3	+38.6	105.0	59 01.9	+40.2	106.7	58 43.9	+41.6	108.2	35
36	60 45.0	+28.8	94.8	60 39.0	+30.6	96.6	60 31.2	+32.4	98.4	60 21.5	+34.3	100.1	60 10.1	+35.9	101.8	59 56.9	+37.6	103.5	59 42.1	+39.1	105.2	59 25.5	+40.6	106.8	36
37	61 13.8	+27.2	93.0	61 09.6	+29.2	94.8	61 03.6	+31.1	96.6	60 55.8	+32.9	98.4	60 46.0	+34.7	100.2	60 34.5	+36.4	102.0	60 21.2	+38.0	103.7	60 06.1	+39.7	105.4	37
38	61 41.0	+25.7	91.2	61 38.8	+27.7	93.0	61 34.7	+29.7	94.9	61 28.7	+31.5	96.7	61 20.7	+33.4	98.5	61 10.9	+35.2	100.3	60 59.2	+36.9	102.1	60 45.8	+38.5	103.8	38
39	62 06.7	+24.1	89.2	62 06.5	+26.2	91.1	62 04.4	+28.1	93.0	62 00.2	+30.1	94.9	61 54.1	+32.0	96.8	61 46.1	+33.8	98.6	61 36.1	+35.7	100.5	61 24.3	+37.4	102.3	39
40	62 30.8	+22.4	87.3	62 32.7	+24.4	89.2	62 32.5	+26.5	91.1	62 30.3	+28.6	93.0	62 26.1	+30.6	95.0	62 19.9	+32.5	96.9	62 11.8	+34.3	98.7	62 01.7	+36.2	100.6	40
41	62 53.2	+20.6	85.3	62 57.1	+22.8	87.2	62 59.0	+24.9	89.2	62 58.9	+26.9	91.1	62 56.7	+29.0	93.1	62 52.4	+31.0	95.0	62 46.1	+33.0	97.0	62 37.9	+34.8	98.9	41
42	63 13.8	+18.7	83.2	63 19.9	+20.9	85.2	63 23.9	+23.1	87.1	63 25.8	+25.3	89.1	63 25.7	+27.3	91.1	63 23.4	+29.5	93.1	63 19.1	+31.5	95.1	63 12.7	+33.5	97.1	42
43	63 32.5	+16.8	81.1	63 40.8	+19.0	83.1	63 47.0	+21.2	85.1	63 51.1	+23.4	87.1	63 53.0	+25.7	89.1	63 52.9	+27.8	91.2	63 50.6	+29.9	93.2	63 46.2	+31.9	95.2	43
44	63 49.3	+14.8•	78.9	63 59.8	+17.1	80.9	64 08.2	+19.4	82.9	64 14.5	+21.7	85.0	64 18.7	+23.8	87.1	64 20.7	+26.0	89.1	64 20.5	+28.2	91.2	64 18.1	+30.4	93.3	44
45	64 04.1	+12.8•	76.7	64 16.9	+15.1•	78.7	64 27.6	+17.4•	80.8	64 36.2	+19.6•	82.8	64 42.5	+22.0	84.9	64 46.7	+24.3	87.1	64 48.7	+26.5	89.2	64 48.5	+28.6	91.3	45
46	64 16.9	+10.7•	74.4	64 32.0	+13.0•	76.5	64 45.0	+15.3•	78.5	64 55.8	+17.7•	80.6	65 04.5	+20.0•	82.7	65 11.0	+22.3•	84.9	65 15.2	+24.6	87.0	65 17.1	+26.9	89.2	46
47	64 27.6	+8.6•	72.2	64 45.0	+10.8•	74.2	65 00.3	+13.3•	76.2	65 13.5	+15.5•	78.4	65 24.5	+17.9•	80.5	65 33.3	+20.3•	82.7	65 39.8	+22.7•	84.9	65 44.0	+25.0	87.1	47
48	64 36.2	+6.3•	69.9	64 55.8	+8.7•	71.9	65 13.5	+11.0•	73.9	65 29.0	+13.4•	76.0	65 42.4	+15.8•	78.2	65 53.6	+18.2•	80.4	66 02.5	+20.6•	82.6	66 09.0	+23.0•	84.8	48
49	64 42.5	+4.2•	67.5	65 04.5	+6.5•	69.5	65 24.5	+8.8•	71.6	65 42.4	+11.2•	73.7	65 58.2	+13.6•	75.8	66 11.8	+16.0•	78.0	66 23.1	+18.4•	80.3	66 32.0	+21.0•	82.5	49
50	64 46.7	+2.0•	65.2	65 11.0	+4.2•	67.2	65 33.3	+6.5•	69.2	65 53.6	+8.9•	71.3	66 11.8	+11.3•	73.4	66 27.8	+13.7•	75.6	66 41.5	+16.3•	77.9	66 53.0	+18.7•	80.2	50
51	64 48.7	-0.2•	62.9	65 15.2	+1.9•	64.8	65 39.8	+4.2•	66.8	66 02.5	+6.5•	68.9	66 23.1	+8.9•	71.0	66 41.5	+11.5•	73.2	66 57.8	+13.9•	75.4	67 11.7	+16.5•	77.7	51
52	64 48.5	-2.5•	60.5	65 17.1	-0.3•	62.4	65 44.0	+1.9•	64.4	66 09.0	+4.3•	66.4	66 32.0	+6.6•	68.5	66 53.0	+9.0•	70.7	67 11.7	+11.6•	72.9	67 28.2	+14.1•	75.2	52
53	64 46.0	-4.7•	58.2	65 16.8	-2.6•	60.0	65 45.9	-0.4•	61.9	66 13.3	+1.8•	63.9	66 38.6	+4.2•	66.0	67 02.0	+6.6•	68.2	67 23.3	+9.1•	70.4	67 42.3	+11.6•	72.7	53
54	64 41.3	-6.9•	55.8	65 14.2	-4.8•	57.6	65 45.5	-2.7•	59.5	66 15.1	-0.5•	61.4	66 42.8	+1.8•	63.5	67 08.6	+4.2•	65.6	67 32.4	+6.6•	67.8	67 53.9	+9.2•	70.1	54
55	64 34.4	-9.0•	53.5	65 09.4	-7.1•	55.2	65 42.8	-5.0•	57.1	66 14.6	-2.9•	59.0	66 44.6	-0.6•	61.0	67 12.8	+1.7•	63.0	67 39.0	+4.1•	65.2	68 03.1	+6.6•	67.4	55
56	64 25.4	-11.2•	51.2	65 02.3	-9.3•	52.9	65 37.8	-7.4•	54.6	66 11.7	-5.3•	56.5	66 44.0	-3.1•	58.4	67 14.5	-0.8•	60.5	67 43.1	+1.6•	62.6	68 09.7	+4.0•	64.8	56
57	64 14.2	-13.2•	48.9	64 53.0	-11.5•	50.6	65 30.4	-9.6•	52.2	66 06.4	-7.6•	54.0	66 40.9	-5.5•	55.9	67 13.7	-3.3•	57.9	67 44.7	-1.0•	59.9	68 13.7	+1.5•	62.1	57
58	64 01.0	-15.3•	46.7	64 41.5	-13.6•	48.2	65 20.8	-11.7•	49.9	65 58.8	-9.9•	51.6	66 35.4	-7.9•	53.4	67 10.4	-5.8•	55.3	67 43.7	-3.6•	57.3	68 15.2	-1.3•	59.4	58
59	63 45.7	-17.3•	44.5	64 27.9	-15.6•	46.0	65 09.1	-14.0•	47.5	65 48.9	-12.1•	49.2	66 27.5	-10.3•	50.9	67 04.6	-8.2•	52.7	67 40.1	-6.1•	54.7	68 13.9	-3.8•	56.7	59
60	63 28.4	-19.1	42.4	64 12.3	-17.6•	43.7	64 55.1	-16.0•	45.2	65 36.8	-14.4•	46.8	66 17.2	-12.5•	48.4	66 56.4	-10.7•	50.2	67 34.0	-8.6•	52.0	68 10.1	-6.4•	54.0	60
61	63 09.3	-21.0	40.2	63 54.7	-19.6	41.6	64 39.1	-18.1•	43.0	65 22.4	-16.4•	44.4	66 04.7	-14.8•	46.0	66 45.7	-12.9•	47.7	67 25.4	-11.0•	49.5	68 03.7	-9.0•	51.3	61
62	62 48.3	-22.7	38.2	63 35.1	-21.5	39.4	64 21.0	-20.1	40.7	65 06.0	-18.6•	42.1	65 49.9	-16.9•	43.6	66 32.8	-15.3•	45.2	67 14.4	-13.4•	46.9	67 54.7	-11.3•	48.7	62
63	62 25.6	-24.5	36.2	63 13.6	-23.2	37.3	64 00.9	-21.9	38.6	64 47.4	-20.5	39.9	65 33.0	-19.1•	41.3	66 17.5	-17.4•	42.8	67 01.0	-15.8•	44.4	67 43.4	-13.9•	46.1	63
64	62 01.1	-26.0	34.2	62 50.4	-24.9	35.3	63 39.0	-23.7	36.5	64 26.9	-22.4	37.7	65 13.9	-21.0	39.0	66 00.1	-19.6•	40.4	66 45.2	-18.0•	41.9	67 29.3	-16.3•	43.6	64
65	61 35.1	-27.7	32.3	62 25.5	-26.6	33.3	63 15.3	-25.5	34.4	64 04.5	-24.3	35.6	64 52.9	-23.0	36.8	65 40.5	-21.6•	38.1	66 27.2	-20.1•	39.5	67 13.0	-18.7•	41.1	65
66	61 07.4	-29.1	30.5	61 58.9	-28.1	31.4	62 49.8	-27.1	32.4	63 40.2	-26.0	33.5	64 29.9	-24.8	34.6	65 18.9	-23.6	35.9	66 07.1	-22.2•	37.2	66 54.4	-20.7•	38.6	66
67	60 38.3	-30.4	28.7	61 30.8	-29.6	29.5	62 22.7	-28.6	30.5	63 14.2	-27.7	31.5	64 05.1	-26.6	32.6	64 55.3	-25.4	33.7	65 44.9	-24.2	34.9	66 33.7	-22.9•	36.2	67
68	60 07.9	-31.9	26.9	61 01.2	-31.1	27.7	61 54.1	-30.2	28.6	62 46.5	-29.2	29.5	63 38.5	-28.3	30.5	64 29.9	-27.2	31.6	65 20.7	-26.1	32.7	66 10.8	-24.8	33.9	68
69	59 36.0	-33.1	25.2	60 30.1	-32.3	26.0	61 23.9	-31.6	26.8	62 17.3	-30.8	27.6	63 10.2	-29.8	28.5	64 02.7	-28.9	29.5	64 54.6	-27.9	30.6	65 46.0	-26.8	31.7	69
70	59 02.9	-34.2	23.6	59 57.8	-33.6	24.3	60 52.3	-32.9	25.0	61 46.5	-32.1	25.8	62 40.4	-31.4	26.6	63 33.8	-30.5	27.5	64 26.7	-29.5	28.5	65 19.2	-28.5	29.5	70
71	58 28.7	-35.4	22.0	59 24.2	-34.8	22.6	60 19.4	-34.2	23.3	61 14.4	-33.5	24.0	62 09.0	-32.8	24.8	63 03.3	-32.0	25.6	63 57.2	-31.2	26.5	64 50.7	-30.3	27.4	71
72	57 53.3	-36.5	20.5	58 49.4	-36.0	21.1	59 45.2	-35.3	21.7	60 40.9	-34.8	22.3	61 36.2	-34.1	23.0	62 31.3	-33.4	23.8	63 26.0	-32.6	24.6	64 20.4	-31.8	25.4	72
73	57 16.8	-37.5	19.0	58 13.4	-37.0	19.5	59 09.9	-36.5	20.1	60 06.1	-35.9	20.7	61 02.1	-35.3	21.3	61 57.9	-34.7	22.0	62 53.4	-34.1	22.7	63 48.6	-33.3	23.5	73
74	56 39.3	-38.5	17.6	57 36.4	-38.0	18.0	58 33.4	-37.6	18.5	59 30.2	-37.1	19.1	60 26.8	-36.6	19.7	61 23.2	-36.0	20.3	62 19.3	-35.3	20.9	63 15.3	-34.8	21.6	74
75	56 00.8	-39.3	16.2	56 58.4	-39.0	16.6	57 55.8	-38.5	17.1	58 53.1	-38.1	17.5	59 50.2	-37.6	18.1	60 47.2	-37.2	18.6	61 44.0	-36.7	19.2	62 40.5	-36.1	19.8	75
76	55 21.5	-40.2	14.8	56 19.4	-39.8	15.2	57 17.3	-39.5	15.6	58 15.0	-39.1	16.1	59 12.6	-38.7	16.5	60 10.0	-38.2	17.0	61 07.3	-37.8	17.5	62 04.4	-37.3	18.1	76
77	54 41.3	-41.0	13.5	55 39.6	-40.7	13.9	56 37.8	-40.4	14.2	57 35.9	-40.1	14.6	58 33.9	-39.7	15.0	59 31.8	-39.3	15.5	60 29.5	-38.9	16.0	61 27.1	-38.4	16.5	77
78	54 00.3	-41.8	12.3	54 58.9	-41.5	12.6	55 57.4	-41.2	12.9	56 55.8	-40.9	13.3	57 54.2	-40.6	13.6	58 52.5	-40.3	14.0	59 50.6	-39.9	14.4	60 48.7	-39.6	14.9	78
79	53 18.5	-42.4	11.1	54 17.4	-42.2	11.3	55 16.2	-42.0	11.6	56 14.9	-41.7	11.9	57 13.6	-41.5	12.2	58 12.2	-41.2	12.6	59 10.7	-40.9	13.0	60 09.1	-40.5	13.3	79
80	52 36.1	-43.2	9.9	53 35.2	-43.0	10.1	54 34.2	-42.7	10.4	55 33.2	-42.5	10.6	56 32.1	-42.3	10.9	57 31.0	-42.0	11.2	58 29.8	-41.7	11.5	59 28.6	-41.5	11.9	80
81	51 52.9	-43.7	8.8	52 52.2	-43.6	9.0	53 51.5	-43.5	9.2	54 50.7	-43.3	9.4	55 49.8	-43.0	9.6	56 49.0	-42.9	9.9	57 48.1	-42.7	10.2	58 47.1	-42.4	10.5	81
82	51 09.2	-44.4	7.7	52 08.6	-44.2	7.8	53 08.0	-44.1	8.0	54 07.4	-43.9	8.2	55 06.8	-43.8	8.4	56 06.1	-43.6	8.6	57 05.4	-43.4	8.9	58 04.7	-43.2	9.1	82
83	50 24.8	-45.0	6.6	51 24.4	-44.8	6.8	52 23.9	-44.6	6.9	53 23.5	-44.6	7.1	54 23.0	-44.4	7.2	55 22.5	-44.2	7.4	56 22.0	-44.1	7.6	57 21.5	-44.0	7.8	83
84	49 39.8	-45.4	5.6	50 39.6	-45.4	5.7	51 39.3	-45.3	5.8	52 38.9	-45.1	6.0	53 38.6	-45.1	6.0	54 38.3	-45.0	6.2	55 37.9	-44.8	6.4	56 37.5	-44.7	6.6	84
85	48 54.4	-46.0	4.6	49 54.2	-45.9	4.7	50 54.0	-45.8	4.8	51 53.8	-45.8	4.9	52 53.5	-45.6	5.0	53 53.3	-45.6	5.1	54 53.1	-45.5	5.2	55 52.8	-45.4	5.4	85
86	48 08.4	-46.5	3.6	49 08.3	-46.4	3.7	50 08.2	-46.4	3.8	51 08.0	-46.3	3.8	52 07.9	-46.2	3.9	53 07.7	-46.1	4.0	54 07.6	-46.1	4.1	55 07.4	-46.0	4.2	86
87	47 21.9	-46.9	2.7	48 21.9	-46.9	2.7	49 21.8	-46.8	2.8	50 21.7	-46.8	2.8	51 21.7	-46.8	2.8	52 21.6	-46.7	3.0	53 21.5	-46.7	3.0	54 21.4	-46.6	3.1	87
88	46 35.0	-47.3	1.8	47 35.0	-47.3	1.8	48 35.0	-47.3	1.8	49 35.0	-47.3	1.9	50 34.9	-47.2	1.9	51 34.9	-47.2	1.9	52 34.9	-47.2	2.0	53 34.8	-47.1	2.0	88
89	45 47.7	-47.7	0.9	46 47.7	-47.7	0.9	47 47.7	-47.7	0.9	48 47.7	-47.7	0.9	49 47.7	-47.7	0.9	50 47.7	-47.7	1.0	51 47.7	-47.7	1.0	52 47.7	-47.7	1.0	89
90	45 00.0	-48.1	0.0	46 00.0	-48.1	0.0	47 00.0	-48.1	0.0	48 00.0	-48.1	0.0	49 00.0	-48.1	0.0	50 00.0	-48.1	0.0	51 00.0	-48.1	0.0	52 00.0	-48.2	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	34 23.0	−51.5	133.2	33 41.7	−51.9	133.7	33 00.1	−52.4	134.1	32 18.2	−52.9	134.6	31 35.9	−53.3	135.0	30 53.2	−53.6	135.5	30 10.3	−54.0	135.9	29 27.1	−54.4	136.3	0
1	33 31.5	−51.7	133.8	32 49.8	−52.2	134.3	32 07.7	−52.5	134.7	31 25.3	−52.9	135.2	30 42.6	−53.3	135.6	29 59.6	−53.7	136.0	29 16.3	−54.1	136.4	28 32.7	−54.4	136.8	1
2	32 39.8	−51.9	134.4	31 57.6	−52.3	134.9	31 15.2	−52.7	135.3	30 32.4	−53.1	135.7	29 49.3	−53.5	136.1	29 05.9	−53.9	136.5	28 22.2	−54.2	136.9	27 38.3	−54.5	137.2	2
3	31 47.9	−52.0	135.0	31 05.3	−52.4	135.4	30 22.5	−52.9	135.8	29 39.3	−53.3	136.2	28 55.8	−53.6	136.6	28 12.0	−53.9	137.0	27 28.0	−54.3	137.4	26 43.8	−54.7	137.7	3
4	30 55.9	−52.2	135.6	30 12.9	−52.6	136.0	29 29.6	−53.0	136.4	28 46.0	−53.3	136.8	28 02.2	−53.7	137.1	27 18.1	−54.1	137.5	26 33.7	−54.4	137.8	25 49.1	−54.7	138.2	4
5	30 03.7	−52.3	136.2	29 20.3	−52.7	136.5	28 36.6	−53.1	136.9	27 52.7	−53.5	137.3	27 08.5	−53.9	137.6	26 24.0	−54.2	138.0	25 39.3	−54.5	138.3	24 54.4	−54.8	138.6	5
6	29 11.4	−52.4	136.7	28 27.6	−52.8	137.1	27 43.5	−53.2	137.5	26 59.2	−53.6	137.8	26 14.6	−53.9	138.1	25 29.8	−54.2	138.5	24 44.8	−54.6	138.8	23 59.6	−54.9	139.1	6
7	28 19.0	−52.6	137.3	27 34.8	−53.0	137.6	26 50.3	−53.3	138.0	26 05.6	−53.7	138.3	25 20.7	−54.0	138.6	24 35.6	−54.3	138.9	23 50.2	−54.6	139.2	23 04.7	−55.0	139.5	7
8	27 26.4	−52.7	137.8	26 41.8	−53.1	138.2	25 57.0	−53.5	138.5	25 11.9	−53.8	138.8	24 26.7	−54.1	139.1	23 41.2	−54.4	139.4	22 55.6	−54.7	139.7	22 09.7	−55.0	139.9	8
9	26 33.7	−52.9	138.4	25 48.7	−53.2	138.7	25 03.5	−53.5	139.0	24 18.2	−53.9	139.3	23 32.6	−54.2	139.6	22 46.8	−54.5	139.9	22 00.9	−54.8	140.1	21 14.7	−55.1	140.4	9
10	25 40.8	−52.9	139.0	24 55.5	−53.3	139.3	24 10.0	−53.6	139.5	23 24.3	−54.0	139.8	22 38.4	−54.3	140.0	21 52.3	−54.6	140.3	21 06.1	−54.9	140.6	20 19.6	−55.1	140.8	10
11	24 47.9	−53.1	139.4	24 02.2	−53.4	139.7	23 16.4	−53.7	140.0	22 30.3	−54.0	140.2	21 44.1	−54.3	140.5	20 57.7	−54.6	140.8	20 11.2	−54.9	141.0	19 24.5	−55.2	141.2	11
12	23 54.8	−53.1	139.9	23 08.8	−53.4	140.2	22 22.7	−53.9	140.5	21 36.3	−54.1	140.7	20 49.8	−54.4	141.0	20 03.1	−54.7	141.2	19 16.3	−55.0	141.4	18 29.3	−55.3	141.6	12
13	23 01.7	−53.3	140.4	22 15.4	−53.6	140.7	21 28.8	−53.8	140.9	20 42.2	−54.2	141.2	19 55.4	−54.5	141.4	19 08.4	−54.8	141.6	18 21.3	−55.1	141.8	17 34.0	−55.3	142.0	13
14	22 08.4	−53.3	140.9	21 21.8	−53.7	141.2	20 35.0	−54.0	141.4	19 48.0	−54.3	141.6	19 00.9	−54.6	141.9	18 13.6	−54.8	142.1	17 26.2	−55.1	142.3	16 38.7	−55.3	142.4	14
15	21 15.1	−53.4	141.4	20 28.1	−53.7	141.6	19 41.0	−54.0	141.9	18 53.7	−54.3	142.1	18 06.3	−54.6	142.3	17 18.8	−54.9	142.5	16 31.1	−55.1	142.7	15 43.4	−55.4	142.8	15
16	20 21.7	−53.5	141.9	19 34.4	−53.8	142.1	18 47.0	−54.1	142.3	17 59.4	−54.4	142.5	17 11.7	−54.6	142.7	16 23.9	−54.9	142.9	15 36.0	−55.2	143.1	14 48.0	−55.3	143.2	16
17	19 28.2	−53.6	142.4	18 40.6	−53.9	142.6	17 52.9	−54.2	142.8	17 05.0	−54.4	143.0	16 17.1	−54.8	143.2	15 29.0	−55.0	143.3	14 40.8	−55.2	143.5	13 52.5	−55.4	143.6	17
18	18 34.6	−53.6	142.9	17 46.7	−53.9	143.1	16 58.7	−54.2	143.2	16 10.6	−54.5	143.4	15 22.3	−54.7	143.6	14 34.0	−55.0	143.7	13 45.6	−55.3	143.9	12 57.1	−55.6	144.0	18
19	17 41.0	−53.6	143.3	16 52.8	−54.0	143.5	16 04.5	−54.3	143.7	15 16.1	−54.6	143.9	14 27.6	−54.8	144.0	13 39.0	−55.1	144.2	12 50.3	−55.3	144.3	12 01.5	−55.5	144.4	19
20	16 47.2	−53.7	143.8	15 58.8	−54.1	144.0	15 10.2	−54.3	144.1	14 21.5	−54.6	144.3	13 32.8	−54.9	144.4	12 43.9	−55.1	144.6	11 55.0	−55.4	144.7	11 06.0	−55.6	144.8	20
21	15 53.5	−53.9	144.3	15 04.7	−54.1	144.4	14 15.9	−54.4	144.6	13 26.9	−54.6	144.7	12 37.9	−54.9	144.8	11 48.8	−55.1	145.0	10 59.7	−55.4	145.1	10 10.4	−55.6	145.2	21
22	14 59.6	−53.9	144.7	14 10.6	−54.2	144.9	13 21.5	−54.5	145.0	12 32.3	−54.7	145.1	11 43.0	−54.9	145.3	10 53.7	−55.2	145.4	10 04.3	−55.4	145.5	9 14.8	−55.6	145.6	22
23	14 05.7	−53.9	145.2	13 16.4	−54.2	145.3	12 27.1	−54.5	145.4	11 37.6	−54.7	145.6	10 48.1	−54.9	145.7	9 58.5	−55.2	145.8	9 08.9	−55.4	145.9	8 19.2	−55.6	146.0	23
24	13 11.8	−54.0	145.6	12 22.2	−54.2	145.7	11 32.6	−54.5	145.9	10 42.9	−54.7	146.0	9 53.2	−55.0	146.1	9 03.3	−55.2	146.2	8 13.5	−55.5	146.3	7 23.6	−55.7	146.3	24
25	12 17.8	−54.0	146.1	11 28.0	−54.3	146.2	10 38.1	−54.5	146.3	9 48.2	−54.8	146.4	8 58.2	−55.0	146.5	8 08.1	−55.2	146.6	7 18.0	−55.4	146.6	6 27.9	−55.7	146.7	25
26	11 23.8	−54.1	146.5	10 33.7	−54.3	146.6	9 43.6	−54.6	146.7	8 53.4	−54.8	146.8	8 03.2	−55.1	146.9	7 12.9	−55.3	147.0	6 22.6	−55.5	147.0	5 32.2	−55.7	147.1	26
27	10 29.7	−54.1	147.0	9 39.4	−54.4	147.0	8 49.0	−54.6	147.1	7 58.6	−54.8	147.2	7 08.1	−55.0	147.3	6 17.6	−55.3	147.4	5 27.1	−55.5	147.4	4 36.5	−55.7	147.5	27
28	9 35.6	−54.1	147.4	8 45.0	−54.4	147.5	7 54.4	−54.6	147.6	7 03.8	−54.9	147.6	6 13.1	−55.1	147.7	5 22.3	−55.3	147.7	4 31.6	−55.5	147.8	3 40.8	−55.7	147.8	28
29	8 41.5	−54.2	147.8	7 50.6	−54.4	147.9	6 59.8	−54.6	148.0	6 08.9	−54.9	148.0	5 18.0	−55.1	148.1	4 27.0	−55.3	148.1	3 36.1	−55.6	148.2	2 45.1	−55.7	148.2	29
30	7 47.3	−54.2	148.3	6 56.2	−54.4	148.3	6 05.2	−54.7	148.4	5 14.0	−54.8	148.4	4 22.9	−55.1	148.5	3 31.7	−55.3	148.5	2 40.6	−55.6	148.5	1 49.4	−55.8	148.6	30
31	6 53.1	−54.2	148.7	6 01.8	−54.4	148.7	5 10.5	−54.7	148.8	4 19.2	−54.9	148.8	3 27.8	−55.1	148.9	2 36.4	−55.3	148.9	1 45.0	−55.6	148.9	0 53.6	−55.7	148.9	31
32	5 58.9	−54.3	149.1	5 07.4	−54.5	149.2	4 15.8	−54.7	149.2	3 24.3	−54.9	149.3	2 32.7	−55.1	149.3	1 41.1	−55.3	149.3	0 49.5	−55.5	149.3	0 02.1	+55.7	30.7	32
33	5 04.6	−54.2	149.6	4 12.9	−54.5	149.6	3 21.1	−54.7	149.6	2 29.4	−55.0	149.7	1 37.6	−55.2	149.7	0 45.8	−55.3	149.7	0 06.0	+55.5	30.3	0 57.8	+55.7	30.3	33
34	4 10.4	−54.3	150.0	3 18.4	−54.5	150.0	2 26.4	−54.7	150.1	1 34.4	−54.9	150.1	0 42.4	−55.1	150.1	0 09.5	+55.4	29.9	1 01.5	+55.6	29.9	1 53.5	+55.8	29.9	34
35	3 16.1	−54.3	150.4	2 23.9	−54.5	150.4	1 31.7	−54.7	150.5	0 39.5	−54.9	150.5	0 12.7	+55.1	29.5	1 04.9	+55.3	29.5	1 57.1	+55.5	29.6	2 49.3	+55.7	29.6	35
36	2 21.8	−54.3	150.8	1 29.4	−54.5	150.9	0 37.0	−54.7	150.9	0 15.4	+54.9	29.1	1 07.8	+55.1	29.1	2 00.2	+55.3	29.2	2 52.6	+55.5	29.2	3 45.0	+55.7	29.2	36
37	1 27.5	−54.3	151.3	0 34.9	−54.5	151.3	0 17.7	+54.7	28.7	1 10.3	+54.9	28.7	2 02.9	+55.1	28.7	2 55.5	+55.3	28.8	3 48.1	+55.5	28.8	4 40.7	+55.7	28.8	37
38	0 33.2	−54.3	151.7	0 19.6	+54.5	28.3	1 12.4	+54.7	28.3	2 05.2	+54.9	28.3	2 58.0	+55.1	28.4	3 50.8	+55.3	28.4	4 43.6	+55.5	28.4	5 36.4	+55.7	28.5	38
39	0 21.1	+54.3	27.9	1 14.1	+54.5	27.9	2 07.1	+54.7	27.9	3 00.1	+54.9	27.9	3 53.1	+55.1	28.0	4 46.1	+55.3	28.0	5 39.1	+55.5	28.0	6 32.1	+55.6	28.1	39
40	1 15.4	+54.2	27.5	2 08.6	+54.5	27.5	3 01.8	+54.7	27.5	3 55.0	+54.9	27.5	4 48.2	+55.1	27.6	5 41.4	+55.3	27.6	6 34.6	+55.4	27.7	7 27.7	+55.7	27.7	40
41	2 09.6	+54.3	27.0	3 03.1	+54.5	27.1	3 56.5	+54.7	27.1	4 49.9	+54.9	27.1	5 43.3	+55.1	27.2	6 36.7	+55.2	27.2	7 30.0	+55.5	27.3	8 23.4	+55.6	27.3	41
42	3 03.9	+54.3	26.6	3 57.6	+54.4	26.6	4 51.2	+54.7	26.7	5 44.8	+54.9	26.7	6 38.4	+55.0	26.8	7 31.9	+55.3	26.8	8 25.5	+55.4	26.9	9 19.0	+55.6	27.0	42
43	3 58.2	+54.3	26.2	4 52.0	+54.5	26.2	5 45.9	+54.6	26.3	6 39.7	+54.8	26.3	7 33.4	+55.1	26.4	8 27.2	+55.2	26.4	9 20.9	+55.4	26.5	10 14.6	+55.6	26.6	43
44	4 52.5	+54.2	25.8	5 46.5	+54.4	25.8	6 40.5	+54.6	25.8	7 34.5	+54.8	25.9	8 28.5	+55.0	26.0	9 22.4	+55.2	26.0	10 16.3	+55.4	26.1	11 10.2	+55.6	26.2	44
45	5 46.7	+54.2	25.3	6 40.9	+54.4	25.4	7 35.1	+54.6	25.4	8 29.3	+54.8	25.5	9 23.5	+54.9	25.6	10 17.6	+55.1	25.6	11 11.7	+55.3	25.7	12 05.7	+55.5	25.8	45
46	6 40.9	+54.2	24.9	7 35.3	+54.4	24.9	8 29.7	+54.6	25.0	9 24.1	+54.8	25.1	10 18.4	+55.0	25.1	11 12.7	+55.1	25.2	12 07.0	+55.3	25.3	13 01.2	+55.5	25.4	46
47	7 35.1	+54.2	24.5	8 29.7	+54.4	24.6	9 24.3	+54.6	24.6	10 18.9	+54.7	24.7	11 13.4	+54.9	24.7	12 07.8	+55.1	24.8	13 02.3	+55.2	24.9	13 56.7	+55.4	25.0	47
48	8 29.3	+54.2	24.0	9 24.1	+54.3	24.1	10 18.9	+54.6	24.2	11 13.6	+54.7	24.2	12 08.3	+54.8	24.3	13 02.9	+55.1	24.4	13 57.5	+55.3	24.5	14 52.1	+55.4	24.6	48
49	9 23.5	+54.1	23.6	10 18.4	+54.3	23.7	11 13.4	+54.4	23.7	12 08.3	+54.6	23.8	13 03.1	+54.9	23.9	13 58.0	+55.0	24.0	14 52.8	+55.1	24.1	15 47.5	+55.4	24.2	49
50	10 17.6	+54.1	23.2	11 12.7	+54.3	23.2	12 07.8	+54.5	23.4	13 02.9	+54.6	23.4	13 58.0	+54.8	23.5	14 53.0	+54.9	23.6	15 47.9	+55.2	23.7	16 42.9	+55.3	23.8	50
51	11 11.7	+54.0	22.7	12 07.0	+54.2	22.8	13 02.3	+54.4	22.9	13 57.5	+54.6	23.0	14 52.8	+54.7	23.1	15 47.9	+55.0	23.2	16 43.1	+55.1	23.3	17 38.2	+55.2	23.4	51
52	12 05.7	+54.0	22.3	13 01.2	+54.2	22.4	13 56.7	+54.3	22.4	14 52.1	+54.5	22.5	15 47.5	+54.7	22.6	16 42.9	+54.8	22.8	17 38.2	+55.0	22.9	18 33.4	+55.2	23.0	52
53	12 59.7	+53.9	21.8	13 55.4	+54.1	21.9	14 51.0	+54.3	22.0	15 46.6	+54.5	22.1	16 42.2	+54.6	22.2	17 37.7	+54.8	22.3	18 33.2	+55.0	22.5	19 28.6	+55.2	22.6	53
54	13 53.6	+53.9	21.4	14 49.5	+54.1	21.5	15 45.3	+54.3	21.6	16 41.1	+54.4	21.7	17 36.8	+54.6	21.8	18 32.5	+54.8	21.9	19 28.2	+54.9	22.0	20 23.8	+55.0	22.2	54
55	14 47.5	+53.9	20.9	15 43.6	+54.0	21.0	16 39.6	+54.1	21.1	17 35.5	+54.4	21.2	18 31.4	+54.5	21.3	19 27.3	+54.7	21.5	20 23.1	+54.8	21.6	21 18.8	+55.1	21.7	55
56	15 41.4	+53.8	20.5	16 37.6	+53.9	20.6	17 33.7	+54.2	20.7	18 29.9	+54.3	20.8	19 25.9	+54.5	20.9	20 22.0	+54.6	21.0	21 17.9	+54.8	21.2	22 13.9	+54.9	21.3	56
57	16 35.2	+53.7	20.0	17 31.5	+53.9	20.1	18 27.9	+54.0	20.2	19 24.2	+54.2	20.3	20 20.4	+54.4	20.5	21 16.6	+54.5	20.6	22 12.7	+54.7	20.7	23 08.8	+54.9	20.9	57
58	17 28.9	+53.7	19.5	18 25.4	+53.9	19.6	19 21.9	+54.0	19.8	20 18.4	+54.1	19.9	21 14.8	+54.3	20.0	22 11.1	+54.5	20.1	23 07.4	+54.7	20.3	24 03.7	+54.8	20.4	58
59	18 22.6	+53.6	19.1	19 19.3	+53.7	19.2	20 15.9	+53.9	19.3	21 12.5	+54.1	19.4	22 09.1	+54.2	19.6	23 05.6	+54.4	19.7	24 02.1	+54.5	19.8	24 58.5	+54.7	20.0	59
60	19 16.2	+53.5	18.6	20 13.0	+53.7	18.7	21 09.8	+53.9	18.8	22 06.6	+54.0	19.0	23 03.3	+54.2	19.1	24 00.0	+54.3	19.2	24 56.6	+54.5	19.4	25 53.2	+54.6	19.5	60
61	20 09.7	+53.4	18.1	21 06.7	+53.6	18.2	22 03.7	+53.7	18.3	23 00.6	+53.9	18.5	23 57.5	+54.0	18.6	24 54.3	+54.2	18.8	25 51.1	+54.4	18.9	26 47.8	+54.6	19.1	61
62	21 03.1	+53.4	17.6	22 00.3	+53.5	17.7	22 57.4	+53.7	17.9	23 54.5	+53.8	18.0	24 51.5	+54.0	18.1	25 48.5	+54.2	18.3	26 45.5	+54.3	18.4	27 42.4	+54.4	18.6	62
63	21 56.5	+53.3	17.1	22 53.8	+53.4	17.3	23 51.1	+53.6	17.4	24 48.3	+53.8	17.5	25 45.5	+53.9	17.7	26 42.7	+54.0	17.8	27 39.8	+54.2	18.0	28 36.8	+54.4	18.1	63
64	22 49.8	+53.1	16.6	23 47.2	+53.3	16.8	24 44.7	+53.4	16.9	25 42.1	+53.6	17.0	26 39.4	+53.8	17.2	27 36.7	+53.9	17.3	28 34.0	+54.0	17.5	29 31.2	+54.2	17.6	64
65	23 42.9	+53.1	16.1	24 40.5	+53.3	16.3	25 38.1	+53.4	16.4	26 35.7	+53.5	16.5	27 33.2	+53.6	16.7	28 30.6	+53.8	16.8	29 28.0	+54.0	17.0	30 25.4	+54.1	17.2	65
66	24 36.0	+53.0	15.6	25 33.8	+53.1	15.7	26 31.5	+53.3	15.9	27 29.2	+53.4	16.0	28 26.8	+53.6	16.2	29 24.4	+53.7	16.3	30 22.0	+53.9	16.5	31 19.5	+54.0	16.7	66
67	25 29.0	+52.8	15.1	26 26.9	+53.0	15.2	27 24.8	+53.1	15.4	28 22.6	+53.3	15.5	29 20.4	+53.4	15.6	30 18.1	+53.6	15.8	31 15.9	+53.7	16.0	32 13.5	+53.9	16.1	67
68	26 21.8	+52.8	14.6	27 19.9	+52.9	14.7	28 17.9	+53.0	14.8	29 15.9	+53.1	15.0	30 13.8	+53.3	15.1	31 11.7	+53.5	15.3	32 09.6	+53.6	15.4	33 07.4	+53.7	15.6	68
69	27 14.6	+52.6	14.0	28 12.8	+52.7	14.2	29 10.9	+52.9	14.3	30 09.0	+53.1	14.4	31 07.1	+53.2	14.6	32 05.2	+53.3	14.7	33 03.2	+53.4	14.9	34 01.1	+53.6	15.1	69
70	28 07.2	+52.5	13.5	29 05.5	+52.6	13.6	30 03.8	+52.8	13.8	31 02.1	+52.9	13.9	32 00.3	+53.0	14.0	32 58.5	+53.2	14.2	33 56.6	+53.3	14.4	34 54.7	+53.5	14.5	70
71	28 59.7	+52.3	12.9	29 58.1	+52.5	13.1	30 56.6	+52.6	13.2	31 55.0	+52.7	13.3	32 53.3	+52.9	13.5	33 51.7	+53.0	13.6	34 49.9	+53.2	13.8	35 48.2	+53.3	14.0	71
72	29 52.0	+52.2	12.4	30 50.6	+52.3	12.5	31 49.2	+52.4	12.6	32 47.7	+52.6	12.8	33 46.2	+52.7	12.9	34 44.7	+52.8	13.1	35 43.1	+53.0	13.2	36 41.5	+53.1	13.4	72
73	30 44.2	+52.1	11.8	31 42.9	+52.2	11.9	32 41.6	+52.3	12.1	33 40.3	+52.4	12.2	34 38.9	+52.6	12.4	35 37.5	+52.7	12.5	36 36.1	+52.8	12.7	37 34.6	+52.9	12.8	73
74	31 36.3	+51.9	11.2	32 35.1	+52.0	11.4	33 33.9	+52.2	11.5	34 32.7	+52.3	11.6	35 31.5	+52.4	11.8	36 30.2	+52.5	11.9	37 28.9	+52.6	12.1	38 27.5	+52.8	12.2	74
75	32 28.2	+51.7	10.6	33 27.1	+51.9	10.8	34 26.1	+51.9	10.9	35 25.0	+52.0	11.0	36 23.9	+52.1	11.2	37 22.7	+52.3	11.3	38 21.5	+52.5	11.5	39 20.3	+52.6	11.6	75
76	33 19.9	+51.5	10.0	34 19.0	+51.6	10.2	35 18.0	+51.7	10.3	36 17.0	+51.9	10.4	37 16.0	+52.0	10.5	38 15.0	+52.1	10.7	39 14.0	+52.3	10.8	40 12.9	+52.3	11.0	76
77	34 11.4	+51.4	9.4	35 10.6	+51.5	9.5	36 09.8	+51.6	9.7	37 08.9	+51.7	9.8	38 08.0	+51.8	9.9	39 07.1	+51.9	10.0	40 06.2	+52.0	10.2	41 05.2	+52.2	10.3	77
78	35 02.8	+51.2	8.8	36 02.1	+51.2	9.0	37 01.4	+51.3	9.0	38 00.6	+51.5	9.1	38 59.8	+51.6	9.3	39 59.0	+51.7	9.4	40 58.2	+51.8	9.5	41 57.4	+51.9	9.7	78
79	35 54.0	+50.9	8.1	36 53.3	+51.1	8.3	37 52.7	+51.1	8.4	38 52.1	+51.2	8.5	39 51.4	+51.3	8.6	40 50.7	+51.5	8.7	41 50.0	+51.6	8.9	42 49.3	+51.6	9.0	79
80	36 44.9	+50.7	7.5	37 44.4	+50.8	7.6	38 43.8	+51.0	7.7	39 43.3	+51.0	7.8	40 42.7	+51.1	7.9	41 42.2	+51.1	8.0	42 41.6	+51.2	8.2	43 40.9	+51.4	8.3	80
81	37 35.6	+50.5	6.8	38 35.2	+50.6	6.9	39 34.8	+50.7	7.0	40 34.3	+50.7	7.1	41 33.8	+50.9	7.2	42 33.3	+51.0	7.3	43 32.8	+51.1	7.5	44 32.2	+51.1	7.6	81
82	38 26.1	+50.3	6.1	39 25.8	+50.3	6.2	40 25.4	+50.4	6.3	41 25.0	+50.5	6.4	42 24.7	+50.5	6.5	43 24.3	+50.6	6.6	44 23.9	+50.7	6.7	45 23.4	+50.9	6.8	82
83	39 16.4	+50.0	5.4	40 16.1	+50.1	5.5	41 15.8	+50.1	5.6	42 15.5	+50.2	5.7	43 15.2	+50.3	5.8	44 14.9	+50.4	5.9	45 14.6	+50.4	6.0	46 14.3	+50.5	6.1	83
84	40 06.4	+49.7	4.8	41 06.2	+49.7	4.9	42 05.9	+49.9	4.9	43 05.7	+49.9	4.9	44 05.5	+50.0	5.0	45 05.3	+50.0	5.0	46 05.0	+50.1	5.2	47 04.8	+50.1	5.3	84
85	40 56.1	+49.4	4.0	41 55.9	+49.5	4.0	42 55.8	+49.5	4.1	43 55.6	+49.6	4.2	44 55.5	+49.6	4.2	45 55.3	+49.7	4.3	46 55.1	+49.8	4.4	47 54.9	+49.9	4.5	85
86	41 45.5	+49.1	3.2	42 45.4	+49.2	3.3	43 45.3	+49.2	3.3	44 45.2	+49.3	3.4	45 45.1	+49.3	3.4	46 45.0	+49.3	3.5	47 44.9	+49.4	3.6	48 44.8	+49.4	3.7	86
87	42 34.6	+48.8	2.5	43 34.6	+48.8	2.5	44 34.5	+48.9	2.5	45 34.5	+48.9	2.6	46 34.4	+48.9	2.6	47 34.3	+49.0	2.7	48 34.3	+49.0	2.8	49 34.2	+49.2	2.8	87
88	43 23.4	+48.5	1.7	44 23.4	+48.5	1.7	45 23.4	+48.5	1.7	46 23.4	+48.5	1.7	47 23.3	+48.6	1.8	48 23.3	+48.6	1.8	49 23.3	+48.6	1.8	50 23.2	+48.6	1.9	88
89	44 11.9	+48.1	0.8	45 11.9	+48.1	0.9	46 11.9	+48.1	0.9	47 11.9	+48.1	0.9	48 11.9	+48.1	0.9	49 11.9	+48.1	0.9	50 11.9	+48.1	0.9	51 11.8	+48.2	1.0	89
90	45 00.0	+47.7	0.0	46 00.0	+47.7	0.0	47 00.0	+47.7	0.0	48 00.0	+47.7	0.0	49 00.0	+47.7	0.0	50 00.0	+47.7	0.0	51 00.0	+47.7	0.0	52 00.0	+47.7	0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z / L.H.A. less than 180° .... Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION — **L.H.A. 143°, 217°**

LATITUDE SAME NAME AS DECLINATION — N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	33 51.8	+51.0	132.1	33 11.3	+51.5	132.6	32 30.5	+51.9	133.1	31 49.3	+52.4	133.6	31 07.8	+52.8	134.0	30 26.0	+53.2	134.4	29 43.8	+53.6	134.8	29 01.3	+54.0	135.2	0
1	34 42.8	+50.8	131.5	34 02.8	+51.3	132.0	33 22.4	+51.8	132.5	32 41.7	+52.3	133.0	32 00.6	+52.7	133.5	31 19.2	+53.1	133.9	30 37.4	+53.5	134.3	29 55.3	+53.9	134.7	1
2	35 33.6	+50.5	130.9	34 54.1	+51.1	131.4	34 14.2	+51.6	131.9	33 34.0	+52.0	132.4	32 53.3	+52.5	132.9	32 12.3	+53.0	133.4	31 30.9	+53.4	133.8	30 49.2	+53.8	134.2	2
3	36 24.1	+50.4	130.2	35 45.2	+50.9	130.7	35 05.8	+51.4	131.3	34 26.0	+51.9	131.8	33 45.8	+52.4	132.3	33 05.3	+52.8	132.8	32 24.3	+53.3	133.3	31 43.0	+53.7	133.7	3
4	37 14.5	+50.1	129.5	36 36.1	+50.6	130.1	35 57.2	+51.2	130.7	35 17.9	+51.7	131.2	34 38.2	+52.2	131.7	33 58.1	+52.6	132.2	33 17.6	+53.0	132.7	32 36.7	+53.5	133.2	4
5	38 04.6	+49.9	128.8	37 26.7	+50.5	129.4	36 48.4	+51.0	130.0	36 09.6	+51.5	130.6	35 30.4	+52.0	131.1	34 50.7	+52.5	131.6	34 10.6	+53.0	132.2	33 30.2	+53.4	132.6	5
6	38 54.5	+49.6	128.1	38 17.2	+50.2	128.7	37 39.4	+50.7	129.3	37 01.1	+51.3	129.9	36 22.4	+51.8	130.5	35 43.2	+52.3	131.0	35 03.6	+52.7	131.6	34 23.6	+53.2	132.1	6
7	39 44.1	+49.4	127.4	39 07.4	+49.9	128.0	38 30.1	+50.5	128.7	37 52.4	+51.1	129.3	37 14.2	+51.6	129.9	36 35.5	+52.1	130.4	35 56.3	+52.6	131.0	35 16.8	+53.0	131.5	7
8	40 33.4	+49.0	126.6	39 57.3	+49.6	127.3	39 20.6	+50.3	128.0	38 43.5	+50.8	128.6	38 05.8	+51.4	129.2	37 27.6	+51.9	129.8	36 48.9	+52.5	130.4	36 09.8	+52.9	131.0	8
9	41 22.4	+48.7	125.9	40 46.9	+49.4	126.6	40 10.9	+50.0	127.3	39 34.3	+50.6	127.9	38 57.2	+51.1	128.6	38 19.5	+51.7	129.2	37 41.4	+52.2	129.8	37 02.7	+52.7	130.4	9
10	42 11.1	+48.4	125.1	41 36.3	+49.1	125.8	41 00.9	+49.7	126.5	40 24.9	+50.3	127.2	39 48.3	+50.9	127.9	39 11.2	+51.5	128.5	38 33.6	+52.0	129.2	37 55.4	+52.6	129.8	10
11	42 59.5	+48.0	124.3	42 25.4	+48.7	125.0	41 50.6	+49.4	125.8	41 15.2	+50.1	126.5	40 39.2	+50.7	127.2	40 02.7	+51.2	127.9	39 25.6	+51.8	128.5	38 48.0	+52.3	129.2	11
12	43 47.5	+47.7	123.5	43 14.1	+48.4	124.3	42 40.0	+49.1	125.0	42 05.3	+49.7	125.8	41 29.9	+50.4	126.5	40 53.9	+51.0	127.2	40 17.4	+51.5	127.9	39 40.3	+52.1	128.5	12
13	44 35.2	+47.3	122.6	44 02.5	+48.1	123.4	43 29.1	+48.8	124.2	42 55.0	+49.5	125.0	42 20.3	+50.1	125.8	41 44.9	+50.7	126.5	41 08.9	+51.4	127.2	40 32.4	+51.9	127.9	13
14	45 22.5	+46.9	121.7	44 50.6	+47.6	122.6	44 17.9	+48.4	123.4	43 44.5	+49.1	124.2	43 10.4	+49.8	125.0	42 35.6	+50.5	125.8	42 00.3	+51.0	126.5	41 24.3	+51.6	127.2	14
15	46 09.4	+46.4	120.9	45 38.2	+47.3	121.7	45 06.3	+48.0	122.6	44 33.6	+48.8	123.4	44 00.2	+49.5	124.2	43 26.1	+50.2	125.0	42 51.3	+50.8	125.8	42 15.9	+51.4	126.5	15
16	46 55.8	+46.0	119.9	46 25.5	+46.8	120.8	45 54.3	+47.7	121.7	45 22.4	+48.4	122.6	44 49.7	+49.1	123.4	44 16.3	+49.8	124.3	43 42.1	+50.5	125.1	43 07.3	+51.2	125.8	16
17	47 41.8	+45.5	119.0	47 12.3	+46.4	119.9	46 42.0	+47.2	120.9	46 10.8	+48.0	121.8	45 38.8	+48.8	122.6	45 06.1	+49.5	123.5	44 32.6	+50.2	124.3	43 58.5	+50.8	125.1	17
18	48 27.3	+45.1	118.0	47 58.7	+45.9	119.0	47 29.2	+46.8	119.9	46 58.8	+47.6	120.9	46 27.6	+48.4	121.8	45 55.6	+49.2	122.7	45 22.8	+49.9	123.5	44 49.3	+50.6	124.4	18
19	49 12.4	+44.4	117.0	48 44.6	+45.4	118.0	48 16.0	+46.3	119.0	47 46.4	+47.2	120.0	47 16.0	+48.0	120.9	46 44.8	+48.8	121.8	46 12.7	+49.6	122.7	45 39.9	+50.3	123.6	19
20	49 56.8	+43.9	116.0	49 30.0	+44.9	117.0	49 02.3	+45.8	118.1	48 33.6	+46.7	119.1	48 04.0	+47.6	120.0	47 33.6	+48.4	121.0	47 02.3	+49.1	121.9	46 30.2	+49.9	122.8	20
21	50 40.7	+43.3	114.9	50 14.9	+44.3	116.0	49 48.1	+45.3	117.1	49 20.3	+46.3	118.1	48 51.6	+47.1	119.1	48 22.0	+48.0	120.1	47 51.4	+48.8	121.1	47 20.1	+49.5	122.0	21
22	51 24.0	+42.7	113.8	50 59.2	+43.8	114.9	50 33.4	+44.8	116.0	50 06.6	+45.7	117.1	49 38.7	+46.7	118.2	49 10.0	+47.5	119.2	48 40.2	+48.4	120.2	48 09.6	+49.2	121.2	22
23	52 06.7	+41.9	112.7	51 43.0	+43.1	113.8	51 18.2	+44.1	115.0	50 52.3	+45.2	116.1	50 25.4	+46.1	117.2	49 57.5	+47.1	118.2	49 28.6	+48.0	119.3	48 58.8	+48.8	120.3	23
24	52 48.6	+41.3	111.5	52 26.1	+42.4	112.7	52 02.3	+43.6	113.9	51 37.5	+44.6	115.0	51 11.5	+45.6	116.2	50 44.6	+46.5	117.3	50 16.6	+47.4	118.4	49 47.6	+48.3	119.4	24
25	53 29.9	+40.5	110.3	53 08.5	+41.7	111.5	52 45.9	+42.8	112.8	52 22.1	+43.9	114.0	51 57.1	+45.1	115.1	51 31.1	+46.0	116.3	51 04.0	+47.0	117.4	50 35.9	+47.9	118.5	25
26	54 10.4	+39.7	109.0	53 50.2	+40.9	110.3	53 28.7	+42.2	111.6	53 06.0	+43.4	112.8	52 42.2	+44.4	114.0	52 17.1	+45.5	115.2	51 51.0	+46.5	116.4	51 23.8	+47.4	117.5	26
27	54 50.1	+38.8	107.7	54 31.1	+40.2	109.1	54 10.9	+41.4	110.4	53 49.4	+42.6	111.7	53 26.6	+43.7	112.9	53 02.6	+44.9	114.2	52 37.5	+45.9	115.4	52 11.2	+46.9	116.5	27
28	55 28.9	+38.0	106.4	55 11.3	+39.3	107.8	54 52.3	+40.6	109.1	54 32.0	+41.8	110.5	54 10.3	+43.1	111.8	53 47.5	+44.2	113.0	53 23.4	+45.3	114.3	52 58.1	+46.4	115.5	28
29	56 06.9	+37.0	105.0	55 50.6	+38.4	106.5	55 32.9	+39.8	107.9	55 13.8	+41.1	109.2	54 53.4	+42.4	110.6	54 31.7	+43.5	111.9	54 08.7	+44.7	113.2	53 44.5	+45.7	114.4	29
30	56 43.9	+36.0	103.6	56 29.0	+37.5	105.1	56 12.7	+38.9	106.5	55 54.9	+40.3	107.9	55 35.8	+41.5	109.3	55 15.2	+42.8	110.7	54 53.4	+44.0	112.0	54 30.2	+45.2	113.3	30
31	57 19.9	+34.9	102.1	57 06.5	+36.5	103.6	56 51.6	+37.9	105.1	56 35.2	+39.3	106.6	56 17.3	+40.7	108.0	55 58.0	+42.1	109.4	55 37.4	+43.2	110.8	55 15.4	+44.4	112.2	31
32	57 54.8	+33.8	100.6	57 43.0	+35.4	102.2	57 29.5	+37.0	103.7	57 14.5	+38.5	105.2	56 58.0	+39.9	106.7	56 40.1	+41.2	108.2	56 20.6	+42.6	109.6	55 59.8	+43.8	111.0	32
33	58 28.6	+32.7	99.0	58 18.4	+34.2	100.6	58 06.5	+35.8	102.2	57 53.0	+37.4	103.8	57 37.9	+38.9	105.3	57 21.3	+40.3	106.8	57 03.2	+41.6	108.3	56 43.6	+43.0	109.8	33
34	59 01.3	+31.3	97.4	58 52.6	+33.1	99.1	58 42.3	+34.8	100.7	58 30.4	+36.3	102.3	58 16.8	+37.9	103.9	58 01.6	+39.4	105.4	57 44.8	+40.9	107.0	57 26.6	+42.2	108.5	34
35	59 32.6	+30.1	95.8	59 25.7	+31.9	97.4	59 17.1	+33.6	99.1	59 06.7	+35.3	100.8	58 54.7	+36.8	102.4	58 41.0	+38.4	104.0	58 25.7	+39.8	105.6	58 08.8	+41.3	107.1	35
36	60 02.7	+28.7	94.0	59 57.6	+30.5	95.8	59 50.7	+32.2	97.5	59 42.0	+34.0	99.2	59 31.5	+35.7	100.9	59 19.4	+37.3	102.5	59 05.5	+38.9	104.1	58 50.1	+40.3	105.8	36
37	60 31.4	+27.2	92.3	60 28.1	+29.1	94.0	60 22.9	+31.0	95.8	60 16.0	+32.8	97.5	60 07.2	+34.5	99.3	59 56.7	+36.2	101.0	59 44.4	+37.8	102.6	59 30.4	+39.3	104.3	37
38	60 58.6	+25.7	90.4	60 57.2	+27.7	92.2	60 53.9	+29.6	94.0	60 48.8	+31.4	95.8	60 41.7	+33.3	97.6	60 32.9	+35.0	99.4	60 22.2	+36.7	101.1	60 09.8	+38.3	102.8	38
39	61 24.3	+24.2	88.6	61 24.9	+26.1	90.4	61 23.5	+28.1	92.2	61 20.2	+30.0	94.1	61 15.0	+31.9	95.9	61 07.9	+33.7	97.7	60 58.9	+35.5	99.5	60 48.1	+37.2	101.2	39
40	61 48.5	+22.4	86.6	61 51.0	+24.5	88.5	61 51.6	+26.5	90.4	61 50.2	+28.5	92.2	61 46.9	+30.4	94.1	61 41.6	+32.4	96.0	61 34.4	+34.2	97.8	61 25.3	+36.0	99.6	40
41	62 10.9	+20.8	84.7	62 15.5	+22.8	86.6	62 18.1	+24.9	88.5	62 18.7	+27.0	90.4	62 17.3	+29.0	92.3	62 14.0	+30.9	94.2	62 08.6	+32.9	96.1	62 01.3	+34.7	97.9	41
42	62 31.7	+18.9	82.6	62 38.3	+21.1	84.6	62 43.0	+23.2	86.5	62 45.7	+25.3	88.4	62 46.3	+27.4	90.4	62 44.9	+29.4	92.3	62 41.5	+31.4	94.3	62 36.0	+33.3	96.2	42
43	62 50.6	+17.1	80.6	62 59.4	+19.3	82.5	63 06.2	+21.5	84.5	63 11.0	+23.6	86.4	63 13.7	+25.7	88.4	63 14.3	+27.8	90.4	63 12.9	+29.8	92.4	63 09.3	+31.9	94.4	43
44	63 07.7	+15.2	78.5	63 18.7	+17.4	80.4	63 27.7	+19.5	82.4	63 34.6	+21.7	84.4	63 39.4	+24.0	86.4	63 42.1	+26.1	88.4	63 42.7	+28.3	90.4	63 41.2	+30.3	92.5	44
45	63 22.9	+13.2•	76.3	63 36.1	+15.4•	78.3	63 47.2	+17.7	80.3	63 56.3	+19.9	82.3	64 03.4	+22.1	84.3	64 08.2	+24.4	86.4	64 11.0	+26.5	88.4	64 11.5	+28.7	90.5	45
46	63 36.1	+11.1•	74.1	63 51.5	+13.4•	76.1	64 04.9	+15.7•	78.1	64 16.2	+18.0•	80.1	64 25.5	+20.2	82.2	64 32.6	+22.4	84.3	64 37.5	+24.7	86.3	64 40.2	+26.9	88.5	46
47	63 47.2	+9.1•	71.9	64 04.9	+11.3•	73.9	64 20.6	+13.6•	75.9	64 34.2	+15.9	77.9	64 45.7	+18.2•	80.0	64 55.0	+20.6	82.1	65 02.2	+22.8	84.2	65 07.1	+25.2	86.4	47
48	63 56.3	+7.1•	69.7	64 16.2	+9.3•	71.6	64 34.2	+11.5•	73.6	64 50.1	+13.8•	75.6	65 03.9	+16.1•	77.7	65 15.6	+18.5•	79.8	65 25.0	+20.9•	82.0	65 32.3	+23.1•	84.2	48
49	64 03.4	+4.8•	67.4	64 25.5	+7.1•	69.3	64 45.7	+9.3•	71.3	65 03.9	+11.7•	73.3	65 20.0	+14.1•	75.4	65 34.1	+16.3•	77.6	65 45.9	+18.7•	79.7	65 55.4	+21.2•	81.9	49
50	64 08.2	+2.8•	65.1	64 32.6	+4.9•	67.0	64 55.0	+7.2•	69.0	65 15.6	+9.4•	71.0	65 34.1	+11.8•	73.1	65 50.4	+14.2•	75.2	66 04.6	+16.7•	77.4	66 16.6	+19.0•	79.6	50
51	64 11.0	+0.5•	62.8	64 37.5	+2.7•	64.7	65 02.2	+4.9•	66.6	65 25.0	+7.3•	68.6	65 45.9	+9.5•	70.7	66 04.6	+12.0•	72.8	66 21.3	+14.3•	75.0	66 35.6	+16.9•	77.2	51
52	64 11.5	–1.6•	60.5	64 40.2	+0.5•	62.4	65 07.1	+2.7•	64.3	65 32.3	+4.9•	66.3	65 55.4	+7.3•	68.3	66 16.6	+9.6•	70.4	66 35.6	+12.1•	72.6	66 52.5	+14.5•	74.8	52
53	64 09.9	–3.7•	58.2	64 40.7	–1.7•	60.0	65 09.8	+0.5•	61.9	65 37.2	+2.6•	63.8	66 02.7	+4.9•	65.9	66 26.2	+7.3•	68.0	66 47.7	+9.7•	70.1	67 07.0	+12.2•	72.3	53
54	64 06.2	–5.9•	56.0	64 39.0	–3.9•	57.7	65 10.3	–1.9•	59.5	65 39.8	+0.4•	61.4	66 07.6	+2.6•	63.4	66 33.5	+4.9•	65.5	66 57.4	+7.3•	67.6	67 19.2	+9.8•	69.8	54
55	64 00.3	–8.0•	53.7	64 35.1	–6.1•	55.4	65 08.4	–4.0•	57.1	65 40.2	–2.0•	59.0	66 10.2	+0.2•	60.9	66 38.4	+2.5•	63.0	67 04.7	+4.9•	65.1	67 29.0	+7.3•	67.2	55
56	63 52.3	–10.1•	51.4	64 29.0	–8.3•	53.1	65 04.4	–6.4•	54.8	65 38.2	–4.3•	56.6	66 10.4	–2.1•	58.5	66 40.9	+0.1•	60.6	67 09.6	+2.4•	62.5	67 36.3	+4.8•	64.6	56
57	63 42.2	–12.2•	49.2	64 20.7	–10.3•	50.8	64 58.0	–8.5•	52.4	65 33.9	–6.6•	54.2	66 08.3	–4.6•	56.0	66 41.0	–2.4•	57.9	67 12.0	–0.1•	59.9	67 41.1	+2.3•	62.0	57
58	63 30.0	–14.1	47.0	64 10.4	–12.5•	48.5	64 49.5	–10.7•	50.1	65 27.3	–8.8•	51.8	66 03.7	–6.8•	53.5	66 38.6	–4.7•	55.4	67 11.9	–2.6•	57.3	67 43.4	–0.3•	59.4	58
59	63 15.9	–16.1	44.8	63 57.9	–14.5•	46.3	64 38.8	–12.8•	47.8	65 18.5	–11.0•	49.4	65 56.9	–9.2•	51.1	66 33.9	–7.2•	52.9	67 09.3	–5.1•	54.8	67 43.1	–2.9•	56.7	59
60	62 59.8	–18.0	42.7	63 43.4	–16.5	44.1	64 26.0	–14.9•	45.5	65 07.5	–13.2•	47.0	65 47.7	–11.4•	48.7	66 26.7	–9.5•	50.4	67 04.2	–7.5•	52.2	67 40.2	–5.4•	54.1	60
61	62 41.8	–19.8	40.6	63 26.9	–18.4	41.9	64 11.1	–16.9•	43.3	64 54.3	–15.4•	44.7	65 36.3	–13.6•	46.3	66 17.2	–11.9•	47.9	66 56.7	–9.9•	49.7	67 34.8	–7.9•	51.5	61
62	62 22.0	–21.6	38.5	63 08.5	–20.2	39.8	63 54.2	–18.9	41.1	64 38.9	–17.3•	42.5	65 22.7	–15.8•	44.0	66 05.3	–14.0•	45.5	66 46.8	–12.3•	47.1	67 26.9	–10.3•	48.9	62
63	62 00.4	–23.3	36.5	62 48.3	–22.1	37.7	63 35.3	–20.7	38.9	64 21.6	–19.4	40.2	65 06.9	–17.8•	41.6	65 51.3	–16.3•	43.1	66 34.5	–14.6•	44.7	67 16.6	–12.8•	46.3	63
64	61 37.1	–24.8	34.6	62 26.2	–23.7	35.7	63 14.6	–22.5	36.8	64 02.2	–21.2	38.1	64 49.1	–19.9•	39.4	65 35.0	–18.4•	40.8	66 19.9	–16.8•	42.2	67 03.8	–15.1•	43.8	64
65	61 12.3	–26.5	32.7	62 02.5	–25.4	33.7	62 52.1	–24.3	34.8	63 41.0	–23.1	35.9	64 29.2	–21.8	37.2	65 16.6	–20.4•	38.5	66 03.1	–18.9•	39.9	66 48.7	–17.4•	41.4	65
66	60 45.8	–27.9	30.8	61 37.1	–27.0	31.8	62 27.8	–25.9	32.8	63 17.9	–24.8	33.9	64 07.4	–23.6	35.0	64 56.2	–22.4	36.2	65 44.2	–21.0•	37.5	66 31.3	–19.6•	38.9	66
67	60 17.9	–29.4	29.0	61 10.1	–28.5	29.9	62 01.9	–27.5	30.9	62 53.1	–26.5	31.9	63 43.8	–25.4	32.9	64 33.8	–24.2	34.1	65 23.2	–23.0	35.3	66 11.7	–21.6•	36.6	67
68	59 48.5	–30.7	27.3	60 41.6	–29.8	28.1	61 34.4	–29.1	29.0	62 26.6	–28.1	29.9	63 18.4	–27.1	30.9	64 09.6	–26.1	31.9	65 00.2	–24.9	33.1	65 50.1	–23.6•	34.3	68
69	59 17.8	–32.0	25.6	60 11.8	–31.3	26.4	61 05.3	–30.4	27.2	61 58.5	–29.6	28.0	62 51.3	–28.7	28.9	63 43.5	–27.7	29.9	64 35.3	–26.7	30.9	65 26.5	–25.6	32.1	69
70	58 45.8	–33.2	24.0	59 40.5	–32.5	24.6	60 34.9	–31.8	25.4	61 28.9	–31.0	26.2	62 22.6	–30.2	27.0	63 15.8	–29.3	27.9	64 08.6	–28.4	28.9	65 00.9	–27.4	29.9	70
71	58 12.6	–34.3	22.4	59 08.0	–33.7	23.0	60 03.1	–33.1	23.7	60 57.9	–32.4	24.4	61 52.4	–31.7	25.2	62 46.5	–30.8	26.0	63 40.2	–30.0	26.9	64 33.5	–29.0	27.8	71
72	57 38.3	–35.5	20.8	58 34.3	–34.9	21.4	59 30.0	–34.2	22.0	60 25.5	–33.7	22.7	61 20.7	–33.0	23.4	62 15.7	–32.3	24.1	63 10.2	–31.5	24.9	64 04.5	–30.7	25.8	72
73	57 02.8	–36.4	19.3	57 59.4	–36.0	19.9	58 55.7	–35.4	20.4	59 51.8	–34.9	21.0	60 47.7	–34.3	21.6	61 43.4	–33.7	22.3	62 38.7	–32.9	23.1	63 33.8	–32.3	23.8	73
74	56 26.4	–37.5	17.9	57 23.4	–37.0	18.4	58 20.3	–36.6	18.9	59 16.9	–36.0	19.4	60 13.4	–35.5	20.0	61 09.7	–34.9	20.6	62 05.8	–34.4	21.3	63 01.5	–33.6	22.0	74
75	55 48.9	–38.4	16.5	56 46.4	–38.0	16.9	57 43.7	–37.6	17.4	58 40.9	–37.1	17.9	59 37.9	–36.6	18.4	60 34.8	–36.2	18.9	61 31.4	–35.6	19.5	62 27.9	–35.0	20.2	75
76	55 10.5	–39.2	15.1	56 08.4	–38.9	15.5	57 06.1	–38.5	15.9	58 03.8	–38.2	16.4	59 01.3	–37.7	16.8	59 58.6	–37.2	17.3	60 55.8	–36.7	17.9	61 52.9	–36.3	18.4	76
77	54 31.3	–40.1	13.8	55 29.5	–39.8	14.1	56 27.6	–39.4	14.5	57 25.6	–39.0	14.9	58 23.6	–38.8	15.3	59 21.4	–38.4	15.8	60 19.1	–38.0	16.2	61 16.6	–37.5	16.7	77
78	53 51.2	–40.9	12.5	54 49.7	–40.6	12.8	55 48.2	–40.3	13.2	56 46.6	–40.1	13.5	57 44.8	–39.8	13.9	58 43.0	–39.3	14.3	59 41.1	–38.9	14.7	60 39.1	–38.6	15.1	78
79	53 10.3	–41.6	11.3	54 09.1	–41.4	11.6	55 07.9	–41.2	11.9	56 06.5	–40.8	12.2	57 05.2	–40.6	12.5	58 03.7	–40.3	12.8	59 02.2	–40.0	13.2	60 00.5	–39.6	13.6	79
80	52 28.7	–42.3	10.1	53 27.7	–42.1	10.3	54 26.7	–41.8	10.6	55 25.7	–41.7	10.9	56 24.6	–41.4	11.1	57 23.4	–41.1	11.4	58 22.2	–40.9	11.8	59 20.9	–40.6	12.1	80
81	51 46.4	–43.0	9.0	52 45.6	–42.7	9.2	53 44.9	–42.6	9.4	54 44.0	–42.4	9.6	55 43.2	–42.2	9.8	56 42.3	–42.0	10.1	57 41.3	–41.7	10.4	58 40.3	–41.5	10.7	81
82	51 03.4	–43.6	7.8	52 02.9	–43.5	8.0	53 02.3	–43.3	8.2	54 01.6	–43.1	8.4	55 01.0	–43.0	8.6	56 00.3	–42.8	8.8	56 59.6	–42.6	9.0	57 58.8	–42.4	9.3	82
83	50 19.8	–44.1	6.7	51 19.4	–44.0	6.9	52 19.0	–43.9	7.1	53 18.5	–43.8	7.2	54 18.0	–43.6	7.4	55 17.5	–43.5	7.6	56 17.0	–43.4	7.8	57 16.4	–43.2	8.0	83
84	49 35.7	–44.7	5.7	50 35.4	–44.7	5.8	51 35.1	–44.6	5.9	52 34.7	–44.4	6.1	53 34.4	–44.3	6.2	54 34.0	–44.2	6.4	55 33.6	–44.0	6.5	56 33.2	–43.9	6.7	84
85	48 51.0	–45.3	4.7	49 50.7	–45.1	4.8	50 50.5	–45.1	4.9	51 50.3	–45.0	5.0	52 50.1	–44.9	5.1	53 49.8	–44.8	5.2	54 49.6	–44.7	5.3	55 49.3	–44.6	5.5	85
86	48 05.7	–45.7	3.7	49 05.6	–45.7	3.8	50 05.4	–45.6	3.8	51 05.3	–45.6	3.9	52 05.2	–45.5	4.0	53 05.0	–45.4	4.1	54 04.9	–45.4	4.2	55 04.7	–45.3	4.3	86
87	47 20.0	–46.3	2.7	48 19.9	–46.2	2.8	49 19.8	–46.1	2.8	50 19.7	–46.1	2.9	51 19.7	–46.0	2.9	52 19.6	–46.0	3.0	53 19.5	–46.0	3.1	54 19.4	–45.9	3.2	87
88	46 33.7	–46.6	1.8	47 33.7	–46.6	1.8	48 33.7	–46.6	1.9	49 33.6	–46.5	1.9	50 33.6	–46.6	1.9	51 33.6	–46.6	2.0	52 33.5	–46.5	2.0	53 33.5	–46.5	2.1	88
89	45 47.1	–47.1	0.9	46 47.1	–47.1	0.9	47 47.1	–47.1	0.9	48 47.1	–47.1	0.9	49 47.0	–47.0	1.0	50 47.0	–47.0	1.0	51 47.0	–47.0	1.0	52 47.0	–47.0	1.0	89
90	45 00.0	–47.5	0.0	46 00.0	–47.5	0.0	47 00.0	–47.5	0.0	48 00.0	–47.5	0.0	49 00.0	–47.5	0.0	50 00.0	–47.5	0.0	51 00.0	–47.5	0.0	52 00.0	–47.5	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	33 51.8	-51.2	132.1	33 11.3	-51.6	132.6	32 30.5	-52.1	133.1	31 49.3	-52.5	133.6	31 07.8	-53.0	134.0	30 26.0	-53.4	134.4	29 43.8	-53.8	134.8	29 01.3	-54.1	135.2	0
1	33 00.6	-51.4	132.8	32 19.7	-51.9	133.3	31 38.4	-52.3	133.7	30 56.8	-52.7	134.1	30 14.8	-53.1	134.6	29 32.6	-53.5	135.0	28 50.0	-53.8	135.4	28 07.2	-54.2	135.7	1
2	32 09.2	-51.5	133.4	31 27.8	-52.0	133.8	30 46.1	-52.4	134.3	30 04.1	-52.9	134.7	29 21.7	-53.2	135.1	28 39.1	-53.6	135.5	27 56.2	-54.0	135.9	27 13.0	-54.3	136.2	2
3	31 17.7	-51.7	134.0	30 35.8	-52.1	134.4	29 53.7	-52.6	134.8	29 11.2	-52.9	135.2	28 28.5	-53.4	135.6	27 45.5	-53.7	136.0	27 02.2	-54.1	136.4	26 18.7	-54.5	136.7	3
4	30 26.0	-51.9	134.6	29 43.7	-52.3	135.0	29 01.1	-52.7	135.4	28 18.3	-53.1	135.8	27 35.1	-53.4	136.1	26 51.8	-53.9	136.5	26 08.1	-54.2	136.8	25 24.2	-54.5	137.2	4
5	29 34.1	-52.0	135.2	28 51.4	-52.4	135.6	28 08.4	-52.8	135.9	27 25.2	-53.2	136.3	26 41.7	-53.6	136.6	25 57.9	-53.9	137.0	25 13.9	-54.2	137.3	24 29.7	-54.6	137.6	5
6	28 42.1	-52.2	135.7	27 59.0	-52.6	136.1	27 15.6	-52.9	136.5	26 32.0	-53.3	136.8	25 48.1	-53.7	137.1	25 04.0	-54.0	137.5	24 19.7	-54.4	137.8	23 35.1	-54.6	138.1	6
7	27 49.9	-52.3	136.3	27 06.4	-52.7	136.6	26 22.7	-53.1	137.0	25 38.7	-53.5	137.3	24 54.4	-53.7	137.6	24 10.0	-54.1	138.0	23 25.3	-54.4	138.2	22 40.5	-54.8	138.5	7
8	26 57.6	-52.4	136.8	26 13.7	-52.8	137.2	25 29.6	-53.2	137.5	24 45.2	-53.5	137.8	24 00.7	-53.9	138.1	23 15.9	-54.2	138.4	22 30.9	-54.5	138.7	21 45.7	-54.8	139.0	8
9	26 05.2	-52.5	137.4	25 20.9	-52.9	137.7	24 36.4	-53.2	138.0	23 51.7	-53.6	138.3	23 06.8	-53.9	138.6	22 21.7	-54.3	138.9	21 36.4	-54.6	139.2	20 50.9	-54.8	139.4	9
10	25 12.7	-52.7	137.9	24 28.0	-53.0	138.2	23 43.2	-53.4	138.5	22 58.1	-53.7	138.8	22 12.9	-54.1	139.1	21 27.4	-54.3	139.3	20 41.8	-54.6	139.6	19 56.1	-55.0	139.8	10
11	24 20.0	-52.7	138.4	23 35.0	-53.1	138.7	22 49.8	-53.5	139.0	22 04.4	-53.8	139.3	21 18.8	-54.1	139.6	20 33.1	-54.4	139.8	19 47.2	-54.7	140.0	19 01.1	-55.0	140.3	11
12	23 27.3	-52.9	139.0	22 41.9	-53.2	139.2	21 56.3	-53.5	139.5	21 10.6	-53.8	139.8	20 24.7	-54.1	140.0	19 38.7	-54.5	140.3	18 52.5	-54.8	140.5	18 06.1	-55.0	140.7	12
13	22 34.4	-53.0	139.5	21 48.7	-53.3	139.7	21 02.8	-53.6	140.0	20 16.8	-54.0	140.2	19 30.6	-54.3	140.5	18 44.2	-54.5	140.7	17 57.7	-54.8	140.9	17 11.1	-55.1	141.1	13
14	21 41.4	-53.0	140.0	20 55.4	-53.4	140.2	20 09.2	-53.7	140.5	19 22.8	-54.0	140.7	18 36.3	-54.3	140.9	17 49.7	-54.6	141.1	17 02.9	-54.9	141.3	16 16.0	-55.2	141.5	14
15	20 48.4	-53.2	140.5	20 02.0	-53.5	140.7	19 15.5	-53.8	141.0	18 28.8	-54.1	141.2	17 42.0	-54.4	141.4	16 55.1	-54.7	141.6	16 08.0	-54.9	141.8	15 20.8	-55.2	141.9	15
16	19 55.2	-53.2	141.0	19 08.5	-53.5	141.2	18 21.7	-53.8	141.4	17 34.7	-54.1	141.6	16 47.6	-54.4	141.8	16 00.4	-54.7	142.0	15 13.1	-55.0	142.2	14 25.6	-55.2	142.3	16
17	19 02.0	-53.3	141.5	18 15.0	-53.6	141.7	17 27.9	-53.9	141.9	16 40.6	-54.2	142.1	15 53.2	-54.5	142.3	15 05.7	-54.8	142.4	14 18.1	-55.0	142.6	13 30.4	-55.3	142.7	17
18	18 08.7	-53.3	142.0	17 21.4	-53.7	142.2	16 34.0	-54.0	142.3	15 46.4	-54.3	142.5	14 58.7	-54.5	142.7	14 11.0	-54.8	142.8	13 23.1	-55.1	143.0	12 35.1	-55.3	143.1	18
19	17 15.4	-53.5	142.4	16 27.7	-53.7	142.6	15 40.0	-54.0	142.8	14 52.1	-54.3	143.0	14 04.2	-54.6	143.1	13 16.2	-54.9	143.3	12 28.0	-55.1	143.4	11 39.8	-55.3	143.5	19
20	16 21.9	-53.5	142.9	15 34.0	-53.8	143.1	14 46.0	-54.1	143.3	13 57.8	-54.3	143.4	13 09.6	-54.6	143.5	12 21.3	-54.9	143.7	11 32.9	-55.1	143.8	10 44.5	-55.4	143.9	20
21	15 28.4	-53.5	143.4	14 40.2	-53.8	143.5	13 51.9	-54.1	143.7	13 03.5	-54.4	143.8	12 15.0	-54.6	144.0	11 26.4	-54.9	144.1	10 37.8	-55.2	144.2	9 49.1	-55.4	144.3	21
22	14 34.9	-53.7	143.9	13 46.4	-53.9	144.0	12 57.8	-54.2	144.1	12 09.1	-54.4	144.4	11 20.4	-54.7	144.4	10 31.5	-54.9	144.5	9 42.7	-55.2	144.6	8 53.7	-55.4	144.7	22
23	13 41.2	-53.7	144.3	12 52.5	-54.0	144.5	12 03.6	-54.2	144.6	11 14.7	-54.5	144.7	10 25.7	-54.8	144.8	9 36.6	-55.0	144.9	8 47.5	-55.2	145.0	7 58.3	-55.5	145.1	23
24	12 47.6	-53.7	144.8	11 58.5	-54.0	144.9	11 09.4	-54.3	145.0	10 20.2	-54.5	145.1	9 30.9	-54.7	145.2	8 41.6	-55.0	145.3	7 52.3	-55.3	145.4	7 02.8	-55.4	145.5	24
25	11 53.9	-53.8	145.2	11 04.5	-54.0	145.3	10 15.1	-54.2	145.5	9 25.7	-54.5	145.6	8 36.2	-54.8	145.6	7 46.6	-55.0	145.7	6 57.0	-55.2	145.8	6 07.4	-55.5	145.9	25
26	11 00.1	-53.8	145.7	10 10.5	-54.0	145.8	9 20.9	-54.3	145.9	8 31.2	-54.6	146.0	7 41.4	-54.8	146.1	6 51.6	-55.0	146.1	6 01.8	-55.3	146.2	5 11.9	-55.5	146.2	26
27	10 06.3	-53.8	146.1	9 16.5	-54.1	146.2	8 26.6	-54.4	146.3	7 36.6	-54.6	146.4	6 46.6	-54.8	146.5	5 56.6	-55.1	146.5	5 06.5	-55.3	146.6	4 16.4	-55.5	146.6	27
28	9 12.5	-53.9	146.6	8 22.4	-54.1	146.7	7 32.2	-54.3	146.7	6 42.0	-54.6	146.8	5 51.8	-54.9	146.9	5 01.5	-55.0	146.9	4 11.2	-55.3	147.0	3 20.9	-55.5	147.0	28
29	8 18.6	-53.9	147.0	7 28.3	-54.2	147.1	6 37.9	-54.4	147.2	5 47.4	-54.6	147.2	4 56.9	-54.8	147.3	4 06.5	-55.1	147.3	3 15.9	-55.3	147.4	2 25.4	-55.5	147.4	29
30	7 24.7	-53.9	147.5	6 34.1	-54.2	147.5	5 43.5	-54.4	147.6	4 52.8	-54.6	147.6	4 02.1	-54.9	147.7	3 11.4	-55.1	147.7	2 20.6	-55.3	147.7	1 29.9	-55.5	147.8	30
31	6 30.8	-53.9	147.9	5 39.9	-54.1	148.0	4 49.1	-54.5	148.0	3 58.2	-54.7	148.1	3 07.2	-54.8	148.1	2 16.3	-55.1	148.1	1 25.3	-55.3	148.1	0 34.4	-55.6	148.1	31
32	5 36.9	-54.0	148.4	4 45.8	-54.2	148.4	3 54.6	-54.4	148.4	3 03.5	-54.7	148.5	2 12.4	-54.9	148.5	1 21.2	-55.1	148.5	0 30.0	-55.3	148.5	0 21.2	+55.5	31.5	32
33	4 42.9	-54.0	148.8	3 51.6	-54.3	148.8	3 00.2	-54.4	148.9	2 08.8	-54.6	148.9	1 17.5	-54.9	148.9	0 26.1	-55.1	148.9	0 25.3	+55.3	31.1	1 16.7	+55.5	31.1	33
34	3 48.9	-54.0	149.2	2 57.3	-54.2	149.3	2 05.8	-54.5	149.3	1 14.2	-54.7	149.3	0 22.6	-54.9	149.3	0 29.0	+55.1	30.7	1 20.6	+55.3	30.7	2 12.2	+55.3	30.7	34
35	2 54.9	-54.0	149.7	2 03.1	-54.2	149.7	1 11.3	-54.4	149.7	0 19.5	-54.7	149.7	0 32.3	+54.9	30.3	1 24.1	+55.1	30.3	2 15.9	+55.3	30.3	3 07.7	+55.5	30.3	35
36	2 00.9	-54.0	150.1	1 08.9	-54.2	150.1	0 16.9	-54.5	150.1	0 35.2	+54.6	29.9	1 27.2	+54.9	29.9	2 19.2	+55.1	29.9	3 11.2	+55.3	29.9	4 03.2	+55.5	30.0	36
37	1 06.9	-54.0	150.5	0 14.7	-54.3	150.5	0 37.6	+54.4	29.5	1 29.8	+54.7	29.5	2 21.1	+54.8	29.5	3 14.3	+55.1	29.5	4 06.5	+55.3	29.5	4 58.7	+55.5	29.6	37
38	0 12.9	-54.0	151.0	0 39.6	+54.2	29.0	1 32.0	+54.5	29.0	2 24.5	+54.7	29.1	3 16.9	+54.9	29.1	4 09.4	+55.1	29.1	5 01.8	+55.3	29.1	5 54.2	+55.4	29.2	38
39	0 41.1	+54.0	28.5	1 33.8	+54.2	28.6	2 26.5	+54.4	28.6	3 19.2	+54.6	28.6	4 11.8	+54.9	28.7	5 04.4	+55.1	28.7	5 57.1	+55.2	28.8	6 49.6	+55.5	28.8	39
40	1 35.1	+54.1	28.2	2 28.0	+54.3	28.2	3 20.9	+54.5	28.2	4 13.8	+54.6	28.2	5 06.7	+54.8	28.3	5 59.5	+55.0	28.3	6 52.3	+55.2	28.4	7 45.1	+55.4	28.4	40
41	2 29.2	+54.0	27.7	3 22.3	+54.2	27.7	4 15.4	+54.4	27.8	5 08.4	+54.7	27.8	6 01.5	+54.8	27.9	6 54.5	+55.1	27.9	7 47.5	+55.3	28.0	8 40.5	+55.4	28.0	41
42	3 23.2	+53.9	27.3	4 16.5	+54.2	27.3	5 09.8	+54.4	27.3	6 03.1	+54.6	27.4	6 56.3	+54.8	27.4	7 49.6	+54.9	27.5	8 42.8	+55.1	27.6	9 35.9	+55.4	27.6	42
43	4 17.1	+54.0	26.8	5 10.7	+54.1	26.9	6 04.2	+54.4	26.9	6 57.7	+54.5	27.0	7 51.1	+54.8	27.0	8 44.5	+55.0	27.1	9 37.9	+55.2	27.2	10 31.3	+55.3	27.3	43
44	5 11.1	+54.0	26.4	6 04.8	+54.2	26.4	6 58.6	+54.3	26.5	7 52.2	+54.6	26.6	8 45.9	+54.7	26.6	9 39.5	+55.0	26.7	10 33.1	+55.1	26.8	11 26.6	+55.4	26.9	44
45	6 05.1	+53.9	26.0	6 59.0	+54.1	26.0	7 52.9	+54.3	26.1	8 46.8	+54.5	26.1	9 40.6	+54.8	26.2	10 34.5	+54.9	26.3	11 28.2	+55.1	26.4	12 22.0	+55.2	26.5	45
46	6 59.0	+53.9	25.5	7 53.1	+54.1	25.6	8 47.2	+54.3	25.6	9 41.3	+54.5	25.7	10 35.4	+54.6	25.8	11 29.4	+54.8	25.9	12 23.3	+55.1	26.0	13 17.2	+55.3	26.1	46
47	7 52.9	+53.9	25.1	8 47.2	+54.1	25.1	9 41.5	+54.3	25.2	10 35.8	+54.5	25.3	11 30.0	+54.7	25.4	12 24.2	+54.9	25.5	13 18.4	+55.0	25.6	14 12.5	+55.2	25.7	47
48	8 46.8	+53.8	24.6	9 41.3	+54.1	24.7	10 35.8	+54.2	24.8	11 30.3	+54.4	24.9	12 24.7	+54.6	24.9	13 19.1	+54.8	25.0	14 13.4	+55.0	25.1	15 07.7	+55.1	25.3	48
49	9 40.6	+53.9	24.2	10 35.4	+54.0	24.3	11 30.0	+54.2	24.3	12 24.7	+54.4	24.4	13 19.3	+54.6	24.5	14 13.9	+54.7	24.6	15 08.4	+54.9	24.7	16 02.8	+55.2	24.9	49
50	10 34.5	+53.7	23.7	11 29.4	+53.9	23.8	12 24.2	+54.2	23.9	13 19.1	+54.3	24.0	14 13.9	+54.5	24.1	15 08.6	+54.7	24.2	16 03.3	+54.9	24.3	16 58.0	+55.0	24.4	50
51	11 28.2	+53.8	23.3	12 23.3	+53.9	23.4	13 18.4	+54.1	23.5	14 13.4	+54.3	23.6	15 08.4	+54.4	23.7	16 03.3	+54.7	23.8	16 58.2	+54.8	23.9	17 53.0	+55.0	24.0	51
52	12 22.0	+53.7	22.8	13 17.2	+53.9	22.9	14 12.5	+54.0	23.0	15 07.7	+54.2	23.1	16 02.8	+54.5	23.2	16 58.0	+54.6	23.3	17 53.0	+54.8	23.5	18 48.0	+55.0	23.6	52
53	13 15.7	+53.6	22.4	14 11.1	+53.8	22.5	15 06.5	+54.0	22.6	16 01.9	+54.2	22.7	16 57.3	+54.3	22.8	17 52.6	+54.5	22.9	18 47.8	+54.7	23.0	19 43.0	+54.9	23.2	53
54	14 09.3	+53.6	21.9	15 04.9	+53.8	22.0	16 00.5	+54.0	22.1	16 56.1	+54.1	22.2	17 51.6	+54.3	22.3	18 47.1	+54.5	22.5	19 42.5	+54.7	22.6	20 37.9	+54.8	22.7	54
55	15 02.9	+53.5	21.4	15 58.7	+53.7	21.6	16 54.5	+53.9	21.7	17 50.2	+54.1	21.8	18 45.9	+54.3	21.9	19 41.6	+54.4	22.0	20 37.2	+54.5	22.2	21 32.7	+54.8	22.3	55
56	15 56.4	+53.5	21.0	16 52.4	+53.6	21.1	17 48.4	+53.8	21.2	18 44.3	+54.0	21.3	19 40.2	+54.1	21.4	20 36.0	+54.3	21.6	21 31.7	+54.6	21.7	22 27.5	+54.6	21.9	56
57	16 49.9	+53.4	20.5	17 46.0	+53.6	20.6	18 42.2	+53.7	20.7	19 38.3	+53.9	20.9	20 34.3	+54.1	21.0	21 30.3	+54.3	21.1	22 26.3	+54.4	21.3	23 22.1	+54.6	21.4	57
58	17 43.3	+53.3	20.0	18 39.6	+53.5	20.1	19 35.9	+53.7	20.3	20 32.2	+53.8	20.4	21 28.4	+54.0	20.5	22 24.6	+54.2	20.7	23 20.7	+54.3	20.8	24 16.7	+54.6	21.0	58
59	18 36.6	+53.3	19.5	19 33.1	+53.5	19.7	20 29.6	+53.6	19.8	21 26.0	+53.8	19.9	22 22.4	+54.0	20.1	23 18.8	+54.1	20.2	24 15.0	+54.3	20.4	25 11.3	+54.4	20.5	59
60	19 29.9	+53.1	19.1	20 26.6	+53.3	19.2	21 23.2	+53.5	19.3	22 19.8	+53.7	19.4	23 16.4	+53.8	19.6	24 12.9	+54.0	19.7	25 09.3	+54.2	19.9	26 05.7	+54.4	20.0	60
61	20 23.0	+53.1	18.6	21 19.9	+53.3	18.7	22 16.7	+53.4	18.8	23 13.5	+53.6	19.0	24 10.2	+53.8	19.1	25 06.9	+53.9	19.2	26 03.5	+54.1	19.4	27 00.1	+54.2	19.6	61
62	21 16.1	+53.0	18.1	22 13.2	+53.1	18.2	23 10.1	+53.4	18.3	24 07.1	+53.5	18.5	25 04.0	+53.6	18.6	26 00.8	+53.8	18.8	26 57.6	+54.0	18.9	27 54.3	+54.2	19.1	62
63	22 09.1	+52.9	17.6	23 06.3	+53.1	17.7	24 03.5	+53.2	17.8	25 00.6	+53.4	18.0	25 57.6	+53.6	18.1	26 54.6	+53.7	18.3	27 51.6	+53.8	18.4	28 48.5	+54.0	18.6	63
64	23 02.0	+52.9	17.1	23 59.4	+53.0	17.2	24 56.7	+53.1	17.3	25 54.0	+53.2	17.5	26 51.2	+53.4	17.6	27 48.3	+53.6	17.8	28 45.4	+53.8	17.9	29 42.5	+53.9	18.1	64
65	23 54.9	+52.7	16.5	24 52.4	+52.8	16.7	25 49.8	+53.0	16.8	26 47.2	+53.2	16.9	27 44.6	+53.3	17.1	28 41.9	+53.5	17.3	29 39.2	+53.7	17.4	30 36.4	+53.8	17.6	65
66	24 47.6	+52.6	16.0	25 45.2	+52.8	16.1	26 42.8	+52.9	16.3	27 40.4	+53.1	16.4	28 37.9	+53.2	16.6	29 35.4	+53.4	16.7	30 32.9	+53.5	16.9	31 30.2	+53.7	17.1	66
67	25 40.2	+52.4	15.5	26 38.0	+52.6	15.6	27 35.7	+52.8	15.7	28 33.5	+52.9	15.9	29 31.1	+53.1	16.0	30 28.8	+53.2	16.2	31 26.4	+53.4	16.4	32 23.9	+53.6	16.6	67
68	26 32.6	+52.4	14.9	27 30.6	+52.5	15.1	28 28.5	+52.7	15.2	29 26.4	+52.8	15.4	30 24.2	+53.0	15.5	31 22.0	+53.1	15.7	32 19.8	+53.2	15.8	33 17.5	+53.4	16.0	68
69	27 25.0	+52.2	14.4	28 23.1	+52.4	14.5	29 21.2	+52.5	14.7	30 19.2	+52.6	14.8	31 17.2	+52.8	15.0	32 15.1	+53.0	15.1	33 13.0	+53.1	15.3	34 10.9	+53.2	15.5	69
70	28 17.2	+52.1	13.8	29 15.5	+52.2	14.0	30 13.7	+52.3	14.1	31 11.8	+52.5	14.3	32 10.0	+52.6	14.4	33 08.1	+52.8	14.6	34 06.1	+53.0	14.7	35 04.1	+53.1	14.9	70
71	29 09.3	+51.9	13.3	30 07.7	+52.1	13.4	31 06.0	+52.2	13.5	32 04.3	+52.4	13.7	33 02.6	+52.5	13.8	34 00.9	+52.6	14.0	34 59.1	+52.7	14.2	35 57.2	+52.9	14.3	71
72	30 01.2	+51.8	12.7	30 59.8	+51.9	12.8	31 58.2	+52.1	13.0	32 56.7	+52.2	13.1	33 55.1	+52.3	13.3	34 53.5	+52.5	13.4	35 51.8	+52.7	13.6	36 50.1	+52.8	13.8	72
73	30 53.0	+51.7	12.1	31 51.7	+51.7	12.2	32 50.3	+51.9	12.4	33 48.9	+52.0	12.5	34 47.4	+52.2	12.7	35 46.0	+52.3	12.8	36 44.5	+52.4	13.0	37 42.9	+52.6	13.2	73
74	31 44.7	+51.4	11.5	32 43.4	+51.6	11.6	33 42.2	+51.7	11.8	34 40.9	+51.8	11.9	35 39.6	+52.0	12.1	36 38.3	+52.1	12.2	37 36.9	+52.2	12.4	38 35.5	+52.3	12.5	74
75	32 36.1	+51.3	10.9	33 35.0	+51.4	11.0	34 33.9	+51.5	11.2	35 32.7	+51.7	11.3	36 31.6	+51.7	11.4	37 30.4	+51.9	11.6	38 29.1	+52.0	11.7	39 27.8	+52.2	11.9	75
76	33 27.4	+51.1	10.3	34 26.4	+51.2	10.4	35 25.4	+51.3	10.5	36 24.4	+51.4	10.7	37 23.3	+51.6	10.8	38 22.3	+51.6	11.0	39 21.1	+51.9	11.1	40 20.0	+52.0	11.3	76
77	34 18.5	+50.9	9.7	35 17.6	+51.0	9.8	36 16.7	+51.1	9.9	37 15.8	+51.3	10.0	38 14.9	+51.3	10.2	39 13.9	+51.5	10.3	40 13.0	+51.6	10.4	41 12.0	+51.7	10.6	77
78	35 09.4	+50.6	9.0	36 08.6	+50.8	9.1	37 07.8	+50.9	9.2	38 07.1	+51.0	9.4	39 06.2	+51.2	9.5	40 05.4	+51.2	9.6	41 04.6	+51.3	9.9	42 03.7	+51.4	9.9	78
79	36 00.0	+50.6	8.3	36 59.4	+50.6	8.5	37 58.7	+50.7	8.6	38 58.1	+50.7	8.7	39 57.4	+50.8	8.8	40 56.6	+51.0	8.9	41 55.9	+51.1	9.1	42 55.1	+51.2	9.2	79
80	36 50.5	+50.2	7.7	37 50.0	+50.3	7.8	38 49.4	+50.4	7.9	39 48.8	+50.5	8.0	40 48.2	+50.6	8.1	41 47.6	+50.7	8.2	42 47.0	+50.8	8.4	43 46.3	+51.0	8.5	80
81	37 40.7	+50.0	7.0	38 40.3	+50.0	7.1	39 39.8	+50.2	7.2	40 39.3	+50.3	7.3	41 38.8	+50.4	7.4	42 38.3	+50.5	7.5	43 37.8	+50.5	7.6	44 37.3	+50.6	7.8	81
82	38 30.7	+49.7	6.3	39 30.3	+49.9	6.4	40 30.0	+49.9	6.5	41 29.6	+50.0	6.6	42 29.2	+50.0	6.7	43 28.8	+50.1	6.8	44 28.3	+50.3	6.9	45 27.9	+50.3	7.0	82
83	39 20.4	+49.5	5.6	40 20.2	+49.5	5.6	41 19.9	+49.6	5.7	42 19.6	+49.6	5.8	43 19.2	+49.8	5.9	44 18.9	+49.8	6.0	45 18.6	+49.9	6.1	46 18.2	+50.0	6.2	83
84	40 09.9	+49.2	4.8	41 09.7	+49.2	4.9	42 09.5	+49.2	5.0	43 09.2	+49.4	5.1	44 09.0	+49.4	5.1	45 08.7	+49.5	5.2	46 08.5	+49.6	5.3	47 08.2	+49.7	5.4	84
85	40 59.1	+48.8	4.1	41 58.9	+48.9	4.1	42 58.7	+49.0	4.2	43 58.6	+49.0	4.3	44 58.4	+49.1	4.4	45 58.2	+49.2	4.4	46 58.1	+49.2	4.5	47 57.9	+49.2	4.6	85
86	41 47.9	+48.6	3.3	42 47.8	+48.6	3.4	43 47.7	+48.6	3.4	44 47.6	+48.7	3.5	45 47.5	+48.7	3.5	46 47.4	+48.8	3.6	47 47.3	+48.8	3.7	48 47.1	+48.9	3.7	86
87	42 36.5	+48.2	2.5	43 36.4	+48.3	2.6	44 36.3	+48.3	2.6	45 36.3	+48.3	2.6	46 36.2	+48.4	2.7	47 36.2	+48.4	2.7	48 36.1	+48.4	2.8	49 36.0	+48.5	2.8	87
88	43 24.7	+47.8	1.7	44 24.6	+47.9	1.7	45 24.6	+47.9	1.8	46 24.6	+47.9	1.8	47 24.6	+47.9	1.8	48 24.5	+48.0	1.9	49 24.5	+48.0	1.9	50 24.5	+48.0	1.9	88
89	44 12.5	+47.5	0.9	45 12.5	+47.5	0.9	46 12.5	+47.5	0.9	47 12.5	+47.5	0.9	48 12.5	+47.5	0.9	49 12.5	+47.5	0.9	50 12.5	+47.5	1.0	51 12.5	+47.5	1.0	89
90	45 00.0	+47.1	0.0	46 00.0	+47.1	0.0	47 00.0	+47.1	0.0	48 00.0	+47.1	0.0	49 00.0	+47.0	0.0	50 00.0	+47.0	0.0	51 00.0	+47.0	0.0	52 00.0	+47.0	0.0	90

	45°			46°			47°			48°			49°			50°			51°			52°		

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 142°, 218°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	33 20.1	+50.6	131.1	32 40.4	+51.2	131.6	32 00.4	+51.6	132.1	31 20.0	+52.1	132.5	30 39.2	+52.6	133.0	29 58.2	+53.0	133.4	29 16.8	+53.4	133.8	28 35.1	+53.8	134.2	0
1	34 10.7	+50.5	130.5	33 31.6	+51.0	131.0	32 52.0	+51.5	131.5	32 12.1	+52.0	132.0	31 31.8	+52.4	132.4	30 51.2	+52.8	132.9	30 10.2	+53.2	133.3	29 28.9	+53.6	133.7	1
2	35 01.2	+50.3	129.8	34 22.6	+50.8	130.4	33 43.5	+51.3	130.9	33 04.1	+51.8	131.4	32 24.2	+52.3	131.8	31 44.0	+52.7	132.3	31 03.4	+53.2	132.8	30 22.5	+53.6	133.2	2
3	35 51.5	+50.0	129.2	35 13.4	+50.6	129.7	34 34.8	+51.1	130.2	33 55.9	+51.6	130.8	33 16.5	+52.1	131.3	32 36.7	+52.6	131.7	31 56.6	+53.0	132.2	31 16.1	+53.4	132.7	3
4	36 41.5	+49.8	128.5	36 04.0	+50.3	129.0	35 25.9	+50.9	129.6	34 47.5	+51.4	130.1	34 08.6	+51.9	130.7	33 29.3	+52.4	131.2	32 49.6	+52.8	131.7	32 09.5	+53.3	132.1	4
5	37 31.3	+49.5	127.8	36 54.3	+50.1	128.4	36 16.8	+50.7	128.9	35 38.9	+51.2	129.5	35 00.5	+51.7	130.1	34 21.7	+52.2	130.6	33 42.4	+52.7	131.1	33 02.8	+53.1	131.6	5
6	38 20.8	+49.3	127.1	37 44.4	+49.9	127.7	37 07.5	+50.4	128.3	36 30.1	+51.0	128.9	35 52.2	+51.5	129.4	35 13.9	+52.0	130.0	34 35.1	+52.5	130.5	33 55.9	+53.0	131.0	6
7	39 10.1	+49.0	126.3	38 34.3	+49.6	127.0	37 57.9	+50.3	127.6	37 21.1	+50.8	128.2	36 43.7	+51.4	128.8	36 05.9	+51.8	129.4	35 27.6	+52.4	129.9	34 48.9	+52.8	130.5	7
8	39 59.1	+48.7	125.6	39 23.9	+49.3	126.3	38 48.2	+49.9	126.9	38 11.9	+50.5	127.5	37 35.1	+51.1	128.1	36 57.7	+51.7	128.7	36 20.0	+52.1	129.3	35 41.7	+52.7	129.9	8
9	40 47.8	+48.4	124.8	40 13.2	+49.1	125.5	39 38.1	+49.7	126.2	39 02.4	+50.3	126.8	38 26.2	+50.8	127.5	37 49.4	+51.4	128.1	37 12.1	+52.0	128.7	36 34.4	+52.4	129.3	9
10	41 36.2	+48.0	124.0	41 02.3	+48.7	124.7	40 27.8	+49.4	125.5	39 52.7	+50.0	126.1	39 17.0	+50.7	126.8	38 40.8	+51.2	127.4	38 04.1	+51.7	128.1	37 26.8	+52.3	128.7	10
11	42 24.2	+47.7	123.2	41 51.0	+48.4	124.0	41 17.2	+49.1	124.7	40 42.7	+49.8	125.4	40 07.7	+50.3	126.1	39 32.0	+51.0	126.8	38 55.8	+51.5	127.4	38 19.1	+52.1	128.1	11
12	43 11.9	+47.4	122.4	42 39.4	+48.1	123.2	42 06.3	+48.8	123.9	41 32.5	+49.4	124.7	40 58.0	+50.1	125.4	40 23.0	+50.7	126.1	39 47.3	+51.3	126.8	39 11.2	+51.8	127.4	12
13	43 59.3	+46.9	121.5	43 27.5	+47.7	122.4	42 55.1	+48.3	123.1	42 21.9	+49.2	123.9	41 48.1	+49.8	124.7	41 13.7	+50.4	125.4	40 38.6	+51.1	126.1	40 03.0	+51.6	126.8	13
14	44 46.2	+46.6	120.7	44 15.2	+47.4	121.5	43 43.5	+48.1	122.3	43 11.1	+48.8	123.1	42 37.9	+49.5	123.9	42 04.1	+50.2	124.7	41 29.7	+50.8	125.4	40 54.6	+51.4	126.1	14
15	45 32.8	+46.1	119.8	45 02.6	+46.9	120.6	44 31.6	+47.7	121.5	43 59.9	+48.4	122.3	43 27.4	+49.2	123.1	42 54.3	+49.9	123.9	42 20.5	+50.5	124.7	41 46.0	+51.2	125.4	15
16	46 18.9	+45.6	118.9	45 49.5	+46.5	119.8	45 19.3	+47.3	120.6	44 48.3	+48.2	121.5	44 16.6	+48.9	122.3	43 44.2	+49.5	123.1	43 11.0	+50.2	123.9	42 37.2	+50.9	124.7	16
17	47 04.5	+45.2	117.9	46 36.0	+46.1	118.8	46 06.6	+46.9	119.8	45 36.5	+47.7	120.7	45 05.5	+48.5	121.5	44 33.7	+49.2	122.4	44 01.2	+50.0	123.2	43 28.1	+50.5	124.0	17
18	47 49.7	+44.7	116.9	47 22.1	+45.6	117.9	46 53.5	+46.5	118.9	46 24.2	+47.3	119.8	45 54.0	+48.1	120.7	45 22.9	+48.9	121.6	44 51.2	+49.6	122.4	44 18.6	+50.3	123.2	18
19	48 34.4	+44.1	115.9	48 07.7	+45.0	116.9	47 40.0	+46.0	117.9	47 11.5	+46.8	118.9	46 42.1	+47.7	119.8	46 11.8	+48.5	120.7	45 40.8	+49.2	121.6	45 08.9	+50.0	122.5	19
20	49 18.5	+43.6	114.9	48 52.7	+44.6	115.9	48 26.0	+45.5	117.0	47 58.3	+46.5	118.0	47 29.8	+47.2	118.9	47 00.3	+48.1	119.9	46 30.0	+48.9	120.8	45 58.9	+49.6	121.7	20
21	50 02.1	+42.9	113.8	49 37.3	+44.0	114.9	49 11.5	+45.0	116.0	48 44.8	+45.9	117.0	48 17.0	+46.9	118.0	47 48.4	+47.7	119.0	47 18.9	+48.5	119.9	46 48.5	+49.3	120.9	21
22	50 45.0	+42.4	112.7	50 21.3	+43.4	113.9	49 56.5	+44.5	115.0	49 30.7	+45.4	116.0	49 03.9	+46.3	117.1	48 36.1	+47.2	118.1	48 07.4	+48.1	119.1	47 37.8	+48.9	120.0	22
23	51 27.4	+41.6	111.6	51 04.7	+42.8	112.8	50 40.9	+43.9	113.9	50 16.1	+44.8	115.0	49 50.2	+45.8	116.1	49 23.3	+46.8	117.1	48 55.5	+47.7	118.2	48 26.7	+48.5	119.2	23
24	52 09.0	+41.0	110.5	51 47.5	+42.1	111.6	51 24.8	+43.2	112.8	51 00.9	+44.3	114.0	50 36.0	+45.3	115.1	50 10.1	+46.3	116.2	49 43.2	+47.1	117.2	49 15.2	+48.1	118.3	24
25	52 50.0	+40.2	109.3	52 29.6	+41.4	110.5	52 08.0	+42.5	111.7	51 45.2	+43.7	112.9	51 21.3	+44.8	114.0	50 56.4	+45.7	115.2	50 30.3	+46.7	116.3	50 03.3	+47.6	117.3	25
26	53 30.2	+39.4	108.0	53 11.0	+40.6	109.3	52 50.5	+41.9	110.5	52 28.9	+43.0	111.8	52 06.1	+44.1	113.0	51 42.1	+45.2	114.1	51 17.0	+46.2	115.3	50 50.9	+47.1	116.4	26
27	54 09.6	+38.5	106.7	53 51.6	+39.9	108.1	53 32.4	+41.1	109.3	53 11.9	+42.3	110.6	52 50.2	+43.4	111.8	52 27.3	+44.5	113.1	52 03.2	+45.6	114.2	51 38.0	+46.6	115.4	27
28	54 48.1	+37.7	105.4	54 31.5	+39.0	106.7	54 13.5	+40.4	108.1	53 54.2	+41.6	109.4	53 33.7	+42.7	110.7	53 11.8	+44.0	111.9	52 48.8	+45.0	113.2	52 24.6	+46.1	114.4	28
29	55 25.8	+36.8	104.1	55 10.5	+38.2	105.5	54 53.9	+39.5	106.8	54 35.8	+40.8	108.2	54 16.4	+42.1	109.5	53 55.8	+43.2	110.8	53 33.8	+44.4	112.1	53 10.7	+45.5	113.3	29
30	56 02.6	+35.7	102.7	55 48.7	+37.2	104.1	55 33.4	+38.6	105.5	55 16.6	+40.0	106.9	54 58.5	+41.3	108.3	54 39.0	+42.5	109.6	54 18.2	+43.8	110.9	53 56.2	+44.8	112.2	30
31	56 38.3	+34.8	101.2	56 25.9	+36.3	102.7	56 12.0	+37.7	104.1	55 56.6	+39.1	105.6	55 39.8	+40.4	107.0	55 21.5	+41.8	108.4	55 02.0	+43.0	109.7	54 41.0	+44.2	111.1	31
32	57 13.1	+33.6	99.7	57 02.2	+35.1	101.2	56 49.7	+36.7	102.7	56 35.7	+38.2	104.2	56 20.2	+39.6	105.7	56 03.3	+41.0	107.1	55 45.0	+42.2	108.5	55 25.2	+43.5	109.9	32
33	57 46.7	+32.4	98.2	57 37.3	+34.1	99.7	57 26.4	+35.7	101.3	57 13.9	+37.2	102.8	56 59.8	+38.7	104.3	56 44.3	+40.0	105.8	56 27.2	+41.4	107.2	56 08.7	+42.7	108.7	33
34	58 19.1	+31.3	96.6	58 11.4	+33.0	98.2	58 02.1	+34.5	99.8	57 51.1	+36.1	101.3	57 38.5	+37.7	102.9	57 24.3	+39.2	104.4	57 08.6	+40.6	105.9	56 51.4	+42.0	107.4	34
35	58 50.4	+30.0	94.9	58 44.4	+31.7	96.6	58 36.6	+33.4	98.2	58 27.2	+35.1	99.8	58 16.2	+36.6	101.4	58 03.5	+38.1	103.0	57 49.2	+39.6	104.5	57 33.4	+41.0	106.1	35
36	59 20.4	+28.6	93.3	59 16.1	+30.4	94.9	59 10.0	+32.2	96.6	59 02.3	+33.9	98.3	58 52.8	+35.5	99.9	58 41.6	+37.2	101.5	58 28.8	+38.7	103.1	58 14.4	+40.2	104.7	36
37	59 49.0	+27.2	91.5	59 46.5	+29.0	93.2	59 42.2	+30.9	94.9	59 36.2	+32.6	96.6	59 28.3	+34.4	98.3	59 18.8	+36.0	100.0	59 07.5	+37.6	101.6	58 54.6	+39.1	103.3	37
38	60 16.2	+25.7	89.7	60 15.5	+27.7	91.5	60 13.1	+29.5	93.2	60 08.8	+31.3	95.0	60 02.7	+33.1	96.7	59 54.8	+34.8	98.4	59 45.1	+36.5	100.1	59 33.7	+38.1	101.8	38
39	60 41.9	+24.2	87.9	60 43.2	+26.1	89.7	60 42.6	+28.1	91.5	60 40.1	+30.0	93.2	60 35.8	+31.8	95.0	60 29.6	+33.6	96.8	60 21.6	+35.4	98.5	60 11.8	+37.1	100.3	39
40	61 06.1	+22.6	86.0	61 09.3	+24.6	87.8	61 10.7	+26.5	89.6	61 10.1	+28.5	91.5	61 07.6	+30.4	93.3	61 03.2	+32.3	95.1	60 57.0	+34.0	96.9	60 48.9	+35.8	98.7	40
41	61 28.7	+20.9	84.1	61 33.9	+23.0	85.9	61 37.2	+25.0	87.8	61 38.6	+27.0	89.6	61 38.0	+28.9	91.5	61 35.5	+30.9	93.3	61 31.0	+32.8	95.2	61 24.7	+34.6	97.0	41
42	61 49.6	+19.2	82.1	61 56.9	+21.2	84.0	62 02.2	+23.3	85.8	62 05.6	+25.3	87.7	62 06.9	+27.4	89.6	62 06.4	+29.3	91.5	62 03.8	+31.3	93.4	61 59.3	+33.2	95.3	42
43	62 08.8	+17.3	80.1	62 18.1	+19.5	82.0	62 25.5	+21.6	83.9	62 30.9	+23.7	85.8	62 34.3	+25.8	87.7	62 35.7	+27.9	89.6	62 35.1	+29.9	91.6	62 32.5	+31.8	93.5	43
44	62 26.1	+15.6	78.0	62 37.6	+17.7	79.9	62 47.1	+19.8	81.8	62 54.6	+22.0	83.8	63 00.1	+24.1	85.7	63 03.6	+26.2	87.7	63 05.0	+28.2	89.7	63 04.3	+30.3	91.6	44
45	62 41.7	+13.6•	75.9	62 55.3	+15.8	77.8	63 06.9	+18.0	79.8	63 16.6	+20.1	81.7	63 24.2	+22.3	83.7	63 29.8	+24.4	85.7	63 33.2	+26.6	87.7	63 34.6	+28.7	89.7	45
46	62 55.3	+11.6	73.8	63 11.1	+13.8•	75.7	63 24.9	+16.0	77.6	63 36.7	+18.3	79.6	63 46.5	+20.5	81.6	63 54.2	+22.7	83.6	63 59.8	+24.9	85.7	64 03.3	+27.0	87.7	46
47	63 06.9	+9.7•	71.6	63 24.9	+11.8•	73.5	63 40.9	+14.1•	75.5	63 55.0	+16.2•	77.5	64 07.0	+18.5•	79.5	64 16.9	+20.7	81.5	64 24.7	+23.0	83.6	64 30.3	+25.2	85.7	47
48	63 16.6	+7.6•	69.5	63 36.7	+9.8•	71.3	63 55.0	+12.0•	73.3	64 11.2	+14.3•	75.3	64 25.5	+16.5•	77.3	64 37.6	+18.8	79.3	64 47.7	+21.1•	81.4	64 55.5	+23.4	83.5	48
49	63 24.2	+5.6•	67.2	63 46.5	+7.7•	69.1	64 07.0	+9.9•	71.0	64 25.5	+12.1•	73.0	64 42.0	+14.4•	75.0	64 56.4	+16.8•	77.1	65 08.8	+19.0•	79.2	65 18.9	+21.4•	81.3	49
50	63 29.8	+3.4•	65.0	63 54.2	+5.5•	66.9	64 16.9	+7.8•	68.8	64 37.6	+10.1•	70.7	64 56.4	+12.4•	72.8	65 13.2	+14.6•	74.8	65 27.8	+17.0•	76.9	65 40.3	+19.3•	79.1	50
51	63 33.2	+1.4•	62.8	63 59.8	+3.5•	64.6	64 24.7	+5.6•	66.5	64 47.7	+7.8•	68.4	65 08.8	+10.1•	70.4	65 27.8	+12.5•	72.5	65 44.8	+14.8•	74.6	65 59.6	+17.3•	76.8	51
52	63 34.6	−0.8•	60.5	64 03.3	+1.3•	62.3	64 30.3	+3.4•	64.2	64 55.5	+5.7•	66.1	65 18.9	+7.9•	68.1	65 40.3	+10.2•	70.1	65 59.6	+12.6•	72.2	66 16.9	+15.0•	74.4	52
53	63 33.8	−2.8•	58.3	64 04.6	−0.8•	60.0	64 33.7	+1.3•	61.9	65 01.2	+3.4•	63.7	65 26.8	+5.7•	65.7	65 50.5	+8.0•	67.7	66 12.2	+10.4•	69.8	66 31.9	+12.7•	72.0	53
54	63 31.0	−4.9•	56.0	64 03.8	−3.0•	57.7	64 35.0	−0.9•	59.5	65 04.6	+1.2•	61.4	65 32.5	+3.3•	63.3	65 58.5	+5.6•	65.3	66 22.6	+7.9•	67.4	66 44.6	+10.4•	69.5	54
55	63 26.1	−7.0•	53.8	64 00.8	−5.1•	55.5	64 34.1	−3.2•	57.2	65 05.8	−1.1•	59.0	65 35.8	+1.1•	60.9	66 04.1	+3.3•	62.9	66 30.5	+5.6•	64.9	66 55.0	+8.0•	67.0	55
56	63 19.1	−9.1•	51.6	63 55.7	−7.3•	53.2	64 30.9	−5.3•	54.9	65 04.7	−3.4•	56.6	65 36.9	−1.3•	58.5	66 07.4	+0.9•	60.4	66 36.1	+3.2•	62.4	67 03.0	+5.5•	64.5	56
57	63 10.0	−11.1	49.4	63 48.4	−9.3•	50.9	64 25.6	−7.5•	52.6	65 01.3	−5.5•	54.3	65 35.6	−3.5•	56.0	66 08.3	−1.4•	57.9	66 39.3	+0.8•	59.9	67 08.5	+3.1•	61.9	57
58	62 58.9	−13.0	47.2	63 39.1	−11.4•	48.7	64 18.1	−9.6•	50.3	64 55.8	−7.8•	51.9	65 32.1	−5.9•	53.6	66 06.9	−3.8•	55.4	66 40.1	−1.7•	57.4	67 11.6	+0.6•	59.4	58
59	62 45.9	−15.0	45.1	63 27.7	−13.4	46.5	64 08.5	−11.7•	48.0	64 48.0	−10.0•	49.6	65 26.2	−8.1•	51.2	66 03.1	−6.2•	53.0	66 38.4	−4.0•	54.8	67 12.2	−1.9•	56.8	59
60	62 30.9	−16.8	43.0	63 14.3	−15.3	44.3	63 56.7	−13.7•	45.8	64 38.0	−12.1•	47.3	65 18.1	−10.3•	48.9	65 56.9	−8.4•	50.5	66 34.4	−6.5•	52.3	67 10.3	−4.4•	54.2	60
61	62 14.1	−18.7	40.9	62 59.0	−17.2	42.2	63 43.0	−15.8•	43.6	64 25.9	−14.1•	45.0	65 07.8	−12.5•	46.5	65 48.5	−10.7•	48.1	66 27.9	−8.8•	49.8	67 05.9	−6.9•	51.6	61
62	61 55.4	−20.4	38.9	62 41.8	−19.1	40.1	63 27.2	−17.7	41.4	64 11.8	−16.2•	42.7	64 55.3	−14.6•	44.1	65 37.8	−13.0•	45.7	66 19.1	−11.2•	47.4	66 59.0	−9.2•	49.1	62
63	61 35.0	−22.1	36.9	62 22.7	−20.9	38.0	63 09.5	−19.5	39.3	63 55.6	−18.2	40.5	64 40.7	−16.7•	41.9	65 24.8	−15.1•	43.4	66 07.9	−13.4•	44.9	66 49.8	−11.7•	46.6	63
64	61 12.9	−23.7	35.0	62 01.8	−22.6	36.0	62 50.0	−21.4	37.2	63 37.4	−20.1	38.4	64 24.0	−18.7	39.7	65 09.7	−17.2•	41.1	65 54.5	−15.7•	42.5	66 38.1	−13.9•	44.1	64
65	60 49.2	−25.3	33.1	61 39.2	−24.2	34.1	62 28.6	−23.1	35.1	63 17.3	−21.9	36.3	64 05.3	−20.6	37.5	64 52.5	−19.2•	38.8	65 38.8	−17.7•	40.2	66 24.2	−16.2•	41.6	65
66	60 23.9	−26.7	31.2	61 15.0	−25.8	32.2	62 05.5	−24.7	33.2	62 55.4	−23.6	34.2	63 44.7	−22.4	35.4	64 33.3	−21.2	36.6	65 21.1	−19.8•	37.9	66 08.0	−18.4•	39.2	66
67	59 57.2	−28.3	29.4	60 49.2	−27.3	30.3	61 40.8	−26.4	31.2	62 31.8	−25.3	32.2	63 22.3	−24.2	33.3	64 12.1	−23.0	34.4	65 01.3	−21.8	35.6	65 49.6	−20.4•	36.9	67
68	59 28.9	−29.5	27.7	60 21.9	−28.8	28.5	61 14.4	−27.9	29.3	62 06.5	−26.9	30.3	62 58.1	−26.0	31.2	63 49.1	−24.9	32.3	64 39.5	−23.7	33.4	65 29.2	−22.5	34.6	68
69	58 59.4	−30.9	26.0	59 53.1	−30.1	26.7	60 46.6	−29.4	27.5	61 39.6	−28.4	28.4	62 32.1	−27.5	29.3	63 24.2	−26.5	30.2	64 15.8	−25.5	31.3	65 06.7	−24.3	32.4	69
70	58 28.5	−32.1	24.3	59 23.0	−31.4	25.0	60 17.2	−30.6	25.7	61 11.1	−29.9	26.5	62 04.6	−29.1	27.4	62 57.7	−28.2	28.3	63 50.3	−27.2	29.2	64 42.4	−26.2	30.2	70
71	57 56.4	−33.3	22.7	58 51.6	−32.7	23.3	59 46.6	−32.0	24.0	60 41.2	−31.3	24.7	61 35.5	−30.5	25.5	62 29.5	−29.7	26.3	63 23.1	−28.9	27.2	64 16.2	−27.9	28.2	71
72	57 23.1	−34.4	21.1	58 18.9	−33.8	21.7	59 14.6	−33.2	22.4	60 09.9	−32.6	23.0	61 05.0	−31.9	23.7	61 59.8	−31.2	24.5	62 54.2	−30.4	25.3	63 48.3	−29.6	26.1	72
73	56 48.7	−35.5	19.6	57 45.1	−34.9	20.2	58 41.3	−34.4	20.7	59 37.3	−33.8	21.3	60 33.1	−33.2	22.0	61 28.6	−32.6	22.7	62 23.8	−31.8	23.4	63 18.7	−31.1	24.2	73
74	56 13.2	−36.4	18.2	57 10.2	−36.0	18.7	58 06.9	−35.5	19.2	59 03.5	−34.9	19.7	59 59.9	−34.5	20.3	60 56.0	−33.8	20.9	61 52.0	−33.3	21.6	62 47.6	−32.6	22.3	74
75	55 36.8	−37.4	16.8	56 34.2	−37.0	17.2	57 31.4	−36.6	17.7	58 28.5	−36.1	18.2	59 25.4	−35.6	18.7	60 22.2	−35.1	19.2	61 18.7	−34.5	19.8	62 15.0	−33.9	20.5	75
76	54 59.4	−38.1	15.4	55 57.2	−38.0	15.8	56 54.8	−37.5	16.2	57 52.4	−37.2	16.6	58 49.8	−36.7	17.1	59 47.1	−36.3	17.6	60 44.2	−35.8	18.1	61 41.1	−35.2	18.7	76
77	54 21.0	−39.1	14.1	55 19.2	−38.8	14.4	56 17.3	−38.5	14.8	57 15.2	−38.1	15.2	58 13.1	−37.8	15.6	59 10.8	−37.3	16.0	60 08.4	−36.9	16.5	61 05.9	−36.5	17.0	77
78	53 41.9	−40.0	12.8	54 40.4	−39.7	13.1	55 38.8	−39.4	13.4	56 37.1	−39.1	13.8	57 35.3	−38.7	14.1	58 33.5	−38.4	14.5	59 31.5	−38.0	15.0	60 29.4	−37.6	15.4	78
79	53 01.9	−40.7	11.5	54 00.7	−40.5	11.8	54 59.4	−40.3	12.1	55 58.0	−39.9	12.4	56 56.6	−39.7	12.7	57 55.1	−39.4	13.1	58 53.5	−39.1	13.4	59 51.8	−38.7	13.8	79
80	52 21.2	−41.5	10.3	53 20.2	−41.3	10.5	54 19.1	−41.0	10.8	55 18.1	−40.8	11.1	56 16.9	−40.5	11.4	57 15.7	−40.3	11.7	58 14.4	−40.0	12.0	59 13.1	−39.7	12.3	80
81	51 39.7	−42.1	9.1	52 38.9	−41.9	9.3	53 38.1	−41.7	9.6	54 37.3	−41.6	9.8	55 36.4	−41.4	9.9	56 35.4	−41.1	10.3	57 34.4	−40.8	10.6	58 33.4	−40.6	10.9	81
82	50 57.6	−42.8	8.0	51 57.0	−42.6	8.2	52 56.4	−42.5	8.4	53 55.7	−42.3	8.6	54 55.0	−42.1	8.8	55 54.3	−41.9	9.0	56 53.6	−41.8	9.2	57 52.8	−41.6	9.5	82
83	50 14.8	−43.4	6.9	51 14.4	−43.3	7.0	52 13.9	−43.1	7.2	53 13.4	−43.0	7.4	54 12.9	−42.8	7.5	55 12.4	−42.7	7.7	56 11.8	−42.5	7.9	57 11.2	−42.3	8.1	83
84	49 31.4	−43.9	5.8	50 31.1	−43.9	5.9	51 30.8	−43.8	6.1	52 30.4	−43.6	6.2	53 30.1	−43.6	6.3	54 29.7	−43.4	6.5	55 29.3	−43.3	6.7	56 28.9	−43.1	6.8	84
85	48 47.5	−44.6	4.9	49 47.2	−44.4	4.9	50 47.0	−44.3	5.0	51 46.8	−44.3	5.1	52 46.5	−44.1	5.2	53 46.3	−44.1	5.3	54 46.0	−43.9	5.5	55 45.8	−43.9	5.6	85
86	48 02.9	−45.0	3.8	49 02.8	−45.0	3.8	50 02.7	−44.9	3.9	51 02.5	−44.8	4.0	52 02.4	−44.8	4.1	53 02.2	−44.7	4.2	54 02.1	−44.7	4.3	55 01.9	−44.6	4.4	86
87	47 17.9	−45.5	2.8	48 17.8	−45.4	2.8	49 17.8	−45.4	2.9	50 17.7	−45.3	3.0	51 17.6	−45.3	3.0	52 17.5	−45.3	3.1	53 17.4	−45.2	3.2	54 17.3	−45.2	3.2	87
88	46 32.4	−46.0	1.8	47 32.4	−46.0	1.9	48 32.3	−45.9	1.9	49 32.3	−45.9	1.9	50 32.3	−45.9	2.0	51 32.2	−45.8	2.0	52 32.2	−45.8	2.1	53 32.1	−45.7	2.1	88
89	45 46.4	−46.4	0.9	46 46.4	−46.4	0.9	47 46.4	−46.4	0.9	48 46.4	−46.4	1.0	49 46.4	−46.4	1.0	50 46.4	−46.4	1.0	51 46.4	−46.4	1.0	52 46.4	−46.4	1.0	89
90	45 00.0	−46.8	0.0	46 00.0	−46.8	0.0	47 00.0	−46.8	0.0	48 00.0	−46.9	0.0	49 00.0	−46.9	0.0	50 00.0	−46.9	0.0	51 00.0	−46.9	0.0	52 00.0	−46.9	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	33 20.1	−50.9	131.1	32 40.4	−51.4	131.6	32 00.4	−51.9	132.1	31 20.0	−52.3	132.5	30 39.2	−52.7	133.0	29 58.2	−53.1	133.4	29 16.8	−53.5	133.8	28 35.1	−53.9	134.2	0
1	32 29.2	−51.1	131.8	31 49.0	−51.5	132.2	31 08.5	−51.9	132.7	30 27.7	−52.4	133.1	29 46.5	−52.8	133.5	29 05.1	−53.3	133.9	28 23.3	−53.7	134.3	27 41.2	−54.1	134.7	1
2	31 38.1	−51.2	132.4	30 57.5	−51.7	132.8	30 16.6	−52.2	133.3	29 35.3	−52.6	133.7	28 53.7	−53.0	134.1	28 11.8	−53.4	134.5	27 29.6	−53.7	134.8	26 47.2	−54.1	135.2	2
3	30 46.9	−51.4	133.0	30 05.8	−51.8	133.4	29 24.4	−52.3	133.8	28 42.7	−52.7	134.2	28 00.7	−53.1	134.6	27 18.4	−53.5	135.0	26 35.9	−53.9	135.3	25 53.1	−54.2	135.7	3
4	29 55.5	−51.6	133.6	29 14.0	−52.0	134.0	28 32.1	−52.4	134.4	27 50.0	−52.8	134.8	27 07.6	−53.2	135.1	26 25.0	−53.6	135.5	25 42.0	−53.9	135.8	24 58.9	−54.3	136.2	4
5	29 03.9	−51.7	134.2	28 22.0	−52.2	134.6	27 39.7	−52.5	134.9	26 57.2	−52.9	135.3	26 14.4	−53.3	135.7	25 31.4	−53.7	136.0	24 48.1	−54.0	136.3	24 04.6	−54.4	136.6	5
6	28 12.2	−51.9	134.7	27 29.8	−52.3	135.1	26 47.2	−52.7	135.5	26 04.3	−53.1	135.8	25 21.1	−53.4	136.2	24 37.7	−53.8	136.5	23 54.1	−54.1	136.8	23 10.2	−54.4	137.1	6
7	27 20.3	−52.0	135.3	26 37.5	−52.4	135.7	25 54.5	−52.8	136.0	25 11.2	−53.2	136.3	24 27.7	−53.5	136.7	23 43.9	−53.9	137.0	23 00.0	−54.3	137.3	22 15.8	−54.5	137.6	7
8	26 28.3	−52.1	135.9	25 45.1	−52.5	136.2	25 01.7	−52.9	136.5	24 18.0	−53.3	136.9	23 34.2	−53.7	137.2	22 50.1	−54.0	137.5	22 05.7	−54.2	137.7	21 21.3	−54.6	138.0	8
9	25 36.2	−52.2	136.4	24 52.6	−52.6	136.8	24 08.8	−53.0	137.1	23 24.8	−53.4	137.4	22 40.5	−53.7	137.7	21 56.1	−54.0	137.9	21 11.5	−54.4	138.2	20 26.7	−54.7	138.4	9
10	24 44.0	−52.4	137.0	24 00.0	−52.7	137.3	23 15.8	−53.1	137.6	22 31.4	−53.4	137.9	21 46.8	−53.7	138.1	21 02.1	−54.1	138.4	20 17.1	−54.4	138.6	19 32.0	−54.7	138.8	10
11	23 51.6	−52.5	137.5	23 07.3	−52.9	137.8	22 22.7	−53.2	138.1	21 38.0	−53.6	138.4	20 53.1	−53.9	138.6	20 08.0	−54.2	138.9	19 22.7	−54.5	139.1	18 37.3	−54.8	139.3	11
12	22 59.1	−52.5	138.0	22 14.4	−52.9	138.3	21 29.5	−53.3	138.6	20 44.4	−53.6	138.8	19 59.2	−53.9	139.1	19 13.8	−54.3	139.3	18 28.2	−54.5	139.5	17 42.5	−54.9	139.7	12
13	22 06.6	−52.7	138.6	21 21.5	−53.0	138.8	20 36.2	−53.3	139.1	19 50.8	−53.7	139.3	19 05.3	−54.0	139.5	18 19.5	−54.3	139.8	17 33.7	−54.7	140.0	16 47.6	−54.8	140.2	13
14	21 13.9	−52.8	139.1	20 28.5	−53.1	139.3	19 42.9	−53.5	139.6	18 57.1	−53.7	139.8	18 11.3	−54.1	140.0	17 25.2	−54.4	140.2	16 39.0	−54.6	140.4	15 52.8	−55.0	140.6	14
15	20 21.1	−52.8	139.6	19 35.4	−53.2	139.8	18 49.4	−53.5	140.0	18 03.4	−53.8	140.3	17 17.2	−54.1	140.5	16 30.8	−54.4	140.7	15 44.4	−54.7	140.8	14 57.8	−55.0	141.0	15
16	19 28.3	−53.0	140.1	18 42.2	−53.3	140.3	17 55.9	−53.5	140.7	17 09.6	−53.9	140.7	16 23.1	−54.2	140.9	15 36.4	−54.5	141.1	14 49.7	−54.8	141.3	14 02.8	−55.0	141.4	16
17	18 35.3	−53.0	140.6	17 48.9	−53.3	140.8	17 02.4	−53.7	141.0	16 15.7	−54.0	141.2	15 28.9	−54.3	141.4	14 41.9	−54.5	141.5	13 54.9	−54.8	141.7	13 07.8	−55.1	141.8	17
18	17 42.3	−53.1	141.1	16 55.6	−53.4	141.3	16 08.7	−53.7	141.5	15 21.7	−54.0	141.6	14 34.6	−54.3	141.8	13 47.4	−54.5	142.0	13 00.1	−54.8	142.1	12 12.7	−55.1	142.2	18
19	16 49.2	−53.1	141.6	16 02.2	−53.5	141.7	15 15.0	−53.8	141.9	14 27.7	−54.0	142.1	13 40.3	−54.3	142.2	12 52.9	−54.7	142.4	12 05.3	−54.9	142.5	11 17.6	−55.1	142.6	19
20	15 56.1	−53.2	142.0	15 08.7	−53.5	142.2	14 21.2	−53.8	142.4	13 33.7	−54.1	142.5	12 46.0	−54.4	142.7	11 58.2	−54.6	142.8	11 10.4	−54.9	142.9	10 22.5	−55.2	143.0	20
21	15 02.9	−53.3	142.5	14 15.2	−53.6	142.7	13 27.4	−53.8	142.8	12 39.6	−54.2	143.0	11 51.6	−54.4	143.1	11 03.6	−54.7	143.2	10 15.5	−54.9	143.3	9 27.3	−55.2	143.4	21
22	14 09.6	−53.4	143.0	13 21.6	−53.6	143.1	12 33.6	−54.0	143.3	11 45.4	−54.2	143.4	10 57.2	−54.5	143.5	10 08.9	−54.7	143.6	9 20.6	−55.0	143.7	8 32.1	−55.2	143.8	22
23	13 16.2	−53.5	143.5	12 28.0	−53.7	143.6	11 39.6	−53.9	143.7	10 51.2	−54.2	143.9	10 02.7	−54.4	144.0	9 14.2	−54.7	144.1	8 25.6	−55.0	144.2	7 36.9	−55.2	144.2	23
24	12 22.9	−53.5	143.9	11 34.3	−53.7	144.1	10 45.7	−54.0	144.2	9 57.0	−54.3	144.3	9 08.3	−54.6	144.4	8 19.5	−54.8	144.5	7 30.6	−55.0	144.6	6 41.7	−55.3	144.6	24
25	11 29.4	−53.5	144.4	10 40.6	−53.8	144.5	9 51.7	−54.0	144.6	9 02.7	−54.3	144.7	8 13.7	−54.5	144.8	7 24.7	−54.8	144.9	6 35.6	−55.1	145.0	5 46.4	−55.2	145.0	25
26	10 35.9	−53.5	144.9	9 46.8	−53.8	145.0	8 57.7	−54.1	145.1	8 08.5	−54.3	145.2	7 19.2	−54.6	145.3	6 29.9	−54.8	145.3	5 40.5	−55.0	145.4	4 51.2	−55.3	145.4	26
27	9 42.4	−53.5	145.3	8 53.0	−53.8	145.4	8 03.6	−54.1	145.5	7 14.1	−54.3	145.6	6 24.6	−54.6	145.6	5 35.1	−54.8	145.7	4 45.5	−55.1	145.8	3 55.9	−55.3	145.8	27
28	8 48.9	−53.6	145.8	7 59.2	−53.8	145.9	7 09.5	−54.1	145.9	6 19.8	−54.3	146.0	5 30.0	−54.6	146.1	4 40.3	−54.9	146.1	3 50.4	−55.0	146.2	3 00.6	−55.3	146.2	28
29	7 55.3	−53.6	146.2	7 05.4	−53.9	146.3	6 15.4	−54.1	146.4	5 25.5	−54.4	146.4	4 35.4	−54.6	146.5	3 45.4	−54.8	146.5	2 55.4	−55.1	146.6	2 05.3	−55.3	146.6	29
30	7 01.7	−53.7	146.7	6 11.5	−53.9	146.8	5 21.3	−54.1	146.8	4 31.1	−54.4	146.9	3 40.8	−54.6	146.9	2 50.6	−54.9	146.9	2 00.3	−55.1	147.0	1 10.0	−55.3	147.0	30
31	6 08.0	−53.6	147.1	5 17.6	−53.9	147.2	4 27.2	−54.2	147.2	3 36.7	−54.4	147.3	2 46.2	−54.6	147.3	1 55.7	−54.9	147.3	1 05.2	−55.1	147.3	0 14.7	−55.4	147.3	31
32	5 14.4	−53.7	147.6	4 23.7	−53.9	147.6	3 33.0	−54.2	147.7	2 42.3	−54.4	147.7	1 51.6	−54.7	147.7	1 00.8	−54.8	147.7	0 10.1	−55.1	147.7	0 40.7	+55.3	32.3	32
33	4 20.7	−53.7	148.0	3 29.8	−54.0	148.1	2 38.8	−54.2	148.1	1 47.9	−54.4	148.1	0 56.9	−54.6	148.1	0 06.0	−54.9	148.1	0 45.0	+55.1	31.9	1 36.0	+55.3	31.9	33
34	3 27.0	−53.8	148.5	2 35.8	−53.9	148.5	1 44.6	−54.2	148.5	0 53.5	−54.5	148.5	0 02.3	−54.7	148.6	0 48.9	+54.9	31.5	1 40.1	+55.1	31.5	2 31.3	+55.3	31.5	34
35	2 33.3	−53.8	148.9	1 41.9	−54.0	149.0	0 50.4	−54.1	149.0	0 01.0	+54.4	31.0	0 52.4	+54.6	31.0	1 43.8	+54.9	31.0	2 35.2	+55.1	31.1	3 26.6	+55.3	31.1	35
36	1 39.5	−53.7	149.4	0 47.9	−54.0	149.4	0 03.7	+54.2	30.6	0 55.4	+54.4	30.6	1 47.0	+54.7	30.6	2 38.7	+54.8	30.6	3 30.3	+55.0	30.7	4 21.9	+55.2	30.7	36
37	0 45.8	−53.7	149.8	0 06.1	+53.9	30.2	0 57.9	+54.2	30.2	1 49.8	+54.4	30.2	2 41.7	+54.6	30.2	3 33.5	+54.9	30.2	4 25.3	+55.1	30.3	5 17.1	+55.3	30.3	37
38	0 07.9	+53.8	29.7	1 00.0	+54.0	29.7	1 52.1	+54.2	29.7	2 44.2	+54.4	29.8	3 36.3	+54.6	29.8	4 28.4	+54.8	29.8	5 20.4	+55.0	29.9	6 12.4	+55.3	29.9	38
39	1 01.7	+53.7	29.3	1 54.0	+53.9	29.3	2 46.3	+54.2	29.3	3 38.6	+54.4	29.3	4 30.9	+54.6	29.4	5 23.2	+54.8	29.4	6 15.4	+55.1	29.5	7 07.7	+55.2	29.5	39
40	1 55.4	+53.7	28.8	2 47.9	+54.0	28.9	3 40.5	+54.1	28.9	4 33.0	+54.4	28.9	5 25.5	+54.6	29.0	6 18.0	+54.8	29.0	7 10.5	+55.0	29.1	8 02.9	+55.2	29.1	40
41	2 49.1	+53.7	28.4	3 41.9	+53.9	28.4	4 34.6	+54.2	28.4	5 27.4	+54.3	28.5	6 20.1	+54.6	28.5	7 12.8	+54.8	28.6	8 05.5	+54.9	28.7	8 58.1	+55.2	28.7	41
42	3 42.8	+53.7	27.9	4 35.8	+53.9	28.0	5 28.8	+54.1	28.0	6 21.7	+54.4	28.1	7 14.7	+54.5	28.1	8 07.6	+54.7	28.2	9 00.4	+55.0	28.3	9 53.3	+55.1	28.3	42
43	4 36.5	+53.7	27.5	5 29.7	+53.9	27.5	6 22.9	+54.1	27.6	7 16.1	+54.3	27.6	8 09.2	+54.5	27.7	9 02.3	+54.7	27.8	9 55.4	+54.9	27.9	10 48.4	+55.1	27.9	43
44	5 30.2	+53.7	27.1	6 23.6	+53.9	27.1	7 17.0	+54.1	27.2	8 10.4	+54.3	27.2	9 03.7	+54.5	27.3	9 57.0	+54.7	27.4	10 50.3	+54.9	27.4	11 43.5	+55.1	27.5	44
45	6 23.9	+53.6	26.6	7 17.5	+53.8	26.7	8 11.1	+54.1	26.7	9 04.7	+54.2	26.8	9 58.2	+54.5	26.9	10 51.7	+54.7	26.9	11 45.2	+54.9	27.0	12 38.6	+55.1	27.1	45
46	7 17.5	+53.6	26.2	8 11.3	+53.9	26.2	9 05.2	+54.0	26.3	9 58.9	+54.3	26.4	10 52.7	+54.4	26.4	11 46.4	+54.6	26.5	12 40.1	+54.8	26.6	13 33.7	+55.0	26.7	46
47	8 11.1	+53.6	25.7	9 05.2	+53.7	25.8	9 59.2	+54.0	25.8	10 53.2	+54.1	25.9	11 47.1	+54.4	26.0	12 41.0	+54.6	26.1	13 34.9	+54.7	26.2	14 28.7	+54.9	26.3	47
48	9 04.7	+53.5	25.2	9 58.9	+53.8	25.3	10 53.2	+53.9	25.4	11 47.3	+54.2	25.5	12 41.5	+54.3	25.6	13 35.6	+54.5	25.7	14 29.6	+54.8	25.8	15 23.6	+55.0	25.9	48
49	9 58.2	+53.5	24.8	10 52.7	+53.7	24.9	11 47.1	+53.9	25.0	12 41.5	+54.1	25.0	13 35.8	+54.3	25.1	14 30.1	+54.5	25.2	15 24.4	+54.6	25.4	16 18.6	+54.8	25.5	49
50	10 51.7	+53.5	24.3	11 46.4	+53.7	24.4	12 41.0	+53.9	24.5	13 35.6	+54.0	24.6	14 30.1	+54.2	24.7	15 24.6	+54.4	24.8	16 19.0	+54.7	24.9	17 13.4	+54.8	25.1	50
51	11 45.2	+53.4	23.9	12 40.1	+53.6	23.9	13 34.9	+53.8	24.0	14 29.6	+54.0	24.1	15 24.4	+54.2	24.3	16 19.0	+54.4	24.4	17 13.7	+54.5	24.5	18 08.2	+54.8	24.6	51
52	12 38.6	+53.4	23.4	13 33.7	+53.5	23.5	14 28.7	+53.7	23.6	15 23.6	+54.0	23.7	16 18.6	+54.1	23.8	17 13.4	+54.3	23.9	18 08.2	+54.5	24.1	19 03.0	+54.7	24.2	52
53	13 32.0	+53.3	22.9	14 27.2	+53.5	23.0	15 22.4	+53.7	23.1	16 17.6	+53.9	23.2	17 12.7	+54.1	23.4	18 07.7	+54.3	23.5	19 02.7	+54.5	23.6	19 57.7	+54.6	23.8	53
54	14 25.3	+53.3	22.5	15 20.7	+53.5	22.6	16 16.1	+53.7	22.7	17 11.5	+53.8	22.8	18 06.8	+54.0	22.9	19 02.0	+54.2	23.0	19 57.2	+54.4	23.2	20 52.3	+54.6	23.3	54
55	15 18.6	+53.2	22.0	16 14.2	+53.4	22.1	17 09.8	+53.5	22.2	18 05.3	+53.8	22.3	19 00.8	+53.9	22.4	19 56.2	+54.1	22.6	20 51.6	+54.3	22.7	21 46.9	+54.5	22.9	55
56	16 11.8	+53.1	21.5	17 07.6	+53.3	21.6	18 03.3	+53.5	21.7	18 59.1	+53.6	21.8	19 54.7	+53.9	22.0	20 50.3	+54.1	22.1	21 45.9	+54.2	22.3	22 41.4	+54.4	22.4	56
57	17 04.9	+53.1	21.0	18 00.9	+53.2	21.1	18 56.8	+53.5	21.2	19 52.7	+53.6	21.4	20 48.6	+53.8	21.5	21 44.4	+54.0	21.7	22 40.1	+54.2	21.8	23 35.8	+54.3	22.0	57
58	17 58.0	+53.0	20.5	18 54.1	+53.2	20.6	19 50.3	+53.3	20.8	20 46.3	+53.6	20.9	21 42.4	+53.7	21.0	22 38.4	+53.8	21.2	23 34.3	+54.0	21.3	24 30.1	+54.3	21.5	58
59	18 51.0	+52.9	20.0	19 47.3	+53.1	20.1	20 43.6	+53.3	20.3	21 39.9	+53.4	20.4	22 36.1	+53.6	20.6	23 32.2	+53.8	20.7	24 28.3	+54.0	20.9	25 24.4	+54.1	21.0	59
60	19 43.9	+52.8	19.5	20 40.4	+53.0	19.7	21 36.9	+53.2	19.8	22 33.3	+53.4	19.9	23 29.7	+53.5	20.1	24 26.0	+53.7	20.2	25 22.3	+53.9	20.4	26 18.5	+54.1	20.5	60
61	20 36.7	+52.7	19.0	21 33.4	+52.9	19.2	22 30.1	+53.1	19.3	23 26.7	+53.2	19.4	24 23.2	+53.5	19.6	25 19.7	+53.6	19.7	26 16.2	+53.8	19.9	27 12.6	+53.9	20.1	61
62	21 29.4	+52.7	18.5	22 26.3	+52.8	18.6	23 23.2	+52.9	18.8	24 19.9	+53.2	18.9	25 16.7	+53.3	19.1	26 13.3	+53.5	19.2	27 10.0	+53.6	19.4	28 06.5	+53.9	19.6	62
63	22 22.1	+52.5	18.0	23 19.1	+52.8	18.1	24 16.1	+52.9	18.3	25 13.1	+53.0	18.4	26 10.0	+53.2	18.6	27 06.8	+53.4	18.7	28 03.6	+53.6	18.9	29 00.4	+53.7	19.1	63
64	23 14.6	+52.5	17.5	24 11.9	+52.6	17.6	25 09.0	+52.8	17.7	26 06.1	+53.0	17.9	27 03.2	+53.1	18.0	28 00.2	+53.3	18.2	28 57.2	+53.4	18.4	29 54.1	+53.6	18.6	64
65	24 07.1	+52.3	16.9	25 04.5	+52.4	17.1	26 01.8	+52.6	17.2	26 59.1	+52.8	17.4	27 56.3	+53.0	17.5	28 53.5	+53.2	17.7	29 50.6	+53.4	17.9	30 47.7	+53.5	18.0	65
66	24 59.4	+52.2	16.4	25 56.9	+52.4	16.5	26 54.4	+52.5	16.7	27 51.9	+52.7	16.8	28 49.3	+52.9	17.0	29 46.7	+53.0	17.2	30 44.0	+53.1	17.3	31 41.2	+53.4	17.5	66
67	25 51.6	+52.1	15.9	26 49.3	+52.3	16.0	27 47.0	+52.4	16.1	28 44.6	+52.5	16.3	29 42.2	+52.7	16.4	30 39.7	+52.9	16.6	31 37.1	+53.1	16.8	32 34.6	+53.2	17.0	67
68	26 43.7	+52.0	15.3	27 41.6	+52.1	15.5	28 39.4	+52.2	15.6	29 37.1	+52.5	15.7	30 34.9	+52.6	15.9	31 32.6	+52.7	16.1	32 30.2	+52.9	16.2	33 27.8	+53.0	16.4	68
69	27 35.7	+51.8	14.7	28 33.7	+51.9	14.9	29 31.6	+52.0	15.0	30 29.6	+52.2	15.2	31 27.5	+52.4	15.3	32 25.3	+52.6	15.5	33 23.1	+52.7	15.7	34 20.8	+52.9	15.9	69
70	28 27.5	+51.7	14.2	29 25.6	+51.9	14.3	30 23.8	+51.9	14.5	31 21.8	+52.2	14.6	32 19.9	+52.3	14.8	33 17.9	+52.4	14.9	34 15.8	+52.6	15.1	35 13.7	+52.8	15.3	70
71	29 19.2	+51.5	13.6	30 17.5	+51.6	13.7	31 15.7	+51.8	13.9	32 13.6	+51.9	14.0	33 12.2	+52.1	14.2	34 10.3	+52.3	14.3	35 08.4	+52.4	14.5	36 06.5	+52.5	14.7	71
72	30 10.7	+51.3	13.0	31 09.1	+51.6	13.1	32 07.5	+51.7	13.3	33 05.9	+51.7	13.4	34 04.3	+51.9	13.6	35 02.6	+52.0	13.7	36 00.8	+52.2	13.9	36 59.0	+52.4	14.1	72
73	31 02.0	+51.2	12.4	32 00.6	+51.3	12.5	32 59.2	+51.4	12.7	33 57.7	+51.6	12.8	34 56.2	+51.7	13.0	35 54.6	+51.9	13.1	36 53.0	+52.1	13.3	37 51.4	+52.2	13.5	73
74	31 53.2	+51.0	11.8	32 51.9	+51.2	11.9	33 50.6	+51.3	12.1	34 49.3	+51.4	12.2	35 47.9	+51.6	12.3	36 46.5	+51.7	12.5	37 45.1	+51.8	12.7	38 43.6	+52.0	12.8	74
75	32 44.2	+50.9	11.2	33 43.1	+50.9	11.3	34 41.9	+51.1	11.4	35 40.7	+51.2	11.6	36 39.5	+51.3	11.7	37 38.2	+51.5	11.9	38 36.9	+51.6	12.0	39 35.6	+51.7	12.2	75
76	33 35.0	+50.7	10.5	34 34.0	+50.8	10.7	35 33.0	+50.8	10.8	36 31.9	+51.0	10.9	37 30.8	+51.1	11.1	38 29.7	+51.2	11.2	39 28.5	+51.4	11.4	40 27.3	+51.5	11.5	76
77	34 25.7	+50.4	9.9	35 24.8	+50.5	10.0	36 23.8	+50.7	10.1	37 22.9	+50.8	10.3	38 21.9	+50.9	10.4	39 20.9	+51.0	10.5	40 19.9	+51.1	10.7	41 18.8	+51.3	10.9	77
78	35 16.1	+50.2	9.2	36 15.3	+50.3	9.3	37 14.5	+50.4	9.5	38 13.7	+50.5	9.6	39 12.8	+50.7	9.7	40 11.9	+50.8	9.9	41 11.0	+50.9	10.0	42 10.1	+51.0	10.2	78
79	36 06.3	+49.9	8.5	37 05.6	+50.1	8.7	38 04.9	+50.2	8.8	39 04.2	+50.3	8.9	40 03.5	+50.4	9.0	41 02.7	+50.5	9.2	42 01.9	+50.7	9.3	43 01.1	+50.8	9.5	79
80	36 56.2	+49.8	7.9	37 55.7	+49.8	8.0	38 55.1	+49.9	8.1	39 54.5	+50.0	8.2	40 53.9	+50.1	8.3	41 53.2	+50.2	8.4	42 52.6	+50.3	8.6	43 51.9	+50.4	8.7	80
81	37 46.0	+49.4	7.2	38 45.5	+49.5	7.3	39 45.0	+49.6	7.4	40 44.5	+49.7	7.5	41 44.0	+49.8	7.6	42 43.4	+50.0	7.7	43 42.9	+50.0	7.8	44 42.3	+50.2	8.0	81
82	38 35.4	+49.2	6.4	39 35.0	+49.3	6.5	40 34.6	+49.4	6.6	41 34.2	+49.5	6.7	42 33.8	+49.5	6.8	43 33.4	+49.6	6.9	44 32.9	+49.7	7.1	45 32.5	+49.8	7.2	82
83	39 24.6	+48.9	5.7	40 24.3	+49.0	5.8	41 24.0	+49.0	5.9	42 23.7	+49.1	6.0	43 23.3	+49.3	6.1	44 23.0	+49.3	6.2	45 22.6	+49.4	6.3	46 22.3	+49.5	6.4	83
84	40 13.5	+48.6	4.9	41 13.3	+48.6	5.0	42 13.0	+48.7	5.1	43 12.8	+48.8	5.2	44 12.6	+48.8	5.3	45 12.3	+48.9	5.4	46 12.0	+49.1	5.5	47 11.8	+49.1	5.6	84
85	41 02.1	+48.3	4.2	42 01.9	+48.4	4.2	43 01.8	+48.4	4.3	44 01.6	+48.5	4.4	45 01.4	+48.5	4.5	46 01.2	+48.6	4.5	47 01.1	+48.6	4.6	48 00.9	+48.7	4.7	85
86	41 50.4	+47.9	3.4	42 50.3	+48.0	3.4	43 50.2	+48.0	3.5	44 50.1	+48.1	3.5	45 49.9	+48.2	3.6	46 49.8	+48.2	3.7	47 49.7	+48.2	3.7	48 49.6	+48.3	3.8	86
87	42 38.3	+47.6	2.6	43 38.3	+47.7	2.6	44 38.3	+47.7	2.7	45 38.2	+47.7	2.7	46 38.1	+47.7	2.7	47 38.0	+47.9	2.7	48 37.9	+47.9	2.8	49 37.9	+47.8	2.9	87
88	43 25.9	+47.3	1.7	44 25.9	+47.3	1.8	45 25.9	+47.3	1.8	46 25.9	+47.2	1.8	47 25.8	+47.3	1.9	48 25.8	+47.3	1.9	49 25.8	+47.3	1.9	50 25.7	+47.4	2.0	88
89	44 13.2	+46.8	0.9	45 13.2	+46.8	0.9	46 13.2	+46.8	0.9	47 13.1	+46.9	0.9	48 13.1	+46.9	0.9	49 13.1	+46.9	1.0	50 13.1	+46.9	1.0	51 13.1	+46.9	1.0	89
90	45 00.0	+46.4	0.0	46 00.0	+46.4	0.0	47 00.0	+46.4	0.0	48 00.0	+46.4	0.0	49 00.0	+46.4	0.0	50 00.0	+46.4	0.0	51 00.0	+46.4	0.0	52 00.0	+46.4	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 141°, 219°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	32 47.9	+50.3	130.1	32 09.0	+50.9	130.6	31 29.8	+51.3	131.1	30 50.2	+51.8	131.5	30 10.2	+52.3	132.0	29 29.9	+52.8	132.4	28 49.3	+53.2	132.8	28 08.4	+53.5	133.2	0
1	33 38.2	+50.2	129.5	32 59.9	+50.7	130.0	32 21.1	+51.2	130.5	31 42.0	+51.7	130.9	31 02.5	+52.2	131.4	30 22.7	+52.6	131.8	29 42.5	+53.0	132.3	29 01.9	+53.5	132.7	1
2	34 28.4	+49.9	128.8	33 50.6	+50.5	129.3	33 12.3	+51.1	129.8	32 33.7	+51.5	130.3	31 54.7	+52.0	130.8	31 15.3	+52.4	131.3	30 35.5	+52.9	131.7	29 55.4	+53.3	132.2	2
3	35 18.3	+49.8	128.1	34 41.1	+50.1	128.7	34 03.4	+50.8	129.2	33 25.2	+51.3	129.7	32 46.7	+51.8	130.2	32 07.7	+52.3	130.7	31 28.4	+52.7	131.2	30 48.7	+53.2	131.6	3
4	36 08.1	+49.4	127.4	35 31.3	+50.1	128.0	34 54.2	+50.6	128.6	34 16.5	+51.2	129.1	33 38.5	+51.6	129.6	33 00.0	+52.1	130.1	32 21.1	+52.6	130.6	31 41.9	+53.0	131.1	4
5	36 57.5	+49.3	126.7	36 21.4	+49.8	127.3	35 44.8	+50.3	127.9	35 07.7	+50.9	128.5	34 30.1	+51.5	129.0	33 52.1	+52.0	129.5	33 13.7	+52.5	130.0	32 34.9	+52.9	130.5	5
6	37 46.8	+48.9	126.0	37 11.2	+49.6	126.6	36 35.1	+50.2	127.2	35 58.6	+50.7	127.8	35 21.6	+51.2	128.4	34 44.1	+51.8	128.9	34 06.2	+52.2	129.5	33 27.8	+52.8	130.0	6
7	38 35.7	+48.7	125.3	38 00.8	+49.3	125.9	37 25.3	+49.9	126.6	36 49.3	+50.5	127.2	36 12.8	+51.1	127.7	35 35.9	+51.5	128.3	34 58.4	+52.1	128.9	34 20.6	+52.5	129.4	7
8	39 24.4	+48.3	124.5	38 50.1	+49.0	125.2	38 15.2	+49.7	125.8	37 39.8	+50.3	126.5	37 03.9	+50.8	127.1	36 27.4	+51.4	127.7	35 50.5	+51.9	128.3	35 13.1	+52.4	128.8	8
9	40 12.7	+48.1	123.8	39 39.1	+48.7	124.5	39 04.9	+49.3	125.1	38 30.1	+50.0	125.8	37 54.7	+50.6	126.4	37 18.8	+51.2	127.0	36 42.4	+51.7	127.6	36 05.5	+52.3	128.2	9
10	41 00.8	+47.7	123.0	40 27.8	+48.4	123.7	39 54.2	+49.1	124.4	39 20.1	+49.7	125.1	38 45.3	+50.3	125.7	38 10.0	+50.9	126.4	37 34.1	+51.5	127.0	36 57.8	+52.0	127.6	10
11	41 48.5	+47.4	122.2	41 16.2	+48.1	122.9	40 43.3	+48.8	123.6	40 09.8	+49.4	124.3	39 35.6	+50.1	125.0	39 00.9	+50.7	125.7	38 25.6	+51.3	126.3	37 49.8	+51.8	127.0	11
12	42 35.9	+47.0	121.3	42 04.3	+47.8	122.1	41 32.1	+48.5	122.9	40 59.2	+49.2	123.6	40 25.7	+49.8	124.3	39 51.6	+50.4	125.0	39 16.9	+51.0	125.7	38 41.6	+51.6	126.3	12
13	43 22.9	+46.6	120.5	42 52.1	+47.4	121.3	42 20.6	+48.1	122.1	41 48.4	+48.8	122.8	41 15.5	+49.5	123.6	40 42.0	+50.2	124.3	40 07.9	+50.8	125.0	39 33.2	+51.4	125.7	13
14	44 09.5	+46.2	119.6	43 39.5	+47.0	120.4	43 08.7	+47.8	121.3	42 37.2	+48.6	122.1	42 05.1	+49.2	122.8	41 32.2	+49.9	123.6	40 58.7	+50.5	124.3	40 24.6	+51.1	125.0	14
15	44 55.7	+45.8	118.7	44 26.5	+46.6	119.6	43 56.5	+47.4	120.4	43 25.8	+48.1	121.2	42 54.3	+48.9	122.0	42 22.1	+49.6	122.8	41 49.2	+50.3	123.6	41 15.7	+50.9	124.3	15
16	45 41.5	+45.4	117.8	45 13.1	+46.2	118.7	44 43.9	+47.0	119.6	44 13.9	+47.8	120.4	43 43.2	+48.5	121.2	43 11.7	+49.3	122.1	42 39.5	+49.9	122.8	42 06.6	+50.6	123.6	16
17	46 26.9	+44.8	116.9	45 59.3	+45.8	117.8	45 30.9	+46.6	118.7	45 01.7	+47.4	119.6	44 31.7	+48.2	120.4	44 01.0	+48.9	121.3	43 29.4	+49.7	122.1	42 57.2	+50.4	122.9	17
18	47 11.7	+44.3	115.9	46 45.1	+45.2	116.8	46 17.5	+46.2	117.8	45 49.1	+47.0	118.7	45 19.9	+47.8	119.6	44 49.9	+48.6	120.5	44 19.1	+49.3	121.3	43 47.6	+50.0	122.1	18
19	47 56.0	+43.9	114.9	47 30.3	+44.8	115.9	47 03.7	+45.8	116.9	46 36.1	+46.6	117.8	46 07.7	+47.4	118.7	45 38.5	+48.2	119.6	45 08.4	+49.0	120.5	44 37.6	+49.7	121.4	19
20	48 39.9	+43.2	113.9	48 15.1	+44.2	114.9	47 49.4	+45.2	115.9	47 22.7	+46.1	116.9	46 55.1	+47.0	117.8	46 26.7	+47.8	118.8	45 57.4	+48.6	119.7	45 27.3	+49.4	120.6	20
21	49 23.1	+42.7	112.8	48 59.3	+43.7	113.9	48 34.6	+44.6	114.9	48 08.8	+45.6	115.9	47 42.1	+46.5	116.9	47 14.5	+47.4	117.9	46 46.0	+48.2	118.8	46 16.7	+49.0	119.7	21
22	50 05.8	+42.0	111.7	49 43.0	+43.1	112.8	49 19.2	+44.2	113.9	48 54.4	+45.1	114.9	48 28.6	+46.1	116.0	48 01.9	+46.9	117.0	47 34.2	+47.8	118.0	47 05.7	+48.6	118.9	22
23	50 47.8	+41.3	110.6	50 26.1	+42.5	111.7	50 03.4	+43.5	112.8	49 39.5	+44.6	113.9	49 14.7	+45.5	115.0	48 48.8	+46.5	116.0	48 22.0	+47.4	117.0	47 54.3	+48.2	118.0	23
24	51 29.1	+40.7	109.4	51 08.6	+41.8	110.6	50 46.9	+42.9	111.8	50 24.1	+44.0	112.9	50 00.2	+45.0	114.0	49 35.3	+46.0	115.1	49 09.4	+46.9	116.1	48 42.5	+47.8	117.1	24
25	52 09.8	+39.9	108.2	51 50.4	+41.1	109.5	51 29.8	+42.3	110.6	51 08.1	+43.4	111.8	50 45.2	+44.5	113.0	50 21.3	+45.5	114.1	49 56.3	+46.4	115.2	49 30.3	+47.3	116.2	25
26	52 49.7	+39.1	107.0	52 31.5	+40.4	108.3	52 12.1	+41.6	109.5	51 51.5	+42.7	110.7	51 29.7	+43.8	111.9	51 06.8	+44.8	113.0	50 42.7	+45.9	114.2	50 17.6	+46.9	115.3	26
27	53 28.8	+38.3	105.8	53 11.9	+39.6	107.0	52 53.7	+40.8	108.3	52 34.2	+42.0	109.6	52 13.5	+43.2	110.8	51 51.6	+44.3	112.0	51 28.6	+45.4	113.1	51 04.5	+46.3	114.3	27
28	54 07.1	+37.5	104.5	53 51.5	+38.8	105.8	53 34.5	+40.1	107.1	53 16.2	+41.4	108.4	52 56.7	+42.5	109.6	52 35.9	+43.7	110.9	52 14.0	+44.7	112.1	51 50.8	+45.8	113.3	28
29	54 44.6	+36.5	103.1	54 30.3	+37.9	104.5	54 14.6	+39.2	105.8	53 57.6	+40.5	107.2	53 39.2	+41.8	108.5	53 19.6	+43.0	109.7	52 58.7	+44.1	111.0	52 36.6	+45.2	112.2	29
30	55 21.1	+35.6	101.7	55 08.2	+37.0	103.1	54 53.8	+38.4	104.5	54 38.1	+39.7	105.9	54 21.0	+41.0	107.2	54 02.6	+42.2	108.6	53 42.8	+43.5	109.8	53 21.8	+44.6	111.1	30
31	55 56.7	+34.5	100.3	55 45.2	+36.0	101.7	55 32.2	+37.3	103.2	55 17.8	+38.9	104.6	55 02.0	+40.2	106.0	54 44.8	+41.5	107.3	54 26.3	+42.7	108.7	54 06.4	+44.0	110.0	31
32	56 31.2	+33.4	98.8	56 21.2	+35.0	100.3	56 09.7	+36.5	101.8	55 56.7	+38.0	103.2	55 42.2	+39.4	104.7	55 26.3	+40.7	106.1	55 09.0	+42.0	107.5	54 50.4	+43.2	108.8	32
33	57 04.6	+32.4	97.3	56 56.2	+33.9	98.8	56 46.2	+35.5	100.3	56 34.7	+37.0	101.8	56 21.6	+38.4	103.3	56 07.0	+39.9	104.8	55 51.0	+41.2	106.2	55 33.6	+42.5	107.6	33
34	57 37.0	+31.1	95.8	57 30.1	+32.8	97.3	57 21.7	+34.4	98.9	57 11.7	+35.9	100.4	57 00.0	+37.5	101.9	56 46.9	+38.9	103.4	56 32.2	+40.4	104.9	56 16.1	+41.9	106.3	34
35	58 08.1	+29.9	94.1	58 02.9	+31.6	95.7	57 56.1	+33.3	97.3	57 47.6	+34.9	98.9	57 37.5	+36.5	100.5	57 25.8	+38.0	102.0	57 12.6	+39.4	103.5	56 57.8	+40.8	105.0	35
36	58 38.0	+28.6	92.5	58 34.5	+30.4	94.1	58 29.4	+32.0	95.8	58 22.5	+33.7	97.4	58 14.0	+35.3	99.0	58 03.8	+36.9	100.6	57 52.0	+38.5	102.1	57 38.6	+39.9	103.7	36
37	59 06.6	+27.2	90.8	59 04.9	+29.0	92.5	59 01.4	+30.8	94.1	58 56.2	+32.6	95.8	58 49.3	+34.3	97.4	58 40.7	+35.9	99.1	58 30.5	+37.4	100.7	58 18.5	+39.0	102.3	37
38	59 33.8	+25.7	89.0	59 33.9	+27.6	90.7	59 32.2	+29.5	92.4	59 28.8	+31.2	94.1	59 23.6	+33.0	95.8	59 16.6	+34.7	97.5	59 07.9	+36.4	99.2	58 57.5	+37.9	100.8	38
39	59 59.5	+24.3	87.2	60 01.5	+26.2	89.0	60 01.7	+28.0	90.7	60 00.0	+29.9	92.4	59 56.6	+31.7	94.2	59 51.3	+33.5	95.9	59 44.3	+35.1	97.6	59 35.4	+36.9	99.3	39
40	60 23.8	+22.7	85.4	60 27.7	+24.7	87.2	60 29.7	+26.6	88.9	60 29.9	+28.5	90.7	60 28.3	+30.3	92.5	60 24.8	+32.2	94.2	60 19.4	+34.0	96.0	60 12.3	+35.7	97.7	40
41	60 46.5	+21.1	83.5	60 52.4	+23.0	85.3	60 56.3	+25.1	87.1	60 58.4	+27.1	88.9	60 58.6	+29.0	90.7	60 57.0	+30.8	92.5	60 53.4	+32.7	94.3	60 48.0	+34.5	96.1	41
42	61 07.6	+19.4	81.6	61 15.4	+21.5	83.4	61 21.4	+23.5	85.2	61 25.5	+25.4	87.0	61 27.6	+27.4	88.9	61 27.8	+29.4	90.7	61 26.1	+31.3	92.6	61 22.5	+33.1	94.4	42
43	61 27.0	+17.7	79.6	61 36.9	+19.7	81.4	61 44.9	+21.7	83.3	61 50.9	+23.8	85.1	61 55.0	+25.9	87.0	61 57.2	+27.8	88.9	61 57.4	+29.8	90.8	61 55.6	+31.8	92.6	43
44	61 44.7	+15.8	77.6	61 56.6	+18.0	79.4	62 06.6	+20.1	81.3	62 14.7	+22.2	83.2	62 20.9	+24.2	85.1	62 25.0	+26.3	87.0	62 27.2	+28.3	88.9	62 27.4	+30.3	90.8	44
45	62 00.5	+14.1	75.6	62 14.6	+16.1	77.4	62 26.7	+18.2	79.3	62 36.9	+20.4	81.2	62 45.1	+22.5	83.1	62 51.3	+24.6	85.0	62 55.5	+26.7	87.0	62 57.7	+28.7	88.9	45
46	62 14.6	+12.1	73.5	62 30.7	+14.2	75.3	62 44.9	+16.4	77.2	62 57.3	+18.5	79.1	63 07.6	+20.7	81.1	63 15.9	+22.9	83.0	63 22.2	+25.0	85.0	63 26.4	+27.1	87.0	46
47	62 26.7	+10.2	71.4	62 44.9	+12.4	73.2	63 01.3	+14.5	75.1	63 15.8	+16.6	77.0	63 28.3	+18.9	79.0	63 38.8	+21.0	80.9	63 47.2	+23.2	82.9	63 53.5	+25.4	85.0	47
48	62 36.9	+8.2	69.2	62 57.3	+10.3	71.1	63 15.8	+12.5	72.9	63 32.4	+14.7	74.9	63 47.1	+16.9	76.8	63 59.8	+19.1	78.8	64 10.4	+21.3	80.8	64 18.9	+23.5	82.9	48
49	62 45.1	+6.2	67.1	63 07.6	+8.3	68.9	63 28.3	+10.5	70.8	63 47.1	+12.7	72.7	64 04.0	+14.9	74.6	64 18.9	+17.1	76.6	64 31.7	+19.4	78.7	64 42.4	+21.7	80.8	49
50	62 51.3	+4.2	64.9	63 15.9	+6.3	66.7	63 38.8	+8.4	68.6	63 59.8	+10.6	70.5	64 18.9	+12.8	72.4	64 36.0	+15.1	74.4	64 51.1	+17.3	76.5	65 04.1	+19.6	78.6	50
51	62 55.5	+2.2	62.7	63 22.2	+4.2	64.5	63 47.2	+6.3	66.3	64 10.4	+8.5	68.2	64 31.7	+10.7	70.2	64 51.1	+13.0	72.2	65 08.4	+15.3	74.2	65 23.7	+17.6	76.3	51
52	62 57.7	0.0	60.5	63 26.4	+2.1	62.3	63 53.5	+4.2	64.1	64 18.9	+6.3	65.9	64 42.4	+8.6	67.9	65 04.1	+10.8	69.8	65 23.7	+13.1	71.9	65 41.3	+15.5	74.0	52
53	62 57.7	−1.9	58.3	63 28.5	0.0	60.0	63 57.7	+2.0	61.8	64 25.2	+4.2	63.6	64 51.0	+6.3	65.5	65 14.9	+8.6	67.5	65 36.8	+10.9	69.5	65 56.8	+13.2	71.6	53
54	62 55.8	−4.0	56.1	63 28.5	−2.1	57.8	63 59.7	0.0	59.5	64 29.4	+2.0	61.3	64 57.3	+4.1	63.2	65 23.5	+6.3	65.1	65 47.7	+8.7	67.2	66 10.1	+11.0	69.2	54
55	62 51.8	−6.0	53.9	63 26.4	−4.1	55.5	63 59.7	−2.3	57.2	64 31.4	−0.3	59.0	65 01.4	+1.9	60.8	65 29.8	+4.1	62.7	65 56.4	+6.3	64.7	66 21.0	+8.6	66.8	55
56	62 45.8	−8.1	51.8	63 22.3	−6.3	53.3	63 57.4	−4.3	55.0	64 31.1	−2.4	56.7	65 03.3	−0.3	58.5	65 33.9	+1.7	60.3	66 02.7	+4.0	62.3	66 29.6	+6.3	64.3	56
57	62 37.7	−10.0	49.6	63 16.0	−8.3	51.1	63 53.1	−6.5	52.7	64 28.7	−4.6	54.3	65 03.0	−2.6	56.1	65 35.6	−0.5	57.9	66 06.7	+1.6	59.8	66 35.9	+3.9	61.8	57
58	62 27.7	−11.9	47.5	63 07.7	−10.3	48.9	63 46.6	−8.6	50.4	64 24.1	−6.7	52.0	65 00.4	−4.9	53.7	65 35.1	−2.8	55.5	66 08.3	−0.7	57.4	66 39.8	+1.5	59.3	58
59	62 15.8	−13.9	45.3	62 57.4	−12.3	46.7	63 38.0	−10.6	48.2	64 17.4	−8.9	49.7	64 55.5	−7.0	51.4	65 32.3	−5.2	53.1	66 07.6	−3.1	54.9	66 41.3	−1.0	56.8	59
60	62 01.9	−15.7	43.3	62 45.1	−14.2	44.6	63 27.4	−12.7	46.0	64 08.5	−11.0	47.5	64 48.5	−9.3	49.0	65 27.1	−7.4	50.7	66 04.5	−5.5	52.4	66 40.3	−3.4	54.3	60
61	61 46.2	−17.5	41.2	62 30.9	−16.1	42.5	63 14.7	−14.6	43.8	63 57.5	−13.1	45.2	64 39.2	−11.4	46.7	65 19.7	−9.6	48.3	65 59.0	−7.8	50.0	66 36.9	−5.8	51.7	61
62	61 28.7	−19.2	39.2	62 14.8	−17.9	40.4	63 00.1	−16.5	41.7	63 44.4	−15.0	43.0	64 27.8	−13.5	44.4	65 10.1	−11.8	45.9	65 51.2	−10.0	47.5	66 31.1	−8.2	49.2	62
63	61 09.5	−21.0	37.2	61 56.9	−19.7	38.4	62 43.6	−18.4	39.6	63 29.4	−17.0	40.8	64 14.3	−15.5	42.2	64 58.3	−14.0	43.6	65 41.2	−12.3	45.1	66 22.9	−10.5	46.8	63
64	60 48.5	−22.5	35.3	61 37.2	−21.4	36.4	62 25.2	−20.2	37.5	63 12.4	−18.9	38.7	63 58.8	−17.5	40.0	64 44.3	−16.0	41.3	65 28.9	−14.5	42.8	66 12.4	−12.8	44.3	64
65	60 26.0	−24.2	33.4	61 15.8	−23.1	34.4	62 05.0	−22.0	35.5	62 53.5	−20.7	36.6	63 41.3	−19.4	37.8	64 28.3	−18.1	39.1	65 14.4	−16.6	40.4	65 59.6	−15.0	41.9	65
66	60 01.8	−25.6	31.6	60 52.7	−24.6	32.5	61 43.0	−23.6	33.5	62 32.8	−22.5	34.5	63 21.9	−21.3	35.7	64 10.2	−20.0	36.9	64 57.8	−18.6	38.2	65 44.6	−17.2	39.5	66
67	59 36.2	−27.1	29.8	60 28.1	−26.2	30.6	61 19.4	−25.1	31.6	62 10.3	−24.1	32.5	63 00.6	−23.1	33.6	63 50.2	−21.8	34.7	64 39.2	−20.6	35.9	65 27.4	−19.3	37.2	67
68	59 09.1	−28.4	28.0	60 01.9	−27.6	28.8	60 54.3	−26.8	29.7	61 46.2	−25.8	30.6	62 37.5	−24.7	31.6	63 28.4	−23.7	32.6	64 18.6	−22.5	33.7	65 08.1	−21.2	34.9	68
69	58 40.7	−29.8	26.3	59 34.3	−29.0	27.1	60 27.5	−28.1	27.9	61 20.4	−27.3	28.7	62 12.8	−26.4	29.6	63 04.7	−25.4	30.6	63 56.1	−24.3	31.6	64 46.9	−23.2	32.7	69
70	58 10.9	−31.0	24.6	59 05.3	−30.3	25.3	59 59.4	−29.6	26.1	60 53.1	−28.8	26.9	61 46.4	−27.9	27.7	62 39.3	−27.0	28.6	63 31.8	−26.1	29.6	64 23.7	−25.0	30.6	70
71	57 39.9	−32.2	23.0	58 35.0	−31.6	23.7	59 29.8	−30.9	24.3	60 24.3	−30.2	25.1	61 18.5	−29.4	25.8	62 12.3	−28.6	26.7	63 05.7	−27.7	27.5	63 58.7	−26.8	28.5	71
72	57 07.7	−33.4	21.5	58 03.4	−32.8	22.1	58 58.9	−32.2	22.7	59 54.1	−31.5	23.3	60 49.1	−30.8	24.0	61 43.7	−30.1	24.8	62 38.0	−29.3	25.6	63 31.9	−28.4	26.5	72
73	56 34.3	−34.4	19.9	57 30.6	−33.9	20.5	58 26.7	−33.3	21.0	59 22.6	−32.7	21.7	60 18.3	−32.2	22.3	61 13.6	−31.4	23.0	62 08.7	−30.7	23.7	63 03.5	−30.0	24.5	73
74	55 59.9	−35.5	18.5	56 56.7	−35.0	19.0	57 53.4	−34.5	19.5	58 49.9	−34.0	20.0	59 46.1	−33.4	20.6	60 42.2	−32.8	21.2	61 38.0	−32.2	21.9	62 33.5	−31.5	22.6	74
75	55 24.4	−36.4	17.0	56 21.7	−36.0	17.5	57 18.9	−35.5	17.9	58 15.9	−35.1	18.4	59 12.7	−34.6	19.0	60 09.4	−34.1	19.5	61 05.8	−33.5	20.1	62 02.0	−32.8	20.8	75
76	54 48.0	−37.3	15.7	55 45.7	−37.0	16.0	56 43.3	−36.6	16.5	57 40.8	−36.2	16.9	58 38.1	−35.7	17.4	59 35.3	−35.2	17.9	60 32.3	−34.7	18.4	61 29.2	−34.3	19.0	76
77	54 10.7	−38.3	14.3	55 08.7	−37.9	14.7	56 06.7	−37.5	15.0	57 04.6	−37.1	15.4	58 02.4	−36.8	15.9	59 00.1	−36.4	16.3	59 57.6	−35.9	16.8	60 54.9	−35.4	17.3	77
78	53 32.4	−39.0	13.0	54 30.8	−38.7	13.3	55 29.2	−38.5	13.6	56 27.5	−38.2	14.0	57 25.6	−37.8	14.4	58 23.7	−37.4	14.8	59 21.7	−37.1	15.2	60 19.5	−36.6	15.7	78
79	52 53.4	−39.9	11.7	53 52.1	−39.6	12.0	54 50.7	−39.3	12.3	55 49.3	−39.0	12.6	56 47.8	−38.7	12.9	57 46.3	−38.5	13.3	58 44.6	−38.1	13.7	59 42.9	−37.8	14.1	79
80	52 13.5	−40.6	10.5	53 12.5	−40.4	10.7	54 11.4	−40.1	11.0	55 10.3	−39.9	11.3	56 09.1	−39.6	11.6	57 07.8	−39.3	11.9	58 06.5	−39.0	12.2	59 05.1	−38.7	12.5	80
81	51 32.9	−41.3	9.3	52 32.1	−41.1	9.5	53 31.3	−40.9	9.7	54 30.4	−40.7	10.0	55 29.5	−40.5	10.2	56 28.5	−40.3	10.5	57 27.5	−40.1	10.8	58 26.4	−39.8	11.1	81
82	50 51.6	−41.9	8.1	51 51.0	−41.8	8.3	52 50.4	−41.7	8.5	53 49.7	−41.5	8.7	54 49.0	−41.3	8.9	55 48.2	−41.0	9.2	56 47.4	−40.8	9.4	57 46.6	−40.6	9.7	82
83	50 09.7	−42.6	7.0	51 09.2	−42.5	7.2	52 08.7	−42.3	7.3	53 08.2	−42.1	7.5	54 07.7	−42.0	7.7	55 07.2	−41.9	7.9	56 06.6	−41.7	8.1	57 06.0	−41.6	8.3	83
84	49 27.1	−43.2	5.9	50 26.7	−43.0	6.1	51 26.4	−43.0	6.2	52 26.1	−42.9	6.3	53 25.7	−42.8	6.5	54 25.3	−42.6	6.6	55 24.9	−42.5	6.8	56 24.4	−42.3	7.0	84
85	48 43.9	−43.8	4.9	49 43.7	−43.7	5.0	50 43.4	−43.6	5.1	51 43.2	−43.5	5.2	52 42.9	−43.4	5.3	53 42.7	−43.3	5.4	54 42.4	−43.2	5.6	55 42.1	−43.1	5.7	85
86	48 00.1	−44.3	3.8	49 00.0	−44.2	3.9	49 59.8	−44.1	4.0	50 59.7	−44.1	4.1	51 59.5	−44.0	4.2	52 59.4	−44.0	4.3	53 59.2	−43.9	4.4	54 59.0	−43.8	4.5	86
87	47 15.8	−44.8	2.8	48 15.8	−44.8	2.9	49 15.7	−44.7	3.0	50 15.6	−44.7	3.0	51 15.5	−44.6	3.1	52 15.4	−44.5	3.2	53 15.3	−44.5	3.2	54 15.2	−44.4	3.3	87
88	46 31.0	−45.3	1.9	47 31.0	−45.3	1.9	48 31.0	−45.3	1.9	49 30.9	−45.2	2.0	50 30.9	−45.2	2.0	51 30.9	−45.2	2.1	52 30.8	−45.1	2.1	53 30.8	−45.1	2.2	88
89	45 45.7	−45.7	0.9	46 45.7	−45.7	0.9	47 45.7	−45.7	1.0	48 45.7	−45.7	1.0	49 45.7	−45.7	1.0	50 45.7	−45.7	1.0	51 45.7	−45.7	1.0	52 45.7	−45.7	1.1	89
90	45 00.0	−46.2	0.0	46 00.0	−46.2	0.0	47 00.0	−46.2	0.0	48 00.0	−46.2	0.0	49 00.0	−46.2	0.0	50 00.0	−46.2	0.0	51 00.0	−46.2	0.0	52 00.0	−46.2	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	32 47.9	−50.6	130.1	32 09.0	−51.1	130.6	31 29.8	−51.6	131.1	30 50.2	−52.0	131.5	30 10.2	−52.4	132.0	29 29.9	−52.9	132.4	28 49.3	−53.3	132.8	28 08.4	−53.7	133.2	0
1	31 57.3	−50.8	130.8	31 17.9	−51.2	131.2	30 38.2	−51.7	131.7	29 58.2	−52.2	132.1	29 17.8	−52.6	132.5	28 37.0	−53.0	132.9	27 56.0	−53.4	133.3	27 14.7	−53.8	133.7	1
2	31 06.5	−50.9	131.4	30 26.7	−51.4	131.8	29 46.5	−51.8	132.3	29 06.0	−52.3	132.7	28 25.2	−52.7	133.1	27 44.0	−53.1	133.5	27 02.6	−53.5	133.8	26 20.9	−53.8	134.2	2
3	30 15.6	−51.1	132.0	29 35.3	−51.6	132.4	28 54.7	−52.1	132.8	28 13.7	−52.4	133.2	27 32.5	−52.9	133.6	26 50.9	−53.2	134.0	26 09.1	−53.6	134.3	25 27.1	−54.0	134.7	3
4	29 24.5	−51.3	132.6	28 43.7	−51.7	133.0	28 02.6	−52.1	133.4	27 21.3	−52.6	133.8	26 39.6	−52.9	134.2	25 57.7	−53.3	134.5	25 15.5	−53.7	134.8	24 33.1	−54.1	135.2	4
5	28 33.2	−51.4	133.2	27 52.0	−51.8	133.6	27 10.5	−52.3	134.0	26 28.7	−52.7	134.3	25 46.7	−53.1	134.7	25 04.4	−53.5	135.0	24 21.8	−53.8	135.3	23 39.0	−54.1	135.6	5
6	27 41.8	−51.5	133.8	27 00.2	−52.0	134.2	26 18.2	−52.4	134.5	25 36.0	−52.8	134.9	24 53.6	−53.2	135.2	24 10.9	−53.5	135.5	23 28.0	−53.9	135.8	22 44.9	−54.3	136.1	6
7	26 50.3	−51.7	134.4	26 08.2	−52.1	134.7	25 25.8	−52.5	135.1	24 43.2	−52.9	135.4	24 00.4	−53.3	135.7	23 17.4	−53.7	136.0	22 34.1	−54.0	136.3	21 50.6	−54.3	136.6	7
8	25 58.6	−51.9	134.9	25 16.1	−52.3	135.3	24 33.3	−52.6	135.6	23 50.3	−53.0	135.9	23 07.1	−53.3	136.2	22 23.7	−53.7	136.5	21 40.1	−54.0	136.8	20 56.3	−54.4	137.0	8
9	25 06.7	−51.9	135.5	24 23.8	−52.3	135.8	23 40.7	−52.7	136.1	22 57.3	−53.1	136.4	22 13.8	−53.5	136.7	21 30.0	−53.8	137.0	20 46.1	−54.2	137.2	20 01.9	−54.4	137.5	9
10	24 14.8	−52.1	136.0	23 31.5	−52.5	136.3	22 48.0	−52.9	136.6	22 04.2	−53.1	136.9	21 20.3	−53.5	137.2	20 36.2	−53.9	137.4	19 51.9	−54.2	137.7	19 07.5	−54.5	137.9	10
11	23 22.7	−52.2	136.6	22 39.0	−52.5	136.9	21 55.1	−52.9	137.1	21 11.1	−53.3	137.4	20 26.8	−53.6	137.7	19 42.3	−53.9	137.9	18 57.7	−54.2	138.1	18 13.0	−54.6	138.4	11
12	22 30.5	−52.3	137.1	21 46.5	−52.7	137.4	21 02.2	−53.0	137.7	20 17.8	−53.4	137.9	19 33.2	−53.7	138.1	18 48.4	−54.0	138.4	18 03.5	−54.4	138.6	17 18.4	−54.6	138.8	12
13	21 38.2	−52.4	137.6	20 53.8	−52.7	137.9	20 09.2	−53.1	138.2	19 24.4	−53.4	138.4	18 39.5	−53.8	138.6	17 54.4	−54.1	138.8	17 09.1	−54.4	139.0	16 23.8	−54.7	139.2	13
14	20 45.8	−52.4	138.2	20 01.1	−52.9	138.4	19 16.1	−53.2	138.6	18 31.0	−53.5	138.9	17 45.7	−53.8	139.1	17 00.3	−54.1	139.3	16 14.7	−54.4	139.5	15 29.1	−54.8	139.7	14
15	19 53.4	−52.6	138.7	19 08.2	−52.9	138.9	18 22.9	−53.2	139.1	17 37.5	−53.6	139.3	16 51.9	−53.9	139.5	16 06.2	−54.2	139.7	15 20.3	−54.5	139.9	14 34.3	−54.7	140.1	15
16	19 00.8	−52.7	139.2	18 15.3	−53.0	139.4	17 29.7	−53.4	139.6	16 43.9	−53.6	139.8	15 58.0	−54.0	140.0	15 12.0	−54.3	140.2	14 25.8	−54.5	140.4	13 39.6	−54.9	140.5	16
17	18 08.1	−52.7	139.7	17 22.3	−53.0	139.9	16 36.3	−53.3	140.1	15 50.3	−53.7	140.3	15 04.0	−54.0	140.5	14 17.7	−54.3	140.6	13 31.3	−54.6	140.8	12 44.7	−54.8	140.9	17
18	17 15.4	−52.8	140.2	16 29.3	−53.2	140.4	15 43.0	−53.5	140.6	14 56.6	−53.8	140.7	14 10.0	−54.0	140.9	13 23.4	−54.3	141.1	12 36.7	−54.6	141.2	11 49.9	−54.9	141.3	18
19	16 22.6	−52.9	140.7	15 36.1	−53.2	140.9	14 49.5	−53.5	141.0	14 02.8	−53.8	141.2	13 16.0	−54.1	141.4	12 29.1	−54.4	141.5	11 42.1	−54.7	141.6	10 55.0	−54.9	141.8	19
20	15 29.7	−52.9	141.2	14 42.9	−53.2	141.4	13 56.0	−53.5	141.5	13 09.0	−53.9	141.7	12 21.9	−54.2	141.8	11 34.7	−54.4	141.9	10 47.4	−54.7	142.1	10 00.1	−55.0	142.2	20
21	14 36.8	−53.0	141.7	13 49.7	−53.3	141.8	13 02.5	−53.7	142.0	12 15.1	−53.9	142.1	11 27.7	−54.1	142.2	10 40.3	−54.5	142.4	9 52.7	−54.7	142.5	9 05.1	−55.0	142.6	21
22	13 43.8	−53.1	142.2	12 56.4	−53.4	142.3	12 08.8	−53.6	142.4	11 21.2	−53.9	142.6	10 33.6	−54.2	142.7	9 45.8	−54.5	142.8	8 58.0	−54.8	142.9	8 10.1	−55.0	143.0	22
23	12 50.7	−53.1	142.6	12 03.0	−53.4	142.8	11 15.2	−53.7	142.9	10 27.3	−54.0	143.0	9 39.4	−54.3	143.1	8 51.3	−54.5	143.2	8 03.2	−54.7	143.3	7 15.1	−55.0	143.4	23
24	11 57.6	−53.1	143.1	11 09.6	−53.4	143.2	10 21.5	−53.7	143.3	9 33.3	−54.0	143.5	8 45.1	−54.3	143.5	7 56.8	−54.5	143.6	7 08.5	−54.8	143.7	6 20.1	−55.1	143.8	24
25	11 04.5	−53.2	143.6	10 16.2	−53.5	143.7	9 27.8	−53.8	143.8	8 39.3	−54.0	143.9	7 50.8	−54.3	144.0	7 02.3	−54.6	144.1	6 13.7	−54.8	144.1	5 25.0	−55.0	144.2	25
26	10 11.3	−53.3	144.1	9 22.7	−53.5	144.2	8 34.0	−53.8	144.2	7 45.3	−54.1	144.3	6 56.5	−54.3	144.4	6 07.7	−54.6	144.5	5 18.9	−54.9	144.5	4 30.0	−55.1	144.6	26
27	9 18.0	−53.2	144.5	8 29.2	−53.6	144.6	7 40.2	−53.8	144.7	6 51.2	−54.1	144.8	6 02.2	−54.4	144.8	5 13.1	−54.6	144.9	4 24.0	−54.8	144.9	3 34.9	−55.1	145.0	27
28	8 24.8	−53.3	145.0	7 35.6	−53.6	145.1	6 46.4	−53.9	145.1	5 57.1	−54.1	145.2	5 07.8	−54.3	145.3	4 18.5	−54.6	145.3	3 29.2	−54.9	145.3	2 39.8	−55.1	145.4	28
29	7 31.5	−53.4	145.5	6 42.0	−53.6	145.5	5 52.5	−53.8	145.6	5 03.0	−54.1	145.6	4 13.5	−54.4	145.7	3 23.9	−54.6	145.7	2 34.3	−54.8	145.8	1 44.7	−55.1	145.8	29
30	6 38.1	−53.3	145.9	5 48.4	−53.6	146.0	4 58.7	−53.9	146.0	4 08.9	−54.1	146.1	3 19.1	−54.4	146.1	2 29.3	−54.6	146.1	1 39.5	−54.9	146.2	0 49.6	−55.1	146.2	30
31	5 44.8	−53.4	146.4	4 54.8	−53.7	146.4	4 04.8	−53.9	146.5	3 14.8	−54.2	146.5	2 24.7	−54.4	146.5	1 34.7	−54.7	146.6	0 44.6	−54.9	146.6	0 05.5	+55.1	33.4	31
32	4 51.4	−53.4	146.8	4 01.1	−53.6	146.9	3 10.9	−53.9	146.9	2 20.6	−54.2	146.9	1 30.3	−54.4	147.0	0 40.0	−54.6	147.0	0 10.3	+54.9	33.0	1 00.6	+55.1	33.0	32
33	3 58.0	−53.4	147.3	3 07.5	−53.7	147.3	2 17.0	−54.0	147.3	1 26.4	−54.1	147.4	0 35.9	−54.4	147.4	0 14.6	+54.7	32.6	1 05.2	+54.8	32.6	1 55.7	+55.1	32.6	33
34	3 04.6	−53.5	147.7	2 13.8	−53.7	147.7	1 23.0	−53.9	147.8	0 32.3	−54.2	147.8	0 18.5	+54.4	32.2	1 09.3	+54.6	32.2	2 00.0	+54.9	32.2	2 50.8	+55.1	32.2	34
35	2 11.1	−53.4	148.2	1 20.1	−53.7	148.2	0 29.1	−53.9	148.2	0 21.9	+54.2	31.8	1 12.9	+54.4	31.8	2 03.9	+54.6	31.8	2 54.9	+54.9	31.8	3 45.9	+55.0	31.8	35
36	1 17.7	−53.5	148.7	0 26.4	−53.6	148.7	0 24.8	+53.9	31.3	1 16.1	+54.1	31.3	2 07.3	+54.4	31.4	2 58.5	+54.6	31.4	3 49.7	+54.9	31.4	4 40.9	+55.0	31.5	36
37	0 24.2	−53.4	149.1	0 27.2	+53.7	30.9	1 18.7	+54.0	30.9	2 10.2	+54.2	30.9	3 01.7	+54.4	30.9	3 53.1	+54.6	31.0	4 44.6	+54.8	31.0	5 36.0	+55.1	31.1	37
38	0 29.2	+53.4	30.4	1 20.9	+53.7	30.4	2 12.7	+53.9	30.5	3 04.4	+54.1	30.5	3 56.1	+54.3	30.5	4 47.7	+54.4	30.6	5 39.4	+54.8	30.6	6 31.0	+55.0	30.7	38
39	1 22.6	+53.5	30.0	2 14.6	+53.7	30.0	3 06.6	+53.9	30.0	3 58.5	+54.1	30.0	4 50.4	+54.4	30.1	5 42.3	+54.6	30.1	6 34.2	+54.8	30.2	7 26.1	+55.0	30.3	39
40	2 16.1	+53.4	29.5	3 08.3	+53.6	29.5	4 00.5	+53.9	29.6	4 52.6	+54.2	29.6	5 44.8	+54.3	29.7	6 36.9	+54.6	29.7	7 29.0	+54.8	29.8	8 21.1	+54.9	29.8	40
41	3 09.5	+53.4	29.1	4 01.9	+53.7	29.1	4 54.4	+53.8	29.1	5 46.8	+54.0	29.2	6 39.1	+54.3	29.2	7 31.5	+54.5	29.3	8 23.8	+54.7	29.4	9 16.0	+55.0	29.4	41
42	4 02.9	+53.4	28.6	4 55.6	+53.6	28.6	5 48.2	+53.9	28.7	6 40.8	+54.1	28.7	7 33.4	+54.3	28.8	8 26.0	+54.5	28.9	9 18.5	+54.7	29.0	10 11.0	+54.9	29.0	42
43	4 56.3	+53.4	28.2	5 49.2	+53.6	28.2	6 42.1	+53.8	28.3	7 34.9	+54.1	28.3	8 27.7	+54.3	28.4	9 20.5	+54.5	28.5	10 13.2	+54.7	28.5	11 05.9	+54.9	28.6	43
44	5 49.7	+53.4	27.7	6 42.8	+53.6	27.7	7 35.9	+53.8	27.8	8 29.0	+54.0	27.9	9 22.0	+54.2	27.9	10 15.0	+54.4	28.0	11 07.9	+54.7	28.1	12 00.8	+54.9	28.2	44
45	6 43.1	+53.3	27.2	7 36.4	+53.5	27.3	8 29.7	+53.8	27.4	9 23.0	+54.0	27.4	10 16.2	+54.2	27.5	11 09.4	+54.4	27.6	12 02.6	+54.6	27.7	12 55.7	+54.8	27.8	45
46	7 36.4	+53.3	26.8	8 29.9	+53.6	26.8	9 23.5	+53.7	26.9	10 17.0	+53.9	27.0	11 10.4	+54.2	27.1	12 03.8	+54.4	27.2	12 57.2	+54.5	27.3	13 50.5	+54.7	27.4	46
47	8 29.7	+53.3	26.3	9 23.5	+53.5	26.4	10 17.2	+53.7	26.5	11 10.9	+53.9	26.5	12 04.6	+54.1	26.6	12 58.2	+54.3	26.7	13 51.7	+54.6	26.8	14 45.2	+54.8	27.0	47
48	9 23.0	+53.2	25.8	10 17.0	+53.4	25.9	11 10.9	+53.7	26.0	12 04.8	+53.9	26.1	12 58.7	+54.0	26.2	13 52.5	+54.3	26.3	14 46.2	+54.5	26.4	15 40.0	+54.6	26.5	48
49	10 16.2	+53.2	25.4	11 10.4	+53.4	25.5	12 04.6	+53.6	25.5	12 58.7	+53.8	25.6	13 52.7	+54.1	25.7	14 46.8	+54.2	25.9	15 40.7	+54.4	26.0	16 34.6	+54.6	26.1	49
50	11 09.4	+53.2	24.9	12 03.8	+53.4	25.0	12 58.2	+53.5	25.1	13 52.5	+53.7	25.2	14 46.8	+53.9	25.3	15 41.0	+54.1	25.4	16 35.1	+54.3	25.5	17 29.2	+54.6	25.7	50
51	12 02.6	+53.1	24.4	12 57.2	+53.3	24.5	13 51.7	+53.5	24.6	14 46.2	+53.7	24.7	15 40.7	+53.9	24.8	16 35.1	+54.0	25.0	17 29.5	+54.3	25.1	18 23.8	+54.5	25.2	51
52	12 55.7	+53.0	24.0	13 50.5	+53.2	24.1	14 45.2	+53.5	24.2	15 40.0	+53.6	24.3	16 34.6	+53.9	24.4	17 29.2	+54.1	24.5	18 23.8	+54.3	24.6	19 18.3	+54.5	24.8	52
53	13 48.7	+53.0	23.5	14 43.7	+53.2	23.6	15 38.7	+53.4	23.7	16 33.6	+53.6	23.8	17 28.5	+53.8	23.9	18 23.3	+54.0	24.1	19 18.1	+54.1	24.2	20 12.8	+54.3	24.3	53
54	14 41.7	+52.9	23.0	15 36.9	+53.1	23.1	16 32.1	+53.3	23.2	17 27.2	+53.5	23.3	18 22.3	+53.7	23.5	19 17.3	+53.9	23.6	20 12.2	+54.1	23.7	21 07.1	+54.3	23.9	54
55	15 34.6	+52.9	22.5	16 30.0	+53.1	22.6	17 25.4	+53.3	22.7	18 20.7	+53.5	22.9	19 16.0	+53.6	23.0	20 11.2	+53.8	23.1	21 06.3	+54.1	23.3	22 01.4	+54.2	23.4	55
56	16 27.5	+52.8	22.1	17 23.1	+53.0	22.1	18 18.7	+53.1	22.3	19 14.2	+53.3	22.4	20 09.6	+53.5	22.5	21 05.0	+53.6	22.7	22 00.4	+53.9	22.8	22 55.6	+54.2	23.0	56
57	17 20.3	+52.7	21.5	18 16.1	+52.9	21.6	19 11.8	+53.1	21.8	20 07.5	+53.3	21.9	21 03.2	+53.5	22.0	21 58.8	+53.6	22.2	22 54.3	+53.9	22.3	23 49.8	+54.0	22.5	57
58	18 13.0	+52.7	21.0	19 09.0	+52.8	21.1	20 04.9	+53.1	21.3	21 00.8	+53.2	21.4	21 56.7	+53.4	21.5	22 52.4	+53.6	21.7	23 48.2	+53.7	21.9	24 43.8	+54.0	22.0	58
59	19 05.7	+52.5	20.5	20 01.8	+52.8	20.6	20 58.0	+52.9	20.8	21 54.0	+53.2	20.9	22 50.1	+53.3	21.1	23 46.0	+53.5	21.2	24 41.9	+53.7	21.4	25 37.8	+53.8	21.5	59
60	19 58.2	+52.6	20.0	20 54.6	+52.6	20.1	21 50.9	+52.8	20.3	22 47.2	+53.0	20.4	23 43.4	+53.2	20.6	24 39.5	+53.4	20.7	25 35.6	+53.6	20.9	26 31.6	+53.8	21.1	60
61	20 50.7	+52.4	19.5	21 47.2	+52.6	19.6	22 43.7	+52.8	19.7	23 40.2	+52.9	19.9	24 36.6	+53.1	20.0	25 32.9	+53.3	20.2	26 29.2	+53.5	20.4	27 25.4	+53.7	20.6	61
62	21 43.1	+52.3	19.0	22 39.8	+52.5	19.1	23 36.5	+52.6	19.2	24 33.1	+52.8	19.4	25 29.7	+53.0	19.5	26 26.2	+53.2	19.7	27 22.7	+53.3	19.9	28 19.1	+53.5	20.0	62
63	22 35.4	+52.1	18.4	23 32.3	+52.3	18.6	24 29.1	+52.5	18.7	25 25.9	+52.7	18.9	26 22.7	+52.8	19.0	27 19.4	+53.0	19.2	28 16.0	+53.2	19.3	29 12.6	+53.4	19.5	63
64	23 27.5	+52.1	17.9	24 24.6	+52.2	18.0	25 21.6	+52.4	18.2	26 18.6	+52.6	18.3	27 15.5	+52.8	18.5	28 12.4	+53.0	18.6	29 09.2	+53.2	18.8	30 06.0	+53.3	19.0	64
65	24 19.6	+51.9	17.3	25 16.8	+52.1	17.5	26 14.0	+52.3	17.6	27 11.2	+52.5	17.8	28 08.3	+52.6	17.9	29 05.4	+52.8	18.1	30 02.4	+52.9	18.3	30 59.3	+53.2	18.5	65
66	25 11.5	+51.8	16.8	26 08.9	+52.0	16.9	27 06.3	+52.2	17.1	28 03.7	+52.3	17.2	29 00.9	+52.5	17.4	29 58.2	+52.6	17.6	30 55.3	+52.9	17.7	31 52.5	+53.0	17.9	66
67	26 03.3	+51.7	16.2	27 00.9	+51.9	16.4	27 58.5	+52.0	16.5	28 56.0	+52.2	16.7	29 53.4	+52.4	16.8	30 50.8	+52.6	17.0	31 48.2	+52.7	17.2	32 45.5	+52.8	17.4	67
68	26 55.0	+51.6	15.7	27 52.8	+51.7	15.8	28 50.5	+51.9	16.0	29 48.2	+52.0	16.1	30 45.8	+52.2	16.3	31 43.4	+52.3	16.4	32 40.9	+52.5	16.6	33 38.3	+52.7	16.8	68
69	27 46.6	+51.4	15.1	28 44.5	+51.6	15.2	29 42.4	+51.7	15.4	30 40.2	+51.9	15.5	31 38.0	+52.0	15.7	32 35.7	+52.2	15.9	33 33.4	+52.4	16.0	34 31.0	+52.6	16.2	69
70	28 38.0	+51.2	14.5	29 36.1	+51.4	14.6	30 34.1	+51.5	14.8	31 32.1	+51.7	14.9	32 30.0	+51.9	15.1	33 27.9	+52.1	15.3	34 25.8	+52.2	15.5	35 23.6	+52.4	15.6	70
71	29 29.2	+51.1	13.9	30 27.5	+51.2	14.1	31 25.6	+51.4	14.2	32 23.8	+51.5	14.4	33 21.9	+51.7	14.5	34 20.0	+51.8	14.7	35 18.0	+52.0	14.9	36 16.0	+52.1	15.0	71
72	30 20.3	+50.9	13.3	31 18.7	+51.1	13.4	32 17.0	+51.2	13.6	33 15.3	+51.4	13.7	34 13.6	+51.5	13.9	35 11.8	+51.7	14.1	36 10.0	+51.8	14.2	37 08.1	+52.0	14.4	72
73	31 11.2	+50.8	12.7	32 09.8	+50.8	12.8	33 08.2	+51.1	13.0	34 06.7	+51.2	13.1	35 05.1	+51.3	13.3	36 03.5	+51.5	13.4	37 01.8	+51.7	13.6	38 00.1	+51.8	13.8	73
74	32 02.0	+50.5	12.1	33 00.6	+50.7	12.2	33 59.3	+50.8	12.3	34 57.9	+50.9	12.5	35 56.4	+51.1	12.6	36 55.0	+51.2	12.8	37 53.5	+51.4	13.0	38 51.9	+51.6	13.2	74
75	32 52.5	+50.4	11.4	33 51.3	+50.5	11.6	34 50.1	+50.6	11.7	35 48.8	+50.8	11.8	36 47.5	+50.9	12.0	37 46.2	+51.1	12.1	38 44.9	+51.1	12.3	39 43.5	+51.3	12.5	75
76	33 42.9	+50.1	10.8	34 41.8	+50.3	10.9	35 40.7	+50.4	11.0	36 39.6	+50.5	11.2	37 38.4	+50.7	11.3	38 37.3	+50.8	11.5	39 36.0	+51.0	11.6	40 34.8	+51.1	11.8	76
77	34 33.0	+50.0	10.1	35 32.1	+50.0	10.2	36 31.1	+50.2	10.4	37 30.1	+50.3	10.5	38 29.1	+50.4	10.6	39 28.1	+50.5	10.8	40 27.0	+50.7	11.0	41 25.9	+50.8	11.1	77
78	35 23.0	+49.7	9.4	36 22.1	+49.8	9.6	37 21.3	+49.9	9.7	38 20.4	+50.1	9.8	39 19.5	+50.2	9.9	40 18.6	+50.3	10.1	41 17.7	+50.4	10.2	42 16.7	+50.6	10.4	78
79	36 12.7	+49.4	8.7	37 11.9	+49.6	8.9	38 11.2	+49.7	9.0	39 10.5	+49.8	9.1	40 09.7	+49.9	9.2	41 08.9	+50.0	9.4	42 08.1	+50.1	9.5	43 07.3	+50.2	9.7	79
80	37 02.1	+49.2	8.0	38 01.5	+49.3	8.1	39 00.9	+49.4	8.3	40 00.3	+49.5	8.4	40 59.6	+49.6	8.5	41 58.9	+49.8	8.6	42 58.2	+49.9	8.8	43 57.5	+50.0	8.9	80
81	37 51.3	+48.9	7.4	38 50.8	+49.0	7.4	39 50.3	+49.1	7.5	40 49.8	+49.2	7.6	41 49.2	+49.3	7.8	42 48.7	+49.4	7.9	43 48.1	+49.5	8.1	44 47.5	+49.6	8.1	81
82	38 40.2	+48.7	6.6	39 39.8	+48.7	6.7	40 39.4	+48.8	6.8	41 39.0	+48.9	6.9	42 38.5	+49.0	7.0	43 38.1	+49.1	7.1	44 37.6	+49.2	7.2	45 37.1	+49.3	7.3	82
83	39 28.9	+48.3	5.8	40 28.5	+48.5	5.9	41 28.2	+48.5	6.0	42 27.9	+48.6	6.1	43 27.5	+48.7	6.2	44 27.2	+48.7	6.3	45 26.8	+48.9	6.4	46 26.4	+49.0	6.5	83
84	40 17.2	+48.0	5.1	41 17.0	+48.1	5.1	42 16.7	+48.2	5.2	43 16.5	+48.3	5.3	44 16.2	+48.3	5.4	45 15.9	+48.4	5.5	46 15.7	+48.4	5.6	47 15.4	+48.5	5.7	84
85	41 05.2	+47.7	4.3	42 05.1	+47.7	4.3	43 04.9	+47.8	4.4	44 04.7	+47.9	4.5	45 04.5	+48.0	4.6	46 04.3	+48.0	4.6	47 04.1	+48.1	4.7	48 03.9	+48.2	4.8	85
86	41 52.9	+47.4	3.5	42 52.8	+47.4	3.5	43 52.7	+47.4	3.6	44 52.6	+47.5	3.6	45 52.5	+47.5	3.7	46 52.3	+47.6	3.8	47 52.2	+47.6	3.8	48 52.1	+47.7	3.9	86
87	42 40.3	+46.9	2.6	43 40.2	+47.0	2.7	44 40.1	+47.1	2.7	45 40.1	+47.1	2.8	46 40.0	+47.1	2.8	47 39.9	+47.2	2.9	48 39.8	+47.2	3.0	49 39.8	+47.2	3.0	87
88	43 27.2	+46.6	1.8	44 27.2	+46.6	1.8	45 27.2	+46.6	1.8	46 27.1	+46.7	1.9	47 27.1	+46.7	1.9	48 27.1	+46.7	1.9	49 27.0	+46.8	2.0	50 27.0	+46.8	2.0	88
89	44 13.8	+46.2	0.9	45 13.8	+46.2	0.9	46 13.8	+46.2	0.9	47 13.8	+46.2	0.9	48 13.8	+46.2	1.0	49 13.8	+46.2	1.0	50 13.8	+46.2	1.0	51 13.8	+46.2	1.0	89
90	45 00.0	+45.7	0.0	46 00.0	+45.7	0.0	47 00.0	+45.7	0.0	48 00.0	+45.7	0.0	49 00.0	+45.7	0.0	50 00.0	+45.7	0.0	51 00.0	+45.7	0.0	52 00.0	+45.7	0.0	90

| | **45°** | **46°** | **47°** | **48°** | **49°** | **50°** | **51°** | **52°** | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 140°, 220°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	32 15.2	+50.1	129.1	31 37.1	+50.6	129.6	30 58.7	+51.1	130.1	30 19.9	+51.6	130.5	29 40.7	+52.1	131.0	29 01.2	+52.5	131.4	28 21.4	+52.9	131.8	27 41.2	+53.4	132.2	0
1	33 05.3	+49.8	128.5	32 27.7	+50.4	129.0	31 49.8	+50.9	129.5	31 11.5	+51.4	129.9	30 32.8	+51.9	130.4	29 53.7	+52.4	130.8	29 14.3	+52.8	131.3	28 34.6	+53.2	131.7	1
2	33 55.1	+49.6	127.8	33 18.1	+50.2	128.3	32 40.7	+50.7	128.8	32 02.9	+51.2	129.3	31 24.7	+51.7	129.8	30 46.1	+52.2	130.3	30 07.1	+52.7	130.7	29 27.8	+53.1	131.1	2
3	34 44.7	+49.5	127.1	34 08.3	+50.0	127.7	33 31.4	+50.5	128.2	32 54.1	+51.1	128.7	32 16.4	+51.5	129.2	31 38.3	+52.0	129.7	30 59.8	+52.5	130.2	30 20.9	+52.9	130.6	3
4	35 34.2	+49.1	126.4	34 58.3	+49.7	127.0	34 21.9	+50.4	127.5	33 45.2	+50.8	128.1	33 07.9	+51.4	128.6	32 30.3	+51.9	129.1	31 52.3	+52.3	129.6	31 13.8	+52.8	130.1	4
5	36 23.3	+48.9	125.7	35 48.0	+49.5	126.3	35 12.3	+50.1	126.9	34 36.0	+50.7	127.4	33 59.3	+51.2	128.0	33 22.2	+51.7	128.5	32 44.6	+52.2	129.0	32 06.6	+52.7	129.5	5
6	37 12.2	+48.7	125.0	36 37.5	+49.3	125.6	36 02.4	+49.8	126.2	35 26.7	+50.4	126.8	34 50.5	+51.0	127.3	34 13.9	+51.5	127.9	33 36.8	+52.0	128.4	32 59.3	+52.5	128.9	6
7	38 00.9	+48.3	124.3	37 26.8	+49.0	124.9	36 52.2	+49.5	125.5	36 17.1	+50.2	126.1	35 41.5	+50.8	126.7	35 05.4	+51.3	127.3	34 28.8	+51.9	127.8	33 51.8	+52.4	128.4	7
8	38 49.2	+48.1	123.5	38 15.8	+48.7	124.2	37 41.8	+49.4	124.8	37 07.3	+50.0	125.4	36 32.3	+50.5	126.0	35 56.7	+51.1	126.6	35 20.7	+51.6	127.2	34 44.2	+52.1	127.8	8
9	39 37.3	+47.7	122.7	39 04.5	+48.4	123.4	38 31.2	+49.1	124.1	37 57.3	+49.7	124.7	37 22.8	+50.3	125.4	36 47.8	+50.9	126.0	36 12.3	+51.5	126.6	35 36.3	+52.0	127.2	9
10	40 25.0	+47.4	121.9	39 52.9	+48.2	122.7	39 20.3	+48.8	124.0	38 47.0	+49.4	124.0	38 13.1	+50.1	124.7	37 38.7	+50.7	125.3	37 03.8	+51.2	125.9	36 28.3	+51.8	126.5	10
11	41 12.4	+47.1	121.1	40 41.1	+47.7	121.9	40 09.1	+48.4	122.6	39 36.4	+49.2	123.3	39 03.2	+49.8	124.0	38 29.4	+50.4	124.6	37 55.0	+51.0	125.3	37 20.1	+51.6	125.9	11
12	41 59.5	+46.7	120.3	41 28.8	+47.5	121.1	40 57.5	+48.2	121.8	40 25.6	+48.9	122.5	39 53.0	+49.5	123.3	39 19.8	+50.2	123.9	38 46.0	+50.8	124.6	38 11.7	+51.3	125.3	12
13	42 46.2	+46.3	119.4	42 16.3	+47.1	120.2	41 45.7	+47.9	121.0	41 14.5	+48.5	121.8	40 42.5	+49.3	122.5	40 10.0	+49.9	123.2	39 36.8	+50.5	123.9	39 03.0	+51.1	124.6	13
14	43 32.5	+45.9	118.6	43 03.4	+46.7	119.4	42 33.6	+47.4	120.2	42 03.0	+48.2	121.0	41 31.8	+48.9	121.8	40 59.9	+49.6	122.5	40 27.3	+50.3	123.2	39 54.1	+50.9	123.9	14
15	44 18.4	+45.4	117.7	43 50.1	+46.3	118.5	43 21.0	+47.1	119.4	42 51.2	+47.9	120.2	42 20.7	+48.6	121.0	41 49.5	+49.3	121.7	41 17.6	+50.0	122.5	40 45.0	+50.7	123.2	15
16	45 03.8	+45.0	116.8	44 36.4	+45.9	117.6	44 08.1	+46.8	118.5	43 39.1	+47.5	119.4	43 09.3	+48.3	120.2	42 38.8	+49.0	121.0	42 07.6	+49.7	121.8	41 35.7	+50.3	122.5	16
17	45 48.8	+44.6	115.8	45 22.3	+45.4	116.7	44 54.9	+46.2	117.6	44 26.6	+47.1	118.5	43 57.6	+47.9	119.4	43 27.8	+48.7	120.2	42 57.3	+49.3	121.0	42 26.0	+50.1	121.8	17
18	46 33.4	+44.0	114.9	46 07.7	+45.0	115.8	45 41.1	+45.9	116.7	45 13.7	+46.7	117.6	44 45.5	+47.5	118.5	44 16.5	+48.3	119.4	43 46.6	+49.1	120.2	43 16.1	+49.8	121.0	18
19	47 17.4	+43.5	113.9	46 52.7	+44.4	114.8	46 27.0	+45.4	115.8	46 00.4	+46.3	116.7	45 33.0	+47.2	117.6	45 04.8	+47.9	118.5	44 35.7	+48.7	119.4	44 05.9	+49.4	120.3	19
20	48 00.9	+42.9	112.8	47 37.1	+44.0	113.9	47 12.4	+44.9	114.8	46 46.7	+45.8	115.8	46 20.2	+46.8	116.8	45 52.7	+47.5	117.7	45 24.4	+48.4	118.6	44 55.3	+49.1	119.5	20
21	48 43.8	+42.4	111.8	48 21.1	+43.4	112.8	47 57.3	+44.4	113.9	47 32.5	+45.4	114.9	47 06.8	+46.3	115.8	46 40.2	+47.2	116.8	46 12.8	+47.9	117.7	45 44.4	+48.8	118.6	21
22	49 26.2	+41.7	110.7	49 04.5	+42.8	111.8	48 41.7	+43.8	112.8	48 17.9	+44.8	113.9	47 53.1	+45.8	114.9	47 27.4	+46.6	115.9	47 00.7	+47.5	116.9	46 33.2	+48.3	117.8	22
23	50 07.9	+41.1	109.6	49 47.3	+42.1	110.7	49 25.5	+43.3	111.8	49 02.7	+44.3	112.9	48 38.9	+45.3	113.9	48 14.0	+46.2	115.0	47 48.2	+47.1	116.0	47 21.5	+48.0	116.9	23
24	50 49.0	+40.4	108.4	50 29.4	+41.6	109.6	50 08.8	+42.6	110.7	49 47.0	+43.7	111.8	49 24.1	+44.8	112.9	49 00.2	+45.7	114.0	48 35.3	+46.7	115.0	48 09.5	+47.5	116.0	24
25	51 29.4	+39.6	107.3	51 11.0	+40.8	108.5	50 51.4	+42.0	109.6	50 30.7	+43.1	110.8	50 08.9	+44.1	111.9	49 45.9	+45.2	113.0	49 22.0	+46.1	114.1	48 57.0	+47.1	115.1	25
26	52 09.0	+38.9	106.1	51 51.8	+40.1	107.3	51 33.4	+41.3	108.5	51 13.8	+42.4	109.7	50 53.0	+43.6	110.8	50 31.1	+44.6	112.0	50 08.1	+45.7	113.1	49 44.1	+46.6	114.2	26
27	52 47.9	+38.1	104.8	52 31.9	+39.4	106.1	52 14.7	+40.6	107.3	51 56.2	+41.8	108.5	51 36.6	+42.9	109.7	51 15.7	+44.1	110.9	50 53.8	+45.0	112.1	50 30.7	+46.1	113.2	27
28	53 26.0	+37.2	103.5	53 11.3	+38.5	104.8	52 55.3	+39.9	106.1	52 38.0	+41.1	107.4	52 19.5	+42.3	108.6	51 59.8	+43.4	109.8	51 38.8	+44.5	111.0	51 16.8	+45.5	112.2	28
29	54 03.2	+36.3	102.2	53 49.8	+37.7	103.5	53 35.1	+39.0	104.8	53 19.1	+40.3	106.1	53 01.8	+41.5	107.4	52 43.2	+42.7	108.7	52 23.3	+43.9	109.9	52 02.3	+45.0	111.1	29
30	54 39.5	+35.4	100.8	54 27.5	+36.8	102.2	54 14.1	+38.2	103.6	53 59.4	+39.5	104.9	53 43.3	+40.8	106.2	53 25.9	+42.0	107.5	53 07.2	+43.2	108.8	52 47.3	+44.3	110.0	30
31	55 14.9	+34.3	99.4	55 04.3	+35.8	100.8	54 52.3	+37.3	102.2	54 38.9	+38.7	103.6	54 24.1	+40.0	105.0	54 07.9	+41.3	106.3	53 50.4	+42.5	107.6	53 31.6	+43.7	108.9	31
32	55 49.2	+33.3	98.0	55 40.1	+34.9	99.4	55 29.6	+36.3	100.9	55 17.6	+37.7	102.3	55 04.1	+39.1	103.7	54 49.2	+40.5	105.1	54 32.9	+41.8	106.4	54 15.3	+43.0	107.8	32
33	56 22.5	+32.2	96.5	56 15.0	+33.8	98.0	56 05.9	+35.3	99.4	55 55.3	+36.8	100.9	55 43.2	+38.3	102.3	55 29.7	+39.6	103.8	55 14.7	+41.0	105.2	54 58.3	+42.2	106.5	33
34	56 54.7	+31.1	94.9	56 48.8	+32.6	96.5	56 41.2	+34.3	98.0	56 32.1	+35.8	99.5	56 21.5	+37.3	101.0	56 09.3	+38.7	102.4	55 55.7	+40.1	103.9	55 40.5	+41.5	105.3	34
35	57 25.8	+29.8	93.4	57 21.4	+31.5	94.9	57 15.5	+33.1	96.5	57 07.9	+34.7	98.0	56 58.8	+36.2	99.5	56 48.0	+37.8	101.0	56 35.8	+39.2	102.5	56 22.0	+40.6	104.0	35
36	57 55.6	+28.5	91.7	57 52.9	+30.3	93.3	57 48.6	+32.0	94.9	57 42.6	+33.7	96.5	57 35.0	+35.3	98.1	57 25.8	+36.8	99.6	57 15.0	+38.3	101.1	57 02.6	+39.8	102.7	36
37	58 24.1	+27.2	90.1	58 23.2	+29.0	91.7	58 20.6	+30.7	93.3	58 16.3	+32.4	94.9	58 10.3	+34.1	96.5	58 02.6	+35.7	98.1	57 53.3	+37.3	99.7	57 42.4	+38.8	101.3	37
38	58 51.3	+25.9	88.4	58 52.2	+27.6	90.0	58 51.3	+29.5	91.7	58 48.7	+31.2	93.3	58 44.4	+32.9	95.0	58 38.3	+34.6	96.6	58 30.6	+36.2	98.2	58 21.2	+37.7	99.8	38
39	59 17.2	+24.3	86.6	59 19.8	+26.3	88.3	59 20.8	+28.0	90.0	59 19.9	+29.9	91.7	59 17.3	+31.6	93.3	59 12.9	+33.4	95.0	59 06.8	+35.1	96.7	58 58.9	+36.8	98.3	39
40	59 41.5	+22.9	84.8	59 46.1	+24.7	86.5	59 48.8	+26.7	88.2	59 49.8	+28.5	89.9	59 48.9	+30.4	91.7	59 46.3	+32.1	93.4	59 41.9	+33.8	95.1	59 35.7	+35.5	96.8	40
41	60 04.4	+21.3	83.0	60 10.8	+23.3	84.7	60 15.5	+25.1	86.4	60 18.3	+27.1	88.2	60 19.3	+28.9	89.9	60 18.4	+30.8	91.7	60 15.7	+32.7	93.4	60 11.2	+34.4	95.2	41
42	60 25.7	+19.6	81.1	60 34.1	+21.6	82.8	60 40.6	+23.6	84.6	60 45.4	+25.5	86.4	60 48.2	+27.5	88.2	60 49.2	+29.4	89.9	60 48.4	+31.2	91.7	60 45.6	+33.1	93.5	42
43	60 45.3	+18.0	79.2	60 55.7	+20.0	80.9	61 04.2	+22.0	82.7	61 10.9	+24.0	84.5	61 15.7	+26.0	86.3	61 18.6	+27.9	88.1	61 19.6	+29.9	90.0	61 18.7	+31.7	91.8	43
44	61 03.3	+16.2	77.2	61 15.7	+18.2	79.0	61 26.2	+20.3	80.8	61 34.9	+22.3	82.6	61 41.7	+24.4	84.4	61 46.5	+26.4	86.3	61 49.5	+28.3	88.1	61 50.4	+30.3	90.0	44
45	61 19.5	+14.4	75.2	61 33.9	+16.5	77.0	61 46.5	+18.6	78.8	61 57.2	+20.7	80.6	62 06.1	+22.6	82.5	62 12.9	+24.8	84.4	62 17.8	+26.8	86.3	62 20.7	+28.8	88.2	45
46	61 33.9	+12.6	73.2	61 50.4	+14.7	74.9	62 05.1	+16.7	76.8	62 17.9	+18.8	78.6	62 28.7	+21.0	80.5	62 37.7	+23.0	82.4	62 44.6	+25.1	84.3	62 49.5	+27.2	86.3	46
47	61 46.5	+10.7	71.1	62 05.1	+12.8	72.9	62 21.8	+14.9	74.7	62 36.7	+17.0	76.6	62 49.7	+19.1	78.5	63 00.7	+21.3	80.4	63 09.7	+23.4	82.3	63 16.7	+25.5	84.3	47
48	61 57.2	+8.9	69.0	62 17.9	+10.8	70.8	62 36.7	+13.0	72.6	62 53.7	+15.1	74.5	63 08.8	+17.3	76.4	63 22.0	+19.4	78.3	63 33.1	+21.6	80.3	63 42.2	+23.8	82.3	48
49	62 06.1	+6.8•	66.9	62 28.7	+9.0	68.7	62 49.7	+11.0•	70.5	63 08.8	+13.2•	72.3	63 26.1	+15.3•	74.2	63 41.4	+17.5	76.2	63 54.7	+19.7	78.2	64 06.0	+21.9	80.2	49
50	62 12.9	+4.9	64.8	62 37.7	+6.9•	66.5	63 00.7	+9.0•	68.3	63 22.0	+11.1•	70.2	63 41.4	+13.3•	72.1	63 58.9	+15.5•	74.0	64 14.4	+17.7	76.0	64 27.9	+20.0•	78.0	50
51	62 17.8	+2.9•	62.6	62 44.6	+4.9•	64.4	63 09.7	+7.0•	66.1	63 33.1	+9.1•	68.0	63 54.7	+11.3•	69.9	64 14.4	+13.5•	71.8	64 32.1	+15.8•	73.8	64 47.9	+17.9•	75.8	51
52	62 20.7	+0.9	60.5	62 49.5	+2.9•	62.2	63 16.7	+4.9•	63.9	63 42.2	+7.0•	65.7	64 06.0	+9.1•	67.6	64 27.9	+11.4•	69.6	64 47.9	+13.6•	71.5	65 05.8	+16.0•	73.6	52
53	62 21.6	−1.0•	58.3	62 52.4	+0.9•	60.0	63 21.6	+2.9•	61.7	63 49.2	+5.0•	63.5	64 15.1	+7.1•	65.4	64 39.3	+9.2•	67.3	65 01.5	+11.5•	69.2	65 21.8	+13.7•	71.3	53
54	62 20.6	−3.1•	56.2	62 53.3	−1.2•	57.8	63 24.5	+0.7•	59.5	63 54.2	+2.7•	61.2	64 22.2	+4.9•	63.1	64 48.5	+7.0•	65.0	65 13.0	+9.2•	66.9	65 35.5	+11.6•	68.9	54
55	62 17.5	−5.1	54.0	62 52.1	−3.3•	55.6	63 25.2	−1.3•	57.2	63 56.9	+0.7•	59.0	64 27.1	+2.7•	60.8	64 55.5	+4.9	62.6	65 22.2	+7.1•	64.5	65 47.1	+9.3•	66.6	55
56	62 12.4	−7.0	51.9	62 48.8	−5.2•	53.4	63 23.9	−3.4•	55.0	63 57.6	−1.5•	56.7	64 29.8	+0.5•	58.4	65 00.4	+2.6•	60.3	65 29.3	+4.7•	62.2	65 56.4	+7.0•	64.1	56
57	62 05.4	−9.0	49.8	62 43.6	−7.3•	51.2	63 20.5	−5.5•	52.8	63 56.1	−3.6•	54.4	64 30.3	−1.7•	56.1	65 03.0	+0.3•	57.9	65 34.0	+2.5•	59.8	66 03.4	+4.7•	61.7	57
58	61 56.4	−10.9	47.7	62 36.3	−9.3	49.1	63 15.0	−7.6•	50.6	63 52.5	−5.8•	52.1	64 28.6	−3.9•	53.8	65 03.3	−1.9•	55.5	65 36.5	+0.2•	57.3	66 08.1	+2.3•	59.2	58
59	61 45.5	−12.7	45.6	62 27.0	−11.2	46.9	63 07.4	−9.5•	48.4	63 46.7	−7.8•	49.9	64 24.7	−6.0•	51.5	65 01.4	−4.1•	53.2	65 36.7	−2.2•	54.9	66 10.4	−0.1•	56.8	59
60	61 32.8	−14.6	43.5	62 15.8	−13.1	44.8	62 57.9	−11.6•	46.2	63 38.9	−10.0•	47.6	64 18.7	−8.2•	49.2	64 57.3	−6.4•	50.8	65 34.5	−4.4•	52.5	66 10.3	−2.4•	54.3	60
61	61 18.2	−16.4	41.5	62 02.7	−15.0	42.7	62 46.3	−13.5	44.0	63 28.9	−11.9	45.4	64 10.5	−10.3•	46.9	64 50.9	−8.5•	48.4	65 30.1	−6.8•	50.1	66 07.9	−4.8•	51.8	61
62	61 01.8	−18.1	39.5	61 47.7	−16.8	40.7	62 32.8	−15.4	41.9	63 17.0	−13.9	43.2	64 00.2	−12.4•	44.6	64 42.4	−10.8•	46.1	65 23.3	−8.9•	47.7	66 03.1	−7.1•	49.4	62
63	60 43.7	−19.8	37.5	61 30.9	−18.5	38.6	62 17.4	−17.2	39.8	63 03.1	−15.9	41.1	63 47.8	−14.4	42.4	64 31.6	−12.8	43.8	65 14.4	−11.2•	45.3	65 56.0	−9.5•	46.9	63
64	60 23.9	−21.4	35.6	61 12.4	−20.3	36.7	62 00.2	−19.1	37.8	62 47.2	−17.7	39.0	63 33.4	−16.3	40.2	64 18.8	−14.9•	41.6	65 03.2	−13.3•	43.0	65 46.5	−11.6•	44.5	64
65	60 02.5	−23.0	33.7	60 52.1	−21.9	34.7	61 41.1	−20.7	35.8	62 29.5	−19.6	36.9	63 17.1	−18.3	38.1	64 03.9	−16.9	39.3	64 49.9	−15.5•	40.7	65 34.9	−13.9•	42.1	65
66	59 39.5	−24.5	31.9	60 30.2	−23.5	32.8	61 20.4	−22.5	33.8	62 09.9	−21.3	34.9	62 58.8	−20.1	36.0	63 47.0	−18.8	37.2	64 34.4	−17.4•	38.4	65 21.0	−16.0•	39.8	66
67	59 15.0	−25.9	30.1	60 06.7	−25.0	31.0	60 57.9	−24.0	31.9	61 48.6	−23.0	32.9	62 38.7	−21.9	33.9	63 28.2	−20.7	35.0	64 17.0	−19.5	36.2	65 05.0	−18.1•	37.5	67
68	58 49.1	−27.3	28.3	59 41.7	−26.5	29.1	60 33.9	−25.6	30.0	61 25.6	−24.6	30.9	62 16.8	−23.6	31.9	63 07.5	−22.5	32.9	63 57.5	−21.3	34.0	64 46.9	−20.0	35.2	68
69	58 21.8	−28.7	26.6	59 15.2	−27.8	27.4	60 08.3	−27.0	28.2	61 01.0	−26.2	29.0	61 53.2	−25.2	29.9	62 45.0	−24.2	30.9	63 36.2	−23.2	31.9	64 26.8	−22.0	33.0	69
70	57 53.1	−29.9	25.0	58 47.4	−29.3	25.7	59 41.3	−28.5	26.4	60 34.8	−27.6	27.2	61 28.0	−26.8	28.0	62 20.8	−25.9	28.9	63 13.0	−24.9	29.9	64 04.8	−23.8	30.9	70
71	57 23.2	−31.2	23.3	58 18.1	−30.4	24.0	59 12.8	−29.8	24.7	60 07.2	−29.1	25.4	61 01.2	−28.3	26.2	61 54.9	−27.5	27.0	62 48.1	−26.5	27.9	63 41.0	−25.6	28.8	71
72	56 52.0	−32.2	21.8	57 47.7	−31.8	22.4	58 43.0	−31.1	23.0	59 38.1	−30.4	23.6	60 32.9	−29.7	24.4	61 27.4	−28.9	25.1	62 21.6	−28.1	25.9	63 15.4	−27.3	26.8	72
73	56 19.8	−33.4	20.2	57 15.9	−32.8	20.8	58 11.9	−32.3	21.3	59 07.7	−31.7	22.0	60 03.2	−31.0	22.6	60 58.5	−30.4	23.3	61 53.5	−29.7	24.0	62 48.1	−28.9	24.8	73
74	55 46.4	−34.5	18.8	56 43.1	−34.0	19.2	57 39.6	−33.4	19.8	58 36.0	−32.9	20.3	59 32.2	−32.4	20.9	60 28.1	−31.7	21.5	61 23.8	−31.1	22.2	62 19.2	−30.4	22.9	74
75	55 11.9	−35.4	17.3	56 09.1	−35.0	17.7	57 06.2	−34.6	18.2	58 03.1	−34.1	18.7	58 59.8	−33.5	19.2	59 56.4	−33.0	19.8	60 52.7	−32.4	20.4	61 48.8	−31.8	21.1	75
76	54 36.5	−36.4	15.9	55 34.1	−36.0	16.3	56 31.6	−35.6	16.7	57 29.0	−35.1	17.2	58 26.3	−34.7	17.7	59 23.4	−34.2	18.2	60 20.3	−33.7	18.8	61 17.0	−33.1	19.3	76
77	54 00.1	−37.3	14.5	54 58.1	−36.9	14.9	55 56.0	−36.5	15.3	56 53.9	−36.2	15.7	57 51.6	−35.8	16.1	58 49.2	−35.4	16.6	59 46.6	−34.9	17.0	60 43.9	−34.5	17.6	77
78	53 22.8	−38.1	13.2	54 21.2	−37.9	13.5	55 19.5	−37.4	13.9	56 17.7	−37.2	14.2	57 15.8	−36.9	14.6	58 13.8	−36.5	15.0	59 11.7	−36.1	15.4	60 09.4	−35.6	15.9	78
79	52 44.7	−39.0	11.9	53 43.3	−38.6	12.2	54 41.9	−38.4	12.5	55 40.5	−38.1	12.8	56 38.9	−37.8	13.2	57 37.3	−37.5	13.5	58 35.6	−37.1	13.9	59 33.8	−36.8	14.3	79
80	52 05.7	−39.7	10.7	53 04.7	−39.5	10.9	54 03.5	−39.2	11.2	55 02.4	−39.0	11.5	56 01.1	−38.7	11.8	56 59.8	−38.4	12.1	57 58.5	−38.2	12.4	58 57.0	−37.8	12.8	80
81	51 26.0	−40.4	9.5	52 25.2	−40.3	9.7	53 24.3	−40.0	9.9	54 23.4	−39.9	10.2	55 22.4	−39.6	10.4	56 21.4	−39.4	10.7	57 20.3	−39.1	11.0	58 19.2	−38.8	11.3	81
82	50 45.6	−41.2	8.3	51 44.9	−40.9	8.5	52 44.3	−40.8	8.7	53 43.5	−40.6	8.9	54 42.8	−40.4	9.1	55 42.0	−40.2	9.3	56 41.2	−40.0	9.6	57 40.4	−39.8	9.8	82
83	50 04.4	−41.7	7.2	51 04.0	−41.7	7.3	52 03.5	−41.5	7.5	53 02.9	−41.3	7.6	54 02.4	−41.2	7.8	55 01.8	−41.0	8.0	56 01.2	−40.8	8.2	57 00.6	−40.7	8.4	83
84	49 22.7	−42.5	6.0	50 22.3	−42.3	6.2	51 22.0	−42.2	6.3	52 21.6	−42.1	6.4	53 21.2	−41.9	6.5	54 20.8	−41.8	6.6	55 20.4	−41.7	6.9	56 19.9	−41.5	7.1	84
85	48 40.2	−42.9	5.0	49 40.0	−42.9	5.1	50 39.8	−42.8	5.2	51 39.5	−42.7	5.3	52 39.3	−42.7	5.4	53 39.0	−42.5	5.5	54 38.7	−42.4	5.7	55 38.4	−42.3	5.8	85
86	47 57.3	−43.6	3.9	48 57.1	−43.5	4.0	49 57.0	−43.5	4.1	50 56.8	−43.3	4.2	51 56.6	−43.2	4.3	52 56.5	−43.2	4.4	53 56.3	−43.1	4.5	54 56.1	−43.0	4.6	86
87	47 13.7	−44.1	2.9	48 13.6	−44.0	3.0	49 13.5	−43.9	3.0	50 13.5	−44.0	3.1	51 13.4	−43.9	3.1	52 13.3	−43.9	3.2	53 13.2	−43.8	3.3	54 13.1	−43.7	3.4	87
88	46 29.6	−44.5	1.9	47 29.6	−44.6	1.9	48 29.6	−44.6	2.0	49 29.5	−44.5	2.0	50 29.5	−44.5	2.1	51 29.4	−44.4	2.1	52 29.4	−44.4	2.2	53 29.4	−44.4	2.2	88
89	45 45.1	−45.1	0.9	46 45.0	−45.0	1.0	47 45.0	−45.0	1.0	48 45.0	−45.0	1.0	49 45.0	−45.0	1.0	50 45.0	−45.0	1.0	51 45.0	−45.0	1.1	52 45.0	−45.0	1.1	89
90	45 00.0	−45.5	0.0	46 00.0	−45.5	0.0	47 00.0	−45.5	0.0	48 00.0	−45.5	0.0	49 00.0	−45.5	0.0	50 00.0	−45.5	0.0	51 00.0	−45.6	0.0	52 00.0	−45.6	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 41°, 319°

Dec.	45° Hc d Z	46° Hc d Z	47° Hc d Z	48° Hc d Z	49° Hc d Z	50° Hc d Z	51° Hc d Z	52° Hc d Z	Dec.
0	32 15.2 −50.3 129.1	31 37.1 −50.7 129.6	30 58.7 −51.3 130.1	30 19.9 −51.8 130.5	29 40.7 −52.2 131.0	29 01.2 −52.6 131.4	28 21.4 −53.1 131.8	27 41.2 −53.4 132.2	0
1	31 24.9 −50.4 129.8	30 46.4 −51.0 130.2	30 07.4 −51.4 130.7	29 28.1 −51.8 131.1	28 48.5 −52.3 131.5	28 08.6 −52.8 131.9	27 28.3 −53.1 132.3	26 47.8 −53.6 132.7	1
2	30 34.5 −50.7 130.4	29 55.4 −51.1 130.8	29 16.0 −51.6 131.3	28 36.3 −52.1 131.7	27 56.2 −52.5 132.1	27 15.8 −52.9 132.5	26 35.2 −53.3 132.8	25 54.2 −53.6 133.2	2
3	29 43.8 −50.8 131.0	29 04.3 −51.3 131.4	28 24.4 −51.7 131.9	27 44.2 −52.1 132.3	27 03.7 −52.6 132.6	26 22.9 −52.9 133.0	25 41.9 −53.4 133.4	25 00.6 −53.8 133.7	3
4	28 53.0 −50.9 131.6	28 13.0 −51.4 132.0	27 32.7 −51.9 132.4	26 52.1 −52.3 132.8	26 11.1 −52.7 133.2	25 30.0 −53.1 133.5	24 48.5 −53.5 133.9	24 06.8 −53.8 134.2	4
5	28 02.1 −51.2 132.2	27 21.6 −51.6 132.6	26 40.8 −52.0 133.0	25 59.8 −52.5 133.4	25 18.4 −52.8 133.7	24 36.9 −53.3 134.0	23 55.0 −53.6 134.4	23 13.0 −54.0 134.7	5
6	27 10.9 −51.2 132.8	26 30.0 −51.7 133.2	25 48.8 −52.1 133.5	25 07.3 −52.5 133.9	24 25.6 −52.9 134.2	23 43.6 −53.3 134.5	23 01.4 −53.6 134.9	22 19.0 −54.0 135.1	6
7	26 19.7 −51.4 133.4	25 38.3 −51.8 133.8	24 56.7 −52.3 134.1	24 14.8 −52.6 134.4	23 32.7 −53.0 134.7	22 50.3 −53.3 135.0	22 07.8 −53.8 135.3	21 25.0 −54.1 135.6	7
8	25 28.3 −51.6 134.0	24 46.5 −52.0 134.3	24 04.4 −52.3 134.6	23 22.2 −52.8 134.9	22 39.7 −53.2 135.2	21 57.0 −53.5 135.5	21 14.0 −53.8 135.8	20 30.9 −54.2 136.1	8
9	24 36.7 −51.6 134.5	23 54.5 −52.0 134.9	23 12.1 −52.5 135.2	22 29.4 −52.8 135.5	21 46.5 −53.2 135.8	21 03.5 −53.6 136.0	20 20.2 −53.9 136.3	19 36.7 −54.2 136.5	9
10	23 45.1 −51.8 135.1	23 02.5 −52.2 135.4	22 19.6 −52.5 135.7	21 36.6 −53.0 136.0	20 53.3 −53.3 136.2	20 09.9 −53.6 136.5	19 26.3 −54.0 136.8	18 42.5 −54.3 137.0	10
11	22 53.3 −51.9 135.6	22 10.3 −52.3 135.9	21 27.1 −52.7 136.2	20 43.6 −53.0 136.5	20 00.0 −53.3 136.7	19 16.3 −53.8 137.0	18 32.3 −54.0 137.2	17 48.2 −54.4 137.4	11
12	22 01.4 −52.0 136.2	21 18.0 −52.4 136.5	20 34.4 −52.7 136.7	19 50.6 −53.1 137.0	19 06.7 −53.5 137.2	18 22.5 −53.7 137.5	17 38.3 −54.1 137.7	16 53.8 −54.4 137.9	12
13	21 09.4 −52.1 136.7	20 25.6 −52.5 137.0	19 41.7 −52.9 137.2	18 57.5 −53.2 137.5	18 13.2 −53.5 137.7	17 28.8 −53.9 137.9	16 44.2 −54.2 138.1	15 59.4 −54.5 138.3	13
14	20 17.3 −52.2 137.3	19 33.1 −52.5 137.5	18 48.8 −52.9 137.7	18 04.3 −53.3 138.0	17 19.7 −53.6 138.2	16 34.9 −53.9 138.4	15 50.0 −54.3 138.6	15 04.9 −54.5 138.8	14
15	19 25.1 −52.3 137.8	18 40.6 −52.7 138.0	17 55.9 −53.0 138.2	17 11.1 −53.3 138.4	16 26.1 −53.6 138.6	15 41.0 −54.0 138.8	14 55.8 −54.3 139.0	14 10.4 −54.6 139.2	15
16	18 32.8 −52.3 138.3	17 47.9 −52.7 138.5	17 02.9 −53.0 138.7	16 17.8 −53.4 138.9	15 32.5 −53.8 139.1	14 47.0 −54.0 139.3	14 01.5 −54.3 139.5	13 15.8 −54.6 139.6	16
17	17 40.5 −52.5 138.8	16 55.2 −52.8 139.0	16 09.9 −53.2 139.2	15 24.4 −53.5 139.4	14 38.7 −53.7 139.6	13 53.0 −54.0 139.7	13 07.2 −54.4 139.9	12 21.2 −54.6 140.0	17
18	16 48.0 −52.5 139.3	16 02.4 −52.8 139.5	15 16.7 −53.2 139.7	14 30.9 −53.5 139.9	13 45.0 −53.8 140.0	12 59.0 −54.2 140.2	12 12.8 −54.4 140.3	11 26.6 −54.7 140.5	18
19	15 55.5 −52.6 139.8	15 09.6 −52.9 140.0	14 23.5 −53.2 140.2	13 37.4 −53.5 140.3	12 51.2 −53.9 140.5	12 04.8 −54.1 140.6	11 18.4 −54.4 140.8	10 31.9 −54.7 140.9	19
20	15 02.9 −52.7 140.3	14 16.7 −53.0 140.5	13 30.3 −53.3 140.7	12 43.9 −53.6 140.8	11 57.3 −53.9 140.9	11 10.7 −54.2 141.1	10 24.0 −54.5 141.2	9 37.2 −54.8 141.3	20
21	14 10.2 −52.7 140.8	13 23.7 −53.1 141.0	12 37.0 −53.3 141.1	11 50.3 −53.7 141.3	11 03.4 −53.9 141.4	10 16.5 −54.2 141.5	9 29.5 −54.5 141.6	8 42.4 −54.7 141.7	21
22	13 17.5 −52.8 141.3	12 30.6 −53.0 141.5	11 43.7 −53.4 141.6	10 56.6 −53.7 141.7	10 09.5 −54.0 141.8	9 22.3 −54.3 141.9	8 35.0 −54.5 142.0	7 47.7 −54.8 142.1	22
23	12 24.7 −52.8 141.8	11 37.6 −53.2 141.9	10 50.3 −53.5 142.1	10 02.9 −53.7 142.2	9 15.5 −54.0 142.3	8 28.0 −54.3 142.4	7 40.5 −54.6 142.5	6 52.9 −54.9 142.5	23
24	11 31.9 −52.8 142.3	10 44.4 −53.2 142.4	9 56.8 −53.4 142.5	9 09.2 −53.8 142.6	8 21.5 −54.1 142.7	7 33.7 −54.3 142.8	6 45.9 −54.6 142.9	5 58.0 −54.8 142.9	24
25	10 39.1 −53.0 142.8	9 51.2 −53.2 142.9	9 03.4 −53.5 143.0	8 15.4 −53.8 143.1	7 27.4 −54.0 143.2	6 39.4 −54.3 143.2	5 51.3 −54.6 143.3	5 03.2 −54.8 143.4	25
26	9 46.1 −52.9 143.2	8 58.0 −53.2 143.3	8 09.9 −53.6 143.4	7 21.6 −53.8 143.5	6 33.4 −54.1 143.6	5 45.1 −54.4 143.7	4 56.7 −54.6 143.7	4 08.4 −54.9 143.8	26
27	8 53.2 −53.0 143.7	8 04.8 −53.3 143.8	7 16.3 −53.5 143.9	6 27.8 −53.8 144.0	5 39.3 −54.1 144.0	4 50.7 −54.3 144.1	4 02.1 −54.6 144.1	3 13.5 −54.9 144.2	27
28	8 00.2 −53.0 144.2	7 11.5 −53.3 144.3	6 22.8 −53.6 144.3	5 34.0 −53.9 144.4	4 45.2 −54.1 144.5	3 56.4 −54.4 144.5	3 07.5 −54.6 144.6	2 18.6 −54.9 144.6	28
29	7 07.2 −53.1 144.7	6 18.2 −53.3 144.7	5 29.2 −53.6 144.8	4 40.1 −53.9 144.9	3 51.1 −54.2 144.9	3 02.0 −54.4 144.9	2 12.9 −54.7 145.0	1 23.7 −54.9 145.0	29
30	6 14.1 −53.1 145.1	5 24.9 −53.4 145.2	4 35.6 −53.6 145.3	3 46.3 −53.9 145.3	2 56.9 −54.1 145.3	2 07.6 −54.4 145.4	1 18.2 −54.6 145.4	0 28.8 −54.8 145.4	30
31	5 21.0 −53.1 145.6	4 31.5 −53.4 145.7	3 42.0 −53.7 145.7	2 52.4 −53.9 145.7	2 02.8 −54.2 145.8	1 13.2 −54.4 145.8	0 23.6 −54.7 145.8	0 26.0 +54.9 34.2	31
32	4 27.9 −53.1 146.1	3 38.1 −53.4 146.1	2 48.3 −53.6 146.1	1 58.5 −53.9 146.2	1 08.6 −54.1 146.2	0 18.8 −54.2 146.2	0 31.1 +54.6 33.8	1 20.9 +54.9 33.8	32
33	3 34.8 −53.1 146.5	2 44.7 −53.3 146.6	1 54.7 −53.7 146.6	1 04.6 −53.9 146.6	0 14.5 −54.2 146.6	0 35.6 +54.4 33.4	1 25.7 +54.7 33.4	2 15.8 +54.9 33.4	33
34	2 41.7 −53.2 147.0	1 51.4 −53.4 147.1	1 01.0 −53.6 147.1	0 10.7 −53.9 147.1	0 39.7 +54.1 33.0	1 30.0 +54.3 33.0	2 20.4 +54.6 33.0	3 10.7 +54.9 33.0	34
35	1 48.5 −53.2 147.5	0 58.0 −53.5 147.5	0 07.4 −53.7 147.5	0 43.2 +54.0 32.5	1 33.8 +54.2 32.5	2 24.4 +54.4 32.5	3 15.0 +54.6 32.6	4 05.6 +54.8 32.6	35
36	0 55.4 −53.2 147.9	0 04.5 −53.4 147.9	0 46.3 +53.7 32.1	1 37.2 +53.9 32.1	2 28.0 +54.1 32.1	3 18.8 +54.4 32.1	4 09.6 +54.6 32.2	5 00.4 +54.9 32.2	36
37	0 02.2 −53.1 148.4	0 48.9 +53.4 31.6	1 40.0 +53.6 31.6	2 31.1 +53.8 31.6	3 22.1 +54.2 31.7	4 13.2 +54.4 31.7	5 04.2 +54.6 31.7	5 55.3 +54.8 31.8	37
38	0 50.9 +53.2 31.1	1 42.3 +53.4 31.1	2 33.6 +53.7 31.2	3 24.9 +53.9 31.2	4 16.3 +54.1 31.2	5 07.6 +54.3 31.3	5 58.8 +54.6 31.3	6 50.1 +54.8 31.4	38
39	1 44.1 +53.1 30.7	2 35.7 +53.3 30.7	3 27.3 +53.6 30.7	4 18.8 +53.9 30.8	5 10.4 +54.1 30.8	6 01.9 +54.3 30.8	6 53.4 +54.6 30.9	7 44.9 +54.7 31.0	39
40	2 37.2 +53.1 30.2	3 29.0 +53.4 30.2	4 20.9 +53.6 30.3	5 12.7 +53.8 30.3	6 04.5 +54.1 30.4	6 56.2 +54.3 30.4	7 48.0 +54.5 30.5	8 39.6 +54.8 30.6	40
41	3 30.3 +53.2 29.7	4 22.4 +53.4 29.8	5 14.5 +53.6 29.8	6 06.5 +53.9 29.9	6 58.6 +54.0 29.9	7 50.5 +54.3 30.0	8 42.5 +54.5 30.1	9 34.4 +54.7 30.1	41
42	4 23.5 +53.1 29.3	5 15.8 +53.3 29.3	6 08.1 +53.6 29.4	7 00.4 +53.8 29.4	7 52.6 +54.0 29.5	8 44.8 +54.3 29.6	9 37.0 +54.5 29.6	10 29.1 +54.7 29.7	42
43	5 16.6 +53.0 28.8	6 09.1 +53.3 28.9	7 01.7 +53.5 28.9	7 54.2 +53.7 29.0	8 46.6 +54.0 29.0	9 39.1 +54.2 29.1	10 31.5 +54.4 29.2	11 23.8 +54.7 29.3	43
44	6 09.6 +53.1 28.3	7 02.4 +53.3 28.4	7 55.2 +53.5 28.5	8 47.9 +53.8 28.5	9 40.6 +54.0 28.6	10 33.3 +54.2 28.7	11 25.9 +54.4 28.8	12 18.5 +54.6 28.9	44
45	7 02.7 +53.0 27.9	7 55.7 +53.3 27.9	8 48.7 +53.5 28.0	9 41.7 +53.7 28.1	10 34.6 +53.9 28.2	11 27.5 +54.1 28.3	12 20.3 +54.3 28.4	13 13.1 +54.6 28.5	45
46	7 55.7 +53.0 27.4	8 49.0 +53.2 27.5	9 42.2 +53.4 27.5	10 35.4 +53.6 27.6	11 28.5 +53.9 27.7	12 21.6 +54.1 27.8	13 14.6 +54.4 27.9	14 07.6 +54.6 28.0	46
47	8 48.7 +53.0 26.9	9 42.2 +53.2 27.0	10 35.6 +53.4 27.1	11 29.0 +53.7 27.2	12 22.4 +53.8 27.3	13 15.7 +54.1 27.4	14 09.0 +54.2 27.5	15 02.2 +54.4 27.6	47
48	9 41.7 +52.9 26.4	10 35.4 +53.1 26.5	11 29.0 +53.4 26.6	12 22.7 +53.5 26.7	13 16.2 +53.8 26.8	14 09.8 +54.0 26.9	15 03.2 +54.2 27.0	15 56.6 +54.5 27.2	48
49	10 34.6 +52.9 26.0	11 28.5 +53.1 26.1	12 22.4 +53.3 26.1	13 16.2 +53.6 26.2	14 10.0 +53.8 26.4	15 03.8 +53.9 26.5	15 57.4 +54.2 26.6	16 51.1 +54.3 26.7	49
50	11 27.5 +52.8 25.5	12 21.6 +53.0 25.6	13 15.7 +53.3 25.7	14 09.8 +53.4 25.8	15 03.8 +53.6 25.9	15 57.7 +53.9 26.0	16 51.6 +54.1 26.1	17 45.4 +54.3 26.3	50
51	12 20.3 +52.8 25.0	13 14.6 +53.0 25.1	14 09.0 +53.2 25.2	15 03.2 +53.4 25.3	15 57.4 +53.7 25.4	16 51.6 +53.8 25.6	17 45.7 +54.0 25.7	18 39.7 +54.3 25.8	51
52	13 13.1 +52.7 24.5	14 07.6 +53.0 24.6	15 02.3 +53.1 24.7	15 56.6 +53.4 24.8	16 51.1 +53.5 25.0	17 45.4 +53.8 25.1	18 39.7 +54.0 25.2	19 34.0 +54.1 25.4	52
53	14 05.8 +52.7 24.0	15 00.6 +52.8 24.1	15 55.3 +53.1 24.2	16 50.0 +53.3 24.4	17 44.6 +53.5 24.5	18 39.2 +53.7 24.6	19 33.7 +53.9 24.8	20 28.1 +54.1 24.9	53
54	14 58.5 +52.5 23.5	15 53.4 +52.8 23.6	16 48.4 +53.0 23.8	17 43.3 +53.2 23.9	18 38.1 +53.4 24.0	19 32.9 +53.6 24.2	20 27.6 +53.8 24.3	21 22.2 +54.1 24.5	54
55	15 51.0 +52.6 23.0	16 46.2 +52.8 23.1	17 41.4 +52.9 23.3	18 36.5 +53.1 23.4	19 31.5 +53.4 23.5	20 26.5 +53.5 23.7	21 21.4 +53.8 23.8	22 16.3 +53.9 24.0	55
56	16 43.6 +52.4 22.5	17 39.0 +52.6 22.6	18 34.3 +52.9 22.8	19 29.6 +53.1 22.9	20 24.9 +53.3 23.0	21 20.0 +53.5 23.2	22 15.2 +53.6 23.3	23 10.2 +53.9 23.5	56
57	17 36.0 +52.4 22.0	18 31.6 +52.6 22.1	19 27.2 +52.8 22.3	20 22.7 +52.9 22.4	21 18.1 +53.2 22.6	22 13.5 +53.4 22.7	23 08.8 +53.6 22.9	24 04.1 +53.7 23.0	57
58	18 28.4 +52.3 21.5	19 24.2 +52.5 21.6	20 20.0 +52.6 21.8	21 15.6 +52.9 21.9	22 11.3 +53.1 22.1	23 06.9 +53.2 22.2	24 02.4 +53.5 22.4	24 57.8 +53.7 22.5	58
59	19 20.7 +52.2 21.0	20 16.7 +52.4 21.1	21 12.6 +52.5 21.3	22 08.5 +52.8 21.4	23 04.4 +52.9 21.5	24 00.1 +53.2 21.7	24 55.9 +53.3 21.9	25 51.5 +53.6 22.1	59
60	20 12.9 +52.1 20.5	21 09.1 +52.3 20.6	22 05.2 +52.5 20.7	23 01.3 +52.7 20.9	23 57.3 +52.9 21.0	24 53.3 +53.1 21.2	25 49.2 +53.3 21.4	26 45.1 +53.4 21.6	60
61	21 05.0 +52.0 19.9	22 01.4 +52.2 20.1	22 57.7 +52.4 20.2	23 54.0 +52.6 20.4	24 50.2 +52.8 20.5	25 46.4 +52.9 20.7	26 42.5 +53.1 20.9	27 38.5 +53.4 21.0	61
62	21 57.0 +51.9 19.4	22 53.6 +52.1 19.5	23 50.1 +52.3 19.7	24 46.6 +52.4 19.8	25 43.0 +52.6 20.0	26 39.3 +52.9 20.2	27 35.6 +53.1 20.3	28 31.9 +53.2 20.5	62
63	22 48.9 +51.8 18.9	23 45.7 +51.9 19.0	24 42.4 +52.1 19.1	25 39.0 +52.4 19.3	26 35.6 +52.6 19.5	27 32.2 +52.7 19.6	28 28.7 +52.9 19.8	29 25.1 +53.1 20.0	63
64	23 40.7 +51.7 18.3	24 37.6 +51.9 18.4	25 34.5 +52.1 18.6	26 31.4 +52.2 18.7	27 28.2 +52.4 18.9	28 24.9 +52.6 19.1	29 21.6 +52.7 19.3	30 18.2 +52.9 19.5	64
65	24 32.4 +51.5 17.7	25 29.5 +51.7 17.9	26 26.6 +51.9 18.0	27 23.6 +52.1 18.2	28 20.6 +52.2 18.4	29 17.5 +52.4 18.5	30 14.3 +52.7 18.7	31 11.1 +52.9 18.9	65
66	25 23.9 +51.4 17.2	26 21.2 +51.6 17.3	27 18.5 +51.7 17.6	28 15.7 +51.9 17.6	29 12.8 +52.2 17.8	30 09.9 +52.3 18.0	31 07.0 +52.5 18.2	32 04.0 +52.6 18.4	66
67	26 15.3 +51.3 16.6	27 12.8 +51.5 16.8	28 10.2 +51.7 16.9	29 07.6 +51.8 17.1	30 05.0 +51.9 17.2	31 02.2 +52.2 17.4	31 59.5 +52.3 17.6	32 56.6 +52.5 17.8	67
68	27 06.6 +51.2 16.0	28 04.3 +51.3 16.2	29 01.9 +51.4 16.3	29 59.4 +51.7 16.5	30 56.9 +51.8 16.7	31 54.4 +52.0 16.8	32 51.8 +52.2 17.0	33 49.1 +52.4 17.2	68
69	27 57.8 +50.9 15.4	28 55.6 +51.1 15.6	29 53.3 +51.4 15.7	30 51.1 +51.5 15.9	31 48.8 +51.6 16.1	32 46.4 +51.8 16.2	33 44.0 +52.0 16.4	34 41.5 +52.2 16.6	69
70	28 48.7 +50.9 14.8	29 46.7 +51.0 15.0	30 44.7 +51.1 15.1	31 42.6 +51.3 15.3	32 40.4 +51.5 15.5	33 38.2 +51.6 15.6	34 36.0 +51.8 15.8	35 33.7 +51.9 16.0	70
71	29 39.6 +50.6 14.2	30 37.7 +50.8 14.4	31 35.8 +51.0 14.5	32 33.9 +51.1 14.7	33 31.9 +51.3 14.8	34 29.8 +51.5 15.0	35 27.8 +51.6 15.2	36 25.6 +51.8 15.4	71
72	30 30.2 +50.5 13.6	31 28.5 +50.6 13.8	32 26.8 +50.7 13.9	33 25.0 +50.9 14.1	34 23.2 +51.1 14.2	35 21.3 +51.3 14.4	36 19.4 +51.4 14.6	37 17.4 +51.6 14.8	72
73	31 20.7 +50.3 13.0	32 19.1 +50.4 13.1	33 17.5 +50.6 13.3	34 15.9 +50.8 13.4	35 14.3 +50.8 13.6	36 12.6 +51.0 13.8	37 10.8 +51.2 13.9	38 09.0 +51.4 14.1	73
74	32 11.0 +50.0 12.3	33 09.5 +50.3 12.5	34 08.1 +50.4 12.6	35 06.7 +50.5 12.8	36 05.1 +50.7 12.9	37 03.6 +50.8 13.1	38 02.0 +51.0 13.3	39 00.4 +51.1 13.5	74
75	33 01.0 +49.9 11.7	33 59.8 +50.0 11.9	34 58.5 +50.1 12.1	35 57.2 +50.3 12.2	36 55.8 +50.5 12.3	37 54.4 +50.6 12.4	38 53.0 +50.8 12.6	39 51.5 +50.9 12.8	75
76	33 50.9 +49.7 11.0	34 49.8 +49.8 11.1	35 48.6 +50.0 11.3	36 47.5 +50.0 11.4	37 46.3 +50.2 11.6	38 45.0 +50.4 11.7	39 43.8 +50.4 11.9	40 42.4 +50.7 12.1	76
77	34 40.6 +49.4 10.3	35 39.6 +49.5 10.5	36 38.6 +49.7 10.6	37 37.5 +49.8 10.7	38 36.5 +49.9 10.9	39 35.4 +50.1 11.0	40 34.2 +50.3 11.2	41 33.1 +50.4 11.4	77
78	35 30.0 +49.2 9.8	36 29.1 +49.4 9.9	37 28.3 +49.4 10.0	38 27.3 +49.6 10.2	39 26.4 +49.7 10.2	40 25.5 +49.8 10.3	41 24.5 +49.9 10.6	42 23.5 +50.0 10.6	78
79	36 19.2 +48.9 8.9	37 18.4 +49.1 9.1	38 17.7 +49.1 9.2	39 16.9 +49.3 9.3	40 16.1 +49.4 9.4	41 15.3 +49.5 9.6	42 14.4 +49.7 9.7	43 13.5 +49.8 9.9	79
80	37 08.1 +48.7 8.2	38 07.5 +48.7 8.3	39 06.8 +48.9 8.4	40 06.2 +49.0 8.6	41 05.5 +49.1 8.7	42 04.8 +49.2 8.8	43 04.1 +49.3 9.0	44 03.3 +49.5 9.1	80
81	37 56.8 +48.3 7.5	38 56.2 +48.5 7.6	39 55.7 +48.6 7.7	40 55.2 +48.7 7.8	41 54.6 +48.8 7.9	42 54.0 +48.9 8.0	43 53.4 +49.0 8.2	44 52.8 +49.1 8.3	81
82	38 45.1 +48.1 6.7	39 44.7 +48.2 6.8	40 44.3 +48.2 6.9	41 43.8 +48.4 7.0	42 43.4 +48.4 7.1	43 42.9 +48.6 7.3	44 42.4 +48.7 7.4	45 41.9 +48.8 7.5	82
83	39 33.2 +47.8 6.0	40 32.9 +47.8 6.0	41 32.5 +48.0 6.1	42 32.2 +48.0 6.2	43 31.8 +48.1 6.3	44 31.5 +48.2 6.4	45 31.1 +48.3 6.6	46 30.7 +48.4 6.7	83
84	40 21.0 +47.4 5.3	41 20.7 +47.5 5.3	42 20.5 +47.6 5.4	43 20.2 +47.7 5.4	44 19.9 +47.8 5.5	45 19.7 +47.8 5.6	46 19.4 +47.9 5.7	47 19.1 +48.0 5.8	84
85	41 08.4 +47.1 4.4	42 08.2 +47.2 4.4	43 08.1 +47.2 4.5	44 07.9 +47.2 4.6	45 07.7 +47.3 4.6	46 07.5 +47.4 4.7	47 07.3 +47.4 4.8	48 07.1 +47.5 4.9	85
86	41 55.5 +46.7 3.5	42 55.4 +46.8 3.6	43 55.3 +46.8 3.6	44 55.1 +46.9 3.7	45 55.0 +46.9 3.8	46 54.9 +47.0 3.8	47 54.7 +47.1 3.9	48 54.6 +47.1 4.0	86
87	42 42.2 +46.4 2.7	43 42.2 +46.4 2.7	44 42.1 +46.4 2.8	45 42.0 +46.5 2.8	46 41.9 +46.5 2.9	47 41.9 +46.5 2.9	48 41.8 +46.6 3.0	49 41.7 +46.6 3.0	87
88	43 28.6 +45.9 1.8	44 28.5 +46.0 1.8	45 28.5 +46.0 1.9	46 28.5 +46.0 1.9	47 28.4 +46.1 1.9	48 28.4 +46.1 2.0	49 28.4 +46.0 2.0	50 28.3 +46.1 2.1	88
89	44 14.5 +45.5 0.9	45 14.5 +45.5 0.9	46 14.5 +45.5 0.9	47 14.5 +45.5 1.0	48 14.5 +45.5 1.0	49 14.5 +45.5 1.0	50 14.4 +45.6 1.0	51 14.4 +45.6 1.0	89
90	45 00.0 +45.1 0.0	46 00.0 +45.0 0.0	47 00.0 +45.0 0.0	48 00.0 +45.0 0.0	49 00.0 +45.0 0.0	50 00.0 +45.0 0.0	51 00.0 +45.0 0.0	52 00.0 +45.0 0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z ; L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 139°, 221°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	31 42.0	+49.8	128.1	31 04.8	+50.3	128.6	30 27.1	+50.9	129.1	29 49.1	+51.3	129.5	29 10.8	+51.8	130.0	28 32.1	+52.2	130.4	27 53.0	+52.7	130.8	27 13.7	+53.1	131.2	0
1	32 31.8	+49.6	127.5	31 55.1	+50.1	128.0	31 18.0	+50.6	128.5	30 40.4	+51.2	128.9	30 02.6	+51.6	129.4	29 24.3	+52.1	129.8	28 45.7	+52.6	130.3	28 06.8	+53.0	130.7	1
2	33 21.4	+49.3	126.8	32 45.2	+49.9	127.3	32 08.6	+50.4	127.8	31 31.6	+51.0	128.3	30 54.2	+51.5	128.8	30 16.4	+52.0	129.3	29 38.3	+52.4	129.7	28 59.8	+52.8	130.1	2
3	34 10.7	+49.1	126.1	33 35.1	+49.7	126.7	32 59.0	+50.3	127.2	32 22.6	+50.7	127.7	31 45.7	+51.3	128.2	31 08.4	+51.8	128.7	30 30.7	+52.2	129.1	29 52.6	+52.7	129.6	3
4	34 59.8	+48.9	125.4	34 24.8	+49.4	126.0	33 49.3	+50.0	126.5	33 13.3	+50.6	127.1	32 37.0	+51.1	127.6	32 00.2	+51.6	128.1	31 22.9	+52.2	128.6	30 45.3	+52.6	129.0	4
5	35 48.7	+48.6	124.7	35 14.2	+49.2	125.3	34 39.3	+49.8	125.9	34 03.9	+50.4	126.4	33 28.1	+50.9	127.0	32 51.8	+51.4	127.5	32 15.1	+51.9	128.0	31 37.9	+52.5	128.5	5
6	36 37.3	+48.3	124.0	36 03.4	+49.0	124.6	35 29.1	+49.6	125.2	34 54.3	+50.2	125.8	34 19.0	+50.7	126.3	33 43.2	+51.3	126.9	33 07.0	+51.8	127.4	32 30.4	+52.2	127.9	6
7	37 25.6	+48.0	123.2	36 52.4	+48.7	123.9	36 18.7	+49.3	124.5	35 44.5	+49.9	125.1	35 09.7	+50.5	125.7	34 34.5	+51.0	126.2	33 58.8	+51.6	126.8	33 22.6	+52.1	127.3	7
8	38 13.6	+47.8	122.5	37 41.1	+48.4	123.1	37 08.0	+49.1	123.8	36 34.4	+49.7	124.4	36 00.2	+50.3	125.0	35 25.5	+50.9	125.6	34 50.4	+51.4	126.2	34 14.7	+52.0	126.7	8
9	39 01.4	+47.4	121.7	38 29.5	+48.1	122.4	37 57.1	+48.8	123.1	37 24.1	+49.4	123.7	36 50.5	+50.1	124.3	36 16.4	+50.6	124.9	35 41.8	+51.2	125.5	35 06.7	+51.7	126.1	9
10	39 48.8	+47.1	120.9	39 17.6	+47.9	121.6	38 45.9	+48.5	122.3	38 13.5	+49.2	123.0	37 40.6	+49.8	123.6	37 07.0	+50.4	124.3	36 33.0	+51.0	124.9	35 58.4	+51.6	125.5	10
11	40 35.9	+46.7	120.1	40 05.5	+47.5	120.8	39 34.4	+48.2	121.6	39 02.7	+48.9	122.3	38 30.4	+49.5	122.9	37 57.4	+50.2	123.6	37 24.0	+50.7	124.2	36 50.0	+51.3	124.9	11
12	41 22.6	+46.4	119.3	40 53.0	+47.1	120.0	40 22.6	+47.9	120.8	39 51.6	+48.5	121.5	39 19.9	+49.2	122.2	38 47.6	+49.9	122.9	38 14.7	+50.6	123.6	37 41.3	+51.1	124.2	12
13	42 09.0	+46.0	118.4	41 40.1	+46.8	119.2	41 10.5	+47.5	120.0	40 40.1	+48.3	120.7	40 09.1	+49.0	121.5	39 37.5	+49.7	122.2	39 05.3	+50.2	122.9	38 32.4	+50.9	123.5	13
14	42 55.0	+45.6	117.6	42 26.9	+46.4	118.4	41 58.0	+47.2	119.2	41 28.4	+47.9	119.9	40 58.1	+48.7	120.7	40 27.2	+49.3	121.4	39 55.5	+50.0	122.2	39 23.3	+50.6	122.9	14
15	43 40.6	+45.2	116.7	43 13.3	+46.0	117.5	42 45.2	+46.8	118.3	42 16.3	+47.6	119.1	41 46.8	+48.3	119.9	41 16.5	+49.1	120.7	40 45.5	+49.8	121.4	40 13.9	+50.4	122.2	15
16	44 25.8	+44.7	115.7	43 59.3	+45.6	116.6	43 32.0	+46.4	117.5	43 03.9	+47.3	118.3	42 35.1	+48.0	119.1	42 05.6	+48.7	119.9	41 35.3	+49.4	120.7	41 04.3	+50.1	121.4	16
17	45 10.5	+44.2	114.8	44 44.9	+45.1	115.7	44 18.4	+46.0	116.6	43 51.2	+46.8	117.5	43 23.1	+47.6	118.3	42 54.3	+48.4	119.1	42 24.7	+49.1	119.9	41 54.4	+49.9	120.7	17
18	45 54.7	+43.8	113.8	45 30.0	+44.7	114.8	45 04.4	+45.6	115.7	44 38.0	+46.4	116.6	44 10.7	+47.3	117.5	43 42.7	+48.0	118.3	43 13.8	+48.8	119.1	42 44.3	+49.5	120.0	18
19	46 38.5	+43.2	112.9	46 14.7	+44.2	113.8	45 50.0	+45.1	114.8	45 24.4	+46.0	115.7	44 58.0	+46.8	116.6	44 30.7	+47.7	117.5	44 02.6	+48.5	118.3	43 33.8	+49.2	119.2	19
20	47 21.7	+42.6	111.8	46 58.9	+43.6	112.8	46 35.1	+44.6	113.8	46 10.4	+45.6	114.8	45 44.8	+46.5	115.7	45 18.4	+47.3	116.6	44 51.1	+48.1	117.5	44 23.0	+48.8	118.4	20
21	48 04.3	+42.1	110.8	47 42.5	+43.1	111.8	47 19.7	+44.1	112.8	46 56.0	+45.0	113.8	46 31.3	+45.9	114.8	46 05.7	+46.8	115.7	45 39.2	+47.7	116.7	45 11.8	+48.5	117.6	21
22	48 46.4	+41.4	109.7	48 25.6	+42.5	110.8	48 03.8	+43.6	111.8	47 41.0	+44.6	112.8	47 17.2	+45.5	113.8	46 52.5	+46.4	114.8	46 26.9	+47.2	115.8	46 00.3	+48.1	116.7	22
23	49 27.8	+40.8	108.6	49 08.1	+42.0	109.7	48 47.4	+43.0	110.8	48 25.6	+44.0	111.8	48 02.7	+45.0	112.9	47 38.9	+46.0	113.9	47 14.1	+46.9	114.9	46 48.4	+47.7	115.9	23
24	50 08.6	+40.2	107.5	49 50.1	+41.2	108.6	49 30.4	+42.3	109.7	49 09.6	+43.4	110.8	48 47.7	+44.5	111.9	48 24.9	+45.4	112.9	48 01.0	+46.4	114.0	47 36.1	+47.3	115.0	24
25	50 48.8	+39.4	106.3	50 31.3	+40.6	107.5	50 12.7	+41.8	108.6	49 53.0	+42.9	109.8	49 32.2	+43.9	110.9	49 10.3	+44.9	111.9	48 47.4	+45.9	113.0	48 23.4	+46.9	114.0	25
26	51 28.2	+38.6	105.1	51 11.9	+39.9	106.3	50 54.5	+41.0	107.5	50 35.9	+42.2	108.7	50 16.1	+43.3	109.8	49 55.2	+44.4	110.9	49 33.3	+45.3	112.0	49 10.3	+46.3	113.1	26
27	52 06.8	+37.8	103.9	51 51.8	+39.1	105.1	51 35.5	+40.4	106.3	51 18.1	+41.5	107.5	50 59.4	+42.7	108.7	50 39.6	+43.8	109.9	50 18.6	+44.9	111.0	49 56.6	+45.8	112.1	27
28	52 44.6	+37.1	102.6	52 30.9	+38.3	103.9	52 15.9	+39.6	105.1	51 59.6	+40.8	106.4	51 42.1	+42.0	107.6	51 23.4	+43.1	108.8	51 03.5	+44.2	110.0	50 42.4	+45.3	111.1	28
29	53 21.7	+36.1	101.3	53 09.2	+37.5	102.6	52 55.5	+38.8	103.9	52 40.4	+40.1	105.2	52 24.1	+41.3	106.4	52 06.5	+42.5	107.7	51 47.7	+43.7	108.9	51 27.7	+44.7	110.1	29
30	53 57.8	+35.2	99.9	53 46.7	+36.6	101.3	53 34.3	+38.0	102.6	53 20.5	+39.3	103.9	53 05.4	+40.6	105.2	52 49.0	+41.8	106.5	52 31.4	+42.9	107.8	52 12.4	+44.2	109.0	30
31	54 33.0	+34.2	98.6	54 23.3	+35.7	99.9	54 12.3	+37.0	101.3	53 59.8	+38.5	102.7	53 46.0	+39.8	104.0	53 30.8	+41.1	105.3	53 14.3	+42.3	106.6	52 56.6	+43.4	107.9	31
32	55 07.2	+33.1	97.1	54 59.0	+34.7	98.5	54 49.3	+36.2	99.9	54 38.3	+37.5	101.3	54 25.8	+38.9	102.7	54 11.9	+40.2	104.1	53 56.6	+41.6	105.4	53 40.0	+42.8	106.7	32
33	55 40.3	+32.1	95.7	55 33.7	+33.6	97.1	55 25.5	+35.2	98.6	55 15.8	+36.7	100.0	55 04.7	+38.1	101.4	54 52.1	+39.5	102.8	54 38.2	+40.7	104.2	54 22.8	+42.0	105.5	33
34	56 12.4	+31.0	94.1	56 07.3	+32.6	95.6	56 00.7	+34.1	97.1	55 52.5	+35.6	98.6	55 42.8	+37.1	100.0	55 31.6	+38.5	101.5	55 18.9	+39.9	102.9	55 04.8	+41.3	104.3	34
35	56 43.4	+29.8	92.6	56 39.9	+31.4	94.1	56 34.8	+33.0	95.6	56 28.1	+34.6	97.1	56 19.9	+36.1	98.6	56 10.1	+37.6	100.1	55 58.9	+39.0	101.6	55 46.1	+40.4	103.0	35
36	57 13.2	+28.5	91.0	57 11.3	+30.2	92.6	57 07.8	+31.9	94.1	57 02.7	+33.5	95.6	56 56.0	+35.1	97.2	56 47.7	+36.7	98.7	56 37.9	+38.1	100.2	56 26.5	+39.6	101.7	36
37	57 41.7	+27.2	89.4	57 41.5	+29.1	91.0	57 39.7	+30.7	92.5	57 36.2	+32.4	94.1	57 31.1	+34.0	95.7	57 24.4	+35.6	97.2	57 16.0	+37.2	98.8	57 06.1	+38.6	100.3	37
38	58 08.9	+25.9	87.7	58 10.5	+27.7	89.3	58 10.4	+29.4	90.9	58 08.6	+31.2	92.5	58 05.1	+32.9	94.1	58 00.0	+34.5	95.7	57 53.2	+36.1	97.3	57 44.7	+37.7	98.9	38
39	58 34.8	+24.5	86.0	58 38.2	+26.3	87.6	58 39.8	+28.1	89.2	58 39.8	+29.8	90.9	58 38.0	+31.6	92.5	58 34.5	+33.3	94.2	58 29.3	+34.9	95.8	58 22.4	+36.5	97.4	39
40	58 59.3	+23.0	84.2	59 04.5	+24.9	85.9	59 07.9	+26.8	87.5	59 09.6	+28.6	89.2	59 09.6	+30.3	90.9	59 07.8	+32.1	92.6	59 04.2	+33.8	94.2	58 58.9	+35.5	95.9	40
41	59 22.3	+21.5	82.4	59 29.4	+23.3	84.1	59 34.7	+25.2	85.8	59 38.2	+27.1	87.5	59 39.9	+29.0	89.2	59 39.9	+30.8	90.9	59 38.0	+32.6	92.6	59 34.4	+34.3	94.3	41
42	59 43.8	+19.9	80.6	59 52.7	+21.9	82.3	59 59.9	+23.8	84.0	60 05.3	+25.7	85.7	60 08.9	+27.6	87.4	60 10.7	+29.4	89.2	60 10.6	+31.3	90.9	60 08.7	+33.1	92.7	42
43	60 03.7	+18.2	78.7	60 14.6	+20.2	80.4	60 23.7	+22.2	82.1	60 31.0	+24.1	83.9	60 36.5	+26.0	85.6	60 40.1	+28.0	87.4	60 41.9	+29.8	89.2	60 41.8	+31.7	91.0	43
44	60 21.9	+16.6	76.8	60 34.8	+18.6	78.5	60 45.9	+20.5	80.2	60 55.1	+22.6	82.0	61 02.5	+24.6	83.8	61 08.1	+26.5	85.6	61 11.7	+28.5	87.4	61 13.5	+30.3	89.2	44
45	60 38.5	+14.9	74.8	60 53.4	+16.8	76.5	61 06.4	+18.9	78.3	61 17.7	+20.8	80.1	61 27.1	+22.8	81.9	61 34.6	+24.9	83.7	61 40.2	+26.8	85.6	61 43.8	+28.9	87.4	45
46	60 53.4	+13.0	72.8	61 10.2	+15.1	74.6	61 25.3	+17.1	76.3	61 38.5	+19.2	78.1	61 49.9	+21.3	80.0	61 59.5	+23.2	81.8	62 07.0	+25.3	83.7	62 12.7	+27.3	85.6	46
47	61 06.4	+11.3	70.8	61 25.3	+13.2	72.5	61 42.4	+15.3	74.3	61 57.7	+17.4	76.1	62 11.2	+19.4	78.0	62 22.7	+21.5	79.8	62 32.3	+23.6	81.7	62 40.0	+25.6	83.6	47
48	61 17.7	+9.4	68.8	61 38.5	+11.4	70.5	61 57.7	+13.5	72.3	62 15.1	+15.5	74.1	62 30.6	+17.6	75.9	62 44.2	+19.8	77.8	62 55.9	+21.9	79.7	63 05.6	+24.0	81.7	48
49	61 27.1	+7.5	66.7	61 49.9	+9.6	68.4	62 11.2	+11.5	70.2	62 30.6	+13.6	72.0	62 48.2	+15.8	73.8	63 04.0	+17.8	75.7	63 17.8	+20.0	77.7	63 29.6	+22.2	79.6	49
50	61 34.6	+5.4	64.6	61 59.5	+7.5	66.3	62 22.7	+9.6	68.1	62 44.2	+11.7	69.9	63 04.0	+13.8•	71.7	63 21.8	+16.0	73.6	63 37.8	+18.1	75.5	63 51.8	+20.3	77.5	50
51	61 40.2	+3.6	62.5	62 07.0	+5.7	64.2	62 32.3	+7.7•	65.9	62 55.9	+9.7•	67.7	63 17.8	+11.8•	69.6	63 37.8	+14.0•	71.5	63 55.9	+16.2•	73.4	64 12.1	+18.4•	75.4	51
52	61 43.8	+1.7	60.4	62 12.7	+3.6•	62.1	62 40.0	+5.6•	63.8	63 05.6	+7.7•	65.6	63 29.6	+9.8•	67.4	63 51.8	+11.9•	69.3	64 12.1	+14.1•	71.2	64 30.5	+16.3•	73.2	52
53	61 45.5	−0.2	58.3	62 16.3	+1.7	59.9	62 45.6	+3.6•	61.6	63 13.3	+5.7•	63.4	63 39.4	+7.7•	65.2	64 03.7	+9.9•	67.0	64 26.2	+12.1•	68.9	64 46.8	+14.3•	70.9	53
54	61 45.3	−2.2	56.2	62 18.0	−0.3•	57.8	62 49.2	+1.6•	59.4	63 19.0	+3.6•	61.1	63 47.1	+5.6•	62.9	64 13.6	+7.7•	64.8	64 38.3	+9.9•	66.7	65 01.1	+12.1•	68.6	54
55	61 43.1	−4.1	54.1	62 17.7	−2.4•	55.6	62 50.8	−0.4•	57.2	63 22.6	+1.4•	58.9	63 52.7	+3.6•	60.7	64 21.3	+5.6•	62.5	64 48.2	+7.7•	64.4	65 13.2	+10.0•	66.3	55
56	61 39.0	−6.0	52.0	62 15.3	−4.3	53.5	62 50.4	−2.5•	55.1	63 24.0	−0.6•	56.7	63 56.3	+1.3•	58.4	64 26.9	+3.4•	60.2	64 55.9	+5.5•	62.0	65 23.2	+7.7•	63.9	56
57	61 33.0	−8.0	49.9	62 11.0	−6.2•	51.4	62 47.9	−4.5•	52.9	63 23.4	−2.6•	54.5	63 57.6	−0.8•	56.1	64 30.3	+1.2•	57.9	65 01.4	+3.3•	59.7	65 30.9	+5.4•	61.6	57
58	61 25.0	−9.8	47.8	62 04.8	−8.3	49.2	62 43.4	−6.6•	50.7	63 20.8	−4.8•	52.2	63 56.8	−2.9•	53.8	64 31.5	−1.0•	55.5	65 04.7	+1.1•	57.3	65 36.3	+3.2•	59.2	58
59	61 15.2	−11.7	45.8	61 56.5	−10.1	47.1	62 36.8	−8.5	48.5	63 16.0	−6.8•	50.0	63 53.9	−5.0•	51.6	64 30.5	−3.1•	53.2	65 05.8	−1.3•	54.9	65 39.5	+0.8•	56.7	59
60	61 03.5	−13.5	43.7	61 46.4	−12.0	45.0	62 28.3	−10.5	46.4	63 09.2	−8.9•	47.8	63 48.9	−7.2•	49.3	64 27.4	−5.4•	50.9	65 04.5	−3.4•	52.6	65 40.3	−1.5•	54.3	60
61	60 50.0	−15.2	41.7	61 34.4	−13.9	43.0	62 17.8	−12.4	44.3	63 00.3	−10.9	45.6	63 41.7	−9.2•	47.1	64 22.0	−7.5•	48.6	65 01.1	−5.7•	50.2	65 38.8	−3.8•	51.9	61
62	60 34.8	−17.0	39.8	61 20.5	−15.7	40.9	62 05.4	−14.3	42.2	62 49.4	−12.8	43.5	63 32.5	−11.3•	44.8	64 14.5	−9.6•	46.3	64 55.4	−7.9•	47.8	65 35.0	−6.0•	49.5	62
63	60 17.8	−18.7	37.8	61 04.8	−17.4	38.9	61 51.1	−16.1	40.1	62 36.6	−14.7	41.3	63 21.2	−13.2•	42.6	64 04.9	−11.7	44.0	64 47.5	−10.1•	45.5	65 29.0	−8.4•	47.1	63
64	59 59.1	−20.2	35.9	60 47.4	−19.1	36.9	61 35.0	−17.9	38.1	62 21.9	−16.6	39.2	63 08.0	−15.3	40.5	63 53.2	−13.8•	41.8	64 37.4	−12.2•	43.2	65 20.6	−10.6•	44.7	64
65	59 38.9	−21.9	34.0	60 28.3	−20.8	35.0	61 17.1	−19.6	36.1	62 05.3	−18.4	37.2	62 52.7	−17.1	38.3	63 39.4	−15.8	39.6	64 25.2	−14.3•	40.9	65 10.0	−12.7•	42.3	65
66	59 17.0	−23.3	32.2	60 07.5	−22.3	33.1	60 57.5	−21.3	34.1	61 46.9	−20.2	35.1	62 35.6	−18.9	36.2	63 23.6	−17.6	37.4	64 10.9	−16.3•	38.7	64 57.3	−14.9•	40.0	66
67	58 53.7	−24.8	30.4	59 45.2	−23.9	31.3	60 36.2	−22.9	32.2	61 26.7	−21.8	33.2	62 16.7	−20.8	34.2	63 06.0	−19.6	35.3	63 54.6	−18.3	36.5	64 42.4	−16.9•	37.7	67
68	58 28.9	−26.2	28.7	59 21.3	−25.3	29.5	60 13.3	−24.4	30.3	61 04.9	−23.5	31.2	61 55.9	−22.4	32.2	62 46.4	−21.3	33.2	63 36.3	−20.2	34.3	64 25.5	−18.9	35.5	68
69	58 02.7	−27.6	26.9	58 56.0	−26.8	27.7	59 48.9	−25.9	28.5	60 41.4	−25.0	29.3	61 33.5	−24.1	30.2	62 25.1	−23.1	31.2	63 16.1	−21.9	32.2	64 06.6	−20.8	33.3	69
70	57 35.1	−28.8	25.3	58 29.2	−28.1	26.0	59 23.0	−27.4	26.7	60 16.4	−26.5	27.5	61 09.4	−25.6	28.3	62 02.0	−24.7	29.2	62 54.2	−23.8	30.2	63 45.8	−22.7	31.2	70
71	57 06.3	−30.1	23.6	58 01.1	−29.4	24.3	58 55.6	−28.7	25.0	59 49.9	−28.0	25.7	60 43.8	−27.2	26.5	61 37.3	−26.3	27.3	62 30.4	−25.4	28.2	63 23.1	−24.5	29.1	71
72	56 36.2	−31.2	22.1	57 31.7	−30.6	22.7	58 26.9	−29.9	23.3	59 21.9	−29.3	23.9	60 16.6	−28.6	24.6	61 11.0	−27.8	25.4	62 05.0	−27.0	26.2	62 58.6	−26.1	27.1	72
73	56 05.0	−32.3	20.5	57 01.1	−31.8	21.1	57 57.0	−31.3	21.6	58 52.6	−30.6	22.2	59 48.0	−30.0	22.9	60 43.2	−29.3	23.6	61 38.0	−28.5	24.3	62 32.5	−27.7	25.1	73
74	55 32.6	−33.4	19.0	56 29.3	−33.0	19.5	57 25.7	−32.4	20.0	58 22.0	−31.9	20.6	59 18.0	−31.2	21.2	60 13.9	−30.7	21.8	61 09.5	−30.0	22.5	62 04.8	−29.3	23.2	74
75	54 59.2	−34.4	17.6	55 56.3	−34.0	18.0	56 53.3	−33.5	18.5	57 50.1	−33.0	19.0	58 46.8	−32.5	19.5	59 43.2	−31.9	20.1	60 39.5	−31.4	20.7	61 35.5	−30.7	21.3	75
76	54 24.8	−35.5	16.2	55 22.3	−35.0	16.6	56 19.8	−34.6	17.0	57 17.1	−34.2	17.4	58 14.3	−33.7	17.9	59 11.3	−33.2	18.4	60 08.1	−32.7	19.0	61 04.8	−32.2	19.6	76
77	53 49.3	−36.3	14.8	54 47.3	−36.0	15.1	55 45.2	−35.6	15.5	56 42.9	−35.2	15.9	57 40.6	−34.8	16.4	58 38.1	−34.4	16.8	59 35.4	−33.9	17.3	60 32.6	−33.4	17.8	77
78	53 13.0	−37.2	13.4	54 11.3	−36.9	13.7	55 09.6	−36.4	14.1	56 07.7	−36.2	14.5	57 05.8	−35.9	14.8	58 03.7	−35.5	15.2	59 01.5	−35.0	15.7	59 59.2	−34.6	16.1	78
79	52 35.8	−38.0	12.1	53 34.4	−37.7	12.4	54 33.0	−37.5	12.7	55 31.5	−37.2	13.0	56 29.9	−36.8	13.4	57 28.2	−36.5	13.7	58 26.5	−36.2	14.1	59 24.6	−35.8	14.5	79
80	51 57.8	−38.8	10.9	52 56.7	−38.6	11.1	53 55.5	−38.3	11.4	54 54.3	−38.1	11.7	55 53.1	−37.9	12.0	56 51.7	−37.5	12.3	57 50.3	−37.2	12.6	58 48.8	−36.9	13.0	80
81	51 19.0	−39.6	9.6	52 18.1	−39.4	9.9	53 17.2	−39.2	10.1	54 16.2	−38.9	10.3	55 15.2	−38.7	10.5	56 14.2	−38.5	10.9	57 13.1	−38.2	11.1	58 11.9	−37.9	11.5	81
82	50 39.4	−40.3	8.4	51 38.7	−40.1	8.6	52 38.0	−39.9	8.8	53 37.3	−39.8	9.0	54 36.5	−39.5	9.3	55 35.7	−39.3	9.5	56 34.9	−39.1	9.7	57 34.0	−38.9	10.0	82
83	49 59.1	−41.0	7.3	50 58.6	−40.8	7.4	51 58.1	−40.7	7.6	52 57.5	−40.5	7.8	53 57.0	−40.4	8.0	54 56.4	−40.2	8.2	55 55.8	−40.0	8.4	56 55.1	−39.8	8.6	83
84	49 18.1	−41.6	6.2	50 17.8	−41.5	6.3	51 17.4	−41.3	6.4	52 17.0	−41.2	6.6	53 16.6	−41.1	6.7	54 16.2	−41.0	6.9	55 15.8	−40.9	7.1	56 15.3	−40.7	7.2	84
85	48 36.5	−42.2	5.1	49 36.3	−42.1	5.2	50 36.1	−42.1	5.3	51 35.8	−41.9	5.4	52 35.5	−41.8	5.5	53 35.2	−41.7	5.6	54 34.9	−41.6	5.8	55 34.6	−41.5	5.9	85
86	47 54.3	−42.8	4.0	48 54.2	−42.7	4.1	49 54.0	−42.6	4.2	50 53.9	−42.6	4.2	51 53.7	−42.5	4.3	52 53.5	−42.4	4.4	53 53.3	−42.3	4.5	54 53.1	−42.2	4.7	86
87	47 11.5	−43.3	3.0	48 11.5	−43.3	3.0	49 11.4	−43.3	3.1	50 11.3	−43.2	3.1	51 11.2	−43.1	3.2	52 11.1	−43.1	3.3	53 11.0	−43.0	3.4	54 10.9	−43.0	3.4	87
88	46 28.2	−43.8	1.9	47 28.2	−43.9	2.0	48 28.1	−43.8	2.0	49 28.1	−43.8	2.1	50 28.1	−43.7	2.1	51 28.0	−43.7	2.1	52 28.0	−43.7	2.2	53 27.9	−43.6	2.2	88
89	45 44.4	−44.4	1.0	46 44.3	−44.3	1.0	47 44.3	−44.3	1.0	48 44.3	−44.3	1.0	49 44.3	−44.3	1.0	50 44.3	−44.3	1.1	51 44.3	−44.3	1.1	52 44.3	−44.3	1.1	89
90	45 00.0	−44.8	0.0	46 00.0	−44.8	0.0	47 00.0	−44.8	0.0	48 00.0	−44.8	0.0	49 00.0	−44.9	0.0	50 00.0	−44.9	0.0	51 00.0	−44.9	0.0	52 00.0	−44.9	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	31 42.0	−49.9	128.1	31 04.8	−50.5	128.6	30 27.1	−50.9	129.1	29 49.1	−51.4	129.5	29 10.8	−52.0	130.0	28 32.1	−52.4	130.4	27 53.0	−52.8	130.8	27 13.7	−53.3	131.2	0
1	30 52.1	−50.2	128.8	30 14.3	−50.7	129.2	29 36.2	−51.2	129.7	28 57.7	−51.7	130.1	28 18.8	−52.2	130.5	27 39.7	−52.5	130.9	27 00.2	−52.9	131.3	26 20.4	−53.3	131.7	1
2	30 01.9	−50.3	129.4	29 23.6	−50.8	129.9	28 45.0	−51.3	130.3	28 06.0	−51.7	130.7	27 26.8	−52.3	131.1	26 47.2	−52.7	131.5	26 07.3	−53.1	131.9	25 27.1	−53.5	132.2	2
3	29 11.6	−50.5	130.1	28 32.8	−51.0	130.5	27 53.7	−51.5	130.9	27 14.3	−51.9	131.3	26 34.5	−52.3	131.7	25 54.5	−52.7	132.0	25 14.2	−53.1	132.4	24 33.6	−53.5	132.7	3
4	28 21.1	−50.7	130.7	27 41.8	−51.1	131.1	27 02.2	−51.6	131.5	26 22.4	−52.1	131.8	25 42.2	−52.4	132.2	25 01.8	−52.9	132.6	24 21.1	−53.3	132.9	23 40.1	−53.6	133.2	4
5	27 30.4	−50.8	131.3	26 50.7	−51.3	131.7	26 10.6	−51.7	132.0	25 30.3	−52.1	132.4	24 49.8	−52.6	132.7	24 08.9	−53.0	133.1	23 27.8	−53.3	133.4	22 46.5	−53.8	133.7	5
6	26 39.6	−51.0	131.9	25 59.4	−51.4	132.2	25 18.9	−51.8	132.6	24 38.2	−52.3	132.9	23 57.2	−52.7	133.3	23 15.9	−53.0	133.6	22 34.5	−53.5	133.9	21 52.7	−53.8	134.2	6
7	25 48.6	−51.1	132.5	25 08.0	−51.6	132.8	24 27.1	−52.0	133.1	23 45.9	−52.4	133.5	23 04.5	−52.8	133.8	22 22.9	−53.2	134.1	21 41.0	−53.5	134.4	20 58.9	−53.8	134.7	7
8	24 57.5	−51.2	133.0	24 16.4	−51.7	133.4	23 35.1	−52.1	133.7	22 53.5	−52.5	134.0	22 11.7	−52.8	134.3	21 29.7	−53.2	134.6	20 47.5	−53.6	134.9	20 05.1	−54.0	135.1	8
9	24 06.3	−51.4	133.6	23 24.7	−51.7	133.9	22 43.0	−52.2	134.2	22 01.0	−52.6	134.5	21 18.9	−53.0	134.8	20 36.5	−53.4	135.1	19 53.9	−53.7	135.3	19 11.1	−54.0	135.6	9
10	23 14.9	−51.5	134.2	22 33.0	−51.9	134.5	21 50.8	−52.3	134.8	21 08.4	−52.6	135.0	20 25.9	−53.1	135.3	19 43.1	−53.4	135.6	19 00.2	−53.8	135.8	18 17.1	−54.1	136.1	10
11	22 23.4	−51.6	134.7	21 41.1	−52.1	135.0	20 58.5	−52.4	135.3	20 15.8	−52.8	135.6	19 32.8	−53.1	135.8	18 49.7	−53.5	136.1	18 06.4	−53.8	136.3	17 23.0	−54.2	136.5	11
12	21 31.8	−51.7	135.3	20 49.0	−52.1	135.6	20 06.1	−52.5	135.8	19 23.0	−52.9	136.1	18 39.7	−53.2	136.3	17 56.2	−53.5	136.5	17 12.6	−53.9	136.7	16 28.8	−54.2	137.0	12
13	20 40.1	−51.8	135.8	19 56.9	−52.2	136.1	19 13.6	−52.5	136.3	18 30.1	−52.9	136.6	17 46.5	−53.3	136.8	17 02.7	−53.6	137.0	16 18.7	−53.9	137.2	15 34.6	−54.2	137.4	13
14	19 48.3	−51.9	136.4	19 04.7	−52.2	136.6	18 21.1	−52.7	136.8	17 37.2	−53.0	137.1	16 53.2	−53.3	137.3	16 09.1	−53.7	137.5	15 24.8	−54.0	137.7	14 40.4	−54.3	137.8	14
15	18 56.4	−52.0	136.9	18 12.5	−52.4	137.1	17 28.4	−52.7	137.3	16 44.2	−53.1	137.6	15 59.9	−53.4	137.7	15 15.4	−53.7	137.9	14 30.8	−54.1	138.1	13 46.1	−54.4	138.3	15
16	18 04.4	−52.1	137.4	17 20.1	−52.4	137.6	16 35.7	−52.8	137.8	15 51.1	−53.1	138.0	15 06.5	−53.5	138.2	14 21.7	−53.8	138.4	13 36.7	−54.1	138.6	12 51.7	−54.4	138.7	16
17	17 12.3	−52.2	137.9	16 27.7	−52.6	138.1	15 42.9	−52.9	138.3	14 58.0	−53.2	138.5	14 13.0	−53.5	138.7	13 27.9	−53.9	138.9	12 42.6	−54.1	139.0	11 57.3	−54.4	139.2	17
18	16 20.1	−52.2	138.5	15 35.1	−52.6	138.6	14 50.0	−52.9	138.8	14 04.8	−53.2	139.0	13 19.5	−53.6	139.2	12 34.0	−53.9	139.3	11 48.5	−54.2	139.4	11 02.9	−54.5	139.6	18
19	15 27.9	−52.3	139.0	14 42.5	−52.6	139.1	13 57.1	−53.0	139.3	13 11.6	−53.3	139.4	12 25.9	−53.6	139.6	11 40.1	−53.9	139.8	10 54.3	−54.2	139.9	10 08.4	−54.5	140.0	19
20	14 35.6	−52.4	139.5	13 49.9	−52.7	139.6	13 04.1	−53.0	139.8	12 18.3	−53.4	139.9	11 32.3	−53.7	140.1	10 46.2	−53.9	140.2	10 00.1	−54.3	140.3	9 13.9	−54.6	140.4	20
21	13 43.2	−52.4	140.0	12 57.2	−52.8	140.1	12 11.1	−53.1	140.3	11 24.9	−53.4	140.4	10 38.6	−53.7	140.5	9 52.3	−54.0	140.6	9 05.8	−54.3	140.8	8 19.3	−54.5	140.9	21
22	12 50.8	−52.5	140.5	12 04.4	−52.8	140.6	11 18.0	−53.1	140.8	10 31.5	−53.4	140.9	9 44.9	−53.7	141.0	8 58.3	−54.1	141.1	8 11.5	−54.3	141.2	7 24.8	−54.6	141.3	22
23	11 58.3	−52.6	141.0	11 11.6	−52.8	141.1	10 24.9	−53.2	141.2	9 38.1	−53.5	141.3	8 51.2	−53.8	141.4	8 04.2	−54.1	141.5	7 17.2	−54.3	141.6	6 30.2	−54.6	141.7	23
24	11 05.7	−52.6	141.5	10 18.8	−52.9	141.6	9 31.7	−53.2	141.7	8 44.6	−53.5	141.8	7 57.4	−53.8	141.9	7 10.2	−54.1	142.0	6 22.9	−54.4	142.0	5 35.6	−54.7	142.1	24
25	10 13.1	−52.6	142.0	9 25.9	−53.0	142.1	8 38.5	−53.2	142.2	7 51.1	−53.6	142.3	7 03.6	−53.8	142.3	6 16.1	−54.1	142.4	5 28.5	−54.3	142.5	4 40.9	−54.6	142.5	25
26	9 20.5	−52.7	142.4	8 32.9	−53.0	142.5	7 45.3	−53.3	142.6	6 57.5	−53.6	142.7	6 09.8	−53.9	142.8	5 22.0	−54.1	142.8	4 34.2	−54.4	142.9	3 46.3	−54.7	142.9	26
27	8 27.8	−52.7	142.9	7 39.9	−53.0	143.0	6 52.0	−53.3	143.1	6 04.0	−53.6	143.2	5 15.9	−53.8	143.2	4 27.9	−54.2	143.3	3 39.8	−54.4	143.3	2 51.6	−54.6	143.3	27
28	7 35.1	−52.7	143.4	6 46.9	−53.0	143.5	5 58.7	−53.3	143.6	5 10.4	−53.6	143.6	4 22.1	−53.9	143.7	3 33.7	−54.1	143.7	2 45.4	−54.4	143.7	1 57.0	−54.7	143.8	28
29	6 42.4	−52.8	143.9	5 53.9	−53.1	144.0	5 05.4	−53.4	144.0	4 16.8	−53.6	144.1	3 28.2	−53.9	144.1	2 39.6	−54.2	144.1	1 51.0	−54.5	144.2	1 02.3	−54.7	144.2	29
30	5 49.6	−52.8	144.4	5 00.8	−53.0	144.4	4 12.0	−53.3	144.5	3 23.2	−53.7	144.5	2 34.3	−53.9	144.5	1 45.4	−54.1	144.6	0 56.5	−54.4	144.6	0 07.6	−54.6	144.6	30
31	4 56.8	−52.8	144.9	4 07.8	−53.1	144.9	3 18.7	−53.4	144.9	2 29.5	−53.6	145.0	1 40.4	−53.9	145.0	0 51.3	−54.2	145.0	0 02.1	−54.5	145.0	0 47.0	+54.7	35.0	31
32	4 04.0	−52.8	145.3	3 14.7	−53.1	145.4	2 25.3	−53.4	145.4	1 35.9	−53.6	145.4	0 46.5	−53.9	145.4	0 02.9	+54.2	34.6	0 52.3	+54.4	34.6	1 41.7	+54.5	34.6	32
33	3 11.2	−52.8	145.8	2 21.6	−53.2	145.8	1 31.9	−53.4	145.8	0 42.3	−53.7	145.9	0 07.4	+53.9	34.1	0 57.1	+54.1	34.1	1 46.7	+54.4	34.2	2 36.4	+54.6	34.2	33
34	2 18.4	−52.9	146.3	1 28.4	−53.1	146.3	0 38.5	−53.4	146.3	0 11.4	+53.6	33.7	1 01.3	+53.9	33.7	1 51.2	+54.2	33.7	2 41.1	+54.4	33.7	3 31.0	+54.7	33.8	34
35	1 25.5	−52.8	146.8	0 35.3	−53.1	146.8	0 14.9	+53.3	33.2	1 05.0	+53.7	33.2	1 55.2	+53.9	33.3	2 45.4	+54.1	33.3	3 35.5	+54.3	33.3	4 25.7	+54.6	33.4	35
36	0 32.7	−52.9	147.2	0 17.8	+53.1	32.8	1 08.2	+53.4	32.8	1 58.7	+53.6	32.8	2 49.1	+53.9	32.8	3 39.5	+54.2	32.9	4 29.9	+54.4	32.9	5 20.3	+54.6	32.9	36
37	0 20.2	+52.9	32.3	1 10.9	+53.1	32.3	2 01.6	+53.4	32.3	2 52.3	+53.6	32.3	3 43.0	+53.9	32.4	4 33.7	+54.1	32.4	5 24.3	+54.4	32.5	6 14.9	+54.6	32.5	37
38	1 13.1	+52.8	31.8	2 04.0	+53.1	31.8	2 55.0	+53.4	31.9	3 45.9	+53.7	31.9	4 36.9	+53.8	31.9	5 27.8	+54.1	32.0	6 18.7	+54.3	32.0	7 09.5	+54.6	32.1	38
39	2 05.9	+52.9	31.4	2 57.1	+53.1	31.4	3 48.4	+53.3	31.4	4 39.6	+53.6	31.4	5 30.7	+53.9	31.5	6 21.9	+54.1	31.5	7 13.0	+54.3	31.6	8 04.1	+54.5	31.7	39
40	2 58.8	+52.8	30.9	3 50.2	+53.1	30.9	4 41.7	+53.3	31.0	5 33.2	+53.5	31.0	6 24.6	+53.8	31.1	7 16.0	+54.0	31.1	8 07.3	+54.3	31.2	8 58.6	+54.5	31.3	40
41	3 51.6	+52.8	30.4	4 43.3	+53.1	30.4	5 35.0	+53.4	30.5	6 26.7	+53.6	30.5	7 18.4	+53.8	30.6	8 10.0	+54.0	30.7	9 01.6	+54.3	30.8	9 53.1	+54.5	30.8	41
42	4 44.4	+52.8	29.9	5 36.4	+53.0	30.0	6 28.4	+53.2	30.0	7 20.3	+53.5	30.1	8 12.2	+53.7	30.2	9 04.0	+54.0	30.2	9 55.9	+54.2	30.3	10 47.6	+54.5	30.4	42
43	5 37.2	+52.8	29.5	6 29.4	+53.1	29.5	7 21.6	+53.3	29.6	8 13.8	+53.5	29.6	9 05.9	+53.8	29.7	9 58.0	+54.0	29.8	10 50.1	+54.2	29.9	11 42.1	+54.4	30.0	43
44	6 30.0	+52.7	29.0	7 22.5	+52.9	29.0	8 14.9	+53.2	29.1	9 07.3	+53.5	29.2	9 59.7	+53.7	29.3	10 52.0	+53.9	29.3	11 44.3	+54.1	29.4	12 36.5	+54.4	29.6	44
45	7 22.7	+52.7	28.5	8 15.4	+53.0	28.6	9 08.1	+53.2	28.6	10 00.8	+53.4	28.7	10 53.4	+53.6	28.8	11 45.9	+53.9	28.9	12 38.4	+54.1	29.0	13 30.9	+54.3	29.1	45
46	8 15.4	+52.7	28.0	9 08.4	+52.9	28.1	10 01.3	+53.2	28.2	10 54.2	+53.4	28.3	11 47.0	+53.6	28.3	12 39.8	+53.8	28.5	13 32.5	+54.1	28.6	14 25.2	+54.3	28.7	46
47	9 08.1	+52.7	27.5	10 01.3	+52.9	27.6	10 54.5	+53.1	27.7	11 47.6	+53.3	27.8	12 40.6	+53.6	27.9	13 33.6	+53.8	28.0	14 26.6	+54.0	28.1	15 19.5	+54.2	28.2	47
48	10 00.8	+52.6	27.0	10 54.2	+52.8	27.1	11 47.6	+53.0	27.2	12 40.9	+53.3	27.3	13 34.2	+53.5	27.4	14 27.4	+53.7	27.5	15 20.6	+53.9	27.7	16 13.7	+54.2	27.8	48
49	10 53.4	+52.5	26.6	11 47.0	+52.8	26.6	12 40.6	+53.0	26.7	13 34.2	+53.2	26.8	14 27.7	+53.4	27.0	15 21.1	+53.7	27.1	16 14.5	+53.9	27.2	17 07.9	+54.1	27.3	49
50	11 45.9	+52.5	26.1	12 39.8	+52.7	26.2	13 33.6	+53.0	26.3	14 27.4	+53.2	26.4	15 21.1	+53.4	26.5	16 14.8	+53.6	26.6	17 08.4	+53.8	26.8	18 02.0	+54.0	26.9	50
51	12 38.4	+52.5	25.6	13 32.5	+52.7	25.7	14 26.6	+52.9	25.8	15 20.6	+53.1	25.9	16 14.5	+53.4	26.0	17 08.4	+53.6	26.1	18 02.2	+53.8	26.3	18 56.0	+54.0	26.4	51
52	13 30.9	+52.3	25.1	14 25.2	+52.6	25.2	15 19.5	+52.8	25.3	16 13.7	+53.0	25.4	17 07.9	+53.2	25.5	18 02.0	+53.4	25.7	18 56.0	+53.7	25.8	19 50.0	+53.9	26.0	52
53	14 23.2	+52.4	24.6	15 17.8	+52.5	24.7	16 12.3	+52.7	24.8	17 06.7	+53.0	24.9	18 01.1	+53.2	25.1	18 55.4	+53.3	25.2	19 49.7	+53.6	25.3	20 43.9	+53.8	25.5	53
54	15 15.6	+52.2	24.1	16 10.3	+52.5	24.2	17 05.0	+52.7	24.3	17 59.7	+52.9	24.4	18 54.3	+53.1	24.6	19 48.8	+53.4	24.7	20 43.3	+53.5	24.9	21 37.7	+53.8	25.0	54
55	16 07.8	+52.2	23.5	17 02.8	+52.4	23.7	17 57.7	+52.6	23.8	18 52.6	+52.8	23.9	19 47.4	+53.0	24.1	20 42.2	+53.2	24.2	21 36.8	+53.5	24.4	22 31.5	+53.6	24.6	55
56	17 00.0	+52.1	23.0	17 55.2	+52.3	23.2	18 50.3	+52.6	23.3	19 45.4	+52.7	23.4	20 40.4	+53.0	23.6	21 35.4	+53.1	23.7	22 30.3	+53.4	23.9	23 25.1	+53.6	24.1	56
57	17 52.1	+52.0	22.5	18 47.5	+52.2	22.6	19 42.9	+52.4	22.8	20 38.1	+52.7	22.9	21 33.4	+52.8	23.1	22 28.5	+53.1	23.2	23 23.7	+53.2	23.4	24 18.7	+53.5	23.6	57
58	18 44.1	+51.9	22.0	19 39.7	+52.2	22.1	20 35.3	+52.3	22.3	21 30.8	+52.5	22.4	22 26.2	+52.8	22.6	23 21.6	+53.0	22.7	24 16.9	+53.2	22.9	25 12.2	+53.3	23.1	58
59	19 36.0	+51.9	21.5	20 31.9	+52.0	21.6	21 27.6	+52.3	21.7	22 23.3	+52.5	21.9	23 18.9	+52.6	22.0	24 14.6	+52.8	22.2	25 10.1	+53.0	22.4	26 05.5	+53.2	22.6	59
60	20 27.9	+51.7	20.9	21 23.9	+51.9	21.1	22 19.9	+52.1	21.2	23 15.8	+52.3	21.4	24 11.6	+52.6	21.5	25 07.4	+52.8	21.7	26 03.1	+53.0	21.9	26 58.8	+53.1	22.1	60
61	21 19.6	+51.7	20.4	22 15.8	+51.9	20.5	23 12.0	+52.0	20.7	24 08.1	+52.2	20.8	25 04.2	+52.4	21.0	26 00.2	+52.6	21.2	26 56.1	+52.8	21.3	27 51.9	+53.1	21.5	61
62	22 11.3	+51.5	19.8	23 07.7	+51.7	20.0	24 04.0	+51.9	20.1	25 00.3	+52.1	20.3	25 56.6	+52.3	20.4	26 52.8	+52.5	20.6	27 48.9	+52.7	20.8	28 45.0	+52.9	21.0	62
63	23 02.8	+51.4	19.3	23 59.4	+51.6	19.4	24 55.9	+51.8	19.6	25 52.4	+52.0	19.7	26 48.9	+52.2	19.9	27 45.3	+52.3	20.1	28 41.6	+52.6	20.3	29 37.9	+52.7	20.5	63
64	23 54.2	+51.2	18.7	24 51.0	+51.4	18.9	25 47.7	+51.7	19.0	26 44.4	+51.9	19.2	27 41.1	+52.0	19.3	28 37.6	+52.3	19.5	29 34.2	+52.4	19.7	30 30.6	+52.6	19.9	64
65	24 45.4	+51.2	18.1	25 42.4	+51.4	18.3	26 39.4	+51.5	18.4	27 36.3	+51.7	18.6	28 33.1	+51.9	18.8	29 29.9	+52.1	19.0	30 26.6	+52.3	19.1	31 23.2	+52.5	19.3	65
66	25 36.6	+51.0	17.6	26 33.8	+51.2	17.7	27 30.9	+51.4	17.9	28 28.0	+51.5	18.0	29 25.0	+51.8	18.2	30 22.0	+51.9	18.4	31 18.9	+52.1	18.6	32 15.7	+52.3	18.8	66
67	26 27.6	+50.9	17.0	27 25.0	+51.0	17.1	28 22.3	+51.2	17.3	29 19.5	+51.4	17.5	30 16.8	+51.5	17.6	31 13.9	+51.8	17.8	32 11.0	+52.0	18.0	33 08.0	+52.2	18.2	67
68	27 18.5	+50.7	16.4	28 16.0	+50.9	16.5	29 13.5	+51.1	16.6	30 10.9	+51.3	16.9	31 08.3	+51.5	17.0	32 05.7	+51.6	17.2	33 03.0	+51.8	17.4	34 00.2	+52.0	17.6	68
69	28 09.2	+50.5	15.8	29 06.9	+50.7	15.9	30 04.6	+50.9	16.1	31 02.2	+51.1	16.3	31 59.8	+51.2	16.4	32 57.3	+51.4	16.6	33 54.8	+51.6	16.8	34 52.2	+51.8	17.0	69
70	28 59.7	+50.4	15.2	29 57.6	+50.6	15.3	30 55.5	+50.7	15.5	31 53.3	+50.8	15.6	32 51.0	+51.1	15.8	33 48.7	+51.3	16.0	34 46.4	+51.4	16.2	35 44.0	+51.6	16.4	70
71	29 50.1	+50.2	14.5	30 48.2	+50.3	14.7	31 46.2	+50.5	14.8	32 44.1	+50.7	15.0	33 42.1	+50.8	15.2	34 40.0	+51.0	15.4	35 37.8	+51.2	15.5	36 35.6	+51.4	15.7	71
72	30 40.3	+50.0	13.9	31 38.5	+50.2	14.1	32 36.7	+50.3	14.2	33 34.8	+50.5	14.4	34 32.9	+50.7	14.5	35 31.0	+50.8	14.7	36 29.0	+51.0	14.9	37 27.0	+51.1	15.1	72
73	31 30.3	+49.8	13.3	32 28.7	+50.0	13.4	33 27.0	+50.2	13.6	34 25.3	+50.3	13.7	35 23.6	+50.5	13.9	36 21.8	+50.6	14.1	37 20.0	+50.8	14.2	38 18.1	+51.0	14.4	73
74	32 20.1	+49.6	12.6	33 18.7	+49.7	12.8	34 17.2	+49.9	12.9	35 15.6	+50.1	13.1	36 14.1	+50.2	13.2	37 12.4	+50.4	13.4	38 10.8	+50.5	13.6	39 09.1	+50.7	13.8	74
75	33 09.7	+49.4	11.9	34 08.4	+49.5	12.1	35 07.1	+49.6	12.2	36 05.7	+49.8	12.4	37 04.3	+50.0	12.5	38 02.8	+50.2	12.7	39 01.3	+50.3	12.9	39 59.8	+50.5	13.1	75
76	33 59.1	+49.2	11.3	34 57.9	+49.3	11.4	35 56.7	+49.5	11.5	36 55.5	+49.6	11.7	37 54.3	+49.7	11.8	38 53.0	+49.8	12.0	39 51.6	+50.1	12.2	40 50.3	+50.1	12.4	76
77	34 48.3	+48.9	10.6	35 47.2	+49.1	10.7	36 46.2	+49.2	10.8	37 45.1	+49.3	11.0	38 44.0	+49.4	11.1	39 42.8	+49.6	11.3	40 41.7	+49.7	11.5	41 40.4	+50.0	11.6	77
78	35 37.2	+48.6	9.9	36 36.3	+48.8	10.0	37 35.4	+48.9	10.1	38 34.4	+49.1	10.3	39 33.4	+49.2	10.4	40 32.4	+49.4	10.5	41 31.4	+49.5	10.7	42 30.4	+49.6	10.8	78
79	36 25.8	+48.4	9.1	37 25.1	+48.5	9.3	38 24.3	+48.6	9.4	39 23.5	+48.7	9.5	40 22.6	+48.9	9.6	41 21.8	+49.0	9.8	42 20.9	+49.1	9.9	43 20.0	+49.2	10.1	79
80	37 14.2	+48.1	8.4	38 13.6	+48.2	8.5	39 12.9	+48.3	8.6	40 12.2	+48.5	8.8	41 11.5	+48.6	8.9	42 10.8	+48.7	9.0	43 10.0	+48.8	9.2	44 09.2	+49.0	9.3	80
81	38 02.3	+47.9	7.6	39 01.8	+47.9	7.7	40 01.2	+48.1	7.9	41 00.7	+48.1	8.0	42 00.1	+48.2	8.1	42 59.5	+48.3	8.2	43 58.8	+48.5	8.3	44 58.2	+48.6	8.5	81
82	38 50.2	+47.5	6.9	39 49.7	+47.6	7.0	40 49.3	+47.7	7.1	41 48.8	+47.8	7.2	42 48.3	+47.9	7.3	43 47.8	+48.0	7.4	44 47.3	+48.1	7.5	45 46.8	+48.2	7.7	82
83	39 37.7	+47.1	6.1	40 37.3	+47.3	6.2	41 37.0	+47.3	6.3	42 36.6	+47.4	6.4	43 36.2	+47.6	6.5	44 35.8	+47.7	6.6	45 35.4	+47.8	6.7	46 35.0	+47.8	6.8	83
84	40 24.8	+46.9	5.3	41 24.6	+46.9	5.4	42 24.3	+47.0	5.4	43 24.0	+47.1	5.5	44 23.8	+47.1	5.6	45 23.5	+47.2	5.7	46 23.2	+47.3	5.8	47 22.8	+47.4	5.9	84
85	41 11.7	+46.4	4.4	42 11.5	+46.5	4.5	43 11.3	+46.6	4.6	44 11.1	+46.7	4.7	45 10.9	+46.7	4.7	46 10.7	+46.8	4.8	47 10.5	+46.9	4.9	48 10.2	+47.0	5.0	85
86	41 58.1	+46.1	3.6	42 58.0	+46.2	3.7	43 57.9	+46.2	3.7	44 57.8	+46.2	3.8	45 57.6	+46.3	3.9	46 57.5	+46.4	3.9	47 57.4	+46.4	4.0	48 57.2	+46.5	4.1	86
87	42 44.2	+45.7	2.7	43 44.2	+45.7	2.8	44 44.1	+45.8	2.8	45 44.0	+45.8	2.9	46 43.9	+45.9	2.9	47 43.9	+45.9	3.0	48 43.8	+45.9	3.0	49 43.7	+46.0	3.1	87
88	43 29.9	+45.3	1.8	44 29.9	+45.3	1.9	45 29.9	+45.3	1.9	46 29.8	+45.4	1.9	47 29.8	+45.4	2.0	48 29.7	+45.4	2.0	49 29.7	+45.4	2.1	50 29.7	+45.4	2.1	88
89	44 15.2	+44.8	0.9	45 15.2	+44.8	1.0	46 15.2	+44.8	1.0	47 15.2	+44.8	1.0	48 15.1	+44.9	1.0	49 15.1	+44.9	1.0	50 15.1	+44.9	1.0	51 15.1	+44.9	1.1	89
90	45 00.0	+44.4	0.0	46 00.0	+44.3	0.0	47 00.0	+44.3	0.0	48 00.0	+44.3	0.0	49 00.0	+44.3	0.0	50 00.0	+44.3	0.0	51 00.0	+44.3	0.0	52 00.0	+44.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 138°, 222°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	31 08.5	+49.4	127.2	30 32.0	+50.0	127.6	29 55.2	+50.5	128.1	29 18.0	+51.0	128.6	28 40.4	+51.5	129.0	28 02.5	+52.0	129.4	27 24.2	+52.5	129.8	26 45.6	+52.9	130.2	0
1	31 57.9	+49.3	126.5	31 22.0	+49.8	127.0	30 45.7	+50.4	127.5	30 09.0	+50.9	127.9	29 31.9	+51.4	128.4	28 54.5	+51.8	128.8	28 16.7	+52.3	129.3	27 38.5	+52.8	129.7	1
2	32 47.2	+49.0	125.8	32 11.8	+49.6	126.3	31 36.1	+50.1	126.8	30 59.9	+50.7	127.3	30 23.3	+51.2	127.8	29 46.3	+51.7	128.3	29 09.0	+52.2	128.7	28 31.3	+52.6	129.1	2
3	33 36.2	+48.8	125.1	33 01.4	+49.4	125.7	32 26.2	+50.0	126.2	31 50.6	+50.5	126.7	31 14.5	+51.1	127.2	30 38.0	+51.6	127.7	30 01.2	+52.0	128.1	29 23.9	+52.6	128.6	3
4	34 25.0	+48.6	124.4	33 50.8	+49.2	125.0	33 16.2	+49.7	125.5	32 41.1	+50.3	126.1	32 05.6	+50.8	126.6	31 29.6	+51.4	127.1	30 53.2	+51.9	127.6	30 16.5	+52.3	128.0	4
5	35 13.6	+48.3	123.7	34 40.0	+48.9	124.3	34 05.9	+49.6	124.9	33 31.4	+50.1	125.4	32 56.4	+50.7	125.9	32 21.0	+51.2	126.5	31 45.1	+51.7	127.0	31 08.8	+52.2	127.5	5
6	36 01.9	+48.0	123.0	35 28.9	+48.7	123.6	34 55.5	+49.3	124.2	34 21.5	+49.9	124.8	33 47.1	+50.4	125.3	33 12.2	+51.0	125.8	32 36.8	+51.5	126.4	32 01.0	+52.1	126.9	6
7	36 49.9	+47.7	122.3	36 17.6	+48.4	122.9	35 44.8	+49.0	123.5	35 11.4	+49.7	124.1	34 37.5	+50.3	124.7	34 03.2	+50.8	125.2	33 28.3	+51.4	125.8	32 53.1	+51.8	126.3	7
8	37 37.6	+47.5	121.5	37 06.0	+48.1	122.1	36 33.8	+48.8	122.8	36 01.1	+49.4	123.4	35 27.8	+50.0	124.0	34 54.0	+50.6	124.6	34 19.7	+51.2	125.1	33 44.9	+51.7	125.7	8
9	38 25.1	+47.1	120.7	37 54.1	+47.9	121.4	37 22.6	+48.5	122.0	36 50.5	+49.1	122.7	36 17.8	+49.8	123.3	35 44.6	+50.4	123.9	35 10.9	+50.9	124.5	34 36.6	+51.5	125.1	9
10	39 12.2	+46.8	119.9	38 42.0	+47.5	120.6	38 11.1	+48.2	121.3	37 39.6	+48.9	122.0	37 07.6	+49.5	122.6	36 35.0	+50.1	123.2	36 01.8	+50.8	123.8	35 28.1	+51.4	124.4	10
11	39 59.0	+46.5	119.1	39 29.5	+47.2	119.8	38 59.3	+47.9	120.5	38 28.5	+48.6	121.2	37 57.1	+49.3	121.9	37 25.1	+49.9	122.5	36 52.6	+50.5	123.2	36 19.5	+51.1	123.8	11
12	40 45.5	+46.0	118.3	40 16.7	+46.8	119.0	39 47.2	+47.6	119.8	39 17.1	+48.3	120.5	38 46.4	+49.0	121.2	38 15.0	+49.7	121.8	37 43.1	+50.3	122.5	37 10.6	+50.8	123.2	12
13	41 31.5	+45.7	117.4	41 03.5	+46.5	118.2	40 34.8	+47.3	119.0	40 05.4	+48.0	119.7	39 35.4	+48.7	120.4	39 04.7	+49.4	121.1	38 33.4	+50.0	121.8	38 01.4	+50.7	122.5	13
14	42 17.2	+45.3	116.6	41 50.0	+46.2	117.4	41 22.1	+46.9	118.1	40 53.4	+47.7	118.9	40 24.1	+48.4	119.7	39 54.1	+49.1	120.4	39 23.4	+49.7	121.1	38 52.1	+50.4	121.8	14
15	43 02.5	+44.9	115.7	42 36.2	+45.7	116.5	42 09.0	+46.5	117.3	41 41.1	+47.3	118.1	41 12.5	+48.1	118.9	40 43.2	+48.7	119.6	40 13.1	+49.5	120.4	39 42.5	+50.1	121.1	15
16	43 47.4	+44.4	114.7	43 21.9	+45.3	115.5	42 55.5	+46.1	116.5	42 28.4	+47.0	117.3	42 00.6	+47.7	118.1	41 31.9	+48.5	118.8	41 02.6	+49.2	119.6	40 32.6	+49.9	120.4	16
17	44 31.8	+44.0	113.8	44 07.2	+44.8	114.7	43 41.7	+45.7	115.6	43 15.4	+46.5	116.4	42 48.3	+47.3	117.3	42 20.4	+48.2	118.1	41 51.8	+48.9	118.9	41 22.5	+49.6	119.6	17
18	45 15.8	+43.4	112.9	44 52.0	+44.4	113.8	44 27.4	+45.3	114.7	44 01.9	+46.2	115.6	43 35.6	+47.0	116.4	43 08.6	+47.7	117.3	42 40.7	+48.5	118.1	42 12.1	+49.3	118.9	18
19	45 59.2	+42.9	111.9	45 36.4	+43.9	112.8	45 12.7	+44.8	113.7	44 48.1	+45.7	114.7	44 22.6	+46.6	115.6	43 56.3	+47.5	116.4	43 29.2	+48.2	117.3	43 01.4	+48.9	118.1	19
20	46 42.1	+42.4	110.9	46 20.3	+43.4	111.8	45 57.5	+44.4	112.8	45 33.8	+45.3	113.7	45 09.2	+46.2	114.7	44 43.8	+47.0	115.6	44 17.4	+47.9	116.5	43 50.3	+48.6	117.3	20
21	47 24.5	+41.8	109.8	47 03.7	+42.8	110.8	46 41.9	+43.8	111.8	46 19.1	+44.8	112.8	45 55.4	+45.7	113.8	45 30.8	+46.6	114.7	45 05.3	+47.4	115.6	44 38.9	+48.3	116.5	21
22	48 06.3	+41.2	108.7	47 46.5	+42.3	109.8	47 25.7	+43.3	110.8	47 03.9	+44.3	111.8	46 41.1	+45.2	112.8	46 17.4	+46.1	113.8	45 52.7	+47.0	114.7	45 27.2	+47.8	115.7	22
23	48 47.5	+40.6	107.6	48 28.8	+41.7	108.7	48 09.0	+42.7	109.8	47 48.2	+43.7	110.8	47 26.3	+44.8	111.9	47 03.5	+45.7	112.9	46 39.7	+46.6	113.8	46 15.0	+47.5	114.8	23
24	49 28.1	+39.9	106.5	49 10.5	+41.0	107.6	48 51.7	+42.2	108.7	48 31.9	+43.2	109.8	48 11.1	+44.2	110.9	47 49.2	+45.2	111.9	47 26.3	+46.2	112.9	47 02.5	+47.1	113.9	24
25	50 08.0	+39.1	105.4	49 51.5	+40.3	106.5	49 33.9	+41.4	107.6	49 15.1	+42.6	108.7	48 55.3	+43.7	109.8	48 34.4	+44.7	110.9	48 12.5	+45.6	112.0	47 49.6	+46.5	113.0	25
26	50 47.1	+38.4	104.2	50 31.8	+39.7	105.4	50 15.3	+40.9	106.5	49 57.7	+42.0	107.7	49 39.0	+43.0	108.8	49 19.1	+44.1	109.9	48 58.1	+45.2	111.0	48 36.1	+46.1	112.0	26
27	51 25.5	+37.7	103.0	51 11.5	+38.9	104.2	50 56.2	+40.1	105.4	50 39.7	+41.3	106.5	50 22.0	+42.5	107.7	50 03.2	+43.5	108.8	49 43.3	+44.6	110.0	49 22.2	+45.6	111.1	27
28	52 03.2	+36.8	101.7	51 50.4	+38.1	102.9	51 36.3	+39.4	104.2	51 21.0	+40.6	105.4	51 04.5	+41.8	106.6	50 46.7	+43.0	107.8	50 27.9	+44.0	108.9	50 07.8	+45.1	110.1	28
29	52 40.0	+35.9	100.4	52 28.5	+37.3	101.7	52 15.7	+38.6	103.0	52 01.6	+39.9	104.2	51 46.3	+41.0	105.4	51 29.7	+42.2	106.6	51 11.9	+43.4	107.8	50 52.9	+44.5	109.0	29
30	53 15.9	+35.1	99.1	53 05.8	+36.4	100.4	52 54.3	+37.8	101.7	52 41.5	+39.1	103.0	52 27.3	+40.4	104.2	52 11.9	+41.6	105.5	51 55.3	+42.7	106.7	51 37.4	+43.9	107.9	30
31	53 51.0	+34.0	97.7	53 42.2	+35.5	99.1	53 32.1	+36.9	100.4	53 20.6	+38.2	101.7	53 07.7	+39.6	103.0	52 53.5	+40.9	104.3	52 38.0	+42.1	105.6	52 21.3	+43.2	106.8	31
32	54 25.0	+33.1	96.3	54 17.7	+34.6	97.7	54 09.0	+36.0	99.1	53 58.8	+37.4	100.4	53 47.3	+38.8	101.8	53 34.4	+40.1	103.1	53 20.1	+41.4	104.4	53 04.5	+42.6	105.7	32
33	54 58.1	+32.0	94.9	54 52.3	+33.5	96.3	54 45.0	+35.0	97.7	54 36.2	+36.5	99.1	54 26.1	+37.8	100.5	54 14.5	+39.2	101.8	54 01.5	+40.5	103.2	53 47.1	+41.8	104.5	33
34	55 30.1	+30.9	93.4	55 25.8	+32.5	94.8	55 20.0	+34.0	96.3	55 12.7	+35.5	97.7	55 03.9	+37.0	99.1	54 53.7	+38.4	100.5	54 42.0	+39.8	101.9	54 28.9	+41.1	103.3	34
35	56 01.0	+29.7	91.8	55 58.3	+31.4	93.3	55 54.0	+33.0	94.8	55 48.2	+34.5	96.3	55 40.9	+36.0	97.7	55 32.1	+37.5	99.2	55 21.8	+38.9	100.6	55 10.0	+40.3	102.0	35
36	56 30.7	+28.6	90.3	56 29.7	+30.2	91.8	56 27.0	+31.8	93.3	56 22.7	+33.5	94.8	56 16.9	+35.0	96.3	56 09.6	+36.5	97.8	56 00.7	+38.0	99.3	55 50.3	+39.4	100.7	36
37	56 59.3	+27.3	88.7	56 59.9	+28.9	90.2	56 58.8	+30.6	91.8	56 56.2	+32.3	93.3	56 51.9	+33.9	94.8	56 46.1	+35.5	96.3	56 38.7	+37.0	97.9	56 29.7	+38.5	99.4	37
38	57 26.6	+25.9	87.0	57 28.8	+27.8	88.6	57 29.5	+29.4	90.2	57 28.5	+31.1	91.7	57 25.8	+32.8	93.3	57 21.6	+34.4	94.9	57 15.7	+36.0	96.4	57 08.2	+37.5	98.0	38
39	57 52.5	+24.6	85.4	57 56.6	+26.3	86.9	57 58.9	+28.2	88.5	57 59.6	+29.9	90.1	57 58.6	+31.6	91.7	57 56.0	+33.2	93.3	57 51.7	+34.9	94.9	57 45.7	+36.5	96.5	39
40	58 17.1	+23.2	83.6	58 22.9	+25.0	85.2	58 27.1	+26.8	86.9	58 29.5	+28.6	88.5	58 30.2	+30.4	90.1	58 29.2	+32.1	91.8	58 26.6	+33.7	93.4	58 22.2	+35.4	95.0	40
41	58 40.3	+21.7	81.9	58 47.9	+23.6	83.5	58 53.9	+25.4	85.1	58 58.1	+27.2	86.8	59 00.6	+29.0	88.5	59 01.3	+30.8	90.1	59 00.3	+32.5	91.8	58 57.6	+34.2	93.5	41
42	59 02.0	+20.1	80.1	59 11.5	+22.0	81.7	59 19.3	+23.9	83.4	59 25.3	+25.8	85.1	59 29.6	+27.6	86.7	59 32.1	+29.5	88.4	59 32.8	+31.3	90.1	59 31.8	+33.0	91.8	42
43	59 22.1	+18.6	78.2	59 33.5	+20.5	79.9	59 43.2	+22.4	81.6	59 51.1	+24.3	83.3	59 57.2	+26.2	85.0	60 01.6	+28.0	86.7	60 04.1	+29.9	88.4	60 04.8	+31.8	90.2	43
44	59 40.7	+16.9	76.3	59 54.0	+18.9	78.0	60 05.6	+20.8	79.7	60 15.4	+22.7	81.4	60 23.4	+24.7	83.2	60 29.6	+26.6	84.9	60 34.0	+28.5	86.7	60 36.6	+30.3	88.5	44
45	59 57.6	+15.3	74.4	60 12.9	+17.2	76.1	60 26.4	+19.2	77.8	60 38.1	+21.2	79.6	60 48.1	+23.1	81.3	60 56.2	+25.1	83.1	61 02.5	+27.0	84.9	61 06.9	+29.0	86.7	45
46	60 12.9	+13.5	72.5	60 30.1	+15.5	74.2	60 45.6	+17.4	75.9	60 59.3	+19.5	77.6	61 11.2	+21.5	79.4	61 21.3	+23.5	81.2	61 29.5	+25.5	83.0	61 35.9	+27.4	84.9	46
47	60 26.4	+11.7	70.5	60 45.6	+13.7	72.2	61 03.0	+15.8	73.9	61 18.8	+17.7	75.7	61 32.7	+19.8	77.5	61 44.8	+21.8	79.3	61 55.0	+23.8	81.1	62 03.3	+25.8	83.0	47
48	60 38.1	+10.0	68.5	60 59.3	+11.9	70.2	61 18.8	+13.9	71.9	61 36.5	+16.0	73.7	61 52.5	+18.0	75.5	62 06.6	+20.0	77.3	62 18.8	+22.1	79.2	62 29.1	+24.2	81.0	48
49	60 48.1	+8.1	66.5	61 11.2	+10.1	68.2	61 32.7	+12.1	69.9	61 52.5	+14.1	71.6	62 10.5	+16.1	73.4	62 26.6	+18.3	75.3	62 40.9	+20.4	77.1	62 53.3	+22.4	79.1	49
50	60 56.2	+6.4	64.5	61 21.3	+8.2	66.1	61 44.8	+10.2	67.8	62 06.6	+12.2	69.6	62 26.6	+14.3	71.4	62 44.9	+16.4	73.2	63 01.3	+18.5	75.1	63 15.7	+20.7	77.0	50
51	61 02.5	+4.4	62.4	61 29.5	+6.4	64.1	61 55.0	+8.3	65.7	62 18.8	+10.3	67.5	62 40.9	+12.4	69.3	63 01.3	+14.4	71.1	63 19.8	+16.6	73.0	63 36.4	+18.7	74.9	51
52	61 06.9	+2.5	60.4	61 35.9	+4.4•	62.0	62 03.3	+6.3	63.6	62 29.1	+8.4•	65.4	62 53.3	+10.4•	67.1	63 15.7	+12.5	68.9	63 36.4	+14.6•	70.8	63 55.1	+16.8	72.8	52
53	61 09.4	+0.6	58.3	61 40.3	+2.4	59.9	62 09.6	+4.4	61.5	62 37.5	+6.3•	63.2	63 03.7	+8.4•	65.0	63 28.2	+10.5•	66.8	63 51.0	+12.6•	68.6	64 11.9	+14.8•	70.6	53
54	61 10.0	−1.3	56.2	61 42.7	+0.5	57.8	62 14.0	+2.4•	59.4	62 43.8	+4.4•	61.0	63 12.1	+6.4•	62.8	63 38.7	+8.4•	64.6	64 03.6	+10.6•	66.4	64 26.7	+12.7•	68.3	54
55	61 08.7	−3.1	54.2	61 43.2	−1.4	55.7	62 16.4	+0.4•	57.2	62 48.2	+2.3•	58.9	63 18.5	+4.2•	60.6	63 47.1	+6.4•	62.3	64 14.2	+8.4•	64.2	64 39.4	+10.6•	66.0	55
56	61 05.6	−5.1	52.1	61 41.8	−3.3	53.5	62 16.8	−1.6	55.1	62 50.5	+0.3•	56.7	63 22.7	+2.2•	58.3	63 53.5	+4.2•	60.1	64 22.6	+6.3•	61.9	64 50.0	+8.4•	63.7	56
57	61 00.5	−7.0	50.0	61 38.5	−5.3	51.4	62 15.2	−3.5•	52.9	62 50.8	−1.8•	54.5	63 24.9	+0.2•	56.1	63 57.7	+2.0•	57.8	64 28.9	+4.1•	59.6	64 58.4	+6.2•	61.4	57
58	60 53.5	−8.8	48.0	61 33.2	−7.2	49.3	62 11.7	−5.6•	50.8	62 49.0	−3.8•	52.3	63 25.1	−2.0•	53.9	63 59.7	0.0•	55.5	64 33.0	+1.9•	57.2	65 04.6	+4.0•	59.1	58
59	60 44.7	−10.6	46.0	61 26.0	−9.1	47.3	62 06.1	−7.5	48.7	62 45.2	−5.8•	50.1	63 23.1	−4.1•	51.6	63 59.7	−2.3•	53.2	64 34.9	−0.3•	54.9	65 08.6	+1.7•	56.7	59
60	60 34.1	−12.4	43.9	61 16.9	−11.0	45.2	61 58.6	−9.4	46.5	62 39.4	−7.8•	47.9	63 19.0	−6.1•	49.4	63 57.4	−4.3•	51.0	64 34.6	−2.5•	52.6	65 10.3	−0.5•	54.3	60
61	60 21.7	−14.1	42.0	61 05.9	−12.8	43.2	61 49.2	−11.3	44.4	62 31.6	−9.8	45.8	63 12.9	−8.2•	47.2	63 53.1	−6.5•	48.7	64 32.1	−4.7•	50.3	65 09.8	−2.9•	51.9	61
62	60 07.6	−15.9	40.0	60 53.1	−14.5	41.2	61 37.9	−13.0	42.4	62 21.8	−11.7	43.6	63 04.7	−10.2•	45.0	63 46.6	−8.6•	46.4	64 27.4	−6.9•	47.9	65 06.9	−5.0•	49.5	62
63	59 51.7	−17.5	38.1	60 38.6	−16.3	39.2	61 24.7	−15.0	40.3	62 10.1	−13.7	41.5	62 54.5	−12.2	42.8	63 38.0	−10.6•	44.2	64 20.5	−9.0•	45.6	65 01.9	−7.3•	47.2	63
64	59 34.2	−19.2	36.2	60 22.3	−18.0	37.2	61 09.7	−16.7	38.3	61 56.4	−15.4	39.5	62 42.3	−14.0	40.7	63 27.4	−12.6•	42.0	64 11.5	−11.1•	43.4	64 54.6	−9.5•	44.8	64
65	59 15.0	−20.7	34.3	60 04.3	−19.6	35.3	60 53.0	−18.5	36.3	61 41.0	−17.3	37.4	62 28.3	−16.0	38.6	63 14.8	−14.7	39.8	64 00.4	−13.2•	41.1	64 45.1	−11.6•	42.5	65
66	58 54.3	−22.2	32.5	59 44.7	−21.2	33.4	60 34.5	−20.2	34.4	61 23.7	−19.0	35.4	62 12.3	−17.8	36.5	63 00.1	−16.5	37.7	63 47.2	−15.1•	38.9	64 33.5	−13.7•	40.2	66
67	58 32.1	−23.7	30.7	59 23.5	−22.8	31.6	60 14.3	−21.7	32.5	61 04.7	−20.7	33.4	61 54.5	−19.6	34.5	62 43.6	−18.4	35.6	63 32.1	−17.2•	36.7	64 19.8	−15.8•	38.0	67
68	58 08.4	−25.1	28.9	59 00.7	−24.2	29.8	59 52.6	−23.3	30.6	60 44.0	−22.3	31.5	61 34.9	−21.3	32.5	62 25.2	−20.2	33.5	63 14.9	−19.0	34.6	64 04.0	−17.8•	35.7	68
69	57 43.3	−26.4	27.2	58 36.5	−25.6	28.0	59 29.3	−24.8	28.8	60 21.7	−23.9	29.6	61 13.6	−22.9	30.5	62 05.0	−21.9	31.5	62 55.9	−20.8	32.5	63 46.2	−19.6	33.6	69
70	57 16.9	−27.7	25.6	58 10.9	−27.0	26.3	59 04.5	−26.2	27.0	59 57.8	−25.4	27.8	60 50.7	−24.6	28.6	61 43.1	−23.6	29.5	62 35.1	−22.6	30.4	63 26.6	−21.6	31.4	70
71	56 49.2	−29.0	23.9	57 43.9	−28.3	24.6	58 38.3	−27.6	25.3	59 32.4	−26.9	26.0	60 26.1	−26.0	26.7	61 19.5	−25.1	27.6	62 12.5	−24.3	28.4	63 05.0	−23.3	29.4	71
72	56 20.2	−30.2	22.3	57 15.6	−29.6	22.9	58 10.7	−28.9	23.6	59 05.5	−28.2	24.2	60 00.1	−27.5	24.9	60 54.4	−26.8	25.7	61 48.2	−25.8	26.5	62 41.7	−25.0	27.4	72
73	55 50.0	−31.3	20.8	56 46.0	−30.8	21.3	57 41.8	−30.2	21.9	58 37.3	−29.5	22.5	59 32.6	−29.0	23.2	60 27.6	−28.1	23.9	61 22.4	−27.5	24.6	62 16.7	−26.6	25.4	73
74	55 18.7	−32.4	19.3	56 15.2	−31.8	19.8	57 11.6	−31.4	20.3	58 07.8	−30.8	20.9	59 03.7	−30.2	21.4	59 59.5	−29.6	22.1	60 54.9	−28.9	22.8	61 50.1	−28.1	23.5	74
75	54 46.3	−33.4	17.8	55 43.4	−33.0	18.3	56 40.2	−32.5	18.7	57 37.0	−32.0	19.2	58 33.5	−31.4	19.8	59 29.9	−30.9	20.4	60 26.0	−30.2	21.0	61 22.0	−29.7	21.6	75
76	54 12.9	−34.5	16.4	55 10.4	−34.0	16.8	56 07.7	−33.5	17.2	57 05.0	−33.2	17.7	58 02.1	−32.7	18.2	58 59.0	−32.1	18.7	59 55.8	−31.7	19.2	60 52.3	−31.0	19.8	76
77	53 38.4	−35.3	15.0	54 36.4	−35.0	15.4	55 34.2	−34.7	15.7	56 31.8	−34.2	16.2	57 29.4	−33.8	16.6	58 26.9	−33.4	17.0	59 24.1	−32.8	17.5	60 21.3	−32.4	18.1	77
78	53 03.1	−36.3	13.6	54 01.4	−36.0	14.0	54 59.5	−35.6	14.3	55 57.6	−35.2	14.7	56 55.6	−34.9	15.1	57 53.5	−34.5	15.5	58 51.3	−34.1	15.9	59 48.9	−33.6	16.4	78
79	52 26.8	−37.1	12.3	53 25.4	−36.8	12.6	54 23.9	−36.5	12.9	55 22.4	−36.3	13.2	56 20.7	−35.9	13.6	57 19.0	−35.5	13.9	58 17.2	−35.2	14.3	59 15.3	−34.8	14.7	79
80	51 49.7	−37.9	11.0	52 48.6	−37.7	11.3	53 47.4	−37.4	11.6	54 46.1	−37.1	11.8	55 44.8	−36.8	12.1	56 43.5	−36.6	12.5	57 42.0	−36.3	12.8	58 40.5	−36.0	13.2	80
81	51 11.8	−38.7	9.8	52 10.9	−38.5	10.0	53 10.0	−38.3	10.3	54 09.0	−38.0	10.5	55 08.0	−37.8	10.8	56 06.9	−37.6	11.0	57 05.7	−37.2	11.3	58 04.5	−37.0	11.6	81
82	50 33.1	−39.4	8.6	51 32.4	−39.2	8.8	52 31.7	−39.1	9.0	53 30.9	−38.8	9.2	54 30.2	−38.7	9.4	55 29.3	−38.4	9.6	56 28.5	−38.3	9.9	57 27.5	−38.0	10.2	82
83	49 53.7	−40.2	7.4	50 53.2	−40.0	7.6	51 52.6	−39.8	7.7	52 52.1	−39.7	7.9	53 51.5	−39.5	8.1	54 50.9	−39.3	8.3	55 50.2	−39.1	8.5	56 49.5	−38.9	8.7	83
84	49 13.5	−40.7	6.3	50 13.2	−40.7	6.4	51 12.8	−40.5	6.5	52 12.4	−40.4	6.7	53 12.0	−40.3	6.8	54 11.6	−40.2	7.0	55 11.1	−40.0	7.2	56 10.6	−39.8	7.4	84
85	48 32.8	−41.5	5.2	49 32.5	−41.3	5.3	50 32.3	−41.3	5.4	51 32.0	−41.1	5.5	52 31.7	−41.0	5.6	53 31.4	−40.9	5.8	54 31.1	−40.8	5.9	55 30.8	−40.7	6.0	85
86	47 51.3	−42.0	4.1	48 51.2	−41.9	4.1	49 51.0	−41.8	4.2	50 50.9	−41.8	4.3	51 50.7	−41.7	4.4	52 50.5	−41.6	4.5	53 50.3	−41.5	4.6	54 50.1	−41.4	4.7	86
87	47 09.3	−42.5	3.0	48 09.3	−42.4	3.1	49 09.2	−42.4	3.1	50 09.1	−42.3	3.2	51 09.0	−42.3	3.3	52 08.9	−42.3	3.3	53 08.8	−42.3	3.4	54 08.7	−42.2	3.5	87
88	46 26.8	−43.2	2.0	47 26.7	−43.1	2.0	48 26.7	−43.1	2.1	49 26.6	−43.0	2.1	50 26.6	−43.0	2.1	51 26.6	−43.0	2.2	52 26.5	−42.9	2.2	53 26.5	−42.9	2.3	88
89	45 43.6	−43.6	1.0	46 43.6	−43.6	1.0	47 43.6	−43.6	1.0	48 43.6	−43.6	1.0	49 43.6	−43.6	1.1	50 43.6	−43.6	1.1	51 43.6	−43.6	1.1	52 43.6	−43.6	1.1	89
90	45 00.0	−44.1	0.0	46 00.0	−44.1	0.0	47 00.0	−44.1	0.0	48 00.0	−44.1	0.0	49 00.0	−44.2	0.0	50 00.0	−44.2	0.0	51 00.0	−44.2	0.0	52 00.0	−44.2	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	31 08.5	−49.7	127.2	30 32.0	−50.2	127.6	29 55.2	−50.7	128.1	29 18.0	−51.3	128.6	28 40.4	−51.7	129.0	28 02.5	−52.2	129.4	27 24.2	−52.6	129.8	26 45.6	−53.0	130.2	0
1	30 18.8	−49.9	127.8	29 41.8	−50.4	128.3	29 04.5	−50.9	128.7	28 26.7	−51.3	129.1	27 48.7	−51.8	129.6	27 10.3	−52.3	130.0	26 31.6	−52.7	130.3	25 52.6	−53.1	130.7	1
2	29 28.9	−50.0	128.5	28 51.4	−50.5	128.9	28 13.6	−51.1	129.3	27 35.4	−51.5	129.7	26 56.9	−52.0	130.1	26 18.0	−52.3	130.5	25 38.9	−52.8	130.9	24 59.5	−53.2	131.2	2
3	28 38.9	−50.2	129.1	28 00.9	−50.7	129.5	27 22.5	−51.1	129.9	26 43.9	−51.7	130.3	26 04.9	−52.1	130.7	25 25.7	−52.6	131.1	24 46.1	−52.9	131.4	24 06.3	−53.3	131.7	3
4	27 48.7	−50.4	129.7	27 10.2	−50.9	130.1	26 31.4	−51.4	130.5	25 52.2	−51.7	130.9	25 12.8	−52.2	131.2	24 33.1	−52.6	131.6	23 53.2	−53.0	131.9	23 13.0	−53.5	132.2	4
5	26 58.3	−50.5	130.3	26 19.3	−51.0	130.7	25 40.0	−51.4	131.1	25 00.5	−51.9	131.4	24 20.6	−52.3	131.8	23 40.5	−52.7	132.1	23 00.2	−53.0	132.4	22 19.5	−53.5	132.7	5
6	26 07.8	−50.7	130.9	25 28.3	−51.1	131.3	24 48.6	−51.6	131.6	24 08.6	−52.1	132.0	23 28.3	−52.4	132.3	22 47.8	−52.9	132.6	22 07.0	−53.2	132.9	21 26.0	−53.5	133.2	6
7	25 17.1	−50.8	131.5	24 37.2	−51.3	131.9	23 57.0	−51.7	132.2	23 16.5	−52.1	132.5	22 35.9	−52.6	132.8	21 54.9	−52.9	133.1	21 13.8	−53.3	133.4	20 32.5	−53.7	133.7	7
8	24 26.3	−51.0	132.1	23 45.9	−51.4	132.4	23 05.3	−51.8	132.8	22 24.4	−52.2	133.1	21 43.3	−52.6	133.4	21 02.0	−53.0	133.6	20 20.5	−53.4	133.9	19 38.8	−53.8	134.2	8
9	23 35.3	−51.1	132.7	22 54.5	−51.5	133.0	22 13.5	−52.0	133.3	21 32.2	−52.3	133.6	20 50.7	−52.7	133.9	20 09.0	−53.1	134.1	19 27.1	−53.4	134.4	18 45.0	−53.8	134.7	9
10	22 44.2	−51.2	133.3	22 03.0	−51.6	133.6	21 21.5	−52.0	133.9	20 39.9	−52.5	134.1	19 58.0	−52.8	134.4	19 15.9	−53.2	134.6	18 33.7	−53.6	134.9	17 51.2	−53.9	135.1	10
11	21 53.0	−51.3	133.8	21 11.4	−51.8	134.1	20 29.5	−52.1	134.4	19 47.4	−52.5	134.6	19 05.2	−52.9	134.9	18 22.7	−53.3	135.1	17 40.1	−53.6	135.4	16 57.3	−53.9	135.6	11
12	21 01.7	−51.4	134.4	20 19.6	−51.8	134.7	19 37.4	−52.3	134.9	18 54.9	−52.6	135.2	18 12.3	−53.0	135.4	17 29.5	−53.3	135.6	16 46.5	−53.6	135.8	16 03.4	−54.0	136.0	12
13	20 10.3	−51.6	134.9	19 27.8	−51.9	135.2	18 45.1	−52.3	135.4	18 02.3	−52.7	135.7	17 19.3	−53.0	135.9	16 36.2	−53.4	136.1	15 52.9	−53.8	136.3	15 09.4	−54.0	136.5	13
14	19 18.7	−51.6	135.5	18 35.9	−52.0	135.7	17 52.8	−52.3	135.9	17 09.6	−52.7	136.2	16 26.3	−53.1	136.4	15 42.8	−53.5	136.6	14 59.1	−53.7	136.8	14 15.4	−54.1	136.9	14
15	18 27.1	−51.7	136.0	17 43.9	−52.1	136.2	17 00.5	−52.5	136.5	16 16.9	−52.8	136.7	15 33.2	−53.2	136.9	14 49.3	−53.5	137.0	14 05.4	−53.9	137.2	13 21.3	−54.2	137.4	15
16	17 35.4	−51.8	136.5	16 51.8	−52.2	136.8	16 08.0	−52.5	137.0	15 24.1	−52.9	137.2	14 40.0	−53.2	137.3	13 55.8	−53.5	137.5	13 11.5	−53.9	137.7	12 27.1	−54.2	137.8	16
17	16 43.6	−51.9	137.1	15 59.6	−52.2	137.3	15 15.5	−52.6	137.5	14 31.2	−53.0	137.6	13 46.8	−53.3	137.8	13 02.3	−53.6	138.0	12 17.6	−53.9	138.1	11 32.9	−54.2	138.3	17
18	15 51.7	−51.9	137.6	15 07.4	−52.3	137.8	14 22.9	−52.7	138.0	13 38.2	−53.0	138.1	12 53.5	−53.3	138.3	12 08.7	−53.7	138.4	11 23.7	−53.9	138.6	10 38.7	−54.3	138.7	18
19	14 59.8	−52.0	138.1	14 15.1	−52.4	138.3	13 30.2	−52.7	138.5	12 45.2	−53.0	138.6	12 00.2	−53.4	138.8	11 15.0	−53.7	138.9	10 29.8	−54.0	139.0	9 44.4	−54.3	139.1	19
20	14 07.8	−52.1	138.6	13 22.7	−52.5	138.8	12 37.5	−52.8	138.9	11 52.2	−53.1	139.1	11 06.8	−53.4	139.2	10 21.3	−53.7	139.3	9 35.8	−54.1	139.5	8 50.1	−54.3	139.6	20
21	13 15.7	−52.2	139.1	12 30.2	−52.4	139.3	11 44.7	−52.8	139.4	10 59.1	−53.2	139.6	10 13.4	−53.5	139.7	9 27.6	−53.8	139.8	8 41.7	−54.0	139.9	7 55.8	−54.4	140.0	21
22	12 23.5	−52.2	139.7	11 37.8	−52.6	139.8	10 51.9	−52.9	139.9	10 05.9	−53.1	140.0	9 19.9	−53.5	140.1	8 33.8	−53.8	140.2	7 47.7	−54.1	140.3	7 01.4	−54.4	140.4	22
23	11 31.3	−52.2	140.2	10 45.2	−52.6	140.3	9 59.0	−52.9	140.4	9 12.8	−53.3	140.5	8 26.4	−53.5	140.6	7 40.0	−53.8	140.7	6 53.6	−54.1	140.8	6 07.1	−54.4	140.8	23
24	10 39.1	−52.3	140.7	9 52.6	−52.6	140.8	9 06.1	−52.9	140.9	8 19.5	−53.2	141.0	7 32.9	−53.6	141.1	6 46.2	−53.8	141.1	5 59.5	−54.2	141.2	5 12.7	−54.4	141.3	24
25	9 46.8	−52.4	141.2	9 00.0	−52.7	141.3	8 13.2	−53.0	141.4	7 26.3	−53.3	141.4	6 39.3	−53.6	141.5	5 52.4	−53.9	141.6	5 05.3	−54.1	141.6	4 18.3	−54.5	141.7	25
26	8 54.4	−52.4	141.7	8 07.3	−52.7	141.7	7 20.2	−53.0	141.8	6 33.0	−53.3	141.9	5 45.8	−53.6	142.0	4 58.5	−53.9	142.0	4 11.2	−54.2	142.1	3 23.8	−54.4	142.1	26
27	8 02.0	−52.4	142.1	7 14.6	−52.7	142.2	6 27.2	−53.0	142.3	5 39.7	−53.3	142.4	4 52.2	−53.7	142.4	4 04.6	−53.9	142.5	3 17.0	−54.2	142.5	2 29.4	−54.5	142.5	27
28	7 09.6	−52.4	142.6	6 21.9	−52.7	142.7	5 34.2	−53.1	142.8	4 46.4	−53.4	142.8	3 58.5	−53.6	142.9	3 10.7	−53.9	142.9	2 22.8	−54.2	142.9	1 34.9	−54.4	143.0	28
29	6 17.2	−52.5	143.1	5 29.2	−52.8	143.2	4 41.1	−53.1	143.2	3 53.0	−53.3	143.3	3 04.9	−53.6	143.3	2 16.8	−53.9	143.3	1 28.6	−54.2	143.4	0 40.5	−54.5	143.4	29
30	5 24.7	−52.5	143.6	4 36.4	−52.8	143.7	3 48.0	−53.1	143.7	2 59.7	−53.4	143.7	2 11.3	−53.7	143.8	1 22.9	−54.0	143.8	0 34.4	−54.1	143.8	0 14.0	+54.4	36.2	30
31	4 32.2	−52.5	144.1	3 43.6	−52.8	144.1	2 54.9	−53.1	144.2	2 06.3	−53.4	144.2	1 17.6	−53.6	144.2	0 28.9	−53.9	144.2	0 19.7	+54.2	35.8	1 08.4	+54.5	35.8	31
32	3 39.7	−52.6	144.6	2 50.8	−52.9	144.6	2 01.8	−53.1	144.6	1 12.9	−53.4	144.7	0 24.0	−53.7	144.7	0 25.0	+53.9	35.3	1 13.9	+54.2	35.3	2 02.9	+54.4	35.4	32
33	2 47.1	−52.5	145.1	1 57.9	−52.8	145.1	1 08.7	−53.1	145.1	0 19.5	−53.4	145.1	0 29.7	+53.7	34.9	1 18.9	+53.9	34.9	2 08.1	+54.2	34.9	2 57.3	+54.5	34.9	33
34	1 54.6	−52.5	145.5	1 05.1	−52.8	145.6	0 15.6	−53.1	145.6	0 33.9	+53.4	34.4	1 23.4	+53.6	34.4	2 12.8	+54.0	34.5	3 02.3	+54.2	34.5	3 51.8	+54.4	34.5	34
35	1 02.0	−52.5	146.0	0 12.3	−52.9	146.0	0 37.5	+53.1	34.0	1 27.3	+53.3	34.0	2 17.0	+53.7	34.0	3 06.8	+53.8	34.0	3 56.5	+54.1	34.1	4 46.2	+54.4	34.1	35
36	0 09.5	−52.6	146.5	0 40.6	+52.8	33.5	1 30.6	+53.1	33.5	2 20.6	+53.4	33.5	3 10.7	+53.6	33.5	4 00.7	+53.8	33.6	4 50.6	+54.2	33.6	5 40.6	+54.4	33.7	36
37	0 43.1	+52.6	33.0	1 33.4	+52.8	33.0	2 23.7	+53.1	33.0	3 14.0	+53.4	33.1	4 04.3	+53.6	33.1	4 54.5	+53.9	33.1	5 44.8	+54.1	33.2	6 35.0	+54.3	33.2	37
38	1 35.7	+52.5	32.5	2 26.2	+52.9	32.5	3 16.8	+53.1	32.6	4 07.4	+53.3	32.6	4 57.9	+53.6	32.6	5 48.4	+53.9	32.7	6 38.9	+54.1	32.8	7 29.3	+54.3	32.8	38
39	2 28.2	+52.6	32.0	3 19.1	+52.8	32.1	4 09.9	+53.1	32.1	5 00.7	+53.3	32.1	5 51.5	+53.6	32.2	6 42.3	+53.8	32.3	7 33.0	+54.1	32.3	8 23.7	+54.3	32.4	39
40	3 20.8	+52.5	31.6	4 11.9	+52.8	31.6	5 03.0	+53.0	31.6	5 54.0	+53.3	31.7	6 45.1	+53.5	31.7	7 36.1	+53.8	31.8	8 27.1	+54.0	31.9	9 18.0	+54.3	32.0	40
41	4 13.3	+52.5	31.1	5 04.7	+52.7	31.1	5 56.0	+53.0	31.2	6 47.3	+53.3	31.2	7 38.6	+53.6	31.3	8 29.9	+53.7	31.4	9 21.1	+54.0	31.4	10 12.3	+54.2	31.5	41
42	5 05.8	+52.5	30.6	5 57.4	+52.8	30.6	6 49.0	+53.0	30.7	7 40.6	+53.3	30.8	8 32.2	+53.4	30.8	9 23.7	+53.7	30.9	10 15.1	+54.0	31.0	11 06.5	+54.2	31.1	42
43	5 58.3	+52.4	30.1	6 50.2	+52.7	30.2	7 42.0	+53.0	30.2	8 33.9	+53.2	30.3	9 25.6	+53.5	30.4	10 17.4	+53.7	30.5	11 09.1	+53.9	30.6	12 00.7	+54.2	30.7	43
44	6 50.7	+52.5	29.6	7 42.9	+52.7	29.7	8 35.0	+52.9	29.7	9 27.1	+53.1	29.8	10 19.1	+53.4	29.9	11 11.1	+53.6	30.0	12 03.0	+53.9	30.1	12 54.9	+54.1	30.2	44
45	7 43.2	+52.4	29.1	8 35.6	+52.6	29.2	9 27.9	+52.9	29.3	10 20.2	+53.2	29.4	11 12.5	+53.4	29.4	12 04.7	+53.6	29.5	12 56.9	+53.9	29.7	13 49.0	+54.1	29.8	45
46	8 35.6	+52.3	28.6	9 28.2	+52.6	28.7	10 20.8	+52.9	28.8	11 13.4	+53.1	28.9	12 05.9	+53.3	29.0	12 58.4	+53.5	29.1	13 50.8	+53.7	29.2	14 43.1	+54.0	29.3	46
47	9 27.9	+52.3	28.1	10 20.8	+52.6	28.2	11 13.7	+52.8	28.3	12 06.5	+53.0	28.4	12 59.2	+53.3	28.5	13 51.9	+53.5	28.6	14 44.5	+53.8	28.7	15 37.1	+54.0	28.7	47
48	10 20.2	+52.3	27.6	11 13.4	+52.5	27.7	12 06.5	+52.7	27.8	12 59.5	+53.0	27.9	13 52.5	+53.2	28.0	14 45.4	+53.5	28.2	15 38.3	+53.7	28.3	16 31.1	+53.9	28.4	48
49	11 12.5	+52.2	27.1	12 05.9	+52.5	27.2	12 59.2	+52.7	27.3	13 52.5	+52.9	27.4	14 45.7	+53.2	27.6	15 38.9	+53.4	27.7	16 32.0	+53.6	27.8	17 25.0	+53.8	28.0	49
50	12 04.7	+52.2	26.6	12 58.4	+52.4	26.7	13 51.9	+52.6	26.8	14 45.4	+52.9	27.0	15 38.9	+53.1	27.1	16 32.3	+53.3	27.2	17 25.6	+53.5	27.4	18 18.8	+53.8	27.5	50
51	12 56.9	+52.1	26.1	13 50.8	+52.3	26.2	14 44.5	+52.6	26.3	15 38.3	+52.8	26.5	16 32.0	+53.0	26.6	17 25.6	+53.2	26.7	18 19.1	+53.5	26.9	19 12.6	+53.7	27.0	51
52	13 49.0	+52.1	25.6	14 43.1	+52.3	25.7	15 37.1	+52.5	25.8	16 31.1	+52.7	26.0	17 25.0	+53.0	26.1	18 18.8	+53.2	26.2	19 12.6	+53.4	26.4	20 06.3	+53.7	26.6	52
53	14 41.1	+51.9	25.1	15 35.4	+52.2	25.2	16 29.6	+52.5	25.3	17 23.8	+52.7	25.5	18 18.0	+52.8	25.6	19 12.0	+53.1	25.8	20 06.0	+53.4	25.9	21 00.0	+53.5	26.1	53
54	15 33.0	+51.9	24.6	16 27.6	+52.1	24.7	17 22.1	+52.3	24.8	18 16.5	+52.6	25.0	19 10.8	+52.8	25.1	20 05.1	+53.0	25.3	20 59.4	+53.2	25.4	21 53.5	+53.5	25.6	54
55	16 24.9	+51.9	24.1	17 19.7	+52.1	24.2	18 14.4	+52.3	24.3	19 09.1	+52.4	24.5	20 03.6	+52.7	24.6	20 58.2	+52.9	24.8	21 52.6	+53.1	24.9	22 47.0	+53.3	25.1	55
56	17 16.8	+51.7	23.5	18 11.8	+51.9	23.7	19 06.7	+52.2	23.8	20 01.5	+52.4	23.9	20 56.3	+52.7	24.1	21 51.1	+52.8	24.3	22 45.7	+53.1	24.4	23 40.3	+53.2	24.6	56
57	18 08.5	+51.7	23.0	19 03.7	+51.9	23.1	19 58.9	+52.0	23.3	20 53.9	+52.4	23.4	21 49.0	+52.5	23.6	22 43.9	+52.8	23.7	23 38.8	+53.0	23.9	24 33.6	+53.2	24.1	57
58	19 00.2	+51.5	22.5	19 55.6	+51.8	22.6	20 50.9	+52.0	22.8	21 46.3	+52.2	22.9	22 41.5	+52.4	23.1	23 36.7	+52.6	23.2	24 31.8	+52.8	23.4	25 26.8	+53.0	23.6	58
59	19 51.7	+51.5	21.9	20 47.4	+51.6	22.1	21 42.9	+51.9	22.2	22 38.5	+52.1	22.4	23 33.9	+52.3	22.5	24 29.3	+52.5	22.7	25 24.6	+52.7	22.9	26 19.8	+53.0	23.1	59
60	20 43.2	+51.4	21.4	21 39.0	+51.6	21.5	22 34.8	+51.8	21.7	23 30.6	+51.9	21.8	24 26.2	+52.2	22.0	25 21.8	+52.4	22.2	26 17.3	+52.7	22.4	27 12.8	+52.8	22.5	60
61	21 34.6	+51.2	20.8	22 30.6	+51.5	21.0	23 26.6	+51.7	21.1	24 22.5	+51.9	21.3	25 18.4	+52.1	21.5	26 14.2	+52.3	21.6	27 10.0	+52.5	21.8	28 05.6	+52.7	22.0	61
62	22 25.8	+51.1	20.3	23 22.1	+51.3	20.4	24 18.3	+51.5	20.6	25 14.4	+51.7	20.7	26 10.5	+51.9	20.9	27 06.5	+52.2	21.1	28 02.5	+52.3	21.3	28 58.3	+52.6	21.5	62
63	23 16.9	+51.0	19.7	24 13.4	+51.2	19.8	25 09.8	+51.4	20.0	26 06.1	+51.7	20.2	27 02.4	+51.8	20.3	27 58.7	+52.0	20.5	28 54.8	+52.2	20.7	29 50.9	+52.4	20.9	63
64	24 07.9	+50.9	19.1	25 04.6	+51.1	19.3	26 01.2	+51.3	19.4	26 57.8	+51.4	19.6	27 54.2	+51.7	19.8	28 50.7	+51.8	20.0	29 47.0	+52.1	20.1	30 43.3	+52.3	20.4	64
65	24 58.8	+50.7	18.5	25 55.7	+50.9	18.7	26 52.5	+51.1	18.9	27 49.2	+51.3	19.0	28 45.9	+51.5	19.2	29 42.5	+51.8	19.4	30 39.1	+51.9	19.6	31 35.6	+52.1	19.8	65
66	25 49.5	+50.6	17.9	26 46.6	+50.8	18.1	27 43.6	+51.0	18.3	28 40.5	+51.2	18.4	29 37.4	+51.4	18.6	30 34.3	+51.5	18.8	31 31.0	+51.8	19.0	32 27.7	+52.0	19.2	66
67	26 40.1	+50.5	17.3	27 37.4	+50.6	17.5	28 34.6	+50.8	17.7	29 31.7	+51.0	17.8	30 28.8	+51.2	18.0	31 25.8	+51.4	18.2	32 22.8	+51.6	18.4	33 19.7	+51.8	18.6	67
68	27 30.6	+50.1	16.7	28 28.0	+50.4	16.9	29 25.4	+50.6	17.1	30 22.7	+50.8	17.2	31 20.0	+51.0	17.4	32 17.2	+51.2	17.6	33 14.4	+51.4	17.8	34 11.5	+51.6	18.0	68
69	28 20.8	+50.1	16.1	29 18.4	+50.3	16.3	30 16.0	+50.5	16.4	31 13.5	+50.7	16.6	32 11.0	+50.8	16.8	33 08.4	+51.1	17.0	34 05.8	+51.2	17.2	35 03.1	+51.4	17.4	69
70	29 10.9	+50.0	15.5	30 08.7	+50.1	15.6	31 06.5	+50.3	15.8	32 04.2	+50.5	16.0	33 01.8	+50.7	16.2	33 59.5	+50.8	16.3	34 57.0	+51.0	16.5	35 54.5	+51.2	16.7	70
71	30 00.9	+49.7	14.9	30 58.8	+49.9	15.0	31 56.8	+50.0	15.2	32 54.7	+50.2	15.3	33 52.5	+50.4	15.5	34 50.3	+50.6	15.7	35 48.0	+50.8	15.9	36 45.7	+51.0	16.1	71
72	30 50.6	+49.5	14.2	31 48.7	+49.8	14.4	32 46.8	+49.9	14.5	33 44.9	+50.1	14.7	34 42.9	+50.3	14.9	35 40.9	+50.4	15.0	36 38.8	+50.6	15.2	37 36.7	+50.7	15.4	72
73	31 40.1	+49.4	13.5	32 38.5	+49.4	13.7	33 36.7	+49.7	13.9	34 35.0	+49.8	14.0	35 33.2	+49.9	14.2	36 31.3	+50.2	14.4	37 29.4	+50.3	14.6	38 27.4	+50.6	14.8	73
74	32 29.5	+49.1	12.9	33 27.9	+49.3	13.0	34 26.4	+49.4	13.2	35 24.8	+49.6	13.3	36 23.1	+49.8	13.5	37 21.5	+49.9	13.7	38 19.7	+50.1	13.9	39 18.0	+50.2	14.1	74
75	33 18.6	+48.9	12.2	34 17.2	+49.1	12.3	35 15.8	+49.2	12.5	36 14.4	+49.3	12.6	37 12.9	+49.5	12.8	38 11.4	+49.7	13.0	39 09.8	+49.9	13.1	40 08.2	+50.0	13.3	75
76	34 07.5	+48.6	11.5	35 06.3	+48.7	11.6	36 05.0	+48.9	11.8	37 03.7	+49.1	11.9	38 02.4	+49.3	12.1	39 01.1	+49.4	12.3	39 59.7	+49.5	12.4	40 58.2	+49.8	12.6	76
77	34 56.1	+48.4	10.8	35 55.0	+48.6	10.9	36 53.9	+48.7	11.1	37 52.8	+48.8	11.2	38 51.7	+48.9	11.4	39 50.5	+49.1	11.5	40 49.2	+49.3	11.7	41 48.0	+49.4	11.9	77
78	35 44.5	+48.1	10.1	36 43.6	+48.2	10.2	37 42.6	+48.4	10.3	38 41.6	+48.6	10.5	39 40.6	+48.7	10.6	40 39.6	+48.8	10.8	41 38.5	+49.0	10.9	42 37.4	+49.1	11.1	78
79	36 32.6	+47.9	9.3	37 31.8	+48.0	9.4	38 31.0	+48.1	9.6	39 30.2	+48.2	9.7	40 29.3	+48.4	9.9	41 28.4	+48.5	10.0	42 27.5	+48.6	10.2	43 26.5	+48.8	10.3	79
80	37 20.5	+47.5	8.6	38 19.8	+47.7	8.7	39 19.1	+47.8	8.8	40 18.4	+47.9	8.9	41 17.7	+48.0	9.1	42 16.9	+48.2	9.2	43 16.1	+48.3	9.4	44 15.3	+48.4	9.5	80
81	38 08.0	+47.3	7.8	39 07.5	+47.3	7.9	40 06.9	+47.5	8.0	41 06.3	+47.6	8.1	42 05.7	+47.7	8.3	43 05.1	+47.8	8.4	44 04.4	+47.9	8.5	45 03.7	+48.1	8.7	81
82	38 55.3	+46.9	7.0	39 54.8	+47.0	7.1	40 54.4	+47.1	7.2	41 53.9	+47.2	7.3	42 53.4	+47.3	7.4	43 52.9	+47.4	7.6	44 52.3	+47.6	7.7	45 51.8	+47.6	7.8	82
83	39 42.2	+46.6	6.2	40 41.8	+46.7	6.3	41 41.5	+46.7	6.4	42 41.1	+46.8	6.5	43 40.7	+46.9	6.6	44 40.3	+47.0	6.7	45 39.9	+47.1	6.8	46 39.4	+47.3	7.0	83
84	40 28.8	+46.2	5.4	41 28.5	+46.3	5.5	42 28.2	+46.4	5.5	43 27.9	+46.5	5.6	44 27.6	+46.6	5.7	45 27.3	+46.7	5.8	46 27.0	+46.7	5.9	47 26.7	+46.8	6.1	84
85	41 15.0	+45.8	4.5	42 14.8	+45.9	4.6	43 14.6	+46.0	4.7	44 14.4	+46.0	4.8	45 14.2	+46.1	4.8	46 14.0	+46.2	4.9	47 13.7	+46.3	5.0	48 13.5	+46.4	5.1	85
86	42 00.8	+45.5	3.7	43 00.7	+45.5	3.7	44 00.6	+45.5	3.8	45 00.4	+45.6	3.9	46 00.3	+45.7	3.9	47 00.2	+45.7	4.0	48 00.0	+45.8	4.1	48 59.9	+45.8	4.2	86
87	42 46.3	+45.0	2.8	43 46.2	+45.1	2.8	44 46.1	+45.1	2.9	45 46.0	+45.2	2.9	46 46.0	+45.2	2.9	47 46.0	+45.2	2.9	48 45.8	+45.3	3.1	49 45.7	+45.3	3.2	87
88	43 31.3	+44.6	1.9	44 31.3	+44.6	1.9	45 31.2	+44.7	1.9	46 31.2	+44.7	2.0	47 31.2	+44.6	2.0	48 31.1	+44.7	2.1	49 31.1	+44.7	2.1	50 31.0	+44.8	2.1	88
89	44 15.9	+44.1	1.0	45 15.9	+44.1	1.0	46 15.9	+44.1	1.0	47 15.9	+44.1	1.0	48 15.8	+44.2	1.0	49 15.8	+44.2	1.0	50 15.8	+44.2	1.1	51 15.8	+44.2	1.1	89
90	45 00.0	+43.6	0.0	46 00.0	+43.6	0.0	47 00.0	+43.6	0.0	48 00.0	+43.6	0.0	49 00.0	+43.6	0.0	50 00.0	+43.6	0.0	51 00.0	+43.6	0.0	52 00.0	+43.6	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 137°, 223°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	30 34.4	+49.2	126.2	29 58.8	+49.7	126.7	29 22.8	+50.2	127.1	28 46.3	+50.8	127.6	28 09.6	+51.3	128.0	27 32.5	+51.7	128.4	26 55.0	+52.2	128.8	26 17.2	+52.7	129.2	0
1	31 23.6	+49.0	125.5	30 48.5	+49.6	126.0	30 13.0	+50.1	126.5	29 37.1	+50.7	127.0	29 00.9	+51.1	127.4	28 24.2	+51.6	127.9	27 47.2	+52.1	128.3	27 09.9	+52.6	128.7	1
2	32 12.6	+48.7	124.9	31 38.1	+49.3	125.4	31 03.1	+49.9	125.9	30 27.8	+50.4	126.3	29 52.0	+51.0	126.8	29 15.8	+51.5	127.3	28 39.3	+52.0	127.7	28 02.5	+52.4	128.1	2
3	33 01.3	+48.5	124.2	32 27.4	+49.1	124.7	31 53.0	+49.7	125.2	31 18.2	+50.2	125.7	30 43.0	+50.7	126.2	30 07.3	+51.3	126.7	29 31.3	+51.8	127.1	28 54.9	+52.3	127.6	3
4	33 49.8	+48.3	123.5	33 16.5	+48.9	124.0	32 42.7	+49.5	124.6	32 08.4	+50.1	125.1	31 33.7	+50.6	125.6	30 58.6	+51.1	126.1	30 23.1	+51.6	126.6	29 47.2	+52.1	127.0	4
5	34 38.1	+48.0	122.7	34 05.4	+48.6	123.3	33 32.2	+49.2	123.9	32 58.5	+49.8	124.4	32 24.3	+50.5	124.9	31 49.7	+51.0	125.5	31 14.7	+51.5	126.0	30 39.3	+52.0	126.4	5
6	35 26.1	+47.7	122.0	34 54.0	+48.4	122.6	34 21.4	+49.0	123.2	33 48.3	+49.7	123.8	33 14.8	+50.2	124.3	32 40.7	+50.8	124.8	32 06.2	+51.3	125.4	31 31.3	+51.8	125.9	6
7	36 13.8	+47.5	121.3	35 42.4	+48.1	121.9	35 10.4	+48.8	122.5	34 38.0	+49.3	123.1	34 05.0	+49.9	123.6	33 31.5	+50.5	124.2	32 57.5	+51.1	124.7	32 23.1	+51.6	125.3	7
8	37 01.3	+47.1	120.5	36 30.5	+47.9	121.1	35 59.2	+48.5	121.8	35 27.3	+49.2	122.4	34 54.9	+49.8	123.0	34 22.0	+50.4	123.6	33 48.6	+51.0	124.1	33 14.7	+51.5	124.7	8
9	37 48.4	+46.9	119.7	37 18.4	+47.5	120.4	36 47.7	+48.3	121.0	36 16.5	+48.9	121.7	35 44.7	+49.5	122.3	35 12.4	+50.1	122.9	34 39.6	+50.7	123.5	34 06.2	+51.3	124.0	9
10	38 35.3	+46.5	118.9	38 05.9	+47.3	119.6	37 36.0	+47.9	120.3	37 05.4	+48.6	121.0	36 34.2	+49.3	121.6	36 02.5	+49.9	122.2	35 30.3	+50.5	122.8	34 57.5	+51.1	123.4	10
11	39 21.8	+46.1	118.1	38 53.2	+46.9	118.8	38 23.9	+47.6	119.5	37 54.0	+48.4	120.2	37 23.5	+49.0	120.9	36 52.4	+49.7	121.5	36 20.8	+50.3	122.2	35 48.6	+50.8	122.8	11
12	40 07.9	+45.8	117.3	39 40.1	+46.5	118.0	39 11.5	+47.4	118.8	38 42.4	+48.0	119.5	38 12.5	+48.8	120.1	37 42.1	+49.4	120.8	37 11.1	+50.0	121.5	36 39.4	+50.7	122.1	12
13	40 53.7	+45.4	116.4	40 26.6	+46.3	117.2	39 58.9	+46.9	118.0	39 30.4	+47.7	118.7	39 01.3	+48.4	119.4	38 31.5	+49.1	120.1	38 01.1	+49.8	120.8	37 30.1	+50.4	121.4	13
14	41 39.1	+45.0	115.6	41 12.9	+45.8	116.4	40 45.8	+46.7	117.1	40 18.1	+47.4	117.9	39 49.7	+48.1	118.6	39 20.6	+48.9	119.4	38 50.9	+49.5	120.1	38 20.5	+50.2	120.8	14
15	42 24.1	+44.6	114.7	41 58.7	+45.4	115.5	41 32.5	+46.2	116.3	41 05.5	+47.1	117.1	40 37.8	+47.9	117.9	40 09.5	+48.5	118.6	39 40.4	+49.2	119.3	39 10.7	+49.9	120.1	15
16	43 08.7	+44.2	113.8	42 44.1	+45.1	114.6	42 18.7	+45.9	115.4	41 52.6	+46.7	116.3	41 25.7	+47.4	117.1	40 58.0	+48.2	117.8	40 29.6	+49.0	118.6	40 00.6	+49.6	119.3	16
17	43 52.9	+43.6	112.8	43 29.2	+44.5	113.7	43 04.6	+45.5	114.6	42 39.3	+46.3	115.4	42 13.1	+47.1	116.2	41 46.2	+47.9	117.0	41 18.6	+48.6	117.8	40 50.2	+49.3	118.6	17
18	44 36.5	+43.2	111.9	44 13.7	+44.2	112.8	43 50.1	+45.0	113.7	43 25.6	+45.9	114.5	43 00.2	+46.8	115.4	42 34.1	+47.6	116.2	42 07.2	+48.3	117.0	41 39.6	+49.0	117.8	18
19	45 19.7	+42.7	110.9	44 57.9	+43.6	111.8	44 35.1	+44.6	112.7	44 11.5	+45.4	113.6	43 47.0	+46.3	114.5	43 21.7	+47.1	115.4	42 55.5	+48.0	116.2	42 28.6	+48.7	117.1	19
20	46 02.4	+42.1	109.9	45 41.5	+43.1	110.8	45 19.7	+44.1	111.8	44 56.9	+45.0	112.7	44 33.3	+45.9	113.6	44 08.8	+46.8	114.5	43 43.5	+47.6	115.4	43 17.3	+48.4	116.3	20
21	46 44.5	+41.5	108.9	46 24.6	+42.6	109.9	46 03.8	+43.5	110.8	45 41.9	+44.6	111.8	45 19.2	+45.5	112.7	44 55.6	+46.3	113.7	44 31.1	+47.2	114.6	44 05.7	+48.0	115.4	21
22	47 26.0	+41.0	107.8	47 07.2	+42.0	108.8	46 47.3	+43.1	109.8	46 26.5	+44.0	110.8	46 04.7	+45.0	111.8	45 41.9	+45.9	112.8	45 18.3	+46.8	113.7	44 53.7	+47.7	114.6	22
23	48 07.0	+40.3	106.7	47 49.2	+41.4	107.8	47 30.4	+42.5	108.8	47 10.5	+43.5	109.8	46 49.7	+44.5	110.8	46 27.8	+45.5	111.8	46 05.1	+46.3	112.8	45 41.4	+47.2	113.7	23
24	48 47.3	+39.7	105.6	48 30.6	+40.8	106.7	48 12.9	+41.9	107.8	47 54.0	+43.0	108.8	47 34.2	+44.0	109.9	47 13.3	+45.0	110.9	46 51.4	+45.9	111.9	46 28.6	+46.8	112.9	24
25	49 27.0	+38.9	104.4	49 11.4	+40.1	105.6	48 54.8	+41.2	106.7	48 37.0	+42.4	107.8	48 18.2	+43.4	108.8	47 58.3	+44.4	109.9	47 37.3	+45.5	110.9	47 15.4	+46.4	111.9	25
26	50 05.9	+38.2	103.3	49 51.5	+39.5	104.4	49 36.0	+40.6	105.6	49 19.4	+41.7	106.7	49 01.6	+42.8	107.8	48 42.7	+43.9	108.9	48 22.8	+44.9	109.9	48 01.8	+45.9	111.0	26
27	50 44.1	+37.5	102.1	50 31.0	+38.7	103.2	50 16.6	+39.9	104.4	50 01.1	+41.1	105.6	49 44.4	+42.2	106.7	49 26.6	+43.3	107.8	49 07.7	+44.3	108.9	48 47.7	+45.3	110.0	27
28	51 21.6	+36.6	100.8	51 09.7	+37.9	102.0	50 56.5	+39.2	103.2	50 42.2	+40.4	104.4	50 26.6	+41.6	105.6	50 09.9	+42.7	106.8	49 52.0	+43.8	107.9	49 33.0	+44.9	109.0	28
29	51 58.2	+35.8	99.5	51 47.6	+37.1	100.8	51 35.7	+38.5	102.0	51 22.6	+39.7	103.3	51 08.2	+40.9	104.5	50 52.6	+42.1	105.7	50 35.8	+43.2	106.8	50 17.9	+44.3	108.0	29
30	52 34.0	+34.9	98.2	52 24.7	+36.3	99.5	52 14.2	+37.6	100.8	52 02.3	+38.9	102.0	51 49.1	+40.2	103.3	51 34.7	+41.4	104.5	51 19.0	+42.6	105.7	51 02.2	+43.6	106.9	30
31	53 08.9	+33.9	96.9	53 01.0	+35.4	98.2	52 51.8	+36.7	99.5	52 41.2	+38.1	100.8	52 29.3	+39.4	102.1	52 16.1	+40.6	103.3	52 01.6	+41.9	104.6	51 45.8	+43.1	105.8	31
32	53 42.8	+33.0	95.5	53 36.4	+34.4	96.8	53 28.5	+35.9	98.2	53 19.3	+37.2	99.5	53 08.7	+38.6	100.8	52 56.7	+39.9	102.1	52 43.5	+41.1	103.4	52 28.9	+42.4	104.7	32
33	54 15.8	+31.9	94.1	54 10.8	+33.5	95.5	54 04.4	+34.9	96.8	53 56.5	+36.4	98.2	53 47.3	+37.7	99.5	53 36.6	+39.1	100.9	53 24.6	+40.4	102.2	53 11.3	+41.6	103.5	33
34	54 47.7	+30.9	92.6	54 44.3	+32.4	94.0	54 39.3	+33.9	95.4	54 32.9	+35.4	96.8	54 25.0	+36.9	98.2	54 15.7	+38.3	99.6	54 05.0	+39.6	101.0	53 52.9	+41.0	102.3	34
35	55 18.6	+29.7	91.1	55 16.7	+31.3	92.6	55 13.2	+32.9	94.0	55 08.3	+34.4	95.4	55 01.9	+35.9	96.9	54 54.0	+37.3	98.3	54 44.6	+38.8	99.7	54 33.8	+40.1	101.1	35
36	55 48.3	+28.6	89.6	55 48.0	+30.2	91.1	55 46.1	+31.8	92.5	55 42.7	+33.4	94.0	55 37.8	+34.9	95.4	55 31.3	+36.4	96.9	55 23.4	+37.8	98.3	55 13.9	+39.3	99.8	36
37	56 16.9	+27.3	88.0	56 18.2	+29.0	89.5	56 17.9	+30.7	91.0	56 16.1	+32.3	92.5	56 12.7	+33.8	94.0	56 07.7	+35.4	95.5	56 01.2	+36.9	97.0	55 53.2	+38.3	98.4	37
38	56 44.2	+26.1	86.4	56 47.2	+27.8	87.9	56 48.6	+29.4	89.4	56 48.4	+31.1	91.0	56 46.5	+32.8	92.5	56 43.1	+34.4	94.0	56 38.1	+35.9	95.5	56 31.5	+37.5	97.0	38
39	57 10.3	+24.7	84.7	57 15.0	+26.4	86.3	57 18.0	+28.2	87.8	57 19.5	+29.9	89.4	57 19.3	+31.6	91.0	57 17.5	+33.2	92.5	57 14.0	+34.8	94.1	57 09.0	+36.3	95.6	39
40	57 35.0	+23.3	83.0	57 41.4	+25.1	84.6	57 46.2	+26.9	86.2	57 49.4	+28.6	87.8	57 50.9	+30.3	89.4	57 50.7	+32.0	91.0	57 48.8	+33.8	92.6	57 45.3	+35.4	94.1	40
41	57 58.3	+21.9	81.3	58 06.5	+23.8	82.9	58 13.1	+25.5	84.5	58 18.0	+27.3	86.1	58 21.2	+29.1	87.8	58 22.7	+30.9	89.4	58 22.6	+32.5	91.0	58 20.7	+34.2	92.6	41
42	58 20.2	+20.4	79.6	58 30.3	+22.2	81.2	58 38.6	+24.1	82.8	58 45.3	+25.9	84.4	58 50.3	+27.7	86.1	58 53.6	+29.5	87.7	58 55.1	+31.3	89.4	58 54.9	+33.0	91.0	42
43	58 40.6	+18.9	77.8	58 52.5	+20.8	79.4	59 02.7	+22.6	81.0	59 11.2	+24.5	82.7	59 18.0	+26.4	84.3	59 23.1	+28.1	86.0	59 26.4	+29.9	87.7	59 27.9	+31.7	89.4	43
44	58 59.5	+17.3	75.9	59 13.3	+19.1	77.5	59 25.3	+21.1	79.2	59 35.7	+23.0	80.9	59 44.4	+24.8	82.6	59 51.2	+26.8	84.3	59 56.3	+28.6	86.0	59 59.6	+30.5	87.7	44
45	59 16.8	+15.6	74.1	59 32.4	+17.6	75.7	59 46.4	+19.5	77.4	59 58.7	+21.4	79.0	60 09.2	+23.4	80.7	60 18.0	+25.2	82.5	60 24.9	+27.2	84.2	60 30.1	+29.0	86.0	45
46	59 32.4	+14.0	72.2	59 50.0	+15.9	73.8	60 05.9	+17.8	75.5	60 20.1	+19.8	77.2	60 32.6	+21.7	78.9	60 43.2	+23.7	80.6	60 52.1	+25.6	82.4	60 59.1	+27.5	84.2	46
47	59 46.4	+12.3	70.2	60 05.9	+14.2	71.9	60 23.7	+16.2	73.5	60 39.9	+18.1	75.2	60 54.3	+20.1	77.0	61 06.9	+22.1	78.7	61 17.7	+24.1	80.5	61 26.6	+26.1	82.3	47
48	59 58.7	+10.5	68.3	60 20.1	+12.5	69.9	60 39.9	+14.4	71.6	60 58.0	+16.4	73.3	61 14.4	+18.4	75.0	61 29.0	+20.4	76.8	61 41.8	+22.4	78.6	61 52.7	+24.4	80.4	48
49	60 09.2	+8.8	66.3	60 32.6	+10.6	67.9	60 54.3	+12.6	69.6	61 14.4	+14.6	71.3	61 32.8	+16.6	73.0	61 49.4	+18.6	74.8	62 04.2	+20.6	76.6	62 17.1	+22.7	78.5	49
50	60 18.0	+6.9	64.3	60 43.2	+8.9	65.9	61 06.9	+10.8	67.6	61 29.0	+12.8	69.3	61 49.4	+14.8	71.0	62 08.0	+16.8	72.8	62 24.8	+18.9	74.6	62 39.8	+21.0	76.5	50
51	60 24.9	+5.2	62.3	60 52.1	+7.0	63.9	61 17.7	+8.9	65.5	61 41.8	+10.9	67.2	62 04.2	+12.9	69.0	62 24.8	+15.0	70.7	62 43.7	+17.1	72.6	63 00.8	+19.1	74.4	51
52	60 30.1	+3.2	60.3	60 59.1	+5.1	61.9	61 26.6	+7.1	63.5	61 52.7	+9.0	65.1	62 17.1	+11.0	66.9	62 39.8	+13.0	68.6	63 00.8	+15.1	70.5	63 19.9	+17.2	72.3	52
53	60 33.3	+1.5	58.3	61 04.2	+3.3	59.8	61 33.7	+5.1	61.4	62 01.7	+7.0	63.0	62 28.1	+9.0	64.8	62 52.8	+11.1	66.5	63 15.9	+13.2•	68.3	63 37.1	+15.3	70.2	53
54	60 34.8	–0.5	56.2	61 07.5	+1.3	57.7	61 38.8	+3.2	59.3	62 08.7	+5.1	60.9	62 37.1	+7.1•	62.6	63 03.9	+9.1•	64.3	63 29.1	+11.1•	66.1	63 52.4	+13.3•	68.0	54
55	60 34.3	–2.2	54.2	61 08.8	–0.5	55.7	61 42.0	+1.3	57.2	62 13.8	+3.2•	58.8	62 44.2	+5.0•	60.4	63 13.0	+7.1•	62.2	63 40.2	+9.1•	63.9	64 05.7	+11.2•	65.8	55
56	60 32.1	–4.2	52.2	61 08.3	–2.5	53.6	61 43.3	–0.7	55.1	62 17.0	+1.1•	56.6	62 49.2	+3.1•	58.3	63 20.1	+4.9•	59.9	63 49.3	+7.0•	61.7	64 16.9	+9.1•	63.5	56
57	60 27.9	–5.9	50.1	61 05.8	–4.3	51.5	61 42.6	–2.6	53.0	62 18.1	–0.9	54.5	62 52.3	+1.0•	56.1	63 25.0	+2.9•	57.7	63 56.3	+4.9•	59.4	64 26.0	+7.0•	61.2	57
58	60 22.0	–7.8	48.1	61 01.5	–6.2	49.5	61 40.0	–4.6	50.9	62 17.2	–2.8	52.3	62 53.3	–1.1•	53.9	63 27.9	+0.9•	55.5	64 01.2	+2.8•	57.2	64 33.0	+4.7•	58.9	58
59	60 14.2	–9.6	46.1	60 55.3	–8.1	47.4	61 35.4	–6.5	48.8	62 14.4	–4.8•	50.2	62 52.2	–3.1•	51.7	63 28.8	–1.3•	53.2	64 04.0	+0.6•	54.9	64 37.7	+2.7•	56.6	59
60	60 04.6	–11.3	44.1	60 47.2	–9.9	45.4	61 28.9	–8.4	46.7	62 09.6	–6.8•	48.0	62 49.1	–5.1•	49.5	63 27.5	–3.4•	51.0	64 04.6	–1.6•	52.6	64 40.3	+0.4•	54.3	60
61	59 53.3	–13.1	42.2	60 37.3	–11.6	43.4	61 20.5	–10.2	44.6	62 02.8	–8.8	45.9	62 44.0	–7.2•	47.3	63 24.1	–5.5•	48.8	64 03.0	–3.7•	50.3	64 40.7	–1.9•	51.9	61
62	59 40.2	–14.7	40.2	60 25.7	–13.5	41.4	61 10.3	–12.1	42.6	61 54.0	–10.6	43.8	62 36.8	–9.1	45.0	63 18.6	–7.5•	46.6	63 59.3	–5.8•	48.0	64 38.8	–4.0•	49.6	62
63	59 25.5	–16.4	38.3	60 12.2	–15.2	39.4	60 58.2	–13.9	40.5	61 43.4	–12.5	41.7	62 27.7	–11.1	43.0	63 11.1	–9.5•	44.4	63 53.5	–8.0•	45.8	64 34.8	–6.3•	47.3	63
64	59 09.1	–18.1	36.4	59 57.0	–16.9	37.5	60 44.3	–15.6	38.5	61 30.9	–14.4	39.7	62 16.6	–13.0	40.9	63 01.6	–11.6•	42.2	63 45.5	–10.0•	43.5	64 28.5	–8.4•	45.0	64
65	58 51.0	–19.5	34.6	59 40.1	–18.4	35.5	60 28.7	–17.4	36.6	61 16.5	–16.1	37.7	62 03.6	–14.8	38.8	62 50.0	–13.5	40.0	63 35.5	–12.0•	41.3	64 20.1	–10.5•	42.7	65
66	58 31.5	–21.1	32.8	59 21.7	–20.1	33.7	60 11.3	–19.0	34.6	61 00.4	–17.9	35.7	61 48.8	–16.7	36.7	62 36.5	–15.4	37.9	63 23.5	–14.1•	39.1	64 09.6	–12.6•	40.4	66
67	58 10.4	–22.6	31.0	59 01.6	–21.6	31.8	59 52.3	–20.6	32.7	60 42.5	–19.6	33.7	61 32.1	–18.4	34.7	62 21.1	–17.2	35.8	63 09.4	–16.0	36.9	63 57.0	–14.6•	38.2	67
68	57 47.8	–24.0	29.2	58 40.0	–23.1	30.0	59 31.7	–22.0	30.9	60 22.9	–21.2	31.8	61 13.7	–20.2	32.7	62 03.9	–19.1	33.7	62 53.4	–17.8	34.8	63 42.4	–16.7	36.0	68
69	57 23.8	–25.3	27.5	58 16.9	–24.6	28.3	59 09.5	–23.7	29.1	60 01.7	–22.7	29.9	60 53.5	–21.8	30.8	61 44.8	–20.7	31.7	62 35.6	–19.7	32.7	63 25.7	–18.5	33.8	69
70	56 58.5	–26.6	25.8	57 52.3	–25.9	26.5	58 45.8	–25.1	27.3	59 39.0	–24.3	28.0	60 31.7	–23.4	28.9	61 24.1	–22.5	29.8	62 15.9	–21.4	30.7	63 07.2	–20.4	31.7	70
71	56 31.9	–27.9	24.2	57 26.4	–27.2	24.8	58 20.7	–26.5	25.5	59 14.7	–25.7	26.2	60 08.3	–24.9	27.0	61 01.6	–24.0	27.8	61 54.5	–23.2	28.7	62 46.8	–22.1	29.6	71
72	56 04.0	–29.1	22.6	56 59.2	–28.5	23.2	57 54.2	–27.8	23.8	58 49.0	–27.1	24.5	59 43.4	–26.4	25.2	60 37.6	–25.6	26.0	61 31.3	–24.7	26.8	62 24.7	–23.8	27.7	72
73	55 34.9	–30.3	21.1	56 30.7	–29.6	21.6	57 26.4	–29.1	22.2	58 21.9	–28.5	22.8	59 17.0	–27.7	23.4	60 12.0	–27.1	24.1	61 06.6	–26.3	24.9	62 00.8	–25.5	25.6	73
74	55 04.6	–31.4	19.5	56 01.1	–30.9	20.0	56 57.3	–30.3	20.6	57 53.4	–29.7	21.1	58 49.3	–29.2	21.7	59 44.9	–28.5	22.3	60 40.3	–27.8	23.0	61 35.3	–27.0	23.7	74
75	54 33.2	–32.4	18.1	55 30.2	–32.0	18.5	56 27.0	–31.4	19.0	57 23.7	–31.0	19.5	58 20.1	–30.4	20.0	59 16.4	–29.8	20.6	60 12.5	–29.3	21.2	61 08.3	–28.6	21.9	75
76	54 00.8	–33.4	16.6	54 58.2	–33.0	17.0	55 55.6	–32.6	17.5	56 52.7	–32.1	17.9	57 49.7	–31.6	18.4	58 46.6	–31.1	18.9	59 43.2	–30.5	19.5	60 39.7	–30.0	20.1	76
77	53 27.4	–34.4	15.2	54 25.2	–34.0	15.6	55 23.0	–33.7	16.0	56 20.6	–33.2	16.4	57 18.1	–32.8	16.8	58 15.5	–32.4	17.3	59 12.7	–31.9	17.8	60 09.7	–31.3	18.3	77
78	52 53.0	–35.3	13.8	53 51.2	–35.0	14.2	54 49.3	–34.6	14.5	55 47.4	–34.3	14.9	56 45.3	–33.9	15.3	57 43.1	–33.4	15.7	58 40.8	–33.0	16.1	59 38.4	–32.6	16.6	78
79	52 17.7	–36.2	12.5	53 16.2	–35.8	12.8	54 14.7	–35.6	13.1	55 13.1	–35.3	13.4	56 11.4	–34.9	13.8	57 09.7	–34.6	14.1	58 07.8	–34.2	14.5	59 05.8	–33.8	15.0	79
80	51 41.5	–37.0	11.2	52 40.4	–36.8	11.5	53 39.1	–36.5	11.7	54 37.8	–36.2	12.0	55 36.5	–35.9	12.3	56 35.1	–35.7	12.7	57 33.6	–35.3	13.0	58 32.0	–35.0	13.4	80
81	51 04.5	–37.8	10.0	52 03.6	–37.6	10.2	53 02.6	–37.3	10.4	54 01.6	–37.1	10.7	55 00.6	–36.9	10.9	55 59.4	–36.6	11.2	56 58.3	–36.4	11.5	57 57.0	–36.0	11.8	81
82	50 26.7	–38.5	8.7	51 26.0	–38.4	8.9	52 25.3	–38.2	9.1	53 24.5	–38.0	9.3	54 23.7	–37.8	9.6	55 22.8	–37.5	9.8	56 21.9	–37.3	10.1	57 21.0	–37.1	10.3	82
83	49 48.2	–39.3	7.5	50 47.6	–39.1	7.7	51 47.1	–39.0	7.9	52 46.5	–38.8	8.0	53 45.9	–38.6	8.2	54 45.3	–38.5	8.4	55 44.6	–38.3	8.6	56 43.9	–38.1	8.9	83
84	49 08.9	–40.0	6.4	50 08.5	–39.8	6.5	51 08.1	–39.7	6.6	52 07.7	–39.6	6.8	53 07.3	–39.5	6.9	54 06.8	–39.3	7.1	55 06.3	–39.1	7.3	56 05.8	–38.9	7.5	84
85	48 28.9	–40.6	5.2	49 28.7	–40.5	5.3	50 28.4	–40.4	5.5	51 28.1	–40.3	5.6	52 27.8	–40.2	5.7	53 27.5	–40.1	5.8	54 27.2	–40.0	6.0	55 26.9	–39.9	6.1	85
86	47 48.3	–41.2	4.1	48 48.2	–41.2	4.2	49 48.0	–41.1	4.3	50 47.8	–41.0	4.4	51 47.6	–40.9	4.5	52 47.4	–40.8	4.6	53 47.2	–40.7	4.7	54 47.0	–40.6	4.8	86
87	47 07.1	–41.8	3.1	48 07.0	–41.8	3.1	49 06.9	–41.7	3.2	50 06.8	–41.6	3.3	51 06.7	–41.6	3.3	52 06.6	–41.5	3.4	53 06.5	–41.5	3.5	54 06.4	–41.4	3.6	87
88	46 25.3	–42.4	2.0	47 25.2	–42.3	2.1	48 25.2	–42.3	2.1	49 25.2	–42.3	2.1	50 25.1	–42.2	2.2	51 25.1	–42.2	2.2	52 25.0	–42.2	2.3	53 25.0	–42.2	2.3	88
89	45 42.9	–42.9	1.0	46 42.9	–42.9	1.0	47 42.9	–42.9	1.0	48 42.9	–42.9	1.1	49 42.9	–42.9	1.1	50 42.9	–42.9	1.1	51 42.8	–42.8	1.1	52 42.8	–42.8	1.1	89
90	45 00.0	–43.4	0.0	46 00.0	–43.4	0.0	47 00.0	–43.4	0.0	48 00.0	–43.4	0.0	49 00.0	–43.4	0.0	50 00.0	–43.5	0.0	51 00.0	–43.5	0.0	52 00.0	–43.5	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	30 34.4	−49.3	126.2	29 58.8	−49.9	126.7	29 22.8	−50.5	127.1	28 46.3	−50.9	127.6	28 09.6	−51.5	128.0	27 32.5	−51.9	128.4	26 55.0	−52.4	128.8	26 17.2	−52.8	129.2	0
1	29 45.1	−49.6	126.9	29 08.9	−50.1	127.3	28 32.3	−50.6	127.8	27 55.4	−51.1	128.2	27 18.1	−51.5	128.6	26 40.6	−52.1	129.0	26 02.6	−52.4	129.4	25 24.4	−52.9	129.7	1
2	28 55.5	−49.8	127.5	28 18.8	−50.3	127.9	27 41.7	−50.8	128.4	27 04.3	−51.3	128.8	26 26.6	−51.7	129.2	25 48.5	−52.1	129.5	25 10.2	−52.6	129.9	24 31.5	−53.0	130.3	2
3	28 05.7	−49.9	128.2	27 28.5	−50.4	128.6	26 50.9	−50.9	129.0	26 13.0	−51.3	129.4	25 34.9	−51.9	129.7	24 56.4	−52.3	130.1	24 17.6	−52.7	130.4	23 38.5	−53.1	130.8	3
4	27 15.8	−50.1	128.8	26 38.1	−50.6	129.2	26 00.0	−51.0	129.6	25 21.7	−51.6	129.9	24 43.0	−52.0	130.3	24 04.1	−52.4	130.6	23 24.9	−52.8	131.0	22 45.4	−53.2	131.3	4
5	26 25.7	−50.2	129.4	25 47.5	−50.7	129.8	25 09.0	−51.2	130.1	24 30.1	−51.6	130.5	23 51.0	−52.0	130.8	23 11.7	−52.5	131.2	22 32.1	−52.9	131.5	21 52.2	−53.3	131.8	5
6	25 35.5	−50.4	130.0	24 56.8	−50.9	130.4	24 17.8	−51.3	130.7	23 38.5	−51.8	131.0	22 59.0	−52.2	131.4	22 19.2	−52.6	131.7	21 39.2	−53.0	132.0	20 58.9	−53.4	132.3	6
7	24 45.1	−50.5	130.6	24 05.9	−51.0	130.9	23 26.5	−51.5	131.3	22 46.7	−51.8	131.6	22 06.8	−52.3	131.9	21 26.6	−52.7	132.2	20 46.2	−53.1	132.5	20 05.5	−53.4	132.7	7
8	23 54.6	−50.7	131.2	23 14.9	−51.1	131.5	22 35.0	−51.5	131.8	21 54.9	−52.0	132.1	21 14.5	−52.4	132.4	20 33.9	−52.8	132.7	19 53.1	−53.2	133.0	19 12.1	−53.5	133.2	8
9	23 03.9	−50.8	131.8	22 23.8	−51.2	132.1	21 43.5	−51.7	132.4	21 02.9	−52.1	132.7	20 22.1	−52.5	133.0	19 41.1	−52.8	133.2	18 59.9	−53.2	133.5	18 18.6	−53.6	133.7	9
10	22 13.1	−50.9	132.4	21 32.6	−51.4	132.7	20 51.8	−51.8	133.0	20 10.8	−52.2	133.2	19 29.6	−52.5	133.5	18 48.3	−53.0	133.7	18 06.7	−53.3	134.0	17 25.0	−53.7	134.2	10
11	21 22.2	−51.1	132.9	20 41.2	−51.5	133.2	20 00.0	−51.8	133.5	19 18.6	−52.3	133.7	18 37.1	−52.7	134.0	17 55.3	−53.0	134.2	17 13.4	−53.4	134.4	16 31.3	−53.7	134.7	11
12	20 31.1	−51.1	133.5	19 49.7	−51.5	133.8	19 08.2	−52.0	134.0	18 26.4	−52.4	134.3	17 44.4	−52.7	134.5	17 02.3	−53.1	134.7	16 20.0	−53.4	134.9	15 37.6	−53.8	135.1	12
13	19 40.0	−51.2	134.0	18 58.2	−51.7	134.3	18 16.2	−52.0	134.5	17 34.0	−52.4	134.8	16 51.7	−52.8	135.0	16 09.2	−53.2	135.2	15 26.6	−53.5	135.4	14 43.8	−53.9	135.6	13
14	18 48.8	−51.4	134.6	18 06.5	−51.7	134.8	17 24.2	−52.2	135.1	16 41.6	−52.5	135.3	15 58.9	−52.9	135.5	15 16.0	−53.2	135.7	14 33.1	−53.6	135.9	13 49.9	−53.9	136.0	14
15	17 57.4	−51.4	135.1	17 14.8	−51.8	135.4	16 32.0	−52.2	135.6	15 49.1	−52.6	135.8	15 06.0	−52.9	136.0	14 22.8	−53.2	136.2	13 39.5	−53.6	136.3	12 56.0	−53.9	136.5	15
16	17 06.0	−51.5	135.7	16 23.0	−51.9	135.9	15 39.8	−52.2	136.1	14 56.5	−52.6	136.3	14 13.1	−53.0	136.5	13 29.6	−53.4	136.6	12 45.9	−53.7	136.8	12 02.1	−54.0	136.9	16
17	16 14.5	−51.6	136.2	15 31.1	−52.0	136.4	14 47.6	−52.4	136.6	14 03.9	−52.7	136.8	13 20.1	−53.0	136.9	12 36.2	−53.3	137.1	11 52.2	−53.7	137.2	11 08.1	−54.0	137.4	17
18	15 22.9	−51.7	136.7	14 39.1	−52.0	136.9	13 55.2	−52.4	137.1	13 11.2	−52.7	137.3	12 27.1	−53.1	137.4	11 42.9	−53.5	137.6	10 58.5	−53.7	137.7	10 14.1	−54.1	137.8	18
19	14 31.2	−51.7	137.3	13 47.1	−52.1	137.4	13 02.8	−52.4	137.6	12 18.5	−52.8	137.7	11 34.0	−53.1	137.9	10 49.4	−53.4	138.0	10 04.8	−53.8	138.2	9 20.0	−54.0	138.3	19
20	13 39.5	−51.8	137.8	12 55.0	−52.2	138.0	12 10.4	−52.5	138.1	11 25.7	−52.9	138.2	10 40.9	−53.2	138.4	9 56.0	−53.5	138.5	9 11.0	−53.8	138.6	8 26.0	−54.2	138.7	20
21	12 47.7	−51.9	138.3	12 02.8	−52.2	138.5	11 17.9	−52.6	138.6	10 32.8	−52.9	138.7	9 47.7	−53.2	138.8	9 02.5	−53.6	139.0	8 17.2	−53.9	139.1	7 31.8	−54.1	139.1	21
22	11 55.8	−51.9	138.8	11 10.6	−52.3	139.0	10 25.3	−52.6	139.1	9 39.9	−52.9	139.2	8 54.5	−53.3	139.3	8 08.9	−53.5	139.4	7 23.3	−53.8	139.5	6 37.7	−54.2	139.6	22
23	11 03.9	−52.0	139.3	10 18.4	−52.4	139.5	9 32.7	−52.6	139.6	8 47.0	−53.0	139.7	8 01.2	−53.3	139.8	7 15.4	−53.5	139.9	6 29.5	−53.9	139.9	5 43.5	−54.2	140.0	23
24	10 11.9	−52.0	139.9	9 26.0	−52.3	140.0	8 40.1	−52.7	140.1	7 54.0	−53.0	140.2	7 07.9	−53.3	140.2	6 21.8	−53.6	140.3	5 35.6	−53.9	140.4	4 49.3	−54.2	140.4	24
25	9 19.9	−52.0	140.4	8 33.7	−52.4	140.5	7 47.4	−52.7	140.5	7 01.0	−53.0	140.6	6 14.6	−53.3	140.7	5 28.2	−53.7	140.8	4 41.7	−53.9	140.8	3 55.1	−54.2	140.9	25
26	8 27.9	−52.1	140.9	7 41.3	−52.4	140.9	6 54.7	−52.8	141.0	6 08.0	−53.0	141.1	5 21.3	−53.4	141.2	4 34.5	−53.6	141.2	3 47.8	−54.0	141.3	3 00.9	−54.2	141.3	26
27	7 35.8	−52.2	141.4	6 48.9	−52.5	141.4	6 01.9	−52.7	141.5	5 15.0	−53.1	141.6	4 27.9	−53.3	141.6	3 40.9	−53.7	141.7	2 53.8	−53.9	141.7	2 06.7	−54.2	141.7	27
28	6 43.6	−52.1	141.9	5 56.4	−52.4	141.9	5 09.2	−52.8	142.0	4 21.9	−53.1	142.1	3 34.6	−53.4	142.1	2 47.2	−53.7	142.1	1 59.9	−54.0	142.1	1 12.5	−54.2	142.2	28
29	5 51.5	−52.2	142.4	5 04.0	−52.5	142.4	4 16.4	−52.8	142.5	3 28.8	−53.1	142.5	2 41.2	−53.4	142.5	1 53.5	−53.6	142.6	1 05.9	−54.0	142.6	0 18.2	−54.2	142.6	29
30	4 59.3	−52.2	142.9	4 11.5	−52.6	142.9	3 23.6	−52.8	142.9	2 35.7	−53.1	143.0	1 47.8	−53.4	143.0	0 59.9	−53.7	143.0	0 11.9	−53.9	143.0	0 36.0	+54.2	37.0	30
31	4 07.1	−52.2	143.3	3 18.9	−52.5	143.4	2 30.8	−52.9	143.4	1 42.6	−53.1	143.4	0 54.4	−53.4	143.5	0 06.2	−53.7	143.5	0 42.0	+54.0	36.5	1 30.2	+54.3	36.6	31
32	3 14.9	−52.3	143.8	2 26.4	−52.6	143.9	1 37.9	−52.8	143.9	0 49.5	−53.2	143.9	0 01.0	−53.4	143.9	0 47.5	+53.9	36.1	1 36.0	+53.9	36.1	2 24.5	+54.2	36.1	32
33	2 22.6	−52.2	144.3	1 33.9	−52.6	144.4	0 45.1	−52.8	144.4	0 03.7	+53.1	35.6	0 52.4	+53.4	35.6	1 41.2	+53.7	35.7	2 29.9	+54.0	35.7	3 18.7	+54.2	35.7	33
34	1 30.4	−52.3	144.8	0 41.3	−52.5	144.8	0 07.7	+52.9	35.2	0 56.8	+53.1	35.2	1 45.8	+53.4	35.2	2 34.9	+53.6	35.2	3 23.9	+53.9	35.2	4 12.9	+54.2	35.3	34
35	0 38.1	−52.3	145.3	0 11.2	+52.6	34.7	1 00.6	+52.8	34.7	1 49.9	+53.1	34.7	2 39.2	+53.4	34.7	3 28.5	+53.7	34.8	4 17.8	+53.9	34.8	5 07.1	+54.2	34.8	35
36	0 14.2	+52.2	34.2	1 03.8	+52.5	34.2	1 53.4	+52.8	34.2	2 43.0	+53.1	34.2	3 32.6	+53.4	34.3	4 22.2	+53.6	34.3	5 11.7	+53.9	34.4	6 01.3	+54.1	34.4	36
37	1 06.4	+52.3	33.7	1 56.3	+52.6	33.7	2 46.2	+52.9	33.7	3 36.1	+53.1	33.8	4 26.0	+53.3	33.8	5 15.8	+53.6	33.9	6 05.6	+53.9	33.9	6 55.4	+54.1	34.0	37
38	1 58.7	+52.2	33.2	2 48.9	+52.5	33.2	3 39.1	+52.8	33.3	4 29.2	+53.1	33.3	5 19.3	+53.4	33.4	6 09.4	+53.6	33.4	6 59.5	+53.9	33.5	7 49.5	+54.2	33.5	38
39	2 50.9	+52.3	32.7	3 41.4	+52.5	32.7	4 31.9	+52.7	32.8	5 22.3	+53.0	32.8	6 12.7	+53.3	32.9	7 03.0	+53.6	33.0	7 53.4	+53.8	33.0	8 43.7	+54.0	33.1	39
40	3 43.2	+52.2	32.2	4 33.9	+52.5	32.3	5 24.6	+52.8	32.3	6 15.3	+53.1	32.4	7 06.0	+53.3	32.4	7 56.6	+53.6	32.5	8 47.2	+53.8	32.6	9 37.7	+54.1	32.7	40
41	4 35.4	+52.2	31.7	5 26.4	+52.5	31.7	6 17.4	+52.7	31.9	7 08.4	+52.9	31.9	7 59.3	+53.2	32.0	8 50.2	+53.5	32.0	9 41.0	+53.8	32.1	10 31.8	+54.0	32.2	41
42	5 27.6	+52.2	31.2	6 18.9	+52.4	31.3	7 10.1	+52.7	31.4	8 01.3	+53.0	31.4	8 52.5	+53.2	31.5	9 43.7	+53.4	31.6	10 34.8	+53.7	31.7	11 25.8	+53.9	31.8	42
43	6 19.8	+52.1	30.7	7 11.3	+52.4	30.8	8 02.8	+52.7	30.9	8 54.3	+52.9	30.9	9 45.7	+53.2	31.0	10 37.1	+53.5	31.1	11 28.5	+53.6	31.2	12 19.7	+54.0	31.3	43
44	7 11.9	+52.1	30.2	8 03.7	+52.4	30.3	8 55.5	+52.6	30.4	9 47.2	+52.9	30.5	10 38.9	+53.2	30.6	11 30.6	+53.4	30.7	12 22.1	+53.7	30.8	13 13.7	+53.8	30.9	44
45	8 04.0	+52.1	29.7	8 56.1	+52.3	29.8	9 48.1	+52.6	29.9	10 40.1	+52.9	30.0	11 32.1	+53.1	30.1	12 24.0	+53.3	30.2	13 15.8	+53.6	30.3	14 07.5	+53.9	30.4	45
46	8 56.1	+52.0	29.2	9 48.4	+52.3	29.3	10 40.7	+52.6	29.4	11 33.0	+52.8	29.5	12 25.2	+53.0	29.6	13 17.3	+53.3	29.7	14 09.4	+53.5	29.8	15 01.4	+53.7	30.0	46
47	9 48.1	+52.0	28.7	10 40.7	+52.3	28.8	11 33.3	+52.5	28.9	12 25.8	+52.7	29.0	13 18.2	+53.0	29.1	14 10.6	+53.2	29.3	15 02.9	+53.5	29.4	15 55.1	+53.7	29.5	47
48	10 40.1	+52.0	28.2	11 33.0	+52.2	28.3	12 25.8	+52.4	28.3	13 18.5	+52.7	28.5	14 11.2	+52.9	28.6	15 03.8	+53.2	28.8	15 56.4	+53.4	28.9	16 48.8	+53.7	29.1	48
49	11 32.1	+51.9	27.7	12 25.2	+52.1	27.8	13 18.2	+52.4	27.9	14 11.2	+52.6	28.0	15 04.1	+52.9	28.2	15 57.0	+53.1	28.3	16 49.8	+53.3	28.4	17 42.5	+53.6	28.6	49
50	12 24.0	+51.8	27.2	13 17.3	+52.1	27.3	14 10.6	+52.3	27.4	15 03.8	+52.6	27.5	15 57.0	+52.8	27.7	16 50.1	+53.0	27.8	17 43.1	+53.3	28.0	18 36.1	+53.5	28.1	50
51	13 15.8	+51.7	26.7	14 09.4	+52.0	26.8	15 02.9	+52.2	26.9	15 56.4	+52.4	27.0	16 49.8	+52.7	27.2	17 43.1	+52.9	27.3	18 36.4	+53.2	27.5	19 29.6	+53.4	27.6	51
52	14 07.5	+51.7	26.2	15 01.4	+51.9	26.3	15 55.1	+52.2	26.4	16 48.8	+52.5	26.5	17 42.5	+52.6	26.7	18 36.1	+52.9	26.8	19 29.6	+53.1	27.0	20 23.0	+53.4	27.1	52
53	14 59.2	+51.7	25.6	15 53.3	+51.9	25.8	16 47.3	+52.1	25.9	17 41.3	+52.3	26.0	18 35.1	+52.6	26.2	19 29.0	+52.8	26.3	20 22.7	+53.0	26.5	21 16.4	+53.2	26.7	53
54	15 50.9	+51.5	25.1	16 45.2	+51.8	25.2	17 39.4	+52.0	25.4	18 33.6	+52.2	25.5	19 27.7	+52.5	25.7	20 21.8	+52.7	25.8	21 15.7	+53.0	26.0	22 09.6	+53.2	26.2	54
55	16 42.4	+51.5	24.6	17 37.0	+51.7	24.7	18 31.4	+52.0	24.8	19 25.8	+52.2	25.0	20 20.2	+52.4	25.1	21 14.5	+52.6	25.3	22 08.7	+52.8	25.5	23 02.8	+53.1	25.7	55
56	17 33.9	+51.4	24.0	18 28.7	+51.6	24.2	19 23.4	+51.8	24.3	20 18.0	+52.1	24.5	21 12.6	+52.3	24.6	22 07.1	+52.5	24.8	23 01.5	+52.8	25.0	23 55.9	+53.0	25.2	56
57	18 25.3	+51.4	23.5	19 20.3	+51.5	23.6	20 15.2	+51.7	23.8	21 10.1	+51.9	23.9	22 04.9	+52.2	24.1	22 59.6	+52.4	24.3	23 54.3	+52.6	24.4	24 48.9	+52.8	24.6	57
58	19 16.6	+51.1	23.0	20 11.8	+51.4	23.1	21 06.9	+51.7	23.2	22 02.0	+51.9	23.4	22 57.1	+52.0	23.6	23 52.0	+52.3	23.7	24 46.9	+52.5	23.9	25 41.7	+52.8	24.1	58
59	20 07.7	+51.1	22.4	21 03.2	+51.3	22.5	21 58.6	+51.5	22.7	22 53.9	+51.7	22.9	23 49.1	+52.0	23.0	24 44.3	+52.2	23.2	25 39.4	+52.3	23.4	26 34.5	+52.6	23.6	59
60	20 58.8	+51.0	21.8	21 54.5	+51.2	22.0	22 50.1	+51.4	22.1	23 45.6	+51.7	22.3	24 41.1	+51.9	22.5	25 36.5	+52.1	22.7	26 31.9	+52.2	22.8	27 27.1	+52.5	23.0	60
61	21 49.8	+50.8	21.3	22 45.7	+51.0	21.4	23 41.5	+51.3	21.6	24 37.3	+51.5	21.7	25 33.0	+51.7	21.9	26 28.6	+51.9	22.1	27 24.1	+52.2	22.3	28 19.6	+52.4	22.5	61
62	22 40.6	+50.8	20.7	23 36.7	+51.0	20.8	24 32.8	+51.1	21.0	25 28.8	+51.3	21.2	26 24.7	+51.6	21.4	27 20.5	+51.7	21.5	28 16.3	+52.0	21.7	29 12.0	+52.2	21.9	62
63	23 31.4	+50.6	20.1	24 27.7	+50.8	20.3	25 23.9	+51.1	20.4	26 20.1	+51.3	20.6	27 16.3	+51.4	20.8	28 12.3	+51.7	21.0	29 08.3	+51.9	21.2	30 04.2	+52.1	21.4	63
64	24 22.0	+50.4	19.5	25 18.5	+50.7	19.7	26 15.0	+50.8	19.8	27 11.4	+51.0	20.0	28 07.7	+51.3	20.2	29 04.0	+51.5	20.4	30 00.2	+51.7	20.6	30 56.3	+51.9	20.8	64
65	25 12.4	+50.3	18.9	26 09.2	+50.5	19.1	27 05.8	+50.7	19.3	28 02.4	+51.0	19.4	28 59.0	+51.1	19.6	29 55.5	+51.3	19.8	30 51.9	+51.5	20.0	31 48.2	+51.8	20.2	65
66	26 02.7	+50.2	18.3	26 59.7	+50.3	18.5	27 56.5	+50.6	18.7	28 53.4	+50.7	18.8	29 50.1	+51.0	19.0	30 46.8	+51.2	19.2	31 43.4	+51.4	19.4	32 40.0	+51.6	19.6	66
67	26 52.9	+50.0	17.7	27 50.0	+50.2	17.9	28 47.1	+50.4	18.0	29 44.1	+50.6	18.2	30 41.1	+50.8	18.4	31 38.0	+51.0	18.6	32 34.8	+51.2	18.8	33 31.6	+51.4	19.0	67
68	27 42.9	+49.7	17.1	28 40.2	+50.0	17.3	29 37.5	+50.2	17.4	30 34.7	+50.4	17.6	31 31.9	+50.6	17.8	32 29.0	+50.8	18.0	33 26.0	+51.0	18.2	34 23.0	+51.2	18.4	68
69	28 32.7	+49.7	16.5	29 30.2	+49.9	16.6	30 27.7	+50.0	16.8	31 25.1	+50.3	17.0	32 22.5	+50.4	17.1	33 19.8	+50.6	17.3	34 17.0	+50.9	17.5	35 14.2	+51.0	17.7	69
70	29 22.4	+49.5	15.8	30 20.1	+49.6	16.0	31 17.7	+49.9	16.1	32 15.4	+50.0	16.3	33 12.9	+50.2	16.5	34 10.4	+50.4	16.7	35 07.9	+50.6	16.9	36 05.2	+50.8	17.1	70
71	30 11.9	+49.2	15.2	31 09.7	+49.5	15.3	32 07.6	+49.6	15.5	33 05.4	+49.8	15.7	34 03.1	+50.0	15.8	35 00.8	+50.2	16.0	35 58.5	+50.3	16.2	36 56.0	+50.6	16.4	71
72	31 01.1	+49.1	14.5	31 59.2	+49.2	14.7	32 57.2	+49.4	14.8	33 55.2	+49.6	15.0	34 53.1	+49.8	15.2	35 51.0	+50.0	15.4	36 48.8	+50.2	15.6	37 46.6	+50.4	15.8	72
73	31 50.2	+48.8	13.8	32 48.4	+49.0	14.0	33 46.6	+49.2	14.1	34 44.8	+49.3	14.3	35 42.9	+49.5	14.5	36 41.0	+49.7	14.7	37 39.0	+49.9	14.9	38 37.0	+50.0	15.1	73
74	32 39.0	+48.6	13.1	33 37.4	+48.8	13.3	34 35.8	+49.0	13.5	35 34.1	+49.2	13.6	36 32.4	+49.3	13.8	37 30.7	+49.4	14.0	38 28.9	+49.6	14.2	39 27.0	+49.9	14.4	74
75	33 27.6	+48.4	12.4	34 26.2	+48.5	12.6	35 24.8	+48.6	12.7	36 23.3	+48.8	12.9	37 21.7	+49.0	13.1	38 20.1	+49.2	13.3	39 18.5	+49.4	13.4	40 16.9	+49.4	13.6	75
76	34 16.0	+48.1	11.7	35 14.7	+48.3	11.9	36 13.4	+48.5	12.0	37 12.1	+48.6	12.2	38 10.7	+48.8	12.3	39 09.3	+48.9	12.5	40 07.9	+49.1	12.7	41 06.4	+49.3	12.9	76
77	35 04.1	+47.9	11.0	36 03.0	+48.0	11.1	37 01.9	+48.1	11.3	38 00.7	+48.3	11.4	38 59.5	+48.4	11.6	39 58.2	+48.7	11.8	40 57.0	+48.7	11.9	41 55.7	+48.9	12.1	77
78	35 52.0	+47.6	10.3	36 51.0	+47.7	10.4	37 50.0	+47.9	10.5	38 49.0	+48.0	10.7	39 47.9	+48.2	10.8	40 46.9	+48.3	11.0	41 45.7	+48.5	11.1	42 44.6	+48.6	11.3	78
79	36 39.6	+47.3	9.5	37 38.7	+47.5	9.6	38 37.9	+47.5	9.8	39 37.0	+47.7	9.9	40 36.1	+47.8	10.1	41 35.2	+47.9	10.2	42 34.2	+48.1	10.4	43 33.2	+48.3	10.5	79
80	37 26.9	+46.9	8.7	38 26.2	+47.1	8.9	39 25.4	+47.3	9.0	40 24.7	+47.3	9.1	41 23.9	+47.5	9.3	42 23.1	+47.6	9.4	43 22.3	+47.8	9.6	44 21.5	+47.9	9.7	80
81	38 13.8	+46.7	8.1	39 13.3	+46.7	8.1	40 12.7	+46.8	8.2	41 12.0	+47.0	8.3	42 11.4	+47.1	8.4	43 10.7	+47.3	8.6	44 10.1	+47.3	8.7	45 09.4	+47.5	8.9	81
82	39 00.5	+46.3	7.1	40 00.0	+46.5	7.3	40 59.5	+46.6	7.4	41 59.0	+46.7	7.5	42 58.5	+46.8	7.6	43 58.0	+46.9	7.7	44 57.4	+47.0	7.9	45 56.9	+47.1	8.0	82
83	39 46.8	+46.0	6.3	40 46.5	+46.0	6.4	41 46.1	+46.1	6.5	42 45.7	+46.2	6.6	43 45.3	+46.3	6.7	44 44.9	+46.4	6.8	45 44.4	+46.6	7.0	46 44.0	+46.6	7.1	83
84	40 32.8	+45.6	5.6	41 32.5	+45.7	5.6	42 32.2	+45.8	5.7	43 31.9	+45.9	5.7	44 31.6	+45.9	5.8	45 31.3	+46.0	5.9	46 31.0	+46.1	6.1	47 30.6	+46.2	6.2	84
85	41 18.4	+45.2	4.6	42 18.2	+45.2	4.7	43 18.0	+45.3	4.8	44 17.8	+45.4	4.9	45 17.5	+45.5	4.9	46 17.3	+45.6	5.0	47 17.1	+45.6	5.1	48 16.8	+45.8	5.2	85
86	42 03.6	+44.8	3.7	43 03.4	+44.9	3.8	44 03.3	+44.9	3.9	45 03.2	+44.9	3.9	46 03.0	+45.0	4.0	47 02.9	+45.1	4.1	48 02.7	+45.2	4.2	49 02.6	+45.2	4.2	86
87	42 48.4	+44.3	2.8	43 48.3	+44.4	2.9	44 48.2	+44.4	2.9	45 48.1	+44.5	3.0	46 48.0	+44.5	3.0	47 48.0	+44.6	3.1	48 47.9	+44.6	3.1	49 47.8	+44.6	3.2	87
88	43 32.7	+43.9	1.9	44 32.7	+43.9	1.9	45 32.6	+44.0	2.0	46 32.6	+44.0	2.0	47 32.6	+44.0	2.1	48 32.5	+44.0	2.1	49 32.5	+44.0	2.1	50 32.4	+44.1	2.2	88
89	44 16.6	+43.4	1.0	45 16.6	+43.4	1.0	46 16.6	+43.4	1.0	47 16.6	+43.4	1.0	48 16.6	+43.4	1.0	49 16.5	+43.5	1.1	50 16.5	+43.5	1.1	51 16.5	+43.5	1.1	89
90	45 00.0	+42.9	0.0	46 00.0	+42.9	0.0	47 00.0	+42.9	0.0	48 00.0	+42.9	0.0	49 00.0	+42.9	0.0	50 00.0	+42.9	0.0	51 00.0	+42.8	0.0	52 00.0	+42.8	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 136°, 224°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	30 00.0	+48.9	125.3	29 25.2	+49.4	125.7	28 49.9	+50.0	126.2	28 14.3	+50.6	126.6	27 38.4	+51.0	127.0	27 02.0	+51.6	127.5	26 25.4	+52.0	127.9	25 48.4	+52.5	128.2	0
1	30 48.9	+48.7	124.6	30 14.6	+49.3	125.1	29 39.9	+49.9	125.5	29 04.9	+50.3	126.0	28 29.4	+50.9	126.4	27 53.6	+51.4	126.9	27 17.4	+51.9	127.3	26 40.9	+52.3	127.7	1
2	31 37.6	+48.4	123.9	31 03.9	+49.0	124.4	30 29.8	+49.6	124.9	29 55.2	+50.2	125.4	29 20.3	+50.7	125.8	28 45.0	+51.2	126.3	28 09.3	+51.7	126.7	27 33.2	+52.2	127.1	2
3	32 26.0	+48.2	123.2	31 52.9	+48.9	123.7	31 19.4	+49.4	124.2	30 45.4	+50.0	124.7	30 11.0	+50.5	125.2	29 36.2	+51.0	125.7	29 01.0	+51.6	126.1	28 25.4	+52.1	126.6	3
4	33 14.2	+48.0	122.5	32 41.8	+48.6	123.0	32 08.8	+49.2	123.6	31 35.4	+49.8	124.1	31 01.5	+50.4	124.6	30 27.2	+50.9	125.1	29 52.6	+51.4	125.6	29 17.5	+51.9	126.0	4
5	34 02.2	+47.7	121.8	33 30.4	+48.3	122.3	32 58.0	+49.0	122.9	32 25.2	+49.6	123.4	31 51.9	+50.1	124.0	31 18.1	+50.8	124.5	30 44.0	+51.2	125.0	30 09.4	+51.7	125.4	5
6	34 49.9	+47.5	121.0	34 18.7	+48.1	121.6	33 47.0	+48.7	122.2	33 14.8	+49.3	122.8	32 42.0	+50.0	123.3	32 08.9	+50.5	123.8	31 35.2	+51.1	124.4	31 01.1	+51.6	124.9	6
7	35 37.4	+47.1	120.3	35 06.8	+47.9	120.9	34 35.7	+48.5	121.5	34 04.1	+49.2	122.1	33 32.0	+49.7	122.7	32 59.4	+50.3	123.2	32 26.3	+50.9	123.7	31 52.7	+51.5	124.3	7
8	36 24.5	+46.9	119.5	35 54.7	+47.5	120.2	35 24.2	+48.3	120.8	34 53.3	+48.8	121.4	34 21.7	+49.6	122.0	33 49.7	+50.1	122.5	33 17.2	+50.7	123.1	32 44.2	+51.2	123.6	8
9	37 11.4	+46.6	118.8	36 42.2	+47.3	119.4	36 12.5	+47.9	120.1	35 42.1	+48.7	120.7	35 11.3	+49.2	121.3	34 39.8	+49.9	121.9	34 07.9	+50.5	122.5	33 35.4	+51.1	123.0	9
10	37 58.0	+46.2	118.0	37 29.5	+47.0	118.6	37 00.4	+47.7	119.3	36 30.8	+48.3	120.0	36 00.5	+49.1	120.6	35 29.7	+49.7	121.2	34 58.4	+50.2	121.8	34 26.5	+50.8	122.4	10
11	38 44.2	+45.9	117.1	38 16.5	+46.6	117.9	37 48.1	+47.4	118.5	37 19.1	+48.1	119.2	36 49.6	+48.7	119.9	36 19.4	+49.4	120.5	35 48.6	+50.1	121.1	35 17.3	+50.7	121.7	11
12	39 30.1	+45.5	116.3	39 03.1	+46.3	117.0	38 35.5	+47.0	117.8	38 07.2	+47.8	118.5	37 38.3	+48.5	119.1	37 08.8	+49.2	119.8	36 38.7	+49.8	120.5	36 08.0	+50.4	121.1	12
13	40 15.6	+45.1	115.5	39 49.4	+46.0	116.2	39 22.5	+46.8	117.0	38 55.0	+47.5	117.7	38 26.8	+48.2	118.4	37 58.0	+48.8	119.1	37 28.5	+49.5	119.8	36 58.4	+50.2	120.4	13
14	41 00.7	+44.7	114.6	40 35.4	+45.5	115.4	40 09.3	+46.3	116.1	39 42.5	+47.1	116.9	39 15.0	+47.9	117.6	38 46.8	+48.6	118.3	38 18.0	+49.3	119.0	37 48.6	+49.9	119.7	14
15	41 45.4	+44.3	113.7	41 20.9	+45.2	114.5	40 55.6	+46.0	115.3	40 29.6	+46.8	116.1	40 02.9	+47.5	116.8	39 35.4	+48.3	117.6	39 07.3	+49.0	118.3	38 38.5	+49.7	119.0	15
16	42 29.7	+43.9	112.8	42 06.1	+44.7	113.6	41 41.6	+45.7	114.5	41 16.4	+46.5	115.3	40 50.4	+47.3	116.1	40 23.7	+48.0	116.8	39 56.3	+48.7	117.6	39 28.2	+49.4	118.3	16
17	43 13.6	+43.4	111.9	42 50.8	+44.4	112.7	42 27.3	+45.2	113.6	42 02.9	+46.0	114.4	41 37.7	+46.8	115.2	41 11.7	+47.7	116.0	40 45.0	+48.4	116.8	40 17.6	+49.2	117.6	17
18	43 57.0	+43.0	110.9	43 35.2	+43.8	111.8	43 12.5	+44.7	112.7	42 48.9	+45.6	113.5	42 24.5	+46.5	114.4	41 59.4	+47.3	115.2	41 33.4	+48.1	116.0	41 06.8	+48.8	116.8	18
19	44 40.0	+42.4	109.9	44 19.0	+43.4	110.9	43 57.2	+44.3	111.8	43 34.5	+45.3	112.7	43 11.0	+46.1	113.5	42 46.7	+46.9	114.4	42 21.5	+47.7	115.2	41 55.6	+48.5	116.0	19
20	45 22.4	+41.8	108.9	45 02.4	+42.9	109.9	44 41.5	+43.9	110.8	44 19.8	+44.7	111.7	43 57.1	+45.7	112.6	43 33.6	+46.5	113.5	43 09.2	+47.4	114.4	42 44.1	+48.1	115.2	20
21	46 04.2	+41.3	107.9	45 45.3	+42.3	108.9	45 25.4	+43.3	109.9	45 04.5	+44.3	110.8	44 42.8	+45.2	111.7	44 20.1	+46.1	112.6	43 56.6	+47.0	113.5	43 32.2	+47.8	114.4	21
22	46 45.5	+40.8	106.9	46 27.6	+41.8	107.9	46 08.7	+42.8	108.9	45 48.8	+43.8	109.8	45 28.0	+44.8	110.8	45 06.2	+45.7	111.7	44 43.6	+46.5	112.7	44 20.0	+47.4	113.6	22
23	47 26.3	+40.0	105.8	47 09.4	+41.2	106.8	46 51.5	+42.3	107.8	46 32.6	+43.3	108.9	46 12.8	+44.2	109.8	45 51.9	+45.2	110.8	45 30.1	+46.2	111.8	45 07.4	+47.0	112.7	23
24	48 06.3	+39.5	104.7	47 50.6	+40.6	105.7	47 33.8	+41.7	106.8	47 15.9	+42.8	107.8	46 57.0	+43.8	108.9	46 37.1	+44.8	109.9	46 16.3	+45.6	110.9	45 54.4	+46.6	111.8	24
25	48 45.8	+38.7	103.5	48 31.2	+39.9	104.6	48 15.5	+41.0	105.7	47 58.7	+42.1	106.8	47 40.8	+43.2	107.9	47 21.9	+44.2	108.8	47 01.9	+45.3	109.9	46 41.0	+46.2	110.9	25
26	49 24.5	+38.1	102.4	49 11.1	+39.2	103.5	48 56.5	+40.4	104.6	48 40.8	+41.5	105.7	48 24.0	+42.6	106.8	48 06.1	+43.7	107.9	47 47.2	+44.6	108.9	47 27.2	+45.6	110.0	26
27	50 02.6	+37.2	101.2	49 50.3	+38.5	102.3	49 36.9	+39.7	103.5	49 22.3	+40.9	104.6	49 06.6	+42.0	105.7	48 49.8	+43.1	106.8	48 31.8	+44.2	107.9	48 12.8	+45.2	109.0	27
28	50 39.8	+36.5	99.9	50 28.8	+37.8	101.1	50 16.6	+39.0	102.3	50 03.2	+40.2	103.5	49 48.6	+41.4	104.6	49 32.9	+42.5	105.8	49 16.0	+43.6	106.9	48 58.0	+44.7	108.0	28
29	51 16.3	+35.6	98.7	51 06.6	+37.0	99.9	50 55.6	+38.3	101.1	50 43.4	+39.5	102.3	50 30.0	+40.7	103.5	50 15.4	+41.9	104.7	49 59.6	+43.0	105.8	49 42.7	+44.0	107.0	29
30	51 51.9	+34.8	97.4	51 43.6	+36.1	98.7	51 33.9	+37.5	99.9	51 22.9	+38.8	101.1	51 10.7	+40.0	102.4	50 57.3	+41.2	103.6	50 42.6	+42.4	104.8	50 26.7	+43.5	105.9	30
31	52 26.7	+33.9	96.1	52 19.7	+35.3	97.4	52 11.4	+36.6	98.6	52 01.7	+37.9	99.9	51 50.7	+39.3	101.2	51 38.5	+40.5	102.4	51 25.0	+41.7	103.6	51 10.2	+42.9	104.8	31
32	53 00.6	+32.8	94.7	52 55.0	+34.3	96.0	52 48.0	+35.7	97.3	52 39.6	+37.2	98.6	52 30.0	+38.4	99.9	52 19.0	+39.7	101.2	52 06.7	+41.0	102.5	51 53.1	+42.2	103.7	32
33	53 33.4	+31.9	93.3	53 29.3	+33.4	94.7	53 23.7	+34.8	96.0	53 16.8	+36.2	97.3	53 08.4	+37.6	98.7	52 58.7	+39.0	100.0	52 47.7	+40.2	101.3	52 35.3	+41.5	102.5	33
34	54 05.3	+30.9	91.9	54 02.7	+32.3	93.2	53 58.5	+33.9	94.6	53 53.0	+35.3	96.0	53 46.0	+36.8	97.3	53 37.7	+38.1	98.7	53 27.9	+39.5	100.0	53 16.8	+40.7	101.4	34
35	54 36.2	+29.7	90.4	54 35.0	+31.3	91.8	54 32.4	+32.8	93.2	54 28.3	+34.3	94.6	54 22.8	+35.8	96.0	54 15.8	+37.2	97.4	54 07.4	+38.6	98.8	53 57.5	+40.0	100.1	35
36	55 05.9	+28.6	88.9	55 06.3	+30.2	90.3	55 05.2	+31.8	91.8	55 02.6	+33.4	93.2	54 58.6	+34.8	94.6	54 53.0	+36.3	96.0	54 46.0	+37.7	97.4	54 37.5	+39.1	98.8	36
37	55 34.5	+27.4	87.3	55 36.5	+29.0	88.8	55 37.0	+30.7	90.3	55 36.0	+32.2	91.7	55 33.4	+33.8	93.2	55 29.3	+35.3	94.6	55 23.7	+36.8	96.1	55 16.6	+38.3	97.5	37
38	56 01.9	+26.1	85.8	56 05.5	+27.9	87.2	56 07.7	+29.4	88.7	56 08.2	+31.1	90.2	56 07.2	+32.7	91.7	56 04.6	+34.3	93.2	56 00.5	+35.8	94.7	55 54.9	+37.3	96.2	38
39	56 28.0	+24.9	84.1	56 33.4	+26.5	85.6	56 37.1	+28.3	87.2	56 39.3	+30.0	88.7	56 39.9	+31.6	90.2	56 38.9	+33.2	91.7	56 36.3	+34.8	93.2	56 32.2	+36.3	94.7	39
40	56 52.9	+23.5	82.5	56 59.9	+25.3	84.0	57 05.4	+27.0	85.5	57 09.3	+28.7	87.1	57 11.5	+30.4	88.6	57 12.1	+32.1	90.2	57 11.1	+33.7	91.7	57 08.5	+35.3	93.3	40
41	57 16.4	+22.1	80.8	57 25.2	+23.9	82.3	57 32.4	+25.7	83.9	57 38.0	+27.4	85.5	57 41.9	+29.1	87.1	57 44.2	+30.8	88.6	57 44.8	+32.5	90.2	57 43.8	+34.1	91.8	41
42	57 38.5	+20.7	79.1	57 49.1	+22.5	80.6	57 58.1	+24.2	82.2	58 05.4	+26.1	83.8	58 11.0	+27.9	85.4	58 15.0	+29.6	87.0	58 17.3	+31.4	88.6	58 17.9	+33.0	90.2	42
43	57 59.2	+19.2	77.3	58 11.6	+21.0	78.9	58 22.3	+22.9	80.5	58 31.5	+24.6	82.1	58 38.9	+26.5	83.7	58 44.6	+28.3	85.3	58 48.7	+30.0	87.0	58 50.9	+31.8	88.6	43
44	58 18.4	+17.6	75.5	58 32.6	+19.5	77.1	58 45.2	+21.3	78.7	58 56.1	+23.2	80.3	59 05.4	+25.0	82.0	59 12.9	+26.9	83.6	59 18.7	+28.7	85.3	59 22.7	+30.5	87.0	44
45	58 36.0	+16.1	73.7	58 52.1	+17.9	75.3	59 06.5	+19.8	76.9	59 19.3	+21.7	78.5	59 30.4	+23.6	80.2	59 39.8	+25.4	81.9	59 47.4	+27.3	83.6	59 53.2	+29.2	85.3	45
46	58 52.1	+14.4	71.8	59 10.0	+16.3	73.4	59 26.3	+18.2	75.0	59 41.0	+20.1	76.7	59 54.0	+22.0	78.4	60 05.2	+23.9	80.1	60 14.7	+25.8	81.8	60 22.4	+27.7	83.5	46
47	59 06.5	+12.6	69.9	59 26.3	+14.7	71.5	59 44.5	+16.6	73.1	60 01.1	+18.5	74.8	60 16.0	+20.4	76.5	60 29.1	+22.4	78.2	60 40.5	+24.3	79.9	60 50.1	+26.2	81.7	47
48	59 19.3	+11.1	68.0	59 41.0	+13.0	69.6	60 01.1	+14.9	71.2	60 19.6	+16.8	72.9	60 36.4	+18.7	74.6	60 51.5	+20.7	76.3	61 04.8	+22.7	78.1	61 16.3	+24.6	79.9	48
49	59 30.4	+9.4	66.1	59 54.0	+11.2	67.7	60 16.0	+13.1	69.3	60 36.4	+15.1	70.9	60 55.1	+17.1	72.6	61 12.2	+19.0	74.4	61 27.5	+21.0	76.1	61 40.9	+23.0	77.9	49
50	59 39.8	+7.6	64.1	60 05.2	+9.5	65.7	60 29.1	+11.4	67.3	60 51.5	+13.3	69.0	61 12.2	+15.3	70.7	61 31.2	+17.3	72.4	61 48.5	+19.2	74.2	62 03.9	+21.3	76.0	50
51	59 47.4	+5.8	62.2	60 14.7	+7.7	63.7	60 40.5	+9.6	65.3	61 04.8	+11.5	67.0	61 27.5	+13.4	68.6	61 48.5	+15.4	70.4	62 07.7	+17.5	72.2	62 25.2	+19.5	74.0	51
52	59 53.2	+4.1	60.2	60 22.4	+5.8	61.7	60 50.1	+7.7	63.3	61 16.3	+9.6	64.9	61 40.9	+11.6	66.6	62 03.9	+13.6	68.3	62 25.2	+15.6	70.1	62 44.7	+17.7	71.9	52
53	59 57.3	+2.2	58.2	60 28.2	+4.0	59.7	60 57.8	+5.9	61.3	61 25.9	+7.8	62.9	61 52.5	+9.7	64.5	62 17.5	+11.7	66.2	62 40.8	+13.8	68.0	63 02.4	+15.8	69.8	53
54	59 59.5	+0.4	56.2	60 32.2	+2.2	57.7	61 03.7	+3.9	59.2	61 33.7	+5.8	60.8	62 02.2	+7.8	62.4	62 29.2	+9.7	64.1	62 54.6	+11.7•	65.9	63 18.2	+13.9•	67.7	54
55	59 59.9	−1.3	54.2	60 34.4	+0.3	55.6	61 07.6	+2.1	57.1	61 39.5	+3.9	58.7	62 10.0	+5.8•	60.3	62 38.9	+7.8	62.0	63 06.3	+9.8•	63.7	63 32.1	+11.8•	65.5	55
56	59 58.6	−3.2	52.2	60 34.7	−1.5	53.6	61 09.7	+0.2	55.1	61 43.4	+2.0	56.6	62 15.8	+3.8	58.2	62 46.7	+5.8•	59.8	63 16.1	+7.7•	61.5	63 43.9	+9.8•	63.3	56
57	59 55.4	−5.0	50.2	60 33.2	−3.4	51.6	61 09.9	−1.7	53.0	61 45.4	0.0	54.5	62 19.6	+1.9•	56.0	62 52.5	+3.7•	57.6	63 23.8	+5.7•	59.3	63 53.7	+7.6•	61.1	57
58	59 50.4	−6.8	48.2	60 29.8	−5.2	49.5	61 08.2	−3.6	50.9	61 45.4	−1.9	52.4	62 21.5	−0.2•	53.9	62 56.2	+1.7•	55.4	63 29.5	+3.6•	57.1	64 01.3	+5.6•	58.8	58
59	59 43.6	−8.6	46.3	60 24.6	−7.1	47.5	61 04.6	−5.5	48.9	61 43.5	−3.8	50.2	62 21.3	−2.1•	51.7	62 57.9	−0.4•	53.2	63 33.1	+1.5•	54.9	64 06.9	+3.4•	56.5	59
60	59 35.0	−10.2	44.3	60 17.5	−8.8	45.5	60 59.1	−7.4	46.8	61 39.7	−5.8	48.1	62 19.2	−4.2•	49.6	62 57.5	−2.4•	51.0	63 34.6	−0.7•	52.6	64 10.3	+1.3•	54.2	60
61	59 24.8	−12.0	42.4	60 08.7	−10.6	43.5	60 51.7	−9.1	44.8	61 33.9	−7.7	46.0	62 15.0	−6.1	47.4	62 55.1	−4.5•	48.8	63 33.9	−2.7•	50.4	64 11.6	−0.9•	51.9	61
62	59 12.8	−13.7	40.4	59 58.1	−12.4	41.6	60 42.6	−11.1	42.7	61 26.2	−9.6	44.0	62 08.9	−8.1	45.3	62 50.6	−6.5•	46.7	63 31.2	−4.8•	48.1	64 10.7	−3.1•	49.7	62
63	58 59.1	−15.3	38.5	59 45.7	−14.1	39.6	60 31.5	−12.8	40.7	61 16.6	−11.4	41.9	62 00.8	−10.0	43.2	62 44.1	−8.5	44.5	63 26.4	−6.9•	45.9	64 07.6	−5.2•	47.4	63
64	58 43.8	−16.9	36.7	59 31.6	−15.8	37.7	60 18.7	−14.5	38.7	61 05.2	−13.3	39.9	61 50.8	−11.9	41.1	62 35.6	−10.4	42.3	63 19.5	−8.9•	43.7	64 02.4	−7.3•	45.1	64
65	58 26.9	−18.5	34.8	59 15.8	−17.3	35.8	60 04.2	−16.2	36.8	60 51.9	−15.0	37.9	61 38.9	−13.7	39.0	62 25.2	−12.4	40.2	63 10.6	−11.0•	41.5	63 55.1	−9.5•	42.8	65
66	58 08.4	−20.0	33.0	58 58.5	−19.0	33.9	59 48.0	−17.9	34.9	60 36.9	−16.7	35.9	61 25.2	−15.6	37.0	62 12.8	−14.3	38.1	62 59.6	−12.9	39.3	63 45.6	−11.5•	40.6	66
67	57 48.4	−21.4	31.2	58 39.5	−20.5	32.1	59 30.1	−19.5	33.0	60 20.2	−18.5	33.9	61 09.6	−17.3	34.9	61 58.5	−16.1	36.0	62 46.7	−14.9	37.2	63 34.1	−13.5•	38.4	67
68	57 27.0	−22.9	29.5	58 19.0	−22.0	30.3	59 10.6	−21.0	31.1	60 01.7	−20.1	32.0	60 52.3	−19.0	33.0	61 42.4	−17.9	34.0	62 31.8	−16.7	35.0	63 20.6	−15.5	36.2	68
69	57 04.1	−24.2	27.8	57 57.0	−23.4	28.5	58 49.6	−22.6	29.3	59 41.7	−21.7	30.1	60 33.3	−20.6	31.0	61 24.5	−19.7	32.0	62 15.1	−18.5	33.0	63 05.1	−17.4	34.0	69
70	56 39.9	−25.5	26.1	57 33.6	−24.8	26.8	58 27.0	−24.0	27.5	59 20.0	−23.1	28.3	60 12.7	−22.3	29.1	61 04.8	−21.3	30.0	61 56.6	−20.4	30.9	62 47.7	−19.2	31.9	70
71	56 14.4	−26.8	24.5	57 08.8	−26.1	25.1	58 03.0	−25.4	25.8	58 56.9	−24.6	26.5	59 50.4	−23.8	27.3	60 43.5	−22.9	28.1	61 36.2	−22.0	29.0	62 28.5	−21.0	29.9	71
72	55 47.6	−28.1	22.9	56 42.7	−27.4	23.5	57 37.6	−26.7	24.1	58 32.3	−26.1	24.7	59 26.6	−25.3	25.5	60 20.6	−24.5	26.2	61 14.2	−23.6	27.0	62 07.5	−22.7	27.9	72
73	55 19.5	−29.2	21.3	56 15.3	−28.6	21.8	57 10.9	−28.0	22.4	58 06.2	−27.3	23.0	59 01.3	−26.7	23.7	59 56.1	−25.9	24.4	60 50.6	−25.2	25.1	61 44.8	−24.4	25.9	73
74	54 50.3	−30.3	19.8	55 46.7	−29.8	20.3	56 42.9	−29.3	20.8	57 38.9	−28.7	21.4	58 34.6	−28.0	22.0	59 30.2	−27.4	22.6	60 25.4	−26.7	23.3	61 20.4	−26.0	24.0	74
75	54 20.0	−31.4	18.3	55 16.9	−30.9	18.7	56 13.6	−30.4	19.2	57 10.2	−29.9	19.7	58 06.6	−29.4	20.3	59 02.8	−28.8	20.8	59 58.7	−28.1	21.5	60 54.4	−27.4	22.1	75
76	53 48.6	−32.4	16.8	54 46.0	−32.0	17.2	55 43.2	−31.6	17.7	56 40.3	−31.1	18.1	57 37.2	−30.6	18.6	58 34.0	−30.1	19.1	59 30.6	−29.5	19.7	60 27.0	−28.9	20.3	76
77	53 16.2	−33.4	15.4	54 14.0	−33.1	15.8	55 11.6	−32.6	16.2	56 09.2	−32.2	16.6	57 06.6	−31.7	17.0	58 03.9	−31.3	17.5	59 01.1	−30.8	18.0	59 58.1	−30.3	18.5	77
78	52 42.8	−34.4	14.0	53 40.9	−34.0	14.4	54 39.0	−33.8	14.7	55 37.0	−33.3	15.1	56 34.9	−32.9	15.5	57 32.6	−32.4	15.9	58 30.3	−32.1	16.3	59 27.8	−31.6	16.8	78
79	52 08.4	−35.2	12.7	53 06.9	−34.9	13.0	54 05.4	−34.7	13.3	55 03.7	−34.3	13.6	56 02.0	−34.0	14.0	57 00.2	−33.6	14.3	57 58.2	−33.2	14.7	58 56.2	−32.8	15.2	79
80	51 33.2	−36.1	11.4	52 32.0	−35.8	11.6	53 30.7	−35.5	11.9	54 29.4	−35.3	12.2	55 28.0	−35.0	12.5	56 26.6	−34.7	12.8	57 25.0	−34.3	13.2	58 23.4	−34.0	13.5	80
81	50 57.1	−36.9	10.1	51 56.2	−36.7	10.3	52 55.2	−36.5	10.6	53 54.1	−36.3	10.8	54 53.0	−35.9	11.1	55 51.9	−35.7	11.4	56 50.7	−35.4	11.7	57 49.4	−35.1	12.0	81
82	50 20.2	−37.7	8.9	51 19.5	−37.5	9.1	52 18.7	−37.3	9.3	53 17.9	−37.1	9.5	54 17.1	−36.9	9.7	55 16.2	−36.6	9.9	56 15.3	−36.4	10.2	57 14.3	−36.2	10.5	82
83	49 42.5	−38.4	7.7	50 42.0	−38.3	7.8	51 41.4	−38.1	8.0	52 40.8	−37.9	8.2	53 40.2	−37.7	8.4	54 39.6	−37.6	8.6	55 38.9	−37.4	8.8	56 38.1	−37.1	9.0	83
84	49 04.1	−39.1	6.5	50 03.7	−39.0	6.6	51 03.3	−38.8	6.8	52 02.9	−38.7	6.9	53 02.5	−38.4	7.0	54 02.0	−38.4	7.2	55 01.5	−38.3	7.4	56 01.0	−38.1	7.6	84
85	48 25.0	−39.8	5.3	49 24.7	−39.6	5.4	50 24.5	−39.6	5.5	51 24.2	−39.5	5.7	52 23.9	−39.4	5.8	53 23.6	−39.3	5.9	54 23.2	−39.1	6.1	55 22.9	−39.0	6.2	85
86	47 45.2	−40.4	4.2	48 45.1	−40.4	4.3	49 44.9	−40.3	4.4	50 44.7	−40.2	4.5	51 44.5	−40.1	4.6	52 44.3	−40.0	4.7	53 44.1	−39.9	4.8	54 43.9	−39.8	4.9	86
87	47 04.8	−41.0	3.2	48 04.7	−41.0	3.2	49 04.6	−40.9	3.3	50 04.5	−40.9	3.4	51 04.4	−40.8	3.4	52 04.3	−40.7	3.5	53 04.2	−40.7	3.5	54 04.1	−40.6	3.6	87
88	46 23.8	−41.6	2.1	47 23.7	−41.5	2.1	48 23.7	−41.6	2.1	49 23.6	−41.5	2.2	50 23.6	−41.5	2.2	51 23.6	−41.5	2.3	52 23.5	−41.4	2.3	53 23.5	−41.4	2.4	88
89	45 42.2	−42.2	1.0	46 42.2	−42.2	1.0	47 42.1	−42.1	1.1	48 42.1	−42.1	1.1	49 42.1	−42.1	1.1	50 42.1	−42.1	1.1	51 42.1	−42.1	1.1	52 42.1	−42.1	1.2	89
90	45 00.0	−42.7	0.0	46 00.0	−42.7	0.0	47 00.0	−42.7	0.0	48 00.0	−42.7	0.0	49 00.0	−42.7	0.0	50 00.0	−42.7	0.0	51 00.0	−42.7	0.0	52 00.0	−42.8	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	30 00.0	−49.1	125.3	29 25.2	−49.7	125.7	28 49.9	−50.1	126.2	28 14.3	−50.7	126.6	27 38.4	−51.2	127.0	27 02.0	−51.6	127.5	26 25.4	−52.1	127.9	25 48.4	−52.6	128.2	0
1	29 10.9	−49.3	125.9	28 35.5	−49.8	126.4	27 59.8	−50.3	126.8	27 23.6	−50.8	127.2	26 47.2	−51.4	127.6	26 10.4	−51.8	128.0	25 33.3	−52.3	128.4	24 55.8	−52.7	128.8	1
2	28 21.6	−49.4	126.6	27 45.7	−50.0	127.0	27 09.4	−50.5	127.4	26 32.8	−51.0	127.8	25 55.8	−51.4	128.2	25 18.6	−52.0	128.6	24 41.0	−52.4	128.9	24 03.1	−52.8	129.3	2
3	27 32.2	−49.7	127.2	26 55.7	−50.1	127.6	26 18.9	−50.6	128.0	25 41.8	−51.1	128.4	25 04.4	−51.6	128.8	24 26.6	−52.0	129.1	23 48.6	−52.5	129.8	23 10.3	−52.8	129.8	3
4	26 42.5	−49.8	127.8	26 05.6	−50.4	128.2	25 28.3	−50.8	128.6	24 50.7	−51.3	129.0	24 12.8	−51.7	129.3	23 34.6	−52.0	129.7	22 56.2	−52.6	130.0	22 17.5	−53.0	130.3	4
5	25 52.7	−49.9	128.5	25 15.2	−50.4	128.8	24 37.5	−51.0	129.2	23 59.4	−51.4	129.6	23 21.1	−51.9	129.9	22 42.4	−52.2	130.2	22 03.6	−52.7	130.5	21 24.5	−53.1	130.8	5
6	25 02.8	−50.1	129.1	24 24.8	−50.6	129.4	23 46.5	−51.0	129.8	23 08.0	−51.5	130.1	22 29.2	−51.9	130.4	21 50.2	−52.4	130.7	21 10.9	−52.8	131.0	20 31.4	−53.2	131.3	6
7	24 12.7	−50.3	129.7	23 34.2	−50.7	130.0	22 55.5	−51.2	130.4	22 16.5	−51.6	130.7	21 37.3	−52.1	131.0	20 57.8	−52.4	131.3	20 18.1	−52.8	131.6	19 38.2	−53.2	131.8	7
8	23 22.4	−50.4	130.3	22 43.5	−50.9	130.6	22 04.3	−51.3	130.9	21 24.9	−51.7	131.2	20 45.2	−52.1	131.5	20 05.4	−52.6	131.8	19 25.3	−53.0	132.1	18 45.0	−53.3	132.3	8
9	22 32.0	−50.5	130.9	21 52.6	−50.9	131.2	21 13.0	−51.4	131.5	20 33.2	−51.9	131.8	19 53.1	−52.2	132.0	19 12.8	−52.6	132.3	18 32.3	−53.0	132.6	17 51.7	−53.4	132.8	9
10	21 41.5	−50.6	131.5	21 01.7	−51.1	131.8	20 21.6	−51.5	132.0	19 41.3	−51.9	132.3	19 00.9	−52.4	132.6	18 20.2	−52.7	132.8	17 39.3	−53.1	133.0	16 58.3	−53.5	133.3	10
11	20 50.9	−50.8	132.0	20 10.6	−51.2	132.3	19 30.1	−51.6	132.6	18 49.4	−52.0	132.8	18 08.5	−52.4	133.1	17 27.5	−52.9	133.3	16 46.2	−53.1	133.5	16 04.8	−53.5	133.7	11
12	20 00.1	−50.8	132.6	19 19.4	−51.3	132.9	18 38.5	−51.7	133.1	17 57.4	−52.1	133.4	17 16.1	−52.5	133.6	16 34.7	−52.9	133.8	15 53.1	−53.3	134.0	15 11.3	−53.6	134.2	12
13	19 09.3	−51.0	133.2	18 28.1	−51.3	133.4	17 46.8	−51.8	133.7	17 05.3	−52.2	133.9	16 23.6	−52.5	134.1	15 41.8	−52.9	134.3	14 59.8	−53.3	134.5	14 17.7	−53.6	134.7	13
14	18 18.3	−51.0	133.7	17 36.8	−51.5	134.0	16 55.0	−51.8	134.2	16 13.1	−52.3	134.4	15 31.1	−52.6	134.6	14 48.9	−53.0	134.8	14 06.5	−53.3	135.0	13 24.1	−53.7	135.1	14
15	17 27.3	−51.2	134.3	16 45.3	−51.5	134.5	16 03.2	−52.0	134.7	15 20.9	−52.3	134.9	14 38.5	−52.7	135.1	13 55.9	−53.0	135.3	13 13.2	−53.4	135.4	12 30.4	−53.7	135.6	15
16	16 36.1	−51.2	134.8	15 53.8	−51.7	135.0	15 11.2	−52.0	135.2	14 28.6	−52.4	135.4	13 45.8	−52.8	135.6	13 02.9	−53.1	135.8	12 19.8	−53.5	135.9	11 36.7	−53.8	136.1	16
17	15 44.9	−51.3	135.4	15 02.1	−51.7	135.6	14 19.2	−52.0	135.7	13 36.2	−52.4	135.9	12 53.0	−52.8	136.1	12 09.8	−53.2	136.2	11 26.4	−53.5	136.4	10 42.9	−53.8	136.5	17
18	14 53.6	−51.4	135.9	14 10.4	−51.7	136.1	13 27.2	−52.2	136.3	12 43.8	−52.5	136.4	12 00.2	−52.8	136.6	11 16.6	−53.2	136.7	10 32.9	−53.5	136.8	9 49.1	−53.9	137.0	18
19	14 02.2	−51.4	136.4	13 18.7	−51.8	136.6	12 35.0	−52.2	136.8	11 51.3	−52.6	136.9	11 07.4	−52.9	137.0	10 23.4	−53.2	137.2	9 39.4	−53.6	137.3	8 55.2	−53.9	137.4	19
20	13 10.8	−51.5	137.0	12 26.9	−51.9	137.1	11 42.8	−52.2	137.3	10 58.7	−52.6	137.4	10 14.5	−52.9	137.5	9 30.2	−53.3	137.6	8 45.8	−53.6	137.8	8 01.4	−53.9	137.9	20
21	12 19.3	−51.6	137.5	11 35.0	−52.0	137.6	10 50.6	−52.3	137.8	10 06.1	−52.6	137.9	9 21.6	−53.0	138.0	8 36.9	−53.3	138.1	7 52.2	−53.6	138.2	7 07.5	−54.0	138.3	21
22	11 27.7	−51.7	138.0	10 43.0	−52.0	138.1	9 58.3	−52.3	138.3	9 13.5	−52.7	138.4	8 28.6	−53.0	138.5	7 43.6	−53.3	138.6	6 58.6	−53.6	138.7	6 13.5	−53.9	138.7	22
23	10 36.0	−51.6	138.5	9 51.0	−52.0	138.7	9 06.0	−52.4	138.8	8 20.8	−52.7	138.9	7 35.6	−53.1	139.0	6 50.3	−53.4	139.0	6 05.0	−53.7	139.1	5 19.6	−54.0	139.2	23
24	9 44.4	−51.8	139.0	8 59.0	−52.1	139.2	8 13.6	−52.4	139.3	7 28.1	−52.7	139.3	6 42.5	−53.0	139.4	5 56.9	−53.3	139.5	5 11.3	−53.7	139.6	4 25.6	−54.0	139.6	24
25	8 52.6	−51.7	139.6	8 06.9	−52.1	139.7	7 21.2	−52.5	139.7	6 35.4	−52.8	139.8	5 49.5	−53.1	139.9	5 03.6	−53.4	140.0	4 17.6	−53.7	140.0	3 31.6	−54.0	140.1	25
26	8 00.9	−51.8	140.1	7 14.8	−52.1	140.2	6 28.7	−52.4	140.2	5 42.6	−52.8	140.3	4 56.4	−53.1	140.4	4 10.2	−53.4	140.4	3 23.9	−53.7	140.5	2 37.6	−54.0	140.5	26
27	7 09.1	−51.9	140.6	6 22.7	−52.2	140.7	5 36.3	−52.5	140.7	4 49.8	−52.8	140.8	4 03.3	−53.1	140.8	3 16.8	−53.5	140.9	2 30.2	−53.7	140.9	1 43.6	−54.0	140.9	27
28	6 17.2	−51.9	141.1	5 30.5	−52.2	141.2	4 43.8	−52.6	141.2	3 57.0	−52.9	141.3	3 10.2	−53.2	141.3	2 23.3	−53.4	141.3	1 36.5	−53.8	141.3	0 49.6	−54.0	141.3	28
29	5 25.3	−51.9	141.6	4 38.3	−52.2	141.6	3 51.2	−52.5	141.7	3 04.1	−52.8	141.7	2 17.0	−53.1	141.8	1 29.9	−53.4	141.8	0 42.7	−53.7	141.8	0 04.4	+54.0	38.2	29
30	4 33.4	−51.9	142.1	3 46.1	−52.2	142.1	2 58.7	−52.5	142.2	2 11.3	−52.9	142.2	1 23.9	−53.2	142.2	0 36.5	−53.5	142.2	0 11.0	+53.7	37.8	0 58.4	+54.0	37.8	30
31	3 41.5	−51.9	142.6	2 53.9	−52.3	142.6	2 06.2	−52.6	142.7	1 18.4	−52.8	142.7	0 30.7	−53.1	142.7	0 17.0	+53.4	37.3	1 04.7	+53.7	37.3	1 52.4	+54.0	37.3	31
32	2 49.6	−51.9	143.1	2 01.6	−52.2	143.1	1 13.6	−52.6	143.1	0 25.6	−52.9	143.2	0 22.4	+53.2	36.8	1 10.4	+53.5	36.9	1 58.4	+53.8	36.9	2 46.4	+54.0	36.9	32
33	1 57.7	−52.0	143.6	1 09.4	−52.3	143.6	0 21.0	−52.5	143.6	0 27.3	+52.8	36.4	1 15.6	+53.1	36.4	2 03.9	+53.4	36.4	2 52.2	+53.7	36.4	3 40.4	+54.0	36.5	33
34	1 05.7	−52.0	144.1	0 17.1	−52.3	144.1	0 31.5	+52.5	35.9	1 20.1	+52.9	35.9	2 08.7	+53.2	35.9	2 57.3	+53.4	35.9	3 45.9	+53.7	36.0	4 34.4	+54.0	36.0	34
35	0 13.7	−51.9	144.6	0 35.2	+52.2	35.4	1 24.1	+52.5	35.4	2 13.0	+52.8	35.4	3 01.9	+53.1	35.5	3 50.7	+53.4	35.5	4 39.6	+53.6	35.5	5 28.4	+53.9	35.6	35
36	0 38.2	+52.0	34.9	1 27.4	+52.3	34.9	2 16.6	+52.6	34.9	3 05.8	+52.8	35.0	3 55.0	+53.1	35.0	4 44.1	+53.4	35.0	5 33.2	+53.7	35.1	6 22.3	+54.0	35.1	36
37	1 30.2	+51.9	34.4	2 19.7	+52.3	34.4	3 09.2	+52.5	34.4	3 58.6	+52.9	34.5	4 48.1	+53.1	34.5	5 37.5	+53.4	34.6	6 26.9	+53.6	34.6	7 16.3	+53.9	34.7	37
38	2 22.1	+52.0	33.9	3 11.9	+52.3	33.9	4 01.7	+52.5	34.0	4 51.5	+52.8	34.0	5 41.2	+53.1	34.1	6 30.9	+53.3	34.1	7 20.5	+53.6	34.2	8 10.2	+53.8	34.3	38
39	3 14.1	+51.9	33.4	4 04.2	+52.2	33.4	4 54.2	+52.5	33.5	5 44.3	+52.7	33.5	6 34.3	+53.0	33.6	7 24.2	+53.3	33.7	8 14.1	+53.6	33.7	9 04.0	+53.9	33.8	39
40	4 06.0	+51.9	32.9	4 56.4	+52.2	32.9	5 46.7	+52.5	33.0	6 37.0	+52.8	33.0	7 27.3	+53.0	33.1	8 17.5	+53.3	33.2	9 07.7	+53.6	33.3	9 57.9	+53.8	33.4	40
41	4 57.9	+51.9	32.4	5 48.6	+52.1	32.4	6 39.2	+52.4	32.5	7 29.8	+52.7	32.6	8 20.3	+53.0	32.6	9 10.8	+53.3	32.7	10 01.3	+53.5	32.8	10 51.7	+53.7	32.9	41
42	5 49.8	+51.8	31.9	6 40.7	+52.2	31.9	7 31.6	+52.4	32.0	8 22.5	+52.7	32.1	9 13.3	+52.9	32.2	10 04.1	+53.2	32.3	10 54.8	+53.4	32.4	11 45.4	+53.7	32.5	42
43	6 41.6	+51.9	31.4	7 32.9	+52.1	31.4	8 24.0	+52.4	31.5	9 15.2	+52.6	31.6	10 06.2	+52.9	31.7	10 57.3	+53.1	31.8	11 48.2	+53.5	31.9	12 39.1	+53.7	32.0	43
44	7 33.5	+51.8	30.9	8 25.0	+52.0	30.9	9 16.4	+52.3	31.0	10 07.8	+52.6	31.1	10 59.1	+52.9	31.2	11 50.4	+53.1	31.3	12 41.7	+53.3	31.4	13 32.8	+53.6	31.5	44
45	8 25.3	+51.7	30.4	9 17.0	+52.0	30.4	10 08.7	+52.3	30.5	11 00.4	+52.5	30.6	11 51.9	+52.8	30.7	12 43.5	+53.1	30.8	13 35.0	+53.3	31.0	14 26.4	+53.6	31.1	45
46	9 17.0	+51.7	29.8	10 09.0	+52.0	29.9	11 01.0	+52.2	30.0	11 52.9	+52.5	30.1	12 44.8	+52.7	30.2	13 36.6	+53.0	30.4	14 28.3	+53.3	30.5	15 20.0	+53.5	30.6	46
47	10 08.7	+51.7	29.3	11 01.0	+51.9	29.4	11 53.2	+52.2	29.5	12 45.4	+52.5	29.6	13 37.5	+52.7	29.7	14 29.6	+52.9	29.9	15 21.6	+53.2	30.0	16 13.5	+53.5	30.1	47
48	11 00.4	+51.6	28.8	11 52.9	+51.9	28.9	12 45.4	+52.1	29.0	13 37.9	+52.3	29.1	14 30.2	+52.7	29.3	15 22.5	+52.9	29.4	16 14.8	+53.1	29.5	17 07.0	+53.3	29.7	48
49	11 52.0	+51.5	28.3	12 44.8	+51.8	28.4	13 37.5	+52.1	28.5	14 30.2	+52.3	28.6	15 22.9	+52.5	28.8	16 15.4	+52.8	28.9	17 07.9	+53.1	29.0	18 00.3	+53.4	29.2	49
50	12 43.5	+51.5	27.8	13 36.6	+51.7	27.9	14 29.6	+52.0	28.0	15 22.5	+52.2	28.1	16 15.4	+52.5	28.3	17 08.2	+52.8	28.4	18 01.0	+53.0	28.6	18 53.7	+53.2	28.7	50
51	13 35.0	+51.4	27.2	14 28.3	+51.7	27.4	15 21.6	+51.9	27.5	16 14.8	+52.2	27.6	17 07.9	+52.4	27.8	18 01.0	+52.7	27.9	18 54.0	+52.9	28.1	19 46.9	+53.1	28.2	51
52	14 26.4	+51.4	26.7	15 20.0	+51.6	26.8	16 13.5	+51.9	27.0	17 07.0	+52.1	27.1	18 00.3	+52.4	27.2	18 53.7	+52.5	27.4	19 46.9	+52.8	27.6	20 40.0	+53.1	27.7	52
53	15 17.8	+51.3	26.2	16 11.6	+51.5	26.3	17 05.4	+51.7	26.4	17 59.1	+52.0	26.6	18 52.7	+52.2	26.7	19 46.2	+52.5	26.9	20 39.7	+52.7	27.1	21 33.1	+53.0	27.2	53
54	16 09.1	+51.1	25.6	17 03.1	+51.5	25.8	17 57.1	+51.7	25.9	18 51.1	+51.9	26.1	19 44.9	+52.2	26.2	20 38.7	+52.4	26.4	21 32.4	+52.7	26.5	22 26.1	+52.9	26.7	54
55	17 00.2	+51.1	25.1	17 54.6	+51.3	25.2	18 48.8	+51.6	25.4	19 43.0	+51.8	25.5	20 37.1	+52.0	25.7	21 31.1	+52.3	25.8	22 25.1	+52.5	26.0	23 19.0	+52.7	26.2	55
56	17 51.3	+51.1	24.5	18 45.9	+51.2	24.7	19 40.4	+51.5	24.8	20 34.8	+51.7	25.0	21 29.1	+52.0	25.1	22 23.4	+52.1	25.3	23 17.6	+52.5	25.5	24 11.7	+52.7	25.7	56
57	18 42.4	+50.9	24.0	19 37.1	+51.2	24.1	20 31.9	+51.4	24.3	21 26.5	+51.6	24.4	22 21.1	+51.9	24.6	23 15.6	+52.1	24.8	24 10.1	+52.3	25.0	25 04.4	+52.6	25.2	57
58	19 33.3	+50.8	23.4	20 28.3	+51.0	23.6	21 23.2	+51.3	23.7	22 18.1	+51.5	23.9	23 13.0	+51.7	24.1	24 07.7	+52.0	24.2	25 02.4	+52.2	24.4	25 57.0	+52.4	24.6	58
59	20 24.1	+50.7	22.9	21 19.3	+50.9	23.0	22 14.5	+51.2	23.2	23 09.6	+51.4	23.3	24 04.7	+51.6	23.5	24 59.7	+51.8	23.7	25 54.6	+52.1	23.9	26 49.4	+52.3	24.1	59
60	21 14.8	+50.5	22.3	22 10.2	+50.8	22.4	23 05.7	+51.0	22.6	24 01.0	+51.3	22.8	24 56.3	+51.5	22.9	25 51.5	+51.7	23.1	26 46.7	+51.9	23.3	27 41.7	+52.2	23.5	60
61	22 05.3	+50.5	21.7	23 01.0	+50.7	21.9	23 56.7	+50.9	22.0	24 52.3	+51.1	22.2	25 47.8	+51.4	22.4	26 43.2	+51.6	22.6	27 38.6	+51.8	22.8	28 33.9	+52.0	23.0	61
62	22 55.8	+50.3	21.1	23 51.7	+50.6	21.3	24 47.6	+50.8	21.4	25 43.4	+51.0	21.6	26 39.2	+51.2	21.8	27 34.8	+51.5	22.0	28 30.4	+51.7	22.2	29 25.9	+51.9	22.4	62
63	23 46.1	+50.2	20.5	24 42.3	+50.4	20.7	25 38.4	+50.6	20.9	26 34.4	+50.8	21.0	27 30.4	+51.0	21.2	28 26.3	+51.2	21.4	29 22.1	+51.5	21.6	30 17.8	+51.8	21.8	63
64	24 36.3	+50.0	19.9	25 32.7	+50.2	20.1	26 29.0	+50.5	20.3	27 25.2	+50.7	20.4	28 21.4	+50.9	20.6	29 17.5	+51.2	20.8	30 13.6	+51.3	21.0	31 09.6	+51.5	21.2	64
65	25 26.3	+49.9	19.3	26 22.9	+50.1	19.5	27 19.5	+50.3	19.7	28 15.9	+50.6	19.8	29 12.3	+50.8	20.0	30 08.7	+50.9	20.2	31 04.9	+51.2	20.4	32 01.1	+51.4	20.6	65
66	26 16.2	+49.7	18.7	27 13.0	+50.0	18.9	28 09.8	+50.1	19.0	29 06.5	+50.3	19.2	30 03.1	+50.5	19.4	30 59.6	+50.8	19.6	31 56.1	+51.0	19.8	32 52.5	+51.2	20.0	66
67	27 05.9	+49.6	18.1	28 03.0	+49.7	18.2	28 59.9	+50.0	18.4	29 56.8	+50.2	18.6	30 53.6	+50.4	18.8	31 50.4	+50.6	19.0	32 47.1	+50.8	19.2	33 43.7	+51.1	19.4	67
68	27 55.5	+49.4	17.4	28 52.7	+49.6	17.6	29 49.9	+49.8	17.8	30 47.0	+50.0	18.0	31 44.0	+50.2	18.1	32 41.0	+50.4	18.3	33 37.9	+50.6	18.5	34 34.8	+50.8	18.8	68
69	28 44.9	+49.2	16.8	29 42.3	+49.4	17.0	30 39.7	+49.5	17.1	31 37.0	+49.7	17.3	32 34.2	+50.0	17.5	33 31.4	+50.2	17.7	34 28.5	+50.4	17.9	35 25.6	+50.6	18.1	69
70	29 34.1	+49.0	16.1	30 31.7	+49.2	16.3	31 29.2	+49.4	16.5	32 26.7	+49.6	16.7	33 24.2	+49.8	16.8	34 21.6	+50.0	17.0	35 18.9	+50.2	17.2	36 16.2	+50.4	17.5	70
71	30 23.1	+48.8	15.5	31 20.9	+48.9	15.6	32 18.6	+49.2	15.8	33 16.3	+49.4	16.0	34 14.0	+49.5	16.2	35 11.6	+49.7	16.4	36 09.1	+50.0	16.6	37 06.6	+50.1	16.8	71
72	31 11.9	+48.5	14.8	32 09.8	+48.8	15.0	33 07.8	+48.9	15.1	34 05.7	+49.1	15.3	35 03.5	+49.3	15.5	36 01.3	+49.5	15.7	36 59.1	+49.7	15.9	37 56.7	+50.0	16.1	72
73	32 00.4	+48.4	14.1	32 58.6	+48.5	14.3	33 56.7	+48.7	14.4	34 54.8	+48.9	14.6	35 52.8	+49.1	14.8	36 50.8	+49.3	15.0	37 48.8	+49.6	15.2	38 46.7	+49.6	15.4	73
74	32 48.8	+48.1	13.4	33 47.1	+48.3	13.5	34 45.4	+48.5	13.7	35 43.7	+48.6	13.9	36 41.9	+48.8	14.1	37 40.1	+49.0	14.3	38 38.2	+49.2	14.4	39 36.3	+49.4	14.7	74
75	33 36.9	+47.8	12.7	34 35.4	+48.0	12.8	35 33.9	+48.2	13.0	36 32.3	+48.4	13.2	37 30.7	+48.5	13.3	38 29.1	+48.7	13.5	39 27.4	+48.9	13.7	40 25.7	+49.0	13.9	75
76	34 24.7	+47.6	12.0	35 23.4	+47.8	12.1	36 22.1	+47.9	12.3	37 20.7	+48.0	12.4	38 19.2	+48.3	12.6	39 17.8	+48.4	12.8	40 16.3	+48.6	13.0	41 14.7	+48.8	13.2	76
77	35 12.3	+47.3	11.2	36 11.2	+47.4	11.4	37 10.0	+47.6	11.5	38 07.7	+47.8	11.7	39 07.5	+47.9	11.8	40 06.2	+48.1	12.0	41 04.9	+48.2	12.2	42 03.5	+48.4	12.4	77
78	35 59.6	+47.1	10.5	36 58.6	+47.2	10.6	37 57.6	+47.3	10.7	38 56.5	+47.5	10.9	39 55.4	+47.6	11.1	40 54.3	+47.8	11.2	41 53.1	+48.0	11.4	42 51.9	+48.1	11.6	78
79	36 46.7	+46.7	9.7	37 45.8	+46.8	9.8	38 44.9	+47.0	10.0	39 44.0	+47.1	10.1	40 43.0	+47.3	10.3	41 42.1	+47.4	10.4	42 41.1	+47.5	10.6	43 40.0	+47.8	10.7	79
80	37 33.4	+46.4	8.9	38 32.6	+46.6	9.0	39 31.9	+46.6	9.2	40 31.1	+46.8	9.3	41 30.3	+46.9	9.4	42 29.5	+47.0	9.6	43 28.6	+47.2	9.7	44 27.8	+47.3	9.9	80
81	38 19.8	+46.0	8.1	39 19.2	+46.1	8.2	40 18.5	+46.3	8.3	41 17.9	+46.4	8.5	42 17.2	+46.5	8.6	43 16.5	+46.7	8.7	44 15.8	+46.8	8.9	45 15.1	+47.0	9.0	81
82	39 05.8	+45.7	7.3	40 05.3	+45.9	7.4	41 04.8	+46.0	7.5	42 04.3	+46.1	7.6	43 03.8	+46.1	7.7	44 03.2	+46.3	7.9	45 02.6	+46.4	8.0	46 02.1	+46.5	8.1	82
83	39 51.5	+45.4	6.4	40 51.2	+45.4	6.5	41 50.8	+45.5	6.6	42 50.4	+45.6	6.7	43 49.9	+45.8	6.9	44 49.5	+45.8	7.0	45 49.0	+46.0	7.1	46 48.6	+46.0	7.2	83
84	40 36.9	+44.9	5.6	41 36.6	+45.0	5.7	42 36.3	+45.1	5.8	43 36.0	+45.2	5.9	44 35.7	+45.3	6.0	45 35.3	+45.4	6.1	46 35.0	+45.5	6.2	47 34.6	+45.6	6.3	84
85	41 21.8	+44.6	4.7	42 21.6	+44.6	4.8	43 21.4	+44.7	4.9	44 21.2	+44.7	4.9	45 21.0	+44.8	5.0	46 20.7	+44.9	5.1	47 20.5	+45.0	5.2	48 20.2	+45.1	5.3	85
86	42 06.4	+44.1	3.8	43 06.2	+44.2	3.9	44 06.1	+44.2	3.9	45 05.9	+44.3	4.0	46 05.8	+44.3	4.1	47 05.6	+44.5	4.2	48 05.5	+44.5	4.2	49 05.3	+44.6	4.3	86
87	42 50.5	+43.6	2.9	43 50.4	+43.7	2.9	44 50.3	+43.8	3.0	45 50.2	+43.9	3.0	46 50.1	+43.9	3.1	47 50.1	+43.9	3.1	48 50.0	+43.9	3.2	49 49.9	+44.0	3.3	87
88	43 34.1	+43.2	2.0	44 34.1	+43.2	2.0	45 34.1	+43.2	2.0	46 34.0	+43.3	2.1	47 34.0	+43.3	2.1	48 33.9	+43.4	2.1	49 33.9	+43.4	2.2	50 33.9	+43.3	2.2	88
89	44 17.3	+42.7	1.0	45 17.3	+42.7	1.0	46 17.3	+42.7	1.0	47 17.3	+42.7	1.0	48 17.3	+42.7	1.1	49 17.3	+42.7	1.1	50 17.3	+42.7	1.1	51 17.2	+42.8	1.1	89
90	45 00.0	+42.2	0.0	46 00.0	+42.2	0.0	47 00.0	+42.1	0.0	48 00.0	+42.1	0.0	49 00.0	+42.1	0.0	50 00.0	+42.1	0.0	51 00.0	+42.1	0.0	52 00.0	+42.1	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION **L.H.A. 135°, 225°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	29 25.2	+48.6	124.3	28 51.1	+49.2	124.8	28 16.7	+49.7	125.2	27 41.9	+50.3	125.7	27 06.7	+50.8	126.1	26 31.2	+51.3	126.5	25 55.4	+51.8	126.9	25 19.2	+52.2	127.3	0
1	30 13.8	+48.4	123.7	29 40.3	+49.0	124.1	29 06.4	+49.6	124.6	28 32.2	+50.1	125.0	27 57.5	+50.7	125.5	27 22.5	+51.2	125.9	26 47.2	+51.6	126.3	26 11.4	+52.2	126.7	1
2	31 02.2	+48.1	123.0	30 29.3	+48.8	123.5	29 56.0	+49.4	123.9	29 22.3	+49.9	124.4	28 48.2	+50.4	124.9	28 13.7	+51.0	125.3	27 38.8	+51.5	125.8	27 03.6	+52.0	126.2	2
3	31 50.3	+48.0	122.3	31 18.1	+48.5	122.8	30 45.4	+49.1	123.3	30 12.2	+49.7	123.8	29 38.6	+50.3	124.3	29 04.7	+50.8	124.7	28 30.3	+51.4	125.2	27 55.6	+51.8	125.6	3
4	32 38.3	+47.7	121.6	32 06.6	+48.4	122.1	31 34.5	+49.0	122.6	31 01.9	+49.6	123.1	30 28.9	+50.1	123.6	29 55.5	+50.7	124.1	29 21.7	+51.1	124.6	28 47.4	+51.7	125.0	4
5	33 26.0	+47.4	120.8	32 55.0	+48.0	121.4	32 23.5	+48.7	121.9	31 51.5	+49.3	122.5	31 19.0	+50.0	123.0	30 46.2	+50.4	123.5	30 12.8	+51.1	124.0	29 39.1	+51.5	124.5	5
6	34 13.4	+47.2	120.1	33 43.0	+47.9	120.7	33 12.2	+48.5	121.2	32 40.8	+49.1	121.8	32 09.0	+49.7	122.3	31 36.6	+50.3	122.9	31 03.9	+50.8	123.4	30 30.6	+51.4	123.9	6
7	35 00.6	+46.8	119.3	34 30.9	+47.6	119.9	34 00.7	+48.2	120.5	33 29.9	+48.9	121.1	32 58.7	+49.5	121.7	32 26.9	+50.1	122.2	31 54.7	+50.7	122.7	31 22.0	+51.2	123.3	7
8	35 47.4	+46.6	118.6	35 18.5	+47.3	119.2	34 48.9	+48.0	119.8	34 18.8	+48.6	120.4	33 48.2	+49.2	121.0	33 17.0	+49.9	121.6	32 45.4	+50.4	122.1	32 13.2	+51.1	122.6	8
9	36 34.0	+46.3	117.8	36 05.8	+47.0	118.4	35 36.9	+47.7	119.1	35 07.4	+48.4	119.7	34 37.4	+49.1	120.3	34 06.9	+49.7	120.9	33 35.8	+50.3	121.5	33 04.3	+50.8	122.0	9
10	37 20.3	+46.0	117.0	36 52.8	+46.7	117.7	36 24.6	+47.4	118.3	35 55.8	+48.1	119.0	35 26.5	+48.8	119.6	34 56.6	+49.4	120.2	34 26.1	+50.0	120.8	33 55.1	+50.7	121.4	10
11	38 06.3	+45.6	116.2	37 39.5	+46.3	116.9	37 12.0	+47.1	117.6	36 43.9	+47.9	118.2	36 15.3	+48.5	118.9	35 46.0	+49.2	119.5	35 16.1	+49.9	120.1	34 45.8	+50.4	120.7	11
12	38 51.9	+45.2	115.4	38 25.8	+46.1	116.1	37 59.1	+46.8	116.8	37 31.8	+47.5	117.5	37 03.8	+48.2	118.1	36 35.2	+48.9	118.8	36 06.0	+49.5	119.4	35 36.2	+50.2	120.1	12
13	39 37.1	+44.9	114.5	39 11.9	+45.6	115.3	38 45.9	+46.5	116.0	38 19.3	+47.2	116.7	37 52.0	+48.0	117.4	37 24.1	+48.6	118.1	36 55.5	+49.4	118.7	36 26.4	+50.0	119.4	13
14	40 22.0	+44.4	113.6	39 57.5	+45.4	114.4	39 32.4	+46.1	115.2	39 06.5	+46.9	115.9	38 40.0	+47.6	116.6	38 12.7	+48.4	117.3	37 44.9	+49.0	118.0	37 16.4	+49.7	118.7	14
15	41 06.4	+44.1	112.8	40 42.9	+44.9	113.6	40 18.5	+45.8	114.3	39 53.4	+46.6	115.1	39 27.6	+47.3	115.8	39 01.1	+48.1	116.6	38 33.9	+48.8	117.3	38 06.1	+49.4	118.0	15
16	41 50.5	+43.6	111.8	41 27.8	+44.5	112.6	41 04.3	+45.3	113.5	40 40.0	+46.2	114.3	40 14.9	+47.0	115.0	39 49.2	+47.7	115.8	39 22.7	+48.5	116.5	38 55.5	+49.2	117.3	16
17	42 34.1	+43.2	110.9	42 12.3	+44.0	111.8	41 49.6	+45.0	112.6	41 26.2	+45.8	113.4	41 01.9	+46.6	114.2	40 36.9	+47.4	115.0	40 11.2	+48.2	115.8	39 44.7	+48.9	116.5	17
18	43 17.3	+42.7	110.0	42 56.3	+43.7	110.9	42 34.6	+44.5	111.7	42 12.0	+45.4	112.6	41 48.5	+46.3	113.4	41 24.3	+47.1	114.2	40 59.4	+47.8	115.0	40 33.6	+48.6	115.8	18
19	44 00.0	+42.1	109.0	43 40.0	+43.1	109.9	43 19.1	+44.1	110.8	42 57.4	+44.9	111.7	42 34.8	+45.8	112.5	42 11.4	+46.7	113.4	41 47.2	+47.5	114.2	41 22.2	+48.3	115.0	19
20	44 42.1	+41.7	108.0	44 23.1	+42.6	108.9	44 03.2	+43.6	109.9	43 43.3	+44.6	110.8	43 20.6	+45.5	111.6	42 58.1	+46.3	112.5	42 34.7	+47.1	113.4	42 10.5	+47.9	114.2	20
21	45 23.8	+41.0	107.0	45 05.7	+42.2	108.0	44 46.8	+43.1	108.9	44 26.9	+44.1	109.8	44 06.1	+45.0	110.7	43 44.4	+45.9	111.6	43 21.8	+46.8	112.5	42 58.4	+47.6	113.4	21
22	46 04.8	+40.5	105.9	45 47.9	+41.5	106.9	45 29.9	+42.6	107.9	45 11.0	+43.5	108.9	44 51.1	+44.5	109.8	44 30.3	+45.5	110.7	44 08.6	+46.3	111.7	43 46.0	+47.2	112.5	22
23	46 45.3	+39.9	104.9	46 29.4	+41.0	105.8	46 12.5	+42.0	106.9	45 54.5	+43.1	107.9	45 35.6	+44.1	108.9	45 15.8	+45.0	109.8	44 54.9	+46.0	110.8	44 33.2	+46.8	111.7	23
24	47 25.2	+39.3	103.8	47 10.4	+40.4	104.8	46 54.5	+41.5	105.9	46 37.6	+42.5	106.9	46 19.7	+43.5	107.9	46 00.8	+44.5	108.9	45 40.9	+45.4	109.8	45 20.0	+46.4	110.8	24
25	48 04.5	+38.5	102.7	47 50.8	+39.7	103.7	47 36.0	+40.8	104.8	47 20.1	+42.0	105.8	47 03.2	+43.0	106.9	46 45.3	+44.0	107.9	46 26.3	+45.0	108.9	46 06.4	+45.9	109.9	25
26	48 43.0	+37.9	101.5	48 30.5	+39.0	102.6	48 16.8	+40.3	103.7	48 02.1	+41.3	104.8	47 46.2	+42.5	105.9	47 29.3	+43.5	106.9	47 11.3	+44.5	107.9	46 52.3	+45.5	109.0	26
27	49 20.9	+37.1	100.3	49 09.5	+38.4	101.5	48 57.1	+39.5	102.6	48 43.4	+40.7	103.7	48 28.7	+41.8	104.8	48 12.8	+42.9	105.9	47 55.8	+44.0	106.9	47 37.8	+45.0	108.0	27
28	49 58.0	+36.3	99.1	49 47.9	+37.6	100.3	49 36.6	+38.8	101.4	49 24.1	+40.1	102.6	49 10.5	+41.2	103.7	48 55.7	+42.3	104.8	48 39.8	+43.4	105.9	48 22.8	+44.4	107.0	28
29	50 34.3	+35.5	97.9	50 25.5	+36.8	99.1	50 15.4	+38.1	100.2	50 04.2	+39.3	101.4	49 51.7	+40.5	102.6	49 38.0	+41.7	103.7	49 23.2	+42.8	104.9	49 07.2	+43.9	106.0	29
30	51 09.8	+34.7	96.6	51 02.3	+36.0	97.8	50 53.5	+37.4	99.0	50 43.5	+38.6	100.2	50 32.2	+39.8	101.4	50 19.7	+41.0	102.6	50 06.0	+42.2	103.8	49 51.1	+43.3	104.9	30
31	51 44.5	+33.8	95.3	51 38.3	+35.2	96.5	51 30.9	+36.5	97.8	51 22.1	+37.8	99.0	51 12.0	+39.1	100.2	51 00.7	+40.4	101.5	50 48.2	+41.5	102.7	50 34.4	+42.7	103.9	31
32	52 18.3	+32.8	93.9	52 13.5	+34.2	95.2	52 07.4	+35.6	96.5	51 59.9	+37.0	97.8	51 51.1	+38.4	99.0	51 41.1	+39.6	100.3	51 29.7	+40.9	101.5	51 17.1	+42.1	102.7	32
33	52 51.1	+31.8	92.5	52 47.7	+33.3	93.9	52 43.0	+34.7	95.2	52 36.9	+36.1	96.5	52 29.5	+37.5	97.8	52 20.7	+38.8	99.1	52 10.6	+40.1	100.3	51 59.2	+41.3	101.6	33
34	53 22.9	+30.8	91.1	53 21.0	+32.3	92.5	53 17.7	+33.8	93.8	53 13.0	+35.3	95.2	53 07.0	+36.6	96.5	52 59.5	+38.0	97.8	52 50.7	+39.3	99.1	52 40.5	+40.6	100.4	34
35	53 53.7	+29.8	89.7	53 53.3	+31.3	91.1	53 51.5	+32.8	92.4	53 48.3	+34.2	93.8	53 43.6	+35.7	95.2	53 37.5	+37.1	96.5	53 30.0	+38.5	97.9	53 21.1	+39.8	99.2	35
36	54 23.5	+28.6	88.2	54 24.6	+30.2	89.6	54 24.3	+31.8	91.0	54 22.5	+33.3	92.4	54 19.3	+34.8	93.8	54 14.6	+36.2	95.2	54 08.5	+37.6	96.6	54 00.9	+39.0	97.9	36
37	54 52.1	+27.5	86.7	54 54.8	+29.1	88.1	54 56.1	+30.7	89.5	54 55.8	+32.3	91.0	54 54.1	+33.7	92.4	54 50.8	+35.3	93.8	54 46.1	+36.8	95.2	54 39.9	+38.2	96.6	37
38	55 19.6	+26.3	85.1	55 23.9	+27.9	86.6	55 26.8	+29.5	88.0	55 28.1	+31.1	89.5	55 27.8	+32.8	90.9	55 26.1	+34.3	92.4	55 22.9	+35.7	93.8	55 18.1	+37.2	95.3	38
39	55 45.9	+25.0	83.5	55 51.8	+26.7	85.0	55 56.3	+28.3	86.5	55 59.2	+30.0	88.0	56 00.6	+31.6	89.4	56 00.4	+33.2	90.9	55 58.6	+34.8	92.4	55 55.3	+36.3	93.9	39
40	56 10.9	+23.6	81.9	56 18.5	+25.4	83.4	56 24.6	+27.1	84.9	56 29.2	+28.8	86.4	56 32.2	+30.4	87.9	56 33.6	+32.0	89.4	56 33.4	+33.6	90.9	56 31.6	+35.2	92.5	40
41	56 34.5	+22.4	80.3	56 43.9	+24.1	81.8	56 51.7	+25.9	83.3	56 58.0	+27.5	84.8	57 02.6	+29.2	86.3	57 05.6	+30.9	87.9	57 07.0	+32.6	89.4	57 06.8	+34.2	91.0	41
42	56 56.9	+20.9	78.6	57 08.0	+22.7	80.1	57 17.6	+24.4	81.6	57 25.5	+26.2	83.2	57 31.8	+28.0	84.7	57 36.5	+29.7	86.3	57 39.6	+31.4	87.9	57 41.0	+33.0	89.4	42
43	57 17.8	+19.5	76.8	57 30.7	+21.3	78.4	57 42.0	+23.1	79.9	57 51.7	+24.9	81.5	57 59.8	+26.6	83.1	58 06.2	+28.4	84.7	58 11.0	+30.1	86.3	58 14.0	+31.9	87.9	43
44	57 37.3	+18.0	75.1	57 52.0	+19.8	76.6	58 05.1	+21.6	78.2	58 16.6	+23.4	79.8	58 26.4	+25.3	81.4	58 34.6	+27.0	83.0	58 41.1	+28.8	84.6	58 45.9	+30.5	86.3	44
45	57 55.3	+16.5	73.3	58 11.8	+18.3	74.8	58 26.7	+20.1	76.4	58 40.0	+22.0	78.0	58 51.7	+23.8	79.6	59 01.6	+25.7	81.3	59 09.9	+27.4	82.9	59 16.4	+29.3	84.6	45
46	58 11.8	+14.9	71.5	58 30.1	+16.7	73.0	58 46.8	+18.6	74.6	59 02.0	+20.4	76.2	59 15.5	+22.3	77.8	59 27.3	+24.1	79.5	59 37.3	+26.1	81.2	59 45.7	+27.8	82.9	46
47	58 26.7	+13.3	69.6	58 46.8	+15.2	71.2	59 05.4	+17.0	72.8	59 22.4	+18.9	74.4	59 37.8	+20.7	76.0	59 51.4	+22.6	77.7	60 03.4	+24.5	79.4	60 13.5	+26.4	81.1	47
48	58 40.0	+11.7	67.8	59 02.0	+13.5	69.3	59 22.4	+15.4	70.9	59 41.3	+17.2	72.5	59 58.5	+19.1	74.1	60 14.0	+21.1	75.8	60 27.9	+22.9	77.5	60 39.9	+24.9	79.3	48
49	58 51.7	+9.9	65.9	59 15.5	+11.8	67.4	59 37.8	+13.6	69.0	59 58.5	+15.5	70.6	60 17.6	+17.5	72.2	60 35.1	+19.4	73.9	60 50.8	+21.4	75.6	61 04.8	+23.3	77.4	49
50	59 01.6	+8.3	64.0	59 27.3	+10.0	65.5	59 51.4	+12.0	67.0	60 14.0	+13.9	68.6	60 35.1	+15.7	70.3	60 54.5	+17.7	72.0	61 12.2	+19.6	73.7	61 28.1	+21.6	75.5	50
51	59 09.9	+6.5	62.0	59 37.3	+8.4	63.5	60 03.4	+10.1	65.1	60 27.9	+12.0	66.7	60 50.8	+14.0	68.3	61 12.2	+15.9	70.0	61 31.8	+17.9	71.7	61 49.7	+20.0	73.5	51
52	59 16.4	+4.8	60.1	59 45.7	+6.6	61.6	60 13.5	+8.4	63.1	60 39.9	+10.3	64.7	61 04.8	+12.2	66.3	61 28.1	+14.1	68.0	61 49.7	+16.2	69.7	62 09.7	+18.1	71.5	52
53	59 21.2	+3.1	58.1	59 52.3	+4.7	59.6	60 21.9	+6.6	61.1	60 50.2	+8.5	62.7	61 17.0	+10.3	64.3	61 42.2	+12.3	66.0	62 05.9	+14.2	67.7	62 27.8	+16.3	69.5	53
54	59 24.3	+1.2	56.2	59 57.0	+3.0	57.6	60 28.5	+4.8	59.1	60 58.7	+6.5	60.6	61 27.3	+8.5	62.2	61 54.5	+10.4	63.9	62 20.1	+12.4	65.6	62 44.1	+14.4	67.4	54
55	59 25.5	−0.5	54.2	60 00.0	+1.2	55.6	60 33.3	+2.9	57.1	61 05.2	+4.7	58.6	61 35.8	+6.6	60.2	62 04.9	+8.5	61.8	62 32.5	+10.4	63.5	62 58.5	+12.4	65.2	55
56	59 25.0	−2.3	52.2	60 01.2	−0.7	53.6	60 36.2	+1.0	55.0	61 09.9	+2.8	56.5	61 42.4	+4.6	58.1	62 13.4	+6.5•	59.7	62 42.9	+8.5•	61.3	63 10.9	+10.5•	63.1	56
57	59 22.7	−4.0	50.3	60 00.5	−2.4	51.6	60 37.2	−0.8	53.0	61 12.7	+1.0	54.4	61 47.0	+2.7	56.0	62 19.9	+4.5	57.5	62 51.4	+6.4•	59.2	63 21.4	+8.4•	60.9	57
58	59 18.7	−5.8	48.3	59 58.1	−4.3	49.6	60 36.4	−2.6	51.0	61 13.7	−1.0•	52.4	61 49.7	+0.7	53.8	62 24.4	+2.6•	55.4	62 57.8	+4.4•	57.0	63 29.8	+6.3•	58.7	58
59	59 12.9	−7.5	46.4	59 53.8	−6.0	47.6	60 33.8	−4.5	48.9	61 12.7	−3.0	50.3	61 50.4	−1.2	51.7	62 27.0	+0.5•	53.2	63 02.2	+2.4•	54.8	63 36.1	+4.3•	56.4	59
60	59 05.4	−9.3	44.4	59 47.8	−7.9	45.6	60 29.3	−6.4	46.9	61 09.7	−4.7	48.2	61 49.2	−3.2	49.6	62 27.5	−1.5•	51.1	63 04.6	+0.3•	52.6	63 40.4	+2.1•	54.2	60
61	58 56.1	−10.9	42.5	59 39.9	−9.5	43.7	60 22.9	−8.2	44.9	61 05.0	−6.7	46.2	61 46.0	−5.1	47.5	62 26.0	−3.5	48.9	63 04.9	−1.8•	50.4	63 42.5	0.0•	51.9	61
62	58 45.2	−12.6	40.6	59 30.4	−11.3	41.7	60 14.7	−9.9	42.9	60 58.3	−8.6	44.1	61 40.9	−7.0	45.4	62 22.5	−5.4•	46.7	63 03.1	−3.8•	48.2	63 42.5	−2.1•	49.7	62
63	58 32.6	−14.2	38.7	59 19.1	−13.0	39.8	60 04.8	−11.7	40.9	60 49.7	−10.3	42.1	61 33.9	−9.0	43.3	62 17.1	−7.5•	44.6	62 59.3	−5.9•	46.0	63 40.4	−4.2•	47.4	63
64	58 18.4	−15.8	36.9	59 06.1	−14.7	37.9	59 53.1	−13.5	38.9	60 39.4	−12.2	40.1	61 24.9	−10.8	41.2	62 09.6	−9.4	42.5	62 53.4	−7.9•	43.8	63 36.2	−6.3•	45.2	64
65	58 02.6	−17.4	35.1	58 51.4	−16.3	36.0	59 39.6	−15.2	37.0	60 27.2	−13.9	38.1	61 14.1	−12.6	39.2	62 00.2	−11.3	40.4	62 45.5	−9.9	41.6	63 29.9	−8.4•	42.9	65
66	57 45.2	−18.8	33.3	58 35.1	−17.8	34.1	59 24.5	−16.8	35.1	60 13.3	−15.6	36.1	61 01.5	−14.5	37.2	61 48.9	−13.1	38.3	62 35.6	−11.8	39.5	63 21.5	−10.4•	40.7	66
67	57 26.4	−20.4	31.5	58 17.3	−19.4	32.3	59 07.7	−18.3	33.2	59 57.7	−17.3	34.2	60 47.0	−16.2	35.2	61 35.8	−15.0	36.2	62 23.8	−13.7	37.3	63 11.1	−12.4	38.5	67
68	57 06.0	−21.7	29.7	57 57.9	−20.8	30.5	58 49.4	−20.0	31.4	59 40.4	−19.0	32.3	60 30.8	−17.8	33.2	61 20.8	−16.8	34.2	62 10.1	−15.6	35.3	62 58.7	−14.3	36.4	68
69	56 44.3	−23.1	28.0	57 37.1	−22.3	28.8	58 29.4	−21.4	29.6	59 21.4	−20.5	30.4	60 13.0	−19.6	31.3	61 04.0	−18.5	32.2	61 54.5	−17.4	33.2	62 44.4	−16.3	34.3	69
70	56 21.2	−24.5	26.4	57 14.8	−23.7	27.0	58 08.0	−22.9	27.8	59 00.9	−22.0	28.5	59 53.4	−21.1	29.4	60 45.5	−20.2	30.2	61 37.1	−19.2	31.2	62 28.1	−18.1	32.2	70
71	55 56.7	−25.7	24.7	56 51.1	−25.1	25.4	57 45.1	−24.3	26.0	58 38.9	−23.5	26.8	59 32.3	−22.7	27.5	60 25.3	−21.8	28.3	61 17.9	−20.9	29.2	62 10.0	−19.8	30.1	71
72	55 31.0	−27.0	23.1	56 26.0	−26.3	23.7	57 20.8	−25.6	24.3	58 15.4	−25.0	25.0	59 09.6	−24.2	25.7	60 03.5	−23.4	26.4	60 57.0	−22.5	27.2	61 50.2	−21.6	28.1	72
73	55 04.0	−28.1	21.5	55 59.7	−27.5	22.1	56 55.2	−26.9	22.7	57 50.4	−26.2	23.3	58 45.4	−25.6	23.9	59 40.1	−24.8	24.6	60 34.5	−24.1	25.3	61 28.6	−23.3	26.1	73
74	54 35.9	−29.3	20.0	55 32.2	−28.8	20.5	56 28.3	−28.2	21.0	57 24.2	−27.6	21.6	58 19.8	−26.9	22.2	59 15.3	−26.3	22.8	60 10.4	−25.6	23.5	61 05.3	−24.8	24.2	74
75	54 06.6	−30.4	18.5	55 03.4	−29.9	19.0	56 00.1	−29.4	19.4	56 56.6	−28.9	20.0	57 52.9	−28.3	20.5	58 49.0	−27.7	21.1	59 44.8	−27.0	21.7	60 40.5	−26.4	22.3	75
76	53 36.2	−31.4	17.1	54 33.5	−30.9	17.5	55 30.7	−30.5	17.9	56 27.7	−30.0	18.4	57 24.6	−29.6	18.8	58 21.3	−29.0	19.4	59 17.8	−28.4	19.9	60 14.1	−27.8	20.5	76
77	53 04.8	−32.4	15.6	54 02.6	−32.1	16.0	55 00.2	−31.6	16.4	55 57.7	−31.2	16.8	56 55.0	−30.7	17.2	57 52.3	−30.3	17.7	58 49.4	−29.8	18.2	59 46.3	−29.3	18.7	77
78	52 32.4	−33.4	14.2	53 30.5	−33.0	14.6	54 28.6	−32.7	14.9	55 26.5	−32.3	15.3	56 24.3	−31.9	15.7	57 22.0	−31.5	16.1	58 19.6	−31.0	16.5	59 17.0	−30.5	17.0	78
79	51 59.0	−34.2	12.9	52 57.5	−34.0	13.2	53 55.9	−33.7	13.5	54 54.2	−33.3	13.8	55 52.4	−33.0	14.2	56 50.5	−32.6	14.5	57 48.6	−32.2	14.9	58 46.5	−31.8	15.4	79
80	51 24.8	−35.2	11.6	52 23.5	−34.9	11.8	53 22.2	−34.6	12.1	54 20.9	−34.4	12.4	55 19.4	−34.0	12.7	56 17.9	−33.7	13.0	57 16.4	−33.4	13.4	58 14.7	−33.0	13.7	80
81	50 49.6	−36.0	10.3	51 48.6	−35.7	10.5	52 47.6	−35.5	10.7	53 46.5	−35.2	11.0	54 45.4	−35.0	11.2	55 44.2	−34.7	11.5	56 43.0	−34.5	11.8	57 41.7	−34.2	12.2	81
82	50 13.6	−36.8	9.0	51 12.9	−36.6	9.2	52 12.1	−36.4	9.4	53 11.3	−36.2	9.6	54 10.4	−36.0	9.8	55 09.5	−35.7	10.1	56 08.5	−35.4	10.4	57 07.5	−35.2	10.6	82
83	49 36.8	−37.5	7.8	50 36.3	−37.4	7.9	51 35.7	−37.2	8.1	52 35.1	−37.1	8.3	53 34.4	−36.8	8.5	54 33.8	−36.7	8.7	55 33.1	−36.5	8.9	56 32.3	−36.2	9.1	83
84	48 59.3	−38.3	6.6	49 58.9	−38.1	6.7	50 58.5	−38.0	6.9	51 58.0	−37.9	7.0	52 57.6	−37.7	7.2	53 57.1	−37.5	7.3	54 56.6	−37.4	7.5	55 56.1	−37.2	7.7	84
85	48 21.0	−38.9	5.4	49 20.8	−38.9	5.5	50 20.5	−38.8	5.6	51 20.2	−38.6	5.8	52 19.9	−38.5	5.9	53 19.6	−38.4	6.0	54 19.2	−38.2	6.2	55 18.9	−38.2	6.3	85
86	47 42.1	−39.6	4.3	48 41.9	−39.5	4.4	49 41.7	−39.4	4.4	50 41.6	−39.4	4.5	51 41.4	−39.3	4.6	52 41.2	−39.2	4.7	53 41.0	−39.1	4.9	54 40.7	−39.0	5.0	86
87	47 02.5	−40.3	3.2	48 02.4	−40.2	3.2	49 02.3	−40.1	3.3	50 02.2	−40.1	3.4	51 02.1	−40.0	3.4	52 02.0	−40.0	3.5	53 01.9	−39.9	3.6	54 01.7	−39.8	3.7	87
88	46 22.2	−40.8	2.1	47 22.2	−40.8	2.1	48 22.2	−40.8	2.2	49 22.1	−40.7	2.2	50 22.1	−40.7	2.3	51 22.0	−40.6	2.3	52 22.0	−40.7	2.4	53 21.9	−40.6	2.4	88
89	45 41.4	−41.4	1.0	46 41.4	−41.4	1.0	47 41.4	−41.4	1.1	48 41.4	−41.4	1.1	49 41.4	−41.4	1.1	50 41.4	−41.4	1.1	51 41.3	−41.3	1.2	52 41.3	−41.3	1.2	89
90	45 00.0	−41.9	0.0	46 00.0	−42.0	0.0	47 00.0	−42.0	0.0	48 00.0	−42.0	0.0	49 00.0	−42.0	0.0	50 00.0	−42.0	0.0	51 00.0	−42.0	0.0	52 00.0	−42.0	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 46°, 314°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	29 25.2	−48.8	124.3	28 51.1	−49.3	124.8	28 16.7	−49.9	125.2	27 41.9	−50.4	125.7	27 06.7	−50.9	126.1	26 31.2	−51.4	126.5	25 55.4	−51.9	126.9	25 19.2	−52.4	127.3	0
1	28 36.4	−49.0	125.0	28 01.8	−49.6	125.4	27 26.8	−50.1	125.9	26 51.5	−50.6	126.3	26 15.8	−51.1	126.7	25 39.8	−51.6	127.1	25 03.5	−52.1	127.4	24 26.8	−52.4	127.4	1
2	27 47.4	−49.2	125.6	27 12.2	−49.7	126.1	26 36.7	−50.2	126.5	26 00.9	−50.8	126.9	25 24.7	−51.2	127.3	24 48.2	−51.7	127.6	24 11.4	−52.1	128.0	23 34.4	−52.6	128.3	2
3	26 58.2	−49.4	126.3	26 22.5	−49.9	126.7	25 46.5	−50.4	127.1	25 10.1	−50.8	127.5	24 33.5	−51.4	127.8	23 56.5	−51.8	128.2	23 19.3	−52.3	128.5	22 41.8	−52.7	128.9	3
4	26 08.8	−49.5	126.9	25 32.6	−50.0	127.3	24 56.1	−50.5	127.7	24 19.3	−51.1	128.1	23 42.1	−51.5	128.4	23 04.7	−51.9	128.7	22 27.0	−52.3	129.1	21 49.1	−52.8	129.4	4
5	25 19.3	−49.7	127.6	24 42.6	−50.2	127.9	24 05.6	−50.7	128.3	23 28.2	−51.1	128.6	22 50.6	−51.5	129.0	22 12.8	−52.0	129.3	21 34.7	−52.5	129.6	20 56.3	−52.9	129.9	5
6	24 29.6	−49.8	128.2	23 52.4	−50.3	128.5	23 14.9	−50.8	128.9	22 37.1	−51.3	129.2	21 59.1	−51.7	129.5	21 20.8	−52.2	129.8	20 42.2	−52.5	130.1	20 03.4	−52.9	130.4	6
7	23 39.8	−50.0	128.9	23 02.1	−50.5	129.1	22 24.1	−50.9	129.4	21 45.8	−51.3	129.8	21 07.4	−51.9	130.1	20 28.6	−52.2	130.3	19 49.7	−52.7	130.6	19 10.5	−53.0	130.9	7
8	22 49.8	−50.1	129.4	22 11.6	−50.5	129.7	21 33.2	−51.1	130.0	20 54.5	−51.5	130.3	20 15.5	−51.9	130.6	19 36.4	−52.3	130.9	18 57.0	−52.7	131.1	18 17.5	−53.2	131.4	8
9	21 59.7	−50.2	130.0	21 21.1	−50.7	130.3	20 42.1	−51.1	130.6	20 03.0	−51.6	130.9	19 23.6	−52.0	131.1	18 44.1	−52.4	131.4	18 04.3	−52.8	131.6	17 24.3	−53.1	131.9	9
10	21 09.5	−50.3	130.6	20 30.4	−50.8	130.9	19 51.0	−51.2	131.1	19 11.4	−51.6	131.4	18 31.6	−52.0	131.7	17 51.7	−52.5	131.9	17 11.5	−52.9	132.1	16 31.2	−53.3	132.4	10
11	20 19.2	−50.5	131.2	19 39.6	−50.9	131.4	18 59.8	−51.4	131.7	18 19.8	−51.8	131.9	17 39.6	−52.2	132.2	16 59.2	−52.6	132.4	16 18.6	−52.9	132.6	15 37.9	−53.3	132.8	11
12	19 28.7	−50.6	131.7	18 48.7	−51.1	132.0	18 08.4	−51.4	132.2	17 28.0	−51.8	132.5	16 47.4	−52.2	132.7	16 06.6	−52.6	132.9	15 25.7	−53.0	133.1	14 44.6	−53.4	133.3	12
13	18 38.1	−50.7	132.3	17 57.6	−51.1	132.5	17 17.0	−51.5	132.8	16 36.2	−52.0	133.0	15 55.2	−52.3	133.2	15 14.0	−52.7	133.4	14 32.7	−53.1	133.6	13 51.2	−53.4	133.8	13
14	17 47.4	−50.7	132.9	17 06.5	−51.1	133.1	16 25.5	−51.6	133.3	15 44.2	−52.0	133.5	15 02.8	−52.3	133.7	14 21.3	−52.7	133.9	13 39.6	−53.1	134.1	12 57.8	−53.4	134.3	14
15	16 56.7	−50.9	133.4	16 15.4	−51.3	133.6	15 33.9	−51.7	133.8	14 52.2	−52.0	134.0	14 10.5	−52.5	134.2	13 28.6	−52.9	134.4	12 46.5	−53.2	134.6	12 04.4	−53.6	134.7	15
16	16 05.8	−50.9	134.0	15 24.1	−51.4	134.2	14 42.2	−51.7	134.4	14 00.2	−52.1	134.7	13 18.0	−52.5	134.7	12 35.7	−52.8	134.9	11 53.3	−53.2	135.0	11 10.8	−53.5	135.2	16
17	15 14.9	−51.0	134.5	14 32.7	−51.4	134.7	13 50.5	−51.9	134.9	13 08.1	−52.2	135.1	12 25.5	−52.5	135.2	11 42.9	−52.9	135.4	11 00.1	−53.2	135.5	10 17.3	−53.6	135.6	17
18	14 23.9	−51.1	135.1	13 41.3	−51.5	135.2	12 58.6	−51.8	135.4	12 15.9	−52.3	135.6	11 33.0	−52.6	135.7	10 50.0	−53.0	135.8	10 06.9	−53.3	136.0	9 23.7	−53.7	136.1	18
19	13 32.8	−51.2	135.6	12 49.8	−51.5	135.8	12 06.8	−52.0	135.9	11 23.6	−52.3	136.1	10 40.4	−52.7	136.2	9 57.0	−53.0	136.3	9 13.6	−53.4	136.4	8 30.0	−53.6	136.6	19
20	12 41.6	−51.2	136.1	11 58.3	−51.6	136.3	11 14.8	−51.9	136.4	10 31.3	−52.3	136.6	9 47.7	−52.7	136.7	9 04.0	−53.0	136.8	8 20.2	−53.4	136.9	7 36.4	−53.7	137.0	20
21	11 50.4	−51.3	136.7	11 06.7	−51.7	136.8	10 22.9	−52.1	136.9	9 39.0	−52.4	137.1	8 55.0	−52.7	137.2	8 11.0	−53.1	137.3	7 26.9	−53.4	137.4	6 42.7	−53.7	137.5	21
22	10 59.1	−51.4	137.2	10 15.0	−51.7	137.3	9 30.8	−52.0	137.4	8 46.6	−52.4	137.6	8 02.3	−52.8	137.7	7 17.9	−53.1	137.7	6 33.5	−53.5	137.8	5 49.0	−53.8	137.9	22
23	10 07.7	−51.4	137.7	9 23.3	−51.8	137.8	8 38.8	−52.1	138.0	7 54.2	−52.5	138.0	7 09.5	−52.8	138.1	6 24.8	−53.1	138.2	5 40.0	−53.4	138.3	4 55.2	−53.7	138.3	23
24	9 16.3	−51.4	138.3	8 31.5	−51.8	138.4	7 46.7	−52.2	138.5	7 01.7	−52.5	138.5	6 16.7	−52.8	138.6	5 31.7	−53.2	138.7	4 46.6	−53.5	138.7	4 01.5	−53.8	138.8	24
25	8 24.9	−51.5	138.8	7 39.7	−51.8	138.9	6 54.5	−52.2	139.0	6 09.2	−52.5	139.0	5 23.9	−52.8	139.1	4 38.5	−53.1	139.1	3 53.1	−53.4	139.2	3 07.7	−53.8	139.2	25
26	7 33.4	−51.6	139.3	6 47.9	−51.9	139.4	6 02.3	−52.2	139.5	5 16.7	−52.5	139.5	4 31.1	−52.9	139.6	3 45.4	−53.2	139.6	2 59.7	−53.5	139.7	2 13.9	−53.8	139.7	26
27	6 41.9	−51.6	139.8	5 56.0	−51.9	139.9	5 10.1	−52.2	139.9	4 24.2	−52.6	140.0	3 38.2	−52.9	140.0	2 52.2	−53.2	140.1	2 06.2	−53.5	140.1	1 20.1	−53.7	140.1	27
28	5 50.3	−51.6	140.3	5 04.1	−51.9	140.4	4 17.9	−52.2	140.4	3 31.6	−52.5	140.5	2 45.3	−52.9	140.5	1 59.0	−53.2	140.5	1 12.7	−53.5	140.6	0 26.4	+53.8	140.6	28
29	4 58.8	−51.6	140.8	4 12.2	−51.9	140.9	3 25.7	−52.3	140.9	2 39.1	−52.6	141.0	1 52.5	−52.9	141.0	1 05.8	−53.2	141.0	0 19.2	−53.5	141.0	0 27.4	+53.8	39.0	29
30	4 07.2	−51.7	141.3	3 20.3	−52.0	141.4	2 33.4	−52.3	141.4	1 46.5	−52.6	141.4	0 59.6	−52.9	141.5	0 12.6	−53.2	141.5	0 34.3	+53.5	38.5	1 21.2	+53.8	38.5	30
31	3 15.5	−51.6	141.9	2 28.3	−51.9	141.9	1 41.1	−52.3	141.9	0 53.9	−52.6	141.9	0 06.7	−52.9	141.9	0 40.6	+53.2	38.1	1 27.8	+53.5	38.1	2 15.0	+53.8	38.1	31
32	2 23.9	−51.7	142.4	1 36.4	−52.0	142.4	0 48.8	−52.2	142.4	0 01.3	−52.6	142.4	0 46.2	+52.9	37.6	1 33.8	+53.2	37.6	2 21.3	+53.5	37.6	3 08.8	+53.7	37.7	32
33	1 32.3	−51.7	142.9	0 44.4	−52.0	142.9	0 03.4	+52.3	37.1	0 51.3	+52.6	37.1	1 39.1	+52.9	37.1	2 27.0	+53.1	37.1	3 14.8	+53.4	37.2	4 02.6	+53.7	37.2	33
34	0 40.6	−51.9	143.4	0 07.6	+51.9	36.6	0 55.7	+52.3	36.6	1 43.9	+52.6	36.6	2 32.0	+52.9	36.7	3 20.1	+53.2	36.7	4 08.2	+53.4	36.8	4 56.3	+53.8	36.8	34
35	0 11.0	+51.7	36.1	0 59.5	+52.0	36.1	1 48.0	+52.3	36.1	2 36.5	+52.5	36.1	3 24.9	+52.9	36.2	4 13.3	+53.2	36.2	5 01.7	+53.4	36.3	5 50.1	+53.7	36.3	35
36	1 02.7	+51.7	35.6	1 51.5	+51.9	35.6	2 40.3	+52.2	35.6	3 29.0	+52.6	35.7	4 17.8	+52.8	35.7	5 06.5	+53.1	35.8	5 55.1	+53.5	35.8	6 43.8	+53.7	35.9	36
37	1 54.4	+51.6	35.1	2 43.4	+52.0	35.1	3 32.5	+52.3	35.1	4 21.6	+52.5	35.2	5 10.6	+52.8	35.2	5 59.6	+53.1	35.3	6 48.6	+53.3	35.4	7 37.5	+53.6	35.4	37
38	2 46.0	+51.6	34.6	3 35.4	+51.9	34.6	4 24.8	+52.2	34.6	5 14.1	+52.5	34.7	6 03.4	+52.8	34.8	6 52.7	+53.1	34.8	7 41.9	+53.4	34.9	8 31.1	+53.7	35.0	38
39	3 37.6	+51.6	34.1	4 27.3	+51.9	34.1	5 17.0	+52.2	34.2	6 06.6	+52.5	34.2	6 56.2	+52.8	34.3	7 45.8	+53.0	34.3	8 35.3	+53.3	34.4	9 24.8	+53.6	34.5	39
40	4 29.2	+51.6	33.6	5 19.2	+51.9	33.6	6 09.2	+52.2	33.7	6 59.1	+52.5	33.7	7 49.0	+52.7	33.8	8 38.8	+53.1	33.9	9 28.6	+53.3	34.0	10 18.4	+53.5	34.1	40
41	5 20.8	+51.6	33.0	6 11.1	+51.9	33.1	7 01.4	+52.1	33.2	7 51.6	+52.4	33.2	8 41.7	+52.7	33.3	9 31.9	+53.0	33.4	10 21.9	+53.3	33.5	11 11.9	+53.5	33.6	41
42	6 12.4	+51.5	32.5	7 03.0	+51.8	32.6	7 53.5	+52.1	32.7	8 44.0	+52.4	32.7	9 34.4	+52.7	32.8	10 24.8	+53.0	32.9	11 15.2	+53.1	33.0	12 05.4	+53.5	33.1	42
43	7 03.9	+51.5	32.0	7 54.8	+51.8	32.1	8 45.6	+52.1	32.2	9 36.4	+52.3	32.2	10 27.1	+52.6	32.3	11 17.8	+52.9	32.4	12 08.4	+53.1	32.6	12 58.9	+53.4	32.7	43
44	7 55.4	+51.5	31.5	8 46.6	+51.7	31.6	9 37.7	+52.0	31.7	10 28.7	+52.3	31.8	11 19.7	+52.6	31.9	12 10.7	+52.8	32.0	13 01.5	+53.1	32.1	13 52.3	+53.4	32.2	44
45	8 46.9	+51.4	31.0	9 38.3	+51.7	31.1	10 29.7	+52.0	31.2	11 21.0	+52.3	31.3	12 12.3	+52.5	31.4	13 03.5	+52.8	31.5	13 54.6	+53.1	31.6	14 45.7	+53.3	31.7	45
46	9 38.3	+51.4	30.5	10 30.0	+51.7	30.5	11 21.7	+51.9	30.6	12 13.3	+52.2	30.7	13 04.8	+52.5	30.9	13 56.3	+52.7	31.0	14 47.7	+53.0	31.1	15 39.0	+53.2	31.3	46
47	10 29.7	+51.3	29.9	11 21.7	+51.6	30.0	12 13.6	+51.9	30.1	13 05.5	+52.1	30.2	13 57.3	+52.4	30.4	14 49.0	+52.7	30.5	15 40.7	+52.9	30.6	16 32.2	+53.2	30.8	47
48	11 21.0	+51.4	29.4	12 13.3	+51.5	29.5	13 05.5	+51.8	29.6	13 57.6	+52.1	29.7	14 49.7	+52.3	29.9	15 41.7	+52.5	30.0	16 33.6	+52.8	30.1	17 25.4	+53.1	30.3	48
49	12 12.3	+51.2	28.9	13 04.8	+51.5	29.0	13 57.3	+51.7	29.1	14 49.7	+52.0	29.2	15 42.0	+52.2	29.4	16 34.2	+52.6	29.5	17 26.4	+52.8	29.6	18 18.5	+53.1	29.8	49
50	13 03.5	+51.1	28.3	13 56.3	+51.4	28.4	14 49.0	+51.7	28.7	15 41.7	+51.9	28.7	16 34.2	+52.2	28.8	17 26.8	+52.4	29.0	18 19.2	+52.7	29.1	19 11.6	+52.9	29.3	50
51	13 54.6	+51.1	27.8	14 47.7	+51.3	27.9	15 40.7	+51.5	28.0	16 33.6	+51.8	28.2	17 26.4	+52.1	28.3	18 19.2	+52.4	28.5	19 11.9	+52.6	28.6	20 04.5	+52.9	28.8	51
52	14 45.7	+51.0	27.3	15 39.0	+51.2	27.4	16 32.2	+51.6	27.5	17 25.4	+51.8	27.7	18 18.5	+52.1	27.8	19 11.6	+52.2	28.0	20 04.5	+52.5	28.1	20 57.4	+52.8	28.3	52
53	15 36.7	+50.9	26.7	16 30.2	+51.2	26.8	17 23.8	+51.4	27.0	18 17.2	+51.7	27.1	19 10.6	+51.9	27.3	20 03.8	+52.2	27.4	20 57.0	+52.5	27.6	21 50.2	+52.6	27.8	53
54	16 27.6	+50.8	26.2	17 21.4	+51.1	26.3	18 15.2	+51.3	26.4	19 08.9	+51.5	26.6	20 02.5	+51.8	26.7	20 56.0	+52.1	26.9	21 49.5	+52.3	27.1	22 42.8	+52.6	27.3	54
55	17 18.4	+50.7	25.6	18 12.5	+51.0	25.7	19 06.5	+51.2	25.9	20 00.4	+51.5	26.0	20 54.3	+51.7	26.2	21 48.1	+52.0	26.4	22 41.8	+52.2	26.6	23 35.4	+52.5	26.8	55
56	18 09.1	+50.7	25.0	19 03.5	+50.8	25.2	19 57.7	+51.2	25.3	20 51.9	+51.4	25.5	21 46.0	+51.7	25.7	22 40.1	+51.8	25.8	23 34.0	+52.1	26.0	24 27.9	+52.4	26.2	56
57	18 59.8	+50.5	24.5	19 54.3	+50.8	24.6	20 48.9	+51.0	24.8	21 43.3	+51.3	24.9	22 37.7	+51.5	25.1	23 31.9	+51.8	25.3	24 26.1	+52.0	25.5	25 20.3	+52.2	25.7	57
58	19 50.3	+50.4	23.9	20 45.1	+50.7	24.1	21 39.9	+50.9	24.2	22 34.6	+51.1	24.4	23 29.2	+51.4	24.6	24 23.7	+51.6	24.7	25 18.1	+51.9	24.9	26 12.5	+52.1	25.1	58
59	20 40.7	+50.3	23.3	21 35.8	+50.5	23.5	22 30.8	+50.7	23.6	23 25.7	+51.0	23.8	24 20.6	+51.2	24.0	25 15.3	+51.5	24.2	26 10.0	+51.8	24.4	27 04.6	+52.0	24.6	59
60	21 31.0	+50.2	22.7	22 26.3	+50.4	22.9	23 21.5	+50.7	23.1	24 16.7	+50.9	23.2	25 11.8	+51.1	23.4	26 06.8	+51.4	23.6	27 01.8	+51.6	23.8	27 56.6	+51.9	24.0	60
61	22 21.2	+50.0	22.2	23 16.7	+50.3	22.3	24 12.2	+50.5	22.5	25 07.6	+50.7	22.7	26 02.9	+51.0	22.8	26 58.2	+51.2	23.0	27 53.4	+51.4	23.2	28 48.5	+51.7	23.5	61
62	23 11.2	+49.9	21.6	24 07.0	+50.1	21.7	25 02.7	+50.4	21.9	25 58.3	+50.7	22.1	26 53.9	+50.9	22.3	27 49.4	+51.1	22.4	28 44.8	+51.3	22.7	29 40.2	+51.5	22.9	62
63	24 01.1	+49.8	20.9	24 57.1	+49.9	21.1	25 53.1	+50.2	21.3	26 49.0	+50.4	21.5	27 44.8	+50.6	21.7	28 40.5	+50.9	21.9	29 36.1	+51.2	22.1	30 31.7	+51.4	22.3	63
64	24 50.9	+49.6	20.3	25 47.1	+49.9	20.5	26 43.3	+50.1	20.7	27 39.4	+50.3	20.9	28 35.4	+50.5	21.0	29 31.4	+50.7	21.2	30 27.3	+50.9	21.5	31 23.1	+51.2	21.7	64
65	25 40.5	+49.5	19.7	26 37.0	+49.6	19.9	27 33.4	+49.8	20.1	28 29.7	+50.1	20.2	29 25.9	+50.4	20.4	30 22.1	+50.6	20.6	31 18.2	+50.8	20.8	32 14.3	+51.0	21.1	65
66	26 30.0	+49.2	19.1	27 26.6	+49.5	19.2	28 23.2	+49.8	19.4	29 19.8	+49.9	19.6	30 16.3	+50.1	19.8	31 12.7	+50.4	20.0	32 09.0	+50.6	20.2	33 05.3	+50.8	20.4	66
67	27 19.2	+49.1	18.4	28 16.1	+49.3	18.6	29 13.0	+49.5	18.8	30 09.7	+49.8	19.0	31 06.4	+50.0	19.2	32 03.1	+50.2	19.4	32 59.6	+50.5	19.6	33 56.1	+50.7	19.8	67
68	28 08.3	+48.9	17.8	29 05.4	+49.2	18.0	30 02.5	+49.3	18.1	30 59.5	+49.5	18.3	31 56.4	+49.8	18.5	32 53.3	+49.9	18.7	33 50.1	+50.2	18.9	34 46.8	+50.4	19.2	68
69	28 57.3	+48.7	17.1	29 54.6	+48.9	17.3	30 51.8	+49.2	17.5	31 49.0	+49.4	17.7	32 46.2	+49.5	17.9	33 43.2	+49.8	18.1	34 40.3	+49.9	18.3	35 37.2	+50.2	18.5	69
70	29 46.0	+48.5	16.5	30 43.5	+48.7	16.6	31 41.0	+48.9	16.8	32 38.4	+49.1	17.0	33 35.7	+49.3	17.2	34 33.0	+49.5	17.4	35 30.2	+49.8	17.6	36 27.4	+50.0	17.8	70
71	30 34.5	+48.3	15.8	31 32.2	+48.5	15.9	32 29.9	+48.7	16.1	33 27.5	+48.9	16.3	34 25.0	+49.1	16.5	35 22.5	+49.3	16.7	36 20.0	+49.5	16.9	37 17.4	+49.7	17.1	71
72	31 22.8	+48.1	15.1	32 20.7	+48.3	15.3	33 18.6	+48.4	15.4	34 16.4	+48.6	15.6	35 14.1	+48.9	15.8	36 11.8	+49.1	16.0	37 09.5	+49.2	16.2	38 07.1	+49.4	16.4	72
73	32 10.9	+47.8	14.4	33 09.0	+48.0	14.5	34 07.0	+48.2	14.7	35 05.0	+48.4	14.9	36 03.0	+48.6	15.1	37 00.9	+48.8	15.3	37 58.7	+49.0	15.5	38 56.5	+49.2	15.7	73
74	32 58.7	+47.6	13.7	33 57.0	+47.7	13.8	34 55.2	+48.0	14.0	35 53.4	+48.1	14.2	36 51.6	+48.3	14.3	37 49.7	+48.5	14.5	38 47.7	+48.7	14.7	39 45.7	+48.9	14.9	74
75	33 46.3	+47.3	12.9	34 44.7	+47.5	13.1	35 43.2	+47.6	13.3	36 41.5	+47.9	13.4	37 39.9	+48.0	13.6	38 38.2	+48.2	13.8	39 36.4	+48.4	14.0	40 34.6	+48.6	14.2	75
76	34 33.6	+47.1	12.2	35 32.2	+47.2	12.3	36 30.8	+47.4	12.5	37 29.4	+47.5	12.7	38 27.9	+47.7	12.8	39 26.4	+47.9	13.0	40 24.8	+48.1	13.2	41 23.2	+48.3	13.4	76
77	35 20.7	+46.7	11.4	36 19.4	+47.0	11.6	37 18.2	+47.1	11.7	38 16.9	+47.3	11.9	39 15.6	+47.4	12.1	40 14.3	+47.6	12.2	41 12.9	+47.8	12.4	42 11.5	+47.9	12.6	77
78	36 07.4	+46.5	10.8	37 06.4	+46.6	10.8	38 05.3	+46.7	11.0	39 04.2	+46.9	11.1	40 03.0	+47.1	11.3	41 01.9	+47.1	11.4	42 00.7	+47.4	11.6	42 59.4	+47.6	11.8	78
79	36 53.9	+46.1	9.9	37 53.0	+46.2	10.0	38 52.0	+46.5	10.2	39 51.1	+46.6	10.3	40 50.1	+46.7	10.5	41 49.1	+46.9	10.6	42 48.1	+47.0	10.8	43 47.0	+47.2	11.0	79
80	37 40.0	+45.8	9.1	38 39.2	+46.0	9.2	39 38.5	+46.0	9.3	40 37.7	+46.2	9.5	41 36.8	+46.4	9.6	42 36.0	+46.5	9.8	43 35.1	+46.6	9.9	44 34.2	+46.8	10.1	80
81	38 25.8	+45.5	8.3	39 25.2	+45.6	8.4	40 24.5	+45.7	8.5	41 23.9	+45.8	8.6	42 23.2	+46.0	8.8	43 22.5	+46.1	8.9	44 21.7	+46.3	9.1	45 21.0	+46.3	9.2	81
82	39 11.3	+45.1	7.4	40 10.8	+45.3	7.5	41 10.2	+45.3	7.6	42 09.7	+45.4	7.8	43 09.1	+45.6	7.9	44 08.6	+45.6	8.0	45 08.0	+45.8	8.2	46 07.3	+46.0	8.3	82
83	39 56.4	+44.7	6.6	40 56.0	+44.8	6.7	41 55.5	+44.9	6.8	42 55.1	+45.0	6.9	43 54.7	+45.1	7.0	44 54.2	+45.2	7.1	45 53.8	+45.3	7.2	46 53.3	+45.4	7.4	83
84	40 41.1	+44.2	5.8	41 40.8	+44.3	5.8	42 40.4	+44.5	5.9	43 40.1	+44.6	6.0	44 39.8	+44.7	6.1	45 39.4	+44.8	6.1	46 39.1	+44.9	6.4	47 38.7	+45.0	6.4	84
85	41 25.3	+43.9	4.8	42 25.1	+44.0	4.9	43 24.9	+44.0	5.0	44 24.7	+44.1	5.0	45 24.4	+44.2	5.1	46 24.2	+44.3	5.2	47 24.0	+44.3	5.3	48 23.7	+44.4	5.4	85
86	42 09.2	+43.4	3.9	43 09.1	+43.5	3.9	44 08.9	+43.6	4.0	45 08.8	+43.6	4.1	46 08.6	+43.7	4.2	47 08.5	+43.7	4.2	48 08.3	+43.8	4.3	49 08.1	+43.9	4.4	86
87	42 52.6	+42.9	3.0	43 52.6	+43.0	3.0	44 52.5	+43.0	3.0	45 52.4	+43.1	3.1	46 52.3	+43.2	3.2	47 52.2	+43.2	3.2	48 52.1	+43.3	3.3	49 52.0	+43.3	3.3	87
88	43 35.6	+42.5	2.0	44 35.6	+42.4	2.0	45 35.5	+42.5	2.1	46 35.5	+42.5	2.1	47 35.4	+42.6	2.1	48 35.4	+42.6	2.2	49 35.4	+42.6	2.2	50 35.3	+42.7	2.3	88
89	44 18.1	+41.9	1.0	45 18.0	+42.0	1.0	46 18.0	+42.0	1.0	47 18.0	+42.0	1.1	48 18.0	+42.0	1.1	49 18.0	+42.0	1.1	50 18.0	+42.0	1.1	51 18.0	+42.0	1.2	89
90	45 00.0	+41.4	0.0	46 00.0	+41.4	0.0	47 00.0	+41.4	0.0	48 00.0	+41.4	0.0	49 00.0	+41.4	0.0	50 00.0	+41.4	0.0	51 00.0	+41.3	0.0	52 00.0	+41.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 134°, 226°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z }

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	
0	28 49.9	+48.4	123.4	28 16.7	+48.9	123.9	27 43.1	+49.5	124.3	27 09.1	+50.0	124.7	26 34.7	+50.6	125.1	26 00.0	+51.1	125.5	25 25.0	+51.6	125.9	24 49.6	+52.1	126.3	0
1	29 38.3	+48.1	122.7	29 05.6	+48.7	123.2	28 32.6	+49.3	123.7	27 59.1	+49.9	124.1	27 25.3	+50.4	124.5	26 51.1	+50.9	125.0	26 16.6	+51.4	125.4	25 41.7	+51.9	125.8	1
2	30 26.4	+47.9	122.0	29 54.3	+48.5	122.5	29 21.9	+49.1	123.0	28 49.0	+49.7	123.5	28 15.7	+50.2	123.9	27 42.0	+50.8	124.4	27 08.0	+51.3	124.8	26 33.6	+51.7	125.2	2
3	31 14.3	+47.6	121.3	30 42.8	+48.3	121.8	30 11.0	+48.9	122.3	29 38.7	+49.4	122.8	29 05.9	+50.1	123.3	28 32.8	+50.6	123.8	27 59.3	+51.1	124.2	27 25.3	+51.7	124.6	3
4	32 01.9	+47.5	120.6	31 31.1	+48.1	121.1	30 59.9	+48.7	121.7	30 28.1	+49.3	122.2	29 56.0	+49.9	122.7	29 23.4	+50.4	123.1	28 50.4	+51.0	123.6	28 17.0	+51.5	124.1	4
5	32 49.4	+47.1	119.9	32 19.2	+47.8	120.4	31 48.6	+48.4	121.0	31 17.4	+49.1	121.5	30 45.9	+49.6	122.0	30 13.8	+50.3	122.5	29 41.4	+50.8	123.0	29 08.5	+51.3	123.5	5
6	33 36.5	+46.9	119.2	33 07.0	+47.6	119.7	32 37.0	+48.3	120.3	32 06.5	+48.9	120.8	31 35.5	+49.5	121.4	31 04.1	+50.0	121.9	30 32.2	+50.6	122.4	29 59.8	+51.2	122.9	6
7	34 23.4	+46.6	118.4	33 54.6	+47.3	119.0	33 25.3	+47.9	119.6	32 55.4	+48.6	120.1	32 25.0	+49.3	120.7	31 54.1	+49.9	121.2	31 22.8	+50.4	121.8	30 51.0	+51.0	122.3	7
8	35 10.0	+46.3	117.6	34 41.9	+47.0	118.2	34 13.2	+47.8	118.9	33 44.0	+48.4	119.4	33 14.3	+49.0	120.0	32 44.0	+49.6	120.6	32 13.2	+50.3	121.1	31 42.0	+50.8	121.7	8
9	35 56.3	+46.1	116.9	35 28.9	+46.8	117.5	35 01.0	+47.4	118.1	34 32.4	+48.1	118.7	34 03.3	+48.8	119.3	33 33.6	+49.5	119.9	33 03.5	+50.0	120.5	32 32.8	+50.6	121.0	9
10	36 42.4	+45.6	116.1	36 15.7	+46.4	116.7	35 48.4	+47.2	117.4	35 20.5	+47.9	118.0	34 52.1	+48.5	118.6	34 23.1	+49.2	119.2	33 53.5	+49.8	119.8	33 23.4	+50.4	120.4	10
11	37 28.0	+45.4	115.2	37 02.1	+46.1	115.9	36 35.6	+46.8	116.6	36 08.4	+47.6	117.3	35 40.6	+48.3	117.9	35 12.3	+48.9	118.5	34 43.3	+49.6	119.1	34 13.8	+50.3	119.7	11
12	38 13.4	+45.0	114.4	37 48.2	+45.8	115.1	37 22.4	+46.6	115.8	36 56.0	+47.3	116.5	36 28.9	+48.0	117.2	36 01.2	+48.7	117.8	35 32.9	+49.4	118.4	35 04.1	+49.9	119.1	12
13	38 58.4	+44.6	113.6	38 34.0	+45.5	114.3	38 09.0	+46.2	115.0	37 43.3	+47.0	115.7	37 16.9	+47.7	116.4	36 49.9	+48.4	117.1	36 22.3	+49.1	117.7	35 54.0	+49.8	118.4	13
14	39 43.0	+44.2	112.7	39 19.5	+45.0	113.5	38 55.2	+45.9	114.2	38 30.3	+46.6	114.9	38 04.6	+47.4	115.6	37 38.3	+48.2	116.3	37 11.4	+48.8	117.0	36 43.8	+49.5	117.7	14
15	40 27.2	+43.8	111.8	40 04.5	+44.7	112.6	39 41.1	+45.5	113.4	39 16.9	+46.3	114.1	38 52.0	+47.1	114.9	38 26.5	+47.8	115.6	38 00.2	+48.6	116.3	37 33.3	+49.3	117.0	15
16	41 11.0	+43.4	110.9	40 49.2	+44.2	111.7	40 26.6	+45.1	112.5	40 03.2	+46.0	113.3	39 39.1	+46.8	114.1	39 14.3	+47.5	114.8	38 48.8	+48.2	115.5	38 22.6	+48.9	116.3	16
17	41 54.4	+42.9	110.0	41 33.4	+43.9	110.8	41 11.7	+44.7	111.6	40 49.2	+45.6	112.5	40 25.9	+46.4	113.2	40 01.8	+47.2	114.0	39 37.0	+48.0	114.8	39 11.5	+48.7	115.5	17
18	42 37.3	+42.4	109.0	42 17.3	+43.4	109.9	41 56.4	+44.3	110.8	41 34.8	+45.1	111.6	41 12.3	+46.0	112.4	40 49.0	+46.9	113.2	40 25.0	+47.6	114.0	40 00.2	+48.4	114.8	18
19	43 19.7	+42.0	108.1	43 00.7	+42.9	109.0	42 40.7	+43.9	109.8	42 19.9	+44.8	110.7	41 58.3	+45.6	111.5	41 35.9	+46.4	112.4	41 12.6	+47.3	113.2	40 48.6	+48.1	114.0	19
20	44 01.7	+41.4	107.1	43 43.6	+42.4	108.0	43 24.6	+43.4	108.9	43 04.7	+44.3	109.8	42 43.9	+45.3	110.7	42 22.3	+46.1	111.5	41 59.9	+46.9	112.4	41 36.7	+47.7	113.2	20
21	44 43.1	+40.9	106.1	44 26.0	+41.9	107.0	44 08.0	+42.9	108.0	43 49.0	+43.9	108.9	43 29.2	+44.7	109.8	43 08.4	+45.7	110.7	42 46.8	+46.6	111.5	42 24.4	+47.4	112.4	21
22	45 24.0	+40.3	105.0	45 07.9	+41.3	106.0	44 50.9	+42.3	107.0	44 32.9	+43.3	107.9	44 13.9	+44.4	108.8	43 54.1	+45.3	109.8	43 33.4	+46.1	110.7	43 11.8	+47.0	111.5	22
23	46 04.3	+39.6	104.0	45 49.2	+40.8	105.0	45 33.2	+41.9	106.0	45 16.2	+42.9	106.9	44 58.3	+43.8	107.9	44 39.4	+44.8	108.8	44 19.5	+45.7	109.8	43 58.8	+46.6	110.7	23
24	46 43.9	+39.1	102.9	46 30.0	+40.2	103.9	46 15.1	+41.2	104.9	45 59.1	+42.3	105.9	45 42.1	+43.4	106.9	45 24.2	+44.3	107.9	45 05.2	+45.3	108.9	44 45.4	+46.2	109.8	24
25	47 23.0	+38.4	101.8	47 10.2	+39.6	102.8	46 56.3	+40.7	103.9	46 41.4	+41.8	104.9	46 25.5	+42.8	105.9	46 08.5	+43.8	106.9	45 50.5	+44.8	107.9	45 31.6	+45.7	108.9	25
26	48 01.4	+37.7	100.6	47 49.8	+38.8	101.7	47 37.0	+40.0	102.8	47 23.2	+41.1	103.9	47 08.3	+42.2	104.9	46 52.3	+43.3	105.9	46 35.3	+44.3	107.0	46 17.3	+45.3	108.0	26
27	48 39.1	+36.9	99.5	48 28.6	+38.2	100.6	48 17.0	+39.4	101.7	48 04.3	+40.6	102.8	47 50.5	+41.7	103.9	47 35.6	+42.7	104.9	47 19.6	+43.8	106.0	47 02.6	+44.8	107.0	27
28	49 16.0	+36.3	98.3	49 06.8	+37.5	99.4	48 56.4	+38.7	100.5	48 44.9	+39.8	101.7	48 32.2	+41.0	102.8	48 18.3	+42.2	103.9	48 03.4	+43.2	105.0	47 47.4	+44.2	106.0	28
29	49 52.3	+35.4	97.0	49 44.3	+36.7	98.2	49 35.1	+38.0	99.4	49 24.7	+39.2	100.5	49 13.2	+40.4	101.7	49 00.5	+41.5	102.8	48 46.6	+42.7	103.9	48 31.6	+43.8	105.0	29
30	50 27.7	+34.5	95.8	50 21.0	+35.9	97.0	50 13.1	+37.2	98.2	50 03.9	+38.5	99.4	49 53.6	+39.7	100.5	49 42.0	+40.9	101.7	49 29.3	+42.0	102.8	49 15.4	+43.1	104.0	30
31	51 02.2	+33.7	94.5	50 56.9	+35.0	95.7	50 50.3	+36.3	96.9	50 42.4	+37.7	98.2	50 33.3	+38.9	99.4	50 22.9	+40.2	100.6	50 11.3	+41.4	101.7	49 58.5	+42.5	102.9	31
32	51 35.9	+32.8	93.2	51 31.9	+34.2	94.4	51 26.7	+35.5	95.7	51 20.1	+36.9	96.9	51 12.2	+38.2	98.2	51 03.1	+39.4	99.4	50 52.7	+40.7	100.6	50 41.0	+41.9	101.8	32
33	52 08.7	+31.8	91.8	52 06.1	+33.3	93.1	52 02.2	+34.7	94.4	51 57.0	+36.0	95.6	51 50.4	+37.4	96.9	51 42.5	+38.7	98.2	51 33.4	+39.9	99.4	51 22.9	+41.2	100.7	33
34	52 40.5	+30.8	90.4	52 39.4	+32.3	91.7	52 36.9	+33.7	93.0	52 33.0	+35.2	94.3	52 27.8	+36.6	95.6	52 21.2	+37.9	96.9	52 13.3	+39.2	98.2	52 04.1	+40.5	99.5	34
35	53 11.3	+29.8	89.0	53 11.7	+31.3	90.3	53 10.6	+32.8	91.7	53 08.2	+34.2	93.0	53 04.4	+35.6	94.3	52 59.1	+37.1	95.7	52 52.5	+38.5	97.0	52 44.6	+39.7	98.3	35
36	53 41.1	+28.7	87.5	53 43.0	+30.2	88.9	53 43.4	+31.8	90.3	53 42.4	+33.3	91.6	53 40.0	+34.7	93.0	53 36.2	+36.1	94.3	53 31.0	+37.5	95.7	53 24.3	+38.9	97.0	36
37	54 09.8	+27.5	86.0	54 13.2	+29.1	87.4	54 15.2	+30.7	88.8	54 15.7	+32.2	90.2	54 14.7	+33.8	91.6	54 12.3	+35.3	93.0	54 08.5	+36.7	94.4	54 03.2	+38.1	95.7	37
38	54 37.3	+26.4	84.5	54 42.3	+28.0	85.9	54 45.9	+29.6	87.3	54 47.9	+31.2	88.7	54 48.5	+32.7	90.2	54 47.6	+34.2	91.6	54 45.2	+35.7	93.0	54 41.3	+37.2	94.4	38
39	55 03.7	+25.2	83.0	55 10.3	+26.8	84.4	55 15.5	+28.4	85.8	55 19.1	+30.0	87.3	55 21.2	+31.6	88.7	55 21.8	+33.2	90.2	55 20.9	+34.7	91.6	55 18.5	+36.2	93.0	39
40	55 28.9	+23.9	81.4	55 37.1	+25.6	82.8	55 43.9	+27.2	84.3	55 49.1	+28.9	85.7	55 52.8	+30.5	87.2	55 55.0	+32.1	88.7	55 55.6	+33.7	90.2	55 54.7	+35.2	91.6	40
41	55 52.8	+22.5	79.7	56 02.7	+24.3	81.2	56 11.1	+26.0	82.7	56 18.0	+27.7	84.2	56 23.3	+29.4	85.7	56 27.1	+31.0	87.2	56 29.3	+32.6	88.7	56 29.9	+34.2	90.2	41
42	56 15.3	+21.3	78.1	56 27.0	+22.9	79.6	56 37.1	+24.7	81.0	56 45.7	+26.3	82.5	56 52.7	+28.0	84.1	56 58.1	+29.7	85.6	57 01.9	+31.4	87.1	57 04.1	+33.0	88.7	42
43	56 36.6	+19.8	76.4	56 49.9	+21.6	77.9	57 01.8	+23.3	79.4	57 12.0	+25.1	80.9	57 20.7	+26.8	82.4	57 27.8	+28.5	84.0	57 33.3	+30.2	85.6	57 37.1	+31.9	87.1	43
44	56 56.4	+18.3	74.7	57 11.5	+20.1	76.2	57 25.1	+21.9	77.7	57 37.1	+23.7	79.2	57 47.5	+25.5	80.8	57 56.3	+27.2	82.3	58 03.5	+28.9	83.9	58 09.0	+30.7	85.5	44
45	57 14.7	+16.9	72.9	57 31.6	+18.7	74.4	57 47.0	+20.4	75.9	58 00.8	+22.2	77.5	58 13.0	+24.0	79.1	58 23.5	+25.9	80.7	58 32.4	+27.7	82.3	58 39.7	+29.4	83.9	45
46	57 31.6	+15.4	71.1	57 50.3	+17.1	72.6	58 07.4	+19.0	74.2	58 23.0	+20.8	75.7	58 37.0	+22.6	77.3	58 49.4	+24.4	78.9	59 00.1	+26.2	80.6	59 09.1	+28.0	82.2	46
47	57 47.0	+13.8	69.3	58 07.4	+15.6	70.8	58 26.4	+17.4	72.4	58 43.8	+19.3	73.9	58 59.6	+21.1	75.5	59 13.8	+22.9	77.1	59 26.3	+24.7	78.8	59 37.1	+26.5	80.5	47
48	58 00.8	+12.2	67.5	58 23.0	+14.0	69.0	58 43.8	+15.8	70.5	59 03.0	+17.7	72.1	59 20.7	+19.5	73.7	59 36.7	+21.4	75.3	59 51.0	+23.3	77.0	60 03.7	+25.1	78.7	48
49	58 13.0	+10.5	65.6	58 37.0	+12.4	67.1	58 59.6	+14.2	68.7	59 20.7	+16.0	70.2	59 40.2	+17.9	71.8	59 58.1	+19.7	73.5	60 14.3	+21.7	75.1	60 28.8	+23.6	76.9	49
50	58 23.5	+8.9	63.8	58 49.4	+10.7	65.2	59 13.8	+12.5	66.8	59 36.7	+14.3	68.3	59 58.1	+16.2	70.0	60 17.8	+18.2	71.6	60 36.0	+20.0	73.3	60 52.4	+22.0	75.0	50
51	58 32.4	+7.3	61.9	59 00.1	+9.0	63.3	59 26.3	+10.8	64.8	59 51.0	+12.7	66.4	60 14.3	+14.5	68.0	60 36.0	+16.4	69.6	60 56.0	+18.4	71.3	61 14.4	+20.3	73.1	51
52	58 39.7	+5.5	60.0	59 09.1	+7.2	61.4	59 37.1	+9.0	62.9	60 03.7	+10.9	64.4	60 28.8	+12.8	66.0	60 52.4	+14.7	67.7	61 14.4	+16.6	69.4	61 34.7	+18.5	71.1	52
53	58 45.2	+3.8	58.0	59 16.3	+5.6	59.5	59 46.1	+7.3	60.9	60 14.0	+9.1	62.5	60 41.6	+10.9	64.0	61 07.1	+12.8	65.7	61 31.0	+14.8	67.4	61 53.2	+16.6	69.1	53
54	58 49.0	+2.1	56.1	59 21.9	+3.7	57.6	59 53.4	+5.6	59.0	60 23.7	+7.3	60.5	60 52.5	+9.2	62.0	61 19.9	+11.1	63.6	61 45.8	+13.0	65.3	62 10.0	+15.0	67.0	54
55	58 51.1	+0.4	54.2	59 25.6	+2.0	55.6	59 59.0	+3.7	57.0	60 31.0	+5.5	58.5	61 01.7	+7.3	60.0	61 31.0	+9.1	61.6	61 58.8	+11.0	63.2	62 25.0	+13.0	64.9	55
56	58 51.5	−1.4	52.3	59 27.6	+0.3	53.6	60 02.7	+1.8	55.0	60 36.5	+3.6	56.4	61 09.0	+5.4	57.9	61 40.1	+7.3	59.5	62 09.8	+9.2	61.1	62 38.0	+11.1	62.8	56
57	58 50.1	−3.1	50.3	59 27.9	−1.6	51.6	60 04.6	0.0	53.0	60 40.1	+1.8	54.4	61 14.4	+3.5	55.9	61 47.4	+5.3	57.4	62 19.0	+7.2•	59.0	62 49.1	+9.1•	60.7	57
58	58 47.0	−4.8	48.4	59 26.3	−3.3	49.7	60 04.6	−1.7	51.0	60 41.9	−0.1	52.4	61 17.9	+1.6	53.8	61 52.7	+3.4	55.3	62 26.2	+5.2•	56.9	62 58.2	+7.1•	58.5	58
59	58 42.2	−6.6	46.5	59 23.0	−5.1	47.7	60 02.9	−3.5	49.0	60 41.8	−2.0	50.3	61 19.5	−0.3	51.7	61 56.1	+1.4•	53.1	62 31.4	+3.2•	54.7	63 05.3	+5.1•	56.3	59
60	58 35.6	−8.2	44.6	59 17.9	−6.8	45.7	59 59.4	−5.4	47.0	60 39.8	−3.9	48.3	61 19.2	−2.2	49.6	61 57.5	−0.6	51.1	62 34.6	+1.2•	52.6	63 10.4	+3.0•	54.1	60
61	58 27.4	−9.9	42.7	59 11.1	−8.5	43.8	59 54.0	−7.1	45.0	60 36.0	−5.7	46.2	61 17.0	−4.2	47.6	61 56.9	−2.5	48.9	62 35.8	−0.9•	50.4	63 13.4	+1.0•	51.9	61
62	58 17.5	−11.5	40.8	59 02.6	−10.3	41.9	59 46.9	−8.9	43.0	60 30.3	−7.5	44.2	61 12.8	−6.0	45.5	61 54.4	−4.5	46.8	62 34.9	−2.8•	48.2	63 14.4	−1.2•	49.7	62
63	58 06.0	−13.1	38.9	58 52.3	−11.9	40.0	59 38.0	−10.7	41.1	60 22.8	−9.3	42.2	61 06.8	−7.9	43.4	61 49.9	−6.4	44.7	62 32.1	−4.9•	46.0	63 13.2	−3.2•	47.5	63
64	57 52.9	−14.8	37.1	58 40.4	−13.5	38.1	59 27.3	−12.3	39.1	60 13.5	−11.1	40.2	60 58.9	−9.7	41.4	61 43.5	−8.3	42.6	62 27.2	−6.8	43.9	63 10.0	−5.3•	45.3	64
65	57 38.1	−16.2	35.3	58 26.9	−15.2	36.2	59 15.0	−14.1	37.2	60 02.4	−12.8	38.2	60 49.2	−11.6	39.3	61 35.2	−10.2	40.5	62 20.4	−8.8	41.7	63 04.7	−7.3•	43.1	65
66	57 21.9	−17.8	33.5	58 11.7	−16.8	34.4	59 00.9	−15.6	35.3	59 49.6	−14.5	36.3	60 37.6	−13.3	37.3	61 25.0	−12.1	38.4	62 11.6	−10.7	39.6	62 57.4	−9.3•	40.9	66
67	57 04.1	−19.2	31.7	57 54.9	−18.2	32.5	58 45.3	−17.3	33.4	59 35.1	−16.2	34.4	60 24.3	−15.1	35.4	61 12.9	−13.9	36.4	62 00.9	−12.7	37.5	62 48.1	−11.3	38.7	67
68	56 44.9	−20.6	30.0	57 36.7	−19.8	30.8	58 28.0	−18.8	31.6	59 18.9	−17.8	32.5	60 09.2	−16.7	33.4	60 59.0	−15.6	34.4	61 48.2	−14.4	35.4	62 36.8	−13.2	36.6	68
69	56 24.3	−22.1	28.3	57 16.9	−21.2	29.0	58 09.2	−20.3	29.8	59 01.1	−19.4	30.6	59 52.5	−18.5	31.5	60 43.4	−17.4	32.4	61 33.8	−16.3	33.4	62 23.6	−15.2	34.4	69
70	56 02.2	−23.3	26.6	56 55.7	−22.6	27.3	57 48.9	−21.8	28.0	58 41.7	−21.0	28.8	59 34.0	−20.0	29.6	60 26.0	−19.1	30.5	61 17.5	−18.1	31.4	62 08.4	−16.9	32.4	70
71	55 38.9	−24.7	25.0	56 33.1	−23.9	25.6	57 27.1	−23.2	26.3	58 20.7	−22.4	27.0	59 14.0	−21.5	27.7	60 06.9	−20.7	28.5	60 59.4	−19.7	29.4	61 51.5	−18.7	30.3	71
72	55 14.2	−25.8	23.4	56 09.2	−25.2	23.9	57 03.9	−24.5	24.6	57 58.3	−23.8	25.2	58 52.5	−23.1	25.9	59 46.2	−22.2	26.7	60 39.7	−21.4	27.5	61 32.7	−20.5	28.3	72
73	54 48.4	−27.1	21.8	55 44.0	−26.5	22.3	56 39.4	−25.9	22.9	57 34.5	−25.2	23.5	58 29.4	−24.5	24.1	59 24.0	−23.8	24.8	60 18.3	−23.0	25.6	61 12.2	−22.1	26.4	73
74	54 21.3	−28.2	20.2	55 17.5	−27.7	20.7	56 13.5	−27.1	21.3	57 09.3	−26.5	21.8	58 04.9	−25.9	22.4	59 00.2	−25.2	23.0	59 55.3	−24.5	23.7	60 50.1	−23.7	24.4	74
75	53 53.1	−29.4	18.7	54 49.8	−28.8	19.2	55 46.4	−28.3	19.7	56 42.8	−27.7	20.2	57 39.0	−27.2	20.7	58 35.0	−26.6	21.3	59 30.8	−25.9	21.9	60 26.4	−25.3	22.6	75
76	53 23.7	−30.4	17.3	54 21.0	−30.0	17.7	55 18.1	−29.5	18.1	56 15.0	−29.0	18.6	57 11.8	−28.5	19.1	58 08.4	−27.9	19.6	59 04.9	−27.4	20.1	60 01.1	−26.8	20.7	76
77	52 53.3	−31.4	15.8	53 51.0	−31.0	16.2	54 48.6	−30.6	16.6	55 46.0	−30.2	17.0	56 43.3	−29.7	17.4	57 40.5	−29.2	17.9	58 37.5	−28.7	18.4	59 34.3	−28.1	19.0	77
78	52 21.9	−32.4	14.4	53 20.0	−32.1	14.8	54 18.0	−31.7	15.1	55 15.8	−31.3	15.5	56 13.6	−30.9	15.9	57 11.3	−30.5	16.3	58 08.8	−30.0	16.7	59 06.2	−29.6	17.2	78
79	51 49.5	−33.3	13.0	52 47.9	−33.0	13.3	53 46.3	−32.7	13.7	54 44.6	−32.4	14.0	55 42.7	−32.0	14.3	56 40.8	−31.6	14.7	57 38.8	−31.2	15.1	58 36.7	−30.8	15.5	79
80	51 16.2	−34.2	11.7	52 14.9	−33.9	12.0	53 13.6	−33.7	12.2	54 12.2	−33.4	12.5	55 10.7	−33.0	12.9	56 09.2	−32.7	13.2	57 07.6	−32.4	13.5	58 05.9	−32.0	13.9	80
81	50 42.0	−35.1	10.4	51 41.0	−34.8	10.6	52 39.9	−34.5	10.9	53 38.8	−34.3	11.1	54 37.7	−34.1	11.4	55 36.5	−33.8	11.7	56 35.2	−33.5	12.0	57 33.9	−33.2	12.3	81
82	50 06.9	−35.8	9.1	51 06.2	−35.7	9.3	52 05.4	−35.5	9.5	53 04.5	−35.3	9.8	54 03.6	−35.0	10.0	55 02.7	−34.8	10.2	56 01.7	−34.5	10.5	57 00.7	−34.3	10.8	82
83	49 31.1	−36.7	7.9	50 30.5	−36.5	8.1	51 29.9	−36.3	8.2	52 29.2	−36.1	8.4	53 28.6	−36.0	8.6	54 27.9	−35.8	8.8	55 27.2	−35.6	9.0	56 26.4	−35.3	9.3	83
84	48 54.4	−37.4	6.7	49 54.0	−37.3	6.8	50 53.6	−37.2	7.0	51 53.1	−37.0	7.1	52 52.6	−36.8	7.3	53 52.1	−36.7	7.4	54 51.6	−36.5	7.6	55 51.1	−36.3	7.8	84
85	48 17.0	−38.1	5.5	49 16.7	−38.0	5.6	50 16.4	−37.9	5.7	51 16.1	−37.7	5.8	52 15.8	−37.6	6.0	53 15.5	−37.6	6.1	54 15.1	−37.4	6.3	55 14.8	−37.3	6.4	85
86	47 38.9	−38.8	4.3	48 38.7	−38.7	4.4	49 38.5	−38.6	4.5	50 38.4	−38.6	4.6	51 38.2	−38.5	4.7	52 37.9	−38.3	4.8	53 37.7	−38.2	4.9	54 37.5	−38.2	5.1	86
87	47 00.1	−39.4	3.2	48 00.0	−39.4	3.3	49 00.0	−39.4	3.3	49 59.8	−39.2	3.4	50 59.7	−39.2	3.5	51 59.6	−39.1	3.6	52 59.5	−39.1	3.6	53 59.3	−39.0	3.7	87
88	46 20.7	−40.1	2.1	47 20.6	−40.0	2.2	48 20.6	−40.0	2.2	49 20.6	−40.0	2.2	50 20.5	−39.9	2.3	51 20.5	−39.9	2.3	52 20.4	−39.8	2.4	53 20.4	−39.8	2.5	88
89	45 40.6	−40.6	1.0	46 40.6	−40.6	1.1	47 40.6	−40.6	1.1	48 40.6	−40.6	1.1	49 40.6	−40.6	1.1	50 40.6	−40.6	1.2	51 40.6	−40.6	1.2	52 40.6	−40.6	1.2	89
90	45 00.0	−41.2	0.0	46 00.0	−41.2	0.0	47 00.0	−41.2	0.0	48 00.0	−41.2	0.0	49 00.0	−41.2	0.0	50 00.0	−41.2	0.0	51 00.0	−41.3	0.0	52 00.0	−41.3	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	28 49.9	−48.5	123.4	28 16.7	−49.1	123.9	27 43.1	−49.7	124.3	27 09.1	−50.2	124.7	26 34.7	−50.7	125.1	26 00.0	−51.2	125.5	25 25.0	−51.7	125.9	24 49.6	−52.1	126.3	0
1	28 01.4	−48.7	124.1	27 27.6	−49.3	124.5	26 53.4	−49.9	124.9	26 18.9	−50.3	125.3	25 44.0	−50.8	125.6	25 08.8	−51.3	126.1	24 33.3	−51.8	126.5	23 57.5	−52.3	126.9	1
2	27 12.7	−48.9	124.7	26 38.3	−49.4	125.1	26 03.6	−50.0	125.5	25 28.6	−50.5	125.9	24 53.2	−51.0	126.3	24 17.5	−51.5	126.7	23 41.5	−51.9	127.0	23 05.2	−52.4	127.4	2
3	26 23.8	−49.1	125.4	25 48.9	−49.6	125.8	25 13.6	−50.1	126.2	24 38.1	−50.7	126.5	24 02.2	−51.1	126.9	23 26.0	−51.6	127.2	22 49.6	−52.1	127.6	22 12.8	−52.4	127.9	3
4	25 34.7	−49.2	126.0	24 59.3	−49.8	126.4	24 23.5	−50.3	126.8	23 47.4	−50.7	127.1	23 11.1	−51.3	127.5	22 34.4	−51.7	127.8	21 57.5	−52.1	128.1	21 20.4	−52.6	128.4	4
5	24 45.5	−49.4	126.6	24 09.5	−49.9	127.0	23 33.2	−50.4	127.4	22 56.7	−50.9	127.7	22 19.8	−51.3	128.0	21 42.7	−51.8	128.4	21 05.4	−52.3	128.7	20 27.8	−52.7	129.0	5
6	23 56.1	−49.6	127.3	23 19.6	−50.1	127.6	22 42.8	−50.5	128.0	22 05.8	−51.0	128.3	21 28.5	−51.5	128.6	20 50.9	−51.9	128.9	20 13.1	−52.3	129.2	19 35.1	−52.7	129.5	6
7	23 06.5	−49.7	127.9	22 29.5	−50.1	128.2	21 52.3	−50.7	128.5	21 14.8	−51.1	128.8	20 37.0	−51.5	129.1	19 59.0	−52.0	129.4	19 20.8	−52.4	129.7	18 42.4	−52.9	130.0	7
8	22 16.8	−49.8	128.5	21 39.4	−50.3	128.8	21 01.6	−50.7	129.1	20 23.7	−51.3	129.4	19 45.5	−51.7	129.7	19 07.0	−52.1	130.0	18 28.4	−52.5	130.2	17 49.5	−52.9	130.5	8
9	21 27.0	−49.9	129.1	20 49.1	−50.5	129.4	20 10.9	−50.9	129.7	19 32.4	−51.3	130.0	18 53.8	−51.8	130.2	18 14.9	−52.1	130.5	17 35.9	−52.6	130.7	16 56.6	−52.9	131.0	9
10	20 37.1	−50.1	129.7	19 58.6	−50.5	130.0	19 20.0	−51.0	130.2	18 41.1	−51.4	130.5	18 02.0	−51.8	130.8	17 22.8	−52.3	131.0	16 43.3	−52.6	131.2	16 03.7	−53.1	131.5	10
11	19 47.0	−50.2	130.3	19 08.1	−50.6	130.5	18 29.0	−51.1	130.8	17 49.7	−51.5	131.1	17 10.2	−51.9	131.3	16 30.5	−52.3	131.5	15 50.7	−52.8	131.7	15 10.6	−53.1	131.9	11
12	18 56.8	−50.3	130.9	18 17.5	−50.8	131.1	17 37.9	−51.2	131.4	16 58.2	−51.6	131.6	16 18.3	−52.0	131.8	15 38.2	−52.4	132.0	14 57.9	−52.7	132.2	14 17.5	−53.1	132.4	12
13	18 06.5	−50.4	131.4	17 26.7	−50.8	131.7	16 46.7	−51.2	131.9	16 06.6	−51.7	132.1	15 26.3	−52.1	132.3	14 45.8	−52.5	132.5	14 05.2	−52.9	132.7	13 24.4	−53.2	132.9	13
14	17 16.1	−50.5	132.0	16 35.9	−50.9	132.2	15 55.5	−51.4	132.4	15 14.9	−51.7	132.6	14 34.2	−52.2	132.8	13 53.3	−52.5	133.0	13 12.3	−52.9	133.2	12 31.2	−53.1	133.4	14
15	16 25.6	−50.5	132.6	15 45.0	−51.0	132.8	15 04.1	−51.4	133.0	14 23.2	−51.8	133.2	13 42.0	−52.2	133.4	13 00.8	−52.6	133.5	12 19.4	−52.9	133.7	11 37.9	−53.3	133.8	15
16	15 35.1	−50.7	133.1	14 54.0	−51.1	133.3	14 12.7	−51.4	133.5	13 31.4	−51.9	133.7	12 49.8	−52.2	133.9	12 08.2	−52.6	134.0	11 26.5	−53.0	134.2	10 44.6	−53.3	134.3	16
17	14 44.4	−50.7	133.7	14 02.9	−51.1	133.9	13 21.3	−51.6	134.0	12 39.5	−52.0	134.2	11 57.6	−52.3	134.4	11 15.6	−52.7	134.5	10 33.5	−53.1	134.6	9 51.3	−53.4	134.8	17
18	13 53.7	−50.8	134.2	13 11.8	−51.3	134.4	12 29.7	−51.6	134.6	11 47.5	−51.9	134.7	11 05.3	−52.4	134.9	10 22.9	−52.7	135.0	9 40.4	−53.1	135.1	8 57.9	−53.5	135.2	18
19	13 02.9	−50.9	134.8	12 20.5	−51.2	134.9	11 38.1	−51.7	135.1	10 55.6	−52.1	135.2	10 12.9	−52.4	135.4	9 30.2	−52.8	135.5	8 47.3	−53.1	135.6	8 04.4	−53.4	135.7	19
20	12 12.0	−51.0	135.3	11 29.3	−51.4	135.5	10 46.4	−51.7	135.6	10 03.5	−52.1	135.7	9 20.5	−52.4	135.9	8 37.4	−52.8	136.0	7 54.2	−53.1	136.1	7 11.0	−53.5	136.2	20
21	11 21.0	−51.0	135.9	10 37.9	−51.4	136.0	9 54.7	−51.7	136.1	9 11.4	−52.1	136.2	8 28.1	−52.5	136.3	7 44.6	−52.8	136.4	7 01.1	−53.2	136.5	6 17.5	−53.5	136.6	21
22	10 30.0	−51.0	136.4	9 46.5	−51.4	136.6	9 03.0	−51.8	136.6	8 19.3	−52.2	136.7	7 35.6	−52.5	136.8	6 51.8	−52.9	136.9	6 07.9	−53.2	137.0	5 24.0	−53.5	137.1	22
23	9 39.0	−51.1	136.9	8 55.1	−51.5	137.0	8 11.1	−51.8	137.1	7 27.1	−52.2	137.2	6 43.0	−52.5	137.3	5 58.9	−52.9	137.4	5 14.7	−53.2	137.5	4 30.5	−53.5	137.5	23
24	8 47.9	−51.2	137.5	8 03.6	−51.5	137.6	7 19.3	−51.9	137.7	6 34.9	−52.2	137.7	5 50.5	−52.6	137.8	5 06.0	−52.9	137.9	4 21.5	−53.2	137.9	3 37.0	−53.6	138.0	24
25	7 56.7	−51.2	138.0	7 12.1	−51.6	138.1	6 27.4	−51.9	138.2	5 42.7	−52.3	138.2	4 57.9	−52.6	138.3	4 13.1	−52.9	138.3	3 28.3	−53.3	138.4	2 43.4	−53.6	138.4	25
26	7 05.5	−51.2	138.5	6 20.5	−51.5	138.6	5 35.5	−51.9	138.7	4 50.4	−52.3	138.7	4 05.3	−52.6	138.8	3 20.2	−52.9	138.8	2 35.0	−53.3	138.9	1 49.8	−53.5	138.9	26
27	6 14.3	−51.3	139.0	5 29.0	−51.6	139.1	4 43.6	−52.0	139.2	3 58.2	−52.3	139.2	3 12.7	−52.6	139.3	2 27.3	−53.0	139.3	1 41.8	−53.3	139.3	0 56.3	−53.6	139.3	27
28	5 23.0	−51.2	139.6	4 37.4	−51.7	139.6	3 51.6	−51.9	139.7	3 05.9	−52.3	139.7	2 20.1	−52.6	139.7	1 34.3	−52.9	139.8	0 48.5	−53.3	139.8	0 02.7	−53.6	139.8	28
29	4 31.8	−51.3	140.1	3 45.7	−51.6	140.1	2 59.7	−52.0	140.2	2 13.6	−52.3	140.2	1 27.5	−52.7	140.2	0 41.4	−53.0	140.2	0 04.8	+53.2	39.8	0 50.9	+53.5	39.8	29
30	3 40.5	−51.4	140.6	2 54.1	−51.7	140.6	2 07.7	−52.0	140.7	1 21.3	−52.4	140.7	0 34.8	−52.6	140.7	0 11.6	+53.0	39.3	0 58.1	+53.3	39.3	1 44.4	+53.6	39.3	30
31	2 49.1	−51.3	141.1	2 02.4	−51.7	141.1	1 15.7	−52.0	141.2	0 28.9	−52.3	141.2	0 17.8	+52.7	38.8	1 04.6	+52.9	38.8	1 51.3	+53.3	38.8	2 38.0	+53.6	38.9	31
32	1 57.8	−51.3	141.6	1 10.7	−51.6	141.7	0 23.7	−52.0	141.7	0 23.4	+52.3	38.3	1 10.5	+52.6	38.3	1 57.5	+52.9	38.4	2 44.5	+53.3	38.4	3 31.6	+53.5	38.4	32
33	1 06.4	−51.3	142.2	0 19.1	−51.7	142.2	0 28.3	+52.0	37.8	1 15.7	+52.3	37.8	2 03.1	+52.6	37.9	2 50.4	+53.0	37.9	3 37.8	+53.2	37.9	4 25.1	+53.5	38.0	33
34	0 15.1	−51.4	142.7	0 32.6	+51.7	37.3	1 20.3	+52.0	37.3	2 08.0	+52.3	37.4	2 55.7	+52.6	37.4	3 43.4	+52.9	37.4	4 31.0	+53.2	37.5	5 18.6	+53.5	37.5	34
35	0 36.3	+51.3	36.8	1 24.3	+51.7	36.8	2 12.3	+52.0	36.8	3 00.3	+52.3	36.9	3 48.3	+52.6	36.9	4 36.3	+52.9	36.9	5 24.2	+53.2	37.0	6 12.1	+53.5	37.1	35
36	1 27.6	+51.4	36.3	2 16.0	+51.6	36.3	3 04.3	+52.0	36.3	3 52.6	+52.3	36.4	4 40.9	+52.6	36.4	5 29.2	+52.9	36.5	6 17.4	+53.2	36.5	7 05.6	+53.5	36.6	36
37	2 19.0	+51.3	35.8	3 07.6	+51.7	35.8	3 56.3	+51.9	35.8	4 44.9	+52.3	35.9	5 33.5	+52.6	35.9	6 22.1	+52.8	36.0	7 10.6	+53.1	36.1	7 59.1	+53.4	36.1	37
38	3 10.3	+51.3	35.3	3 59.3	+51.6	35.3	4 48.2	+52.0	35.3	5 37.2	+52.2	35.4	6 26.1	+52.5	35.4	7 14.9	+52.8	35.5	8 03.7	+53.1	35.6	8 52.5	+53.4	35.7	38
39	4 01.6	+51.3	34.7	4 50.9	+51.6	34.8	5 40.2	+51.9	34.8	6 29.4	+52.2	34.9	7 18.6	+52.5	35.0	8 07.7	+52.8	35.0	8 56.8	+53.1	35.1	9 45.9	+53.3	35.2	39
40	4 52.9	+51.3	34.2	5 42.5	+51.6	34.3	6 32.1	+51.8	34.3	7 21.6	+52.2	34.4	8 11.1	+52.4	34.5	9 00.5	+52.8	34.6	9 49.9	+53.0	34.7	10 39.2	+53.3	34.8	40
41	5 44.2	+51.2	33.7	6 34.1	+51.5	33.8	7 23.9	+51.9	33.8	8 13.8	+52.1	33.9	9 03.5	+52.5	34.0	9 53.3	+52.7	34.1	10 42.9	+53.0	34.2	11 32.5	+53.3	34.3	41
42	6 35.4	+51.2	33.2	7 25.6	+51.5	33.2	8 15.8	+51.8	33.3	9 05.9	+52.1	33.4	9 56.0	+52.3	33.5	10 46.0	+52.6	33.6	11 35.9	+53.0	33.7	12 25.8	+53.2	33.8	42
43	7 26.6	+51.2	32.6	8 17.1	+51.5	32.7	9 07.6	+51.7	32.8	9 58.0	+52.0	32.9	10 48.3	+52.4	33.0	11 38.6	+52.7	33.1	12 28.9	+52.9	33.2	13 19.0	+53.2	33.3	43
44	8 17.8	+51.1	32.1	9 08.6	+51.4	32.2	9 59.3	+51.7	32.3	10 50.0	+52.0	32.4	11 40.7	+52.3	32.5	12 31.3	+52.5	32.6	13 21.8	+52.8	32.7	14 12.2	+53.1	32.9	44
45	9 08.9	+51.1	31.6	10 00.0	+51.4	31.7	10 51.1	+51.6	31.8	11 42.0	+52.0	31.9	12 33.0	+52.2	32.0	13 23.8	+52.5	32.1	14 14.6	+52.8	32.2	15 05.3	+53.0	32.4	45
46	10 00.0	+51.1	31.1	10 51.4	+51.3	31.2	11 42.7	+51.6	31.3	12 34.0	+51.9	31.4	13 25.2	+52.1	31.5	14 16.3	+52.4	31.6	15 07.4	+52.7	31.8	15 58.3	+53.0	31.9	46
47	10 51.1	+50.9	30.5	11 42.7	+51.3	30.6	12 34.3	+51.6	30.7	13 25.9	+51.8	30.9	14 17.3	+52.1	31.0	15 08.7	+52.4	31.1	16 00.1	+52.6	31.3	16 51.3	+52.9	31.4	47
48	11 42.0	+51.0	30.0	12 34.0	+51.2	30.1	13 25.9	+51.4	30.2	14 17.7	+51.7	30.3	15 09.4	+52.1	30.5	16 01.1	+52.3	30.6	16 52.7	+52.6	30.8	17 44.2	+52.9	30.9	48
49	12 33.0	+50.8	29.4	13 25.2	+51.1	29.6	14 17.3	+51.4	29.7	15 09.4	+51.7	29.8	16 01.5	+51.9	29.9	16 53.4	+52.2	30.1	17 45.3	+52.5	30.3	18 37.1	+52.7	30.4	49
50	13 23.8	+50.8	28.9	14 16.3	+51.1	29.0	15 08.7	+51.4	29.1	16 01.1	+51.6	29.3	16 53.4	+51.9	29.4	17 45.6	+52.2	29.6	18 37.8	+52.4	29.7	19 29.8	+52.7	29.9	50
51	14 14.6	+50.7	28.3	15 07.4	+50.9	28.5	16 00.1	+51.2	28.6	16 52.7	+51.5	28.7	17 45.3	+51.8	28.9	18 37.8	+52.0	29.1	19 30.2	+52.3	29.2	20 22.5	+52.6	29.4	51
52	15 05.3	+50.6	27.8	15 58.3	+50.9	27.9	16 51.3	+51.2	28.1	17 44.2	+51.5	28.2	18 37.1	+51.7	28.4	19 29.8	+52.0	28.5	20 22.5	+52.2	28.7	21 15.1	+52.5	28.9	52
53	15 55.9	+50.6	27.2	16 49.2	+50.8	27.4	17 42.5	+51.1	27.5	18 35.7	+51.3	27.7	19 28.8	+51.6	27.8	20 21.8	+51.8	28.0	21 14.7	+52.1	28.2	22 07.6	+52.3	28.4	53
54	16 46.5	+50.4	26.7	17 40.0	+50.6	26.8	18 33.6	+50.9	27.0	19 27.0	+51.2	27.1	20 20.4	+51.5	27.3	21 13.6	+51.8	27.5	22 06.8	+52.1	27.6	22 59.9	+52.3	27.8	54
55	17 36.9	+50.4	26.1	18 30.8	+50.6	26.3	19 24.5	+50.9	26.4	20 18.2	+51.2	26.6	21 11.9	+51.3	26.7	22 05.4	+51.6	26.9	22 58.9	+51.9	27.1	23 52.2	+52.2	27.3	55
56	18 27.3	+50.2	25.5	19 21.4	+50.5	25.7	20 15.4	+50.8	25.8	21 09.4	+51.0	26.0	22 03.2	+51.3	26.2	22 57.0	+51.6	26.4	23 50.8	+51.8	26.6	24 44.4	+52.0	26.8	56
57	19 17.5	+50.1	25.0	20 11.9	+50.4	25.1	21 06.2	+50.6	25.3	22 00.4	+50.9	25.4	22 54.5	+51.2	25.6	23 48.6	+51.4	25.8	24 42.6	+51.6	26.0	25 36.4	+52.0	26.2	57
58	20 07.6	+50.1	24.4	21 02.3	+50.2	24.5	21 56.8	+50.5	24.7	22 51.3	+50.8	24.9	23 45.7	+51.0	25.1	24 40.0	+51.3	25.2	25 34.2	+51.6	25.4	26 28.4	+51.7	25.7	58
59	20 57.7	+49.9	23.8	21 52.5	+50.2	23.9	22 47.3	+50.4	24.1	23 42.1	+50.6	24.3	24 36.7	+50.9	24.5	25 31.3	+51.1	24.7	26 25.8	+51.4	24.9	27 20.1	+51.7	25.1	59
60	21 47.6	+49.7	23.2	22 42.7	+50.0	23.4	23 37.7	+50.3	23.5	24 32.7	+50.5	23.7	25 27.6	+50.8	23.9	26 22.4	+51.0	24.1	27 17.2	+51.2	24.3	28 11.8	+51.5	24.5	60
61	22 37.3	+49.7	22.6	23 32.7	+49.9	22.8	24 28.0	+50.1	22.9	25 23.2	+50.4	23.1	26 18.4	+50.6	23.3	27 13.4	+50.9	23.5	28 08.4	+51.1	23.7	29 03.3	+51.3	23.9	61
62	23 27.0	+49.4	22.1	24 22.6	+49.7	22.2	25 18.1	+50.0	22.4	26 13.6	+50.2	22.5	27 09.0	+50.4	22.7	28 04.3	+50.7	22.9	28 59.5	+50.9	23.1	29 54.6	+51.2	23.3	62
63	24 16.4	+49.4	21.4	25 12.3	+49.6	21.5	26 08.1	+49.8	21.7	27 03.8	+50.0	21.9	27 59.4	+50.3	22.1	28 55.0	+50.5	22.3	29 50.4	+50.8	22.5	30 45.8	+51.0	22.7	63
64	25 05.8	+49.2	20.7	26 01.9	+49.4	20.9	26 57.9	+49.6	21.1	27 53.8	+49.9	21.3	28 49.7	+50.1	21.5	29 45.5	+50.4	21.7	30 41.2	+50.6	21.9	31 36.8	+50.9	22.1	64
65	25 55.0	+49.0	20.1	26 51.3	+49.2	20.3	27 47.5	+49.5	20.4	28 43.7	+49.7	20.6	29 39.8	+49.9	20.8	30 35.9	+50.1	21.0	31 31.8	+50.4	21.2	32 27.7	+50.6	21.5	65
66	26 44.0	+48.9	19.5	27 40.5	+49.1	19.6	28 37.0	+49.3	19.8	29 33.4	+49.5	20.0	30 29.7	+49.8	20.2	31 26.0	+50.0	20.4	32 22.2	+50.2	20.6	33 18.3	+50.5	20.9	66
67	27 32.8	+48.6	18.8	28 29.6	+48.8	19.0	29 26.3	+49.0	19.2	30 22.9	+49.3	19.3	31 19.5	+49.5	19.5	32 16.0	+49.8	19.8	33 12.4	+50.0	20.0	34 08.8	+50.2	20.2	67
68	28 21.4	+48.5	18.1	29 18.4	+48.7	18.3	30 15.3	+48.9	18.5	31 12.2	+49.1	18.7	32 09.0	+49.4	18.9	33 05.8	+49.5	19.1	34 02.4	+49.8	19.3	34 59.0	+50.0	19.5	68
69	29 09.9	+48.2	17.5	30 07.1	+48.4	17.6	31 04.2	+48.7	17.8	32 01.3	+48.9	18.0	32 58.4	+49.1	18.2	33 55.3	+49.3	18.4	34 52.2	+49.6	18.6	35 49.0	+49.8	18.9	69
70	29 58.1	+48.0	16.8	30 55.5	+48.3	17.0	31 52.9	+48.4	17.1	32 50.2	+48.7	17.3	33 47.5	+48.8	17.5	34 44.6	+49.1	17.7	35 41.8	+49.3	17.9	36 38.8	+49.5	18.2	70
71	30 46.1	+47.8	16.1	31 43.8	+48.0	16.3	32 41.3	+48.3	16.4	33 38.9	+48.4	16.6	34 36.3	+48.7	16.8	35 33.7	+48.9	17.0	36 31.1	+49.0	17.2	37 28.3	+49.3	17.5	71
72	31 33.9	+47.6	15.4	32 31.8	+47.7	15.5	33 29.6	+47.9	15.7	34 27.3	+48.1	15.9	35 25.0	+48.3	16.1	36 22.6	+48.5	16.3	37 20.1	+48.8	16.5	38 17.6	+49.0	16.7	72
73	32 21.5	+47.3	14.7	33 19.5	+47.5	14.8	34 17.5	+47.7	15.0	35 15.4	+47.9	15.2	36 13.3	+48.1	15.4	37 11.1	+48.3	15.6	38 08.9	+48.5	15.8	39 06.6	+48.7	16.0	73
74	33 08.8	+47.1	13.9	34 07.0	+47.3	14.1	35 05.2	+47.4	14.3	36 03.3	+47.7	14.4	37 01.4	+47.8	14.6	37 59.4	+48.1	14.8	38 57.4	+48.2	15.0	39 55.3	+48.5	15.2	74
75	33 55.9	+46.8	13.2	34 54.3	+46.9	13.4	35 52.6	+47.2	13.5	36 51.0	+47.3	13.7	37 49.2	+47.5	13.9	38 47.5	+47.7	14.1	39 45.6	+47.9	14.3	40 43.8	+48.1	14.5	75
76	34 42.7	+46.5	12.4	35 41.2	+46.7	12.6	36 39.8	+46.8	12.7	37 38.3	+47.0	12.9	38 36.7	+47.2	13.1	39 35.2	+47.3	13.3	40 33.5	+47.6	13.5	41 31.9	+47.7	13.7	76
77	35 29.2	+46.1	11.7	36 27.9	+46.4	11.8	37 26.6	+46.5	12.0	38 25.3	+46.7	12.1	39 23.9	+46.9	12.3	40 22.5	+47.1	12.5	41 21.1	+47.2	12.7	42 19.6	+47.4	12.9	77
78	36 15.3	+45.9	10.9	37 14.3	+46.0	11.0	38 13.1	+46.2	11.2	39 12.0	+46.3	11.3	40 10.8	+46.5	11.5	41 09.6	+46.7	11.7	42 08.3	+46.9	11.9	43 07.0	+47.1	12.0	78
79	37 01.2	+45.6	10.1	38 00.3	+45.7	10.2	38 59.3	+45.9	10.3	39 58.3	+46.0	10.5	40 57.3	+46.2	10.6	41 56.3	+46.3	10.8	42 55.2	+46.5	11.0	43 54.1	+46.6	11.2	79
80	37 46.8	+45.2	9.2	38 46.0	+45.3	9.4	39 45.2	+45.4	9.5	40 44.3	+45.6	9.6	41 43.5	+45.7	9.8	42 42.6	+45.9	10.0	43 41.7	+46.0	10.1	44 40.7	+46.2	10.3	80
81	38 32.0	+44.8	8.4	39 31.3	+45.0	8.5	40 30.6	+45.1	8.7	41 29.9	+45.3	8.8	42 29.2	+45.4	8.9	43 28.5	+45.5	9.1	44 27.7	+45.7	9.2	45 26.9	+45.8	9.4	81
82	39 16.8	+44.4	7.6	40 16.3	+44.5	7.7	41 15.7	+44.7	7.8	42 15.2	+44.8	7.9	43 14.6	+44.9	8.0	44 14.0	+45.0	8.2	45 13.4	+45.2	8.3	46 12.7	+45.3	8.5	82
83	40 01.2	+44.1	6.7	41 00.8	+44.2	6.8	42 00.4	+44.3	6.9	43 00.0	+44.3	7.0	43 59.5	+44.5	7.1	44 59.0	+44.6	7.2	45 58.6	+44.7	7.4	46 58.0	+44.9	7.5	83
84	40 45.3	+43.6	6.0	41 45.0	+43.7	6.0	42 44.7	+43.8	6.0	43 44.3	+43.9	6.1	44 44.0	+44.0	6.2	45 43.6	+44.1	6.2	46 43.3	+44.2	6.3	47 42.9	+44.4	6.5	84
85	41 28.9	+43.2	4.9	42 28.7	+43.3	5.0	43 28.5	+43.3	5.0	44 28.2	+43.5	5.1	45 28.0	+43.5	5.2	46 27.7	+43.6	5.3	47 27.5	+43.7	5.4	48 27.2	+43.8	5.5	85
86	42 12.1	+42.7	3.9	43 12.0	+42.8	4.0	44 11.8	+42.9	4.1	45 11.7	+42.9	4.2	46 11.5	+43.0	4.2	47 11.3	+43.1	4.3	48 11.2	+43.1	4.4	49 11.0	+43.2	4.5	86
87	42 54.8	+42.3	2.9	43 54.8	+42.3	3.0	44 54.7	+42.4	3.1	45 54.6	+42.4	3.2	46 54.5	+42.4	3.2	47 54.4	+42.5	3.3	48 54.3	+42.5	3.4	49 54.2	+42.6	3.4	87
88	43 37.1	+41.7	2.0	44 37.0	+41.8	2.1	45 37.0	+41.8	2.1	46 37.0	+41.8	2.1	47 36.9	+41.9	2.2	48 36.9	+41.9	2.2	49 36.8	+41.9	2.3	50 36.8	+41.9	2.3	88
89	44 18.8	+41.2	1.0	45 18.8	+41.2	1.0	46 18.8	+41.2	1.1	47 18.8	+41.2	1.1	48 18.8	+41.2	1.1	49 18.8	+41.2	1.1	50 18.7	+41.3	1.1	51 18.7	+41.3	1.2	89
90	45 00.0	+40.6	0.0	46 00.0	+40.6	0.0	47 00.0	+40.6	0.0	48 00.0	+40.6	0.0	49 00.0	+40.6	0.0	50 00.0	+40.6	0.0	51 00.0	+40.6	0.0	52 00.0	+40.6	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 133°, 227°**
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	28 14.3	+48.1	122.5	27 41.9	+48.7	122.9	27 09.1	+49.2	123.4	26 35.9	+49.8	123.8	26 02.4	+50.3	124.2	25 28.5	+50.8	124.6	24 54.2	+51.4	125.0	24 19.7	+51.8	125.4	0
1	29 02.4	+47.8	121.8	28 30.6	+48.4	122.3	27 58.3	+49.1	122.7	27 25.7	+49.6	123.2	26 52.7	+50.1	123.6	26 19.3	+50.7	124.0	25 45.6	+51.2	124.4	25 11.5	+51.7	124.8	1
2	29 50.2	+47.7	121.1	29 19.0	+48.3	121.6	28 47.4	+48.8	122.1	28 15.3	+49.4	122.5	27 42.8	+50.0	123.0	27 10.0	+50.5	123.4	26 36.8	+51.0	123.8	26 03.2	+51.6	124.2	2
3	30 37.9	+47.3	120.4	30 07.3	+48.0	120.9	29 36.2	+48.7	121.4	29 04.7	+49.3	121.9	28 32.8	+49.9	122.3	28 00.5	+50.4	122.8	27 27.8	+51.0	123.2	26 54.8	+51.4	123.7	3
4	31 25.2	+47.2	119.7	30 55.3	+47.8	120.2	30 24.9	+48.4	120.7	29 54.0	+49.0	121.2	29 22.7	+49.6	121.7	28 50.9	+50.2	122.2	28 18.8	+50.7	122.6	27 46.2	+51.3	123.1	4
5	32 12.4	+46.9	119.0	31 43.1	+47.6	119.5	31 13.3	+48.2	120.0	30 43.0	+48.9	120.6	30 12.3	+49.4	121.1	29 41.1	+50.0	121.6	29 09.5	+50.6	122.0	28 37.5	+51.1	122.5	5
6	32 59.3	+46.6	118.2	32 30.7	+47.3	118.8	32 01.5	+48.0	119.3	31 31.9	+48.6	119.9	31 01.7	+49.3	120.4	30 31.1	+49.9	120.9	30 00.1	+50.4	121.4	29 28.6	+51.0	121.9	6
7	33 45.9	+46.4	117.5	33 18.0	+47.0	118.1	32 49.5	+47.7	118.6	32 20.5	+48.4	119.2	31 51.0	+49.0	119.7	31 21.0	+49.6	120.3	30 50.5	+50.2	120.8	30 19.6	+50.8	121.3	7
8	34 32.3	+46.0	116.7	34 05.0	+46.8	117.3	33 37.2	+47.5	117.9	33 08.9	+48.1	118.5	32 40.0	+48.8	119.1	32 10.6	+49.4	119.6	31 40.7	+50.1	120.1	31 10.4	+50.6	120.7	8
9	35 18.3	+45.8	115.9	34 51.8	+46.5	116.5	34 24.7	+47.2	117.2	33 57.0	+47.9	117.8	33 28.8	+48.6	118.4	33 00.0	+49.2	118.9	32 30.8	+49.8	119.5	32 01.0	+50.4	120.0	9
10	36 04.1	+45.4	115.1	35 38.3	+46.2	115.8	35 11.9	+46.9	116.4	34 44.9	+47.7	117.0	34 17.4	+48.3	117.6	33 49.2	+49.0	118.2	33 20.6	+49.6	118.8	32 51.4	+50.2	119.4	10
11	36 49.5	+45.1	114.3	36 24.5	+45.9	115.0	35 58.8	+46.7	115.6	35 32.6	+47.3	116.3	35 05.7	+48.0	116.9	34 38.2	+48.7	117.5	34 10.2	+49.4	118.2	33 41.6	+50.0	118.7	11
12	37 34.6	+44.7	113.5	37 10.4	+45.5	114.2	36 45.5	+46.3	114.9	36 19.9	+47.1	115.5	35 53.7	+47.8	116.2	35 26.9	+48.5	116.8	34 59.6	+49.1	117.5	34 31.6	+49.8	118.1	12
13	38 19.3	+44.4	112.6	37 55.9	+45.2	113.4	37 31.8	+46.0	114.1	37 07.0	+46.7	114.8	36 41.5	+47.5	115.4	36 15.4	+48.2	116.1	35 48.7	+48.9	116.8	35 21.4	+49.5	117.4	13
14	39 03.7	+44.0	111.8	38 41.1	+44.8	112.5	38 17.7	+45.7	113.3	37 53.7	+46.4	114.0	37 29.0	+47.2	114.7	37 03.6	+47.9	115.4	36 37.6	+48.6	116.0	36 10.9	+49.3	116.7	14
15	39 47.7	+43.5	110.9	39 25.9	+44.4	111.7	39 03.4	+45.3	112.4	38 40.1	+46.1	113.2	38 16.2	+46.9	113.9	37 51.5	+47.7	114.6	37 26.2	+48.4	115.3	37 00.2	+49.1	116.0	15
16	40 31.2	+43.2	110.0	40 10.3	+44.1	110.8	39 48.7	+44.9	111.6	39 26.2	+45.7	112.3	39 03.1	+46.5	113.1	38 39.2	+47.3	113.8	38 14.6	+48.0	114.6	37 49.3	+48.8	115.3	16
17	41 14.4	+42.7	109.1	40 54.4	+43.6	109.9	40 33.6	+44.4	110.7	40 11.9	+45.4	111.5	39 49.6	+46.2	112.3	39 26.5	+46.9	113.0	39 02.6	+47.8	113.8	38 38.1	+48.5	114.5	17
18	41 57.1	+42.2	108.1	41 38.0	+43.1	109.0	41 18.0	+44.1	109.8	40 57.3	+45.0	110.6	40 35.8	+45.8	111.4	40 13.4	+46.7	112.2	39 50.4	+47.4	113.0	39 26.6	+48.1	113.8	18
19	42 39.3	+41.7	107.2	42 21.1	+42.7	108.0	42 02.1	+43.7	108.9	41 42.3	+44.5	109.8	41 21.6	+45.4	110.6	41 00.1	+46.2	111.4	40 37.8	+47.1	112.2	40 14.7	+47.9	113.0	19
20	43 21.0	+41.2	106.2	43 03.8	+42.2	107.1	42 45.8	+43.1	108.0	42 26.8	+44.1	108.9	42 07.0	+45.0	109.7	41 46.3	+45.9	110.6	41 24.9	+46.7	111.4	41 02.6	+47.5	112.2	20
21	44 02.2	+40.7	105.2	43 46.0	+41.7	106.1	43 28.9	+42.7	107.0	43 10.9	+43.7	107.9	42 52.0	+44.6	108.8	42 32.2	+45.5	109.7	42 11.6	+46.3	110.5	41 50.1	+47.2	111.4	21
22	44 42.9	+40.1	104.2	44 27.7	+41.2	105.1	44 11.6	+42.2	106.1	43 54.6	+43.1	107.0	43 36.6	+44.1	107.9	43 17.7	+45.1	108.8	42 57.9	+46.0	109.7	42 37.3	+46.8	110.5	22
23	45 23.0	+39.5	103.1	45 08.9	+40.6	104.1	44 53.8	+41.7	105.1	44 37.7	+42.7	106.0	44 20.7	+43.7	107.0	44 02.8	+44.6	107.9	43 43.9	+45.5	108.8	43 24.1	+46.4	109.7	23
24	46 02.5	+38.9	102.0	45 49.5	+40.0	103.0	45 35.5	+41.0	104.0	45 20.4	+42.1	105.0	45 04.4	+43.1	106.0	44 47.4	+44.1	106.9	44 29.4	+45.1	107.9	44 10.5	+46.0	108.8	24
25	46 41.4	+38.2	100.9	46 29.5	+39.4	102.0	46 16.5	+40.5	103.0	46 02.5	+41.6	104.0	45 47.5	+42.6	105.0	45 31.5	+43.6	106.0	45 14.5	+44.6	107.0	44 56.5	+45.6	107.9	25
26	47 19.6	+37.6	99.8	47 08.9	+38.7	100.9	46 57.0	+39.9	101.9	46 44.1	+41.0	103.0	46 30.1	+42.1	104.0	46 15.1	+43.2	105.0	45 59.1	+44.1	106.0	45 42.1	+45.1	107.0	26
27	47 57.2	+36.8	98.6	47 47.6	+38.1	99.7	47 36.9	+39.2	100.8	47 25.1	+40.4	101.9	47 12.2	+41.5	102.9	46 58.3	+42.5	104.0	46 43.2	+43.6	105.0	46 27.2	+44.6	106.0	27
28	48 34.0	+36.1	97.4	48 25.7	+37.3	98.6	48 16.1	+38.6	99.7	48 05.5	+39.7	100.8	47 53.7	+40.9	101.9	47 40.8	+42.0	102.9	47 26.8	+43.1	104.0	47 11.8	+44.1	105.1	28
29	49 10.1	+35.3	96.2	49 03.0	+36.6	97.4	48 54.7	+37.8	98.5	48 45.2	+39.1	99.6	48 34.6	+40.2	100.8	48 22.8	+41.4	101.9	48 09.9	+42.5	103.0	47 55.9	+43.5	104.1	29
30	49 45.4	+34.5	95.0	49 39.6	+35.8	96.2	49 32.5	+37.1	97.3	49 24.3	+38.3	98.5	49 14.8	+39.6	99.6	49 04.2	+40.7	100.8	48 52.4	+41.9	101.9	48 39.4	+43.0	103.0	30
31	50 19.9	+33.6	93.7	50 15.4	+35.0	94.9	50 09.6	+36.3	96.1	50 02.6	+37.6	97.3	49 54.4	+38.8	98.5	49 44.9	+40.1	99.6	49 34.3	+41.2	100.8	49 22.4	+42.4	102.0	31
32	50 53.5	+32.8	92.4	50 50.4	+34.1	93.6	50 45.9	+35.5	94.9	50 40.2	+36.8	96.1	50 33.2	+38.1	97.3	50 25.0	+39.3	98.5	50 15.5	+40.6	99.7	50 04.8	+41.8	100.9	32
33	51 26.3	+31.8	91.1	51 24.5	+33.2	92.3	51 21.4	+34.6	93.6	51 17.0	+36.0	94.8	51 11.3	+37.3	96.1	51 04.3	+38.6	97.3	50 56.1	+39.8	98.5	50 46.6	+41.0	99.7	33
34	51 58.1	+30.8	89.7	51 57.7	+32.3	91.0	51 56.0	+33.7	92.3	51 53.0	+35.1	93.5	51 48.6	+36.5	94.8	51 42.9	+37.8	96.1	51 35.9	+39.1	97.3	51 27.6	+40.4	98.6	34
35	52 28.9	+29.8	88.3	52 30.0	+31.3	89.6	52 29.7	+32.8	90.9	52 28.1	+34.2	92.2	52 25.1	+35.6	93.5	52 20.7	+37.0	94.8	52 15.0	+38.4	96.1	52 08.0	+39.6	97.4	35
36	52 58.7	+28.8	86.9	53 01.3	+30.3	88.2	53 02.5	+31.8	89.5	53 02.3	+33.2	90.9	53 00.7	+34.7	92.2	52 57.7	+36.1	93.5	52 53.4	+37.4	94.8	52 47.6	+38.8	96.1	36
37	53 27.5	+27.6	85.4	53 31.6	+29.2	86.8	53 34.3	+30.7	88.1	53 35.5	+32.3	89.5	53 35.4	+33.7	90.8	53 33.8	+35.2	92.2	53 30.8	+36.6	93.5	53 26.4	+38.0	94.9	37
38	53 55.1	+26.5	83.9	54 00.8	+28.1	85.3	54 05.0	+29.7	86.7	54 07.8	+31.2	88.0	54 09.1	+32.8	89.4	54 09.0	+34.2	90.8	54 07.4	+35.7	92.2	54 04.4	+37.2	93.6	38
39	54 21.6	+25.4	82.4	54 28.9	+26.9	83.8	54 34.7	+28.5	85.2	54 39.0	+30.1	86.6	54 41.9	+31.6	88.0	54 43.2	+33.2	89.4	54 43.1	+34.8	90.8	54 41.6	+36.1	92.2	39
40	54 47.0	+24.1	80.8	54 55.8	+25.7	82.2	55 03.2	+27.4	83.6	55 09.1	+29.0	85.1	55 13.5	+30.6	86.5	55 16.4	+32.2	87.9	55 17.9	+33.6	89.4	55 17.7	+35.3	90.8	40
41	55 11.1	+22.8	79.2	55 21.5	+24.5	80.6	55 30.6	+26.1	82.1	55 38.1	+27.8	83.5	55 44.1	+29.4	85.0	55 48.6	+31.0	86.4	55 51.5	+32.7	87.9	55 53.0	+34.1	89.4	41
42	55 33.9	+21.5	77.6	55 46.0	+23.2	79.0	55 56.7	+24.9	80.5	56 05.9	+26.5	81.9	56 13.5	+28.2	83.4	56 19.6	+29.9	84.9	56 24.2	+31.5	86.4	56 27.1	+33.1	87.9	42
43	55 55.4	+20.1	75.9	56 09.2	+21.9	77.4	56 21.6	+23.5	78.8	56 32.4	+25.3	80.3	56 41.7	+27.0	81.8	56 49.5	+28.6	83.3	56 55.7	+30.3	84.9	57 00.2	+32.0	86.4	43
44	56 15.5	+18.7	74.2	56 31.1	+20.4	75.7	56 45.1	+22.2	77.2	56 57.7	+23.9	78.7	57 08.7	+25.7	80.2	57 18.1	+27.4	81.7	57 26.0	+29.1	83.3	57 32.2	+30.8	84.8	44
45	56 34.2	+17.3	72.5	56 51.5	+19.1	74.0	57 07.3	+20.8	75.5	57 21.6	+22.6	77.0	57 34.4	+24.3	78.5	57 45.5	+26.1	80.1	57 55.1	+27.7	81.6	58 03.0	+29.5	83.2	45
46	56 51.5	+15.8	70.8	57 10.6	+17.5	72.2	57 28.1	+19.3	73.7	57 44.2	+21.1	75.3	57 58.7	+22.8	76.8	58 11.6	+24.6	78.4	58 22.8	+26.5	80.0	58 32.5	+28.2	81.6	46
47	57 07.3	+14.3	69.0	57 28.1	+16.1	70.5	57 47.4	+17.9	72.0	58 05.3	+19.6	73.5	58 21.5	+21.4	75.0	58 36.2	+23.2	76.6	58 49.3	+25.0	78.2	59 00.7	+26.8	79.9	47
48	57 21.6	+12.8	67.2	57 44.2	+14.5	68.7	58 05.3	+16.2	70.2	58 24.9	+18.0	71.7	58 42.9	+19.9	73.3	58 59.4	+21.7	74.8	59 14.3	+23.5	76.5	59 27.5	+25.4	78.1	48
49	57 34.4	+11.1	65.4	57 58.7	+12.9	66.8	58 21.5	+14.7	68.3	58 42.9	+16.5	69.9	59 02.8	+18.3	71.4	59 21.1	+20.2	73.0	59 37.8	+22.1	74.7	59 52.9	+23.9	76.3	49
50	57 45.5	+9.6	63.6	58 11.6	+11.2	65.0	58 36.2	+13.1	66.5	58 59.4	+14.8	68.0	59 21.1	+16.7	69.6	59 41.3	+18.6	71.2	59 59.9	+20.4	72.8	60 16.8	+22.3	74.5	50
51	57 55.1	+7.9	61.7	58 22.8	+9.7	63.1	58 49.3	+11.4	64.6	59 14.3	+13.2	66.1	59 37.8	+15.1	67.7	59 59.9	+16.9	69.3	60 20.3	+18.8	70.9	60 39.1	+20.7	72.6	51
52	58 03.0	+6.2	59.8	58 32.5	+7.9	61.2	59 00.7	+9.7	62.7	59 27.5	+11.5	64.2	59 52.9	+13.3	65.8	60 16.8	+15.2	67.3	60 39.1	+17.1	69.0	60 59.8	+19.0	70.7	52
53	58 09.2	+4.6	58.0	58 40.4	+6.3	59.3	59 10.4	+8.0	60.8	59 39.0	+9.8	62.3	60 06.2	+11.6	63.8	60 32.0	+13.4	65.4	60 56.2	+15.3	67.0	61 18.8	+17.3	68.7	53
54	58 13.8	+2.9	56.1	58 46.7	+4.6	57.4	59 18.4	+6.3	58.8	59 48.8	+8.0	60.3	60 17.8	+9.8	61.8	60 45.4	+11.7	63.4	61 11.5	+13.6	65.0	61 36.1	+15.4	66.7	54
55	58 16.7	+1.2	54.2	58 51.3	+2.8	55.5	59 24.7	+4.5	56.9	59 56.8	+6.2	58.3	60 27.6	+8.0	59.8	60 57.1	+9.8	61.4	61 25.1	+11.7	63.0	61 51.5	+13.7	64.7	55
56	58 17.9	−0.5	52.3	58 54.1	+1.1	53.6	59 29.2	+2.7	54.9	60 03.0	+4.5	56.3	60 35.6	+6.2	57.8	61 06.9	+8.0	59.3	61 36.8	+9.8	60.9	62 05.2	+11.7	62.6	56
57	58 17.4	−2.2	50.4	58 55.2	−0.6	51.6	59 31.9	+1.0	53.0	60 07.5	+2.6	54.3	60 41.8	+4.3	55.8	61 14.9	+6.1	57.3	61 46.6	+8.0	58.9	62 16.9	+9.9	60.5	57
58	58 15.2	−3.8	48.5	58 54.6	−2.4	49.7	59 32.9	−0.9	51.0	60 10.1	+0.8	52.3	60 46.1	+2.5	53.7	61 21.0	+4.2	55.2	61 54.6	+6.0•	56.8	62 26.8	+7.8•	58.4	58
59	58 11.4	−5.6	46.6	58 52.2	−4.1	47.8	59 32.0	−2.6	49.0	60 10.9	−1.1	50.3	60 48.6	+0.6	51.7	61 25.2	+2.3	53.1	62 00.6	+4.0	54.6	62 34.6	+5.9	56.2	59
60	58 05.8	−7.2	44.7	58 48.1	−5.9	45.8	59 29.4	−4.4	47.0	60 09.8	−2.8	48.3	60 49.2	−1.3	49.7	61 27.5	+0.3	51.0	62 04.6	+2.1	52.5	62 40.5	+3.9•	54.0	60
61	57 58.6	−8.8	42.8	58 42.2	−7.5	43.9	59 25.0	−6.1	45.1	60 07.0	−4.7	46.3	60 47.9	−3.1	47.6	61 27.8	−1.5	49.0	62 06.7	+0.1•	50.4	62 44.4	+1.8•	51.9	61
62	57 49.8	−10.5	40.9	58 34.7	−9.2	42.0	59 18.9	−7.9	43.1	60 02.3	−6.5	44.3	60 44.8	−5.1	45.6	61 26.3	−3.5	46.9	62 06.8	−1.9	48.2	62 46.2	−0.2•	49.7	62
63	57 39.3	−12.1	39.1	58 25.5	−10.8	40.1	59 11.0	−9.5	41.2	59 55.8	−8.3	42.3	60 39.7	−6.8	43.5	61 22.8	−5.4	44.8	62 04.9	−3.8•	46.1	62 46.0	−2.3•	47.5	63
64	57 27.2	−13.6	37.3	58 14.7	−12.5	38.2	59 01.5	−11.3	39.3	59 47.5	−10.0	40.4	60 32.9	−8.7	41.5	61 17.4	−7.3	42.7	62 01.1	−5.9	44.0	62 43.7	−4.2•	45.3	64
65	57 13.6	−15.2	35.5	58 02.2	−14.1	36.4	58 50.2	−13.0	37.4	59 37.5	−11.7	38.4	60 24.2	−10.5	39.5	61 10.1	−9.1	40.6	61 55.2	−7.7	41.9	62 39.5	−6.3•	43.1	65
66	56 58.4	−16.6	33.7	57 48.1	−15.6	34.6	58 37.2	−14.5	35.5	59 25.8	−13.4	36.5	60 13.7	−12.2	37.5	61 01.0	−11.0	38.6	61 47.5	−9.7	39.8	62 33.2	−8.2•	41.0	66
67	56 41.8	−18.2	31.9	57 32.5	−17.2	32.8	58 22.7	−16.2	33.6	59 12.4	−15.1	34.6	60 01.5	−14.0	35.5	60 50.0	−12.8	36.6	61 37.8	−11.5	37.7	62 25.0	−10.3	38.8	67
68	56 23.6	−19.5	30.2	57 15.3	−18.7	31.0	58 06.5	−17.7	31.8	58 57.3	−16.8	32.7	59 47.5	−15.7	33.6	60 37.2	−14.5	34.6	61 26.3	−13.4	35.6	62 14.7	−12.1	36.7	68
69	56 04.1	−20.9	28.5	56 56.6	−20.1	29.2	57 48.8	−19.2	30.0	58 40.5	−18.2	30.8	59 31.8	−17.3	31.7	60 22.7	−16.3	32.6	61 12.9	−15.2	33.6	62 02.6	−14.0	34.6	69
70	55 43.2	−22.3	26.8	56 36.5	−21.4	27.5	57 29.6	−20.7	28.2	58 22.3	−19.8	29.0	59 14.5	−18.9	29.8	60 06.4	−18.0	30.7	60 57.7	−16.9	31.6	61 48.6	−15.8	32.6	70
71	55 20.9	−23.6	25.2	56 15.1	−22.9	25.8	57 08.9	−22.1	26.5	58 02.5	−21.3	27.2	58 55.6	−20.4	28.0	59 48.4	−19.5	28.8	60 40.8	−18.6	29.6	61 32.8	−17.7	30.5	71
72	54 57.3	−24.8	23.6	55 52.2	−24.1	24.2	56 46.8	−23.4	24.8	57 41.2	−22.6	25.4	58 35.2	−22.0	26.1	59 28.9	−21.2	26.9	60 22.2	−20.3	27.7	61 15.1	−19.3	28.5	72
73	54 32.5	−26.0	22.0	55 28.1	−25.4	22.5	56 23.4	−24.8	23.1	57 18.4	−24.1	23.7	58 13.2	−23.4	24.4	59 07.7	−22.6	25.1	60 01.9	−21.8	25.8	60 55.8	−21.0	26.6	73
74	54 06.5	−27.1	20.5	55 02.7	−26.7	20.9	55 58.6	−26.1	21.5	56 54.3	−25.4	22.0	57 49.8	−24.8	22.6	58 45.1	−24.1	23.3	59 40.1	−23.4	23.9	60 34.8	−22.7	24.6	74
75	53 39.4	−28.3	18.9	54 36.0	−27.8	19.4	55 32.5	−27.2	19.9	56 28.9	−26.7	20.4	57 25.0	−26.1	20.9	58 21.0	−25.6	21.5	59 16.7	−24.9	22.1	60 12.1	−24.2	22.8	75
76	53 11.1	−29.4	17.5	54 08.2	−28.9	17.9	55 05.3	−28.5	18.3	56 02.2	−28.0	18.8	56 58.9	−27.5	19.3	57 55.4	−26.9	19.8	58 51.8	−26.3	20.3	59 47.9	−25.6	20.9	76
77	52 41.7	−30.4	16.0	53 39.3	−30.0	16.4	54 36.8	−29.6	16.8	55 34.2	−29.1	17.2	56 31.4	−28.6	17.6	57 28.5	−28.1	18.1	58 25.5	−27.7	18.6	59 22.3	−27.1	19.2	77
78	52 11.3	−31.4	14.6	53 09.3	−31.0	14.9	54 07.2	−30.6	15.3	55 05.1	−30.3	15.7	56 02.8	−29.9	16.1	57 00.4	−29.4	16.5	57 57.8	−28.9	16.9	58 55.2	−28.5	17.4	78
79	51 39.9	−32.3	13.2	52 38.3	−32.1	13.5	53 36.6	−31.7	13.8	54 34.8	−31.4	14.2	55 32.9	−31.0	14.5	56 31.0	−30.7	14.9	57 28.9	−30.2	15.3	58 26.7	−29.8	15.7	79
80	51 07.6	−33.2	11.9	52 06.2	−32.9	12.1	53 04.9	−32.7	12.4	54 03.4	−32.4	12.7	55 01.9	−32.0	13.0	56 00.3	−31.7	13.3	56 58.7	−31.4	13.7	57 56.9	−31.0	14.1	80
81	50 34.3	−34.1	10.5	51 33.3	−33.9	10.8	52 32.2	−33.6	11.0	53 31.0	−33.3	11.3	54 29.9	−33.2	11.5	55 28.6	−32.8	11.8	56 27.3	−32.5	12.1	57 25.9	−32.2	12.5	81
82	50 00.2	−35.0	9.3	50 59.4	−34.8	9.5	51 58.5	−34.5	9.7	52 57.7	−34.4	9.9	53 56.7	−34.1	10.1	54 55.8	−33.9	10.4	55 54.8	−33.6	10.6	56 53.7	−33.3	10.9	82
83	49 25.2	−35.8	8.0	50 24.6	−35.6	8.2	51 24.0	−35.4	8.3	52 23.3	−35.2	8.5	53 22.7	−35.1	8.7	54 21.9	−34.8	8.9	55 21.2	−34.6	9.2	56 20.4	−34.4	9.4	83
84	48 49.4	−36.5	6.8	49 49.0	−36.4	6.9	50 48.6	−36.3	7.1	51 48.1	−36.1	7.2	52 47.6	−35.9	7.4	53 47.1	−35.8	7.6	54 46.6	−35.6	7.7	55 46.0	−35.4	7.9	84
85	48 12.9	−37.2	5.6	49 12.6	−37.1	5.7	50 12.3	−37.0	5.8	51 12.0	−36.9	5.9	52 11.7	−36.8	6.1	53 11.3	−36.6	6.2	54 11.0	−36.5	6.4	55 10.6	−36.4	6.5	85
86	47 35.7	−38.0	4.4	48 35.5	−37.9	4.5	49 35.3	−37.8	4.6	50 35.1	−37.7	4.7	51 34.9	−37.6	4.8	52 34.7	−37.5	4.9	53 34.5	−37.4	5.0	54 34.2	−37.3	5.1	86
87	46 57.7	−38.6	3.3	47 57.6	−38.5	3.3	48 57.5	−38.5	3.4	49 57.4	−38.4	3.5	50 57.3	−38.4	3.6	51 57.2	−38.3	3.6	52 57.1	−38.3	3.7	53 56.9	−38.1	3.8	87
88	46 19.1	−39.2	2.2	47 19.1	−39.3	2.2	48 19.0	−39.2	2.2	49 19.0	−39.2	2.3	50 18.9	−39.1	2.3	51 18.9	−39.1	2.4	52 18.8	−39.0	2.4	53 18.8	−39.0	2.5	88
89	45 39.9	−39.9	1.1	46 39.8	−39.8	1.1	47 39.8	−39.8	1.1	48 39.8	−39.8	1.1	49 39.8	−39.8	1.1	50 39.8	−39.8	1.2	51 39.8	−39.8	1.2	52 39.8	−39.8	1.2	89
90	45 00.0	−40.4	0.0	46 00.0	−40.4	0.0	47 00.0	−40.5	0.0	48 00.0	−40.5	0.0	49 00.0	−40.5	0.0	50 00.0	−40.5	0.0	51 00.0	−40.5	0.0	52 00.0	−40.5	0.0	90

| 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 48°, 312°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	28 14.3	−48.2	122.5	27 41.9	−48.8	122.9	27 09.1	−49.4	123.4	26 35.9	−49.9	123.8	26 02.4	−50.5	124.2	25 28.5	−51.0	124.6	24 54.2	−51.4	125.0	24 19.7	−52.0	125.4	0
1	27 26.1	−48.5	123.2	26 53.1	−49.1	123.6	26 19.7	−49.6	124.0	25 46.0	−50.1	124.4	25 11.9	−50.6	124.8	24 37.5	−51.1	125.2	24 02.8	−51.6	125.5	23 27.7	−52.1	125.9	1
2	26 37.6	−48.6	123.8	26 04.0	−49.1	124.2	25 30.1	−49.7	124.6	24 55.9	−50.3	125.0	24 21.3	−50.8	125.4	23 46.4	−51.3	125.8	23 11.2	−51.7	126.1	22 35.7	−52.2	126.4	2
3	25 49.0	−48.8	124.5	25 14.9	−49.4	124.9	24 40.4	−49.9	125.2	24 05.6	−50.4	125.6	23 30.5	−50.9	126.0	22 55.1	−51.3	126.3	22 19.5	−51.9	126.7	21 43.5	−52.3	127.0	3
4	25 00.2	−49.0	125.1	24 25.5	−49.5	125.5	23 50.5	−50.0	125.9	23 15.2	−50.5	126.2	22 39.6	−51.0	126.5	22 03.8	−51.5	126.9	21 27.6	−51.9	127.2	20 51.2	−52.3	127.5	4
5	24 11.2	−49.1	125.8	23 36.0	−49.6	126.1	23 00.5	−50.1	126.5	22 24.7	−50.6	126.8	21 48.6	−51.1	127.1	21 12.3	−51.6	127.4	20 35.7	−52.0	127.7	19 58.9	−52.5	128.0	5
6	23 22.1	−49.3	126.4	22 46.4	−49.8	126.7	22 10.4	−50.3	127.1	21 34.1	−50.8	127.4	20 57.5	−51.2	127.7	20 20.7	−51.7	128.0	19 43.7	−52.1	128.3	19 06.4	−52.5	128.5	6
7	22 32.8	−49.4	127.0	21 56.6	−49.9	127.3	21 20.1	−50.4	127.7	20 43.3	−50.9	127.9	20 06.3	−51.3	128.2	19 29.0	−51.8	128.5	18 51.6	−52.2	128.8	18 13.9	−52.6	129.1	7
8	21 43.4	−49.5	127.6	21 06.7	−50.1	127.9	20 29.7	−50.5	128.2	19 52.4	−50.9	128.5	19 15.0	−51.5	128.8	18 37.3	−51.9	129.1	17 59.4	−52.3	129.3	17 21.3	−52.7	129.6	8
9	20 53.9	−49.7	128.2	20 16.6	−50.1	128.5	19 39.2	−50.7	128.8	19 01.5	−51.1	129.1	18 23.5	−51.5	129.3	17 45.4	−51.9	129.6	17 07.1	−52.4	129.8	16 28.6	−52.8	130.1	9
10	20 04.2	−49.8	128.8	19 26.5	−50.3	129.1	18 48.5	−50.8	129.4	18 10.4	−51.2	129.6	17 32.0	−51.6	129.8	16 53.5	−52.1	130.1	16 14.7	−52.4	130.3	15 35.8	−52.8	130.6	10
11	19 14.4	−49.9	129.4	18 36.2	−50.3	129.7	17 57.8	−50.8	129.9	17 19.2	−51.3	130.2	16 40.4	−51.7	130.4	16 01.4	−52.1	130.6	15 22.3	−52.5	130.8	14 43.0	−52.9	131.0	11
12	18 24.5	−50.0	130.0	17 45.9	−50.5	130.2	17 07.0	−50.9	130.5	16 27.9	−51.3	130.7	15 48.7	−51.7	130.9	15 09.3	−52.1	131.1	14 29.8	−52.6	131.3	13 50.1	−53.0	131.5	12
13	17 34.5	−50.1	130.6	16 55.4	−50.6	130.8	16 16.1	−51.0	131.0	15 36.6	−51.4	131.3	14 57.0	−51.9	131.5	14 17.2	−52.3	131.7	13 37.2	−52.6	131.8	12 57.1	−53.0	132.0	13
14	16 44.4	−50.2	131.2	16 04.8	−50.6	131.4	15 25.1	−51.1	131.6	14 45.2	−51.5	131.8	14 05.1	−51.9	132.0	13 24.9	−52.3	132.2	12 44.6	−52.7	132.3	12 04.1	−53.0	132.5	14
15	15 54.2	−50.3	131.7	15 14.2	−50.8	131.9	14 34.0	−51.1	132.1	13 53.7	−51.6	132.3	13 13.2	−51.9	132.5	12 32.6	−52.3	132.7	11 51.9	−52.7	132.8	11 11.1	−53.1	133.0	15
16	15 03.9	−50.4	132.3	14 23.4	−50.8	132.5	13 42.9	−51.3	132.7	13 02.1	−51.6	133.0	12 21.3	−52.1	133.0	11 40.3	−52.4	133.2	10 59.2	−52.8	133.3	10 18.0	−53.2	133.4	16
17	14 13.5	−50.4	132.8	13 32.6	−50.8	133.0	12 51.6	−51.3	133.2	12 10.5	−51.7	133.4	11 29.2	−52.0	133.5	10 47.9	−52.5	133.7	10 06.4	−52.8	133.8	9 24.8	−53.1	133.9	17
18	13 23.1	−50.6	133.4	12 41.8	−51.0	133.6	12 00.3	−51.3	133.7	11 18.8	−51.7	133.9	10 37.2	−52.2	134.0	9 55.4	−52.5	134.2	9 13.6	−52.9	134.3	8 31.7	−53.3	134.4	18
19	12 32.5	−50.6	134.0	11 50.8	−51.0	134.1	11 09.0	−51.4	134.3	10 27.1	−51.8	134.4	9 45.0	−52.1	134.5	9 02.9	−52.5	134.6	8 20.7	−52.9	134.8	7 38.4	−53.2	134.9	19
20	11 41.9	−50.6	134.5	10 59.8	−51.0	134.7	10 17.6	−51.5	134.8	9 35.3	−51.8	134.9	8 52.9	−52.2	135.0	8 10.4	−52.6	135.1	7 27.8	−52.9	135.2	6 45.2	−53.3	135.3	20
21	10 51.3	−50.7	135.1	10 08.8	−51.2	135.2	9 26.1	−51.5	135.3	8 43.5	−51.9	135.4	8 00.7	−52.3	135.5	7 17.8	−52.6	135.6	6 34.9	−52.9	135.7	5 51.9	−53.2	135.8	21
22	10 00.6	−50.8	135.6	9 17.6	−51.1	135.7	8 34.6	−51.5	135.8	7 51.6	−51.9	135.9	7 08.4	−52.3	136.0	6 25.2	−52.6	136.1	5 42.0	−53.0	136.2	4 58.7	−53.3	136.2	22
23	9 09.8	−50.8	136.1	8 26.5	−51.2	136.2	7 43.1	−51.6	136.3	6 59.7	−52.0	136.4	6 16.2	−52.3	136.5	5 32.6	−52.6	136.6	4 49.0	−53.0	136.6	4 05.4	−53.4	136.7	23
24	8 19.0	−50.9	136.7	7 35.3	−51.3	136.8	6 51.5	−51.6	136.9	6 07.7	−51.9	136.9	5 23.9	−52.4	137.0	4 40.0	−52.7	137.1	3 56.0	−53.0	137.1	3 12.0	−53.3	137.2	24
25	7 28.1	−50.9	137.2	6 44.0	−51.2	137.3	5 59.9	−51.6	137.4	5 15.8	−52.0	137.4	4 31.5	−52.3	137.5	3 47.3	−52.7	137.5	3 03.0	−53.0	137.6	2 18.7	−53.4	137.6	25
26	6 37.2	−50.9	137.7	5 52.8	−51.3	137.8	5 08.3	−51.7	137.9	4 23.8	−52.1	137.9	3 39.2	−52.4	138.0	2 54.6	−52.7	138.0	2 10.0	−53.0	138.1	1 25.3	−53.3	138.1	26
27	5 46.3	−51.0	138.3	5 01.5	−51.4	138.3	4 16.6	−51.7	138.4	3 31.7	−52.0	138.4	2 46.8	−52.3	138.5	2 01.9	−52.7	138.5	1 17.0	−53.1	138.5	0 32.0	−53.4	138.5	27
28	4 55.3	−51.0	138.8	4 10.1	−51.3	138.9	3 24.9	−51.7	138.9	2 39.7	−52.0	139.0	1 54.5	−52.4	139.0	1 09.2	−52.7	139.0	0 23.9	−53.0	139.0	0 21.4	+53.3	41.0	28
29	4 04.3	−51.0	139.3	3 18.8	−51.4	139.4	2 33.2	−51.7	139.4	1 47.7	−52.1	139.4	1 02.1	−52.4	139.5	0 16.5	−52.7	139.5	0 29.1	+53.0	40.5	1 14.7	+53.3	40.6	29
30	3 13.3	−51.0	139.9	2 27.4	−51.3	139.9	1 41.5	−51.7	139.9	0 55.6	−52.0	139.9	0 09.7	−52.4	139.9	0 36.2	+52.7	40.1	1 22.1	+53.1	40.1	2 08.0	+53.4	40.1	30
31	2 22.3	−51.0	140.4	1 36.1	−51.4	140.4	0 49.8	−51.7	140.4	0 03.6	−52.1	140.4	0 42.7	+52.4	39.6	1 28.9	+52.7	39.6	2 15.2	+53.0	39.6	3 01.4	+53.3	39.6	31
32	1 31.3	−51.1	140.9	0 44.7	−51.4	140.9	0 01.9	+51.7	39.1	0 48.5	+52.0	39.1	1 35.1	+52.4	39.1	2 21.6	+52.7	39.1	3 08.2	+53.0	39.1	3 54.7	+53.3	39.2	32
33	0 40.2	−51.0	141.4	0 06.7	+51.4	38.6	0 53.6	+51.7	38.6	1 40.5	+52.1	38.6	2 27.4	+52.4	38.6	3 14.3	+52.7	38.6	4 01.2	+53.0	38.7	4 48.0	+53.3	38.7	33
34	0 10.8	+51.1	38.0	0 58.1	+51.4	38.0	1 45.3	+51.8	38.1	2 32.6	+52.0	38.1	3 19.8	+52.4	38.1	4 07.0	+52.7	38.1	4 54.2	+52.9	38.2	5 41.3	+53.3	38.2	34
35	1 01.9	+51.1	37.5	1 49.5	+51.4	37.5	2 37.1	+51.7	37.5	3 24.6	+52.0	37.6	4 12.2	+52.3	37.6	4 59.7	+52.6	37.7	5 47.1	+53.0	37.7	6 34.6	+53.2	37.8	35
36	1 52.9	+51.1	37.0	2 40.9	+51.3	37.0	3 28.8	+51.6	37.0	4 16.6	+52.0	37.1	5 04.5	+52.3	37.1	5 52.3	+52.6	37.2	6 40.1	+52.9	37.3	7 27.8	+53.2	37.3	36
37	2 44.0	+51.0	36.5	3 32.2	+51.4	36.5	4 20.4	+51.7	36.5	5 08.6	+52.0	36.6	5 56.8	+52.3	36.6	6 44.9	+52.6	36.7	7 33.0	+52.9	36.8	8 21.0	+53.2	36.9	37
38	3 35.0	+51.0	35.9	4 23.6	+51.3	36.0	5 12.1	+51.6	36.0	6 00.6	+52.0	36.1	6 49.1	+52.2	36.1	7 37.5	+52.6	36.2	8 25.9	+52.9	36.3	9 14.2	+53.2	36.4	38
39	4 26.0	+51.0	35.4	5 14.9	+51.3	35.4	6 03.7	+51.6	35.5	6 52.6	+51.9	35.6	7 41.3	+52.3	35.6	8 30.1	+52.5	35.7	9 18.8	+52.8	35.8	10 07.4	+53.1	35.9	39
40	5 17.0	+50.9	34.9	6 06.2	+51.2	34.9	6 55.3	+51.6	35.0	7 44.5	+51.9	35.1	8 33.6	+52.1	35.1	9 22.6	+52.5	35.2	10 11.6	+52.7	35.3	11 00.5	+53.0	35.4	40
41	6 07.9	+50.9	34.3	6 57.4	+51.3	34.4	7 46.9	+51.6	34.5	8 36.4	+51.8	34.6	9 25.7	+52.2	34.6	10 15.1	+52.4	34.7	11 04.3	+52.8	34.9	11 53.5	+53.1	35.0	41
42	6 58.8	+50.9	33.8	7 48.7	+51.2	33.9	8 38.5	+51.4	34.0	9 28.2	+51.8	34.0	10 17.9	+52.1	34.1	11 07.5	+52.4	34.3	11 57.1	+52.6	34.4	12 46.6	+52.9	34.5	42
43	7 49.7	+50.9	33.3	8 39.9	+51.1	33.4	9 29.9	+51.5	33.4	10 20.0	+51.7	33.5	11 10.0	+52.0	33.6	11 59.9	+52.3	33.8	12 49.7	+52.7	33.9	13 39.5	+52.9	34.0	43
44	8 40.6	+50.7	32.7	9 31.0	+51.1	32.8	10 21.4	+51.4	32.9	11 11.7	+51.7	33.0	12 02.0	+52.0	33.1	12 52.2	+52.3	33.3	13 42.4	+52.5	33.4	14 32.4	+52.9	33.5	44
45	9 31.3	+50.8	32.2	10 22.1	+51.0	32.3	11 12.8	+51.3	32.4	12 03.4	+51.7	32.5	12 54.0	+51.9	32.6	13 44.5	+52.2	32.7	14 34.9	+52.5	32.9	15 25.3	+52.7	33.0	45
46	10 22.1	+50.7	31.7	11 13.1	+51.0	31.9	12 04.1	+51.3	31.9	12 55.1	+51.5	32.0	13 45.9	+51.9	32.1	14 36.7	+52.1	32.2	15 27.4	+52.4	32.4	16 18.0	+52.7	32.5	46
47	11 12.8	+50.6	31.1	12 04.1	+51.0	31.2	12 55.4	+51.2	31.3	13 46.6	+51.5	31.5	14 37.8	+51.8	31.6	15 28.8	+52.1	31.7	16 19.8	+52.4	31.9	17 10.7	+52.7	32.0	47
48	12 03.4	+50.6	30.6	12 55.1	+50.8	30.7	13 46.6	+51.2	30.8	14 38.1	+51.5	30.9	15 29.6	+51.7	31.1	16 20.9	+52.0	31.2	17 12.2	+52.3	31.4	18 03.4	+52.5	31.5	48
49	12 54.0	+50.5	30.0	13 45.9	+50.8	30.1	14 37.8	+51.0	30.3	15 29.6	+51.3	30.4	16 21.3	+51.6	30.5	17 12.9	+51.9	30.7	18 04.5	+52.2	30.9	18 55.9	+52.5	31.0	49
50	13 44.5	+50.4	29.5	14 36.7	+50.7	29.6	15 28.8	+51.0	29.7	16 20.9	+51.3	29.9	17 12.9	+51.6	30.0	18 04.8	+51.9	30.1	18 56.7	+52.1	30.3	19 48.4	+52.4	30.5	50
51	14 34.9	+50.4	28.9	15 27.4	+50.6	29.0	16 19.8	+50.9	29.2	17 12.2	+51.2	29.3	18 04.5	+51.4	29.5	18 56.7	+51.7	29.6	19 48.8	+52.0	29.8	20 40.8	+52.3	30.0	51
52	15 25.3	+50.2	28.3	16 18.0	+50.6	28.5	17 10.7	+50.9	28.6	18 03.4	+51.1	28.8	18 55.9	+51.4	28.9	19 48.4	+51.7	29.1	20 40.8	+51.9	29.3	21 33.1	+52.2	29.5	52
53	16 15.5	+50.2	27.8	17 08.6	+50.4	27.9	18 01.6	+50.7	28.1	18 54.5	+51.0	28.2	19 47.3	+51.3	28.4	20 40.1	+51.5	28.6	21 32.7	+51.8	28.7	22 25.3	+52.0	28.9	53
54	17 05.7	+50.1	27.2	17 59.0	+50.4	27.3	18 52.3	+50.6	27.5	19 45.5	+50.9	27.7	20 38.6	+51.1	27.8	21 31.6	+51.4	28.0	22 24.5	+51.7	28.2	23 17.3	+52.0	28.4	54
55	17 55.8	+49.9	26.6	18 49.4	+50.2	26.8	19 42.9	+50.5	26.9	20 36.4	+50.7	27.1	21 29.7	+51.1	27.3	22 23.0	+51.3	27.5	23 16.2	+51.6	27.6	24 09.3	+51.9	27.8	55
56	18 45.7	+49.9	26.0	19 39.6	+50.1	26.2	20 33.4	+50.4	26.3	21 27.1	+50.7	26.5	22 20.8	+50.9	26.7	23 14.3	+51.2	26.9	24 07.8	+51.5	27.1	25 01.2	+51.7	27.3	56
57	19 35.6	+49.7	25.4	20 29.7	+50.0	25.6	21 23.8	+50.3	25.8	22 17.8	+50.5	25.9	23 11.7	+50.8	26.1	24 05.5	+51.1	26.3	24 59.3	+51.3	26.5	25 52.9	+51.6	26.7	57
58	20 25.3	+49.6	24.8	21 19.7	+49.9	25.0	22 14.1	+50.1	25.2	23 08.3	+50.4	25.4	24 02.5	+50.7	25.5	24 56.6	+50.9	25.7	25 50.6	+51.2	25.9	26 44.5	+51.4	26.2	58
59	21 14.9	+49.5	24.2	22 09.6	+49.8	24.4	23 04.2	+50.0	24.6	23 58.7	+50.3	24.8	24 53.0	+50.5	25.0	25 47.5	+50.8	25.2	26 41.8	+51.0	25.4	27 35.9	+51.4	25.6	59
60	22 04.4	+49.4	23.6	22 59.4	+49.6	23.8	23 54.2	+49.9	24.0	24 49.0	+50.1	24.2	25 43.7	+50.4	24.4	26 38.3	+50.6	24.6	27 32.8	+50.9	24.8	28 27.3	+51.1	25.0	60
61	22 53.8	+49.2	23.0	23 49.0	+49.4	23.2	24 44.1	+49.7	23.4	25 39.1	+50.0	23.6	26 34.1	+50.2	23.8	27 28.9	+50.5	24.0	28 23.7	+50.8	24.2	29 18.4	+51.0	24.4	61
62	23 43.0	+49.0	22.4	24 38.4	+49.3	22.6	25 33.8	+49.5	22.8	26 29.1	+49.8	22.9	27 24.3	+50.1	23.1	28 19.4	+50.3	23.3	29 14.5	+50.5	23.5	30 09.4	+50.8	23.8	62
63	24 32.0	+48.9	21.8	25 27.7	+49.2	21.9	26 23.3	+49.4	22.1	27 18.9	+49.6	22.3	28 14.4	+49.8	22.5	29 09.7	+50.2	22.7	30 05.0	+50.4	22.9	31 00.2	+50.7	23.2	63
64	25 20.9	+48.8	21.1	26 16.9	+48.9	21.3	27 12.7	+49.2	21.5	28 08.5	+49.5	21.7	29 04.2	+49.7	21.9	29 59.9	+49.9	22.1	30 55.4	+50.2	22.3	31 50.9	+50.4	22.6	64
65	26 09.7	+48.5	20.5	27 05.8	+48.8	20.7	28 01.9	+49.1	20.8	28 58.0	+49.3	21.0	29 53.9	+49.6	21.2	30 49.8	+49.8	21.5	31 45.6	+50.0	21.7	32 41.3	+50.3	21.9	65
66	26 58.2	+48.4	19.8	27 54.6	+48.6	20.0	28 51.0	+48.8	20.2	29 47.3	+49.0	20.4	30 43.5	+49.3	20.6	31 39.6	+49.5	20.8	32 35.6	+49.8	21.0	33 31.6	+50.1	21.3	66
67	27 46.6	+48.2	19.2	28 43.2	+48.4	19.3	29 39.8	+48.6	19.5	30 36.3	+48.9	19.7	31 32.8	+49.1	19.9	32 29.1	+49.4	20.1	33 25.4	+49.6	20.4	34 21.7	+49.8	20.6	67
68	28 34.8	+47.9	18.5	29 31.6	+48.2	18.7	30 28.4	+48.5	18.8	31 25.2	+48.6	19.0	32 21.9	+48.9	19.2	33 18.5	+49.1	19.5	34 15.0	+49.4	19.7	35 11.5	+49.6	19.9	68
69	29 22.7	+47.8	17.8	30 19.8	+48.0	18.0	31 16.9	+48.2	18.2	32 13.8	+48.5	18.4	33 10.8	+48.6	18.6	34 07.6	+48.9	18.8	35 04.4	+49.1	19.0	36 01.1	+49.3	19.2	69
70	30 10.5	+47.5	17.1	31 07.8	+47.7	17.3	32 05.1	+47.9	17.5	33 02.3	+48.2	17.6	33 59.4	+48.4	17.9	34 56.5	+48.6	18.1	35 53.5	+48.9	18.3	36 50.4	+49.1	18.5	70
71	30 58.0	+47.3	16.4	31 55.5	+47.5	16.6	32 53.0	+47.7	16.7	33 50.5	+47.9	16.9	34 47.8	+48.2	17.1	35 45.1	+48.4	17.3	36 42.4	+48.6	17.6	37 39.5	+48.9	17.8	71
72	31 45.3	+47.0	15.7	32 43.0	+47.3	15.8	33 40.7	+47.5	16.0	34 38.4	+47.7	16.2	35 36.0	+47.9	16.4	36 33.5	+48.1	16.6	37 31.0	+48.3	16.8	38 28.4	+48.5	17.1	72
73	32 32.3	+46.8	14.9	33 30.3	+47.0	15.1	34 28.2	+47.2	15.3	35 26.1	+47.4	15.5	36 23.9	+47.5	15.7	37 21.6	+47.8	15.9	38 19.3	+48.0	16.1	39 16.9	+48.2	16.3	73
74	33 19.1	+46.5	14.2	34 17.3	+46.7	14.4	35 15.4	+46.9	14.5	36 13.4	+47.1	14.7	37 11.4	+47.3	14.9	38 09.4	+47.5	15.1	39 07.3	+47.7	15.3	40 05.1	+48.0	15.5	74
75	34 05.6	+46.3	13.4	35 04.0	+46.4	13.6	36 02.3	+46.6	13.8	37 00.5	+46.8	13.9	37 58.7	+47.0	14.1	38 56.9	+47.2	14.3	39 55.0	+47.4	14.5	40 53.1	+47.6	14.7	75
76	34 51.9	+45.9	12.7	35 50.4	+46.1	12.8	36 48.9	+46.3	13.0	37 47.3	+46.5	13.1	38 45.7	+46.7	13.3	39 44.1	+46.8	13.5	40 42.4	+47.1	13.7	41 40.7	+47.2	13.9	76
77	35 37.8	+45.6	11.9	36 36.5	+45.8	12.0	37 35.2	+45.9	12.2	38 33.8	+46.1	12.3	39 32.4	+46.3	12.5	40 30.9	+46.5	12.7	41 29.5	+46.6	12.9	42 27.9	+46.9	13.1	77
78	36 23.4	+45.1	11.1	37 22.3	+45.4	11.2	38 21.1	+45.6	11.4	39 19.9	+45.7	11.5	40 18.7	+46.0	11.7	41 17.4	+46.1	11.9	42 16.1	+46.3	12.1	43 14.8	+46.5	12.3	78
79	37 08.7	+44.9	10.2	38 07.7	+45.1	10.4	39 06.7	+45.3	10.5	40 05.7	+45.4	10.7	41 04.7	+45.5	10.8	42 03.6	+45.7	11.0	43 02.4	+45.9	11.2	44 01.3	+46.1	11.4	79
80	37 53.6	+44.6	9.4	38 52.8	+44.7	9.5	39 52.0	+44.8	9.7	40 51.1	+45.0	9.8	41 50.2	+45.2	10.0	42 49.3	+45.3	10.1	43 48.3	+45.5	10.3	44 47.4	+45.6	10.5	80
81	38 38.2	+44.2	8.6	39 37.5	+44.4	8.7	40 36.8	+44.5	8.8	41 36.1	+44.6	8.9	42 35.4	+44.7	9.1	43 34.6	+44.9	9.2	44 33.8	+45.1	9.4	45 33.0	+45.2	9.6	81
82	39 22.4	+43.8	7.7	40 21.9	+43.9	7.8	41 21.3	+44.1	7.9	42 20.7	+44.2	8.0	43 20.1	+44.3	8.2	44 19.5	+44.4	8.3	45 18.9	+44.5	8.5	46 18.2	+44.7	8.6	82
83	40 06.2	+43.4	6.8	41 05.8	+43.5	6.9	42 05.4	+43.6	7.0	43 04.9	+43.7	7.1	44 04.4	+43.9	7.2	45 03.9	+44.0	7.4	46 03.4	+44.1	7.5	47 02.9	+44.2	7.6	83
84	40 49.6	+43.0	6.0	41 49.3	+43.0	6.1	42 49.0	+43.1	6.1	43 48.6	+43.3	6.2	44 48.3	+43.3	6.3	45 47.9	+43.4	6.3	46 47.5	+43.6	6.5	47 47.1	+43.7	6.6	84
85	41 32.6	+42.5	5.0	42 32.3	+42.6	5.0	43 32.1	+42.7	5.1	44 31.9	+42.7	5.2	45 31.6	+42.8	5.3	46 31.3	+43.0	5.4	47 31.1	+43.0	5.5	48 30.8	+43.1	5.6	85
86	42 15.1	+42.0	4.0	43 14.9	+42.1	4.1	44 14.8	+42.1	4.1	45 14.6	+42.2	4.2	46 14.4	+42.3	4.3	47 14.3	+42.3	4.4	48 14.1	+42.4	4.5	49 13.9	+42.5	4.6	86
87	42 57.1	+41.5	3.0	43 57.0	+41.5	3.1	44 56.9	+41.6	3.2	45 56.8	+41.7	3.2	46 56.7	+41.7	3.3	47 56.6	+41.8	3.3	48 56.5	+41.8	3.4	49 56.4	+41.9	3.5	87
88	43 38.6	+41.0	2.1	44 38.5	+41.1	2.1	45 38.5	+41.0	2.1	46 38.5	+41.0	2.2	47 38.4	+41.1	2.2	48 38.4	+41.1	2.2	49 38.3	+41.2	2.3	50 38.3	+41.2	2.3	88
89	44 19.6	+40.4	1.0	45 19.6	+40.4	1.1	46 19.5	+40.5	1.1	47 19.5	+40.5	1.1	48 19.5	+40.5	1.1	49 19.5	+40.5	1.1	50 19.5	+40.5	1.2	51 19.5	+40.5	1.2	89
90	45 00.0	+39.9	0.0	46 00.0	+39.8	0.0	47 00.0	+39.8	0.0	48 00.0	+39.8	0.0	49 00.0	+39.8	0.0	50 00.0	+39.8	0.0	51 00.0	+39.8	0.0	52 00.0	+39.8	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 132°, 228°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	27 38.4	+47.7	121.6	27 06.7	+48.4	122.0	26 34.7	+49.0	122.4	26 02.4	+49.5	122.9	25 29.6	+50.1	123.3	24 56.5	+50.7	123.7	24 23.1	+51.2	124.0	23 49.4	+51.6	124.4	0
1	28 26.1	+47.6	120.9	27 55.1	+48.2	121.4	27 23.7	+48.8	121.8	26 51.9	+49.4	122.2	26 19.7	+50.0	122.7	25 47.2	+50.4	123.1	25 14.3	+50.9	123.5	24 41.0	+51.5	123.9	1
2	29 13.7	+47.4	120.2	28 43.3	+48.0	120.7	28 12.5	+48.6	121.1	27 41.3	+49.2	121.6	27 09.7	+49.7	122.0	26 37.6	+50.4	122.5	26 05.2	+50.9	122.9	25 32.5	+51.4	123.3	2
3	30 01.1	+47.1	119.5	29 31.3	+47.8	120.0	29 01.1	+48.4	120.5	28 30.5	+49.0	120.9	27 59.4	+49.6	121.4	27 28.0	+50.1	121.9	26 56.1	+50.7	122.3	26 23.9	+51.2	122.7	3
4	30 48.2	+46.9	118.8	30 19.1	+47.6	119.3	29 49.5	+48.2	119.8	29 19.5	+48.8	120.3	28 49.0	+49.4	120.8	28 18.1	+50.0	121.2	27 46.8	+50.5	121.7	27 15.1	+51.1	122.1	4
5	31 35.1	+46.7	118.0	31 06.7	+47.3	118.6	30 37.7	+48.0	119.1	30 08.3	+48.6	119.6	29 38.4	+49.2	120.1	29 08.1	+49.8	120.6	28 37.3	+50.4	121.1	28 06.2	+50.9	121.5	5
6	32 21.8	+46.3	117.3	31 54.0	+47.0	117.9	31 25.7	+47.7	118.4	30 56.9	+48.4	118.9	30 27.6	+49.0	119.5	29 57.9	+49.6	120.0	29 27.7	+50.2	120.5	28 57.1	+50.7	120.9	6
7	33 08.1	+46.1	116.5	32 41.0	+46.8	117.1	32 13.4	+47.5	117.7	31 45.3	+48.1	118.2	31 16.6	+48.8	118.8	30 47.5	+49.4	119.3	30 17.9	+50.0	119.8	29 47.8	+50.6	120.3	7
8	33 54.2	+45.8	115.8	33 27.8	+46.6	116.4	33 00.9	+47.2	117.0	32 33.4	+48.0	117.5	32 05.4	+48.6	118.1	31 36.9	+49.2	118.6	31 07.9	+49.8	119.2	30 38.4	+50.4	119.7	8
9	34 40.0	+45.5	115.0	34 14.4	+46.2	115.6	33 48.1	+47.0	116.2	33 21.4	+47.6	116.8	32 54.0	+48.3	117.4	32 26.1	+49.0	118.0	31 57.7	+49.6	118.5	31 28.8	+50.3	119.1	9
10	35 25.5	+45.2	114.2	35 00.6	+46.0	114.8	34 35.1	+46.7	115.5	34 09.0	+47.4	116.1	33 42.3	+48.1	116.7	33 15.1	+48.8	117.3	32 47.3	+49.4	117.9	32 19.1	+50.0	118.4	10
11	36 10.7	+44.9	113.4	35 46.6	+45.6	114.1	35 21.8	+46.4	114.7	34 56.4	+47.1	115.3	34 30.4	+47.9	116.0	34 03.9	+48.5	116.6	33 36.7	+49.2	117.2	33 09.1	+49.8	117.8	11
12	36 55.6	+44.5	112.6	36 32.2	+45.3	113.3	36 08.2	+46.1	113.9	35 43.5	+46.9	114.6	35 18.3	+47.5	115.2	34 52.4	+48.2	115.9	34 25.9	+48.9	116.5	33 58.9	+49.6	117.1	12
13	37 40.1	+44.1	111.7	37 17.5	+45.0	112.4	36 54.3	+45.7	113.1	36 30.4	+46.5	113.8	36 05.8	+47.3	114.5	35 40.6	+48.0	115.1	35 14.8	+48.7	115.8	34 48.5	+49.3	116.4	13
14	38 24.2	+43.7	110.9	38 02.5	+44.5	111.6	37 40.0	+45.4	112.3	37 16.9	+46.2	113.0	36 53.1	+47.0	113.7	36 28.6	+47.7	114.4	36 03.5	+48.5	115.1	35 37.8	+49.1	115.7	14
15	39 07.9	+43.4	110.0	38 47.0	+44.3	110.7	38 25.4	+45.1	111.5	38 03.1	+45.9	112.2	37 40.1	+46.6	112.9	37 16.3	+47.5	113.6	36 52.0	+48.1	114.3	36 26.9	+48.9	115.0	15
16	39 51.3	+42.9	109.1	39 31.3	+43.8	109.9	39 10.5	+44.7	110.6	38 49.0	+45.5	111.4	38 26.7	+46.3	112.1	38 03.8	+47.1	112.9	37 40.1	+47.8	113.6	37 15.8	+48.5	114.3	16
17	40 34.2	+42.5	108.2	40 15.1	+43.4	109.0	39 55.2	+44.2	109.8	39 34.5	+45.1	110.6	39 13.0	+45.9	111.3	38 50.9	+46.7	112.1	38 27.9	+47.6	112.8	38 04.3	+48.3	113.5	17
18	41 16.7	+42.0	107.2	40 58.5	+42.9	108.1	40 39.4	+43.9	108.9	40 19.6	+44.8	109.7	39 59.0	+45.6	110.5	39 37.6	+46.5	111.3	39 15.5	+47.2	112.0	38 52.6	+48.0	112.8	18
19	41 58.7	+41.5	106.3	41 41.4	+42.5	107.1	41 23.3	+43.4	108.0	41 04.4	+44.3	108.8	40 44.6	+45.2	109.6	40 24.1	+46.0	110.4	40 02.7	+46.9	111.2	39 40.6	+47.7	112.0	19
20	42 40.2	+41.0	105.3	42 23.9	+42.0	106.2	42 06.7	+43.0	107.1	41 48.7	+43.9	107.9	41 29.8	+44.8	108.8	41 10.1	+45.7	109.6	40 49.6	+46.5	110.4	40 28.3	+47.3	111.2	20
21	43 21.2	+40.5	104.3	43 05.9	+41.5	105.2	42 49.7	+42.5	106.1	42 32.6	+43.5	107.0	42 14.6	+44.4	107.9	41 55.8	+45.3	108.7	41 36.1	+46.2	109.6	41 15.6	+47.0	110.4	21
22	44 01.7	+39.9	103.3	43 47.4	+41.0	104.2	43 32.2	+42.0	105.1	43 16.1	+43.0	106.1	42 59.0	+44.0	107.0	42 41.1	+44.9	107.8	42 22.3	+45.7	108.7	42 02.6	+46.6	109.6	22
23	44 41.6	+39.4	102.2	44 28.4	+40.4	103.2	44 14.2	+41.5	104.2	43 59.1	+42.4	105.1	43 43.0	+43.4	106.0	43 26.0	+44.4	106.9	43 08.0	+45.4	107.8	42 49.2	+46.2	108.7	23
24	45 21.0	+38.7	101.2	45 08.8	+39.9	102.2	44 55.7	+40.9	103.1	44 41.5	+42.0	104.1	44 26.4	+43.0	105.1	44 10.4	+43.9	106.0	43 53.4	+44.9	106.9	43 35.4	+45.9	107.8	24
25	45 59.7	+38.1	100.1	45 48.7	+39.2	101.1	45 36.6	+40.3	102.1	45 23.5	+41.4	103.1	45 09.4	+42.5	104.1	44 54.3	+43.5	105.0	44 38.3	+44.6	106.0	44 21.3	+45.4	106.9	25
26	46 37.8	+37.4	99.0	46 27.9	+38.6	100.0	46 16.9	+39.8	101.0	46 04.9	+40.9	102.1	45 51.9	+41.9	103.1	45 37.8	+43.0	104.1	45 22.7	+44.0	105.0	45 06.7	+44.9	106.0	26
27	47 15.2	+36.7	97.8	47 06.5	+37.9	98.9	46 56.7	+39.1	99.9	46 45.8	+40.2	101.0	46 33.8	+41.3	102.0	46 20.8	+42.4	103.1	46 06.7	+43.4	104.1	45 51.6	+44.4	105.1	27
28	47 51.9	+36.0	96.6	47 44.4	+37.2	97.7	47 35.8	+38.4	98.8	47 26.0	+39.6	99.9	47 15.1	+40.8	101.0	47 03.2	+41.8	102.0	46 50.1	+42.9	103.1	46 36.0	+44.0	104.1	28
29	48 27.9	+35.2	95.4	48 21.6	+36.5	96.6	48 14.2	+37.7	97.7	48 05.6	+38.9	98.8	47 55.9	+40.1	99.9	47 45.0	+41.2	101.0	47 33.0	+42.4	102.0	47 20.0	+43.4	103.1	29
30	49 03.1	+34.4	94.2	48 58.1	+35.7	95.4	48 51.9	+37.0	96.5	48 44.5	+38.3	97.6	48 36.0	+39.4	98.8	48 26.2	+40.6	99.9	48 15.4	+41.7	101.0	48 03.4	+42.8	102.1	30
31	49 37.5	+33.6	93.0	49 33.8	+35.0	94.1	49 28.9	+36.3	95.3	49 22.8	+37.4	96.5	49 15.4	+38.7	97.6	49 06.8	+40.0	98.8	48 57.1	+41.1	99.9	48 46.2	+42.3	101.0	31
32	50 11.1	+32.7	91.7	50 08.8	+34.0	92.9	50 05.1	+35.4	94.1	50 00.2	+36.8	95.3	49 54.1	+38.0	96.4	49 46.8	+39.2	97.6	49 38.2	+40.5	98.8	49 28.5	+41.6	99.9	32
33	50 43.8	+31.8	90.4	50 42.8	+33.2	91.6	50 40.5	+34.6	92.8	50 37.0	+35.9	94.0	50 32.1	+37.3	95.2	50 26.0	+38.5	96.4	50 18.7	+39.7	97.6	50 10.1	+41.0	98.8	33
34	51 15.6	+30.9	89.0	51 16.0	+32.3	90.3	51 15.1	+33.7	91.5	51 12.9	+35.1	92.7	51 09.4	+36.4	94.0	51 04.5	+37.8	95.2	50 58.4	+39.1	96.5	50 51.1	+40.2	97.7	34
35	51 46.5	+29.9	87.6	51 48.3	+31.3	88.9	51 48.8	+32.8	90.2	51 48.0	+34.1	91.4	51 45.8	+35.5	92.7	51 42.3	+36.9	94.0	51 37.5	+38.2	95.2	51 31.3	+39.6	96.5	35
36	52 16.4	+28.8	86.2	52 19.6	+30.4	87.5	52 21.6	+31.8	88.8	52 22.1	+33.3	90.1	52 21.3	+34.7	91.4	52 19.2	+36.1	92.7	52 15.7	+37.4	94.0	52 10.9	+38.7	95.3	36
37	52 45.2	+27.8	84.8	52 50.0	+29.3	86.1	52 53.4	+30.8	87.4	52 55.4	+32.3	88.7	52 56.0	+33.8	90.1	52 55.3	+35.1	91.4	52 53.1	+36.6	92.7	52 49.6	+38.0	94.0	37
38	53 13.0	+26.6	83.3	53 19.3	+28.2	84.6	53 24.2	+29.7	86.0	53 27.7	+31.2	87.3	53 29.8	+32.7	88.7	53 30.4	+34.3	90.0	53 29.7	+35.7	91.4	53 27.6	+37.0	92.7	38
39	53 39.6	+25.5	81.8	53 47.5	+27.0	83.2	53 53.9	+28.7	84.5	53 58.9	+30.2	85.9	54 02.5	+31.8	87.3	54 04.7	+33.2	88.6	54 05.4	+34.7	90.0	54 04.6	+36.2	91.4	39
40	54 05.1	+24.3	80.3	54 14.5	+26.0	81.6	54 22.6	+27.5	83.0	54 29.1	+29.1	84.4	54 34.3	+30.6	85.8	54 37.9	+32.2	87.2	54 40.1	+33.7	88.6	54 40.8	+35.2	90.0	40
41	54 29.4	+23.1	78.7	54 40.5	+24.7	80.1	54 50.1	+26.3	81.5	54 58.2	+28.0	82.9	55 04.9	+29.6	84.3	55 10.1	+31.1	85.7	55 13.8	+32.7	87.2	55 16.0	+34.2	88.6	41
42	54 52.5	+21.8	77.1	55 05.2	+23.4	78.5	55 16.4	+25.1	79.9	55 26.2	+26.7	81.3	55 34.5	+28.3	82.8	55 41.2	+30.0	84.2	55 46.5	+31.6	85.7	55 50.2	+33.2	87.2	42
43	55 14.3	+20.4	75.5	55 28.6	+22.1	76.9	55 41.5	+23.8	78.3	55 52.9	+25.5	79.8	56 02.8	+27.2	81.2	56 11.2	+28.8	82.7	56 18.1	+30.4	84.2	56 23.4	+32.0	85.7	43
44	55 34.7	+19.1	73.8	55 50.7	+20.8	75.2	56 05.3	+22.5	76.7	56 18.4	+24.1	78.1	56 30.0	+25.8	79.6	56 40.0	+27.6	81.1	56 48.5	+29.2	82.6	56 55.4	+30.9	84.1	44
45	55 53.8	+17.7	72.1	56 11.5	+19.4	73.6	56 27.8	+21.1	75.0	56 42.5	+22.9	76.5	56 55.8	+24.6	78.0	57 07.6	+26.2	79.5	57 17.7	+28.0	81.0	57 26.3	+29.7	82.6	45
46	56 11.5	+16.3	70.4	56 30.9	+18.0	71.8	56 48.9	+19.7	73.3	57 05.4	+21.4	74.8	57 20.4	+23.1	76.3	57 33.8	+24.9	77.8	57 45.7	+26.6	79.4	57 56.0	+28.4	80.9	46
47	56 27.8	+14.7	68.7	56 48.9	+16.5	70.1	57 08.6	+18.2	71.6	57 26.8	+20.0	73.1	57 43.5	+21.8	74.6	57 58.7	+23.5	76.1	58 12.3	+25.3	77.7	58 24.4	+27.0	79.3	47
48	56 42.5	+13.3	66.9	57 05.4	+15.0	68.4	57 26.8	+16.7	69.8	57 46.8	+18.5	71.3	58 05.3	+20.3	72.8	58 22.2	+22.1	74.4	58 37.6	+23.9	75.9	58 51.4	+25.6	77.5	48
49	56 55.8	+11.8	65.1	57 20.4	+13.4	66.6	57 43.5	+15.2	68.0	58 05.3	+16.9	69.5	58 25.6	+18.7	71.0	58 44.3	+20.5	72.6	59 01.5	+22.3	74.2	59 17.0	+24.2	75.8	49
50	57 07.6	+10.1	63.3	57 33.8	+11.9	64.8	57 58.7	+13.6	66.2	58 22.2	+15.4	67.7	58 44.3	+17.2	69.2	59 04.8	+19.0	70.8	59 23.8	+20.8	72.3	59 41.2	+22.7	74.0	50
51	57 17.7	+8.6	61.5	57 45.7	+10.3	62.9	58 12.3	+12.1	64.4	58 37.6	+13.8	65.8	59 01.5	+15.5	67.3	59 23.8	+17.4	68.9	59 44.6	+19.3	70.5	60 03.9	+21.1	72.1	51
52	57 26.3	+7.0	59.7	57 56.0	+8.6	61.1	58 24.4	+10.3	62.5	58 51.4	+12.1	64.0	59 17.0	+13.9	65.5	59 41.2	+15.7	67.0	60 03.9	+17.6	68.6	60 25.0	+19.4	70.2	52
53	57 33.3	+5.3	57.8	58 04.6	+7.0	59.2	58 34.7	+8.7	60.6	59 03.5	+10.4	62.1	59 30.9	+12.2	63.5	59 56.9	+14.1	65.1	60 21.5	+15.8	66.7	60 44.4	+17.8	68.3	53
54	57 38.6	+3.7	56.0	58 11.6	+5.3	57.3	58 43.4	+7.0	58.7	59 13.9	+8.8	60.1	59 43.1	+10.5	61.6	60 11.0	+12.3	63.1	60 37.3	+14.2	64.7	61 02.2	+16.0	66.4	54
55	57 42.3	+2.1	54.1	58 16.9	+3.7	55.4	58 50.4	+5.3	56.8	59 22.7	+6.9	58.2	59 53.6	+8.7	59.7	60 23.3	+10.5	61.2	60 51.5	+12.3	62.7	61 18.2	+14.2	64.4	55
56	57 44.4	+0.4	52.2	58 20.6	+1.9	53.5	58 55.7	+3.5	54.9	59 29.6	+5.2	56.2	60 02.3	+7.0	57.7	60 33.8	+8.7	59.2	61 03.8	+10.5	60.7	61 32.4	+12.4	62.3	56
57	57 44.8	−1.3	50.4	58 22.5	+0.3	51.6	58 59.2	+1.9	52.9	59 34.8	+3.5	54.3	60 09.3	+5.1	55.7	60 42.5	+6.8	57.2	61 14.3	+8.7	58.7	61 44.8	+10.5	60.3	57
58	57 43.5	−2.9	48.5	58 22.8	−1.5	49.7	59 01.1	0.0	51.0	59 38.3	+1.7	52.3	60 14.4	+3.3	53.7	60 49.3	+5.1	55.1	61 23.0	+6.8	56.6	61 55.3	+8.6	58.2	58
59	57 40.6	−4.6	46.6	58 21.3	−3.1	47.8	59 01.1	−1.6	49.0	59 40.0	−0.2	50.3	60 17.7	+1.5	51.7	60 54.4	+3.1	53.1	61 29.8	+4.9	54.5	62 03.9	+6.7	56.1	59
60	57 36.0	−6.2	44.8	58 18.2	−4.9	45.9	58 59.5	−3.4	47.1	59 39.8	−1.9	48.3	60 19.2	−0.4	49.6	60 57.5	+1.3	51.0	61 34.7	+2.9	52.4	62 10.6	+4.7•	53.9	60
61	57 29.8	−7.9	42.9	58 13.3	−6.5	44.0	58 56.1	−5.2	45.2	59 37.9	−3.7	46.4	60 18.8	−2.2	47.6	60 58.8	−0.7	49.0	61 37.6	+1.0	50.3	62 15.3	+2.7•	51.8	61
62	57 21.9	−9.4	41.1	58 06.8	−8.2	42.1	58 50.9	−6.8	43.2	59 34.2	−5.5	44.4	60 16.6	−4.0	45.6	60 58.1	−2.5	46.9	61 38.6	−0.9	48.2	62 18.0	+0.7	49.7	62
63	57 12.5	−11.0	39.2	57 58.6	−9.8	40.3	58 44.1	−8.6	41.3	59 28.7	−7.2	42.4	60 12.6	−5.8	43.6	60 55.6	−4.4	44.8	61 37.7	−2.9	46.1	62 18.7	−1.2•	47.5	63
64	57 01.5	−12.6	37.4	57 48.8	−11.4	38.4	58 35.5	−10.2	39.4	59 21.5	−8.9	40.5	60 06.8	−7.7	41.6	60 51.2	−6.2	42.8	61 34.8	−4.8	44.0	62 17.5	−3.3•	45.4	64
65	56 48.9	−14.1	35.6	57 37.4	−13.0	36.6	58 25.3	−11.9	37.5	59 12.6	−10.7	38.5	59 59.1	−9.4	39.6	60 45.0	−8.1	40.7	61 30.0	−6.7	41.9	62 14.2	−5.2	43.2	65
66	56 34.8	−15.5	33.9	57 24.4	−14.6	34.7	58 13.4	−13.5	35.7	59 01.9	−12.4	36.6	59 49.7	−11.1	37.6	60 36.9	−9.9	38.7	61 23.3	−8.6	39.9	62 09.0	−7.2•	41.1	66
67	56 19.3	−17.1	32.1	57 09.8	−16.0	32.9	57 59.9	−15.0	33.8	58 49.5	−14.0	34.7	59 38.6	−12.9	35.7	60 27.0	−11.7	36.7	61 14.7	−10.4	37.8	62 01.8	−9.2	39.0	67
68	56 02.2	−18.4	30.4	56 53.8	−17.6	31.2	57 44.9	−16.6	32.0	58 35.5	−15.6	32.9	59 25.7	−14.6	33.8	60 15.3	−13.5	34.7	61 04.3	−12.3	35.8	61 52.6	−11.0	36.9	68
69	55 43.8	−19.9	28.7	56 36.2	−19.0	29.4	57 28.3	−18.1	30.2	58 19.9	−17.2	31.0	59 11.1	−16.2	31.9	60 01.8	−15.1	32.8	60 52.0	−14.1	33.7	61 41.6	−12.9	34.8	69
70	55 23.9	−21.1	27.0	56 17.2	−20.4	27.7	57 10.2	−19.6	28.4	58 02.7	−18.7	29.2	58 54.9	−17.8	30.0	59 46.7	−16.9	30.9	60 37.9	−15.8	31.8	61 28.7	−14.8	32.7	70
71	55 02.8	−22.5	25.4	55 56.8	−21.7	26.0	56 50.6	−21.0	26.7	57 44.0	−20.2	27.4	58 37.1	−19.3	28.2	59 29.8	−18.4	29.0	60 22.1	−17.5	29.8	61 13.9	−16.5	30.7	71
72	54 40.3	−23.7	23.8	55 35.1	−23.1	24.4	56 29.6	−22.4	25.0	57 23.8	−21.6	25.6	58 17.8	−20.9	26.3	59 11.4	−20.1	27.1	60 04.6	−19.2	27.9	60 57.4	−18.2	28.7	72
73	54 16.6	−24.9	22.2	55 12.0	−24.3	22.7	56 07.2	−23.7	23.3	57 02.1	−23.0	23.9	57 56.9	−22.3	24.6	58 51.3	−21.5	25.3	59 45.4	−20.7	26.0	60 39.2	−19.9	26.8	73
74	53 51.6	−26.1	20.7	54 47.7	−25.6	21.2	55 43.5	−24.9	21.7	56 39.2	−24.4	22.2	57 34.6	−23.7	22.8	58 29.8	−23.0	23.5	59 24.7	−22.3	24.1	60 19.3	−21.5	24.8	74
75	53 25.5	−27.2	19.1	54 22.1	−26.7	19.6	55 18.6	−26.3	20.1	56 14.8	−25.6	20.6	57 10.9	−25.1	21.1	58 06.8	−24.5	21.7	59 02.4	−23.8	22.3	59 57.8	−23.1	23.0	75
76	52 58.3	−28.4	17.6	53 55.4	−27.9	18.1	54 52.3	−27.4	18.5	55 49.2	−26.9	19.0	56 45.8	−26.3	19.5	57 42.3	−25.8	20.0	58 38.6	−25.2	20.5	59 34.7	−24.6	21.1	76
77	52 29.9	−29.4	16.2	53 27.5	−29.0	16.6	54 24.9	−28.5	17.0	55 22.3	−28.1	17.4	56 19.5	−27.7	17.8	57 16.5	−27.1	18.3	58 13.4	−26.6	18.8	59 10.1	−26.0	19.3	77
78	52 00.5	−30.4	14.8	52 58.5	−30.0	15.1	53 56.4	−29.7	15.5	54 54.2	−29.3	15.8	55 51.8	−28.8	16.2	56 49.4	−28.4	16.7	57 46.8	−27.9	17.1	58 44.1	−27.3	17.6	78
79	51 30.1	−31.3	13.4	52 28.5	−31.1	13.7	53 26.7	−30.7	14.0	54 24.9	−30.3	14.3	55 23.0	−30.0	14.7	56 21.0	−29.6	15.1	57 18.9	−29.2	15.5	58 16.6	−28.7	15.9	79
80	50 58.8	−32.3	12.0	51 57.4	−32.0	12.3	52 56.0	−31.7	12.6	53 54.6	−31.5	12.9	54 53.0	−31.1	13.2	55 51.4	−30.8	13.5	56 49.7	−30.4	13.9	57 47.9	−30.0	14.2	80
81	50 26.5	−33.2	10.7	51 25.4	−32.9	10.9	52 24.3	−32.7	11.2	53 23.1	−32.4	11.4	54 21.9	−32.1	11.7	55 20.6	−31.8	12.0	56 19.3	−31.5	12.3	57 17.9	−31.2	12.6	81
82	49 53.3	−34.0	9.4	50 52.5	−33.9	9.6	51 51.6	−33.6	9.8	52 50.7	−33.4	10.0	53 49.8	−33.2	10.3	54 48.8	−32.9	10.5	55 47.8	−32.7	10.8	56 46.7	−32.4	11.1	82
83	49 19.3	−34.9	8.1	50 18.6	−34.6	8.3	51 18.0	−34.5	8.5	52 17.3	−34.3	8.6	53 16.6	−34.1	8.8	54 15.9	−33.9	9.1	55 15.1	−33.6	9.3	56 14.3	−33.4	9.5	83
84	48 44.4	−35.6	6.9	49 44.0	−35.5	7.0	50 43.5	−35.3	7.2	51 43.0	−35.2	7.3	52 42.5	−35.0	7.5	53 42.0	−34.9	7.7	54 41.5	−34.7	7.8	55 40.9	−34.5	8.0	84
85	48 08.8	−36.4	5.7	49 08.5	−36.3	5.8	50 08.2	−36.2	5.9	51 07.8	−36.0	6.0	52 07.5	−35.9	6.2	53 07.1	−35.7	6.3	54 06.8	−35.7	6.4	55 06.4	−35.5	6.6	85
86	47 32.4	−37.1	4.5	48 32.2	−37.0	4.6	49 32.0	−36.9	4.7	50 31.8	−36.8	4.8	51 31.6	−36.8	4.9	52 31.4	−36.7	5.0	53 31.1	−36.5	5.1	54 30.9	−36.4	5.2	86
87	46 55.3	−37.8	3.3	47 55.2	−37.7	3.4	48 55.1	−37.7	3.4	49 55.0	−37.6	3.5	50 54.8	−37.5	3.6	51 54.7	−37.4	3.7	52 54.6	−37.4	3.8	53 54.5	−37.3	3.8	87
88	46 17.5	−38.4	2.2	47 17.5	−38.5	2.2	48 17.4	−38.4	2.3	49 17.4	−38.4	2.3	50 17.3	−38.3	2.4	51 17.3	−38.3	2.4	52 17.2	−38.2	2.5	53 17.1	−38.1	2.5	88
89	45 39.1	−39.1	1.1	46 39.0	−39.0	1.1	47 39.0	−39.0	1.1	48 39.0	−39.0	1.1	49 39.0	−39.0	1.2	50 39.0	−39.0	1.2	51 39.0	−39.0	1.2	52 39.0	−39.0	1.2	89
90	45 00.0	−39.7	0.0	46 00.0	−39.7	0.0	47 00.0	−39.7	0.0	48 00.0	−39.7	0.0	49 00.0	−39.7	0.0	50 00.0	−39.7	0.0	51 00.0	−39.7	0.0	52 00.0	−39.7	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 49°, 311°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	27 38.4	−48.0	121.6	27 06.7	−48.5	122.0	26 34.7	−49.1	122.4	26 02.4	−49.7	122.9	25 29.6	−50.2	123.3	24 56.5	−50.7	123.7	24 23.1	−51.2	124.0	23 49.4	−51.8	124.4	0
1	26 50.4	−48.2	122.3	26 18.2	−48.8	122.7	25 45.6	−49.5	123.1	25 12.7	−49.9	123.5	24 39.4	−50.4	123.9	24 05.8	−50.9	124.2	23 31.9	−51.4	124.6	22 57.6	−51.8	125.0	1
2	26 02.2	−48.4	122.9	25 29.4	−48.9	123.3	24 56.3	−49.5	123.7	24 22.8	−50.0	124.1	23 49.0	−50.5	124.5	23 14.9	−51.0	124.8	22 40.5	−51.5	125.2	22 05.8	−52.0	125.5	2
3	25 13.8	−48.5	123.6	24 40.5	−49.1	124.0	24 06.8	−49.6	124.3	23 32.8	−50.1	124.7	22 58.5	−50.7	125.1	22 23.9	−51.2	125.4	21 49.0	−51.6	125.7	21 13.8	−52.1	126.0	3
4	24 25.3	−48.7	124.2	23 51.4	−49.2	124.6	23 17.2	−49.8	125.0	22 42.7	−50.3	125.3	22 07.8	−50.7	125.6	21 32.7	−51.2	126.0	20 57.4	−51.7	126.3	20 21.7	−52.1	126.6	4
5	23 36.6	−48.8	124.9	23 02.2	−49.4	125.2	22 27.4	−49.9	125.6	21 52.4	−50.4	125.9	21 17.1	−50.9	126.2	20 41.5	−51.4	126.5	20 05.7	−51.8	126.8	19 29.6	−52.3	127.1	5
6	22 47.8	−49.0	125.5	22 12.8	−49.5	125.8	21 37.5	−50.0	126.2	21 02.0	−50.5	126.5	20 26.2	−51.0	126.8	19 50.1	−51.4	127.1	19 13.9	−51.9	127.4	18 37.3	−52.3	127.6	6
7	21 58.8	−49.2	126.1	21 23.3	−49.7	126.4	20 47.5	−50.2	126.7	20 11.5	−50.7	127.0	19 35.2	−51.1	127.3	18 58.7	−51.6	127.6	18 22.0	−52.0	127.9	17 45.0	−52.4	128.1	7
8	21 09.6	−49.3	126.7	20 33.6	−49.8	127.0	19 57.3	−50.2	127.3	19 20.8	−50.7	127.6	18 44.1	−51.2	127.9	18 07.1	−51.6	128.2	17 30.0	−52.1	128.4	16 52.6	−52.5	128.6	8
9	20 20.3	−49.3	127.3	19 43.8	−49.9	127.6	19 07.1	−50.4	127.9	18 30.1	−50.8	128.2	17 52.9	−51.3	128.4	17 15.5	−51.7	128.7	16 37.9	−52.2	128.9	16 00.1	−52.6	129.2	9
10	19 31.0	−49.6	128.0	18 53.9	−50.0	128.2	18 16.7	−50.5	128.5	17 39.3	−51.0	128.7	17 01.6	−51.4	129.0	16 23.8	−51.8	129.2	15 45.7	−52.2	129.4	15 07.5	−52.6	129.7	10
11	18 41.4	−49.6	128.5	18 03.9	−50.1	128.8	17 26.2	−50.5	129.1	16 48.3	−51.0	129.3	16 10.2	−51.4	129.5	15 32.0	−51.9	129.7	14 53.5	−52.3	130.0	14 14.9	−52.7	130.2	11
12	17 51.8	−49.7	129.1	17 13.8	−50.2	129.4	16 35.7	−50.7	129.6	15 57.3	−51.1	129.8	15 18.8	−51.5	130.1	14 40.1	−52.0	130.3	14 01.2	−52.3	130.5	13 22.2	−52.7	130.6	12
13	17 02.1	−49.9	129.7	16 23.6	−50.3	130.0	15 45.0	−50.7	130.2	15 06.2	−51.2	130.4	14 27.3	−51.6	130.6	13 48.1	−52.0	130.8	13 08.9	−52.4	131.0	12 29.5	−52.8	131.1	13
14	16 12.2	−49.9	130.3	15 33.3	−50.3	130.5	14 54.3	−50.8	130.7	14 15.0	−51.2	130.9	13 35.7	−51.7	131.1	12 56.1	−52.0	131.3	12 16.5	−52.5	131.5	11 36.7	−52.9	131.6	14
15	15 22.3	−50.0	130.9	14 43.0	−50.5	131.1	14 03.5	−50.9	131.3	13 23.8	−51.3	131.5	12 44.0	−51.7	131.6	12 04.1	−52.2	131.8	11 24.0	−52.5	132.0	10 43.8	−52.8	132.1	15
16	14 32.3	−50.1	131.5	13 52.5	−50.5	131.6	13 12.6	−51.0	131.8	12 32.5	−51.4	132.0	11 52.3	−51.8	132.2	11 11.9	−52.1	132.3	10 31.5	−52.5	132.4	9 51.0	−53.0	132.6	16
17	13 42.2	−50.2	132.0	13 02.0	−50.6	132.2	12 21.6	−51.0	132.4	11 41.1	−51.4	132.5	11 00.5	−51.8	132.7	10 19.8	−52.2	132.8	9 39.0	−52.6	132.9	8 58.0	−52.9	133.1	17
18	12 52.0	−50.2	132.6	12 11.4	−50.7	132.7	11 30.6	−51.1	132.9	10 49.7	−51.5	133.0	10 08.7	−51.9	133.2	9 27.6	−52.3	133.3	8 46.4	−52.7	133.4	8 05.1	−53.0	133.5	18
19	12 01.8	−50.3	133.1	11 20.7	−50.7	133.3	10 39.5	−51.1	133.4	9 58.2	−51.6	133.5	9 16.8	−51.9	133.7	8 35.3	−52.3	133.8	7 53.7	−52.6	133.9	7 12.1	−53.1	134.0	19
20	11 11.5	−50.4	133.7	10 30.0	−50.8	133.8	9 48.4	−51.2	134.0	9 06.6	−51.5	134.1	8 24.9	−52.0	134.2	7 43.0	−52.3	134.3	7 01.1	−52.7	134.4	6 19.0	−53.1	134.5	20
21	10 21.1	−50.4	134.3	9 39.2	−50.9	134.4	8 57.2	−51.3	134.5	8 15.1	−51.7	134.6	7 32.9	−52.0	134.7	6 50.7	−52.4	134.8	6 08.4	−52.8	134.9	5 26.0	−53.1	134.9	21
22	9 30.7	−50.5	134.8	8 48.3	−50.9	134.9	8 05.9	−51.2	135.0	7 23.4	−51.6	135.1	6 40.9	−52.0	135.2	5 58.3	−52.4	135.3	5 15.6	−52.7	135.4	4 32.9	−53.1	135.4	22
23	8 40.2	−50.5	135.4	7 57.5	−51.0	135.5	7 14.7	−51.4	135.5	6 31.8	−51.7	135.6	5 48.9	−52.1	135.7	5 05.9	−52.4	135.8	4 22.9	−52.8	135.8	3 39.8	−53.1	135.9	23
24	7 49.6	−50.5	135.9	7 06.5	−50.9	136.0	6 23.3	−51.3	136.1	5 40.1	−51.7	136.1	4 56.8	−52.1	136.2	4 13.5	−52.4	136.3	3 30.1	−52.8	136.3	2 46.7	−53.1	136.3	24
25	6 59.1	−50.6	136.4	6 15.6	−51.0	136.5	5 32.0	−51.4	136.6	4 48.4	−51.7	136.7	4 04.7	−52.1	136.7	3 21.1	−52.5	136.8	2 37.3	−52.7	136.8	1 53.6	−53.1	136.8	25
26	6 08.5	−50.7	137.0	5 24.6	−51.0	137.0	4 40.6	−51.4	137.1	3 56.7	−51.8	137.2	3 12.6	−52.1	137.2	2 28.6	−52.4	137.2	1 44.6	−52.8	137.3	1 00.5	−53.2	137.3	26
27	5 17.8	−50.6	137.5	4 33.6	−51.1	137.6	3 49.2	−51.4	137.6	3 04.9	−51.8	137.7	2 20.5	−52.1	137.7	1 36.2	−52.5	137.7	0 51.8	−52.8	137.7	0 07.3	−53.1	137.7	27
28	4 27.2	−50.7	138.1	3 42.5	−51.0	138.1	2 57.8	−51.4	138.1	2 13.1	−51.7	138.2	1 28.4	−52.1	138.2	0 43.7	−52.5	138.2	0 01.0	+52.8	41.8	0 45.8	+53.1	41.8	28
29	3 36.5	−50.7	138.6	2 51.5	−51.1	138.6	2 06.4	−51.4	138.7	1 21.4	−51.8	138.7	0 36.3	−52.1	138.7	0 08.8	+52.4	41.3	0 53.8	+52.8	41.3	1 38.9	+53.1	41.3	29
30	2 45.8	−50.8	139.1	2 00.4	−51.1	139.2	1 15.0	−51.5	139.2	0 29.6	−51.8	139.2	0 15.8	+52.2	40.8	1 01.2	+52.5	40.8	1 46.6	+52.8	40.8	2 32.0	+53.1	40.9	30
31	1 55.0	−50.7	139.7	1 09.3	−51.1	139.7	0 23.5	−51.5	139.7	0 22.2	+51.8	40.3	1 08.0	+52.1	40.3	1 53.7	+52.5	40.3	2 39.4	+52.8	40.4	3 25.1	+53.1	40.4	31
32	1 04.3	−50.8	140.2	0 18.2	−51.1	140.2	0 27.9	+51.4	39.8	1 14.0	+51.8	39.8	2 00.1	+52.1	39.8	2 46.2	+52.4	39.8	3 32.2	+52.8	39.9	4 18.2	+53.1	39.9	32
33	0 13.6	−50.8	140.7	0 32.9	+51.1	39.3	1 19.3	+51.5	39.3	2 05.8	+51.7	39.3	2 52.2	+52.1	39.3	3 38.6	+52.4	39.4	4 25.0	+52.7	39.4	5 11.3	+53.1	39.5	33
34	0 37.2	+50.7	38.7	1 24.0	+51.1	38.8	2 10.8	+51.4	38.8	2 57.5	+51.8	38.8	3 44.3	+52.1	38.8	4 31.0	+52.4	38.9	5 17.7	+52.7	38.9	6 04.4	+53.0	39.0	34
35	1 27.9	+50.8	38.2	2 15.1	+51.0	38.2	3 02.2	+51.4	38.2	3 49.3	+51.7	38.3	4 36.4	+52.0	38.3	5 23.4	+52.4	38.4	6 10.4	+52.7	38.4	6 57.4	+53.0	38.5	35
36	2 18.7	+50.7	37.7	3 06.1	+51.1	37.7	3 53.6	+51.4	37.7	4 41.0	+51.8	37.8	5 28.4	+52.1	37.8	6 15.8	+52.4	37.9	7 03.1	+52.7	38.0	7 50.4	+53.0	38.0	36
37	3 09.4	+50.7	37.1	3 57.2	+51.0	37.2	4 45.0	+51.4	37.2	5 32.8	+51.6	37.3	6 20.5	+52.0	37.3	7 08.2	+52.3	37.4	7 55.8	+52.6	37.5	8 43.4	+52.9	37.6	37
38	4 00.1	+50.7	36.6	4 48.2	+51.0	36.6	5 36.4	+51.3	36.7	6 24.4	+51.7	36.8	7 12.5	+52.0	36.8	8 00.5	+52.3	36.9	8 48.4	+52.6	37.0	9 36.3	+52.9	37.1	38
39	4 50.8	+50.6	36.1	5 39.2	+51.0	36.1	6 27.7	+51.3	36.2	7 16.1	+51.6	36.2	8 04.5	+51.9	36.3	8 52.8	+52.2	36.4	9 41.0	+52.6	36.5	10 29.2	+52.9	36.6	39
40	5 41.4	+50.6	35.5	6 30.2	+51.0	35.6	7 19.0	+51.3	35.7	8 07.7	+51.6	35.7	8 56.4	+51.9	35.8	9 45.0	+52.2	35.9	10 33.6	+52.5	36.0	11 22.1	+52.8	36.1	40
41	6 32.0	+50.6	35.0	7 21.2	+50.9	35.1	8 10.3	+51.2	35.1	8 59.3	+51.6	35.2	9 48.3	+51.9	35.3	10 37.2	+52.2	35.4	11 26.1	+52.5	35.5	12 14.9	+52.7	35.7	41
42	7 22.6	+50.6	34.4	8 12.1	+50.9	34.5	9 01.5	+51.2	34.6	9 50.9	+51.5	34.7	10 40.2	+51.8	34.8	11 29.4	+52.1	34.9	12 18.6	+52.4	35.0	13 07.6	+52.8	35.2	42
43	8 13.2	+50.5	33.9	9 03.0	+50.8	34.0	9 52.7	+51.1	34.1	10 42.4	+51.4	34.2	11 32.0	+51.7	34.3	12 21.5	+52.0	34.4	13 11.0	+52.3	34.5	14 00.4	+52.6	34.7	43
44	9 03.7	+50.4	33.4	9 53.8	+50.7	33.4	10 43.8	+51.1	33.5	11 33.8	+51.4	33.7	12 23.7	+51.7	33.8	13 13.5	+52.0	33.9	14 03.3	+52.3	34.0	14 53.0	+52.6	34.2	44
45	9 54.1	+50.4	32.8	10 44.5	+50.8	32.9	11 34.9	+51.0	33.0	12 25.2	+51.3	33.1	13 15.4	+51.6	33.2	14 05.5	+52.0	33.4	14 55.6	+52.2	33.5	15 45.6	+52.5	33.7	45
46	10 44.5	+50.4	32.3	11 35.3	+50.6	32.4	12 25.9	+51.0	32.5	13 16.5	+51.3	32.6	14 07.0	+51.6	32.7	14 57.5	+51.8	32.9	15 47.8	+52.2	33.0	16 38.1	+52.4	33.2	46
47	11 34.9	+50.3	31.7	12 25.9	+50.6	31.8	13 16.9	+50.9	31.9	14 07.8	+51.1	32.1	14 58.6	+51.5	32.2	15 49.3	+51.8	32.3	16 40.0	+52.0	32.5	17 30.5	+52.4	32.7	47
48	12 25.2	+50.2	31.1	13 16.5	+50.5	31.3	14 07.8	+50.8	31.4	14 58.9	+51.2	31.5	15 50.1	+51.4	31.7	16 41.1	+51.7	31.8	17 32.0	+52.0	32.0	18 22.9	+52.2	32.2	48
49	13 15.4	+50.1	30.6	14 07.0	+50.5	30.7	14 58.6	+50.7	30.8	15 50.1	+51.0	31.0	16 41.5	+51.3	31.1	17 32.8	+51.6	31.3	18 24.0	+51.9	31.5	19 15.1	+52.2	31.6	49
50	14 05.5	+50.1	30.0	14 57.5	+50.3	30.1	15 49.3	+50.7	30.3	16 41.1	+50.9	30.4	17 32.8	+51.2	30.6	18 24.4	+51.5	30.7	19 15.9	+51.8	30.9	20 07.3	+52.1	31.1	50
51	14 55.6	+50.0	29.4	15 47.8	+50.3	29.6	16 40.0	+50.5	29.7	17 32.0	+50.9	29.9	18 24.0	+51.1	30.0	19 15.9	+51.4	30.2	20 07.7	+51.7	30.4	20 59.4	+51.9	30.6	51
52	15 45.6	+49.9	28.9	16 38.1	+50.2	29.0	17 30.5	+50.5	29.2	18 22.9	+50.7	29.3	19 15.1	+51.1	29.5	20 07.3	+51.3	29.7	20 59.4	+51.6	29.8	21 51.4	+51.9	30.0	52
53	16 35.5	+49.7	28.3	17 28.3	+50.0	28.4	18 21.0	+50.3	28.6	19 13.6	+50.7	28.8	20 06.2	+50.9	28.9	20 58.6	+51.3	29.1	21 51.0	+51.5	29.3	22 43.3	+51.8	29.5	53
54	17 25.2	+49.7	27.7	18 18.3	+50.0	27.9	19 11.3	+50.3	28.0	20 04.3	+50.5	28.2	20 57.1	+50.8	28.4	21 49.9	+51.1	28.5	22 42.5	+51.4	28.7	23 35.1	+51.6	28.9	54
55	18 14.9	+49.6	27.1	19 08.3	+49.9	27.3	20 01.6	+50.1	27.4	20 54.8	+50.4	27.6	21 47.9	+50.7	27.8	22 41.0	+50.9	28.0	23 33.9	+51.2	28.2	24 26.7	+51.6	28.4	55
56	19 04.5	+49.5	26.5	19 58.2	+49.7	26.7	20 51.7	+50.0	26.8	21 45.2	+50.3	27.0	22 38.6	+50.6	27.2	23 31.9	+50.9	27.4	24 25.1	+51.2	27.6	25 18.3	+51.4	27.8	56
57	19 54.0	+49.3	25.9	20 47.9	+49.6	26.1	21 41.7	+49.9	26.3	22 35.5	+50.2	26.4	23 29.2	+50.4	26.6	24 22.8	+50.7	26.8	25 16.3	+51.0	27.0	26 09.7	+51.2	27.3	57
58	20 43.3	+49.2	25.3	21 37.5	+49.5	25.5	22 31.6	+49.8	25.7	23 25.7	+50.0	25.8	24 19.6	+50.3	26.0	25 13.5	+50.6	26.2	26 07.3	+50.8	26.5	27 00.9	+51.1	26.7	58
59	21 32.5	+49.1	24.7	22 27.0	+49.3	24.9	23 21.4	+49.6	25.0	24 15.7	+49.9	25.2	25 09.9	+50.1	25.4	26 04.1	+50.4	25.6	26 58.1	+50.7	25.9	27 52.0	+51.0	26.1	59
60	22 21.6	+48.9	24.1	23 16.3	+49.2	24.3	24 11.0	+49.5	24.4	25 05.6	+49.7	24.6	26 00.1	+50.0	24.8	26 54.5	+50.2	25.0	27 48.8	+50.5	25.3	28 43.0	+50.8	25.5	60
61	23 10.5	+48.8	23.5	24 05.5	+49.1	23.6	25 00.5	+49.3	23.8	25 55.3	+49.6	24.0	26 50.1	+49.8	24.2	27 44.7	+50.1	24.4	28 39.3	+50.4	24.6	29 33.8	+50.7	24.9	61
62	23 59.3	+48.6	22.8	24 54.6	+48.8	23.0	25 49.8	+49.1	23.1	26 44.9	+49.4	23.4	27 39.9	+49.7	23.6	28 34.8	+50.0	23.8	29 29.7	+50.2	24.0	30 24.5	+50.4	24.3	62
63	24 47.9	+48.5	22.2	25 43.4	+48.7	22.4	26 38.9	+49.0	22.5	27 34.3	+49.2	22.7	28 29.6	+49.4	22.9	29 24.8	+49.7	23.2	30 19.9	+50.0	23.4	31 14.9	+50.3	23.6	63
64	25 36.4	+48.2	21.5	26 32.1	+48.6	21.7	27 27.9	+48.7	21.9	28 23.5	+49.0	22.1	29 19.0	+49.3	22.3	30 14.5	+49.6	22.5	31 09.9	+49.8	22.7	32 05.2	+50.1	23.0	64
65	26 24.6	+48.1	20.9	27 20.7	+48.3	21.0	28 16.6	+48.6	21.2	29 12.5	+48.9	21.4	30 08.3	+49.1	21.6	31 04.1	+49.3	21.9	31 59.7	+49.6	22.1	32 55.3	+49.8	22.3	65
66	27 12.7	+47.9	20.2	28 09.0	+48.2	20.4	29 05.2	+48.4	20.6	30 01.4	+48.6	20.8	30 57.4	+48.9	21.0	31 53.4	+49.1	21.2	32 49.3	+49.4	21.4	33 45.1	+49.7	21.7	66
67	28 00.6	+47.7	19.5	28 57.2	+47.9	19.7	29 53.6	+48.2	19.9	30 50.0	+48.4	20.1	31 46.3	+48.7	20.3	32 42.5	+49.0	20.5	33 38.7	+49.2	20.7	34 34.8	+49.4	21.0	67
68	28 48.3	+47.5	18.8	29 45.1	+47.7	19.0	30 41.8	+47.9	19.2	31 38.4	+48.2	19.4	32 35.0	+48.4	19.6	33 31.5	+48.6	19.8	34 27.9	+48.9	20.0	35 24.2	+49.2	20.2	68
69	29 35.8	+47.3	18.1	30 32.8	+47.5	18.3	31 29.7	+47.8	18.5	32 26.6	+48.0	18.7	33 23.4	+48.2	18.9	34 20.1	+48.5	19.1	35 16.8	+48.7	19.3	36 13.4	+48.9	19.6	69
70	30 23.1	+47.0	17.4	31 20.3	+47.2	17.6	32 17.5	+47.4	17.8	33 14.6	+47.7	18.0	34 11.6	+47.9	18.2	35 08.6	+48.1	18.4	36 05.5	+48.4	18.6	37 02.3	+48.6	18.9	70
71	31 10.1	+46.8	16.7	32 07.5	+47.0	16.9	33 04.9	+47.2	17.1	34 02.3	+47.4	17.2	34 59.5	+47.7	17.5	35 56.7	+47.9	17.7	36 53.9	+48.1	17.9	37 50.9	+48.4	18.1	71
72	31 56.9	+46.5	16.0	32 54.5	+46.8	16.1	33 52.1	+47.0	16.3	34 49.7	+47.2	16.5	35 47.2	+47.4	16.7	36 44.6	+47.6	16.9	37 42.0	+47.8	17.1	38 39.3	+48.1	17.4	72
73	32 43.4	+46.2	15.2	33 41.3	+46.4	15.4	34 39.1	+46.6	15.6	35 36.9	+46.8	15.7	36 34.6	+47.1	15.9	37 32.2	+47.3	16.2	38 29.8	+47.6	16.4	39 27.4	+47.7	16.6	73
74	33 29.6	+46.0	14.4	34 27.7	+46.2	14.6	35 25.7	+46.4	14.8	36 23.7	+46.6	15.0	37 21.7	+46.7	15.2	38 19.5	+47.0	15.4	39 17.4	+47.2	15.6	40 15.1	+47.5	15.8	74
75	34 15.6	+45.6	13.7	35 13.9	+45.8	13.8	36 12.1	+46.1	14.0	37 10.3	+46.2	14.2	38 08.4	+46.5	14.4	39 06.5	+46.7	14.6	40 04.6	+46.8	14.8	41 02.6	+47.0	15.0	75
76	35 01.2	+45.4	12.9	35 59.7	+45.6	13.0	36 58.2	+45.7	13.2	37 56.5	+46.0	13.4	38 54.9	+46.1	13.6	39 53.2	+46.3	13.8	40 51.4	+46.6	14.0	41 49.6	+46.8	14.2	76
77	35 46.6	+45.0	12.1	36 45.3	+45.2	12.2	37 43.9	+45.4	12.4	38 42.5	+45.5	12.6	39 41.0	+45.8	12.7	40 39.5	+45.9	12.9	41 38.0	+46.1	13.1	42 36.4	+46.3	13.3	77
78	36 31.6	+44.7	11.3	37 30.5	+44.8	11.4	38 29.3	+45.0	11.6	39 28.0	+45.2	11.7	40 26.8	+45.3	11.9	41 25.4	+45.6	12.1	42 24.1	+45.7	12.3	43 22.7	+45.9	12.5	78
79	37 16.3	+44.3	10.4	38 15.3	+44.5	10.6	39 14.3	+44.6	10.7	40 13.2	+44.8	10.9	41 12.1	+45.0	11.0	42 11.0	+45.1	11.2	43 09.8	+45.4	11.4	44 08.6	+45.5	11.6	79
80	38 00.6	+44.0	9.6	38 59.8	+44.1	9.7	39 58.9	+44.3	9.8	40 58.0	+44.4	10.0	41 57.1	+44.6	10.1	42 56.1	+44.8	10.3	43 55.2	+44.8	10.5	44 54.1	+45.1	10.7	80
81	38 44.6	+43.5	8.7	39 43.9	+43.7	8.8	40 43.2	+43.8	9.0	41 42.4	+44.0	9.1	42 41.7	+44.1	9.2	43 40.9	+44.2	9.4	44 40.0	+44.5	9.6	45 39.2	+44.6	9.7	81
82	39 28.1	+43.2	7.8	40 27.6	+43.2	7.9	41 27.0	+43.4	8.1	42 26.4	+43.5	8.2	43 25.8	+43.6	8.3	44 25.1	+43.8	8.5	45 24.5	+43.9	8.6	46 23.8	+44.1	8.8	82
83	40 11.3	+42.7	6.9	41 10.8	+42.9	7.0	42 10.4	+42.9	7.1	43 09.9	+43.1	7.2	44 09.4	+43.2	7.4	45 08.9	+43.3	7.5	46 08.4	+43.4	7.6	47 07.9	+43.5	7.8	83
84	40 54.0	+42.3	6.0	41 53.7	+42.3	6.1	42 53.3	+42.5	6.2	43 53.0	+42.5	6.3	44 52.6	+42.7	6.4	45 52.2	+42.8	6.5	46 51.8	+42.9	6.6	47 51.4	+43.0	6.8	84
85	41 36.3	+41.8	5.0	42 36.0	+41.9	5.1	43 35.8	+41.9	5.2	44 35.5	+42.1	5.3	45 35.3	+42.1	5.4	46 35.0	+42.2	5.5	47 34.7	+42.3	5.6	48 34.4	+42.4	5.7	85
86	42 18.1	+41.2	4.1	43 17.9	+41.4	4.1	44 17.7	+41.5	4.2	45 17.6	+41.5	4.3	46 17.4	+41.6	4.4	47 17.2	+41.7	4.5	48 17.0	+41.8	4.5	49 16.8	+41.8	4.6	86
87	42 59.3	+40.8	3.1	43 59.3	+40.8	3.1	44 59.1	+40.8	3.2	45 59.1	+40.9	3.3	46 59.0	+40.9	3.3	47 58.9	+40.9	3.3	48 58.8	+41.0	3.4	49 58.6	+41.2	3.5	87
88	43 40.1	+40.2	2.1	44 40.1	+40.2	2.1	45 40.0	+40.3	2.2	46 40.0	+40.3	2.2	47 39.9	+40.4	2.2	48 39.9	+40.4	2.3	49 39.8	+40.5	2.3	50 39.8	+40.5	2.4	88
89	44 20.3	+39.7	1.1	45 20.3	+39.7	1.1	46 20.3	+39.7	1.1	47 20.3	+39.7	1.1	48 20.3	+39.7	1.1	49 20.3	+39.7	1.2	50 20.3	+39.7	1.2	51 20.3	+39.7	1.2	89
90	45 00.0	+39.1	0.0	46 00.0	+39.0	0.0	47 00.0	+39.0	0.0	48 00.0	+39.0	0.0	49 00.0	+39.0	0.0	50 00.0	+39.0	0.0	51 00.0	+39.0	0.0	52 00.0	+39.0	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 131°, 229°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	27 02.0	+47.6	120.7	26 31.2	+48.2	121.1	26 00.0	+48.8	121.5	25 28.5	+49.3	121.9	24 56.5	+49.9	122.3	24 24.3	+50.4	122.7	23 51.7	+50.9	123.1	23 18.7	+51.4	123.5	0
1	27 49.6	+47.3	120.0	27 19.4	+47.9	120.4	26 48.8	+48.5	120.9	26 17.8	+49.1	121.3	25 46.4	+49.7	121.7	25 14.7	+50.2	122.1	24 42.6	+50.8	122.5	24 10.1	+51.3	122.9	1
2	28 36.9	+47.1	119.3	28 07.3	+47.8	119.8	27 37.3	+48.4	120.2	27 06.9	+49.0	120.7	26 36.1	+49.6	121.1	26 04.9	+50.1	121.5	25 33.4	+50.6	121.9	25 01.4	+51.2	122.3	2
3	29 24.0	+46.9	118.6	28 55.1	+47.5	119.1	28 25.7	+48.1	119.6	27 55.9	+48.8	120.0	27 25.7	+49.3	120.5	26 55.0	+50.0	120.9	26 24.0	+50.5	121.3	25 52.6	+51.0	121.8	3
4	30 10.9	+46.6	117.9	29 42.6	+47.3	118.4	29 13.8	+48.0	118.9	28 44.7	+48.5	119.4	28 15.0	+49.2	119.8	27 45.0	+49.7	120.3	27 14.5	+50.3	120.7	26 43.6	+50.9	121.2	4
5	30 57.5	+46.4	117.1	30 29.9	+47.1	117.7	30 01.8	+47.7	118.2	29 33.2	+48.4	118.7	29 04.2	+49.0	119.2	28 34.7	+49.6	119.7	28 04.8	+50.2	120.1	27 34.5	+50.7	120.6	5
6	31 43.9	+46.1	116.4	31 17.0	+46.8	116.9	30 49.5	+47.5	117.5	30 21.6	+48.2	118.0	29 53.2	+48.8	118.5	29 24.3	+49.4	119.0	28 55.0	+50.0	119.5	28 25.2	+50.6	120.0	6
7	32 30.0	+45.9	115.6	32 03.8	+46.6	116.2	31 37.0	+47.3	116.8	31 09.8	+47.9	117.3	30 42.0	+48.6	117.8	30 13.7	+49.2	118.4	29 45.0	+49.8	118.9	29 15.8	+50.4	119.4	7
8	33 15.9	+45.5	114.9	32 50.4	+46.3	115.5	32 24.3	+47.0	116.0	31 57.7	+47.7	116.6	31 30.6	+48.3	117.2	31 02.9	+49.0	117.7	30 34.8	+49.6	118.2	30 06.2	+50.2	118.7	8
9	34 01.4	+45.3	114.1	33 36.7	+46.0	114.7	33 11.3	+46.7	115.3	32 45.4	+47.4	115.9	32 18.9	+48.1	116.5	31 51.9	+48.8	117.0	31 24.4	+49.4	117.6	30 56.4	+50.0	118.1	9
10	34 46.7	+44.9	113.3	34 22.7	+45.7	113.9	33 58.0	+46.5	114.5	33 32.8	+47.2	115.2	33 07.0	+47.9	115.7	32 40.7	+48.5	116.3	32 13.8	+49.2	116.9	31 46.4	+49.8	117.5	10
11	35 31.6	+44.7	112.5	35 08.4	+45.4	113.1	34 44.5	+46.2	113.8	34 20.0	+46.9	114.4	33 54.9	+47.6	115.0	33 29.2	+48.3	115.6	33 03.0	+49.0	116.2	32 36.2	+49.6	116.8	11
12	36 16.3	+44.2	111.7	35 53.8	+45.0	112.3	35 30.7	+45.8	113.0	35 06.9	+46.6	113.6	34 42.5	+47.4	114.3	34 17.5	+48.1	114.9	33 52.0	+48.7	115.5	33 25.8	+49.4	116.1	12
13	37 00.5	+43.9	110.8	36 38.8	+44.8	111.5	36 16.5	+45.5	112.2	35 53.5	+46.3	112.9	35 29.9	+47.0	113.5	35 05.6	+47.8	114.2	34 40.7	+48.5	114.8	34 15.2	+49.2	115.4	13
14	37 44.4	+43.5	110.0	37 23.6	+44.3	110.7	37 02.0	+45.2	111.4	36 39.8	+46.0	112.1	36 16.9	+46.8	112.8	35 53.4	+47.5	113.4	35 29.2	+48.2	114.1	35 04.4	+48.9	114.7	14
15	38 27.9	+43.2	109.1	38 07.9	+44.0	109.8	37 47.2	+44.9	110.6	37 25.8	+45.7	111.3	37 03.7	+46.4	112.0	36 40.9	+47.2	112.7	36 17.4	+48.0	113.4	35 53.3	+48.7	114.0	15
16	39 11.1	+42.7	108.2	38 51.9	+43.6	109.0	38 32.1	+44.4	109.7	38 11.5	+45.3	110.5	37 50.1	+46.1	111.2	37 28.1	+46.9	111.9	37 05.4	+47.6	112.6	36 42.0	+48.3	113.3	16
17	39 53.8	+42.2	107.3	39 35.5	+43.2	108.1	39 16.5	+44.1	108.9	38 56.8	+44.9	109.6	38 36.2	+45.8	110.4	38 15.0	+46.6	111.1	37 53.0	+47.4	111.8	37 30.3	+48.1	112.6	17
18	40 36.0	+41.8	106.4	40 18.7	+42.8	107.2	40 00.6	+43.7	108.0	39 41.7	+44.6	108.8	39 22.0	+45.4	109.5	39 01.6	+46.2	110.3	38 40.4	+47.0	111.1	38 18.4	+47.8	111.8	18
19	41 17.8	+41.4	105.4	41 01.5	+42.3	106.2	40 44.3	+43.2	107.1	40 26.3	+44.1	107.9	40 07.4	+45.1	108.7	39 47.8	+45.9	109.5	39 27.4	+46.7	110.3	39 06.2	+47.5	111.0	19
20	41 59.2	+40.8	104.4	41 43.8	+41.8	105.3	41 27.5	+42.8	106.2	41 10.4	+43.7	107.0	40 52.5	+44.6	107.8	40 33.7	+45.5	108.6	40 14.1	+46.3	109.4	39 53.7	+47.2	110.2	20
21	42 40.0	+40.3	103.4	42 25.6	+41.3	104.3	42 10.3	+42.3	105.2	41 54.1	+43.3	106.1	41 37.1	+44.2	106.9	41 19.2	+45.1	107.8	41 00.4	+46.0	108.6	40 40.9	+46.8	109.4	21
22	43 20.3	+39.8	102.4	43 06.9	+40.8	103.3	42 52.6	+41.9	104.3	42 37.4	+42.8	105.1	42 21.3	+43.7	106.0	42 04.3	+44.7	106.9	41 46.4	+45.6	107.7	41 27.7	+46.4	108.6	22
23	44 00.1	+39.2	101.4	43 47.7	+40.3	102.3	43 34.5	+41.3	103.3	43 20.2	+42.3	104.2	43 05.0	+43.3	105.1	42 49.0	+44.2	106.0	42 32.0	+45.2	106.9	42 14.1	+46.1	107.7	23
24	44 39.3	+38.6	100.3	44 28.0	+39.7	101.3	44 15.8	+40.7	102.3	44 02.5	+41.8	103.2	43 48.3	+42.9	104.1	43 33.2	+43.8	105.1	43 17.2	+44.7	106.0	43 00.2	+45.6	106.9	24
25	45 17.9	+37.9	99.3	45 07.7	+39.1	100.2	44 56.5	+40.2	101.2	44 44.3	+41.3	102.2	44 31.2	+42.3	103.2	44 17.0	+43.3	104.1	44 01.9	+44.3	105.1	43 45.8	+45.3	106.0	25
26	45 55.8	+37.3	98.1	45 46.8	+38.5	99.2	45 36.7	+39.6	100.2	45 25.6	+40.7	101.2	45 13.5	+41.7	102.2	45 00.3	+42.8	103.1	44 46.2	+43.8	104.1	44 31.1	+44.7	105.1	26
27	46 33.1	+36.6	97.0	46 25.3	+37.8	98.1	46 16.3	+39.0	99.1	46 06.3	+40.1	100.1	45 55.2	+41.2	101.1	45 43.1	+42.3	102.1	45 30.0	+43.3	103.1	45 15.8	+44.3	104.1	27
28	47 09.7	+35.9	95.9	47 03.1	+37.1	96.9	46 55.3	+38.3	98.0	46 46.4	+39.5	99.0	46 36.4	+40.6	100.1	46 25.4	+41.7	101.1	46 13.3	+42.7	102.1	46 00.1	+43.8	103.2	28
29	47 45.6	+35.2	94.7	47 40.2	+36.4	95.8	47 33.6	+37.6	96.9	47 25.9	+38.8	97.9	47 17.0	+40.0	99.0	47 07.1	+41.1	100.1	46 56.0	+42.3	101.1	46 43.9	+43.3	102.2	29
30	48 20.8	+34.4	93.5	48 16.6	+35.6	94.6	48 11.2	+36.9	95.7	48 04.7	+38.1	96.8	47 57.0	+39.3	97.9	47 48.2	+40.5	99.0	47 38.3	+41.6	100.1	47 27.2	+42.7	101.2	30
31	48 55.2	+33.5	92.2	48 52.2	+34.9	93.4	48 48.1	+36.2	94.5	48 42.8	+37.4	95.6	48 36.3	+38.7	96.8	48 28.7	+39.8	97.9	48 19.9	+41.0	99.0	48 09.9	+42.1	100.1	31
32	49 28.7	+32.7	90.9	49 27.1	+34.1	92.1	49 24.3	+35.4	93.3	49 20.2	+36.7	94.4	49 15.0	+37.9	95.6	49 08.5	+39.2	96.8	49 00.9	+40.3	97.9	48 52.0	+41.6	99.0	32
33	50 01.4	+31.8	89.6	50 01.2	+33.2	90.8	49 59.7	+34.5	92.0	49 56.9	+35.9	93.2	49 52.9	+37.2	94.4	49 47.7	+38.4	95.6	49 41.2	+39.7	96.8	49 33.6	+40.8	97.9	33
34	50 33.2	+30.9	88.3	50 34.4	+32.3	89.5	50 34.2	+33.7	90.8	50 32.8	+35.1	92.0	50 30.1	+36.4	93.2	50 26.1	+37.7	94.4	50 20.9	+38.9	95.6	50 14.4	+40.2	96.8	34
35	51 04.1	+29.9	87.0	51 06.7	+31.3	88.2	51 07.9	+32.8	89.4	51 07.8	+34.2	90.7	51 06.5	+35.5	91.9	51 03.8	+36.9	93.2	50 59.8	+38.2	94.4	50 54.6	+39.5	95.6	35
36	51 34.0	+29.0	85.6	51 38.0	+30.4	86.8	51 40.7	+31.8	88.1	51 42.0	+33.3	89.4	51 42.0	+34.7	90.6	51 40.7	+36.0	91.9	51 38.0	+37.4	93.2	51 34.1	+38.6	94.4	36
37	52 03.0	+27.9	84.2	52 08.4	+29.4	85.4	52 12.5	+30.9	86.7	52 15.3	+32.3	88.0	52 16.7	+33.7	89.3	52 16.7	+35.2	90.6	52 16.7	+36.6	91.9	52 12.7	+37.9	93.2	37
38	52 30.9	+26.8	82.7	52 37.8	+28.3	84.0	52 43.4	+29.8	85.3	52 47.6	+31.3	86.6	52 50.4	+32.8	87.9	52 51.9	+34.2	89.3	52 52.0	+35.6	90.6	52 50.6	+37.1	91.9	38
39	52 57.7	+25.6	81.2	53 06.1	+27.2	82.6	53 13.2	+28.8	83.9	53 18.9	+30.3	85.2	53 23.2	+31.8	86.6	53 26.1	+33.3	87.9	53 27.6	+34.8	89.2	53 27.7	+36.2	90.6	39
40	53 23.3	+24.5	79.7	53 33.3	+26.1	81.1	53 42.0	+27.6	82.4	53 49.2	+29.2	83.8	53 55.0	+30.8	85.1	53 59.4	+32.3	86.5	54 02.4	+33.7	87.9	54 03.9	+35.2	89.2	40
41	53 47.8	+23.4	78.2	53 59.4	+24.9	79.5	54 09.6	+26.5	80.9	54 18.4	+28.1	82.3	54 25.8	+29.6	83.7	54 31.7	+31.2	85.0	54 36.1	+32.8	86.4	54 39.1	+34.3	87.9	41
42	54 11.2	+22.0	76.6	54 24.3	+23.7	78.0	54 36.1	+25.3	79.4	54 46.5	+26.9	80.7	54 55.4	+28.5	82.2	55 02.9	+30.1	83.6	55 08.9	+31.6	85.0	55 13.4	+33.2	86.4	42
43	54 33.2	+20.8	75.0	54 48.0	+22.5	76.4	55 01.4	+24.1	77.8	55 13.4	+25.7	79.2	55 23.9	+27.4	80.6	55 33.0	+28.9	82.0	55 40.5	+30.6	83.5	55 46.6	+32.1	85.0	43
44	54 54.0	+19.5	73.4	55 10.5	+21.1	74.8	55 25.5	+22.8	76.2	55 39.1	+24.5	77.6	55 51.3	+26.1	79.0	56 01.9	+27.8	80.5	56 11.1	+29.4	82.0	56 18.7	+31.0	83.4	44
45	55 13.5	+18.1	71.8	55 31.6	+19.7	73.1	55 48.3	+21.4	74.5	56 03.6	+23.1	76.0	56 17.4	+24.8	77.4	56 29.7	+26.5	78.9	56 40.5	+28.1	80.4	56 49.7	+29.8	81.9	45
46	55 31.6	+16.7	70.1	55 51.3	+18.4	71.5	56 09.7	+20.1	72.9	56 26.7	+21.7	74.3	56 42.2	+23.4	75.8	56 56.2	+25.1	77.3	57 08.6	+26.9	78.8	57 19.5	+28.6	80.3	46
47	55 48.3	+15.3	68.4	56 09.7	+17.0	69.8	56 29.8	+18.6	71.2	56 48.4	+20.4	72.6	57 05.6	+22.1	74.1	57 21.3	+23.8	75.6	57 35.5	+25.5	77.1	57 48.1	+27.3	78.7	47
48	56 03.6	+13.8	66.6	56 26.7	+15.5	68.0	56 48.4	+17.2	69.4	57 08.8	+18.9	70.9	57 27.7	+20.7	72.4	57 45.1	+22.4	73.9	58 01.0	+24.2	75.4	58 15.4	+25.9	77.0	48
49	56 17.4	+12.3	64.9	56 42.2	+14.0	66.3	57 05.6	+15.7	67.7	57 27.7	+17.4	69.1	57 48.4	+19.1	70.6	58 07.5	+21.0	72.1	58 25.2	+22.7	73.7	58 41.3	+24.5	75.2	49
50	56 29.7	+10.8	63.1	56 56.2	+12.4	64.5	57 21.3	+14.2	65.9	57 45.1	+15.9	67.3	58 07.5	+17.7	68.8	58 28.5	+19.4	70.3	58 47.9	+21.2	71.9	59 05.8	+23.0	73.5	50
51	56 40.5	+9.2	61.3	57 08.6	+10.9	62.7	57 35.5	+12.6	64.1	58 01.0	+14.4	65.5	58 25.2	+16.1	67.0	58 47.9	+17.9	68.5	59 09.1	+19.7	70.1	59 28.8	+21.4	71.7	51
52	56 49.7	+7.7	59.5	57 19.5	+9.3	60.9	57 48.1	+11.0	62.3	58 15.4	+12.7	63.7	58 41.3	+14.4	65.2	59 05.8	+16.2	66.7	59 28.8	+18.0	68.2	59 50.2	+19.9	69.8	52
53	56 57.4	+6.1	57.7	57 28.8	+7.8	59.0	57 59.1	+9.4	60.4	58 28.1	+11.1	61.8	58 55.7	+12.9	63.3	59 22.0	+14.6	64.8	59 46.8	+16.4	66.3	60 10.1	+18.3	67.9	53
54	57 03.5	+4.5	55.9	57 36.6	+6.0	57.1	58 08.5	+7.7	58.5	58 39.2	+9.4	59.9	59 08.6	+11.1	61.4	59 36.6	+12.9	62.9	60 03.2	+14.7	64.4	60 28.4	+16.5	66.0	54
55	57 08.0	+2.8	54.1	57 42.6	+4.5	55.3	58 16.2	+6.0	56.7	58 48.6	+7.7	58.0	59 19.7	+9.4	59.5	59 49.5	+11.2	60.9	60 17.9	+13.0	62.5	60 44.9	+14.9	64.1	55
56	57 10.8	+1.3	52.2	57 47.1	+2.8	53.5	58 22.2	+4.4	54.8	58 56.3	+6.0	56.1	59 29.1	+7.7	57.5	60 00.7	+9.4	59.0	60 30.9	+11.2	60.5	60 59.8	+13.0	62.1	56
57	57 12.1	-0.4	50.4	57 49.9	+1.1	51.6	58 26.6	+2.7	52.9	59 02.3	+4.2	54.2	59 36.8	+5.9	55.6	60 10.1	+7.6	57.0	60 42.1	+9.4	58.5	61 12.8	+11.2	60.0	57
58	57 11.7	-2.0	48.5	57 51.0	-0.6	49.7	58 29.3	+0.9	51.0	59 06.5	+2.6	52.2	59 42.7	+4.2	53.6	60 17.7	+5.8	55.0	60 51.5	+7.6	56.5	61 24.0	+9.3	58.0	58
59	57 09.7	-3.6	46.7	57 50.4	-2.2	47.8	58 30.2	-0.7	49.0	59 09.1	+0.7	50.3	59 46.9	+2.3	51.6	60 23.5	+4.0	53.0	60 59.1	+5.6	54.4	61 33.3	+7.5	55.9	59
60	57 06.1	-5.3	44.8	57 48.2	-3.9	46.0	58 29.5	-2.5	47.1	59 09.8	-1.0	48.4	59 49.2	+0.6	49.6	60 27.5	+2.2	51.0	61 04.7	+3.8	52.4	61 40.8	+5.5	53.8	60
61	57 00.8	-6.8	43.0	57 44.3	-5.5	44.1	58 27.0	-4.1	45.2	59 08.8	-2.7	46.4	59 49.8	-1.3	47.6	60 29.7	+0.3	48.9	61 08.5	+2.0	50.3	61 46.3	+3.6	51.7	61
62	56 54.0	-8.4	41.2	57 38.8	-7.1	42.2	58 22.9	-5.9	43.3	59 06.1	-4.5	44.5	59 48.5	-3.0	45.7	60 30.0	-1.6	46.9	61 10.5	0.0	48.2	61 49.9	+1.6	49.6	62
63	56 45.6	-10.0	39.4	57 31.7	-8.8	40.4	58 17.0	-7.5	41.4	59 01.6	-6.2	42.5	59 45.5	-4.9	43.7	60 28.4	-3.4	44.9	61 10.5	-1.9	46.2	61 51.5	-0.3	47.5	63
64	56 35.6	-11.5	37.6	57 22.9	-10.4	38.5	58 09.5	-9.2	39.5	58 55.4	-7.9	40.6	59 40.6	-6.6	41.7	60 25.0	-5.2	42.9	61 08.6	-3.8	44.1	61 51.2	-2.3	45.4	64
65	56 24.1	-13.0	35.8	57 12.5	-11.9	36.7	58 00.3	-10.8	37.7	58 47.5	-9.6	38.7	59 34.0	-8.4	39.7	60 19.8	-7.1	40.8	61 04.8	-5.8	42.0	61 48.9	-4.2	43.3	65
66	56 11.1	-14.5	34.0	57 00.6	-13.5	34.9	57 49.5	-12.4	35.8	58 37.9	-11.3	36.8	59 25.6	-10.1	37.8	60 12.7	-8.8	38.8	60 59.1	-7.6	40.0	61 44.7	-6.2	41.2	66
67	55 56.6	-15.9	32.3	56 47.1	-15.0	33.1	57 37.1	-13.9	34.0	58 26.6	-12.9	34.9	59 15.5	-11.7	35.8	60 03.9	-10.6	36.9	60 51.5	-9.3	37.9	61 38.5	-8.1	39.1	67
68	55 40.7	-17.4	30.6	56 32.1	-16.4	31.4	57 23.2	-15.6	32.2	58 13.7	-14.5	33.0	59 03.8	-13.5	33.9	59 53.3	-12.4	34.9	60 42.2	-11.2	35.9	61 30.4	-10.0	37.0	68
69	55 23.3	-18.7	28.9	56 15.7	-17.9	29.6	57 07.6	-17.0	30.4	57 59.2	-16.1	31.2	58 50.3	-15.1	32.0	59 40.9	-14.1	32.9	60 31.0	-13.0	33.9	61 20.5	-11.8	34.9	69
70	55 04.6	-20.1	27.2	55 57.8	-19.3	27.9	56 50.6	-18.4	28.6	57 43.1	-17.6	29.4	58 35.2	-16.7	30.2	59 26.8	-15.7	31.0	60 18.0	-14.7	31.9	61 08.7	-13.7	32.9	70
71	54 44.5	-21.4	25.6	55 38.5	-20.7	26.2	56 32.2	-19.9	26.9	57 25.5	-19.1	27.6	58 18.5	-18.3	28.3	59 11.1	-17.3	29.1	60 03.3	-16.4	30.0	60 55.0	-15.4	30.9	71
72	54 23.1	-22.6	24.0	55 17.8	-22.0	24.6	56 12.3	-21.3	25.2	57 06.4	-20.5	25.8	58 00.2	-19.7	26.5	58 53.8	-19.0	27.3	59 46.9	-18.1	28.1	60 39.6	-17.1	28.9	72
73	54 00.5	-23.9	22.4	54 55.8	-23.2	22.9	55 51.0	-22.6	23.5	56 45.9	-22.0	24.1	57 40.5	-21.2	24.8	58 34.8	-20.4	25.4	59 28.8	-19.6	26.2	60 22.5	-18.8	26.9	73
74	53 36.6	-25.1	20.8	54 32.6	-24.5	21.3	55 28.4	-23.9	21.9	56 23.9	-23.3	22.4	57 19.3	-22.7	23.0	58 14.4	-22.0	23.6	59 09.2	-21.2	24.3	60 03.7	-20.4	25.0	74
75	53 11.5	-26.2	19.3	54 08.1	-25.7	19.8	55 04.5	-25.2	20.3	56 00.6	-24.5	20.8	56 56.6	-23.9	21.3	57 52.4	-23.3	21.9	58 48.0	-22.7	22.5	59 43.3	-22.0	23.2	75
76	52 45.3	-27.3	17.8	53 42.4	-26.9	18.2	54 39.3	-26.4	18.7	55 36.1	-25.9	19.1	56 32.7	-25.4	19.6	57 29.1	-24.8	20.2	58 25.3	-24.2	20.7	59 21.3	-23.5	21.3	76
77	52 18.0	-28.3	16.4	53 15.5	-27.9	16.7	54 12.9	-27.5	17.1	55 10.2	-27.1	17.6	56 07.3	-26.5	18.0	57 04.3	-26.0	18.5	58 01.1	-25.5	19.0	58 57.8	-25.0	19.5	77
78	51 49.7	-29.4	14.9	52 47.6	-29.0	15.3	53 45.4	-28.6	15.6	54 43.1	-28.2	16.0	55 40.8	-27.8	16.4	56 38.3	-27.4	16.8	57 35.6	-26.9	17.3	58 32.8	-26.3	17.8	78
79	51 20.3	-30.4	13.5	52 18.6	-30.1	13.8	53 16.8	-29.7	14.2	54 14.9	-29.3	14.5	55 13.0	-29.0	14.8	56 10.9	-28.6	15.2	57 08.7	-28.1	15.6	58 06.5	-27.7	16.1	79
80	50 49.9	-31.3	12.2	51 48.5	-31.0	12.4	52 47.1	-30.8	12.7	53 45.6	-30.5	13.0	54 44.0	-30.1	13.3	55 42.3	-29.7	13.7	56 40.6	-29.4	14.0	57 38.8	-29.0	14.4	80
81	50 18.6	-32.3	10.8	51 17.5	-32.0	11.0	52 16.3	-31.7	11.3	53 15.1	-31.4	11.6	54 13.9	-31.2	11.8	55 12.6	-30.9	12.1	56 11.2	-30.5	12.4	57 09.8	-30.2	12.8	81
82	49 46.3	-33.1	9.5	50 45.5	-32.9	9.7	51 44.6	-32.7	9.9	52 43.7	-32.4	10.1	53 42.7	-32.2	10.4	54 41.7	-31.9	10.6	55 40.7	-31.7	10.9	56 39.6	-31.4	11.2	82
83	49 13.2	-33.9	8.2	50 12.6	-33.8	8.4	51 11.9	-33.5	8.6	52 11.3	-33.4	8.8	53 10.5	-33.1	9.0	54 09.8	-33.0	9.2	55 09.0	-32.7	9.4	56 08.2	-32.5	9.6	83
84	48 39.3	-34.7	7.0	49 38.8	-34.6	7.1	50 38.4	-34.5	7.3	51 37.9	-34.3	7.4	52 37.4	-34.2	7.6	53 36.8	-33.9	7.8	54 36.3	-33.8	7.9	55 35.7	-33.6	8.1	84
85	48 04.6	-35.6	5.7	49 04.2	-35.3	5.8	50 03.9	-35.2	6.0	51 03.6	-35.2	6.1	52 03.2	-35.0	6.2	53 02.9	-34.9	6.4	54 02.5	-34.7	6.5	55 02.1	-34.6	6.7	85
86	47 29.0	-36.2	4.5	48 28.9	-36.2	4.6	49 28.7	-36.1	4.7	50 28.4	-35.9	4.8	51 28.2	-35.8	4.9	52 28.0	-35.8	5.0	53 27.8	-35.7	5.1	54 27.5	-35.5	5.3	86
87	46 52.8	-36.9	3.4	47 52.7	-36.9	3.4	48 52.6	-36.8	3.5	49 52.5	-36.8	3.6	50 52.4	-36.7	3.6	51 52.2	-36.6	3.7	52 52.1	-36.5	3.8	53 51.9	-36.4	3.9	87
88	46 15.9	-37.6	2.2	47 15.8	-37.6	2.3	48 15.8	-37.6	2.3	49 15.7	-37.5	2.3	50 15.7	-37.5	2.4	51 15.6	-37.4	2.4	52 15.6	-37.4	2.5	53 15.5	-37.3	2.6	88
89	45 38.3	-38.3	1.1	46 38.2	-38.2	1.1	47 38.2	-38.2	1.1	48 38.2	-38.2	1.2	49 38.2	-38.2	1.2	50 38.2	-38.2	1.2	51 38.2	-38.2	1.2	52 38.2	-38.2	1.3	89
90	45 00.0	-38.9	0.0	46 00.0	-38.9	0.0	47 00.0	-38.9	0.0	48 00.0	-38.9	0.0	49 00.0	-38.9	0.0	50 00.0	-38.9	0.0	51 00.0	-38.9	0.0	52 00.0	-39.0	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

50°, 310° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	27 02.0	-47.7	120.7	26 31.2	-48.3	121.1	26 00.0	-48.9	121.5	25 28.5	-49.5	121.9	24 56.5	-50.0	122.3	24 24.3	-50.6	122.7	23 51.7	-51.1	123.1	23 18.7	-51.5	123.5	0
1	26 14.3	-47.9	121.4	25 42.9	-48.5	121.8	25 11.1	-49.0	122.2	24 39.0	-49.6	122.6	24 06.5	-50.1	123.0	23 33.7	-50.6	123.3	23 00.6	-51.2	123.7	22 27.2	-51.7	124.0	1
2	25 26.4	-48.1	122.0	24 54.4	-48.7	122.4	24 22.1	-49.3	122.8	23 49.4	-49.8	123.2	23 16.4	-50.3	123.6	22 43.1	-50.8	123.9	22 09.4	-51.4	124.2	21 35.5	-51.7	124.6	2
3	24 38.3	-48.3	122.7	24 05.7	-48.8	123.1	23 32.8	-49.3	123.4	22 59.6	-49.9	123.8	22 26.1	-50.4	124.1	21 52.3	-51.0	124.5	21 18.2	-51.4	124.8	20 43.8	-51.9	125.1	3
4	23 50.0	-48.4	123.3	23 16.9	-49.0	123.7	22 43.5	-49.6	124.1	22 09.7	-50.0	124.4	21 35.7	-50.6	124.7	21 01.3	-51.0	125.0	20 26.8	-51.5	125.4	19 51.9	-52.0	125.7	4
5	23 01.6	-48.6	124.0	22 27.9	-49.1	124.3	21 53.9	-49.6	124.7	21 19.7	-50.2	125.0	20 45.1	-50.6	125.3	20 10.3	-51.1	125.6	19 35.3	-51.6	125.9	18 59.9	-52.0	126.2	5
6	22 13.0	-48.7	124.6	21 38.8	-49.3	124.9	21 04.3	-49.8	125.3	20 29.5	-50.3	125.6	19 54.5	-50.8	125.9	19 19.2	-51.3	126.2	18 43.7	-51.7	126.4	18 07.9	-52.1	126.7	6
7	21 24.3	-48.9	125.2	20 49.5	-49.4	125.6	20 14.5	-49.9	125.9	19 39.2	-50.4	126.2	19 03.7	-50.9	126.4	18 27.9	-51.3	126.7	17 52.0	-51.8	127.0	17 15.8	-52.2	127.2	7
8	20 35.4	-49.0	125.9	20 00.1	-49.5	126.2	19 24.6	-50.0	126.5	18 48.8	-50.5	126.7	18 12.8	-50.9	127.0	17 36.6	-51.4	127.3	17 00.2	-51.9	127.5	16 23.6	-52.3	127.7	8
9	19 46.4	-49.1	126.5	19 10.6	-49.6	126.8	18 34.6	-50.1	127.0	17 58.3	-50.5	127.3	17 21.9	-51.1	127.6	16 45.2	-51.5	127.8	16 08.3	-51.9	128.0	15 31.3	-52.4	128.3	9
10	18 57.3	-49.2	127.1	18 21.0	-49.7	127.4	17 44.5	-50.2	127.6	17 07.8	-50.7	127.9	16 30.8	-51.1	128.1	15 53.7	-51.6	128.3	15 16.4	-52.0	128.6	14 38.9	-52.4	128.8	10
11	18 08.1	-49.4	127.7	17 31.3	-49.9	127.9	16 54.3	-50.3	128.2	16 17.1	-50.8	128.4	15 39.7	-51.2	128.7	15 02.1	-51.6	128.9	14 24.4	-52.1	129.1	13 46.5	-52.5	129.3	11
12	17 18.7	-49.5	128.3	16 41.4	-49.9	128.5	16 04.0	-50.4	128.8	15 26.3	-50.9	129.0	14 48.5	-51.3	129.2	14 10.5	-51.7	129.4	13 32.3	-52.1	129.6	12 54.0	-52.5	129.8	12
13	16 29.2	-49.5	128.9	15 51.5	-50.0	129.1	15 13.6	-50.5	129.3	14 35.4	-50.9	129.5	13 57.2	-51.4	129.7	13 18.8	-51.8	129.9	12 40.2	-52.2	130.1	12 01.5	-52.6	130.3	13
14	15 39.7	-49.7	129.5	15 01.5	-50.1	129.7	14 23.1	-50.6	129.9	13 44.5	-51.0	130.1	13 05.8	-51.4	130.3	12 27.0	-51.9	130.4	11 48.0	-52.3	130.6	11 08.9	-52.6	130.7	14
15	14 50.0	-49.7	130.1	14 11.4	-50.2	130.3	13 32.5	-50.6	130.4	12 53.5	-51.1	130.6	12 14.4	-51.5	130.8	11 35.1	-51.9	130.9	10 55.8	-52.3	131.1	10 16.3	-52.7	131.2	15
16	14 00.3	-49.8	130.6	13 21.2	-50.3	130.8	12 41.9	-50.7	131.0	12 02.4	-51.1	131.2	11 22.9	-51.5	131.3	10 43.2	-51.9	131.5	10 03.5	-52.4	131.6	9 23.6	-52.7	131.7	16
17	13 10.5	-49.9	131.2	12 30.9	-50.3	131.4	11 51.2	-50.8	131.5	11 11.3	-51.2	131.7	10 31.4	-51.6	131.8	9 51.3	-52.0	132.0	9 11.1	-52.4	132.1	8 30.9	-52.8	132.2	17
18	12 20.6	-50.0	131.8	11 40.6	-50.4	131.9	11 00.4	-50.8	132.1	10 20.1	-51.2	132.2	9 39.8	-51.7	132.4	8 59.3	-52.0	132.5	8 18.7	-52.4	132.6	7 38.1	-52.8	132.7	18
19	11 30.6	-50.0	132.3	10 50.2	-50.5	132.5	10 09.6	-50.9	132.6	9 28.9	-51.3	132.7	8 48.1	-51.7	132.9	8 07.3	-52.1	133.0	7 26.3	-52.4	133.1	6 45.3	-52.8	133.2	19
20	10 40.6	-50.1	132.9	9 59.7	-50.5	133.0	9 18.7	-50.9	133.2	8 37.6	-51.3	133.3	7 56.4	-51.7	133.4	7 15.2	-52.1	133.5	6 33.9	-52.5	133.6	5 52.5	-52.9	133.6	20
21	9 50.5	-50.1	133.5	9 09.2	-50.6	133.6	8 27.8	-51.0	133.7	7 46.3	-51.4	133.8	7 04.7	-51.7	133.9	6 23.1	-52.1	134.0	5 41.4	-52.5	134.1	4 59.7	-52.9	134.1	21
22	9 00.4	-50.2	134.0	8 18.6	-50.6	134.1	7 36.8	-51.0	134.2	6 54.9	-51.4	134.3	6 13.0	-51.8	134.4	5 31.0	-52.2	134.5	4 48.9	-52.5	134.5	4 06.8	-52.9	134.6	22
23	8 10.2	-50.3	134.6	7 28.0	-50.6	134.7	6 45.8	-51.0	134.8	6 03.5	-51.4	134.8	5 21.2	-51.8	134.9	4 38.8	-52.2	135.0	3 56.4	-52.6	135.0	3 13.9	-52.9	135.1	23
24	7 19.9	-50.3	135.1	6 37.4	-50.7	135.2	5 54.8	-51.1	135.3	5 12.1	-51.5	135.4	4 29.4	-51.8	135.4	3 46.6	-52.2	135.5	3 03.8	-52.5	135.5	2 21.0	-52.9	135.5	24
25	6 29.6	-50.3	135.7	5 46.7	-50.7	135.7	5 03.7	-51.1	135.8	4 20.6	-51.5	135.9	3 37.6	-51.9	135.9	2 54.4	-52.2	136.0	2 11.3	-52.6	136.0	1 28.1	-52.9	136.0	25
26	5 39.3	-50.4	136.2	4 56.0	-50.8	136.3	4 12.6	-51.1	136.3	3 29.2	-51.5	136.4	2 45.7	-51.8	136.4	2 02.2	-52.2	136.5	1 18.7	-52.5	136.5	0 35.2	-52.9	136.5	26
27	4 49.0	-50.4	136.8	4 05.2	-50.7	136.8	3 21.5	-51.2	136.9	2 37.7	-51.5	136.9	1 53.9	-51.9	136.9	1 10.0	-52.2	136.9	0 26.2	-52.6	137.0	0 17.7	+52.9	43.0	27
28	3 58.6	-50.4	137.3	3 14.5	-50.8	137.3	2 30.3	-51.1	137.4	1 46.2	-51.5	137.4	1 02.0	-51.9	137.4	0 17.8	-52.2	137.4	0 26.4	+52.6	42.6	1 10.6	+52.9	42.6	28
29	3 08.2	-50.4	137.9	2 23.7	-50.8	137.9	1 39.2	-51.2	137.9	0 54.7	-51.6	137.9	0 10.1	-51.9	137.9	0 34.4	+52.2	42.1	1 19.0	+52.5	42.1	2 03.5	+52.9	42.1	29
30	2 17.8	-50.4	138.4	1 32.9	-50.8	138.4	0 48.0	-51.1	138.4	0 03.1	-51.5	138.4	0 41.8	+51.8	41.6	1 26.6	+52.3	41.6	2 11.5	+52.6	41.6	2 56.4	+52.9	41.6	30
31	1 27.4	-50.5	138.9	0 42.1	-50.8	139.0	0 03.1	+51.2	41.0	0 48.4	+51.5	41.0	1 33.6	+51.9	41.1	2 18.9	+52.2	41.1	3 04.1	+52.5	41.1	3 49.3	+52.8	41.2	31
32	0 36.9	-50.4	139.5	0 08.7	+50.8	40.5	0 54.3	+51.1	40.5	1 39.9	+51.5	40.5	2 25.5	+51.8	40.6	3 11.1	+52.1	40.6	3 56.6	+52.5	40.6	4 42.1	+52.8	40.7	32
33	0 13.5	+50.4	40.0	0 59.5	+50.8	40.0	1 45.4	+51.2	40.0	2 31.4	+51.5	40.0	3 17.3	+51.9	40.1	4 03.2	+52.2	40.1	4 49.1	+52.5	40.1	5 35.0	+52.8	40.2	33
34	1 03.9	+50.5	39.4	1 50.3	+50.7	39.5	2 36.6	+51.1	39.5	3 22.9	+51.5	39.5	4 09.2	+51.8	39.6	4 55.4	+52.2	39.6	5 41.6	+52.5	39.7	6 27.8	+52.8	39.7	34
35	1 54.4	+50.4	38.9	2 41.0	+50.8	38.9	3 27.7	+51.1	39.0	4 14.4	+51.4	39.0	5 01.0	+51.8	39.0	5 47.6	+52.1	39.1	6 34.1	+52.5	39.2	7 20.6	+52.8	39.2	35
36	2 44.8	+50.4	38.3	3 31.8	+50.8	38.4	4 18.8	+51.1	38.4	5 05.8	+51.5	38.5	5 52.8	+51.7	38.5	6 39.7	+52.1	38.6	7 26.6	+52.4	38.7	8 13.4	+52.7	38.8	36
37	3 35.2	+50.4	37.8	4 22.6	+50.7	37.8	5 09.9	+51.1	37.9	5 57.3	+51.4	38.0	6 44.5	+51.8	38.0	7 31.8	+52.0	38.1	8 19.0	+52.3	38.2	9 06.1	+52.7	38.3	37
38	4 25.6	+50.3	37.3	5 13.3	+50.7	37.3	6 01.0	+51.0	37.4	6 48.7	+51.3	37.4	7 36.3	+51.7	37.5	8 23.8	+52.1	37.6	9 11.3	+52.4	37.7	9 58.8	+52.6	37.8	38
39	5 15.9	+50.4	36.7	6 04.0	+50.7	36.8	6 52.0	+51.0	36.8	7 40.0	+51.4	36.9	8 28.0	+51.6	37.0	9 15.9	+51.9	37.1	10 03.7	+52.3	37.2	10 51.4	+52.6	37.3	39
40	6 06.3	+50.3	36.2	6 54.7	+50.6	36.2	7 43.0	+51.0	36.3	8 31.4	+51.3	36.4	9 19.6	+51.6	36.5	10 07.8	+52.0	36.6	10 56.0	+52.2	36.7	11 44.0	+52.6	36.8	40
41	6 56.6	+50.2	35.6	7 45.3	+50.6	35.7	8 34.0	+50.9	35.8	9 22.7	+51.2	35.9	10 11.2	+51.6	36.0	10 59.8	+51.8	36.1	11 48.2	+52.2	36.2	12 36.6	+52.5	36.3	41
42	7 46.8	+50.2	35.1	8 35.9	+50.5	35.2	9 24.9	+50.9	35.2	10 13.9	+51.2	35.3	11 02.8	+51.5	35.5	11 51.6	+51.9	35.6	12 40.4	+52.1	35.7	13 29.1	+52.4	35.8	42
43	8 37.0	+50.2	34.5	9 26.4	+50.5	34.6	10 15.8	+50.8	34.7	11 05.1	+51.1	34.8	11 54.3	+51.5	34.9	12 43.5	+51.7	35.1	13 32.5	+52.1	35.2	14 21.5	+52.4	35.3	43
44	9 27.2	+50.1	34.0	10 16.9	+50.5	34.1	11 06.6	+50.8	34.2	11 56.2	+51.1	34.3	12 45.8	+51.4	34.4	13 35.2	+51.7	34.5	14 24.6	+52.0	34.7	15 13.9	+52.4	34.8	44
45	10 17.3	+50.1	33.4	11 07.4	+50.4	33.5	11 57.4	+50.7	33.6	12 47.3	+51.0	33.7	13 37.2	+51.3	33.9	14 26.9	+51.7	34.0	15 16.6	+52.0	34.2	16 06.2	+52.3	34.3	45
46	11 07.4	+50.0	32.8	11 57.8	+50.3	33.0	12 48.1	+50.6	33.1	13 38.3	+50.9	33.2	14 28.5	+51.2	33.3	15 18.6	+51.5	33.5	16 08.6	+51.8	33.6	16 58.5	+52.1	33.8	46
47	11 57.4	+49.9	32.3	12 48.1	+50.2	32.4	13 38.7	+50.5	32.5	14 29.2	+50.9	32.7	15 19.7	+51.2	32.8	16 10.1	+51.5	33.0	17 00.4	+51.8	33.1	17 50.6	+52.1	33.3	47
48	12 47.3	+49.9	31.7	13 38.3	+50.2	31.8	14 29.2	+50.5	32.0	15 20.1	+50.8	32.1	16 10.9	+51.1	32.3	17 01.6	+51.4	32.4	17 52.2	+51.7	32.6	18 42.7	+52.0	32.8	48
49	13 37.2	+49.7	31.1	14 28.5	+50.1	31.3	15 19.7	+50.4	31.4	16 10.9	+50.7	31.6	17 02.0	+51.0	31.7	17 53.0	+51.3	31.9	18 43.9	+51.6	32.1	19 34.7	+51.9	32.2	49
50	14 26.9	+49.7	30.5	15 18.6	+49.9	30.7	16 10.1	+50.3	30.8	17 01.6	+50.6	31.0	17 53.0	+50.9	31.2	18 44.3	+51.2	31.3	19 35.5	+51.5	31.5	20 26.6	+51.8	31.7	50
51	15 16.6	+49.6	30.0	16 08.6	+49.9	30.1	17 00.4	+50.2	30.3	17 52.2	+50.5	30.4	18 43.9	+50.8	30.6	19 35.5	+51.1	30.8	20 27.0	+51.4	31.0	21 18.4	+51.7	31.2	51
52	16 06.2	+49.5	29.4	16 58.5	+49.8	29.5	17 50.6	+50.1	29.7	18 42.7	+50.4	29.9	19 34.7	+50.7	30.0	20 26.6	+51.0	30.2	21 18.4	+51.3	30.4	22 10.1	+51.5	30.6	52
53	16 55.7	+49.3	28.8	17 48.3	+49.7	29.0	18 40.7	+50.0	29.1	19 33.1	+50.3	29.3	20 25.4	+50.6	29.5	21 17.6	+50.8	29.7	22 09.7	+51.1	29.9	23 01.6	+51.5	30.1	53
54	17 45.1	+49.3	28.2	18 38.0	+49.6	28.4	19 30.7	+49.9	28.5	20 23.4	+50.2	28.7	21 16.0	+50.4	28.9	22 08.4	+50.8	29.1	23 00.8	+51.1	29.3	23 53.1	+51.3	29.5	54
55	18 34.4	+49.2	27.6	19 27.6	+49.4	27.8	20 20.6	+49.8	27.9	21 13.6	+50.0	28.1	22 06.4	+50.4	28.3	22 59.2	+50.6	28.5	23 51.9	+50.9	28.7	24 44.4	+51.3	28.9	55
56	19 23.6	+49.1	27.0	20 17.0	+49.4	27.2	21 10.4	+49.6	27.3	22 03.6	+49.9	27.5	22 56.8	+50.2	27.7	23 49.8	+50.5	27.9	24 42.8	+50.8	28.1	25 35.7	+51.0	28.4	56
57	20 12.7	+48.9	26.4	21 06.4	+49.2	26.6	22 00.0	+49.5	26.7	22 53.5	+49.8	26.9	23 47.0	+50.1	27.1	24 40.3	+50.4	27.3	25 33.6	+50.6	27.5	26 26.7	+51.0	27.8	57
58	21 01.6	+48.8	25.8	21 55.6	+49.1	26.0	22 49.5	+49.4	26.1	23 43.3	+49.7	26.3	24 37.1	+49.9	26.5	25 30.7	+50.2	26.7	26 24.2	+50.5	27.0	27 17.7	+50.7	27.2	58
59	21 50.4	+48.6	25.2	22 44.7	+48.9	25.3	23 38.9	+49.2	25.5	24 33.0	+49.5	25.7	25 27.0	+49.8	25.9	26 20.9	+50.0	26.1	27 14.7	+50.4	26.4	28 08.4	+50.6	26.6	59
60	22 39.0	+48.5	24.5	23 33.6	+48.8	24.7	24 28.1	+49.0	24.9	25 22.5	+49.3	25.1	26 16.7	+49.7	25.3	27 10.9	+49.9	25.5	28 05.1	+50.1	25.7	28 59.0	+50.5	26.0	60
61	23 27.5	+48.4	23.9	24 22.4	+48.6	24.1	25 17.1	+48.9	24.3	26 11.8	+49.1	24.4	27 06.4	+49.4	24.7	28 00.8	+49.7	24.9	28 55.2	+50.0	25.1	29 49.5	+50.3	25.3	61
62	24 15.9	+48.2	23.2	25 11.0	+48.4	23.4	26 06.0	+48.7	23.6	27 00.9	+49.0	23.8	27 55.8	+49.2	24.0	28 50.5	+49.6	24.2	29 45.2	+49.8	24.5	30 39.8	+50.0	24.7	62
63	25 04.1	+48.0	22.6	25 59.4	+48.3	22.8	26 54.7	+48.5	23.0	27 49.9	+48.8	23.2	28 45.0	+49.1	23.4	29 40.1	+49.4	23.6	30 35.0	+49.6	23.8	31 29.8	+49.9	24.1	63
64	25 52.1	+47.8	21.9	26 47.7	+48.1	22.1	27 43.2	+48.4	22.3	28 38.7	+48.6	22.5	29 34.1	+48.9	22.7	30 29.4	+49.2	22.9	31 24.6	+49.4	23.2	32 19.7	+49.7	23.4	64
65	26 39.9	+47.6	21.2	27 35.8	+47.8	21.4	28 31.6	+48.1	21.6	29 27.3	+48.4	21.8	30 23.0	+48.6	22.0	31 18.6	+48.9	22.2	32 14.0	+49.2	22.5	33 09.4	+49.5	22.7	65
66	27 27.5	+47.4	20.6	28 23.6	+47.7	20.7	29 19.7	+47.9	20.9	30 15.7	+48.2	21.1	31 11.6	+48.5	21.4	32 07.5	+48.7	21.6	33 03.2	+49.0	21.8	33 58.9	+49.2	22.1	66
67	28 14.9	+47.2	19.9	29 11.3	+47.5	20.1	30 07.6	+47.8	20.2	31 03.9	+48.0	20.5	32 00.1	+48.2	20.7	32 56.2	+48.5	20.9	33 52.2	+48.7	21.1	34 48.1	+49.0	21.4	67
68	29 02.1	+47.0	19.2	29 58.8	+47.2	19.4	30 55.4	+47.4	19.5	31 51.9	+47.7	19.7	32 48.3	+48.0	20.0	33 44.7	+48.2	20.2	34 40.9	+48.5	20.4	35 37.1	+48.7	20.7	68
69	29 49.1	+46.8	18.4	30 46.0	+47.0	18.6	31 42.8	+47.3	18.8	32 39.6	+47.5	19.0	33 36.3	+47.7	19.2	34 32.9	+47.9	19.5	35 29.4	+48.2	19.7	36 25.8	+48.5	20.0	69
70	30 35.9	+46.5	17.7	31 33.0	+46.7	17.9	32 30.1	+46.9	18.1	33 27.1	+47.2	18.3	34 24.0	+47.4	18.5	35 20.8	+47.7	18.7	36 17.6	+48.0	19.0	37 14.3	+48.2	19.2	70
71	31 22.4	+46.2	17.0	32 19.7	+46.5	17.2	33 17.0	+46.7	17.4	34 14.3	+46.9	17.6	35 11.4	+47.2	17.8	36 08.5	+47.4	18.0	37 05.6	+47.6	18.2	38 02.5	+47.9	18.5	71
72	32 08.6	+46.0	16.2	33 06.2	+46.2	16.4	34 03.7	+46.5	16.6	35 01.2	+46.6	16.8	35 58.6	+46.9	17.0	36 55.9	+47.2	17.2	37 53.2	+47.4	17.5	38 50.4	+47.6	17.7	72
73	32 54.6	+45.7	15.5	33 52.4	+45.9	15.6	34 50.2	+46.1	15.8	35 47.8	+46.4	16.0	36 45.5	+46.6	16.2	37 43.1	+46.8	16.4	38 40.6	+47.0	16.7	39 38.0	+47.3	16.9	73
74	33 40.3	+45.4	14.7	34 38.3	+45.6	14.9	35 36.3	+45.8	15.1	36 34.2	+46.0	15.2	37 32.1	+46.2	15.4	38 29.9	+46.4	15.7	39 27.6	+46.7	15.9	40 25.3	+46.9	16.1	74
75	34 25.7	+45.1	13.9	35 23.9	+45.3	14.1	36 22.1	+45.5	14.3	37 20.2	+45.7	14.4	38 18.3	+45.9	14.6	39 16.3	+46.1	14.8	40 14.3	+46.3	15.1	41 12.2	+46.6	15.3	75
76	35 10.8	+44.8	13.1	36 09.2	+45.0	13.3	37 07.6	+45.1	13.4	38 05.9	+45.4	13.6	39 04.2	+45.6	13.8	40 02.4	+45.8	14.0	41 00.6	+46.0	14.2	41 58.6	+46.2	14.4	76
77	35 55.6	+44.4	12.3	36 54.2	+44.6	12.4	37 52.7	+44.8	12.6	38 51.3	+45.0	12.8	39 49.8	+45.1	13.0	40 48.2	+45.4	13.2	41 46.6	+45.6	13.4	42 45.0	+45.7	13.6	77
78	36 40.0	+44.1	11.5	37 38.8	+44.2	11.6	38 37.5	+44.5	11.8	39 36.3	+44.6	12.0	40 34.9	+44.8	12.1	41 33.6	+45.0	12.3	42 32.2	+45.2	12.5	43 30.7	+45.4	12.7	78
79	37 24.1	+43.7	10.6	38 23.0	+43.9	10.7	39 22.0	+44.0	10.9	40 20.9	+44.2	11.1	41 19.7	+44.4	11.2	42 18.6	+44.5	11.4	43 17.4	+44.7	11.6	44 16.1	+44.9	11.8	79
80	38 07.8	+43.3	9.7	39 06.9	+43.4	9.9	40 06.0	+43.6	10.0	41 05.1	+43.7	10.2	42 04.1	+43.9	10.3	43 03.1	+44.1	10.5	44 02.1	+44.3	10.7	45 01.0	+44.5	10.8	80
81	38 51.1	+42.9	8.9	39 50.3	+43.1	9.0	40 49.6	+43.2	9.1	41 48.8	+43.4	9.3	42 48.0	+43.5	9.4	43 47.2	+43.7	9.6	44 46.4	+43.8	9.7	45 45.5	+44.0	9.9	81
82	39 34.0	+42.4	7.9	40 33.4	+42.6	8.1	41 32.8	+42.7	8.2	42 32.2	+42.8	8.3	43 31.5	+43.0	8.5	44 30.9	+43.1	8.6	45 30.2	+43.3	8.7	46 29.5	+43.4	8.9	82
83	40 16.4	+42.1	7.0	41 16.0	+42.1	7.1	42 15.5	+42.3	7.2	43 15.0	+42.4	7.4	44 14.5	+42.5	7.5	45 14.0	+42.6	7.6	46 13.5	+42.7	7.8	47 12.9	+42.9	7.9	83
84	40 58.5	+41.5	6.1	41 58.1	+41.7	6.2	42 57.8	+41.7	6.3	43 57.4	+41.9	6.4	44 57.0	+42.0	6.5	45 56.6	+42.1	6.6	46 56.2	+42.2	6.7	47 55.8	+42.4	6.9	84
85	41 40.0	+41.1	5.1	42 39.8	+41.1	5.2	43 39.5	+41.3	5.3	44 39.3	+41.3	5.4	45 39.0	+41.4	5.5	46 38.7	+41.5	5.6	47 38.4	+41.7	5.7	48 38.1	+41.8	5.8	85
86	42 21.1	+40.6	4.1	43 20.9	+40.7	4.2	44 20.8	+40.7	4.3	45 20.6	+40.8	4.4	46 20.4	+40.9	4.4	47 20.2	+41.0	4.5	48 20.1	+41.0	4.6	49 19.9	+41.0	4.7	86
87	43 01.7	+40.0	3.1	44 01.6	+40.0	3.1	45 01.5	+40.1	3.3	46 01.4	+40.1	3.3	47 01.3	+40.2	3.4	48 01.2	+40.2	3.4	49 01.1	+40.3	3.5	50 00.9	+40.4	3.6	87
88	43 41.7	+39.4	2.1	44 41.6	+39.5	2.2	45 41.6	+39.5	2.2	46 41.5	+39.6	2.2	47 41.5	+39.6	2.3	48 41.4	+39.7	2.3	49 41.4	+39.7	2.4	50 41.3	+39.7	2.4	88
89	44 21.1	+38.9	1.1	45 21.1	+38.9	1.1	46 21.1	+38.9	1.1	47 21.1	+38.9	1.1	48 21.1	+38.9	1.2	49 21.1	+38.9	1.2	50 21.1	+39.0	1.2	51 21.0	+39.0	1.2	89
90	45 00.0	+38.3	0.0	46 00.0	+38.2	0.0	47 00.0	+38.2	0.0	48 00.0	+38.2	0.0	49 00.0	+38.2	0.0	50 00.0	+38.2	0.0	51 00.0	+38.2	0.0	52 00.0	+38.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 130°, 230°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	26 25.4	+47.3	119.8	25 55.4	+47.9	120.2	25 25.0	+48.5	120.6	24 54.2	+49.1	121.0	24 23.1	+49.7	121.4	23 51.7	+50.1	121.8	23 19.9	+50.7	122.2	22 47.7	+51.3	122.5	0
1	27 12.7	+47.0	119.1	26 43.3	+47.7	119.5	26 13.5	+48.3	120.0	25 43.3	+48.9	120.4	25 12.8	+49.4	120.8	24 41.8	+50.1	121.2	24 10.6	+50.6	121.6	23 39.0	+51.1	122.0	1
2	27 59.7	+46.9	118.4	27 31.0	+47.5	118.9	27 01.8	+48.1	119.3	26 32.2	+48.8	119.8	26 02.2	+49.4	120.2	25 31.9	+49.9	120.6	25 01.2	+50.4	121.0	24 30.1	+50.9	121.4	2
3	28 46.6	+46.6	117.7	28 18.5	+47.3	118.2	27 49.9	+48.0	118.6	27 21.0	+48.5	119.1	26 51.6	+49.1	119.5	26 21.8	+49.7	120.0	25 51.6	+50.3	120.4	25 21.0	+50.8	120.8	3
4	29 33.2	+46.4	117.0	29 05.8	+47.0	117.5	28 37.9	+47.7	118.0	28 09.5	+48.4	118.4	27 40.7	+49.0	118.9	27 11.5	+49.6	119.4	26 41.9	+50.1	119.8	26 11.9	+50.7	120.2	4
5	30 19.6	+46.2	116.2	29 52.8	+46.9	116.8	29 25.6	+47.5	117.3	28 57.9	+48.1	117.8	28 29.7	+48.8	118.2	28 01.1	+49.3	118.7	27 32.0	+50.0	119.2	27 02.6	+50.5	119.6	5
6	31 05.8	+45.8	115.5	30 39.7	+46.6	116.0	30 13.1	+47.3	116.6	29 46.0	+47.9	117.1	29 18.5	+48.5	117.6	28 50.4	+49.2	118.1	28 22.0	+49.8	118.6	27 53.1	+50.4	119.0	6
7	31 51.6	+45.6	114.7	31 26.3	+46.3	115.3	31 00.4	+47.0	115.8	30 33.9	+47.7	116.4	30 07.0	+48.4	116.9	29 39.6	+49.0	117.4	29 11.8	+49.6	117.9	28 43.5	+50.2	118.4	7
8	32 37.2	+45.4	114.0	32 12.6	+46.1	114.6	31 47.4	+46.8	115.1	31 21.6	+47.5	115.7	30 55.4	+48.1	116.2	30 28.6	+48.8	116.8	30 01.4	+49.4	117.3	29 33.7	+50.0	117.8	8
9	33 22.6	+45.0	113.2	32 58.7	+45.7	113.8	32 34.2	+46.5	114.4	32 09.1	+47.2	115.0	31 43.5	+47.9	115.5	31 17.4	+48.6	116.1	30 50.8	+49.2	116.6	30 23.7	+49.8	117.1	9
10	34 07.6	+44.7	112.4	33 44.4	+45.5	113.0	33 20.7	+46.2	113.6	32 56.3	+47.0	114.2	32 31.4	+47.7	114.8	32 06.0	+48.3	115.4	31 40.0	+49.0	115.9	31 13.5	+49.6	116.5	10
11	34 52.3	+44.3	111.6	34 29.9	+45.2	112.2	34 06.9	+46.0	112.9	33 43.3	+46.7	113.5	33 19.1	+47.4	114.1	32 54.3	+48.1	114.7	32 29.0	+48.8	115.3	32 03.1	+49.4	115.8	11
12	35 36.7	+44.0	110.8	35 15.1	+44.9	111.4	34 52.9	+45.6	112.1	34 30.0	+46.4	112.7	34 06.5	+47.1	113.4	33 42.4	+47.9	114.0	33 17.8	+48.5	114.6	32 52.5	+49.2	115.2	12
13	36 20.7	+43.7	109.9	36 00.0	+44.5	110.6	35 38.5	+45.3	111.3	35 16.4	+46.1	111.9	34 53.6	+46.9	112.6	34 30.3	+47.6	113.2	34 06.3	+48.3	113.9	33 41.7	+49.0	114.5	13
14	37 04.4	+43.3	109.1	36 44.5	+44.1	109.8	36 23.8	+45.0	110.5	36 02.5	+45.8	111.2	35 40.5	+46.6	111.8	35 17.9	+47.3	112.5	34 54.6	+48.0	113.1	34 30.7	+48.7	113.8	14
15	37 47.7	+43.0	108.2	37 28.6	+43.8	108.9	37 08.8	+44.6	109.7	36 48.3	+45.4	110.4	36 27.1	+46.2	111.1	36 05.2	+47.0	111.7	35 42.6	+47.8	112.4	35 19.4	+48.5	113.1	15
16	38 30.7	+42.5	107.3	38 12.4	+43.4	108.0	37 53.4	+44.3	108.8	37 33.7	+45.1	109.5	37 13.3	+45.9	110.3	36 52.2	+46.7	111.0	36 30.4	+47.5	111.7	36 07.9	+48.2	112.3	16
17	39 13.2	+42.0	106.4	38 55.8	+43.0	107.2	38 37.7	+43.9	107.9	38 18.8	+44.8	108.7	37 59.2	+45.6	109.4	37 38.9	+46.4	110.2	37 17.9	+47.1	110.9	36 56.1	+47.9	111.6	17
18	39 55.2	+41.7	105.5	39 38.8	+42.6	106.3	39 21.6	+43.5	107.1	39 03.6	+44.4	107.8	38 44.8	+45.2	108.6	38 25.3	+46.0	109.4	38 05.0	+46.9	110.1	37 44.0	+47.7	110.8	18
19	40 36.9	+41.1	104.5	40 21.4	+42.1	105.4	40 05.1	+43.0	106.2	39 48.0	+43.9	107.0	39 30.0	+44.9	107.8	39 11.3	+45.7	108.5	38 51.9	+46.5	109.3	38 31.7	+47.3	110.1	19
20	41 18.0	+40.7	103.6	41 03.5	+41.7	104.4	40 48.1	+42.6	105.3	40 31.9	+43.6	106.1	40 14.9	+44.6	106.9	39 57.0	+45.4	107.7	39 38.4	+46.2	108.5	39 19.0	+46.9	109.3	20
21	41 58.7	+40.1	102.6	41 45.2	+41.1	103.5	41 30.7	+42.2	104.3	41 15.5	+43.1	105.2	40 59.3	+44.1	106.0	40 42.4	+44.9	106.8	40 24.6	+45.8	107.7	40 05.9	+46.7	108.5	21
22	42 38.8	+39.6	101.6	42 26.3	+40.7	102.5	42 12.9	+41.7	103.4	41 58.6	+42.6	104.2	41 43.4	+43.6	105.1	41 27.3	+44.5	106.0	41 10.4	+45.4	106.8	40 52.6	+46.3	107.6	22
23	43 18.4	+39.1	100.6	43 07.0	+40.1	101.5	42 54.6	+41.1	102.4	42 41.2	+42.2	103.3	42 27.0	+43.1	104.2	42 11.8	+44.1	105.1	41 55.8	+45.0	105.9	41 38.9	+45.9	106.8	23
24	43 57.5	+38.4	99.5	43 47.1	+39.5	100.5	43 35.7	+40.6	101.4	43 23.4	+41.6	102.3	43 10.1	+42.7	103.2	42 55.9	+43.6	104.1	42 40.8	+44.6	105.0	42 24.8	+45.4	105.9	24
25	44 35.9	+37.9	98.4	44 26.6	+39.0	99.4	44 16.3	+40.1	100.4	44 05.0	+41.2	101.3	43 52.8	+42.1	102.3	43 39.5	+43.2	103.2	43 25.4	+44.1	104.1	43 10.2	+45.1	105.0	25
26	45 13.8	+37.2	97.3	45 05.6	+38.3	98.3	44 56.4	+39.5	99.3	44 46.2	+40.5	100.3	44 34.9	+41.6	101.3	44 22.7	+42.6	102.2	44 09.5	+43.6	103.2	43 55.3	+44.6	104.1	26
27	45 51.0	+36.5	96.2	45 43.9	+37.8	97.2	45 35.9	+38.8	98.3	45 26.7	+40.0	99.3	45 16.5	+41.1	100.3	45 05.3	+42.2	101.2	44 53.1	+43.2	102.2	44 39.9	+44.2	103.2	27
28	46 27.5	+35.8	95.1	46 21.7	+37.0	96.1	46 14.7	+38.2	97.2	46 06.7	+39.4	98.2	45 57.6	+40.5	99.2	45 47.5	+41.6	100.2	45 36.3	+42.6	101.2	45 24.1	+43.7	102.2	28
29	47 03.3	+35.1	93.9	46 58.7	+36.3	95.0	46 52.9	+37.6	96.0	46 46.1	+38.7	97.1	46 38.1	+39.8	98.1	46 29.1	+41.0	99.2	46 18.9	+42.1	100.2	46 07.8	+43.1	101.3	29
30	47 38.4	+34.4	92.7	47 35.0	+35.6	93.8	47 30.5	+36.8	94.9	47 24.8	+38.0	96.0	47 18.0	+39.2	97.1	47 10.1	+40.3	98.1	47 01.0	+41.5	99.2	46 50.9	+42.6	100.2	30
31	48 12.8	+33.5	91.5	48 10.6	+34.9	92.6	48 07.3	+36.1	93.7	48 02.8	+37.4	94.8	47 57.2	+38.6	95.9	47 50.4	+39.8	97.0	47 42.5	+41.0	98.1	47 33.5	+42.0	99.2	31
32	48 46.3	+32.7	90.2	48 45.5	+34.0	91.4	48 43.4	+35.4	92.5	48 40.2	+36.6	93.6	48 35.8	+37.8	94.8	48 30.2	+39.1	95.9	48 23.4	+40.3	97.0	48 15.5	+41.4	98.1	32
33	49 19.0	+31.8	89.0	49 19.5	+33.2	90.1	49 18.8	+34.5	91.3	49 16.8	+35.8	92.4	49 13.6	+37.2	93.6	49 09.3	+38.3	94.8	49 03.7	+39.6	95.9	48 56.9	+40.8	97.0	33
34	49 50.8	+31.0	87.6	49 52.7	+32.3	88.8	49 53.3	+33.7	90.0	49 52.6	+35.1	91.2	49 50.8	+36.3	92.3	49 47.6	+37.7	93.6	49 43.3	+38.9	94.8	49 37.7	+40.1	95.9	34
35	50 21.8	+30.0	86.3	50 25.0	+31.4	87.5	50 27.0	+32.8	88.7	50 27.7	+34.2	89.9	50 27.1	+35.5	91.1	50 25.3	+36.8	92.4	50 22.2	+38.1	93.6	50 17.8	+39.4	94.8	35
36	50 51.8	+29.0	84.9	50 56.4	+30.5	86.2	50 59.8	+31.9	87.4	51 01.9	+33.2	88.6	51 02.6	+34.7	89.9	51 02.1	+36.0	91.1	51 00.3	+37.4	92.3	50 57.2	+38.7	93.6	36
37	51 20.8	+28.0	83.6	51 26.9	+29.5	84.8	51 31.7	+30.9	86.0	51 35.1	+32.4	87.3	51 37.3	+33.8	88.6	51 38.1	+35.2	89.8	51 37.7	+36.5	91.1	51 35.9	+37.8	92.4	37
38	51 48.8	+27.0	82.1	51 56.4	+28.4	83.4	52 02.6	+29.9	84.7	52 07.5	+31.4	85.9	52 11.1	+32.8	87.2	52 13.3	+34.3	88.5	52 14.2	+35.7	89.8	52 13.7	+37.1	91.1	38
39	52 15.8	+25.8	80.7	52 24.8	+27.4	82.0	52 32.5	+28.9	83.2	52 38.9	+30.4	84.5	52 43.9	+31.9	85.9	52 47.6	+33.3	87.2	52 49.9	+34.7	88.5	52 50.8	+36.1	89.8	39
40	52 41.6	+24.8	79.2	52 52.2	+26.3	80.5	53 01.4	+27.9	81.8	53 09.3	+29.4	83.1	53 15.8	+30.9	84.4	53 20.9	+32.4	85.8	53 24.6	+33.9	87.1	53 26.9	+35.3	88.5	40
41	53 06.4	+23.5	77.7	53 18.5	+25.1	79.0	53 29.3	+26.7	80.3	53 38.7	+28.2	81.7	53 46.7	+29.8	83.0	53 53.3	+31.3	84.4	53 58.5	+32.8	85.7	54 02.2	+34.3	87.1	41
42	53 29.9	+22.4	76.1	53 43.6	+24.0	77.5	53 56.0	+25.5	78.8	54 06.9	+27.1	80.2	54 16.5	+28.6	81.5	54 24.6	+30.2	82.9	54 31.3	+31.8	84.3	54 36.5	+33.3	85.7	42
43	53 52.3	+21.1	74.6	54 07.6	+22.7	75.9	54 21.5	+24.3	77.3	54 34.0	+26.0	78.6	54 45.1	+27.6	80.0	54 54.8	+29.1	81.4	55 03.1	+30.6	82.8	55 09.8	+32.2	84.3	43
44	54 13.4	+19.8	73.0	54 30.3	+21.4	74.3	54 45.8	+23.1	75.7	55 00.0	+24.6	77.1	55 12.7	+26.3	78.5	55 23.9	+28.0	79.9	55 33.7	+29.6	81.3	55 42.0	+31.2	82.8	44
45	54 33.2	+18.5	71.4	54 51.7	+20.2	72.7	55 08.9	+21.8	74.1	55 24.6	+23.5	75.5	55 39.0	+25.1	76.9	55 51.9	+26.7	78.3	56 03.3	+28.3	79.8	56 13.2	+30.0	81.2	45
46	54 51.7	+17.2	69.7	55 11.9	+18.8	71.1	55 30.7	+20.4	72.4	55 48.1	+22.1	73.8	56 04.1	+23.7	75.3	56 18.6	+25.4	76.7	56 31.6	+27.1	78.2	56 43.2	+28.7	79.7	46
47	55 08.9	+15.7	68.0	55 30.7	+17.4	69.4	55 51.1	+19.1	70.8	56 10.2	+20.7	72.2	56 27.8	+22.5	73.6	56 44.0	+24.1	75.1	56 58.7	+25.8	76.6	57 11.9	+27.5	78.1	47
48	55 24.6	+14.4	66.4	55 48.1	+16.0	67.7	56 10.2	+17.6	69.1	56 30.9	+19.4	70.5	56 50.3	+21.0	71.9	57 08.1	+22.8	73.4	57 24.5	+24.5	74.9	57 39.4	+26.2	76.4	48
49	55 39.0	+12.9	64.6	56 04.1	+14.5	66.0	56 27.8	+16.2	67.3	56 50.3	+17.8	68.8	57 11.3	+19.6	70.2	57 30.9	+21.3	71.7	57 49.0	+23.1	73.2	58 05.6	+24.8	74.7	49
50	55 51.9	+11.4	62.9	56 18.6	+13.0	64.2	56 44.0	+14.7	65.6	57 08.1	+16.4	67.0	57 30.9	+18.1	68.5	57 52.2	+19.9	69.9	58 12.1	+21.6	71.4	58 30.4	+23.3	73.0	50
51	56 03.3	+9.9	61.1	56 31.6	+11.6	62.5	56 58.7	+13.2	63.8	57 24.5	+14.9	65.2	57 49.0	+16.6	66.7	58 12.1	+18.3	68.1	58 33.7	+20.0	69.7	58 53.7	+21.9	71.2	51
52	56 13.2	+8.3	59.4	56 43.2	+9.9	60.7	57 11.9	+11.6	62.0	57 39.4	+13.3	63.4	58 05.6	+15.0	64.9	58 30.4	+16.7	66.3	58 53.7	+18.6	67.8	59 15.6	+20.3	69.4	52
53	56 21.5	+6.9	57.6	56 53.1	+8.4	58.9	57 23.5	+10.1	60.2	57 52.7	+11.7	61.6	58 20.6	+13.4	63.0	58 47.1	+15.2	64.5	59 12.3	+16.9	66.0	59 35.9	+18.7	67.6	53
54	56 28.4	+5.2	55.8	57 01.5	+6.9	57.1	57 33.6	+8.4	58.4	58 04.4	+10.1	59.7	58 34.0	+11.8	61.2	59 02.3	+13.5	62.6	59 29.2	+15.3	64.1	59 54.7	+17.1	65.7	54
55	56 33.6	+3.7	54.0	57 08.4	+5.2	55.2	57 42.0	+6.8	56.5	58 14.5	+8.5	57.9	58 45.8	+10.1	59.3	59 15.8	+11.9	60.7	59 44.5	+13.6	62.2	60 11.8	+15.4	63.7	55
56	56 37.3	+2.1	52.2	57 13.6	+3.6	53.4	57 48.8	+5.2	54.7	58 23.0	+6.7	56.0	58 55.9	+8.5	57.4	59 27.7	+10.1	58.8	59 58.1	+11.9	60.3	60 27.2	+13.6	61.8	56
57	56 39.4	+0.5	50.4	57 17.2	+2.0	51.6	57 54.0	+3.5	52.8	58 29.7	+5.1	54.1	59 04.4	+6.7	55.4	59 37.8	+8.4	56.8	60 10.0	+10.1	58.3	60 40.8	+11.9	59.8	57
58	56 39.9	−1.1	48.5	57 19.2	+0.3	49.7	57 57.5	+1.8	50.9	58 34.8	+3.4	52.2	59 11.1	+4.9	53.5	59 46.2	+6.6	54.9	60 20.1	+8.3	56.3	60 52.7	+10.1	57.8	58
59	56 38.8	−2.7	46.7	57 19.5	−1.3	47.9	57 59.3	+0.2	49.0	58 38.2	+1.6	50.3	59 16.0	+3.2	51.6	59 52.8	+4.8	52.9	60 28.4	+6.5	54.3	61 02.8	+8.2	55.8	59
60	56 36.1	−4.2	44.9	57 18.2	−2.9	46.0	57 59.5	−1.5	47.1	58 39.8	0.0	48.3	59 19.2	+1.5	49.6	59 57.6	+3.0	50.9	60 34.9	+4.6	52.3	61 11.0	+6.3	53.7	60
61	56 31.9	−5.8	43.1	57 15.3	−4.5	44.2	57 58.0	−3.2	45.3	58 39.8	−1.8	46.4	59 20.7	−0.4	47.6	60 00.6	+1.2	48.9	60 39.5	+2.8	50.3	61 17.3	+4.4	51.7	61
62	56 26.1	−7.4	41.3	57 10.8	−6.2	42.3	57 54.8	−4.9	43.4	58 38.0	−3.5	44.5	59 20.3	−2.0	45.7	60 01.8	−0.6	46.9	60 42.3	+0.9	48.2	61 21.7	+2.6	49.6	62
63	56 18.7	−9.0	39.5	57 04.6	−7.7	40.5	57 49.9	−6.5	41.5	58 34.5	−5.2	42.6	59 18.3	−3.9	43.7	60 01.2	−2.4	44.9	60 43.2	−0.9	46.2	61 24.3	+0.6	47.5	63
64	56 09.7	−10.4	37.7	56 56.9	−9.3	38.7	57 43.4	−8.1	39.6	58 29.3	−6.9	40.7	59 14.4	−5.6	41.8	59 58.8	−4.3	42.9	60 42.3	−2.8	44.1	61 24.9	−1.3	45.4	64
65	55 59.3	−12.0	36.0	56 47.6	−10.9	36.8	57 35.3	−9.8	37.8	58 22.4	−8.6	38.8	59 08.8	−7.3	39.8	59 54.5	−6.0	40.9	60 39.5	−4.7	42.1	61 23.6	−3.3	43.3	65
66	55 47.3	−13.4	34.2	56 36.7	−12.4	35.1	57 25.5	−11.3	36.0	58 13.8	−10.2	36.9	59 01.5	−9.0	37.9	59 48.5	−7.8	38.9	60 34.8	−6.5	40.1	61 20.3	−5.1	41.2	66
67	55 33.9	−14.9	32.5	56 24.3	−13.9	33.3	57 14.2	−12.9	34.1	58 03.6	−11.8	35.0	58 52.5	−10.8	36.0	59 40.7	−9.5	37.0	60 28.3	−8.3	38.0	61 15.2	−7.0	39.2	67
68	55 19.0	−16.2	30.8	56 10.4	−15.3	31.5	57 01.3	−14.3	32.3	57 51.8	−13.5	33.2	58 41.7	−12.3	34.1	59 31.2	−11.3	35.0	60 20.0	−10.1	36.0	61 08.2	−8.9	37.1	68
69	55 02.8	−17.7	29.1	55 55.0	−16.8	29.8	56 46.9	−15.9	30.6	57 38.3	−14.9	31.4	58 29.4	−14.1	32.2	59 19.9	−13.0	33.1	60 09.9	−11.9	34.0	60 59.3	−10.7	35.0	69
70	54 45.1	−19.0	27.4	55 38.2	−18.2	28.1	56 31.0	−17.4	28.8	57 23.4	−16.6	29.6	58 15.3	−15.5	30.3	59 06.9	−14.6	31.2	59 58.0	−13.6	32.1	60 48.6	−12.6	33.0	70
71	54 26.1	−20.3	25.8	55 20.0	−19.6	26.4	56 13.6	−18.8	27.1	57 06.8	−18.0	27.8	57 59.8	−17.2	28.5	58 52.3	−16.3	29.3	59 44.4	−15.3	30.1	60 36.0	−14.3	31.0	71
72	54 05.8	−21.6	24.2	55 00.4	−20.9	24.8	55 54.8	−20.2	25.4	56 48.8	−19.4	26.0	57 42.6	−18.7	26.7	58 36.0	−17.8	27.4	59 29.1	−17.0	28.2	60 21.7	−16.0	29.1	72
73	53 44.2	−22.8	22.6	54 39.5	−22.2	23.1	55 34.6	−21.5	23.7	56 29.4	−20.8	24.3	57 23.9	−20.1	24.9	58 18.2	−19.4	25.6	59 12.1	−18.5	26.3	60 05.7	−17.7	27.1	73
74	53 21.4	−24.0	21.0	54 17.3	−23.4	21.5	55 13.1	−22.9	22.1	56 08.6	−22.2	22.6	57 03.8	−21.5	23.2	57 58.8	−20.8	23.8	58 53.6	−20.1	24.5	59 48.0	−19.3	25.2	74
75	52 57.4	−25.1	19.5	53 53.9	−24.6	20.0	54 50.2	−24.1	20.4	55 46.4	−23.6	21.0	56 42.3	−22.9	21.5	57 38.0	−22.3	22.1	58 33.5	−21.6	22.7	59 28.7	−20.9	23.3	75
76	52 32.3	−26.3	18.0	53 29.3	−25.8	18.4	54 26.1	−25.3	18.9	55 22.8	−24.8	19.3	56 19.4	−24.3	19.8	57 15.7	−23.7	20.3	58 11.9	−23.1	20.9	59 07.8	−22.4	21.5	76
77	52 06.0	−27.3	16.5	53 03.5	−27.0	16.9	54 00.8	−26.5	17.3	54 58.0	−26.0	17.7	55 55.1	−25.5	18.2	56 52.0	−25.0	18.7	57 48.8	−24.5	19.2	58 45.4	−23.9	19.7	77
78	51 38.7	−28.4	15.1	52 36.5	−28.0	15.4	53 34.3	−27.6	15.8	54 32.0	−27.2	16.2	55 29.6	−26.8	16.6	56 27.0	−26.3	17.0	57 24.3	−25.8	17.5	58 21.5	−25.3	17.9	78
79	51 10.3	−29.4	13.7	52 08.5	−29.0	14.0	53 06.7	−28.7	14.3	54 04.8	−28.3	14.6	55 02.8	−27.9	15.0	56 00.7	−27.5	15.4	56 58.5	−27.1	15.8	57 56.2	−26.7	16.2	79
80	50 40.9	−30.3	12.3	51 39.5	−30.1	12.6	52 38.0	−29.7	12.8	53 36.5	−29.4	13.1	54 34.9	−29.1	13.5	55 33.2	−28.7	13.8	56 31.4	−28.4	14.2	57 29.5	−27.9	14.5	80
81	50 10.6	−31.3	10.9	51 09.4	−31.0	11.2	52 08.3	−30.8	11.4	53 07.1	−30.5	11.7	54 05.8	−30.2	12.0	55 04.5	−29.9	12.3	56 03.0	−29.5	12.6	57 01.6	−29.2	12.9	81
82	49 39.3	−32.2	9.6	50 38.4	−31.9	9.8	51 37.5	−31.7	10.0	52 36.6	−31.5	10.3	53 35.6	−31.2	10.5	54 34.6	−31.0	10.8	55 33.5	−30.7	11.0	56 32.4	−30.4	11.3	82
83	49 07.1	−33.0	8.3	50 06.5	−32.8	8.5	51 05.8	−32.6	8.7	52 05.1	−32.4	8.9	53 04.4	−32.3	9.1	54 03.6	−32.0	9.3	55 02.8	−31.8	9.5	56 02.0	−31.6	9.8	83
84	48 34.1	−33.7	7.1	49 33.7	−33.7	7.2	50 33.2	−33.4	7.3	51 32.7	−33.4	7.5	52 32.1	−33.2	7.7	53 31.6	−33.0	7.9	54 31.0	−32.8	8.0	55 30.4	−32.6	8.2	84
85	48 00.3	−34.6	5.8	49 00.0	−34.5	5.9	49 59.6	−34.3	6.0	50 59.3	−34.2	6.2	51 58.9	−34.1	6.3	52 58.6	−34.0	6.5	53 58.2	−33.8	6.6	54 57.8	−33.7	6.8	85
86	47 25.7	−35.4	4.6	48 25.5	−35.3	4.7	49 25.3	−35.2	4.8	50 25.1	−35.1	4.9	51 24.8	−35.0	5.0	52 24.6	−34.9	5.1	53 24.4	−34.8	5.2	54 24.1	−34.7	5.3	86
87	46 50.3	−36.1	3.4	47 50.2	−36.0	3.5	48 50.1	−36.0	3.5	49 50.1	−35.9	3.6	50 49.8	−35.8	3.6	51 49.7	−35.7	3.8	52 49.6	−35.7	3.9	53 49.4	−35.6	4.0	87
88	46 14.2	−36.8	2.2	47 14.2	−36.8	2.3	48 14.1	−36.7	2.3	49 14.1	−36.7	2.4	50 14.0	−36.6	2.4	51 14.0	−36.6	2.5	52 13.9	−36.5	2.5	53 13.8	−36.5	2.6	88
89	45 37.4	−37.4	1.1	46 37.4	−37.4	1.1	47 37.4	−37.4	1.2	48 37.4	−37.4	1.2	49 37.4	−37.4	1.2	50 37.4	−37.4	1.2	51 37.4	−37.4	1.3	52 37.3	−37.3	1.3	89
90	45 00.0	−38.1	0.0	46 00.0	−38.1	0.0	47 00.0	−38.1	0.0	48 00.0	−38.1	0.0	49 00.0	−38.1	0.0	50 00.0	−38.1	0.0	51 00.0	−38.1	0.0	52 00.0	−38.2	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

LATITUDE **CONTRARY** NAME TO DECLINATION   **L.H.A. 51°, 309°**

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	26 25.4	−47.5	119.8	25 55.4	−48.1	120.2	25 25.0	−48.7	120.6	24 54.2	−49.2	121.0	24 23.1	−49.8	121.4	23 51.7	−50.4	121.8	23 19.9	−50.9	122.2	22 47.7	−51.3	122.5	0
1	25 37.9	−47.6	120.5	25 07.3	−48.3	120.9	24 36.3	−48.8	121.3	24 05.0	−49.4	121.7	23 33.3	−49.9	122.0	23 01.3	−50.4	122.4	22 29.0	−50.9	122.8	21 56.4	−51.5	123.1	1
2	24 50.3	−47.9	121.1	24 19.0	−48.4	121.5	23 47.5	−49.0	121.9	23 15.6	−49.5	122.3	22 43.4	−50.1	122.6	22 10.9	−50.6	123.0	21 38.1	−51.1	123.3	21 04.9	−51.5	123.7	2
3	24 02.4	−48.0	121.8	23 30.6	−48.6	122.2	22 58.5	−49.1	122.5	22 26.1	−49.7	122.9	21 53.3	−50.2	123.2	21 20.3	−50.7	123.6	20 47.0	−51.2	123.9	20 13.4	−51.7	124.2	3
4	23 14.4	−48.2	122.5	22 42.0	−48.7	122.8	22 09.4	−49.3	123.2	21 36.4	−49.8	123.5	21 03.1	−50.3	123.8	20 29.6	−50.8	124.1	19 55.8	−51.3	124.4	19 21.7	−51.7	124.7	4
5	22 26.2	−48.3	123.1	21 53.3	−48.8	123.5	21 20.1	−49.4	123.8	20 46.6	−49.9	124.1	20 12.8	−50.4	124.4	19 38.8	−50.9	124.7	19 04.5	−51.4	125.0	18 30.0	−51.9	125.3	5
6	21 37.9	−48.4	123.8	21 04.5	−49.1	124.1	20 30.7	−49.5	124.4	19 56.7	−50.1	124.7	19 22.4	−50.5	125.0	18 47.9	−51.0	125.3	18 13.1	−51.5	125.5	17 38.1	−51.9	125.8	6
7	20 49.5	−48.6	124.4	20 15.4	−49.1	124.7	19 41.2	−49.7	125.0	19 06.6	−50.1	125.3	18 31.9	−50.7	125.6	17 56.9	−51.2	125.8	17 21.6	−51.5	126.1	16 46.2	−52.0	126.3	7
8	20 00.9	−48.8	125.0	19 26.3	−49.2	125.3	18 51.5	−49.7	125.6	18 16.5	−50.3	125.9	17 41.2	−50.7	126.1	17 05.7	−51.2	126.4	16 30.1	−51.7	126.6	15 54.2	−52.1	126.8	8
9	19 12.1	−48.8	125.6	18 37.1	−49.4	125.9	18 01.8	−49.9	126.2	17 26.2	−50.3	126.4	16 50.5	−50.8	126.7	16 14.5	−51.2	126.9	15 38.4	−51.7	127.1	15 02.1	−52.2	127.4	9
10	18 23.3	−49.0	126.2	17 47.7	−49.5	126.5	17 11.9	−50.0	126.8	16 35.9	−50.5	127.0	15 59.7	−50.9	127.2	15 23.3	−51.4	127.5	14 46.7	−51.8	127.7	14 09.9	−52.2	127.9	10
11	17 34.3	−49.1	126.9	16 58.2	−49.6	127.1	16 21.9	−50.0	127.3	15 45.4	−50.5	127.6	15 08.8	−51.0	127.8	14 31.9	−51.4	128.0	13 54.9	−51.9	128.2	13 17.7	−52.3	128.4	11
12	16 45.2	−49.2	127.5	16 08.6	−49.6	127.7	15 31.9	−50.2	127.9	14 54.9	−50.6	128.1	14 17.8	−51.1	128.3	13 40.5	−51.5	128.5	13 03.0	−51.9	128.7	12 25.4	−52.3	128.9	12
13	15 56.0	−49.3	128.0	15 19.0	−49.8	128.3	14 41.7	−50.2	128.5	14 04.3	−50.7	128.7	13 26.7	−51.1	128.9	12 49.0	−51.6	129.1	12 11.1	−52.0	129.2	11 33.1	−52.4	129.4	13
14	15 06.7	−49.3	128.6	14 29.2	−49.8	128.8	13 51.5	−50.3	129.0	13 13.6	−50.7	129.2	12 35.6	−51.2	129.4	11 57.4	−51.6	129.6	11 19.1	−52.0	129.7	10 40.7	−52.4	129.9	14
15	14 17.4	−49.5	129.2	13 39.3	−49.9	129.4	13 01.2	−50.4	129.6	12 22.9	−50.9	129.8	11 44.4	−51.3	129.9	11 05.8	−51.7	130.1	10 27.1	−52.1	130.2	9 48.3	−52.5	130.4	15
16	13 27.9	−49.5	129.8	12 49.4	−50.0	130.0	12 10.8	−50.5	130.2	11 32.0	−50.9	130.3	10 53.1	−51.3	130.5	10 14.1	−51.7	130.6	9 35.0	−52.1	130.7	8 55.8	−52.5	130.9	16
17	12 38.4	−49.7	130.4	11 59.4	−50.0	130.6	11 20.3	−50.4	130.7	10 41.1	−50.9	130.9	10 01.8	−51.3	131.0	9 22.4	−51.7	131.1	8 42.9	−52.1	131.2	8 03.3	−52.5	131.4	17
18	11 48.7	−49.6	131.0	11 09.4	−50.2	131.1	10 29.8	−50.5	131.3	9 50.2	−51.0	131.4	9 10.5	−51.4	131.5	8 30.7	−51.8	131.6	7 50.8	−52.2	131.7	7 10.8	−52.6	131.8	18
19	10 59.1	−49.8	131.5	10 19.2	−50.2	131.7	9 39.3	−50.6	131.8	8 59.2	−51.0	131.9	8 19.1	−51.5	132.0	7 38.9	−51.9	132.1	6 58.6	−52.3	132.2	6 18.2	−52.6	132.3	19
20	10 09.3	−49.8	132.1	9 29.0	−50.2	132.2	8 48.7	−50.7	132.4	8 08.2	−51.1	132.5	7 27.6	−51.4	132.6	6 47.0	−51.8	132.7	6 06.3	−52.2	132.7	5 25.4	−52.6	132.8	20
21	9 19.5	−49.9	132.7	8 38.8	−50.3	132.8	7 58.0	−50.7	132.9	7 17.1	−51.1	133.0	6 36.2	−51.5	133.1	5 55.2	−51.9	133.2	5 14.1	−52.3	133.2	4 33.0	−52.7	133.3	21
22	8 29.6	−49.9	133.2	7 48.5	−50.3	133.3	7 07.3	−50.8	133.5	6 26.0	−51.1	133.5	5 44.7	−51.6	133.6	5 03.3	−52.0	133.7	4 21.8	−52.3	133.7	3 40.3	−52.7	133.8	22
23	7 39.7	−49.9	133.8	6 58.2	−50.4	133.9	6 16.5	−50.7	134.0	5 34.9	−51.2	134.0	4 53.1	−51.6	134.1	4 11.3	−51.9	134.2	3 29.5	−52.3	134.2	2 47.6	−52.6	134.3	23
24	6 49.8	−50.0	134.4	6 07.8	−50.4	134.4	5 25.8	−50.8	134.5	4 43.7	−51.2	134.6	4 01.6	−51.6	134.6	3 19.4	−52.0	134.7	2 37.2	−52.3	134.7	1 55.0	−52.7	134.7	24
25	5 59.8	−50.0	134.9	5 17.4	−50.5	135.0	4 35.0	−50.9	135.0	3 52.5	−51.2	135.1	3 10.0	−51.6	135.1	2 27.4	−51.9	135.2	1 44.9	−52.4	135.2	1 02.3	−52.7	135.2	25
26	5 09.8	−50.1	135.5	4 27.0	−50.5	135.5	3 44.1	−50.8	135.6	3 01.3	−51.3	135.6	2 18.4	−51.6	135.6	1 35.5	−52.0	135.7	0 52.5	−52.3	135.7	0 09.6	−52.7	135.7	26
27	4 19.7	−50.1	136.0	3 36.5	−50.5	136.1	2 53.3	−50.9	136.1	2 10.0	−51.2	136.1	1 26.8	−51.6	136.2	0 43.5	−52.0	136.2	0 00.2	−52.3	136.2	0 43.1	+52.7	43.8	27
28	3 29.6	−50.1	136.6	2 46.0	−50.4	136.6	2 02.4	−50.8	136.6	1 18.8	−51.2	136.7	0 35.2	−51.6	136.7	0 08.5	+52.0	43.3	0 52.1	+52.4	43.3	1 35.8	+52.6	43.3	28
29	2 39.5	−50.1	137.1	1 55.6	−50.5	137.1	1 11.6	−50.9	137.2	0 27.6	−51.3	137.2	0 16.4	+51.7	42.8	1 00.5	+51.9	42.8	1 44.5	+52.3	42.8	2 28.4	+52.7	42.9	29
30	1 49.4	−50.1	137.7	1 05.1	−50.5	137.7	0 20.7	−50.9	137.7	0 23.7	+51.2	42.3	1 08.1	+51.6	42.3	1 52.4	+52.0	42.3	2 36.8	+52.3	42.4	3 21.1	+52.7	42.4	30
31	0 59.3	−50.1	138.2	0 14.6	−50.5	138.2	0 30.2	+50.9	41.8	1 14.9	+51.3	41.8	1 59.7	+51.6	41.8	2 44.4	+51.9	41.8	3 29.1	+52.3	41.9	4 13.8	+52.6	41.9	31
32	0 09.2	−50.2	138.8	0 35.9	+50.6	41.2	1 21.1	+50.9	41.2	2 06.2	+51.2	41.3	2 51.3	+51.6	41.3	3 36.3	+52.0	41.3	4 21.4	+52.3	41.4	5 06.4	+52.6	41.4	32
33	0 41.0	+50.1	40.7	1 26.5	+50.4	40.7	2 11.9	+50.9	40.7	2 57.4	+51.2	40.7	3 42.9	+51.5	40.8	4 28.3	+51.9	40.8	5 13.7	+52.2	40.9	5 59.0	+52.6	40.9	33
34	1 31.1	+50.1	40.1	2 16.9	+50.5	40.2	3 02.8	+50.8	40.2	3 48.6	+51.2	40.2	4 34.4	+51.6	40.3	5 20.2	+51.9	40.3	6 05.9	+52.2	40.4	6 51.6	+52.5	40.5	34
35	2 21.2	+50.1	39.6	3 07.4	+50.5	39.6	3 53.6	+50.9	39.6	4 39.8	+51.2	39.7	5 26.0	+51.5	39.8	6 12.1	+51.8	39.8	6 58.1	+51.9	39.9	7 44.1	+52.6	40.0	35
36	3 11.3	+50.1	39.0	3 57.9	+50.4	39.1	4 44.5	+50.8	39.1	5 31.0	+51.1	39.2	6 17.5	+51.5	39.2	7 03.9	+51.9	39.3	7 50.3	+52.2	39.4	8 36.7	+52.5	39.5	36
37	4 01.4	+50.0	38.5	4 48.3	+50.5	38.5	5 35.3	+50.7	38.6	6 22.1	+51.1	38.6	7 09.0	+51.4	38.7	7 55.8	+51.8	38.8	8 42.5	+52.1	38.9	9 29.2	+52.4	39.0	37
38	4 51.4	+50.1	37.9	5 38.8	+50.3	38.0	6 26.0	+50.8	38.0	7 13.3	+51.0	38.1	8 00.4	+51.5	38.2	8 47.6	+51.7	38.3	9 34.6	+52.1	38.4	10 21.6	+52.4	38.5	38
39	5 41.5	+50.0	37.4	6 29.1	+50.4	37.4	7 16.8	+50.7	37.5	8 04.3	+51.1	37.6	8 51.9	+51.3	37.7	9 39.3	+51.7	37.8	10 26.7	+52.0	37.9	11 14.0	+52.4	38.0	39
40	6 31.5	+50.0	36.8	7 19.5	+50.3	36.9	8 07.5	+50.6	37.0	8 55.4	+51.0	37.1	9 43.2	+51.3	37.2	10 31.0	+51.7	37.3	11 18.7	+52.0	37.4	12 06.4	+52.3	37.5	40
41	7 21.5	+49.9	36.3	8 09.8	+50.3	36.3	8 58.1	+50.6	36.4	9 46.4	+50.9	36.5	10 34.5	+51.3	36.6	11 22.7	+51.6	36.7	12 10.7	+51.9	36.9	12 58.7	+52.2	37.0	41
42	8 11.4	+49.9	35.7	9 00.1	+50.2	35.8	9 48.7	+50.6	35.9	10 37.3	+50.9	36.0	11 25.8	+51.2	36.1	12 14.3	+51.5	36.2	13 02.6	+51.9	36.4	13 50.9	+52.2	36.5	42
43	9 01.3	+49.8	35.1	9 50.3	+50.2	35.2	10 39.3	+50.5	35.3	11 28.2	+50.8	35.4	12 17.0	+51.2	35.6	13 05.8	+51.5	35.7	13 54.5	+51.8	35.8	14 43.1	+52.1	36.0	43
44	9 51.1	+49.8	34.6	10 40.5	+50.1	34.7	11 29.8	+50.4	34.8	12 19.0	+50.8	34.9	13 08.2	+51.1	35.0	13 57.3	+51.4	35.2	14 46.3	+51.7	35.3	15 35.2	+52.0	35.5	44
45	10 40.9	+49.7	34.0	11 30.6	+50.0	34.1	12 20.2	+50.4	34.2	13 09.8	+50.7	34.4	13 59.3	+51.0	34.5	14 48.7	+51.3	34.6	15 38.0	+51.6	34.8	16 27.2	+52.0	35.0	45
46	11 30.6	+49.6	33.4	12 20.6	+50.0	33.5	13 10.6	+50.3	33.7	14 00.5	+50.6	33.8	14 50.3	+50.9	34.0	15 40.0	+51.3	34.1	16 29.6	+51.6	34.3	17 19.2	+51.9	34.4	46
47	12 20.2	+49.6	32.9	13 10.6	+49.9	33.0	14 00.9	+50.2	33.1	14 51.1	+50.5	33.3	15 41.2	+50.9	33.4	16 31.3	+51.1	33.6	17 21.2	+51.5	33.7	18 11.1	+51.8	33.9	47
48	13 09.8	+49.5	32.3	14 00.5	+49.8	32.4	14 51.1	+50.1	32.5	15 41.6	+50.5	32.7	16 32.1	+50.7	32.9	17 22.4	+51.1	33.0	18 12.7	+51.4	33.2	19 02.9	+51.7	33.4	48
49	13 59.3	+49.4	31.7	14 50.3	+49.7	31.8	15 41.2	+50.1	32.0	16 32.1	+50.3	32.1	17 22.8	+50.7	32.3	18 13.5	+51.0	32.5	19 04.1	+51.3	32.6	19 54.6	+51.6	32.8	49
50	14 48.7	+49.3	31.1	15 40.0	+49.6	31.3	16 31.3	+49.9	31.4	17 22.4	+50.3	31.6	18 13.5	+50.6	31.7	19 04.5	+50.9	31.9	19 55.4	+51.2	32.1	20 46.2	+51.4	32.3	50
51	15 38.0	+49.2	30.5	16 29.6	+49.6	30.7	17 21.2	+49.9	30.8	18 12.7	+50.2	31.0	19 04.1	+50.5	31.2	19 55.4	+50.8	31.3	20 46.6	+51.0	31.5	21 37.6	+51.4	31.7	51
52	16 27.2	+49.1	29.9	17 19.2	+49.4	30.1	18 11.1	+49.7	30.2	19 02.9	+50.0	30.4	19 54.6	+50.3	30.6	20 46.2	+50.6	30.8	21 37.6	+51.0	31.0	22 29.0	+51.3	31.2	52
53	17 16.3	+49.1	29.3	18 08.6	+49.3	29.6	19 00.8	+49.6	29.6	19 52.9	+49.9	29.8	20 44.9	+50.2	30.0	21 36.8	+50.5	30.2	22 28.6	+50.9	30.4	23 20.3	+51.2	30.6	53
54	18 05.4	+48.9	28.7	18 57.9	+49.2	28.9	19 50.4	+49.5	29.1	20 42.8	+49.8	29.2	21 35.1	+50.2	29.4	22 27.4	+50.4	29.6	23 19.5	+50.7	29.8	24 11.5	+51.0	30.1	54
55	18 54.3	+48.7	28.1	19 47.1	+49.1	28.3	20 39.9	+49.4	28.5	21 32.6	+49.7	28.6	22 25.3	+49.9	28.8	23 17.8	+50.3	29.0	24 10.2	+50.6	29.2	25 02.5	+50.9	29.5	55
56	19 43.0	+48.7	27.5	20 36.2	+49.0	27.7	21 29.3	+49.3	27.8	22 22.3	+49.6	28.0	23 15.2	+49.9	28.2	24 08.1	+50.1	28.4	25 00.8	+50.4	28.7	25 53.4	+50.7	28.9	56
57	20 31.7	+48.5	26.9	21 25.2	+48.8	27.0	22 18.6	+49.1	27.2	23 11.9	+49.4	27.4	24 05.1	+49.7	27.6	24 58.2	+50.0	27.8	25 51.2	+50.3	28.1	26 44.1	+50.6	28.3	57
58	21 20.2	+48.4	26.2	22 14.0	+48.6	26.4	23 07.7	+48.9	26.6	24 01.3	+49.2	26.8	24 54.8	+49.5	27.0	25 48.2	+49.8	27.2	26 41.5	+50.1	27.4	27 34.7	+50.4	27.7	58
59	22 08.6	+48.2	25.6	23 02.6	+48.6	25.8	23 56.6	+48.8	26.0	24 50.5	+49.1	26.2	25 44.3	+49.4	26.4	26 38.0	+49.7	26.6	27 31.6	+50.0	26.8	28 25.1	+50.3	27.1	59
60	22 56.8	+48.1	25.0	23 51.2	+48.3	25.1	24 45.4	+48.7	25.3	25 39.6	+48.9	25.5	26 33.7	+49.2	25.7	27 27.7	+49.5	26.0	28 21.6	+49.8	26.2	29 15.4	+50.0	26.4	60
61	23 44.9	+47.9	24.3	24 39.5	+48.2	24.5	25 34.1	+48.4	24.7	26 28.5	+48.8	24.9	27 22.9	+49.0	25.1	28 17.2	+49.3	25.3	29 11.4	+49.6	25.6	30 05.4	+49.9	25.8	61
62	24 32.8	+47.7	23.6	25 27.7	+48.0	23.8	26 22.5	+48.3	24.0	27 17.3	+48.5	24.2	28 11.9	+48.9	24.5	29 06.5	+49.1	24.7	30 01.0	+49.4	24.9	30 55.3	+49.7	25.2	62
63	25 20.5	+47.5	23.0	26 15.7	+47.8	23.2	27 10.8	+48.1	23.4	28 05.8	+48.4	23.6	29 00.8	+48.6	23.8	29 55.6	+49.0	24.0	30 50.4	+49.2	24.3	31 45.0	+49.5	24.5	63
64	26 08.0	+47.4	22.3	27 03.5	+47.6	22.5	27 58.9	+47.9	22.7	28 54.2	+48.2	22.9	29 49.4	+48.5	23.1	30 44.6	+48.7	23.4	31 39.6	+49.0	23.6	32 34.5	+49.3	23.8	64
65	26 55.4	+47.1	21.6	27 51.1	+47.4	21.8	28 46.8	+47.7	22.0	29 42.4	+47.9	22.2	30 37.9	+48.2	22.4	31 33.3	+48.5	22.7	32 28.6	+48.8	22.9	33 23.8	+49.1	23.2	65
66	27 42.5	+47.0	20.9	28 38.5	+47.2	21.1	29 34.5	+47.4	21.3	30 30.3	+47.8	21.5	31 26.1	+48.0	21.7	32 21.8	+48.3	22.0	33 17.4	+48.5	22.2	34 12.9	+48.8	22.5	66
67	28 29.5	+46.7	20.2	29 25.7	+47.0	20.4	30 21.9	+47.3	20.6	31 18.1	+47.4	20.8	32 14.1	+47.7	21.0	33 10.1	+48.0	21.3	34 05.9	+48.3	21.5	35 01.7	+48.6	21.8	67
68	29 16.2	+46.5	19.5	30 12.7	+46.7	19.7	31 09.2	+46.9	19.9	32 05.5	+47.2	20.1	33 01.8	+47.6	20.3	33 58.1	+47.7	20.6	34 54.2	+48.0	20.8	35 50.3	+48.3	21.0	68
69	30 02.7	+46.2	18.8	30 59.4	+46.5	19.0	31 56.1	+46.8	19.2	32 52.8	+47.0	19.4	33 49.4	+47.2	19.6	34 45.8	+47.5	19.8	35 42.2	+47.8	20.1	36 38.6	+48.0	20.3	69
70	30 48.9	+46.0	18.0	31 45.9	+46.2	18.2	32 42.9	+46.4	18.4	33 39.8	+46.7	18.6	34 36.6	+46.9	18.8	35 33.3	+47.2	19.1	36 30.0	+47.5	19.3	37 26.6	+47.7	19.6	70
71	31 34.9	+45.7	17.3	32 32.1	+46.0	17.5	33 29.3	+46.2	17.7	34 26.5	+46.4	17.9	35 23.5	+46.7	18.1	36 20.5	+47.0	18.3	37 17.5	+47.1	18.5	38 14.3	+47.4	18.8	71
72	32 20.6	+45.4	16.5	33 18.1	+45.6	16.7	34 15.5	+45.9	16.9	35 12.9	+46.1	17.1	36 10.2	+46.4	17.3	37 07.5	+46.6	17.5	38 04.6	+46.9	17.8	39 01.7	+47.1	18.0	72
73	33 06.0	+45.2	15.7	34 03.7	+45.4	15.9	35 01.4	+45.6	16.1	35 59.0	+45.8	16.3	36 56.6	+46.0	16.5	37 54.1	+46.3	16.7	38 51.5	+46.5	17.0	39 48.8	+46.8	17.2	73
74	33 51.2	+44.8	14.9	34 49.1	+45.0	15.1	35 47.0	+45.3	15.3	36 44.8	+45.5	15.5	37 42.6	+45.7	15.7	38 40.4	+45.9	15.9	39 38.0	+46.2	16.1	40 35.6	+46.4	16.4	74
75	34 36.0	+44.5	14.1	35 34.1	+44.8	14.3	36 32.3	+44.9	14.5	37 30.3	+45.2	14.7	38 28.3	+45.4	14.9	39 26.3	+45.6	15.1	40 24.2	+45.8	15.3	41 22.0	+46.1	15.5	75
76	35 20.5	+44.2	13.3	36 18.9	+44.3	13.5	37 17.2	+44.5	13.7	38 15.5	+44.7	13.9	39 13.7	+45.0	14.0	40 11.9	+45.2	14.2	41 10.0	+45.4	14.5	42 08.1	+45.6	14.7	76
77	36 04.7	+43.8	12.5	37 03.2	+44.0	12.7	38 01.7	+44.2	12.8	39 00.2	+44.4	13.0	39 58.7	+44.6	13.2	40 57.1	+44.8	13.4	41 55.4	+45.0	13.6	42 53.7	+45.2	13.8	77
78	36 48.5	+43.4	11.6	37 47.2	+43.7	11.8	38 45.9	+43.9	12.0	39 44.6	+44.0	12.1	40 43.3	+44.1	12.3	41 41.9	+44.3	12.5	42 40.4	+44.6	12.7	43 38.9	+44.8	12.9	78
79	37 31.9	+43.1	10.8	38 30.9	+43.2	10.9	39 29.8	+43.4	11.1	40 28.6	+43.6	11.2	41 27.4	+43.8	11.4	42 26.2	+44.0	11.6	43 25.0	+44.1	11.8	44 23.7	+44.3	12.0	79
80	38 15.0	+42.6	9.9	39 14.1	+42.8	10.0	40 13.2	+42.9	10.2	41 12.2	+43.1	10.3	42 11.2	+43.3	10.5	43 10.2	+43.5	10.7	44 09.1	+43.7	10.8	45 08.0	+43.9	11.0	80
81	38 57.6	+42.3	9.0	39 56.9	+42.4	9.1	40 56.1	+42.6	9.3	41 55.3	+42.7	9.4	42 54.5	+42.9	9.6	43 53.7	+43.0	9.7	44 52.8	+43.2	9.9	45 51.9	+43.3	10.1	81
82	39 39.9	+41.8	8.1	40 39.3	+41.9	8.2	41 38.7	+42.0	8.3	42 38.0	+42.2	8.5	43 37.4	+42.3	8.6	44 36.7	+42.5	8.7	45 36.0	+42.6	8.9	46 35.2	+42.8	9.1	82
83	40 21.7	+41.3	7.1	41 21.2	+41.4	7.2	42 20.7	+41.6	7.4	43 20.2	+41.7	7.5	44 19.7	+41.8	7.6	45 19.2	+41.9	7.7	46 18.6	+42.1	7.9	47 18.0	+42.3	8.0	83
84	41 03.0	+40.8	6.1	42 02.6	+41.0	6.3	43 02.3	+41.0	6.4	44 01.9	+41.2	6.5	45 01.5	+41.3	6.6	46 01.1	+41.4	6.6	47 00.7	+41.5	6.8	48 00.3	+41.6	7.0	84
85	41 43.8	+40.4	5.2	42 43.6	+40.4	5.3	43 43.3	+40.6	5.4	44 43.1	+40.6	5.5	45 42.8	+40.7	5.6	46 42.5	+40.8	5.7	47 42.2	+40.9	5.8	48 41.9	+41.0	5.9	85
86	42 24.2	+39.8	4.2	43 24.0	+39.9	4.3	44 23.9	+39.9	4.4	45 23.7	+40.0	4.4	46 23.5	+40.1	4.5	47 23.3	+40.2	4.6	48 23.1	+40.3	4.7	49 22.9	+40.4	4.8	86
87	43 04.0	+39.3	3.2	44 03.9	+39.3	3.2	45 03.8	+39.4	3.3	46 03.7	+39.4	3.4	47 03.6	+39.5	3.4	48 03.5	+39.6	3.5	49 03.4	+39.6	3.6	50 03.3	+39.6	3.6	87
88	43 43.3	+38.6	2.2	44 43.2	+38.7	2.2	45 43.2	+38.7	2.2	46 43.1	+38.8	2.3	47 43.1	+38.8	2.3	48 43.0	+38.9	2.4	49 43.0	+38.9	2.4	50 42.9	+38.9	2.5	88
89	44 21.9	+38.1	1.1	45 21.9	+38.1	1.1	46 21.9	+38.1	1.1	47 21.9	+38.1	1.1	48 21.9	+38.1	1.2	49 21.9	+38.1	1.2	50 21.9	+38.1	1.2	51 21.8	+38.2	1.2	89
90	45 00.0	+37.4	0.0	46 00.0	+37.4	0.0	47 00.0	+37.4	0.0	48 00.0	+37.4	0.0	49 00.0	+37.4	0.0	50 00.0	+37.4	0.0	51 00.0	+37.4	0.0	52 00.0	+37.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
         { L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 129°, 231°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	25 48.4	+47.0	118.9	25 19.2	+47.7	119.3	24 49.6	+48.3	119.7	24 19.7	+48.8	120.1	23 49.4	+49.4	120.5	23 18.7	+50.0	120.9	22 47.7	+50.6	121.3	22 16.5	+51.0	121.6	0
1	26 35.4	+46.9	118.2	26 06.9	+47.4	118.7	25 37.9	+48.1	119.1	25 08.5	+48.7	119.5	24 38.8	+49.3	120.3	24 08.7	+49.8	120.3	23 38.3	+50.3	120.7	23 07.5	+50.9	121.0	1
2	27 22.3	+46.6	117.5	26 54.3	+47.3	118.0	26 26.0	+47.9	118.4	25 57.2	+48.5	118.9	25 28.1	+49.1	119.3	24 58.5	+49.7	119.7	24 28.6	+50.3	120.1	23 58.4	+50.8	120.5	2
3	28 08.9	+46.4	116.8	27 41.6	+47.0	117.3	27 13.9	+47.7	117.7	26 45.7	+48.4	118.2	26 17.2	+48.9	118.6	25 48.2	+49.5	119.1	25 18.9	+50.1	119.5	24 49.2	+50.6	119.9	3
4	28 55.3	+46.1	116.1	28 28.6	+46.9	116.6	28 01.6	+47.5	117.1	27 34.1	+48.1	117.5	27 06.1	+48.8	118.0	26 37.7	+49.4	118.4	26 09.0	+49.9	118.9	25 39.8	+50.5	119.3	4
5	29 41.4	+45.9	115.4	29 15.5	+46.6	115.9	28 49.1	+47.2	116.4	28 22.2	+47.9	116.9	27 54.9	+48.5	117.3	27 27.1	+49.2	117.8	26 58.9	+49.8	118.2	26 30.3	+50.3	118.7	5
6	30 27.3	+45.7	114.6	30 02.1	+46.3	115.1	29 36.3	+47.1	115.7	29 10.1	+47.7	116.2	28 43.4	+48.4	116.7	28 16.3	+49.0	117.1	27 48.7	+49.6	117.6	27 20.6	+50.2	118.1	6
7	31 13.0	+45.3	113.9	30 48.4	+46.1	114.4	30 23.4	+46.8	114.9	29 57.8	+47.5	115.5	29 31.8	+48.1	116.0	29 05.3	+48.8	116.5	28 38.3	+49.4	117.0	28 10.8	+50.0	117.5	7
8	31 58.3	+45.1	113.1	31 34.5	+45.9	113.7	31 10.2	+46.6	114.2	30 45.3	+47.3	114.8	30 19.9	+48.0	115.3	29 54.1	+48.5	115.8	29 27.7	+49.2	116.3	29 00.8	+49.9	116.8	8
9	32 43.4	+44.8	112.3	32 20.4	+45.5	112.9	31 56.8	+46.3	113.5	31 32.6	+47.0	114.0	31 07.9	+47.7	114.6	30 42.6	+48.4	115.1	30 16.9	+49.0	115.7	29 50.7	+49.6	116.2	9
10	33 28.2	+44.5	111.5	33 05.9	+45.3	112.1	32 43.1	+46.0	112.7	32 19.6	+46.8	113.3	31 55.6	+47.4	113.9	31 31.0	+48.2	114.4	31 05.9	+48.8	115.0	30 40.3	+49.4	115.5	10
11	34 12.7	+44.2	110.7	33 51.2	+45.0	111.3	33 29.1	+45.7	112.0	33 06.4	+46.4	112.6	32 43.0	+47.2	113.2	32 19.2	+47.9	113.7	31 54.7	+48.6	114.3	31 29.7	+49.3	114.9	11
12	34 56.9	+43.8	109.9	34 36.2	+44.6	110.5	34 14.8	+45.5	111.2	33 52.8	+46.2	111.8	33 30.2	+47.0	112.4	33 07.1	+47.6	113.0	32 43.3	+48.4	113.6	32 19.0	+49.0	114.2	12
13	35 40.7	+43.5	109.0	35 20.8	+44.3	109.7	35 00.3	+45.1	110.4	34 39.0	+45.9	111.0	34 17.2	+46.6	111.7	33 54.7	+47.4	112.3	33 31.7	+48.1	112.9	33 08.0	+48.8	113.5	13
14	36 24.2	+43.1	108.2	36 05.1	+44.0	108.9	35 45.4	+44.8	109.6	35 24.9	+45.6	110.2	35 03.8	+46.4	110.9	34 42.1	+47.1	111.6	34 19.8	+47.8	112.2	33 56.8	+48.5	112.8	14
15	37 07.3	+42.8	107.3	36 49.1	+43.6	108.0	36 30.2	+44.4	108.8	36 10.5	+45.3	109.4	35 50.2	+46.1	110.1	35 29.2	+46.9	110.8	35 07.6	+47.6	111.5	34 45.3	+48.3	112.1	15
16	37 50.1	+42.3	106.4	37 32.7	+43.2	107.2	37 14.6	+44.1	107.9	36 55.8	+44.9	108.6	36 36.3	+45.7	109.3	36 16.1	+46.5	110.0	35 55.2	+47.3	110.7	35 33.6	+48.1	111.4	16
17	38 32.4	+41.9	105.5	38 15.9	+42.8	106.3	37 58.7	+43.7	107.1	37 40.7	+44.6	107.8	37 22.0	+45.4	108.5	37 02.6	+46.2	109.2	36 42.5	+47.0	110.0	36 21.7	+47.7	110.6	17
18	39 14.3	+41.4	104.6	38 58.7	+42.4	105.4	38 42.4	+43.3	106.2	38 25.3	+44.2	106.9	38 07.4	+45.1	107.7	37 48.8	+45.9	108.4	37 29.5	+46.6	109.2	37 09.4	+47.5	109.9	18
19	39 55.7	+41.0	103.7	39 41.1	+42.0	104.5	39 25.7	+42.9	105.3	39 09.5	+43.8	106.1	38 52.5	+44.6	106.9	38 34.7	+45.5	107.6	38 16.1	+46.4	108.4	37 56.9	+47.1	109.1	19
20	40 36.7	+40.5	102.7	40 23.1	+41.4	103.6	40 08.6	+42.4	104.4	39 53.3	+43.3	105.2	39 37.1	+44.3	106.0	39 20.2	+45.2	106.8	39 02.5	+46.0	107.6	38 44.0	+46.8	108.3	20
21	41 17.2	+40.0	101.7	41 04.5	+41.1	102.6	40 51.0	+42.0	103.5	40 36.6	+43.0	104.3	40 21.4	+43.9	105.1	40 05.4	+44.7	105.9	39 48.5	+45.6	106.7	39 30.8	+46.5	107.5	21
22	41 57.2	+39.5	100.8	41 45.6	+40.5	101.6	41 33.0	+41.5	102.5	41 19.6	+42.5	103.4	41 05.3	+43.4	104.2	40 50.1	+44.4	105.1	40 34.1	+45.3	105.9	40 17.3	+46.1	106.7	22
23	42 36.7	+38.9	99.7	42 26.1	+39.9	100.6	42 14.5	+41.0	101.5	42 02.1	+42.0	102.4	41 48.7	+43.0	103.3	41 34.5	+43.9	104.2	41 19.4	+44.8	105.0	41 03.4	+45.8	105.9	23
24	43 15.6	+38.3	98.7	43 06.0	+39.5	99.6	42 55.5	+40.5	100.5	42 44.1	+41.5	101.5	42 31.7	+42.5	102.4	42 18.4	+43.5	103.2	42 04.2	+44.5	104.1	41 49.2	+45.3	105.0	24
25	43 53.9	+37.8	97.6	43 45.5	+38.8	98.6	43 36.0	+40.0	99.5	43 25.6	+41.0	100.5	43 14.2	+42.1	101.4	43 01.9	+43.0	102.3	42 48.7	+44.0	103.2	42 34.5	+44.9	104.1	25
26	44 31.7	+37.1	96.5	44 24.3	+38.3	97.5	44 16.0	+39.3	98.5	44 06.6	+40.4	99.5	43 56.3	+41.5	100.4	43 44.9	+42.6	101.3	43 32.7	+43.5	102.3	43 19.4	+44.5	103.2	26
27	45 08.8	+36.4	95.4	45 02.6	+37.6	96.4	44 55.3	+38.8	97.4	44 47.0	+39.9	98.4	44 37.8	+40.9	99.4	44 27.5	+42.0	100.4	44 16.2	+43.0	101.3	44 03.9	+44.0	102.3	27
28	45 45.2	+35.8	94.3	45 40.2	+36.9	95.3	45 34.1	+38.1	96.3	45 26.9	+39.3	97.4	45 18.7	+40.4	98.4	45 09.5	+41.4	99.4	44 59.2	+42.5	100.3	44 47.9	+43.6	101.3	28
29	46 21.0	+35.0	93.2	46 17.1	+36.3	94.2	46 12.2	+37.5	95.2	46 06.2	+38.6	96.3	45 59.1	+39.8	97.3	45 50.9	+40.9	98.3	45 41.7	+42.0	99.3	45 31.5	+43.0	100.3	29
30	46 56.0	+34.3	92.0	46 53.4	+35.6	93.0	46 49.7	+36.8	94.1	46 44.8	+38.0	95.2	46 38.9	+39.1	96.2	46 31.8	+40.3	97.3	46 23.7	+41.4	98.3	46 14.5	+42.5	99.3	30
31	47 30.3	+33.6	90.8	47 29.0	+34.8	91.9	47 26.5	+36.0	92.9	47 22.8	+37.3	94.0	47 18.0	+38.5	95.1	47 12.1	+39.7	96.2	47 05.1	+40.8	97.3	46 57.0	+41.9	98.3	31
32	48 03.9	+32.7	89.5	48 03.8	+34.0	90.6	48 02.5	+35.3	91.8	48 00.1	+36.5	92.9	47 56.5	+37.8	94.0	47 51.8	+39.0	95.1	47 45.9	+40.2	96.2	47 38.9	+41.3	97.3	32
33	48 36.6	+31.9	88.3	48 37.8	+33.2	89.4	48 37.8	+34.6	90.5	48 36.7	+35.8	91.7	48 34.3	+37.1	92.8	48 30.8	+38.3	93.9	48 26.1	+39.5	95.1	48 20.2	+40.7	96.2	33
34	49 08.5	+30.9	87.0	49 11.0	+32.4	88.1	49 12.4	+33.7	89.3	49 12.5	+35.0	90.5	49 11.4	+36.3	91.6	49 09.1	+37.6	92.8	49 05.6	+38.9	93.9	49 00.9	+40.1	95.1	34
35	49 39.4	+30.1	85.7	49 43.4	+31.4	86.8	49 46.1	+32.8	88.0	49 47.5	+34.2	89.2	49 47.7	+35.6	90.4	49 46.7	+36.8	91.6	49 44.5	+38.1	92.7	49 41.0	+39.3	93.9	35
36	50 09.5	+29.2	84.3	50 14.8	+30.6	85.5	50 18.9	+32.0	86.7	50 21.7	+33.4	87.9	50 23.3	+34.7	89.1	50 23.5	+36.1	90.3	50 22.6	+37.3	91.5	50 20.3	+38.6	92.7	36
37	50 38.7	+28.1	82.9	50 45.4	+29.6	84.2	50 50.9	+31.0	85.4	50 55.1	+32.4	86.6	50 58.0	+33.8	87.8	50 59.6	+35.2	89.1	50 59.9	+36.5	90.3	50 58.9	+37.9	91.5	37
38	51 06.8	+27.1	81.5	51 15.0	+28.6	82.8	51 21.9	+30.0	84.0	51 27.5	+31.5	85.3	51 31.8	+32.9	86.5	51 34.8	+34.3	87.8	51 36.4	+35.7	89.0	51 36.8	+37.0	90.3	38
39	51 33.9	+26.1	80.1	51 43.6	+27.5	81.4	51 51.9	+29.1	82.6	51 59.0	+30.5	83.9	52 04.7	+32.0	85.2	52 09.1	+33.4	86.4	52 12.1	+34.8	87.7	52 13.8	+36.2	89.0	39
40	52 00.0	+24.9	78.7	52 11.1	+26.5	79.9	52 21.0	+28.0	81.2	52 29.5	+29.5	82.5	52 36.7	+30.9	83.8	52 42.5	+32.4	85.1	52 46.9	+33.9	86.4	52 50.0	+35.3	87.7	40
41	52 24.9	+23.9	77.2	52 37.6	+25.4	78.5	52 49.0	+26.9	79.7	52 59.0	+28.4	81.0	53 07.6	+30.0	82.4	53 14.9	+31.4	83.7	53 20.8	+32.9	85.0	53 25.3	+34.4	86.4	41
42	52 48.8	+22.6	75.7	53 03.0	+24.2	77.0	53 15.9	+25.7	78.3	53 27.4	+27.3	79.6	53 37.6	+28.8	80.9	53 46.3	+30.4	82.3	53 53.7	+31.9	83.6	53 59.7	+33.4	85.0	42
43	53 11.4	+21.5	74.1	53 27.2	+23.0	75.4	53 41.6	+24.6	76.7	53 54.7	+26.2	78.1	54 06.4	+27.7	79.4	54 16.7	+29.3	80.8	54 25.6	+30.8	82.2	54 33.1	+32.3	83.6	43
44	53 32.9	+20.2	72.6	53 50.2	+21.8	73.9	54 06.2	+23.4	75.2	54 20.9	+24.9	76.5	54 34.1	+26.6	77.9	54 46.0	+28.1	79.3	54 56.4	+29.8	80.7	55 05.4	+31.3	82.1	44
45	53 53.1	+18.9	71.0	54 12.0	+20.5	72.3	54 29.6	+22.1	73.6	54 45.8	+23.8	75.0	55 00.7	+25.3	76.3	55 14.1	+27.0	77.7	55 26.2	+28.5	79.2	55 36.7	+30.1	80.6	45
46	54 12.0	+17.6	69.4	54 32.5	+19.2	70.7	54 51.7	+20.8	72.0	55 09.6	+22.4	73.4	55 26.0	+24.1	74.8	55 41.1	+25.7	76.2	55 54.7	+27.4	77.6	56 06.8	+29.0	79.1	46
47	54 29.6	+16.2	67.7	54 51.7	+17.9	69.0	55 12.5	+19.5	70.4	55 32.0	+21.1	71.7	55 50.1	+22.8	73.1	56 06.8	+24.4	74.6	56 22.1	+26.0	76.0	56 35.8	+27.8	77.5	47
48	54 45.8	+14.9	66.1	55 09.6	+16.4	67.4	55 32.0	+18.1	68.7	55 53.1	+19.8	70.1	56 12.9	+21.4	71.5	56 31.2	+23.1	72.9	56 48.1	+24.8	74.4	57 03.6	+26.4	75.9	48
49	55 00.7	+13.4	64.4	55 26.0	+15.1	65.7	55 50.1	+16.7	67.0	56 12.9	+18.3	68.4	56 34.3	+20.0	69.8	56 54.3	+21.7	71.2	57 12.9	+23.4	72.7	57 30.0	+25.1	74.2	49
50	55 14.1	+12.1	62.7	55 41.1	+13.6	64.0	56 06.8	+15.3	65.3	56 31.2	+16.9	66.7	56 54.3	+18.6	68.1	57 16.0	+20.3	69.5	57 36.3	+22.0	71.0	57 55.1	+23.7	72.5	50
51	55 26.2	+10.5	60.9	55 54.7	+12.1	62.2	56 22.1	+13.7	63.6	56 48.1	+15.5	64.9	57 12.9	+17.1	66.3	57 36.3	+18.8	67.8	57 58.3	+20.5	69.2	58 18.8	+22.3	70.8	51
52	55 36.7	+9.1	59.2	56 06.8	+10.7	60.5	56 35.8	+12.3	61.8	57 03.6	+13.8	63.1	57 30.0	+15.6	64.5	57 55.1	+17.3	66.0	58 18.8	+19.0	67.5	58 41.1	+20.8	69.0	52
53	55 45.8	+7.5	57.4	56 17.5	+9.1	58.7	56 48.1	+10.7	60.0	57 17.4	+12.4	61.4	57 45.6	+14.0	62.8	58 12.4	+15.7	64.2	58 37.8	+17.5	65.6	59 01.9	+19.2	67.2	53
54	55 53.3	+6.0	55.7	56 26.6	+7.6	56.9	56 58.8	+9.1	58.2	57 29.8	+10.8	59.5	57 59.6	+12.4	60.9	58 28.1	+14.1	62.3	58 55.3	+15.8	63.8	59 21.1	+17.6	65.3	54
55	55 59.3	+4.5	53.9	56 34.2	+6.0	55.1	57 07.9	+7.6	56.4	57 40.6	+9.1	57.7	58 12.0	+10.8	59.1	58 42.2	+12.5	60.5	59 11.1	+14.2	61.9	59 38.7	+16.0	63.4	55
56	56 03.8	+2.9	52.1	56 40.2	+4.4	53.3	57 15.5	+5.9	54.6	57 49.7	+7.5	55.9	58 22.8	+9.2	57.2	58 54.7	+10.8	58.6	59 25.3	+12.6	60.1	59 54.7	+14.2	61.5	56
57	56 06.7	+1.4	50.3	56 44.6	+2.8	51.5	57 21.4	+4.3	52.7	57 57.2	+5.9	54.0	58 32.0	+7.4	55.3	59 05.5	+9.1	56.7	59 37.9	+10.8	58.1	60 08.9	+12.6	59.6	57
58	56 08.1	−0.2	48.5	56 47.4	+1.2	49.7	57 25.7	+2.7	50.9	58 03.1	+4.2	52.1	58 39.4	+5.8	53.4	59 14.6	+7.4	54.7	59 48.7	+9.0	56.1	60 21.5	+10.7	57.6	58
59	56 07.9	−1.7	46.7	56 48.6	−0.4	47.9	57 28.4	+1.1	49.0	58 07.3	+2.5	50.2	58 45.2	+4.1	51.5	59 22.0	+5.7	52.8	59 57.7	+7.3	54.2	60 32.2	+9.0	55.6	59
60	56 06.2	−3.3	44.9	56 48.2	−1.9	46.0	57 29.5	−0.6	47.1	58 09.8	+0.9	48.3	58 49.3	+2.3	49.6	59 27.7	+3.8	50.8	60 05.0	+5.5	52.2	60 41.2	+7.1	53.6	60
61	56 02.9	−4.9	43.2	56 46.3	−3.6	44.2	57 28.9	−2.2	45.3	58 10.7	−0.9	46.4	58 51.6	+0.6	47.6	59 31.5	+2.1	48.9	60 10.5	+3.6	50.2	60 48.3	+5.3	51.6	61
62	55 58.0	−6.4	41.4	56 42.7	−5.1	42.4	57 26.7	−3.9	43.4	58 09.8	−2.5	44.5	58 52.2	−1.2	45.7	59 33.6	+0.4	46.9	60 14.1	+1.9	48.2	60 53.6	+3.4	49.5	62
63	55 51.6	−7.9	39.6	56 37.6	−6.8	40.6	57 22.8	−5.5	41.6	58 07.3	−4.2	42.6	58 51.0	−2.8	43.8	59 34.0	−1.5	44.9	60 16.0	0.0	46.2	60 57.0	+1.6	47.5	63
64	55 43.7	−9.4	37.8	56 30.8	−8.3	38.8	57 17.3	−7.1	39.7	58 03.1	−5.9	40.8	58 48.2	−4.6	41.8	59 32.5	−3.2	43.0	60 16.0	−1.8	44.1	60 58.6	−0.4	45.4	64
65	55 34.3	−10.9	36.1	56 22.5	−9.8	37.0	57 10.2	−8.7	37.9	57 57.2	−7.5	38.9	58 43.6	−6.3	39.9	59 29.3	−5.1	41.0	60 14.2	−3.7	42.1	60 58.2	−2.2	43.3	65
66	55 23.4	−12.3	34.4	56 12.7	−11.3	35.2	57 01.5	−10.3	36.1	57 49.7	−9.2	37.0	58 37.3	−8.0	38.0	59 24.2	−6.7	39.0	60 10.5	−5.5	40.1	60 56.0	−4.1	41.3	66
67	55 11.1	−13.8	32.6	56 01.4	−12.9	33.4	56 51.2	−11.8	34.3	57 40.5	−10.7	35.2	58 29.3	−9.7	36.1	59 17.5	−8.5	37.1	60 05.0	−7.3	38.1	60 51.9	−6.0	39.2	67
68	54 57.3	−15.2	30.9	55 48.5	−14.2	31.7	56 39.4	−13.4	32.5	57 29.8	−12.4	33.3	58 19.6	−11.3	34.2	59 09.0	−10.2	35.1	59 57.7	−9.0	36.1	60 45.9	−7.8	37.2	68
69	54 42.1	−16.6	29.3	55 34.3	−15.8	30.0	56 26.0	−14.8	30.7	57 17.4	−13.9	31.5	58 08.3	−12.9	32.3	58 58.8	−11.9	33.2	59 48.7	−10.8	34.2	60 38.1	−9.7	35.2	69
70	54 25.5	−17.9	27.6	55 18.5	−17.1	28.3	56 11.2	−16.3	29.0	57 03.5	−15.4	29.7	57 55.4	−14.5	30.5	58 46.9	−13.5	31.3	59 37.9	−12.5	32.2	60 28.4	−11.4	33.2	70
71	54 07.6	−19.2	26.0	55 01.4	−18.5	26.6	55 54.9	−17.7	27.2	56 48.1	−16.9	27.9	57 40.9	−16.0	28.7	58 33.4	−15.2	29.5	59 25.4	−14.2	30.3	60 17.0	−13.2	31.2	71
72	53 48.4	−20.5	24.4	54 42.9	−19.8	24.9	55 37.2	−19.1	25.5	56 31.2	−18.4	26.2	57 24.9	−17.6	26.9	58 18.2	−16.7	27.6	59 11.2	−15.9	28.4	60 03.8	−15.0	29.2	72
73	53 27.9	−21.8	22.8	54 23.1	−21.1	23.3	55 18.1	−20.5	23.9	56 12.8	−19.7	24.5	57 07.3	−19.0	25.1	58 01.5	−18.3	25.8	58 55.3	−17.4	26.5	59 48.8	−16.5	27.3	73
74	53 06.1	−22.9	21.2	54 02.0	−22.4	21.7	54 57.6	−21.7	22.2	55 53.1	−21.2	22.8	56 48.3	−20.5	23.4	57 43.2	−19.7	24.0	58 37.9	−19.0	24.7	59 32.3	−18.3	25.4	74
75	52 43.2	−24.1	19.7	53 39.6	−23.6	20.1	54 35.9	−23.1	20.6	55 31.9	−22.4	21.1	56 27.8	−21.8	21.7	57 23.5	−21.2	22.2	58 18.9	−20.5	22.8	59 14.0	−19.8	23.5	75
76	52 19.1	−25.2	18.2	53 16.0	−24.7	18.6	54 12.8	−24.2	19.0	55 09.5	−23.7	19.5	56 06.0	−23.2	20.0	57 02.3	−22.6	20.5	57 58.4	−22.0	21.1	58 54.2	−21.3	21.7	76
77	51 53.9	−26.3	16.7	52 51.3	−25.9	17.1	53 48.6	−25.5	17.5	54 45.8	−25.0	17.9	55 42.8	−24.5	18.3	56 39.7	−24.0	18.8	57 36.4	−23.4	19.3	58 32.9	−22.8	19.9	77
78	51 27.6	−27.4	15.2	52 25.4	−27.0	15.6	53 23.1	−26.5	15.9	54 20.8	−26.2	16.3	55 18.3	−25.7	16.7	56 15.7	−25.3	17.2	57 13.0	−24.8	17.6	58 10.1	−24.3	18.1	78
79	51 00.2	−28.4	13.8	51 58.4	−28.0	14.1	52 56.6	−27.7	14.4	53 54.6	−27.3	14.8	54 52.6	−26.9	15.1	55 50.4	−26.5	15.5	56 48.2	−26.1	15.9	57 45.8	−25.6	16.4	79
80	50 31.8	−29.3	12.4	51 30.4	−29.1	12.7	52 28.9	−28.8	13.0	53 27.3	−28.4	13.3	54 25.7	−28.1	13.6	55 23.9	−27.7	13.9	56 22.1	−27.3	14.3	57 20.2	−26.9	14.7	80
81	50 02.5	−30.3	11.1	51 01.3	−30.0	11.3	52 00.1	−29.7	11.6	52 58.9	−29.5	11.8	53 57.6	−29.2	12.1	54 56.2	−29.0	12.4	55 54.8	−28.6	12.7	56 53.3	−28.2	13.0	81
82	49 32.2	−31.3	9.7	50 31.3	−31.0	9.9	51 30.4	−30.8	10.1	52 29.4	−30.5	10.4	53 28.4	−30.3	10.6	54 27.3	−30.0	10.9	55 26.2	−29.7	11.1	56 25.1	−29.4	11.4	82
83	49 00.9	−32.0	8.4	50 00.3	−31.9	8.6	50 59.6	−31.7	8.8	51 58.9	−31.5	9.0	52 58.1	−31.2	9.2	53 57.3	−31.0	9.4	54 56.5	−30.8	9.6	55 55.7	−30.6	9.9	83
84	48 28.9	−32.9	7.1	49 28.4	−32.8	7.3	50 27.9	−32.6	7.4	51 27.4	−32.4	7.6	52 26.9	−32.3	7.8	53 26.3	−32.1	7.9	54 25.7	−31.9	8.1	55 25.1	−31.7	8.3	84
85	47 56.0	−33.8	5.9	48 55.6	−33.6	6.0	49 55.3	−33.5	6.1	50 55.0	−33.4	6.3	51 54.6	−33.2	6.4	52 54.2	−33.0	6.5	53 53.8	−32.9	6.7	54 53.4	−32.8	6.9	85
86	47 22.2	−34.4	4.7	48 22.0	−34.3	4.7	49 21.8	−34.3	4.8	50 21.6	−34.2	4.9	51 21.4	−34.1	5.0	52 21.2	−34.0	5.2	53 20.9	−33.9	5.3	54 20.6	−33.7	5.4	86
87	46 47.8	−35.3	3.5	47 47.7	−35.2	3.5	48 47.5	−35.1	3.6	49 47.4	−35.0	3.7	50 47.3	−35.0	3.7	51 47.2	−34.9	3.8	52 47.0	−34.8	3.9	53 46.9	−34.7	4.0	87
88	46 12.5	−35.9	2.3	47 12.5	−35.9	2.3	48 12.4	−35.8	2.4	49 12.4	−35.8	2.4	50 12.3	−35.7	2.5	51 12.3	−35.8	2.5	52 12.2	−35.7	2.6	53 12.2	−35.7	2.6	88
89	45 36.6	−36.6	1.1	46 36.6	−36.6	1.1	47 36.6	−36.6	1.2	48 36.6	−36.6	1.2	49 36.6	−36.6	1.2	50 36.5	−36.5	1.2	51 36.5	−36.5	1.3	52 36.5	−36.5	1.3	89
90	45 00.0	−37.3	0.0	46 00.0	−37.3	0.0	47 00.0	−37.3	0.0	48 00.0	−37.3	0.0	49 00.0	−37.3	0.0	50 00.0	−37.3	0.0	51 00.0	−37.3	0.0	52 00.0	−37.3	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	25 48.4	−47.2	118.9	25 19.2	−47.8	119.3	24 49.6	−48.4	119.7	24 19.7	−49.0	120.1	23 49.4	−49.6	120.5	23 18.7	−50.1	120.9	22 47.7	−50.6	121.3	22 16.5	−51.2	121.6	0
1	25 01.2	−47.4	119.6	24 31.4	−48.0	120.0	24 01.2	−48.6	120.4	23 30.7	−49.2	120.8	22 59.8	−49.7	121.1	22 28.6	−50.2	121.5	21 57.1	−50.8	121.8	21 25.3	−51.3	122.1	1
2	24 13.8	−47.6	120.3	23 43.4	−48.2	120.7	23 12.6	−48.8	121.0	22 41.5	−49.3	121.4	22 10.1	−49.9	121.7	21 38.4	−50.4	122.1	21 06.3	−50.8	122.4	20 34.0	−51.3	122.7	2
3	23 26.2	−47.8	120.9	22 55.2	−48.3	121.3	22 23.8	−48.8	121.7	21 52.2	−49.4	122.0	21 20.2	−49.9	122.3	20 48.0	−50.5	122.7	20 15.5	−51.0	123.0	19 42.7	−51.5	123.3	3
4	22 38.4	−47.9	121.6	22 06.9	−48.5	121.9	21 35.0	−49.1	122.3	21 02.8	−49.6	122.6	20 30.3	−50.1	122.9	19 57.5	−50.6	123.2	19 24.5	−51.1	123.5	18 51.2	−51.6	123.8	4
5	21 50.5	−48.0	122.3	21 18.4	−48.6	122.6	20 45.9	−49.1	122.9	20 13.2	−49.7	123.2	19 40.2	−50.2	123.5	19 06.9	−50.7	123.8	18 33.4	−51.2	124.1	17 59.6	−51.6	124.4	5
6	21 02.5	−48.2	122.9	20 29.8	−48.8	123.2	19 56.8	−49.3	123.5	19 23.5	−49.8	123.8	18 50.0	−50.3	124.1	18 16.2	−50.8	124.4	17 42.2	−51.3	124.6	17 08.0	−51.7	124.9	6
7	20 14.3	−48.4	123.5	19 41.0	−49.0	123.8	19 07.5	−49.4	124.1	18 33.7	−49.9	124.4	17 59.7	−50.4	124.7	17 25.4	−50.9	124.9	16 50.9	−51.3	125.2	16 16.3	−51.9	125.4	7
8	19 25.9	−48.4	124.2	18 52.1	−49.0	124.4	18 18.1	−49.6	124.7	17 43.8	−50.1	125.0	17 09.3	−50.6	125.2	16 34.5	−51.0	125.5	15 59.6	−51.5	125.7	15 24.4	−51.8	126.0	8
9	18 37.5	−48.6	124.8	18 03.1	−49.1	125.1	17 28.5	−49.6	125.3	16 53.7	−50.1	125.6	16 18.7	−50.5	125.8	15 43.5	−51.0	126.0	15 08.1	−51.5	126.3	14 32.6	−52.0	126.5	9
10	17 48.9	−48.7	125.4	17 14.0	−49.2	125.7	16 38.9	−49.7	125.9	16 03.6	−50.2	126.1	15 28.2	−50.7	126.4	14 52.5	−51.2	126.6	14 16.6	−51.6	126.8	13 40.6	−52.0	127.0	10
11	17 00.2	−48.9	126.0	16 24.8	−49.3	126.3	15 49.2	−49.8	126.5	15 13.4	−50.3	126.7	14 37.5	−50.8	126.9	14 01.3	−51.2	127.1	13 25.0	−51.6	127.3	12 48.6	−52.1	127.5	11
12	16 11.3	−48.9	126.6	15 35.5	−49.5	126.8	14 59.4	−49.9	127.1	14 23.1	−50.3	127.3	13 46.7	−50.8	127.5	13 10.1	−51.2	127.7	12 33.4	−51.7	127.8	11 56.5	−52.1	128.0	12
13	15 22.4	−49.0	127.2	14 46.0	−49.5	127.4	14 09.5	−50.0	127.6	13 32.8	−50.5	127.8	12 55.9	−50.9	128.0	12 18.9	−51.4	128.2	11 41.7	−51.8	128.4	11 04.4	−52.2	128.5	13
14	14 33.4	−49.1	127.8	13 56.5	−49.6	128.0	13 19.5	−50.0	128.2	12 42.3	−50.5	128.4	12 05.0	−51.0	128.6	11 27.5	−51.4	128.7	10 49.9	−51.8	128.9	10 12.2	−52.2	129.0	14
15	13 44.3	−49.2	128.4	13 07.0	−49.7	128.6	12 29.5	−50.2	128.8	11 51.8	−50.6	128.9	11 14.0	−51.0	129.1	10 36.1	−51.4	129.3	9 58.1	−51.9	129.4	9 20.0	−52.3	129.5	15
16	12 55.1	−49.2	129.0	12 17.3	−49.7	129.2	11 39.3	−50.2	129.5	11 01.2	−50.6	129.5	10 23.0	−51.1	129.8	9 44.7	−51.5	129.8	9 06.2	−51.9	129.9	8 27.7	−52.3	130.0	16
17	12 05.9	−49.4	129.6	11 27.6	−49.8	129.7	10 49.1	−50.2	129.9	10 10.6	−50.7	130.0	9 31.9	−51.1	130.2	8 53.2	−51.5	130.3	8 14.3	−51.9	130.4	7 35.4	−52.3	130.5	17
18	11 16.5	−49.4	130.2	10 37.8	−49.9	130.3	9 58.9	−50.3	130.5	9 19.9	−50.7	130.6	8 40.8	−51.1	130.7	8 01.7	−51.6	130.8	7 22.4	−52.0	130.9	6 43.1	−52.4	131.0	18
19	10 27.1	−49.5	130.7	9 47.9	−49.9	130.9	9 08.6	−50.4	131.0	8 29.2	−50.8	131.1	7 49.7	−51.2	131.2	7 10.1	−51.6	131.3	6 30.4	−52.0	131.4	5 50.7	−52.4	131.5	19
20	9 37.6	−49.5	131.3	8 58.0	−50.0	131.4	8 18.2	−50.4	131.6	7 38.4	−50.8	131.7	6 58.5	−51.3	131.8	6 18.5	−51.7	131.8	5 38.4	−52.0	131.9	4 58.3	−52.4	132.0	20
21	8 48.1	−49.6	131.9	8 08.0	−50.0	132.0	7 27.8	−50.4	132.1	6 47.6	−50.9	132.2	6 07.2	−51.2	132.3	5 26.8	−51.6	132.4	4 46.4	−52.1	132.4	4 05.9	−52.4	132.5	21
22	7 58.5	−49.6	132.5	7 18.0	−50.1	132.6	6 37.4	−50.5	132.6	5 56.7	−50.9	132.7	5 16.0	−51.3	132.8	4 35.2	−51.7	132.9	3 54.3	−52.0	132.9	3 13.5	−52.5	133.0	22
23	7 08.9	−49.7	133.0	6 27.9	−50.1	133.1	5 46.9	−50.5	133.2	5 05.8	−50.9	133.3	4 24.7	−51.3	133.3	3 43.5	−51.7	133.4	3 02.3	−52.1	133.4	2 21.0	−52.4	133.4	23
24	6 19.2	−49.7	133.6	5 37.8	−50.1	133.7	4 56.4	−50.5	133.7	4 14.9	−50.9	133.8	3 33.4	−51.4	133.8	2 51.8	−51.7	133.9	2 10.2	−52.1	133.9	1 28.6	−52.5	133.9	24
25	5 29.5	−49.7	134.2	4 47.7	−50.1	134.2	4 05.9	−50.6	134.3	3 24.0	−51.0	134.3	2 42.0	−51.3	134.4	2 00.1	−51.8	134.4	1 18.1	−52.1	134.4	0 36.1	−52.5	134.4	25
26	4 39.8	−49.7	134.7	3 57.6	−50.2	134.8	3 15.3	−50.6	134.8	2 33.0	−51.0	134.8	1 50.7	−51.4	134.9	1 08.3	−51.7	134.9	0 26.0	−52.1	134.9	0 16.4	+52.4	45.1	26
27	3 50.1	−49.8	135.3	3 07.4	−50.2	135.3	2 24.7	−50.6	135.4	1 42.0	−50.9	135.4	0 59.3	−51.3	135.4	0 16.6	−51.7	135.4	0 26.1	+52.1	44.6	1 08.8	+52.5	44.6	27
28	3 00.3	−49.8	135.8	2 17.2	−50.2	135.9	1 34.1	−50.5	135.9	0 51.1	−51.0	135.9	0 08.0	−51.4	135.9	0 35.1	+51.8	44.1	1 18.2	+52.1	44.1	2 01.3	+52.4	44.1	28
29	2 10.5	−49.8	136.4	1 27.0	−50.2	136.4	0 43.6	−50.6	136.4	0 00.1	−51.0	136.4	0 43.4	+51.4	43.6	1 26.9	+51.7	43.6	2 10.3	+52.1	43.6	2 53.7	+52.5	43.6	29
30	1 20.7	−49.9	137.0	0 36.8	−50.2	137.0	0 07.0	+50.6	43.0	0 50.9	+51.0	43.0	1 34.8	+51.3	43.1	2 18.6	+51.7	43.1	3 02.4	+52.1	43.1	3 46.2	+52.4	43.2	30
31	0 30.8	−49.8	137.5	0 13.4	+50.2	42.5	0 57.6	+50.6	42.5	1 41.9	+50.9	42.5	2 26.1	+51.3	42.5	3 10.3	+51.7	42.6	3 54.5	+52.0	42.6	4 38.6	+52.4	42.7	31
32	0 19.0	+49.8	41.9	1 03.6	+50.2	41.9	1 48.2	+50.6	42.0	2 32.8	+51.0	42.0	3 17.4	+51.4	42.0	4 02.0	+51.7	42.1	4 46.5	+52.1	42.1	5 31.0	+52.4	42.2	32
33	1 08.8	+49.8	41.4	1 53.8	+50.2	41.4	2 38.8	+50.6	41.4	3 23.8	+50.9	41.5	4 08.8	+51.3	41.5	4 53.7	+51.6	41.6	5 38.6	+52.0	41.6	6 23.4	+52.3	41.7	33
34	1 58.6	+49.8	40.8	2 44.0	+50.2	40.8	3 29.4	+50.5	40.9	4 14.7	+51.0	40.9	5 00.1	+51.3	41.0	5 45.3	+51.7	41.0	6 30.6	+51.9	41.1	7 15.7	+52.4	41.2	34
35	2 48.4	+49.8	40.3	3 34.2	+50.2	40.3	4 19.9	+50.6	40.3	5 05.7	+50.8	40.4	5 51.3	+51.3	40.5	6 37.0	+51.6	40.5	7 22.5	+52.0	40.6	8 08.1	+52.2	40.7	35
36	3 38.2	+49.8	39.7	4 24.4	+50.1	39.7	5 10.5	+50.5	39.8	5 56.5	+50.9	39.9	6 42.6	+51.2	39.9	7 28.6	+51.5	40.0	8 14.5	+51.9	40.1	9 00.3	+52.3	40.2	36
37	4 28.0	+49.7	39.1	5 14.5	+50.1	39.2	6 01.0	+50.4	39.3	6 47.4	+50.8	39.3	7 33.8	+51.2	39.4	8 20.1	+51.5	39.5	9 06.4	+51.8	39.6	9 52.6	+52.2	39.7	37
38	5 17.7	+49.7	38.6	6 04.6	+50.1	38.6	6 51.4	+50.5	38.7	7 38.2	+50.8	38.8	8 25.0	+51.1	38.9	9 11.6	+51.5	39.0	9 58.2	+51.9	39.1	10 44.8	+52.1	39.2	38
39	6 07.4	+49.7	38.0	6 54.7	+50.0	38.1	7 41.9	+50.4	38.2	8 29.0	+50.8	38.3	9 16.1	+51.1	38.4	10 03.1	+51.4	38.5	10 50.1	+51.7	38.6	11 36.9	+52.1	38.7	39
40	6 57.1	+49.6	37.5	7 44.7	+50.0	37.5	8 32.3	+50.3	37.6	9 19.8	+50.6	37.7	10 07.2	+51.0	37.8	10 54.5	+51.4	37.9	11 41.8	+51.7	38.1	12 29.0	+52.1	38.2	40
41	7 46.7	+49.6	36.9	8 34.7	+49.9	37.0	9 22.6	+50.3	37.1	10 10.4	+50.7	37.2	10 58.2	+51.0	37.3	11 45.9	+51.3	37.4	12 33.5	+51.7	37.5	13 21.1	+51.9	37.7	41
42	8 36.3	+49.6	36.3	9 24.6	+49.9	36.4	10 12.9	+50.2	36.5	11 01.1	+50.6	36.6	11 49.2	+50.9	36.7	12 37.2	+51.3	36.9	13 25.2	+51.6	37.0	14 13.0	+52.0	37.2	42
43	9 25.9	+49.4	35.7	10 14.5	+49.9	35.8	11 03.1	+50.2	36.0	11 51.7	+50.5	36.1	12 40.1	+50.9	36.2	13 28.5	+51.2	36.3	14 16.8	+51.5	36.5	15 05.0	+51.8	36.6	43
44	10 15.3	+49.5	35.2	11 04.4	+49.7	35.3	11 53.3	+50.1	35.4	12 42.2	+50.4	35.5	13 31.0	+50.7	35.7	14 19.7	+51.1	35.8	15 08.3	+51.4	36.0	15 56.8	+51.8	36.1	44
45	11 04.8	+49.3	34.6	11 54.1	+49.7	34.7	12 43.4	+50.0	34.8	13 32.6	+50.4	35.0	14 21.7	+50.7	35.1	15 10.8	+51.0	35.3	15 59.7	+51.4	35.4	16 48.6	+51.6	35.6	45
46	11 54.1	+49.3	34.0	12 43.8	+49.6	34.1	13 33.4	+50.0	34.3	14 23.0	+50.3	34.4	15 12.4	+50.7	34.6	16 01.8	+51.0	34.7	16 51.1	+51.2	34.9	17 40.2	+51.6	35.1	46
47	12 43.4	+49.2	33.4	13 33.4	+49.6	33.5	14 23.4	+49.9	33.7	15 13.3	+50.2	33.8	16 03.1	+50.5	34.0	16 52.8	+50.8	34.2	17 42.3	+51.2	34.3	18 31.8	+51.5	34.5	47
48	13 32.6	+49.1	32.8	14 23.0	+49.4	33.0	15 13.3	+49.8	33.1	16 03.5	+50.1	33.3	16 53.6	+50.4	33.4	17 43.6	+50.8	33.6	18 33.5	+51.1	33.8	19 23.3	+51.4	34.0	48
49	14 21.7	+49.1	32.3	15 12.4	+49.4	32.4	16 03.1	+49.7	32.5	16 53.6	+50.0	32.7	17 44.0	+50.4	32.9	18 34.4	+50.6	33.1	19 24.6	+51.0	33.2	20 14.7	+51.3	33.4	49
50	15 10.8	+48.9	31.7	16 01.8	+49.3	31.8	16 52.8	+49.5	32.0	17 43.6	+49.9	32.1	18 34.4	+50.2	32.3	19 25.0	+50.6	32.5	20 15.6	+50.9	32.7	21 06.0	+51.2	32.9	50
51	15 59.7	+48.9	31.1	16 51.1	+49.1	31.2	17 42.3	+49.5	31.4	18 33.5	+49.8	31.5	19 24.6	+50.1	31.7	20 15.6	+50.4	31.9	21 06.5	+50.7	32.1	21 57.2	+51.1	32.3	51
52	16 48.6	+48.7	30.5	17 40.2	+49.1	30.6	18 31.8	+49.4	30.8	19 23.3	+49.7	31.0	20 14.7	+50.1	31.1	21 06.0	+50.4	31.3	21 57.2	+50.7	31.5	22 48.3	+51.0	31.8	52
53	17 37.3	+48.6	29.8	18 29.3	+48.9	30.0	19 21.2	+49.3	30.2	20 13.0	+49.6	30.4	21 04.8	+49.8	30.5	21 56.4	+50.2	30.7	22 47.9	+50.5	31.0	23 39.3	+50.8	31.2	53
54	18 25.9	+48.5	29.2	19 18.2	+48.8	29.4	20 10.5	+49.1	29.6	21 02.6	+49.4	29.8	21 54.6	+49.8	29.9	22 46.6	+50.0	30.2	23 38.4	+50.4	30.4	24 30.1	+50.7	30.6	54
55	19 14.4	+48.4	28.6	20 07.0	+48.7	28.8	20 59.6	+49.0	29.0	21 52.0	+49.3	29.1	22 44.4	+49.6	29.3	23 36.6	+50.0	29.6	24 28.8	+50.2	29.8	25 20.8	+50.5	30.0	55
56	20 02.8	+48.2	28.1	20 55.7	+48.6	28.3	21 48.6	+48.8	28.3	22 41.3	+49.2	28.5	23 34.0	+49.5	28.7	24 26.6	+49.7	28.9	25 19.0	+50.1	29.2	26 11.3	+50.4	29.4	56
57	20 51.0	+48.1	27.3	21 44.3	+48.4	27.5	22 37.4	+48.7	27.7	23 30.5	+49.0	27.9	24 23.5	+49.3	28.1	25 16.3	+49.7	28.3	26 09.1	+49.9	28.6	27 01.7	+50.3	28.8	57
58	21 39.1	+48.0	26.7	22 32.7	+48.2	26.9	23 26.1	+48.6	27.1	24 19.5	+48.9	27.3	25 12.8	+49.2	27.5	26 06.0	+49.4	27.7	26 59.0	+49.8	27.9	27 52.0	+50.1	28.2	58
59	22 27.1	+47.7	26.0	23 20.9	+48.1	26.2	24 14.7	+48.4	26.4	25 08.4	+48.7	26.6	26 02.0	+49.0	26.9	26 55.4	+49.3	27.1	27 48.8	+49.6	27.3	28 42.1	+49.9	27.6	59
60	23 14.8	+47.7	25.4	24 09.0	+47.9	25.6	25 03.1	+48.2	25.8	25 57.1	+48.5	26.0	26 50.9	+48.9	26.2	27 44.7	+49.1	26.4	28 38.4	+49.4	26.7	29 32.0	+49.7	26.9	60
61	24 02.5	+47.4	24.7	24 56.9	+47.8	24.9	25 51.3	+48.0	25.1	26 45.6	+48.3	25.3	27 39.8	+48.6	25.6	28 33.8	+49.0	25.8	29 27.8	+49.2	26.0	30 21.7	+49.5	26.3	61
62	24 49.9	+47.3	24.1	25 44.7	+47.5	24.2	26 39.3	+47.9	24.5	27 33.9	+48.1	24.7	28 28.4	+48.4	24.9	29 22.8	+48.7	25.2	30 17.0	+49.0	25.4	31 11.2	+49.3	25.6	62
63	25 37.2	+47.1	23.4	26 32.2	+47.4	23.6	27 27.2	+47.6	23.8	28 22.0	+48.0	24.0	29 16.8	+48.2	24.2	30 11.5	+48.5	24.4	31 06.0	+48.8	24.7	32 00.5	+49.1	25.0	63
64	26 24.3	+46.8	22.7	27 19.6	+47.1	22.9	28 14.8	+47.5	23.1	29 10.0	+47.7	23.3	30 05.0	+48.0	23.5	31 00.0	+48.3	23.8	31 54.8	+48.6	24.0	32 49.6	+48.9	24.3	64
65	27 11.1	+46.7	22.0	28 06.7	+47.0	22.2	29 02.3	+47.2	22.4	29 57.7	+47.5	22.6	30 53.0	+47.8	22.8	31 48.3	+48.1	23.1	32 43.4	+48.4	23.3	33 38.5	+48.6	23.6	65
66	27 57.8	+46.4	21.3	28 53.7	+46.7	21.5	29 49.5	+47.0	21.7	30 45.2	+47.2	21.9	31 40.8	+47.5	22.1	32 36.3	+47.9	22.4	33 31.8	+48.1	22.6	34 27.1	+48.4	22.9	66
67	28 44.2	+46.2	20.6	29 40.4	+46.5	20.8	30 36.5	+46.7	21.0	31 32.4	+47.1	21.2	32 28.3	+47.3	21.4	33 24.2	+47.5	21.6	34 19.9	+47.8	21.9	35 15.5	+48.1	22.2	67
68	29 30.4	+46.0	19.8	30 26.9	+46.2	20.0	31 23.2	+46.5	20.2	32 19.5	+46.7	20.4	33 15.6	+47.1	20.7	34 11.7	+47.3	20.9	35 07.7	+47.6	21.2	36 03.6	+47.9	21.4	68
69	30 16.4	+45.7	19.1	31 13.1	+46.0	19.3	32 09.7	+46.2	19.5	33 06.2	+46.5	19.7	34 02.7	+46.7	19.9	34 59.0	+47.0	20.2	35 55.3	+47.3	20.4	36 51.5	+47.6	20.7	69
70	31 02.1	+45.5	18.3	31 59.1	+45.6	18.5	32 55.9	+46.0	18.7	33 52.7	+46.2	18.9	34 49.4	+46.5	19.2	35 46.0	+46.8	19.4	36 42.6	+47.0	19.6	37 39.1	+47.2	19.9	70
71	31 47.6	+45.1	17.6	32 44.7	+45.5	17.8	33 41.9	+45.6	18.0	34 38.9	+45.9	18.2	35 35.9	+46.1	18.4	36 32.8	+46.4	18.6	37 29.6	+46.7	18.9	38 26.3	+47.0	19.1	71
72	32 32.7	+44.9	16.8	33 30.2	+45.1	17.0	34 27.5	+45.4	17.2	35 24.8	+45.6	17.4	36 22.0	+45.9	17.6	37 19.2	+46.1	17.8	38 16.3	+46.3	18.1	39 13.3	+46.6	18.3	72
73	33 17.6	+44.6	16.0	34 15.3	+44.8	16.2	35 12.9	+45.0	16.4	36 10.4	+45.3	16.6	37 07.9	+45.5	16.8	38 05.3	+45.7	17.0	39 02.6	+46.0	17.3	39 59.9	+46.2	17.5	73
74	34 02.2	+44.2	15.2	35 00.1	+44.4	15.4	35 57.9	+44.7	15.6	36 55.7	+44.9	15.8	37 53.4	+45.1	16.0	38 51.0	+45.4	16.2	39 48.6	+45.6	16.4	40 46.1	+45.9	16.7	74
75	34 46.4	+43.9	14.4	35 44.5	+44.2	14.6	36 42.6	+44.3	14.7	37 40.6	+44.5	14.9	38 38.5	+44.8	15.1	39 36.4	+45.0	15.4	40 34.2	+45.3	15.6	41 32.0	+45.5	15.8	75
76	35 30.3	+43.6	13.5	36 28.7	+43.7	13.7	37 26.9	+44.0	13.9	38 25.1	+44.2	14.1	39 23.3	+44.4	14.3	40 21.4	+44.7	14.5	41 19.5	+44.9	14.7	42 17.5	+45.1	14.9	76
77	36 13.9	+43.2	12.7	37 12.4	+43.4	12.9	38 10.9	+43.6	13.0	39 09.3	+43.8	13.2	40 07.7	+44.0	13.4	41 06.1	+44.2	13.6	42 04.4	+44.4	13.8	43 02.6	+44.6	14.0	77
78	36 57.1	+42.8	11.8	37 55.8	+43.0	12.0	38 54.5	+43.2	12.2	39 53.1	+43.4	12.3	40 51.7	+43.6	12.5	41 50.3	+43.8	12.7	42 48.8	+44.0	12.9	43 47.2	+44.2	13.1	78
79	37 39.9	+42.4	10.9	38 38.8	+42.6	11.1	39 37.7	+42.7	11.3	40 36.5	+43.0	11.4	41 35.3	+43.1	11.6	42 34.1	+43.3	11.8	43 32.8	+43.5	12.0	44 31.4	+43.8	12.2	79
80	38 22.3	+42.0	10.1	39 21.4	+42.2	10.2	40 20.4	+42.4	10.3	41 19.5	+42.4	10.5	42 18.4	+42.7	10.7	43 17.4	+42.8	10.8	44 16.3	+43.0	11.0	45 15.2	+43.2	11.2	80
81	39 04.3	+41.6	9.1	40 03.6	+41.7	9.3	41 02.8	+41.8	9.4	42 01.9	+42.1	9.6	43 01.1	+42.2	9.7	44 00.2	+42.4	9.9	44 59.3	+42.5	10.0	45 58.4	+42.7	10.2	81
82	39 45.9	+41.1	8.2	40 45.3	+41.2	8.3	41 44.6	+41.4	8.5	42 44.0	+41.5	8.6	43 43.3	+41.6	8.7	44 42.6	+41.8	8.9	45 41.8	+42.0	9.0	46 41.1	+42.1	9.2	82
83	40 27.0	+40.6	7.3	41 26.5	+40.7	7.4	42 26.0	+40.9	7.5	43 25.5	+41.0	7.6	44 24.9	+41.2	7.7	45 24.4	+41.3	7.9	46 23.8	+41.4	8.0	47 23.2	+41.6	8.2	83
84	41 07.6	+40.1	6.4	42 07.2	+40.3	6.4	43 06.9	+40.3	6.5	44 06.5	+40.4	6.6	45 06.1	+40.5	6.7	46 05.7	+40.6	6.8	47 05.2	+40.8	6.9	48 04.8	+40.9	7.1	84
85	41 47.7	+39.6	5.3	42 47.5	+39.7	5.4	43 47.2	+39.8	5.5	44 46.9	+39.9	5.6	45 46.6	+40.0	5.7	46 46.3	+40.1	5.8	47 46.0	+40.2	5.9	48 45.7	+40.3	6.0	85
86	42 27.3	+39.1	4.3	43 27.2	+39.1	4.3	44 27.0	+39.2	4.4	45 26.8	+39.3	4.5	46 26.6	+39.4	4.6	47 26.4	+39.5	4.7	48 26.2	+39.5	4.8	49 26.0	+39.6	4.8	86
87	43 06.4	+38.5	3.2	44 06.3	+38.5	3.3	45 06.2	+38.6	3.3	46 06.1	+38.6	3.4	47 06.0	+38.7	3.5	48 05.9	+38.7	3.5	49 05.7	+38.9	3.6	50 05.6	+38.9	3.7	87
88	43 44.9	+37.8	2.2	44 44.8	+37.9	2.2	45 44.8	+37.9	2.3	46 44.7	+38.0	2.3	47 44.7	+38.0	2.3	48 44.6	+38.1	2.4	49 44.6	+38.1	2.4	50 44.5	+38.2	2.5	88
89	44 22.7	+37.3	1.1	45 22.7	+37.3	1.1	46 22.7	+37.3	1.1	47 22.7	+37.3	1.2	48 22.7	+37.3	1.2	49 22.7	+37.3	1.2	50 22.7	+37.3	1.2	51 22.7	+37.3	1.3	89
90	45 00.0	+36.6	0.0	46 00.0	+36.6	0.0	47 00.0	+36.6	0.0	48 00.0	+36.6	0.0	49 00.0	+36.6	0.0	50 00.0	+36.5	0.0	51 00.0	+36.5	0.0	52 00.0	+36.5	0.0	90

	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION **L.H.A. 128°, 232°**

53°, 307° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	25 11.1	+46.8	118.1	24 42.7	+47.4	118.5	24 13.9	+48.1	118.9	23 44.8	+48.6	119.2	23 15.3	+49.2	119.6	22 45.5	+49.8	120.0	22 15.3	+50.3	120.4	21 44.8	+50.9	120.7	0
1	25 57.9	+46.6	117.4	25 30.1	+47.3	117.8	25 02.0	+47.8	118.2	24 33.4	+48.5	118.6	24 04.5	+49.1	119.0	23 35.3	+49.6	119.4	23 05.6	+50.2	119.8	22 35.7	+50.7	120.1	1
2	26 44.5	+46.4	116.7	26 17.4	+47.0	117.1	25 49.8	+47.7	117.5	25 21.9	+48.3	118.0	24 53.6	+48.9	118.4	24 24.9	+49.5	118.8	23 55.8	+50.1	119.2	23 26.4	+50.6	119.5	2
3	27 30.9	+46.1	115.9	27 04.4	+46.8	116.4	26 37.5	+47.5	116.9	26 10.2	+48.1	117.3	25 42.5	+48.7	117.7	25 14.4	+49.3	118.2	24 45.9	+49.9	118.6	24 17.0	+50.4	119.0	3
4	28 17.0	+45.9	115.2	27 51.2	+46.6	115.7	27 25.0	+47.3	116.2	26 58.3	+47.9	116.6	26 31.2	+48.5	117.1	26 03.7	+49.1	117.5	25 35.8	+49.7	117.9	25 07.4	+50.4	118.4	4
5	29 02.9	+45.7	114.5	28 37.8	+46.4	115.0	28 12.3	+47.0	115.5	27 46.2	+47.7	116.0	27 19.7	+48.4	116.4	26 52.8	+49.0	116.9	26 25.5	+49.6	117.3	25 57.8	+50.1	117.8	5
6	29 48.6	+45.4	113.7	29 24.2	+46.2	114.3	28 59.3	+46.9	114.8	28 33.9	+47.6	115.3	28 08.1	+48.2	115.8	27 41.8	+48.8	116.2	27 15.1	+49.4	116.7	26 47.9	+50.0	117.1	6
7	30 34.0	+45.2	113.0	30 10.4	+45.8	113.5	29 46.2	+46.5	114.0	29 21.5	+47.2	114.6	28 56.3	+47.9	115.1	28 30.6	+48.5	115.6	28 04.5	+49.2	116.1	27 37.9	+49.8	116.5	7
8	31 19.2	+44.9	112.2	30 56.2	+45.7	112.8	30 32.7	+46.4	113.3	30 08.7	+47.1	113.9	29 44.2	+47.8	114.4	29 19.2	+48.4	114.9	28 53.7	+49.0	115.4	28 27.7	+49.7	115.9	8
9	32 04.1	+44.6	111.4	31 41.9	+45.3	112.0	31 19.1	+46.1	112.6	30 55.8	+46.8	113.1	30 32.0	+47.5	113.7	30 07.6	+48.2	114.2	29 42.7	+48.9	114.7	29 17.4	+49.4	115.3	9
10	32 48.7	+44.2	110.6	32 27.2	+45.1	111.2	32 05.2	+45.8	111.8	31 42.6	+46.6	112.4	31 19.5	+47.2	113.0	30 55.8	+47.9	113.5	30 31.6	+48.6	114.1	30 06.8	+49.3	114.6	10
11	33 32.9	+44.0	109.8	33 12.3	+44.7	110.5	32 51.0	+45.6	111.1	32 29.2	+46.2	111.7	32 06.7	+47.0	112.2	31 43.7	+47.8	112.8	31 20.2	+48.4	113.4	30 56.1	+49.1	113.9	11
12	34 16.9	+43.6	109.0	33 57.0	+44.5	109.7	33 36.6	+45.2	110.3	33 15.4	+46.1	110.9	32 53.7	+46.8	111.5	32 31.5	+47.4	112.1	32 08.6	+48.2	112.7	31 45.2	+48.8	113.3	12
13	35 00.5	+43.3	108.2	34 41.5	+44.1	108.8	34 21.8	+44.9	109.5	34 01.5	+45.7	110.1	33 40.5	+46.5	110.8	33 18.9	+47.2	111.4	32 56.8	+47.9	112.0	32 34.0	+48.6	112.6	13
14	35 43.8	+42.9	107.3	35 25.6	+43.8	108.0	35 06.7	+44.6	108.7	34 47.2	+45.4	109.3	34 27.0	+46.1	110.0	34 06.1	+47.0	110.6	33 44.7	+47.7	111.3	33 22.6	+48.4	111.9	14
15	36 26.7	+42.6	106.5	36 09.4	+43.4	107.2	35 51.3	+44.3	107.9	35 32.6	+45.1	108.5	35 13.2	+45.8	109.2	34 53.1	+46.6	109.9	34 32.4	+47.4	110.5	34 11.0	+48.1	111.2	15
16	37 09.3	+42.1	105.6	36 52.8	+43.0	106.3	36 35.6	+43.9	107.0	36 17.7	+44.7	107.7	35 59.0	+45.6	108.4	35 39.7	+46.4	109.1	35 19.8	+47.1	109.8	34 59.1	+47.9	110.4	16
17	37 51.4	+41.7	104.7	37 35.8	+42.7	105.4	37 19.5	+43.5	106.2	37 02.4	+44.4	106.9	36 44.6	+45.2	107.6	36 26.1	+46.0	108.3	36 06.9	+46.8	109.0	35 47.0	+47.6	109.7	17
18	38 33.1	+41.3	103.8	38 18.5	+42.2	104.5	38 03.0	+43.1	105.3	37 46.8	+44.0	106.1	37 29.8	+44.9	106.8	37 12.1	+45.7	107.5	36 53.7	+46.5	108.2	36 34.6	+47.3	108.9	18
19	39 14.4	+40.9	102.8	39 00.7	+41.8	103.6	38 46.1	+42.8	104.4	38 30.8	+43.6	105.2	38 14.7	+44.6	105.9	37 57.8	+45.4	106.7	37 40.2	+46.2	107.4	37 21.9	+46.9	108.2	19
20	39 55.3	+40.3	101.9	39 42.5	+41.3	102.7	39 28.9	+42.3	103.5	39 14.4	+43.3	104.3	38 59.2	+44.1	105.1	38 43.2	+45.0	105.9	38 26.4	+45.8	106.6	38 08.8	+46.7	107.4	20
21	40 35.6	+39.9	100.9	40 23.8	+40.9	101.8	40 11.2	+41.8	102.6	39 57.7	+42.8	103.4	39 43.3	+43.8	104.2	39 28.2	+44.6	105.0	39 12.2	+45.5	105.8	38 55.5	+46.3	106.6	21
22	41 15.5	+39.3	99.9	41 04.7	+40.3	100.8	40 53.0	+41.4	101.6	40 40.5	+42.3	102.5	40 27.1	+43.2	103.3	40 12.8	+44.2	104.1	39 57.7	+45.1	105.0	39 41.8	+46.0	105.8	22
23	41 54.8	+38.8	98.9	41 45.0	+39.9	99.8	41 34.4	+40.9	100.7	41 22.8	+41.9	101.5	41 10.3	+42.9	102.4	40 57.0	+43.8	103.3	40 42.8	+44.7	104.1	40 27.8	+45.6	104.9	23
24	42 33.6	+38.2	97.9	42 24.9	+39.3	98.8	42 15.3	+40.3	99.7	42 04.7	+41.4	100.6	41 53.2	+42.4	101.5	41 40.8	+43.4	102.3	41 27.5	+44.3	103.2	41 13.4	+45.2	104.1	24
25	43 11.8	+37.7	96.8	43 04.2	+38.8	97.8	42 55.6	+39.8	98.7	42 46.1	+40.9	99.6	42 35.6	+41.9	100.5	42 24.2	+42.9	101.4	42 11.8	+43.9	102.3	41 58.6	+44.8	103.2	25
26	43 49.5	+37.0	95.8	43 43.0	+38.1	96.7	43 35.4	+39.3	97.7	43 27.0	+40.3	98.6	43 17.5	+41.4	99.5	43 07.1	+42.4	100.5	42 55.7	+43.4	101.4	42 43.4	+44.4	102.3	26
27	44 26.5	+36.4	94.7	44 21.1	+37.6	95.6	44 14.7	+38.7	96.6	44 07.3	+39.8	97.6	43 58.9	+40.8	98.5	43 49.5	+41.9	99.5	43 39.1	+42.9	100.4	43 27.8	+43.9	101.4	27
28	45 02.9	+35.7	93.6	44 58.7	+36.9	94.5	44 53.4	+38.0	95.5	44 47.1	+39.2	96.5	44 39.7	+40.3	97.5	44 31.4	+41.3	98.5	44 22.0	+42.4	99.5	44 11.7	+43.4	100.4	28
29	45 38.6	+35.0	92.4	45 35.6	+36.2	93.4	45 31.4	+37.4	94.4	45 26.3	+38.5	95.5	45 20.0	+39.7	96.5	45 12.7	+40.8	97.5	45 04.4	+41.9	98.5	44 55.1	+42.9	99.5	29
30	46 13.6	+34.3	91.2	46 11.8	+35.5	92.3	46 08.8	+36.8	93.3	46 04.8	+38.0	94.4	45 59.7	+39.1	95.4	45 53.5	+40.3	96.4	45 46.3	+41.3	97.4	45 38.0	+42.4	98.5	30
31	46 47.9	+33.5	90.0	46 47.3	+34.8	91.1	46 45.6	+36.0	92.2	46 42.8	+37.2	93.2	46 38.8	+38.5	94.3	46 33.8	+39.6	95.4	46 27.6	+40.8	96.4	46 20.4	+41.8	97.4	31
32	47 21.4	+32.8	88.8	47 22.1	+34.0	89.9	47 21.6	+35.3	91.0	47 20.0	+36.5	92.1	47 17.3	+37.7	93.2	47 13.4	+38.9	94.3	47 08.4	+40.1	95.3	47 02.2	+41.3	96.4	32
33	47 54.2	+31.9	87.6	47 56.1	+33.3	88.7	47 56.9	+34.6	89.8	47 56.5	+35.9	90.9	47 55.0	+37.1	92.0	47 52.3	+38.3	93.1	47 48.5	+39.4	94.2	47 43.5	+40.6	95.3	33
34	48 26.1	+31.1	86.3	48 29.4	+32.4	87.4	48 31.5	+33.7	88.6	48 32.4	+35.0	89.7	48 32.1	+36.3	90.8	48 30.6	+37.6	92.0	48 27.9	+38.8	93.1	48 24.1	+40.0	94.2	34
35	48 57.2	+30.1	85.0	49 01.8	+31.5	86.2	49 05.2	+32.9	87.3	49 07.4	+34.2	88.5	49 08.4	+35.5	89.6	49 08.2	+36.8	90.8	49 06.7	+38.1	91.9	49 04.1	+39.3	93.1	35
36	49 27.3	+29.3	83.7	49 33.3	+30.7	84.9	49 38.1	+32.0	86.0	49 41.6	+33.4	87.2	49 43.9	+34.7	88.4	49 45.0	+36.0	89.6	49 44.8	+37.3	90.8	49 43.4	+38.6	91.9	36
37	49 56.6	+28.3	82.3	50 04.0	+29.7	83.5	50 10.1	+31.1	84.7	50 15.0	+32.5	85.9	50 18.6	+33.9	87.1	50 21.0	+35.2	88.3	50 22.1	+36.6	89.5	50 22.7	+37.9	90.7	37
38	50 24.9	+27.3	81.0	50 33.7	+28.7	82.2	50 41.2	+30.2	83.4	50 47.5	+31.6	84.6	50 52.5	+33.0	85.8	50 56.2	+34.4	87.0	50 58.7	+35.7	88.3	50 59.8	+37.1	89.5	38
39	50 52.2	+26.2	79.6	51 02.4	+27.7	80.8	51 11.4	+29.2	82.0	51 19.1	+30.6	83.2	51 25.5	+32.1	84.5	51 30.6	+33.5	85.7	51 34.4	+34.9	87.0	51 36.9	+36.2	88.3	39
40	51 18.4	+25.2	78.1	51 30.1	+26.7	79.4	51 40.6	+28.1	80.6	51 49.7	+29.6	81.9	51 57.6	+31.0	83.2	52 04.1	+32.5	84.4	52 09.3	+33.9	85.7	52 13.1	+35.4	87.0	40
41	51 43.6	+24.1	76.7	51 56.8	+25.6	77.9	52 08.7	+27.1	79.2	52 19.3	+28.6	80.4	52 28.6	+30.1	81.7	52 36.6	+31.6	83.0	52 43.2	+33.0	84.3	52 48.5	+34.4	85.6	41
42	52 07.7	+23.0	75.2	52 22.4	+24.5	76.4	52 35.8	+26.0	77.7	52 47.9	+27.6	79.0	52 58.7	+29.1	80.3	53 08.2	+30.5	81.6	53 16.2	+32.0	82.9	53 22.9	+33.5	84.3	42
43	52 30.7	+21.7	73.7	52 46.9	+23.3	74.9	53 01.8	+24.9	76.2	53 15.5	+26.4	77.5	53 27.8	+27.9	78.8	53 38.7	+29.4	80.2	53 48.2	+31.0	81.5	53 56.4	+32.5	82.9	43
44	52 52.4	+20.6	72.1	53 10.2	+22.1	73.4	53 26.7	+23.7	74.7	53 41.9	+25.2	76.0	53 55.7	+26.8	77.3	54 08.1	+28.4	78.7	54 19.2	+29.9	80.1	54 28.9	+31.4	81.4	44
45	53 13.0	+19.3	70.6	53 32.3	+20.9	71.9	53 50.4	+22.4	73.2	54 07.1	+24.0	74.5	54 22.5	+25.6	75.8	54 36.5	+27.2	77.2	54 49.1	+28.8	78.6	55 00.3	+30.3	80.0	45
46	53 32.3	+18.1	69.0	53 53.2	+19.6	70.3	54 12.8	+21.2	71.6	54 31.1	+22.8	72.9	54 48.1	+24.4	74.3	55 03.7	+26.0	75.6	55 17.9	+27.6	77.0	55 30.6	+29.2	78.4	46
47	53 50.4	+16.7	67.4	54 12.8	+18.3	68.7	54 34.0	+19.9	70.0	54 53.9	+21.5	71.3	55 12.5	+23.1	72.7	55 29.7	+24.7	74.0	55 45.5	+26.3	75.5	55 59.8	+28.0	76.9	47
48	54 07.1	+15.4	65.7	54 31.1	+17.0	67.0	54 53.9	+18.6	68.3	55 15.4	+20.2	69.7	55 35.6	+21.8	71.0	55 54.4	+23.5	72.4	56 11.8	+25.1	73.9	56 27.8	+26.7	75.3	48
49	54 22.5	+14.0	64.1	54 48.1	+15.6	65.4	55 12.5	+17.2	66.7	55 35.6	+18.8	68.0	55 57.4	+20.5	69.4	56 17.9	+22.0	70.8	56 36.9	+23.8	72.2	56 54.5	+25.4	73.7	49
50	54 36.5	+12.6	62.4	55 03.7	+14.2	63.7	55 29.7	+15.8	65.0	55 54.4	+17.4	66.3	56 17.9	+19.0	67.7	56 39.9	+20.8	69.1	57 00.7	+22.3	70.5	57 19.9	+24.1	72.0	50
51	54 49.1	+11.2	60.7	55 17.9	+12.7	62.0	55 45.5	+14.3	63.3	56 11.8	+16.0	64.6	56 36.9	+17.6	66.0	57 00.7	+19.2	67.4	57 23.0	+21.0	68.8	57 44.0	+22.7	70.3	51
52	55 00.3	+9.7	59.0	55 30.6	+11.3	60.3	55 59.8	+12.9	61.5	56 27.8	+14.5	62.9	56 54.5	+16.1	64.2	57 19.9	+17.8	65.6	57 44.0	+19.5	67.1	58 06.7	+21.2	68.6	52
53	55 10.0	+8.3	57.3	55 41.9	+9.8	58.5	56 12.7	+11.3	59.8	56 42.3	+12.9	61.1	57 10.6	+14.6	62.5	57 37.7	+16.3	63.9	58 03.5	+18.0	65.3	58 27.9	+19.7	66.8	53
54	55 18.3	+6.8	55.6	55 51.7	+8.3	56.8	56 24.0	+9.9	58.0	56 55.2	+11.5	59.3	57 25.2	+13.1	60.7	57 54.0	+14.7	62.1	58 21.5	+16.4	63.5	58 47.6	+18.1	65.0	54
55	55 25.1	+5.2	53.8	56 00.0	+6.7	55.0	56 33.9	+8.3	56.2	57 06.7	+9.8	57.5	57 38.3	+11.5	58.8	58 08.7	+13.1	60.2	58 37.9	+14.8	61.6	59 05.7	+16.5	63.1	55
56	55 30.3	+3.8	52.1	56 06.7	+5.3	53.2	56 42.2	+6.7	54.4	57 16.5	+8.3	55.7	57 49.8	+9.8	57.0	58 21.8	+11.5	58.4	58 52.7	+13.2	59.8	59 22.2	+14.9	61.2	56
57	55 34.1	+2.2	50.3	56 12.0	+3.6	51.4	56 48.9	+5.1	52.6	57 24.8	+6.6	53.9	57 59.6	+8.3	55.2	58 33.3	+9.9	56.5	59 05.9	+11.5	57.9	59 37.1	+13.2	59.3	57
58	55 36.3	+0.7	48.5	56 15.6	+2.1	49.6	56 54.0	+3.6	50.8	57 31.4	+5.1	52.0	58 07.9	+6.5	53.3	58 43.2	+8.1	54.6	59 17.4	+9.7	56.0	59 50.3	+11.5	57.4	58
59	55 37.0	-0.8	46.8	56 17.7	+0.5	47.8	56 57.6	+1.9	49.0	57 36.5	+3.4	50.2	58 14.4	+4.9	51.4	58 51.3	+6.5	52.7	59 27.1	+8.1	54.0	60 01.8	+9.7	55.4	59
60	55 36.2	-2.4	45.0	56 18.2	-1.0	46.0	56 59.5	+0.3	47.1	57 39.9	+1.7	48.3	58 19.3	+3.2	49.5	58 57.8	+4.7	50.8	59 35.2	+6.3	52.1	60 11.5	+7.9	53.4	60
61	55 33.8	-3.8	43.2	56 17.2	-2.6	44.2	56 59.8	-1.3	45.3	57 41.6	+0.1	46.4	58 22.5	+1.5	47.6	59 02.5	+3.0	48.8	59 41.5	+4.5	50.1	60 19.4	+6.2	51.4	61
62	55 30.0	-5.4	41.4	56 14.6	-4.2	42.4	56 58.5	-2.9	43.5	57 41.7	-1.6	44.6	58 24.0	-0.2	45.7	59 05.5	+1.2	46.9	59 46.0	+2.7	48.1	60 25.6	+4.2	49.4	62
63	55 24.6	-6.9	39.7	56 10.4	-5.7	40.6	56 55.6	-4.5	41.6	57 40.1	-3.2	42.7	58 23.8	-1.9	43.8	59 06.7	-0.5	44.9	59 48.7	+1.0	46.1	60 29.8	+2.5	47.4	63
64	55 17.7	-8.4	37.9	56 04.7	-7.3	38.9	56 51.1	-6.1	39.8	57 36.9	-4.9	40.8	58 21.9	-3.6	41.9	59 06.2	-2.3	43.0	59 49.7	-0.9	44.2	60 32.3	+0.6	45.4	64
65	55 09.3	-9.9	36.2	55 57.4	-8.7	37.1	56 45.0	-7.6	38.0	57 32.0	-6.5	39.0	58 18.3	-5.3	40.0	59 03.9	-4.0	41.0	59 48.8	-2.7	42.2	60 33.3	-1.3	43.3	65
66	54 59.4	-11.3	34.5	55 48.7	-10.3	35.3	56 37.4	-9.3	36.2	57 25.5	-8.1	37.1	58 13.0	-6.9	38.1	58 59.9	-5.7	39.1	59 46.1	-4.4	40.2	60 31.6	-3.1	41.3	66
67	54 48.1	-12.7	32.8	55 38.4	-11.8	33.6	56 28.1	-10.7	34.4	57 17.4	-9.7	35.3	58 06.1	-8.6	36.2	58 54.2	-7.4	37.2	59 41.7	-6.2	38.2	60 28.5	-5.0	39.3	67
68	54 35.4	-14.1	31.1	55 26.6	-13.2	31.8	56 17.4	-12.3	32.6	57 07.7	-11.3	33.4	57 57.5	-10.3	34.3	58 46.8	-9.2	35.3	59 35.5	-8.0	36.2	60 23.5	-6.7	37.3	68
69	54 21.3	-15.5	29.4	55 13.4	-14.7	30.1	56 05.1	-13.8	30.9	56 56.4	-12.8	31.6	57 47.2	-11.8	32.5	58 37.6	-10.8	33.3	59 27.5	-9.8	34.3	60 16.8	-8.6	35.3	69
70	54 05.8	-16.8	27.8	54 58.7	-16.0	28.4	55 51.3	-15.2	29.1	56 43.6	-14.4	29.9	57 35.4	-13.4	30.6	58 26.8	-12.5	31.5	59 17.7	-11.4	32.3	60 08.2	-10.4	33.3	70
71	53 49.0	-18.2	26.1	54 42.7	-17.4	26.7	55 36.1	-16.6	27.4	56 29.2	-15.8	28.1	57 22.0	-15.0	28.8	58 14.3	-14.0	29.6	59 06.3	-13.1	30.4	59 57.8	-12.1	31.3	71
72	53 30.8	-19.4	24.5	54 25.3	-18.7	25.1	55 19.5	-18.0	25.7	56 13.4	-17.3	26.4	57 07.0	-16.5	27.0	58 00.3	-15.7	27.8	58 53.2	-14.8	28.5	59 45.7	-13.8	29.4	72
73	53 11.4	-20.7	22.9	54 06.6	-20.1	23.5	55 01.5	-19.4	24.0	55 56.1	-18.6	24.6	56 50.5	-17.9	25.3	57 44.6	-17.1	25.9	58 38.4	-16.3	26.7	59 31.9	-15.5	27.4	73
74	52 50.7	-21.8	21.4	53 46.5	-21.3	21.9	54 42.1	-20.7	22.4	55 37.5	-20.1	22.9	56 32.6	-19.4	23.5	57 27.5	-18.7	24.2	58 22.1	-17.9	24.8	59 16.4	-17.1	25.5	74
75	52 28.9	-23.1	19.8	53 25.2	-22.5	20.3	54 21.4	-21.9	20.8	55 17.4	-21.4	21.3	56 13.2	-20.7	21.8	57 08.8	-20.1	22.4	58 04.2	-19.5	23.0	58 59.3	-18.8	23.7	75
76	52 05.8	-24.2	18.3	53 02.7	-23.7	18.7	53 59.5	-23.2	19.2	54 56.0	-22.6	19.7	55 52.5	-22.2	20.1	56 48.7	-21.5	20.7	57 44.7	-20.9	21.2	58 40.5	-20.2	21.8	76
77	51 41.6	-25.2	16.8	52 39.0	-24.8	17.2	53 36.3	-24.4	17.6	54 33.4	-23.9	18.0	55 30.3	-23.4	18.5	56 27.2	-22.9	19.0	57 23.8	-22.3	19.5	58 20.3	-21.7	20.0	77
78	51 16.4	-26.4	15.4	52 14.2	-26.0	15.7	53 11.9	-25.6	16.1	54 09.5	-25.2	16.5	55 06.9	-24.6	16.8	56 04.3	-24.2	17.3	57 01.5	-23.7	17.8	57 58.6	-23.2	18.2	78
79	50 50.0	-27.4	14.0	51 48.2	-27.0	14.3	52 46.3	-26.7	14.6	53 44.3	-26.3	14.9	54 42.3	-25.9	15.3	55 40.1	-25.5	15.7	56 37.8	-25.0	16.1	57 35.4	-24.6	16.5	79
80	50 22.6	-28.3	12.6	51 21.2	-28.1	12.8	52 19.6	-27.7	13.1	53 18.0	-27.4	13.4	54 16.4	-27.1	13.7	55 14.6	-26.7	14.1	56 12.8	-26.4	14.4	57 10.8	-25.9	14.8	80
81	49 54.3	-29.4	11.2	50 53.1	-29.1	11.4	51 51.9	-28.8	11.7	52 50.6	-28.5	11.9	53 49.3	-28.2	12.2	54 47.9	-27.9	12.5	55 46.4	-27.5	12.8	56 44.9	-27.2	13.2	81
82	49 24.9	-30.2	9.8	50 24.0	-30.0	10.0	51 23.1	-29.8	10.3	52 22.1	-29.5	10.5	53 21.1	-29.2	10.7	54 20.0	-29.0	11.0	55 18.9	-28.7	11.3	56 17.7	-28.4	11.6	82
83	48 54.7	-31.1	8.5	49 54.0	-30.9	8.7	50 53.3	-30.7	8.9	51 52.6	-30.5	9.1	52 51.8	-30.3	9.3	53 51.0	-30.1	9.5	54 50.2	-29.9	9.7	55 49.3	-29.6	10.0	83
84	48 23.6	-32.0	7.2	49 23.1	-31.8	7.4	50 22.6	-31.7	7.5	51 22.1	-31.5	7.7	52 21.5	-31.3	7.9	53 20.9	-31.1	8.0	54 20.3	-30.9	8.2	55 19.7	-30.7	8.4	84
85	47 51.6	-32.8	6.0	48 51.3	-32.7	6.1	49 50.9	-32.5	6.2	50 50.6	-32.5	6.3	51 50.2	-32.3	6.5	52 49.8	-32.1	6.6	53 49.4	-32.0	6.8	54 49.0	-31.9	6.9	85
86	47 18.8	-33.6	4.7	48 18.6	-33.5	4.8	49 18.4	-33.4	4.9	50 18.1	-33.3	5.0	51 17.9	-33.2	5.1	52 17.7	-33.1	5.2	53 17.4	-33.0	5.3	54 17.1	-32.8	5.5	86
87	46 45.2	-34.4	3.5	47 45.1	-34.3	3.6	48 45.0	-34.3	3.6	49 44.8	-34.1	3.7	50 44.7	-34.1	3.7	51 44.6	-34.0	3.9	52 44.3	-33.9	4.0	53 44.3	-33.8	4.1	87
88	46 10.8	-35.0	2.3	47 10.8	-35.0	2.4	48 10.7	-35.0	2.4	49 10.7	-35.0	2.4	50 10.6	-34.9	2.5	51 10.6	-34.9	2.5	52 10.5	-34.8	2.6	53 10.5	-34.8	2.7	88
89	45 35.8	-35.8	1.1	46 35.8	-35.8	1.2	47 35.7	-35.7	1.2	48 35.7	-35.7	1.2	49 35.7	-35.7	1.2	50 35.7	-35.7	1.3	51 35.7	-35.7	1.3	52 35.7	-35.7	1.3	89
90	45 00.0	-36.4	0.0	46 00.0	-36.4	0.0	47 00.0	-36.5	0.0	48 00.0	-36.5	0.0	49 00.0	-36.5	0.0	50 00.0	-36.5	0.0	51 00.0	-36.5	0.0	52 00.0	-36.5	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

53°, 307° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	25 11.1	−47.0	118.1	24 42.7	−47.6	118.5	24 13.9	−48.2	118.9	23 44.8	−48.8	119.2	23 15.3	−49.4	119.6	22 45.5	−49.9	120.0	22 15.3	−50.4	120.4	21 44.8	−50.9	120.7	0
1	24 24.1	−47.1	118.7	23 55.1	−47.8	119.1	23 25.7	−48.3	119.5	22 56.0	−48.9	119.9	22 25.9	−49.4	120.2	21 55.6	−50.1	120.6	21 24.9	−50.6	120.9	20 53.9	−51.1	121.3	1
2	23 37.0	−47.4	119.4	23 07.3	−47.9	119.8	22 37.4	−48.5	120.2	22 07.1	−49.1	120.5	21 36.5	−49.7	120.9	21 05.5	−50.1	121.2	20 34.3	−50.7	121.5	20 02.8	−51.2	121.8	2
3	22 49.6	−47.5	120.1	22 19.4	−48.1	120.4	21 48.9	−48.7	120.8	21 18.0	−49.2	121.1	20 46.8	−49.7	121.5	20 15.4	−50.3	121.8	19 43.6	−50.7	122.1	19 11.6	−51.2	122.4	3
4	22 02.1	−47.6	120.7	21 31.3	−48.2	121.1	21 00.2	−48.8	121.4	20 28.8	−49.4	121.7	19 57.1	−49.9	122.1	19 25.1	−50.4	122.4	18 52.9	−50.9	122.6	18 20.4	−51.4	122.9	4
5	21 14.5	−47.8	121.4	20 43.1	−48.4	121.7	20 11.4	−48.9	122.0	19 39.4	−49.4	122.3	19 07.2	−50.0	122.6	18 34.7	−50.5	122.9	18 02.0	−51.0	123.2	17 29.0	−51.5	123.5	5
6	20 26.7	−48.0	122.0	19 54.7	−48.5	122.4	19 22.5	−49.1	122.7	18 50.0	−49.6	122.9	18 17.2	−50.1	123.2	17 44.2	−50.6	123.5	17 11.0	−51.1	123.8	16 37.5	−51.5	124.0	6
7	19 38.7	−48.0	122.7	19 06.2	−48.6	123.0	18 33.4	−49.1	123.3	18 00.4	−49.7	123.5	17 27.1	−50.2	123.8	16 53.6	−50.7	124.1	16 19.9	−51.1	124.3	15 46.0	−51.6	124.5	7
8	18 50.7	−48.3	123.3	18 17.6	−48.8	123.6	17 44.3	−49.3	123.9	17 10.7	−49.8	124.1	16 36.9	−50.3	124.4	16 02.9	−50.7	124.6	15 28.8	−51.3	124.9	14 54.4	−51.7	125.1	8
9	18 02.4	−48.3	123.9	17 28.8	−48.8	124.2	16 55.0	−49.4	124.5	16 20.9	−49.9	124.7	15 46.7	−50.4	124.9	15 12.2	−50.9	125.2	14 37.5	−51.3	125.4	14 02.7	−51.8	125.6	9
10	17 14.1	−48.4	124.6	16 40.0	−49.0	124.8	16 05.6	−49.5	125.1	15 31.0	−49.9	125.3	14 56.3	−50.5	125.5	14 21.3	−50.9	125.7	13 46.2	−51.4	125.9	13 10.9	−51.8	126.1	10
11	16 25.7	−48.6	125.2	15 51.0	−49.1	125.4	15 16.1	−49.5	125.6	14 41.1	−50.1	125.9	14 05.8	−50.5	126.1	13 30.4	−51.0	126.3	12 54.8	−51.4	126.5	12 19.1	−51.9	126.6	11
12	15 37.1	−48.6	125.8	15 01.9	−49.1	126.0	14 26.6	−49.7	126.2	13 51.0	−50.1	126.4	13 15.3	−50.6	126.6	12 39.4	−51.0	126.8	12 03.4	−51.5	127.0	11 27.2	−51.9	127.1	12
13	14 48.5	−48.8	126.4	14 12.8	−49.3	126.6	13 36.9	−49.7	126.8	13 00.9	−50.2	127.0	12 24.7	−50.7	127.2	11 48.4	−51.1	127.3	11 11.9	−51.5	127.5	10 35.3	−52.0	127.7	13
14	13 59.7	−48.8	127.0	13 23.5	−49.3	127.2	12 47.2	−49.8	127.4	12 10.7	−50.3	127.6	11 34.0	−50.7	127.7	10 57.3	−51.2	127.9	10 20.4	−51.6	128.0	9 43.3	−52.0	128.2	14
15	13 10.9	−48.9	127.6	12 34.2	−49.4	127.8	11 57.4	−49.9	128.0	11 20.4	−50.3	128.1	10 43.3	−50.8	128.3	10 06.1	−51.2	128.4	9 28.8	−51.7	128.5	8 51.3	−52.1	128.7	15
16	12 22.0	−49.0	128.2	11 44.8	−49.5	128.4	11 07.5	−49.9	128.5	10 30.1	−50.4	128.7	9 52.5	−50.8	128.8	9 14.9	−51.3	128.9	8 37.1	−51.7	129.1	7 59.2	−52.1	129.2	16
17	11 33.0	−49.1	128.8	10 55.3	−49.5	128.9	10 17.6	−50.0	129.1	9 39.7	−50.5	129.2	9 01.7	−50.9	129.3	8 23.6	−51.3	129.5	7 45.4	−51.7	129.6	7 07.1	−52.1	129.7	17
18	10 43.9	−49.1	129.4	10 05.8	−49.6	129.5	9 27.6	−50.1	129.6	8 49.2	−50.5	129.8	8 10.8	−50.9	129.9	7 32.3	−51.4	130.0	6 53.7	−51.8	130.1	6 15.0	−52.1	130.2	18
19	9 54.8	−49.2	130.0	9 16.2	−49.7	130.1	8 37.5	−50.1	130.2	7 58.7	−50.5	130.3	7 19.9	−51.0	130.4	6 40.9	−51.3	130.5	6 01.9	−51.8	130.6	5 22.9	−52.2	130.7	19
20	9 05.6	−49.3	130.5	8 26.5	−49.7	130.7	7 47.4	−50.1	130.8	7 08.2	−50.6	130.9	6 28.9	−51.0	130.9	5 49.6	−51.4	131.0	5 10.1	−51.8	131.1	4 30.7	−52.2	131.2	20
21	8 16.3	−49.3	131.1	7 36.8	−49.7	131.2	6 57.3	−50.2	131.3	6 17.6	−50.6	131.4	5 37.9	−51.0	131.5	4 58.2	−51.5	131.5	4 18.3	−51.8	131.6	3 38.5	−52.3	131.7	21
22	7 27.0	−49.3	131.7	6 47.1	−49.8	131.8	6 07.1	−50.2	131.9	5 27.0	−50.6	131.9	4 46.9	−51.1	132.0	4 06.7	−51.4	132.1	3 26.5	−51.8	132.1	2 46.2	−52.2	132.2	22
23	6 37.7	−49.4	132.3	5 57.3	−49.8	132.3	5 16.9	−50.3	132.4	4 36.4	−50.7	132.5	3 55.8	−51.0	132.5	3 15.3	−51.5	132.6	2 34.7	−51.9	132.6	1 54.0	−52.3	132.6	23
24	5 48.3	−49.4	132.8	5 07.5	−49.8	132.9	4 26.6	−50.2	133.0	3 45.7	−50.7	133.0	3 04.8	−51.1	133.1	2 23.8	−51.5	133.1	1 42.8	−51.9	133.1	1 01.8	−52.3	133.1	24
25	4 58.9	−49.4	133.4	4 17.7	−49.9	133.5	3 36.4	−50.3	133.5	2 55.0	−50.6	133.5	2 13.7	−51.1	133.6	1 32.3	−51.5	133.6	0 50.9	−51.8	133.6	0 09.5	−52.2	133.6	25
26	4 09.5	−49.5	134.0	3 27.8	−49.9	134.0	2 46.1	−50.3	134.1	2 04.4	−50.8	134.1	1 22.6	−51.1	134.1	0 40.8	−51.5	134.1	0 00.9	+51.9	45.9	0 42.7	+52.3	45.9	26
27	3 20.0	−49.5	134.5	2 37.9	−49.9	134.6	1 55.8	−50.3	134.6	1 13.6	−50.7	134.6	0 31.5	−51.1	134.6	0 10.7	+51.4	45.4	0 52.8	+51.9	45.4	1 35.0	+52.2	45.4	27
28	2 30.5	−49.5	135.1	1 48.0	−49.9	135.1	1 05.5	−50.3	135.1	0 22.9	−50.7	135.2	0 19.6	+51.1	44.8	1 02.1	+51.5	44.9	1 44.7	+51.8	44.9	2 27.2	+52.2	44.9	28
29	1 41.0	−49.5	135.7	0 58.1	−49.9	135.7	0 15.2	−50.4	135.7	0 27.8	+50.7	44.3	1 10.7	+51.1	44.3	1 53.6	+51.5	44.3	2 36.5	+51.9	44.4	3 19.4	+52.2	44.4	29
30	0 51.5	−49.5	136.2	0 08.2	−49.9	136.2	0 35.2	+50.3	43.8	1 18.5	+50.7	43.8	2 01.8	+51.1	43.8	2 45.1	+51.5	43.8	3 28.4	+51.8	43.9	4 11.6	+52.2	43.9	30
31	0 02.0	−49.5	136.8	0 41.7	+50.0	43.2	1 25.5	+50.3	43.2	2 09.2	+50.7	43.2	2 52.9	+51.1	43.3	3 36.6	+51.4	43.3	4 20.2	+51.8	43.4	5 03.8	+52.2	43.4	31
32	0 47.5	+49.5	42.6	1 31.7	+49.9	42.7	2 15.8	+50.3	42.7	2 59.9	+50.7	42.7	3 44.0	+51.0	42.7	4 28.0	+51.4	42.8	5 12.0	+51.8	42.8	5 56.0	+52.1	42.9	32
33	1 37.0	+49.5	42.1	2 21.6	+49.9	42.1	3 06.1	+50.3	42.1	3 50.6	+50.6	42.2	4 35.0	+51.1	42.2	5 19.4	+51.4	42.3	6 03.8	+51.8	42.3	6 48.1	+52.1	42.4	33
34	2 26.5	+49.5	41.5	3 11.5	+49.8	41.5	3 56.4	+50.2	41.6	4 41.2	+50.7	41.6	5 26.1	+51.0	41.7	6 10.8	+51.4	41.7	6 55.6	+51.7	41.8	7 40.2	+52.1	41.9	34
35	3 16.0	+49.5	40.9	4 01.3	+49.9	41.0	4 46.6	+50.2	41.1	5 31.9	+50.6	41.1	6 17.1	+50.9	41.2	7 02.2	+51.3	41.2	7 47.3	+51.7	41.3	8 32.3	+52.1	41.4	35
36	4 05.5	+49.4	40.4	4 51.2	+49.8	40.4	5 36.8	+50.2	40.5	6 22.5	+50.5	40.6	7 08.0	+51.0	40.6	7 53.5	+51.3	40.7	8 39.0	+51.6	40.8	9 24.4	+52.0	40.9	36
37	4 54.9	+49.5	39.8	5 41.0	+49.8	39.9	6 27.0	+50.2	39.9	7 13.0	+50.6	40.0	7 59.0	+50.9	40.1	8 44.8	+51.3	40.2	9 30.6	+51.6	40.3	10 16.4	+51.9	40.4	37
38	5 44.4	+49.3	39.2	6 30.8	+49.8	39.3	7 17.2	+50.1	39.4	8 03.6	+50.5	39.5	8 49.9	+50.8	39.6	9 36.1	+51.2	39.7	10 22.2	+51.6	39.8	11 08.3	+51.9	39.9	38
39	6 33.7	+49.4	38.7	7 20.6	+49.7	38.7	8 07.3	+50.1	38.8	8 54.1	+50.4	38.9	9 40.7	+50.8	39.0	10 27.3	+51.1	39.1	11 13.8	+51.5	39.3	12 00.2	+51.8	39.4	39
40	7 23.1	+49.3	38.1	8 10.3	+49.6	38.2	8 57.4	+50.0	38.3	9 44.5	+50.4	38.4	10 31.5	+50.7	38.5	11 18.4	+51.1	38.6	12 05.3	+51.4	38.7	12 52.0	+51.8	38.9	40
41	8 12.4	+49.2	37.5	8 59.9	+49.7	37.6	9 47.4	+50.0	37.7	10 34.9	+50.3	37.8	11 22.2	+50.7	37.9	12 09.5	+51.0	38.1	12 56.7	+51.4	38.2	13 43.8	+51.7	38.4	41
42	9 01.6	+49.2	36.9	9 49.6	+49.5	37.0	10 37.4	+49.9	37.1	11 25.2	+50.3	37.3	12 12.9	+50.6	37.4	13 00.5	+51.0	37.5	13 48.1	+51.3	37.7	14 35.5	+51.7	37.8	42
43	9 50.8	+49.2	36.4	10 39.1	+49.5	36.5	11 27.3	+49.9	36.6	12 15.5	+50.2	36.7	13 03.5	+50.6	36.8	13 51.5	+50.9	37.0	14 39.4	+51.2	37.1	15 27.2	+51.5	37.3	43
44	10 40.0	+49.0	35.8	11 28.6	+49.4	35.9	12 17.2	+49.8	36.0	13 05.7	+50.1	36.1	13 54.1	+50.5	36.3	14 42.4	+50.8	36.4	15 30.6	+51.2	36.6	16 18.7	+51.5	36.8	44
45	11 29.0	+49.0	35.2	12 18.0	+49.4	35.3	13 07.0	+49.7	35.4	13 55.8	+50.0	35.6	14 44.6	+50.3	35.7	15 33.2	+50.7	35.9	16 21.8	+51.0	36.1	17 10.2	+51.4	36.2	45
46	12 18.0	+49.0	34.6	13 07.4	+49.3	34.7	13 56.7	+49.6	34.9	14 45.8	+50.0	35.0	15 34.9	+50.3	35.2	16 23.9	+50.7	35.3	17 12.8	+51.0	35.5	18 01.6	+51.3	35.7	46
47	13 07.0	+48.8	34.0	13 56.7	+49.1	34.1	14 46.3	+49.5	34.3	15 35.8	+49.9	34.4	16 25.2	+50.1	34.6	17 14.6	+50.5	34.8	18 03.8	+50.9	35.0	18 52.9	+51.2	35.1	47
48	13 55.8	+48.8	33.4	14 45.8	+49.1	33.5	15 35.8	+49.4	33.7	16 25.7	+49.8	33.9	17 15.5	+50.1	34.0	18 05.1	+50.5	34.2	18 54.7	+50.8	34.4	19 44.1	+51.2	34.6	48
49	14 44.6	+48.6	32.8	15 34.9	+49.0	33.0	16 25.2	+49.4	33.1	17 15.5	+49.6	33.3	18 05.6	+50.0	33.4	18 55.6	+50.3	33.6	19 45.5	+50.7	33.8	20 35.3	+51.0	34.0	49
50	15 33.2	+48.5	32.2	16 23.9	+48.9	32.4	17 14.6	+49.2	32.5	18 05.1	+49.6	32.7	18 55.6	+49.9	32.9	19 45.9	+50.3	33.1	20 36.2	+50.5	33.3	21 26.3	+50.8	33.5	50
51	16 21.8	+48.4	31.6	17 12.8	+48.8	31.7	18 03.8	+49.1	31.9	18 54.7	+49.4	32.1	19 45.5	+49.8	32.3	20 36.2	+50.1	32.5	21 26.7	+50.4	32.7	22 17.1	+50.8	32.9	51
52	17 10.2	+48.4	31.0	18 01.6	+48.7	31.1	18 52.9	+49.0	31.3	19 44.1	+49.4	31.5	20 35.3	+49.6	31.7	21 26.3	+49.9	31.9	22 17.1	+50.4	32.1	23 07.9	+50.7	32.3	52
53	17 58.6	+48.2	30.4	18 50.3	+48.5	30.5	19 41.9	+48.9	30.7	20 33.5	+49.2	30.9	21 24.9	+49.5	31.1	22 16.2	+49.9	31.3	23 07.5	+50.1	31.5	23 58.6	+50.5	31.7	53
54	18 46.8	+48.1	29.7	19 38.8	+48.5	29.9	20 30.8	+48.8	30.1	21 22.7	+49.1	30.3	22 14.4	+49.4	30.5	23 06.1	+49.7	30.7	23 57.6	+50.1	30.9	24 49.1	+50.3	31.1	54
55	19 34.9	+47.9	29.1	20 27.3	+48.2	29.3	21 19.6	+48.6	29.5	22 11.8	+48.9	29.7	23 03.8	+49.3	29.9	23 55.8	+49.6	30.1	24 47.7	+49.9	30.3	25 39.4	+50.2	30.5	55
56	20 22.8	+47.9	28.5	21 15.5	+48.2	28.7	22 08.2	+48.4	28.8	23 00.7	+48.8	29.0	23 53.1	+49.1	29.2	24 45.4	+49.4	29.5	25 37.6	+49.7	29.7	26 29.6	+50.1	29.9	56
57	21 10.7	+47.6	27.8	22 03.7	+48.0	28.0	22 56.6	+48.3	28.2	23 49.5	+48.6	28.4	24 42.2	+48.9	28.6	25 34.8	+49.3	28.8	26 27.3	+49.6	29.1	27 19.7	+49.9	29.3	57
58	21 58.3	+47.5	27.2	22 51.7	+47.8	27.3	23 44.9	+48.2	27.5	24 38.1	+48.4	27.7	25 31.1	+48.8	28.0	26 24.1	+49.0	28.2	27 16.9	+49.4	28.4	28 09.6	+49.7	28.7	58
59	22 45.8	+47.4	26.5	23 39.5	+47.6	26.9	24 33.1	+47.9	26.9	25 26.5	+48.3	27.1	26 19.9	+48.6	27.3	27 13.1	+49.0	27.5	28 06.3	+49.2	27.8	28 59.3	+49.5	28.0	59
60	23 33.2	+47.2	25.8	24 27.1	+47.5	26.0	25 21.0	+47.8	26.2	26 14.8	+48.1	26.4	27 08.5	+48.4	26.7	28 02.0	+48.7	26.9	28 55.5	+49.0	27.1	29 48.8	+49.4	27.4	60
61	24 20.4	+47.0	25.1	25 14.6	+47.3	25.3	26 08.8	+47.6	25.6	27 02.9	+47.9	25.8	27 56.9	+48.2	26.0	28 50.7	+48.6	26.2	29 44.5	+48.8	26.5	30 38.2	+49.1	26.7	61
62	25 07.4	+46.8	24.5	26 01.9	+47.1	24.7	26 56.4	+47.4	24.9	27 50.8	+47.7	25.1	28 45.1	+48.0	25.3	29 39.3	+48.3	25.6	30 33.3	+48.6	25.8	31 27.3	+48.9	26.1	62
63	25 54.2	+46.6	23.8	26 49.0	+46.9	24.0	27 43.8	+47.2	24.2	28 38.5	+47.5	24.4	29 33.1	+47.8	24.6	30 27.6	+48.1	24.9	31 21.9	+48.4	25.1	32 16.2	+48.7	25.4	63
64	26 40.8	+46.3	23.1	27 35.9	+46.7	23.3	28 31.0	+47.0	23.5	29 26.0	+47.2	23.7	30 20.9	+47.5	23.9	31 15.7	+47.8	24.2	32 10.3	+48.2	24.4	33 04.9	+48.5	24.7	64
65	27 27.1	+46.2	22.4	28 22.6	+46.5	22.6	29 18.0	+46.7	22.8	30 13.2	+47.1	23.0	31 08.4	+47.4	23.2	32 03.5	+47.6	23.5	32 58.5	+47.9	23.7	33 53.4	+48.2	24.0	65
66	28 13.3	+46.0	21.6	29 09.1	+46.2	21.8	30 04.7	+46.5	22.0	31 00.3	+46.8	22.3	31 55.8	+47.0	22.5	32 51.1	+47.4	22.7	33 46.4	+47.7	23.0	34 41.6	+47.9	23.3	66
67	28 59.3	+45.7	20.9	29 55.3	+45.9	21.1	30 51.2	+46.3	21.3	31 47.1	+46.5	21.5	32 42.8	+46.8	21.8	33 38.5	+47.1	22.0	34 34.1	+47.4	22.3	35 29.5	+47.7	22.5	67
68	29 45.0	+45.4	20.2	30 41.2	+45.8	20.4	31 37.5	+45.9	20.6	32 33.6	+46.3	20.8	33 29.6	+46.6	21.0	34 25.6	+46.8	21.3	35 21.5	+47.1	21.5	36 17.2	+47.4	21.8	68
69	30 30.4	+45.2	19.4	31 27.0	+45.4	19.6	32 23.4	+45.8	19.8	33 19.9	+45.9	20.0	34 16.2	+46.2	20.3	35 12.4	+46.6	20.5	36 08.6	+46.8	20.8	37 04.6	+47.1	21.0	69
70	31 15.6	+44.9	18.6	32 12.4	+45.2	18.8	33 09.2	+45.4	19.0	34 05.8	+45.7	19.3	35 02.4	+46.0	19.5	35 59.0	+46.2	19.7	36 55.4	+46.5	20.0	37 51.7	+46.8	20.2	70
71	32 00.5	+44.6	17.9	32 57.6	+44.8	18.1	33 54.6	+45.1	18.3	34 51.5	+45.4	18.5	35 48.4	+45.6	18.7	36 45.2	+45.9	18.9	37 41.9	+46.2	19.2	38 38.5	+46.5	19.4	71
72	32 45.1	+44.3	17.1	33 42.4	+44.6	17.3	34 39.7	+44.8	17.5	35 36.9	+45.0	17.7	36 34.0	+45.3	17.9	37 31.1	+45.6	18.1	38 28.1	+45.8	18.4	39 25.0	+46.1	18.6	72
73	33 29.4	+44.0	16.3	34 27.0	+44.2	16.4	35 24.5	+44.5	16.6	36 21.9	+44.8	16.9	37 19.3	+45.0	17.1	38 16.7	+45.2	17.3	39 13.9	+45.5	17.5	40 11.1	+45.7	17.8	73
74	34 13.4	+43.6	15.4	35 11.2	+43.9	15.6	36 09.0	+44.1	15.8	37 06.7	+44.3	16.0	38 04.3	+44.6	16.2	39 01.9	+44.8	16.5	39 59.4	+45.1	16.7	40 56.8	+45.4	16.9	74
75	34 57.0	+43.4	14.6	35 55.1	+43.5	14.8	36 53.1	+43.7	15.0	37 51.0	+44.0	15.2	38 48.9	+44.2	15.4	39 46.7	+44.5	15.6	40 44.5	+44.7	15.8	41 42.2	+44.9	16.1	75
76	35 40.4	+42.9	13.8	36 38.6	+43.2	13.9	37 36.8	+43.4	14.1	38 35.0	+43.6	14.3	39 33.1	+43.8	14.5	40 31.2	+44.0	14.7	41 29.2	+44.2	14.9	42 27.1	+44.5	15.2	76
77	36 23.3	+42.6	12.9	37 21.8	+42.7	13.1	38 20.2	+43.0	13.2	39 18.6	+43.2	13.4	40 16.9	+43.4	13.6	41 15.2	+43.6	13.8	42 13.4	+43.9	14.0	43 11.6	+44.1	14.3	77
78	37 05.9	+42.1	12.0	38 04.5	+42.4	12.2	39 03.2	+42.5	12.3	40 01.8	+42.7	12.5	41 00.3	+43.0	12.7	41 58.8	+43.2	12.9	42 57.3	+43.4	13.1	43 55.7	+43.6	13.3	78
79	37 48.0	+41.8	11.1	38 46.9	+41.9	11.3	39 45.7	+42.1	11.4	40 44.5	+42.3	11.6	41 43.3	+42.5	11.8	42 42.0	+42.7	12.0	43 40.7	+42.9	12.2	44 39.3	+43.1	12.4	79
80	38 29.8	+41.3	10.2	39 28.8	+41.5	10.4	40 27.8	+41.7	10.5	41 26.8	+41.9	10.7	42 25.8	+42.0	10.8	43 24.7	+42.2	11.0	44 23.6	+42.4	11.2	45 22.4	+42.6	11.4	80
81	39 11.1	+40.9	9.3	40 10.3	+41.0	9.4	41 09.5	+41.2	9.6	42 08.7	+41.3	9.7	43 07.8	+41.5	9.9	44 06.9	+41.7	10.0	45 06.0	+41.9	10.2	46 05.0	+42.0	10.4	81
82	39 52.0	+40.4	8.3	40 51.3	+40.6	8.5	41 50.7	+40.7	8.6	42 50.0	+40.8	8.7	43 49.3	+41.0	8.9	44 48.6	+41.1	9.0	45 47.8	+41.3	9.2	46 47.0	+41.5	9.3	82
83	40 32.4	+39.9	7.4	41 31.9	+40.0	7.5	42 31.4	+40.1	7.6	43 30.8	+40.3	7.7	44 30.3	+40.4	7.8	45 29.7	+40.6	8.0	46 29.1	+40.7	8.1	47 28.5	+40.9	8.3	83
84	41 12.3	+39.4	6.5	42 11.9	+39.5	6.5	43 11.5	+39.6	6.6	44 11.1	+39.7	6.7	45 10.7	+39.8	6.8	46 10.3	+39.9	6.9	47 09.8	+40.1	7.1	48 09.4	+40.2	7.2	84
85	41 51.7	+38.8	5.4	42 51.4	+38.9	5.4	43 51.1	+39.1	5.5	44 50.8	+39.2	5.6	45 50.5	+39.3	5.7	46 50.2	+39.4	5.8	47 49.9	+39.5	6.0	48 49.6	+39.6	6.1	85
86	42 30.5	+38.3	4.3	43 30.3	+38.4	4.4	44 30.2	+38.4	4.5	45 30.0	+38.5	4.6	46 29.8	+38.6	4.6	47 29.6	+38.7	4.7	48 29.4	+38.7	4.8	49 29.2	+38.8	4.9	86
87	43 08.8	+37.7	3.3	44 08.7	+37.7	3.3	45 08.6	+37.8	3.4	46 08.5	+37.8	3.5	47 08.4	+37.9	3.5	48 08.3	+37.9	3.6	49 08.1	+38.1	3.7	50 08.0	+38.1	3.7	87
88	43 46.5	+37.1	2.2	44 46.4	+37.2	2.3	45 46.4	+37.1	2.3	46 46.3	+37.2	2.3	47 46.3	+37.2	2.4	48 46.2	+37.3	2.4	49 46.2	+37.3	2.5	50 46.1	+37.4	2.5	88
89	44 23.6	+36.4	1.1	45 23.6	+36.4	1.1	46 23.5	+36.5	1.2	47 23.5	+36.5	1.2	48 23.5	+36.5	1.2	49 23.5	+36.5	1.2	50 23.5	+36.5	1.3	51 23.5	+36.5	1.3	89
90	45 00.0	+35.8	0.0	46 00.0	+35.8	0.0	47 00.0	+35.7	0.0	48 00.0	+35.7	0.0	49 00.0	+35.7	0.0	50 00.0	+35.7	0.0	51 00.0	+35.7	0.0	52 00.0	+35.7	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	24 33.5	+46.6	117.2	24 05.9	+47.2	117.6	23 37.9	+47.9	118.0	23 09.6	+48.4	118.4	22 40.9	+49.0	118.7	22 11.9	+49.6	119.1	21 42.6	+50.1	119.5	21 12.9	+50.7	119.8	0
1	25 20.1	+46.3	116.5	24 53.1	+47.0	116.9	24 25.8	+47.6	117.3	23 58.0	+48.3	117.7	23 29.9	+48.9	118.1	23 01.5	+49.4	118.5	22 32.7	+50.0	118.9	22 03.6	+50.5	119.2	1
2	26 06.4	+46.2	115.8	25 40.1	+46.8	116.2	25 13.4	+47.5	116.7	24 46.3	+48.1	117.1	24 18.8	+48.7	117.5	23 50.9	+49.3	117.9	23 22.7	+49.9	118.3	22 54.1	+50.4	118.6	2
3	26 52.6	+45.9	115.1	26 26.9	+46.6	115.5	26 00.9	+47.2	116.0	25 34.4	+47.9	116.4	25 07.5	+48.5	116.8	24 40.2	+49.1	117.2	24 12.6	+49.7	117.6	23 44.5	+50.3	118.0	3
4	27 38.5	+45.7	114.4	27 13.5	+46.4	114.8	26 48.1	+47.1	115.3	26 22.3	+47.7	115.7	25 56.0	+48.4	116.2	25 29.3	+49.0	116.6	25 02.3	+49.5	117.0	24 34.8	+50.1	117.4	4
5	28 24.2	+45.5	113.6	27 59.9	+46.2	114.1	27 35.2	+46.8	114.6	27 10.0	+47.5	115.1	26 44.4	+48.1	115.5	26 18.3	+48.8	116.0	25 51.8	+49.4	116.4	25 24.9	+50.0	116.8	5
6	29 09.7	+45.2	112.9	28 46.1	+45.9	113.4	28 22.0	+46.7	113.9	27 57.5	+47.3	114.4	27 32.5	+48.0	114.8	27 07.1	+48.6	115.3	26 41.2	+49.2	115.8	26 14.9	+49.8	116.2	6
7	29 54.9	+44.9	112.1	29 32.0	+45.7	112.6	29 08.7	+46.3	113.2	28 44.8	+47.1	113.7	28 20.5	+47.7	114.2	27 55.7	+48.4	114.7	27 30.4	+49.1	115.1	27 04.7	+49.7	115.6	7
8	30 39.8	+44.7	111.4	30 17.7	+45.4	111.9	29 55.0	+46.2	112.4	29 31.9	+46.9	113.0	29 08.2	+47.6	113.5	28 44.1	+48.2	114.0	28 19.5	+48.8	114.5	27 54.4	+49.4	115.0	8
9	31 24.5	+44.3	110.6	31 03.1	+45.2	111.1	30 41.2	+45.9	111.7	30 18.8	+46.6	112.2	29 55.8	+47.3	112.8	29 32.3	+48.0	113.3	29 08.3	+48.7	113.8	28 43.8	+49.3	114.3	9
10	32 08.8	+44.1	109.8	31 48.3	+44.8	110.4	31 27.1	+45.6	110.9	31 05.4	+46.3	111.5	30 43.1	+47.1	112.1	30 20.3	+47.8	112.6	29 57.0	+48.4	113.1	29 33.1	+49.1	113.7	10
11	32 52.9	+43.8	109.0	32 33.1	+44.6	109.6	32 12.7	+45.4	110.2	31 51.7	+46.1	110.8	31 30.2	+46.8	111.3	31 08.1	+47.5	111.9	30 45.4	+48.2	112.5	30 22.2	+48.9	113.0	11
12	33 36.7	+43.4	108.2	33 17.7	+44.2	108.8	32 58.1	+45.0	109.4	32 37.8	+45.9	110.0	32 17.0	+46.6	110.6	31 55.6	+47.3	111.2	31 33.6	+48.0	111.8	31 11.1	+48.7	112.3	12
13	34 20.1	+43.1	107.3	34 01.9	+44.0	108.0	33 43.1	+44.8	108.6	33 23.7	+45.5	109.2	33 03.6	+46.3	109.9	32 42.9	+47.0	110.5	32 21.6	+47.8	111.1	31 59.8	+48.4	111.6	13
14	35 03.2	+42.8	106.5	34 45.9	+43.6	107.1	34 27.9	+44.4	107.8	34 09.2	+45.2	108.5	33 49.9	+46.0	109.1	33 29.9	+46.8	109.7	33 09.4	+47.5	110.3	32 48.2	+48.2	110.9	14
15	35 46.0	+42.3	105.6	35 29.5	+43.2	106.3	35 12.3	+44.1	107.0	34 54.4	+44.9	107.7	34 35.9	+45.7	108.3	34 16.7	+46.5	109.0	33 56.9	+47.2	109.6	33 36.4	+48.0	110.2	15
16	36 28.3	+42.0	104.7	36 12.7	+42.9	105.5	35 56.4	+43.7	106.2	35 39.3	+44.6	106.8	35 21.6	+45.4	107.5	35 03.2	+46.2	108.2	34 44.1	+47.0	108.9	34 24.4	+47.7	109.5	16
17	37 10.3	+41.6	103.8	36 55.6	+42.4	104.6	36 40.1	+43.4	105.3	36 23.9	+44.2	106.0	36 07.0	+45.0	106.7	35 49.4	+45.9	107.4	35 31.1	+46.6	108.1	35 12.1	+47.4	108.8	17
18	37 51.9	+41.1	102.9	37 38.0	+42.1	103.7	37 23.5	+42.9	104.4	37 08.1	+43.9	105.2	36 52.0	+44.8	105.9	36 35.3	+45.5	106.6	36 17.7	+46.4	107.3	35 59.5	+47.2	108.0	18
19	38 33.0	+40.7	102.0	38 20.1	+41.6	102.8	38 06.4	+42.6	103.6	37 52.0	+43.5	104.3	37 36.8	+44.3	105.1	37 20.8	+45.2	105.8	37 04.1	+46.0	106.5	36 46.7	+46.8	107.2	19
20	39 13.7	+40.2	101.1	39 01.7	+41.2	101.9	38 49.0	+42.2	102.7	38 35.5	+43.0	103.4	38 21.1	+44.0	104.2	38 06.0	+44.9	105.0	37 50.1	+45.7	105.7	37 33.5	+46.5	106.5	20
21	39 53.9	+39.7	100.1	39 42.9	+40.8	100.9	39 31.2	+41.7	101.7	39 18.5	+42.7	102.5	39 05.1	+43.6	103.3	38 50.9	+44.4	104.1	38 35.8	+45.4	104.9	38 20.0	+46.2	105.7	21
22	40 33.6	+39.2	99.1	40 23.7	+40.2	100.0	40 12.9	+41.2	100.8	40 01.2	+42.2	101.6	39 48.7	+43.1	102.4	39 35.3	+44.1	103.3	39 21.2	+44.9	104.1	39 06.2	+45.8	104.8	22
23	41 12.8	+38.7	98.1	41 03.9	+39.8	99.0	40 54.1	+40.8	99.8	40 43.4	+41.8	100.7	40 31.8	+42.8	101.5	40 19.4	+43.7	102.4	40 06.1	+44.6	103.2	39 52.0	+45.5	104.0	23
24	41 51.5	+38.2	97.1	41 43.7	+39.2	98.0	41 34.9	+40.2	98.9	41 25.2	+41.2	99.7	41 14.6	+42.2	100.6	41 03.1	+43.2	101.5	40 50.7	+44.2	102.3	40 37.5	+45.1	103.2	24
25	42 29.7	+37.5	96.1	42 22.9	+38.6	97.0	42 15.1	+39.8	97.9	42 06.4	+40.8	98.8	41 56.8	+41.8	99.7	41 46.3	+42.8	100.5	41 34.9	+43.7	101.4	41 22.6	+44.6	102.3	25
26	43 07.2	+37.0	95.0	43 01.5	+38.1	95.9	42 54.9	+39.1	96.9	42 47.2	+40.3	97.8	42 38.6	+41.3	98.7	42 29.1	+42.3	99.6	42 18.6	+43.3	100.5	42 07.2	+44.3	101.4	26
27	43 44.2	+36.3	93.9	43 39.6	+37.5	94.9	43 34.0	+38.6	95.8	43 27.5	+39.7	96.8	43 19.9	+40.8	97.7	43 11.4	+41.8	98.6	43 01.9	+42.8	99.6	42 51.5	+43.8	100.5	27
28	44 20.5	+35.7	92.8	44 17.1	+36.8	93.8	44 12.6	+38.0	94.8	44 07.2	+39.1	95.7	44 00.7	+40.2	96.7	43 53.2	+41.3	97.6	43 44.7	+42.3	98.6	43 35.3	+43.3	99.5	28
29	44 56.2	+35.0	91.7	44 53.9	+36.2	92.7	44 50.6	+37.4	93.7	44 46.3	+38.5	94.7	44 40.9	+39.6	95.6	44 34.5	+40.7	96.6	44 27.0	+41.8	97.6	44 18.6	+42.8	98.6	29
30	45 31.2	+34.3	90.5	45 30.1	+35.5	91.5	45 28.0	+36.7	92.6	45 24.8	+37.9	93.6	45 20.5	+39.0	94.6	45 15.2	+40.1	95.6	45 08.8	+41.3	96.6	45 01.4	+42.3	97.6	30
31	46 05.5	+33.5	89.3	46 05.6	+34.8	90.4	46 04.7	+36.0	91.4	46 02.7	+37.2	92.5	45 59.5	+38.4	93.5	45 55.3	+39.6	94.5	45 50.1	+40.6	95.6	45 43.7	+41.8	96.6	31
32	46 39.0	+32.8	88.1	46 40.4	+34.1	89.2	46 40.7	+35.3	90.3	46 39.9	+36.5	91.3	46 37.9	+37.8	92.4	46 34.9	+38.9	93.4	46 30.7	+40.1	94.5	46 25.5	+41.2	95.5	32
33	47 11.8	+32.0	86.9	47 14.5	+33.2	88.0	47 16.0	+34.6	89.1	47 16.4	+35.8	90.2	47 15.7	+37.0	91.2	47 13.8	+38.2	92.3	47 10.8	+39.4	93.4	47 06.7	+40.6	94.5	33
34	47 43.8	+31.1	85.7	47 47.7	+32.5	86.8	47 50.6	+33.7	87.9	47 52.2	+35.1	89.0	47 52.7	+36.3	90.1	47 52.0	+37.6	91.2	47 50.2	+38.8	92.3	47 47.3	+39.9	93.4	34
35	48 14.9	+30.3	84.4	48 20.2	+31.6	85.5	48 24.3	+33.0	86.6	48 27.3	+34.2	87.8	48 29.0	+35.6	88.9	48 29.6	+36.8	90.0	48 29.0	+38.1	91.1	48 27.2	+39.3	92.3	35
36	48 45.2	+29.4	83.1	48 51.8	+30.8	84.2	48 57.3	+32.1	85.4	49 01.5	+33.5	86.5	49 04.6	+34.7	87.7	49 06.4	+36.1	88.8	49 07.1	+37.3	90.0	49 06.5	+38.6	91.1	36
37	49 14.6	+28.4	81.8	49 22.6	+29.8	82.9	49 29.4	+31.2	84.1	49 35.0	+32.5	85.2	49 39.3	+34.0	86.4	49 42.5	+35.2	87.6	49 44.4	+36.6	88.8	49 45.1	+37.8	89.9	37
38	49 43.0	+27.5	80.4	49 52.4	+28.9	81.6	50 00.6	+30.3	82.7	50 07.5	+31.7	83.9	50 13.3	+33.0	85.1	50 17.7	+34.5	86.3	50 21.0	+35.7	87.5	50 22.9	+37.1	88.7	38
39	50 10.5	+26.4	79.0	50 21.3	+27.9	80.2	50 30.9	+29.3	81.4	50 39.2	+30.8	82.6	50 46.3	+32.2	83.8	50 52.2	+33.5	85.0	50 56.7	+34.9	86.3	51 00.0	+36.2	87.5	39
40	50 36.9	+25.5	77.6	50 49.2	+26.9	78.8	51 00.2	+28.4	80.0	51 10.0	+29.8	81.2	51 18.5	+31.2	82.5	51 25.7	+32.7	83.7	51 31.6	+34.1	85.0	51 36.2	+35.5	86.2	40
41	51 02.4	+24.3	76.2	51 16.1	+25.8	77.4	51 28.6	+27.3	78.6	51 39.8	+28.8	79.8	51 49.7	+30.3	81.1	51 58.4	+31.6	82.3	52 05.7	+33.1	83.6	52 11.7	+34.5	84.9	41
42	51 26.7	+23.3	74.7	51 41.9	+24.8	75.9	51 55.9	+26.2	77.2	52 08.6	+27.7	78.4	52 20.0	+29.2	79.7	52 30.0	+30.7	81.0	52 38.8	+32.1	82.3	52 46.2	+33.6	83.6	42
43	51 50.0	+22.1	73.2	52 06.7	+23.6	74.5	52 22.1	+25.2	75.7	52 36.3	+26.7	77.0	52 49.2	+28.1	78.3	53 00.7	+29.7	79.6	53 10.9	+31.2	80.9	53 19.8	+32.6	82.2	43
44	52 12.1	+20.9	71.7	52 30.3	+22.5	73.0	52 47.3	+24.0	74.2	53 03.0	+25.5	75.5	53 17.3	+27.1	76.8	53 30.4	+28.5	78.1	53 42.1	+30.0	79.4	53 52.4	+31.6	80.8	44
45	52 33.0	+19.8	70.2	52 52.8	+21.2	71.4	53 11.3	+22.8	72.7	53 28.5	+24.3	74.0	53 44.4	+25.9	75.3	53 58.9	+27.5	76.6	54 12.1	+29.0	78.0	54 24.0	+30.5	79.3	45
46	52 52.8	+18.5	68.6	53 14.0	+20.1	69.9	53 34.1	+21.5	71.1	53 52.8	+23.1	72.4	54 10.3	+24.7	73.8	54 26.4	+26.2	75.1	54 41.1	+27.9	76.5	54 54.5	+29.4	77.8	46
47	53 11.3	+17.2	67.0	53 34.1	+18.7	68.3	53 55.6	+20.3	69.6	54 15.9	+21.7	70.9	54 35.0	+23.4	72.2	54 52.6	+25.1	73.5	55 09.0	+26.6	74.9	55 23.9	+28.2	76.3	47
48	53 28.5	+15.9	65.4	53 52.8	+17.5	66.7	54 15.9	+19.1	68.0	54 37.6	+20.6	69.3	54 58.4	+22.2	70.6	55 17.7	+23.8	72.0	55 35.6	+25.4	73.3	55 52.1	+27.0	74.7	48
49	53 44.4	+14.5	63.8	54 10.3	+16.1	65.1	54 35.0	+17.6	66.3	54 58.4	+19.3	67.6	55 20.6	+20.9	69.0	55 41.5	+22.5	70.3	56 01.0	+24.1	71.7	56 19.1	+25.7	73.1	49
50	53 58.9	+13.2	62.2	54 26.4	+14.7	63.4	54 52.6	+16.4	64.7	55 17.7	+17.9	66.0	55 41.5	+19.5	67.3	56 04.0	+21.1	68.7	56 25.1	+22.8	70.1	56 44.8	+24.5	71.5	50
51	54 12.1	+11.9	60.5	54 41.1	+13.4	61.7	55 09.0	+14.9	63.0	55 35.6	+16.5	64.3	56 01.0	+18.1	65.6	56 25.1	+19.7	67.0	56 47.9	+21.4	68.4	57 09.3	+23.0	69.8	51
52	54 24.0	+10.4	58.8	54 54.5	+11.9	60.0	55 23.9	+13.4	61.3	55 52.1	+15.0	62.6	56 19.1	+16.7	63.9	56 44.8	+18.3	65.3	57 09.3	+19.9	66.7	57 32.3	+21.7	68.1	52
53	54 34.4	+8.9	57.1	55 06.4	+10.5	58.3	55 37.3	+12.1	59.6	56 07.1	+13.6	60.9	56 35.8	+15.2	62.2	57 03.1	+16.9	63.5	57 29.2	+18.5	64.9	57 54.0	+20.1	66.4	53
54	54 43.3	+7.5	55.4	55 16.9	+9.0	56.6	55 49.4	+10.5	57.8	56 20.7	+12.1	59.1	56 51.0	+13.6	60.4	57 20.0	+15.3	61.8	57 47.7	+17.0	63.2	58 14.1	+18.7	64.6	54
55	54 50.8	+6.1	53.7	55 25.9	+7.5	54.9	55 59.9	+9.0	56.1	56 32.8	+10.6	57.3	57 04.6	+12.2	58.6	57 35.3	+13.7	60.0	58 04.7	+15.4	61.4	58 32.8	+17.1	62.8	55
56	54 56.9	+4.6	52.0	55 33.4	+6.0	53.1	56 08.9	+7.5	54.3	56 43.4	+9.0	55.5	57 16.8	+10.6	56.8	57 49.0	+12.2	58.1	58 20.1	+13.8	59.5	58 49.9	+15.5	60.9	56
57	55 01.5	+3.0	50.2	55 39.4	+4.5	51.4	56 16.4	+5.9	52.5	56 52.4	+7.4	53.7	57 27.4	+8.9	55.0	58 01.2	+10.6	56.3	58 33.9	+12.2	57.7	59 05.4	+13.8	59.1	57
58	55 04.5	+1.6	48.5	55 43.9	+2.9	49.6	56 22.3	+4.4	50.7	56 59.8	+5.9	51.9	57 36.3	+7.4	53.2	58 11.8	+8.9	54.4	58 46.1	+10.5	55.8	59 19.2	+12.2	57.2	58
59	55 06.1	+0.1	46.7	55 46.8	+1.5	47.8	56 26.7	+2.8	48.9	57 05.7	+4.2	50.1	57 43.7	+5.7	51.3	58 20.7	+7.2	52.6	58 56.6	+8.8	53.9	59 31.4	+10.5	55.2	59
60	55 06.2	−1.4	45.0	55 48.3	−0.2	46.0	56 29.5	+1.2	47.1	57 09.9	+2.6	48.2	57 49.4	+4.1	49.4	58 27.9	+5.6	50.7	59 05.4	+7.1	51.9	59 41.9	+8.7	53.3	60
61	55 04.8	−2.9	43.2	55 48.1	−1.6	44.3	56 30.7	−0.3	45.3	57 12.5	+1.0	46.4	57 53.5	+2.3	47.6	58 33.5	+3.8	48.8	59 12.5	+5.4	50.0	59 50.6	+6.9	51.3	61
62	55 01.9	−4.4	41.5	55 46.5	−3.2	42.5	56 30.4	−2.0	43.5	57 13.5	−0.6	44.6	57 55.8	+0.8	45.7	58 37.3	+2.2	46.8	59 17.9	+3.6	48.1	59 57.5	+5.2	49.3	62
63	54 57.5	−5.9	39.8	55 43.3	−4.8	40.7	56 28.4	−3.5	41.7	57 12.9	−2.3	42.7	57 56.6	−1.0	43.8	58 39.5	+0.4	44.9	59 21.5	+1.9	46.1	60 02.7	+3.3	47.4	63
64	54 51.6	−7.4	38.0	55 38.5	−6.2	38.9	56 24.9	−5.1	39.9	57 10.6	−3.9	40.9	57 55.6	−2.6	41.9	58 39.9	−1.3	43.0	59 23.4	+0.1	44.1	60 06.0	+1.5	45.4	64
65	54 44.2	−8.8	36.3	55 32.3	−7.8	37.2	56 19.8	−6.6	38.1	57 06.7	−5.5	39.0	57 53.0	−4.3	40.0	58 38.6	−3.0	41.1	59 23.5	−1.7	42.2	60 07.5	−0.3	43.3	65
66	54 35.4	−10.3	34.6	55 24.5	−9.2	35.4	56 13.2	−8.2	36.3	57 01.2	−7.0	37.2	57 48.7	−5.9	38.1	58 35.6	−4.7	39.2	59 21.8	−3.5	40.2	60 07.2	−2.1	41.3	66
67	54 25.1	−11.6	32.9	55 15.3	−10.7	33.7	56 05.0	−9.7	34.5	56 54.2	−8.7	35.4	57 42.8	−7.5	36.3	58 30.9	−6.4	37.2	59 18.3	−5.2	38.3	60 05.1	−4.0	39.3	67
68	54 13.5	−13.1	31.2	55 04.6	−12.2	32.0	55 55.3	−11.3	32.7	56 45.5	−10.2	33.6	57 35.3	−9.2	34.4	58 24.5	−8.1	35.3	59 13.1	−6.9	36.3	60 01.1	−5.7	37.3	68
69	54 00.4	−14.4	29.6	54 52.4	−13.5	30.3	55 44.1	−12.7	31.0	56 35.3	−11.8	31.8	57 26.1	−10.8	32.6	58 16.4	−9.8	33.5	59 06.2	−8.7	34.4	59 55.4	−7.5	35.3	69
70	53 46.0	−15.8	27.9	54 38.9	−15.0	28.6	55 31.4	−14.2	29.3	56 23.5	−13.2	30.0	57 15.3	−12.3	30.8	58 06.6	−11.3	31.6	58 57.5	−10.4	32.5	59 47.9	−9.3	33.4	70
71	53 30.2	−17.0	26.3	54 23.9	−16.3	26.9	55 17.2	−15.5	27.6	56 10.3	−14.8	28.2	57 03.0	−13.9	29.0	57 55.3	−13.0	29.7	58 47.1	−12.0	30.5	59 38.6	−11.0	31.4	71
72	53 13.2	−18.4	24.7	54 07.6	−17.7	25.3	55 01.7	−16.9	25.9	55 55.5	−16.1	26.5	56 49.1	−15.4	27.2	57 42.3	−14.6	27.9	58 35.1	−13.6	28.7	59 28.4	−12.8	29.5	72
73	52 54.8	−19.6	23.1	53 49.9	−19.0	23.6	54 44.8	−18.3	24.2	55 39.4	−17.6	24.8	56 33.7	−16.9	25.4	57 27.7	−16.1	26.1	58 21.5	−15.3	26.8	59 14.8	−14.4	27.6	73
74	52 35.2	−20.8	21.5	53 30.9	−20.2	22.0	54 26.5	−19.7	22.5	55 21.8	−19.0	23.1	56 16.8	−18.3	23.7	57 11.6	−17.5	24.3	58 06.2	−16.8	25.0	59 00.4	−16.0	25.7	74
75	52 14.4	−22.0	20.0	53 10.7	−21.4	20.4	54 06.8	−20.8	20.9	55 02.8	−20.3	21.4	55 58.5	−19.6	22.0	56 54.1	−19.1	22.6	57 49.4	−18.4	23.2	58 44.4	−17.6	23.8	75
76	51 52.4	−23.1	18.5	52 49.3	−22.7	18.9	53 46.0	−22.2	19.3	54 42.5	−21.6	19.8	55 38.9	−21.1	20.3	56 35.0	−20.4	20.8	57 31.0	−19.8	21.4	58 26.8	−19.2	22.0	76
77	51 29.3	−24.3	17.0	52 26.6	−23.8	17.4	53 23.8	−23.3	17.8	54 20.9	−22.9	18.2	55 17.8	−22.3	18.6	56 14.6	−21.8	19.1	57 11.2	−21.3	19.6	58 07.6	−20.7	20.2	77
78	51 05.0	−25.3	15.5	52 02.8	−24.9	15.9	53 00.5	−24.5	16.2	53 58.0	−24.1	16.6	54 55.5	−23.7	17.0	55 52.8	−23.2	17.4	56 49.9	−22.6	17.9	57 46.9	−22.1	18.4	78
79	50 39.7	−26.3	14.1	51 37.9	−26.0	14.4	52 36.0	−25.7	14.7	53 33.9	−25.2	15.1	54 31.8	−24.8	15.4	55 29.6	−24.4	15.8	56 27.3	−24.0	16.2	57 24.8	−23.5	16.7	79
80	50 13.4	−27.4	12.7	51 11.9	−27.1	13.0	52 10.3	−26.7	13.2	53 08.7	−26.4	13.5	54 07.0	−26.1	13.9	55 05.2	−25.7	14.2	56 03.3	−25.3	14.6	57 01.3	−24.9	15.0	80
81	49 46.0	−28.3	11.3	50 44.8	−28.1	11.5	51 43.6	−27.8	11.8	52 42.3	−27.5	12.1	53 40.9	−27.2	12.3	54 39.5	−26.9	12.6	55 38.0	−26.5	13.0	56 36.4	−26.1	13.3	81
82	49 17.7	−29.3	9.9	50 16.7	−29.0	10.1	51 15.8	−28.8	10.4	52 14.8	−28.6	10.6	53 13.7	−28.3	10.8	54 12.6	−28.0	11.1	55 11.5	−27.7	11.4	56 10.3	−27.4	11.7	82
83	48 48.4	−30.2	8.6	49 47.7	−30.0	8.8	50 47.0	−29.8	9.0	51 46.2	−29.5	9.2	52 45.4	−29.3	9.4	53 44.6	−29.1	9.6	54 43.8	−28.8	9.8	55 42.9	−28.7	10.1	83
84	48 18.2	−31.0	7.3	49 17.7	−30.9	7.5	50 17.2	−30.7	7.6	51 16.7	−30.4	7.8	52 16.1	−30.4	8.0	53 15.5	−30.2	8.1	54 15.0	−30.0	8.3	55 14.2	−29.7	8.5	84
85	47 47.2	−31.9	6.0	48 46.8	−31.7	6.1	49 46.5	−31.7	6.3	50 46.1	−31.5	6.4	51 45.7	−31.3	6.5	52 45.3	−31.2	6.7	53 44.9	−31.0	6.8	54 44.5	−30.9	7.0	85
86	47 15.3	−32.7	4.8	48 15.1	−32.6	4.9	49 14.8	−32.5	5.0	50 14.6	−32.4	5.1	51 14.4	−32.3	5.2	52 14.1	−32.1	5.3	53 13.9	−32.1	5.4	54 13.6	−31.9	5.5	86
87	46 42.6	−33.5	3.5	47 42.5	−33.4	3.6	48 42.3	−33.3	3.7	49 42.3	−33.3	3.8	50 42.1	−33.2	3.8	51 42.0	−33.1	3.9	52 41.8	−33.0	4.0	53 41.7	−33.0	4.1	87
88	46 09.1	−34.2	2.3	47 09.1	−34.2	2.4	48 09.0	−34.1	2.4	49 09.0	−34.1	2.5	50 08.9	−34.0	2.5	51 08.9	−34.0	2.6	52 08.8	−34.0	2.6	53 08.7	−33.9	2.7	88
89	45 34.9	−34.9	1.2	46 34.9	−34.9	1.2	47 34.9	−34.9	1.2	48 34.9	−34.9	1.2	49 34.9	−34.9	1.2	50 34.9	−34.9	1.3	51 34.8	−34.8	1.3	52 34.8	−34.8	1.3	89
90	45 00.0	−35.6	0.0	46 00.0	−35.6	0.0	47 00.0	−35.6	0.0	48 00.0	−35.6	0.0	49 00.0	−35.7	0.0	50 00.0	−35.7	0.0	51 00.0	−35.7	0.0	52 00.0	−35.7	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	24 33.5	−46.7	117.2	24 05.9	−47.3	117.6	23 37.9	−47.9	118.0	23 09.6	−48.6	118.4	22 40.9	−49.1	118.7	22 11.9	−49.7	119.1	21 42.6	−50.3	119.5	21 12.9	−50.7	119.8	0
1	23 46.8	−46.9	117.9	23 18.6	−47.6	118.3	22 50.0	−48.2	118.6	22 21.0	−48.7	119.0	21 51.8	−49.3	119.4	21 22.2	−49.8	119.7	20 52.3	−50.3	120.0	20 22.2	−50.9	120.4	1
2	22 59.9	−47.1	118.6	22 31.0	−47.7	118.9	22 01.8	−48.3	119.3	21 32.3	−48.8	119.6	21 02.5	−49.4	120.0	20 32.4	−50.0	120.3	20 02.0	−50.5	120.6	19 31.3	−51.0	120.9	2
3	22 12.8	−47.3	119.2	21 43.3	−47.8	119.6	21 13.5	−48.4	119.9	20 43.5	−49.0	120.3	20 13.1	−49.6	120.6	19 42.4	−50.0	120.9	19 11.5	−50.6	121.2	18 40.3	−51.1	121.5	3
4	21 25.5	−47.4	119.9	20 55.5	−48.0	120.2	20 25.1	−48.6	120.6	19 54.5	−49.2	120.9	19 23.5	−49.6	121.2	18 52.4	−50.2	121.5	18 20.9	−50.7	121.8	17 49.2	−51.2	122.0	4
5	20 38.1	−47.5	120.5	20 07.5	−48.2	120.9	19 36.5	−48.6	121.2	19 05.3	−49.2	121.5	18 33.9	−49.8	121.8	18 02.2	−50.3	122.0	17 30.2	−50.8	122.3	16 58.0	−51.2	122.6	5
6	19 50.6	−47.7	121.2	19 19.3	−48.2	121.5	18 47.9	−48.9	121.8	18 16.1	−49.3	122.1	17 44.1	−49.9	122.4	17 11.9	−50.4	122.6	16 39.4	−50.8	122.9	16 06.8	−51.4	123.1	6
7	19 02.9	−47.9	121.8	18 31.1	−48.4	122.1	17 59.0	−48.9	122.4	17 26.8	−49.5	122.7	16 54.2	−49.9	122.9	16 21.5	−50.5	123.2	15 48.6	−51.0	123.4	15 15.4	−51.4	123.7	7
8	18 15.0	−47.9	122.5	17 42.7	−48.5	122.8	17 10.1	−49.0	123.0	16 37.3	−49.6	123.3	16 04.3	−50.1	123.5	15 31.0	−50.5	123.8	14 57.6	−51.0	124.0	14 24.0	−51.5	124.2	8
9	17 27.1	−48.1	123.1	16 54.2	−48.6	123.4	16 21.1	−49.2	123.6	15 47.7	−49.6	123.9	15 14.2	−50.1	124.1	14 40.5	−50.6	124.3	14 06.6	−51.1	124.5	13 32.5	−51.6	124.7	9
10	16 39.0	−48.2	123.7	16 05.6	−48.7	124.0	15 31.9	−49.2	124.2	14 58.1	−49.7	124.4	14 24.1	−50.3	124.7	13 49.9	−50.7	124.9	13 15.5	−51.2	125.1	12 40.9	−51.6	125.2	10
11	15 50.8	−48.3	124.4	15 16.9	−48.9	124.6	14 42.7	−49.3	124.8	14 08.4	−49.9	125.0	13 33.8	−50.3	125.2	12 59.2	−50.8	125.4	12 24.3	−51.2	125.6	11 49.3	−51.7	125.8	11
12	15 02.5	−48.4	125.0	14 28.0	−48.9	125.2	13 53.4	−49.4	125.4	13 18.5	−49.9	125.6	12 43.5	−50.3	125.8	12 08.4	−50.9	126.0	11 33.1	−51.3	126.1	10 57.6	−51.7	126.3	12
13	14 14.1	−48.4	125.6	13 39.1	−49.0	125.8	13 04.0	−49.5	126.0	12 28.6	−49.9	126.2	11 53.2	−50.5	126.3	11 17.5	−50.9	126.5	10 41.8	−51.4	126.7	10 05.9	−51.8	126.9	13
14	13 25.7	−48.6	126.2	12 50.1	−49.0	126.4	12 14.5	−49.6	126.6	11 38.7	−50.1	126.7	11 02.7	−50.5	126.9	10 26.6	−50.9	127.0	9 50.4	−51.4	127.2	9 14.1	−51.8	127.3	14
15	12 37.1	−48.7	126.8	12 01.1	−49.2	127.0	11 24.9	−49.6	127.1	10 48.6	−50.1	127.3	10 12.2	−50.5	127.4	9 35.7	−51.0	127.6	8 59.0	−51.4	127.7	8 22.3	−51.9	127.8	15
16	11 48.4	−48.7	127.4	11 11.9	−49.2	127.7	10 35.3	−49.7	127.7	9 58.5	−50.1	128.0	9 21.7	−50.6	128.0	8 44.7	−51.1	128.1	8 07.6	−51.5	128.2	7 30.4	−51.9	128.3	16
17	10 59.7	−48.8	128.0	10 22.7	−49.2	128.1	9 45.6	−49.7	128.3	9 08.4	−50.2	128.4	8 31.1	−50.7	128.5	7 53.6	−51.0	128.6	7 16.1	−51.6	128.7	6 38.5	−51.9	128.8	17
18	10 10.9	−48.8	128.6	9 33.5	−49.4	128.7	8 55.9	−49.8	128.8	8 18.2	−50.3	129.0	7 40.4	−50.7	129.1	7 02.6	−51.2	129.2	6 24.6	−51.5	129.3	5 46.6	−51.9	129.3	18
19	9 22.1	−48.9	129.2	8 44.1	−49.4	129.3	8 06.1	−49.9	129.4	7 27.9	−50.2	129.5	6 49.7	−50.7	129.6	6 11.4	−51.1	129.7	5 33.1	−51.6	129.8	4 54.7	−52.0	129.8	19
20	8 33.2	−49.0	129.8	7 54.7	−49.4	129.9	7 16.2	−49.8	130.0	6 37.7	−50.4	130.1	5 59.0	−50.8	130.1	5 20.3	−51.2	130.2	4 41.5	−51.6	130.3	4 02.7	−52.0	130.3	20
21	7 44.2	−49.0	130.3	7 05.3	−49.5	130.4	6 26.4	−50.0	130.5	5 47.3	−50.3	130.6	5 08.2	−50.7	130.7	4 29.1	−51.2	130.7	3 49.9	−51.6	130.8	3 10.7	−52.0	130.8	21
22	6 55.2	−49.1	130.9	6 15.8	−49.5	131.0	5 36.4	−49.9	131.1	4 57.0	−50.4	131.2	4 17.5	−50.8	131.2	3 37.9	−51.2	131.3	2 58.3	−51.6	131.3	2 18.7	−52.0	131.3	22
23	6 06.1	−49.1	131.5	5 26.3	−49.5	131.6	4 46.5	−50.0	131.6	4 06.6	−50.4	131.7	3 26.7	−50.9	131.8	2 46.7	−51.3	131.8	2 06.7	−51.6	131.8	1 26.7	−52.1	131.8	23
24	5 17.0	−49.1	132.1	4 36.8	−49.6	132.1	3 56.5	−50.0	132.2	3 16.2	−50.4	132.2	2 35.8	−50.8	132.3	1 55.5	−51.3	132.3	1 15.1	−51.7	132.3	0 34.6	−52.0	132.3	24
25	4 27.9	−49.2	132.7	3 47.2	−49.6	132.7	3 06.5	−50.0	132.8	2 25.8	−50.5	132.8	1 45.0	−50.8	132.8	1 04.2	−51.3	132.8	0 23.4	−51.6	132.8	0 17.4	+52.0	47.2	25
26	3 38.7	−49.1	133.2	2 57.6	−49.6	133.3	2 16.5	−50.0	133.3	1 35.3	−50.4	133.3	0 54.2	−50.9	133.3	0 13.0	−51.3	133.4	0 28.2	+51.7	46.6	1 09.4	+52.0	46.7	26
27	2 49.6	−49.2	133.8	2 08.0	−49.6	133.8	1 26.5	−50.1	133.9	0 44.9	−50.5	133.9	0 03.3	−50.8	133.9	0 38.3	+51.2	46.1	1 19.9	+51.6	46.1	2 01.4	+52.0	46.2	27
28	2 00.4	−49.2	134.4	1 18.4	−49.6	134.4	0 36.4	−50.0	134.4	0 05.6	+50.4	45.6	0 47.5	+50.9	45.6	1 29.5	+51.3	45.6	2 11.5	+51.6	45.6	2 53.4	+52.0	45.2	28
29	1 11.2	−49.2	134.9	0 28.8	−49.6	135.0	0 13.6	+50.1	45.0	0 56.0	+50.5	45.0	1 38.4	+50.8	45.1	2 20.8	+51.2	45.1	3 03.1	+51.6	45.1	3 45.4	+52.0	45.2	29
30	0 22.0	−49.2	135.5	0 20.8	+49.7	44.5	1 03.7	+50.0	44.5	1 46.5	+50.4	44.5	2 29.2	+50.9	44.5	3 12.0	+51.2	44.6	3 54.7	+51.6	44.6	4 37.4	+52.0	44.7	30
31	0 27.2	+49.3	43.9	1 10.5	+49.6	43.9	1 53.7	+50.0	43.9	2 36.9	+50.4	44.0	3 20.1	+50.8	44.0	4 03.2	+51.2	44.0	4 46.3	+51.6	44.1	5 29.4	+51.9	44.2	31
32	1 16.5	+49.2	43.3	2 00.1	+49.6	43.4	2 43.7	+50.0	43.4	3 27.3	+50.4	43.4	4 10.9	+50.8	43.5	4 54.4	+51.2	43.5	5 37.9	+51.5	43.6	6 21.3	+51.9	43.7	32
33	2 05.7	+49.1	42.8	2 49.7	+49.6	42.8	3 33.7	+50.0	42.8	4 17.7	+50.4	42.9	5 01.7	+50.7	42.9	5 45.6	+51.1	43.0	6 29.4	+51.5	43.1	7 13.2	+51.9	43.2	33
34	2 54.8	+49.2	42.2	3 39.3	+49.6	42.2	4 23.7	+50.0	42.3	5 08.1	+50.3	42.3	5 52.4	+50.7	42.4	6 36.7	+51.1	42.5	7 20.9	+51.5	42.6	8 05.1	+51.8	42.6	34
35	3 44.0	+49.2	41.6	4 28.9	+49.5	41.7	5 13.7	+49.9	41.7	5 58.4	+50.3	41.8	6 43.1	+50.7	41.9	7 27.8	+51.1	41.9	8 12.4	+51.4	42.0	8 56.9	+51.8	42.1	35
36	4 33.2	+49.1	41.0	5 18.4	+49.5	41.1	6 03.6	+49.9	41.2	6 48.7	+50.3	41.2	7 33.8	+50.7	41.3	8 18.9	+51.0	41.4	9 03.8	+51.4	41.5	9 48.7	+51.8	41.6	36
37	5 22.3	+49.1	40.5	6 07.9	+49.5	40.5	6 53.5	+49.9	40.6	7 39.0	+50.3	40.7	8 24.5	+50.6	40.8	9 09.9	+51.0	40.9	9 55.2	+51.4	41.0	10 40.5	+51.7	41.1	37
38	6 11.4	+49.0	39.9	6 57.4	+49.4	40.0	7 43.4	+49.8	40.0	8 29.3	+50.2	40.1	9 15.1	+50.6	40.2	10 00.9	+50.9	40.3	10 46.6	+51.2	40.5	11 32.2	+51.6	40.6	38
39	7 00.4	+49.0	39.3	7 46.8	+49.4	39.4	8 33.2	+49.7	39.5	9 19.5	+50.1	39.6	10 05.7	+50.5	39.7	10 51.8	+50.9	39.8	11 37.8	+51.3	39.9	12 23.8	+51.6	40.1	39
40	7 49.4	+49.0	38.7	8 36.2	+49.4	38.8	9 22.9	+49.8	38.9	10 09.6	+50.1	39.0	10 56.2	+50.4	39.1	11 42.7	+50.8	39.3	12 29.1	+51.1	39.4	13 15.4	+51.5	39.5	40
41	8 38.4	+48.9	38.1	9 25.6	+49.2	38.2	10 12.7	+49.6	38.5	10 59.7	+50.0	38.5	11 46.6	+50.4	38.6	12 33.5	+50.7	38.7	13 20.2	+51.1	38.8	14 06.9	+51.4	39.0	41
42	9 27.3	+48.9	37.6	10 14.8	+49.3	37.7	11 02.3	+49.6	37.8	11 49.7	+49.9	37.9	12 37.0	+50.3	38.0	13 24.2	+50.7	38.2	14 11.3	+51.1	38.3	14 58.3	+51.4	38.5	42
43	10 16.2	+48.7	37.0	11 04.1	+49.1	37.1	11 51.9	+49.5	37.2	12 39.6	+49.9	37.3	13 27.3	+50.3	37.5	14 14.9	+50.6	37.6	15 02.4	+50.9	37.8	15 49.7	+51.3	38.0	43
44	11 04.9	+48.8	36.4	11 53.2	+49.1	36.5	12 41.4	+49.5	36.6	13 29.5	+49.8	36.8	14 17.6	+50.1	36.9	15 05.5	+50.5	37.1	15 53.3	+50.9	37.2	16 41.0	+51.2	37.4	44
45	11 53.7	+48.6	35.8	12 42.3	+49.0	35.9	13 30.9	+49.3	36.0	14 19.3	+49.7	36.2	15 07.7	+50.1	36.3	15 56.0	+50.4	36.5	16 44.2	+50.7	36.7	17 32.2	+51.1	36.9	45
46	12 42.3	+48.6	35.2	13 31.3	+48.9	35.3	14 20.2	+49.3	35.5	15 09.0	+49.7	35.6	15 57.8	+50.0	35.8	16 46.4	+50.3	35.9	17 34.9	+50.7	36.1	18 23.3	+51.1	36.3	46
47	13 30.9	+48.4	34.6	14 20.2	+48.8	34.7	15 09.5	+49.2	34.9	15 58.7	+49.5	35.0	16 47.8	+49.8	35.2	17 36.7	+50.3	35.4	18 25.6	+50.6	35.6	19 14.4	+50.9	35.8	47
48	14 19.3	+48.4	34.0	15 09.0	+48.8	34.1	15 58.7	+49.1	34.3	16 48.2	+49.4	34.4	17 37.6	+49.8	34.6	18 27.0	+50.1	34.8	19 16.2	+50.5	35.0	20 05.3	+50.8	35.2	48
49	15 07.7	+48.3	33.4	15 57.8	+48.6	33.5	16 47.8	+48.9	33.7	17 37.6	+49.4	33.8	18 27.4	+49.7	34.0	19 17.1	+50.0	34.2	20 06.7	+50.3	34.4	20 56.1	+50.7	34.6	49
50	15 56.0	+48.2	32.7	16 46.4	+48.5	32.9	17 36.7	+48.9	33.1	18 27.0	+49.2	33.2	19 17.1	+49.6	33.4	20 07.1	+49.9	33.6	20 57.0	+50.3	33.8	21 46.8	+50.6	34.1	50
51	16 44.2	+48.0	32.1	17 34.9	+48.4	32.3	18 25.6	+48.8	32.5	19 16.2	+49.1	32.6	20 06.7	+49.4	32.8	20 57.0	+49.8	33.0	21 47.3	+50.1	33.3	22 37.4	+50.4	33.5	51
52	17 32.2	+48.0	31.5	18 23.3	+48.3	31.7	19 14.4	+48.6	31.8	20 05.3	+48.9	32.0	20 56.1	+49.3	32.2	21 46.8	+49.6	32.4	22 37.4	+49.9	32.7	23 27.8	+50.3	32.9	52
53	18 20.2	+47.8	30.9	19 11.6	+48.2	31.0	20 03.0	+48.5	31.2	20 54.2	+48.9	31.4	21 45.4	+49.2	31.6	22 36.4	+49.5	31.8	23 27.3	+49.9	32.1	24 18.1	+50.2	32.3	53
54	19 08.0	+47.7	30.2	19 59.8	+48.0	30.4	20 51.5	+48.3	30.6	21 43.1	+48.7	30.8	22 34.6	+49.0	31.0	23 25.9	+49.4	31.2	24 17.2	+49.7	31.4	25 08.3	+50.0	31.7	54
55	19 55.7	+47.5	29.6	20 47.8	+47.9	29.8	21 39.8	+48.2	30.0	22 31.8	+48.5	30.2	23 23.6	+48.9	30.4	24 15.3	+49.2	30.6	25 06.9	+49.5	30.8	25 58.3	+49.9	31.1	55
56	20 43.2	+47.4	28.9	21 35.7	+47.7	29.1	22 28.0	+48.1	29.3	23 20.3	+48.4	29.5	24 12.5	+48.7	29.7	25 04.5	+49.0	30.0	25 56.4	+49.4	30.2	26 48.2	+49.7	30.5	56
57	21 30.6	+47.2	28.3	22 23.4	+47.6	28.5	23 16.1	+47.9	28.7	24 08.7	+48.2	28.9	25 01.2	+48.5	29.1	25 53.5	+48.9	29.3	26 45.8	+49.2	29.6	27 37.9	+49.5	29.8	57
58	22 17.8	+47.1	27.6	23 11.0	+47.4	27.8	24 04.0	+47.7	28.0	24 56.9	+48.1	28.2	25 49.7	+48.4	28.4	26 42.4	+48.7	28.7	27 35.0	+49.0	28.9	28 27.4	+49.4	29.2	58
59	23 04.9	+46.9	26.9	23 58.4	+47.2	27.1	24 51.7	+47.5	27.3	25 45.0	+47.8	27.6	26 38.1	+48.2	27.8	27 31.1	+48.5	28.0	28 24.0	+48.9	28.3	29 16.8	+49.2	28.5	59
60	23 51.8	+46.7	26.3	24 45.6	+47.0	26.5	25 39.2	+47.4	26.7	26 32.8	+47.7	26.9	27 26.3	+48.0	27.1	28 19.6	+48.3	27.4	29 12.9	+48.6	27.6	30 06.0	+48.9	27.9	60
61	24 38.5	+46.6	25.6	25 32.6	+46.9	25.8	26 26.6	+47.1	26.0	27 20.5	+47.5	26.2	28 14.3	+47.7	26.4	29 07.9	+48.1	26.7	30 01.5	+48.4	26.9	30 54.9	+48.8	27.2	61
62	25 25.1	+46.3	24.9	26 19.5	+46.6	25.1	27 13.7	+47.0	25.3	28 08.0	+47.2	25.5	29 02.0	+47.6	25.7	29 56.0	+47.9	25.9	30 49.9	+48.2	26.3	31 43.7	+48.5	26.5	62
63	26 11.4	+46.1	24.2	27 06.1	+46.4	24.4	28 00.7	+46.7	24.6	28 55.2	+47.0	24.8	29 49.6	+47.4	25.0	30 43.9	+47.7	25.3	31 38.1	+48.0	25.6	32 32.2	+48.3	25.8	63
64	26 57.5	+45.9	23.4	27 52.5	+46.2	23.7	28 47.4	+46.5	23.9	29 42.2	+46.8	24.1	30 37.0	+47.1	24.3	31 31.6	+47.4	24.6	32 26.1	+47.7	24.8	33 20.5	+48.0	25.1	64
65	27 43.4	+45.7	22.7	28 38.7	+46.0	22.9	29 33.9	+46.3	23.1	30 29.0	+46.6	23.4	31 24.1	+46.8	23.6	32 19.0	+47.2	23.9	33 13.8	+47.5	24.1	34 08.5	+47.8	24.4	65
66	28 29.1	+45.4	22.0	29 24.7	+45.7	22.2	30 20.2	+46.0	22.4	31 15.6	+46.3	22.6	32 10.9	+46.6	22.9	33 06.2	+46.9	23.1	34 01.3	+47.2	23.4	34 56.3	+47.5	23.7	66
67	29 14.5	+45.2	21.2	30 10.4	+45.5	21.4	31 06.2	+45.7	21.7	32 01.9	+46.1	21.9	32 57.5	+46.4	22.1	33 53.1	+46.6	22.4	34 48.5	+46.9	22.6	35 43.8	+47.3	22.9	67
68	29 59.7	+44.9	20.5	30 55.9	+45.1	20.7	31 51.9	+45.5	20.9	32 48.0	+45.7	21.1	33 43.9	+46.0	21.4	34 39.7	+46.3	21.6	35 35.4	+46.7	21.9	36 31.1	+46.9	22.2	68
69	30 44.6	+44.6	19.7	31 41.0	+45.0	19.9	32 37.4	+45.2	20.1	33 33.7	+45.5	20.4	34 29.9	+45.8	20.6	35 26.0	+46.1	20.8	36 22.1	+46.3	21.1	37 18.0	+46.6	21.4	69
70	31 29.2	+44.4	18.9	32 26.0	+44.6	19.1	33 22.6	+44.9	19.4	34 19.2	+45.1	19.6	35 15.7	+45.4	19.8	36 12.1	+45.7	20.1	37 08.4	+46.0	20.3	38 04.6	+46.3	20.6	70
71	32 13.6	+44.0	18.1	33 10.6	+44.3	18.3	34 07.5	+44.6	18.6	35 04.3	+44.9	18.8	36 01.1	+45.1	19.0	36 57.8	+45.4	19.2	37 54.4	+45.7	19.5	38 50.9	+46.0	19.8	71
72	32 57.6	+43.8	17.3	33 54.9	+44.0	17.5	34 52.1	+44.2	17.7	35 49.2	+44.5	18.0	36 46.2	+44.8	18.2	37 43.2	+45.0	18.4	38 40.1	+45.3	18.7	39 36.9	+45.5	18.9	72
73	33 41.4	+43.4	16.5	34 38.9	+43.6	16.7	35 36.3	+43.9	16.9	36 33.7	+44.1	17.1	37 31.0	+44.4	17.4	38 28.2	+44.7	17.6	39 25.4	+44.9	17.8	40 22.4	+45.3	18.1	73
74	34 24.8	+43.0	15.7	35 22.5	+43.3	15.9	36 20.2	+43.5	16.1	37 17.8	+43.8	16.3	38 15.4	+44.0	16.5	39 12.9	+44.3	16.7	40 10.3	+44.5	17.0	41 07.7	+44.8	17.2	74
75	35 07.8	+42.7	14.8	36 05.8	+42.9	15.0	37 03.7	+43.2	15.2	38 01.6	+43.4	15.4	38 59.4	+43.6	15.6	39 57.2	+43.9	15.9	40 54.8	+44.2	16.1	41 52.5	+44.3	16.3	75
76	35 50.5	+42.3	14.0	36 48.7	+42.6	14.2	37 46.9	+42.7	14.3	38 45.0	+43.0	14.5	39 43.0	+43.3	14.7	40 41.0	+43.5	15.0	41 39.0	+43.7	15.2	42 36.8	+44.0	15.4	76
77	36 32.8	+42.0	13.1	37 31.3	+42.1	13.3	38 29.6	+42.4	13.4	39 28.0	+42.5	13.6	40 26.3	+42.7	13.8	41 24.5	+43.0	14.0	42 22.7	+43.2	14.3	43 20.8	+43.5	14.5	77
78	37 14.8	+41.5	12.2	38 13.4	+41.7	12.4	39 12.0	+41.9	12.5	40 10.5	+42.2	12.7	41 09.0	+42.4	12.9	42 07.5	+42.5	13.1	43 05.9	+42.8	13.3	44 04.3	+43.0	13.5	78
79	37 56.3	+41.1	11.3	38 55.1	+41.3	11.4	39 53.9	+41.5	11.6	40 52.7	+41.6	11.8	41 51.4	+41.8	12.0	42 50.0	+42.1	12.2	43 48.7	+42.2	12.4	44 47.3	+42.5	12.6	79
80	38 37.4	+40.6	10.4	39 36.4	+40.8	10.5	40 35.4	+40.9	10.7	41 34.3	+41.2	10.8	42 33.2	+41.4	11.0	43 32.1	+41.5	11.2	44 30.9	+41.8	11.4	45 29.8	+41.9	11.6	80
81	39 18.0	+40.2	9.4	40 17.2	+40.3	9.5	41 16.3	+40.5	9.7	42 15.5	+40.6	9.8	43 14.6	+40.8	10.0	44 13.6	+41.1	10.2	45 12.7	+41.2	10.3	46 11.7	+41.4	10.5	81
82	39 58.2	+39.7	8.4	40 57.5	+39.8	8.6	41 56.8	+40.0	8.7	42 56.1	+40.2	8.8	43 55.4	+40.3	9.0	44 54.7	+40.4	9.1	45 53.9	+40.6	9.3	46 53.1	+40.8	9.5	82
83	40 37.9	+39.1	7.5	41 37.3	+39.3	7.6	42 36.8	+39.4	7.7	43 36.3	+39.5	7.8	44 35.7	+39.7	8.0	45 35.1	+39.9	8.1	46 34.5	+40.0	8.2	47 33.9	+40.1	8.4	83
84	41 17.0	+38.7	6.5	42 16.6	+38.8	6.6	43 16.2	+38.9	6.7	44 15.8	+39.0	6.8	45 15.4	+39.1	6.9	46 15.0	+39.2	7.0	47 14.5	+39.4	7.2	48 14.0	+39.5	7.3	84
85	41 55.7	+38.0	5.4	42 55.4	+38.2	5.5	43 55.1	+38.3	5.6	44 54.8	+38.4	5.7	45 54.5	+38.5	5.8	46 54.2	+38.6	5.9	47 53.9	+38.7	6.0	48 53.5	+38.8	6.2	85
86	42 33.7	+37.5	4.4	43 33.6	+37.5	4.5	44 33.4	+37.6	4.5	45 33.2	+37.7	4.6	46 33.0	+37.8	4.7	47 32.8	+37.9	4.8	48 32.6	+38.0	4.9	49 32.3	+38.1	5.0	86
87	43 11.2	+36.9	3.3	44 11.1	+37.0	3.4	45 11.0	+37.0	3.4	46 10.9	+37.1	3.5	47 10.8	+37.1	3.6	48 10.7	+37.2	3.6	49 10.6	+37.2	3.7	50 10.4	+37.4	3.8	87
88	43 48.1	+36.3	2.2	44 48.1	+36.3	2.3	45 48.0	+36.4	2.3	46 48.0	+36.4	2.4	47 47.9	+36.4	2.4	48 47.9	+36.4	2.5	49 47.8	+36.5	2.5	50 47.8	+36.5	2.6	88
89	44 24.4	+35.6	1.1	45 24.4	+35.6	1.2	46 24.4	+35.6	1.2	47 24.4	+35.6	1.2	48 24.3	+35.7	1.2	49 24.3	+35.7	1.2	50 24.3	+35.7	1.3	51 24.3	+35.7	1.3	89
90	45 00.0	+34.9	0.0	46 00.0	+34.9	0.0	47 00.0	+34.9	0.0	48 00.0	+34.9	0.0	49 00.0	+34.9	0.0	50 00.0	+34.9	0.0	51 00.0	+34.8	0.0	52 00.0	+34.8	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 126°, 234°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	23 55.6	+46.4	116.3	23 28.8	+47.0	116.7	23 01.7	+47.6	117.1	22 34.1	+48.3	117.5	22 06.3	+48.8	117.9	21 38.1	+49.4	118.2	21 09.6	+49.9	118.6	20 40.7	+50.5	118.9	0
1	24 42.0	+46.1	115.6	24 15.8	+46.8	116.1	23 49.3	+47.4	116.5	23 22.4	+48.0	116.8	22 55.1	+48.6	117.2	22 27.5	+49.2	117.6	21 59.5	+49.8	118.0	21 31.2	+50.4	118.3	1
2	25 28.1	+45.9	114.9	25 02.6	+46.6	115.4	24 36.7	+47.2	115.8	24 10.4	+47.9	116.2	23 43.7	+48.5	116.6	23 16.7	+49.1	117.0	22 49.3	+49.7	117.4	22 21.6	+50.2	117.7	2
3	26 14.0	+45.7	114.2	25 49.2	+46.4	114.7	25 23.9	+47.1	115.1	24 58.3	+47.7	115.5	24 32.2	+48.5	115.9	24 05.8	+48.9	116.3	23 39.0	+49.5	116.7	23 11.8	+50.1	117.1	3
4	26 59.7	+45.5	113.5	26 35.6	+46.1	114.0	26 11.0	+46.8	114.4	25 46.0	+47.5	114.9	25 20.6	+48.1	115.3	24 54.7	+48.8	115.7	24 28.5	+49.4	116.1	24 01.9	+49.9	116.5	4
5	27 45.2	+45.2	112.8	27 21.7	+46.0	113.2	26 57.8	+46.7	113.7	26 33.5	+47.3	114.2	26 08.7	+48.0	114.6	25 43.5	+48.6	115.1	25 17.9	+49.2	115.5	24 51.8	+49.8	115.9	5
6	28 30.4	+45.0	112.0	28 07.7	+45.7	112.5	27 44.5	+46.4	113.0	27 20.8	+47.1	113.5	26 56.7	+47.7	114.0	26 32.1	+48.4	114.4	26 07.1	+49.0	114.9	25 41.6	+49.7	115.3	6
7	29 15.4	+44.8	111.3	28 53.4	+45.5	111.8	28 30.9	+46.2	112.3	28 07.9	+46.9	112.8	27 44.4	+47.6	113.3	27 20.5	+48.2	113.8	26 56.1	+48.9	114.2	26 31.3	+49.5	114.7	7
8	30 00.2	+44.4	110.5	29 38.9	+45.2	111.0	29 17.1	+46.0	111.6	28 54.8	+46.7	112.1	28 32.0	+47.4	112.6	28 08.7	+48.1	113.1	27 45.0	+48.7	113.6	27 20.8	+49.3	114.0	8
9	30 44.6	+44.2	109.7	30 24.1	+45.0	110.3	30 03.1	+45.7	110.8	29 41.5	+46.4	111.4	29 19.4	+47.1	111.9	28 56.8	+47.8	112.4	28 33.7	+48.4	112.9	28 10.1	+49.1	113.4	9
10	31 28.8	+43.9	108.9	31 09.1	+44.6	109.5	30 48.8	+45.4	110.1	30 27.9	+46.2	110.6	30 06.5	+46.9	111.2	29 44.6	+47.6	111.7	29 22.1	+48.3	112.2	28 59.2	+48.7	112.7	10
11	32 12.7	+43.6	108.1	31 53.7	+44.4	108.7	31 34.2	+45.2	109.3	31 14.1	+45.9	109.9	30 53.4	+46.7	110.4	30 32.2	+47.3	111.0	30 10.4	+48.1	111.5	29 48.1	+48.7	112.1	11
12	32 56.3	+43.2	107.3	32 38.1	+44.1	107.9	32 19.4	+44.8	108.5	32 00.0	+45.6	109.1	31 40.1	+46.3	109.7	31 19.5	+47.2	110.3	30 58.5	+47.8	110.9	30 36.8	+48.5	111.4	12
13	33 39.5	+43.0	106.5	33 22.2	+43.8	107.1	33 04.2	+44.6	107.7	32 45.6	+45.4	108.4	32 26.4	+46.2	109.0	32 06.7	+46.8	109.6	31 46.3	+47.6	110.1	31 25.3	+48.3	110.7	13
14	34 22.5	+42.5	105.6	34 06.0	+43.4	106.3	33 48.8	+44.3	106.9	33 31.0	+45.1	107.6	33 12.6	+45.8	108.2	32 53.5	+46.6	108.8	32 33.9	+47.3	109.4	32 13.6	+48.1	110.0	14
15	35 05.0	+42.2	104.8	34 49.4	+43.0	105.5	34 33.1	+43.9	106.1	34 16.1	+44.7	106.8	33 58.4	+45.6	107.4	33 40.1	+46.4	108.1	33 21.2	+47.1	108.7	33 01.7	+47.8	109.3	15
16	35 47.2	+41.8	103.9	35 32.4	+42.7	104.6	35 17.0	+43.5	105.3	35 00.8	+44.4	106.0	34 44.0	+45.2	106.6	34 26.5	+46.0	107.3	34 08.3	+46.8	107.9	33 49.5	+47.5	108.6	16
17	36 29.0	+41.4	103.0	36 15.1	+42.4	103.7	36 00.5	+43.3	104.4	35 45.2	+44.1	105.1	35 29.2	+44.9	105.8	35 12.5	+45.7	106.5	34 55.1	+46.5	107.2	34 37.0	+47.3	107.8	17
18	37 10.4	+41.0	102.1	36 57.5	+41.9	102.9	36 43.8	+42.8	103.6	36 29.3	+43.7	104.3	36 14.1	+44.6	105.0	35 58.2	+45.4	105.7	35 41.6	+46.2	106.4	35 24.3	+47.0	107.1	18
19	37 51.4	+40.6	101.2	37 39.4	+41.5	102.0	37 26.6	+42.4	102.7	37 13.0	+43.3	103.4	36 58.7	+44.2	104.2	36 43.6	+45.1	104.9	36 27.8	+45.9	105.6	36 11.3	+46.7	106.3	19
20	38 32.0	+40.1	100.3	38 20.9	+41.1	101.1	38 09.0	+42.0	101.8	37 56.3	+43.0	102.6	37 42.9	+43.8	103.3	37 28.7	+44.7	104.1	37 13.7	+45.6	104.8	36 58.0	+46.4	105.5	20
21	39 12.1	+39.6	99.3	39 02.0	+40.6	100.1	38 51.0	+41.6	100.9	38 39.3	+42.5	101.7	38 26.7	+43.5	102.5	38 13.4	+44.3	103.2	37 59.3	+45.2	104.0	37 44.4	+46.0	104.7	21
22	39 51.7	+39.1	98.3	39 42.6	+40.1	99.1	39 32.6	+41.1	100.0	39 21.8	+42.1	100.8	39 10.2	+43.0	101.6	38 57.7	+44.0	102.4	38 44.5	+44.8	103.2	38 30.4	+45.7	103.9	22
23	40 30.8	+38.6	97.3	40 22.7	+39.6	98.2	40 13.7	+40.7	99.0	40 03.9	+41.6	99.8	39 53.2	+42.6	100.7	39 41.7	+43.5	101.5	39 29.3	+44.5	102.3	39 16.1	+45.4	103.1	23
24	41 09.4	+38.1	96.3	41 02.3	+39.2	97.2	40 54.4	+40.2	98.0	40 45.5	+41.2	98.9	40 35.8	+42.2	99.8	40 25.2	+43.1	100.6	40 13.8	+44.0	101.4	40 01.5	+44.9	102.3	24
25	41 47.5	+37.5	95.3	41 41.5	+38.5	96.2	41 34.6	+39.6	97.1	41 26.7	+40.7	97.9	41 18.0	+41.7	98.8	41 08.3	+42.7	99.7	40 57.8	+43.6	100.5	40 46.4	+44.6	101.4	25
26	42 25.0	+36.9	94.2	42 20.0	+38.1	95.1	42 14.2	+39.1	96.1	42 07.4	+40.2	97.0	41 59.7	+41.2	97.8	41 51.0	+42.2	98.7	41 41.4	+43.2	99.6	41 31.0	+44.1	100.5	26
27	43 01.9	+36.2	93.2	42 58.1	+37.4	94.1	42 53.3	+38.5	95.0	42 47.6	+39.6	95.9	42 40.9	+40.6	96.9	42 33.2	+41.7	97.8	42 24.6	+42.7	98.7	42 15.1	+43.7	99.6	27
28	43 38.1	+35.7	92.1	43 35.5	+36.8	93.0	43 31.8	+38.0	94.0	43 27.2	+39.0	94.9	43 21.5	+40.0	95.9	43 14.9	+41.2	96.8	43 07.3	+42.3	97.7	42 58.8	+43.2	98.7	28
29	44 13.8	+35.0	91.0	44 12.3	+36.2	91.9	44 09.8	+37.3	92.9	44 06.2	+38.5	93.9	44 01.7	+39.6	94.8	43 56.1	+40.7	95.8	43 49.6	+41.7	96.7	43 42.0	+42.8	97.7	29
30	44 48.8	+34.3	89.8	44 48.5	+35.5	90.8	44 47.1	+36.7	91.8	44 44.7	+37.8	92.8	44 41.3	+38.9	93.8	44 36.8	+40.1	94.8	44 31.3	+41.2	95.7	44 24.8	+42.2	96.7	30
31	45 23.1	+33.5	88.7	45 24.0	+34.8	89.7	45 23.8	+36.0	90.7	45 22.5	+37.2	91.7	45 20.2	+38.4	92.7	45 16.9	+39.5	93.7	45 12.5	+40.6	94.7	45 07.0	+41.7	95.7	31
32	45 56.6	+32.9	87.5	45 58.8	+34.0	88.5	45 59.8	+35.3	89.5	45 59.7	+36.5	90.6	45 58.6	+37.7	91.6	45 56.4	+38.9	92.6	45 53.1	+40.0	93.7	45 48.7	+41.1	94.7	32
33	46 29.5	+32.0	86.3	46 32.8	+33.3	87.3	46 35.1	+34.6	88.4	46 36.3	+35.8	89.4	46 36.3	+37.0	90.5	46 35.3	+38.2	91.5	46 33.1	+39.4	92.6	46 29.8	+40.6	93.6	33
34	47 01.5	+31.2	85.0	47 06.1	+32.6	86.1	47 09.7	+33.8	87.2	47 12.1	+35.1	88.2	47 13.3	+36.4	89.3	47 13.5	+37.5	90.4	47 12.5	+38.7	91.5	47 10.4	+39.9	92.6	34
35	47 32.7	+30.4	83.8	47 38.7	+31.7	84.9	47 43.5	+33.0	85.9	47 47.2	+34.3	87.0	47 49.7	+35.6	88.1	47 51.0	+36.9	89.3	47 51.2	+38.1	90.4	47 50.3	+39.2	91.5	35
36	48 03.1	+29.5	82.5	48 10.4	+30.8	83.6	48 16.5	+32.2	84.7	48 21.5	+33.5	85.8	48 25.3	+34.8	86.9	48 27.9	+36.1	88.1	48 29.3	+37.3	89.2	48 29.5	+38.6	90.3	36
37	48 32.6	+28.6	81.2	48 41.2	+30.0	82.3	48 48.7	+31.3	83.4	48 55.0	+32.7	84.6	49 00.1	+34.0	85.7	49 04.0	+35.3	86.9	49 06.6	+36.6	88.0	49 08.1	+37.9	89.2	37
38	49 01.2	+27.7	79.8	49 11.2	+29.1	81.0	49 20.0	+30.5	82.1	49 27.7	+31.8	83.3	49 34.1	+33.1	84.4	49 39.3	+34.5	85.6	49 43.2	+35.9	86.8	49 46.0	+37.1	88.0	38
39	49 28.9	+26.6	78.5	49 40.3	+28.1	79.6	49 50.5	+29.5	80.8	49 59.5	+30.9	82.0	50 07.2	+32.3	83.2	50 13.8	+33.6	84.3	50 19.1	+34.9	85.5	50 23.1	+36.3	86.7	39
40	49 55.5	+25.7	77.1	50 08.4	+27.1	78.3	50 20.0	+28.5	79.4	50 30.4	+29.9	80.6	50 39.5	+31.4	81.8	50 47.4	+32.8	83.0	50 54.0	+34.2	84.3	50 59.4	+35.5	85.5	40
41	50 21.2	+24.7	75.7	50 35.5	+26.1	76.9	50 48.5	+27.5	78.1	51 00.3	+29.0	79.3	51 10.9	+30.4	80.5	51 20.2	+31.8	81.7	51 28.2	+33.2	82.9	51 34.9	+34.6	84.2	41
42	50 45.9	+23.5	74.2	51 01.6	+25.0	75.4	51 16.0	+26.5	76.6	51 29.3	+27.9	77.9	51 41.3	+29.4	79.1	51 52.0	+30.8	80.3	52 01.4	+32.3	81.6	52 09.5	+33.7	82.9	42
43	51 09.4	+22.5	72.8	51 26.6	+23.9	74.0	51 42.5	+25.4	75.2	51 57.2	+26.9	76.4	52 10.7	+28.3	77.7	52 22.8	+29.9	78.9	52 33.7	+31.3	80.2	52 43.2	+32.7	81.5	43
44	51 31.9	+21.3	71.3	51 50.5	+22.8	72.5	52 07.9	+24.3	73.7	52 24.1	+25.8	75.0	52 39.0	+27.3	76.2	52 52.7	+28.8	77.5	53 05.0	+30.3	78.8	53 15.9	+31.8	80.1	44
45	51 53.2	+20.1	69.8	52 13.3	+21.7	71.0	52 32.2	+23.2	72.2	52 49.9	+24.7	73.5	53 06.3	+26.2	74.8	53 21.5	+27.7	76.1	53 35.3	+29.2	77.4	53 47.7	+30.7	78.7	45
46	52 13.3	+18.9	68.3	52 35.0	+20.4	69.5	52 55.4	+21.9	70.7	53 14.6	+23.5	72.0	53 32.5	+25.0	73.3	53 49.2	+26.5	74.6	54 04.5	+28.0	75.9	54 18.4	+29.6	77.2	46
47	52 32.2	+17.7	66.7	52 55.4	+19.2	67.9	53 17.3	+20.8	69.2	53 38.1	+22.2	70.4	53 57.5	+23.9	71.7	54 15.7	+25.4	73.0	54 32.5	+27.0	74.4	54 48.0	+28.5	75.7	47
48	52 49.9	+16.4	65.1	53 14.6	+17.9	66.3	53 38.1	+19.4	67.6	54 00.3	+21.1	68.9	54 21.4	+22.5	70.1	54 41.1	+24.1	71.5	54 59.5	+25.7	72.8	55 16.5	+27.3	74.2	48
49	53 06.3	+15.2	63.5	53 32.5	+16.7	64.7	53 57.5	+18.2	66.0	54 21.4	+19.7	67.3	54 43.9	+21.3	68.6	55 05.2	+22.9	69.9	55 25.2	+24.5	71.2	55 43.8	+26.1	72.6	49
50	53 21.5	+13.8	61.9	53 49.2	+15.3	63.1	54 15.7	+16.8	64.4	54 41.1	+18.4	65.6	55 05.2	+20.0	66.9	55 28.1	+21.6	68.3	55 49.7	+23.1	69.6	56 09.9	+24.7	71.0	50
51	53 35.3	+12.4	60.3	54 04.5	+13.9	61.5	54 32.5	+15.5	62.7	54 59.5	+17.0	64.0	55 25.2	+18.6	65.3	55 49.7	+20.2	66.6	56 12.8	+21.8	68.0	56 34.6	+23.5	69.4	51
52	53 47.7	+11.1	58.6	54 18.4	+12.6	59.8	54 48.0	+14.1	61.0	55 16.5	+15.6	62.3	55 43.8	+17.2	63.6	56 09.9	+18.8	64.9	56 34.6	+20.5	66.3	56 58.1	+22.1	67.7	52
53	53 58.8	+9.6	57.0	54 31.0	+11.1	58.1	55 02.1	+12.7	59.3	55 32.1	+14.2	60.6	56 01.0	+15.8	61.9	56 28.7	+17.3	63.2	56 55.1	+19.0	64.6	57 20.2	+20.6	66.0	53
54	54 08.4	+8.3	55.3	54 42.1	+9.7	56.4	55 14.8	+11.2	57.6	55 46.3	+12.8	58.9	56 16.8	+14.3	60.1	56 46.0	+15.9	61.5	57 14.1	+17.5	62.8	57 40.8	+19.2	64.2	54
55	54 16.7	+6.8	53.6	54 51.8	+8.3	54.7	55 26.0	+9.7	55.9	55 59.1	+11.2	57.1	56 31.1	+12.8	58.4	57 01.9	+14.4	59.7	57 31.6	+16.0	61.1	58 00.0	+17.7	62.5	55
56	54 23.5	+5.4	51.9	55 00.1	+6.8	53.0	55 35.7	+8.2	54.2	56 10.3	+9.7	55.4	56 43.9	+11.2	56.6	57 16.3	+12.9	57.9	57 47.6	+14.5	59.3	58 17.7	+16.0	60.6	56
57	54 28.9	+3.9	50.2	55 06.9	+5.3	51.3	55 43.9	+6.8	52.4	56 20.0	+8.2	53.6	56 55.1	+9.8	54.8	57 29.2	+11.2	56.1	58 02.1	+12.8	57.4	58 33.7	+14.5	58.8	57
58	54 32.8	+2.4	48.4	55 12.2	+3.8	49.5	55 50.7	+5.2	50.6	56 28.2	+6.7	51.8	57 04.9	+8.1	53.0	57 40.4	+9.7	54.3	58 14.9	+11.2	55.6	58 48.2	+12.9	56.9	58
59	54 35.2	+1.0	46.7	55 16.0	+2.3	47.8	55 55.9	+3.8	48.9	56 34.9	+5.1	50.0	57 13.0	+6.5	51.2	57 50.1	+8.0	52.4	58 26.1	+9.5	53.7	59 01.1	+11.2	55.0	59
60	54 36.2	−0.5	45.0	55 18.3	+0.7	46.0	55 59.5	+2.1	47.1	56 40.0	+3.4	48.2	57 19.5	+4.9	49.3	57 58.1	+6.4	50.6	58 35.7	+7.9	51.8	59 12.3	+9.5	53.1	60
61	54 35.7	−2.0	43.3	55 19.0	−0.7	44.3	56 01.6	+0.6	45.3	56 43.4	+1.9	46.4	57 24.4	+3.3	47.5	58 04.5	+4.7	48.7	58 43.6	+6.2	49.9	59 21.8	+7.7	51.2	61
62	54 33.7	−3.4	41.5	55 18.3	−2.2	42.5	56 02.2	−1.0	43.5	56 45.3	+0.3	44.5	57 27.7	+1.6	45.6	58 09.2	+3.1	46.8	58 49.8	+4.5	48.0	59 29.5	+6.0	49.2	62
63	54 30.3	−4.9	39.8	55 16.1	−3.8	40.7	56 01.2	−2.6	41.7	56 45.6	−1.3	42.7	57 29.3	0.0	43.8	58 12.3	+1.3	44.9	58 54.3	+2.8	46.1	59 35.5	+4.2	47.3	63
64	54 25.4	−6.3	38.1	55 12.3	−5.2	39.0	55 58.6	−4.0	39.9	56 44.3	−2.9	40.9	57 29.3	−1.6	41.9	58 13.6	−0.3	43.0	58 57.1	+1.0	44.1	59 39.7	+2.5	45.3	64
65	54 19.1	−7.8	36.4	55 07.1	−6.7	37.3	55 54.6	−5.7	38.1	56 41.4	−4.4	39.1	57 27.7	−3.3	40.1	58 13.3	−2.1	41.1	58 58.1	−0.7	42.2	59 42.2	+0.9	43.3	65
66	54 11.3	−9.2	34.7	55 00.3	−8.2	35.5	55 48.9	−7.1	36.4	56 37.0	−6.1	37.3	57 24.4	−4.9	38.2	58 11.2	−3.7	39.2	58 57.4	−2.5	40.2	59 42.8	−1.1	41.3	66
67	54 02.1	−10.7	33.0	54 52.1	−9.6	33.8	55 41.8	−8.7	34.6	56 30.9	−7.6	35.5	57 19.5	−6.5	36.4	58 07.5	−5.4	37.3	58 54.9	−4.2	38.3	59 41.7	−3.0	39.4	67
68	53 51.4	−12.0	31.4	54 42.5	−11.1	32.1	55 33.1	−10.1	32.9	56 23.3	−9.2	33.7	57 13.0	−8.2	34.5	58 02.1	−7.0	35.4	58 50.7	−5.9	36.4	59 38.7	−4.7	37.4	68
69	53 39.4	−13.3	29.7	54 31.4	−12.5	30.4	55 23.0	−11.7	31.1	56 14.1	−10.7	31.9	57 04.8	−9.7	32.7	57 55.1	−8.7	33.6	58 44.8	−7.6	34.5	59 34.0	−6.5	35.4	69
70	53 26.1	−14.7	28.1	54 18.9	−13.9	28.7	55 11.3	−13.0	29.4	56 03.4	−12.2	30.1	56 55.1	−11.2	30.9	57 46.4	−10.3	31.7	58 37.2	−9.3	32.6	59 27.5	−8.2	33.5	70
71	53 11.4	−16.0	26.4	54 05.0	−15.3	27.0	54 58.3	−14.5	27.7	55 51.2	−13.6	28.4	56 43.9	−12.8	29.1	57 36.1	−11.9	29.9	58 27.9	−10.9	30.7	59 19.3	−9.9	31.5	71
72	52 55.4	−17.3	24.8	53 49.7	−16.6	25.4	54 43.8	−15.9	26.0	55 37.6	−15.1	26.6	56 31.1	−14.4	27.3	57 24.2	−13.5	28.0	58 17.0	−12.6	28.8	59 09.4	−11.7	29.6	72
73	52 38.1	−18.5	23.2	53 33.1	−17.8	23.8	54 27.9	−17.2	24.3	55 22.5	−16.5	24.9	56 16.7	−15.7	25.6	57 10.7	−15.0	26.2	58 04.4	−14.2	26.9	58 57.7	−13.3	27.7	73
74	52 19.6	−19.7	21.7	53 15.3	−19.2	22.2	54 10.7	−18.5	22.7	55 06.0	−17.9	23.2	56 01.0	−17.2	23.8	56 55.7	−16.5	24.4	57 50.2	−15.7	25.1	58 44.4	−15.0	25.8	74
75	51 59.9	−21.0	20.1	52 56.1	−20.4	20.6	53 52.2	−19.8	21.1	54 48.1	−19.3	21.6	55 43.8	−18.6	22.1	56 39.2	−17.9	22.7	57 34.5	−17.3	23.3	58 29.4	−16.5	23.9	75
76	51 38.9	−22.1	18.6	52 35.7	−21.6	19.0	53 32.4	−21.1	19.5	54 28.8	−20.5	19.9	55 25.2	−20.0	20.4	56 21.3	−19.4	21.0	57 17.2	−18.7	21.5	58 12.9	−18.1	22.1	76
77	51 16.8	−23.2	17.1	52 14.1	−22.7	17.5	53 11.3	−22.3	17.9	54 08.3	−21.8	18.3	55 05.2	−21.3	18.8	56 01.9	−20.7	19.3	56 58.5	−20.2	19.8	57 54.8	−19.6	20.3	77
78	50 53.6	−24.3	15.7	51 51.4	−23.9	16.0	52 49.0	−23.5	16.4	53 46.5	−23.0	16.7	54 43.9	−22.6	17.2	55 41.2	−22.1	17.6	56 38.3	−21.6	18.0	57 35.2	−21.0	18.5	78
79	50 29.3	−25.3	14.2	51 27.5	−25.0	14.5	52 25.5	−24.6	14.9	53 23.5	−24.3	15.2	54 21.3	−23.8	15.6	55 19.1	−23.4	15.9	56 16.7	−22.9	16.4	57 14.2	−22.5	16.8	79
80	50 04.0	−26.4	12.8	51 02.5	−26.1	13.1	52 00.9	−25.7	13.4	52 59.2	−25.3	13.7	53 57.5	−25.0	14.0	54 55.7	−24.7	14.3	55 53.8	−24.3	14.7	56 51.7	−23.8	15.1	80
81	49 37.6	−27.3	11.4	50 36.4	−27.0	11.6	51 35.2	−26.8	11.9	52 33.9	−26.5	12.2	53 32.5	−26.2	12.5	54 31.0	−25.8	12.8	55 29.5	−25.5	13.1	56 27.9	−25.1	13.4	81
82	49 10.3	−28.3	10.0	50 09.4	−28.1	10.2	51 08.4	−27.8	10.5	52 07.4	−27.6	10.7	53 06.3	−27.3	10.9	54 05.2	−27.0	11.2	55 04.0	−26.7	11.5	56 02.8	−26.4	11.8	82
83	48 42.0	−29.2	8.7	49 41.3	−29.0	8.9	50 40.6	−28.9	9.1	51 39.8	−28.6	9.3	52 39.0	−28.4	9.5	53 38.2	−28.2	9.7	54 37.3	−27.9	9.9	55 36.4	−27.7	10.2	83
84	48 12.8	−30.1	7.4	49 12.3	−30.0	7.5	50 11.7	−29.7	7.7	51 11.2	−29.6	7.9	52 10.6	−29.4	8.0	53 10.0	−29.2	8.2	54 09.4	−29.0	8.4	55 08.7	−28.8	8.6	84
85	47 42.7	−31.0	6.1	48 42.3	−30.8	6.2	49 42.0	−30.7	6.3	50 41.6	−30.5	6.5	51 41.2	−30.4	6.6	52 40.8	−30.2	6.8	53 40.4	−30.1	6.9	54 39.9	−29.9	7.1	85
86	47 11.7	−31.7	4.8	48 11.5	−31.7	4.9	49 11.3	−31.6	5.0	50 11.1	−31.5	5.1	51 10.8	−31.4	5.2	52 10.6	−31.3	5.3	53 10.3	−31.1	5.5	54 10.0	−31.0	5.6	86
87	46 40.0	−32.4	3.6	47 39.8	−32.3	3.6	48 39.7	−32.4	3.7	49 39.6	−32.4	3.8	50 39.4	−32.2	3.9	51 39.3	−32.2	4.0	52 39.2	−32.2	4.1	53 39.0	−32.0	4.1	87
88	46 07.4	−33.3	2.4	47 07.3	−33.3	2.4	48 07.3	−33.3	2.5	49 07.2	−33.2	2.5	50 07.2	−33.2	2.6	51 07.1	−33.1	2.6	52 07.0	−33.0	2.7	53 07.0	−33.0	2.7	88
89	45 34.1	−34.1	1.2	46 34.0	−34.0	1.2	47 34.0	−34.0	1.2	48 34.0	−34.0	1.2	49 34.0	−34.0	1.3	50 34.0	−34.0	1.3	51 34.0	−34.0	1.3	52 34.0	−34.0	1.3	89
90	45 00.0	−34.8	0.0	46 00.0	−34.8	0.0	47 00.0	−34.8	0.0	48 00.0	−34.8	0.0	49 00.0	−34.8	0.0	50 00.0	−34.8	0.0	51 00.0	−34.8	0.0	52 00.0	−34.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	23 55.6	−46.5	116.3	23 28.8	−47.1	116.7	23 01.7	−47.8	117.1	22 34.1	−48.3	117.5	22 06.3	−49.0	117.9	21 38.1	−49.5	118.2	21 09.6	−50.1	118.6	20 40.7	−50.6	118.9	0
1	23 09.1	−46.6	117.0	22 41.7	−47.3	117.4	22 13.9	−47.9	117.8	21 45.8	−48.5	118.1	21 17.3	−49.0	118.5	20 48.6	−49.7	118.8	20 19.5	−50.2	119.1	19 50.1	−50.7	119.5	1
2	22 22.5	−46.9	117.7	21 54.4	−47.5	118.1	21 26.0	−48.1	118.4	20 57.3	−48.7	118.8	20 28.3	−49.3	119.1	19 58.9	−49.7	119.4	19 29.3	−50.3	119.7	18 59.4	−50.8	120.0	2
3	21 35.6	−47.0	118.4	21 06.9	−47.6	118.7	20 37.9	−48.2	119.1	20 08.6	−48.7	119.4	19 39.0	−49.3	119.7	19 09.2	−49.9	120.0	18 39.0	−50.4	120.3	18 08.6	−50.9	120.6	3
4	20 48.6	−47.2	119.1	20 19.3	−47.8	119.4	19 49.7	−48.3	119.7	19 19.9	−48.9	120.0	18 49.7	−49.4	120.3	18 19.3	−50.0	120.6	17 48.6	−50.4	120.9	17 17.7	−51.0	121.1	4
5	20 01.4	−47.3	119.7	19 31.5	−47.9	120.0	19 01.4	−48.5	120.3	18 31.0	−49.1	120.6	18 00.3	−49.6	120.9	17 29.3	−50.0	121.2	16 58.2	−50.6	121.4	16 26.7	−51.0	121.7	5
6	19 14.1	−47.4	120.4	18 43.6	−48.0	120.7	18 12.9	−48.6	120.9	17 41.9	−49.1	121.2	17 10.7	−49.6	121.5	16 39.3	−50.2	121.8	16 07.6	−50.7	122.0	15 35.7	−51.2	122.2	6
7	18 26.7	−47.6	121.0	17 55.6	−48.1	121.3	17 24.3	−48.7	121.6	16 52.8	−49.2	121.8	16 21.1	−49.8	122.1	15 49.1	−50.3	122.3	15 16.9	−50.8	122.6	14 44.5	−51.2	122.8	7
8	17 39.1	−47.7	121.7	17 07.5	−48.3	121.9	16 35.6	−48.8	122.2	16 03.6	−49.4	122.4	15 31.3	−49.8	122.7	14 58.8	−50.3	122.9	14 26.1	−50.8	123.1	13 53.3	−51.3	123.3	8
9	16 51.4	−47.8	122.3	16 19.2	−48.4	122.5	15 46.8	−48.9	122.8	15 14.2	−49.4	123.0	14 41.5	−50.0	123.2	14 08.5	−50.4	123.5	13 35.3	−50.9	123.7	13 02.0	−51.4	123.9	9
10	16 03.6	−48.0	122.9	15 30.8	−48.4	123.2	14 57.9	−49.0	123.4	14 24.8	−49.5	123.6	13 51.5	−50.0	123.8	13 18.1	−50.5	124.0	12 44.4	−51.0	124.2	12 10.6	−51.4	124.4	10
11	15 15.6	−48.0	123.5	14 42.4	−48.6	123.8	14 08.9	−49.1	124.0	13 35.3	−49.6	124.2	13 01.5	−50.1	124.4	12 27.6	−50.6	124.6	11 53.4	−51.0	124.7	11 19.2	−51.5	124.9	11
12	14 27.6	−48.1	124.2	13 53.8	−48.6	124.4	13 19.8	−49.1	124.6	12 45.7	−49.6	124.8	12 11.4	−50.1	124.9	11 37.0	−50.6	125.1	11 02.4	−51.1	125.3	10 27.7	−51.5	125.4	12
13	13 39.5	−48.3	124.8	13 05.2	−48.8	125.0	12 30.7	−49.3	125.2	11 56.1	−49.8	125.3	11 21.3	−50.2	125.5	10 46.4	−50.7	125.7	10 11.3	−51.1	125.8	9 36.2	−51.6	126.0	13
14	12 51.2	−48.3	125.4	12 16.4	−48.8	125.6	11 41.4	−49.3	125.7	11 06.3	−49.8	125.9	10 31.1	−50.3	126.1	9 55.7	−50.7	126.2	9 20.2	−51.2	126.3	8 44.6	−51.6	126.5	14
15	12 02.9	−48.3	126.0	11 27.6	−48.9	126.2	10 52.1	−49.3	126.3	10 16.5	−49.8	126.5	9 40.8	−50.3	126.6	9 05.0	−50.8	126.7	8 29.0	−51.2	126.9	7 53.0	−51.7	127.0	15
16	11 14.6	−48.5	126.6	10 38.7	−48.9	126.8	10 02.8	−49.5	126.9	9 26.7	−49.9	127.0	8 50.5	−50.4	127.2	8 14.2	−50.8	127.3	7 37.8	−51.3	127.4	7 01.3	−51.7	127.5	16
17	10 26.1	−48.5	127.2	9 49.8	−49.0	127.3	9 13.3	−49.5	127.5	8 36.8	−50.0	127.6	8 00.1	−50.4	127.7	7 23.4	−50.9	127.8	6 46.5	−51.3	127.9	6 09.6	−51.7	128.0	17
18	9 37.6	−48.6	127.8	9 00.8	−49.1	127.9	8 23.8	−49.5	128.0	7 46.8	−50.0	128.2	7 09.7	−50.5	128.3	6 32.5	−50.9	128.4	5 55.2	−51.3	128.4	5 17.9	−51.8	128.5	18
19	8 49.0	−48.6	128.4	8 11.7	−49.1	128.5	7 34.3	−49.6	128.7	6 56.8	−50.0	128.7	6 19.2	−50.5	128.8	5 41.6	−50.9	128.9	5 03.9	−51.4	129.0	4 26.1	−51.7	129.0	19
20	8 00.4	−48.7	129.0	7 22.6	−49.2	129.1	6 44.7	−49.6	129.2	6 06.8	−50.1	129.3	5 28.7	−50.5	129.4	4 50.7	−51.0	129.4	4 12.5	−51.3	129.5	3 34.4	−51.8	129.5	20
21	7 11.7	−48.8	129.6	6 33.4	−49.2	129.7	5 55.1	−49.7	129.8	5 16.7	−50.1	129.8	4 38.2	−50.5	129.9	3 59.7	−51.0	129.9	3 21.2	−51.4	130.0	2 42.6	−51.8	130.0	21
22	6 22.9	−48.7	130.2	5 44.2	−49.2	130.2	5 05.4	−49.7	130.3	4 26.6	−50.2	130.4	3 47.7	−50.6	130.4	3 08.7	−50.9	130.5	2 29.8	−51.4	130.5	1 50.8	−51.8	130.5	22
23	5 34.2	−48.9	130.7	4 55.0	−49.3	130.8	4 15.7	−49.7	130.9	3 36.4	−50.1	130.9	2 57.1	−50.6	131.0	2 17.8	−51.0	131.0	1 38.4	−51.4	131.0	0 59.0	−51.8	131.0	23
24	4 45.3	−48.8	131.3	4 05.7	−49.3	131.4	3 26.0	−49.7	131.4	2 46.3	−50.2	131.5	2 06.5	−50.6	131.5	1 26.8	−51.0	131.5	0 47.0	−51.4	131.5	0 07.2	−51.8	131.6	24
25	3 56.5	−48.9	131.9	3 16.4	−49.3	132.0	2 36.3	−49.8	132.0	1 56.1	−50.2	132.0	1 15.9	−50.6	132.0	0 35.8	−51.1	132.1	0 04.4	+51.5	47.9	0 44.6	+51.8	47.9	25
26	3 07.6	−48.8	132.5	2 27.1	−49.3	132.5	1 46.5	−49.7	132.6	1 05.9	−50.1	132.6	0 25.3	−50.6	132.6	0 15.3	+51.0	47.4	0 55.9	+51.4	47.4	1 36.4	+51.8	47.4	26
27	2 18.8	−48.9	133.1	1 37.8	−49.4	133.1	0 56.8	−49.8	133.1	0 15.8	−50.2	133.1	0 25.3	+50.5	46.9	1 06.3	+51.0	46.9	1 47.3	+51.4	46.9	2 28.2	+51.8	46.9	27
28	1 29.9	−48.9	133.7	0 48.4	−49.3	133.7	0 07.0	−49.8	133.7	0 34.4	+50.2	46.3	1 15.8	+50.6	46.3	1 57.3	+51.0	46.4	2 38.7	+51.3	46.4	3 20.0	+51.8	46.4	28
29	0 41.0	−48.9	134.2	0 00.9	+49.3	45.8	0 42.8	+49.7	45.8	1 24.6	+50.2	45.8	2 06.4	+50.6	45.8	2 48.3	+50.9	45.8	3 30.0	+51.4	45.9	4 11.8	+51.8	45.9	29
30	0 07.9	+49.0	45.2	0 50.2	+49.4	45.2	1 32.5	+49.8	45.2	2 14.8	+50.1	45.2	2 57.0	+50.6	45.3	3 39.2	+51.0	45.3	4 21.4	+51.4	45.4	5 03.6	+51.7	45.4	30
31	0 56.9	+48.9	44.6	1 39.6	+49.3	44.6	2 22.3	+49.7	44.7	3 04.9	+50.2	44.7	3 47.6	+50.5	44.7	4 30.2	+50.9	44.8	5 12.8	+51.3	44.8	5 55.3	+51.7	44.9	31
32	1 45.8	+48.8	44.0	2 28.9	+49.3	44.1	3 12.0	+49.7	44.1	3 55.1	+50.1	44.1	4 38.1	+50.6	44.2	5 21.1	+50.9	44.2	6 04.1	+51.3	44.3	6 47.0	+51.7	44.4	32
33	2 34.6	+48.8	43.4	3 18.2	+49.3	43.5	4 01.7	+49.7	43.5	4 45.2	+50.1	43.6	5 28.6	+50.5	43.6	6 12.0	+50.9	43.7	6 55.4	+51.2	43.8	7 38.7	+51.6	43.9	33
34	3 23.5	+48.9	42.9	4 07.5	+49.2	42.9	4 51.4	+49.7	43.0	5 35.3	+50.1	43.0	6 19.1	+50.5	43.1	7 02.9	+50.9	43.2	7 46.6	+51.3	43.3	8 30.3	+51.6	43.4	34
35	4 12.4	+48.8	42.3	4 56.7	+49.3	42.3	5 41.1	+49.6	42.4	6 25.4	+50.0	42.5	7 09.6	+50.4	42.6	7 53.8	+50.8	42.6	8 37.9	+51.1	42.7	9 21.9	+51.5	42.8	35
36	5 01.2	+48.8	41.7	5 46.0	+49.2	41.8	6 30.7	+49.6	41.8	7 15.4	+50.0	41.9	8 00.0	+50.4	42.0	8 44.6	+50.7	42.1	9 29.0	+51.2	42.2	10 13.4	+51.5	42.3	36
37	5 50.0	+48.8	41.1	6 35.2	+49.1	41.2	7 20.3	+49.6	41.3	8 05.4	+49.9	41.4	8 50.4	+50.3	41.5	9 35.3	+50.7	41.6	10 20.2	+51.0	41.7	11 04.9	+51.5	41.8	37
38	6 38.8	+48.7	40.5	7 24.3	+49.2	40.6	8 09.9	+49.5	40.7	8 55.3	+49.9	40.8	9 40.7	+50.3	40.9	10 26.0	+50.7	41.0	11 11.2	+51.1	41.1	11 56.4	+51.4	41.3	38
39	7 27.5	+48.7	39.9	8 13.5	+49.0	40.0	8 59.4	+49.4	40.1	9 45.2	+49.8	40.2	10 31.0	+50.2	40.4	11 16.7	+50.5	40.5	12 02.3	+50.9	40.6	12 47.8	+51.3	40.8	39
40	8 16.2	+48.6	39.4	9 02.5	+49.0	39.4	9 48.8	+49.4	39.6	10 35.0	+49.8	39.7	11 21.2	+50.1	39.8	12 07.2	+50.6	39.9	12 53.2	+50.9	40.1	13 39.1	+51.2	40.2	40
41	9 04.8	+48.5	38.8	9 51.5	+49.0	38.9	10 38.2	+49.3	39.1	11 24.8	+49.7	39.1	12 11.3	+50.1	39.2	12 57.8	+50.4	39.4	13 44.1	+50.8	39.5	14 30.3	+51.2	39.7	41
42	9 53.3	+48.5	38.2	10 40.5	+48.9	38.3	11 27.5	+49.3	38.4	12 14.5	+49.7	38.5	13 01.4	+50.0	38.7	13 48.2	+50.4	38.8	14 34.9	+50.8	39.0	15 21.5	+51.1	39.1	42
43	10 41.8	+48.5	37.6	11 29.4	+48.8	37.8	12 16.8	+49.2	37.8	13 04.2	+49.5	38.0	13 51.4	+50.0	38.1	14 38.6	+50.3	38.3	15 25.7	+50.6	38.4	16 12.6	+51.0	38.6	43
44	11 30.3	+48.3	37.0	12 18.2	+48.7	37.1	13 06.0	+49.1	37.2	13 53.7	+49.5	37.4	14 41.4	+49.8	37.5	15 28.9	+50.2	37.7	16 16.3	+50.6	37.9	17 03.6	+50.9	38.1	44
45	12 18.6	+48.3	36.4	13 06.9	+48.7	36.5	13 55.1	+49.0	36.6	14 43.2	+49.4	36.8	15 31.2	+49.8	37.0	16 19.1	+50.1	37.1	17 06.9	+50.5	37.3	17 54.5	+50.9	37.5	45
46	13 06.9	+48.2	35.8	13 55.6	+48.5	35.9	14 44.1	+49.0	36.0	15 32.6	+49.3	36.2	16 21.0	+49.6	36.4	17 09.2	+50.0	36.5	17 57.4	+50.3	36.7	18 45.4	+50.7	36.9	46
47	13 55.1	+48.1	35.1	14 44.1	+48.5	35.3	15 33.1	+48.8	35.3	16 21.9	+49.2	35.6	17 10.6	+49.6	35.8	17 59.2	+49.9	36.0	18 47.7	+50.3	36.2	19 36.1	+50.6	36.4	47
48	14 43.2	+48.0	34.5	15 32.6	+48.4	34.7	16 21.9	+48.7	34.8	17 11.1	+49.1	35.0	18 00.2	+49.4	35.2	18 49.1	+49.8	35.4	19 38.0	+50.2	35.6	20 26.7	+50.5	35.8	48
49	15 31.2	+47.9	33.9	16 21.0	+48.2	34.1	17 10.6	+48.6	34.2	18 00.2	+48.9	34.4	18 49.6	+49.4	34.6	19 39.0	+49.6	34.8	20 28.2	+50.0	35.0	21 17.2	+50.4	35.2	49
50	16 19.1	+47.8	33.3	17 09.2	+48.2	33.4	17 59.2	+48.5	33.6	18 49.1	+48.9	33.8	19 39.0	+49.2	34.0	20 28.6	+49.6	34.2	21 18.2	+49.9	34.4	22 07.6	+50.3	34.6	50
51	17 06.9	+47.6	32.6	17 57.4	+48.0	32.8	18 47.7	+48.4	33.0	19 38.0	+48.7	33.2	20 28.2	+49.0	33.4	21 18.2	+49.4	33.6	22 08.1	+49.8	33.8	22 57.9	+50.1	34.0	51
52	17 54.5	+47.6	32.0	18 45.4	+47.9	32.2	19 36.1	+48.3	32.4	20 26.7	+48.6	32.6	21 17.2	+49.0	32.8	22 07.6	+49.3	33.0	22 57.9	+49.6	33.2	23 48.0	+50.0	33.4	52
53	18 42.1	+47.4	31.4	19 33.3	+47.7	31.5	20 24.4	+48.1	31.7	21 15.3	+48.5	31.9	22 06.2	+48.8	32.1	22 56.9	+49.2	32.4	23 47.5	+49.5	32.6	24 38.0	+49.9	32.8	53
54	19 29.5	+47.3	30.7	20 21.0	+47.6	30.9	21 12.5	+47.9	31.1	22 03.8	+48.3	31.3	22 55.0	+48.6	31.5	23 46.1	+49.0	31.7	24 37.0	+49.4	32.0	25 27.9	+49.7	32.3	54
55	20 16.8	+47.1	30.1	21 08.6	+47.5	30.2	22 00.4	+47.8	30.4	22 52.1	+48.1	30.7	23 43.6	+48.5	30.9	24 35.1	+48.8	31.1	25 26.4	+49.2	31.4	26 17.6	+49.5	31.6	55
56	21 03.9	+46.9	29.4	21 56.1	+47.3	29.6	22 48.2	+47.7	29.8	23 40.2	+48.0	30.0	24 32.1	+48.4	30.2	25 23.9	+48.7	30.5	26 15.6	+49.0	30.7	27 07.1	+49.3	31.0	56
57	21 50.8	+46.8	28.7	22 43.4	+47.1	28.9	23 35.9	+47.4	29.1	24 28.2	+47.8	29.4	25 20.5	+48.1	29.6	26 12.6	+48.5	29.8	27 04.6	+48.8	30.1	27 56.4	+49.2	30.3	57
58	22 37.6	+46.7	28.1	23 30.5	+47.0	28.3	24 23.3	+47.3	28.5	25 16.0	+47.7	28.7	26 08.6	+48.0	28.9	27 01.1	+48.3	29.2	27 53.4	+48.6	29.4	28 45.6	+49.0	29.7	58
59	23 24.3	+46.4	27.4	24 17.5	+46.8	27.6	25 10.6	+47.1	27.8	26 03.7	+47.4	28.0	26 56.6	+47.8	28.2	27 49.4	+48.1	28.5	28 42.0	+48.5	28.8	29 34.6	+48.8	29.0	59
60	24 10.7	+46.3	26.7	25 04.3	+46.6	26.9	25 57.7	+47.0	27.1	26 51.1	+47.2	27.3	27 44.4	+47.5	27.6	28 37.5	+47.9	27.8	29 30.5	+48.2	28.1	30 23.4	+48.5	28.3	60
61	24 57.0	+46.0	26.0	25 50.9	+46.3	26.2	26 44.7	+46.7	26.4	27 38.3	+47.1	26.6	28 31.9	+47.4	26.9	29 25.4	+47.7	27.1	30 18.7	+48.0	27.4	31 11.9	+48.4	27.7	61
62	25 43.0	+45.9	25.3	26 37.2	+46.2	25.5	27 31.4	+46.4	25.7	28 25.4	+46.8	25.9	29 19.3	+47.1	26.2	30 13.1	+47.4	26.4	31 06.7	+47.8	26.7	32 00.3	+48.1	27.0	62
63	26 28.9	+45.6	24.5	27 23.4	+46.0	24.8	28 17.8	+46.3	25.0	29 12.2	+46.6	25.2	30 06.4	+46.9	25.5	31 00.5	+47.3	25.7	31 54.5	+47.6	26.0	32 48.4	+47.9	26.3	63
64	27 14.5	+45.4	23.8	28 09.4	+45.7	24.0	29 04.1	+46.0	24.3	29 58.8	+46.3	24.5	30 53.3	+46.7	24.7	31 47.8	+46.9	25.0	32 42.1	+47.3	25.3	33 36.3	+47.6	25.5	64
65	27 59.9	+45.2	23.1	28 55.1	+45.4	23.3	29 50.1	+45.8	23.5	30 45.1	+46.1	23.8	31 40.0	+46.4	24.0	32 34.7	+46.7	24.3	33 29.4	+47.0	24.5	34 23.9	+47.3	24.8	65
66	28 45.1	+44.9	22.3	29 40.5	+45.3	22.5	30 35.9	+45.5	22.8	31 31.2	+45.8	23.0	32 26.4	+46.1	23.3	33 21.4	+46.5	23.5	34 16.4	+46.8	23.8	35 11.2	+47.1	24.1	66
67	29 30.0	+44.6	21.6	30 25.8	+44.9	21.8	31 21.4	+45.3	22.0	32 17.0	+45.5	22.2	33 12.5	+45.8	22.5	34 07.9	+46.1	22.7	35 03.2	+46.4	23.0	35 58.3	+46.8	23.3	67
68	30 14.6	+44.4	20.8	31 10.7	+44.7	21.0	32 06.7	+44.9	21.2	33 02.5	+45.3	21.5	33 58.3	+45.6	21.7	34 54.0	+45.9	21.9	35 49.6	+46.2	22.2	36 45.1	+46.5	22.5	68
69	30 59.0	+44.1	20.0	31 55.4	+44.3	20.2	32 51.6	+44.7	20.5	33 47.8	+44.9	20.7	34 43.9	+45.2	20.9	35 39.9	+45.5	21.2	36 35.8	+45.8	21.4	37 31.6	+46.1	21.7	69
70	31 43.1	+43.8	19.2	32 39.7	+44.1	19.4	33 36.3	+44.3	19.7	34 32.7	+44.7	19.9	35 29.1	+44.9	20.1	36 25.4	+45.2	20.4	37 21.6	+45.5	20.6	38 17.7	+45.8	20.9	70
71	32 26.9	+43.5	18.4	33 23.8	+43.7	18.6	34 20.6	+44.0	18.8	35 17.4	+44.2	19.1	36 14.0	+44.6	19.3	37 10.6	+44.9	19.6	38 07.1	+45.1	19.8	39 03.5	+45.4	20.1	71
72	33 10.4	+43.1	17.6	34 07.5	+43.4	17.8	35 04.6	+43.7	18.0	36 01.6	+44.0	18.2	36 58.6	+44.2	18.5	37 55.5	+44.5	18.7	38 52.2	+44.8	19.0	39 48.9	+45.1	19.2	72
73	33 53.5	+42.8	16.8	34 50.9	+43.1	17.0	35 48.3	+43.3	17.2	36 45.6	+43.6	17.4	37 42.8	+43.8	17.6	38 40.0	+44.1	17.9	39 37.0	+44.4	18.1	40 34.0	+44.7	18.4	73
74	34 36.3	+42.5	15.9	35 34.0	+42.7	16.1	36 31.6	+42.9	16.3	37 29.2	+43.2	16.5	38 26.6	+43.5	16.8	39 24.1	+43.7	17.0	40 21.4	+44.0	17.2	41 18.7	+44.2	17.5	74
75	35 18.8	+42.0	15.1	36 16.7	+42.3	15.2	37 14.5	+42.6	15.4	38 12.4	+42.7	15.7	39 10.1	+43.0	15.9	40 07.8	+43.3	16.1	41 05.4	+43.5	16.3	42 02.9	+43.8	16.6	75
76	36 00.8	+41.7	14.2	36 59.0	+41.9	14.4	37 57.1	+42.1	14.6	38 55.1	+42.4	14.8	39 53.1	+42.6	15.0	40 51.1	+42.8	15.2	41 48.9	+43.1	15.4	42 46.7	+43.4	15.7	76
77	36 42.5	+41.3	13.3	37 40.9	+41.5	13.5	38 39.2	+41.7	13.6	39 37.5	+41.9	13.8	40 35.7	+42.2	14.0	41 33.9	+42.4	14.3	42 32.0	+42.7	14.5	43 30.1	+42.9	14.7	77
78	37 23.8	+40.9	12.4	38 22.4	+41.1	12.6	39 20.9	+41.3	12.7	40 19.4	+41.5	12.9	41 17.9	+41.7	13.1	42 16.3	+41.9	13.3	43 14.7	+42.1	13.5	44 13.0	+42.4	13.7	78
79	38 04.7	+40.4	11.5	39 03.4	+40.6	11.6	40 02.2	+40.8	11.8	41 00.9	+41.0	12.0	41 59.6	+41.2	12.1	42 58.2	+41.4	12.3	43 56.8	+41.6	12.5	44 55.4	+41.8	12.8	79
80	38 45.1	+39.9	10.5	39 44.0	+40.2	10.7	40 43.0	+40.3	10.8	41 41.9	+40.5	11.0	42 40.8	+40.7	11.2	43 39.6	+40.9	11.3	44 38.4	+41.1	11.5	45 37.2	+41.3	11.7	80
81	39 25.0	+39.5	9.5	40 24.2	+39.6	9.7	41 23.3	+39.8	9.8	42 22.4	+40.0	10.0	43 21.5	+40.1	10.2	44 20.5	+40.3	10.3	45 19.5	+40.5	10.5	46 18.5	+40.7	10.7	81
82	40 04.5	+38.9	8.6	41 03.8	+39.1	8.7	42 03.1	+39.2	8.8	43 02.4	+39.4	9.0	44 01.6	+39.6	9.1	45 00.8	+39.8	9.3	46 00.0	+39.9	9.4	46 59.2	+40.1	9.6	82
83	40 43.4	+38.4	7.6	41 42.9	+38.5	7.7	42 42.3	+38.7	7.8	43 41.8	+38.8	7.9	44 41.2	+39.0	8.1	45 40.6	+39.1	8.2	46 39.9	+39.3	8.4	47 39.3	+39.4	8.5	83
84	41 21.8	+37.9	6.6	42 21.4	+38.0	6.7	43 21.0	+38.1	6.8	44 20.6	+38.2	6.9	45 20.2	+38.3	7.0	46 19.7	+38.5	7.1	47 19.2	+38.7	7.3	48 18.7	+38.8	7.4	84
85	41 59.7	+37.3	5.5	42 59.4	+37.4	5.6	43 59.1	+37.5	5.7	44 58.8	+37.6	5.8	45 58.5	+37.7	5.9	46 58.2	+37.8	6.0	47 57.9	+37.9	6.1	48 57.5	+38.1	6.2	85
86	42 37.0	+36.7	4.5	43 36.8	+36.8	4.5	44 36.6	+36.9	4.6	45 36.4	+37.0	4.7	46 36.2	+37.1	4.8	47 36.0	+37.2	4.9	48 35.8	+37.2	5.0	49 35.6	+37.3	5.1	86
87	43 13.7	+36.1	3.4	44 13.6	+36.2	3.4	45 13.5	+36.2	3.5	46 13.2	+36.3	3.6	47 13.3	+36.3	3.6	48 13.2	+36.5	3.7	49 13.0	+36.5	3.8	50 12.9	+36.5	3.8	87
88	43 49.8	+35.4	2.3	44 49.8	+35.4	2.3	45 49.7	+35.5	2.4	46 49.7	+35.5	2.4	47 49.6	+35.6	2.4	48 49.5	+35.7	2.5	49 49.5	+35.7	2.5	50 49.4	+35.7	2.6	88
89	44 25.2	+34.8	1.1	45 25.2	+34.8	1.2	46 25.2	+34.8	1.2	47 25.2	+34.8	1.2	48 25.2	+34.8	1.2	49 25.2	+34.9	1.3	50 25.2	+34.9	1.3	51 25.1	+34.9	1.3	89
90	45 00.0	+34.1	0.0	46 00.0	+34.0	0.0	47 00.0	+34.0	0.0	48 00.0	+34.0	0.0	49 00.0	+34.0	0.0	50 00.0	+34.0	0.0	51 00.0	+34.0	0.0	52 00.0	+34.0	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z }   LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 125°, 235°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	23 17.5	+46.1	115.5	22 51.5	+46.7	115.9	22 25.1	+47.4	116.3	21 58.4	+48.0	116.6	21 31.3	+48.6	117.0	21 04.0	+49.1	117.3	20 36.3	+49.7	117.7	20 08.2	+50.3	118.0	0
1	24 03.6	+45.9	114.8	23 38.2	+46.6	115.2	23 12.5	+47.2	115.6	22 46.4	+47.8	116.0	22 19.9	+48.5	116.3	21 53.1	+49.1	116.7	21 26.0	+49.6	117.1	20 58.5	+50.2	117.4	1
2	24 49.5	+45.7	114.1	24 24.8	+46.4	114.5	23 59.7	+47.1	114.9	23 34.2	+47.7	115.3	23 08.4	+48.3	115.7	22 42.2	+48.9	116.1	22 15.6	+49.5	116.5	21 48.7	+50.1	116.8	2
3	25 35.2	+45.5	113.4	25 11.2	+46.2	113.8	24 46.8	+46.8	114.2	24 21.9	+47.5	114.7	23 56.7	+48.1	115.1	23 31.1	+48.7	115.5	23 05.1	+49.4	115.8	22 38.8	+49.9	116.2	3
4	26 20.7	+45.3	112.7	25 57.4	+45.9	113.1	25 33.6	+46.7	113.5	25 09.4	+47.3	114.0	24 44.8	+48.0	114.4	24 19.8	+48.6	114.8	23 54.5	+49.2	115.2	23 28.7	+49.8	115.6	4
5	27 06.0	+45.0	111.9	26 43.3	+45.8	112.4	26 20.3	+46.4	112.8	25 56.7	+47.2	113.3	25 32.8	+47.8	113.7	25 08.4	+48.4	114.2	24 43.7	+49.0	114.6	24 18.5	+49.6	115.0	5
6	27 51.0	+44.8	111.2	27 29.1	+45.5	111.7	27 06.7	+46.2	112.1	26 43.9	+46.9	112.6	26 20.6	+47.6	113.1	25 56.8	+48.3	113.5	25 32.7	+48.9	114.0	25 08.1	+49.5	114.4	6
7	28 35.8	+44.5	110.4	28 14.6	+45.3	110.9	27 52.9	+46.1	111.4	27 30.8	+46.7	111.9	27 08.2	+47.4	112.4	26 45.1	+48.0	112.9	26 21.6	+48.6	113.3	25 57.6	+49.3	113.8	7
8	29 20.3	+44.3	109.7	28 59.9	+45.0	110.2	28 38.9	+45.8	110.7	28 17.5	+46.5	111.2	27 55.6	+47.1	111.7	27 33.1	+47.9	112.2	27 10.2	+48.6	112.7	26 46.9	+49.1	113.1	8
9	30 04.6	+44.0	108.9	29 44.9	+44.8	109.4	29 24.7	+45.5	110.0	29 04.0	+46.2	110.5	28 42.7	+47.0	111.0	28 21.0	+47.6	111.5	27 58.8	+48.3	112.0	27 36.0	+49.0	112.5	9
10	30 48.6	+43.7	108.1	30 29.7	+44.5	108.6	30 10.2	+45.3	109.2	29 50.2	+46.0	109.7	29 29.7	+46.7	110.3	29 08.6	+47.5	110.8	28 47.1	+48.1	111.3	28 25.0	+48.8	111.8	10
11	31 32.3	+43.4	107.3	31 14.2	+44.2	107.9	30 55.5	+45.0	108.4	30 36.2	+45.8	109.0	30 16.4	+46.5	109.6	29 56.1	+47.2	110.1	29 35.2	+47.9	110.6	29 13.8	+48.5	111.2	11
12	32 15.7	+43.1	106.5	31 58.4	+43.9	107.1	31 40.5	+44.7	107.7	31 22.0	+45.4	108.2	31 02.9	+46.2	108.8	30 43.3	+46.9	109.4	30 23.1	+47.6	109.9	30 02.3	+48.4	110.5	12
13	32 58.8	+42.7	105.6	32 42.3	+43.6	106.3	32 25.2	+44.4	106.9	32 07.4	+45.2	107.5	31 49.1	+46.0	108.1	31 30.2	+46.7	108.7	31 10.7	+47.5	109.2	30 50.7	+48.1	109.8	13
14	33 41.5	+42.4	104.8	33 25.9	+43.2	105.4	33 09.6	+44.1	106.1	32 52.6	+44.9	106.7	32 35.1	+45.7	107.3	32 16.9	+46.5	107.9	31 58.2	+47.2	108.5	31 38.8	+47.9	109.1	14
15	34 23.9	+42.1	104.0	34 09.1	+42.9	104.6	33 53.7	+43.7	105.3	33 37.5	+44.6	105.9	33 20.8	+45.4	106.5	33 03.4	+46.1	107.2	32 45.4	+46.9	107.8	32 26.7	+47.7	108.4	15
16	35 06.0	+41.6	103.1	34 52.0	+42.6	103.8	34 37.4	+43.4	104.4	34 22.1	+44.3	105.1	34 06.2	+45.0	105.8	33 49.5	+45.9	106.4	33 32.3	+46.6	107.0	33 14.4	+47.4	107.7	16
17	35 47.6	+41.3	102.2	35 34.6	+42.2	102.9	35 20.8	+43.1	103.6	35 06.4	+43.9	104.3	34 51.2	+44.8	105.0	34 35.4	+45.6	105.6	34 18.9	+46.4	106.3	34 01.8	+47.1	106.9	17
18	36 28.9	+40.9	101.3	36 16.8	+41.8	102.0	36 03.9	+42.7	102.7	35 50.3	+43.6	103.4	35 36.0	+44.4	104.1	35 21.0	+45.3	104.8	35 05.3	+46.1	105.5	34 48.9	+46.9	106.2	18
19	37 09.8	+40.4	100.4	36 58.6	+41.3	101.1	36 46.6	+42.3	101.9	36 33.9	+43.2	102.6	36 20.4	+44.1	103.3	36 06.3	+44.9	104.0	35 51.4	+45.7	104.7	35 35.8	+46.5	105.4	19
20	37 50.2	+40.0	99.5	37 39.9	+41.0	100.2	37 28.9	+41.9	101.0	37 17.1	+42.8	101.7	37 04.5	+43.7	102.5	36 51.2	+44.6	103.2	36 37.1	+45.5	103.9	36 22.3	+46.3	104.6	20
21	38 30.2	+39.5	98.5	38 20.9	+40.5	99.3	38 10.8	+41.5	100.1	37 59.9	+42.4	100.8	37 48.2	+43.4	101.6	37 35.8	+44.2	102.4	37 22.6	+45.0	103.1	37 08.6	+45.9	103.8	21
22	39 09.7	+39.0	97.5	39 01.4	+40.0	98.3	38 52.3	+41.0	99.1	38 42.3	+42.0	99.9	38 31.6	+42.9	100.7	38 20.0	+43.8	101.5	38 07.6	+44.8	102.3	37 54.5	+45.6	103.0	22
23	39 48.7	+38.5	96.6	39 41.4	+39.6	97.4	39 33.3	+40.5	98.2	39 24.3	+41.5	99.0	39 14.5	+42.5	99.8	39 03.8	+43.5	100.6	38 52.4	+44.3	101.4	38 40.1	+45.2	102.2	23
24	40 27.2	+38.0	95.6	40 21.0	+39.0	96.4	40 13.8	+40.1	97.2	40 05.8	+41.1	98.1	39 57.0	+42.0	98.9	39 47.3	+43.0	99.7	39 36.7	+43.9	100.5	39 25.3	+44.8	101.4	24
25	41 05.2	+37.4	94.5	41 00.0	+38.5	95.4	40 53.9	+39.6	96.3	40 46.9	+40.6	97.1	40 39.0	+41.6	98.0	40 30.3	+42.6	98.8	40 20.6	+43.6	99.7	40 10.1	+44.5	100.5	25
26	41 42.6	+36.9	93.5	41 38.5	+38.0	94.4	41 33.5	+39.0	95.3	41 27.5	+40.1	96.1	41 20.6	+41.1	97.0	41 12.9	+42.1	97.9	41 04.2	+43.1	98.8	40 54.6	+44.0	99.6	26
27	42 19.5	+36.2	92.4	42 16.5	+37.3	93.3	42 12.5	+38.5	94.2	42 07.6	+39.6	95.1	42 01.7	+40.7	96.0	41 55.0	+41.6	96.9	41 47.3	+42.6	97.8	41 38.6	+43.6	98.7	27
28	42 55.7	+35.7	91.3	42 53.8	+36.8	92.3	42 51.0	+37.9	93.2	42 47.2	+39.0	94.1	42 42.4	+40.0	95.0	42 36.6	+41.1	96.0	42 29.9	+42.1	96.9	42 22.2	+43.2	97.8	28
29	43 31.4	+35.0	90.2	43 30.6	+36.2	91.2	43 28.9	+37.3	92.1	43 26.2	+38.4	93.1	43 22.4	+39.6	94.0	43 17.7	+40.6	95.0	43 12.0	+41.7	95.9	43 05.4	+42.7	96.8	29
30	44 06.4	+34.3	89.1	44 06.8	+35.5	90.1	44 06.2	+36.7	91.1	44 04.6	+37.8	92.0	44 02.0	+38.9	93.0	43 58.3	+40.1	94.0	43 53.7	+41.1	94.9	43 48.1	+42.1	95.9	30
31	44 40.7	+33.6	88.0	44 42.3	+34.8	89.0	44 42.9	+36.0	89.9	44 42.4	+37.2	90.9	44 40.9	+38.3	91.9	44 38.4	+39.4	92.9	44 34.8	+40.6	93.9	44 30.2	+41.7	94.9	31
32	45 14.3	+32.8	86.8	45 17.1	+34.1	87.8	45 18.9	+35.3	88.8	45 19.6	+36.5	89.8	45 19.2	+37.7	90.8	45 17.8	+38.9	91.8	45 15.4	+40.0	92.9	45 11.9	+41.0	93.9	32
33	45 47.1	+32.1	85.6	45 51.2	+33.4	86.6	45 54.2	+34.6	87.7	45 56.1	+35.9	88.7	45 56.9	+37.1	89.7	45 56.7	+38.2	90.8	45 55.4	+39.3	91.8	45 52.9	+40.6	92.8	33
34	46 19.2	+31.4	84.4	46 24.6	+32.6	85.4	46 28.8	+33.9	86.5	46 32.0	+35.1	87.5	46 34.0	+36.3	88.6	46 34.9	+37.6	89.6	46 34.7	+38.8	90.7	46 33.5	+39.9	91.8	34
35	46 50.6	+30.5	83.1	46 57.2	+31.8	84.2	47 02.7	+33.1	85.3	47 07.1	+34.3	86.3	47 10.3	+35.7	87.4	47 12.5	+36.8	88.6	47 13.5	+38.0	89.6	47 13.4	+39.2	90.7	35
36	47 21.1	+29.6	81.9	47 29.0	+31.0	83.0	47 35.8	+32.3	84.0	47 41.4	+33.6	85.1	47 46.0	+34.8	86.2	47 49.3	+36.2	87.3	47 51.5	+37.4	88.4	47 52.6	+38.6	89.5	36
37	47 50.7	+28.8	80.6	48 00.0	+30.1	81.7	48 08.1	+31.4	82.8	48 15.0	+32.8	83.9	48 20.8	+34.1	85.0	48 25.5	+35.3	86.1	48 28.9	+36.7	87.3	48 31.2	+37.9	88.4	37
38	48 19.5	+27.8	79.3	48 30.1	+29.2	80.4	48 39.5	+30.6	81.5	48 47.8	+31.9	82.6	48 54.9	+33.3	83.8	49 00.8	+34.6	84.9	49 05.6	+35.8	86.1	49 09.1	+37.1	87.2	38
39	48 47.3	+26.9	77.9	48 59.3	+28.3	79.1	49 10.1	+29.7	80.2	49 19.7	+31.1	81.3	49 28.2	+32.4	82.5	49 35.4	+33.8	83.7	49 41.4	+35.1	84.8	49 46.2	+36.4	86.0	39
40	49 14.2	+26.0	76.6	49 27.6	+27.3	77.7	49 39.8	+28.7	78.9	49 50.8	+30.1	80.0	50 00.6	+31.5	81.2	50 09.2	+32.8	82.4	50 16.5	+34.2	83.6	50 22.6	+35.6	84.8	40
41	49 40.2	+24.9	75.2	49 54.9	+26.4	76.3	50 08.5	+27.8	77.5	50 20.9	+29.2	78.7	50 32.1	+30.6	79.9	50 42.0	+32.0	81.1	50 50.7	+33.4	82.3	50 58.2	+34.7	83.5	41
42	50 05.1	+23.8	73.8	50 21.3	+25.3	74.9	50 36.3	+26.7	76.1	50 50.1	+28.2	77.3	51 02.7	+29.6	78.5	51 14.0	+31.0	79.7	51 24.1	+32.4	80.9	51 32.9	+33.8	82.2	42
43	50 28.9	+22.8	72.3	50 46.6	+24.2	73.5	51 03.0	+25.7	74.7	51 18.3	+27.1	75.9	51 32.3	+28.6	77.1	51 45.0	+30.1	78.3	51 56.5	+31.5	79.6	52 06.7	+32.9	80.9	43
44	50 51.7	+21.7	70.9	51 10.8	+23.2	72.0	51 28.7	+24.6	73.2	51 45.4	+26.1	74.5	52 00.9	+27.5	75.7	52 15.1	+29.0	76.9	52 28.0	+30.5	78.2	52 39.6	+31.9	79.5	44
45	51 13.4	+20.6	69.4	51 34.0	+22.0	70.6	51 53.3	+23.5	71.8	52 11.5	+25.0	73.0	52 28.4	+26.5	74.2	52 44.1	+27.9	75.5	52 58.5	+29.4	76.8	53 11.5	+30.9	78.1	45
46	51 34.0	+19.3	67.9	51 56.0	+20.8	69.1	52 16.8	+22.4	70.3	52 36.5	+23.8	71.5	52 54.9	+25.3	72.8	53 12.0	+26.9	74.0	53 27.9	+28.3	75.3	53 42.4	+29.9	76.6	46
47	51 53.3	+18.2	66.4	52 16.8	+19.7	67.5	52 39.2	+21.1	68.8	53 00.3	+22.6	70.0	53 20.2	+24.2	71.2	53 38.9	+25.7	72.5	53 56.2	+27.2	73.8	54 12.3	+28.7	75.2	47
48	52 11.5	+16.9	64.8	52 36.5	+18.4	66.0	53 00.3	+19.9	67.2	53 22.9	+21.5	68.4	53 44.4	+22.9	69.7	54 04.6	+24.5	71.0	54 23.4	+26.1	72.3	54 41.0	+27.6	73.7	48
49	52 28.4	+15.7	63.2	52 54.9	+17.1	64.4	53 20.2	+18.7	65.6	53 44.4	+20.2	66.9	54 07.3	+21.8	68.1	54 29.1	+23.2	69.4	54 49.5	+24.8	70.8	55 08.6	+26.4	72.1	49
50	52 44.1	+14.4	61.7	53 12.0	+15.9	62.8	53 38.9	+17.3	64.0	54 04.6	+18.8	65.3	54 29.1	+20.4	66.5	54 52.3	+22.0	67.8	55 14.3	+23.6	69.2	55 35.0	+25.1	70.5	50
51	52 58.5	+13.0	60.0	53 27.9	+14.5	61.2	53 56.2	+16.1	62.4	54 23.4	+17.6	63.6	54 49.5	+19.1	64.9	55 14.3	+20.7	66.2	55 37.9	+22.2	67.5	56 00.1	+23.9	68.9	51
52	53 11.5	+11.7	58.4	53 42.4	+13.2	59.6	54 12.3	+14.6	60.8	54 41.0	+16.2	62.0	55 08.6	+17.7	63.3	55 35.0	+19.3	64.6	56 00.1	+20.9	65.9	56 24.0	+22.5	67.3	52
53	53 23.2	+10.4	56.8	53 55.6	+11.8	57.9	54 26.9	+13.3	59.1	54 57.2	+14.8	60.3	55 26.3	+16.4	61.6	55 54.3	+17.9	62.9	56 21.0	+19.5	64.2	56 46.5	+21.1	65.6	53
54	53 33.6	+9.0	55.1	54 07.4	+10.4	56.3	54 40.2	+11.9	57.4	55 12.0	+13.4	58.6	55 42.7	+14.9	59.9	56 12.2	+16.5	61.2	56 40.5	+18.1	62.5	57 07.6	+19.7	63.9	54
55	53 42.6	+7.5	53.5	54 17.8	+9.0	54.6	54 52.1	+10.5	55.7	55 25.4	+11.9	56.9	55 57.6	+13.4	58.2	56 28.7	+15.0	59.4	56 58.6	+16.6	60.8	57 27.3	+18.2	62.1	55
56	53 50.1	+6.2	51.8	54 26.8	+7.6	52.9	55 02.6	+9.0	54.0	55 37.3	+10.5	55.2	56 11.0	+12.0	56.4	56 43.7	+13.5	57.7	57 15.2	+15.1	59.0	57 45.5	+16.7	60.3	56
57	53 56.3	+4.7	50.1	54 34.4	+6.1	51.2	55 11.5	+7.5	52.3	55 47.8	+8.9	53.4	56 23.0	+10.4	54.6	56 57.2	+12.0	55.9	57 30.3	+13.5	57.2	58 02.2	+15.1	58.5	57
58	54 01.0	+3.3	48.4	54 40.5	+4.6	49.4	55 19.0	+6.1	50.5	55 56.7	+7.5	51.7	56 33.4	+8.9	52.9	57 09.2	+10.4	54.1	57 43.8	+11.9	55.4	58 17.3	+13.6	56.7	58
59	54 04.3	+1.9	46.7	54 45.1	+3.2	47.7	55 25.1	+4.5	48.8	56 04.2	+5.9	49.9	56 42.3	+7.4	51.1	57 19.6	+8.8	52.3	57 55.7	+10.4	53.5	58 30.9	+11.9	54.8	59
60	54 06.2	+0.4	45.0	54 48.3	+1.7	46.0	55 29.6	+3.0	47.0	56 10.1	+4.3	48.1	56 49.7	+5.7	49.3	57 28.4	+7.2	50.4	58 06.1	+8.7	51.7	58 42.8	+10.2	53.0	60
61	54 06.6	−1.0	43.3	54 50.0	+0.1	44.3	55 32.6	+1.4	45.3	56 14.4	+2.8	46.3	56 55.4	+4.2	47.4	57 35.6	+5.5	48.6	58 14.8	+7.0	49.8	58 53.0	+8.5	51.1	61
62	54 05.6	−2.5	41.6	54 50.1	−1.2	42.5	55 34.0	0.0	43.5	56 17.2	+1.2	44.5	56 59.6	+2.5	45.6	57 41.1	+3.9	46.7	58 21.8	+5.3	47.9	59 01.5	+6.9	49.1	62
63	54 03.1	−3.9	39.9	54 48.9	−2.8	40.8	55 34.0	−1.6	41.7	56 18.4	−0.4	42.7	57 02.1	+0.9	43.8	57 45.0	+2.3	44.9	58 27.1	+3.7	46.0	59 08.4	+5.1	47.2	63
64	53 59.2	−5.4	38.2	54 46.1	−4.3	39.0	55 32.4	−3.1	40.0	56 18.0	−1.9	40.9	57 03.0	−0.7	41.9	57 47.3	+0.6	43.0	58 30.8	+1.9	44.1	59 13.5	+3.3	45.3	64
65	53 53.8	−6.7	36.5	54 41.8	−5.7	37.3	55 29.3	−4.7	38.2	56 16.1	−3.5	39.1	57 02.3	−2.3	40.1	57 47.9	−1.1	41.1	58 32.7	+0.3	42.2	59 16.8	+1.6	43.3	65
66	53 47.1	−8.2	34.8	54 36.1	−7.2	35.6	55 24.6	−6.1	36.4	56 12.6	−5.0	37.3	57 00.0	−3.9	38.3	57 46.8	−2.7	39.2	58 33.0	−1.5	40.3	59 18.4	−0.2	41.3	66
67	53 38.9	−9.6	33.1	54 28.9	−8.6	33.9	55 18.5	−7.6	34.7	56 07.6	−6.6	35.5	56 56.1	−5.5	36.4	57 44.1	−4.3	37.4	58 31.5	−3.2	38.3	59 18.2	−1.9	39.4	67
68	53 29.3	−10.9	31.5	54 20.3	−10.0	32.2	55 10.9	−9.1	33.0	56 01.0	−8.1	33.8	56 50.6	−7.1	34.6	57 39.8	−6.1	35.5	58 28.3	−4.9	36.4	59 16.3	−3.7	37.4	68
69	53 18.4	−12.3	29.8	54 10.3	−11.5	30.5	55 01.8	−10.6	31.2	55 52.9	−9.7	32.0	56 43.5	−8.6	32.8	57 33.7	−7.6	33.6	58 23.4	−6.5	34.5	59 12.6	−5.5	35.5	69
70	53 06.1	−13.6	28.2	53 58.8	−12.8	28.8	54 51.2	−12.0	29.5	55 43.2	−11.1	30.2	56 34.9	−10.2	31.0	57 26.1	−9.2	31.8	58 16.9	−8.3	32.6	59 07.1	−7.1	33.5	70
71	52 52.5	−15.0	26.6	53 46.0	−14.2	27.2	54 39.2	−13.4	27.8	55 32.1	−12.6	28.5	56 24.7	−11.7	29.2	57 16.9	−10.9	30.0	58 08.6	−9.8	30.8	59 00.0	−8.9	31.6	71
72	52 37.5	−16.2	25.0	53 31.8	−15.5	25.5	54 25.8	−14.8	26.1	55 19.5	−14.0	26.8	56 13.0	−13.2	27.4	57 06.0	−12.4	28.1	57 58.8	−11.5	28.9	58 51.1	−10.6	29.7	72
73	52 21.3	−17.4	23.4	53 16.3	−16.8	23.9	54 11.0	−16.1	24.5	55 05.5	−15.4	25.1	55 59.7	−14.7	25.7	56 53.6	−13.9	26.3	57 47.3	−13.1	27.0	58 40.5	−12.2	27.8	73
74	52 03.9	−18.7	21.8	52 59.5	−18.1	22.3	53 54.9	−17.5	22.8	54 50.1	−16.8	23.4	55 45.0	−16.1	24.0	56 39.7	−15.4	24.6	57 34.2	−14.7	25.2	58 28.3	−13.9	25.9	74
75	51 45.2	−19.9	20.3	52 41.4	−19.3	20.7	53 37.4	−18.7	21.2	54 33.3	−18.2	21.7	55 28.9	−17.5	22.3	56 24.3	−16.9	22.8	57 19.5	−16.2	23.4	58 14.4	−15.4	24.1	75
76	51 25.3	−21.0	18.8	52 22.1	−20.6	19.2	53 18.7	−20.1	19.6	54 15.1	−19.5	20.1	55 11.4	−18.9	20.6	56 07.4	−18.3	21.1	57 03.3	−17.6	21.6	57 59.0	−17.0	22.2	76
77	51 04.3	−22.2	17.3	52 01.5	−21.7	17.6	52 58.6	−21.2	18.0	53 55.6	−20.7	18.5	54 52.5	−20.3	18.9	55 49.1	−19.6	19.4	56 45.7	−19.2	19.9	57 42.0	−18.5	20.4	77
78	50 42.1	−23.2	15.8	51 39.8	−22.8	16.1	52 37.4	−22.4	16.5	53 34.9	−22.0	16.9	54 32.2	−21.5	17.3	55 29.5	−21.1	17.7	56 26.5	−20.5	18.2	57 23.5	−20.0	18.7	78
79	50 18.9	−24.3	14.3	51 17.0	−24.0	14.6	52 15.0	−23.6	15.0	53 12.9	−23.2	15.3	54 10.7	−22.8	15.7	55 08.4	−22.3	16.1	56 06.0	−21.9	16.5	57 03.5	−21.4	16.9	79
80	49 54.6	−25.4	12.9	50 53.0	−25.0	13.2	51 51.4	−24.7	13.5	52 49.7	−24.4	13.8	53 47.9	−24.0	14.1	54 46.1	−23.6	14.5	55 44.1	−23.2	14.8	56 42.1	−22.8	15.2	80
81	49 29.2	−26.3	11.5	50 28.0	−26.1	11.8	51 26.7	−25.8	12.0	52 25.3	−25.4	12.3	53 23.9	−25.1	12.6	54 22.5	−24.9	12.9	55 20.9	−24.4	13.2	56 19.3	−24.1	13.5	81
82	49 02.9	−27.4	10.1	50 01.9	−27.1	10.3	51 00.9	−26.8	10.6	51 59.9	−26.6	10.8	52 58.8	−26.3	11.0	53 57.6	−26.0	11.3	54 56.5	−25.8	11.6	55 55.2	−25.4	11.9	82
83	48 35.5	−28.2	8.8	49 34.8	−28.0	9.0	50 34.1	−27.9	9.2	51 33.3	−27.6	9.4	52 32.5	−27.4	9.6	53 31.6	−27.1	9.8	54 30.7	−26.9	10.0	55 29.8	−26.6	10.3	83
84	48 07.3	−29.1	7.5	49 06.8	−29.0	7.6	50 06.2	−28.8	7.8	51 05.7	−28.6	7.9	52 05.1	−28.4	8.1	53 04.5	−28.3	8.3	54 03.8	−28.0	8.5	55 03.2	−27.9	8.7	84
85	47 38.2	−30.1	6.2	48 37.8	−29.9	6.3	49 37.4	−29.7	6.4	50 37.1	−29.7	6.5	51 36.7	−29.5	6.7	52 36.2	−29.3	6.8	53 35.8	−29.1	7.0	54 35.3	−28.9	7.2	85
86	47 08.1	−30.8	4.9	48 07.9	−30.7	5.0	49 07.7	−30.7	5.1	50 07.4	−30.5	5.2	51 07.2	−30.4	5.3	52 06.9	−30.3	5.4	53 06.7	−30.2	5.5	54 06.4	−30.1	5.7	86
87	46 37.3	−31.7	3.6	47 37.2	−31.6	3.7	48 37.0	−31.5	3.8	49 36.9	−31.4	3.8	50 36.8	−31.4	3.9	51 36.6	−31.3	4.0	52 36.5	−31.2	4.1	53 36.3	−31.1	4.2	87
88	46 05.6	−32.4	2.4	47 05.6	−32.4	2.4	48 05.5	−32.3	2.5	49 05.5	−32.4	2.5	50 05.4	−32.3	2.6	51 05.3	−32.2	2.6	52 05.3	−32.2	2.7	53 05.2	−32.1	2.8	88
89	45 33.2	−33.2	1.2	46 33.2	−33.2	1.2	47 33.2	−33.2	1.2	48 33.1	−33.1	1.3	49 33.1	−33.1	1.3	50 33.1	−33.1	1.3	51 33.1	−33.1	1.3	52 33.1	−33.1	1.4	89
90	45 00.0	−33.9	0.0	46 00.0	−33.9	0.0	47 00.0	−33.9	0.0	48 00.0	−33.9	0.0	49 00.0	−34.0	0.0	50 00.0	−34.0	0.0	51 00.0	−34.0	0.0	52 00.0	−34.0	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	23 17.5	−46.3	115.5	22 51.5	−46.9	115.9	22 25.1	−47.5	116.3	21 58.4	−48.2	116.6	21 31.3	−48.7	117.0	21 04.0	−49.4	117.3	20 36.3	−49.9	117.7	20 08.2	−50.4	118.0	0
1	22 31.2	−46.4	116.2	22 04.6	−47.1	116.6	21 37.6	−47.7	116.9	21 10.2	−48.3	117.3	20 42.6	−48.9	117.6	20 14.6	−49.4	117.9	19 46.4	−50.0	118.3	19 17.8	−50.5	118.6	1
2	21 44.8	−46.7	116.9	21 17.5	−47.3	117.2	20 49.9	−47.9	117.6	20 21.9	−48.4	117.9	19 53.7	−49.0	118.2	19 25.2	−49.6	118.5	18 56.4	−50.1	118.8	18 27.3	−50.6	119.1	2
3	20 58.1	−46.8	117.5	20 30.2	−47.4	117.9	20 02.0	−48.0	118.2	19 33.5	−48.6	118.5	19 04.7	−49.1	118.8	18 35.6	−49.6	119.1	18 06.3	−50.2	119.4	17 36.7	−50.7	119.7	3
4	20 11.3	−46.9	118.2	19 42.8	−47.5	118.5	19 14.0	−48.1	118.8	18 44.9	−48.6	119.1	18 15.6	−49.3	119.4	17 46.0	−49.8	119.7	17 16.1	−50.3	120.0	16 46.0	−50.8	120.3	4
5	19 24.4	−47.1	118.9	18 55.3	−47.7	119.2	18 25.9	−48.2	119.5	17 56.3	−48.8	119.8	17 26.3	−49.3	120.0	16 56.2	−49.9	120.3	16 25.8	−50.4	120.6	15 55.2	−50.9	120.8	5
6	18 37.3	−47.2	119.5	18 07.6	−47.8	119.8	17 37.7	−48.4	120.1	17 07.5	−49.0	120.4	16 37.0	−49.5	120.6	16 06.3	−50.0	120.9	15 35.4	−50.5	121.1	15 04.3	−51.0	121.4	6
7	17 50.1	−47.3	120.2	17 19.8	−47.9	120.5	16 49.3	−48.5	120.7	16 18.5	−49.0	121.0	15 47.5	−49.5	121.2	15 16.3	−50.0	121.5	14 44.9	−50.5	121.7	14 13.3	−51.0	121.9	7
8	17 02.8	−47.5	120.8	16 31.9	−48.0	121.1	16 00.8	−48.5	121.3	15 29.5	−49.1	121.6	14 58.0	−49.6	121.8	14 26.3	−50.2	122.0	13 54.4	−50.7	122.2	13 22.3	−51.2	122.5	8
9	16 15.3	−47.5	121.5	15 43.9	−48.1	121.7	15 12.3	−48.7	121.9	14 40.4	−49.2	122.2	14 08.4	−49.7	122.4	13 36.1	−50.2	122.6	13 03.7	−50.7	122.8	12 31.1	−51.1	123.0	9
10	15 27.8	−47.7	122.1	14 55.8	−48.2	122.3	14 23.6	−48.8	122.6	13 51.2	−49.3	122.8	13 18.7	−49.8	123.0	12 45.9	−50.3	123.2	12 13.0	−50.7	123.3	11 40.0	−51.3	123.5	10
11	14 40.1	−47.8	122.7	14 07.6	−48.4	122.9	13 34.8	−48.8	123.2	13 01.9	−49.3	123.4	12 28.9	−49.9	123.5	11 55.6	−50.3	123.7	11 22.3	−50.9	123.9	10 48.7	−51.3	124.1	11
12	13 52.3	−47.9	123.4	13 19.2	−48.4	123.6	12 46.0	−48.9	123.7	12 12.6	−49.5	123.9	11 39.0	−49.9	124.1	11 05.3	−50.4	124.3	10 31.4	−50.9	124.4	9 57.4	−51.3	124.6	12
13	13 04.4	−47.9	124.0	12 30.8	−48.5	124.2	11 57.1	−49.0	124.3	11 23.1	−49.5	124.5	10 49.1	−50.0	124.7	10 14.9	−50.5	124.8	9 40.5	−50.9	125.0	9 06.1	−51.4	125.1	13
14	12 16.5	−48.1	124.6	11 42.3	−48.5	124.8	11 08.1	−49.1	124.9	10 33.6	−49.5	125.1	9 59.1	−50.1	125.2	9 24.4	−50.5	125.4	8 49.6	−51.0	125.5	8 14.7	−51.4	125.6	14
15	11 28.4	−48.1	125.2	10 53.8	−48.7	125.4	10 19.0	−49.1	125.5	9 44.1	−49.6	125.7	9 09.0	−50.1	125.8	8 33.9	−50.6	125.9	7 58.6	−51.0	126.0	7 23.3	−51.5	126.1	15
16	10 40.3	−48.2	125.8	10 05.1	−48.6	126.0	9 29.9	−49.2	126.1	8 54.5	−49.7	126.2	8 18.9	−50.1	126.4	7 43.3	−50.6	126.5	7 07.6	−51.0	126.6	6 31.8	−51.5	126.7	16
17	9 52.1	−48.2	126.4	9 16.5	−48.8	126.6	8 40.7	−49.3	126.7	8 04.8	−49.7	126.8	7 28.8	−50.2	126.9	6 52.7	−50.6	127.0	6 16.6	−51.1	127.1	5 40.3	−51.5	127.2	17
18	9 03.9	−48.3	127.0	8 27.7	−48.8	127.1	7 51.4	−49.3	127.3	7 15.1	−49.8	127.4	6 38.6	−50.2	127.5	6 02.1	−50.7	127.5	5 25.5	−51.1	127.6	4 48.8	−51.5	127.7	18
19	8 15.6	−48.4	127.6	7 38.9	−48.9	127.7	7 02.1	−49.3	127.8	6 25.3	−49.8	127.9	5 48.4	−50.3	128.0	5 11.4	−50.7	128.1	4 34.4	−51.2	128.2	3 57.3	−51.6	128.2	19
20	7 27.2	−48.4	128.2	6 50.0	−48.9	128.3	6 12.8	−49.4	128.4	5 35.5	−49.8	128.5	4 58.1	−50.3	128.6	4 20.7	−50.7	128.6	3 43.2	−51.1	128.7	3 05.7	−51.6	128.7	20
21	6 38.8	−48.5	128.8	6 01.1	−48.9	128.9	5 23.4	−49.4	129.0	4 45.7	−49.9	129.0	4 07.8	−50.3	129.1	3 30.0	−50.8	129.2	2 52.1	−51.2	129.2	2 14.1	−51.5	129.2	21
22	5 50.3	−48.5	129.4	5 12.2	−49.0	129.5	4 34.0	−49.4	129.5	3 55.8	−49.9	129.6	3 17.5	−50.3	129.7	2 39.2	−50.7	129.7	2 00.9	−51.2	129.7	1 22.6	−51.6	129.7	22
23	5 01.8	−48.5	130.0	4 23.2	−48.9	130.1	3 44.6	−49.4	130.1	3 05.9	−49.9	130.2	2 27.2	−50.3	130.2	1 48.5	−50.8	130.2	1 09.7	−51.2	130.2	0 31.0	−51.6	130.3	23
24	4 13.3	−48.5	130.6	3 34.3	−49.1	130.6	2 55.2	−49.5	130.7	2 16.0	−49.9	130.7	1 36.9	−50.4	130.7	0 57.7	−50.8	130.8	0 18.5	−51.1	130.8	0 20.6	+51.6	49.2	24
25	3 24.8	−48.6	131.2	2 45.2	−49.0	131.2	2 05.7	−49.5	131.2	1 26.1	−49.9	131.2	0 46.5	−50.3	131.3	0 06.9	−50.7	131.3	0 32.6	+51.2	48.7	1 12.2	+51.6	48.7	25
26	2 36.2	−48.5	131.8	1 56.2	−49.0	131.8	1 16.2	−49.5	131.8	0 36.2	−49.9	131.8	0 03.8	+50.4	48.2	0 43.8	+50.8	48.2	1 23.8	+51.2	48.2	2 03.8	+51.6	48.2	26
27	1 47.6	−48.6	132.4	1 07.2	−49.1	132.4	0 26.7	−49.5	132.4	0 13.7	+49.9	47.6	0 54.2	+50.3	47.6	1 34.6	+50.7	47.6	2 15.0	+51.2	47.7	2 55.4	+51.6	47.7	27
28	0 59.0	−48.6	132.9	0 18.1	−49.0	132.9	0 22.8	+49.4	47.1	1 03.6	+50.0	47.1	1 44.5	+50.3	47.1	2 25.3	+50.8	47.1	3 06.2	+51.1	47.1	3 47.0	+51.5	47.1	28
29	0 10.4	−48.6	133.5	0 30.9	+49.1	46.5	1 12.2	+49.5	46.5	1 53.6	+49.9	46.5	2 34.8	+50.4	46.5	3 16.1	+50.7	46.6	3 57.3	+51.2	46.6	4 38.5	+51.5	46.7	29
30	0 38.2	+48.6	45.9	1 20.0	+49.0	45.9	2 01.7	+49.5	45.9	2 43.5	+49.8	46.0	3 25.2	+50.3	46.0	4 06.8	+50.7	46.0	4 48.5	+51.1	46.1	5 30.0	+51.5	46.2	30
31	1 26.8	+48.6	45.3	2 09.0	+49.0	45.3	2 51.2	+49.4	45.4	3 33.3	+49.9	45.4	4 15.5	+50.2	45.4	4 57.5	+50.7	45.5	5 39.6	+51.0	45.6	6 21.5	+51.5	45.6	31
32	2 15.4	+48.6	44.7	2 58.0	+49.1	44.7	3 40.6	+49.5	44.8	4 23.2	+49.9	44.8	5 05.7	+50.3	44.9	5 48.2	+50.7	45.0	6 30.6	+51.1	45.0	7 13.0	+51.4	45.1	32
33	3 04.0	+48.6	44.1	3 47.1	+48.9	44.2	4 30.1	+49.4	44.2	5 13.1	+49.8	44.3	5 56.0	+50.2	44.3	6 38.9	+50.6	44.4	7 21.7	+51.0	44.5	8 04.4	+51.4	44.6	33
34	3 52.6	+48.5	43.5	4 36.0	+49.0	43.6	5 19.5	+49.3	43.7	6 02.9	+49.7	43.7	6 46.2	+50.2	43.8	7 29.5	+50.6	43.9	8 12.7	+51.0	44.0	8 55.8	+51.4	44.1	34
35	4 41.1	+48.5	43.0	5 25.0	+48.9	43.0	6 08.8	+49.4	43.1	6 52.6	+49.8	43.2	7 36.4	+50.1	43.2	8 20.1	+50.5	43.3	9 03.7	+50.9	43.4	9 47.2	+51.3	43.6	35
36	5 29.6	+48.5	42.4	6 13.9	+48.9	42.4	6 58.2	+49.3	42.5	7 42.4	+49.7	42.6	8 26.5	+50.1	42.7	9 10.6	+50.5	42.8	9 54.6	+50.8	42.9	10 38.5	+51.2	43.0	36
37	6 18.1	+48.4	41.8	7 02.8	+48.9	41.8	7 47.5	+49.2	41.9	8 32.1	+49.6	42.0	9 16.6	+50.1	42.1	10 01.1	+50.4	42.2	10 45.4	+50.8	42.4	11 29.7	+51.2	42.5	37
38	7 06.5	+48.4	41.2	7 51.7	+48.7	41.3	8 36.7	+49.2	41.4	9 21.7	+49.6	41.5	10 06.7	+49.9	41.6	10 51.5	+50.4	41.7	11 36.2	+50.8	41.8	12 20.9	+51.1	42.0	38
39	7 54.9	+48.3	40.6	8 40.4	+48.8	40.7	9 25.9	+49.2	40.8	10 11.3	+49.5	40.9	10 56.6	+50.0	41.0	11 41.9	+50.3	41.1	12 27.0	+50.7	41.3	13 12.0	+51.1	41.4	39
40	8 43.2	+48.3	40.0	9 29.2	+48.7	40.1	10 15.1	+49.0	40.2	11 00.8	+49.5	40.3	11 46.6	+49.8	40.4	12 32.2	+50.2	40.6	13 17.7	+50.6	40.7	14 03.1	+51.0	40.9	40
41	9 31.5	+48.2	39.4	10 17.9	+48.6	39.5	11 04.1	+49.0	39.6	11 50.3	+49.4	39.7	12 36.4	+49.8	39.9	13 22.4	+50.2	40.0	14 08.3	+50.5	40.2	14 54.1	+50.9	40.4	41
42	10 19.7	+48.2	38.8	11 06.5	+48.5	38.9	11 53.1	+49.0	39.0	12 39.7	+49.3	39.2	13 26.2	+49.7	39.3	14 12.6	+50.0	39.5	14 58.8	+50.5	39.6	15 45.0	+50.8	39.8	42
43	11 07.9	+48.1	38.2	11 55.0	+48.5	38.3	12 42.1	+48.8	38.4	13 29.0	+49.3	38.6	14 15.9	+49.6	38.7	15 02.6	+50.0	38.9	15 49.3	+50.4	39.1	16 35.8	+50.8	39.2	43
44	11 56.0	+48.0	37.6	12 43.5	+48.4	37.7	13 30.9	+48.8	37.8	14 18.3	+49.1	38.0	15 05.5	+49.5	38.1	15 52.6	+49.9	38.3	16 39.7	+50.2	38.5	17 26.6	+50.6	38.7	44
45	12 44.0	+47.9	36.9	13 31.9	+48.3	37.1	14 19.7	+48.7	37.2	15 07.4	+49.1	37.4	15 55.0	+49.5	37.6	16 42.5	+49.8	37.7	17 29.9	+50.2	37.9	18 17.2	+50.5	38.1	45
46	13 31.9	+47.8	36.3	14 20.2	+48.2	36.5	15 08.4	+48.6	36.6	15 56.5	+48.9	36.8	16 44.5	+49.3	37.0	17 32.3	+49.7	37.2	18 20.1	+50.1	37.4	19 07.7	+50.5	37.6	46
47	14 19.7	+47.7	35.7	15 08.4	+48.1	35.9	15 57.0	+48.4	36.0	16 45.4	+48.9	36.2	17 33.8	+49.2	36.4	18 22.0	+49.6	36.6	19 10.2	+49.9	36.8	19 58.2	+50.3	37.0	47
48	15 07.4	+47.6	35.1	15 56.5	+48.0	35.2	16 45.4	+48.4	35.4	17 34.3	+48.7	35.6	18 23.0	+49.1	35.8	19 11.6	+49.5	36.0	20 00.1	+49.9	36.2	20 48.5	+50.2	36.4	48
49	15 55.0	+47.5	34.4	16 44.5	+47.8	34.6	17 33.8	+48.2	34.8	18 23.0	+48.6	35.0	19 12.1	+49.0	35.2	20 01.1	+49.4	35.4	20 50.0	+49.7	35.6	21 38.7	+50.1	35.8	49
50	16 42.5	+47.3	33.8	17 32.3	+47.8	33.9	18 22.0	+48.2	34.2	19 11.6	+48.5	34.4	20 01.1	+48.9	34.6	20 50.5	+49.2	34.8	21 39.7	+49.6	35.0	22 28.8	+49.9	35.3	50
51	17 29.9	+47.3	33.2	18 20.1	+47.6	33.3	19 10.2	+48.0	33.5	20 00.1	+48.4	33.7	20 50.0	+48.7	33.9	21 39.7	+49.1	34.2	22 29.3	+49.4	34.4	23 18.7	+49.8	34.6	51
52	18 17.2	+47.1	32.5	19 07.7	+47.5	32.7	19 58.2	+47.8	32.9	20 48.5	+48.2	33.1	21 38.7	+48.6	33.3	22 28.8	+48.9	33.5	23 18.7	+49.3	33.8	24 08.5	+49.7	34.0	52
53	19 04.3	+47.0	31.9	19 55.2	+47.4	32.1	20 45.9	+47.7	32.3	21 36.7	+48.1	32.5	22 27.3	+48.4	32.7	23 17.7	+48.8	32.9	24 08.0	+49.2	33.1	24 58.2	+49.5	33.3	53
54	19 51.3	+46.9	31.2	20 42.6	+47.2	31.4	21 33.7	+47.6	31.6	22 24.8	+47.9	31.8	23 15.7	+48.3	32.0	24 06.5	+48.7	32.3	24 57.2	+49.0	32.5	25 47.7	+49.4	32.8	54
55	20 38.2	+46.7	30.5	21 29.8	+47.0	30.7	22 21.3	+47.4	30.9	23 12.7	+47.8	31.2	24 04.0	+48.1	31.4	24 55.2	+48.4	31.6	25 46.2	+48.8	31.9	26 37.1	+49.1	32.1	55
56	21 24.9	+46.5	29.9	22 16.8	+46.9	30.1	23 08.7	+47.2	30.3	24 00.5	+47.5	30.5	24 52.1	+47.9	30.7	25 43.6	+48.3	31.0	26 35.0	+48.6	31.2	27 26.2	+49.0	31.5	56
57	22 11.4	+46.3	29.2	23 03.7	+46.7	29.4	23 55.9	+47.1	29.6	24 48.0	+47.4	29.8	25 40.0	+47.8	30.1	26 31.9	+48.1	30.3	27 23.6	+48.5	30.6	28 15.2	+48.8	30.8	57
58	22 57.7	+46.2	28.5	23 50.4	+46.5	28.7	24 43.0	+46.9	28.9	25 35.4	+47.3	29.2	26 27.8	+47.5	29.4	27 20.0	+47.9	29.6	28 12.1	+48.2	29.9	29 04.0	+48.6	30.2	58
59	23 43.9	+46.0	27.8	24 36.9	+46.4	28.0	25 29.9	+46.6	28.2	26 22.7	+47.0	28.5	27 15.3	+47.4	28.7	28 07.9	+47.7	29.0	29 00.3	+48.1	29.2	29 52.6	+48.4	29.5	59
60	24 29.9	+45.8	27.1	25 23.3	+46.1	27.3	26 16.5	+46.5	27.5	27 09.7	+46.8	27.8	28 02.7	+47.1	28.0	28 55.6	+47.5	28.3	29 48.4	+47.8	28.5	30 41.0	+48.2	28.8	60
61	25 15.7	+45.6	26.4	26 09.4	+45.9	26.6	27 03.0	+46.2	26.8	27 56.5	+46.6	27.1	28 49.8	+47.0	27.3	29 43.1	+47.3	27.6	30 36.2	+47.6	27.8	31 29.2	+48.0	28.1	61
62	26 01.3	+45.3	25.7	26 55.3	+45.7	25.9	27 49.2	+46.1	26.1	28 43.1	+46.3	26.3	29 36.8	+46.7	26.6	30 30.4	+47.0	26.9	31 23.8	+47.4	27.2	32 17.2	+47.7	27.4	62
63	26 46.6	+45.2	24.9	27 41.0	+45.5	25.2	28 35.3	+45.7	25.4	29 29.4	+46.1	25.6	30 23.5	+46.4	25.9	31 17.4	+46.8	26.1	32 11.2	+47.1	26.4	33 04.9	+47.4	26.7	63
64	27 31.8	+44.9	24.2	28 26.5	+45.2	24.4	29 21.0	+45.6	24.6	30 15.5	+45.9	24.9	31 09.9	+46.2	25.1	32 04.2	+46.5	25.4	32 58.3	+46.9	25.7	33 52.3	+47.2	26.0	64
65	28 16.7	+44.6	23.4	29 11.7	+44.9	23.7	30 06.6	+45.3	23.9	31 01.4	+45.6	24.1	31 56.1	+45.9	24.4	32 50.7	+46.2	24.6	33 45.2	+46.5	24.9	34 39.5	+46.9	25.2	65
66	29 01.3	+44.4	22.7	29 56.6	+44.7	22.9	30 51.9	+45.0	23.1	31 47.0	+45.3	23.4	32 42.0	+45.7	23.6	33 36.9	+46.0	23.9	34 31.7	+46.3	24.2	35 26.4	+46.6	24.4	66
67	29 45.7	+44.1	21.9	30 41.3	+44.5	22.1	31 36.9	+44.7	22.4	32 32.3	+45.0	22.6	33 27.7	+45.3	22.8	34 22.9	+45.7	23.1	35 18.0	+46.0	23.4	36 13.0	+46.3	23.7	67
68	30 29.8	+43.9	21.1	31 25.8	+44.1	21.4	32 21.6	+44.4	21.6	33 17.3	+44.8	21.8	34 13.0	+45.0	22.1	35 08.6	+45.3	22.3	36 04.0	+45.7	22.6	36 59.3	+46.0	22.9	68
69	31 13.7	+43.5	20.3	32 09.9	+43.8	20.5	33 06.0	+44.1	20.8	34 02.1	+44.4	21.0	34 58.0	+44.8	21.3	35 53.9	+45.0	21.5	36 49.7	+45.3	21.8	37 45.3	+45.7	22.1	69
70	31 57.2	+43.2	19.5	32 53.7	+43.5	19.7	33 50.1	+43.8	20.0	34 46.5	+44.1	20.2	35 42.8	+44.3	20.4	36 38.9	+44.7	20.7	37 35.0	+45.0	21.0	38 31.0	+45.3	21.2	70
71	32 40.4	+42.9	18.7	33 37.2	+43.2	18.9	34 33.9	+43.5	19.1	35 30.6	+43.7	19.4	36 27.1	+44.1	19.6	37 23.6	+44.3	19.9	38 20.0	+44.6	20.1	39 16.3	+44.9	20.4	71
72	33 23.3	+42.6	17.9	34 20.4	+42.8	18.1	35 17.4	+43.1	18.3	36 14.3	+43.4	18.5	37 11.2	+43.6	18.8	38 07.9	+44.0	19.0	39 04.6	+44.2	19.2	40 01.2	+44.5	19.5	72
73	34 05.9	+42.1	17.0	35 03.2	+42.4	17.2	36 00.5	+42.7	17.4	36 57.7	+43.0	17.7	37 54.8	+43.3	17.9	38 51.9	+43.5	18.1	39 48.8	+43.9	18.4	40 45.7	+44.2	18.7	73
74	34 48.0	+41.9	16.2	35 45.6	+42.1	16.4	36 43.2	+42.3	16.6	37 40.7	+42.6	16.8	38 38.1	+42.8	17.0	39 35.4	+43.1	17.2	40 32.7	+43.4	17.5	41 29.9	+43.7	17.8	74
75	35 29.9	+41.4	15.3	36 27.7	+41.7	15.5	37 25.5	+42.0	15.7	38 23.3	+42.2	15.9	39 20.9	+42.5	16.1	40 18.5	+42.7	16.3	41 16.1	+43.0	16.6	42 13.6	+43.2	16.8	75
76	36 11.3	+41.0	14.4	37 09.4	+41.3	14.6	38 07.5	+41.5	14.8	39 05.4	+41.8	15.0	40 03.4	+42.0	15.2	41 01.2	+42.3	15.4	41 59.1	+42.5	15.7	42 56.8	+42.8	15.9	76
77	36 52.3	+40.7	13.5	37 50.7	+40.8	13.7	38 49.0	+41.0	13.8	39 47.2	+41.3	14.0	40 45.4	+41.5	14.3	41 43.5	+41.8	14.5	42 41.6	+42.0	14.7	43 39.6	+42.2	14.9	77
78	37 33.0	+40.1	12.6	38 31.5	+40.4	12.7	39 30.0	+40.6	12.9	40 28.5	+40.8	13.1	41 26.9	+41.0	13.3	42 25.3	+41.2	13.5	43 23.6	+41.5	13.7	44 21.8	+41.8	13.9	78
79	38 13.1	+39.7	11.6	39 11.9	+39.9	11.8	40 10.6	+40.1	11.9	41 09.3	+40.3	12.1	42 07.9	+40.6	12.3	43 06.5	+40.8	12.5	44 05.1	+41.0	12.7	45 03.6	+41.2	12.9	79
80	38 52.8	+39.3	10.7	39 51.8	+39.4	10.8	40 50.7	+39.6	11.0	41 49.6	+39.8	11.1	42 48.5	+40.0	11.3	43 47.3	+40.2	11.5	44 46.0	+40.5	11.7	45 44.8	+40.6	11.9	80
81	39 32.1	+38.7	9.7	40 31.2	+38.9	9.8	41 30.3	+39.1	10.0	42 29.4	+39.3	10.1	43 28.5	+39.4	10.3	44 27.5	+39.6	10.5	45 26.5	+39.8	10.7	46 25.4	+40.0	10.8	81
82	40 10.8	+38.2	8.7	41 10.1	+38.4	8.8	42 09.4	+38.5	9.0	43 08.7	+38.6	9.1	44 07.9	+38.8	9.3	45 07.1	+39.0	9.4	46 06.3	+39.2	9.6	47 05.4	+39.4	9.8	82
83	40 49.0	+37.7	7.7	41 48.5	+37.8	7.8	42 47.9	+38.0	7.9	43 47.3	+38.1	8.0	44 46.7	+38.3	8.2	45 46.1	+38.4	8.3	46 45.5	+38.5	8.5	47 44.8	+38.7	8.6	83
84	41 26.7	+37.1	6.6	42 26.3	+37.2	6.7	43 25.9	+37.3	6.9	44 25.4	+37.5	7.0	45 25.0	+37.6	7.1	46 24.5	+37.8	7.2	47 24.0	+37.9	7.4	48 23.5	+38.1	7.5	84
85	42 03.8	+36.5	5.6	43 03.5	+36.6	5.7	44 03.2	+36.7	5.8	45 02.9	+36.8	5.9	46 02.6	+36.9	6.0	47 02.3	+37.0	6.1	48 01.9	+37.2	6.2	49 01.6	+37.3	6.3	85
86	42 40.3	+35.9	4.5	43 40.1	+36.0	4.6	44 39.9	+36.1	4.7	45 39.7	+36.2	4.7	46 39.5	+36.3	4.8	47 39.3	+36.3	4.9	48 39.1	+36.4	5.0	49 38.9	+36.5	5.1	86
87	43 16.2	+35.3	3.4	44 16.1	+35.3	3.5	45 16.0	+35.4	3.5	46 15.9	+35.4	3.6	47 15.8	+35.5	3.7	48 15.6	+35.7	3.7	49 15.5	+35.7	3.8	50 15.4	+35.7	3.9	87
88	43 51.5	+34.6	2.3	44 51.4	+34.7	2.3	45 51.4	+34.7	2.4	46 51.3	+34.8	2.4	47 51.3	+34.7	2.5	48 51.2	+34.8	2.5	49 51.2	+34.8	2.6	50 51.1	+34.9	2.6	88
89	44 26.1	+33.9	1.2	45 26.1	+33.9	1.2	46 26.1	+33.9	1.2	47 26.1	+33.9	1.2	48 26.0	+34.0	1.2	49 26.0	+34.0	1.3	50 26.0	+34.0	1.3	51 26.0	+34.0	1.3	89
90	45 00.0	+33.2	0.0	46 00.0	+33.2	0.0	47 00.0	+33.2	0.0	48 00.0	+33.1	0.0	49 00.0	+33.1	0.0	50 00.0	+33.1	0.0	51 00.0	+33.1	0.0	52 00.0	+33.1	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION   L.H.A. 124°, 236°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	22 39.1	+45.8	114.7	22 13.8	+46.6	115.0	21 48.3	+47.2	115.4	21 22.4	+47.8	115.8	20 56.1	+48.4	116.1	20 29.6	+49.0	116.4	20 02.7	+49.6	116.8	19 35.5	+50.1	117.1	0
1	23 24.9	+45.7	114.0	23 00.4	+46.3	114.4	22 35.5	+47.0	114.7	22 10.2	+47.6	115.1	21 44.5	+48.3	115.5	21 18.6	+48.8	115.8	20 52.3	+49.4	116.2	20 25.6	+50.0	116.5	1
2	24 10.6	+45.5	113.3	23 46.7	+46.2	113.7	23 22.5	+46.8	114.1	22 57.8	+47.5	114.5	22 32.8	+48.1	114.8	22 07.4	+48.7	115.2	21 41.7	+49.3	115.6	21 15.6	+49.9	115.9	2
3	24 56.1	+45.3	112.5	24 32.9	+46.0	113.0	24 09.3	+46.7	113.4	23 45.3	+47.3	113.8	23 20.9	+48.0	114.2	22 56.1	+48.6	114.6	22 31.0	+49.2	115.0	22 05.5	+49.8	115.3	3
4	25 41.4	+45.1	111.8	25 18.9	+45.8	112.3	24 56.0	+46.4	112.7	24 32.6	+47.1	113.1	24 08.9	+47.7	113.5	23 44.7	+48.4	113.9	23 20.2	+49.0	114.3	22 55.3	+49.6	114.7	4
5	26 26.5	+44.8	111.1	26 04.7	+45.5	111.5	25 42.4	+46.3	112.0	25 19.7	+47.0	112.4	24 56.6	+47.6	112.9	24 33.1	+48.3	113.3	24 09.2	+48.9	113.7	23 44.9	+49.5	114.1	5
6	27 11.3	+44.6	110.3	26 50.2	+45.4	110.8	26 28.7	+46.0	111.3	26 06.7	+46.7	111.7	25 44.2	+47.5	112.2	25 21.4	+48.0	112.6	24 58.1	+48.7	113.1	24 34.4	+49.3	113.5	6
7	27 55.9	+44.4	109.6	27 35.6	+45.1	110.1	27 14.7	+45.9	110.6	26 53.4	+46.5	111.0	26 31.7	+47.2	111.5	26 09.4	+47.9	112.0	25 46.8	+48.5	112.4	25 23.7	+49.1	112.9	7
8	28 40.3	+44.0	108.8	28 20.7	+44.8	109.3	28 00.6	+45.5	109.8	27 39.9	+46.4	110.3	27 18.9	+47.0	110.8	26 57.3	+47.7	111.3	26 35.3	+48.3	111.8	26 12.8	+49.0	112.2	8
9	29 24.3	+43.9	108.0	29 05.5	+44.6	108.6	28 46.1	+45.4	109.1	28 26.3	+46.0	109.6	28 05.9	+46.8	110.1	27 45.0	+47.5	110.6	27 23.6	+48.2	111.1	27 01.8	+48.8	111.6	9
10	30 08.2	+43.4	107.3	29 50.1	+44.3	107.8	29 31.5	+45.1	108.3	29 12.3	+45.9	108.9	28 52.7	+46.5	109.4	28 32.5	+47.2	109.9	28 11.8	+47.9	110.4	27 50.6	+48.6	110.9	10
11	30 51.7	+43.2	106.5	30 34.4	+44.0	107.0	30 16.6	+44.8	107.6	29 58.2	+45.5	108.1	29 39.2	+46.3	108.7	29 19.7	+47.1	109.2	28 59.7	+47.8	109.7	28 39.2	+48.4	110.3	11
12	31 34.9	+42.9	105.6	31 18.4	+43.8	106.2	31 01.4	+44.5	106.8	30 43.7	+45.4	107.4	30 25.5	+46.1	107.9	30 06.8	+46.8	108.5	29 47.5	+47.5	109.0	29 27.6	+48.2	109.6	12
13	32 17.8	+42.6	104.8	32 02.2	+43.4	105.4	31 45.9	+44.3	106.0	31 29.1	+45.0	106.6	31 11.6	+45.8	107.2	30 53.6	+46.5	107.8	30 35.0	+47.3	108.3	30 15.8	+48.0	108.9	13
14	33 00.4	+42.3	104.0	32 45.6	+43.1	104.6	32 30.2	+43.9	105.2	32 14.1	+44.7	105.8	31 57.4	+45.5	106.4	31 40.1	+46.3	107.0	31 22.3	+47.0	107.6	31 03.8	+47.8	108.2	14
15	33 42.7	+41.9	103.1	33 28.7	+42.8	103.8	33 14.1	+43.6	104.4	32 58.8	+44.5	105.0	32 43.0	+45.2	105.7	32 26.4	+46.1	106.3	32 09.3	+46.8	106.9	31 51.6	+47.5	107.5	15
16	34 24.6	+41.5	102.3	34 11.5	+42.4	102.9	33 57.7	+43.3	103.6	33 43.3	+44.1	104.2	33 28.2	+44.9	104.9	33 12.5	+45.7	105.5	32 56.1	+46.5	106.1	32 39.1	+47.3	106.8	16
17	35 06.1	+41.1	101.4	34 53.9	+42.0	102.1	34 41.0	+42.9	102.8	34 27.4	+43.8	103.4	34 13.1	+44.7	104.1	33 58.2	+45.4	104.7	33 42.6	+46.2	105.4	33 26.4	+47.0	106.0	17
18	35 47.2	+40.8	100.5	35 35.9	+41.7	101.2	35 23.9	+42.6	101.9	35 11.2	+43.4	102.6	34 57.8	+44.3	103.3	34 43.6	+45.2	104.0	34 28.8	+46.0	104.6	34 13.4	+46.7	105.3	18
19	36 28.0	+40.3	99.6	36 17.6	+41.3	100.3	36 06.5	+42.2	101.0	35 54.6	+43.1	101.7	35 42.1	+43.9	102.4	35 28.8	+44.8	103.1	35 14.8	+45.6	103.8	35 00.1	+46.4	104.5	19
20	37 08.3	+39.9	98.7	36 58.9	+40.8	99.4	36 48.7	+41.8	100.1	36 37.7	+42.7	100.9	36 26.0	+43.6	101.6	36 13.6	+44.4	102.3	36 00.4	+45.3	103.0	35 46.5	+46.1	103.7	20
21	37 48.2	+39.4	97.7	37 39.7	+40.4	98.5	37 30.5	+41.3	99.2	37 20.4	+42.3	100.0	37 09.6	+43.2	100.7	36 58.0	+44.1	101.5	36 45.7	+45.0	102.2	36 32.6	+45.8	102.9	21
22	38 27.6	+38.9	96.8	38 20.1	+39.9	97.5	38 11.8	+40.9	98.3	38 02.7	+41.9	99.1	37 52.8	+42.8	99.9	37 42.1	+43.8	100.6	37 30.7	+44.6	101.4	37 18.4	+45.5	102.1	22
23	39 06.5	+38.5	95.8	39 00.0	+39.5	96.6	38 52.7	+40.5	97.4	38 44.6	+41.5	98.2	38 35.6	+42.4	99.0	38 25.9	+43.3	99.8	38 15.3	+44.2	100.5	38 03.9	+45.1	101.3	23
24	39 45.0	+37.9	94.8	39 39.5	+39.0	95.6	39 33.2	+40.0	96.4	39 26.1	+40.9	97.3	39 18.0	+42.0	98.1	39 09.2	+42.9	98.9	38 59.5	+43.9	99.7	38 49.0	+44.8	100.5	24
25	40 22.9	+37.4	93.8	40 18.5	+38.4	94.6	40 13.2	+39.5	95.5	40 07.0	+40.6	96.3	40 00.0	+41.5	97.1	39 52.1	+42.5	98.0	39 43.4	+43.4	98.8	39 33.8	+44.3	99.6	25
26	41 00.3	+36.8	92.7	40 56.9	+37.9	93.6	40 52.7	+39.0	94.5	40 47.6	+40.0	95.3	40 41.5	+41.1	96.2	40 34.6	+42.1	97.0	40 26.8	+43.0	97.9	40 18.1	+44.0	98.7	26
27	41 37.1	+36.2	91.7	41 34.8	+37.4	92.6	41 31.7	+38.4	93.5	41 27.6	+39.5	94.4	41 22.6	+40.5	95.2	41 16.7	+41.5	96.1	41 09.8	+42.6	97.0	41 02.1	+43.5	97.8	27
28	42 13.3	+35.6	90.6	42 12.2	+36.8	91.5	42 10.1	+37.9	92.4	42 07.1	+39.0	93.3	42 03.1	+40.1	94.2	41 58.2	+41.1	95.1	41 52.4	+42.1	96.0	41 45.8	+43.1	96.9	28
29	42 48.9	+35.0	89.5	42 49.0	+36.1	90.5	42 48.0	+37.3	91.4	42 46.1	+38.3	92.3	42 43.2	+39.4	93.2	42 39.3	+40.5	94.2	42 34.5	+41.5	95.1	42 28.7	+42.6	96.0	29
30	43 23.9	+34.4	88.4	43 25.1	+35.5	89.4	43 25.3	+36.6	90.3	43 24.4	+37.9	91.3	43 22.6	+39.0	92.2	43 19.8	+40.0	93.1	43 16.0	+41.1	94.1	43 11.3	+42.1	95.0	30
31	43 58.3	+33.6	87.3	44 00.6	+34.9	88.3	44 01.9	+36.1	89.2	44 02.3	+37.1	90.2	44 01.6	+38.3	91.2	43 59.8	+39.5	92.1	43 57.1	+40.6	93.1	43 53.4	+41.6	94.0	31
32	44 31.9	+33.0	86.1	44 35.5	+34.1	87.1	44 38.0	+35.3	88.1	44 39.4	+36.6	89.1	44 39.9	+37.7	90.1	44 39.3	+38.8	91.1	44 37.7	+39.9	92.1	44 35.0	+41.0	93.0	32
33	45 04.9	+32.2	85.0	45 09.6	+33.5	86.0	45 13.3	+34.7	87.0	45 16.0	+35.9	88.0	45 17.6	+37.0	89.0	45 18.1	+38.3	90.0	45 17.6	+39.4	91.0	45 16.0	+40.5	92.0	33
34	45 37.1	+31.4	83.8	45 43.1	+32.6	84.8	45 48.0	+33.9	85.8	45 51.9	+35.1	86.8	45 54.6	+36.4	87.9	45 56.4	+37.5	88.9	45 57.0	+38.7	89.9	45 56.5	+39.9	91.0	34
35	46 08.5	+30.6	82.5	46 15.7	+32.0	83.6	46 21.9	+33.2	84.6	46 27.0	+34.5	85.7	46 31.0	+35.7	86.7	46 33.9	+36.9	87.8	46 35.7	+38.1	88.8	46 36.4	+39.3	89.9	35
36	46 39.1	+29.8	81.3	46 47.7	+31.1	82.3	46 55.1	+32.4	83.4	47 01.5	+33.6	84.5	47 06.7	+34.9	85.5	47 10.8	+36.2	86.6	47 13.8	+37.4	87.7	47 15.7	+38.6	88.8	36
37	47 08.9	+28.9	80.0	47 18.8	+30.2	81.1	47 27.5	+31.5	82.2	47 35.1	+32.9	83.2	47 41.6	+34.2	84.3	47 47.0	+35.4	85.4	47 51.2	+36.7	86.5	47 54.3	+37.9	87.6	37
38	47 37.8	+28.1	78.7	47 49.0	+29.4	79.8	47 59.1	+30.7	80.9	48 08.0	+32.1	82.0	48 15.8	+33.4	83.1	48 22.4	+34.7	84.2	48 27.9	+35.9	85.3	48 32.2	+37.2	86.5	38
39	48 05.9	+27.1	77.4	48 18.4	+28.5	78.5	48 29.8	+29.9	79.6	48 40.1	+31.2	80.7	48 49.2	+32.5	81.8	48 57.1	+33.9	83.0	49 03.8	+35.2	84.1	49 09.4	+36.4	85.3	39
40	48 33.0	+26.2	76.1	48 46.9	+27.6	77.2	48 59.7	+28.9	78.3	49 11.3	+30.3	79.4	49 21.7	+31.7	80.6	49 31.0	+33.0	81.7	49 39.0	+34.3	82.9	49 45.8	+35.7	84.0	40
41	48 59.2	+25.2	74.7	49 14.5	+26.5	75.8	49 28.6	+28.0	76.9	49 41.6	+29.4	78.1	49 53.4	+30.7	79.2	50 04.0	+32.1	80.4	50 13.3	+33.5	81.6	50 21.5	+34.8	82.8	41
42	49 24.4	+24.2	73.3	49 41.1	+25.6	74.4	49 56.6	+27.0	75.6	50 11.0	+28.4	76.7	50 24.1	+29.8	77.9	50 36.1	+31.2	79.1	50 46.8	+32.6	80.3	50 56.3	+34.0	81.5	42
43	49 48.6	+23.1	71.9	50 06.7	+24.5	73.0	50 23.6	+26.0	74.2	50 39.4	+27.4	75.4	50 53.9	+28.9	76.5	51 07.3	+30.2	77.7	51 19.4	+31.7	79.0	51 30.3	+33.0	80.2	43
44	50 11.7	+22.1	70.5	50 31.2	+23.5	71.6	50 49.6	+24.9	72.8	51 06.8	+26.3	73.9	51 22.8	+27.8	75.1	51 37.5	+29.3	76.4	51 51.1	+30.6	77.6	52 03.3	+32.1	78.8	44
45	50 33.8	+20.9	69.0	50 54.7	+22.4	70.1	51 14.5	+23.8	71.3	51 33.1	+25.3	72.5	51 50.6	+26.7	73.7	52 06.8	+28.2	74.9	52 21.7	+29.7	76.2	52 35.4	+31.1	77.5	45
46	50 54.7	+19.8	67.5	51 17.1	+21.2	68.7	51 38.3	+22.8	69.8	51 58.4	+24.2	71.0	52 17.3	+25.7	72.3	52 35.0	+27.1	73.5	52 51.4	+28.6	74.8	53 06.5	+30.1	76.0	46
47	51 14.5	+18.6	66.0	51 38.3	+20.1	67.2	52 01.1	+21.5	68.3	52 22.6	+23.1	69.5	52 43.0	+24.5	70.8	53 02.1	+26.0	72.2	53 20.0	+27.5	73.3	53 36.6	+29.0	74.6	47
48	51 33.1	+17.5	64.5	51 58.4	+18.9	65.6	52 22.6	+20.4	66.8	52 45.7	+21.8	68.0	53 07.5	+23.4	69.3	53 28.1	+24.9	70.5	53 47.5	+26.4	71.8	54 05.6	+27.9	73.1	48
49	51 50.6	+16.2	62.9	52 17.3	+17.7	64.1	52 43.0	+19.1	65.3	53 07.5	+20.6	66.5	53 30.9	+22.1	67.7	53 53.0	+23.7	69.0	54 13.9	+25.2	70.3	54 33.5	+26.7	71.6	49
50	52 06.8	+14.9	61.4	52 35.0	+16.4	62.5	53 02.1	+17.9	63.7	53 28.1	+19.4	64.9	53 53.0	+20.9	66.1	54 16.7	+22.4	67.4	54 39.1	+23.9	68.7	55 00.2	+25.5	70.0	50
51	52 21.7	+13.7	59.8	52 51.4	+15.1	60.9	53 20.0	+16.6	62.1	53 47.5	+18.1	63.3	54 13.9	+19.6	64.6	54 39.1	+21.1	65.8	55 03.0	+22.7	67.1	55 25.7	+24.3	68.5	51
52	52 35.4	+12.4	58.2	53 06.5	+13.8	59.3	53 36.6	+15.3	60.5	54 05.6	+16.8	61.7	54 33.5	+18.3	62.9	55 00.2	+19.8	64.2	55 25.7	+21.4	65.5	55 50.0	+22.9	66.8	52
53	52 47.8	+11.0	56.6	53 20.3	+12.5	57.7	53 51.9	+13.9	58.9	54 22.4	+15.4	60.1	54 51.8	+16.9	61.3	55 20.0	+18.5	62.5	55 47.1	+20.0	63.8	56 12.9	+21.6	65.2	53
54	52 58.8	+9.7	55.0	53 32.8	+11.1	56.1	54 05.8	+12.5	57.2	54 37.8	+14.0	58.4	55 08.7	+15.5	59.6	55 38.5	+17.0	60.9	56 07.1	+18.6	62.2	56 34.5	+20.2	63.5	54
55	53 08.5	+8.3	53.3	53 43.9	+9.7	54.4	54 18.3	+11.2	55.5	54 51.8	+12.6	56.7	55 24.2	+14.1	57.9	55 55.5	+15.6	59.2	56 25.7	+17.2	60.4	56 54.7	+18.8	61.8	55
56	53 16.8	+7.0	51.7	53 53.6	+8.3	52.7	54 29.5	+9.7	53.8	55 04.4	+11.2	55.0	55 38.3	+12.6	56.2	56 11.1	+14.2	57.4	56 42.9	+15.7	58.7	57 13.5	+17.2	60.0	56
57	53 23.8	+5.5	50.0	54 01.9	+6.9	51.1	54 39.2	+8.3	52.1	55 15.6	+9.7	53.3	55 50.9	+11.2	54.5	56 25.3	+12.7	55.7	56 58.6	+14.2	56.9	57 30.7	+15.8	58.3	57
58	53 29.3	+4.2	48.3	54 08.8	+5.5	49.4	54 47.5	+6.8	50.4	55 25.3	+8.2	51.5	56 02.1	+9.6	52.7	56 38.0	+11.1	53.9	57 12.8	+12.6	55.2	57 46.5	+14.2	56.5	58
59	53 33.5	+2.7	46.7	54 14.3	+4.0	47.7	54 54.3	+5.3	48.7	55 33.5	+6.7	49.8	56 11.7	+8.2	50.9	56 49.1	+9.6	52.1	57 25.4	+11.1	53.3	58 00.7	+12.6	54.6	59
60	53 36.2	+1.3	45.0	54 18.3	+2.6	45.9	54 59.6	+3.9	47.0	55 40.2	+5.2	48.0	56 19.9	+6.5	49.1	56 58.7	+8.0	50.3	57 36.5	+9.5	51.5	58 13.3	+11.0	52.8	60
61	53 37.5	−0.1	43.3	54 20.9	+1.1	44.2	55 03.5	+2.4	45.2	55 45.4	+3.6	46.3	56 26.4	+5.0	47.4	57 06.7	+6.4	48.5	57 46.0	+7.8	49.7	58 24.3	+9.3	50.9	61
62	53 37.4	−1.5	41.6	54 22.0	−0.4	42.5	55 05.9	+0.8	43.5	55 49.0	+2.2	44.5	56 31.4	+3.5	45.5	57 13.1	+4.7	46.7	57 53.8	+6.2	47.8	58 33.6	+7.7	49.0	62
63	53 35.9	−2.9	39.9	54 21.6	−1.8	40.8	55 06.7	−0.6	41.7	55 51.2	+0.5	42.7	56 34.9	+1.8	43.7	57 17.8	+3.2	44.8	58 00.0	+4.5	45.9	58 41.3	+5.9	47.1	63
64	53 33.0	−4.4	38.2	54 19.8	−3.3	39.1	55 06.1	−2.2	40.0	55 51.7	−0.9	40.9	56 36.7	+0.3	41.9	57 21.0	+1.6	43.0	58 04.5	+2.9	44.0	58 47.2	+4.3	45.2	64
65	53 28.6	−5.8	36.6	54 15.5	−4.7	37.4	55 03.9	−3.6	38.2	55 50.8	−2.5	39.1	56 37.0	−1.3	40.1	57 22.6	−0.1	41.1	58 07.4	+1.2	42.2	58 51.5	+2.5	43.3	65
66	53 22.8	−7.1	34.9	54 11.8	−6.1	35.7	55 00.3	−5.1	36.5	55 48.3	−4.1	37.4	56 35.7	−2.9	38.3	57 22.5	−1.8	39.2	58 08.6	−0.5	40.3	58 54.0	+0.8	41.3	66
67	53 15.7	−8.5	33.2	54 05.7	−7.6	34.0	54 55.2	−6.6	34.8	55 44.2	−5.5	35.6	56 32.8	−4.5	36.5	57 20.7	−3.3	37.4	58 08.1	−2.2	38.4	58 54.8	−1.0	39.4	67
68	53 07.2	−9.9	31.6	53 58.1	−9.0	32.3	54 48.6	−8.1	33.0	55 38.7	−7.1	33.8	56 28.3	−6.1	34.7	57 17.4	−5.0	35.5	58 05.9	−3.9	36.5	58 53.8	−2.7	37.5	68
69	52 57.3	−11.3	29.9	53 49.1	−10.4	30.6	54 40.5	−9.5	31.3	55 31.6	−8.6	32.1	56 22.2	−7.6	32.9	57 12.4	−6.6	33.7	58 02.0	−5.5	34.6	58 51.1	−4.4	35.5	69
70	52 46.0	−12.5	28.3	53 38.7	−11.8	28.9	54 31.0	−10.9	29.6	55 23.0	−10.1	30.3	56 14.6	−9.2	31.1	57 05.8	−8.2	31.9	57 56.5	−7.2	32.7	58 46.7	−6.1	33.6	70
71	52 33.5	−13.9	26.7	53 26.9	−13.1	27.3	54 20.1	−12.3	27.9	55 12.9	−11.5	28.6	56 05.4	−10.6	29.3	56 57.6	−9.8	30.1	57 49.3	−8.8	30.8	58 40.6	−7.8	31.7	71
72	52 19.6	−15.1	25.1	53 13.8	−14.4	25.7	54 07.8	−13.8	26.3	55 01.4	−12.9	26.9	55 54.8	−12.2	27.5	56 47.8	−11.3	28.2	57 40.5	−10.4	29.0	58 32.8	−9.5	29.8	72
73	52 04.5	−16.4	23.5	52 59.4	−15.8	24.0	53 54.0	−15.0	24.6	54 48.5	−14.4	25.2	55 42.6	−13.6	25.8	56 36.5	−12.8	26.5	57 30.1	−12.1	27.2	58 23.3	−11.2	27.9	73
74	51 48.1	−17.7	22.0	52 43.6	−17.0	22.4	53 39.0	−16.4	23.0	54 34.1	−15.7	23.5	55 29.0	−15.0	24.1	56 23.7	−14.4	24.7	57 18.0	−13.5	25.3	58 12.1	−12.8	26.0	74
75	51 30.4	−18.8	20.4	52 26.6	−18.3	20.9	53 22.6	−17.7	21.3	54 18.4	−17.1	21.8	55 14.0	−16.5	22.4	56 09.3	−15.8	22.9	57 04.5	−15.1	23.5	57 59.3	−14.3	24.2	75
76	51 11.6	−19.9	18.9	52 08.3	−19.4	19.3	53 04.9	−19.0	19.7	54 01.3	−18.4	20.2	54 57.5	−17.8	20.7	55 53.5	−17.2	21.2	56 49.4	−16.6	21.8	57 45.0	−15.9	22.3	76
77	50 51.7	−21.2	17.4	51 48.9	−20.7	17.8	52 45.9	−20.2	18.2	53 42.9	−19.7	18.6	54 39.7	−19.2	19.0	55 36.3	−18.6	19.5	56 32.8	−18.1	20.0	57 29.1	−17.5	20.5	77
78	50 30.5	−22.2	15.9	51 28.2	−21.8	16.3	52 25.7	−21.3	16.6	53 23.2	−21.0	17.0	54 20.5	−20.5	17.4	55 17.7	−20.0	17.8	56 14.7	−19.4	18.3	57 11.6	−19.0	18.8	78
79	50 08.3	−23.3	14.5	51 06.4	−22.9	14.8	52 04.4	−22.6	15.1	53 02.2	−22.1	15.4	54 00.0	−21.7	15.8	54 57.7	−21.3	16.2	55 55.3	−20.9	16.6	56 52.7	−20.3	17.0	79
80	49 45.0	−24.3	13.0	50 43.5	−24.1	13.3	51 41.8	−23.7	13.6	52 40.1	−23.3	13.9	53 38.3	−23.0	14.2	54 36.4	−22.5	14.6	55 34.4	−22.1	14.9	56 32.4	−21.8	15.3	80
81	49 20.7	−25.3	11.6	50 19.4	−25.0	11.9	51 18.1	−24.7	12.1	52 16.8	−24.5	12.4	53 15.3	−24.1	12.7	54 13.9	−23.9	13.0	55 12.3	−23.5	13.3	56 10.6	−23.3	13.6	81
82	48 55.4	−26.4	10.2	49 54.4	−26.1	10.4	50 53.4	−25.9	10.7	51 52.3	−25.6	10.9	52 51.2	−25.3	11.1	53 50.0	−25.0	11.4	54 48.8	−24.7	11.7	55 47.6	−24.4	12.0	82
83	48 29.0	−27.2	8.9	49 28.3	−27.1	9.0	50 27.5	−26.8	9.2	51 26.7	−26.6	9.4	52 25.9	−26.4	9.7	53 25.0	−26.1	9.9	54 24.1	−25.9	10.1	55 23.2	−25.6	10.4	83
84	48 01.8	−28.2	7.5	49 01.2	−28.0	7.7	50 00.7	−27.9	7.8	51 00.1	−27.6	8.0	51 59.5	−27.4	8.2	52 58.9	−27.3	8.4	53 58.2	−27.0	8.6	54 57.6	−26.9	8.8	84
85	47 33.6	−29.1	6.2	48 33.2	−28.9	6.3	49 32.8	−28.7	6.5	50 32.5	−28.7	6.6	51 32.1	−28.5	6.7	52 31.6	−28.3	6.9	53 31.2	−28.2	7.1	54 30.7	−28.0	7.2	85
86	47 04.5	−29.9	4.9	48 04.3	−29.8	5.0	49 04.1	−29.8	5.1	50 03.8	−29.6	5.2	51 03.6	−29.5	5.3	52 03.3	−29.4	5.5	53 03.0	−29.2	5.6	54 02.7	−29.1	5.7	86
87	46 34.6	−30.8	3.7	47 34.5	−30.7	3.7	48 34.3	−30.6	3.8	49 34.2	−30.5	3.9	50 34.1	−30.4	4.0	51 33.9	−30.3	4.0	52 33.8	−30.3	4.1	53 33.6	−30.2	4.2	87
88	46 03.8	−31.5	2.4	47 03.8	−31.5	2.5	48 03.7	−31.4	2.5	49 03.7	−31.4	2.6	50 03.6	−31.4	2.6	51 03.6	−31.4	2.7	52 03.5	−31.3	2.7	53 03.4	−31.2	2.8	88
89	45 32.3	−32.3	1.2	46 32.3	−32.3	1.2	47 32.3	−32.3	1.2	48 32.3	−32.3	1.3	49 32.2	−32.2	1.3	50 32.2	−32.2	1.3	51 32.2	−32.2	1.3	52 32.2	−32.2	1.4	89
90	45 00.0	−33.0	0.0	46 00.0	−33.1	0.0	47 00.0	−33.1	0.0	48 00.0	−33.1	0.0	49 00.0	−33.1	0.0	50 00.0	−33.1	0.0	51 00.0	−33.1	0.0	52 00.0	−33.1	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	22 39.1	−46.1	114.7	22 13.8	−46.7	115.0	21 48.3	−47.4	115.4	21 22.4	−48.0	115.8	20 56.1	−48.5	116.1	20 29.6	−49.2	116.4	20 02.7	−49.7	116.8	19 35.5	−50.2	117.1	0
1	21 53.0	−46.2	115.4	21 27.1	−46.8	115.7	21 00.9	−47.5	116.1	20 34.4	−48.1	116.4	20 07.6	−48.7	116.7	19 40.4	−49.2	117.1	19 13.0	−49.8	117.4	18 45.3	−50.4	117.7	1
2	21 06.8	−46.4	116.0	20 40.3	−47.1	116.4	20 13.4	−47.6	116.7	19 46.3	−48.2	117.0	19 18.9	−48.8	117.4	18 51.2	−49.4	117.7	18 23.2	−49.9	118.0	17 54.9	−50.4	118.3	2
3	20 20.4	−46.6	116.7	19 53.2	−47.1	117.0	19 25.8	−47.8	117.4	18 58.1	−48.4	117.7	18 30.1	−48.9	118.0	18 01.8	−49.5	118.3	17 33.3	−50.1	118.5	17 04.5	−50.6	118.8	3
4	19 33.8	−46.7	117.4	19 06.1	−47.3	117.7	18 38.0	−47.9	118.0	18 09.7	−48.4	118.3	17 41.2	−49.1	118.6	17 12.3	−49.6	118.9	16 43.2	−50.1	119.1	16 13.9	−50.6	119.4	4
5	18 47.1	−46.8	118.1	18 18.8	−47.5	118.4	17 50.1	−48.0	118.6	17 21.3	−48.6	118.9	16 52.1	−49.1	119.2	16 22.7	−49.6	119.4	15 53.1	−50.2	119.7	15 23.3	−50.7	119.9	5
6	18 00.3	−47.0	118.7	17 31.3	−47.5	119.0	17 02.1	−48.1	119.3	16 32.7	−48.7	119.5	16 03.0	−49.3	119.8	15 33.1	−49.8	120.0	15 02.9	−50.3	120.3	14 32.6	−50.8	120.5	6
7	17 13.3	−47.1	119.4	16 43.8	−47.7	119.6	16 14.0	−48.3	119.9	15 44.0	−48.8	120.1	15 13.7	−49.3	120.4	14 43.3	−49.9	120.6	14 12.6	−50.3	120.8	13 41.8	−50.9	121.0	7
8	16 26.2	−47.2	120.0	15 56.1	−47.8	120.3	15 25.7	−48.3	120.5	14 55.2	−48.9	120.7	14 24.4	−49.4	121.0	13 53.4	−49.9	121.2	13 22.3	−50.5	121.4	12 50.9	−50.9	121.6	8
9	15 39.0	−47.3	120.7	15 08.3	−47.9	120.9	14 37.4	−48.5	121.1	14 06.3	−49.0	121.3	13 35.0	−49.5	121.6	13 03.5	−50.0	121.8	12 31.8	−50.5	121.9	12 00.0	−51.0	122.1	9
10	14 51.7	−47.5	121.3	14 20.4	−48.0	121.5	13 48.9	−48.5	121.7	13 17.3	−49.1	121.9	12 45.5	−49.6	122.1	12 13.5	−50.1	122.3	11 41.3	−50.5	122.5	11 09.0	−51.0	122.7	10
11	14 04.2	−47.5	121.9	13 32.4	−48.1	122.1	13 00.4	−48.6	122.3	12 28.2	−49.1	122.5	11 55.9	−49.6	122.7	11 23.4	−50.1	122.9	10 50.8	−50.7	123.0	10 18.0	−51.1	123.2	11
12	13 16.7	−47.6	122.6	12 44.3	−48.1	122.7	12 11.8	−48.7	122.9	11 39.1	−49.2	123.1	11 06.3	−49.8	123.3	10 33.3	−50.2	123.4	10 00.1	−50.7	123.6	9 26.9	−51.2	123.7	12
13	12 29.1	−47.7	123.2	11 56.2	−48.3	123.4	11 23.1	−48.8	123.5	10 49.9	−49.3	123.7	10 16.5	−49.7	123.9	9 43.1	−50.3	124.0	9 09.4	−50.7	124.1	8 35.7	−51.2	124.3	13
14	11 41.4	−47.8	123.8	11 07.9	−48.3	124.0	10 34.3	−48.8	124.1	10 00.6	−49.3	124.3	9 26.8	−49.9	124.4	8 52.8	−50.3	124.6	8 18.7	−50.8	124.7	7 44.5	−51.2	124.8	14
15	10 53.6	−47.9	124.4	10 19.6	−48.4	124.6	9 45.5	−48.9	124.7	9 11.3	−49.4	124.9	8 36.9	−49.8	125.0	8 02.5	−50.4	125.1	7 27.9	−50.8	125.2	6 53.3	−51.3	125.3	15
16	10 05.7	−47.9	125.0	9 31.2	−48.4	125.2	8 56.6	−48.9	125.3	8 21.9	−49.4	125.4	7 47.1	−49.9	125.5	7 12.1	−50.3	125.6	6 37.1	−50.8	125.7	6 02.0	−51.3	125.8	16
17	9 17.8	−48.0	125.6	8 42.8	−48.5	125.8	8 07.7	−49.0	125.9	7 32.5	−49.5	126.0	6 57.2	−50.0	126.1	6 21.8	−50.5	126.2	5 46.3	−50.9	126.3	5 10.7	−51.3	126.4	17
18	8 29.8	−48.0	126.2	7 54.3	−48.5	126.4	7 18.7	−49.1	126.5	6 43.0	−49.5	126.6	6 07.2	−50.0	126.7	5 31.3	−50.4	126.7	4 55.4	−50.9	126.8	4 19.4	−51.3	126.9	18
19	7 41.8	−48.1	126.9	7 05.8	−48.6	127.0	6 29.6	−49.0	127.1	5 53.5	−49.6	127.2	5 17.2	−50.0	127.2	4 40.9	−50.5	127.3	4 04.5	−50.9	127.3	3 28.1	−51.4	127.4	19
20	6 53.7	−48.1	127.5	6 17.2	−48.7	127.5	5 40.6	−49.1	127.6	5 03.9	−49.6	127.7	4 27.2	−50.1	127.8	3 50.4	−50.5	127.8	3 13.6	−51.0	127.9	2 36.7	−51.3	127.9	20
21	6 05.6	−48.2	128.1	5 28.5	−48.6	128.1	4 51.5	−49.2	128.2	4 14.3	−49.6	128.3	3 37.1	−50.0	128.3	2 59.9	−50.5	128.4	2 22.6	−50.9	128.4	1 45.4	−51.4	128.4	21
22	5 17.4	−48.2	128.7	4 39.9	−48.7	128.7	4 02.3	−49.2	128.8	3 24.7	−49.6	128.8	2 47.1	−50.1	128.9	2 09.4	−50.5	128.9	1 31.7	−51.0	128.9	0 54.0	−51.4	128.9	22
23	4 29.2	−48.3	129.3	3 51.2	−48.8	129.3	3 13.1	−49.1	129.4	2 35.1	−49.7	129.4	1 57.0	−50.1	129.4	1 18.9	−50.6	129.4	0 40.7	−50.9	129.5	0 02.6	−51.4	129.5	23
24	3 40.9	−48.3	129.8	3 02.4	−48.7	129.9	2 24.0	−49.2	129.9	1 45.4	−49.6	130.0	1 06.9	−50.1	130.0	0 28.3	−50.5	130.0	0 10.2	+51.0	50.0	0 48.8	+51.4	50.0	24
25	2 52.6	−48.2	130.4	2 13.7	−48.7	130.5	1 34.8	−49.3	130.5	0 55.8	−49.7	130.5	0 18.6	−50.1	130.5	0 22.2	+50.5	49.5	1 01.2	+50.9	49.5	1 40.2	+51.3	49.5	25
26	2 04.4	−48.3	131.0	1 25.0	−48.8	131.1	0 45.5	−49.2	131.1	0 06.1	−49.6	131.1	0 33.3	+50.1	48.9	1 12.7	+50.6	48.9	1 52.1	+51.0	49.0	2 31.5	+51.4	49.0	26
27	1 16.1	−48.3	131.6	0 36.2	−48.8	131.6	0 03.7	+49.2	48.4	0 43.5	+49.7	48.4	1 23.4	+50.1	48.4	2 03.3	+50.5	48.4	2 43.1	+50.9	48.4	3 22.9	+51.3	48.5	27
28	0 27.8	−48.4	132.2	0 12.6	+48.7	47.8	0 52.9	+49.2	47.8	1 33.2	+49.7	47.8	2 13.5	+50.1	47.8	2 53.8	+50.5	47.9	3 34.0	+50.9	47.9	4 14.2	+51.3	47.9	28
29	0 20.6	+48.3	47.2	1 01.3	+48.8	47.2	1 42.1	+49.2	47.2	2 22.9	+49.6	47.2	3 03.6	+50.0	47.3	3 44.3	+50.5	47.3	4 24.9	+50.9	47.4	5 05.5	+51.3	47.4	29
30	1 08.9	+48.3	46.6	1 50.1	+48.7	46.6	2 31.3	+49.2	46.6	3 12.5	+49.6	46.7	3 53.6	+50.1	46.7	4 34.8	+50.4	46.8	5 15.8	+50.9	46.8	5 56.8	+51.3	46.9	30
31	1 57.2	+48.3	46.0	2 38.8	+48.8	46.0	3 20.5	+49.2	46.1	4 02.1	+49.6	46.1	4 43.7	+50.0	46.2	5 25.2	+50.4	46.2	6 06.7	+50.8	46.3	6 48.1	+51.2	46.4	31
32	2 45.5	+48.2	45.4	3 27.6	+48.7	45.4	4 09.7	+49.1	45.5	4 51.7	+49.6	45.5	5 33.7	+50.0	45.6	6 15.6	+50.4	45.7	6 57.5	+50.8	45.8	7 39.3	+51.2	45.9	32
33	3 33.7	+48.3	44.8	4 16.3	+48.7	44.9	4 58.8	+49.1	44.9	5 41.3	+49.5	45.0	6 23.7	+49.9	45.1	7 06.0	+50.4	45.1	7 48.3	+50.8	45.2	8 30.5	+51.2	45.3	33
34	4 22.0	+48.2	44.2	5 05.0	+48.6	44.3	5 47.9	+49.1	44.3	6 30.8	+49.5	44.4	7 13.6	+49.9	44.5	7 56.4	+50.3	44.6	8 39.1	+50.7	44.7	9 21.7	+51.1	44.8	34
35	5 10.2	+48.2	43.6	5 53.6	+48.6	43.7	6 37.0	+49.0	43.8	7 20.3	+49.4	43.8	8 03.5	+49.9	43.9	8 46.7	+50.3	44.0	9 29.8	+50.6	44.2	10 12.8	+51.0	44.3	35
36	5 58.4	+48.1	43.0	6 42.2	+48.6	43.1	7 26.0	+49.0	43.2	8 09.7	+49.4	43.3	8 53.4	+49.8	43.4	9 37.0	+50.2	43.5	10 20.4	+50.7	43.6	11 03.8	+51.0	43.7	36
37	6 46.5	+48.1	42.4	7 30.8	+48.5	42.5	8 15.0	+48.9	42.6	8 59.1	+49.4	42.7	9 43.2	+49.7	42.8	10 27.2	+50.1	42.9	11 11.1	+50.5	43.1	11 54.8	+51.0	43.2	37
38	7 34.6	+48.1	41.8	8 19.3	+48.5	41.9	9 03.9	+48.9	42.0	9 48.5	+49.3	42.1	10 32.9	+49.7	42.2	11 17.3	+50.1	42.4	12 01.6	+50.5	42.5	12 45.8	+50.8	42.7	38
39	8 22.7	+48.0	41.2	9 07.8	+48.4	41.3	9 52.8	+48.8	41.4	10 37.8	+49.2	41.5	11 22.6	+49.7	41.7	12 07.4	+50.0	41.8	12 52.1	+50.4	42.0	13 36.6	+50.8	42.1	39
40	9 10.7	+47.9	40.6	9 56.2	+48.3	40.7	10 41.6	+48.8	40.8	11 27.0	+49.1	41.0	12 12.3	+49.5	41.1	12 57.4	+50.0	41.2	13 42.5	+50.3	41.4	14 27.4	+50.8	41.6	40
41	9 58.6	+47.9	40.0	10 44.5	+48.3	40.1	11 30.4	+48.7	40.2	12 16.1	+49.1	40.4	13 01.8	+49.5	40.5	13 47.4	+49.8	40.7	14 32.8	+50.3	40.8	15 18.2	+50.6	41.0	41
42	10 46.5	+47.8	39.4	11 32.8	+48.2	39.5	12 19.1	+48.6	39.6	13 05.2	+49.0	39.8	13 51.3	+49.4	39.9	14 37.2	+49.8	40.1	15 23.1	+50.1	40.3	16 08.8	+50.5	40.5	42
43	11 34.3	+47.7	38.8	12 21.0	+48.1	38.9	13 07.7	+48.5	39.0	13 54.2	+48.9	39.2	14 40.7	+49.3	39.4	15 27.0	+49.7	39.5	16 13.2	+50.1	39.7	16 59.3	+50.5	39.9	43
44	12 22.0	+47.6	38.1	13 09.1	+48.1	38.3	13 56.2	+48.4	38.4	14 43.1	+48.9	38.6	15 30.0	+49.2	38.8	16 16.7	+49.6	38.9	17 03.3	+50.0	39.1	17 49.8	+50.4	39.3	44
45	13 09.6	+47.6	37.5	13 57.2	+47.9	37.7	14 44.6	+48.4	37.8	15 32.0	+48.7	38.0	16 19.2	+49.1	38.2	17 06.3	+49.5	38.4	17 53.3	+49.9	38.5	18 40.2	+50.2	38.8	45
46	13 57.2	+47.4	36.9	14 45.1	+47.9	37.0	15 33.0	+48.2	37.2	16 20.7	+48.6	37.4	17 08.3	+49.0	37.6	17 55.8	+49.4	37.8	18 43.2	+49.7	38.0	19 30.4	+50.2	38.2	46
47	14 44.6	+47.4	36.3	15 33.0	+47.7	36.4	16 21.2	+48.1	36.6	17 09.3	+48.5	36.8	17 57.3	+48.9	37.0	18 45.2	+49.3	37.2	19 32.9	+49.7	37.4	20 20.6	+50.0	37.6	47
48	15 32.0	+47.2	35.6	16 20.7	+47.6	35.8	17 09.3	+48.0	36.0	17 57.8	+48.4	36.2	18 46.2	+48.8	36.3	19 34.5	+49.1	36.6	20 22.6	+49.5	36.8	21 10.6	+49.9	37.0	48
49	16 19.2	+47.1	35.0	17 08.3	+47.5	35.2	17 57.3	+47.9	35.3	18 46.2	+48.3	35.5	19 35.0	+48.6	35.7	20 23.6	+49.0	35.9	21 12.1	+49.4	36.2	22 00.5	+49.7	36.4	49
50	17 06.3	+47.0	34.3	17 55.8	+47.4	34.5	18 45.2	+47.7	34.7	19 34.5	+48.1	34.9	20 23.6	+48.5	35.1	21 12.6	+48.9	35.3	22 01.5	+49.3	35.6	22 50.2	+49.7	35.8	50
51	17 53.3	+46.9	33.7	18 43.2	+47.2	33.9	19 32.9	+47.7	34.1	20 22.6	+48.0	34.3	21 12.1	+48.4	34.5	22 01.5	+48.7	34.7	22 50.8	+49.1	34.9	23 39.9	+49.5	35.2	51
52	18 40.2	+46.7	33.0	19 30.4	+47.1	33.2	20 20.6	+47.4	33.4	21 10.6	+47.8	33.6	22 00.5	+48.2	33.8	22 50.2	+48.6	34.1	23 39.9	+48.9	34.3	24 29.4	+49.3	34.6	52
53	19 26.9	+46.6	32.4	20 17.5	+47.0	32.6	21 08.0	+47.3	32.8	21 58.4	+47.7	33.0	22 48.7	+48.0	33.2	23 38.8	+48.5	33.4	24 28.8	+48.8	33.7	25 18.7	+49.1	33.9	53
54	20 13.5	+46.4	31.7	21 04.5	+46.7	31.9	21 55.3	+47.2	32.1	22 46.1	+47.4	32.3	23 36.7	+47.9	32.5	24 27.3	+48.2	32.8	25 17.6	+48.7	33.0	26 07.8	+49.0	33.3	54
55	20 59.9	+46.2	31.0	21 51.2	+46.7	31.2	22 42.5	+47.0	31.4	23 33.6	+47.4	31.7	24 24.6	+47.8	31.9	25 15.5	+48.1	32.1	26 06.3	+48.4	32.4	26 56.8	+48.9	32.7	55
56	21 46.1	+46.1	30.3	22 37.9	+46.4	30.5	23 29.5	+46.8	30.8	24 21.0	+47.2	31.0	25 12.4	+47.5	31.2	26 03.6	+47.9	31.5	26 54.7	+48.3	31.7	27 45.7	+48.6	32.0	56
57	22 32.2	+45.9	29.6	23 24.3	+46.3	29.8	24 16.3	+46.6	30.1	25 08.2	+46.9	30.3	25 59.9	+47.3	30.5	26 51.5	+47.7	30.8	27 43.0	+48.0	31.1	28 34.3	+48.4	31.3	57
58	23 18.1	+45.7	28.9	24 10.6	+46.1	29.2	25 02.9	+46.5	29.4	25 55.1	+46.8	29.6	26 47.2	+47.2	29.9	27 39.2	+47.5	30.1	28 31.0	+47.9	30.4	29 22.7	+48.3	30.7	58
59	24 03.8	+45.6	28.2	24 56.7	+45.8	28.4	25 49.4	+46.2	28.7	26 41.9	+46.6	28.9	27 34.4	+46.9	29.2	28 26.7	+47.3	29.4	29 18.9	+47.7	29.7	30 11.0	+48.0	30.0	59
60	24 49.4	+45.3	27.5	25 42.5	+45.7	27.7	26 35.6	+46.0	28.0	27 28.5	+46.4	28.2	28 21.3	+46.7	28.5	29 14.0	+47.1	28.7	30 06.6	+47.4	29.0	30 59.0	+47.7	29.3	60
61	25 34.7	+45.1	26.8	26 28.2	+45.4	27.0	27 21.6	+45.8	27.2	28 14.9	+46.1	27.5	29 08.0	+46.5	27.7	30 01.1	+46.8	28.0	30 54.0	+47.2	28.3	31 46.7	+47.6	28.6	61
62	26 19.8	+44.9	26.1	27 13.6	+45.2	26.3	28 07.4	+45.5	26.5	29 01.0	+45.9	26.8	29 54.5	+46.3	27.0	30 47.9	+46.6	27.3	31 41.2	+46.9	27.6	32 34.3	+47.3	27.9	62
63	27 04.7	+44.6	25.3	27 58.8	+45.0	25.5	28 52.9	+45.3	25.8	29 46.9	+45.6	26.0	30 40.8	+45.9	26.3	31 34.5	+46.3	26.5	32 28.1	+46.7	26.8	33 21.6	+47.0	27.1	63
64	27 49.3	+44.4	24.6	28 43.8	+44.7	24.8	29 38.2	+45.1	25.0	30 32.5	+45.4	25.3	31 26.7	+45.8	25.5	32 20.8	+46.1	25.8	33 14.8	+46.4	26.1	34 08.6	+46.8	26.4	64
65	28 33.7	+44.1	23.8	29 28.5	+44.5	24.0	30 23.3	+44.8	24.3	31 17.9	+45.1	24.5	32 12.5	+45.4	24.8	33 06.9	+45.8	25.0	34 01.2	+46.1	25.3	34 55.4	+46.4	25.6	65
66	29 17.8	+43.9	23.0	30 13.0	+44.2	23.3	31 08.1	+44.5	23.5	32 03.0	+44.9	23.7	32 57.9	+45.2	24.0	33 52.7	+45.4	24.3	34 47.3	+45.8	24.5	35 41.8	+46.2	24.8	66
67	30 01.7	+43.5	22.2	30 57.2	+43.8	22.5	31 52.6	+44.1	22.7	32 47.9	+44.5	22.9	33 43.1	+44.8	23.2	34 38.1	+45.2	23.5	35 33.1	+45.5	23.8	36 28.0	+45.8	24.0	67
68	30 45.2	+43.3	21.4	31 41.0	+43.6	21.7	32 36.7	+43.9	21.9	33 32.4	+44.2	22.1	34 27.9	+44.5	22.4	35 23.3	+44.8	22.7	36 18.6	+45.2	22.9	37 13.8	+45.5	23.2	68
69	31 28.5	+43.0	20.6	32 24.6	+43.3	20.9	33 20.6	+43.6	21.1	34 16.6	+43.9	21.3	35 12.4	+44.2	21.6	36 08.2	+44.5	21.8	37 03.8	+44.8	22.1	37 59.3	+45.2	22.4	69
70	32 11.5	+42.6	19.8	33 07.9	+42.9	20.0	34 04.2	+43.2	20.3	35 00.5	+43.5	20.5	35 56.6	+43.8	20.8	36 52.7	+44.1	21.0	37 48.6	+44.5	21.3	38 44.5	+44.8	21.6	70
71	32 54.1	+42.3	19.0	33 50.8	+42.6	19.2	34 47.4	+42.9	19.4	35 44.0	+43.2	19.7	36 40.4	+43.5	19.9	37 36.8	+43.8	20.2	38 33.1	+44.1	20.4	39 29.3	+44.4	20.7	71
72	33 36.4	+42.0	18.1	34 33.4	+42.2	18.3	35 30.3	+42.5	18.6	36 27.2	+42.7	18.8	37 23.9	+43.1	19.0	38 20.6	+43.4	19.3	39 17.2	+43.7	19.6	40 13.7	+43.9	19.8	72
73	34 18.4	+41.5	17.3	35 15.6	+41.9	17.5	36 12.8	+42.1	17.7	37 09.9	+42.4	17.9	38 07.0	+42.7	18.2	39 04.0	+42.9	18.4	40 00.9	+43.2	18.7	40 57.6	+43.6	18.9	73
74	34 59.9	+41.2	16.4	35 57.5	+41.4	16.6	36 54.9	+41.8	16.8	37 52.3	+42.0	17.0	38 49.7	+42.2	17.3	39 46.9	+42.6	17.5	40 44.1	+42.8	17.8	41 41.2	+43.1	18.0	74
75	35 41.1	+40.8	15.5	36 38.9	+41.1	15.7	37 36.7	+41.3	15.9	38 34.3	+41.6	16.1	39 31.9	+41.9	16.3	40 29.5	+42.1	16.6	41 26.9	+42.4	16.8	42 24.3	+42.7	17.1	75
76	36 21.9	+40.4	14.6	37 20.0	+40.6	14.8	38 18.0	+40.8	15.0	39 15.9	+41.1	15.2	40 13.8	+41.3	15.4	41 11.6	+41.6	15.6	42 09.3	+41.9	15.9	43 07.0	+42.2	16.1	76
77	37 02.3	+39.9	13.7	38 00.6	+40.2	13.9	38 58.8	+40.4	14.0	39 57.0	+40.6	14.2	40 55.1	+40.9	14.5	41 53.2	+41.1	14.7	42 51.2	+41.4	14.9	43 49.2	+41.6	15.2	77
78	37 42.2	+39.5	12.7	38 40.8	+39.7	12.9	39 39.2	+39.9	13.1	40 37.6	+40.2	13.3	41 36.0	+40.4	13.5	42 34.3	+40.6	13.7	43 32.6	+40.8	13.9	44 30.8	+41.1	14.2	78
79	38 21.7	+39.0	11.8	39 20.5	+39.2	11.9	40 19.1	+39.5	12.1	41 17.8	+39.6	12.3	42 16.4	+39.8	12.5	43 14.9	+40.1	12.7	44 13.4	+40.4	12.9	45 11.9	+40.6	13.1	79
80	39 00.7	+38.6	10.8	39 59.7	+38.7	11.0	40 58.6	+38.9	11.1	41 57.4	+39.1	11.3	42 56.2	+39.3	11.5	43 55.0	+39.5	11.7	44 53.8	+39.7	11.9	45 52.5	+39.9	12.1	80
81	39 39.3	+38.0	9.8	40 38.4	+38.2	10.0	41 37.5	+38.3	10.1	42 36.5	+38.5	10.3	43 35.5	+38.8	10.4	44 34.5	+38.9	10.6	45 33.5	+39.1	10.8	46 32.4	+39.3	11.0	81
82	40 17.3	+37.4	8.8	41 16.6	+37.6	8.9	42 15.8	+37.8	9.1	43 15.0	+38.0	9.2	44 14.3	+38.1	9.4	45 13.4	+38.3	9.5	46 12.6	+38.5	9.7	47 11.7	+38.7	9.9	82
83	40 54.7	+36.9	7.8	41 54.2	+37.0	7.9	42 53.6	+37.2	8.0	43 53.0	+37.3	8.2	44 52.4	+37.5	8.3	45 51.7	+37.7	8.4	46 51.1	+37.8	8.6	47 50.4	+38.0	8.8	83
84	41 31.6	+36.4	6.7	42 31.2	+36.5	6.8	43 30.8	+36.6	6.9	44 30.3	+36.7	7.1	45 29.4	+37.0	7.3	46 29.4	+37.0	7.3	47 28.9	+37.1	7.5	48 28.4	+37.3	7.6	84
85	42 08.0	+35.7	5.7	43 07.7	+35.8	5.7	44 07.4	+35.9	5.8	45 07.0	+36.1	5.9	46 06.7	+36.2	6.1	47 06.4	+36.2	6.2	48 06.0	+36.4	6.3	49 05.7	+36.5	6.4	85
86	42 43.7	+35.1	4.6	43 43.5	+35.2	4.6	44 43.3	+35.2	4.7	45 43.1	+35.3	4.8	46 42.9	+35.4	4.9	47 42.6	+35.6	5.0	48 42.4	+35.6	5.1	49 42.2	+35.7	5.2	86
87	43 18.8	+34.4	3.5	44 18.7	+34.4	3.5	45 18.5	+34.6	3.6	46 18.4	+34.7	3.6	47 18.3	+34.7	3.7	48 18.2	+34.7	3.7	49 18.0	+34.9	3.9	50 17.9	+34.9	3.9	87
88	43 53.2	+33.8	2.3	44 53.2	+33.7	2.4	45 53.1	+33.8	2.4	46 53.1	+33.8	2.5	47 53.0	+33.9	2.5	48 52.9	+34.0	2.6	49 52.9	+34.0	2.6	50 52.8	+34.1	2.7	88
89	44 27.0	+33.0	1.2	45 26.9	+33.1	1.2	46 26.9	+33.1	1.2	47 26.9	+33.1	1.2	48 26.9	+33.1	1.3	49 26.9	+33.1	1.3	50 26.9	+33.1	1.3	51 26.9	+33.1	1.3	89
90	45 00.0	+32.3	0.0	46 00.0	+32.3	0.0	47 00.0	+32.3	0.0	48 00.0	+32.3	0.0	49 00.0	+32.2	0.0	50 00.0	+32.2	0.0	51 00.0	+32.2	0.0	52 00.0	+32.2	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 123°, 237°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°−Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	22 00.4	+45.7	113.8	21 36.0	+46.3	114.2	21 11.2	+47.0	114.6	20 46.1	+47.6	114.9	20 20.6	+48.3	115.2	19 54.9	+48.8	115.6	19 28.8	+49.4	115.9	19 02.5	+49.9	116.2	0
1	22 46.1	+45.4	113.1	22 22.3	+46.2	113.5	21 58.2	+46.8	113.9	21 33.7	+47.5	114.3	21 08.9	+48.1	114.6	20 43.7	+48.7	115.0	20 18.2	+49.3	115.3	19 52.4	+49.9	115.6	1
2	23 31.5	+45.3	112.4	23 08.5	+45.9	112.8	22 45.0	+46.6	113.2	22 21.2	+47.2	113.6	21 57.0	+47.9	114.0	21 32.4	+48.6	114.3	21 07.5	+49.2	114.7	20 42.3	+49.7	115.0	2
3	24 16.8	+45.1	111.7	23 54.4	+45.8	112.1	23 31.6	+46.5	112.5	23 08.4	+47.2	112.9	22 44.9	+47.8	113.3	22 21.0	+48.3	113.7	21 56.7	+49.0	114.1	21 32.0	+49.6	114.4	3
4	25 01.9	+44.9	111.0	24 40.2	+45.6	111.4	24 18.1	+46.3	111.8	23 55.6	+46.9	112.3	23 32.7	+47.6	112.7	23 09.3	+48.3	113.1	22 45.7	+48.8	113.4	22 21.6	+49.5	113.8	4
5	25 46.8	+44.6	110.2	25 25.8	+45.4	110.7	25 04.4	+46.0	111.1	24 42.5	+46.8	111.6	24 20.3	+47.4	112.0	23 57.6	+48.1	112.4	23 34.5	+48.7	112.8	23 11.1	+49.3	113.2	5
6	26 31.4	+44.4	109.5	26 11.2	+45.1	110.0	25 50.4	+45.9	110.4	25 29.3	+46.5	110.9	25 07.7	+47.2	111.3	24 45.7	+47.9	111.8	24 23.2	+48.6	112.2	24 00.4	+49.1	112.6	6
7	27 15.8	+44.2	108.8	26 56.3	+44.9	109.2	26 36.3	+45.7	109.7	26 15.8	+46.4	110.2	25 54.9	+47.1	110.6	25 33.6	+47.7	111.1	25 11.8	+48.3	111.5	24 49.5	+49.0	112.1	7
8	28 00.0	+43.9	108.0	27 41.2	+44.7	108.5	27 22.0	+45.4	109.0	27 02.2	+46.1	109.5	26 42.0	+46.8	109.9	26 21.3	+47.5	110.4	26 00.1	+48.2	110.9	25 38.5	+48.8	111.3	8
9	28 43.9	+43.7	107.2	28 25.9	+44.4	107.7	28 07.4	+45.1	108.2	27 48.3	+45.9	108.7	27 28.8	+46.6	109.2	27 08.8	+47.3	109.7	26 48.3	+48.0	110.2	26 27.3	+48.7	110.7	9
10	29 27.6	+43.3	106.4	29 10.3	+44.2	107.0	28 52.5	+45.0	107.5	28 34.2	+45.7	108.0	28 15.4	+46.4	108.5	27 56.1	+47.1	109.0	27 36.3	+47.8	109.5	27 16.0	+48.5	110.0	10
11	30 10.9	+43.1	105.6	29 54.5	+43.8	106.2	29 37.5	+44.6	106.7	29 19.9	+45.4	107.3	29 01.8	+46.2	107.8	28 43.2	+46.9	108.3	28 24.1	+47.6	108.8	28 04.5	+48.2	109.4	11
12	30 54.0	+42.7	104.8	30 38.3	+43.6	105.4	30 22.1	+44.4	106.0	30 05.3	+45.2	106.5	29 48.0	+45.9	107.1	29 30.1	+46.7	107.6	29 11.7	+47.4	108.2	28 52.7	+48.1	108.7	12
13	31 36.7	+42.5	104.0	31 21.9	+43.3	104.6	31 06.5	+44.1	105.2	30 50.5	+44.9	105.8	30 33.9	+45.7	106.3	30 16.8	+46.4	106.9	29 59.1	+47.1	107.4	29 40.8	+47.8	108.0	13
14	32 19.2	+42.1	103.2	32 05.2	+43.0	103.8	31 50.6	+43.8	104.4	31 35.4	+44.6	105.0	31 19.6	+45.4	105.6	31 03.2	+46.1	106.2	30 46.2	+46.9	106.7	30 28.6	+47.7	107.3	14
15	33 01.3	+41.8	102.3	32 48.2	+42.6	103.0	32 34.4	+43.5	103.6	32 20.0	+44.3	104.2	32 05.0	+45.1	104.8	31 49.3	+45.9	105.4	31 33.1	+46.6	106.0	31 16.3	+47.3	106.6	15
16	33 43.1	+41.5	101.5	33 30.8	+42.3	102.1	33 17.9	+43.1	102.8	33 04.3	+44.0	103.4	32 50.1	+44.8	104.0	32 35.2	+45.6	104.6	32 19.7	+46.4	105.3	32 03.6	+47.2	105.9	16
17	34 24.4	+41.1	100.6	34 13.1	+41.9	101.3	34 01.0	+42.8	101.9	33 48.3	+43.7	102.6	33 34.9	+44.5	103.2	33 20.8	+45.3	103.9	33 06.1	+46.1	104.5	32 50.8	+46.9	105.1	17
18	35 05.5	+40.6	99.7	34 55.0	+41.5	100.4	34 43.8	+42.5	101.1	34 32.0	+43.3	101.7	34 19.4	+44.2	102.4	34 06.1	+45.0	103.1	33 52.2	+45.8	103.7	33 37.7	+46.6	104.4	18
19	35 46.1	+40.2	98.8	35 36.5	+41.2	99.5	35 26.3	+42.0	100.2	35 15.3	+42.9	100.9	35 03.6	+43.8	101.6	34 51.2	+44.6	102.3	34 38.0	+45.6	103.0	34 24.3	+46.3	103.6	19
20	36 26.3	+39.8	97.9	36 17.7	+40.7	98.6	36 08.3	+41.7	99.3	35 58.2	+42.6	100.0	35 47.4	+43.5	100.8	35 35.8	+44.4	101.5	35 23.6	+45.2	102.2	35 10.6	+46.0	102.9	20
21	37 06.1	+39.3	96.9	36 58.4	+40.3	97.7	36 50.0	+41.3	98.4	36 40.8	+42.2	99.2	36 30.9	+43.1	99.9	36 20.2	+44.0	100.6	36 08.8	+44.8	101.4	35 56.6	+45.7	102.1	21
22	37 45.4	+38.9	96.0	37 38.7	+39.9	96.8	37 31.3	+40.8	97.5	37 23.0	+41.8	98.3	37 14.0	+42.7	99.0	37 04.2	+43.6	99.8	36 53.6	+44.5	100.5	36 42.3	+45.3	101.3	22
23	38 24.3	+38.4	95.0	38 18.6	+39.4	95.8	38 12.1	+40.4	96.6	38 04.8	+41.4	97.4	37 56.7	+42.3	98.2	37 47.8	+43.3	98.9	37 38.1	+44.2	99.7	37 27.6	+45.1	100.4	23
24	39 02.7	+37.8	94.0	38 58.0	+38.9	94.8	38 52.5	+39.9	95.7	38 46.2	+40.9	96.5	38 39.0	+41.9	97.2	38 31.1	+42.8	98.0	38 22.3	+43.7	98.8	38 12.7	+44.6	99.6	24
25	39 40.5	+37.4	93.0	39 36.9	+38.4	93.9	39 32.4	+39.5	94.7	39 27.1	+40.5	95.5	39 20.9	+41.5	96.3	39 13.9	+42.4	97.1	39 06.0	+43.4	97.9	38 57.3	+44.3	98.7	25
26	40 17.9	+36.8	92.0	40 15.3	+37.9	92.9	40 11.9	+38.9	93.7	40 07.6	+39.9	94.5	40 02.4	+41.0	95.4	39 56.3	+42.0	96.2	39 49.4	+42.9	97.1	39 41.6	+43.9	97.9	26
27	40 54.7	+36.2	91.0	40 53.2	+37.3	91.8	40 50.8	+38.4	92.7	40 47.5	+39.5	93.6	40 43.4	+40.4	94.4	40 38.3	+41.5	95.3	40 32.3	+42.5	96.1	40 25.5	+43.4	97.0	27
28	41 30.9	+35.6	89.9	41 30.5	+36.8	90.8	41 29.2	+37.9	91.7	41 27.0	+38.9	92.6	41 23.8	+40.0	93.4	41 19.8	+41.0	94.3	41 14.8	+42.0	95.2	41 08.9	+43.0	96.1	28
29	42 06.5	+35.0	88.8	42 07.3	+36.1	89.7	42 07.1	+37.3	90.6	42 05.9	+38.4	91.5	42 03.8	+39.5	92.4	42 00.8	+40.5	93.3	41 56.8	+41.6	94.2	41 51.9	+42.6	95.1	29
30	42 41.5	+34.4	87.7	42 43.4	+35.6	88.7	42 44.4	+36.6	89.6	42 44.3	+37.8	90.5	42 43.3	+38.9	91.4	42 41.3	+40.0	92.4	42 38.4	+41.0	93.3	42 34.5	+42.0	94.2	30
31	43 15.9	+33.7	86.6	43 19.0	+34.8	87.6	43 21.0	+36.1	88.5	43 22.1	+37.2	89.4	43 22.2	+38.3	90.4	43 21.3	+39.4	91.3	43 19.4	+40.5	92.3	43 16.5	+41.6	93.2	31
32	43 49.6	+33.0	85.5	43 53.8	+34.3	86.4	43 57.1	+35.4	87.4	43 59.3	+36.6	88.4	44 00.5	+37.7	89.3	44 00.7	+38.9	90.3	43 59.9	+40.0	91.3	43 58.1	+41.0	92.2	32
33	44 22.6	+32.3	84.3	44 28.1	+33.5	85.3	44 32.5	+34.7	86.3	44 35.9	+35.9	87.3	44 38.2	+37.1	88.2	44 39.6	+38.2	89.2	44 39.9	+39.3	90.2	44 39.1	+40.5	91.2	33
34	44 54.9	+31.5	83.1	45 01.6	+32.7	84.1	45 07.2	+34.0	85.1	45 11.8	+35.2	86.1	45 15.3	+36.4	87.1	45 17.8	+37.6	88.1	45 19.2	+38.8	89.1	45 19.6	+39.9	90.2	34
35	45 26.4	+30.8	81.9	45 34.3	+32.1	82.9	45 41.2	+33.3	83.9	45 47.0	+34.5	85.0	45 51.7	+35.8	86.0	45 55.4	+36.9	87.0	45 58.0	+38.1	88.1	45 59.5	+39.2	89.1	35
36	45 57.2	+30.0	80.7	46 06.4	+31.2	81.7	46 14.5	+32.5	82.7	46 21.5	+33.8	83.8	46 27.5	+35.0	84.8	46 32.3	+36.3	85.9	46 36.1	+37.4	86.9	46 38.7	+38.7	88.0	36
37	46 27.2	+29.1	79.4	46 37.6	+30.4	80.5	46 47.0	+31.7	81.5	46 55.3	+33.0	82.6	47 02.5	+34.3	83.6	47 08.6	+35.5	84.7	47 13.5	+36.8	85.8	47 17.4	+37.9	86.9	37
38	46 56.3	+28.2	78.2	47 08.0	+29.6	79.2	47 18.7	+30.9	80.3	47 28.3	+32.2	81.4	47 36.8	+33.4	82.4	47 44.1	+34.8	83.5	47 50.3	+36.0	84.6	47 55.3	+37.3	85.7	38
39	47 24.5	+27.4	76.9	47 37.6	+28.7	77.9	47 49.6	+30.0	79.0	48 00.5	+31.4	80.1	48 10.2	+32.7	81.2	48 18.9	+33.9	82.3	48 26.3	+35.3	83.4	48 32.6	+36.5	84.5	39
40	47 51.9	+26.4	75.5	48 06.3	+27.8	76.6	48 19.6	+29.2	77.7	48 31.9	+30.4	78.8	48 42.9	+31.8	79.9	48 52.8	+33.2	81.1	49 01.6	+34.4	82.2	49 09.1	+35.8	83.3	40
41	48 18.3	+25.5	74.2	48 34.1	+26.9	75.3	48 48.8	+28.2	76.4	49 02.3	+29.6	77.5	49 14.7	+31.0	78.6	49 26.0	+32.3	79.8	49 36.0	+33.6	80.9	49 44.9	+34.9	82.1	41
42	48 43.8	+24.5	72.8	49 01.0	+25.8	73.9	49 17.0	+27.3	75.0	49 31.9	+28.7	76.2	49 45.7	+30.0	77.3	49 58.3	+31.3	78.5	50 09.6	+32.8	79.7	50 19.8	+34.1	80.8	42
43	49 08.3	+23.5	71.4	49 26.8	+24.9	72.5	49 44.3	+26.2	73.7	50 00.6	+27.6	74.8	50 15.7	+29.1	76.0	50 29.6	+30.5	77.1	50 42.4	+31.8	78.3	50 53.9	+33.2	79.5	43
44	49 31.8	+22.4	70.0	49 51.7	+23.9	71.1	50 10.5	+25.3	72.3	50 28.2	+26.7	73.4	50 44.8	+28.0	74.6	51 00.1	+29.5	75.8	51 14.2	+30.9	77.0	51 27.1	+32.3	78.2	44
45	49 54.2	+21.4	68.6	50 15.6	+22.7	69.7	50 35.8	+24.2	70.9	50 54.9	+25.6	72.0	51 12.8	+27.1	73.2	51 29.6	+28.5	74.4	51 45.1	+29.9	75.6	51 59.4	+31.3	76.9	45
46	50 15.6	+20.2	67.1	50 38.3	+21.7	68.3	51 00.0	+23.1	69.4	51 20.5	+24.6	70.6	51 39.9	+26.0	71.8	51 58.1	+27.4	73.0	52 15.0	+28.9	74.2	52 30.7	+30.3	75.5	46
47	50 35.8	+19.1	65.7	51 00.0	+20.5	66.8	51 23.1	+22.0	67.9	51 45.1	+23.4	69.1	52 05.9	+24.9	70.3	52 25.5	+26.3	71.5	52 43.9	+27.8	72.8	53 01.0	+29.3	74.0	47
48	50 54.9	+17.9	64.2	51 20.5	+19.4	65.3	51 45.1	+20.8	66.4	52 08.5	+22.3	67.6	52 30.8	+23.7	68.8	52 51.8	+25.3	70.0	53 11.7	+26.7	71.3	53 30.3	+28.2	72.6	48
49	51 12.8	+16.8	62.6	51 39.9	+18.2	63.8	52 05.9	+19.6	64.9	52 30.8	+21.0	66.1	52 54.5	+22.6	67.3	53 17.1	+24.0	68.5	53 38.4	+25.5	69.8	53 58.5	+27.0	71.1	49
50	51 29.6	+15.5	61.1	51 58.1	+16.9	62.2	52 25.5	+18.4	63.4	52 51.8	+19.9	64.5	53 17.1	+21.3	65.8	53 41.1	+22.8	67.0	54 03.9	+24.4	68.3	54 25.5	+25.9	69.6	50
51	51 45.1	+14.3	59.6	52 15.0	+15.7	60.7	52 43.9	+17.1	61.8	53 11.7	+18.6	63.0	53 38.4	+20.1	64.2	54 03.9	+21.6	65.4	54 28.3	+23.1	66.7	54 51.4	+24.7	68.0	51
52	51 59.4	+13.0	58.0	52 30.7	+14.4	59.1	53 01.0	+15.9	60.2	53 30.3	+17.3	61.4	53 58.5	+18.8	62.6	54 25.5	+20.3	63.8	54 51.4	+21.8	65.1	55 16.1	+23.3	66.4	52
53	52 12.4	+11.7	56.4	52 45.1	+13.2	57.5	53 16.9	+14.5	58.6	53 47.6	+16.0	59.8	54 17.3	+17.5	61.0	54 45.8	+19.0	62.2	55 13.2	+20.6	63.5	55 39.4	+22.1	64.8	53
54	52 24.1	+10.4	54.8	52 58.3	+11.7	55.9	53 31.4	+13.2	57.0	54 03.6	+14.7	58.1	54 34.8	+16.1	59.3	55 04.8	+17.7	60.6	55 33.8	+19.1	61.8	56 01.5	+20.7	63.1	54
55	52 34.5	+9.1	53.2	53 10.0	+10.5	54.2	53 44.6	+11.9	55.3	54 18.3	+13.2	56.5	54 50.9	+14.7	57.7	55 22.5	+16.2	58.9	55 52.9	+17.8	60.1	56 22.2	+19.3	61.4	55
56	52 43.6	+7.7	51.5	53 20.5	+9.0	52.6	53 56.5	+10.4	53.7	54 31.5	+11.9	54.9	55 05.6	+13.3	56.0	55 38.7	+14.8	57.2	56 10.7	+16.3	58.4	56 41.5	+17.9	59.7	56
57	52 51.3	+6.4	49.9	53 29.5	+7.7	50.9	54 06.9	+9.1	52.0	54 43.4	+10.4	53.1	55 18.9	+11.9	54.3	55 53.5	+13.3	55.5	56 27.0	+14.8	56.7	56 59.4	+16.4	58.0	57
58	52 57.7	+4.9	48.3	53 37.2	+6.3	49.3	54 16.0	+7.6	50.3	54 53.8	+9.0	51.4	55 30.8	+10.4	52.5	56 06.8	+11.9	53.7	56 41.8	+13.4	54.9	57 15.8	+14.8	56.2	58
59	53 02.6	+3.6	46.6	53 43.5	+4.9	47.6	54 23.6	+6.3	48.6	55 02.8	+7.5	49.7	55 41.2	+8.9	50.8	56 18.7	+10.3	51.9	56 55.2	+11.8	53.2	57 30.6	+13.3	54.4	59
60	53 06.2	+2.2	44.9	53 48.4	+3.4	45.9	54 29.7	+4.8	46.9	55 10.3	+6.1	47.9	55 50.1	+7.4	49.0	56 29.0	+8.8	50.2	57 07.0	+10.2	51.4	57 43.9	+11.8	52.6	60
61	53 08.4	+0.9	43.3	53 51.8	+2.0	44.2	54 34.5	+3.2	45.2	55 16.4	+4.5	46.2	55 57.5	+5.9	47.3	56 37.8	+7.2	48.4	57 17.2	+8.7	49.5	57 55.7	+10.1	50.7	61
62	53 09.3	-0.6	41.6	53 53.8	+0.6	42.5	54 37.7	+1.8	43.5	55 20.9	+3.0	44.4	56 03.4	+4.3	45.5	56 45.0	+5.7	46.6	57 25.9	+7.0	47.7	58 05.8	+8.5	48.9	62
63	53 08.7	-2.0	39.9	53 54.4	-0.9	40.8	54 39.5	+0.3	41.7	55 23.9	+1.5	42.7	56 07.7	+2.7	43.7	56 50.7	+4.0	44.7	57 32.9	+5.4	45.8	58 14.3	+6.8	47.0	63
64	53 06.7	-3.4	38.3	53 53.5	-2.3	39.1	54 39.8	-1.2	40.0	55 25.4	0.0	40.9	56 10.4	+1.2	41.9	56 54.7	+2.5	42.9	57 38.3	+3.8	44.0	58 21.1	+5.1	45.1	64
65	53 03.3	-4.7	36.6	53 51.2	-3.7	37.4	54 38.6	-2.6	38.3	55 25.4	-1.5	39.2	56 11.6	-0.3	40.1	56 57.2	+0.8	41.1	57 42.1	+2.1	42.1	58 26.2	+3.4	43.2	65
66	52 58.6	-6.2	34.9	53 47.5	-5.1	35.7	54 36.0	-4.2	36.5	55 23.9	-3.0	37.4	56 11.3	-2.0	38.3	56 58.0	-0.7	39.3	57 44.2	+0.4	40.3	58 29.6	+1.7	41.3	66
67	52 52.4	-7.5	33.3	53 42.4	-6.6	34.0	54 31.8	-5.5	34.8	55 20.9	-4.6	35.6	56 09.3	-3.4	36.5	56 57.3	-2.4	37.4	57 44.6	-1.2	38.4	58 31.3	+0.1	39.4	67
68	52 44.9	-8.8	31.7	53 35.8	-8.0	32.4	54 26.3	-7.1	33.1	55 16.3	-6.1	33.9	56 05.9	-5.1	34.7	56 54.9	-4.0	35.6	57 43.4	-2.8	36.5	58 31.4	-1.7	37.5	68
69	52 36.1	-10.2	30.0	53 27.8	-9.3	30.7	54 19.2	-8.4	31.4	55 10.2	-7.5	32.1	56 00.8	-6.5	32.9	56 50.9	-5.5	33.8	57 40.6	-4.5	34.6	58 29.7	-3.4	35.6	69
70	52 25.9	-11.5	28.4	53 18.5	-10.7	29.0	54 10.8	-9.9	29.7	55 02.7	-9.0	30.4	55 54.3	-8.1	31.2	56 45.4	-7.2	31.9	57 36.1	-6.2	32.8	58 26.3	-5.1	33.7	70
71	52 14.4	-12.8	26.8	53 07.8	-12.1	27.4	54 00.9	-11.3	28.0	54 53.7	-10.5	28.7	55 46.2	-9.7	29.4	56 38.2	-8.7	30.1	57 29.9	-7.7	30.9	58 21.2	-6.8	31.8	71
72	52 01.6	-14.1	25.2	52 55.7	-13.4	25.8	53 49.6	-12.6	26.4	54 43.2	-11.8	27.0	55 36.5	-11.0	27.6	56 29.5	-10.2	28.3	57 22.2	-9.3	29.1	58 14.4	-8.4	29.9	72
73	51 47.5	-15.3	23.6	52 42.3	-14.6	24.2	53 37.0	-14.0	24.7	54 31.4	-13.3	25.3	55 25.5	-12.6	25.9	56 19.3	-11.8	26.6	57 12.8	-11.0	27.2	58 06.0	-10.1	28.0	73
74	51 32.2	-16.6	22.1	52 27.7	-16.0	22.6	53 23.0	-15.4	23.1	54 18.1	-14.7	23.6	55 12.9	-14.0	24.2	56 07.5	-13.2	24.8	57 01.8	-12.5	25.4	57 55.9	-11.7	26.1	74
75	51 15.6	-17.7	20.5	52 11.7	-17.2	21.0	53 07.6	-16.6	21.5	54 03.4	-16.0	22.0	54 58.9	-15.4	22.5	55 54.3	-14.8	23.1	56 49.3	-14.0	23.6	57 44.2	-13.3	24.3	75
76	50 57.9	-19.0	19.0	51 54.5	-18.4	19.4	52 51.0	-17.9	19.9	53 47.4	-17.4	20.3	54 43.5	-16.7	20.8	55 39.5	-16.1	21.3	56 35.3	-15.5	21.9	57 30.9	-14.8	22.5	76
77	50 38.9	-20.0	17.5	51 36.1	-19.6	17.9	52 33.1	-19.1	18.3	53 30.0	-18.6	18.7	54 26.8	-18.1	19.2	55 23.4	-17.6	19.6	56 19.8	-17.0	20.1	57 16.1	-16.4	20.7	77
78	50 18.9	-21.2	16.0	51 16.5	-20.8	16.4	52 14.0	-20.3	16.7	53 11.4	-19.9	17.1	54 08.7	-19.4	17.5	55 05.8	-18.9	17.9	56 02.8	-18.3	18.4	56 59.7	-17.8	18.9	78
79	49 57.7	-22.3	14.6	50 55.7	-21.9	14.9	51 53.7	-21.5	15.2	52 51.5	-21.1	15.5	53 49.3	-20.7	15.9	54 46.9	-20.2	16.3	55 44.5	-19.8	16.7	56 41.9	-19.3	17.1	79
80	49 35.4	-23.3	13.1	50 33.8	-23.0	13.4	51 32.2	-22.7	13.7	52 30.4	-22.3	14.0	53 28.6	-21.9	14.3	54 26.7	-21.5	14.7	55 24.7	-21.1	15.0	56 22.6	-20.7	15.4	80
81	49 12.1	-24.3	11.7	50 10.8	-24.0	12.0	51 09.5	-23.7	12.2	52 08.1	-23.4	12.5	53 06.7	-23.1	12.8	54 05.2	-22.8	13.1	55 03.6	-22.4	13.4	56 01.9	-22.0	13.7	81
82	48 47.8	-25.3	10.3	49 46.8	-25.1	10.5	50 45.8	-24.9	10.8	51 44.7	-24.6	11.0	52 43.6	-24.3	11.2	53 42.4	-24.0	11.5	54 41.2	-23.7	11.8	55 39.9	-23.4	12.1	82
83	48 22.5	-26.3	9.0	49 21.7	-26.1	9.1	50 20.9	-25.8	9.3	51 20.1	-25.6	9.5	52 19.3	-25.4	9.7	53 18.4	-25.1	10.0	54 17.5	-24.9	10.2	55 16.5	-24.6	10.5	83
84	47 56.2	-27.2	7.6	48 55.6	-27.0	7.8	49 55.1	-26.9	7.9	50 54.5	-26.7	8.1	51 53.9	-26.5	8.3	52 53.3	-26.3	8.4	53 52.6	-26.1	8.6	54 51.9	-25.9	8.9	84
85	47 29.0	-28.1	6.3	48 28.6	-28.0	6.4	49 28.2	-27.8	6.5	50 27.8	-27.7	6.7	51 27.4	-27.5	6.8	52 27.0	-27.4	7.0	53 26.5	-27.2	7.1	54 26.0	-27.0	7.3	85
86	47 00.9	-29.0	5.0	48 00.6	-28.9	5.1	49 00.4	-28.8	5.2	50 00.1	-28.6	5.3	50 59.9	-28.6	5.4	51 59.6	-28.4	5.5	52 59.3	-28.3	5.6	53 59.0	-28.1	5.8	86
87	46 31.9	-29.9	3.7	47 31.7	-29.7	3.8	48 31.6	-29.7	3.8	49 31.5	-29.6	3.9	50 31.3	-29.5	4.0	51 31.2	-29.5	4.1	52 31.0	-29.3	4.2	53 30.9	-29.3	4.3	87
88	46 02.0	-30.6	2.4	47 02.0	-30.6	2.5	48 01.9	-30.5	2.5	49 01.9	-30.5	2.6	50 01.8	-30.4	2.6	51 01.7	-30.4	2.7	52 01.7	-30.4	2.8	53 01.6	-30.3	2.8	88
89	45 31.4	-31.4	1.2	46 31.4	-31.4	1.2	47 31.4	-31.4	1.3	48 31.4	-31.4	1.3	49 31.4	-31.4	1.3	50 31.3	-31.3	1.3	51 31.3	-31.3	1.4	52 31.3	-31.3	1.4	89
90	45 00.0	-32.2	0.0	46 00.0	-32.2	0.0	47 00.0	-32.2	0.0	48 00.0	-32.2	0.0	49 00.0	-32.2	0.0	50 00.0	-32.2	0.0	51 00.0	-32.3	0.0	52 00.0	-32.3	0.0	90

| | **45°** | | | **46°** | | | **47°** | | | **48°** | | | **49°** | | | **50°** | | | **51°** | | | **52°** | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	22 00.4	−45.9	113.8	21 36.0	−46.5	114.2	21 11.2	−47.2	114.6	20 46.1	−47.8	114.9	20 20.6	−48.3	115.2	19 54.9	−48.9	115.6	19 28.8	−49.5	115.9	19 02.5	−50.1	116.2	0
1	21 14.5	−46.0	114.5	20 49.5	−46.7	114.9	20 24.0	−47.3	115.2	19 58.3	−47.9	115.6	19 32.3	−48.5	115.9	19 06.0	−49.1	116.2	18 39.3	−49.6	116.5	18 12.4	−50.2	116.8	1
2	20 28.5	−46.2	115.2	20 02.8	−46.8	115.6	19 36.8	−47.5	115.9	19 10.4	−48.0	116.2	18 43.8	−48.6	116.5	18 16.9	−49.2	116.8	17 49.7	−49.7	117.1	17 22.2	−50.2	117.4	2
3	19 42.3	−46.3	115.9	19 16.0	−47.0	116.2	18 49.3	−47.5	116.5	18 22.4	−48.2	116.8	17 55.2	−48.7	117.1	17 27.7	−49.3	117.4	17 00.0	−49.9	117.7	16 32.0	−50.4	117.9	3
4	18 56.0	−46.5	116.6	18 29.0	−47.1	116.9	18 01.8	−47.7	117.2	17 34.2	−48.2	117.5	17 06.5	−48.9	117.7	16 38.4	−49.4	118.0	16 10.1	−49.9	118.3	15 41.6	−50.5	118.5	4
5	18 09.5	−46.6	117.2	17 41.9	−47.2	117.5	17 14.1	−47.8	117.8	16 46.0	−48.4	118.1	16 17.6	−48.9	118.3	15 49.0	−49.5	118.6	15 20.2	−50.0	118.8	14 51.1	−50.5	119.1	5
6	17 22.9	−46.7	117.9	16 54.7	−47.3	118.2	16 26.3	−47.9	118.4	15 57.6	−48.5	118.7	15 28.7	−49.1	118.9	14 59.5	−49.6	119.2	14 30.2	−50.1	119.4	14 00.6	−50.6	119.6	6
7	16 36.2	−46.9	118.6	16 07.4	−47.5	118.8	15 38.4	−48.1	119.1	15 09.1	−48.6	119.3	14 39.6	−49.1	119.5	14 09.9	−49.6	119.8	13 40.1	−50.2	120.0	13 10.0	−50.7	120.2	7
8	15 49.3	−46.9	119.2	15 19.9	−47.5	119.4	14 50.3	−48.1	119.7	14 20.5	−48.7	119.9	13 50.5	−49.2	120.1	13 20.3	−49.7	120.3	12 49.9	−50.3	120.5	12 19.3	−50.7	120.7	8
9	15 02.4	−47.1	119.9	14 32.4	−47.7	120.1	14 02.2	−48.2	120.3	13 31.8	−48.7	120.5	13 01.3	−49.3	120.7	12 30.6	−49.9	120.9	11 59.6	−50.3	121.1	11 28.6	−50.8	121.3	9
10	14 15.3	−47.2	120.5	13 44.7	−47.7	120.7	13 14.0	−48.3	120.9	12 43.1	−48.9	121.1	12 12.0	−49.4	121.3	11 40.7	−49.9	121.5	11 09.3	−50.3	121.7	10 37.8	−50.9	121.8	10
11	13 28.1	−47.3	121.1	12 57.0	−47.9	121.3	12 25.7	−48.4	121.5	11 54.2	−48.9	121.7	11 22.6	−49.4	121.9	10 50.9	−50.0	122.0	10 19.0	−50.5	122.2	9 46.9	−50.9	122.4	11
12	12 40.8	−47.4	121.8	12 09.1	−47.9	121.9	11 37.3	−48.5	122.1	11 05.3	−49.0	122.3	10 33.2	−49.5	122.5	10 00.9	−50.0	122.6	9 28.5	−50.5	122.8	8 56.0	−51.0	122.9	12
13	11 53.4	−47.4	122.4	11 21.2	−48.0	122.6	10 48.8	−48.5	122.7	10 16.3	−49.0	122.9	9 43.7	−49.6	123.0	9 10.9	−50.0	123.2	8 38.0	−50.5	123.3	8 05.0	−51.0	123.4	13
14	11 06.0	−47.6	123.0	10 33.2	−48.1	123.2	10 00.3	−48.6	123.3	9 27.3	−49.1	123.5	8 54.1	−49.6	123.6	8 20.9	−50.1	123.7	7 47.5	−50.6	123.8	7 14.0	−51.0	124.0	14
15	10 18.4	−47.6	123.6	9 45.1	−48.1	123.8	9 11.7	−48.6	123.9	8 38.2	−49.2	124.1	8 04.5	−49.6	124.2	7 30.8	−50.2	124.3	6 56.9	−50.6	124.4	6 23.0	−51.1	124.5	15
16	9 30.8	−47.6	124.3	8 57.0	−48.2	124.3	8 23.1	−48.7	124.5	7 49.0	−49.2	124.6	7 14.9	−49.7	124.7	6 40.6	−50.1	124.8	6 06.3	−50.6	124.9	5 31.9	−51.1	125.0	16
17	8 43.2	−47.8	124.9	8 08.8	−48.2	125.0	7 34.4	−48.8	125.1	6 59.8	−49.2	125.2	6 25.2	−49.7	125.3	5 50.5	−50.2	125.4	5 15.7	−50.7	125.5	4 40.8	−51.1	125.5	17
18	7 55.4	−47.7	125.5	7 20.6	−48.3	125.6	6 45.6	−48.8	125.7	6 10.6	−49.3	125.8	5 35.5	−49.8	125.9	5 00.3	−50.3	125.9	4 25.0	−50.7	126.0	3 49.7	−51.1	126.1	18
19	7 07.7	−47.9	126.1	6 32.3	−48.3	126.2	5 56.8	−48.8	126.3	5 21.3	−49.3	126.4	4 45.7	−49.8	126.4	4 10.0	−50.2	126.5	3 34.3	−50.7	126.5	2 58.6	−51.2	126.6	19
20	6 19.8	−47.8	126.7	5 44.0	−48.3	126.8	5 08.0	−48.9	126.9	4 32.0	−49.4	126.9	3 55.9	−49.8	127.0	3 19.8	−50.3	127.0	2 43.6	−50.7	127.1	2 07.4	−51.1	127.1	20
21	5 32.0	−47.9	127.3	4 55.6	−48.4	127.4	4 19.1	−48.9	127.4	3 42.6	−49.3	127.5	3 06.1	−49.8	127.5	2 29.5	−50.3	127.6	1 52.9	−50.7	127.6	1 16.3	−51.2	127.6	21
22	4 44.1	−48.0	127.9	4 07.2	−48.5	128.0	3 30.2	−48.9	128.0	2 53.3	−49.4	128.1	2 16.3	−49.9	128.1	1 39.2	−50.3	128.1	1 02.2	−50.8	128.1	0 25.1	−51.2	128.2	22
23	3 56.1	−47.9	128.5	3 18.7	−48.4	128.6	2 41.3	−48.9	128.6	2 03.9	−49.4	128.6	1 26.4	−49.8	128.7	0 48.9	−50.3	128.7	0 11.4	−50.7	128.7	0 26.1	+51.1	51.3	23
24	3 08.2	−48.0	129.1	2 30.3	−48.5	129.2	1 52.4	−48.9	129.2	1 14.5	−49.4	129.2	0 36.6	−49.9	129.2	0 01.4	+50.3	50.8	0 39.3	+50.8	50.8	1 17.2	+51.2	50.8	24
25	2 20.2	−48.0	129.7	1 41.8	−48.4	129.7	1 03.5	−49.0	129.8	0 25.1	−49.4	129.8	0 13.3	+49.9	50.2	0 51.7	+50.3	50.2	1 30.1	+50.7	50.3	2 08.4	+51.2	50.3	25
26	1 32.2	−48.0	130.3	0 53.4	−48.5	130.3	0 14.5	−48.9	130.3	0 24.3	+49.4	49.7	1 03.2	+49.8	49.7	1 42.0	+50.3	49.7	2 20.8	+50.7	49.7	2 59.6	+51.1	49.8	26
27	0 44.2	−48.0	130.9	0 04.9	−48.5	130.9	0 34.4	+49.0	49.1	1 13.7	+49.4	49.1	1 53.0	+49.8	49.1	2 32.3	+50.2	49.1	3 11.5	+50.7	49.2	3 50.7	+51.1	49.2	27
28	0 03.8	+48.1	48.5	0 43.6	+48.5	48.5	1 23.4	+48.9	48.5	2 03.1	+49.4	48.5	2 42.8	+49.8	48.6	3 22.5	+50.3	48.6	4 02.2	+50.7	48.6	4 41.8	+51.1	48.7	28
29	0 51.9	+48.0	47.9	1 32.1	+48.5	47.9	2 12.3	+48.9	47.9	2 52.5	+49.4	48.0	3 32.7	+49.8	48.0	4 12.8	+50.2	48.1	4 52.9	+50.6	48.1	5 32.9	+51.1	48.2	29
30	1 39.9	+48.0	47.3	2 20.6	+48.4	47.3	3 01.2	+48.9	47.3	3 41.9	+49.3	47.4	4 22.5	+49.7	47.4	5 03.0	+50.2	47.5	5 43.5	+50.7	47.6	6 24.0	+51.0	47.6	30
31	2 27.9	+47.9	46.7	3 09.0	+48.4	46.7	3 50.1	+48.9	46.8	4 31.2	+49.3	46.8	5 12.2	+49.8	46.9	5 53.2	+50.2	47.0	6 34.2	+50.5	47.0	7 15.0	+51.0	47.1	31
32	3 15.8	+48.0	46.1	3 57.4	+48.5	46.1	4 39.0	+48.9	46.2	5 20.5	+49.3	46.2	6 02.0	+49.7	46.3	6 43.4	+50.1	46.4	7 24.7	+50.6	46.5	8 06.0	+51.0	46.6	32
33	4 03.8	+47.9	45.5	4 45.9	+48.3	45.5	5 27.9	+48.8	45.6	6 09.8	+49.3	45.7	6 51.7	+49.7	45.8	7 33.5	+50.1	45.8	8 15.3	+50.5	45.9	8 57.0	+50.9	46.1	33
34	4 51.7	+47.9	44.9	5 34.2	+48.4	44.9	6 16.7	+48.7	45.0	6 59.1	+49.2	45.1	7 41.4	+49.6	45.2	8 23.6	+50.1	45.3	9 05.8	+50.5	45.3	9 47.9	+50.8	45.5	34
35	5 39.6	+47.9	44.3	6 22.6	+48.3	44.3	7 05.4	+48.8	44.4	7 48.3	+49.1	44.5	8 31.0	+49.6	44.6	9 13.7	+50.0	44.7	9 56.3	+50.4	44.9	10 38.7	+50.8	45.0	35
36	6 27.5	+47.8	43.7	7 10.9	+48.2	43.7	7 54.2	+48.7	43.8	8 37.4	+49.1	43.9	9 20.6	+49.5	44.1	10 03.7	+49.9	44.2	10 46.7	+50.3	44.3	11 29.5	+50.8	44.4	36
37	7 15.3	+47.8	43.1	7 59.1	+48.2	43.2	8 42.9	+48.6	43.3	9 26.5	+49.1	43.4	10 10.1	+49.5	43.5	10 53.6	+49.9	43.6	11 37.0	+50.3	43.7	12 20.3	+50.7	43.9	37
38	8 03.1	+47.7	42.4	8 47.3	+48.2	42.5	9 31.5	+48.6	42.7	10 15.6	+49.0	42.8	10 59.6	+49.4	42.9	11 43.5	+49.8	43.0	12 27.3	+50.2	43.2	13 11.0	+50.6	43.3	38
39	8 50.8	+47.7	41.8	9 35.5	+48.1	41.9	10 20.1	+48.5	42.1	11 04.6	+48.9	42.2	11 49.0	+49.3	42.3	12 33.3	+49.7	42.5	13 17.5	+50.1	42.6	14 01.6	+50.5	42.8	39
40	9 38.5	+47.6	41.2	10 23.6	+48.0	41.3	11 08.6	+48.4	41.5	11 53.5	+48.8	41.6	12 38.3	+49.3	41.7	13 23.0	+49.7	41.9	14 07.6	+50.1	42.1	14 52.1	+50.5	42.2	40
41	10 26.1	+47.5	40.6	11 11.6	+47.9	40.7	11 57.0	+48.3	40.9	12 42.3	+48.8	41.0	13 27.6	+49.1	41.2	14 12.7	+49.5	41.3	14 57.7	+49.9	41.5	15 42.6	+50.3	41.7	41
42	11 13.6	+47.4	40.0	11 59.5	+47.9	40.1	12 45.3	+48.3	40.3	13 31.1	+48.7	40.4	14 16.7	+49.1	40.6	15 02.2	+49.5	40.7	15 47.6	+49.9	40.9	16 32.9	+50.3	41.1	42
43	12 01.0	+47.4	39.4	12 47.4	+47.7	39.5	13 33.6	+48.2	39.6	14 19.8	+48.6	39.8	15 05.8	+49.0	40.0	15 51.7	+49.4	40.1	16 37.5	+49.8	40.3	17 23.2	+50.2	40.5	43
44	12 48.4	+47.2	38.7	13 35.1	+47.8	39.0	14 21.8	+48.1	39.0	15 08.4	+48.6	39.2	15 54.8	+48.9	39.4	16 41.1	+49.3	39.6	17 27.3	+49.7	39.8	18 13.4	+50.0	40.0	44
45	13 35.6	+47.2	38.1	14 22.8	+47.6	38.2	15 09.9	+48.0	38.4	15 56.8	+48.4	38.6	16 43.7	+48.8	38.8	17 30.4	+49.3	39.0	18 17.0	+49.6	39.2	19 03.4	+50.0	39.4	45
46	14 22.8	+47.1	37.5	15 10.4	+47.5	37.6	15 57.9	+47.8	37.8	16 45.2	+48.3	38.0	17 32.5	+48.6	38.2	18 19.6	+49.0	38.4	19 06.6	+49.4	38.6	19 53.4	+49.8	38.8	46
47	15 09.9	+46.9	36.8	15 57.9	+47.3	37.0	16 45.7	+47.8	37.3	17 33.5	+48.2	37.5	18 21.1	+48.6	37.5	19 08.6	+49.0	37.8	19 56.0	+49.3	38.0	20 43.2	+49.8	38.3	47
48	15 56.8	+46.9	36.2	16 45.2	+47.3	36.3	17 33.5	+47.6	36.5	18 21.7	+48.0	36.7	19 09.7	+48.4	36.9	19 57.6	+48.8	37.1	20 45.3	+49.2	37.4	21 33.0	+49.5	37.6	48
49	16 43.7	+46.7	35.5	17 32.5	+47.1	35.7	18 21.1	+47.5	35.9	19 09.7	+47.9	36.1	19 58.1	+48.3	36.3	20 46.4	+48.7	36.5	21 34.5	+49.1	36.7	22 22.5	+49.5	37.0	49
50	17 30.4	+46.6	34.9	18 19.6	+47.0	35.0	19 08.6	+47.4	35.2	19 57.6	+47.7	35.4	20 46.4	+48.1	35.7	21 35.1	+48.5	35.9	22 23.6	+48.9	36.1	23 12.0	+49.3	36.4	50
51	18 17.0	+46.4	34.2	19 06.6	+46.8	34.4	19 56.0	+47.2	34.6	20 45.3	+47.7	34.8	21 34.5	+48.0	35.0	22 23.6	+48.3	35.3	23 12.5	+48.8	35.5	24 01.3	+49.2	35.8	51
52	19 03.4	+46.3	33.5	19 53.4	+46.7	33.7	20 43.2	+47.1	33.9	21 33.0	+47.4	34.1	22 22.5	+47.9	34.4	23 12.0	+48.2	34.6	24 01.3	+48.6	34.9	24 50.5	+49.0	35.1	52
53	19 49.7	+46.2	32.9	20 40.1	+46.5	33.1	21 30.3	+46.9	33.3	22 20.4	+47.3	33.5	23 10.4	+47.7	33.7	24 00.2	+48.1	34.0	24 49.9	+48.5	34.2	25 39.5	+48.8	34.5	53
54	20 35.9	+46.0	32.2	21 26.6	+46.4	32.4	22 17.2	+46.8	32.6	23 07.7	+47.1	32.8	23 58.1	+47.5	33.1	24 48.3	+47.9	33.3	25 38.4	+48.2	33.6	26 28.3	+48.6	33.8	54
55	21 21.9	+45.8	31.5	22 13.0	+46.2	31.7	23 04.0	+46.6	31.9	23 54.8	+47.0	32.1	24 45.6	+47.3	32.4	25 36.2	+47.7	32.6	26 26.6	+48.1	32.9	27 16.9	+48.5	33.2	55
56	22 07.7	+45.6	30.8	22 59.2	+46.0	31.0	23 50.6	+46.3	31.2	24 41.8	+46.8	31.5	25 32.9	+47.1	31.7	26 23.9	+47.5	32.0	27 14.7	+47.9	32.2	28 05.4	+48.2	32.5	56
57	22 53.3	+45.5	30.1	23 45.2	+45.8	30.3	24 36.9	+46.2	30.5	25 28.6	+46.5	30.8	26 20.0	+47.0	31.0	27 11.4	+47.3	31.3	28 02.6	+47.7	31.6	28 53.6	+48.1	31.8	57
58	23 38.8	+45.3	29.4	24 31.0	+45.6	29.6	25 23.1	+46.0	29.8	26 15.1	+46.4	30.1	27 07.0	+46.7	30.3	27 58.7	+47.1	30.6	28 50.3	+47.5	30.9	29 41.7	+47.8	31.2	58
59	24 24.1	+45.0	28.7	25 16.6	+45.5	28.9	26 09.1	+45.8	29.1	27 01.5	+46.1	29.4	27 53.7	+46.5	29.6	28 45.8	+46.9	29.9	29 37.8	+47.2	30.2	30 29.5	+47.7	30.5	59
60	25 09.1	+44.8	27.9	26 02.1	+45.2	28.2	26 54.9	+45.6	28.4	27 47.6	+45.9	28.6	28 40.2	+46.3	28.9	29 32.7	+46.6	29.2	30 25.0	+47.0	29.5	31 17.2	+47.3	29.7	60
61	25 53.9	+44.7	27.2	26 47.3	+44.9	27.4	27 40.5	+45.3	27.7	28 33.5	+45.7	27.9	29 26.5	+46.0	28.2	30 19.3	+46.4	28.4	31 12.0	+46.8	28.7	32 04.5	+47.2	29.0	61
62	26 38.6	+44.3	26.5	27 32.2	+44.7	26.7	28 25.8	+45.0	26.9	29 19.2	+45.4	27.2	30 12.5	+45.8	27.4	31 05.7	+46.2	27.7	31 58.8	+46.5	28.0	32 51.7	+46.8	28.3	62
63	27 22.9	+44.2	25.7	28 16.9	+44.5	25.9	29 10.8	+44.9	26.2	30 04.6	+45.2	26.4	30 58.3	+45.5	26.7	31 51.9	+45.9	27.0	32 45.3	+46.2	27.2	33 38.5	+46.6	27.5	63
64	28 07.1	+43.8	24.9	29 01.4	+44.2	25.2	29 55.7	+44.5	25.4	30 49.8	+44.9	25.7	31 43.8	+45.3	25.9	32 37.7	+45.6	26.2	33 31.5	+46.0	26.5	34 25.1	+46.3	26.8	64
65	28 50.9	+43.6	24.2	29 45.6	+43.9	24.4	30 40.2	+44.3	24.6	31 34.7	+44.6	24.9	32 29.1	+44.9	25.1	33 23.3	+45.3	25.4	34 17.5	+45.6	25.7	35 11.4	+46.1	26.0	65
66	29 34.5	+43.3	23.4	30 29.5	+43.7	23.6	31 24.5	+44.0	23.8	32 19.3	+44.4	24.1	33 14.0	+44.7	24.4	34 08.6	+45.0	24.6	35 03.1	+45.3	24.9	35 57.5	+45.5	25.2	66
67	30 17.8	+43.0	22.6	31 13.2	+43.3	22.8	32 08.5	+43.6	23.0	33 03.6	+44.0	23.3	33 58.7	+44.3	23.6	34 53.6	+44.7	23.8	35 48.4	+45.1	24.1	36 43.1	+45.4	24.4	67
68	31 00.8	+42.8	21.8	31 56.5	+43.1	22.0	32 52.1	+43.4	22.2	33 47.6	+43.7	22.5	34 43.0	+44.0	22.7	35 38.3	+44.3	23.0	36 33.5	+44.6	23.3	37 28.5	+45.0	23.6	68
69	31 43.6	+42.3	20.9	32 39.6	+42.7	21.2	33 35.5	+43.0	21.4	34 31.3	+43.3	21.6	35 27.0	+43.7	21.9	36 22.6	+44.0	22.2	37 18.1	+44.3	22.5	38 13.5	+44.7	22.8	69
70	32 25.9	+42.1	20.1	33 22.3	+42.3	20.3	34 18.5	+42.6	20.6	35 14.6	+43.0	20.8	36 10.7	+43.2	21.1	37 06.6	+43.6	21.3	38 02.4	+44.0	21.6	38 58.2	+44.2	21.9	70
71	33 08.0	+41.7	19.3	34 04.6	+42.0	19.5	35 01.1	+42.3	19.7	35 57.6	+42.6	19.9	36 53.9	+42.9	20.2	37 50.2	+43.2	20.5	38 46.4	+43.5	20.7	39 42.4	+43.9	21.0	71
72	33 49.7	+41.3	18.4	34 46.6	+41.6	18.8	35 43.4	+41.9	18.8	36 40.2	+42.2	19.1	37 36.8	+42.5	19.3	38 33.4	+42.8	19.6	39 29.9	+43.1	19.9	40 26.3	+43.4	20.1	72
73	34 31.0	+41.0	17.5	35 28.2	+41.3	17.7	36 25.3	+41.6	17.9	37 22.4	+41.8	18.2	38 19.3	+42.1	18.4	39 16.2	+42.4	18.7	40 13.0	+42.7	18.9	41 09.7	+43.0	19.2	73
74	35 12.0	+40.6	16.6	36 09.5	+40.8	16.8	37 06.9	+41.0	17.0	38 04.2	+41.4	17.3	39 01.4	+41.7	17.5	39 58.6	+42.0	17.8	40 55.7	+42.3	18.0	41 52.7	+42.6	18.3	74
75	35 52.6	+40.1	15.7	36 50.3	+40.4	15.8	37 47.9	+40.7	16.1	38 45.6	+40.9	16.3	39 43.1	+41.2	16.6	40 40.6	+41.4	16.8	41 38.0	+41.7	17.1	42 35.3	+42.0	17.3	75
76	36 32.7	+39.7	14.8	37 30.7	+39.9	15.0	38 28.6	+40.2	15.2	39 26.5	+40.4	15.4	40 24.3	+40.7	15.6	41 22.0	+41.0	15.9	42 19.7	+41.3	16.1	43 17.3	+41.6	16.4	76
77	37 12.4	+39.3	13.9	38 10.6	+39.5	14.0	39 08.8	+39.7	14.2	40 06.9	+40.0	14.4	41 05.0	+40.2	14.7	42 03.0	+40.5	14.9	43 01.0	+40.7	15.1	43 58.9	+41.0	15.4	77
78	37 51.7	+38.8	12.9	38 50.1	+39.0	13.1	39 48.5	+39.3	13.3	40 46.9	+39.5	13.5	41 45.2	+39.8	13.7	42 43.5	+40.0	13.9	43 41.7	+40.2	14.1	44 39.9	+40.5	14.4	78
79	38 30.5	+38.3	11.9	39 29.1	+38.5	12.1	40 27.8	+38.7	12.3	41 26.4	+38.9	12.5	42 25.0	+39.1	12.7	43 23.5	+39.4	12.9	44 21.9	+39.7	13.1	45 20.4	+39.8	13.3	79
80	39 08.8	+37.7	10.9	40 07.6	+38.0	11.1	41 06.5	+38.2	11.3	42 05.3	+38.4	11.4	43 04.1	+38.6	11.6	44 02.9	+38.8	11.8	45 01.6	+39.0	12.0	46 00.2	+39.3	12.2	80
81	39 46.5	+37.3	9.9	40 45.6	+37.5	10.1	41 44.7	+37.6	10.2	42 43.7	+37.8	10.4	43 42.7	+38.0	10.6	44 41.7	+38.2	10.8	45 40.6	+38.4	10.9	46 39.5	+38.6	11.1	81
82	40 23.8	+36.7	8.9	41 23.1	+36.8	9.1	42 22.3	+37.0	9.2	43 21.5	+37.2	9.3	44 20.7	+37.4	9.5	45 19.9	+37.5	9.7	46 19.0	+37.8	9.8	47 18.1	+38.0	10.0	82
83	41 00.5	+36.1	7.9	41 59.9	+36.3	8.0	42 59.3	+36.5	8.1	43 58.7	+36.6	8.3	44 58.1	+36.7	8.4	45 57.4	+36.9	8.5	46 56.8	+37.0	8.7	47 56.1	+37.2	8.9	83
84	41 36.6	+35.6	6.9	42 36.2	+35.7	7.0	43 35.8	+35.8	7.0	44 35.3	+35.9	7.2	45 34.8	+36.1	7.3	46 34.3	+36.2	7.4	47 33.8	+36.4	7.5	48 33.3	+36.5	7.7	84
85	42 12.2	+34.9	5.7	43 11.9	+35.0	5.8	44 11.6	+35.1	5.9	45 11.2	+35.3	6.0	46 10.9	+35.3	6.1	47 10.5	+35.5	6.2	48 10.2	+35.6	6.4	49 09.8	+35.7	6.5	85
86	42 47.1	+34.2	4.6	43 46.9	+34.3	4.7	44 46.7	+34.4	4.8	45 46.5	+34.5	4.9	46 46.2	+34.7	5.0	47 46.0	+34.7	5.0	48 45.8	+34.8	5.1	49 45.5	+35.0	5.3	86
87	43 21.3	+33.6	3.5	44 21.2	+33.7	3.6	45 21.1	+33.7	3.6	46 21.0	+33.8	3.7	47 20.9	+33.8	3.7	48 20.7	+34.0	3.8	49 20.6	+34.0	3.9	50 20.5	+34.0	4.0	87
88	43 54.9	+32.9	2.4	44 54.9	+32.9	2.4	45 54.8	+33.0	2.4	46 54.8	+33.0	2.5	47 54.7	+33.1	2.5	48 54.7	+33.1	2.6	49 54.6	+33.1	2.6	50 54.5	+33.2	2.7	88
89	44 27.8	+32.2	1.2	45 27.8	+32.2	1.2	46 27.8	+32.2	1.2	47 27.8	+32.2	1.3	48 27.8	+32.2	1.3	49 27.8	+32.3	1.3	50 27.7	+32.3	1.3	51 27.7	+32.3	1.4	89
90	45 00.0	+31.4	0.0	46 00.0	+31.4	0.0	47 00.0	+31.4	0.0	48 00.0	+31.4	0.0	49 00.0	+31.4	0.0	50 00.0	+31.3	0.0	51 00.0	+31.3	0.0	52 00.0	+31.3	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME** NAME AS DECLINATION   **L.H.A. 122°, 238°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°−Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	21 21.5	+45.4	113.0	20 57.8	+46.2	113.4	20 33.8	+46.8	113.7	20 09.5	+47.5	114.1	19 44.9	+48.1	114.4	19 20.0	+48.6	114.7	18 54.8	+49.2	115.0	18 29.2	+49.8	115.3	0
1	22 06.9	+45.3	112.3	21 44.0	+45.9	112.7	21 20.6	+46.7	113.1	20 57.0	+47.2	113.4	20 33.0	+47.9	113.8	20 08.6	+48.5	114.1	19 44.0	+49.1	114.4	19 19.0	+49.7	114.7	1
2	22 52.2	+45.1	111.6	22 29.9	+45.8	112.0	22 07.3	+46.4	112.4	21 44.2	+47.2	112.7	21 20.9	+47.7	113.1	20 57.1	+48.4	113.5	20 33.1	+49.0	113.8	20 08.7	+49.6	114.2	2
3	23 37.3	+44.9	110.9	23 15.7	+45.6	111.3	22 53.7	+46.3	111.7	22 31.4	+46.9	112.1	22 08.6	+47.6	112.5	21 45.5	+48.2	112.8	21 22.1	+48.8	113.2	20 58.3	+49.4	113.5	3
4	24 22.2	+44.7	110.2	24 01.3	+45.4	110.6	23 40.0	+46.1	111.0	23 18.3	+46.8	111.4	22 56.2	+47.4	111.8	22 33.7	+48.1	112.2	22 10.9	+48.7	112.6	21 47.7	+49.3	112.9	4
5	25 06.9	+44.4	109.4	24 46.7	+45.2	109.9	24 26.1	+45.9	110.3	24 05.1	+46.6	110.7	23 43.6	+47.3	111.1	23 21.8	+47.9	111.5	22 59.6	+48.5	111.9	22 37.0	+49.1	112.3	5
6	25 51.3	+44.3	108.7	25 31.9	+45.0	109.1	25 12.0	+45.7	109.6	24 51.7	+46.4	110.0	24 30.9	+47.1	110.5	24 09.7	+47.8	110.9	23 48.1	+48.4	111.3	23 26.1	+49.1	111.7	6
7	26 35.6	+44.0	107.9	26 16.9	+44.7	108.4	25 57.7	+45.5	108.9	25 38.1	+46.1	109.3	25 18.0	+46.9	109.8	24 57.5	+47.5	110.2	24 36.5	+48.2	110.6	24 15.2	+48.8	111.1	7
8	27 19.6	+43.7	107.2	27 01.6	+44.5	107.7	26 43.2	+45.2	108.1	26 24.2	+46.0	108.6	26 04.9	+46.6	109.1	25 45.0	+47.4	109.5	25 24.7	+48.1	110.0	25 04.0	+48.7	110.4	8
9	28 03.3	+43.5	106.4	27 46.1	+44.3	106.9	27 28.4	+45.0	107.4	27 10.2	+45.8	107.9	26 51.5	+46.5	108.4	26 32.4	+47.2	108.9	26 12.8	+47.8	109.3	25 52.7	+48.5	109.8	9
10	28 46.8	+43.2	105.6	28 30.4	+44.0	106.1	28 13.4	+44.8	106.7	27 56.0	+45.5	107.2	27 38.0	+46.3	107.7	27 19.6	+46.9	108.2	27 00.6	+47.7	108.8	26 41.2	+48.3	109.3	10
11	29 30.0	+42.9	104.8	29 14.4	+43.7	105.4	28 58.2	+44.5	105.9	28 41.5	+45.3	106.4	28 24.3	+46.0	106.9	28 06.5	+46.8	107.5	27 48.3	+47.4	108.0	27 29.5	+48.1	108.5	11
12	30 12.9	+42.6	104.0	29 58.1	+43.4	104.6	29 42.7	+44.2	105.1	29 26.8	+45.0	105.7	29 10.3	+45.8	106.2	28 53.3	+46.5	106.7	28 35.7	+47.2	107.3	28 17.6	+48.0	107.8	12
13	30 55.5	+42.3	103.2	30 41.5	+43.2	103.8	30 26.9	+44.0	104.3	30 11.8	+44.7	104.9	29 56.1	+45.5	105.5	29 39.8	+46.3	106.0	29 22.9	+47.1	106.6	29 05.6	+47.7	107.1	13
14	31 37.8	+42.0	102.4	31 24.7	+42.8	103.0	31 10.9	+43.7	103.6	30 56.5	+44.5	104.1	30 41.6	+45.2	104.7	30 26.1	+46.0	105.3	30 10.0	+46.7	105.8	29 53.3	+47.5	106.4	14
15	32 19.8	+41.6	101.5	32 07.5	+42.5	102.1	31 54.6	+43.3	102.7	31 41.0	+44.2	103.4	31 26.8	+45.0	103.9	31 12.1	+45.7	104.5	30 56.7	+46.5	105.1	30 40.8	+47.2	105.7	15
16	33 01.4	+41.3	100.7	32 50.0	+42.1	101.3	32 37.9	+43.0	101.9	32 25.2	+43.8	102.6	32 11.8	+44.7	103.2	31 57.8	+45.5	103.8	31 43.2	+46.3	104.4	31 28.0	+47.0	105.0	16
17	33 42.7	+40.9	99.8	33 32.1	+41.9	100.5	33 20.9	+42.7	101.1	33 09.0	+43.6	101.7	32 56.5	+44.4	102.4	32 43.3	+45.2	103.0	32 29.5	+46.0	103.6	32 15.0	+46.8	104.2	17
18	34 23.6	+40.5	98.9	34 14.0	+41.4	99.6	34 03.6	+42.3	100.3	33 52.6	+43.2	100.9	33 40.9	+44.1	101.6	33 28.5	+44.9	102.2	33 15.5	+45.7	102.9	33 01.8	+46.5	103.5	18
19	35 04.1	+40.1	98.0	34 55.4	+41.0	98.7	34 45.9	+42.0	99.4	34 35.8	+42.9	100.1	34 25.0	+43.7	100.8	34 13.4	+44.6	101.4	34 01.2	+45.4	102.1	33 48.3	+46.2	102.7	19
20	35 44.2	+39.7	97.1	35 36.4	+40.7	97.8	35 27.9	+41.6	98.5	35 18.7	+42.5	99.2	35 08.7	+43.4	99.9	34 58.0	+44.2	100.6	34 46.6	+45.1	101.3	34 34.5	+45.9	102.0	20
21	36 23.9	+39.3	96.2	36 17.1	+40.2	96.9	36 09.5	+41.2	97.6	36 01.2	+42.1	98.4	35 52.1	+43.0	99.1	35 42.2	+43.9	99.8	35 31.7	+44.7	100.5	35 20.4	+45.6	101.2	21
22	37 03.2	+38.8	95.2	36 57.3	+39.8	96.0	36 50.7	+40.7	96.7	36 43.3	+41.7	97.5	36 35.1	+42.6	98.2	36 26.1	+43.6	98.9	36 16.4	+44.5	99.7	36 06.0	+45.3	100.4	22
23	37 42.0	+38.3	94.3	37 37.1	+39.4	95.0	37 31.4	+40.4	95.8	37 25.0	+41.3	96.6	37 17.7	+42.3	97.3	37 09.7	+43.1	98.1	37 00.9	+44.0	98.8	36 51.3	+44.9	99.6	23
24	38 20.3	+37.8	93.3	38 16.5	+38.8	94.1	38 11.8	+39.8	94.9	38 06.3	+40.8	95.7	38 00.0	+41.8	96.4	37 52.8	+42.8	97.2	37 44.9	+43.7	98.0	37 36.2	+44.6	98.7	24
25	38 58.1	+37.4	92.3	38 55.3	+38.4	93.1	38 51.6	+39.4	93.9	38 47.1	+40.4	94.7	38 41.8	+41.4	95.5	38 35.6	+42.3	96.3	38 28.6	+43.3	97.1	38 20.8	+44.2	97.9	25
26	39 35.5	+36.7	91.3	39 33.7	+37.8	92.1	39 31.0	+38.9	92.9	39 27.5	+40.0	93.8	39 23.2	+40.9	94.6	39 17.9	+41.9	95.4	39 11.9	+42.8	96.2	39 05.0	+43.8	97.0	26
27	40 12.2	+36.3	90.3	40 11.5	+37.3	91.1	40 09.9	+38.4	91.9	40 07.5	+39.4	92.8	40 04.1	+40.4	93.6	39 59.8	+41.5	94.5	39 54.7	+42.5	95.3	39 48.8	+43.3	96.1	27
28	40 48.5	+35.6	89.2	40 48.8	+36.8	90.1	40 48.3	+37.9	90.9	40 46.9	+38.9	91.8	40 44.5	+40.0	92.7	40 41.3	+41.0	93.5	40 37.2	+42.0	94.4	40 32.1	+43.0	95.2	28
29	41 24.1	+35.1	88.1	41 25.6	+36.2	89.0	41 26.2	+37.2	89.9	41 25.8	+38.4	90.8	41 24.5	+39.4	91.7	41 22.3	+40.5	92.6	41 19.2	+41.5	93.4	41 15.1	+42.5	94.3	29
30	41 59.2	+34.4	87.1	42 01.8	+35.5	88.0	42 03.4	+36.7	88.9	42 04.2	+37.8	89.8	42 03.9	+38.9	90.7	42 02.8	+39.9	91.6	42 00.7	+41.0	92.5	41 57.6	+42.0	93.4	30
31	42 33.6	+33.7	86.0	42 37.3	+35.0	86.9	42 40.1	+36.1	87.8	42 42.0	+37.2	88.7	42 42.8	+38.4	89.6	42 42.7	+39.5	90.6	42 41.7	+40.5	91.5	42 39.6	+41.6	92.4	31
32	43 07.3	+33.1	84.8	43 12.3	+34.2	85.8	43 16.2	+35.5	86.7	43 19.2	+36.6	87.6	43 21.2	+37.7	88.6	43 22.2	+38.8	89.5	43 22.2	+39.9	90.5	43 21.2	+41.0	91.4	32
33	43 40.4	+32.4	83.7	43 46.5	+33.6	84.6	43 51.7	+34.7	85.6	43 55.8	+35.9	86.5	43 58.9	+37.1	87.5	44 01.0	+38.3	88.5	44 02.1	+39.4	89.4	44 02.2	+40.4	90.4	33
34	44 12.8	+31.7	82.5	44 20.1	+32.9	83.5	44 26.4	+34.1	84.4	44 31.7	+35.3	85.4	44 36.0	+36.5	86.4	44 39.3	+37.6	87.4	44 41.5	+38.7	88.4	44 42.6	+39.9	89.4	34
35	44 44.5	+30.9	81.3	44 53.0	+32.2	82.3	45 00.5	+33.4	83.3	45 07.0	+34.6	84.3	45 12.5	+35.8	85.3	45 16.9	+37.0	86.3	45 20.2	+38.2	87.3	45 22.5	+39.3	88.3	35
36	45 15.4	+30.1	80.1	45 25.2	+31.3	81.1	45 33.9	+32.7	82.1	45 41.6	+33.9	83.1	45 48.3	+35.1	84.1	45 53.9	+36.3	85.2	45 58.4	+37.5	86.2	46 01.8	+38.7	87.2	36
37	45 45.5	+29.3	78.9	45 56.5	+30.6	79.9	46 06.6	+31.8	80.9	46 15.5	+33.1	81.9	46 23.4	+34.4	83.0	46 30.2	+35.6	84.0	46 35.9	+36.8	85.1	46 40.5	+38.0	86.1	37
38	46 14.8	+28.5	77.6	46 27.1	+29.8	78.6	46 38.4	+31.1	79.7	46 48.6	+32.4	80.7	46 57.8	+33.6	81.8	47 05.8	+34.9	82.8	47 12.7	+36.1	83.9	47 18.5	+37.3	85.0	38
39	46 43.3	+27.6	76.3	46 56.9	+28.9	77.4	47 09.5	+30.2	78.4	47 21.0	+31.5	79.5	47 31.4	+32.8	80.6	47 40.7	+34.1	81.6	47 48.8	+35.4	82.7	47 55.8	+36.7	83.8	39
40	47 10.9	+26.6	75.0	47 25.8	+28.0	76.1	47 39.7	+29.4	77.1	47 52.5	+30.7	78.2	48 04.2	+32.0	79.3	48 14.8	+33.3	80.4	48 24.2	+34.6	81.5	48 32.5	+35.8	82.6	40
41	47 37.5	+25.8	73.7	47 53.8	+27.2	74.8	48 09.1	+28.4	75.8	48 23.2	+29.8	76.9	48 36.2	+31.1	78.0	48 48.1	+32.4	79.2	48 58.8	+33.7	80.3	49 08.3	+35.1	81.4	41
42	48 03.3	+24.8	72.4	48 21.0	+26.1	73.4	48 37.5	+27.6	74.5	48 53.0	+28.9	75.6	49 07.3	+30.3	76.7	49 20.5	+31.6	77.9	49 32.5	+32.9	79.0	49 43.4	+34.2	80.2	42
43	48 28.1	+23.9	71.0	48 47.1	+25.2	72.1	49 05.1	+26.5	73.2	49 21.9	+27.9	74.3	49 37.6	+29.3	75.4	49 52.1	+30.7	76.6	50 05.4	+32.1	77.7	50 17.6	+33.4	78.9	43
44	48 52.0	+22.8	69.6	49 12.3	+24.2	70.7	49 31.6	+25.6	71.8	49 49.8	+27.0	72.9	50 06.9	+28.3	74.1	50 22.8	+29.7	75.2	50 37.5	+31.1	76.4	50 51.0	+32.5	77.6	44
45	49 14.8	+21.7	68.2	49 36.5	+23.2	69.3	49 57.2	+24.5	70.4	50 16.8	+25.9	71.5	50 35.2	+27.4	72.7	50 52.5	+28.7	73.8	51 08.6	+30.1	75.0	51 23.5	+31.5	76.2	45
46	49 36.5	+20.7	66.8	49 59.7	+22.0	67.9	50 21.7	+23.5	69.0	50 42.7	+24.9	70.1	51 02.6	+26.3	71.3	51 21.2	+27.8	72.5	51 38.7	+29.2	73.7	51 55.0	+30.6	74.9	46
47	49 57.2	+19.6	65.3	50 21.7	+21.0	66.4	50 45.2	+22.4	67.5	51 07.6	+23.8	68.7	51 28.9	+25.2	69.9	51 49.0	+26.6	71.0	52 07.9	+28.1	72.2	52 25.6	+29.5	73.5	47
48	50 16.8	+18.4	63.8	50 42.7	+19.9	64.9	51 07.6	+21.3	66.0	51 31.4	+22.7	67.2	51 54.1	+24.1	68.4	52 15.6	+25.6	69.6	52 36.0	+27.0	70.8	52 55.1	+28.5	72.0	48
49	50 35.2	+17.3	62.3	51 02.6	+18.6	63.4	51 28.9	+20.1	64.6	51 54.1	+21.5	65.7	52 18.2	+23.0	66.9	52 41.2	+24.5	68.1	53 03.0	+25.9	69.3	53 23.6	+27.4	70.6	49
50	50 52.5	+16.1	60.8	51 21.2	+17.5	61.9	51 49.0	+18.9	63.0	52 15.6	+20.4	64.2	52 41.2	+21.8	65.4	53 05.7	+23.2	66.6	53 28.9	+24.8	67.8	53 51.0	+26.2	69.1	50
51	51 08.6	+14.9	59.3	51 38.7	+16.3	60.4	52 07.9	+17.7	61.5	52 36.0	+19.1	62.6	53 03.0	+20.6	63.8	53 28.9	+22.1	65.0	53 53.7	+23.5	66.3	54 17.2	+25.1	67.5	51
52	51 23.5	+13.6	57.7	51 55.0	+15.0	58.8	52 25.6	+16.4	59.9	52 55.1	+17.9	61.1	53 23.6	+19.3	62.2	53 51.0	+20.8	63.5	54 17.2	+22.3	64.7	54 42.3	+23.8	66.0	52
53	51 37.1	+12.4	56.2	52 10.0	+13.8	57.2	52 42.0	+15.2	58.3	53 13.0	+16.6	59.5	53 42.9	+18.1	60.7	54 11.8	+19.5	61.9	54 39.5	+21.0	63.1	55 06.1	+22.5	64.4	53
54	51 49.5	+11.1	54.6	52 23.8	+12.5	55.7	52 57.2	+13.8	56.7	53 29.6	+15.3	57.9	54 01.0	+16.7	59.0	54 31.3	+18.2	60.2	55 00.5	+19.7	61.5	55 28.6	+21.2	62.7	54
55	52 00.6	+9.8	53.0	52 36.3	+11.1	54.1	53 11.0	+12.5	55.1	53 44.9	+13.9	56.2	54 17.7	+15.4	57.4	54 49.5	+16.8	58.6	55 20.2	+18.3	59.8	55 49.8	+19.9	61.1	55
56	52 10.4	+8.5	51.4	52 47.4	+9.8	52.4	53 23.5	+11.2	53.5	53 58.8	+12.5	54.6	54 33.1	+13.9	55.7	55 06.3	+15.5	56.9	55 38.5	+17.0	58.1	56 09.7	+18.4	59.4	56
57	52 18.9	+7.1	49.8	52 57.2	+8.5	50.8	53 34.7	+9.8	51.8	54 11.3	+11.2	52.9	54 47.0	+12.6	54.1	55 21.8	+14.0	55.2	55 55.5	+15.5	56.4	56 28.1	+17.0	57.7	57
58	52 26.0	+5.8	48.2	53 05.7	+7.1	49.1	53 44.5	+8.4	50.2	54 22.5	+9.8	51.2	54 59.6	+11.1	52.4	55 35.8	+12.5	53.5	56 11.0	+14.0	54.7	56 45.1	+15.5	55.9	58
59	52 31.8	+4.5	46.5	53 12.8	+5.7	47.5	53 52.9	+7.0	48.5	54 32.3	+8.3	49.5	55 10.7	+9.7	50.6	55 48.3	+11.1	51.8	56 25.0	+12.5	52.9	57 00.6	+14.0	54.2	59
60	52 36.3	+3.1	44.9	53 18.5	+4.3	45.8	53 59.9	+5.6	46.8	54 40.6	+6.8	47.8	55 20.4	+8.2	48.9	55 59.4	+9.6	50.0	56 37.5	+11.0	51.2	57 14.6	+12.5	52.4	60
61	52 39.4	+1.7	43.2	53 22.8	+2.9	44.2	54 05.5	+4.1	45.1	54 47.4	+5.4	46.1	55 28.6	+6.7	47.2	56 09.0	+8.0	48.2	56 48.5	+9.5	49.4	57 27.1	+10.9	50.6	61
62	52 41.1	+0.3	41.6	53 25.7	+1.4	42.5	54 09.6	+2.7	43.4	54 52.8	+3.9	44.4	55 35.3	+5.2	45.4	56 17.0	+6.5	46.5	56 58.0	+7.8	47.6	57 38.0	+9.3	48.7	62
63	52 41.4	-1.0	39.9	53 27.1	+0.1	40.8	54 12.3	+1.2	41.7	54 56.7	+2.4	42.7	55 40.5	+3.7	43.6	56 23.5	+5.0	44.7	57 05.8	+6.3	45.8	57 47.3	+7.6	46.9	63
64	52 40.4	-2.4	38.3	53 27.2	-1.3	39.1	54 13.5	-0.2	40.0	54 59.1	+1.0	40.9	55 44.2	+2.1	41.9	56 28.5	+3.4	42.9	57 12.1	+4.6	43.9	57 54.9	+6.0	45.0	64
65	52 38.0	-3.8	36.6	53 25.9	-2.8	37.4	54 13.3	-1.7	38.3	55 00.1	-0.6	39.2	55 46.3	+0.6	40.1	56 31.9	+1.7	41.1	57 16.7	+3.1	42.1	58 00.9	+4.3	43.1	65
66	52 34.2	-5.1	35.0	53 23.1	-4.1	35.8	54 11.6	-3.1	36.6	54 59.5	-2.1	37.4	55 46.9	-1.0	38.3	56 33.6	+0.2	39.2	57 19.8	+1.4	40.2	58 05.2	+2.7	41.3	66
67	52 29.1	-6.5	33.4	53 19.0	-5.5	34.1	54 08.5	-4.6	34.9	54 57.4	-3.5	35.7	55 45.9	-2.5	36.5	56 33.8	-1.3	37.4	57 21.2	-0.2	38.4	58 07.9	+1.0	39.4	67
68	52 22.6	-7.8	31.7	53 13.5	-7.0	32.4	54 03.9	-6.0	33.2	54 53.9	-5.0	33.9	55 43.4	-4.0	34.8	56 32.5	-3.0	35.6	57 21.0	-1.8	36.5	58 08.9	-0.7	37.5	68
69	52 14.8	-9.1	30.1	53 06.5	-8.3	30.8	53 57.9	-7.4	31.5	54 48.9	-6.5	32.2	55 39.4	-5.5	33.0	56 29.5	-4.5	33.8	57 19.1	-3.5	34.7	58 08.2	-2.4	35.6	69
70	52 05.7	-10.5	28.5	52 58.2	-9.6	29.1	53 50.5	-8.9	29.8	54 42.4	-8.0	30.5	55 33.9	-7.1	31.2	56 25.0	-6.1	32.0	57 15.6	-5.1	32.8	58 05.8	-4.1	33.7	70
71	51 55.2	-11.7	26.9	52 48.6	-11.0	27.5	53 41.6	-10.2	28.1	54 34.4	-9.4	28.8	55 26.8	-8.5	29.5	56 18.9	-7.7	30.2	57 10.5	-6.7	31.0	58 01.7	-5.7	31.8	71
72	51 43.5	-13.1	25.3	52 37.6	-12.3	25.9	53 31.4	-11.6	26.5	54 25.0	-10.8	27.1	55 18.3	-10.1	27.7	56 11.2	-9.2	28.4	57 03.8	-8.3	29.2	57 56.0	-7.4	29.9	72
73	51 30.4	-14.2	23.7	52 25.3	-13.7	24.3	53 19.8	-12.9	24.8	54 14.2	-12.3	25.4	55 08.2	-11.4	26.0	56 02.0	-10.7	26.7	56 55.5	-9.9	27.3	57 48.6	-9.0	28.1	73
74	51 16.2	-15.5	22.2	52 11.6	-14.9	22.7	53 06.9	-14.3	23.2	54 01.9	-13.6	23.7	54 56.8	-13.0	24.3	55 51.3	-12.2	24.9	56 45.6	-11.4	25.5	57 39.6	-10.6	26.2	74
75	51 00.7	-16.7	20.6	51 56.7	-16.1	21.1	52 52.6	-15.5	21.6	53 48.3	-14.9	22.1	54 43.8	-14.3	22.6	55 39.1	-13.6	23.2	56 34.2	-13.0	23.7	57 29.0	-12.3	24.4	75
76	50 44.0	-17.9	19.1	51 40.6	-17.3	19.5	52 37.1	-16.8	20.0	53 33.4	-16.3	20.4	54 29.5	-15.7	20.9	55 25.5	-15.1	21.4	56 21.2	-14.4	22.0	57 16.7	-13.7	22.6	76
77	50 26.1	-19.0	17.6	51 23.3	-18.6	18.0	52 20.3	-18.1	18.4	53 17.1	-17.5	18.8	54 13.8	-17.0	19.3	55 10.4	-16.5	19.7	56 06.8	-15.9	20.2	57 03.0	-15.3	20.8	77
78	50 07.1	-20.1	16.1	51 04.7	-19.7	16.5	52 02.2	-19.3	16.8	52 59.6	-18.8	17.2	53 56.8	-18.3	17.6	54 53.9	-17.8	18.1	55 50.9	-17.3	18.5	56 47.7	-16.8	19.0	78
79	49 47.0	-21.2	14.7	50 45.0	-20.9	15.0	51 42.9	-20.5	15.3	52 40.7	-20.0	15.7	53 38.5	-19.7	16.0	54 36.1	-19.2	16.4	55 33.6	-18.7	16.8	56 30.9	-18.2	17.2	79
80	49 25.8	-22.3	13.2	50 24.1	-21.9	13.5	51 22.4	-21.6	13.8	52 20.7	-21.3	14.1	53 18.8	-20.9	14.4	54 16.9	-20.5	14.8	55 14.9	-20.1	15.1	56 12.7	-19.6	15.5	80
81	49 03.5	-23.3	11.8	50 02.2	-23.0	12.1	51 00.8	-22.7	12.3	51 59.4	-22.4	12.6	52 57.9	-22.0	12.9	53 56.4	-21.7	13.2	54 54.8	-21.4	13.5	55 53.1	-21.0	13.8	81
82	48 40.2	-24.4	10.4	49 39.2	-24.1	10.6	50 38.1	-23.8	10.8	51 37.0	-23.5	11.1	52 35.9	-23.3	11.3	53 34.7	-23.0	11.6	54 33.4	-22.6	11.9	55 32.1	-22.3	12.2	82
83	48 15.8	-25.3	9.0	49 15.1	-25.1	9.2	50 14.3	-24.9	9.4	51 13.5	-24.7	9.6	52 12.6	-24.4	9.8	53 11.7	-24.1	10.0	54 10.8	-23.9	10.3	55 09.8	-23.6	10.5	83
84	47 50.5	-26.2	7.7	48 50.0	-26.1	7.8	49 49.4	-25.9	8.0	50 48.8	-25.7	8.2	51 48.2	-25.5	8.3	52 47.6	-25.3	8.5	53 46.9	-25.1	8.7	54 46.2	-24.9	8.9	84
85	47 24.3	-27.1	6.3	48 23.9	-27.0	6.5	49 23.5	-26.8	6.6	50 23.1	-26.7	6.7	51 22.7	-26.5	6.9	52 22.3	-26.4	7.0	53 21.8	-26.2	7.2	54 21.3	-26.0	7.4	85
86	46 57.2	-28.1	5.0	47 56.9	-27.9	5.1	48 56.7	-27.8	5.2	49 56.4	-27.7	5.3	50 56.2	-27.6	5.4	51 55.9	-27.5	5.6	52 55.6	-27.3	5.7	53 55.3	-27.2	5.8	86
87	46 29.1	-28.9	3.7	47 29.0	-28.8	3.8	48 28.9	-28.7	3.9	49 28.7	-28.6	3.9	50 28.6	-28.5	4.0	51 28.4	-28.5	4.1	52 28.3	-28.4	4.2	53 28.1	-28.3	4.3	87
88	46 00.2	-29.7	2.5	47 00.2	-29.7	2.5	48 00.1	-29.6	2.6	49 00.1	-29.6	2.6	50 00.0	-29.5	2.7	50 59.9	-29.5	2.7	51 59.9	-29.5	2.8	52 59.8	-29.4	2.8	88
89	45 30.5	-30.5	1.2	46 30.5	-30.5	1.2	47 30.5	-30.5	1.3	48 30.5	-30.5	1.3	49 30.5	-30.5	1.3	50 30.4	-30.4	1.3	51 30.4	-30.4	1.4	52 30.4	-30.4	1.4	89
90	45 00.0	-31.3	0.0	46 00.0	-31.3	0.0	47 00.0	-31.3	0.0	48 00.0	-31.3	0.0	49 00.0	-31.3	0.0	50 00.0	-31.4	0.0	51 00.0	-31.4	0.0	52 00.0	-31.4	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	21 21.5	−45.7	113.0	20 57.8	−46.3	113.4	20 33.8	−46.9	113.7	20 09.5	−47.5	114.1	19 44.9	−48.2	114.4	19 20.0	−48.8	114.7	18 54.8	−49.4	115.0	18 29.2	−49.9	115.3	0
1	20 35.8	−45.8	113.7	20 11.5	−46.4	114.1	19 46.9	−47.1	114.4	19 22.0	−47.7	114.7	18 56.7	−48.3	115.0	18 31.2	−48.9	115.3	18 05.4	−49.5	115.6	17 39.3	−50.0	115.9	1
2	19 50.0	−46.0	114.4	19 25.1	−46.6	114.7	18 59.8	−47.2	115.0	18 34.3	−47.9	115.4	18 08.4	−48.4	115.7	17 42.3	−49.0	115.9	17 15.9	−49.6	116.2	16 49.3	−50.1	116.5	2
3	19 04.0	−46.1	115.1	18 38.5	−46.8	115.4	18 12.6	−47.4	115.7	17 46.4	−47.9	116.0	17 20.0	−48.5	116.3	16 53.3	−49.1	116.5	16 26.4	−49.7	116.8	15 59.2	−50.2	117.1	3
4	18 17.9	−46.2	115.8	17 51.7	−46.9	116.1	17 25.2	−47.4	116.3	16 58.5	−48.1	116.6	16 31.5	−48.7	116.9	16 04.2	−49.2	117.1	15 36.7	−49.7	117.4	15 09.0	−50.3	117.6	4
5	17 31.7	−46.4	116.4	17 04.8	−47.0	116.7	16 37.8	−47.6	117.0	16 10.4	−48.2	117.2	15 42.8	−48.7	117.5	15 15.0	−49.3	117.7	14 47.0	−49.9	118.0	14 18.7	−50.3	118.2	5
6	16 45.3	−46.5	117.1	16 17.8	−47.1	117.4	15 50.2	−47.8	117.6	15 22.2	−48.2	117.9	14 54.1	−48.9	118.1	14 25.7	−49.4	118.3	13 57.1	−49.9	118.6	13 28.4	−50.5	118.8	6
7	15 58.8	−46.6	117.8	15 30.7	−47.2	118.0	15 02.4	−47.8	118.3	14 34.0	−48.4	118.5	14 05.2	−48.9	118.7	13 36.3	−49.4	118.9	13 07.2	−50.0	119.1	12 37.9	−50.5	119.4	7
8	15 12.2	−46.8	118.4	14 43.5	−47.3	118.6	14 14.6	−47.9	118.9	13 45.6	−48.5	119.1	13 16.3	−49.0	119.3	12 46.9	−49.6	119.5	12 17.2	−50.0	119.7	11 47.4	−50.5	119.9	8
9	14 25.4	−46.8	119.1	13 56.2	−47.5	119.3	13 26.7	−48.0	119.5	12 57.1	−48.5	119.7	12 27.3	−49.1	119.9	11 57.3	−49.6	120.1	11 27.2	−50.2	120.3	10 56.9	−50.7	120.4	9
10	13 38.6	−47.0	119.7	13 08.7	−47.5	119.9	12 38.7	−48.0	120.1	12 08.6	−48.7	120.3	11 38.2	−49.1	120.5	11 07.7	−49.7	120.6	10 37.0	−50.1	120.8	10 06.2	−50.6	121.0	10
11	12 51.6	−47.0	120.3	12 21.2	−47.6	120.5	11 50.7	−48.2	120.7	11 19.9	−48.7	120.9	10 49.1	−49.3	121.1	10 18.0	−49.7	121.2	9 46.9	−50.3	121.4	9 15.6	−50.8	121.5	11
12	12 04.6	−47.2	121.0	11 33.6	−47.7	121.2	11 02.5	−48.2	121.3	10 31.2	−48.7	121.5	9 59.8	−49.3	121.6	9 28.3	−49.8	121.8	8 56.6	−50.3	121.9	8 24.8	−50.7	122.1	12
13	11 17.4	−47.2	121.6	10 45.9	−47.7	121.8	10 14.3	−48.3	121.9	9 42.5	−48.9	122.1	9 10.5	−49.3	122.2	8 38.5	−49.8	122.4	8 06.3	−50.3	122.5	7 34.1	−50.8	122.6	13
14	10 30.2	−47.2	122.2	9 58.2	−47.9	122.4	9 26.0	−48.4	122.5	8 53.6	−48.8	122.7	8 21.2	−49.4	122.8	7 48.7	−49.9	122.9	7 16.0	−50.4	123.0	6 43.3	−50.9	123.1	14
15	9 43.0	−47.4	122.9	9 10.3	−47.8	123.0	8 37.6	−48.4	123.1	8 04.8	−49.0	123.3	7 31.8	−49.4	123.4	6 58.8	−50.0	123.5	6 25.6	−50.4	123.6	5 52.4	−50.9	123.7	15
16	8 55.6	−47.5	123.5	8 22.5	−48.0	123.6	7 49.2	−48.5	123.7	7 15.8	−49.3	123.9	6 42.4	−49.5	123.9	6 08.8	−49.9	124.0	5 35.2	−50.4	124.1	5 01.5	−50.9	124.2	16
17	8 08.2	−47.5	124.1	7 34.5	−48.0	124.2	7 00.7	−48.5	124.3	6 26.9	−49.1	124.4	5 52.9	−49.5	124.5	5 18.9	−50.0	124.6	4 44.8	−50.4	124.7	4 10.6	−50.9	124.7	17
18	7 20.7	−47.5	124.7	6 46.5	−48.0	124.8	6 12.2	−48.5	124.9	5 37.8	−49.0	125.0	5 03.4	−49.5	125.1	4 28.9	−50.0	125.1	3 54.3	−50.5	125.2	3 19.7	−50.9	125.3	18
19	6 33.2	−47.5	125.3	5 58.5	−48.1	125.3	5 23.7	−48.6	125.5	4 48.8	−49.0	125.5	4 13.9	−49.6	125.6	3 38.9	−50.1	125.7	3 03.8	−50.5	125.7	2 28.8	−51.0	125.8	19
20	5 45.7	−47.6	125.9	5 10.4	−48.1	126.0	4 35.1	−48.6	126.1	3 59.7	−49.1	126.2	3 24.3	−49.6	126.2	2 48.8	−50.0	126.2	2 13.3	−50.5	126.3	1 37.8	−50.9	126.3	20
21	4 58.1	−47.7	126.6	4 22.3	−48.1	126.6	3 46.5	−48.7	126.7	3 10.6	−49.1	126.7	2 34.7	−49.6	126.8	1 58.8	−50.1	126.8	1 22.8	−50.5	126.8	0 46.9	−51.0	126.8	21
22	4 10.4	−47.7	127.2	3 34.2	−48.2	127.2	2 57.8	−48.7	127.2	2 21.5	−49.1	127.3	1 45.1	−49.6	127.3	1 08.7	−50.1	127.4	0 32.3	−50.5	127.4	0 04.1	+51.0	52.6	22
23	3 22.8	−47.7	127.8	2 46.0	−48.2	127.8	2 09.2	−48.7	127.9	1 32.4	−49.2	127.9	0 55.5	−49.6	127.9	0 18.6	−50.0	127.9	0 18.2	+50.5	52.1	0 55.1	+50.9	52.1	23
24	2 35.1	−47.7	128.4	1 57.8	−48.2	128.4	1 20.5	−48.7	128.4	0 43.2	−49.1	128.5	0 05.9	−49.6	128.5	0 31.4	+50.1	51.5	1 08.7	+50.5	51.6	1 46.0	+51.0	51.6	24
25	1 47.4	−47.7	129.0	1 09.6	−48.2	129.0	0 31.8	−48.6	129.0	0 05.9	+49.1	51.0	0 43.7	+49.6	51.0	1 21.5	+50.0	51.0	1 59.2	+50.5	51.0	2 37.0	+50.9	51.0	25
26	0 59.7	−47.8	129.6	0 21.4	−48.2	129.6	0 16.8	+48.7	50.4	0 55.1	+49.1	50.4	1 33.3	+49.6	50.4	2 11.5	+50.1	50.4	2 49.7	+50.5	50.5	3 27.9	+50.9	50.5	26
27	0 11.9	−47.7	130.2	0 26.8	+48.2	49.8	1 05.5	+48.7	49.8	1 44.2	+49.2	49.8	2 22.9	+49.6	49.9	3 01.6	+50.0	49.9	3 40.2	+50.5	49.9	4 18.8	+50.9	50.0	27
28	0 35.8	+47.7	49.2	1 15.0	+48.2	49.2	1 54.2	+48.6	49.2	2 33.4	+49.1	49.3	3 12.5	+49.6	49.3	3 51.6	+50.0	49.3	4 30.7	+50.4	49.3	5 09.7	+50.9	49.5	28
29	1 23.5	+47.7	48.6	2 03.2	+48.2	48.6	2 42.8	+48.7	48.6	3 22.5	+49.1	48.7	4 02.1	+49.5	48.7	4 41.6	+50.0	48.8	5 21.1	+50.5	48.8	6 00.6	+50.8	48.9	29
30	2 11.2	+47.7	48.0	2 51.4	+48.1	48.0	3 31.5	+48.6	48.1	4 11.6	+49.1	48.1	4 51.6	+49.5	48.2	5 31.6	+50.0	48.2	6 11.6	+50.3	48.3	6 51.4	+50.8	48.4	30
31	2 58.9	+47.7	47.4	3 39.5	+48.2	47.4	4 20.1	+48.6	47.5	5 00.7	+49.0	47.5	5 41.1	+49.5	47.6	6 21.6	+49.9	47.7	7 01.9	+50.4	47.7	7 42.2	+50.8	47.9	31
32	3 46.6	+47.6	46.8	4 27.7	+48.1	46.8	5 08.7	+48.6	46.9	5 49.7	+49.0	46.9	6 30.6	+49.5	47.0	7 11.5	+49.9	47.1	7 52.3	+50.3	47.2	8 33.0	+50.7	47.3	32
33	4 34.2	+47.6	46.2	5 15.8	+48.0	46.2	5 57.3	+48.5	46.3	6 38.7	+49.0	46.4	7 20.1	+49.4	46.5	8 01.4	+49.8	46.6	8 42.6	+50.2	46.7	9 23.7	+50.7	46.8	33
34	5 21.8	+47.6	45.5	6 03.8	+48.1	45.6	6 45.8	+48.5	45.8	7 27.7	+48.9	45.8	8 09.5	+49.3	45.9	8 51.2	+49.8	46.1	9 32.8	+50.2	46.1	10 14.4	+50.6	46.2	34
35	6 09.4	+47.6	44.9	6 51.9	+48.0	45.0	7 34.3	+48.4	45.1	8 16.6	+48.8	45.2	8 58.8	+49.3	45.3	9 41.0	+49.7	45.4	10 23.0	+50.1	45.5	11 05.0	+50.5	45.7	35
36	6 57.0	+47.5	44.3	7 39.9	+47.9	44.4	8 22.7	+48.4	44.5	9 05.4	+48.9	44.6	9 48.1	+49.3	44.7	10 30.7	+49.7	44.9	11 13.2	+50.1	45.0	11 55.6	+50.5	45.1	36
37	7 44.5	+47.4	43.7	8 27.8	+47.9	43.8	9 11.1	+48.3	43.9	9 54.3	+48.7	44.0	10 37.4	+49.1	44.1	11 20.4	+49.6	44.3	12 03.3	+50.0	44.4	12 46.1	+50.4	44.6	37
38	8 31.9	+47.4	43.1	9 15.7	+47.8	43.2	9 59.4	+48.2	43.3	10 43.0	+48.7	43.4	11 26.5	+49.1	43.6	12 10.0	+49.5	43.7	12 53.3	+49.9	43.8	13 36.5	+50.3	44.0	38
39	9 19.3	+47.3	42.5	10 03.5	+47.8	42.6	10 47.6	+48.2	42.7	11 31.7	+48.6	42.8	12 15.6	+49.1	43.0	12 59.5	+49.4	43.1	13 43.2	+49.9	43.3	14 26.8	+50.3	43.5	39
40	10 06.6	+47.2	41.8	10 51.3	+47.6	42.0	11 35.8	+48.1	42.1	12 20.3	+48.5	42.2	13 04.7	+48.9	42.4	13 48.9	+49.4	42.5	14 33.1	+49.8	42.7	15 17.1	+50.2	42.9	40
41	10 53.8	+47.2	41.2	11 38.9	+47.6	41.3	12 23.9	+48.1	41.5	13 08.8	+48.5	41.6	13 53.6	+48.9	41.8	14 38.3	+49.2	42.0	15 22.9	+49.6	42.1	16 07.3	+50.1	42.3	41
42	11 41.0	+47.1	40.6	12 26.5	+47.5	40.7	13 12.0	+47.9	40.9	13 57.3	+48.3	41.0	14 42.5	+48.8	41.2	15 27.6	+49.2	41.4	16 12.5	+49.6	41.6	16 57.4	+50.0	41.8	42
43	12 28.1	+47.0	39.9	13 14.0	+47.5	40.0	13 59.9	+47.8	40.2	14 45.6	+48.3	40.4	15 31.3	+48.6	40.6	16 16.8	+49.0	40.8	17 02.1	+49.5	41.0	17 47.4	+49.8	41.2	43
44	13 15.1	+46.9	39.3	14 01.5	+47.3	39.5	14 47.7	+47.3	39.6	15 33.9	+48.1	39.8	16 19.9	+48.6	40.0	17 05.8	+49.0	40.2	17 51.6	+49.4	40.4	18 37.2	+49.8	40.6	44
45	14 02.0	+46.8	38.7	14 48.8	+47.2	38.8	15 35.5	+47.6	39.0	16 22.0	+48.1	39.2	17 08.5	+48.4	39.4	17 54.8	+48.9	39.6	18 41.0	+49.3	39.8	19 27.0	+49.7	40.0	45
46	14 48.8	+46.7	38.0	15 36.0	+47.1	38.2	16 23.1	+47.5	38.4	17 10.1	+47.9	38.6	17 56.9	+48.4	38.7	18 43.7	+48.7	39.0	19 30.3	+49.1	39.2	20 16.7	+49.5	39.4	46
47	15 35.5	+46.5	37.4	16 23.1	+47.0	37.5	17 10.6	+47.4	37.7	17 58.0	+47.7	37.9	18 45.3	+48.1	38.1	19 32.4	+48.5	38.3	20 19.4	+49.0	38.5	21 06.2	+49.3	38.8	47
48	16 22.0	+46.5	36.7	17 10.1	+46.8	36.9	17 58.0	+47.3	37.1	18 45.8	+47.7	37.3	19 33.5	+48.1	37.5	20 21.0	+48.5	37.7	21 08.4	+48.9	37.9	21 55.6	+49.3	38.2	48
49	17 08.5	+46.3	36.1	17 56.9	+46.8	36.2	18 45.3	+47.1	36.4	19 33.5	+47.5	36.6	20 21.6	+47.9	36.9	21 09.5	+48.3	37.1	21 57.3	+48.7	37.3	22 44.9	+49.2	37.6	49
50	17 54.8	+46.2	35.4	18 43.7	+46.6	35.8	19 32.4	+47.0	36.0	20 21.0	+47.2	36.0	21 09.5	+47.8	36.2	21 57.8	+48.1	36.4	22 46.0	+48.6	36.6	23 34.1	+48.9	36.9	50
51	18 41.0	+46.0	34.7	19 30.3	+46.4	34.9	20 19.4	+46.8	35.1	21 08.4	+47.2	35.3	21 57.3	+47.6	35.6	22 46.0	+48.1	35.8	23 34.6	+48.3	36.1	24 23.0	+48.9	36.3	51
52	19 27.0	+45.9	34.0	20 16.7	+46.3	34.2	21 06.2	+46.7	34.4	21 55.6	+47.1	34.7	22 44.9	+47.5	34.9	23 34.1	+47.8	35.2	24 22.9	+48.4	35.4	25 11.9	+48.6	35.7	52
53	20 12.9	+45.7	33.3	21 03.0	+46.1	33.6	21 52.9	+46.5	33.8	22 42.7	+46.9	34.0	23 32.4	+47.2	34.2	24 21.9	+47.7	34.5	25 11.3	+48.1	34.7	26 00.5	+48.5	35.0	53
54	20 58.6	+45.6	32.7	21 49.1	+45.9	32.9	22 39.4	+46.4	33.3	23 29.6	+46.8	33.3	24 19.7	+47.1	33.6	25 09.6	+47.5	33.8	25 59.4	+47.9	34.1	26 49.0	+48.3	34.4	54
55	21 44.2	+45.4	32.0	22 35.0	+45.8	32.2	23 25.8	+46.1	32.4	24 16.4	+46.5	32.6	25 06.8	+46.9	32.9	25 57.1	+47.3	33.1	26 47.3	+47.7	33.4	27 37.3	+48.1	33.7	55
56	22 29.6	+45.2	31.3	23 20.8	+45.6	31.5	24 11.9	+46.0	31.7	25 02.9	+46.3	31.9	25 53.7	+46.6	32.2	26 44.4	+47.2	32.5	27 35.0	+47.5	32.8	28 25.4	+47.9	33.0	56
57	23 14.8	+45.0	30.5	24 06.4	+45.3	30.8	24 57.9	+45.7	31.0	25 49.2	+46.2	31.2	26 40.5	+46.5	31.5	27 31.6	+46.9	31.8	28 22.5	+47.3	32.0	29 13.3	+47.7	32.3	57
58	23 59.8	+44.7	29.8	24 51.8	+45.1	30.0	25 43.6	+45.6	30.3	26 35.4	+45.9	30.5	27 27.0	+46.3	30.8	28 18.5	+46.7	31.1	29 09.8	+47.1	31.3	30 01.0	+47.4	31.6	58
59	24 44.5	+44.6	29.1	25 36.9	+44.7	29.3	26 29.2	+45.3	29.6	27 21.3	+45.7	29.8	28 13.3	+46.1	30.1	29 05.2	+46.6	30.3	29 56.9	+46.8	30.5	30 48.4	+47.2	30.9	59
60	25 29.1	+44.4	28.3	26 21.9	+44.7	28.6	27 14.5	+45.1	28.9	28 07.0	+45.5	29.1	28 59.4	+45.8	29.3	29 51.6	+46.2	29.6	30 43.7	+46.6	29.9	31 35.6	+47.0	30.2	60
61	26 13.5	+44.1	27.6	27 06.6	+44.5	27.8	27 59.6	+44.8	28.1	28 52.5	+45.2	28.3	29 45.2	+45.6	28.6	30 37.8	+46.0	28.9	31 30.3	+46.3	29.2	32 22.6	+46.7	29.5	61
62	26 57.6	+43.8	26.8	27 51.1	+44.2	27.1	28 44.4	+44.6	27.3	29 37.7	+44.9	27.6	30 30.8	+45.3	27.8	31 23.8	+45.7	28.1	32 16.6	+46.1	28.4	33 09.3	+46.4	28.7	62
63	27 41.4	+43.7	26.1	28 35.3	+44.0	26.3	29 29.0	+44.3	26.6	30 22.6	+44.7	26.8	31 16.1	+45.1	27.1	32 09.5	+45.4	27.4	33 02.7	+45.8	27.7	33 55.7	+46.2	28.0	63
64	28 25.1	+43.3	25.3	29 19.3	+43.6	25.5	30 13.3	+44.1	25.8	31 07.3	+44.4	26.0	32 01.2	+44.7	26.3	32 54.9	+45.1	26.6	33 48.5	+45.4	26.9	34 41.9	+45.9	27.2	64
65	29 08.4	+43.1	24.5	30 02.9	+43.4	24.7	30 57.4	+43.7	25.0	31 51.7	+44.1	25.2	32 45.9	+44.5	25.5	33 40.0	+44.8	25.8	34 33.9	+45.2	26.1	35 27.8	+45.5	26.4	65
66	29 51.5	+42.7	23.7	30 46.3	+43.1	23.9	31 41.1	+43.5	24.2	32 35.8	+43.8	24.4	33 30.4	+44.1	24.7	34 24.8	+44.5	25.0	35 19.1	+44.9	25.3	36 13.3	+45.2	25.6	66
67	30 34.2	+42.5	22.9	31 29.4	+42.8	23.1	32 24.6	+43.1	23.4	33 19.6	+43.5	23.6	34 14.5	+43.8	23.9	35 09.3	+44.2	24.2	36 04.0	+44.5	24.5	36 58.5	+44.9	24.8	67
68	31 16.7	+42.1	22.1	32 12.2	+42.5	22.3	33 07.7	+42.8	22.5	34 03.1	+43.1	22.8	34 58.3	+43.5	23.1	35 53.5	+43.8	23.4	36 48.5	+44.1	23.7	37 43.4	+44.5	24.0	68
69	31 58.8	+41.8	21.2	32 54.7	+42.1	21.5	33 50.5	+42.4	21.7	34 46.2	+42.8	22.0	35 41.8	+43.1	22.2	36 37.3	+43.4	22.5	37 32.6	+43.8	22.8	38 27.9	+44.1	23.1	69
70	32 40.6	+41.5	20.4	33 36.8	+41.8	20.6	34 32.9	+42.1	20.9	35 29.0	+42.4	21.1	36 24.9	+42.7	21.4	37 20.7	+43.1	21.6	38 16.4	+43.4	21.9	39 12.0	+43.8	22.2	70
71	33 22.1	+41.1	19.5	34 18.6	+41.4	19.7	35 15.0	+41.7	20.0	36 11.4	+42.0	20.2	37 07.6	+42.4	20.5	38 03.8	+42.6	20.8	38 59.8	+43.0	21.0	39 55.8	+43.3	21.3	71
72	34 03.2	+40.7	18.6	35 00.0	+41.0	18.8	35 56.7	+41.3	19.1	36 53.4	+41.6	19.3	37 50.0	+41.9	19.6	38 46.4	+42.3	19.9	39 42.8	+42.6	20.1	40 39.1	+42.9	20.4	72
73	34 43.9	+40.3	17.8	35 41.0	+40.6	18.0	36 38.0	+40.9	18.2	37 35.0	+41.2	18.4	38 31.9	+41.5	18.7	39 28.7	+41.8	18.9	40 25.4	+42.1	19.2	41 22.0	+42.4	19.5	73
74	35 24.2	+39.9	16.9	36 21.6	+40.2	17.1	37 18.9	+40.5	17.3	38 16.2	+40.7	17.5	39 13.4	+41.0	17.8	40 10.5	+41.3	18.0	41 07.5	+41.6	18.3	42 04.4	+42.0	18.6	74
75	36 04.1	+39.5	15.9	37 01.8	+39.7	16.1	37 59.4	+40.0	16.3	38 56.9	+40.3	16.6	39 54.4	+40.6	16.8	40 51.8	+40.9	17.1	41 49.1	+41.2	17.3	42 46.4	+41.4	17.6	75
76	36 43.6	+39.0	15.0	37 41.5	+39.3	15.2	38 39.4	+39.5	15.4	39 37.2	+39.8	15.6	40 35.0	+40.0	15.8	41 32.7	+40.3	16.1	42 30.3	+40.6	16.3	43 27.8	+40.9	16.6	76
77	37 22.6	+38.6	14.0	38 20.8	+38.8	14.2	39 18.9	+39.1	14.4	40 17.0	+39.3	14.6	41 15.0	+39.6	14.9	42 13.0	+39.8	15.1	43 10.9	+40.1	15.3	44 08.7	+40.4	15.6	77
78	38 01.2	+38.1	13.1	38 59.6	+38.3	13.3	39 58.0	+38.5	13.4	40 56.3	+38.8	13.6	41 54.6	+39.0	13.9	42 52.8	+39.3	14.1	43 51.0	+39.5	14.3	44 49.1	+39.8	14.5	78
79	38 39.3	+37.6	12.1	39 37.9	+37.8	12.3	40 36.5	+38.1	12.4	41 35.1	+38.2	12.6	42 33.6	+38.5	12.8	43 32.1	+38.7	13.0	44 30.5	+39.0	13.3	45 28.9	+39.2	13.5	79
80	39 16.9	+37.0	11.1	40 15.7	+37.3	11.2	41 14.6	+37.4	11.4	42 13.3	+37.7	11.6	43 12.1	+37.9	11.8	44 10.8	+38.1	12.0	45 09.5	+38.3	12.2	46 08.1	+38.6	12.4	80
81	39 53.9	+36.5	10.1	40 53.0	+36.7	10.2	41 52.0	+36.9	10.4	42 51.0	+37.1	10.5	43 50.0	+37.3	10.7	44 48.9	+37.5	10.9	45 47.8	+37.7	11.1	46 46.7	+37.9	11.3	81
82	40 30.4	+36.0	9.0	41 29.7	+36.1	9.2	42 28.9	+36.3	9.3	43 28.1	+36.4	9.5	44 27.3	+36.6	9.6	45 26.4	+36.8	9.8	46 25.5	+37.0	10.0	47 24.6	+37.2	10.2	82
83	41 06.4	+35.3	8.0	42 05.8	+35.5	8.1	43 05.2	+35.6	8.2	44 04.5	+35.8	8.4	45 03.9	+35.9	8.5	46 03.2	+36.1	8.7	47 02.5	+36.3	8.8	48 01.8	+36.5	9.0	83
84	41 41.7	+34.7	7.0	42 41.3	+34.8	7.0	43 40.8	+35.0	7.1	44 40.3	+35.2	7.2	45 39.8	+35.3	7.4	46 39.3	+35.6	7.5	47 38.8	+35.6	7.6	48 38.3	+35.7	7.8	84
85	42 16.4	+34.1	5.8	43 16.1	+34.2	5.9	44 15.8	+34.3	6.0	45 15.5	+34.4	6.1	46 15.1	+34.6	6.2	47 14.8	+34.6	6.3	48 14.4	+34.8	6.4	49 14.0	+34.9	6.6	85
86	42 50.5	+33.5	4.7	43 50.3	+33.5	4.8	44 50.1	+33.6	4.8	45 49.9	+33.7	4.9	46 49.7	+33.8	5.0	47 49.4	+33.9	5.1	48 49.2	+34.0	5.2	49 48.9	+34.1	5.3	86
87	43 24.0	+32.7	3.6	44 23.8	+32.8	3.7	45 23.7	+32.9	3.7	46 23.6	+32.9	3.7	47 23.5	+33.0	3.8	48 23.3	+33.1	3.8	49 23.2	+33.1	3.9	50 23.0	+33.3	4.0	87
88	43 56.7	+32.0	2.4	44 56.6	+32.1	2.4	45 56.6	+32.1	2.5	46 56.5	+32.2	2.5	47 56.5	+32.2	2.6	48 56.4	+32.2	2.6	49 56.3	+32.3	2.7	50 56.3	+32.3	2.7	88
89	44 28.7	+31.3	1.2	45 28.7	+31.3	1.2	46 28.7	+31.3	1.2	47 28.7	+31.3	1.3	48 28.7	+31.3	1.3	49 28.6	+31.4	1.3	50 28.6	+31.4	1.3	51 28.6	+31.4	1.4	89
90	45 00.0	+30.5	0.0	46 00.0	+30.5	0.0	47 00.0	+30.5	0.0	48 00.0	+30.5	0.0	49 00.0	+30.5	0.0	50 00.0	+30.4	0.0	51 00.0	+30.4	0.0	52 00.0	+30.4	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z ; L.H.A. less than 180° ....Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 121°, 239°**

121

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	20 42.3	+45.3	112.2	20 19.4	+46.0	112.6	19 56.3	+46.6	112.9	19 32.8	+47.2	113.2	19 09.0	+47.8	113.5	18 44.8	+48.5	113.9	18 20.4	+49.1	114.2	17 55.7	+49.7	114.5	0
1	21 27.6	+45.0	111.5	21 05.4	+45.8	111.9	20 42.9	+46.4	112.2	20 20.0	+47.1	112.6	19 56.8	+47.8	112.9	19 33.3	+48.4	113.2	19 09.5	+48.9	113.6	18 45.4	+49.5	113.9	1
2	22 12.6	+45.0	110.8	21 51.2	+45.6	111.2	21 29.3	+46.3	111.5	21 07.1	+46.9	111.9	20 44.6	+47.5	112.3	20 21.7	+48.2	112.6	19 58.4	+48.8	112.9	19 34.9	+49.4	113.3	2
3	22 57.6	+44.7	110.1	22 36.8	+45.4	110.5	22 15.6	+46.1	110.9	21 54.0	+46.8	111.2	21 32.1	+47.5	111.6	21 09.9	+48.0	112.0	20 47.2	+48.7	112.3	20 24.3	+49.3	112.7	3
4	23 42.3	+44.5	109.3	23 22.2	+45.2	109.8	23 01.7	+45.9	110.2	22 40.8	+46.6	110.6	22 19.6	+47.2	110.9	21 57.9	+47.9	111.3	21 35.9	+48.6	111.7	21 13.6	+49.1	112.1	4
5	24 26.8	+44.3	108.6	24 07.4	+45.0	109.0	23 47.6	+45.7	109.5	23 27.4	+46.4	109.9	23 06.8	+47.1	110.3	22 45.8	+47.8	110.7	22 24.5	+48.4	111.1	22 02.7	+49.0	111.4	5
6	25 11.1	+44.0	107.9	24 52.4	+44.8	108.3	24 33.3	+45.6	108.8	24 13.8	+46.3	109.2	23 53.9	+46.9	109.6	23 33.6	+47.6	110.0	23 12.9	+48.2	110.4	22 51.7	+48.9	110.8	6
7	25 55.1	+43.8	107.1	25 37.2	+44.6	107.6	25 18.9	+45.3	108.0	25 00.1	+46.0	108.5	24 40.8	+46.8	108.9	24 21.2	+47.3	109.3	24 01.1	+48.1	109.8	23 40.6	+48.7	110.2	7
8	26 38.9	+43.6	106.4	26 21.8	+44.3	106.8	26 04.2	+45.1	107.3	25 46.1	+45.8	107.8	25 27.6	+46.5	108.2	25 08.6	+47.2	108.7	24 49.2	+47.8	109.1	24 29.3	+48.5	109.5	8
9	27 22.5	+43.3	105.6	27 06.1	+44.1	106.1	26 49.3	+44.8	106.6	26 31.9	+45.6	107.0	26 14.1	+46.3	107.5	25 55.8	+47.0	108.0	25 37.0	+47.7	108.4	25 17.8	+48.4	108.9	9
10	28 05.8	+43.1	104.8	27 50.2	+43.9	105.3	27 34.1	+44.7	105.8	27 17.5	+45.4	106.3	27 00.4	+46.1	106.8	26 42.8	+46.8	107.3	26 24.7	+47.6	107.8	26 06.2	+48.2	108.2	10
11	28 48.9	+42.8	104.0	28 34.1	+43.6	104.5	28 18.8	+44.3	105.1	28 02.9	+45.1	105.6	27 46.5	+45.9	106.1	27 29.6	+46.7	106.6	27 12.3	+47.3	107.1	26 54.4	+48.0	107.6	11
12	29 31.7	+42.4	103.2	29 17.7	+43.3	103.8	29 03.1	+44.1	104.3	28 48.0	+44.9	104.8	28 32.4	+45.6	105.4	28 16.3	+46.3	105.9	27 59.6	+47.1	106.4	27 42.4	+47.8	106.9	12
13	30 14.1	+42.2	102.4	30 01.0	+43.0	103.0	29 47.2	+43.8	103.5	29 32.9	+44.6	104.1	29 18.0	+45.4	104.6	29 02.6	+46.2	105.2	28 46.7	+46.9	105.7	28 30.2	+47.6	106.2	13
14	30 56.3	+41.9	101.6	30 44.0	+42.7	102.2	30 31.0	+43.6	102.7	30 17.5	+44.4	103.3	30 03.4	+45.2	103.9	29 48.8	+45.9	104.4	29 33.6	+46.6	105.0	29 17.8	+47.3	105.5	14
15	31 38.2	+41.5	100.7	31 26.7	+42.4	101.3	31 14.6	+43.2	101.9	31 01.9	+44.0	102.5	30 48.6	+44.8	103.1	30 34.7	+45.6	103.7	30 20.2	+46.4	104.3	30 05.1	+47.2	104.8	15
16	32 19.7	+41.1	99.9	32 09.1	+42.0	100.5	31 58.1	+42.9	101.1	31 45.9	+43.6	101.7	31 33.4	+44.6	102.3	31 20.3	+45.4	102.9	31 06.6	+46.1	103.5	30 52.3	+46.9	104.1	16
17	33 00.8	+40.8	99.0	32 51.1	+41.7	99.7	32 40.7	+42.6	100.3	32 29.7	+43.4	100.9	32 18.0	+44.3	101.5	32 05.7	+45.1	102.2	31 52.7	+45.9	102.8	31 39.2	+46.6	103.4	17
18	33 41.6	+40.5	98.1	33 32.8	+41.3	98.8	33 23.3	+42.2	99.4	33 13.1	+43.1	100.1	33 02.3	+43.9	100.7	32 50.8	+44.8	101.4	32 38.6	+45.6	102.0	32 25.8	+46.4	102.6	18
19	34 22.1	+40.0	97.2	34 14.1	+41.0	97.9	34 05.5	+41.9	98.6	33 56.2	+42.8	99.3	33 46.2	+43.7	99.9	33 35.6	+44.4	100.6	33 24.2	+45.3	101.2	33 12.2	+46.1	101.9	19
20	35 02.1	+39.6	96.3	34 55.1	+40.6	97.0	34 47.4	+41.5	97.7	34 39.0	+42.4	98.4	34 29.9	+43.3	99.1	34 20.0	+44.2	99.8	34 09.5	+45.0	100.4	33 58.3	+45.8	101.1	20
21	35 41.7	+39.2	95.4	35 35.7	+40.1	96.1	35 28.9	+41.1	96.8	35 21.4	+42.0	97.5	35 13.2	+42.9	98.2	35 04.2	+43.8	98.9	34 54.5	+44.7	99.6	34 44.1	+45.5	100.3	21
22	36 20.9	+38.8	94.5	36 15.8	+39.8	95.2	36 10.0	+40.7	95.9	36 03.4	+41.7	96.7	35 56.1	+42.5	97.4	35 48.0	+43.5	98.1	35 39.2	+44.3	98.8	35 29.6	+45.2	99.5	22
23	36 59.7	+38.2	93.5	36 55.6	+39.3	94.3	36 50.7	+40.3	95.0	36 45.1	+41.2	95.8	36 38.6	+42.2	96.5	36 31.5	+43.0	97.3	36 23.5	+44.0	98.0	36 14.8	+44.8	98.7	23
24	37 37.9	+37.8	92.6	37 34.9	+38.8	93.3	37 31.0	+39.8	94.1	37 26.3	+40.8	94.9	37 20.8	+41.8	95.6	37 14.5	+42.7	96.4	37 07.5	+43.6	97.1	36 59.6	+44.5	97.9	24
25	38 15.7	+37.3	91.6	38 13.7	+38.3	92.4	38 10.8	+39.4	93.1	38 07.1	+40.3	93.9	38 02.6	+41.3	94.7	37 57.2	+42.3	95.5	37 51.1	+43.2	96.3	37 44.1	+44.2	97.0	25
26	38 53.0	+36.8	90.6	38 52.0	+37.9	91.4	38 50.2	+38.8	92.2	38 47.4	+39.9	93.0	38 43.9	+40.9	93.8	38 39.5	+41.9	94.6	38 34.3	+42.8	95.4	38 28.3	+43.7	96.2	26
27	39 29.8	+36.3	89.6	39 29.9	+37.3	90.4	39 29.0	+38.4	91.2	39 27.3	+39.4	92.0	39 24.8	+40.4	92.8	39 21.4	+41.4	93.7	39 17.1	+42.4	94.5	39 12.0	+43.3	95.3	27
28	40 06.1	+35.6	88.5	40 07.2	+36.7	89.4	40 07.4	+37.8	90.2	40 06.7	+38.9	91.0	40 05.2	+39.9	91.9	40 02.8	+40.9	92.7	39 59.5	+41.9	93.6	39 55.3	+42.9	94.4	28
29	40 41.7	+35.1	87.5	40 43.9	+36.2	88.3	40 45.2	+37.3	89.2	40 45.6	+38.4	90.0	40 45.1	+39.4	90.9	40 43.7	+40.5	91.8	40 41.4	+41.5	92.6	40 38.2	+42.5	93.5	29
30	41 16.8	+34.5	86.4	41 20.1	+35.6	87.3	41 22.5	+36.7	88.1	41 24.0	+37.8	89.0	41 24.6	+38.9	89.9	41 24.2	+40.0	90.8	41 22.9	+41.0	91.7	41 20.7	+42.0	92.5	30
31	41 51.3	+33.8	85.3	41 55.7	+35.0	86.2	41 59.2	+36.2	87.1	42 01.8	+37.3	88.0	42 03.5	+38.3	88.9	42 04.2	+39.4	89.8	42 03.9	+40.5	90.7	42 02.7	+41.5	91.6	31
32	42 25.1	+33.2	84.2	42 30.7	+34.4	85.1	42 35.4	+35.5	86.0	42 39.1	+36.6	86.9	42 41.8	+37.7	87.8	42 43.6	+38.9	88.8	42 44.4	+39.9	89.7	42 44.2	+41.0	90.6	32
33	42 58.3	+32.5	83.0	43 05.1	+33.7	84.0	43 10.9	+34.8	84.9	43 15.7	+36.0	85.8	43 19.6	+37.1	86.8	43 22.5	+38.2	87.7	43 24.3	+39.4	88.7	43 25.2	+40.5	89.6	33
34	43 30.8	+31.8	81.9	43 38.8	+32.9	82.8	43 45.7	+34.2	83.8	43 51.7	+35.4	84.7	43 56.7	+36.6	85.7	44 00.7	+37.7	86.7	44 03.7	+38.8	87.6	44 05.7	+39.9	88.6	34
35	44 02.6	+31.0	80.7	44 11.7	+32.3	81.7	44 19.9	+33.5	82.6	44 27.1	+34.7	83.6	44 33.3	+35.9	84.6	44 38.4	+37.1	85.6	44 42.5	+38.2	86.6	44 45.6	+39.4	87.5	35
36	44 33.6	+30.3	79.5	44 44.0	+31.6	80.5	44 53.4	+32.8	81.5	45 01.8	+34.0	82.5	45 09.2	+35.2	83.5	45 15.5	+36.4	84.5	45 20.7	+37.6	85.5	45 25.0	+38.7	86.5	36
37	45 03.9	+29.5	78.3	45 15.6	+30.7	79.3	45 26.2	+32.0	80.3	45 35.8	+33.3	81.3	45 44.4	+34.4	82.3	45 51.9	+35.7	83.3	45 58.3	+36.9	84.4	46 03.7	+38.0	85.4	37
38	45 33.4	+28.7	77.1	45 46.3	+30.0	78.1	45 58.2	+31.2	79.1	46 09.1	+32.4	80.1	46 18.8	+33.8	81.1	46 27.6	+34.9	82.2	46 35.2	+36.2	83.2	46 41.7	+37.4	84.3	38
39	46 02.1	+27.8	75.8	46 16.3	+29.1	76.8	46 29.4	+30.5	77.8	46 41.5	+31.7	78.9	46 52.6	+33.0	79.9	47 02.5	+34.3	81.0	47 11.4	+35.5	82.0	47 19.1	+36.7	83.1	39
40	46 29.9	+27.0	74.5	46 45.4	+28.3	75.5	46 59.9	+29.5	76.6	47 13.2	+30.9	77.6	47 25.6	+32.1	78.7	47 36.8	+33.4	79.8	47 46.9	+34.7	80.9	47 55.8	+36.0	81.9	40
41	46 56.9	+26.0	73.2	47 13.7	+27.4	74.3	47 29.4	+28.7	75.3	47 44.1	+30.0	76.4	47 57.7	+31.4	77.4	48 10.2	+32.6	78.5	48 21.6	+33.9	79.6	48 31.8	+35.2	80.7	41
42	47 22.9	+25.2	71.9	47 41.1	+26.4	72.9	47 58.1	+27.8	74.0	48 14.1	+29.2	75.1	48 29.1	+30.4	76.2	48 42.8	+31.8	77.3	48 55.5	+33.1	78.4	49 07.0	+34.4	79.5	42
43	47 48.1	+24.1	70.5	48 07.5	+25.5	71.6	48 25.9	+26.9	72.7	48 43.3	+28.2	73.8	48 59.5	+29.6	74.9	49 14.6	+30.9	76.0	49 28.6	+32.2	77.1	49 41.4	+33.6	78.3	43
44	48 12.2	+23.2	69.2	48 33.0	+24.6	70.2	48 52.8	+25.9	71.3	49 11.5	+27.2	72.4	49 29.1	+28.6	73.5	49 45.5	+30.0	74.7	50 00.8	+31.4	75.8	50 15.0	+32.6	77.0	44
45	48 35.4	+22.2	67.8	48 57.6	+23.5	68.9	49 18.7	+24.9	69.9	49 38.7	+26.3	71.0	49 57.7	+27.6	72.2	50 15.5	+29.0	73.3	50 32.2	+30.4	74.5	50 47.6	+31.8	75.6	45
46	48 57.6	+21.1	66.4	49 21.1	+22.5	67.4	49 43.6	+23.9	68.5	50 05.0	+25.3	69.6	50 25.3	+26.7	70.8	50 44.5	+28.1	71.9	51 02.6	+29.4	73.1	51 19.4	+30.8	74.3	46
47	49 18.7	+20.0	65.0	49 43.6	+21.4	66.0	50 07.5	+22.8	67.1	50 30.3	+24.2	68.2	50 52.0	+25.6	69.4	51 12.6	+27.0	70.5	51 32.0	+28.4	71.7	51 50.2	+29.8	72.9	47
48	49 38.7	+19.0	63.5	50 05.0	+20.3	64.6	50 30.3	+21.7	65.7	50 54.5	+23.1	66.8	51 17.6	+24.5	67.9	51 39.6	+25.9	69.1	52 00.4	+27.4	70.3	52 20.0	+28.8	71.5	48
49	49 57.7	+17.8	62.0	50 25.3	+19.2	63.1	50 52.0	+20.6	64.2	51 17.6	+22.0	65.3	51 42.1	+23.4	66.5	52 05.5	+24.8	67.6	52 27.8	+26.2	68.8	52 48.8	+27.7	70.1	49
50	50 15.5	+16.7	60.5	50 44.5	+18.1	61.6	51 12.6	+19.4	62.7	51 39.6	+20.8	63.8	52 05.5	+22.3	65.0	52 30.3	+23.7	66.1	52 54.0	+25.2	67.3	53 16.5	+26.6	68.6	50
51	50 32.2	+15.4	59.0	51 02.6	+16.8	60.1	51 32.0	+18.2	61.2	52 00.4	+19.6	62.3	52 27.8	+21.0	63.4	52 54.0	+22.5	64.6	53 19.2	+23.9	65.8	53 43.1	+25.5	67.1	51
52	50 47.6	+14.3	57.5	51 19.4	+15.6	58.6	51 50.2	+17.0	59.6	52 20.0	+18.5	60.8	52 48.8	+19.9	61.9	53 16.5	+21.3	63.1	53 43.1	+22.8	64.3	54 08.6	+24.2	65.5	52
53	51 01.9	+13.0	56.0	51 35.0	+14.4	57.0	52 07.2	+15.8	58.1	52 38.5	+17.1	59.2	53 08.7	+18.6	60.3	53 37.8	+20.1	61.5	54 05.9	+21.5	62.7	54 32.8	+23.0	64.0	53
54	51 14.9	+11.8	54.4	51 49.4	+13.2	55.4	52 23.0	+14.5	56.5	52 55.6	+15.9	57.6	53 27.3	+17.3	58.7	53 57.9	+18.7	59.9	54 27.4	+20.2	61.1	54 55.8	+21.7	62.4	54
55	51 26.7	+10.6	52.8	52 02.6	+11.8	53.9	52 37.5	+13.2	54.9	53 11.5	+14.6	56.0	53 44.6	+16.0	57.1	54 16.6	+17.5	58.3	54 47.6	+18.9	59.5	55 17.5	+20.4	60.7	55
56	51 37.3	+9.2	51.3	52 14.4	+10.5	52.3	52 50.7	+11.9	53.3	53 26.1	+13.2	54.4	54 00.6	+14.6	55.5	54 34.1	+16.0	56.7	55 06.5	+17.6	57.8	55 37.9	+19.0	59.1	56
57	51 46.5	+7.9	49.7	52 24.9	+9.3	50.7	53 02.6	+10.5	51.7	53 39.3	+11.9	52.7	54 15.2	+13.3	53.8	54 50.1	+14.7	55.0	55 24.1	+16.1	56.2	55 56.9	+17.6	57.4	57
58	51 54.4	+6.7	48.1	52 34.2	+7.9	49.0	53 13.1	+9.2	50.0	53 51.2	+10.5	51.1	54 28.5	+11.8	52.2	55 04.8	+13.3	53.3	55 40.2	+14.7	54.5	56 14.5	+16.2	55.7	58
59	52 01.1	+5.3	46.4	52 42.1	+6.5	47.4	53 22.3	+7.8	48.4	54 01.7	+9.1	49.4	54 40.3	+10.5	50.5	55 18.1	+11.8	51.6	55 54.9	+13.2	52.7	56 30.7	+14.7	53.9	59
60	52 06.4	+3.9	44.8	52 48.6	+5.1	45.8	53 30.1	+6.4	46.7	54 10.8	+7.7	47.7	54 50.8	+9.0	48.8	55 29.9	+10.4	49.9	56 08.1	+11.8	51.0	56 45.4	+13.2	52.2	60
61	52 10.3	+2.6	43.2	52 53.7	+3.8	44.1	53 36.5	+5.0	45.0	54 18.5	+6.2	46.0	54 59.8	+7.5	47.0	55 40.3	+8.8	48.1	56 19.9	+10.2	49.2	56 58.6	+11.6	50.4	61
62	52 12.9	+1.3	41.6	52 57.5	+2.4	42.4	53 41.5	+3.5	43.4	54 24.7	+4.8	44.3	55 07.3	+6.1	45.3	55 49.1	+7.4	46.4	56 30.1	+8.7	47.4	57 10.2	+10.1	48.6	62
63	52 14.2	−0.1	39.9	52 59.9	+1.0	40.8	53 45.0	+2.2	41.7	54 29.5	+3.4	42.6	55 13.4	+4.5	43.6	55 56.5	+5.8	44.6	56 38.8	+7.1	45.7	57 20.3	+8.5	46.8	63
64	52 14.1	−1.4	38.3	53 00.9	−0.4	39.1	53 47.2	+0.7	40.0	54 32.9	+1.8	40.9	55 17.9	+3.0	41.8	56 02.3	+4.2	42.8	56 45.9	+5.6	43.8	57 28.8	+6.9	44.9	64
65	52 12.7	−2.8	36.7	53 00.5	−1.7	37.5	53 47.9	−0.7	38.3	54 34.7	+0.4	39.2	55 20.9	+1.6	40.1	56 06.5	+2.7	41.0	56 51.5	+3.9	42.0	57 35.7	+5.2	43.1	65
66	52 09.9	−4.1	35.0	52 58.8	−3.2	35.8	53 47.2	−2.1	36.6	54 35.1	−1.1	37.4	55 22.5	0.0	38.3	56 09.2	+1.2	39.2	56 55.4	+2.4	40.2	57 40.9	+3.6	41.2	66
67	52 05.8	−5.5	33.4	52 55.6	−4.5	34.1	53 45.1	−3.6	34.9	54 34.0	−2.5	35.7	55 22.5	−1.5	36.6	56 10.4	−0.4	37.4	56 57.8	+0.7	38.4	57 44.5	+1.9	39.3	67
68	52 00.3	−6.8	31.8	52 51.1	−5.9	32.5	53 41.5	−5.0	33.2	54 31.5	−4.1	34.0	55 21.0	−3.0	34.8	56 10.0	−2.0	35.6	56 58.5	−0.9	36.5	57 46.4	+0.3	37.5	68
69	51 53.5	−8.1	30.2	52 45.2	−7.3	30.8	53 36.5	−6.4	31.5	54 27.4	−5.4	32.3	55 18.0	−4.6	33.0	56 08.0	−3.5	33.8	56 57.6	−2.5	34.7	57 46.7	−1.4	35.6	69
70	51 45.4	−9.4	28.6	52 37.9	−8.6	29.2	53 30.1	−7.8	29.9	54 22.0	−7.0	30.6	55 13.4	−6.0	31.3	56 04.5	−5.1	32.1	56 55.1	−4.1	32.9	57 45.3	−3.1	33.7	70
71	51 36.0	−10.7	27.0	52 29.3	−10.0	27.6	53 22.3	−9.1	28.2	54 15.0	−8.3	28.9	55 07.4	−7.5	29.5	55 59.4	−6.6	30.3	56 51.0	−5.6	31.0	57 42.2	−4.7	31.9	71
72	51 25.3	−12.0	25.4	52 19.3	−11.2	26.0	53 13.2	−10.6	26.5	54 06.7	−9.8	27.2	54 59.9	−9.0	27.8	55 52.8	−8.1	28.5	56 45.4	−7.3	29.2	57 37.5	−6.3	30.0	72
73	51 13.3	−13.2	23.8	52 08.1	−12.6	24.4	53 02.6	−11.8	24.9	53 56.9	−11.1	25.5	54 50.9	−10.4	26.1	55 44.7	−9.7	26.7	56 38.1	−8.8	27.4	57 31.2	−8.0	28.1	73
74	51 00.1	−14.4	22.3	51 55.5	−13.8	22.8	52 50.8	−13.2	23.3	53 45.8	−12.6	23.8	54 40.5	−11.8	24.4	55 35.0	−11.1	25.0	56 29.3	−10.4	25.6	57 23.2	−9.5	26.3	74
75	50 45.7	−15.6	20.8	51 41.7	−15.1	21.2	52 37.6	−14.5	21.7	53 33.2	−13.9	22.2	54 28.7	−13.3	22.7	55 23.9	−12.5	23.2	56 18.9	−11.8	23.8	57 13.7	−11.1	24.5	75
76	50 30.1	−16.9	19.2	51 26.6	−16.3	19.6	52 23.1	−15.8	20.1	53 19.3	−15.2	20.5	54 15.4	−14.6	21.0	55 11.4	−14.1	21.5	56 07.1	−13.4	22.1	57 02.6	−12.7	22.7	76
77	50 13.2	−17.9	17.7	51 10.3	−17.5	18.1	52 07.3	−17.0	18.5	53 04.1	−16.5	18.9	54 00.8	−16.0	19.4	54 57.3	−15.4	19.8	55 53.7	−14.8	20.3	56 49.9	−14.2	20.9	77
78	49 55.3	−19.1	16.2	50 52.8	−18.6	16.6	51 50.3	−18.2	16.9	52 47.6	−17.7	17.3	53 44.8	−17.2	17.7	54 41.9	−16.8	18.2	55 38.9	−16.3	18.6	56 35.7	−15.7	19.1	78
79	49 36.2	−20.2	14.8	50 34.2	−19.8	15.1	51 32.1	−19.4	15.4	52 29.9	−19.0	15.7	53 27.6	−18.6	16.1	54 25.1	−18.1	16.5	55 22.6	−17.6	16.9	56 20.0	−17.2	17.3	79
80	49 16.0	−21.2	13.3	50 14.4	−21.0	13.6	51 12.7	−20.6	13.9	52 10.9	−20.3	14.2	53 09.0	−19.8	14.5	54 07.0	−19.4	14.9	55 05.0	−19.0	15.2	56 02.8	−18.6	15.6	80
81	48 54.8	−22.3	11.9	49 53.4	−22.0	12.1	50 52.1	−21.7	12.4	51 50.6	−21.3	12.7	52 49.2	−21.1	13.0	53 47.6	−20.7	13.3	54 46.0	−20.4	13.6	55 44.2	−19.9	13.9	81
82	48 32.5	−23.3	10.5	49 31.4	−23.0	10.7	50 30.4	−22.8	10.9	51 29.3	−22.6	11.2	52 28.1	−22.2	11.4	53 26.9	−21.9	11.7	54 25.6	−21.6	12.0	55 24.3	−21.3	12.3	82
83	48 09.2	−24.3	9.1	49 08.4	−24.1	9.3	50 07.6	−23.9	9.5	51 06.7	−23.6	9.7	52 05.9	−23.4	9.9	53 05.0	−23.2	10.1	54 04.0	−22.9	10.4	55 03.0	−22.6	10.6	83
84	47 44.9	−25.3	7.7	48 44.3	−25.1	7.9	49 43.7	−24.9	8.1	50 43.1	−24.7	8.2	51 42.5	−24.5	8.3	52 41.8	−24.3	8.6	53 41.1	−24.0	8.8	54 40.4	−23.8	9.0	84
85	47 19.6	−26.2	6.4	48 19.2	−26.0	6.5	49 18.8	−25.9	6.6	50 18.4	−25.7	6.8	51 18.0	−25.6	6.9	52 17.5	−25.4	7.1	53 17.1	−25.3	7.3	54 16.6	−25.1	7.4	85
86	46 53.4	−27.1	5.1	47 53.2	−27.0	5.2	48 52.9	−26.8	5.3	49 52.7	−26.8	5.4	50 52.4	−26.6	5.5	51 52.1	−26.5	5.6	52 51.8	−26.3	5.7	53 51.5	−26.2	5.9	86
87	46 26.3	−27.9	3.8	47 26.2	−27.9	3.8	48 26.1	−27.8	3.9	49 26.0	−27.7	4.0	50 25.8	−27.7	4.1	51 25.6	−27.5	4.2	52 25.5	−27.4	4.3	53 25.3	−27.4	4.4	87
88	45 58.4	−28.8	2.5	46 58.3	−28.7	2.5	47 58.3	−28.7	2.6	48 58.2	−28.6	2.6	49 58.1	−28.6	2.7	50 58.1	−28.6	2.8	51 58.0	−28.5	2.8	52 57.9	−28.4	2.9	88
89	45 29.6	−29.6	1.2	46 29.6	−29.6	1.3	47 29.6	−29.6	1.3	48 29.6	−29.6	1.3	49 29.5	−29.5	1.3	50 29.5	−29.5	1.4	51 29.5	−29.5	1.4	52 29.5	−29.5	1.4	89
90	45 00.0	−30.4	0.0	46 00.0	−30.4	0.0	47 00.0	−30.4	0.0	48 00.0	−30.4	0.0	49 00.0	−30.4	0.0	50 00.0	−30.5	0.0	51 00.0	−30.5	0.0	52 00.0	−30.5	0.0	90

LATITUDE **CONTRARY** NAME TO DECLINATION   **L.H.A. 60°, 300°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	20 42.3	−45.5	112.2	20 19.4	−46.1	112.6	19 56.3	−46.8	112.9	19 32.8	−47.4	113.2	19 09.0	−48.0	113.5	18 44.8	−48.6	113.9	18 20.4	−49.2	114.2	17 55.7	−49.7	114.5	0
1	19 56.8	−45.6	112.9	19 33.3	−46.2	113.2	19 09.5	−46.9	113.6	18 45.4	−47.5	113.9	18 21.0	−48.2	114.2	17 56.2	−48.7	114.5	17 31.2	−49.3	114.8	17 06.0	−49.9	115.0	1
2	19 11.2	−45.7	113.6	18 47.1	−46.4	113.9	18 22.6	−47.0	114.2	17 57.9	−47.7	114.5	17 32.8	−48.2	114.8	17 07.5	−48.8	115.1	16 41.9	−49.3	115.4	16 16.1	−49.9	115.6	2
3	18 25.5	−45.9	114.3	18 00.7	−46.6	114.6	17 35.6	−47.2	114.9	17 10.2	−47.7	115.2	16 44.6	−48.3	115.4	16 18.7	−48.9	115.7	15 52.6	−49.5	116.0	15 26.2	−50.0	116.2	3
4	17 39.6	−46.0	115.0	17 14.1	−46.6	115.2	16 48.4	−47.2	115.5	16 22.5	−47.9	115.8	15 56.2	−48.4	116.0	15 29.8	−49.1	116.3	15 03.1	−49.6	116.5	14 36.2	−50.2	116.8	4
5	16 53.6	−46.2	115.6	16 27.5	−46.8	115.9	16 01.2	−47.4	116.2	15 34.6	−48.0	116.4	15 07.8	−48.6	116.7	14 40.7	−49.1	116.9	14 13.5	−49.7	117.1	13 46.0	−50.1	117.3	5
6	16 07.4	−46.3	116.3	15 40.7	−46.9	116.5	15 13.8	−47.5	116.8	14 46.6	−48.1	117.0	14 19.2	−48.6	117.3	13 51.6	−49.2	117.5	13 23.8	−49.7	117.7	12 55.9	−50.3	117.9	6
7	15 21.1	−46.4	117.0	14 53.8	−47.0	117.2	14 26.3	−47.6	117.4	13 58.5	−48.1	117.7	13 30.6	−48.8	117.9	13 02.4	−49.3	118.1	12 34.1	−49.8	118.3	12 05.6	−50.3	118.5	7
8	14 34.7	−46.5	117.6	14 06.8	−47.1	117.8	13 38.7	−47.7	118.1	13 10.4	−48.3	118.3	12 41.8	−48.8	118.5	12 13.2	−49.4	118.7	11 44.3	−49.9	118.8	11 15.3	−50.4	119.0	8
9	13 48.2	−46.6	118.3	13 19.7	−47.2	118.5	12 51.0	−47.8	118.7	12 22.1	−48.3	118.9	11 53.0	−48.9	119.1	11 23.8	−49.4	119.2	10 54.4	−49.9	119.4	10 24.9	−50.5	119.6	9
10	13 01.6	−46.9	118.9	12 32.5	−47.3	119.1	12 03.2	−47.9	119.3	11 33.8	−48.5	119.5	11 04.1	−49.0	119.7	10 34.4	−49.5	119.8	10 04.5	−50.0	120.0	9 34.4	−50.5	120.1	10
11	12 14.9	−46.9	119.6	11 45.2	−47.4	119.7	11 15.3	−47.9	119.9	10 45.3	−48.4	120.1	10 15.2	−49.0	120.2	9 44.9	−49.5	120.4	9 14.5	−50.1	120.5	8 43.9	−50.5	120.7	11
12	11 28.0	−46.8	120.2	10 57.8	−47.5	120.4	10 27.4	−48.0	120.5	9 56.9	−48.6	120.7	9 26.2	−49.1	120.8	8 55.4	−49.6	121.0	8 24.4	−50.1	121.1	7 53.4	−50.6	121.2	12
13	10 41.2	−47.0	120.8	10 10.3	−47.5	121.0	9 39.4	−48.1	121.1	9 08.3	−48.6	121.3	8 37.1	−49.1	121.4	8 05.8	−49.7	121.5	7 34.3	−50.1	121.7	7 02.8	−50.6	121.8	13
14	9 54.2	−47.0	121.5	9 22.8	−47.6	121.6	8 51.3	−48.1	121.7	8 19.7	−48.7	121.9	7 48.0	−49.2	122.0	7 16.1	−49.7	122.1	6 44.2	−50.1	122.2	6 12.2	−50.7	122.3	14
15	9 07.2	−47.1	122.1	8 35.2	−47.6	122.2	8 03.2	−48.2	122.3	7 31.0	−48.7	122.5	6 58.8	−49.2	122.6	6 26.4	−49.7	122.7	5 54.0	−50.2	122.8	5 21.5	−50.7	122.8	15
16	8 20.1	−47.2	122.7	7 47.6	−47.7	122.8	7 15.0	−48.2	122.9	6 42.3	−48.7	123.0	6 09.6	−49.3	123.1	5 36.7	−49.7	123.2	5 03.8	−50.2	123.3	4 30.8	−50.7	123.4	16
17	7 32.9	−47.2	123.3	6 59.9	−47.8	123.4	6 26.8	−48.3	123.5	5 53.6	−48.8	123.6	5 20.3	−49.3	123.7	4 47.0	−49.8	123.8	4 13.6	−50.3	123.9	3 40.1	−50.7	123.9	17
18	6 45.7	−47.3	124.0	6 12.1	−47.7	124.1	5 38.5	−48.3	124.1	5 04.8	−48.8	124.2	4 31.0	−49.3	124.3	3 57.2	−49.8	124.4	3 23.3	−50.3	124.4	2 49.4	−50.7	124.4	18
19	5 58.4	−47.2	124.6	5 24.4	−47.9	124.7	4 50.2	−48.3	124.7	4 16.0	−48.9	124.8	3 41.7	−49.3	124.9	3 07.4	−49.8	124.9	2 33.0	−50.3	124.9	1 58.7	−50.8	125.0	19
20	5 11.2	−47.4	125.2	4 36.5	−47.8	125.3	4 01.9	−48.4	125.3	3 27.1	−48.8	125.4	2 52.4	−49.4	125.4	2 17.6	−49.9	125.5	1 42.7	−50.3	125.5	1 07.9	−50.8	125.5	20
21	4 23.8	−47.3	125.8	3 48.7	−47.9	125.9	3 13.5	−48.4	125.9	2 38.3	−48.9	126.0	2 03.0	−49.3	126.0	1 27.7	−49.8	126.0	0 52.4	−50.3	126.0	0 17.1	−50.7	126.0	21
22	3 36.5	−47.4	126.4	3 00.8	−47.9	126.5	2 25.1	−48.4	126.5	1 49.4	−48.9	126.5	1 13.7	−49.4	126.6	0 37.9	−49.8	126.6	0 02.1	−50.3	126.6	0 33.6	+50.8	53.4	22
23	2 49.1	−47.4	127.0	2 12.9	−47.9	127.1	1 36.7	−48.4	127.1	1 00.5	−48.9	127.1	0 24.3	−49.4	127.1	0 11.9	+49.9	52.9	0 48.2	+50.3	52.9	1 24.4	+50.7	52.9	23
24	2 01.7	−47.5	127.7	1 25.0	−47.9	127.7	0 48.3	−48.4	127.7	0 11.6	−48.9	127.7	0 25.1	+49.4	52.3	1 01.8	+49.8	52.3	1 38.5	+50.3	52.3	2 15.1	+50.8	52.4	24
25	1 14.2	−47.4	128.3	0 37.1	−48.0	128.3	0 00.1	+48.4	51.7	0 37.3	+48.9	51.7	1 14.5	+49.3	51.7	1 51.6	+49.8	51.7	2 28.8	+50.2	51.8	3 05.9	+50.7	51.8	25
26	0 26.8	−47.4	128.9	0 10.9	+47.9	51.1	0 48.5	+48.4	51.1	1 26.2	+48.9	51.1	2 03.8	+49.4	51.2	2 41.4	+49.9	51.2	3 19.0	+50.3	51.2	3 56.6	+50.7	51.3	26
27	0 20.6	+47.5	50.5	0 58.8	+47.9	50.5	1 36.9	+48.4	50.5	2 15.1	+48.8	50.6	2 53.2	+49.3	50.6	3 31.3	+49.7	50.6	4 09.3	+50.2	50.7	4 47.3	+50.7	50.7	27
28	1 08.1	+47.4	49.9	1 46.7	+47.9	49.9	2 25.3	+48.4	49.9	3 03.9	+48.9	50.0	3 42.5	+49.3	50.0	4 21.0	+49.8	50.1	4 59.5	+50.2	50.1	5 38.0	+50.6	50.2	28
29	1 55.5	+47.4	49.3	2 34.6	+47.9	49.3	3 13.7	+48.4	49.3	3 52.8	+48.8	49.4	4 31.8	+49.3	49.4	5 10.8	+49.7	49.5	5 49.7	+50.2	49.6	6 28.6	+50.6	49.7	29
30	2 42.9	+47.4	48.7	3 22.5	+47.9	48.7	4 02.1	+48.3	48.8	4 41.6	+48.8	48.8	5 21.1	+49.3	48.9	6 00.5	+49.7	49.0	6 39.9	+50.2	49.0	7 19.2	+50.6	49.1	30
31	3 30.3	+47.4	48.0	4 10.4	+47.8	48.1	4 50.4	+48.3	48.2	5 30.4	+48.8	48.2	6 10.4	+49.2	48.3	6 50.2	+49.7	48.4	7 30.1	+50.1	48.6	8 09.8	+50.5	48.6	31
32	4 17.7	+47.3	47.4	4 58.2	+47.8	47.5	5 38.7	+48.3	47.6	6 19.2	+48.7	47.6	6 59.6	+49.2	47.7	7 39.9	+49.6	47.8	8 20.2	+50.0	47.9	9 00.3	+50.5	48.0	32
33	5 05.0	+47.3	46.8	5 46.0	+47.8	46.9	6 27.0	+48.2	47.0	7 07.9	+48.7	47.1	7 48.8	+49.1	47.1	8 29.5	+49.6	47.3	9 10.2	+50.0	47.4	9 50.8	+50.4	47.5	33
34	5 52.3	+47.3	46.2	6 33.8	+47.7	46.3	7 15.2	+48.2	46.4	7 56.6	+48.6	46.5	8 37.9	+49.1	46.6	9 19.1	+49.5	46.7	10 00.2	+50.0	46.8	10 41.2	+50.4	46.9	34
35	6 39.6	+47.2	45.6	7 21.5	+47.7	45.7	8 03.4	+48.1	45.8	8 45.2	+48.6	45.9	9 27.0	+49.0	46.0	10 08.6	+49.5	46.1	10 50.2	+49.8	46.2	11 31.6	+50.3	46.4	35
36	7 26.8	+47.1	45.0	8 09.2	+47.6	45.1	8 51.5	+48.1	45.2	9 33.8	+48.5	45.3	10 16.0	+48.9	45.4	10 58.1	+49.4	45.5	11 40.0	+49.9	45.7	12 21.9	+50.2	45.8	36
37	8 13.9	+47.1	44.3	8 56.8	+47.6	44.4	9 39.6	+48.0	44.6	10 22.3	+48.5	44.7	11 04.9	+48.9	44.8	11 47.5	+49.3	45.0	12 29.9	+49.7	45.1	13 12.1	+50.2	45.3	37
38	9 01.0	+47.1	43.7	9 44.4	+47.5	43.8	10 27.6	+48.0	43.9	11 10.8	+48.4	44.1	11 53.8	+48.8	44.2	12 36.8	+49.2	44.4	13 19.6	+49.7	44.5	14 02.3	+50.1	44.7	38
39	9 48.1	+47.0	43.1	10 31.9	+47.4	43.2	11 15.6	+47.8	43.3	11 59.2	+48.2	43.5	12 42.6	+48.8	43.6	13 26.0	+49.2	43.8	14 09.3	+49.6	44.0	14 52.4	+50.0	44.1	39
40	10 35.1	+46.9	42.4	11 19.3	+47.3	42.6	12 03.4	+47.8	42.7	12 47.4	+48.3	42.9	13 31.4	+48.6	43.0	14 15.2	+49.0	43.2	14 58.9	+49.4	43.4	15 42.4	+49.9	43.6	40
41	11 22.0	+46.8	41.8	12 06.6	+47.3	41.9	12 51.2	+47.7	42.1	13 35.7	+48.1	42.3	14 20.0	+48.6	42.4	15 04.2	+49.0	42.6	15 48.3	+49.4	42.8	16 32.3	+49.8	43.0	41
42	12 08.8	+46.7	41.2	12 53.9	+47.1	41.3	13 38.9	+47.6	41.5	14 23.8	+48.0	41.6	15 08.6	+48.4	41.8	15 53.2	+48.9	42.0	16 37.7	+49.3	42.2	17 22.1	+49.7	42.4	42
43	12 55.5	+46.6	40.5	13 41.0	+47.1	40.7	14 26.5	+47.5	40.8	15 11.8	+47.9	41.0	15 57.0	+48.4	41.2	16 42.1	+48.8	41.4	17 27.0	+49.2	41.6	18 11.8	+49.6	41.8	43
44	13 42.1	+46.6	39.9	14 28.1	+47.0	40.0	15 14.0	+47.4	40.2	15 59.7	+47.9	40.4	16 45.4	+48.2	40.6	17 30.9	+48.6	40.8	18 16.2	+49.1	41.0	19 01.4	+49.5	41.2	44
45	14 28.7	+46.4	39.2	15 15.1	+46.8	39.4	16 01.4	+47.3	39.6	16 47.6	+47.7	39.8	17 33.6	+48.1	40.0	18 19.5	+48.6	40.2	19 05.3	+49.0	40.4	19 50.9	+49.4	40.6	45
46	15 15.1	+46.3	38.6	16 01.9	+46.8	38.8	16 48.7	+47.1	38.9	17 35.3	+47.5	39.1	18 21.7	+48.0	39.3	19 08.1	+48.4	39.6	19 54.3	+48.8	39.8	20 40.3	+49.2	40.0	46
47	16 01.4	+46.2	37.9	16 48.7	+46.6	38.1	17 35.8	+47.0	38.3	18 22.8	+47.4	38.5	19 09.7	+47.9	38.7	19 56.5	+48.3	38.9	20 43.1	+48.7	39.2	21 29.5	+49.1	39.4	47
48	16 47.6	+46.0	37.3	17 35.3	+46.4	37.4	18 22.6	+46.9	37.6	19 10.3	+47.3	37.8	19 57.6	+47.7	38.1	20 44.8	+48.1	38.3	21 31.8	+48.5	38.5	22 18.6	+49.0	38.8	48
49	17 33.6	+45.9	36.6	18 21.7	+46.4	36.8	19 09.7	+46.8	37.0	19 57.6	+47.2	37.2	20 45.3	+47.6	37.4	21 32.9	+48.0	37.7	22 20.3	+48.4	37.9	23 07.6	+48.8	38.2	49
50	18 19.5	+45.8	35.9	19 08.1	+46.2	36.3	19 56.5	+46.6	36.3	20 44.8	+47.0	36.5	21 32.9	+47.4	36.8	22 20.9	+47.8	37.0	23 08.7	+48.3	37.3	23 56.4	+48.7	37.5	50
51	19 05.3	+45.6	35.2	19 54.3	+46.0	35.4	20 43.1	+46.4	35.6	21 31.8	+46.8	35.9	22 20.3	+47.3	36.1	23 08.7	+47.7	36.3	23 57.0	+48.1	36.6	24 45.1	+48.4	36.9	51
52	19 50.9	+45.5	34.5	20 40.3	+45.9	34.7	21 29.5	+46.3	35.0	22 18.6	+46.7	35.2	23 07.6	+47.1	35.4	23 56.4	+47.5	35.7	24 45.1	+47.9	36.0	25 33.5	+48.4	36.2	52
53	20 36.4	+45.3	33.8	21 26.2	+45.7	34.1	22 15.8	+46.1	34.3	23 05.3	+46.5	34.5	23 54.7	+46.9	34.8	24 43.9	+47.3	35.0	25 33.0	+47.7	35.3	26 21.9	+48.1	35.6	53
54	21 21.7	+45.1	33.1	22 11.9	+45.5	33.4	23 01.9	+45.9	33.6	23 51.8	+46.4	33.8	24 41.6	+46.7	34.1	25 31.2	+47.2	34.3	26 20.7	+47.5	34.6	27 10.0	+47.9	34.9	54
55	22 06.8	+44.9	32.4	22 57.4	+45.3	32.6	23 47.8	+45.8	32.9	24 38.2	+46.1	33.1	25 28.3	+46.6	33.4	26 18.4	+46.9	33.6	27 08.2	+47.3	33.9	27 57.9	+47.7	34.2	55
56	22 51.7	+44.8	31.7	23 42.7	+45.1	31.9	24 33.6	+45.5	32.2	25 24.3	+45.9	32.4	26 14.9	+46.3	32.7	27 05.3	+46.7	33.0	27 55.5	+47.2	33.2	28 45.6	+47.6	33.5	56
57	23 36.5	+44.5	31.0	24 27.8	+45.0	31.2	25 19.1	+45.3	31.5	26 10.2	+45.7	31.7	27 01.2	+46.1	32.0	27 52.0	+46.5	32.2	28 42.7	+46.9	32.5	29 33.2	+47.3	32.8	57
58	24 21.0	+44.3	30.2	25 12.8	+44.7	30.5	26 04.4	+45.1	30.7	26 55.9	+45.5	31.0	27 47.3	+45.9	31.2	28 38.5	+46.3	31.5	29 29.6	+46.6	31.8	30 20.5	+47.0	32.1	58
59	25 05.3	+44.1	29.5	25 57.5	+44.4	29.7	26 49.5	+44.9	30.0	27 41.4	+45.2	30.2	28 33.2	+45.6	30.5	29 24.8	+46.0	30.8	30 16.2	+46.4	31.1	31 07.5	+46.8	31.4	59
60	25 49.4	+43.8	28.8	26 41.9	+44.3	29.0	27 34.4	+44.6	29.2	28 26.6	+45.0	29.5	29 18.8	+45.4	29.8	30 10.8	+45.8	30.1	31 02.6	+46.2	30.4	31 54.3	+46.6	30.7	60
61	26 33.2	+43.7	28.0	27 26.2	+44.0	28.2	28 19.0	+44.3	28.5	29 11.6	+44.8	28.7	30 04.2	+45.1	29.0	30 56.6	+45.5	29.3	31 48.8	+45.9	29.6	32 40.9	+46.3	29.9	61
62	27 16.9	+43.3	27.2	28 10.2	+43.7	27.5	29 03.3	+44.1	27.7	29 56.4	+44.5	28.0	30 49.3	+44.9	28.3	31 42.1	+45.2	28.5	32 34.7	+45.6	28.8	33 27.2	+46.0	29.2	62
63	28 00.2	+43.1	26.4	28 53.9	+43.4	26.7	29 47.4	+43.9	26.9	30 40.9	+44.2	27.2	31 34.2	+44.5	27.5	32 27.3	+45.0	27.8	33 20.3	+45.4	28.1	34 13.2	+45.7	28.4	63
64	28 43.3	+42.8	25.7	29 37.3	+43.2	25.9	30 31.3	+43.5	26.1	31 25.1	+43.8	26.4	32 18.7	+44.3	26.7	33 12.3	+44.6	27.0	34 05.7	+45.0	27.3	34 58.9	+45.4	27.6	64
65	29 26.1	+42.5	24.9	30 20.5	+42.9	25.1	31 14.8	+43.2	25.3	32 08.9	+43.6	25.6	33 03.0	+43.9	25.9	33 56.9	+44.3	26.2	34 50.7	+44.7	26.5	35 44.3	+45.1	26.8	65
66	30 08.6	+42.2	24.0	31 03.4	+42.5	24.3	31 58.0	+42.9	24.5	32 52.5	+43.3	24.8	33 46.9	+43.7	25.1	34 41.2	+44.0	25.4	35 35.4	+44.3	25.7	36 29.4	+44.7	26.0	66
67	30 50.8	+41.9	23.2	31 45.9	+42.3	23.5	32 40.9	+42.6	23.7	33 35.8	+42.9	24.0	34 30.6	+43.3	24.2	35 25.2	+43.7	24.5	36 19.7	+44.0	24.8	37 14.1	+44.4	25.2	67
68	31 32.7	+41.6	22.4	32 28.2	+41.9	22.6	33 23.5	+42.2	22.9	34 18.7	+42.6	23.1	35 13.9	+42.9	23.4	36 08.9	+43.2	23.7	37 03.7	+43.7	24.0	37 58.5	+44.0	24.3	68
69	32 14.3	+41.2	21.5	33 10.1	+41.5	21.8	34 05.7	+41.9	22.0	35 01.3	+42.2	22.3	35 56.8	+42.5	22.5	36 52.1	+42.9	22.8	37 47.4	+43.2	23.1	38 42.5	+43.6	23.4	69
70	32 55.5	+40.9	20.7	33 51.6	+41.2	20.9	34 47.6	+41.5	21.1	35 43.5	+41.8	21.4	36 39.3	+42.2	21.7	37 35.0	+42.5	21.9	38 30.6	+42.9	22.2	39 26.1	+43.2	22.6	70
71	33 36.4	+40.4	19.8	34 32.8	+40.8	20.0	35 29.1	+41.1	20.3	36 25.3	+41.5	20.5	37 21.5	+41.7	20.8	38 17.5	+42.1	21.1	39 13.5	+42.4	21.3	40 09.3	+42.8	21.6	71
72	34 16.8	+40.1	18.9	35 13.6	+40.3	19.1	36 10.2	+40.7	19.4	37 06.8	+41.0	19.6	38 03.2	+41.4	19.9	38 59.6	+41.7	20.1	39 55.9	+42.0	20.4	40 52.1	+42.3	20.7	72
73	34 56.9	+39.7	18.0	35 53.9	+40.0	18.2	36 50.9	+40.3	18.4	37 47.8	+40.5	18.7	38 44.6	+40.8	18.9	39 41.3	+41.2	19.2	40 37.9	+41.5	19.5	41 34.4	+41.8	19.8	73
74	35 36.6	+39.2	17.1	36 33.9	+39.5	17.3	37 31.2	+39.8	17.5	38 28.3	+40.2	17.8	39 25.4	+40.5	18.0	40 22.5	+40.7	18.3	41 19.4	+41.0	18.5	42 16.2	+41.4	18.8	74
75	36 15.8	+38.8	16.1	37 13.4	+39.1	16.4	38 11.0	+39.3	16.6	39 08.5	+39.6	16.8	40 05.9	+39.9	17.0	41 03.2	+40.2	17.3	42 00.4	+40.6	17.6	42 57.6	+40.8	17.8	75
76	36 54.6	+38.4	15.2	37 52.5	+38.6	15.4	38 50.3	+38.9	15.6	39 48.1	+39.1	15.8	40 45.8	+39.4	16.1	41 43.4	+39.7	16.3	42 41.0	+40.0	16.6	43 38.4	+40.3	16.8	76
77	37 33.0	+37.9	14.2	38 31.1	+38.1	14.4	39 29.2	+38.4	14.6	40 27.2	+38.7	14.8	41 25.2	+38.9	15.1	42 23.1	+39.2	15.3	43 21.0	+39.4	15.5	44 18.7	+39.8	15.8	77
78	38 10.9	+37.3	13.2	39 09.2	+37.6	13.4	40 07.6	+37.8	13.6	41 05.9	+38.0	13.8	42 04.1	+38.3	14.0	43 02.3	+38.6	14.3	44 00.4	+38.9	14.5	44 58.5	+39.1	14.7	78
79	38 48.2	+36.9	12.2	39 46.8	+37.1	12.4	40 45.4	+37.3	12.6	41 43.9	+37.6	12.8	42 42.4	+37.8	13.0	43 40.9	+38.0	13.2	44 39.3	+38.2	13.4	45 37.6	+38.5	13.7	79
80	39 25.1	+36.3	11.2	40 23.9	+36.5	11.4	41 22.7	+36.7	11.6	42 21.5	+36.9	11.7	43 20.2	+37.1	11.9	44 18.9	+37.4	12.1	45 17.5	+37.6	12.3	46 16.1	+37.9	12.6	80
81	40 01.4	+35.7	10.2	41 00.4	+35.9	10.3	41 59.4	+36.1	10.5	42 58.4	+36.3	10.7	43 57.3	+36.6	10.8	44 56.3	+36.7	11.0	45 55.1	+37.0	11.2	46 54.0	+37.1	11.4	81
82	40 37.1	+35.2	9.1	41 36.3	+35.4	9.3	42 35.5	+35.5	9.4	43 34.7	+35.7	9.6	44 33.9	+35.8	9.7	45 33.0	+36.1	9.9	46 32.1	+36.2	10.1	47 31.1	+36.5	10.3	82
83	41 12.3	+34.5	8.1	42 11.7	+34.7	8.2	43 11.0	+34.9	8.3	44 10.4	+35.0	8.5	45 09.7	+35.2	8.6	46 09.1	+35.3	8.8	47 08.3	+35.6	8.9	48 07.6	+35.7	9.1	83
84	41 46.8	+33.9	7.0	42 46.4	+34.0	7.1	43 45.9	+34.2	7.2	44 45.4	+34.4	7.3	45 44.9	+34.4	7.5	46 44.4	+34.6	7.6	47 43.9	+34.8	7.7	48 43.3	+35.0	7.9	84
85	42 20.7	+33.3	5.9	43 20.4	+33.4	6.0	44 20.1	+33.5	6.1	45 19.8	+33.6	6.2	46 19.4	+33.7	6.3	47 19.0	+33.9	6.4	48 18.7	+33.9	6.5	49 18.3	+34.1	6.6	85
86	42 54.0	+32.6	4.7	43 53.8	+32.7	4.8	44 53.6	+32.7	4.9	45 53.4	+32.8	5.0	46 53.1	+33.0	5.1	47 52.9	+33.0	5.2	48 52.6	+33.2	5.3	49 52.4	+33.3	5.4	86
87	43 26.6	+31.9	3.6	44 26.5	+31.9	3.6	45 26.3	+32.1	3.7	46 26.2	+32.1	3.8	47 26.1	+32.1	3.8	48 25.9	+32.3	3.9	49 25.8	+32.3	4.0	50 25.7	+32.3	4.1	87
88	43 58.5	+31.1	2.4	44 58.4	+31.2	2.4	45 58.4	+31.2	2.5	46 58.3	+31.3	2.5	47 58.2	+31.4	2.6	48 58.2	+31.3	2.6	49 58.1	+31.4	2.7	50 58.0	+31.5	2.8	88
89	44 29.6	+30.4	1.2	45 29.6	+30.4	1.2	46 29.6	+30.4	1.3	47 29.6	+30.4	1.3	48 29.6	+30.4	1.3	49 29.5	+30.5	1.3	50 29.5	+30.5	1.4	51 29.5	+30.5	1.4	89
90	45 00.0	+29.6	0.0	46 00.0	+29.6	0.0	47 00.0	+29.6	0.0	48 00.0	+29.6	0.0	49 00.0	+29.5	0.0	50 00.0	+29.5	0.0	51 00.0	+29.5	0.0	52 00.0	+29.5	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 120°, 240°**

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	20 02.9	+45.1	111.4	19 40.8	+45.8	111.7	19 18.5	+46.4	112.1	18 55.8	+47.0	112.4	18 32.8	+47.6	112.7	18 09.4	+48.4	113.0	17 45.9	+48.9	113.3	17 22.0	+49.5	113.6	0
1	20 48.0	+44.9	110.7	20 26.6	+45.6	111.1	20 04.9	+46.2	111.4	19 42.8	+46.9	111.7	19 20.4	+47.6	112.1	18 57.8	+48.1	112.4	18 34.8	+48.7	112.7	18 11.5	+49.3	113.0	1
2	21 32.9	+44.7	110.0	21 12.2	+45.4	110.4	20 51.1	+46.1	110.7	20 29.7	+46.8	111.1	20 08.0	+47.4	111.4	19 45.9	+48.1	111.8	19 23.5	+48.7	112.1	19 00.8	+49.3	112.4	2
3	22 17.6	+44.5	109.3	21 57.6	+45.3	109.7	21 37.2	+46.0	110.0	21 16.5	+46.6	110.4	20 55.4	+47.3	110.8	20 34.0	+47.9	111.1	20 12.2	+48.5	111.5	19 50.1	+49.1	111.8	3
4	23 02.1	+44.4	108.5	22 42.9	+45.0	108.9	22 23.2	+45.7	109.3	22 03.1	+46.5	109.7	21 42.7	+47.1	110.1	21 21.9	+47.8	110.5	21 00.7	+48.4	110.8	20 39.2	+49.0	111.2	4
5	23 46.5	+44.1	107.8	23 27.9	+44.9	108.2	23 08.9	+45.6	108.6	22 49.6	+46.2	109.0	22 29.8	+46.9	109.4	22 09.7	+47.6	109.8	21 49.1	+48.3	110.2	21 28.2	+48.9	110.6	5
6	24 30.6	+43.9	107.1	24 12.8	+44.6	107.5	23 54.5	+45.4	107.9	23 35.8	+46.1	108.3	23 16.7	+46.8	108.8	22 57.3	+47.4	109.2	22 37.4	+48.1	109.6	22 17.1	+48.7	109.9	6
7	25 14.5	+43.6	106.3	24 57.4	+44.4	106.8	24 39.9	+45.1	107.2	24 21.9	+45.9	107.6	24 03.5	+46.6	108.1	23 44.7	+47.3	108.5	23 25.5	+47.9	108.9	23 05.8	+48.6	109.3	7
8	25 58.1	+43.5	105.6	25 41.8	+44.2	106.0	25 25.0	+45.0	106.5	25 07.8	+45.7	106.9	24 50.1	+46.4	107.4	24 32.0	+47.0	107.8	24 13.4	+47.7	108.2	23 54.4	+48.4	108.7	8
9	26 41.6	+43.1	104.8	26 26.0	+44.0	105.3	26 10.0	+44.7	105.7	25 53.5	+45.4	106.2	25 36.5	+46.2	106.7	25 19.0	+46.9	107.1	25 01.1	+47.6	107.6	24 42.8	+48.2	108.0	9
10	27 24.7	+43.0	104.0	27 10.0	+43.7	104.5	26 54.7	+44.5	105.0	26 38.9	+45.3	105.5	26 22.7	+45.9	106.0	26 05.9	+46.7	106.4	25 48.7	+47.4	106.9	25 31.0	+48.1	107.4	10
11	28 07.7	+42.6	103.2	27 53.7	+43.4	103.7	27 39.2	+44.2	104.2	27 24.2	+45.0	104.7	27 08.6	+45.8	105.2	26 52.6	+46.5	105.7	26 36.1	+47.2	106.2	26 19.1	+47.9	106.7	11
12	28 50.3	+42.3	102.4	28 37.1	+43.2	102.9	28 23.4	+44.0	103.5	28 09.2	+44.7	104.0	27 54.4	+45.5	104.5	27 39.1	+46.2	105.0	27 23.3	+46.9	105.5	27 07.0	+47.6	106.0	12
13	29 32.6	+42.1	101.6	29 20.3	+42.9	102.2	29 07.4	+43.7	102.7	28 53.9	+44.5	103.2	28 39.9	+45.3	103.8	28 25.3	+46.1	104.3	28 10.2	+46.8	104.8	27 54.6	+47.5	105.3	13
14	30 14.7	+41.7	100.8	30 03.2	+42.5	101.3	29 51.1	+43.4	101.9	29 38.4	+44.2	102.5	29 25.2	+45.0	103.0	29 11.4	+45.7	103.6	28 57.0	+46.5	104.1	28 42.1	+47.3	104.6	14
15	30 56.4	+41.4	99.9	30 45.7	+42.3	100.5	30 34.5	+43.1	101.1	30 22.6	+44.0	101.7	30 10.2	+44.7	102.3	29 57.1	+45.6	102.8	29 43.5	+46.3	103.4	29 29.4	+47.0	103.9	15
16	31 37.8	+41.1	99.1	31 28.0	+42.0	99.7	31 17.6	+42.8	100.3	31 06.6	+43.6	100.9	30 54.9	+44.5	101.5	30 42.7	+45.2	102.1	30 29.8	+46.0	102.7	30 16.4	+46.8	103.2	16
17	32 18.9	+40.7	98.2	32 10.0	+41.6	98.9	32 00.4	+42.5	99.5	31 50.2	+43.3	100.1	31 39.4	+44.1	100.7	31 27.9	+45.0	101.3	31 15.8	+45.8	101.9	31 03.2	+46.5	102.5	17
18	32 59.6	+40.3	97.4	32 51.6	+41.2	98.0	32 42.9	+42.1	98.6	32 33.5	+43.1	99.3	32 23.5	+43.9	99.9	32 12.9	+44.7	100.5	32 01.6	+45.5	101.1	31 49.7	+46.3	101.8	18
19	33 39.9	+40.0	96.5	33 32.8	+40.9	97.1	33 25.0	+41.8	97.8	33 16.6	+42.6	98.4	33 07.4	+43.5	99.1	32 57.6	+44.4	99.7	32 47.1	+45.2	100.4	32 36.0	+46.0	101.0	19
20	34 19.9	+39.6	95.6	34 13.7	+40.5	96.3	34 06.8	+41.4	96.9	33 59.2	+42.4	97.6	33 50.9	+43.2	98.3	33 42.0	+44.0	98.9	33 32.3	+44.9	99.6	33 22.0	+45.7	100.2	20
21	34 59.5	+39.1	94.7	34 54.2	+40.1	95.4	34 48.2	+41.1	96.1	34 41.6	+41.9	96.7	34 34.2	+42.8	97.4	34 26.0	+43.8	98.1	34 17.2	+44.6	98.8	34 07.7	+45.4	99.5	21
22	35 38.6	+38.7	93.7	35 34.3	+39.7	94.5	35 29.3	+40.6	95.2	35 23.5	+41.6	95.9	35 17.0	+42.5	96.6	35 09.8	+43.4	97.3	35 01.8	+44.3	98.0	34 53.1	+45.1	98.7	22
23	36 17.3	+38.2	92.8	36 14.0	+39.2	93.5	36 09.9	+40.2	94.3	36 05.1	+41.2	95.0	35 59.5	+42.1	95.7	35 53.2	+43.0	96.4	35 46.1	+43.9	97.1	35 38.2	+44.8	97.9	23
24	36 55.5	+37.8	91.8	36 53.2	+38.8	92.6	36 50.1	+39.8	93.3	36 46.3	+40.7	94.1	36 41.6	+41.7	94.8	36 36.2	+42.6	95.6	36 30.0	+43.5	96.3	36 23.0	+44.4	97.0	24
25	37 33.3	+37.3	90.9	37 32.0	+38.3	91.6	37 29.9	+39.4	92.4	37 27.0	+40.3	93.2	37 23.3	+41.3	93.9	37 18.8	+42.3	94.7	37 13.5	+43.2	95.4	37 07.4	+44.1	96.2	25
26	38 10.6	+36.8	89.9	38 10.3	+37.9	90.7	38 09.3	+38.8	91.4	38 07.3	+39.9	92.2	38 04.6	+40.9	93.0	38 01.1	+41.8	93.8	37 56.7	+42.7	94.6	37 51.5	+43.7	95.3	26
27	38 47.4	+36.2	88.9	38 48.2	+37.3	89.7	38 48.1	+38.4	90.5	38 47.2	+39.4	91.3	38 45.5	+40.4	92.1	38 42.9	+41.4	92.9	38 39.4	+42.4	93.7	38 35.2	+43.3	94.5	27
28	39 23.6	+35.7	87.8	39 25.5	+36.8	88.6	39 26.5	+37.8	89.5	39 26.6	+38.9	90.3	39 25.9	+39.9	91.1	39 24.3	+40.9	91.9	39 21.8	+41.9	92.8	39 18.5	+42.9	93.6	28
29	39 59.3	+35.2	86.8	40 02.3	+36.2	87.6	40 04.3	+37.3	88.5	40 05.5	+38.4	89.3	40 05.8	+39.4	90.1	40 05.2	+40.4	91.0	40 03.7	+41.5	91.8	40 01.4	+42.4	92.7	29
30	40 34.5	+34.5	85.7	40 38.5	+35.7	86.6	40 41.6	+36.8	87.4	40 43.9	+37.8	88.3	40 45.2	+38.9	89.2	40 45.6	+40.0	90.0	40 45.2	+41.0	90.9	40 43.8	+42.0	91.7	30
31	41 09.0	+33.9	84.6	41 14.2	+35.0	85.5	41 18.4	+36.2	86.4	41 21.7	+37.3	87.3	41 24.1	+38.4	88.1	41 25.6	+39.4	89.0	41 26.2	+40.4	89.9	41 25.8	+41.5	90.8	31
32	41 42.9	+33.3	83.5	41 49.2	+34.4	84.4	41 54.6	+35.5	85.3	41 59.0	+36.7	86.2	42 02.5	+37.8	87.1	42 05.0	+38.9	88.0	42 06.6	+40.0	88.9	42 07.3	+41.0	89.8	32
33	42 16.2	+32.6	82.4	42 23.6	+33.8	83.3	42 30.1	+35.0	84.2	42 35.7	+36.1	85.1	42 40.3	+37.2	86.1	42 43.9	+38.4	87.0	42 46.6	+39.4	87.9	42 48.3	+40.5	88.8	33
34	42 48.8	+31.9	81.3	42 57.4	+33.1	82.2	43 05.1	+34.3	83.1	43 11.8	+35.4	84.1	43 17.5	+36.6	85.0	43 23.2	+37.7	85.9	43 26.0	+38.9	86.9	43 28.8	+39.9	87.8	34
35	43 20.7	+31.2	80.1	43 30.5	+32.5	81.1	43 39.4	+33.6	82.0	43 47.2	+34.8	82.9	43 54.1	+36.0	83.9	44 00.0	+37.1	84.9	44 04.9	+38.2	85.8	44 08.7	+39.4	86.8	35
36	43 51.9	+30.5	78.9	44 03.0	+31.6	79.9	44 13.0	+32.9	80.8	44 22.0	+34.1	81.8	44 30.1	+35.3	82.8	44 37.1	+36.5	83.8	44 43.1	+37.7	84.7	44 48.1	+38.8	85.7	36
37	44 22.4	+29.7	77.7	44 34.6	+31.0	78.7	44 45.9	+32.2	79.7	44 56.1	+33.4	80.7	45 05.4	+34.6	81.6	45 13.6	+35.8	82.6	45 20.8	+36.9	83.6	45 26.9	+38.1	84.7	37
38	44 52.1	+28.9	76.5	45 05.6	+30.1	77.5	45 18.1	+31.4	78.5	45 29.5	+32.7	79.5	45 40.0	+33.9	80.5	45 49.4	+35.1	81.5	45 57.7	+36.3	82.5	46 05.0	+37.5	83.5	38
39	45 21.0	+28.1	75.3	45 35.7	+29.4	76.3	45 49.5	+30.6	77.3	46 02.2	+31.9	78.3	46 13.9	+33.1	79.3	46 24.5	+34.4	80.3	46 34.0	+35.6	81.4	46 42.5	+36.8	82.4	39
40	45 49.1	+27.2	74.0	46 05.1	+28.5	75.0	46 20.1	+29.8	76.0	46 34.1	+31.1	77.0	46 47.0	+32.3	78.1	46 58.9	+33.6	79.1	47 09.6	+34.9	80.2	47 19.3	+36.1	81.3	40
41	46 16.3	+26.4	72.7	46 33.6	+27.7	73.7	46 49.9	+29.0	74.8	47 05.2	+30.2	75.8	47 19.3	+31.6	76.8	47 32.5	+32.8	77.9	47 44.5	+34.1	79.0	47 55.4	+35.3	80.1	41
42	46 42.7	+25.4	71.4	47 01.3	+26.7	72.4	47 18.9	+28.0	73.5	47 35.4	+29.4	74.5	47 50.9	+30.7	75.6	48 05.3	+32.0	76.7	48 18.6	+33.2	77.8	48 30.7	+34.6	78.9	42
43	47 08.1	+24.5	70.1	47 28.0	+25.9	71.1	47 46.9	+27.2	72.2	48 04.8	+28.5	73.2	48 21.6	+29.8	74.3	48 37.3	+31.1	75.4	48 51.8	+32.5	76.5	49 05.3	+33.7	77.6	43
44	47 32.6	+23.6	68.8	47 53.9	+24.9	69.8	48 14.1	+26.2	70.8	48 33.3	+27.5	71.9	48 51.4	+28.9	73.0	49 08.4	+30.2	74.1	49 24.3	+31.5	75.2	49 39.0	+32.9	76.3	44
45	47 56.2	+22.6	67.4	48 18.8	+23.9	68.4	48 40.3	+25.3	69.5	49 00.8	+26.6	70.6	49 20.3	+27.9	71.6	49 38.6	+29.3	72.8	49 55.8	+30.7	73.9	50 11.9	+32.0	75.0	45
46	48 18.8	+21.5	66.0	48 42.7	+22.9	67.0	49 05.6	+24.2	68.1	49 27.4	+25.6	69.2	49 48.2	+27.0	70.3	50 07.9	+28.4	71.4	50 26.5	+29.7	72.6	50 43.9	+31.1	73.7	46
47	48 40.3	+20.5	64.6	49 05.6	+21.8	65.6	49 29.8	+23.2	66.7	49 53.0	+24.6	67.8	50 15.2	+26.0	68.9	50 36.3	+27.3	70.0	50 56.2	+28.7	71.2	51 15.0	+30.1	72.4	47
48	49 00.8	+19.5	63.2	49 27.4	+20.8	64.2	49 53.0	+22.2	65.3	50 17.6	+23.6	66.4	50 41.2	+24.9	67.5	51 03.6	+26.3	68.6	51 24.9	+27.7	69.8	51 45.1	+29.1	71.0	48
49	49 20.3	+18.3	61.7	49 48.2	+19.7	62.8	50 15.2	+21.1	63.8	50 41.2	+22.4	64.9	51 06.1	+23.8	66.0	51 29.9	+25.2	67.2	51 52.6	+26.6	68.3	52 14.2	+28.0	69.5	49
50	49 38.6	+17.2	60.3	50 07.9	+18.6	61.3	50 36.3	+19.9	62.4	51 03.6	+21.3	63.4	51 29.9	+22.7	64.6	51 55.1	+24.1	65.7	52 19.2	+25.6	66.9	52 42.2	+27.0	68.1	50
51	49 55.8	+16.1	58.8	50 26.5	+17.4	59.8	50 56.2	+18.8	60.9	51 24.9	+20.2	61.9	51 52.6	+21.6	63.1	52 19.2	+23.0	64.2	52 44.8	+24.4	65.4	53 09.2	+25.8	66.6	51
52	50 11.9	+14.9	57.3	50 43.9	+16.2	58.3	51 15.0	+17.5	59.3	51 45.1	+18.9	60.4	52 14.2	+20.3	61.6	52 42.2	+21.8	62.7	53 09.2	+23.2	63.9	53 35.0	+24.7	65.1	52
53	50 26.8	+13.7	55.7	51 00.1	+15.0	56.8	51 32.5	+16.4	57.8	52 04.0	+17.8	58.9	52 34.5	+19.2	60.1	53 04.0	+20.6	61.2	53 32.4	+22.0	62.3	53 59.7	+23.4	63.6	53
54	50 40.5	+12.5	54.2	51 15.1	+13.8	55.2	51 48.9	+15.2	56.3	52 21.8	+16.5	57.3	52 53.7	+17.9	58.4	53 24.6	+19.3	59.6	53 54.4	+20.7	60.8	54 23.1	+22.3	62.0	54
55	50 53.0	+11.2	52.7	51 28.9	+12.6	53.7	52 04.1	+13.8	54.7	52 38.3	+15.2	55.8	53 11.6	+16.6	56.9	53 43.9	+18.0	58.0	54 15.1	+19.5	59.2	54 45.4	+20.9	60.4	55
56	51 04.2	+10.0	51.1	51 41.5	+11.3	52.1	52 17.9	+12.6	53.1	52 53.5	+13.9	54.2	53 28.2	+15.3	55.2	54 01.9	+16.7	56.4	54 34.6	+18.1	57.5	55 06.3	+19.6	58.8	56
57	51 14.2	+8.7	49.5	51 52.8	+9.9	50.5	52 30.5	+11.3	51.5	53 07.4	+12.6	52.5	53 43.5	+13.9	53.6	54 18.6	+15.3	54.7	54 52.7	+16.8	55.9	55 25.9	+18.2	57.1	57
58	51 22.9	+7.4	48.0	52 02.7	+8.7	48.9	52 41.8	+9.9	49.9	53 20.0	+11.3	50.9	53 57.4	+12.6	52.0	54 33.9	+14.0	53.1	55 09.5	+15.4	54.2	55 44.1	+16.8	55.4	58
59	51 30.3	+6.2	46.4	52 11.4	+7.3	47.3	52 51.7	+8.6	48.3	53 31.3	+9.9	49.3	54 10.0	+11.2	50.3	54 47.9	+12.6	51.4	55 24.9	+13.9	52.5	56 00.9	+15.4	53.7	59
60	51 36.5	+4.8	44.8	52 18.7	+6.0	45.7	53 00.3	+7.2	46.6	53 41.2	+8.4	47.6	54 21.2	+9.8	48.6	55 00.5	+11.1	49.7	55 38.8	+12.5	50.8	56 16.3	+13.9	52.0	60
61	51 41.3	+3.5	43.2	52 24.7	+4.7	44.0	53 07.5	+5.9	45.0	53 49.6	+7.1	45.9	54 31.0	+8.3	46.9	55 11.6	+9.6	48.0	55 51.3	+11.0	49.1	56 30.2	+12.4	50.2	61
62	51 44.8	+2.2	41.5	52 29.4	+3.3	42.4	53 13.4	+4.4	43.3	53 56.7	+5.7	44.2	54 39.3	+6.9	45.2	55 21.2	+8.2	46.2	56 02.3	+9.5	47.3	56 42.6	+10.8	48.4	62
63	51 47.0	+0.8	39.9	52 32.7	+1.9	40.8	53 17.8	+3.1	41.6	54 02.4	+4.2	42.5	54 46.2	+5.5	43.5	55 29.4	+6.7	44.5	56 11.8	+8.0	45.5	56 53.4	+9.3	46.6	63
64	51 47.8	−0.5	38.3	52 34.6	+0.6	39.1	53 20.9	+1.6	40.0	54 06.6	+2.8	40.8	54 51.7	+3.9	41.8	55 36.1	+5.1	42.7	56 19.8	+6.4	43.8	57 02.7	+7.8	44.8	64
65	51 47.3	−1.8	36.7	52 35.2	−0.8	37.5	53 22.5	+0.3	38.3	54 09.4	+1.3	39.1	54 55.6	+2.5	40.0	55 41.2	+3.7	41.0	56 26.2	+4.8	42.0	57 10.5	+6.1	43.0	65
66	51 45.5	−3.1	35.1	52 34.4	−2.2	35.8	53 22.8	−1.2	36.6	54 10.7	−0.1	37.4	54 58.1	+0.9	38.3	55 44.9	+2.1	39.2	56 31.0	+3.3	40.2	57 16.6	+4.5	41.2	66
67	51 42.4	−4.5	33.5	52 32.2	−3.5	34.2	53 21.6	−2.5	34.9	54 10.6	−1.6	35.7	54 59.0	−0.5	36.6	55 47.0	+0.5	37.4	56 34.3	+1.7	38.3	57 21.1	+2.8	39.3	67
68	51 37.9	−5.8	31.9	52 28.7	−4.9	32.5	53 19.1	−4.0	33.3	54 09.0	−3.0	34.0	54 58.5	−2.0	34.8	55 47.5	−1.0	35.6	56 36.0	+0.1	36.5	57 23.9	+1.3	37.5	68
69	51 32.1	−7.0	30.3	52 23.8	−6.3	30.9	53 15.1	−5.4	31.6	54 06.0	−4.5	32.3	54 56.5	−3.5	33.1	55 46.5	−2.5	33.9	56 36.1	−1.5	34.7	57 25.2	−0.4	35.6	69
70	51 25.1	−8.4	28.7	52 17.5	−7.5	29.3	53 09.7	−6.7	29.9	54 01.5	−5.9	30.6	54 53.0	−5.0	31.3	55 44.0	−4.0	32.1	56 34.6	−3.0	32.9	57 24.8	−2.1	33.7	70
71	51 16.7	−9.7	27.1	52 10.0	−8.9	27.7	53 03.0	−8.2	28.3	53 55.6	−7.3	28.9	54 48.0	−6.5	29.6	55 40.0	−5.6	30.3	56 31.6	−4.7	31.1	57 22.7	−3.6	31.9	71
72	51 07.0	−10.9	25.5	52 01.1	−10.2	26.1	52 54.8	−9.4	26.6	53 48.3	−8.7	27.2	54 41.5	−7.9	27.9	55 34.4	−7.1	28.6	56 26.9	−6.2	29.3	57 19.1	−5.3	30.0	72
73	50 56.1	−12.1	23.9	51 50.9	−11.5	24.5	52 45.4	−10.8	25.0	53 39.6	−10.1	25.6	54 33.6	−9.3	26.2	55 27.3	−8.6	26.8	56 20.7	−7.8	27.5	57 13.8	−6.9	28.2	73
74	50 44.0	−13.4	22.4	51 39.4	−12.8	22.9	52 34.6	−12.2	23.4	53 29.5	−11.5	23.9	54 24.3	−10.8	24.5	55 18.7	−10.0	25.1	56 12.9	−9.2	25.7	57 06.9	−8.5	26.4	74
75	50 30.6	−14.6	20.9	51 26.6	−14.0	21.3	52 22.4	−13.4	21.8	53 18.0	−12.8	22.3	54 13.5	−12.2	22.8	55 08.7	−11.5	23.3	56 03.7	−10.9	23.9	56 58.4	−10.1	24.5	75
76	50 16.0	−15.7	19.3	51 12.6	−15.2	19.7	52 09.0	−14.7	20.2	53 05.2	−14.1	20.6	54 01.3	−13.6	21.1	54 57.2	−13.0	21.6	55 52.8	−12.3	22.2	56 48.3	−11.6	22.7	76
77	50 00.3	−16.9	17.8	50 57.4	−16.5	18.2	51 54.3	−16.0	18.6	52 51.1	−15.5	19.0	53 47.7	−14.9	19.5	54 44.2	−14.3	19.9	55 40.5	−13.7	20.4	56 36.7	−13.2	20.9	77
78	49 43.4	−18.0	16.3	50 40.9	−17.6	16.7	51 38.3	−17.1	17.0	52 35.6	−16.7	17.4	53 32.8	−16.2	17.8	54 29.9	−15.7	18.2	55 26.8	−15.2	18.7	56 23.5	−14.6	19.2	78
79	49 25.4	−19.2	14.9	50 23.3	−18.8	15.2	51 21.2	−18.4	15.5	52 18.9	−17.9	15.8	53 16.6	−17.5	16.2	54 14.2	−17.1	16.6	55 11.6	−16.6	17.0	56 08.9	−16.1	17.4	79
80	49 06.2	−20.2	13.4	50 04.5	−19.8	13.7	51 02.8	−19.5	14.0	52 01.0	−19.2	14.3	52 59.1	−18.8	14.6	53 57.1	−18.4	15.0	54 55.0	−17.9	15.3	55 52.8	−17.5	15.7	80
81	48 46.0	−21.3	12.0	49 44.7	−21.0	12.2	50 43.3	−20.7	12.5	51 41.8	−20.3	12.8	52 40.3	−20.0	13.0	53 38.7	−19.6	13.3	54 37.1	−19.3	13.7	55 35.3	−18.9	14.0	81
82	48 24.7	−22.3	10.6	49 23.7	−22.1	10.8	50 22.6	−21.8	11.0	51 21.5	−21.5	11.2	52 20.3	−21.2	11.5	53 19.1	−20.9	11.8	54 17.8	−20.6	12.0	55 16.4	−20.2	12.3	82
83	48 02.4	−23.3	9.2	49 01.6	−23.0	9.4	50 00.8	−22.8	9.5	51 00.0	−22.6	9.8	51 59.1	−22.4	10.0	52 58.2	−22.2	10.2	53 57.2	−21.9	10.4	54 56.2	−21.6	10.7	83
84	47 39.1	−24.2	7.8	48 38.6	−24.1	8.0	49 38.0	−23.9	8.1	50 37.4	−23.8	8.3	51 36.7	−23.5	8.5	52 36.0	−23.2	8.7	53 35.3	−23.0	8.9	54 34.6	−22.8	9.1	84
85	47 14.9	−25.2	6.4	48 14.5	−25.1	6.6	49 14.1	−24.9	6.7	50 13.6	−24.7	6.8	51 13.2	−24.6	7.0	52 12.8	−24.5	7.1	53 12.3	−24.3	7.3	54 11.8	−24.1	7.5	85
86	46 49.7	−26.2	5.1	47 49.4	−26.0	5.2	48 49.2	−25.9	5.3	49 48.9	−25.8	5.4	50 48.6	−25.6	5.5	51 48.3	−25.5	5.7	52 48.0	−25.4	5.8	53 47.7	−25.2	5.9	86
87	46 23.5	−27.0	3.8	47 23.4	−26.9	3.9	48 23.3	−26.9	4.0	49 23.1	−26.7	4.0	50 23.0	−26.7	4.1	51 22.8	−26.6	4.2	52 22.6	−26.5	4.3	53 22.5	−26.4	4.4	87
88	45 56.5	−27.8	2.5	46 56.5	−27.8	2.6	47 56.4	−27.7	2.6	48 56.4	−27.8	2.7	49 56.3	−27.7	2.7	50 56.2	−27.6	2.8	51 56.1	−27.5	2.8	52 56.1	−27.5	2.9	88
89	45 28.7	−28.7	1.2	46 28.7	−28.7	1.3	47 28.7	−28.7	1.3	48 28.6	−28.6	1.3	49 28.6	−28.6	1.3	50 28.6	−28.6	1.4	51 28.6	−28.6	1.4	52 28.6	−28.6	1.4	89
90	45 00.0	−29.5	0.0	46 00.0	−29.5	0.0	47 00.0	−29.5	0.0	48 00.0	−29.5	0.0	49 00.0	−29.5	0.0	50 00.0	−29.6	0.0	51 00.0	−29.6	0.0	52 00.0	−29.6	0.0	90

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. **61°, 299°**

Dec.	45° Hc d Z	46° Hc d Z	47° Hc d Z	48° Hc d Z	49° Hc d Z	50° Hc d Z	51° Hc d Z	52° Hc d Z	Dec.
0	20 02.9 –45.2 111.4	19 40.8 –45.9 111.7	19 18.5 –46.6 112.1	18 55.8 –47.2 112.4	18 32.8 –47.9 112.7	18 09.4 –48.4 113.0	17 45.9 –49.1 113.3	17 22.0 –49.6 113.6	0
1	19 17.7 –45.4 112.1	18 54.9 –46.0 112.4	18 31.9 –46.7 112.7	18 08.6 –47.4 113.0	17 44.9 –47.9 113.3	17 21.0 –48.5 113.6	16 56.8 –49.1 113.9	16 32.4 –49.7 114.2	1
2	18 32.3 –45.6 112.8	18 08.9 –46.2 113.1	17 45.2 –46.9 113.4	17 21.2 –47.4 113.7	16 57.0 –48.1 114.0	16 32.5 –48.7 114.2	16 07.7 –49.2 114.5	15 42.7 –49.8 114.8	2
3	17 46.7 –45.7 113.5	17 22.7 –46.4 113.8	16 58.3 –46.9 114.0	16 33.8 –47.6 114.3	16 08.9 –48.2 114.6	15 43.8 –48.7 114.9	15 18.5 –49.3 115.1	14 52.9 –49.8 115.3	3
4	17 01.0 –45.8 114.2	16 36.3 –46.4 114.4	16 11.4 –47.1 114.7	15 46.2 –47.7 115.0	15 20.7 –48.2 115.2	14 55.1 –48.9 115.5	14 29.2 –49.4 115.7	14 03.1 –50.0 115.9	4
5	16 15.2 –46.0 114.8	15 49.9 –46.6 115.1	15 24.3 –47.2 115.3	14 58.5 –47.8 115.6	14 32.5 –48.4 115.8	14 06.2 –48.9 116.1	13 39.8 –49.5 116.3	13 13.1 –50.0 116.5	5
6	15 29.2 –46.0 115.5	15 03.3 –46.7 115.7	14 37.1 –47.3 116.0	14 10.7 –47.9 116.2	13 44.1 –48.5 116.4	13 17.3 –49.0 116.7	12 50.3 –49.6 116.9	12 23.1 –50.1 117.1	6
7	14 43.2 –46.2 116.2	14 16.6 –46.8 116.4	13 49.8 –47.4 116.6	13 22.8 –47.9 116.9	12 55.6 –48.5 117.0	12 28.3 –49.1 117.2	12 00.7 –49.6 117.4	11 33.0 –50.2 117.6	7
8	13 57.0 –46.3 116.8	13 29.8 –46.9 117.0	13 02.4 –47.5 117.2	12 34.9 –48.1 117.4	12 07.1 –48.6 117.6	11 39.2 –49.2 117.8	11 11.1 –49.7 118.0	10 42.8 –50.2 118.2	8
9	13 10.7 –46.4 117.5	12 42.9 –47.0 117.7	12 14.9 –47.5 117.9	11 46.8 –48.1 118.1	11 18.5 –48.7 118.2	10 50.0 –49.2 118.4	10 21.4 –49.8 118.6	9 52.6 –50.3 118.7	9
10	12 24.3 –46.5 118.1	11 55.9 –47.1 118.3	11 27.4 –47.7 118.5	10 58.7 –48.2 118.7	10 29.8 –48.8 118.9	10 00.8 –49.3 119.0	9 31.6 –49.8 119.1	9 02.3 –50.3 119.3	10
11	11 37.8 –46.6 118.8	11 08.8 –47.1 118.9	10 39.7 –47.7 119.1	10 10.5 –48.3 119.3	9 41.0 –48.8 119.4	9 11.5 –49.4 119.6	8 41.8 –49.9 119.7	8 12.0 –50.3 119.8	11
12	10 51.2 –46.6 119.4	10 21.7 –47.2 119.6	9 52.0 –47.8 119.7	9 22.2 –48.4 119.9	8 52.2 –48.8 120.0	8 22.1 –49.3 120.1	7 52.0 –50.0 120.3	7 21.7 –50.4 120.4	12
13	10 04.6 –46.7 120.1	9 34.5 –47.3 120.2	9 04.2 –47.8 120.3	8 33.8 –48.3 120.5	8 03.4 –49.0 120.6	7 32.8 –49.5 120.7	7 02.0 –49.9 120.8	6 31.3 –50.5 120.9	13
14	9 17.9 –46.8 120.7	8 47.2 –47.4 120.8	8 16.4 –47.9 121.0	7 45.5 –48.5 121.1	7 14.4 –48.9 121.2	6 43.3 –49.5 121.3	6 12.1 –50.0 121.4	5 40.8 –50.5 121.5	14
15	8 31.1 –46.9 121.3	7 59.8 –47.4 121.4	7 28.5 –48.0 121.6	6 57.0 –48.5 121.7	6 25.5 –49.0 121.8	5 53.8 –49.5 121.9	5 22.1 –50.0 121.9	4 50.3 –50.5 122.0	15
16	7 44.2 –46.9 122.0	7 12.4 –47.4 122.1	6 40.5 –48.0 122.2	6 08.5 –48.5 122.3	5 36.5 –49.1 122.4	5 04.3 –49.5 122.4	4 32.1 –50.0 122.5	3 59.8 –50.5 122.6	16
17	6 57.3 –46.9 122.6	6 25.0 –47.5 122.7	5 52.5 –48.0 122.8	5 20.0 –48.6 122.9	4 47.4 –49.0 122.9	4 14.8 –49.6 123.0	3 42.1 –50.1 123.1	3 09.3 –50.6 123.1	17
18	6 10.4 –47.0 123.2	5 37.5 –47.6 123.3	5 04.5 –48.1 123.4	4 31.4 –48.5 123.4	3 58.4 –49.1 123.5	3 25.2 –49.6 123.6	2 52.0 –50.1 123.6	2 18.8 –50.6 123.6	18
19	5 23.4 –47.1 123.8	4 49.9 –47.6 123.9	4 16.4 –48.1 124.0	3 42.9 –48.6 124.0	3 09.3 –49.2 124.1	2 35.6 –49.6 124.1	2 01.9 –50.0 124.2	1 28.2 –50.5 124.2	19
20	4 36.3 –47.0 124.5	4 02.3 –47.6 124.5	3 28.3 –48.1 124.6	2 54.3 –48.7 124.6	2 20.1 –49.1 124.7	1 46.0 –49.6 124.7	1 11.9 –50.1 124.7	0 37.7 –50.6 124.7	20
21	3 49.3 –47.1 125.1	3 14.7 –47.6 125.1	2 40.2 –48.1 125.2	2 05.6 –48.6 125.2	1 31.0 –49.1 125.2	0 56.4 –49.6 125.3	0 21.8 –50.1 125.3	0 12.9 +50.5 54.7	21
22	3 02.2 –47.2 125.7	2 27.1 –47.6 125.7	1 52.1 –48.2 125.8	1 17.0 –48.7 125.8	0 41.9 –49.2 125.8	0 06.8 –49.5 125.8	0 28.3 +50.1 54.2	1 03.4 +50.6 54.2	22
23	2 15.0 –47.1 126.3	1 39.5 –47.7 126.3	1 03.9 –48.1 126.4	0 28.3 –48.6 126.4	0 07.3 +49.1 53.6	0 42.8 +49.7 53.6	1 18.4 +50.1 53.6	1 54.0 +50.5 53.7	23
24	1 27.9 –47.1 126.9	0 51.8 –47.6 127.0	0 15.8 –48.2 127.0	0 20.3 +48.7 53.0	0 56.4 +49.1 53.0	1 32.5 +49.6 53.1	2 08.5 +50.1 53.1	2 44.5 +50.5 53.1	24
25	0 40.8 –47.2 127.6	0 04.2 –47.7 127.6	0 32.4 +48.1 52.4	1 09.0 +48.6 52.5	1 45.5 +49.1 52.5	2 22.1 +49.6 52.5	2 58.6 +50.0 52.5	3 35.0 +50.6 52.6	25
26	0 06.4 +47.1 51.8	0 43.5 +47.6 51.8	1 20.5 +48.2 51.8	1 57.6 +48.6 51.9	2 34.6 +49.2 51.9	3 11.7 +49.5 51.9	3 48.6 +50.1 52.0	4 25.6 +50.4 52.0	26
27	0 53.5 +47.2 51.2	1 31.1 +47.7 51.2	2 08.7 +48.1 51.2	2 46.2 +48.6 51.3	3 23.8 +49.0 51.3	4 01.2 +49.6 51.4	4 38.7 +50.0 51.4	5 16.0 +50.5 51.5	27
28	1 40.7 +47.1 50.6	2 18.8 +47.6 50.6	2 56.8 +48.1 50.6	3 34.8 +48.6 50.7	4 12.8 +49.1 50.7	4 50.8 +49.5 50.8	5 28.7 +49.9 50.9	6 06.5 +50.4 51.0	28
29	2 27.8 +47.1 50.0	3 06.4 +47.6 50.0	3 44.9 +48.1 50.0	4 23.4 +48.6 50.1	5 01.9 +49.0 50.2	5 40.3 +49.5 50.2	6 18.6 +50.0 50.3	6 56.9 +50.4 50.4	29
30	3 14.9 +47.1 49.3	3 54.0 +47.6 49.4	4 33.0 +48.1 49.4	5 12.0 +48.5 49.5	5 50.9 +49.0 49.6	6 29.8 +49.4 49.7	7 08.6 +49.9 49.8	7 47.3 +50.3 49.9	30
31	4 02.0 +47.1 48.7	4 41.6 +47.5 48.8	5 21.1 +48.0 48.8	6 00.5 +48.5 48.9	6 39.9 +49.0 49.0	7 19.2 +49.5 49.1	7 58.5 +49.8 49.2	8 37.6 +50.3 49.3	31
32	4 49.1 +47.0 48.1	5 29.1 +47.6 48.2	6 09.1 +48.0 48.2	6 49.0 +48.5 48.3	7 28.9 +48.9 48.4	8 07.7 +49.3 48.5	8 48.3 +49.8 48.6	9 27.9 +50.3 48.8	32
33	5 36.1 +47.0 47.5	6 16.6 +47.5 47.6	6 57.1 +47.9 47.6	7 37.5 +48.4 47.7	8 17.8 +48.8 47.8	8 58.0 +49.3 48.0	9 38.1 +49.8 48.1	10 18.2 +50.2 48.2	33
34	6 23.1 +46.9 46.9	7 04.1 +47.4 46.9	7 45.0 +47.9 47.1	8 25.9 +48.3 47.1	9 06.6 +48.8 47.3	9 47.3 +49.3 47.4	10 27.9 +49.7 47.5	11 08.4 +50.1 47.7	34
35	7 10.0 +46.9 46.2	7 51.5 +47.4 46.3	8 32.9 +47.8 46.4	9 14.2 +48.3 46.5	9 55.4 +48.8 46.7	10 36.6 +49.1 46.8	11 17.6 +49.6 46.9	11 58.5 +50.1 47.1	35
36	7 56.9 +46.9 45.6	8 38.9 +47.3 45.7	9 20.7 +47.8 45.8	10 02.5 +48.2 45.9	10 44.2 +48.6 46.1	11 25.7 +49.2 46.2	12 07.2 +49.6 46.4	12 48.6 +49.9 46.5	36
37	8 43.8 +46.7 45.0	9 26.2 +47.2 45.1	10 08.5 +47.7 45.2	10 50.7 +48.2 45.3	11 32.8 +48.6 45.5	12 14.9 +49.0 45.6	12 56.8 +49.4 45.8	13 38.5 +50.0 46.0	37
38	9 30.5 +46.7 44.3	10 13.4 +47.2 44.5	10 56.2 +47.6 44.6	11 38.9 +48.0 44.7	12 21.4 +48.6 44.9	13 03.9 +49.0 45.0	13 46.2 +49.4 45.2	14 28.5 +49.8 45.4	38
39	10 17.2 +46.7 43.7	11 00.6 +47.1 43.8	11 43.8 +47.5 44.0	12 26.9 +48.0 44.1	13 10.0 +48.4 44.3	13 52.9 +48.8 44.4	14 35.6 +49.3 44.6	15 18.3 +49.7 44.8	39
40	11 03.9 +46.5 43.1	11 47.7 +47.0 43.2	12 31.3 +47.5 43.3	13 14.9 +47.9 43.5	13 58.4 +48.3 43.7	14 41.7 +48.8 43.8	15 24.9 +49.2 44.0	16 08.0 +49.6 44.2	40
41	11 50.4 +46.5 42.4	12 34.7 +46.9 42.6	13 18.8 +47.4 42.7	14 02.8 +47.8 42.9	14 46.7 +48.3 43.1	15 30.5 +48.7 43.2	16 14.1 +49.2 43.4	16 57.6 +49.6 43.6	41
42	12 36.9 +46.3 41.8	13 21.6 +46.8 41.9	14 06.2 +47.2 42.1	14 50.6 +47.7 42.3	15 35.0 +48.1 42.4	16 19.2 +48.6 42.6	17 03.3 +49.0 42.8	17 47.2 +49.4 43.0	42
43	13 23.2 +46.3 41.1	14 08.4 +46.7 41.3	14 53.4 +47.2 41.4	15 38.3 +47.6 41.6	16 23.1 +48.0 41.8	17 07.8 +48.4 42.0	17 52.3 +48.9 42.2	18 36.6 +49.3 42.5	43
44	14 09.5 +46.1 40.5	14 55.1 +46.6 40.6	15 40.6 +47.0 40.8	16 25.9 +47.5 41.0	17 11.1 +48.0 41.2	17 56.2 +48.4 41.4	18 41.2 +48.7 41.6	19 25.9 +49.2 41.8	44
45	14 55.6 +46.1 39.8	15 41.7 +46.5 40.0	16 27.6 +46.9 40.2	17 13.4 +47.4 40.4	17 59.1 +47.7 40.6	18 44.6 +48.2 40.8	19 29.9 +48.7 41.0	20 15.1 +49.1 41.2	45
46	15 41.7 +45.9 39.1	16 28.2 +46.3 39.3	17 14.5 +46.8 39.5	18 00.8 +47.2 39.7	18 46.8 +47.7 39.9	19 32.8 +48.1 40.1	20 18.6 +48.5 40.4	21 04.2 +48.9 40.6	46
47	16 27.6 +45.8 38.5	17 14.5 +46.3 38.6	18 01.3 +46.7 38.8	18 48.0 +47.1 39.1	19 34.5 +47.5 39.3	20 20.9 +47.9 39.5	21 07.1 +48.4 39.7	21 53.1 +48.8 40.0	47
48	17 13.4 +45.7 37.8	18 00.8 +46.0 38.0	18 48.0 +46.5 38.2	19 35.1 +46.9 38.4	20 22.0 +47.4 38.6	21 08.8 +47.8 38.9	21 55.5 +48.2 39.1	22 41.9 +48.7 39.4	48
49	17 59.1 +45.5 37.1	18 46.8 +46.0 37.3	19 34.5 +46.4 37.5	20 22.0 +46.8 37.7	21 09.4 +47.2 38.0	21 56.6 +47.7 38.2	22 43.7 +48.0 38.5	23 30.6 +48.5 38.7	49
50	18 44.6 +45.3 36.4	19 32.8 +45.8 36.6	20 20.9 +46.2 36.8	21 08.8 +46.6 37.1	21 56.6 +47.1 37.3	22 44.3 +47.4 37.6	23 31.7 +47.9 37.8	24 19.1 +48.3 38.1	50
51	19 29.9 +45.2 35.7	20 18.6 +45.6 35.9	21 07.1 +46.0 36.2	21 55.5 +46.4 36.4	22 43.7 +46.9 36.6	23 31.7 +47.3 36.9	24 19.6 +47.8 37.2	25 07.4 +48.1 37.4	51
52	20 15.1 +45.1 35.0	21 04.2 +45.4 35.2	21 53.1 +45.9 35.5	22 41.9 +46.3 35.7	23 30.6 +46.7 36.0	24 19.1 +47.1 36.2	25 07.4 +47.5 36.5	25 55.5 +48.0 36.8	52
53	21 00.2 +44.8 34.3	21 49.6 +45.3 34.5	22 39.0 +45.7 34.8	23 28.2 +46.1 35.0	24 17.3 +46.5 35.3	25 06.2 +46.9 35.5	25 54.9 +47.4 35.8	26 43.5 +47.8 36.1	53
54	21 45.0 +44.7 33.6	22 34.9 +45.1 33.8	23 24.7 +45.5 34.1	24 14.3 +45.9 34.3	25 03.8 +46.3 34.6	25 53.1 +46.8 34.8	26 42.3 +47.1 35.1	27 31.3 +47.5 35.4	54
55	22 29.7 +44.5 32.9	23 20.0 +44.9 33.1	24 10.2 +45.3 33.4	25 00.2 +45.7 33.6	25 50.1 +46.1 33.9	26 39.9 +46.5 34.2	27 29.4 +47.0 34.4	28 18.8 +47.4 34.7	55
56	23 14.2 +44.2 32.4	24 04.9 +44.7 32.4	24 55.5 +45.1 32.6	25 45.9 +45.5 32.9	26 36.2 +46.0 33.2	27 26.4 +46.3 33.4	28 16.4 +46.7 33.7	29 06.2 +47.1 34.0	56
57	23 58.4 +44.1 31.4	24 49.6 +44.4 31.7	25 40.6 +44.8 31.9	26 31.4 +45.3 32.2	27 22.2 +45.6 32.4	28 12.7 +46.1 32.7	29 03.1 +46.5 33.0	29 53.3 +46.9 33.3	57
58	24 42.5 +43.8 30.7	25 34.0 +44.3 30.9	26 25.4 +44.7 31.2	27 16.7 +45.0 31.4	28 07.8 +45.5 31.7	28 58.8 +45.8 32.0	29 49.6 +46.3 32.3	30 40.2 +46.7 32.6	58
59	25 26.3 +43.6 29.9	26 18.3 +44.0 30.2	27 10.1 +44.4 30.4	28 01.7 +44.8 30.7	28 53.3 +45.2 31.0	29 44.6 +45.6 31.3	30 35.9 +46.0 31.6	31 26.9 +46.4 31.9	59
60	26 09.9 +43.4 29.2	27 02.3 +43.7 29.4	27 54.5 +44.1 29.7	28 46.5 +44.6 29.9	29 38.5 +44.9 30.2	30 30.2 +45.4 30.5	31 21.9 +45.7 30.8	32 13.3 +46.1 31.1	60
61	26 53.3 +43.1 28.4	27 46.0 +43.5 28.6	28 38.6 +43.9 28.9	29 31.1 +44.2 29.2	30 23.4 +44.7 29.4	31 15.6 +45.0 29.7	32 07.6 +45.5 30.0	32 59.4 +45.9 30.4	61
62	27 36.4 +42.8 27.6	28 29.5 +43.2 27.9	29 22.5 +43.6 28.1	30 15.3 +44.0 28.4	31 08.1 +44.3 28.7	32 00.6 +44.8 28.9	32 53.1 +45.1 29.3	33 45.3 +45.6 29.6	62
63	28 19.2 +42.6 26.8	29 12.7 +43.0 27.1	30 06.1 +43.3 27.3	30 59.3 +43.7 27.6	31 52.4 +44.1 27.9	32 45.4 +44.5 28.2	33 38.2 +44.9 28.5	34 30.9 +45.2 28.8	63
64	29 01.8 +42.3 26.0	29 55.7 +42.6 26.3	30 49.4 +43.0 26.5	31 43.0 +43.4 26.8	32 36.5 +43.8 27.1	33 29.9 +44.1 27.4	34 23.1 +44.5 27.7	35 16.1 +45.0 28.0	64
65	29 44.1 +41.9 25.2	30 38.3 +42.3 25.4	31 32.4 +42.7 25.7	32 26.4 +43.1 26.0	33 20.3 +43.4 26.3	34 14.0 +43.9 26.6	35 07.6 +44.2 26.9	36 01.1 +44.6 27.2	65
66	30 26.0 +41.7 24.4	31 20.6 +42.0 24.6	32 15.1 +42.4 24.9	33 09.5 +42.7 25.1	34 03.7 +43.1 25.4	34 57.9 +43.4 25.7	35 51.8 +43.9 26.0	36 45.7 +44.2 26.4	66
67	31 07.7 +41.3 23.5	32 02.6 +41.7 23.8	32 57.5 +42.0 24.0	33 52.2 +42.4 24.3	34 46.8 +42.8 24.6	35 41.3 +43.2 24.9	36 35.7 +43.5 25.2	37 29.9 +43.9 25.5	67
68	31 49.0 +41.0 22.7	32 44.3 +41.3 22.9	33 39.5 +41.7 23.2	34 34.6 +42.0 23.4	35 29.6 +42.4 23.7	36 24.5 +42.7 24.0	37 19.2 +43.1 24.3	38 13.8 +43.5 24.7	68
69	32 30.0 +40.6 21.8	33 25.6 +41.0 22.1	34 21.2 +41.3 22.3	35 16.6 +41.7 22.6	36 12.0 +42.0 22.9	37 07.2 +42.3 23.1	38 02.3 +42.7 23.5	38 57.3 +43.1 23.8	69
70	33 10.6 +40.2 20.9	34 06.6 +40.5 21.2	35 02.5 +40.9 21.4	35 58.3 +41.2 21.7	36 54.0 +41.5 22.0	37 49.5 +42.0 22.3	38 45.0 +42.3 22.6	39 40.4 +42.6 22.9	70
71	33 50.8 +39.9 20.1	34 47.1 +40.2 20.3	35 43.4 +40.5 20.5	36 39.5 +40.8 20.8	37 35.5 +41.2 21.1	38 31.5 +41.5 21.3	39 27.3 +41.9 21.6	40 23.0 +42.2 22.0	71
72	34 30.7 +39.4 19.1	35 27.3 +39.8 19.4	36 23.9 +40.0 19.6	37 20.3 +40.4 19.9	38 16.7 +40.7 20.1	39 13.0 +41.0 20.4	40 09.2 +41.4 20.7	41 05.2 +41.8 21.0	72
73	35 10.1 +39.0 18.2	36 07.1 +39.3 18.5	37 03.9 +39.7 18.7	38 00.7 +40.0 18.9	38 57.4 +40.3 19.2	39 54.0 +40.6 19.5	40 50.6 +40.9 19.8	41 47.0 +41.2 20.1	73
74	35 49.1 +38.6 17.3	36 46.4 +38.8 17.5	37 43.6 +39.1 17.7	38 40.7 +39.4 18.0	39 37.7 +39.8 18.2	40 34.6 +40.1 18.5	41 31.5 +40.4 18.8	42 28.2 +40.8 19.1	74
75	36 27.7 +38.1 16.3	37 25.2 +38.5 16.5	38 22.7 +38.7 16.8	39 20.1 +39.0 17.0	40 17.5 +39.2 17.3	41 14.7 +39.6 17.5	42 11.9 +39.9 17.8	43 09.0 +40.2 18.1	75
76	37 05.8 +37.7 15.4	38 03.7 +37.9 15.6	39 01.4 +38.2 15.8	39 59.1 +38.5 16.0	40 56.7 +38.8 16.3	41 54.3 +39.1 16.5	42 51.8 +39.3 16.8	43 49.2 +39.7 17.1	76
77	37 43.5 +37.1 14.4	38 41.6 +37.4 14.6	39 39.6 +37.7 14.8	40 37.6 +37.9 15.0	41 35.5 +38.2 15.3	42 33.4 +38.4 15.5	43 31.1 +38.8 15.7	44 28.9 +39.0 16.0	77
78	38 20.6 +36.7 13.4	39 19.0 +36.9 13.6	40 17.3 +37.1 13.8	41 15.5 +37.4 14.0	42 13.7 +37.6 14.2	43 11.8 +37.9 14.4	44 09.9 +38.2 14.7	45 07.9 +38.5 14.9	78
79	38 57.3 +36.1 12.4	39 55.9 +36.3 12.6	40 54.4 +36.6 12.8	41 52.9 +36.8 13.0	42 51.3 +37.1 13.2	43 49.7 +37.3 13.4	44 48.1 +37.5 13.6	45 46.4 +37.8 13.8	79
80	39 33.4 +35.5 11.4	40 32.2 +35.7 11.5	41 31.0 +35.9 11.7	42 29.7 +36.2 11.9	43 28.4 +36.4 12.1	44 27.0 +36.7 12.3	45 25.6 +36.9 12.5	46 24.2 +37.1 12.7	80
81	40 08.9 +35.0 10.3	41 07.9 +35.2 10.5	42 06.9 +35.4 10.6	43 05.9 +35.5 10.8	44 04.8 +35.8 11.0	45 03.7 +36.0 11.2	46 02.5 +36.2 11.4	47 01.3 +36.5 11.6	81
82	40 43.9 +34.4 9.2	41 43.1 +34.5 9.4	42 42.3 +34.7 9.5	43 41.4 +34.9 9.7	44 40.6 +35.1 9.9	45 39.7 +35.3 10.0	46 38.7 +35.5 10.2	47 37.8 +35.7 10.4	82
83	41 18.3 +33.7 8.2	42 17.6 +33.9 8.3	43 17.0 +34.1 8.4	44 16.3 +34.3 8.6	45 15.7 +34.4 8.7	46 15.0 +34.5 8.9	47 14.2 +34.8 9.0	48 13.5 +34.9 9.2	83
84	41 52.0 +33.1 7.1	42 51.5 +33.3 7.2	43 51.1 +33.3 7.3	44 50.6 +33.5 7.4	45 50.1 +33.6 7.5	46 49.5 +33.9 7.7	47 49.0 +34.0 7.8	48 48.4 +34.2 8.0	84
85	42 25.1 +32.4 5.9	43 24.8 +32.5 6.0	44 24.4 +32.7 6.1	45 24.1 +32.8 6.2	46 23.7 +32.9 6.3	47 23.4 +33.0 6.5	48 23.0 +33.1 6.6	49 22.6 +33.3 6.7	85
86	42 57.5 +31.8 4.8	43 57.3 +31.8 4.9	44 57.1 +31.9 4.9	45 56.9 +32.0 5.0	46 56.6 +32.1 5.1	47 56.4 +32.2 5.2	48 56.1 +32.4 5.3	49 55.9 +32.4 5.4	86
87	43 29.3 +31.0 3.6	44 29.1 +31.1 3.7	45 29.0 +31.1 3.7	46 28.9 +31.2 3.8	47 28.7 +31.3 3.9	48 28.6 +31.4 3.9	49 28.5 +31.4 4.0	50 28.3 +31.5 4.1	87
88	44 00.3 +30.2 2.4	45 00.2 +30.3 2.5	46 00.1 +30.4 2.5	47 00.1 +30.4 2.6	48 00.0 +30.5 2.6	49 00.0 +30.4 2.7	49 59.9 +30.5 2.7	50 59.8 +30.6 2.8	88
89	44 30.5 +29.5 1.2	45 30.5 +29.5 1.2	46 30.5 +29.5 1.3	47 30.5 +29.5 1.3	48 30.5 +29.5 1.3	49 30.4 +29.6 1.3	50 30.4 +29.6 1.4	51 30.4 +29.6 1.4	89
90	45 00.0 +28.7 0.0	46 00.0 +28.7 0.0	47 00.0 +28.7 0.0	48 00.0 +28.6 0.0	49 00.0 +28.6 0.0	50 00.0 +28.6 0.0	51 00.0 +28.6 0.0	52 00.0 +28.6 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION L.H.A. **119°, 241°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	19 23.3	+44.9	110.6	19 02.0	+45.6	110.9	18 40.4	+46.3	111.2	18 18.5	+46.9	111.6	17 56.3	+47.6	111.9	17 33.8	+48.2	112.2	17 11.1	+48.7	112.5	16 48.0	+49.4	112.7	0
1	20 08.2	+44.7	109.9	19 47.6	+45.4	110.2	19 26.7	+46.1	110.6	19 05.4	+46.8	110.9	18 43.9	+47.4	111.2	18 22.0	+48.0	111.5	17 59.8	+48.7	111.8	17 37.4	+49.2	112.1	1
2	20 52.9	+44.6	109.2	20 33.0	+45.3	109.5	20 12.8	+45.9	109.9	19 52.2	+46.6	110.2	19 31.3	+47.2	110.6	19 10.0	+47.9	110.9	18 48.5	+48.5	111.2	18 26.6	+49.1	111.5	2
3	21 37.5	+44.3	108.5	21 18.3	+45.0	108.8	20 58.7	+45.8	109.2	20 38.8	+46.4	109.6	20 18.5	+47.1	109.9	19 57.9	+47.8	110.3	19 37.0	+48.3	110.6	19 15.7	+49.0	110.9	3
4	22 21.8	+44.2	107.7	22 03.3	+44.9	108.1	21 44.5	+45.6	108.5	21 25.2	+46.3	108.9	21 05.6	+47.0	109.3	20 45.7	+47.6	109.6	20 25.3	+48.3	110.0	20 04.7	+48.8	110.3	4
5	23 06.0	+43.9	107.0	22 48.2	+44.7	107.4	22 30.1	+45.4	107.8	22 11.5	+46.1	108.2	21 52.6	+46.8	108.6	21 33.3	+47.4	109.0	21 13.6	+48.1	109.3	20 53.5	+48.8	109.7	5
6	23 49.9	+43.8	106.3	23 32.9	+44.5	106.7	23 15.5	+45.2	107.1	22 57.6	+46.0	107.5	22 39.4	+46.6	107.9	22 20.7	+47.3	108.3	22 01.7	+47.9	108.7	21 42.3	+48.6	109.1	6
7	24 33.7	+43.5	105.5	24 17.4	+44.3	106.0	24 00.7	+45.0	106.4	23 43.6	+45.7	106.8	23 26.0	+46.4	107.2	23 08.0	+47.1	107.6	22 49.6	+47.8	108.0	22 30.9	+48.4	108.4	7
8	25 17.2	+43.3	104.8	25 01.7	+44.0	105.2	24 45.7	+44.8	105.7	24 29.3	+45.5	106.1	24 12.4	+46.3	106.5	23 55.1	+47.0	107.0	23 37.4	+47.7	107.4	23 19.3	+48.3	107.8	8
9	26 00.5	+43.0	104.0	25 45.7	+43.8	104.5	25 30.5	+44.6	104.9	25 14.8	+45.4	105.4	24 58.7	+46.0	105.8	24 42.1	+46.7	106.3	24 25.1	+47.4	106.7	24 07.6	+48.1	107.1	9
10	26 43.5	+42.8	103.2	26 29.5	+43.6	103.7	26 15.1	+44.3	104.2	26 00.2	+45.1	104.7	25 44.7	+45.9	105.1	25 28.8	+46.6	105.6	25 12.5	+47.3	106.0	24 55.7	+47.9	106.5	10
11	27 26.3	+42.5	102.4	27 13.1	+43.3	102.9	26 59.4	+44.1	103.4	26 45.3	+44.8	103.9	26 30.6	+45.6	104.4	26 15.4	+46.4	104.9	25 59.8	+47.0	105.4	25 43.6	+47.8	105.8	11
12	28 08.8	+42.2	101.6	27 56.4	+43.1	102.1	27 43.5	+43.9	102.7	27 30.1	+44.7	103.2	27 16.2	+45.4	103.7	27 01.8	+46.1	104.2	26 46.8	+46.9	104.7	26 31.4	+47.5	105.2	12
13	28 51.0	+42.0	100.8	28 39.5	+42.7	101.4	28 27.4	+43.6	101.9	28 14.8	+44.3	102.4	28 01.6	+45.1	102.9	27 47.9	+45.9	103.5	27 33.7	+46.6	104.0	27 18.9	+47.4	104.5	13
14	29 33.0	+41.6	100.0	29 22.2	+42.5	100.6	29 11.0	+43.3	101.1	28 59.1	+44.1	101.7	28 46.7	+44.9	102.2	28 33.8	+45.7	102.7	28 20.3	+46.4	103.3	28 06.3	+47.1	103.8	14
15	30 14.6	+41.3	99.2	30 04.7	+42.2	99.7	29 54.3	+43.0	100.3	29 43.2	+43.9	100.9	29 31.6	+44.7	101.4	29 19.5	+45.4	102.0	29 06.7	+46.2	102.5	28 53.4	+47.0	103.1	15
16	30 55.9	+41.0	98.3	30 46.9	+41.8	98.9	30 37.3	+42.7	99.5	30 27.1	+43.5	100.1	30 16.3	+44.3	100.7	30 04.9	+45.1	101.2	29 52.9	+45.9	101.8	29 40.4	+46.6	102.4	16
17	31 36.9	+40.6	97.5	31 28.7	+41.6	98.1	31 20.0	+42.4	98.7	31 10.6	+43.3	99.3	31 00.6	+44.1	99.9	30 50.0	+44.9	100.5	30 38.8	+45.7	101.1	30 27.0	+46.5	101.6	17
18	32 17.5	+40.3	96.6	32 10.3	+41.1	97.2	32 02.4	+42.1	97.9	31 53.9	+42.9	98.5	31 44.7	+43.8	99.1	31 34.9	+44.6	99.7	31 24.5	+45.4	100.3	31 13.5	+46.2	100.9	18
19	32 57.8	+39.9	95.7	32 51.4	+40.9	96.4	32 44.5	+41.7	97.0	32 36.8	+42.6	97.6	32 28.5	+43.5	98.3	32 19.5	+44.3	98.9	32 09.9	+45.1	99.5	31 59.7	+45.9	100.1	19
20	33 37.7	+39.5	94.8	33 32.3	+40.4	95.5	33 26.2	+41.3	96.1	33 19.4	+42.3	96.8	33 12.0	+43.1	97.5	33 03.8	+44.0	98.1	32 55.0	+44.9	98.7	32 45.6	+45.6	99.4	20
21	34 17.2	+39.0	93.9	34 12.7	+40.0	94.6	34 07.5	+41.0	95.3	34 01.7	+41.9	96.0	33 55.1	+42.8	96.6	33 47.8	+43.7	97.3	33 39.9	+44.5	97.9	33 31.2	+45.4	98.6	21
22	34 56.2	+38.7	93.0	34 52.7	+39.7	93.7	34 48.5	+40.6	94.4	34 43.6	+41.5	95.1	34 37.9	+42.4	95.8	34 31.5	+43.3	96.5	34 24.4	+44.2	97.1	34 16.6	+45.0	97.8	22
23	35 34.9	+38.2	92.1	35 32.4	+39.2	92.8	35 29.1	+40.2	93.5	35 25.1	+41.1	94.2	35 20.3	+42.1	94.9	35 14.8	+43.0	95.6	35 08.6	+43.8	96.3	35 01.6	+44.7	97.0	23
24	36 13.1	+37.8	91.1	36 11.6	+38.8	91.8	36 09.3	+39.7	92.6	36 06.2	+40.7	93.3	36 02.4	+41.6	94.0	35 57.8	+42.6	94.8	35 52.4	+43.5	95.5	35 46.3	+44.4	96.2	24
25	36 50.9	+37.3	90.1	36 50.4	+38.3	90.9	36 49.0	+39.3	91.6	36 46.9	+40.3	92.4	36 44.0	+41.3	93.1	36 40.4	+42.2	93.9	36 35.9	+43.1	94.6	36 30.7	+44.0	95.4	25
26	37 28.2	+36.8	89.2	37 28.7	+37.8	89.9	37 28.3	+38.9	90.7	37 27.2	+39.9	91.5	37 25.3	+40.8	92.2	37 22.6	+41.7	93.0	37 19.0	+42.8	93.8	37 14.7	+43.6	94.5	26
27	38 05.0	+36.3	88.2	38 06.5	+37.3	88.9	38 07.2	+38.4	89.7	38 07.1	+39.4	90.5	38 06.1	+40.4	91.3	38 04.3	+41.4	92.1	38 01.8	+42.3	92.9	37 58.3	+43.3	93.6	27
28	38 41.3	+35.7	87.1	38 43.8	+36.8	87.9	38 45.6	+37.8	88.7	38 46.5	+38.9	89.6	38 46.5	+39.9	90.4	38 45.7	+40.9	91.2	38 44.1	+41.9	92.0	38 41.6	+42.8	92.8	28
29	39 17.0	+35.2	86.1	39 20.6	+36.3	86.9	39 23.4	+37.4	87.8	39 25.4	+38.4	88.6	39 26.4	+39.5	89.4	39 26.6	+40.5	90.3	39 26.0	+41.4	91.0	39 24.4	+42.5	91.9	29
30	39 52.2	+34.6	85.1	39 56.9	+35.7	85.9	40 00.8	+36.8	86.7	40 03.8	+37.8	87.6	40 05.9	+38.9	88.4	40 07.1	+39.9	89.3	40 07.4	+41.0	90.1	40 06.9	+41.9	90.9	30
31	40 26.8	+34.0	84.0	40 32.6	+35.2	84.8	40 37.6	+36.2	85.7	40 41.6	+37.4	86.6	40 44.8	+38.4	87.4	40 47.0	+39.5	88.3	40 48.4	+40.5	89.1	40 48.8	+41.6	90.0	31
32	41 00.8	+33.4	82.9	41 07.8	+34.5	83.8	41 13.8	+35.7	84.6	41 19.0	+36.7	85.5	41 23.2	+37.8	86.4	41 26.5	+38.9	87.3	41 28.9	+40.0	88.2	41 30.4	+41.0	89.0	32
33	41 34.2	+32.7	81.8	41 42.3	+33.9	82.7	41 49.5	+35.0	83.6	41 55.7	+36.2	84.5	42 01.0	+37.3	85.4	42 05.4	+38.4	86.3	42 08.9	+39.4	87.2	42 11.4	+40.5	88.1	33
34	42 06.9	+32.1	80.7	42 16.2	+33.2	81.6	42 24.5	+34.4	82.5	42 31.9	+35.5	83.4	42 38.3	+36.7	84.3	42 43.8	+37.8	85.2	42 48.3	+38.9	86.1	42 51.9	+40.0	87.1	34
35	42 39.0	+31.3	79.5	42 49.4	+32.6	80.4	42 58.9	+33.7	81.4	43 07.4	+34.9	82.3	43 15.0	+36.1	83.2	43 21.6	+37.2	84.2	43 27.2	+38.3	85.1	43 31.9	+39.4	86.0	35
36	43 10.3	+30.7	78.4	43 22.0	+31.8	79.3	43 32.6	+33.1	80.2	43 42.3	+34.3	81.2	43 51.1	+35.4	82.1	43 58.8	+36.6	83.1	44 05.5	+37.8	84.0	44 11.3	+38.8	85.0	36
37	43 41.0	+29.9	77.2	43 53.8	+31.1	78.1	44 05.7	+32.3	79.1	44 16.6	+33.5	80.0	44 26.5	+34.7	81.0	44 35.4	+35.9	82.0	44 43.3	+37.0	82.9	44 50.1	+38.2	83.9	37
38	44 10.9	+29.1	76.0	44 24.9	+30.4	76.9	44 38.0	+31.6	77.9	44 50.1	+32.8	78.9	45 01.2	+34.0	79.8	45 11.3	+35.2	80.8	45 20.3	+36.4	81.8	45 28.3	+37.6	82.8	38
39	44 40.0	+28.3	74.8	44 55.3	+29.6	75.7	45 09.6	+30.8	76.7	45 22.9	+32.1	77.7	45 35.2	+33.3	78.7	45 46.5	+34.5	79.7	45 56.7	+35.8	80.7	46 05.9	+36.9	81.7	39
40	45 08.3	+27.5	73.5	45 24.9	+28.8	74.5	45 40.4	+30.1	75.5	45 55.0	+31.3	76.5	46 08.5	+32.6	77.5	46 21.0	+33.8	78.5	46 32.5	+35.0	79.5	46 42.8	+36.2	80.6	40
41	45 35.8	+26.7	72.2	45 53.7	+27.9	73.2	46 10.5	+29.2	74.2	46 26.3	+30.5	75.2	46 41.1	+31.7	76.3	46 54.8	+33.0	77.3	47 07.5	+34.2	78.3	47 19.0	+35.5	79.4	41
42	46 02.5	+25.8	71.0	46 21.6	+27.1	71.9	46 39.7	+28.3	73.0	46 56.8	+29.6	74.0	47 12.8	+30.9	75.0	47 27.8	+32.2	76.1	47 41.7	+33.5	77.1	47 54.5	+34.7	78.2	42
43	46 28.3	+24.9	69.7	46 48.7	+26.1	70.6	47 08.0	+27.5	71.7	47 26.4	+28.8	72.7	47 43.7	+30.1	73.7	48 00.0	+31.3	74.8	48 15.2	+32.6	75.9	48 29.2	+34.0	77.0	43
44	46 53.2	+23.9	68.3	47 14.8	+25.3	69.3	47 35.5	+26.6	70.4	47 55.2	+27.8	71.4	48 13.8	+29.2	72.5	48 31.3	+30.5	73.5	48 47.8	+31.8	74.6	49 03.2	+33.1	75.7	44
45	47 17.1	+23.0	67.0	47 40.1	+24.3	68.0	48 02.1	+25.6	69.0	48 23.0	+27.0	70.1	48 43.0	+28.2	71.1	49 01.8	+29.6	72.2	49 19.6	+30.9	73.3	49 36.3	+32.2	74.4	45
46	47 40.1	+22.0	65.6	48 04.4	+23.3	66.6	48 27.7	+24.6	67.7	48 50.0	+25.9	68.7	49 11.2	+27.3	69.8	49 31.4	+28.7	70.9	49 50.5	+30.0	72.0	50 08.5	+31.3	73.1	46
47	48 02.1	+20.9	64.2	48 27.7	+22.3	65.2	48 52.3	+23.6	66.3	49 15.9	+25.0	67.3	49 38.5	+26.4	68.5	50 00.1	+27.6	69.5	50 20.5	+29.0	70.7	50 39.8	+30.4	71.8	47
48	48 23.0	+20.0	62.8	48 50.0	+21.2	63.8	49 15.9	+22.6	64.9	49 40.9	+24.0	65.9	50 04.9	+25.3	67.0	50 27.7	+26.7	68.1	50 49.5	+28.1	69.3	51 10.2	+29.4	70.4	48
49	48 43.0	+18.8	61.4	49 11.2	+20.2	62.4	49 38.5	+21.6	63.4	50 04.9	+22.8	64.5	50 30.2	+24.2	65.6	50 54.4	+25.6	66.7	51 17.6	+27.0	67.9	51 39.6	+28.4	69.0	49
50	49 01.8	+17.8	60.0	49 31.4	+19.1	61.0	50 00.1	+20.4	62.0	50 27.7	+21.8	63.1	50 54.4	+23.2	64.2	51 20.0	+24.6	65.3	51 44.6	+25.9	66.4	52 08.0	+27.3	67.6	50
51	49 19.6	+16.7	58.5	49 50.5	+18.0	59.5	50 20.5	+19.3	60.5	50 49.5	+20.7	61.6	51 17.6	+22.0	62.7	51 44.6	+23.4	63.8	52 10.5	+24.8	65.0	52 35.3	+26.3	66.2	51
52	49 36.3	+15.5	57.0	50 08.5	+16.8	58.0	50 39.8	+18.2	59.0	51 10.2	+19.5	60.1	51 39.6	+20.9	61.2	52 08.0	+22.3	62.3	52 35.3	+23.7	63.5	53 01.6	+25.1	64.7	52
53	49 51.8	+14.3	55.5	50 25.3	+15.7	56.5	50 58.0	+16.9	57.5	51 29.7	+18.3	58.6	52 00.5	+19.7	59.7	52 30.3	+21.1	60.8	52 59.0	+22.5	62.0	53 26.7	+23.9	63.1	53
54	50 06.1	+13.2	54.0	50 41.0	+14.4	55.0	51 14.9	+15.8	56.0	51 48.0	+17.1	57.1	52 20.2	+18.5	58.1	52 51.4	+19.8	59.3	53 21.5	+21.3	60.4	53 50.6	+22.7	61.6	54
55	50 19.3	+11.9	52.5	50 55.4	+13.2	53.5	51 30.7	+14.5	54.5	52 05.1	+15.9	55.5	52 38.7	+17.2	56.6	53 11.2	+18.6	57.7	53 42.8	+20.0	58.8	54 13.3	+21.5	60.0	55
56	50 31.2	+10.8	50.9	51 08.6	+12.0	51.9	51 45.2	+13.3	52.9	52 21.0	+14.6	53.9	52 55.9	+15.9	55.0	53 29.8	+17.4	56.1	54 02.8	+18.7	57.2	54 34.8	+20.1	58.4	56
57	50 42.0	+9.4	49.4	51 20.6	+10.8	50.3	51 58.5	+12.0	51.3	52 35.6	+13.3	52.3	53 11.8	+14.7	53.4	53 47.2	+16.0	54.5	54 21.5	+17.4	55.6	54 54.9	+18.8	56.8	57
58	50 51.4	+8.3	47.8	51 31.4	+9.4	48.8	52 10.5	+10.7	49.7	52 48.9	+12.0	50.7	53 26.5	+13.3	51.8	54 03.2	+14.6	52.8	54 38.9	+16.1	54.0	55 13.7	+17.5	55.1	58
59	50 59.7	+6.9	46.3	51 40.8	+8.1	47.2	52 21.2	+9.4	48.1	53 00.9	+10.6	49.1	53 39.8	+11.9	50.1	54 17.8	+13.3	51.2	54 55.0	+14.6	52.3	55 31.2	+16.0	53.4	59
60	51 06.6	+5.7	44.7	51 48.9	+6.9	45.6	52 30.6	+8.0	46.5	53 11.5	+9.3	47.5	53 51.7	+10.6	48.5	54 31.1	+11.9	49.5	55 09.6	+13.2	50.6	55 47.2	+14.6	51.7	60
61	51 12.3	+4.4	43.1	51 55.8	+5.5	44.0	52 38.6	+6.7	44.9	53 20.8	+7.9	45.8	54 02.3	+9.1	46.8	54 43.0	+10.4	47.8	55 22.8	+11.8	48.9	56 01.8	+13.2	50.0	61
62	51 16.7	+3.0	41.5	52 01.3	+4.2	42.3	52 45.3	+5.4	43.2	53 28.7	+6.5	44.1	54 11.4	+7.8	45.1	54 53.4	+9.0	46.1	55 34.6	+10.3	47.2	56 15.0	+11.6	48.3	62
63	51 19.7	+1.8	39.9	52 05.5	+2.8	40.7	52 50.7	+3.9	41.6	53 35.2	+5.1	42.5	54 19.2	+6.3	43.4	55 02.4	+7.5	44.4	55 44.9	+8.8	45.4	56 26.6	+10.1	46.5	63
64	51 21.5	+0.5	38.3	52 08.3	+1.5	39.1	52 54.6	+2.6	39.9	53 40.3	+3.7	40.8	54 25.5	+4.8	41.7	55 09.9	+6.1	42.7	55 53.7	+7.3	43.7	56 36.7	+8.6	44.7	64
65	51 22.0	−0.9	36.7	52 09.8	+0.2	37.5	52 57.2	+1.2	38.3	53 44.0	+2.3	39.1	54 30.3	+3.4	40.0	55 16.0	+4.5	40.9	56 01.0	+5.7	41.9	56 45.3	+7.0	42.9	65
66	51 21.1	−2.1	35.1	52 10.0	−1.2	35.8	52 58.4	−0.2	36.6	53 46.3	+0.8	37.4	54 33.7	+1.9	38.3	55 20.5	+3.0	39.2	56 06.7	+4.2	40.1	56 52.3	+5.4	41.1	66
67	51 19.0	−3.5	33.5	52 08.8	−2.6	34.2	52 58.2	−1.6	34.9	53 47.1	−0.6	35.7	54 35.6	+0.4	36.5	55 23.5	+1.5	37.4	56 10.9	+2.6	38.3	56 57.7	+3.8	39.3	67
68	51 15.5	−4.8	31.9	52 06.2	−3.8	32.6	52 56.6	−3.0	33.3	53 46.5	−2.0	34.0	54 36.0	−1.0	34.8	55 25.0	0.0	35.6	56 13.5	+1.1	36.5	57 01.5	+2.2	37.4	68
69	51 10.7	−6.0	30.3	52 02.4	−5.3	31.0	52 53.6	−4.3	31.6	53 44.5	−3.4	32.3	54 35.0	−2.5	33.1	55 25.0	−1.5	33.9	56 14.6	−0.5	34.7	57 03.7	+0.6	35.6	69
70	51 04.7	−7.4	28.7	51 57.1	−6.5	29.3	52 49.3	−5.7	30.0	53 41.1	−4.9	30.7	54 32.5	−4.0	31.4	55 23.5	−3.0	32.1	56 14.1	−2.0	32.9	57 04.3	−1.1	33.7	70
71	50 57.3	−8.6	27.2	51 50.6	−7.9	27.7	52 43.6	−7.1	28.3	53 36.2	−6.3	29.0	54 28.5	−5.4	29.7	55 20.5	−4.6	30.4	56 12.1	−3.7	31.1	57 03.2	−2.6	31.9	71
72	50 48.7	−9.8	25.6	51 42.7	−9.1	26.1	52 36.5	−8.4	26.7	53 29.9	−7.6	27.3	54 23.1	−6.9	27.9	55 15.9	−6.0	28.6	56 08.4	−5.1	29.3	57 00.6	−4.3	30.1	72
73	50 38.9	−11.1	24.0	51 33.6	−10.5	24.5	52 28.1	−9.8	25.1	53 22.3	−9.1	25.6	54 16.2	−8.3	26.2	55 09.9	−7.5	26.9	56 03.3	−6.7	27.5	56 56.3	−5.9	28.2	73
74	50 27.8	−12.3	22.5	51 23.1	−11.7	23.0	52 18.3	−11.1	23.5	53 13.2	−10.4	24.0	54 07.9	−9.7	24.5	55 02.4	−9.0	25.1	55 56.6	−8.3	25.8	56 50.4	−7.4	26.4	74
75	50 15.5	−13.5	20.9	51 11.4	−12.9	21.4	52 07.2	−12.3	21.9	53 02.8	−11.7	22.3	53 58.2	−11.1	22.9	54 53.4	−10.5	23.4	55 48.3	−9.7	24.0	56 43.0	−9.0	24.6	75
76	50 02.0	−14.7	19.4	50 58.5	−14.2	19.8	51 54.9	−13.7	20.3	52 51.1	−13.1	20.7	53 47.1	−12.5	21.2	54 42.9	−11.8	21.7	55 38.6	−11.3	22.2	56 34.0	−10.5	22.8	76
77	49 47.3	−15.9	17.9	50 44.3	−15.4	18.3	51 41.2	−14.9	18.7	52 38.0	−14.4	19.1	53 34.6	−13.8	19.5	54 31.1	−13.3	20.0	55 27.3	−12.6	20.5	56 23.5	−12.1	21.0	77
78	49 31.4	−17.0	16.4	50 28.9	−16.5	16.8	51 26.3	−16.1	17.1	52 23.6	−15.7	17.5	53 20.8	−15.2	17.9	54 17.8	−14.7	18.3	55 14.7	−14.2	18.8	56 11.4	−13.6	19.3	78
79	49 14.4	−18.1	15.0	50 12.4	−17.8	15.3	51 10.2	−17.3	15.6	52 07.9	−16.9	15.9	53 05.6	−16.5	16.3	54 03.1	−16.0	16.7	55 00.5	−15.5	17.1	55 57.8	−15.0	17.5	79
80	48 56.3	−19.2	13.5	49 54.6	−18.8	13.8	50 52.9	−18.5	14.1	51 51.0	−18.1	14.4	52 49.1	−17.7	14.7	53 47.1	−17.3	15.0	54 45.0	−16.9	15.4	55 42.8	−16.5	15.8	80
81	48 37.1	−20.2	12.1	49 35.8	−19.9	12.3	50 34.4	−19.6	12.6	51 32.9	−19.3	12.8	52 31.4	−19.0	13.1	53 29.8	−18.6	13.4	54 28.1	−18.2	13.7	55 26.3	−17.8	14.1	81
82	48 16.9	−21.3	10.6	49 15.9	−21.1	10.9	50 14.8	−20.8	11.1	51 13.6	−20.5	11.3	52 12.4	−20.2	11.6	53 11.2	−19.9	11.8	54 09.9	−19.6	12.1	55 08.5	−19.2	12.4	82
83	47 55.6	−22.3	9.2	48 54.8	−22.0	9.4	49 54.0	−21.8	9.6	50 53.1	−21.6	9.8	51 52.2	−21.3	10.0	52 51.3	−21.1	10.3	53 50.3	−20.8	10.5	54 49.3	−20.5	10.8	83
84	47 33.3	−23.2	7.9	48 32.8	−23.1	8.0	49 32.2	−22.9	8.2	50 31.5	−22.7	8.3	51 30.9	−22.5	8.5	52 30.2	−22.3	8.7	53 29.5	−22.0	8.9	54 28.8	−21.9	9.1	84
85	47 10.1	−24.2	6.5	48 09.7	−24.1	6.6	49 09.3	−24.0	6.8	50 08.8	−23.7	6.9	51 08.4	−23.6	7.0	52 07.9	−23.4	7.2	53 07.5	−23.3	7.4	54 06.9	−23.0	7.5	85
86	46 45.9	−25.2	5.2	47 45.6	−25.0	5.3	48 45.3	−24.9	5.4	49 45.1	−24.8	5.5	50 44.8	−24.7	5.6	51 44.5	−24.5	5.7	52 44.2	−24.4	5.8	53 43.9	−24.3	6.0	86
87	46 20.7	−26.0	3.8	47 20.6	−26.0	3.9	48 20.4	−25.9	4.0	49 20.3	−25.8	4.1	50 20.1	−25.7	4.2	51 20.0	−25.7	4.2	52 19.8	−25.5	4.3	53 19.6	−25.4	4.4	87
88	45 54.7	−26.9	2.5	46 54.6	−26.9	2.6	47 54.5	−26.8	2.6	48 54.5	−26.8	2.7	49 54.4	−26.7	2.7	50 54.3	−26.6	2.8	51 54.3	−26.6	2.9	52 54.2	−26.6	2.9	88
89	45 27.8	−27.8	1.3	46 27.7	−27.7	1.3	47 27.7	−27.7	1.3	48 27.7	−27.7	1.3	49 27.7	−27.7	1.4	50 27.7	−27.7	1.4	51 27.7	−27.7	1.4	52 27.6	−27.6	1.4	89
90	45 00.0	−28.6	0.0	46 00.0	−28.6	0.0	47 00.0	−28.6	0.0	48 00.0	−28.6	0.0	49 00.0	−28.6	0.0	50 00.0	−28.6	0.0	51 00.0	−28.7	0.0	52 00.0	−28.7	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	19 23.3	-45.1	110.6	19 02.0	-45.7	110.9	18 40.4	-46.4	111.2	18 18.5	-47.0	111.6	17 56.3	-47.6	111.9	17 33.8	-48.2	112.2	17 11.1	-48.9	112.5	16 48.0	-49.4	112.7	0
1	18 38.2	-45.2	111.3	18 16.3	-45.9	111.6	17 54.0	-46.5	111.9	17 31.5	-47.2	112.2	17 08.7	-47.8	112.5	16 45.6	-48.4	112.8	16 22.2	-49.0	113.1	15 58.6	-49.6	113.3	1
2	17 53.0	-45.3	112.0	17 30.4	-46.0	112.3	17 07.5	-46.6	112.6	16 44.3	-47.2	112.9	16 20.9	-47.9	113.1	15 57.2	-48.5	113.4	15 33.2	-49.0	113.7	15 09.0	-49.6	113.9	2
3	17 07.7	-45.5	112.7	16 44.4	-46.1	113.0	16 20.9	-46.8	113.2	15 57.1	-47.4	113.5	15 33.0	-48.0	113.8	15 08.7	-48.6	114.0	14 44.2	-49.2	114.3	14 19.4	-49.7	114.5	3
4	16 22.2	-45.6	113.4	15 58.3	-46.3	113.6	15 34.1	-46.9	113.9	15 09.7	-47.5	114.1	14 45.0	-48.1	114.4	14 20.1	-48.6	114.6	13 55.0	-49.2	114.8	13 29.7	-49.8	115.1	4
5	15 36.6	-45.8	114.0	15 12.0	-46.4	114.3	14 47.2	-47.0	114.5	14 22.2	-47.6	114.8	13 56.9	-48.2	115.0	13 31.5	-48.8	115.2	13 05.8	-49.3	115.4	12 39.9	-49.8	115.6	5
6	14 50.8	-45.9	114.7	14 25.6	-46.5	114.9	14 00.2	-47.1	115.2	13 34.6	-47.7	115.4	13 08.7	-48.2	115.6	12 42.7	-48.8	115.8	12 16.5	-49.4	116.0	11 50.1	-50.0	116.2	6
7	14 04.9	-45.9	115.4	13 39.1	-46.6	115.6	13 13.1	-47.2	115.8	12 46.9	-47.8	116.0	12 20.5	-48.4	116.2	11 53.9	-49.0	116.4	11 27.1	-49.5	116.6	11 00.1	-50.0	116.8	7
8	13 19.0	-46.1	116.0	12 52.5	-46.6	116.2	12 25.9	-47.3	116.4	11 59.1	-47.9	116.6	11 32.1	-48.4	116.8	11 04.9	-49.1	117.0	10 37.6	-49.5	117.2	10 10.1	-50.0	117.3	8
9	12 32.9	-46.2	116.7	12 05.9	-46.8	116.9	11 38.6	-47.3	117.1	11 11.2	-47.9	117.3	10 43.7	-48.5	117.4	10 16.0	-49.1	117.6	9 48.1	-49.6	117.7	9 20.1	-50.1	117.9	9
10	11 46.7	-46.2	117.3	11 19.1	-46.9	117.5	10 51.3	-47.5	117.7	10 23.3	-48.0	117.9	9 55.2	-48.6	118.0	9 26.9	-49.1	118.2	8 58.5	-49.6	118.3	8 30.0	-50.2	118.5	10
11	11 00.5	-46.4	118.0	10 32.2	-46.9	118.2	10 03.8	-47.5	118.3	9 35.3	-48.1	118.5	9 06.6	-48.6	118.6	8 37.8	-49.1	118.8	8 09.0	-49.7	118.9	7 39.8	-50.1	119.0	11
12	10 14.1	-46.4	118.6	9 45.3	-47.0	118.8	9 16.3	-47.5	118.9	8 47.2	-48.1	119.1	8 18.0	-48.7	119.2	7 48.7	-49.2	119.3	7 19.2	-49.7	119.5	6 49.7	-50.3	119.6	12
13	9 27.7	-46.5	119.3	8 58.3	-47.1	119.4	8 28.8	-47.7	119.6	7 59.1	-48.2	119.7	7 29.3	-48.7	119.8	6 59.5	-49.3	119.9	6 29.5	-49.8	120.0	5 59.4	-50.2	120.1	13
14	8 41.2	-46.5	119.9	8 11.2	-47.1	120.1	7 41.1	-47.6	120.2	7 10.9	-48.2	120.3	6 40.6	-48.7	120.4	6 10.2	-49.3	120.5	5 39.7	-49.8	120.6	5 09.2	-50.3	120.7	14
15	7 54.7	-46.6	120.6	7 24.1	-47.1	120.7	6 53.5	-47.8	120.8	6 22.7	-48.3	120.9	5 51.9	-48.8	121.0	5 20.9	-49.3	121.1	4 49.9	-49.8	121.1	4 18.9	-50.3	121.2	15
16	7 08.1	-46.7	121.2	6 37.0	-47.3	121.3	6 05.7	-47.7	121.4	5 34.4	-48.3	121.5	5 03.1	-48.9	121.6	4 31.6	-49.3	121.6	4 00.1	-49.8	121.7	3 28.6	-50.4	121.8	16
17	6 21.4	-46.7	121.8	5 49.7	-47.2	121.9	5 18.0	-47.8	122.0	4 46.1	-48.3	122.1	4 14.2	-48.8	122.1	3 42.3	-49.4	122.2	3 10.3	-49.9	122.3	2 38.2	-50.3	122.3	17
18	5 34.7	-46.7	122.5	5 02.5	-47.3	122.5	4 30.2	-47.9	122.6	3 57.8	-48.4	122.7	3 25.4	-48.9	122.7	2 52.9	-49.4	122.8	2 20.4	-49.8	122.8	1 47.9	-50.4	122.8	18
19	4 48.0	-46.8	123.1	4 15.2	-47.3	123.2	3 42.3	-47.8	123.3	3 09.4	-48.4	123.3	2 36.5	-48.9	123.3	2 03.5	-49.3	123.3	1 30.6	-49.9	123.4	0 57.5	-50.3	123.4	19
20	4 01.2	-46.8	123.7	3 27.9	-47.4	123.8	2 54.5	-47.9	123.8	2 21.1	-48.4	123.9	1 47.6	-48.9	123.9	1 14.2	-49.4	123.9	0 40.7	-49.9	123.9	0 07.2	-50.4	123.9	20
21	3 14.4	-46.9	124.3	2 40.5	-47.4	124.4	2 06.6	-47.9	124.4	1 32.7	-48.4	124.5	0 58.7	-48.9	124.5	0 24.8	-49.4	124.5	0 09.2	+49.9	55.5	0 43.2	+50.3	55.5	21
22	2 27.5	-46.8	125.0	1 53.1	-47.3	125.0	1 18.7	-47.9	125.0	0 44.3	-48.4	125.0	0 09.8	-48.9	125.0	0 24.6	+49.4	55.0	0 59.1	+49.9	55.0	1 33.5	+50.4	55.0	22
23	1 40.7	-46.9	125.6	1 05.8	-47.4	125.6	0 30.8	-47.9	125.6	0 04.1	+48.4	54.4	0 39.1	+48.9	54.4	1 14.0	+49.4	54.4	1 49.0	+49.8	54.4	2 23.9	+50.3	54.4	23
24	0 53.8	-46.8	126.2	0 18.4	-47.4	126.2	0 17.1	+47.9	53.8	0 52.5	+48.5	53.8	1 28.0	+48.9	53.8	2 03.4	+49.4	53.8	2 38.8	+49.9	53.8	3 14.2	+50.3	53.9	24
25	0 07.0	-46.8	126.8	0 29.0	+47.4	53.2	1 05.0	+47.9	53.2	1 41.0	+48.3	53.2	2 16.9	+48.9	53.2	2 52.8	+49.4	53.3	3 28.7	+49.8	53.3	4 04.5	+50.3	53.3	25
26	0 39.9	+46.9	52.5	1 16.4	+47.4	52.5	1 52.9	+47.9	52.6	2 29.3	+48.4	52.6	3 05.8	+48.8	52.6	3 42.2	+49.3	52.7	4 18.5	+49.8	52.7	4 54.8	+50.3	52.8	26
27	1 26.8	+46.8	51.9	2 03.8	+47.3	51.9	2 40.8	+47.8	52.0	3 17.7	+48.4	52.0	3 54.6	+48.9	52.1	4 31.5	+49.3	52.1	5 08.3	+49.8	52.2	5 45.1	+50.2	52.3	27
28	2 13.6	+46.9	51.3	2 51.1	+47.4	51.3	3 28.6	+47.9	51.4	4 06.1	+48.3	51.4	4 43.5	+48.8	51.5	5 20.8	+49.3	51.5	5 58.1	+49.8	51.6	6 35.3	+50.2	51.7	28
29	3 00.5	+46.8	50.7	3 38.5	+47.3	50.7	4 16.5	+47.8	50.8	4 54.4	+48.3	50.8	5 32.3	+48.8	50.9	6 10.1	+49.2	51.0	6 47.9	+49.7	51.1	7 25.5	+50.2	51.1	29
30	3 47.3	+46.8	50.0	4 25.8	+47.3	50.1	5 04.3	+47.7	50.1	5 42.7	+48.3	50.2	6 21.1	+48.7	50.3	6 59.3	+49.3	50.4	7 37.6	+49.6	50.5	8 15.7	+50.1	50.6	30
31	4 34.1	+46.7	49.4	5 13.1	+47.2	49.5	5 52.0	+47.8	49.5	6 31.0	+48.2	49.6	7 09.8	+48.7	49.7	7 48.6	+49.1	49.8	8 27.2	+49.6	49.9	9 05.8	+50.1	50.0	31
32	5 20.8	+46.7	48.8	6 00.3	+47.2	48.8	6 39.8	+47.7	48.9	7 19.2	+48.1	49.0	7 58.5	+48.6	49.1	8 37.7	+49.1	49.2	9 16.8	+49.6	49.4	9 55.9	+50.0	49.5	32
33	6 07.5	+46.7	48.1	6 47.5	+47.2	48.2	7 27.5	+47.6	48.3	8 07.3	+48.2	48.4	8 47.1	+48.6	48.5	9 26.8	+49.1	48.6	10 06.4	+49.5	48.8	10 45.9	+49.9	48.9	33
34	6 54.2	+46.6	47.5	7 34.7	+47.1	47.6	8 15.1	+47.6	47.6	8 55.5	+48.0	47.8	9 35.7	+48.5	47.9	10 15.9	+48.9	48.1	10 55.9	+49.4	48.2	11 35.8	+49.9	48.4	34
35	7 40.8	+46.6	46.9	8 21.8	+47.1	47.0	9 02.7	+47.5	47.1	9 43.5	+48.0	47.2	10 24.2	+48.5	47.3	11 04.8	+48.9	47.5	11 45.3	+49.4	47.6	12 25.7	+49.8	47.8	35
36	8 27.4	+46.5	46.2	9 08.9	+46.9	46.3	9 50.2	+47.5	46.5	10 31.5	+47.9	46.6	11 12.7	+48.4	46.7	11 53.7	+48.9	46.9	12 34.7	+49.3	47.0	13 15.5	+49.7	47.2	36
37	9 13.9	+46.4	45.6	9 55.8	+47.0	45.7	10 37.7	+47.4	45.8	11 19.4	+47.9	46.0	12 01.1	+48.3	46.1	12 42.6	+48.7	46.3	13 24.0	+49.2	46.5	14 05.2	+49.7	46.6	37
38	10 00.3	+46.4	45.0	10 42.8	+46.8	45.1	11 25.1	+47.3	45.2	12 07.3	+47.7	45.4	12 49.4	+48.2	45.5	13 31.3	+48.7	45.7	14 13.2	+49.1	45.9	14 54.9	+49.6	46.1	38
39	10 46.7	+46.3	44.3	11 29.6	+46.7	44.4	12 12.4	+47.2	44.6	12 55.0	+47.7	44.7	13 37.6	+48.1	44.9	14 20.0	+48.6	45.1	15 02.3	+49.0	45.3	15 44.5	+49.4	45.5	39
40	11 33.0	+46.2	43.7	12 16.3	+46.7	43.8	12 59.6	+47.1	44.0	13 42.7	+47.6	44.1	14 25.7	+48.1	44.3	15 08.6	+48.5	44.5	15 51.3	+49.0	44.7	16 33.9	+49.4	44.9	40
41	12 19.2	+46.1	43.0	13 03.0	+46.6	43.2	13 46.7	+47.0	43.3	14 30.3	+47.5	43.5	15 13.8	+47.9	43.7	15 57.1	+48.4	43.9	16 40.3	+48.8	44.1	17 23.3	+49.2	44.3	41
42	13 05.3	+46.0	42.3	13 49.6	+46.4	42.5	14 33.7	+47.0	42.7	15 17.8	+47.4	42.9	16 01.7	+47.8	43.1	16 45.5	+48.2	43.3	17 29.1	+48.7	43.5	18 12.5	+49.2	43.7	42
43	13 51.3	+45.9	41.7	14 36.0	+46.4	41.8	15 20.7	+46.8	42.0	16 05.2	+47.2	42.2	16 49.5	+47.7	42.4	17 33.7	+48.2	42.6	18 17.8	+48.6	42.9	19 01.7	+49.0	43.1	43
44	14 37.2	+45.8	41.0	15 22.4	+46.2	41.2	16 07.5	+46.7	41.4	16 52.4	+47.1	41.6	17 37.2	+47.6	41.8	18 21.9	+48.0	42.0	19 06.4	+48.4	42.2	19 50.7	+48.9	42.5	44
45	15 23.0	+45.6	40.4	16 08.6	+46.1	40.5	16 54.2	+46.5	40.7	17 39.5	+47.1	40.9	18 24.8	+47.5	41.1	19 09.9	+47.9	41.4	19 54.8	+48.4	41.6	20 39.6	+48.8	41.9	45
46	16 08.6	+45.6	39.7	16 54.7	+46.0	39.9	17 40.7	+46.4	40.1	18 26.6	+46.8	40.3	19 12.3	+47.3	40.5	19 57.8	+47.8	40.7	20 43.2	+48.2	41.0	21 28.4	+48.6	41.2	46
47	16 54.2	+45.3	39.0	17 40.7	+45.9	39.2	18 27.1	+46.3	39.4	19 13.4	+46.8	39.6	19 59.6	+47.1	39.9	20 45.6	+47.6	40.1	21 31.4	+48.0	40.3	22 17.0	+48.5	40.6	47
48	17 39.5	+45.3	38.3	18 26.6	+45.7	38.5	19 13.4	+46.2	38.7	20 00.2	+46.5	39.0	20 46.7	+47.1	39.2	21 33.2	+47.4	39.4	22 19.4	+47.9	39.7	23 05.5	+48.3	40.0	48
49	18 24.8	+45.1	37.6	19 12.3	+45.5	37.8	19 59.6	+46.0	38.1	20 46.7	+46.5	38.3	21 33.8	+46.8	38.5	22 20.6	+47.3	38.8	23 07.3	+47.7	39.0	23 53.8	+48.2	39.3	49
50	19 09.9	+44.9	36.9	19 57.8	+45.4	37.1	20 45.6	+45.8	37.4	21 33.2	+46.2	37.6	22 20.6	+46.7	37.9	23 07.9	+47.1	38.1	23 55.0	+47.6	38.4	24 42.0	+48.0	38.7	50
51	19 54.8	+44.8	36.2	20 43.2	+45.2	36.4	21 31.4	+45.6	36.7	22 19.4	+46.1	36.9	23 07.3	+46.5	37.2	23 55.0	+47.0	37.4	24 42.6	+47.4	37.7	25 30.0	+47.8	38.0	51
52	20 39.6	+44.6	35.5	21 28.4	+45.0	35.7	22 17.0	+45.5	36.0	23 05.5	+45.9	36.2	23 53.8	+46.4	36.5	24 42.0	+46.7	36.8	25 30.0	+47.2	37.0	26 17.8	+47.6	37.3	52
53	21 24.2	+44.4	34.8	22 13.4	+44.9	35.0	23 02.5	+45.3	35.3	23 51.4	+45.7	35.5	24 40.2	+46.1	35.8	25 28.7	+46.6	36.1	26 17.2	+46.9	36.3	27 05.4	+47.4	36.6	53
54	22 08.6	+44.3	34.1	22 58.3	+44.6	34.3	23 47.8	+45.0	34.6	24 37.1	+45.5	34.8	25 26.3	+45.9	35.1	26 15.3	+46.4	35.4	27 04.1	+46.8	35.6	27 52.8	+47.2	36.0	54
55	22 52.9	+44.0	33.3	23 42.9	+44.5	33.6	24 32.8	+44.9	33.8	25 22.6	+45.3	34.1	26 12.2	+45.7	34.4	27 01.7	+46.1	34.6	27 50.9	+46.6	34.9	28 40.0	+47.0	35.3	55
56	23 36.9	+43.8	32.6	24 27.4	+44.2	32.8	25 17.7	+44.6	33.1	26 07.9	+45.0	33.4	26 57.9	+45.5	33.6	27 47.8	+45.9	33.9	28 37.5	+46.3	34.2	29 27.0	+46.8	34.5	56
57	24 20.7	+43.6	31.9	25 11.6	+44.0	32.1	26 02.3	+44.5	32.4	26 52.9	+44.9	32.6	27 43.4	+45.3	32.9	28 33.7	+45.7	33.2	29 23.8	+46.1	33.5	30 13.8	+46.5	33.8	57
58	25 04.3	+43.3	31.1	25 55.6	+43.7	31.3	26 46.8	+44.1	31.6	27 37.8	+44.6	31.9	28 28.7	+45.0	32.2	29 19.4	+45.4	32.5	30 09.9	+45.8	32.8	31 00.3	+46.2	33.1	58
59	25 47.6	+43.1	30.3	26 39.3	+43.6	30.6	27 30.9	+44.0	30.8	28 22.4	+44.3	31.1	29 13.7	+44.7	31.4	30 04.8	+45.1	31.7	30 55.7	+45.6	32.0	31 46.5	+46.0	32.3	59
60	26 30.7	+42.9	29.6	27 22.9	+43.2	29.8	28 14.9	+43.6	30.1	29 06.7	+44.1	30.4	29 58.4	+44.5	30.6	30 49.9	+44.9	30.9	31 41.3	+45.3	31.3	32 32.5	+45.7	31.6	60
61	27 13.6	+42.6	28.8	28 06.1	+43.0	29.0	28 58.5	+43.4	29.3	29 50.8	+43.8	29.6	30 42.9	+44.2	29.9	31 34.8	+44.6	30.2	32 26.6	+45.0	30.5	33 18.2	+45.5	30.8	61
62	27 56.2	+42.3	28.0	28 49.1	+42.7	28.2	29 41.9	+43.1	28.5	30 34.6	+43.4	28.8	31 27.1	+43.9	29.1	32 19.4	+44.3	29.4	33 11.6	+44.7	29.7	34 03.7	+45.1	30.0	62
63	28 38.5	+42.0	27.2	29 31.8	+42.4	27.4	30 25.0	+42.8	27.7	31 18.0	+43.2	28.0	32 11.0	+43.6	28.3	33 03.7	+44.0	28.6	33 56.3	+44.4	28.9	34 48.8	+44.8	29.2	63
64	29 20.5	+41.7	26.4	30 14.2	+42.1	26.6	31 07.8	+42.5	26.9	32 01.2	+42.9	27.2	32 54.6	+43.2	27.5	33 47.7	+43.7	27.8	34 40.7	+44.1	28.1	35 33.6	+44.5	28.4	64
65	30 02.2	+41.4	25.5	30 56.3	+41.8	25.8	31 50.3	+42.1	26.1	32 44.1	+42.6	26.3	33 37.8	+42.9	26.6	34 31.4	+43.3	26.9	35 24.8	+43.7	27.2	36 18.1	+44.1	27.6	65
66	30 43.6	+41.1	24.7	31 38.1	+41.4	24.9	32 32.4	+41.9	25.2	33 26.7	+42.1	25.5	34 20.7	+42.6	25.8	35 14.7	+43.0	26.1	36 08.5	+43.4	26.4	37 02.2	+43.7	26.7	66
67	31 24.7	+40.7	23.8	32 19.5	+41.1	24.1	33 14.3	+41.4	24.4	34 08.8	+41.9	24.6	35 03.3	+42.2	24.9	35 57.7	+42.6	25.2	36 51.9	+43.0	25.5	37 45.9	+43.4	25.9	67
68	32 05.4	+40.4	23.0	33 00.6	+40.8	23.2	33 55.7	+41.1	23.5	34 50.7	+41.4	23.8	35 45.5	+41.9	24.1	36 40.3	+42.2	24.4	37 34.9	+42.5	24.7	38 29.3	+43.0	25.0	68
69	32 45.8	+40.0	22.1	33 41.4	+40.3	22.4	34 36.8	+40.7	22.6	35 32.1	+41.1	22.9	36 27.4	+41.4	23.2	37 22.5	+41.7	23.5	38 17.4	+42.2	23.8	39 12.3	+42.5	24.1	69
70	33 25.8	+39.6	21.2	34 21.7	+40.0	21.5	35 17.5	+40.3	21.7	36 13.2	+40.6	22.0	37 08.8	+41.0	22.3	38 04.2	+41.4	22.6	38 59.6	+41.7	22.9	39 54.8	+42.1	23.2	70
71	34 05.4	+39.3	20.3	35 01.7	+39.5	20.8	35 57.8	+39.9	20.8	36 53.8	+40.3	21.1	37 49.8	+40.5	21.3	38 45.6	+40.9	21.6	39 41.3	+41.3	21.9	40 36.9	+41.7	22.3	71
72	34 44.7	+38.8	19.4	35 41.2	+39.1	19.6	36 37.7	+39.4	19.9	37 34.1	+39.7	20.1	38 30.3	+40.2	20.4	39 26.5	+40.5	20.7	40 22.6	+40.8	21.0	41 18.6	+41.1	21.3	72
73	35 23.5	+38.3	18.5	36 20.3	+38.7	18.7	37 17.1	+39.0	18.9	38 13.8	+39.3	19.2	39 10.5	+39.6	19.5	40 07.0	+40.0	19.7	41 03.4	+40.3	20.0	41 59.7	+40.7	20.3	73
74	36 01.8	+37.9	17.5	36 59.0	+38.2	17.7	37 56.1	+38.5	18.0	38 53.1	+38.9	18.2	39 50.1	+39.1	18.5	40 47.0	+39.4	18.7	41 43.7	+39.8	19.0	42 40.4	+40.1	19.3	74
75	36 39.7	+37.5	16.6	37 37.2	+37.7	16.8	38 34.6	+38.0	17.0	39 32.0	+38.3	17.2	40 29.2	+38.6	17.5	41 26.4	+38.9	17.7	42 23.5	+39.3	18.0	43 20.5	+39.6	18.3	75
76	37 17.2	+36.9	15.6	38 14.9	+37.2	15.8	39 12.6	+37.5	16.0	40 10.3	+37.8	16.2	41 07.8	+38.1	16.5	42 05.3	+38.4	16.7	43 02.8	+38.6	17.0	44 00.1	+39.0	17.3	76
77	37 54.1	+36.4	14.6	38 52.1	+36.7	14.8	39 50.1	+37.0	15.0	40 48.1	+37.2	15.2	41 45.9	+37.5	15.4	42 43.7	+37.8	15.7	43 41.4	+38.1	15.9	44 39.1	+38.4	16.2	77
78	38 30.5	+35.9	13.6	39 28.8	+36.2	13.8	40 27.1	+36.4	14.0	41 25.3	+36.6	14.2	42 23.4	+37.0	14.4	43 21.5	+37.2	14.6	44 19.5	+37.5	14.8	45 17.5	+37.8	15.1	78
79	39 06.4	+35.4	12.5	40 05.0	+35.6	12.7	41 03.5	+35.8	12.9	42 01.9	+36.1	13.1	43 00.4	+36.3	13.3	43 58.7	+36.6	13.5	44 57.0	+36.9	13.8	45 55.3	+37.1	14.0	79
80	39 41.8	+34.8	11.5	40 40.6	+35.0	11.7	41 39.3	+35.2	11.8	42 38.0	+35.4	12.0	43 36.7	+35.6	12.2	44 35.3	+35.9	12.4	45 33.9	+36.1	12.7	46 32.4	+36.4	12.9	80
81	40 16.6	+34.1	10.4	41 15.6	+34.3	10.6	42 14.5	+34.6	10.8	43 13.4	+34.8	10.9	44 12.3	+35.0	11.1	45 11.2	+35.2	11.3	46 10.0	+35.5	11.5	47 08.8	+35.7	11.7	81
82	40 50.7	+33.6	9.3	41 49.9	+33.8	9.5	42 49.1	+33.9	9.6	43 48.2	+34.2	9.8	44 47.3	+34.4	10.0	45 46.4	+34.5	10.1	46 45.5	+34.7	10.3	47 44.5	+34.9	10.5	82
83	41 24.3	+32.9	8.2	42 23.7	+33.1	8.4	43 23.0	+33.3	8.5	44 22.4	+33.4	8.7	45 21.7	+33.6	8.8	46 20.9	+33.8	9.0	47 20.2	+34.0	9.1	48 19.4	+34.2	9.3	83
84	41 57.2	+32.3	7.1	42 56.8	+32.4	7.2	43 56.3	+32.5	7.4	44 55.8	+32.7	7.5	45 55.3	+32.8	7.6	46 54.7	+33.0	7.8	47 54.2	+33.1	7.9	48 53.6	+33.3	8.1	84
85	42 29.5	+31.6	6.0	43 29.2	+31.7	6.1	44 28.8	+31.8	6.2	45 28.5	+31.9	6.3	46 28.1	+32.1	6.4	47 27.7	+32.2	6.5	48 27.3	+32.4	6.7	49 26.9	+32.5	6.8	85
86	43 01.1	+30.8	4.8	44 00.9	+30.9	4.9	45 00.6	+31.1	5.0	46 00.4	+31.2	5.1	47 00.2	+31.2	5.2	47 59.9	+31.4	5.3	48 59.7	+31.4	5.4	49 59.4	+31.6	5.5	86
87	43 31.9	+30.2	3.7	44 31.8	+30.2	3.8	45 31.7	+30.3	3.8	46 31.6	+30.3	3.9	47 31.4	+30.4	3.9	48 31.3	+30.6	4.1	49 31.1	+30.6	4.1	50 31.0	+30.6	4.2	87
88	44 02.1	+29.3	2.5	45 02.0	+29.4	2.5	46 02.0	+29.4	2.5	47 01.9	+29.5	2.6	48 01.8	+29.6	2.6	49 01.8	+29.6	2.7	50 01.7	+29.6	2.7	51 01.6	+29.7	2.8	88
89	44 31.4	+28.6	1.2	45 31.4	+28.6	1.3	46 31.4	+28.6	1.3	47 31.4	+28.6	1.3	48 31.4	+28.6	1.3	49 31.4	+28.7	1.4	50 31.3	+28.7	1.4	51 31.3	+28.7	1.4	89
90	45 00.0	+27.8	0.0	46 00.0	+27.7	0.0	47 00.0	+27.7	0.0	48 00.0	+27.7	0.0	49 00.0	+27.7	0.0	50 00.0	+27.7	0.0	51 00.0	+27.7	0.0	52 00.0	+27.6	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   L.H.A. 118°, 242°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	18 43.5	+44.7	109.8	18 23.0	+45.4	110.1	18 02.2	+46.1	110.4	17 41.1	+46.7	110.7	17 19.7	+47.4	111.0	16 58.0	+48.0	111.3	16 36.1	+48.6	111.6	16 13.8	+49.2	111.9	0
1	19 28.2	+44.5	109.1	19 08.4	+45.2	109.4	18 48.3	+45.9	109.8	18 27.8	+46.6	110.1	18 07.1	+47.2	110.4	17 46.0	+47.9	110.7	17 24.7	+48.5	111.0	17 03.0	+49.1	111.3	1
2	20 12.7	+44.4	108.4	19 53.6	+45.1	108.7	19 34.2	+45.8	109.1	19 14.4	+46.5	109.4	18 54.3	+47.1	109.7	18 33.9	+47.7	110.1	18 13.2	+48.3	110.4	17 52.1	+49.0	110.7	2
3	20 57.1	+44.2	107.7	20 38.7	+44.9	108.0	20 20.0	+45.6	108.4	20 00.9	+46.3	108.7	19 41.4	+47.0	109.1	19 21.6	+47.6	109.4	19 01.5	+48.3	109.7	18 41.1	+48.8	110.1	3
4	21 41.3	+44.0	107.0	21 23.6	+44.8	107.3	21 05.6	+45.4	107.7	20 47.2	+46.1	108.1	20 28.4	+46.8	108.4	20 09.2	+47.5	108.8	19 49.8	+48.1	109.1	19 29.9	+48.8	109.5	4
5	22 25.3	+43.8	106.2	22 08.4	+44.5	106.6	21 51.0	+45.3	107.0	21 33.3	+46.0	107.4	21 15.2	+46.6	107.8	20 56.7	+47.3	108.1	20 37.9	+47.9	108.5	20 18.7	+48.6	108.8	5
6	23 09.1	+43.6	105.5	22 52.9	+44.4	105.9	22 36.3	+45.1	106.3	22 19.3	+45.7	106.7	22 01.8	+46.5	107.1	21 44.0	+47.2	107.5	21 25.8	+47.9	107.8	21 07.3	+48.4	108.2	6
7	23 52.7	+43.4	104.7	23 37.3	+44.1	105.2	23 21.4	+44.8	105.6	23 05.0	+45.6	106.0	22 48.3	+46.3	106.4	22 31.2	+47.0	106.8	22 13.7	+47.6	107.2	21 55.7	+48.3	107.6	7
8	24 36.1	+43.1	104.0	24 21.4	+43.9	104.4	24 06.2	+44.7	104.8	23 50.6	+45.4	105.3	23 34.6	+46.1	105.7	23 18.2	+46.8	106.1	23 01.3	+47.5	106.5	22 44.0	+48.2	106.9	8
9	25 19.2	+42.9	103.2	25 05.3	+43.7	103.7	24 50.9	+44.4	104.1	24 36.0	+45.2	104.6	24 20.7	+46.0	105.0	24 05.0	+46.6	105.4	23 48.8	+47.3	105.9	23 32.2	+48.0	106.3	9
10	26 02.1	+42.7	102.4	25 49.0	+43.4	102.9	25 35.3	+44.3	103.4	25 21.2	+45.0	103.8	25 06.7	+45.7	104.3	24 51.6	+46.5	104.7	24 36.1	+47.2	105.2	24 20.2	+47.8	105.6	10
11	26 44.8	+42.4	101.6	26 32.4	+43.2	102.1	26 19.6	+44.0	102.6	26 06.2	+44.8	103.1	25 52.4	+45.5	103.6	25 38.1	+46.2	104.0	25 23.3	+46.9	104.5	25 08.0	+47.6	105.0	11
12	27 27.2	+42.1	100.8	27 15.6	+43.0	101.4	27 03.6	+43.7	101.9	26 51.0	+44.5	102.4	26 37.9	+45.3	102.8	26 24.3	+46.0	103.3	26 10.2	+46.8	103.8	25 55.6	+47.5	104.3	12
13	28 09.3	+41.8	100.0	27 58.6	+42.6	100.6	27 47.3	+43.5	101.1	27 35.5	+44.3	101.6	27 23.2	+45.0	102.1	27 10.3	+45.8	102.6	26 57.0	+46.5	103.1	26 43.1	+47.3	103.6	13
14	28 51.1	+41.5	99.2	28 41.2	+42.4	99.8	28 30.8	+43.2	100.3	28 19.8	+44.0	100.8	28 08.2	+44.8	101.4	27 56.1	+45.6	101.9	27 43.5	+46.3	102.4	27 30.4	+47.0	102.9	14
15	29 32.6	+41.3	98.4	29 23.6	+42.1	99.0	29 14.0	+42.9	99.5	29 03.8	+43.7	100.1	28 53.0	+44.5	100.6	28 41.7	+45.3	101.1	28 29.8	+46.1	101.7	28 17.4	+46.8	102.2	15
16	30 13.9	+40.9	97.6	30 05.7	+41.7	98.1	29 56.9	+42.6	98.7	29 47.5	+43.5	99.3	29 37.5	+44.3	99.8	29 27.0	+45.1	100.4	29 15.9	+45.8	100.9	29 04.2	+46.6	101.5	16
17	30 54.8	+40.5	96.7	30 47.4	+41.5	97.3	30 39.5	+42.3	97.9	30 31.0	+43.1	98.5	30 21.8	+44.0	99.1	30 12.1	+44.8	99.6	30 01.7	+45.6	100.2	29 50.8	+46.4	100.8	17
18	31 35.3	+40.2	95.8	31 28.9	+41.1	96.5	31 21.8	+42.0	97.1	31 14.1	+42.9	97.7	31 05.8	+43.7	98.3	30 56.9	+44.5	98.9	30 47.3	+45.3	99.5	30 37.2	+46.1	100.0	18
19	32 15.5	+39.9	95.0	32 10.0	+40.7	95.6	32 03.8	+41.7	96.2	31 57.0	+42.5	96.8	31 49.5	+43.4	97.5	31 41.4	+44.2	98.1	31 32.6	+45.1	98.7	31 23.3	+45.8	99.3	19
20	32 55.4	+39.4	94.1	32 50.7	+40.4	94.7	32 45.5	+41.3	95.4	32 39.5	+42.2	96.0	32 32.9	+43.1	96.6	32 25.6	+43.9	97.3	32 17.7	+44.7	97.9	32 09.1	+45.6	98.5	20
21	33 34.8	+39.1	93.2	33 31.1	+40.0	93.8	33 26.8	+40.9	94.5	33 21.7	+41.8	95.2	33 16.0	+42.7	95.8	33 09.5	+43.6	96.5	33 02.4	+44.5	97.1	32 54.7	+45.2	97.8	21
22	34 13.9	+38.6	92.3	34 11.1	+39.6	92.9	34 07.7	+40.5	93.6	34 03.5	+41.5	94.3	33 58.7	+42.4	95.0	33 53.1	+43.3	95.6	33 46.9	+44.1	96.3	33 39.9	+45.0	97.0	22
23	34 52.5	+38.2	91.3	34 50.7	+39.2	92.0	34 48.2	+40.2	92.7	34 45.0	+41.1	93.4	34 41.1	+42.0	94.1	34 36.4	+42.9	94.8	34 31.0	+43.8	95.5	34 24.9	+44.7	96.2	23
24	35 30.7	+37.8	90.4	35 29.9	+38.8	91.1	35 28.4	+39.7	91.8	35 26.1	+40.7	92.5	35 23.1	+41.6	93.2	35 19.3	+42.6	94.0	35 14.8	+43.4	94.7	35 09.6	+44.3	95.4	24
25	36 08.5	+37.3	89.4	36 08.7	+38.3	90.2	36 08.1	+39.3	90.9	36 06.8	+40.3	91.6	36 04.7	+41.2	92.4	36 01.9	+42.1	93.1	35 58.2	+43.1	93.8	35 53.9	+44.0	94.5	25
26	36 45.8	+36.8	88.5	36 47.0	+37.8	89.2	36 47.4	+38.9	90.0	36 47.1	+39.8	90.7	36 45.9	+40.9	91.5	36 44.0	+41.8	92.2	36 41.3	+42.7	92.9	36 37.9	+43.6	93.7	26
27	37 22.6	+36.3	87.5	37 24.8	+37.4	88.2	37 26.3	+38.4	89.0	37 26.9	+39.4	89.8	37 26.8	+40.3	90.5	37 25.8	+41.3	91.3	37 24.0	+42.3	92.1	37 21.5	+43.2	92.8	27
28	37 58.9	+35.8	86.5	38 02.2	+36.8	87.3	38 04.7	+37.9	88.0	38 06.3	+38.9	88.8	38 07.1	+40.0	89.6	38 07.1	+41.0	90.4	38 06.3	+41.9	91.2	38 04.7	+42.8	92.0	28
29	38 34.7	+35.2	85.4	38 39.0	+36.4	86.2	38 42.6	+37.3	87.0	38 45.2	+38.5	87.8	38 47.1	+39.4	88.6	38 48.1	+40.4	89.5	38 48.2	+41.5	90.3	38 47.5	+42.4	91.1	29
30	39 09.9	+34.7	84.4	39 15.4	+35.7	85.2	39 19.9	+36.9	86.0	39 23.7	+37.9	86.9	39 26.5	+39.0	87.7	39 28.5	+40.0	88.5	39 29.7	+40.9	89.3	39 29.9	+42.0	90.1	30
31	39 44.6	+34.1	83.4	39 51.1	+35.2	84.2	39 56.8	+36.3	85.0	40 01.6	+37.4	85.8	40 05.5	+38.4	86.7	40 08.5	+39.5	87.5	40 10.6	+40.6	88.4	40 11.9	+41.5	89.2	31
32	40 18.7	+33.5	82.3	40 26.3	+34.7	83.1	40 33.1	+35.7	84.0	40 39.0	+36.8	84.8	40 43.9	+37.9	85.7	40 48.0	+39.0	86.5	40 51.2	+40.0	87.4	40 53.4	+41.1	88.3	32
33	40 52.2	+32.9	81.2	41 01.0	+34.0	82.0	41 08.8	+35.2	82.9	41 15.8	+36.2	83.8	41 21.8	+37.4	84.7	41 27.0	+38.4	85.5	41 31.2	+39.5	86.4	41 34.5	+40.5	87.3	33
34	41 25.1	+32.2	80.1	41 35.0	+33.3	80.9	41 44.0	+34.5	81.8	41 52.0	+35.7	82.7	41 59.2	+36.7	83.6	42 05.4	+37.9	84.5	42 10.7	+38.9	85.4	42 15.0	+40.0	86.3	34
35	41 57.3	+31.5	78.9	42 08.3	+32.7	79.8	42 18.5	+33.8	80.7	42 27.7	+35.0	81.6	42 35.9	+36.2	82.5	42 43.3	+37.2	83.4	42 49.6	+38.4	84.4	42 55.0	+39.5	85.3	35
36	42 28.8	+30.9	77.8	42 41.0	+32.1	78.7	42 52.3	+33.2	79.6	43 02.7	+34.4	80.5	43 12.1	+35.5	81.4	43 20.5	+36.7	82.4	43 28.0	+37.8	83.3	43 34.5	+38.9	84.3	36
37	42 59.7	+30.1	76.6	43 13.1	+31.3	77.5	43 25.5	+32.6	78.5	43 37.1	+33.7	79.4	43 47.6	+34.9	80.3	43 57.2	+36.0	81.3	44 05.8	+37.2	82.2	44 13.4	+38.3	83.2	37
38	43 29.8	+29.3	75.4	43 44.4	+30.6	76.4	43 58.1	+31.7	77.3	44 10.8	+33.0	78.2	44 22.5	+34.2	79.2	44 33.2	+35.4	80.2	44 43.0	+36.5	81.1	44 51.7	+37.7	82.1	38
39	43 59.1	+28.6	74.2	44 15.0	+29.8	75.2	44 29.8	+31.1	76.1	44 43.8	+32.2	77.1	44 56.7	+33.4	78.0	45 08.6	+34.7	79.0	45 19.5	+35.9	80.0	45 29.4	+37.0	81.0	39
40	44 27.7	+27.8	73.0	44 44.8	+29.0	74.0	45 00.9	+30.3	74.9	45 16.0	+31.5	75.9	45 30.1	+32.8	76.9	45 43.3	+33.9	77.9	45 55.4	+35.1	78.9	46 06.4	+36.4	79.9	40
41	44 55.5	+27.0	71.8	45 13.8	+28.2	72.7	45 31.2	+29.4	73.7	45 47.5	+30.7	74.7	46 02.9	+31.9	75.7	46 17.2	+33.2	76.7	46 30.5	+34.4	77.7	46 42.8	+35.6	78.7	41
42	45 22.5	+26.1	70.5	45 42.0	+27.4	71.5	46 00.6	+28.7	72.4	46 18.2	+29.9	73.4	46 34.8	+31.2	74.4	46 50.4	+32.4	75.5	47 04.9	+33.7	76.5	47 18.4	+34.9	77.6	42
43	45 48.6	+25.2	69.2	46 09.4	+26.5	70.2	46 29.3	+27.7	71.2	46 48.1	+29.1	72.2	47 06.0	+30.3	73.2	47 22.8	+31.6	74.2	47 38.6	+32.9	75.3	47 53.3	+34.1	76.4	43
44	46 13.8	+24.3	67.9	46 35.9	+25.6	68.9	46 57.0	+26.9	69.9	47 17.2	+28.2	70.9	47 36.3	+29.5	71.9	47 54.4	+30.8	73.0	48 11.5	+32.0	74.0	48 27.4	+33.3	75.1	44
45	46 38.1	+23.4	66.6	47 01.5	+24.7	67.6	47 23.9	+26.0	68.6	47 45.4	+27.2	69.6	48 05.8	+28.5	70.6	48 25.2	+29.8	71.7	48 43.5	+31.2	72.8	49 00.7	+32.5	73.9	45
46	47 01.5	+22.4	65.2	47 26.2	+23.7	66.2	47 49.9	+25.0	67.2	48 12.6	+26.4	68.2	48 34.3	+27.7	69.3	48 55.0	+29.0	70.4	49 14.7	+30.2	71.5	49 33.2	+31.6	72.6	46
47	47 23.9	+21.5	63.9	47 49.9	+22.7	64.8	48 14.9	+24.1	65.9	48 39.0	+25.3	66.9	49 02.0	+26.7	67.9	49 24.0	+28.0	69.0	49 44.9	+29.4	70.1	50 04.8	+30.6	71.2	47
48	47 45.4	+20.4	62.5	48 12.6	+21.7	63.5	48 39.0	+23.0	64.5	49 04.3	+24.4	65.5	49 28.7	+25.7	66.6	49 52.0	+27.0	67.7	50 14.3	+28.3	68.8	50 35.4	+29.8	69.9	48
49	48 05.8	+19.4	61.1	48 34.3	+20.7	62.1	49 02.0	+22.0	63.1	49 28.7	+23.3	64.1	49 54.4	+24.6	65.2	50 19.0	+26.1	66.3	50 42.6	+27.4	67.4	51 05.2	+28.7	68.5	49
50	48 25.2	+18.3	59.7	48 55.0	+19.7	60.6	49 24.0	+20.9	61.7	49 52.0	+22.3	62.7	50 19.0	+23.6	63.8	50 45.1	+24.9	64.9	51 10.0	+26.3	66.0	51 33.9	+27.7	67.1	50
51	48 43.5	+17.2	58.2	49 14.7	+18.5	59.2	49 44.9	+19.9	60.2	50 14.3	+21.1	61.2	50 42.6	+22.6	62.3	51 10.0	+23.9	63.4	51 36.3	+25.3	64.5	52 01.6	+26.6	65.7	51
52	49 00.7	+16.1	56.8	49 33.2	+17.4	57.7	50 04.8	+18.7	58.7	50 35.4	+20.1	59.8	51 05.2	+21.4	60.8	51 33.9	+22.8	61.9	52 01.6	+24.1	63.1	52 28.2	+25.6	64.2	52
53	49 16.8	+15.0	55.3	49 50.6	+16.3	56.3	50 23.5	+17.6	57.3	50 55.5	+18.9	58.3	51 26.6	+20.2	59.4	51 56.7	+21.6	60.4	52 25.7	+23.0	61.6	52 53.8	+24.4	62.7	53
54	49 31.8	+13.9	53.8	50 06.9	+15.1	54.8	50 41.1	+16.4	55.8	51 14.4	+17.7	56.8	51 46.8	+19.1	57.8	52 18.3	+20.4	58.9	52 48.7	+21.8	60.1	53 18.2	+23.2	61.2	54
55	49 45.7	+12.6	52.3	50 22.0	+13.9	53.2	50 57.5	+15.2	54.2	51 32.1	+16.5	55.2	52 05.9	+17.8	56.3	52 38.7	+19.2	57.4	53 10.5	+20.6	58.5	53 41.4	+21.9	59.7	55
56	49 58.3	+11.5	50.8	50 35.9	+12.7	51.7	51 12.7	+13.9	52.7	51 48.6	+15.3	53.7	52 23.7	+16.6	54.7	52 57.9	+17.9	55.9	53 31.1	+19.3	56.9	54 03.3	+20.8	58.1	56
57	50 09.8	+10.2	49.2	50 48.6	+11.4	50.2	51 26.6	+12.7	51.1	52 03.9	+14.0	52.1	52 40.3	+15.3	53.2	53 15.8	+16.7	54.2	53 50.4	+18.0	55.3	54 24.1	+19.4	56.5	57
58	50 20.0	+9.0	47.7	51 00.0	+10.3	48.6	51 39.3	+11.5	49.6	52 17.9	+12.7	50.5	52 55.6	+14.0	51.6	53 32.5	+15.3	52.6	54 08.4	+16.7	53.7	54 43.5	+18.1	54.8	58
59	50 29.0	+7.8	46.2	51 10.3	+8.9	47.0	51 50.8	+10.2	48.0	52 30.6	+11.4	48.9	53 09.6	+12.7	49.9	53 47.8	+14.0	51.0	54 25.1	+15.4	52.1	55 01.6	+16.7	53.2	59
60	50 36.8	+6.5	44.6	51 19.2	+7.7	45.5	52 01.0	+8.8	46.4	52 42.0	+10.1	47.3	53 22.3	+11.3	48.3	54 01.8	+12.6	49.3	54 40.5	+13.9	50.4	55 18.3	+15.3	51.5	60
61	50 43.3	+5.3	43.0	51 26.9	+6.3	43.9	52 09.8	+7.5	44.8	52 52.1	+8.7	45.7	53 33.6	+10.0	46.7	54 14.4	+11.2	47.7	54 54.4	+12.5	48.7	55 33.6	+13.9	49.8	61
62	50 48.6	+3.9	41.5	51 33.2	+5.1	42.3	52 17.3	+6.2	43.1	53 00.8	+7.3	44.0	53 43.6	+8.5	45.0	54 25.6	+9.8	46.0	55 06.9	+11.1	47.0	55 47.5	+12.4	48.1	62
63	50 52.5	+2.7	39.9	51 38.3	+3.8	40.7	52 23.5	+4.9	41.5	53 08.1	+6.0	42.4	53 52.1	+7.2	43.3	54 35.4	+8.4	44.3	55 18.0	+9.7	45.3	55 59.9	+10.9	46.3	63
64	50 55.2	+1.4	38.3	51 42.1	+2.4	39.1	52 28.4	+3.5	39.9	53 14.1	+4.6	40.7	53 59.3	+5.7	41.6	54 43.8	+6.9	42.6	55 27.7	+8.1	43.5	56 10.8	+9.4	44.6	64
65	50 56.6	+0.1	36.7	51 44.5	+1.1	37.5	52 31.9	+2.1	38.2	53 18.7	+3.2	39.1	54 05.0	+4.3	39.9	54 50.7	+5.5	40.8	55 35.8	+6.6	41.8	56 20.2	+7.8	42.8	65
66	50 56.7	−1.2	35.1	51 45.6	−0.2	35.8	52 34.0	+0.7	36.6	53 21.9	+1.8	37.4	54 09.3	+2.9	38.2	54 56.2	+3.9	39.1	55 42.4	+5.1	40.0	56 28.0	+6.3	41.0	66
67	50 55.5	−2.4	33.5	51 45.4	−1.6	34.2	52 34.7	−0.6	35.0	53 23.7	+0.4	35.7	54 12.2	+1.4	36.5	55 00.1	+2.5	37.4	55 47.5	+3.6	38.3	56 34.3	+4.7	39.2	67
68	50 53.1	−3.8	31.9	51 43.8	−2.9	32.6	52 34.1	−1.9	33.3	53 24.1	−1.1	34.0	54 13.6	−0.1	34.8	55 02.6	+0.9	35.6	55 51.1	+2.0	36.5	56 39.0	+3.2	37.4	68
69	50 49.3	−5.0	30.4	51 40.9	−4.2	31.0	52 32.2	−3.4	31.7	53 23.0	−2.4	32.4	54 13.5	−1.5	33.1	55 03.5	−0.5	33.9	55 53.1	+0.5	34.7	56 42.2	+1.5	35.6	69
70	50 44.3	−6.3	28.8	51 36.7	−5.5	29.4	52 28.8	−4.7	30.0	53 20.6	−3.9	30.7	54 12.0	−3.0	31.4	55 03.0	−2.0	32.1	55 53.6	−1.1	32.9	56 43.7	0.0	33.7	70
71	50 38.0	−7.6	27.2	51 31.2	−6.8	27.8	52 24.1	−6.0	28.4	53 16.7	−5.2	29.0	54 09.0	−4.4	29.7	55 01.0	−3.5	30.4	55 52.5	−2.6	31.1	56 43.7	−1.7	31.9	71
72	50 30.4	−8.8	25.7	51 24.4	−8.1	26.2	52 18.1	−7.4	26.8	53 11.5	−6.6	27.4	54 04.6	−5.8	28.0	54 57.5	−5.0	28.7	55 49.9	−4.1	29.4	56 42.0	−3.2	30.1	72
73	50 21.6	−10.1	24.1	51 16.3	−9.4	24.6	52 10.7	−8.7	25.1	53 04.9	−8.0	25.7	53 58.8	−7.2	26.3	54 52.5	−6.5	26.9	55 45.8	−5.7	27.6	56 38.8	−4.8	28.3	73
74	50 11.5	−11.2	22.6	51 06.9	−10.7	23.0	52 02.0	−10.0	23.5	52 56.9	−9.4	24.1	53 51.6	−8.7	24.6	54 46.0	−8.0	25.2	55 40.1	−7.2	25.8	56 34.0	−6.4	26.5	74
75	50 00.3	−12.5	21.0	50 56.2	−11.9	21.5	51 52.0	−11.3	21.9	52 47.5	−10.7	22.4	53 42.9	−10.1	22.9	54 38.0	−9.4	23.5	55 32.9	−8.6	24.1	56 27.6	−7.9	24.7	75
76	49 47.8	−13.6	19.5	50 44.3	−13.1	19.9	51 40.7	−12.6	20.3	52 36.8	−12.0	20.8	53 32.8	−11.4	21.3	54 28.6	−10.8	21.8	55 24.3	−10.2	22.3	56 19.7	−9.5	22.9	76
77	49 34.2	−14.8	18.0	50 31.2	−14.3	18.4	51 28.1	−13.9	18.8	52 24.8	−13.3	19.2	53 21.4	−12.8	19.6	54 17.8	−12.2	20.1	55 14.1	−11.6	20.6	56 10.2	−11.0	21.1	77
78	49 19.4	−15.9	16.5	50 16.9	−15.5	16.9	51 14.2	−15.0	17.2	52 11.5	−14.6	17.6	53 08.6	−14.1	18.0	54 05.6	−13.6	18.4	55 02.5	−13.1	18.9	55 59.2	−12.5	19.3	78
79	49 03.5	−17.1	15.0	50 01.4	−16.7	15.3	50 59.2	−16.3	15.7	51 56.9	−15.8	16.0	52 54.5	−15.4	16.4	53 52.0	−14.9	16.8	54 49.4	−14.4	17.2	55 46.7	−14.0	17.6	79
80	48 46.4	−18.1	13.6	49 44.7	−17.8	13.9	50 42.9	−17.4	14.1	51 41.1	−17.1	14.5	52 39.1	−16.7	14.8	53 37.1	−16.3	15.1	54 35.0	−15.9	15.5	55 32.7	−15.4	15.9	80
81	48 28.3	−19.3	12.1	49 26.9	−18.9	12.4	50 25.5	−18.6	12.6	51 24.0	−18.3	12.9	52 22.4	−17.9	13.2	53 20.8	−17.6	13.5	54 19.1	−17.2	13.8	55 17.3	−16.8	14.2	81
82	48 09.0	−20.2	10.7	49 08.0	−20.0	10.9	50 06.9	−19.8	11.1	51 05.7	−19.4	11.4	52 04.5	−19.1	11.6	53 03.2	−18.8	11.9	54 01.9	−18.5	12.2	55 00.5	−18.1	12.5	82
83	47 48.8	−21.3	9.3	48 48.0	−21.1	9.5	49 47.1	−20.8	9.7	50 46.3	−20.6	9.9	51 45.4	−20.4	10.1	52 44.4	−20.1	10.3	53 43.4	−19.8	10.6	54 42.4	−19.5	10.8	83
84	47 27.5	−22.2	7.9	48 26.9	−22.0	8.1	49 26.3	−21.9	8.2	50 25.7	−21.7	8.4	51 25.0	−21.4	8.6	52 24.3	−21.2	8.8	53 23.6	−21.0	9.0	54 22.8	−20.8	9.2	84
85	47 05.3	−23.3	6.5	48 04.9	−23.1	6.7	49 04.4	−22.9	6.8	50 04.0	−22.8	6.9	51 03.6	−22.6	7.1	52 03.1	−22.4	7.3	53 02.6	−22.2	7.4	54 02.1	−22.1	7.6	85
86	46 42.0	−24.1	5.2	47 41.8	−24.1	5.3	48 41.5	−23.9	5.4	49 41.2	−23.8	5.5	50 41.0	−23.7	5.6	51 40.7	−23.6	5.8	52 40.4	−23.5	5.9	53 40.0	−23.2	6.0	86
87	46 17.9	−25.1	3.9	47 17.7	−25.0	4.0	48 17.6	−24.9	4.0	49 17.4	−24.8	4.1	50 17.3	−24.8	4.2	51 17.1	−24.6	4.3	52 16.9	−24.5	4.4	53 16.8	−24.5	4.5	87
88	45 52.8	−26.0	2.6	46 52.7	−25.9	2.6	47 52.7	−25.9	2.7	48 52.6	−25.8	2.7	49 52.5	−25.7	2.8	50 52.5	−25.8	2.8	51 52.4	−25.7	2.9	52 52.3	−25.6	3.0	88
89	45 26.8	−26.8	1.3	46 26.8	−26.8	1.3	47 26.8	−26.8	1.3	48 26.8	−26.8	1.3	49 26.8	−26.8	1.4	50 26.7	−26.7	1.4	51 26.7	−26.7	1.4	52 26.7	−26.7	1.5	89
90	45 00.0	−27.7	0.0	46 00.0	−27.7	0.0	47 00.0	−27.7	0.0	48 00.0	−27.7	0.0	49 00.0	−27.7	0.0	50 00.0	−27.7	0.0	51 00.0	−27.7	0.0	52 00.0	−27.8	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 63°, 297°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	18 43.5	−44.9	109.8	18 23.0	−45.6	110.1	18 02.2	−46.2	110.4	17 41.1	−46.9	110.7	17 19.7	−47.5	111.0	16 58.0	−48.1	111.3	16 36.1	−48.7	111.6	16 13.8	−49.3	111.9	0
1	17 58.6	−45.0	110.5	17 37.4	−45.7	110.8	17 16.0	−46.4	111.1	16 54.2	−47.0	111.4	16 32.2	−47.6	111.7	16 09.9	−48.2	111.9	15 47.4	−48.9	112.2	15 24.5	−49.3	112.5	1
2	17 13.6	−45.2	111.2	16 51.7	−45.8	111.5	16 29.6	−46.5	111.8	16 07.2	−47.1	112.0	15 44.6	−47.7	112.3	15 21.7	−48.3	112.6	14 58.5	−49.2	112.8	14 35.2	−49.5	113.1	2
3	16 28.4	−45.3	111.9	16 05.9	−45.9	112.2	15 43.1	−46.5	112.4	15 20.1	−47.2	112.7	14 56.9	−47.9	112.9	14 33.4	−48.4	113.2	14 09.6	−49.0	113.4	13 45.7	−49.6	113.6	3
4	15 43.1	−45.4	112.6	15 20.0	−46.1	112.8	14 56.6	−46.8	113.1	14 32.9	−47.3	113.3	14 09.0	−47.9	113.6	13 45.0	−48.6	113.8	13 20.6	−49.0	114.0	12 56.1	−49.6	114.2	4
5	14 57.7	−45.6	113.3	14 33.9	−46.2	113.5	14 09.8	−46.8	113.7	13 45.6	−47.4	114.0	13 21.1	−48.0	114.2	12 56.4	−48.5	114.4	12 31.6	−49.2	114.6	12 06.5	−49.7	114.8	5
6	14 12.1	−45.6	113.9	13 47.7	−46.3	114.2	13 23.0	−46.9	114.4	12 58.2	−47.5	114.6	12 33.1	−48.1	114.8	12 07.9	−48.7	115.0	11 42.4	−49.2	115.2	11 16.8	−49.8	115.4	6
7	13 26.5	−45.8	114.6	13 01.4	−46.4	114.8	12 36.1	−47.0	115.0	12 10.7	−47.6	115.2	11 45.0	−48.1	115.4	11 19.2	−48.5	115.6	10 53.2	−49.3	115.8	10 27.0	−49.8	115.8	7
8	12 40.7	−45.8	115.3	12 15.0	−46.4	115.5	11 49.1	−47.0	115.7	11 23.1	−47.7	115.8	10 56.9	−48.3	116.0	10 30.5	−48.8	116.2	10 03.9	−49.3	116.3	9 37.2	−49.9	116.5	8
9	11 54.9	−46.0	115.9	11 28.6	−46.6	116.1	11 02.1	−47.2	116.3	10 35.4	−47.7	116.5	10 08.6	−48.3	116.6	9 41.7	−48.9	116.8	9 14.6	−49.4	116.9	8 47.3	−49.9	117.1	9
10	11 08.9	−46.0	116.6	10 42.0	−46.6	116.7	10 14.9	−47.2	116.9	9 47.7	−47.8	117.1	9 20.3	−48.4	117.2	8 52.8	−48.9	117.4	8 25.2	−49.5	117.5	7 57.4	−50.0	117.6	10
11	10 22.9	−46.1	117.2	9 55.4	−46.8	117.4	9 27.7	−47.3	117.5	8 59.9	−47.9	117.7	8 31.9	−48.4	117.8	8 03.9	−49.0	117.9	7 35.7	−49.5	118.1	7 07.4	−50.0	118.2	11
12	9 36.8	−46.2	117.9	9 08.6	−46.7	118.0	8 40.4	−47.4	118.2	8 12.0	−47.9	118.3	7 43.5	−48.5	118.4	7 14.9	−49.0	118.5	6 46.2	−49.5	118.6	6 17.4	−50.1	118.7	12
13	8 50.6	−46.3	118.5	8 21.9	−46.9	118.7	7 53.0	−47.4	118.8	7 24.1	−48.0	118.9	6 55.0	−48.5	119.0	6 25.9	−49.1	119.1	5 56.7	−49.6	119.2	5 27.3	−50.0	119.3	13
14	8 04.3	−46.3	119.2	7 35.0	−46.9	119.3	7 05.6	−47.4	119.4	6 36.1	−48.0	119.5	6 06.5	−48.5	119.6	5 36.8	−49.0	119.7	5 07.1	−49.6	119.8	4 37.3	−50.1	119.8	14
15	7 18.0	−46.4	119.8	6 48.1	−46.9	119.9	6 18.2	−47.5	120.0	5 48.1	−48.0	120.1	5 18.0	−48.6	120.2	4 47.8	−49.2	120.3	4 17.5	−49.6	120.3	3 47.2	−50.2	120.4	15
16	6 31.6	−46.4	120.4	6 01.2	−47.0	120.5	5 30.7	−47.6	120.7	5 00.1	−48.1	120.7	4 29.4	−48.6	120.8	3 58.6	−49.1	120.8	3 27.9	−49.7	120.9	2 57.0	−50.1	121.0	16
17	5 45.2	−46.4	121.1	5 14.2	−47.0	121.2	4 43.1	−47.5	121.2	4 12.0	−48.1	121.3	3 40.8	−48.7	121.4	3 09.5	−49.1	121.4	2 38.2	−49.6	121.5	2 06.9	−50.2	121.5	17
18	4 58.8	−46.5	121.7	4 27.2	−47.1	121.8	3 55.6	−47.6	121.9	3 23.9	−48.2	121.9	2 52.1	−48.6	122.0	2 20.4	−49.2	122.0	1 48.6	−49.7	122.0	1 16.7	−50.1	122.0	18
19	4 12.3	−46.5	122.4	3 40.1	−47.0	122.4	3 08.0	−47.7	122.5	2 35.9	−48.2	122.5	2 03.5	−48.7	122.5	1 31.2	−49.2	122.6	0 58.9	−49.7	122.6	0 26.6	−50.2	122.6	19
20	3 25.8	−46.6	123.0	2 53.1	−47.1	123.0	2 20.3	−47.6	123.1	1 47.6	−48.2	123.1	1 14.8	−48.7	123.1	0 42.0	−49.2	123.1	0 09.2	−49.7	123.1	0 23.6	+50.2	56.9	20
21	2 39.2	−46.6	123.6	2 06.0	−47.1	123.7	1 32.7	−47.6	123.7	0 59.4	−48.2	123.7	0 26.1	−48.7	123.7	0 07.2	+49.2	56.3	0 40.5	+49.7	56.3	1 13.8	+50.1	56.3	21
22	1 52.6	−46.6	124.3	1 18.9	−47.2	124.3	0 45.1	−47.7	124.3	0 11.2	−48.1	124.3	0 22.6	+48.6	55.7	0 56.4	+49.1	55.7	1 30.2	+49.6	55.7	2 03.9	+50.2	55.8	22
23	1 06.0	−46.5	124.9	0 31.7	−47.1	124.9	0 02.6	+47.6	55.1	0 36.9	+48.2	55.1	1 11.2	+48.7	55.1	1 45.5	+49.2	55.1	2 19.8	+49.5	55.2	2 54.1	+50.1	55.2	23
24	0 19.5	−46.6	125.5	0 15.4	+47.1	54.5	0 50.2	+47.7	54.5	1 25.1	+48.1	54.5	1 59.9	+48.7	54.5	2 34.7	+49.2	54.6	3 09.5	+49.6	54.6	3 44.2	+50.1	54.7	24
25	0 27.1	+46.6	53.9	1 02.5	+47.1	53.9	1 37.9	+47.6	53.9	2 13.2	+48.2	53.9	2 48.6	+48.6	53.9	3 23.9	+49.1	54.0	3 59.1	+49.6	54.0	4 34.3	+50.1	54.1	25
26	1 13.7	+46.6	53.2	1 49.6	+47.1	53.2	2 25.5	+47.6	53.3	3 01.4	+48.1	53.3	3 37.2	+48.6	53.4	4 13.0	+49.1	53.4	4 48.7	+49.6	53.5	5 24.4	+50.1	53.6	26
27	2 00.3	+46.6	52.6	2 36.7	+47.1	52.6	3 13.1	+47.6	52.7	3 49.5	+48.1	52.7	4 25.8	+48.6	52.8	5 02.1	+49.1	52.8	5 38.3	+49.6	52.9	6 14.5	+50.0	53.0	27
28	2 46.9	+46.5	52.0	3 23.8	+47.1	52.0	4 00.7	+47.6	52.1	4 37.6	+48.1	52.1	5 14.4	+48.6	52.2	5 51.2	+49.0	52.3	6 27.9	+49.5	52.3	7 04.5	+50.0	52.4	28
29	3 33.4	+46.5	51.3	4 10.9	+47.0	51.4	4 48.3	+47.5	51.4	5 25.7	+48.0	51.5	6 03.0	+48.5	51.6	6 40.2	+49.0	51.7	7 17.4	+49.4	51.8	7 54.5	+49.9	51.9	29
30	4 19.9	+46.5	50.7	4 57.9	+47.0	50.8	5 35.8	+47.5	50.8	6 13.7	+48.0	50.9	6 51.5	+48.5	51.0	7 29.2	+49.0	51.1	8 06.8	+49.5	51.2	8 44.4	+49.9	51.3	30
31	5 06.4	+46.5	50.1	5 44.9	+47.0	50.1	6 23.3	+47.5	50.2	7 01.7	+47.9	50.3	7 40.0	+48.4	50.4	8 18.2	+48.9	50.5	8 56.3	+49.3	50.6	9 34.3	+49.8	50.8	31
32	5 52.9	+46.4	49.4	6 31.9	+46.9	49.5	7 10.8	+47.4	49.6	7 49.6	+47.9	49.7	8 28.4	+48.4	49.8	9 07.1	+48.8	49.9	9 45.6	+49.4	50.1	10 24.1	+49.8	50.2	32
33	6 39.3	+46.4	48.8	7 18.8	+46.8	48.9	7 58.2	+47.3	49.0	8 37.5	+47.9	49.1	9 16.8	+48.3	49.2	9 55.9	+48.8	49.3	10 35.0	+49.2	49.5	11 13.9	+49.7	49.6	33
34	7 25.7	+46.3	48.2	8 05.6	+46.8	48.3	8 45.5	+47.3	48.4	9 25.4	+47.7	48.5	10 05.1	+48.2	48.6	10 44.7	+48.7	48.8	11 24.2	+49.2	48.9	12 03.6	+49.6	49.1	34
35	8 12.0	+46.2	47.5	8 52.4	+46.8	47.6	9 32.8	+47.3	47.7	10 13.1	+47.7	47.9	10 53.3	+48.2	48.0	11 33.4	+48.7	48.2	12 13.4	+49.1	48.3	12 53.2	+49.6	48.5	35
36	8 58.2	+46.2	46.9	9 39.2	+46.6	47.0	10 20.1	+47.1	47.1	11 00.8	+47.7	47.3	11 41.5	+48.1	47.4	12 22.1	+48.5	47.6	13 02.5	+49.0	47.7	13 42.8	+49.5	47.9	36
37	9 44.4	+46.1	46.2	10 25.8	+46.6	46.3	11 07.2	+47.1	46.5	11 48.5	+47.5	46.6	12 29.6	+48.0	46.8	13 10.6	+48.5	47.0	13 51.5	+48.9	47.1	14 32.3	+49.3	47.3	37
38	10 30.5	+46.0	45.6	11 12.4	+46.5	45.7	11 54.3	+47.0	45.9	12 36.0	+47.5	46.0	13 17.6	+47.9	46.2	13 59.1	+48.4	46.4	14 40.4	+48.9	46.5	15 21.6	+49.3	46.7	38
39	11 16.5	+45.9	44.9	11 58.9	+46.4	45.1	12 41.3	+46.8	45.2	13 23.5	+47.3	45.4	14 05.5	+47.9	45.6	14 47.5	+48.3	45.7	15 29.3	+48.7	45.9	16 10.9	+49.2	46.1	39
40	12 02.4	+45.9	44.3	12 45.3	+46.4	44.4	13 28.1	+46.8	44.6	14 10.8	+47.3	44.7	14 53.4	+47.7	44.9	15 35.8	+48.2	45.1	16 18.0	+48.7	45.3	17 00.1	+49.1	45.5	40
41	12 48.3	+45.7	43.6	13 31.7	+46.2	43.8	14 14.9	+46.7	43.9	14 58.1	+47.1	44.1	15 41.1	+47.6	44.3	16 24.0	+48.0	44.5	17 06.7	+48.5	44.7	17 49.2	+49.0	44.9	41
42	13 34.0	+45.7	42.9	14 17.9	+46.1	43.1	15 01.6	+46.6	43.3	15 45.2	+47.1	43.5	16 28.7	+47.5	43.7	17 12.0	+48.0	43.9	17 55.2	+48.4	44.1	18 38.2	+48.9	44.3	42
43	14 19.7	+45.5	42.3	15 04.0	+46.0	42.4	15 48.2	+46.5	42.6	16 32.3	+46.9	42.8	17 16.2	+47.4	43.0	18 00.0	+47.8	43.2	18 43.6	+48.3	43.5	19 27.1	+48.7	43.7	43
44	15 05.2	+45.4	41.6	15 50.0	+45.9	41.8	16 34.7	+46.3	42.0	17 19.2	+46.8	42.2	18 03.6	+47.3	42.4	18 47.8	+47.7	42.6	19 31.9	+48.2	42.8	20 15.8	+48.6	43.1	44
45	15 50.6	+45.3	40.9	16 35.9	+45.7	41.1	17 21.0	+46.2	41.3	18 06.0	+46.7	41.5	18 50.9	+47.1	41.7	19 35.5	+47.6	42.0	20 20.1	+48.0	42.2	21 04.4	+48.6	42.5	45
46	16 35.9	+45.1	40.2	17 21.6	+45.6	40.4	18 07.2	+46.1	40.6	18 52.7	+46.5	40.9	19 38.0	+46.9	41.1	20 23.1	+47.4	41.3	21 08.1	+47.9	41.6	21 52.9	+48.3	41.8	46
47	17 21.0	+45.0	39.5	18 07.2	+45.5	39.7	18 53.3	+45.9	40.0	19 39.2	+46.4	40.2	20 24.9	+46.9	40.4	21 10.5	+47.3	40.7	21 56.0	+47.7	40.9	22 41.2	+48.2	41.2	47
48	18 06.0	+44.9	38.8	18 52.7	+45.3	39.1	19 39.2	+45.7	39.3	20 25.6	+46.2	39.5	21 11.8	+46.6	39.8	21 57.8	+47.1	40.0	22 43.7	+47.5	40.3	23 29.4	+48.0	40.5	48
49	18 50.9	+44.6	38.1	19 38.0	+45.1	38.4	20 24.9	+45.6	38.6	21 11.8	+46.0	38.8	21 58.4	+46.5	39.1	22 44.9	+47.0	39.3	23 31.2	+47.4	39.6	24 17.4	+47.8	39.9	49
50	19 35.5	+44.4	37.4	20 23.1	+45.0	37.6	21 10.5	+45.5	37.9	21 57.8	+45.9	38.1	22 44.9	+46.3	38.4	23 31.9	+46.7	38.7	24 18.6	+47.2	38.9	25 05.2	+47.7	39.2	50
51	20 20.1	+44.3	36.7	21 08.1	+44.8	37.0	21 56.0	+45.2	37.2	22 43.7	+45.7	37.4	23 31.2	+46.2	37.7	24 18.6	+46.6	38.0	25 05.8	+47.1	38.3	25 52.9	+47.4	38.6	51
52	21 04.4	+44.2	36.0	21 52.9	+44.6	36.2	22 41.2	+45.1	36.5	23 29.4	+45.5	36.7	24 17.4	+45.9	37.0	25 05.2	+46.4	37.3	25 52.9	+46.8	37.6	26 40.3	+47.3	37.9	52
53	21 48.6	+44.0	35.3	22 37.5	+44.4	35.5	23 26.3	+44.8	35.8	24 14.9	+45.3	36.0	25 03.3	+45.7	36.3	25 51.6	+46.2	36.6	26 39.7	+46.6	36.9	27 27.6	+47.0	37.2	53
54	22 32.6	+43.7	34.5	23 21.9	+44.2	34.8	24 11.1	+44.7	35.0	25 00.2	+45.0	35.3	25 49.0	+45.6	35.6	26 37.8	+45.9	35.9	27 26.3	+46.4	36.2	28 14.6	+46.9	36.5	54
55	23 16.3	+43.6	33.8	24 06.1	+44.0	34.0	24 55.8	+44.4	34.3	25 45.2	+44.9	34.6	26 34.6	+45.3	34.9	27 23.7	+45.7	35.1	28 12.7	+46.2	35.4	29 01.5	+46.6	35.8	55
56	23 59.9	+43.3	33.1	24 50.1	+43.8	33.3	25 40.2	+44.2	33.6	26 30.1	+44.6	33.8	27 19.9	+45.0	34.1	28 09.4	+45.5	34.4	28 58.9	+45.9	34.7	29 48.1	+46.3	35.0	56
57	24 43.2	+43.1	32.3	25 33.9	+43.5	32.5	26 24.4	+43.9	32.8	27 14.7	+44.4	33.1	28 04.9	+44.8	33.4	28 54.9	+45.3	33.7	29 44.8	+45.7	34.0	30 34.4	+46.2	34.3	57
58	25 26.3	+42.9	31.5	26 17.4	+43.3	31.8	27 08.3	+43.7	32.0	27 59.1	+44.1	32.3	28 49.7	+44.6	32.6	29 40.2	+45.0	32.9	30 30.5	+45.4	33.2	31 20.6	+45.8	33.6	58
59	26 09.2	+42.6	30.7	27 00.7	+43.0	31.0	27 52.0	+43.5	31.3	28 43.2	+43.9	31.6	29 34.3	+44.3	31.8	30 25.2	+44.7	32.2	31 15.9	+45.1	32.5	32 06.4	+45.6	32.8	59
60	26 51.8	+42.3	30.0	27 43.7	+42.8	30.2	28 35.5	+43.2	30.5	29 27.1	+43.6	30.8	30 18.6	+44.0	31.1	31 09.9	+44.4	31.4	32 01.0	+44.9	31.7	32 52.0	+45.3	32.0	60
61	27 34.1	+42.1	29.2	28 26.5	+42.4	29.4	29 18.7	+42.8	29.7	30 10.7	+43.3	30.0	31 02.6	+43.7	30.3	31 54.3	+44.2	30.6	32 45.9	+44.6	30.9	33 37.3	+45.0	31.2	61
62	28 16.2	+41.8	28.4	29 08.9	+42.2	28.6	30 01.5	+42.6	28.9	30 54.0	+43.0	29.2	31 46.3	+43.4	29.5	32 38.5	+43.8	29.8	33 30.5	+44.2	30.1	34 22.3	+44.6	30.5	62
63	28 58.0	+41.5	27.5	29 51.1	+41.9	27.8	30 44.1	+42.3	28.1	31 37.0	+42.7	28.4	32 29.7	+43.1	28.7	33 22.3	+43.5	29.0	34 14.7	+43.9	29.3	35 06.9	+44.4	29.6	63
64	29 39.5	+41.1	26.7	30 33.0	+41.6	27.0	31 26.4	+42.0	27.2	32 19.7	+42.3	27.5	33 12.8	+42.8	27.8	34 05.8	+43.2	28.1	34 58.6	+43.6	28.5	35 51.3	+44.0	28.8	64
65	30 20.6	+40.9	25.9	31 14.6	+41.2	26.1	32 08.4	+41.6	26.4	33 02.0	+42.0	26.7	33 55.6	+42.4	27.0	34 49.0	+42.8	27.3	35 42.2	+43.2	27.6	36 35.3	+43.6	28.0	65
66	31 01.5	+40.5	25.0	31 55.8	+40.9	25.3	32 50.0	+41.2	25.6	33 44.0	+41.7	25.8	34 38.0	+42.0	26.1	35 31.8	+42.4	26.4	36 25.4	+42.9	26.8	37 18.9	+43.3	27.1	66
67	31 42.0	+40.1	24.2	32 36.7	+40.5	24.4	33 31.2	+40.9	24.7	34 25.7	+41.3	25.0	35 20.0	+41.7	25.3	36 14.2	+42.1	25.6	37 08.3	+42.4	25.9	38 02.2	+42.8	26.2	67
68	32 22.1	+39.8	23.3	33 17.2	+40.1	23.6	34 12.1	+40.5	23.8	35 07.0	+40.9	24.1	36 01.7	+41.2	24.4	36 56.3	+41.6	24.7	37 50.7	+42.1	25.0	38 45.0	+42.5	25.3	68
69	33 01.9	+39.4	22.4	33 57.3	+39.8	22.6	34 52.6	+40.1	22.9	35 47.8	+40.5	23.2	36 42.9	+40.9	23.5	37 37.9	+41.2	23.8	38 32.8	+41.6	24.1	39 27.5	+42.0	24.4	69
70	33 41.3	+39.0	21.5	34 37.1	+39.3	21.7	35 32.7	+39.7	22.0	36 28.3	+40.1	22.3	37 23.8	+40.4	22.6	38 19.1	+40.8	22.9	39 14.4	+41.1	23.2	40 09.5	+41.5	23.5	70
71	34 20.3	+38.5	20.6	35 16.4	+38.9	20.8	36 12.4	+39.3	21.1	37 08.4	+39.6	21.3	38 04.2	+40.0	21.6	38 59.9	+40.3	21.9	39 55.5	+40.7	22.2	40 51.0	+41.1	22.6	71
72	34 58.8	+38.2	19.6	35 55.3	+38.5	19.9	36 51.7	+38.8	20.1	37 48.0	+39.1	20.4	38 44.2	+39.4	20.7	39 40.2	+39.9	21.0	40 36.2	+40.2	21.3	41 32.1	+40.5	21.6	72
73	35 37.0	+37.7	18.7	36 33.8	+38.0	18.9	37 30.5	+38.3	19.2	38 27.1	+38.7	19.4	39 23.6	+39.0	19.7	40 20.1	+39.3	20.0	41 16.4	+39.7	20.3	42 12.6	+40.1	20.6	73
74	36 14.7	+37.2	17.7	37 11.8	+37.5	18.0	38 08.8	+37.8	18.2	39 05.8	+38.1	18.4	40 02.6	+38.5	18.7	40 59.4	+38.8	19.0	41 56.1	+39.2	19.3	42 52.7	+39.5	19.6	74
75	36 51.9	+36.7	16.8	37 49.3	+37.0	17.0	38 46.6	+37.4	17.2	39 43.9	+37.7	17.4	40 41.1	+38.0	17.7	41 38.2	+38.3	18.0	42 35.3	+38.6	18.3	43 32.2	+38.9	18.5	75
76	37 28.6	+36.2	15.8	38 26.3	+36.5	16.0	39 24.0	+36.8	16.2	40 21.6	+37.1	16.4	41 19.1	+37.4	16.7	42 16.5	+37.7	16.9	43 13.9	+38.0	17.2	44 11.1	+38.4	17.5	76
77	38 04.8	+35.7	14.8	39 02.8	+36.0	15.0	40 00.8	+36.2	15.2	40 58.7	+36.5	15.4	41 56.5	+36.8	15.6	42 54.2	+37.1	15.9	43 51.9	+37.4	16.1	44 49.5	+37.7	16.4	77
78	38 40.5	+35.2	13.7	39 38.8	+35.4	14.0	40 37.0	+35.7	14.1	41 35.2	+35.9	14.3	42 33.3	+36.2	14.6	43 31.3	+36.5	14.8	44 29.3	+36.8	15.1	45 27.1	+37.1	15.3	78
79	39 15.7	+34.6	12.7	40 14.2	+34.8	12.9	41 12.7	+35.0	13.1	42 11.1	+35.3	13.3	43 09.5	+35.6	13.5	44 07.8	+35.8	13.7	45 06.1	+36.1	13.9	46 04.3	+36.4	14.2	79
80	39 50.3	+34.0	11.6	40 49.0	+34.3	11.8	41 47.7	+34.5	12.0	42 46.4	+34.7	12.2	43 45.1	+34.9	12.4	44 43.6	+35.2	12.6	45 42.2	+35.4	12.8	46 40.7	+35.6	13.0	80
81	40 24.3	+33.4	10.5	41 23.3	+33.5	10.7	42 22.2	+33.8	10.9	43 21.1	+34.0	11.1	44 20.0	+34.2	11.2	45 18.8	+34.5	11.4	46 17.6	+34.7	11.6	47 16.3	+35.0	11.9	81
82	40 57.7	+32.7	9.5	41 56.8	+33.0	9.6	42 56.0	+33.1	9.8	43 55.1	+33.3	9.9	44 54.2	+33.5	10.1	45 53.3	+33.7	10.3	46 52.3	+33.9	10.5	47 51.3	+34.1	10.6	82
83	41 30.4	+32.1	8.3	42 29.8	+32.2	8.5	43 29.1	+32.5	8.6	44 28.4	+32.6	8.8	45 27.7	+32.8	8.9	46 27.0	+33.0	9.1	47 26.2	+33.2	9.2	48 25.4	+33.4	9.4	83
84	42 02.5	+31.5	7.2	43 02.0	+31.6	7.3	44 01.6	+31.7	7.4	45 01.0	+31.9	7.6	46 00.5	+32.0	7.7	47 00.0	+32.2	7.7	47 59.4	+32.3	8.0	48 58.8	+32.5	8.2	84
85	42 34.0	+30.7	6.1	43 33.6	+30.8	6.2	44 33.3	+30.9	6.3	45 32.9	+31.1	6.4	46 32.5	+31.2	6.5	47 32.1	+31.4	6.6	48 31.7	+31.5	6.7	49 31.3	+31.6	6.9	85
86	43 04.7	+30.0	4.9	44 04.4	+30.1	5.0	45 04.2	+30.2	5.0	46 04.0	+30.3	5.1	47 03.7	+30.4	5.2	48 03.5	+30.5	5.3	49 03.2	+30.6	5.4	50 02.9	+30.8	5.6	86
87	43 34.7	+29.2	3.7	44 34.5	+29.3	3.8	45 34.4	+29.4	3.8	46 34.3	+29.4	3.9	47 34.1	+29.6	4.0	48 34.0	+29.6	4.1	49 33.8	+29.7	4.2	50 33.7	+29.7	4.2	87
88	44 03.9	+28.4	2.5	45 03.8	+28.5	2.5	46 03.8	+28.5	2.6	47 03.7	+28.6	2.6	48 03.7	+28.6	2.7	49 03.6	+28.7	2.7	50 03.5	+28.8	2.8	51 03.4	+28.8	2.8	88
89	44 32.3	+27.7	1.3	45 32.3	+27.7	1.3	46 32.3	+27.7	1.3	47 32.3	+27.7	1.3	48 32.3	+27.7	1.3	49 32.3	+27.7	1.4	50 32.3	+27.7	1.4	51 32.2	+27.8	1.4	89
90	45 00.0	+26.8	0.0	46 00.0	+26.8	0.0	47 00.0	+26.8	0.0	48 00.0	+26.8	0.0	49 00.0	+26.8	0.0	50 00.0	+26.7	0.0	51 00.0	+26.7	0.0	52 00.0	+26.7	0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z / L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 117°, 243°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	18 03.5	+44.5	109.0	17 43.8	+45.2	109.3	17 23.7	+46.0	109.6	17 03.4	+46.6	109.9	16 42.9	+47.2	110.2	16 22.0	+47.8	110.5	16 00.9	+48.4	110.8	15 39.5	+49.0	111.0	0
1	18 48.0	+44.4	108.3	18 29.0	+45.1	108.6	18 09.7	+45.7	109.0	17 50.0	+46.5	109.3	17 30.1	+47.1	109.6	17 09.8	+47.8	109.9	16 49.3	+48.4	110.1	16 28.5	+49.0	110.4	1
2	19 32.4	+44.2	107.6	19 14.1	+44.9	107.9	18 55.4	+45.6	108.3	18 36.5	+46.3	108.6	18 17.2	+46.9	108.9	17 57.6	+47.6	109.2	17 37.7	+48.2	109.5	17 17.5	+48.8	109.8	2
3	20 16.6	+44.1	106.9	19 59.0	+44.8	107.2	19 41.0	+45.5	107.6	19 22.8	+46.1	107.9	19 04.1	+46.8	108.3	18 45.2	+47.4	108.6	18 25.9	+48.1	108.9	18 06.3	+48.7	109.2	3
4	21 00.7	+43.8	106.2	20 43.8	+44.5	106.5	20 26.5	+45.3	106.9	20 08.9	+46.0	107.2	19 50.9	+46.7	107.6	19 32.6	+47.4	107.9	19 14.0	+48.0	108.3	18 55.0	+48.6	108.6	4
5	21 44.5	+43.7	105.4	21 28.3	+44.4	105.8	21 11.8	+45.1	106.2	20 54.9	+45.8	106.6	20 37.6	+46.5	106.9	20 20.0	+47.2	107.3	20 02.0	+47.8	107.6	19 43.6	+48.5	108.0	5
6	22 28.2	+43.4	104.7	22 12.7	+44.2	105.1	21 56.9	+45.0	105.5	21 40.7	+45.7	105.9	21 24.1	+46.4	106.2	21 07.2	+47.0	106.6	20 49.8	+47.7	107.0	20 32.1	+48.3	107.3	6
7	23 11.6	+43.3	103.9	22 56.9	+44.0	104.3	22 41.9	+44.7	104.8	22 26.4	+45.4	105.2	22 10.5	+46.1	105.6	21 54.2	+46.8	106.0	21 37.5	+47.5	106.3	21 20.4	+48.2	106.7	7
8	23 54.9	+43.0	103.2	23 40.9	+43.8	103.6	23 26.6	+44.5	104.0	23 11.8	+45.3	104.5	22 56.6	+46.0	104.9	22 41.0	+46.7	105.3	22 25.0	+47.4	105.7	22 08.6	+48.1	106.1	8
9	24 37.9	+42.7	102.4	24 24.7	+43.6	102.9	24 11.1	+44.4	103.3	23 57.1	+45.1	103.7	23 42.6	+45.8	104.2	23 27.7	+46.6	104.6	23 12.4	+47.2	105.0	22 56.7	+47.8	105.4	9
10	25 20.6	+42.6	101.6	25 08.3	+43.3	102.1	24 55.5	+44.1	102.6	24 42.2	+44.9	103.0	24 28.4	+45.6	103.5	24 14.3	+46.3	103.9	23 59.6	+47.0	104.3	23 44.5	+47.8	104.8	10
11	26 03.2	+42.3	100.9	25 51.6	+43.1	101.3	25 39.6	+43.9	101.8	25 27.1	+44.6	102.3	25 14.0	+45.4	102.7	25 00.6	+46.1	103.2	24 46.6	+46.9	103.7	24 32.3	+47.5	104.1	11
12	26 45.5	+42.0	100.1	26 34.7	+42.8	100.6	26 23.5	+43.6	101.1	26 11.7	+44.4	101.5	25 59.4	+45.2	102.0	25 46.7	+45.9	102.5	25 33.5	+46.6	103.0	25 19.8	+47.3	103.4	12
13	27 27.5	+41.7	99.3	27 17.5	+42.6	99.8	27 07.1	+43.4	100.3	26 56.1	+44.2	100.8	26 44.6	+45.0	101.3	26 32.6	+45.7	101.8	26 20.1	+46.5	102.3	26 07.1	+47.2	102.7	13
14	28 09.2	+41.4	98.5	28 00.1	+42.3	99.0	27 50.5	+43.1	99.5	27 40.3	+43.9	100.0	27 29.6	+44.7	100.5	27 18.3	+45.5	101.1	27 06.6	+46.2	101.6	26 54.3	+46.9	102.1	14
15	28 50.6	+41.2	97.6	28 42.4	+42.0	98.2	28 33.6	+42.8	98.7	28 24.2	+43.6	99.3	28 14.3	+44.4	99.8	28 03.8	+45.2	100.3	27 52.8	+46.0	100.8	27 41.2	+46.8	101.4	15
16	29 31.8	+40.8	96.8	29 24.4	+41.7	97.4	29 16.4	+42.5	97.9	29 07.8	+43.4	98.5	28 58.7	+44.2	99.0	28 49.0	+45.0	99.6	28 38.8	+45.7	100.1	28 28.0	+46.5	100.6	16
17	30 12.6	+40.5	96.0	30 06.1	+41.3	96.5	29 58.9	+42.3	97.1	29 51.2	+43.1	97.7	29 42.9	+43.9	98.2	29 34.0	+44.7	98.8	29 24.5	+45.5	99.4	29 14.5	+46.2	99.9	17
18	30 53.1	+40.1	95.1	30 47.4	+41.1	95.7	30 41.2	+41.9	96.3	30 34.3	+42.8	96.9	30 26.8	+43.6	97.5	30 18.7	+44.5	98.0	30 10.0	+45.3	98.6	30 00.7	+46.1	99.2	18
19	31 33.2	+39.8	94.2	31 28.5	+40.7	94.8	31 23.1	+41.6	95.5	31 17.1	+42.5	96.1	31 10.4	+43.4	96.7	31 03.2	+44.1	97.3	30 55.3	+44.9	97.9	30 46.8	+45.7	98.4	19
20	32 13.0	+39.4	93.3	32 09.2	+40.3	94.0	32 04.7	+41.2	94.6	31 59.6	+42.1	95.2	31 53.8	+43.0	95.8	31 47.3	+43.9	96.5	31 40.2	+44.7	97.1	31 32.5	+45.5	97.7	20
21	32 52.4	+39.1	92.5	32 49.5	+40.0	93.1	32 45.9	+40.9	93.7	32 41.7	+41.8	94.4	32 36.8	+42.6	95.0	32 31.2	+43.5	95.7	32 24.9	+44.4	96.3	32 18.0	+45.2	96.9	21
22	33 31.5	+38.6	91.5	33 29.5	+39.6	92.2	33 26.8	+40.6	92.9	33 23.5	+41.4	93.5	33 19.4	+42.4	94.2	33 14.7	+43.2	94.8	33 09.3	+44.1	95.5	33 03.2	+45.0	96.1	22
23	34 10.1	+38.2	90.6	34 09.1	+39.1	91.3	34 07.4	+40.1	92.0	34 04.9	+41.1	92.7	34 01.8	+42.0	93.3	33 57.9	+42.9	94.0	33 53.4	+43.7	94.7	33 48.2	+44.6	95.3	23
24	34 48.3	+37.8	89.7	34 48.2	+38.8	90.4	34 47.5	+39.7	91.1	34 46.0	+40.7	91.8	34 43.8	+41.6	92.5	34 40.8	+42.5	93.2	34 37.1	+43.5	93.9	34 32.8	+44.2	94.5	24
25	35 26.1	+37.3	88.7	35 27.0	+38.3	89.5	35 27.2	+39.3	90.2	35 26.7	+40.2	90.9	35 25.4	+41.2	91.6	35 23.3	+42.2	92.3	35 20.6	+43.0	93.0	35 17.0	+44.0	93.7	25
26	36 03.4	+36.8	87.8	36 05.3	+37.9	88.5	36 06.5	+38.9	89.2	36 06.9	+39.9	90.0	36 06.6	+40.8	90.7	36 05.5	+41.7	91.4	36 03.6	+42.7	92.1	36 01.0	+43.6	92.9	26
27	36 40.2	+36.4	86.8	36 43.2	+37.4	87.5	36 45.4	+38.4	88.3	36 46.8	+39.4	89.0	36 47.4	+40.4	89.8	36 47.2	+41.4	90.5	36 46.3	+42.3	91.3	36 44.6	+43.2	92.0	27
28	37 16.6	+35.8	85.8	37 20.6	+36.9	86.6	37 23.8	+37.9	87.3	37 26.2	+38.9	88.1	37 27.8	+39.9	88.9	37 28.6	+40.9	89.6	37 28.6	+41.9	90.4	37 27.8	+42.9	91.2	28
29	37 52.4	+35.3	84.8	37 57.5	+36.3	85.6	38 01.7	+37.4	86.3	38 05.1	+38.5	87.1	38 07.7	+39.5	87.9	38 09.5	+40.5	88.7	38 10.5	+41.4	89.5	38 10.6	+42.4	90.3	29
30	38 27.7	+34.8	83.8	38 33.8	+35.9	84.6	38 39.1	+36.9	85.3	38 43.6	+37.9	86.1	38 47.2	+39.0	86.9	38 50.0	+40.0	87.8	38 51.9	+41.0	88.6	38 53.0	+42.0	89.4	30
31	39 02.5	+34.2	82.7	39 09.7	+35.3	83.5	39 16.0	+36.4	84.3	39 21.5	+37.5	85.1	39 26.2	+38.5	86.0	39 30.0	+39.5	86.8	39 32.9	+40.6	87.6	39 35.0	+41.5	88.4	31
32	39 36.7	+33.6	81.7	39 45.0	+34.7	82.5	39 52.4	+35.8	83.3	39 59.0	+36.9	84.1	40 04.7	+38.0	85.0	40 09.5	+39.0	85.8	40 13.5	+40.0	86.7	40 16.5	+41.1	87.5	32
33	40 10.3	+33.0	80.6	40 19.7	+34.1	81.4	40 28.2	+35.3	82.3	40 35.9	+36.3	83.1	40 42.7	+37.4	84.0	40 48.5	+38.5	84.8	40 53.5	+39.6	85.7	40 57.6	+40.6	86.5	33
34	40 43.3	+32.4	79.5	40 53.8	+33.6	80.3	41 03.5	+34.6	81.2	41 12.2	+35.8	82.0	41 20.1	+36.8	82.9	41 27.0	+38.0	83.8	41 33.1	+39.0	84.7	41 38.2	+40.0	85.6	34
35	41 15.7	+31.7	78.4	41 27.4	+32.8	79.2	41 38.1	+34.0	80.1	41 48.0	+35.1	81.0	41 56.9	+36.3	81.9	42 05.0	+37.3	82.7	42 12.1	+38.4	83.7	42 18.2	+39.6	84.6	35
36	41 47.4	+31.0	77.2	42 00.2	+32.2	78.1	42 12.1	+33.4	79.0	42 23.1	+34.5	79.9	42 33.2	+35.7	80.8	42 42.3	+36.8	81.7	42 50.5	+37.9	82.6	42 57.8	+39.0	83.5	36
37	42 18.4	+30.4	76.1	42 32.4	+31.5	77.0	42 45.5	+32.7	77.9	42 57.6	+33.9	78.8	43 08.9	+35.0	79.7	43 19.1	+36.2	80.6	43 28.4	+37.3	81.5	43 36.8	+38.4	82.4	37
38	42 48.8	+29.6	74.9	43 03.9	+30.8	75.8	43 18.2	+32.0	76.7	43 31.5	+33.2	77.6	43 43.9	+34.3	78.6	43 55.3	+35.5	79.5	44 05.7	+36.7	80.5	44 15.2	+37.7	81.4	38
39	43 18.4	+28.8	73.7	43 34.7	+30.1	74.6	43 50.2	+31.2	75.5	44 04.7	+32.4	76.5	44 18.2	+33.7	77.4	44 30.8	+34.8	78.4	44 42.4	+36.0	79.4	44 52.9	+37.2	80.3	39
40	43 47.2	+28.1	72.5	44 04.8	+29.3	73.4	44 21.4	+30.5	74.4	44 37.1	+31.7	75.3	44 51.9	+32.9	76.3	45 05.6	+34.1	77.2	45 18.4	+35.3	78.2	45 30.1	+36.5	79.2	40
41	44 15.3	+27.2	71.3	44 34.1	+28.5	72.2	44 51.9	+29.8	73.1	45 08.8	+31.0	74.1	45 24.8	+32.2	75.1	45 39.7	+33.4	76.1	45 53.7	+34.6	77.1	46 06.6	+35.8	78.1	41
42	44 42.5	+26.5	70.0	45 02.6	+27.6	71.0	45 21.7	+28.9	71.9	45 39.8	+30.2	72.9	45 57.0	+31.4	73.9	46 13.1	+32.7	74.9	46 28.3	+33.8	75.9	46 42.4	+35.0	76.9	42
43	45 09.0	+25.5	68.8	45 30.2	+26.9	69.7	45 50.6	+28.1	70.7	46 10.0	+29.3	71.6	46 28.4	+30.6	72.6	46 45.8	+31.8	73.7	47 02.1	+33.1	74.7	47 17.4	+34.4	75.7	43
44	45 34.5	+24.7	67.5	45 57.1	+25.9	68.4	46 18.7	+27.2	69.4	46 39.3	+28.5	70.4	46 59.0	+29.7	71.4	47 17.6	+31.0	72.4	47 35.2	+32.3	73.5	47 51.8	+33.5	74.5	44
45	45 59.2	+23.8	66.2	46 23.0	+25.1	67.1	46 45.9	+26.3	68.1	47 07.8	+27.6	69.1	47 28.7	+28.9	70.1	47 48.6	+30.2	71.1	48 07.5	+31.4	72.2	48 25.3	+32.7	73.3	45
46	46 23.0	+22.9	64.8	46 48.1	+24.1	65.8	47 12.2	+25.4	66.8	47 35.4	+26.7	67.8	47 57.6	+28.0	68.8	48 18.8	+29.2	69.8	48 38.9	+30.6	70.9	48 58.0	+31.9	72.0	46
47	46 45.9	+21.9	63.5	47 12.2	+23.2	64.5	47 37.6	+24.5	65.4	48 02.1	+25.7	66.4	48 25.6	+27.0	67.5	48 48.0	+28.4	68.5	49 09.5	+29.6	69.6	49 29.9	+30.9	70.7	47
48	47 07.8	+20.9	62.1	47 35.4	+22.2	63.1	48 02.1	+23.5	64.1	48 27.8	+24.8	65.1	48 52.6	+26.1	66.1	49 16.4	+27.4	67.2	49 39.1	+28.8	68.3	50 00.8	+30.1	69.4	48
49	47 28.7	+19.9	60.7	47 57.6	+21.2	61.7	48 25.6	+22.4	62.7	48 52.6	+23.8	63.7	49 18.7	+25.1	64.8	49 43.8	+26.4	65.8	50 07.9	+27.7	66.9	50 30.9	+29.0	68.0	49
50	47 48.6	+18.9	59.3	48 18.8	+20.1	60.3	48 48.0	+21.5	61.3	49 16.4	+22.7	62.3	49 43.8	+24.1	63.4	50 10.2	+25.4	64.4	50 35.6	+26.7	65.5	50 59.9	+28.1	66.6	50
51	48 07.5	+17.8	57.9	48 38.9	+19.1	58.9	49 09.5	+20.4	59.9	49 39.1	+21.7	60.9	50 07.9	+23.0	61.9	50 35.6	+24.3	63.0	51 02.3	+25.7	64.1	51 28.0	+27.0	65.2	51
52	48 25.3	+16.7	56.5	48 58.0	+18.0	57.4	49 29.9	+19.2	58.4	50 00.8	+20.6	59.4	50 30.9	+21.9	60.5	50 59.9	+23.3	61.6	51 28.0	+24.6	62.7	51 55.0	+26.0	63.8	52
53	48 42.0	+15.6	55.0	49 16.0	+16.9	56.0	49 49.1	+18.2	57.0	50 21.4	+19.5	58.0	50 52.8	+20.7	59.0	51 23.2	+22.1	60.1	51 52.6	+23.5	61.2	52 21.0	+24.8	62.3	53
54	48 57.6	+14.5	53.6	49 32.9	+15.7	54.5	50 07.3	+17.0	55.5	50 40.9	+18.3	56.5	51 13.5	+19.7	57.5	51 45.3	+21.0	58.6	52 16.1	+22.3	59.7	52 45.8	+23.7	60.8	54
55	49 12.1	+13.4	52.1	49 48.6	+14.6	53.0	50 24.3	+15.9	54.0	50 59.2	+17.1	55.0	51 33.2	+18.4	56.0	52 06.3	+19.7	57.1	52 38.4	+21.1	58.2	53 09.5	+22.5	59.3	55
56	49 25.5	+12.2	50.6	50 03.2	+13.4	51.5	50 40.2	+14.6	52.5	51 16.3	+15.9	53.5	51 51.6	+17.2	54.5	52 26.0	+18.6	55.6	52 59.5	+19.9	56.6	53 32.0	+21.3	57.7	56
57	49 37.7	+11.0	49.1	50 16.6	+12.2	50.0	50 54.8	+13.4	50.9	51 32.2	+14.7	51.9	52 08.8	+16.0	52.9	52 44.6	+17.3	54.0	53 19.4	+18.7	55.0	53 53.3	+20.0	56.2	57
58	49 48.7	+9.8	47.6	50 28.8	+11.0	48.5	51 08.2	+12.2	49.4	51 46.9	+13.5	50.3	52 24.8	+14.7	51.3	53 01.9	+16.0	52.4	53 38.1	+17.3	53.4	54 13.3	+18.7	54.6	58
59	49 58.5	+8.5	46.0	50 39.8	+9.7	46.9	51 20.4	+11.0	47.8	52 00.4	+12.1	48.8	52 39.5	+13.4	49.7	53 17.9	+14.7	50.8	53 55.4	+16.0	51.8	54 32.0	+17.4	52.9	59
60	50 07.0	+7.4	44.5	50 49.5	+8.5	45.4	51 31.4	+9.6	46.2	52 12.5	+10.9	47.2	52 52.9	+12.1	48.1	53 32.6	+13.3	49.1	54 11.4	+14.7	50.2	54 49.4	+16.0	51.3	60
61	50 14.4	+6.1	42.9	50 58.0	+7.2	43.8	51 41.0	+8.4	44.7	52 23.4	+9.5	45.6	53 05.0	+10.8	46.5	53 45.9	+12.0	47.5	54 26.1	+13.3	48.5	55 05.4	+14.6	49.6	61
62	50 20.5	+4.8	41.4	51 05.2	+6.0	42.2	51 49.4	+7.0	43.1	52 32.9	+8.2	43.9	53 15.8	+9.4	44.9	53 57.9	+10.6	45.8	54 39.4	+11.8	46.8	55 20.0	+13.2	47.9	62
63	50 25.3	+3.6	39.8	51 11.2	+4.6	40.6	51 56.4	+5.7	41.4	52 41.1	+6.8	42.3	53 25.2	+8.0	43.2	54 08.5	+9.2	44.2	54 51.2	+10.5	45.1	55 33.2	+11.7	46.2	63
64	50 28.9	+2.4	38.3	51 15.8	+3.3	39.0	52 02.1	+4.4	39.8	52 47.9	+5.5	40.7	53 33.2	+6.6	41.5	54 17.7	+7.8	42.5	55 01.7	+8.9	43.4	55 44.9	+10.2	44.4	64
65	50 31.3	+1.0	36.7	51 19.1	+2.1	37.4	52 06.5	+3.1	38.2	52 53.4	+4.1	39.0	53 39.8	+5.2	39.9	54 25.5	+6.3	40.8	55 10.6	+7.5	41.7	55 55.1	+8.7	42.7	65
66	50 32.3	−0.2	35.1	51 21.2	+0.7	35.8	52 09.6	+1.7	36.6	52 57.5	+2.7	37.4	53 45.0	+3.7	38.2	54 31.8	+4.9	39.1	55 18.1	+6.0	40.0	56 03.8	+7.2	40.9	66
67	50 32.1	−1.5	33.5	51 21.9	−0.6	34.2	52 11.3	+0.4	34.9	53 00.3	+1.3	35.7	53 48.7	+2.4	36.5	54 36.7	+3.4	37.3	55 24.1	+4.5	38.2	56 11.0	+5.6	39.1	67
68	50 30.6	−2.8	32.0	51 21.3	−1.9	32.6	52 11.7	−1.0	33.3	53 01.6	−0.1	34.0	53 51.1	+0.9	34.8	54 40.1	+1.9	35.6	55 28.6	+3.0	36.4	56 16.6	+4.1	37.3	68
69	50 27.8	−4.0	30.4	51 19.4	−3.2	31.0	52 10.7	−2.4	31.7	53 01.5	−1.4	32.4	53 52.0	−0.5	33.1	54 42.0	+0.5	33.9	55 31.6	+1.5	34.7	56 20.7	+2.5	35.5	69
70	50 23.8	−5.3	28.8	51 16.2	−4.5	29.4	52 08.3	−3.6	30.1	53 00.1	−2.8	30.7	53 51.5	−2.0	31.4	54 42.5	−1.0	32.1	55 33.1	−0.1	32.9	56 23.2	+1.0	33.7	70
71	50 18.5	−6.5	27.3	51 11.7	−5.7	27.8	52 04.7	−5.1	28.4	52 57.3	−4.3	29.1	53 49.5	−3.3	29.7	54 41.5	−2.5	30.4	55 33.0	−1.6	31.2	56 24.2	−0.7	31.9	71
72	50 12.0	−7.8	25.7	51 06.0	−7.1	26.2	51 59.6	−6.3	26.8	52 53.0	−5.5	27.4	53 46.2	−4.8	28.0	54 39.0	−4.0	28.7	55 31.4	−3.1	29.4	56 23.5	−2.2	30.1	72
73	50 04.2	−9.0	24.2	50 58.9	−8.4	24.7	51 53.3	−7.7	25.2	52 47.5	−7.0	25.8	53 41.4	−6.3	26.3	54 35.0	−5.5	27.0	55 28.3	−4.6	27.6	56 21.3	−3.8	28.3	73
74	49 55.2	−10.2	22.6	50 50.5	−9.6	23.1	51 45.6	−8.9	23.6	52 40.5	−8.3	24.1	53 35.1	−7.6	24.7	54 29.5	−6.9	25.2	55 23.7	−6.2	25.9	56 17.5	−5.3	26.5	74
75	49 45.0	−11.4	21.1	50 40.9	−10.8	21.5	51 36.7	−10.3	22.0	52 32.2	−9.6	22.5	53 27.5	−9.0	23.0	54 22.6	−8.3	23.5	55 17.5	−7.6	24.1	56 12.2	−6.9	24.7	75
76	49 33.6	−12.5	19.6	50 30.1	−12.1	20.0	51 26.4	−11.5	20.4	52 22.6	−11.0	20.9	53 18.5	−10.3	21.3	54 14.3	−9.7	21.8	55 09.9	−9.1	22.4	56 05.3	−8.4	22.9	76
77	49 21.1	−13.8	18.1	50 18.0	−13.2	18.5	51 14.9	−12.8	18.8	52 11.6	−12.3	19.3	53 08.2	−11.8	19.7	54 04.6	−11.2	20.2	55 00.8	−10.6	20.6	55 56.9	−10.0	21.2	77
78	49 07.3	−14.9	16.6	50 04.8	−14.5	16.9	51 02.1	−14.0	17.3	51 59.3	−13.5	17.7	52 56.4	−13.0	18.1	53 53.4	−12.5	18.5	54 50.2	−11.9	18.9	55 46.9	−11.4	19.4	78
79	48 52.4	−16.0	15.1	49 50.3	−15.6	15.4	50 48.1	−15.2	15.7	51 45.8	−14.8	16.1	52 43.4	−14.4	16.4	53 40.9	−13.9	16.8	54 38.3	−13.4	17.2	55 35.5	−12.9	17.7	79
80	48 36.4	−17.1	13.7	49 34.7	−16.8	13.9	50 32.9	−16.4	14.2	51 31.0	−16.0	14.5	52 29.0	−15.6	14.8	53 27.0	−15.2	15.2	54 24.9	−14.8	15.6	55 22.6	−14.3	15.9	80
81	48 19.3	−18.2	12.2	49 17.9	−17.8	12.5	50 16.5	−17.6	12.7	51 15.0	−17.2	13.0	52 13.4	−16.9	13.3	53 11.8	−16.5	13.6	54 10.1	−16.2	13.9	55 08.3	−15.8	14.2	81
82	48 01.1	−19.2	10.8	49 00.1	−19.0	11.0	49 58.9	−18.7	11.2	50 57.8	−18.4	11.5	51 56.5	−18.1	11.7	52 55.3	−17.8	12.0	53 53.9	−17.4	12.3	54 52.5	−17.1	12.6	82
83	47 41.9	−20.2	9.4	48 41.1	−20.0	9.6	49 40.2	−19.8	9.7	50 39.4	−19.6	9.9	51 38.4	−19.3	10.2	52 37.5	−19.1	10.4	53 36.5	−18.8	10.6	54 35.4	−18.5	10.9	83
84	47 21.7	−21.3	8.0	48 21.1	−21.1	8.1	49 20.4	−20.8	8.3	50 19.8	−20.7	8.5	51 19.1	−20.4	8.8	52 18.4	−20.2	8.8	53 17.7	−20.0	9.0	54 16.9	−19.7	9.3	84
85	47 00.4	−22.2	6.6	48 00.0	−22.1	6.7	48 59.6	−22.0	6.9	49 59.1	−21.7	7.0	50 58.7	−21.6	7.1	51 58.2	−21.4	7.3	52 57.7	−21.2	7.5	53 57.2	−21.1	7.6	85
86	46 38.2	−23.2	5.2	47 37.9	−23.1	5.3	48 37.6	−22.9	5.4	49 37.4	−22.9	5.6	50 37.1	−22.7	5.7	51 36.8	−22.6	5.8	52 36.5	−22.5	5.9	53 36.1	−22.2	6.1	86
87	46 15.0	−24.1	3.9	47 14.8	−24.0	4.0	48 14.7	−23.9	4.1	49 14.5	−23.8	4.1	50 14.4	−23.8	4.2	51 14.2	−23.7	4.3	52 14.0	−23.6	4.4	53 13.9	−23.5	4.5	87
88	45 50.9	−25.0	2.6	46 50.8	−24.9	2.6	47 50.8	−25.0	2.7	48 50.7	−24.9	2.7	49 50.6	−24.9	2.8	50 50.5	−24.7	2.8	51 50.5	−24.7	2.9	52 50.4	−24.6	3.0	88
89	45 25.9	−25.9	1.3	46 25.9	−25.9	1.3	47 25.8	−25.8	1.3	48 25.8	−25.8	1.4	49 25.8	−25.8	1.4	50 25.8	−25.8	1.4	51 25.8	−25.8	1.4	52 25.8	−25.8	1.5	89
90	45 00.0	−26.7	0.0	46 00.0	−26.7	0.0	47 00.0	−26.8	0.0	48 00.0	−26.8	0.0	49 00.0	−26.8	0.0	50 00.0	−26.8	0.0	51 00.0	−26.8	0.0	52 00.0	−26.8	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	18 03.5	−44.7	109.0	17 43.8	−45.4	109.3	17 23.7	−46.0	109.6	17 03.4	−46.7	109.9	16 42.9	−47.4	110.2	16 22.0	−48.0	110.5	16 00.9	−48.6	110.8	15 39.5	−49.2	111.0	0
1	17 18.8	−44.9	109.7	16 58.4	−45.6	110.0	16 37.7	−46.2	110.3	16 16.7	−46.8	110.6	15 55.5	−47.4	110.8	15 34.0	−48.0	111.1	15 12.3	−48.7	111.4	14 50.3	−49.2	111.6	1
2	16 33.9	−45.0	110.4	16 12.8	−45.6	110.7	15 51.5	−46.3	111.0	15 29.9	−46.9	111.2	15 08.1	−47.6	111.5	14 46.0	−48.2	111.7	14 23.6	−48.7	112.0	14 01.1	−49.4	112.2	2
3	15 48.9	−45.1	111.1	15 27.2	−45.8	111.4	15 05.2	−46.4	111.6	14 43.0	−47.1	111.9	14 20.5	−47.7	112.1	13 57.8	−48.3	112.3	13 34.9	−48.9	112.6	13 11.7	−49.4	112.8	3
4	15 03.8	−45.2	111.8	14 41.4	−45.9	112.0	14 18.8	−46.5	112.3	13 55.9	−47.1	112.5	13 32.8	−47.7	112.7	13 09.5	−48.3	113.0	12 46.0	−48.9	113.2	12 22.3	−49.4	113.4	4
5	14 18.6	−45.4	112.5	13 55.5	−45.9	112.7	13 32.3	−46.6	112.9	13 08.8	−47.2	113.2	12 45.1	−47.8	113.4	12 21.2	−48.4	113.6	11 57.1	−49.0	113.8	11 32.9	−49.6	114.0	5
6	13 33.2	−45.4	113.1	13 09.6	−46.1	113.4	12 45.7	−46.8	113.6	12 21.6	−47.4	113.8	11 57.3	−48.0	114.0	11 32.8	−48.5	114.2	11 08.1	−49.0	114.4	10 43.3	−49.6	114.5	6
7	12 47.8	−45.6	113.8	12 23.5	−46.2	114.0	11 58.9	−46.8	114.2	11 34.2	−47.4	114.4	11 09.3	−47.9	114.6	10 44.3	−48.6	114.8	10 19.1	−49.1	114.9	9 53.7	−49.7	115.1	7
8	12 02.2	−45.6	114.5	11 37.3	−46.3	114.7	11 12.1	−46.8	114.9	10 46.8	−47.4	115.0	10 21.4	−48.1	115.2	9 55.7	−48.6	115.4	9 30.0	−49.2	115.5	9 04.0	−49.7	115.7	8
9	11 16.6	−45.8	115.1	10 51.0	−46.4	115.3	10 25.3	−47.0	115.5	9 59.4	−47.6	115.7	9 33.3	−48.1	115.8	9 07.1	−48.7	116.0	8 40.8	−49.3	116.1	8 14.3	−49.8	116.2	9
10	10 30.8	−45.8	115.8	10 04.6	−46.4	116.0	9 38.3	−47.0	116.1	9 11.8	−47.6	116.3	8 45.2	−48.2	116.4	8 18.4	−48.7	116.6	7 51.5	−49.2	116.7	7 24.5	−49.8	116.8	10
11	9 45.0	−45.9	116.5	9 18.2	−46.5	116.6	8 51.3	−47.1	116.8	8 24.2	−47.7	116.9	7 57.0	−48.2	117.0	7 29.7	−48.8	117.1	7 02.3	−49.4	117.3	6 34.7	−49.8	117.4	11
12	8 59.1	−45.9	117.1	8 31.7	−46.5	117.3	8 04.2	−47.2	117.4	7 36.5	−47.7	117.5	7 08.8	−48.3	117.6	6 40.9	−48.8	117.7	6 12.9	−49.3	117.8	5 44.9	−49.9	117.9	12
13	8 13.2	−46.1	117.8	7 45.2	−46.7	117.9	7 17.0	−47.2	118.0	6 48.8	−47.8	118.1	6 20.5	−48.3	118.2	5 52.1	−48.9	118.3	5 23.6	−49.4	118.4	4 55.0	−49.9	118.5	13
14	7 27.1	−46.0	118.4	6 58.5	−46.6	118.5	6 29.8	−47.2	118.6	6 01.0	−47.8	118.7	5 32.2	−48.4	118.8	5 03.2	−48.9	118.9	4 34.2	−49.4	119.0	4 05.1	−49.9	119.0	14
15	6 41.1	−46.2	119.1	6 11.9	−46.7	119.2	5 42.6	−47.3	119.2	5 13.2	−47.8	119.3	4 43.8	−48.4	119.4	4 14.3	−48.9	119.5	3 44.8	−49.5	119.5	3 15.2	−50.0	119.6	15
16	5 54.9	−46.1	119.7	5 25.2	−46.8	119.8	4 55.3	−47.3	119.9	4 25.4	−47.9	119.9	3 55.4	−48.4	120.0	3 25.4	−49.0	120.1	2 55.3	−49.4	120.1	2 25.2	−50.0	120.1	16
17	5 08.8	−46.3	120.3	4 38.4	−46.8	120.4	4 08.0	−47.3	120.5	3 37.5	−47.9	120.5	3 07.0	−48.4	120.6	2 36.5	−49.0	120.6	2 05.9	−49.5	120.7	1 35.2	−49.9	120.7	17
18	4 22.5	−46.2	121.0	3 51.6	−46.8	121.0	3 20.7	−47.4	121.1	2 49.6	−47.9	121.1	2 18.6	−48.5	121.2	1 47.5	−49.0	121.2	1 16.4	−49.5	121.2	0 45.3	−50.0	121.3	18
19	3 36.3	−46.3	121.6	3 04.8	−46.8	121.7	2 33.3	−47.4	121.7	2 01.7	−47.9	121.8	1 30.1	−48.5	121.8	0 58.5	−49.0	121.8	0 26.9	−49.5	121.8	0 04.7	+50.0	58.2	19
20	2 50.0	−46.3	122.3	2 18.0	−46.9	122.3	1 45.9	−47.4	122.3	1 13.8	−47.9	122.4	0 41.7	−48.5	122.4	0 09.6	−49.0	122.4	0 22.6	+49.4	57.6	0 54.7	+49.9	57.6	20
21	2 03.7	−46.3	122.9	1 31.1	−46.8	122.9	0 58.5	−47.4	122.9	0 25.9	−48.0	123.0	0 06.8	+48.4	57.0	0 39.4	+49.0	57.1	1 12.0	+49.5	57.1	1 44.6	+50.0	57.1	21
22	1 17.4	−46.3	123.5	0 44.3	−46.9	123.5	0 11.1	−47.4	123.6	0 22.1	+47.9	56.4	0 55.2	+48.5	56.5	1 28.4	+48.9	56.5	2 01.5	+49.5	56.5	2 34.6	+50.0	56.5	22
23	0 31.1	−46.3	124.2	0 02.6	+46.9	55.8	0 36.3	+47.4	55.8	1 10.0	+47.9	55.8	1 43.7	+48.5	55.9	2 17.3	+49.0	55.9	2 51.0	+49.5	55.9	3 24.6	+49.9	56.0	23
24	0 15.2	+46.4	55.2	0 49.5	+46.8	55.2	1 23.7	+47.4	55.2	1 57.9	+47.9	55.2	2 32.1	+48.4	55.3	3 06.3	+48.9	55.3	3 40.4	+49.4	55.4	4 14.5	+49.9	55.4	24
25	1 01.6	+46.3	54.6	1 36.3	+46.9	54.6	2 11.1	+47.4	54.6	2 45.8	+47.9	54.6	3 20.5	+48.4	54.7	3 55.2	+48.9	54.7	4 29.8	+49.4	54.8	5 04.4	+49.9	54.9	25
26	1 47.9	+46.3	53.9	2 23.2	+46.8	54.0	2 58.5	+47.3	54.0	3 33.7	+47.9	54.0	4 08.9	+48.4	54.1	4 44.1	+48.9	54.2	5 19.2	+49.4	54.2	5 54.3	+49.8	54.3	26
27	2 34.2	+46.2	53.3	3 10.0	+46.8	53.3	3 45.8	+47.4	53.4	4 21.6	+47.8	53.4	4 57.3	+48.4	53.5	5 33.0	+48.8	53.6	6 08.6	+49.3	53.7	6 44.1	+49.8	53.7	27
28	3 20.4	+46.2	52.6	3 56.8	+46.8	52.7	4 33.2	+47.3	52.8	5 09.4	+47.9	52.8	5 45.7	+48.3	52.9	6 21.8	+48.8	53.0	6 57.9	+49.3	53.1	7 33.9	+49.8	53.2	28
29	4 06.7	+46.2	52.0	4 43.6	+46.8	52.1	5 20.5	+47.2	52.1	5 57.3	+47.7	52.2	6 34.0	+48.2	52.3	7 10.6	+48.8	52.4	7 47.2	+49.2	52.5	8 23.7	+49.7	52.6	29
30	4 52.9	+46.2	51.4	5 30.4	+46.7	51.4	6 07.7	+47.2	51.5	6 45.0	+47.7	51.6	7 22.2	+48.3	51.7	7 59.4	+48.7	51.8	8 36.4	+49.2	51.9	9 13.4	+49.6	52.1	30
31	5 39.1	+46.2	50.7	6 17.1	+46.6	50.8	6 54.9	+47.2	50.9	7 32.7	+47.7	51.0	8 10.5	+48.1	51.1	8 48.1	+48.6	51.2	9 25.6	+49.1	51.3	10 03.0	+49.6	51.5	31
32	6 25.3	+46.1	50.1	7 03.7	+46.6	50.2	7 42.1	+47.1	50.3	8 20.4	+47.6	50.4	8 58.6	+48.1	50.5	9 36.7	+48.6	50.6	10 14.7	+49.1	50.8	10 52.6	+49.6	50.9	32
33	7 11.4	+46.0	49.4	7 50.3	+46.6	49.5	8 29.2	+47.1	49.7	9 08.0	+47.6	49.8	9 46.7	+48.1	49.9	10 25.3	+48.5	50.0	11 03.8	+49.0	50.2	11 42.2	+49.4	50.3	33
34	7 57.4	+46.0	48.8	8 36.9	+46.5	48.9	9 16.3	+47.0	49.0	9 55.6	+47.5	49.2	10 34.8	+47.9	49.3	11 13.8	+48.5	49.4	11 52.8	+48.9	49.6	12 31.6	+49.4	49.8	34
35	8 43.4	+45.9	48.1	9 23.4	+46.4	48.3	10 03.3	+46.9	48.4	10 43.1	+47.4	48.5	11 22.7	+47.9	48.7	12 02.3	+48.4	48.8	12 41.7	+49.0	49.0	13 21.0	+49.3	49.2	35
36	9 29.3	+45.9	47.5	10 09.8	+46.4	47.6	10 50.2	+46.9	47.8	11 30.5	+47.3	47.9	12 10.6	+47.8	48.1	12 50.7	+48.3	48.2	13 30.6	+48.7	48.4	14 10.3	+49.3	48.6	36
37	10 15.2	+45.7	46.8	10 56.2	+46.2	47.0	11 37.0	+46.8	47.1	12 17.8	+47.2	47.3	12 58.4	+47.7	47.4	13 39.0	+48.2	47.6	14 19.3	+48.7	47.8	14 59.6	+49.1	48.0	37
38	11 00.9	+45.7	46.2	11 42.4	+46.1	46.3	12 23.8	+46.7	46.5	13 05.0	+47.1	46.6	13 46.2	+47.6	46.8	14 27.2	+48.1	47.0	15 08.0	+48.6	47.2	15 48.7	+49.0	47.4	38
39	11 46.6	+45.6	45.5	12 28.6	+46.1	45.7	13 10.5	+46.5	45.8	13 52.2	+47.0	46.0	14 33.8	+47.5	46.2	15 15.3	+48.0	46.4	15 56.6	+48.4	46.6	16 37.7	+49.0	46.8	39
40	12 32.2	+45.5	44.9	13 14.7	+46.0	45.0	13 57.0	+46.5	45.2	14 39.2	+47.0	45.4	15 21.3	+47.4	45.6	16 03.3	+47.8	45.8	16 45.0	+48.4	46.0	17 26.7	+48.8	46.2	40
41	13 17.7	+45.4	44.2	14 00.7	+45.8	44.4	14 43.5	+46.3	44.5	15 26.2	+46.8	44.7	16 08.7	+47.4	44.9	16 51.1	+47.8	45.1	17 33.4	+48.2	45.4	18 15.5	+48.7	45.6	41
42	14 03.1	+45.2	43.5	14 46.5	+45.8	43.7	15 29.8	+46.3	43.9	16 13.0	+46.7	44.1	16 56.1	+47.1	44.3	17 38.9	+47.7	44.5	18 21.6	+48.2	44.7	19 04.2	+48.6	45.0	42
43	14 48.3	+45.2	42.8	15 32.3	+45.6	43.0	16 16.1	+46.1	43.2	16 59.7	+46.6	43.4	17 43.2	+47.1	43.6	18 26.6	+47.5	43.9	19 09.8	+47.9	44.1	19 52.8	+48.4	44.3	43
44	15 33.5	+45.0	42.2	16 17.9	+45.5	42.3	17 02.2	+46.0	42.5	17 46.3	+46.5	42.8	18 30.3	+46.9	43.0	19 14.1	+47.4	43.2	19 57.7	+47.9	43.5	20 41.2	+48.3	43.7	44
45	16 18.5	+44.9	41.5	17 03.4	+45.4	41.7	17 48.2	+45.8	41.9	18 32.8	+46.3	42.1	19 17.2	+46.8	42.3	20 01.5	+47.2	42.6	20 45.6	+47.7	42.8	21 29.5	+48.2	43.1	45
46	17 03.4	+44.8	40.8	17 48.8	+45.2	41.0	18 34.0	+45.7	41.2	19 19.1	+46.1	41.4	20 04.0	+46.6	41.7	20 48.7	+47.1	41.9	21 33.3	+47.5	42.2	22 17.7	+48.0	42.4	46
47	17 48.2	+44.6	40.1	18 34.0	+45.1	40.3	19 19.7	+45.5	40.5	20 05.2	+46.0	40.7	20 50.6	+46.5	41.0	21 35.8	+47.0	41.3	22 20.8	+47.4	41.5	23 05.7	+47.8	41.8	47
48	18 32.8	+44.4	39.4	19 19.1	+44.9	39.6	20 05.2	+45.4	39.8	20 51.2	+45.9	40.1	21 37.1	+46.3	40.3	22 22.8	+46.7	40.6	23 08.2	+47.3	40.8	23 53.5	+47.7	41.1	48
49	19 17.2	+44.3	38.7	20 04.0	+44.7	38.9	20 50.6	+45.2	39.1	21 37.1	+45.7	39.4	22 23.4	+46.1	39.6	23 09.5	+46.6	39.9	23 55.5	+47.0	40.2	24 41.2	+47.5	40.5	49
50	20 01.5	+44.1	37.9	20 48.7	+44.6	38.2	21 35.8	+45.0	38.4	22 22.8	+45.4	38.7	23 09.5	+46.0	38.9	23 56.1	+46.4	39.2	24 42.5	+46.9	39.5	25 28.7	+47.3	39.8	50
51	20 45.6	+43.9	37.2	21 33.3	+44.4	37.5	22 20.8	+44.9	37.7	23 08.2	+45.3	38.0	23 55.5	+45.7	38.2	24 42.5	+46.2	38.5	25 29.4	+46.6	38.8	26 16.0	+47.1	39.1	51
52	21 29.5	+43.7	36.5	22 17.7	+44.2	36.7	23 05.7	+44.6	37.0	23 53.5	+45.1	37.2	24 41.2	+45.5	37.5	25 28.7	+46.0	37.8	26 16.0	+46.5	38.1	27 03.1	+46.9	38.4	52
53	22 13.2	+43.6	35.8	23 01.9	+43.9	36.0	23 50.3	+44.4	36.3	24 38.6	+44.9	36.5	25 26.7	+45.4	36.8	26 14.7	+45.8	37.1	27 02.5	+46.2	37.4	27 50.0	+46.7	37.7	53
54	22 56.8	+43.3	35.0	23 45.8	+43.8	35.3	24 34.7	+44.3	35.5	25 23.5	+44.7	35.8	26 12.1	+45.1	36.1	27 00.5	+45.5	36.4	27 48.7	+46.0	36.7	28 36.7	+46.5	37.0	54
55	23 40.1	+43.1	34.3	24 29.6	+43.5	34.5	25 19.0	+43.9	34.8	26 08.2	+44.4	35.0	26 57.2	+44.9	35.3	27 46.0	+45.4	35.6	28 34.7	+45.8	35.9	29 23.2	+46.2	36.3	55
56	24 23.2	+42.8	33.5	25 13.1	+43.3	33.7	26 02.9	+43.8	34.0	26 52.6	+44.2	34.3	27 42.1	+44.6	34.6	28 31.4	+45.1	34.9	29 20.5	+45.5	35.2	30 09.4	+46.0	35.5	56
57	25 06.0	+42.6	32.7	25 56.4	+43.1	33.0	26 46.7	+43.5	33.3	27 36.8	+43.9	33.5	28 26.7	+44.4	33.8	29 16.5	+44.8	34.1	30 06.0	+45.3	34.5	30 55.4	+45.7	34.8	57
58	25 48.6	+42.4	31.9	26 39.5	+42.8	32.2	27 30.2	+43.2	32.5	28 20.7	+43.7	32.8	29 11.1	+44.1	33.1	30 01.3	+44.5	33.4	30 51.3	+45.0	33.7	31 41.1	+45.5	34.0	58
59	26 31.0	+42.1	31.2	27 22.3	+42.5	31.4	28 13.4	+43.0	31.7	29 04.4	+43.4	32.0	29 55.2	+43.8	32.3	30 45.8	+44.3	32.6	31 36.3	+44.7	32.9	32 26.6	+45.1	33.3	59
60	27 13.1	+41.8	30.4	28 04.8	+42.3	30.6	28 56.4	+42.7	30.9	29 47.8	+43.1	31.2	30 39.0	+43.6	31.5	31 30.1	+44.0	31.8	32 21.0	+44.4	32.1	33 11.7	+44.9	32.5	60
61	27 54.9	+41.6	29.5	28 47.1	+41.9	29.8	29 39.1	+42.3	30.1	30 30.9	+42.8	30.4	31 22.6	+43.2	30.7	32 14.1	+43.6	31.0	33 05.4	+44.1	31.3	33 56.6	+44.5	31.7	61
62	28 36.5	+41.2	28.7	29 29.0	+41.7	29.0	30 21.4	+42.1	29.3	31 13.7	+42.5	29.6	32 05.8	+42.9	29.9	32 57.7	+43.4	30.2	33 49.5	+43.8	30.5	34 41.1	+44.2	30.9	62
63	29 17.7	+40.9	27.9	30 10.7	+41.3	28.2	31 03.5	+41.8	28.4	31 56.2	+42.2	28.7	32 48.7	+42.6	29.0	33 41.1	+43.0	29.4	34 33.3	+43.4	29.7	35 25.3	+43.9	30.0	63
64	29 58.6	+40.7	27.1	30 52.0	+41.0	27.3	31 45.3	+41.4	27.6	32 38.4	+41.8	27.9	33 31.3	+42.2	28.2	34 24.1	+42.7	28.5	35 16.7	+43.1	28.9	36 09.2	+43.5	29.2	64
65	30 39.3	+40.2	26.2	31 33.0	+40.7	26.5	32 26.7	+41.0	26.8	33 20.2	+41.4	27.0	34 13.5	+41.9	27.3	35 06.8	+42.3	27.6	35 59.8	+42.7	27.9	36 52.7	+43.1	28.4	65
66	31 19.5	+39.9	25.3	32 13.7	+40.3	25.6	33 07.7	+40.7	25.9	34 01.6	+41.1	26.2	34 55.4	+41.5	26.5	35 49.1	+41.9	26.8	36 42.5	+42.4	27.1	37 35.8	+42.8	27.5	66
67	31 59.4	+39.6	24.5	32 54.0	+39.9	24.7	33 48.4	+40.3	25.0	34 42.7	+40.7	25.3	35 36.9	+41.1	25.6	36 31.0	+41.5	25.9	37 24.9	+41.9	26.2	38 18.6	+42.3	26.6	67
68	32 39.0	+39.1	23.6	33 33.9	+39.5	23.8	34 28.7	+40.0	24.1	35 23.4	+40.0	24.4	36 17.2	+40.7	24.7	37 12.5	+41.1	25.0	38 06.8	+41.5	25.3	39 00.9	+41.9	25.7	68
69	33 18.1	+38.8	22.7	34 13.4	+39.2	22.9	35 08.7	+39.5	23.2	36 03.7	+39.9	23.5	36 58.7	+40.3	23.8	37 53.6	+40.6	24.1	38 48.3	+41.0	24.4	39 42.8	+41.5	24.8	69
70	33 56.9	+38.4	21.8	34 52.6	+38.7	22.0	35 48.2	+39.0	22.3	36 43.6	+39.5	22.6	37 39.0	+39.8	22.8	38 34.2	+40.2	23.2	39 29.3	+40.6	23.5	40 24.3	+41.0	23.8	70
71	34 35.3	+37.9	20.8	35 31.3	+38.3	21.1	36 27.2	+38.6	21.3	37 23.1	+38.9	21.6	38 18.8	+39.3	21.9	39 14.4	+39.7	22.2	40 09.9	+40.1	22.5	41 05.3	+40.4	22.8	71
72	35 13.2	+37.4	19.9	36 09.6	+37.8	20.1	37 05.8	+38.2	20.4	38 02.0	+38.5	20.6	38 58.1	+38.9	20.9	39 54.1	+39.2	21.2	40 50.0	+39.6	21.5	41 45.7	+40.0	21.8	72
73	35 50.6	+37.1	18.9	36 47.4	+37.3	19.2	37 44.0	+37.7	19.4	38 40.5	+38.0	19.7	39 37.0	+38.3	19.9	40 33.3	+38.7	20.2	41 29.6	+39.1	20.5	42 25.7	+39.5	20.9	73
74	36 27.7	+36.5	17.9	37 24.7	+36.8	18.2	38 21.7	+37.1	18.4	39 18.5	+37.5	18.7	40 15.3	+37.9	18.9	41 12.0	+38.2	19.2	42 08.7	+38.5	19.5	43 05.2	+38.8	19.8	74
75	37 04.2	+36.0	17.0	38 01.5	+36.4	17.2	38 58.8	+36.7	17.4	39 56.0	+37.0	17.7	40 53.2	+37.2	17.9	41 50.2	+37.6	18.2	42 47.2	+37.9	18.5	43 44.0	+38.3	18.8	75
76	37 40.2	+35.5	15.9	38 37.9	+35.8	16.2	39 35.5	+36.0	16.4	40 33.0	+36.4	16.6	41 30.4	+36.7	16.9	42 27.8	+37.0	17.1	43 25.1	+37.3	17.4	44 22.3	+37.7	17.7	76
77	38 15.7	+35.0	14.9	39 13.7	+35.2	15.1	40 11.5	+35.6	15.3	41 09.4	+35.8	15.6	42 07.1	+36.1	15.8	43 04.8	+36.4	16.1	44 02.4	+36.8	16.3	45 00.0	+37.0	16.6	77
78	38 50.7	+34.4	13.9	39 48.9	+34.6	14.1	40 47.1	+34.9	14.3	41 45.2	+35.2	14.5	42 43.2	+35.5	14.7	43 41.2	+35.8	15.0	44 39.2	+36.0	15.2	45 37.0	+36.4	15.5	78
79	39 25.1	+33.8	12.8	40 23.5	+34.1	13.0	41 22.0	+34.3	13.2	42 20.4	+34.5	13.4	43 18.7	+34.8	13.6	44 17.0	+35.1	13.9	45 15.2	+35.4	14.1	46 13.4	+35.6	14.4	79
80	39 58.9	+33.2	11.8	40 57.6	+33.4	11.9	41 56.3	+33.7	12.1	42 54.9	+33.9	12.3	43 53.5	+34.2	12.5	44 52.1	+34.4	12.7	45 50.6	+34.6	12.9	46 49.0	+35.0	13.2	80
81	40 32.1	+32.6	10.7	41 31.0	+32.8	10.8	42 30.0	+33.0	11.0	43 28.8	+33.3	11.2	44 27.7	+33.4	11.4	45 26.5	+33.7	11.6	46 25.2	+34.0	11.8	47 24.0	+34.1	12.0	81
82	41 04.7	+31.9	9.6	42 03.8	+32.2	9.7	43 03.0	+32.3	9.9	44 02.1	+32.5	10.0	45 01.1	+32.7	10.2	46 00.2	+32.9	10.4	46 59.2	+33.1	10.6	47 58.1	+33.4	10.8	82
83	41 36.6	+31.3	8.4	42 36.0	+31.4	8.6	43 35.3	+31.6	8.7	44 34.6	+31.8	8.8	45 33.8	+32.0	9.0	46 33.1	+32.1	9.2	47 32.3	+32.4	9.3	48 31.5	+32.6	9.5	83
84	42 07.9	+30.5	7.3	43 07.4	+30.7	7.4	44 06.9	+30.8	7.5	45 06.4	+31.0	7.6	46 05.8	+31.2	7.8	47 05.2	+31.4	7.9	48 04.7	+31.5	8.1	49 04.1	+31.6	8.2	84
85	42 38.4	+29.9	6.1	43 38.1	+30.0	6.2	44 37.7	+30.1	6.3	45 37.4	+30.2	6.4	46 37.0	+30.3	6.5	47 36.6	+30.5	6.7	48 36.2	+30.6	6.8	49 35.7	+30.8	6.9	85
86	43 08.3	+29.1	4.9	44 08.1	+29.2	5.0	45 07.8	+29.3	5.1	46 07.6	+29.4	5.2	47 07.3	+29.6	5.3	48 07.1	+29.6	5.4	49 06.8	+29.8	5.5	50 06.5	+29.9	5.6	86
87	43 37.4	+28.3	3.7	44 37.3	+28.4	3.8	45 37.1	+28.5	3.9	46 37.0	+28.6	3.9	47 36.9	+28.6	4.0	48 36.7	+28.7	4.1	49 36.6	+28.8	4.2	50 36.4	+28.9	4.3	87
88	44 05.7	+27.6	2.5	45 05.7	+27.6	2.5	46 05.6	+27.6	2.6	47 05.6	+27.6	2.6	48 05.5	+27.7	2.7	49 05.4	+27.8	2.7	50 05.4	+27.8	2.8	51 05.3	+27.9	2.9	88
89	44 33.3	+26.7	1.3	45 33.3	+26.7	1.3	46 33.2	+26.8	1.3	47 33.2	+26.8	1.3	48 33.2	+26.8	1.4	49 33.2	+26.8	1.4	50 33.2	+26.8	1.4	51 33.2	+26.8	1.4	89
90	45 00.0	+25.9	0.0	46 00.0	+25.9	0.0	47 00.0	+25.8	0.0	48 00.0	+25.8	0.0	49 00.0	+25.8	0.0	50 00.0	+25.8	0.0	51 00.0	+25.8	0.0	52 00.0	+25.8	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 116°, 244°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

	45°			46°			47°			48°			49°			50°			51°			52°		
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
0	17 23.3	+44.3	108.2	17 04.3	+45.1	108.5	16 45.1	+45.8	108.8	16 25.6	+46.4	109.1	16 05.8	+47.1	109.4	15 45.8	+47.7	109.7	15 25.4	+48.4	109.9	15 04.9	+48.9	110.2	0
1	18 07.6	+44.3	107.5	17 49.4	+44.9	107.9	17 30.9	+45.6	108.2	17 12.0	+46.3	108.5	16 52.9	+46.9	108.7	16 33.5	+47.6	109.0	16 13.8	+48.3	109.3	15 53.8	+48.8	109.6	1
2	18 51.9	+44.0	106.8	18 34.3	+44.8	107.2	18 16.5	+45.5	107.5	17 58.3	+46.2	107.8	17 39.8	+46.9	108.1	17 21.1	+47.4	108.4	17 02.0	+48.1	108.7	16 42.6	+48.7	109.0	2
3	19 35.9	+43.9	106.1	19 19.1	+44.6	106.5	19 02.0	+45.3	106.8	18 44.5	+46.0	107.1	18 26.7	+46.6	107.4	18 08.5	+47.4	107.7	17 50.1	+48.0	108.1	17 31.3	+48.6	108.4	3
4	20 19.8	+43.7	105.4	20 03.7	+44.5	105.7	19 47.3	+45.1	106.1	19 30.5	+45.8	106.4	19 13.3	+46.6	106.8	18 55.9	+47.2	107.1	18 38.1	+47.8	107.4	18 19.9	+48.5	107.7	4
5	21 03.5	+43.6	104.7	20 48.2	+44.2	105.0	20 32.4	+45.0	105.4	20 16.3	+45.7	105.7	19 59.9	+46.4	106.1	19 43.1	+47.0	106.4	19 25.9	+47.7	106.8	19 08.4	+48.4	107.1	5
6	21 47.1	+43.3	103.9	21 32.4	+44.1	104.3	21 17.4	+44.8	104.7	21 02.0	+45.5	105.1	20 46.3	+46.2	105.4	20 30.1	+46.9	105.8	20 13.6	+47.6	106.1	19 56.8	+48.2	106.5	6
7	22 30.4	+43.1	103.2	22 16.5	+43.9	103.6	22 02.2	+44.6	104.0	21 47.5	+45.4	104.4	21 32.5	+46.0	104.7	21 17.0	+46.8	105.1	21 01.2	+47.4	105.5	20 45.0	+48.1	105.9	7
8	23 13.5	+42.9	102.4	23 00.4	+43.6	102.8	22 46.8	+44.5	103.2	22 32.9	+45.1	103.6	22 18.5	+45.9	104.0	22 03.8	+46.5	104.4	21 48.6	+47.3	104.8	21 33.1	+47.9	105.2	8
9	23 56.4	+42.6	101.6	23 44.0	+43.5	102.1	23 31.3	+44.2	102.5	23 18.0	+45.0	102.9	23 04.4	+45.7	103.3	22 50.3	+46.5	103.8	22 35.9	+47.1	104.2	22 21.0	+47.8	104.6	9
10	24 39.0	+42.4	100.9	24 27.5	+43.2	101.3	24 15.5	+44.0	101.8	24 03.0	+44.8	102.2	23 50.1	+45.5	102.6	23 36.8	+46.2	103.1	23 23.0	+46.9	103.5	23 08.8	+47.6	103.9	10
11	25 21.5	+42.1	100.1	25 10.7	+43.0	100.6	24 59.5	+43.7	101.0	24 47.8	+44.5	101.5	24 35.6	+45.3	101.9	24 23.0	+46.0	102.4	24 09.9	+46.7	102.8	23 56.4	+47.4	103.2	11
12	26 03.6	+42.0	99.3	25 53.7	+42.7	99.8	25 43.2	+43.6	100.3	25 32.3	+44.3	100.7	25 20.9	+45.1	101.2	25 09.0	+45.8	101.7	24 56.6	+46.6	102.1	24 43.8	+47.2	102.6	12
13	26 45.6	+41.6	98.5	26 36.4	+42.5	99.0	26 26.8	+43.3	99.5	26 16.6	+44.1	100.0	26 06.0	+44.8	100.5	25 54.8	+45.6	100.9	25 43.2	+46.3	101.4	25 31.0	+47.1	101.9	13
14	27 27.2	+41.4	97.7	27 18.9	+42.2	98.2	27 10.1	+43.0	98.7	27 00.7	+43.8	99.2	26 50.8	+44.6	99.7	26 40.4	+45.4	100.2	26 29.5	+46.1	100.7	26 18.1	+46.9	101.2	14
15	28 08.6	+41.0	96.9	28 01.1	+41.9	97.4	27 53.1	+42.7	97.9	27 44.5	+43.6	98.5	27 35.4	+44.4	99.0	27 25.8	+45.1	99.5	27 15.6	+46.0	100.0	27 05.0	+46.6	100.5	15
16	28 49.6	+40.8	96.1	28 43.0	+41.6	96.6	28 35.8	+42.5	97.1	28 28.1	+43.3	97.7	28 19.8	+44.1	98.2	28 10.9	+45.0	98.7	28 01.6	+45.6	99.3	27 51.6	+46.4	99.8	16
17	29 30.4	+40.4	95.2	29 24.6	+41.3	95.8	29 18.3	+42.2	96.3	29 11.4	+43.0	96.9	29 03.9	+43.8	97.4	28 55.9	+44.6	98.0	28 47.2	+45.5	98.5	28 38.0	+46.2	99.1	17
18	30 10.8	+40.1	94.4	30 05.9	+41.0	94.9	30 00.5	+41.8	95.5	29 54.4	+42.7	96.1	29 47.7	+43.6	96.7	29 40.5	+44.4	97.2	29 32.7	+45.1	97.8	29 24.2	+46.0	98.3	18
19	30 50.9	+39.7	93.5	30 46.9	+40.7	94.1	30 42.3	+41.5	94.7	30 37.1	+42.4	95.3	30 31.3	+43.3	95.9	30 24.9	+44.1	96.4	30 17.8	+44.9	97.0	30 10.2	+45.7	97.6	19
20	31 30.6	+39.4	92.6	31 27.6	+40.3	93.2	31 23.9	+41.2	93.8	31 19.5	+42.1	94.4	31 14.6	+42.9	95.1	31 09.0	+43.8	95.7	31 02.7	+44.7	96.3	30 55.9	+45.4	96.9	20
21	32 10.0	+39.0	91.7	32 07.9	+39.9	92.4	32 05.1	+40.9	93.0	32 01.6	+41.8	93.6	31 57.5	+42.7	94.2	31 52.8	+43.5	94.9	31 47.4	+44.3	95.5	31 41.3	+45.2	96.1	21
22	32 49.0	+38.7	90.8	32 47.8	+39.6	91.5	32 46.0	+40.4	92.1	32 43.4	+41.4	92.8	32 40.2	+42.3	93.4	32 36.3	+43.2	94.0	32 31.7	+44.0	94.7	32 26.5	+44.9	95.3	22
23	33 27.7	+38.2	89.9	33 27.4	+39.2	90.6	33 26.4	+40.2	91.2	33 24.8	+41.0	91.9	33 22.5	+41.9	92.6	33 19.5	+42.8	93.2	33 15.7	+43.8	93.9	33 11.4	+44.5	94.5	23
24	34 05.9	+37.7	89.0	34 06.6	+38.7	89.7	34 06.6	+39.7	90.3	34 05.8	+40.7	91.0	34 04.4	+41.6	91.7	34 02.3	+42.5	92.4	33 59.5	+43.3	93.0	33 55.9	+44.3	93.7	24
25	34 43.6	+37.4	88.0	34 45.3	+38.4	88.7	34 46.3	+39.4	89.4	34 46.5	+40.3	90.1	34 46.0	+41.2	90.8	34 44.8	+42.1	91.5	34 42.8	+43.1	92.2	34 40.2	+43.9	92.9	25
26	35 21.0	+36.9	87.1	35 23.7	+37.9	87.8	35 25.6	+38.9	88.5	35 26.8	+39.8	89.2	35 27.2	+40.8	89.9	35 26.9	+41.8	90.6	35 25.9	+42.6	91.4	35 24.1	+43.5	92.1	26
27	35 57.9	+36.4	86.1	36 01.6	+37.4	86.8	36 04.5	+38.4	87.6	36 06.6	+39.5	88.3	36 08.0	+40.4	89.0	36 08.7	+41.3	89.8	36 08.5	+42.3	90.5	36 07.6	+43.2	91.2	27
28	36 34.3	+35.9	85.1	36 39.0	+36.9	85.9	36 42.9	+38.0	86.6	36 46.1	+38.9	87.4	36 48.4	+40.0	88.1	36 50.0	+40.9	88.8	36 50.8	+41.9	89.6	36 50.8	+42.8	90.4	28
29	37 10.2	+35.4	84.1	37 15.9	+36.5	84.9	37 20.9	+37.5	85.6	37 25.0	+38.5	86.4	37 28.4	+39.5	87.2	37 30.9	+40.5	87.9	37 32.7	+41.5	88.7	37 33.6	+42.5	89.5	29
30	37 45.6	+34.9	83.1	37 52.4	+35.9	83.9	37 58.4	+37.0	84.7	38 03.5	+38.1	85.4	38 07.9	+39.0	86.2	38 11.4	+40.1	87.0	38 14.2	+41.0	87.8	38 16.1	+42.0	88.6	30
31	38 20.5	+34.3	82.1	38 28.3	+35.4	82.9	38 35.4	+36.4	83.7	38 41.6	+37.5	84.5	38 46.9	+38.6	85.3	38 51.5	+39.6	86.0	38 55.2	+40.6	86.9	38 58.1	+41.6	87.7	31
32	38 54.8	+33.7	81.0	39 03.7	+34.8	81.8	39 11.8	+35.9	82.6	39 19.1	+37.0	83.5	39 25.5	+38.0	84.3	39 31.1	+39.0	85.1	39 35.8	+40.1	85.9	39 39.6	+41.1	86.7	32
33	39 28.5	+33.2	80.0	39 38.5	+34.3	80.8	39 47.7	+35.4	81.6	39 56.1	+36.4	82.4	40 03.5	+37.6	83.3	40 10.1	+38.6	84.1	40 15.9	+39.6	84.9	40 20.7	+40.7	85.8	33
34	40 01.7	+32.5	78.9	40 12.8	+33.6	79.7	40 23.1	+34.8	80.5	40 32.5	+35.9	81.4	40 41.1	+36.9	82.2	40 48.7	+38.0	83.0	40 55.5	+39.1	84.0	41 01.4	+40.1	84.8	34
35	40 34.2	+31.9	77.8	40 46.4	+33.1	78.6	40 57.9	+34.1	79.5	41 08.4	+35.3	80.3	41 18.0	+36.4	81.2	41 26.7	+37.5	82.1	41 34.6	+38.5	82.9	41 41.5	+39.6	83.8	35
36	41 06.1	+31.2	76.7	41 19.5	+32.4	77.5	41 32.0	+33.5	78.4	41 43.7	+34.6	79.2	41 54.4	+35.8	80.1	42 04.2	+36.9	81.0	42 13.1	+38.0	81.9	42 21.1	+39.1	82.8	36
37	41 37.3	+30.5	75.5	41 51.9	+31.7	76.4	42 05.5	+32.9	77.3	42 18.3	+34.0	78.2	42 30.2	+35.1	79.0	42 41.1	+36.3	79.9	42 51.1	+37.4	80.9	43 00.2	+38.5	81.8	37
38	42 07.8	+29.9	74.4	42 23.6	+31.0	75.2	42 38.4	+32.2	76.1	42 52.3	+33.4	77.0	43 05.3	+34.5	77.9	43 17.4	+35.6	78.9	43 28.5	+36.8	79.8	43 38.7	+37.9	80.7	38
39	42 37.7	+29.1	73.2	42 54.6	+30.3	74.1	43 10.6	+31.5	75.0	43 25.7	+32.6	75.9	43 39.8	+33.9	76.8	43 53.0	+35.0	77.8	44 05.3	+36.1	78.7	44 16.6	+37.2	79.6	39
40	43 06.8	+28.3	72.0	43 24.9	+29.5	72.9	43 42.1	+30.7	73.8	43 58.3	+32.0	74.7	44 13.7	+33.1	75.7	44 28.0	+34.4	76.6	44 41.4	+35.5	77.6	44 53.8	+36.7	78.5	40
41	43 35.1	+27.6	70.8	43 54.4	+28.7	71.7	44 12.8	+30.0	72.6	44 30.3	+31.2	73.6	44 46.8	+32.4	74.5	45 02.4	+33.5	75.5	45 16.9	+34.8	76.4	45 30.5	+35.9	77.4	41
42	44 02.7	+26.8	69.6	44 23.2	+28.0	70.5	44 42.8	+29.2	71.4	45 01.5	+30.4	72.3	45 19.2	+31.6	73.3	45 35.9	+32.9	74.3	45 51.7	+34.1	75.3	46 06.4	+35.3	76.3	42
43	44 29.5	+25.9	68.3	44 51.2	+27.2	69.2	45 12.0	+28.4	70.2	45 31.9	+29.6	71.1	45 50.8	+30.9	72.1	46 08.8	+32.1	73.1	46 25.8	+33.3	74.1	46 41.7	+34.5	75.1	43
44	44 55.4	+25.1	67.0	45 18.4	+26.3	68.0	45 40.4	+27.6	68.9	46 01.5	+28.8	69.9	46 21.7	+30.0	70.9	46 40.9	+31.3	71.9	46 59.1	+32.5	72.9	47 16.2	+33.8	73.9	44
45	45 20.5	+24.2	65.7	45 44.7	+25.4	66.7	46 08.0	+26.7	67.6	46 30.3	+28.0	68.6	46 51.7	+29.2	69.6	47 12.2	+30.4	70.6	47 31.6	+31.7	71.6	47 50.0	+32.9	72.7	45
46	45 44.7	+23.3	64.4	46 10.1	+24.6	65.4	46 34.7	+25.8	66.3	46 58.3	+27.0	67.3	47 20.9	+28.4	68.3	47 42.6	+29.6	69.3	48 03.3	+30.8	70.4	48 22.9	+32.1	71.4	46
47	46 08.0	+22.3	63.1	46 34.7	+23.6	64.1	47 00.5	+24.8	65.0	47 25.3	+26.2	66.0	47 49.3	+27.4	67.0	48 12.2	+28.7	68.0	48 34.1	+30.0	69.1	48 55.0	+31.3	70.1	47
48	46 30.3	+21.4	61.8	46 58.3	+22.6	62.7	47 25.3	+24.0	63.7	47 51.5	+25.2	64.7	48 16.7	+26.5	65.7	48 40.9	+27.8	66.7	49 04.1	+29.1	67.8	49 26.3	+30.4	68.8	48
49	46 51.7	+20.5	60.4	47 20.9	+21.7	61.4	47 49.3	+22.9	62.3	48 16.7	+24.2	63.3	48 43.2	+25.5	64.3	49 08.7	+26.8	65.4	49 33.2	+28.1	66.4	49 56.7	+29.4	67.5	49
50	47 12.2	+19.4	59.0	47 42.6	+20.7	60.0	48 12.2	+21.9	60.9	48 40.9	+23.2	61.9	49 08.7	+24.5	62.9	49 35.5	+25.8	64.0	50 01.3	+27.1	65.1	50 26.1	+28.4	66.1	50
51	47 31.6	+18.4	57.6	48 03.3	+19.6	58.6	48 34.1	+20.9	59.5	49 04.1	+22.2	60.5	49 33.2	+23.5	61.5	50 01.3	+24.8	62.6	50 28.4	+26.1	63.7	50 54.5	+27.5	64.8	51
52	47 50.0	+17.3	56.2	48 22.9	+18.6	57.2	48 55.0	+19.9	58.1	49 26.3	+21.1	59.1	49 56.7	+22.4	60.1	50 26.1	+23.7	61.2	50 54.5	+25.1	62.2	51 22.0	+26.3	63.3	52
53	48 07.3	+16.3	54.8	48 41.5	+17.5	55.7	49 14.9	+18.7	56.7	49 47.4	+20.0	57.7	50 19.1	+21.3	58.7	50 49.8	+22.6	59.7	51 19.6	+23.9	60.8	51 48.3	+25.4	61.9	53
54	48 23.6	+15.1	53.3	48 59.0	+16.4	54.3	49 33.6	+17.7	55.2	50 07.4	+18.9	56.2	50 40.4	+20.2	57.2	51 12.4	+21.5	58.2	51 43.5	+22.9	59.3	52 13.7	+24.1	60.4	54
55	48 38.7	+14.1	51.9	49 15.4	+15.2	52.8	49 51.3	+16.5	53.7	50 26.3	+17.8	54.7	51 00.6	+19.0	55.7	51 33.9	+20.4	56.7	52 06.4	+21.6	57.8	52 37.8	+23.1	58.9	55
56	48 52.8	+12.9	50.4	49 30.6	+14.1	51.3	50 07.8	+15.3	52.2	50 44.1	+16.6	53.2	51 19.6	+17.9	54.2	51 54.3	+19.1	55.2	52 28.0	+20.5	56.3	53 00.9	+21.8	57.4	56
57	49 05.7	+11.7	48.9	49 44.7	+13.0	49.8	50 23.1	+14.1	50.7	51 00.7	+15.4	51.7	51 37.5	+16.6	52.7	52 13.4	+18.0	53.7	52 48.5	+19.3	54.7	53 22.7	+20.6	55.8	57
58	49 17.4	+10.6	47.4	49 57.7	+11.7	48.3	50 37.2	+12.9	49.2	51 16.1	+14.1	50.1	51 54.1	+15.4	51.1	52 31.4	+16.7	52.1	53 07.8	+18.0	53.2	53 43.3	+19.3	54.3	58
59	49 28.0	+9.3	45.9	50 09.4	+10.5	46.8	50 50.1	+11.7	47.7	51 30.2	+12.9	48.6	52 09.5	+14.2	49.5	52 48.1	+15.4	50.5	53 25.8	+16.7	51.6	54 02.6	+18.0	52.7	59
60	49 37.3	+8.2	44.4	50 19.9	+9.3	45.2	51 01.8	+10.5	46.1	51 43.1	+11.6	47.0	52 23.7	+12.8	48.0	53 03.5	+14.1	48.9	53 42.5	+15.3	50.0	54 20.6	+16.7	51.0	60
61	49 45.5	+7.0	42.9	50 29.2	+8.1	43.7	51 12.3	+9.2	44.5	51 54.7	+10.4	45.4	52 36.5	+11.5	46.3	53 17.6	+12.7	47.3	53 57.8	+14.1	48.3	54 37.3	+15.4	49.4	61
62	49 52.5	+5.7	41.3	50 37.3	+6.7	42.1	51 21.5	+7.9	43.0	52 05.1	+9.0	43.8	52 48.0	+10.2	44.7	53 30.3	+11.4	45.7	54 11.9	+12.6	46.7	54 52.7	+13.9	47.7	62
63	49 58.2	+4.5	39.8	50 44.0	+5.6	40.5	51 29.4	+6.6	41.4	52 14.1	+7.7	42.2	52 58.2	+8.9	43.1	53 41.7	+10.0	44.0	54 24.5	+11.2	45.0	55 06.6	+12.5	46.0	63
64	50 02.7	+3.2	38.2	50 49.6	+4.2	39.0	51 36.0	+5.2	39.8	52 21.8	+6.4	40.6	53 07.1	+7.4	41.5	53 51.7	+8.7	42.4	54 35.7	+9.9	43.3	55 19.1	+11.0	44.3	64
65	50 05.9	+2.0	36.7	50 53.8	+3.0	37.4	51 41.2	+4.0	38.2	52 28.2	+5.0	39.0	53 14.5	+6.1	39.8	54 00.4	+7.2	40.7	54 45.6	+8.3	41.6	55 30.1	+9.5	42.6	65
66	50 07.9	+0.8	35.1	50 56.8	+1.7	35.8	51 45.2	+2.7	36.5	52 33.2	+3.6	37.3	53 20.6	+4.7	38.1	54 07.6	+5.7	39.0	54 53.9	+6.9	39.9	55 39.6	+8.1	40.8	66
67	50 08.7	–0.6	33.5	50 58.5	+0.4	34.2	51 47.9	+1.3	34.9	52 36.8	+2.3	35.7	53 25.3	+3.3	36.5	54 13.3	+4.4	37.3	55 00.8	+5.4	38.1	55 47.7	+6.5	39.0	67
68	50 08.1	–1.7	32.0	50 58.9	–1.0	32.6	51 49.2	0.0	33.3	52 39.1	+0.9	34.0	53 28.6	+1.9	34.8	54 17.7	+2.8	35.6	55 06.2	+3.9	36.4	55 54.2	+5.0	37.3	68
69	50 06.4	–3.0	30.4	50 57.9	–2.2	31.0	51 49.2	–1.4	31.7	52 40.0	–0.4	32.4	53 30.5	+0.5	33.1	54 20.5	+1.5	33.9	55 10.1	+2.3	34.7	55 59.2	+3.5	35.5	69
70	50 03.4	–4.3	28.9	50 55.7	–3.4	29.5	51 47.8	–2.6	30.1	52 39.6	–1.9	30.7	53 31.0	–1.0	31.4	54 22.0	–0.1	32.1	55 12.6	+0.9	32.9	56 02.7	+1.9	33.7	70
71	49 59.1	–5.5	27.3	50 52.3	–4.8	27.9	51 45.2	–4.0	28.5	52 37.7	–3.1	29.1	53 30.0	–2.3	29.7	54 21.9	–1.5	30.4	55 13.5	–0.6	31.2	56 04.6	+0.4	31.9	71
72	49 53.6	–6.7	25.8	50 47.5	–6.0	26.3	51 41.2	–5.4	26.9	52 34.6	–4.6	27.4	53 27.7	–3.8	28.1	54 20.4	–2.9	28.7	55 12.9	–2.1	29.4	56 05.0	–1.2	30.1	72
73	49 46.9	–8.0	24.2	50 41.5	–7.3	24.7	51 35.8	–6.6	25.3	52 30.0	–5.9	25.8	53 23.9	–5.2	26.4	54 17.5	–4.4	27.0	55 10.8	–3.6	27.6	56 03.8	–2.8	28.3	73
74	49 38.9	–9.2	22.7	50 34.2	–8.6	23.2	51 29.2	–7.9	23.7	52 24.1	–7.3	24.2	53 18.7	–6.6	24.7	54 13.1	–5.9	25.3	55 07.2	–5.1	25.9	56 01.0	–4.3	26.5	74
75	49 29.7	–10.3	21.2	50 25.6	–9.8	21.6	51 21.3	–9.2	22.1	52 16.8	–8.6	22.5	53 12.1	–7.9	23.1	54 07.2	–7.2	23.6	55 02.1	–6.6	24.2	55 56.7	–5.8	24.8	75
76	49 19.4	–11.5	19.7	50 15.8	–11.0	20.1	51 12.1	–10.5	20.5	52 08.2	–9.9	20.9	53 04.2	–9.3	21.4	54 00.0	–8.7	21.9	54 55.5	–8.0	22.4	55 50.9	–7.4	23.0	76
77	49 07.9	–12.7	18.2	50 04.8	–12.2	18.5	51 01.6	–11.7	18.9	51 58.3	–11.2	19.3	52 54.9	–10.7	19.8	53 51.3	–10.1	20.2	54 47.5	–9.5	20.7	55 43.5	–8.9	21.2	77
78	48 55.2	–13.9	16.7	49 52.6	–13.4	17.0	50 49.9	–12.9	17.4	51 47.1	–12.5	17.7	52 44.2	–12.0	18.1	53 41.2	–11.5	18.6	54 38.0	–11.0	19.0	55 34.6	–10.3	19.5	78
79	48 41.3	–14.9	15.2	49 39.2	–14.6	15.5	50 37.0	–14.2	15.8	51 34.6	–13.7	16.2	52 32.2	–13.3	16.5	53 29.7	–12.8	16.9	54 27.0	–12.3	17.3	55 24.3	–11.9	17.7	79
80	48 26.4	–16.1	13.7	49 24.6	–15.7	14.0	50 22.8	–15.3	14.3	51 20.9	–15.0	14.6	52 18.9	–14.5	14.9	53 16.9	–14.2	15.3	54 14.7	–13.7	15.6	55 12.4	–13.2	16.0	80
81	48 10.3	–17.1	12.3	49 08.9	–16.8	12.5	50 07.5	–16.6	12.8	51 05.9	–16.1	13.0	52 04.4	–15.9	13.3	53 02.7	–15.5	13.6	54 01.0	–15.1	14.0	54 59.2	–14.6	14.3	81
82	47 53.2	–18.3	10.8	48 52.1	–17.9	11.1	49 50.9	–17.6	11.3	50 49.8	–17.4	11.5	51 48.5	–17.0	11.8	52 47.2	–16.7	12.0	53 45.9	–16.4	12.3	54 44.5	–16.1	12.6	82
83	47 35.0	–19.3	9.4	48 34.2	–19.1	9.6	49 33.3	–18.8	9.8	50 32.4	–18.5	10.0	51 31.5	–18.3	10.2	52 30.5	–18.0	10.5	53 29.5	–17.7	10.7	54 28.4	–17.4	11.0	83
84	47 15.7	–20.2	8.0	48 15.1	–20.0	8.2	49 14.5	–19.8	8.3	50 13.9	–19.5	8.5	51 13.2	–19.4	8.7	52 12.5	–19.2	8.9	53 11.8	–19.0	9.1	54 11.0	–18.6	9.3	84
85	46 55.5	–21.2	6.6	47 55.1	–21.1	6.8	48 54.7	–21.0	6.9	49 54.2	–20.7	7.0	50 53.8	–20.6	7.2	51 53.3	–20.4	7.4	52 52.8	–20.2	7.5	53 52.4	–20.0	7.7	85
86	46 34.3	–22.2	5.3	47 34.0	–22.1	5.4	48 33.7	–21.9	5.5	49 33.5	–21.9	5.6	50 33.2	–21.7	5.7	51 32.9	–21.6	5.8	52 32.6	–21.5	6.0	53 32.2	–21.3	6.1	86
87	46 12.1	–23.1	3.9	47 11.9	–23.0	4.0	48 11.8	–23.0	4.1	49 11.6	–22.8	4.2	50 11.5	–22.8	4.2	51 11.3	–22.7	4.3	52 11.1	–22.6	4.4	53 10.9	–22.4	4.5	87
88	45 49.0	–24.1	2.6	46 48.9	–24.0	2.6	47 48.8	–23.9	2.7	48 48.7	–23.8	2.8	49 48.7	–23.8	2.8	50 48.6	–23.8	2.9	51 48.5	–23.7	2.9	52 48.5	–23.7	3.0	88
89	45 24.9	–24.9	1.3	46 24.9	–24.9	1.3	47 24.9	–24.9	1.3	48 24.9	–24.9	1.4	49 24.9	–24.9	1.4	50 24.8	–24.8	1.5	51 24.8	–24.8	1.5	52 24.8	–24.8	1.5	89
90	45 00.0	–25.8	0.0	46 00.0	–25.8	0.0	47 00.0	–25.8	0.0	48 00.0	–25.8	0.0	49 00.0	–25.8	0.0	50 00.0	–25.9	0.0	51 00.0	–25.9	0.0	52 00.0	–25.9	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	17 23.3	−44.6	108.2	17 04.3	−45.2	108.5	16 45.1	−45.9	108.8	16 25.6	−46.6	109.1	16 05.8	−47.2	109.4	15 45.8	−47.8	109.7	15 25.4	−48.4	109.9	15 04.9	−49.0	110.2	0
1	16 38.7	−44.6	108.9	16 19.1	−45.3	109.2	15 59.2	−46.0	109.5	15 39.0	−46.6	109.8	15 18.6	−47.3	110.0	14 58.0	−48.0	110.3	14 37.0	−48.5	110.5	14 15.9	−49.1	110.8	1
2	15 54.1	−44.8	109.6	15 33.8	−45.5	109.9	15 13.2	−46.1	110.2	14 52.4	−46.8	110.4	14 31.3	−47.4	110.7	14 10.0	−48.0	110.9	13 48.5	−48.6	111.1	13 26.8	−49.2	111.4	2
3	15 09.3	−45.0	110.3	14 48.3	−45.6	110.6	14 27.1	−46.3	110.8	14 05.6	−46.9	111.1	13 43.9	−47.5	111.3	13 22.0	−48.1	111.5	12 59.9	−48.7	111.7	12 37.6	−49.3	112.0	3
4	14 24.3	−45.0	111.0	14 02.7	−45.7	111.3	13 40.8	−46.3	111.5	13 18.7	−46.9	111.7	12 56.4	−47.5	111.9	12 33.9	−48.2	112.1	12 11.2	−48.7	112.3	11 48.3	−49.3	112.5	4
5	13 39.3	−45.2	111.7	13 17.0	−45.8	111.9	12 54.5	−46.5	112.1	12 31.8	−47.1	112.3	12 08.9	−47.7	112.6	11 45.7	−48.2	112.7	11 22.5	−48.9	112.9	10 59.0	−49.4	113.1	5
6	12 54.1	−45.2	112.4	12 31.2	−45.9	112.6	12 08.0	−46.5	112.8	11 44.7	−47.1	113.0	11 21.2	−47.8	113.2	10 57.5	−48.3	113.4	10 33.6	−48.9	113.5	10 09.6	−49.5	113.7	6
7	12 08.9	−45.4	113.1	11 45.3	−46.0	113.2	11 21.5	−46.6	113.4	10 57.6	−47.3	113.6	10 33.4	−47.8	113.8	10 09.2	−48.4	114.0	9 44.7	−49.1	114.1	9 20.1	−49.5	114.3	7
8	11 23.5	−45.4	113.7	10 59.3	−46.1	113.9	10 34.9	−46.7	114.1	10 10.3	−47.3	114.2	9 45.6	−47.9	114.4	9 20.8	−48.5	114.6	8 55.8	−49.1	114.7	8 30.6	−49.7	114.8	8
9	10 38.1	−45.6	114.4	10 13.2	−46.1	114.6	9 48.2	−46.8	114.7	9 23.0	−47.3	114.9	8 57.7	−47.9	115.0	8 32.3	−48.5	115.2	8 06.7	−49.0	115.3	7 41.1	−49.7	115.4	9
10	9 52.5	−45.5	115.0	9 27.1	−46.3	115.2	9 01.4	−46.8	115.3	8 35.7	−47.4	115.5	8 09.8	−48.0	115.6	7 43.8	−48.6	115.7	7 17.7	−49.1	115.9	6 51.4	−49.6	116.0	10
11	9 06.9	−45.7	115.7	8 40.8	−46.3	115.8	8 14.6	−46.9	116.0	7 48.3	−47.5	116.1	7 21.8	−48.0	116.2	6 55.2	−48.6	116.3	6 28.6	−49.2	116.4	6 01.8	−49.7	116.5	11
12	8 21.2	−45.7	116.4	7 54.5	−46.3	116.5	7 27.7	−46.9	116.6	7 00.8	−47.5	116.7	6 33.8	−48.1	116.8	6 06.6	−48.6	116.9	5 39.4	−49.2	117.0	5 12.1	−49.7	117.1	12
13	7 35.5	−45.8	117.0	7 08.2	−46.4	117.1	6 40.8	−47.0	117.2	6 13.3	−47.6	117.3	5 45.7	−48.1	117.4	5 18.0	−48.7	117.5	4 50.2	−49.2	117.6	4 22.4	−49.7	117.7	13
14	6 49.7	−45.9	117.7	6 21.8	−46.5	117.8	5 53.8	−47.0	117.9	5 25.7	−47.6	118.0	4 57.6	−48.2	118.1	4 29.3	−48.7	118.1	4 01.0	−49.3	118.2	3 32.7	−49.8	118.2	14
15	6 03.8	−45.9	118.3	5 35.3	−46.4	118.4	5 06.8	−47.1	118.5	4 38.1	−47.6	118.6	4 09.4	−48.2	118.6	3 40.6	−48.7	118.7	3 11.8	−49.3	118.7	2 42.9	−49.8	118.8	15
16	5 17.9	−45.9	119.0	4 48.9	−46.6	119.0	4 19.7	−47.1	119.1	3 50.5	−47.7	119.2	3 21.2	−48.2	119.2	2 51.9	−48.8	119.3	2 22.5	−49.2	119.3	1 53.1	−49.7	119.3	16
17	4 32.0	−46.0	119.6	4 02.3	−46.5	119.7	3 32.6	−47.1	119.7	3 02.8	−47.7	119.8	2 33.0	−48.2	119.8	2 03.1	−48.7	119.9	1 33.3	−49.3	119.9	1 03.4	−49.8	119.9	17
18	3 46.0	−46.0	120.3	3 15.8	−46.6	120.3	2 45.5	−47.2	120.4	2 15.1	−47.6	120.4	1 44.8	−48.3	120.4	1 14.4	−48.8	120.4	0 44.0	−49.3	120.5	0 13.6	−49.8	120.5	18
19	2 59.9	−46.0	120.9	2 29.2	−46.6	120.9	1 58.3	−47.1	121.0	1 27.5	−47.8	121.0	0 56.5	−48.2	121.0	0 25.6	−48.7	121.0	0 05.3	+49.3	59.0	0 36.2	+49.9	59.0	19
20	2 14.0	−46.0	121.5	1 42.6	−46.6	121.6	1 11.2	−47.2	121.6	0 39.7	−47.7	121.6	0 08.3	−48.2	121.6	0 23.1	+48.8	58.4	0 54.6	+49.3	58.4	1 26.0	+49.8	58.4	20
21	1 28.0	−46.1	122.2	0 56.0	−46.6	122.2	0 24.0	−47.1	122.2	0 08.0	+47.7	57.8	0 39.9	+48.3	57.8	1 11.9	+48.8	57.8	1 43.9	+49.2	57.8	2 15.8	+49.8	57.9	21
22	0 41.9	−46.1	122.8	0 09.4	−46.6	122.8	0 23.1	+47.2	57.2	0 55.7	+47.7	57.2	1 28.2	+48.2	57.2	2 00.7	+48.7	57.2	2 33.1	+49.3	57.3	3 05.6	+49.7	57.3	22
23	0 04.2	+46.0	56.5	0 37.2	+46.6	56.5	1 10.3	+47.2	56.6	1 43.4	+47.7	56.6	2 16.4	+48.2	56.6	2 49.4	+48.7	56.6	3 22.4	+49.2	56.7	3 55.3	+49.7	56.7	23
24	0 50.2	+46.1	55.9	1 23.8	+46.6	55.9	1 57.5	+47.1	55.9	2 31.1	+47.6	56.0	3 04.6	+48.2	56.0	3 38.1	+48.7	56.1	4 11.6	+49.2	56.1	4 45.0	+49.7	56.2	24
25	1 36.3	+46.0	55.3	2 10.4	+46.6	55.3	2 44.6	+47.1	55.3	3 18.7	+47.6	55.4	3 52.8	+48.2	55.4	4 26.8	+48.7	55.5	5 00.8	+49.2	55.5	5 34.7	+49.7	55.6	25
26	2 22.3	+46.0	54.6	2 57.0	+46.6	54.7	3 31.7	+47.1	54.7	4 06.4	+47.6	54.8	4 41.0	+48.1	54.8	5 15.5	+48.7	54.9	5 50.0	+49.1	55.0	6 24.4	+49.6	55.1	26
27	3 08.3	+46.0	54.0	3 43.6	+46.5	54.0	4 18.8	+47.1	54.1	4 54.0	+47.6	54.1	5 29.1	+48.1	54.2	6 04.2	+48.6	54.3	6 39.1	+49.1	54.4	7 14.0	+49.6	54.5	27
28	3 54.3	+45.9	53.3	4 30.1	+46.5	53.4	5 05.9	+47.0	53.5	5 41.6	+47.5	53.5	6 17.2	+48.1	53.6	6 52.8	+48.5	53.7	7 28.2	+49.1	53.8	8 03.6	+49.6	53.9	28
29	4 40.3	+45.9	52.7	5 16.6	+46.5	52.8	5 52.9	+47.0	52.8	6 29.1	+47.5	52.9	7 05.3	+48.0	53.0	7 41.3	+48.5	53.1	8 17.3	+49.0	53.2	8 53.2	+49.4	53.4	29
30	5 26.2	+45.9	52.0	6 03.1	+46.4	52.1	6 39.9	+47.0	52.2	7 16.6	+47.5	52.3	7 53.3	+47.9	52.4	8 29.8	+48.5	52.5	9 06.3	+48.9	52.6	9 42.6	+49.5	52.8	30
31	6 12.1	+45.9	51.4	6 49.5	+46.4	51.5	7 26.9	+46.8	51.6	8 04.1	+47.4	51.7	8 41.2	+47.9	51.8	9 18.3	+48.4	51.9	9 55.2	+48.9	52.1	10 32.1	+49.3	52.2	31
32	6 58.0	+45.8	50.7	7 35.9	+46.3	50.8	8 13.7	+46.9	50.9	8 51.5	+47.3	51.1	9 29.1	+47.9	51.2	10 06.7	+48.3	51.3	10 44.1	+48.9	51.5	11 21.4	+49.3	51.6	32
33	7 43.8	+45.7	50.1	8 22.2	+46.3	50.2	9 00.6	+46.7	50.3	9 38.8	+47.3	50.4	10 17.0	+47.8	50.6	10 55.0	+48.3	50.7	11 33.0	+48.7	50.9	12 10.7	+49.3	51.0	33
34	8 29.5	+45.7	49.4	9 08.5	+46.1	49.6	9 47.3	+46.7	49.7	10 26.1	+47.2	49.8	11 04.8	+47.7	50.0	11 43.3	+48.2	50.1	12 21.7	+48.7	50.3	13 00.0	+49.1	50.5	34
35	9 15.2	+45.6	48.8	9 54.6	+46.2	48.9	10 34.0	+46.6	49.0	11 13.3	+47.1	49.2	11 52.5	+47.6	49.3	12 31.5	+48.1	49.5	13 10.4	+48.6	49.7	13 49.1	+49.1	49.9	35
36	10 00.8	+45.5	48.1	10 40.8	+46.0	48.3	11 20.6	+46.6	48.4	12 00.4	+47.0	48.6	12 40.1	+47.5	48.7	13 19.6	+48.0	48.9	13 59.0	+48.5	49.1	14 38.2	+49.0	49.3	36
37	10 46.3	+45.4	47.5	11 26.8	+45.9	47.6	12 07.2	+46.4	47.8	12 47.4	+47.0	47.9	13 27.6	+47.4	48.1	14 07.6	+47.9	48.3	14 47.5	+48.3	48.5	15 27.2	+48.8	48.7	37
38	11 31.7	+45.3	46.8	12 12.7	+45.9	46.9	12 53.6	+46.4	47.1	13 34.4	+46.8	47.3	14 15.0	+47.4	47.5	14 55.5	+47.8	47.7	15 35.8	+48.3	47.9	16 16.0	+48.8	48.1	38
39	12 17.0	+45.3	46.1	12 58.6	+45.7	46.3	13 40.0	+46.2	46.5	14 21.2	+46.8	46.6	15 02.4	+47.2	46.8	15 43.3	+47.7	47.0	16 24.1	+48.2	47.2	17 04.8	+48.7	47.5	39
40	13 02.3	+45.1	45.5	13 44.3	+45.6	45.6	14 26.2	+46.1	45.8	15 08.0	+46.6	46.0	15 49.6	+47.1	46.2	16 31.0	+47.6	46.4	17 12.3	+48.1	46.6	17 53.5	+48.5	46.8	40
41	13 47.4	+45.0	44.8	14 29.9	+45.6	45.0	15 12.3	+46.1	45.3	15 54.6	+46.5	45.5	16 36.7	+47.0	45.5	17 18.6	+47.5	45.8	18 00.4	+48.0	46.0	18 42.0	+48.4	46.2	41
42	14 32.4	+45.0	44.1	15 15.5	+45.5	44.3	15 58.4	+45.9	44.5	16 41.1	+46.4	44.7	17 23.7	+46.8	44.9	18 06.1	+47.3	45.1	18 48.4	+47.8	45.4	19 30.4	+48.3	45.6	42
43	15 17.4	+44.7	43.4	16 00.9	+45.2	43.6	16 44.3	+45.7	43.8	17 27.5	+46.1	44.0	18 10.5	+46.8	44.2	18 53.4	+47.3	44.5	19 36.2	+47.7	44.7	20 18.7	+48.2	45.0	43
44	16 02.1	+44.7	42.7	16 46.1	+45.2	42.9	17 30.0	+45.6	43.1	18 13.7	+46.1	43.3	18 57.3	+46.6	43.6	19 40.7	+47.0	43.8	20 23.9	+47.5	44.1	21 06.9	+48.0	44.3	44
45	16 46.8	+44.5	42.0	17 31.3	+45.0	42.2	18 15.6	+45.5	42.4	18 59.8	+46.0	42.7	19 43.9	+46.4	42.9	20 27.7	+46.9	43.2	21 11.4	+47.4	43.4	21 54.9	+47.8	43.7	45
46	17 31.3	+44.3	41.3	18 16.3	+44.8	41.5	19 01.1	+45.3	41.8	19 45.8	+45.8	42.0	20 30.3	+46.3	42.2	21 14.6	+46.8	42.5	21 58.8	+47.2	42.8	22 42.7	+47.7	43.0	46
47	18 15.6	+44.2	40.6	19 01.1	+44.7	40.8	19 46.4	+45.2	41.1	20 31.6	+45.6	41.3	21 16.6	+46.1	41.6	22 01.4	+46.6	41.9	22 46.0	+47.1	42.1	23 30.4	+47.6	42.4	47
48	18 59.8	+44.1	39.9	19 45.8	+44.5	40.1	20 31.6	+45.0	40.4	21 17.2	+45.5	40.6	22 02.7	+45.9	40.9	22 48.0	+46.4	41.1	23 33.1	+46.9	41.4	24 18.0	+47.3	41.7	48
49	19 43.9	+43.8	39.2	20 30.3	+44.3	39.4	21 16.6	+44.8	39.6	22 02.7	+45.3	39.9	22 48.6	+45.8	40.2	23 34.4	+46.2	40.4	24 20.0	+46.7	40.7	25 05.3	+47.2	41.0	49
50	20 27.7	+43.7	38.4	21 14.6	+44.2	38.7	22 01.4	+44.6	38.9	22 48.0	+45.1	39.2	23 34.4	+45.6	39.5	24 20.6	+46.1	39.7	25 06.7	+46.5	40.0	25 52.5	+47.0	40.4	50
51	21 11.4	+43.5	37.7	21 58.8	+43.9	38.0	22 46.0	+44.4	38.2	23 33.1	+44.9	38.5	24 20.0	+45.3	38.8	25 06.7	+45.8	39.0	25 53.2	+46.3	39.3	26 39.5	+46.7	39.7	51
52	21 54.9	+43.3	37.0	22 42.7	+43.8	37.2	23 30.4	+44.3	37.5	24 18.0	+44.6	37.7	25 03.3	+45.2	38.0	25 52.5	+45.6	38.3	26 39.5	+46.0	38.6	27 26.2	+46.6	39.0	52
53	22 38.2	+43.0	36.2	23 26.5	+43.5	36.5	24 14.7	+44.0	36.7	25 02.6	+44.5	37.0	25 48.5	+44.9	37.3	26 38.1	+45.4	37.6	27 25.5	+45.9	37.9	28 12.8	+46.3	38.3	53
54	23 21.2	+42.9	35.5	24 10.0	+43.3	35.7	24 58.7	+43.7	36.0	25 47.1	+44.2	36.3	26 35.4	+44.7	36.6	27 23.5	+45.2	36.9	28 11.4	+45.6	37.2	28 59.1	+46.1	37.5	54
55	24 04.1	+42.6	34.7	24 53.3	+43.1	35.0	25 42.4	+43.6	35.2	26 31.3	+44.0	35.5	27 20.1	+44.4	35.8	28 08.7	+44.9	36.1	28 57.0	+45.4	36.4	29 45.2	+45.8	36.8	55
56	24 46.7	+42.4	33.9	25 36.4	+42.8	34.2	26 26.0	+43.2	34.5	27 15.3	+43.8	34.8	28 04.5	+44.3	35.1	28 53.6	+44.6	35.4	29 42.4	+45.1	35.7	30 31.0	+45.6	36.0	56
57	25 29.1	+42.1	33.1	26 19.2	+42.6	33.4	27 09.2	+43.1	33.7	27 59.1	+43.5	34.0	28 48.7	+44.0	34.3	29 38.2	+44.4	34.6	30 27.5	+44.9	34.9	31 16.6	+45.3	35.3	57
58	26 11.2	+41.9	32.4	27 01.8	+42.3	32.6	27 52.3	+42.7	32.9	28 42.6	+43.2	33.2	29 32.7	+43.6	33.5	30 22.6	+44.1	33.8	31 12.4	+44.5	34.2	32 01.9	+45.0	34.5	58
59	26 53.1	+41.6	31.6	27 44.1	+42.1	31.8	28 35.0	+42.5	32.1	29 25.8	+42.9	32.4	30 16.3	+43.4	32.7	31 06.7	+43.9	33.0	31 56.9	+44.3	33.3	32 46.9	+44.8	33.7	59
60	27 34.7	+41.3	30.7	28 26.2	+41.7	31.0	29 17.5	+42.2	31.3	30 08.7	+42.6	31.6	30 59.7	+43.1	31.9	31 50.6	+43.5	32.2	32 41.2	+44.0	32.6	33 31.7	+44.4	32.9	60
61	28 16.0	+41.0	29.9	29 07.9	+41.4	30.2	29 59.7	+41.9	30.5	30 51.3	+42.3	30.8	31 42.8	+42.7	31.1	32 34.1	+43.2	31.4	33 25.2	+43.6	31.8	34 16.1	+44.1	32.1	61
62	28 57.0	+40.7	29.1	29 49.3	+41.2	29.4	30 41.6	+41.5	29.7	31 33.6	+42.0	30.0	32 25.5	+42.4	30.3	33 17.3	+42.8	30.6	34 08.8	+43.3	31.0	35 00.2	+43.7	31.3	62
63	29 37.7	+40.4	28.3	30 30.5	+40.8	28.5	31 23.1	+41.2	28.8	32 15.6	+41.7	29.1	33 07.9	+42.1	29.4	34 00.1	+42.5	29.8	34 52.1	+43.0	30.1	35 43.9	+43.4	30.5	63
64	30 18.1	+40.0	27.4	31 11.3	+40.4	27.7	32 04.3	+40.9	28.0	32 57.3	+41.2	28.3	33 50.0	+41.7	28.6	34 42.6	+42.2	28.9	35 35.1	+42.6	29.2	36 27.3	+43.1	29.6	64
65	30 58.1	+39.7	26.5	31 51.7	+40.1	26.8	32 45.2	+40.5	27.1	33 38.5	+41.0	27.4	34 31.7	+41.4	27.7	35 24.8	+41.7	28.0	36 17.7	+42.2	28.4	37 10.4	+42.6	28.7	65
66	31 37.8	+39.3	25.7	32 31.8	+39.7	25.9	33 25.7	+40.1	26.2	34 19.5	+40.5	26.5	35 13.1	+40.9	26.8	36 06.5	+41.4	27.1	36 59.9	+41.8	27.5	37 53.0	+42.2	27.8	66
67	32 17.1	+38.9	24.8	33 11.5	+39.4	25.0	34 05.8	+39.8	25.3	35 00.0	+40.1	25.6	35 54.0	+40.6	25.9	36 47.9	+41.0	26.2	37 41.7	+41.3	26.6	38 35.2	+41.8	26.9	67
68	32 56.0	+38.6	23.9	33 50.9	+38.9	24.2	34 45.6	+39.3	24.4	35 40.1	+39.7	24.7	36 34.6	+40.1	25.0	37 28.9	+40.5	25.3	38 23.0	+41.0	25.7	39 17.0	+41.4	26.0	68
69	33 34.6	+38.1	22.9	34 29.8	+38.5	23.2	35 24.9	+38.9	23.5	36 19.8	+39.3	23.8	37 14.7	+39.7	24.1	38 09.4	+40.1	24.4	39 04.0	+40.4	24.7	39 58.4	+40.9	25.1	69
70	34 12.7	+37.7	22.0	35 08.3	+38.1	22.3	36 03.8	+38.4	22.5	36 59.1	+38.8	22.8	37 54.4	+39.2	23.1	38 49.5	+39.6	23.4	39 44.4	+40.0	23.8	40 39.3	+40.4	24.1	70
71	34 50.4	+37.3	21.1	35 46.4	+37.6	21.3	36 42.2	+38.0	21.6	37 37.9	+38.4	21.9	38 33.6	+38.7	22.2	39 29.1	+39.1	22.5	40 24.4	+39.5	22.8	41 19.7	+39.9	23.1	71
72	35 27.7	+36.8	20.1	36 24.0	+37.1	20.4	37 20.2	+37.5	20.6	38 16.3	+37.9	20.9	39 12.3	+38.2	21.2	40 08.2	+38.6	21.5	41 03.9	+39.0	21.8	41 59.6	+39.3	22.1	72
73	36 04.5	+36.3	19.1	37 01.1	+36.7	19.4	37 57.7	+37.0	19.6	38 54.1	+37.4	19.9	39 50.5	+37.7	20.2	40 46.8	+38.0	20.5	41 42.9	+38.4	20.8	42 38.9	+38.9	21.1	73
74	36 40.8	+35.8	18.1	37 37.8	+36.1	18.4	38 34.7	+36.4	18.6	39 31.5	+36.8	18.9	40 28.2	+37.1	19.2	41 24.8	+37.5	19.5	42 21.3	+37.9	19.8	43 17.8	+38.2	20.1	74
75	37 16.6	+35.3	17.1	38 13.9	+35.6	17.4	39 11.1	+36.0	17.6	40 08.3	+36.2	17.9	41 05.3	+36.6	18.1	42 02.3	+36.9	18.4	42 59.2	+37.3	18.7	43 56.0	+37.6	19.0	75
76	37 51.9	+34.8	16.1	38 49.5	+35.1	16.3	39 47.1	+35.3	16.6	40 44.5	+35.7	16.8	41 41.9	+36.0	17.1	42 39.2	+36.4	17.3	43 36.5	+36.6	17.6	44 33.6	+37.0	17.9	76
77	38 26.7	+34.2	15.1	39 24.6	+34.5	15.3	40 22.4	+34.8	15.5	41 20.2	+35.1	15.8	42 17.9	+35.4	16.0	43 15.6	+35.6	16.3	44 13.1	+36.0	16.5	45 10.6	+36.3	16.8	77
78	39 00.9	+33.6	14.1	39 59.1	+33.9	14.3	40 57.2	+34.2	14.4	41 55.3	+34.4	14.7	42 53.3	+34.7	14.9	43 51.2	+35.1	15.1	44 49.1	+35.4	15.4	45 46.9	+35.7	15.6	78
79	39 34.5	+33.1	13.0	40 33.0	+33.3	13.2	41 31.4	+33.5	13.4	42 29.7	+33.8	13.6	43 28.0	+34.1	13.8	44 26.3	+34.3	14.0	45 24.5	+34.6	14.3	46 22.6	+34.9	14.5	79
80	40 07.6	+32.4	11.9	41 06.3	+32.6	12.1	42 04.9	+32.9	12.2	43 03.5	+33.2	12.4	44 02.1	+33.4	12.6	45 00.6	+33.7	12.9	45 59.1	+33.9	13.1	46 57.5	+34.2	13.3	80
81	40 40.0	+31.8	10.8	41 38.9	+32.0	10.9	42 37.8	+32.2	11.1	43 36.7	+32.4	11.3	44 35.5	+32.6	11.5	45 34.3	+32.8	11.7	46 33.0	+33.1	11.9	47 31.7	+33.4	12.1	81
82	41 11.8	+31.1	9.6	42 10.9	+31.3	9.8	43 10.0	+31.5	10.0	44 09.1	+31.7	10.1	45 08.1	+31.9	10.3	46 07.1	+32.2	10.5	47 06.1	+32.4	10.7	48 05.1	+32.5	10.9	82
83	41 42.9	+30.4	8.5	42 42.2	+30.6	8.6	43 41.5	+30.8	8.8	44 40.8	+30.9	8.9	45 40.0	+31.2	9.1	46 39.3	+31.3	9.3	47 38.5	+31.5	9.4	48 37.6	+31.8	9.6	83
84	42 13.3	+29.7	7.3	43 12.8	+29.8	7.5	44 12.3	+30.0	7.6	45 11.7	+30.2	7.7	46 11.2	+30.3	7.9	47 10.6	+30.5	8.0	48 10.0	+30.7	8.2	49 09.4	+30.8	8.3	84
85	42 43.0	+29.0	6.2	43 42.6	+29.1	6.3	44 42.3	+29.2	6.4	45 41.9	+29.3	6.5	46 41.5	+29.5	6.6	47 41.1	+29.6	6.7	48 40.7	+29.7	6.9	49 40.2	+30.0	7.0	85
86	43 12.0	+28.2	5.0	44 11.7	+28.3	5.1	45 11.5	+28.4	5.1	46 11.2	+28.6	5.2	47 11.0	+28.6	5.3	48 10.7	+28.8	5.4	49 10.4	+28.9	5.5	50 10.2	+28.9	5.7	86
87	43 40.2	+27.4	3.8	44 40.0	+27.5	3.8	45 39.9	+27.6	3.9	46 39.8	+27.6	4.0	47 39.6	+27.7	4.0	48 39.5	+27.8	4.1	49 39.3	+27.9	4.2	50 39.1	+28.0	4.3	87
88	44 07.6	+26.6	2.5	45 07.5	+26.7	2.6	46 07.5	+26.7	2.6	47 07.4	+26.8	2.7	48 07.3	+26.9	2.7	49 07.3	+26.8	2.8	50 07.2	+26.9	2.8	51 07.1	+27.0	2.9	88
89	44 34.2	+25.8	1.3	45 34.2	+25.8	1.3	46 34.2	+25.8	1.3	47 34.2	+25.8	1.3	48 34.2	+25.8	1.4	49 34.1	+25.9	1.4	50 34.1	+25.9	1.4	51 34.1	+25.9	1.5	89
90	45 00.0	+24.9	0.0	46 00.0	+24.9	0.0	47 00.0	+24.9	0.0	48 00.0	+24.9	0.0	49 00.0	+24.9	0.0	50 00.0	+24.8	0.0	51 00.0	+24.8	0.0	52 00.0	+24.8	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION · **L.H.A. 115°, 245°**

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	16 42.9	+44.2	107.5	16 24.7	+44.9	107.8	16 06.3	+45.6	108.0	15 47.6	+46.2	108.3	15 28.6	+46.9	108.6	15 09.4	+47.5	108.8	14 49.9	+48.1	109.1	14 30.1	+48.8	109.3	0
1	17 27.1	+44.1	106.8	17 09.6	+44.8	107.1	16 51.9	+45.5	107.4	16 33.8	+46.2	107.6	16 15.5	+46.8	107.9	15 56.9	+47.5	108.2	15 38.0	+48.1	108.5	15 18.9	+48.7	108.7	1
2	18 11.2	+43.9	106.1	17 54.4	+44.7	106.4	17 37.4	+45.3	106.7	17 20.0	+46.0	107.0	17 02.3	+46.7	107.3	16 44.4	+47.3	107.6	16 26.1	+48.0	107.8	16 07.6	+48.6	108.1	2
3	18 55.1	+43.7	105.3	18 39.1	+44.4	105.7	18 22.7	+45.3	106.0	18 06.0	+45.9	106.3	17 49.0	+46.6	106.6	17 31.7	+47.2	106.9	17 14.1	+47.8	107.2	16 56.2	+48.5	107.5	3
4	19 38.8	+43.6	104.6	19 23.5	+44.3	105.0	19 07.9	+45.0	105.3	18 51.9	+45.7	105.6	18 35.6	+46.3	105.9	18 18.9	+47.1	106.3	18 01.9	+47.8	106.6	17 44.7	+48.3	106.9	4
5	20 22.4	+43.4	103.9	20 07.8	+44.2	104.2	19 52.9	+44.9	104.6	19 37.6	+45.6	104.9	19 22.0	+46.2	105.3	19 06.0	+46.9	105.6	18 49.7	+47.6	105.9	18 33.0	+48.3	106.3	5
6	21 05.8	+43.2	103.1	20 52.0	+43.9	103.5	20 37.8	+44.6	103.9	20 23.2	+45.4	104.2	20 08.2	+46.1	104.6	19 52.9	+46.8	105.0	19 37.3	+47.4	105.3	19 21.3	+48.1	105.6	6
7	21 49.0	+43.0	102.4	21 35.9	+43.8	102.8	21 22.4	+44.5	103.2	21 08.6	+45.2	103.5	20 54.3	+46.0	103.9	20 39.7	+46.7	104.3	20 24.7	+47.3	104.7	20 09.4	+47.9	105.0	7
8	22 32.0	+42.8	101.6	22 19.7	+43.5	102.0	22 06.9	+44.4	102.4	21 53.8	+45.1	102.8	21 40.3	+45.7	103.2	21 26.4	+46.4	103.6	21 12.0	+47.2	104.0	20 57.3	+47.9	104.4	8
9	23 14.8	+42.5	100.9	23 03.2	+43.4	101.3	22 51.3	+44.1	101.7	22 38.9	+44.8	102.1	22 26.0	+45.6	102.5	22 12.8	+46.3	102.9	21 59.2	+47.0	103.3	21 45.2	+47.6	103.7	9
10	23 57.3	+42.3	100.1	23 46.6	+43.1	100.5	23 35.4	+43.9	101.0	23 23.7	+44.7	101.4	23 11.6	+45.4	101.8	22 59.1	+46.1	102.2	22 46.2	+46.8	102.7	22 32.8	+47.5	103.1	10
11	24 39.6	+42.1	99.3	24 29.7	+42.9	99.8	24 19.3	+43.6	100.2	24 08.4	+44.4	100.7	23 57.0	+45.2	101.1	23 45.2	+46.0	101.5	23 33.0	+46.7	102.0	23 20.3	+47.4	102.4	11
12	25 21.7	+41.9	98.5	25 12.6	+42.6	99.0	25 02.9	+43.5	99.5	24 52.8	+44.2	99.9	24 42.2	+45.0	100.4	24 31.2	+45.7	100.8	24 19.7	+46.4	101.3	24 07.7	+47.1	101.7	12
13	26 03.6	+41.5	97.8	25 55.2	+42.4	98.2	25 46.4	+43.2	98.7	25 37.0	+44.0	99.2	25 27.2	+44.8	99.7	25 16.9	+45.5	100.1	25 06.1	+46.3	100.6	24 54.8	+47.0	101.0	13
14	26 45.1	+41.3	96.9	26 37.6	+42.1	97.4	26 29.6	+42.9	97.9	26 21.0	+43.8	98.4	26 12.0	+44.5	98.9	26 02.4	+45.3	99.4	25 52.4	+46.0	99.9	25 41.8	+46.8	100.4	14
15	27 26.4	+41.0	96.1	27 19.7	+41.9	96.6	27 12.5	+42.7	97.2	27 04.8	+43.5	97.7	26 56.5	+44.3	98.2	26 47.7	+45.1	98.7	26 38.4	+45.8	99.2	26 28.6	+46.6	99.7	15
16	28 07.4	+40.7	95.3	28 01.6	+41.5	95.8	27 55.2	+42.4	96.4	27 48.3	+43.2	96.9	27 40.8	+44.0	97.4	27 32.8	+44.8	97.9	27 24.2	+45.6	98.4	27 15.2	+46.3	99.0	16
17	28 48.1	+40.4	94.5	28 43.1	+41.3	95.0	28 37.6	+42.1	95.6	28 31.5	+43.0	96.1	28 24.8	+43.8	96.6	28 17.6	+44.6	97.2	28 09.8	+45.4	97.7	28 01.5	+46.2	98.2	17
18	29 28.5	+40.0	93.6	29 24.4	+40.9	94.2	29 19.7	+41.8	94.7	29 14.5	+42.6	95.3	29 08.6	+43.5	95.9	29 02.2	+44.3	96.4	28 55.2	+45.1	97.0	28 47.7	+45.8	97.5	18
19	30 08.5	+39.8	92.8	30 05.3	+40.7	93.3	30 01.5	+41.5	93.9	29 57.1	+42.4	94.5	29 52.1	+43.2	95.1	29 46.5	+44.1	95.6	29 40.3	+44.9	96.2	29 33.5	+45.7	96.8	19
20	30 48.3	+39.3	91.9	30 46.0	+40.2	92.5	30 43.0	+41.2	93.1	30 39.5	+42.1	93.7	30 35.3	+43.0	94.3	30 30.6	+43.7	94.9	30 25.2	+44.6	95.4	30 19.2	+45.4	96.0	20
21	31 27.6	+39.0	91.0	31 26.2	+40.0	91.6	31 24.2	+40.9	92.2	31 21.6	+41.7	92.8	31 18.3	+42.6	93.5	31 14.3	+43.5	94.1	31 09.8	+44.3	94.7	31 04.6	+45.1	95.3	21
22	32 06.6	+38.6	90.1	32 06.2	+39.5	90.7	32 05.1	+40.4	91.4	32 03.3	+41.4	92.0	32 00.9	+42.2	92.6	31 57.8	+43.1	93.3	31 54.1	+44.0	93.9	31 49.7	+44.8	94.5	22
23	32 45.2	+38.3	89.2	32 45.7	+39.2	89.9	32 45.5	+40.1	90.5	32 44.7	+41.0	91.1	32 43.1	+42.0	91.8	32 40.9	+42.9	92.4	32 38.1	+43.6	93.1	32 34.5	+44.5	93.7	23
24	33 23.5	+37.8	88.3	33 24.9	+38.8	89.0	33 25.6	+39.8	89.6	33 25.7	+40.7	90.3	33 25.1	+41.6	90.9	33 23.8	+42.4	91.6	33 21.7	+43.4	92.3	33 19.0	+44.3	92.9	24
25	34 01.3	+37.3	87.4	34 03.7	+38.3	88.0	34 05.4	+39.3	88.7	34 06.4	+40.2	89.4	34 06.7	+41.2	90.1	34 06.2	+42.2	90.7	34 05.1	+43.0	91.4	34 03.3	+43.8	92.1	25
26	34 38.6	+37.0	86.4	34 42.0	+38.0	87.1	34 44.7	+38.9	87.8	34 46.6	+39.9	88.5	34 47.9	+40.8	89.2	34 48.4	+41.7	89.9	34 48.1	+42.7	90.6	34 47.1	+43.6	91.3	26
27	35 15.6	+36.4	85.5	35 20.0	+37.4	86.2	35 23.6	+38.5	86.9	35 26.5	+39.5	87.6	35 28.7	+40.4	88.3	35 30.1	+41.4	89.0	35 30.8	+42.3	89.7	35 30.7	+43.2	90.4	27
28	35 52.0	+36.0	84.5	35 57.4	+37.0	85.2	36 02.1	+38.0	85.9	36 06.0	+39.0	86.6	36 09.1	+40.0	87.4	36 11.5	+40.9	88.1	36 13.1	+41.9	88.8	36 13.9	+42.8	89.6	28
29	36 28.0	+35.5	83.5	36 34.4	+36.6	84.2	36 40.1	+37.5	85.0	36 45.0	+38.5	85.7	36 49.1	+39.5	86.4	36 52.4	+40.5	87.2	36 55.0	+41.4	87.9	36 56.7	+42.4	88.7	29
30	37 03.5	+35.0	82.5	37 11.0	+36.0	83.2	37 17.6	+37.1	84.0	37 23.5	+38.1	84.7	37 28.6	+39.1	85.5	37 32.9	+40.1	86.3	37 36.4	+41.1	87.0	37 39.1	+42.1	87.8	30
31	37 38.5	+34.4	81.5	37 47.0	+35.5	82.2	37 54.7	+36.6	83.0	38 01.6	+37.7	83.8	38 07.7	+38.7	84.5	38 13.0	+39.7	85.3	38 17.5	+40.6	86.1	38 21.2	+41.6	86.9	31
32	38 12.9	+33.9	80.4	38 22.5	+34.9	81.2	38 31.3	+36.0	82.0	38 39.2	+37.1	82.8	38 46.4	+38.1	83.6	38 52.7	+39.1	84.4	38 58.1	+40.2	85.2	39 02.8	+41.1	86.0	32
33	38 46.8	+33.3	79.4	38 57.4	+34.4	80.2	39 07.3	+35.5	81.0	39 16.3	+36.5	81.8	39 24.5	+37.6	82.6	39 31.8	+38.7	83.4	39 38.3	+39.7	84.2	39 43.9	+40.7	85.0	33
34	39 20.1	+32.7	78.3	39 31.8	+33.8	79.1	39 42.8	+34.9	79.9	39 52.8	+36.0	80.7	40 02.1	+37.0	81.6	40 10.5	+38.1	82.4	40 18.0	+39.1	83.2	40 24.6	+40.2	84.1	34
35	39 52.8	+32.0	77.2	40 05.6	+33.2	78.0	40 17.7	+34.3	78.8	40 28.8	+35.5	79.7	40 39.1	+36.5	80.5	40 48.6	+37.6	81.4	40 57.1	+38.7	82.2	41 04.8	+39.7	83.1	35
36	40 24.8	+31.5	76.1	40 38.8	+32.6	76.9	40 52.0	+33.7	77.8	41 04.3	+34.8	78.6	41 15.6	+36.0	79.5	41 26.2	+37.0	80.3	41 35.8	+38.1	81.2	41 44.5	+39.1	82.1	36
37	40 56.3	+30.7	75.0	41 11.4	+31.9	75.8	41 25.7	+33.0	76.7	41 39.1	+34.2	77.5	41 51.6	+35.3	78.4	42 03.2	+36.4	79.3	42 13.9	+37.5	80.2	42 23.6	+38.6	81.1	37
38	41 27.0	+30.1	73.8	41 43.3	+31.3	74.7	41 58.7	+32.4	75.6	42 13.3	+33.5	76.4	42 26.9	+34.7	77.3	42 39.6	+35.8	78.2	42 51.4	+36.9	79.1	43 02.2	+38.1	80.0	38
39	41 57.1	+29.4	72.7	42 14.6	+30.5	73.5	42 31.1	+31.7	74.4	42 46.8	+32.9	75.3	43 01.6	+34.0	76.2	43 15.4	+35.2	77.1	43 28.3	+36.3	78.0	43 40.3	+37.4	79.0	39
40	42 26.5	+28.6	71.5	42 45.1	+29.8	72.4	43 02.8	+31.0	73.3	43 19.7	+32.1	74.2	43 35.6	+33.3	75.1	43 50.6	+34.5	76.0	44 04.6	+35.7	76.9	44 17.7	+36.8	77.9	40
41	42 55.1	+27.9	70.3	43 14.9	+29.1	71.2	43 33.8	+30.3	72.1	43 51.8	+31.5	73.0	44 08.9	+32.7	73.9	44 25.1	+33.8	74.9	44 40.3	+34.9	75.8	44 54.5	+36.1	76.8	41
42	43 23.0	+27.1	69.1	43 44.0	+28.3	70.0	44 04.1	+29.5	70.9	44 23.3	+30.7	71.8	44 41.6	+31.8	72.7	44 58.9	+33.1	73.7	45 15.2	+34.3	74.7	45 30.6	+35.5	75.6	42
43	43 50.1	+26.3	67.9	44 12.3	+27.5	68.8	44 33.6	+28.7	69.7	44 54.0	+29.9	70.6	45 13.4	+31.2	71.5	45 32.0	+32.3	72.5	45 49.5	+33.5	73.5	46 06.1	+34.7	74.5	43
44	44 16.4	+25.5	66.6	44 39.8	+26.7	67.5	45 02.3	+27.9	68.4	45 23.9	+29.1	69.4	45 44.6	+30.3	70.3	46 04.3	+31.6	71.3	46 23.0	+32.8	72.3	46 40.8	+34.0	73.3	44
45	44 41.9	+24.6	65.3	45 06.5	+25.8	66.2	45 30.2	+27.1	67.2	45 53.0	+28.3	68.1	46 14.9	+29.5	69.1	46 35.9	+30.7	70.1	46 55.8	+32.0	71.1	47 14.8	+33.2	72.1	45
46	45 06.5	+23.7	64.0	45 32.3	+25.0	65.0	45 57.3	+26.1	65.9	46 21.3	+27.4	66.8	46 44.4	+28.7	67.8	47 06.6	+29.9	68.8	47 27.8	+31.1	69.8	47 48.0	+32.4	70.9	46
47	45 30.2	+22.8	62.7	45 57.3	+24.0	63.7	46 23.4	+25.3	64.6	46 48.7	+26.6	65.6	47 13.1	+27.8	66.5	47 36.5	+29.0	67.5	47 58.9	+30.3	68.6	48 20.4	+31.5	69.6	47
48	45 53.0	+21.9	61.4	46 21.3	+23.1	62.3	46 48.7	+24.4	63.3	47 15.3	+25.6	64.2	47 40.9	+26.9	65.2	48 05.5	+28.2	66.2	48 29.2	+29.4	67.3	48 51.9	+30.7	68.3	48
49	46 14.9	+21.0	60.1	46 44.4	+22.2	61.0	47 13.1	+23.4	61.9	47 40.9	+24.6	62.9	48 07.8	+25.9	63.9	48 33.7	+27.2	64.9	48 58.6	+28.5	65.9	49 22.6	+29.8	67.0	49
50	46 35.9	+19.9	58.7	47 06.6	+21.2	59.6	47 36.5	+22.4	60.6	48 05.5	+23.7	61.5	48 33.7	+24.9	62.5	49 00.9	+26.2	63.6	49 27.1	+27.5	64.6	49 52.4	+28.8	65.7	50
51	46 55.8	+19.0	57.3	47 27.8	+20.2	58.3	47 58.9	+21.5	59.2	48 29.2	+22.7	60.2	48 58.6	+24.0	61.2	49 27.1	+25.3	62.2	49 54.6	+26.6	63.2	50 21.2	+27.8	64.3	51
52	47 14.8	+17.9	55.9	47 48.0	+19.1	56.9	48 20.4	+20.4	57.8	48 51.9	+21.7	58.8	49 22.6	+22.9	59.8	49 52.4	+24.2	60.8	50 21.2	+25.5	61.8	50 49.0	+26.8	62.9	52
53	47 32.7	+16.9	54.5	48 07.1	+18.1	55.4	48 40.8	+19.3	56.4	49 13.6	+20.6	57.3	49 45.5	+21.9	58.3	50 16.6	+23.1	59.3	50 46.7	+24.4	60.4	51 15.8	+25.8	61.5	53
54	47 49.6	+15.8	53.1	48 25.2	+17.0	54.0	49 00.1	+18.2	54.9	49 34.1	+19.5	55.9	50 07.4	+20.7	56.9	50 39.7	+22.0	57.9	51 11.1	+23.4	58.9	51 41.6	+24.7	60.0	54
55	48 05.4	+14.7	51.7	48 42.2	+15.9	52.6	49 18.3	+17.2	53.5	49 53.6	+18.4	54.4	50 28.1	+19.7	55.4	51 01.7	+21.0	56.4	51 34.5	+22.2	57.5	52 06.3	+23.5	58.5	55
56	48 20.1	+13.6	50.2	48 58.1	+14.8	51.1	49 35.5	+16.0	52.0	50 12.0	+17.2	52.9	50 47.8	+18.4	53.9	51 22.7	+19.7	54.9	51 56.7	+21.1	56.0	52 29.8	+22.4	57.0	56
57	48 33.7	+12.5	48.7	49 12.9	+13.7	49.6	49 51.5	+14.8	50.5	50 29.2	+16.1	51.4	51 06.2	+17.3	52.4	51 42.4	+18.6	53.4	52 17.8	+19.8	54.4	52 52.2	+21.2	55.5	57
58	48 46.2	+11.3	47.3	49 26.6	+12.5	48.1	50 06.3	+13.6	49.0	50 45.3	+14.8	49.9	51 23.5	+16.1	50.9	52 01.0	+17.3	51.9	52 37.6	+18.6	52.9	53 13.4	+19.9	54.0	58
59	48 57.5	+10.2	45.8	49 39.1	+11.3	46.6	50 19.9	+12.5	47.5	51 00.1	+13.7	48.4	51 39.6	+14.9	49.3	52 18.3	+16.1	50.3	52 56.2	+17.4	51.3	53 33.3	+18.7	52.4	59
60	49 07.7	+9.0	44.3	49 50.4	+10.0	45.1	50 32.4	+11.2	45.9	51 13.8	+12.4	46.8	51 54.5	+13.6	47.8	52 34.4	+14.8	48.7	53 13.6	+16.1	49.7	53 52.0	+17.3	50.8	60
61	49 16.7	+7.8	42.8	50 00.4	+8.9	43.6	50 43.6	+10.0	44.4	51 26.2	+11.1	45.3	52 08.1	+12.3	46.2	52 49.2	+13.6	47.1	53 29.7	+14.7	48.1	54 09.3	+16.1	49.1	61
62	49 24.5	+6.6	41.2	50 09.3	+7.7	42.0	50 53.6	+8.7	42.8	51 37.3	+9.9	43.7	52 20.4	+11.0	44.6	53 02.8	+12.1	45.5	53 44.4	+13.4	46.5	54 25.4	+14.6	47.5	62
63	49 31.1	+5.3	39.7	50 17.0	+6.4	40.5	51 02.3	+7.5	41.3	51 47.2	+8.5	42.1	52 31.4	+9.6	43.0	53 14.9	+10.9	43.9	53 57.8	+12.1	44.8	54 40.0	+13.3	45.8	63
64	49 36.4	+4.2	38.2	50 23.4	+5.1	38.9	51 09.8	+6.2	39.7	51 55.7	+7.2	40.5	52 41.0	+8.4	41.3	53 25.8	+9.4	42.2	54 09.9	+10.6	43.2	54 53.3	+11.8	44.1	64
65	49 40.6	+2.9	36.6	50 28.5	+3.9	37.3	51 16.0	+4.9	38.1	52 02.9	+6.0	38.9	52 49.4	+7.0	39.7	53 35.2	+8.1	40.6	54 20.5	+9.2	41.5	55 05.1	+10.4	42.4	65
66	49 43.5	+1.7	35.1	50 32.4	+2.6	35.8	51 20.9	+3.5	36.5	52 08.9	+4.5	37.3	52 56.4	+5.6	38.1	53 43.3	+6.7	38.9	54 29.7	+7.8	39.8	55 15.5	+9.0	40.7	66
67	49 45.2	+0.5	33.5	50 35.0	+1.4	34.2	51 24.4	+2.3	34.9	52 13.4	+3.3	35.6	53 02.0	+4.2	36.4	53 50.0	+5.2	37.2	54 37.5	+6.3	38.1	55 24.5	+7.4	39.0	67
68	49 45.7	−0.8	32.0	50 36.4	0.0	32.6	51 26.7	+1.0	33.3	52 16.7	+1.8	34.0	53 06.2	+2.8	34.8	53 55.2	+3.9	35.5	54 43.8	+4.9	36.3	55 31.9	+6.0	37.2	68
69	49 44.9	−2.0	30.4	50 36.4	−1.2	31.1	51 27.7	−0.4	31.7	52 18.5	+0.6	32.4	53 09.0	+1.4	33.1	53 59.1	+2.4	33.8	54 48.7	+3.4	34.6	55 37.8	+4.4	35.4	69
70	49 42.9	−3.3	28.9	50 35.2	−2.4	29.5	51 27.3	−1.7	30.1	52 19.1	−0.9	30.7	53 10.4	+0.1	31.4	54 01.5	+0.9	32.1	54 52.1	+1.8	32.9	55 42.2	+2.9	33.7	70
71	49 39.6	−4.5	27.4	50 32.8	−3.8	27.9	51 25.6	−2.9	28.5	52 18.2	−2.2	29.1	53 10.5	−1.4	29.8	54 02.4	−0.5	30.4	54 53.9	+0.4	31.1	55 45.1	+1.3	31.9	71
72	49 35.1	−5.7	25.8	50 29.0	−5.0	26.3	51 22.7	−4.3	26.9	52 16.0	−3.5	27.5	53 09.1	−2.7	28.1	54 01.9	−1.9	28.7	54 54.3	−1.0	29.4	55 46.4	−0.2	30.1	72
73	49 29.4	−6.9	24.3	50 24.0	−6.2	24.8	51 18.4	−5.6	25.3	52 12.5	−4.9	25.8	53 06.4	−4.2	26.4	54 00.0	−3.4	27.0	54 53.3	−2.6	27.7	55 46.2	−1.7	28.3	73
74	49 22.5	−8.1	22.8	50 17.8	−7.6	23.2	51 12.8	−6.9	23.7	52 07.6	−6.2	24.2	53 02.2	−5.5	24.8	53 56.6	−4.8	25.3	54 50.7	−4.1	25.9	55 44.5	−3.3	26.6	74
75	49 14.4	−9.3	21.2	50 10.2	−8.7	21.7	51 05.9	−8.1	22.1	52 01.4	−7.5	22.6	52 56.7	−6.9	23.1	53 51.8	−6.3	23.6	54 46.6	−5.5	24.2	55 41.2	−4.8	24.8	75
76	49 05.1	−10.5	19.7	50 01.5	−10.0	20.1	50 57.8	−9.4	20.5	51 53.9	−8.9	21.0	52 49.8	−8.3	21.5	53 45.5	−7.6	22.0	54 41.1	−7.0	22.5	55 36.4	−6.3	23.0	76
77	48 54.6	−11.6	18.2	49 51.5	−11.1	18.6	50 48.4	−10.7	19.0	51 45.0	−10.1	19.4	52 41.5	−9.6	19.8	53 37.9	−9.0	20.3	54 34.1	−8.4	20.8	55 30.1	−7.8	21.3	77
78	48 43.0	−12.8	16.7	49 40.4	−12.4	17.1	50 37.7	−11.9	17.4	51 34.9	−11.4	17.8	52 31.9	−10.9	18.2	53 28.9	−10.4	18.6	54 25.7	−9.9	19.1	55 22.3	−9.3	19.5	78
79	48 30.2	−13.9	15.3	49 28.0	−13.5	15.6	50 25.8	−13.1	15.9	51 23.5	−12.7	16.2	52 21.0	−12.2	16.6	53 18.5	−11.8	17.0	54 15.8	−11.3	17.4	55 13.0	−10.8	17.8	79
80	48 16.3	−15.0	13.8	49 14.5	−14.6	14.1	50 12.7	−14.3	14.4	51 10.8	−13.9	14.7	52 08.8	−13.5	15.0	53 06.7	−13.1	15.3	54 04.5	−12.7	15.7	55 02.2	−12.2	16.1	80
81	48 01.3	−16.1	12.3	48 59.9	−15.8	12.5	49 58.4	−15.5	12.8	50 56.9	−15.2	13.1	51 55.3	−14.8	13.4	52 53.6	−14.4	13.7	53 51.8	−14.0	14.0	54 50.0	−13.6	14.4	81
82	47 45.2	−17.2	10.9	48 44.1	−16.9	11.1	49 42.9	−16.6	11.3	50 41.7	−16.3	11.6	51 40.5	−16.0	11.8	52 39.2	−15.7	12.1	53 37.8	−15.4	12.4	54 36.4	−15.0	12.7	82
83	47 28.0	−18.2	9.5	48 27.2	−18.0	9.7	49 26.3	−17.7	9.9	50 25.4	−17.5	10.1	51 24.5	−17.3	10.3	52 23.5	−17.0	10.5	53 22.4	−16.6	10.8	54 21.4	−16.4	11.0	83
84	47 09.8	−19.2	8.1	48 09.2	−19.0	8.2	49 08.6	−18.9	8.4	50 07.9	−18.6	8.6	51 07.2	−18.4	8.8	52 06.5	−18.2	8.9	53 05.8	−18.0	9.2	54 05.0	−17.7	9.4	84
85	46 50.6	−20.2	6.7	47 50.2	−20.1	6.8	48 49.7	−19.9	6.9	49 48.8	−19.8	7.1	50 48.8	−19.6	7.2	51 48.3	−19.4	7.4	52 47.8	−19.2	7.6	53 47.3	−19.0	7.7	85
86	46 30.4	−21.2	5.3	47 30.1	−21.1	5.4	48 29.8	−20.9	5.5	49 29.0	−20.8	5.6	50 29.2	−20.6	5.7	51 28.9	−20.5	5.9	52 28.6	−20.4	6.0	53 28.3	−20.3	6.1	86
87	46 09.2	−22.2	4.0	47 09.0	−22.0	4.0	48 08.9	−21.9	4.1	49 08.2	−21.8	4.2	50 08.6	−21.7	4.3	51 08.4	−21.7	4.4	52 08.2	−21.6	4.5	53 08.0	−21.5	4.6	87
88	45 47.0	−23.0	2.6	46 47.0	−23.1	2.7	47 46.9	−23.0	2.7	48 46.8	−22.9	2.8	49 46.8	−22.9	2.8	50 46.7	−22.8	2.9	51 46.6	−22.7	3.0	52 46.5	−22.7	3.0	88
89	45 24.0	−24.0	1.3	46 23.9	−23.9	1.3	47 23.9	−23.9	1.3	48 23.9	−23.9	1.4	49 23.9	−23.9	1.4	50 23.9	−23.9	1.4	51 23.9	−23.9	1.5	52 23.8	−23.8	1.5	89
90	45 00.0	−24.8	0.0	46 00.0	−24.9	0.0	47 00.0	−24.9	0.0	48 00.0	−24.9	0.0	49 00.0	−24.9	0.0	50 00.0	−24.9	0.0	51 00.0	−24.9	0.0	52 00.0	−25.0	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 66°, 294°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	16 42.9	−44.4	107.5	16 24.7	−45.0	107.8	16 06.3	−45.8	108.0	15 47.6	−46.4	108.3	15 28.6	−47.1	108.6	15 09.4	−47.7	108.8	14 49.9	−48.3	109.1	14 30.1	−48.9	109.3	0
1	15 58.5	−44.5	108.2	15 39.7	−45.2	108.4	15 20.5	−45.8	108.7	15 01.2	−46.5	109.0	14 41.5	−47.1	109.2	14 21.7	−47.8	109.5	14 01.6	−48.4	109.7	13 41.2	−48.9	109.9	1
2	15 14.0	−44.6	108.9	14 54.5	−45.3	109.1	14 34.7	−46.0	109.4	14 14.7	−46.7	109.6	13 54.4	−47.2	109.8	13 33.9	−47.9	110.1	13 13.2	−48.5	110.3	12 52.3	−49.1	110.5	2
3	14 29.4	−44.8	109.6	14 09.2	−45.5	109.8	13 48.7	−46.1	110.0	13 28.0	−46.7	110.3	13 07.2	−47.4	110.5	12 46.0	−47.9	110.7	12 24.7	−48.5	111.1	12 03.2	−49.1	111.1	3
4	13 44.6	−44.8	110.3	13 23.7	−45.5	110.5	13 02.6	−46.1	110.7	12 41.3	−46.8	110.9	12 19.8	−47.4	111.1	11 58.1	−48.0	111.3	11 36.2	−48.6	111.5	11 14.1	−49.2	111.7	4
5	12 59.8	−45.0	110.9	12 38.2	−45.6	111.1	12 16.5	−46.3	111.4	11 54.5	−46.9	111.6	11 32.4	−47.5	111.7	11 10.1	−48.1	111.9	10 47.6	−48.7	112.1	10 24.9	−49.2	112.3	5
6	12 14.8	−45.1	111.6	11 52.6	−45.7	111.8	11 30.2	−46.3	112.0	11 07.6	−46.9	112.2	10 44.9	−47.6	112.4	10 22.0	−48.2	112.5	9 58.9	−48.8	112.7	9 35.7	−49.4	112.9	6
7	11 29.7	−45.1	112.3	11 06.9	−45.8	112.5	10 43.9	−46.5	112.8	10 20.7	−47.1	113.0	9 57.3	−47.6	113.0	9 33.8	−48.2	113.1	9 10.1	−48.8	113.3	8 46.3	−49.3	113.4	7
8	10 44.6	−45.3	113.0	10 21.1	−45.9	113.1	9 57.4	−46.5	113.3	9 33.6	−47.1	113.5	9 09.7	−47.7	113.6	8 45.6	−48.3	113.7	8 21.3	−48.8	113.9	7 57.0	−49.4	114.0	8
9	9 59.3	−45.3	113.6	9 35.2	−46.0	113.8	9 10.9	−46.6	113.9	8 46.5	−47.2	114.1	8 22.0	−47.8	114.2	7 57.3	−48.4	114.3	7 32.5	−48.9	114.5	7 07.6	−49.5	114.6	9
10	9 14.0	−45.4	114.3	8 49.2	−46.0	114.4	8 24.3	−46.6	114.5	7 59.3	−47.2	114.7	7 34.2	−47.8	114.8	7 08.9	−48.3	114.9	6 43.6	−49.0	115.1	6 18.1	−49.5	115.2	10
11	8 28.6	−45.5	115.0	8 03.2	−46.1	115.1	7 37.7	−46.7	115.2	7 12.1	−47.3	115.3	6 46.4	−47.9	115.4	6 20.6	−48.5	115.5	5 54.6	−48.9	115.6	5 28.6	−49.5	115.7	11
12	7 43.1	−45.5	115.6	7 17.1	−46.1	115.7	6 51.0	−46.7	115.8	6 24.8	−47.3	115.9	5 58.5	−47.9	116.0	5 32.1	−48.4	116.1	5 05.7	−49.0	116.2	4 39.1	−49.5	116.3	12
13	6 57.6	−45.6	116.3	6 31.0	−46.2	116.4	6 04.3	−46.8	116.5	5 37.5	−47.4	116.6	5 10.6	−47.9	116.6	4 43.7	−48.5	116.7	4 16.7	−49.1	116.8	3 49.6	−49.6	116.9	13
14	6 12.0	−45.6	116.9	5 44.8	−46.2	117.0	5 17.5	−46.8	117.1	4 50.1	−47.4	117.2	4 22.7	−48.0	117.3	3 55.2	−48.5	117.3	3 27.6	−49.0	117.4	3 00.0	−49.6	117.4	14
15	5 26.4	−45.7	117.6	4 58.6	−46.3	117.7	4 30.7	−46.9	117.7	4 02.7	−47.4	117.8	3 34.7	−48.0	117.9	3 06.7	−48.6	117.9	2 38.6	−49.1	118.0	2 10.4	−49.6	118.0	15
16	4 40.7	−45.7	118.2	4 12.3	−46.3	118.3	3 43.8	−46.9	118.4	3 15.3	−47.5	118.4	2 46.7	−48.0	118.5	2 18.1	−48.5	118.5	1 49.5	−49.1	118.5	1 20.8	−49.6	118.6	16
17	3 55.0	−45.8	118.9	3 26.0	−46.3	118.9	2 56.9	−46.9	119.0	2 27.8	−47.4	119.0	1 58.7	−48.0	119.1	1 29.6	−48.6	119.1	1 00.4	−49.1	119.1	0 31.2	−49.6	119.1	17
18	3 09.2	−45.7	119.5	2 39.7	−46.4	119.6	2 10.0	−46.9	119.6	1 40.4	−47.5	119.6	1 10.7	−48.0	119.7	0 41.0	−48.6	119.7	0 11.3	−49.1	119.7	0 18.4	+49.6	60.3	18
19	2 23.5	−45.8	120.2	1 53.3	−46.3	120.2	1 23.1	−46.9	120.2	0 52.9	−47.5	120.3	0 22.7	−48.1	120.3	0 07.6	+48.5	59.7	0 37.8	+49.1	59.7	1 08.0	+49.6	59.8	19
20	1 37.7	−45.8	120.8	1 07.0	−46.4	120.8	0 36.2	−46.9	120.9	0 05.4	−47.5	120.9	0 25.4	+48.0	59.1	0 56.1	+48.6	59.2	1 26.9	+49.0	59.2	1 57.6	+49.6	59.2	20
21	0 51.9	−45.8	121.5	0 20.6	−46.4	121.5	0 10.7	+47.0	58.5	0 42.1	+47.4	58.5	1 13.4	+48.0	58.5	1 44.7	+48.5	58.6	2 16.0	+49.0	58.6	2 47.2	+49.6	58.6	21
22	0 06.1	−45.8	122.1	0 25.8	+46.4	57.9	0 57.7	+46.9	57.9	1 29.5	+47.5	57.9	2 01.4	+48.0	57.9	2 33.2	+48.6	58.0	3 05.0	+49.1	58.0	3 36.8	+49.5	58.1	22
23	0 39.7	+45.8	57.2	1 12.2	+46.3	57.3	1 44.6	+46.9	57.3	2 17.0	+47.5	57.3	2 49.4	+48.0	57.3	3 21.8	+48.5	57.4	3 54.1	+49.0	57.4	4 26.3	+49.6	57.5	23
24	1 25.5	+45.8	56.6	1 58.5	+46.4	56.6	2 31.5	+46.9	56.7	3 04.5	+47.4	56.7	3 37.4	+48.0	56.7	4 10.3	+48.5	56.8	4 43.1	+49.0	56.9	5 15.9	+49.5	56.9	24
25	2 11.3	+45.7	56.0	2 44.9	+46.3	56.0	3 18.4	+46.9	56.0	3 51.9	+47.4	56.1	4 25.4	+47.9	56.1	4 58.8	+48.4	56.2	5 32.1	+49.0	56.3	6 05.4	+49.4	56.4	25
26	2 57.0	+45.8	55.3	3 31.2	+46.3	55.4	4 05.3	+46.8	55.4	4 39.3	+47.4	55.5	5 13.3	+47.9	55.5	5 47.2	+48.4	55.6	6 21.1	+48.9	55.7	6 54.8	+49.4	55.8	26
27	3 42.8	+45.7	54.7	4 17.5	+46.2	54.7	4 52.1	+46.8	54.8	5 26.7	+47.3	54.9	6 01.2	+47.8	54.9	6 35.6	+48.4	55.0	7 10.0	+48.9	55.1	7 44.2	+49.4	55.2	27
28	4 28.5	+45.7	54.0	5 03.7	+46.3	54.1	5 38.9	+46.8	54.1	6 14.0	+47.3	54.2	6 49.0	+47.9	54.3	7 24.0	+48.3	54.4	7 58.9	+48.8	54.5	8 33.6	+49.3	54.7	28
29	5 14.2	+45.6	53.4	5 50.0	+46.1	53.4	6 25.7	+46.7	53.5	7 01.3	+47.3	53.6	7 36.9	+47.7	53.7	8 12.3	+48.3	53.8	8 47.7	+48.8	54.0	9 22.9	+49.3	54.1	29
30	5 59.8	+45.6	52.7	6 36.1	+46.2	52.8	7 12.4	+46.7	52.9	7 48.6	+47.1	53.0	8 24.6	+47.7	53.1	9 00.6	+48.2	53.2	9 36.5	+48.7	53.4	10 12.2	+49.2	53.5	30
31	6 45.4	+45.6	52.0	7 22.3	+46.1	52.1	7 59.1	+46.6	52.3	8 35.7	+47.2	52.4	9 12.3	+47.7	52.5	9 48.8	+48.2	52.6	10 25.2	+48.6	52.8	11 01.4	+49.1	52.9	31
32	7 31.0	+45.5	51.4	8 08.4	+46.0	51.5	8 45.7	+46.5	51.6	9 22.9	+47.0	51.7	10 00.0	+47.5	51.9	10 37.0	+48.0	52.0	11 13.8	+48.6	52.2	11 50.5	+49.1	52.3	32
33	8 16.5	+45.4	50.7	8 54.4	+45.9	50.9	9 32.2	+46.5	51.0	10 09.9	+47.0	51.1	10 47.5	+47.5	51.3	11 25.0	+48.0	51.4	12 02.4	+48.5	51.6	12 39.6	+49.0	51.7	33
34	9 01.9	+45.3	50.1	9 40.3	+45.9	50.2	10 18.7	+46.4	50.3	10 56.9	+46.9	50.5	11 35.0	+47.5	50.6	12 13.0	+48.0	50.8	12 50.9	+48.4	51.0	13 28.6	+49.0	51.2	34
35	9 47.2	+45.3	49.4	10 26.2	+45.8	49.5	11 05.1	+46.3	49.7	11 43.8	+46.9	49.8	12 22.5	+47.3	50.0	13 01.0	+47.8	50.2	13 39.3	+48.3	50.4	14 17.5	+48.8	50.6	35
36	10 32.5	+45.2	48.7	11 12.0	+45.7	48.9	11 51.4	+46.2	49.0	12 30.7	+46.7	49.2	13 09.8	+47.2	49.4	13 48.8	+47.7	49.6	14 27.6	+48.3	49.8	15 06.3	+48.7	50.0	36
37	11 17.7	+45.1	48.1	11 57.7	+45.6	48.2	12 37.6	+46.1	48.4	13 17.4	+46.6	48.6	13 57.0	+47.2	48.7	14 36.5	+47.7	48.9	15 15.9	+48.1	49.1	15 55.0	+48.7	49.3	37
38	12 02.8	+45.0	47.4	12 43.3	+45.5	47.6	13 23.7	+46.1	47.7	14 04.0	+46.6	47.9	14 44.2	+47.0	48.1	15 24.2	+47.5	48.3	16 04.0	+48.0	48.5	16 43.7	+48.5	48.7	38
39	12 47.8	+44.9	46.7	13 28.8	+45.5	46.9	14 09.8	+45.9	47.1	14 50.6	+46.4	47.3	15 31.2	+46.9	47.5	16 11.7	+47.4	47.7	16 52.0	+47.9	47.9	17 32.2	+48.4	48.1	39
40	13 32.7	+44.8	46.0	14 14.3	+45.2	46.2	14 55.7	+45.8	46.4	15 37.0	+46.3	46.6	16 18.1	+46.8	46.8	16 59.1	+47.3	47.0	17 39.9	+47.8	47.3	18 20.6	+48.2	47.5	40
41	14 17.5	+44.6	45.4	14 59.5	+45.2	45.5	15 41.5	+45.7	45.7	16 23.3	+46.2	45.9	17 04.9	+46.7	46.2	17 46.4	+47.2	46.4	18 27.7	+47.7	46.6	19 08.8	+48.2	46.9	41
42	15 02.1	+44.6	44.7	15 44.7	+45.1	44.9	16 27.2	+45.5	45.1	17 09.5	+46.0	45.3	17 51.6	+46.6	45.5	18 33.6	+47.0	45.7	19 15.4	+47.6	46.0	19 57.0	+48.0	46.2	42
43	15 46.7	+44.4	44.0	16 29.8	+44.9	44.2	17 12.7	+45.4	44.4	17 55.5	+45.9	44.6	18 38.2	+46.4	44.8	19 20.6	+46.9	45.1	20 02.9	+47.4	45.3	20 45.0	+47.8	45.6	43
44	16 31.1	+44.2	43.3	17 14.7	+44.7	43.5	17 58.1	+45.3	43.7	18 41.4	+45.8	43.9	19 24.6	+46.2	44.2	20 07.5	+46.7	44.4	20 50.3	+47.2	44.7	21 32.8	+47.7	45.0	44
45	17 15.3	+44.1	42.6	17 59.4	+44.7	42.8	18 43.4	+45.1	43.0	19 27.2	+45.6	43.2	20 10.8	+46.1	43.5	20 54.2	+46.6	43.7	21 37.5	+47.1	44.0	22 20.5	+47.6	44.3	45
46	17 59.4	+44.0	41.9	18 44.1	+44.4	42.1	19 28.5	+45.0	42.3	20 12.8	+45.4	42.6	20 56.9	+45.9	42.8	21 40.8	+46.4	43.1	22 24.6	+46.9	43.3	23 08.1	+47.4	43.6	46
47	18 43.4	+43.8	41.1	19 28.5	+44.3	41.4	20 13.5	+44.7	41.6	20 58.2	+45.3	41.9	21 42.8	+45.8	42.1	22 27.2	+46.3	42.4	23 11.5	+46.7	42.7	23 55.5	+47.2	43.0	47
48	19 27.2	+43.6	40.4	20 12.8	+44.1	40.6	20 58.2	+44.6	40.9	21 43.5	+45.1	41.1	22 28.6	+45.6	41.4	23 13.5	+46.1	41.7	23 58.2	+46.5	42.0	24 42.7	+47.0	42.3	48
49	20 10.8	+43.4	39.7	20 56.9	+43.9	39.9	21 42.8	+44.4	40.2	22 28.6	+44.9	40.4	23 14.2	+45.4	40.7	23 59.6	+45.8	41.0	24 44.7	+46.4	41.3	25 29.7	+46.8	41.6	49
50	20 54.2	+43.3	38.9	21 40.8	+43.8	39.2	22 27.2	+44.3	39.4	23 13.5	+44.7	39.7	23 59.6	+45.0	40.0	24 45.4	+45.7	40.3	25 31.1	+46.0	40.6	26 16.5	+46.7	40.9	50
51	21 37.5	+43.0	38.2	22 24.6	+43.5	38.5	23 11.5	+44.0	38.7	23 58.2	+44.5	39.0	24 44.7	+45.0	39.3	25 31.1	+45.4	39.6	26 17.2	+45.9	39.9	27 03.2	+46.4	40.2	51
52	22 20.5	+42.9	37.5	23 08.1	+43.3	37.7	23 55.5	+43.8	38.0	24 42.7	+44.3	38.3	25 29.7	+44.8	38.5	26 16.5	+45.3	38.8	27 03.2	+45.7	39.2	27 49.6	+46.2	39.5	52
53	23 03.4	+42.6	36.7	23 51.4	+43.1	37.0	24 39.3	+43.5	37.2	25 27.0	+44.0	37.5	26 14.5	+44.5	37.8	27 01.8	+45.0	38.1	27 48.9	+45.4	38.4	28 35.8	+45.9	38.8	53
54	23 46.0	+42.4	35.9	24 34.5	+42.9	36.2	25 22.8	+43.4	36.5	26 11.0	+43.8	36.8	26 59.0	+44.3	37.1	27 46.8	+44.7	37.4	28 34.3	+45.3	37.7	29 21.7	+45.7	38.0	54
55	24 28.4	+42.1	35.1	25 17.4	+42.6	35.4	26 06.2	+43.1	35.7	26 54.8	+43.6	36.0	27 43.3	+44.0	36.3	28 31.5	+44.5	36.6	29 19.6	+45.0	36.9	30 07.4	+45.5	37.3	55
56	25 10.5	+41.9	34.4	26 00.0	+42.3	34.6	26 49.3	+42.8	34.9	27 38.4	+43.3	35.2	28 27.3	+43.8	35.5	29 16.0	+44.3	35.9	30 04.6	+44.7	36.2	30 52.9	+45.2	36.5	56
57	25 52.4	+41.7	33.6	26 42.3	+42.1	33.8	27 32.1	+42.5	34.1	28 21.7	+43.0	34.4	29 11.1	+43.4	34.7	30 00.3	+43.9	35.1	30 49.3	+44.4	35.4	31 38.1	+44.9	35.8	57
58	26 34.1	+41.3	32.8	27 24.4	+41.8	33.0	28 14.6	+42.3	33.3	29 04.7	+42.7	33.6	29 54.5	+43.2	34.0	30 44.2	+43.7	34.3	31 33.7	+44.1	34.6	32 23.0	+44.6	35.0	58
59	27 15.4	+41.1	32.0	28 06.2	+41.6	32.2	28 56.9	+42.0	32.5	29 47.4	+42.5	32.8	30 37.7	+42.9	33.1	31 27.9	+43.3	33.5	32 17.8	+43.9	33.8	33 07.6	+44.3	34.2	59
60	27 56.5	+40.8	31.1	28 47.8	+41.2	31.4	29 38.9	+41.7	31.7	30 29.9	+42.1	32.0	31 20.6	+42.6	32.3	32 11.2	+43.1	32.7	33 01.7	+43.5	33.0	33 51.9	+43.9	33.4	60
61	28 37.3	+40.4	30.3	29 29.0	+40.9	30.6	30 20.6	+41.3	30.9	31 12.0	+41.8	31.2	32 03.2	+42.3	31.5	32 54.3	+42.7	31.8	33 45.2	+43.1	32.2	34 35.8	+43.7	32.6	61
62	29 17.7	+40.2	29.5	30 09.9	+40.6	29.7	31 01.9	+41.1	30.0	31 53.8	+41.5	30.3	32 45.5	+41.9	30.7	33 37.0	+42.4	31.0	34 28.3	+42.9	31.3	35 19.5	+43.3	31.7	62
63	29 57.9	+39.8	28.6	30 50.5	+40.2	28.9	31 43.0	+40.6	29.2	32 35.3	+41.1	29.5	33 27.4	+41.6	29.8	34 19.4	+42.0	30.1	35 11.2	+42.4	30.5	36 02.8	+42.9	30.9	63
64	30 37.7	+39.5	27.7	31 30.7	+39.9	28.0	32 23.6	+40.3	28.3	33 16.4	+40.7	28.6	34 09.0	+41.1	28.9	35 01.4	+41.6	29.3	35 53.6	+42.1	29.6	36 45.7	+42.5	30.0	64
65	31 17.2	+39.1	26.9	32 10.6	+39.5	27.1	33 03.9	+40.0	27.4	33 57.1	+40.4	27.7	34 50.1	+40.8	28.1	35 43.0	+41.2	28.4	36 35.7	+41.7	28.7	37 28.2	+42.2	29.1	65
66	31 56.3	+38.7	26.0	32 50.1	+39.2	26.2	33 43.9	+39.5	26.5	34 37.5	+39.9	26.8	35 30.9	+40.4	27.2	36 24.2	+40.9	27.5	37 17.4	+41.3	27.8	38 10.4	+41.7	28.2	66
67	32 35.0	+38.3	25.1	33 29.3	+38.7	25.3	34 23.4	+39.2	25.6	35 17.4	+39.6	25.9	36 11.3	+40.0	26.2	37 05.1	+40.4	26.6	37 58.7	+40.8	26.9	38 52.1	+41.2	27.3	67
68	33 13.3	+37.9	24.1	34 08.0	+38.3	24.4	35 02.6	+38.7	24.7	35 57.0	+39.1	25.0	36 51.3	+39.5	25.3	37 45.5	+39.9	25.6	38 39.5	+40.4	26.0	39 33.3	+40.8	26.4	68
69	33 51.2	+37.5	23.2	34 46.3	+37.9	23.5	35 41.3	+38.2	23.8	36 36.1	+38.7	24.1	37 30.8	+39.1	24.4	38 25.4	+39.5	24.7	39 19.9	+39.9	25.0	40 14.1	+40.4	25.4	69
70	34 28.7	+37.1	22.3	35 24.2	+37.4	22.5	36 19.5	+37.8	22.8	37 14.8	+38.2	23.1	38 09.9	+38.6	23.4	39 04.9	+39.0	23.7	39 59.8	+39.4	24.1	40 54.5	+39.8	24.4	70
71	35 05.8	+36.5	21.3	36 01.6	+37.0	21.6	36 57.3	+37.4	21.9	37 53.0	+37.7	22.1	38 48.5	+38.1	22.4	39 43.9	+38.5	22.8	40 39.2	+38.8	23.1	41 34.3	+39.3	23.4	71
72	35 42.3	+36.2	20.3	36 38.6	+36.4	20.6	37 34.7	+36.8	20.9	38 30.7	+37.2	21.1	39 26.6	+37.6	21.4	40 22.4	+37.9	21.7	41 18.0	+38.4	22.1	42 13.6	+38.7	22.4	72
73	36 18.5	+35.6	19.4	37 15.0	+36.0	19.6	38 11.5	+36.3	19.9	39 07.9	+36.7	20.1	40 04.2	+37.0	20.4	41 00.3	+37.4	20.7	41 56.4	+37.8	21.0	42 52.3	+38.2	21.4	73
74	36 54.1	+35.1	18.4	37 51.0	+35.4	18.6	38 47.8	+35.8	18.8	39 44.6	+36.1	19.1	40 41.2	+36.5	19.4	41 37.7	+36.9	19.7	42 34.2	+37.2	20.0	43 30.5	+37.6	20.3	74
75	37 29.2	+34.6	17.3	38 26.4	+34.9	17.6	39 23.6	+35.2	17.8	40 20.7	+35.5	18.1	41 17.7	+35.9	18.3	42 14.6	+36.2	18.6	43 11.4	+36.6	18.9	44 08.1	+36.9	19.2	75
76	38 03.8	+34.0	16.3	39 01.3	+34.3	16.5	39 58.8	+34.6	16.8	40 56.2	+35.0	17.0	41 53.6	+35.2	17.3	42 50.8	+35.6	17.5	43 48.0	+35.9	17.8	44 45.0	+36.3	18.1	76
77	38 37.8	+33.4	15.3	39 35.6	+33.8	15.5	40 33.4	+34.1	15.7	41 31.2	+34.3	15.9	42 28.8	+34.7	16.2	43 26.4	+35.0	16.4	44 23.9	+35.3	16.7	45 21.3	+35.7	17.0	77
78	39 11.2	+32.9	14.2	40 09.4	+33.1	14.4	41 07.5	+33.4	14.6	42 05.5	+33.7	14.8	43 03.5	+34.0	15.1	44 01.4	+34.3	15.3	44 59.2	+34.6	15.6	45 57.0	+34.9	15.9	78
79	39 44.1	+32.2	13.1	40 42.5	+32.5	13.3	41 40.9	+32.7	13.5	42 39.2	+33.0	13.7	43 37.5	+33.3	13.9	44 35.7	+33.6	14.2	45 33.8	+33.9	14.4	46 31.9	+34.2	14.7	79
80	40 16.3	+31.6	12.0	41 15.0	+31.9	12.2	42 13.6	+32.1	12.4	43 12.2	+32.4	12.6	44 10.8	+32.6	12.8	45 09.3	+32.8	13.0	46 07.7	+33.1	13.2	47 06.1	+33.4	13.5	80
81	40 47.9	+31.0	10.9	41 46.9	+31.1	11.0	42 45.7	+31.4	11.2	43 44.6	+31.6	11.4	44 43.4	+31.8	11.6	45 42.1	+32.1	11.8	46 40.8	+32.4	12.0	47 39.5	+32.6	12.2	81
82	41 18.9	+30.3	9.7	42 18.0	+30.5	9.9	43 17.1	+30.7	10.1	44 16.2	+30.8	10.2	45 15.2	+31.1	10.4	46 14.2	+31.3	10.6	47 13.2	+31.5	10.8	48 12.1	+31.8	11.0	82
83	41 49.2	+29.5	8.6	42 48.5	+29.7	8.7	43 47.8	+29.9	8.9	44 47.0	+30.1	9.0	45 46.3	+30.3	9.2	46 45.5	+30.5	9.4	47 44.7	+30.7	9.5	48 43.9	+30.9	9.7	83
84	42 18.7	+28.9	7.4	43 18.2	+29.0	7.5	44 17.7	+29.1	7.7	45 17.1	+29.4	7.8	46 16.6	+29.5	7.9	47 16.0	+29.6	8.1	48 15.4	+29.8	8.2	49 14.8	+30.0	8.4	84
85	42 47.6	+28.1	6.2	43 47.2	+28.2	6.3	44 46.8	+28.4	6.4	45 46.5	+28.4	6.6	46 46.1	+28.6	6.7	47 45.6	+28.8	6.8	48 45.2	+28.9	6.9	49 44.8	+29.0	7.1	85
86	43 15.7	+27.3	5.0	44 15.4	+27.4	5.1	45 15.2	+27.5	5.2	46 14.9	+27.7	5.3	47 14.7	+27.7	5.4	48 14.4	+27.8	5.5	49 14.1	+28.0	5.6	50 13.8	+28.1	5.7	86
87	43 43.0	+26.5	3.8	44 42.8	+26.6	3.9	45 42.7	+26.7	3.9	46 42.6	+26.7	4.0	47 42.4	+26.8	4.1	48 42.2	+27.0	4.2	49 42.1	+27.0	4.2	50 41.9	+27.1	4.3	87
88	44 09.5	+25.7	2.5	45 09.4	+25.7	2.6	46 09.4	+25.7	2.6	47 09.3	+25.8	2.7	48 09.2	+25.9	2.7	49 09.2	+25.9	2.8	50 09.1	+26.0	2.9	51 09.0	+26.0	2.9	88
89	44 35.2	+24.8	1.3	45 35.1	+24.9	1.3	46 35.1	+24.9	1.3	47 35.1	+24.9	1.4	48 35.1	+24.9	1.4	49 35.1	+24.9	1.4	50 35.1	+24.9	1.4	51 35.0	+25.0	1.5	89
90	45 00.0	+24.0	0.0	46 00.0	+23.9	0.0	47 00.0	+23.9	0.0	48 00.0	+23.9	0.0	49 00.0	+23.9	0.0	50 00.0	+23.9	0.0	51 00.0	+23.9	0.0	52 00.0	+23.8	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 114°, 246°**

	45°			46°			47°			48°			49°			50°			51°			52°		
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 02.3	+44.1	106.7	15 44.9	+44.8	107.0	15 27.3	+45.5	107.2	15 09.4	+46.1	107.5	14 51.2	+46.8	107.8	14 32.8	+47.4	108.0	14 14.1	+48.0	108.3	13 55.2	+48.6	108.5	0
1	16 46.4	+43.9	106.0	16 29.7	+44.7	106.3	16 12.8	+45.3	106.6	15 55.5	+46.0	106.8	15 38.0	+46.7	107.1	15 20.2	+47.3	107.4	15 02.1	+48.0	107.6	14 43.8	+48.6	107.9	1
2	17 30.3	+43.8	105.3	17 14.4	+44.5	105.6	16 58.1	+45.2	105.9	16 41.5	+45.9	106.2	16 24.7	+46.5	106.5	16 07.5	+47.2	106.7	15 50.1	+47.8	107.0	15 32.4	+48.5	107.3	2
3	18 14.1	+43.6	104.6	17 58.9	+44.3	104.9	17 43.3	+45.0	105.2	17 27.4	+45.7	105.5	17 11.2	+46.4	105.8	16 54.7	+47.1	106.1	16 37.9	+47.8	106.4	16 20.9	+48.3	106.7	3
4	18 57.7	+43.5	103.8	18 43.2	+44.2	104.2	18 28.3	+44.9	104.5	18 13.1	+45.7	104.8	17 57.6	+46.3	105.1	17 41.8	+47.0	105.4	17 25.7	+47.6	105.8	17 09.2	+48.3	106.1	4
5	19 41.2	+43.2	103.1	19 27.4	+44.0	103.5	19 13.2	+44.8	103.8	18 58.8	+45.4	104.1	18 43.9	+46.2	104.5	18 28.8	+46.8	104.8	18 13.3	+47.5	105.1	17 57.5	+48.1	105.4	5
6	20 24.4	+43.1	102.4	20 11.4	+43.8	102.7	19 58.0	+44.5	103.1	19 44.2	+45.3	103.4	19 30.1	+46.0	103.8	19 15.6	+46.7	104.1	19 00.8	+47.3	104.5	18 45.6	+48.0	104.8	6
7	21 07.5	+42.9	101.6	20 55.2	+43.7	102.0	20 42.5	+44.4	102.4	20 29.5	+45.1	102.7	20 16.1	+45.8	103.1	20 02.3	+46.5	103.5	19 48.1	+47.2	103.8	19 33.6	+47.9	104.2	7
8	21 50.4	+42.6	100.9	21 38.9	+43.4	101.3	21 26.9	+44.2	101.7	21 14.6	+44.9	102.0	21 01.9	+45.7	102.4	20 48.8	+46.4	102.8	20 35.3	+47.1	103.2	20 21.5	+47.7	103.5	8
9	22 33.0	+42.5	100.1	22 22.3	+43.2	100.5	22 11.1	+44.0	100.9	21 59.5	+44.8	101.3	21 47.6	+45.4	101.7	21 35.2	+46.2	102.1	21 22.4	+46.9	102.5	21 09.2	+47.6	102.9	9
10	23 15.5	+42.2	99.4	23 05.5	+43.1	99.8	22 55.1	+43.8	100.2	22 44.3	+44.6	100.6	22 33.0	+45.3	101.0	22 21.4	+46.0	101.4	22 09.3	+46.7	101.8	21 56.8	+47.4	102.2	10
11	23 57.7	+42.0	98.6	23 48.6	+42.8	99.0	23 38.9	+43.6	99.4	23 28.9	+44.3	99.9	23 18.3	+45.2	100.3	23 07.4	+45.8	100.7	22 56.0	+46.6	101.1	22 44.2	+47.3	101.6	11
12	24 39.7	+41.8	97.8	24 31.4	+42.5	98.2	24 22.5	+43.4	98.7	24 13.2	+44.2	99.1	24 03.5	+44.9	99.6	23 53.2	+45.7	100.0	23 42.6	+46.3	100.5	23 31.5	+47.0	100.9	12
13	25 21.5	+41.5	97.0	25 13.9	+42.3	97.5	25 05.9	+43.1	97.9	24 57.4	+43.9	98.4	24 48.4	+44.6	98.9	24 38.9	+45.4	99.3	24 28.9	+46.2	99.8	24 18.5	+46.9	100.2	13
14	26 03.0	+41.2	96.2	25 56.2	+42.1	96.7	25 49.0	+42.9	97.2	25 41.3	+43.6	97.6	25 33.0	+44.5	98.1	25 24.3	+45.2	98.6	25 15.1	+46.0	99.1	25 05.4	+46.7	99.5	14
15	26 44.2	+40.9	95.4	26 38.3	+41.8	95.9	26 31.9	+42.6	96.4	26 24.9	+43.5	96.9	26 17.5	+44.2	97.4	26 09.5	+45.1	97.9	26 01.1	+45.8	98.3	25 52.1	+46.5	98.8	15
16	27 25.1	+40.7	94.6	27 20.1	+41.5	95.1	27 14.5	+42.3	95.6	27 08.4	+43.2	96.1	27 01.7	+44.0	96.6	26 54.6	+44.7	97.1	26 46.9	+45.5	97.6	26 38.6	+46.3	98.1	16
17	28 05.8	+40.3	93.7	28 01.6	+41.2	94.3	27 56.8	+42.1	94.8	27 51.6	+42.9	95.3	27 45.7	+43.7	95.8	27 39.3	+44.5	96.4	27 32.4	+45.3	96.9	27 24.9	+46.1	97.4	17
18	28 46.1	+40.0	92.9	28 42.8	+40.9	93.4	28 38.9	+41.8	94.0	28 34.5	+42.6	94.5	28 29.4	+43.5	95.1	28 23.8	+44.3	95.6	28 17.7	+45.1	96.1	28 11.0	+45.8	96.7	18
19	29 26.1	+39.7	92.0	29 23.7	+40.6	92.6	29 20.7	+41.5	93.2	29 17.1	+42.3	93.7	29 12.9	+43.2	94.3	29 08.1	+44.0	94.8	29 02.8	+44.8	95.4	28 56.8	+45.6	95.9	19
20	30 05.8	+39.4	91.2	30 04.3	+40.3	91.8	30 02.2	+41.1	92.3	29 59.4	+42.0	92.9	29 56.1	+42.9	93.5	29 52.1	+43.7	94.1	29 47.6	+44.5	94.6	29 42.4	+45.4	95.2	20
21	30 45.2	+39.0	90.3	30 44.6	+39.9	90.9	30 43.3	+40.8	91.5	30 41.4	+41.8	92.1	30 39.0	+42.5	92.7	30 35.8	+43.5	93.3	30 32.1	+44.3	93.9	30 27.8	+45.0	94.4	21
22	31 24.2	+38.6	89.4	31 24.5	+39.5	90.0	31 24.1	+40.5	90.6	31 23.2	+41.3	91.2	31 21.5	+42.3	91.9	31 19.3	+43.1	92.5	31 16.4	+43.9	93.1	31 12.8	+44.8	93.7	22
23	32 02.8	+38.3	88.5	32 04.0	+39.2	89.1	32 04.6	+40.1	89.8	32 04.5	+41.1	90.4	32 03.8	+41.9	91.0	32 02.4	+42.8	91.6	32 00.3	+43.7	92.3	31 57.6	+44.5	92.9	23
24	32 41.1	+37.8	87.6	32 43.2	+38.8	88.2	32 44.7	+39.8	88.9	32 45.6	+40.6	89.5	32 45.7	+41.6	90.2	32 45.2	+42.5	90.8	32 44.0	+43.3	91.5	32 42.1	+44.2	92.1	24
25	33 18.9	+37.4	86.7	33 22.0	+38.4	87.3	33 24.5	+39.3	88.0	33 26.2	+40.3	88.7	33 27.3	+41.2	89.3	33 27.7	+42.1	90.0	33 27.3	+43.1	90.6	33 26.3	+43.9	91.3	25
26	33 56.3	+37.0	85.7	34 00.4	+38.0	86.4	34 03.8	+39.0	87.1	34 06.5	+39.9	87.8	34 08.5	+40.8	88.4	34 09.8	+41.7	89.1	34 10.4	+42.6	89.8	34 10.2	+43.6	90.5	26
27	34 33.3	+36.5	84.8	34 38.4	+37.5	85.5	34 42.8	+38.5	86.2	34 46.4	+39.5	86.9	34 49.3	+40.5	87.5	34 51.5	+41.4	88.2	34 53.0	+42.3	88.9	34 53.8	+43.2	89.6	27
28	35 09.8	+36.1	83.8	35 15.9	+37.1	84.5	35 21.3	+38.1	85.2	35 25.9	+39.1	85.9	35 29.8	+40.0	86.6	35 32.9	+41.0	87.4	35 35.3	+41.9	88.1	35 37.0	+42.8	88.8	28
29	35 45.9	+35.6	82.8	35 53.0	+36.6	83.6	35 59.4	+37.6	84.3	36 05.0	+38.6	85.0	36 09.8	+39.6	85.7	36 13.9	+40.6	86.5	36 17.2	+41.5	87.2	36 19.8	+42.4	87.9	29
30	36 21.5	+35.0	81.8	36 29.6	+36.1	82.6	36 37.0	+37.1	83.3	36 43.6	+38.1	84.0	36 49.4	+39.2	84.8	36 54.5	+40.1	85.5	36 58.7	+41.2	86.3	37 02.2	+42.1	87.0	30
31	36 56.5	+34.6	80.8	37 05.7	+35.6	81.6	37 14.1	+36.7	82.3	37 21.7	+37.7	83.1	37 28.6	+38.7	83.8	37 34.6	+39.7	84.6	37 39.9	+40.6	85.4	37 44.3	+41.6	86.1	31
32	37 31.1	+34.0	79.8	37 41.3	+35.1	80.6	37 50.8	+36.1	81.3	37 59.4	+37.2	82.1	38 07.3	+38.2	82.9	38 14.3	+39.2	83.7	38 20.5	+40.2	84.4	38 25.9	+41.2	85.2	32
33	38 05.1	+33.5	78.8	38 16.4	+34.5	79.5	38 26.9	+35.6	80.3	38 36.6	+36.7	81.1	38 45.5	+37.7	81.9	38 53.5	+38.8	82.7	39 00.7	+39.8	83.5	39 07.1	+40.8	84.3	33
34	38 38.6	+32.8	77.7	38 50.9	+34.0	78.5	39 02.5	+35.1	79.3	39 13.3	+36.1	80.1	39 23.2	+37.2	80.9	39 32.3	+38.2	81.7	39 40.5	+39.3	82.5	39 47.9	+40.2	83.3	34
35	39 11.4	+32.3	76.6	39 24.9	+33.4	77.4	39 37.6	+34.4	78.2	39 49.4	+35.5	79.0	40 00.4	+36.6	79.9	40 10.5	+37.7	80.7	40 19.8	+38.7	81.5	40 28.1	+39.8	82.4	35
36	39 43.7	+31.6	75.5	39 58.3	+32.7	76.3	40 12.0	+33.9	77.2	40 24.9	+35.0	78.0	40 37.0	+36.1	78.8	40 48.2	+37.1	79.7	40 58.5	+38.2	80.5	41 07.9	+39.3	81.4	36
37	40 15.3	+31.0	74.4	40 31.0	+32.2	75.2	40 45.9	+33.3	76.1	40 59.9	+34.4	76.9	41 13.1	+35.4	77.8	41 25.3	+36.6	78.6	41 36.7	+37.6	79.5	41 47.2	+38.7	80.4	37
38	40 46.3	+30.4	73.3	41 03.2	+31.4	74.1	41 19.2	+32.6	75.0	41 34.3	+33.7	75.8	41 48.5	+34.9	76.7	42 01.9	+36.0	77.6	42 14.3	+37.1	78.5	42 25.9	+38.2	79.3	38
39	41 16.7	+29.6	72.2	41 34.6	+30.8	73.0	41 51.8	+31.9	73.9	42 08.0	+33.1	74.7	42 23.4	+34.2	75.6	42 37.9	+35.3	76.5	42 51.4	+36.5	77.4	43 04.1	+37.5	78.3	39
40	41 46.3	+29.0	71.0	42 05.4	+30.1	71.8	42 23.7	+31.3	72.7	42 41.1	+32.4	73.6	42 57.6	+33.6	74.5	43 13.2	+34.7	75.4	43 27.9	+35.8	76.3	43 41.6	+37.0	77.2	40
41	42 15.3	+28.1	69.8	42 35.5	+29.4	70.7	43 13.5	+31.7	72.4	43 13.5	+31.7	72.4	43 31.2	+32.8	73.3	43 47.9	+34.0	74.3	44 03.7	+35.2	75.2	44 18.6	+36.3	76.1	41
42	42 43.4	+27.5	68.6	43 04.9	+28.6	69.5	43 25.5	+29.8	70.4	43 45.2	+31.0	71.3	44 04.0	+32.2	72.2	44 21.9	+33.3	73.1	44 38.9	+34.5	74.1	44 54.9	+35.6	75.0	42
43	43 10.9	+26.6	67.4	43 33.5	+27.9	68.3	43 55.3	+29.0	69.2	44 16.2	+30.2	70.1	44 36.2	+31.4	71.0	44 55.2	+32.6	71.9	45 13.4	+33.7	72.9	45 30.5	+35.0	73.9	43
44	43 37.5	+25.9	66.2	44 01.4	+27.0	67.1	44 24.3	+28.3	68.0	44 46.4	+29.4	68.9	45 07.6	+30.6	69.8	45 27.8	+31.9	70.8	45 47.1	+33.1	71.7	46 05.5	+34.2	72.7	44
45	44 03.4	+25.0	64.9	44 28.4	+26.2	65.8	44 52.6	+27.4	66.7	45 15.8	+28.7	67.6	45 38.2	+29.8	68.6	45 59.7	+31.0	69.5	46 20.2	+32.2	70.5	46 39.7	+33.4	71.5	45
46	44 28.4	+24.2	63.6	44 54.6	+25.4	64.5	45 20.0	+26.5	65.5	45 44.5	+27.7	66.4	46 08.0	+29.1	67.3	46 30.7	+30.2	68.3	46 52.4	+31.5	69.3	47 13.1	+32.7	70.3	46
47	44 52.6	+23.2	62.4	45 20.0	+24.5	63.3	45 46.5	+25.7	64.2	46 12.2	+27.0	65.1	46 37.1	+28.1	66.1	47 00.9	+29.4	67.0	47 23.9	+30.6	68.0	47 45.8	+31.9	69.1	47
48	45 15.8	+22.4	61.1	45 44.5	+23.5	62.0	46 12.2	+24.9	62.9	46 39.2	+26.0	63.8	47 05.2	+27.3	64.8	47 30.3	+28.5	65.8	47 54.5	+29.7	66.8	48 17.7	+31.0	67.8	48
49	45 38.2	+21.5	59.7	46 08.0	+22.7	60.6	46 37.1	+23.8	61.5	47 05.2	+25.1	62.5	47 32.5	+26.3	63.5	47 58.8	+27.6	64.4	48 24.2	+28.9	65.5	48 48.7	+30.1	66.5	49
50	45 59.7	+20.5	58.4	46 30.7	+21.7	59.3	47 00.9	+23.0	60.2	47 30.3	+24.2	61.2	47 58.8	+25.4	62.1	48 26.4	+26.7	63.1	48 53.1	+27.9	64.1	49 18.8	+29.2	65.2	50
51	46 20.2	+19.5	57.0	46 52.4	+20.7	57.9	47 23.9	+21.9	58.8	47 54.5	+23.2	59.8	48 24.2	+24.5	60.8	48 53.1	+25.7	61.8	49 21.0	+27.0	62.8	49 48.0	+28.2	63.8	51
52	46 39.7	+18.5	55.7	47 13.1	+19.8	56.6	47 45.8	+20.9	57.5	48 17.7	+22.1	58.4	48 48.7	+23.4	59.4	49 18.8	+24.6	60.4	49 48.0	+25.9	61.4	50 16.2	+27.2	62.5	52
53	46 58.2	+17.5	54.3	47 32.9	+18.6	55.2	48 06.7	+19.9	56.1	48 39.8	+21.2	57.0	49 12.1	+22.4	58.0	49 43.4	+23.7	59.0	50 13.9	+24.9	60.0	50 43.4	+26.3	61.1	53
54	47 15.7	+16.5	52.9	47 51.5	+17.7	53.7	48 26.6	+18.9	54.7	49 01.0	+20.0	55.6	49 34.5	+21.3	56.6	50 07.1	+22.6	57.5	50 38.8	+23.9	58.6	51 09.7	+25.1	59.6	54
55	47 32.2	+15.4	51.4	48 09.2	+16.6	52.3	48 45.5	+17.8	53.2	49 21.0	+19.0	54.1	49 55.8	+20.2	55.1	50 29.7	+21.5	56.1	51 02.7	+22.8	57.1	51 34.8	+24.1	58.2	55
56	47 47.6	+14.3	50.0	48 25.8	+15.4	50.9	49 03.3	+16.6	51.8	49 40.0	+17.9	52.7	50 16.0	+19.1	53.6	50 51.2	+20.3	54.6	51 25.5	+21.6	55.6	51 58.9	+22.9	56.7	56
57	48 01.9	+13.2	48.6	48 41.2	+14.4	49.4	49 19.9	+15.6	50.3	49 57.9	+16.7	51.2	50 35.1	+17.9	52.1	51 11.5	+19.2	53.1	51 47.1	+20.5	54.1	52 21.8	+21.8	55.2	57
58	48 15.1	+12.1	47.1	48 55.6	+13.2	47.9	49 35.5	+14.3	48.8	50 14.6	+15.6	49.7	50 53.0	+16.8	50.6	51 30.7	+18.0	51.6	52 07.6	+19.2	52.6	52 43.6	+20.5	53.7	58
59	48 27.2	+10.9	45.6	49 08.8	+12.1	46.5	49 49.8	+13.2	47.3	50 30.2	+14.3	48.2	51 09.8	+15.6	49.1	51 48.7	+16.8	50.1	52 26.8	+18.1	51.1	53 04.1	+19.3	52.1	59
60	48 38.1	+9.8	44.1	49 20.9	+10.9	44.9	50 03.0	+12.0	45.8	50 44.5	+13.2	46.7	51 25.4	+14.3	47.6	52 05.5	+15.5	48.5	52 44.9	+16.7	49.5	53 23.4	+18.1	50.5	60
61	48 47.9	+8.6	42.6	49 31.8	+9.7	43.4	50 15.0	+10.8	44.3	50 57.7	+11.9	45.1	51 39.7	+13.1	46.0	52 21.0	+14.3	46.9	53 01.6	+15.5	47.9	53 41.5	+16.7	48.9	61
62	48 56.5	+7.5	41.1	49 41.5	+8.4	41.9	50 25.8	+9.6	42.7	51 09.6	+10.7	43.6	51 52.8	+11.8	44.4	52 35.3	+12.9	45.3	53 17.1	+14.2	46.3	53 58.2	+15.4	47.3	62
63	49 04.0	+6.2	39.6	49 49.9	+7.3	40.4	50 35.4	+8.3	41.2	51 20.3	+9.4	42.0	52 04.6	+10.5	42.8	52 48.2	+11.7	43.7	53 31.3	+12.8	44.7	54 13.6	+14.0	45.6	63
64	49 10.2	+5.1	38.1	49 57.2	+6.1	38.8	50 43.7	+7.1	39.6	51 29.7	+8.1	40.4	52 15.1	+9.2	41.2	52 59.9	+10.3	42.1	53 44.1	+11.4	43.0	54 27.6	+12.7	44.0	64
65	49 15.3	+3.8	36.6	50 03.3	+4.8	37.3	50 50.8	+5.7	38.0	51 37.8	+6.8	38.8	52 24.3	+7.8	39.6	53 10.2	+8.9	40.5	53 55.5	+10.1	41.4	54 40.3	+11.2	42.3	65
66	49 19.1	+2.7	35.1	50 08.1	+3.5	35.7	50 56.5	+4.5	36.5	51 44.6	+5.4	37.2	52 32.1	+6.5	38.0	53 19.1	+7.6	38.8	54 05.6	+8.6	39.7	54 51.5	+9.8	40.6	66
67	49 21.8	+1.4	33.5	50 11.6	+2.3	34.2	51 01.0	+3.3	34.9	51 50.0	+4.2	35.6	52 38.6	+5.2	36.4	53 26.7	+6.1	37.1	54 14.2	+7.3	38.0	55 01.3	+8.3	38.9	67
68	49 23.2	+0.2	32.0	50 13.9	+1.0	32.6	51 04.3	+1.9	33.3	51 54.2	+2.8	34.0	52 43.8	+3.7	34.7	53 32.8	+4.8	35.5	54 21.5	+5.7	36.3	55 09.6	+6.8	37.1	68
69	49 23.4	−1.0	30.5	50 14.9	−0.2	31.1	51 06.2	+0.6	31.7	51 57.0	+1.5	32.4	52 47.5	+2.4	33.1	53 37.6	+3.3	33.8	54 27.2	+4.4	34.6	55 16.4	+5.3	35.4	69
70	49 22.4	−2.3	28.9	50 14.7	−1.4	29.5	51 06.8	−0.7	30.1	51 58.5	+0.2	30.7	52 49.9	+1.1	31.4	53 40.9	+2.0	32.1	54 31.6	+2.8	32.9	55 21.7	+3.9	33.6	70
71	49 20.1	−3.5	27.4	50 13.3	−2.8	27.9	51 06.1	−2.0	28.5	51 58.7	−1.2	29.1	52 51.0	−0.4	29.8	53 42.9	+0.5	30.4	54 34.4	+1.4	31.1	55 25.6	+2.3	31.9	71
72	49 16.6	−4.6	25.8	50 10.5	−4.0	26.4	51 04.1	−3.2	26.9	51 57.5	−2.5	27.5	52 50.6	−1.7	28.1	53 43.4	−1.0	28.7	54 35.8	−0.1	29.4	55 27.9	+0.8	30.1	72
73	49 12.0	−5.9	24.3	50 06.5	−5.2	24.8	51 00.9	−4.6	25.3	51 55.0	−3.9	25.9	52 48.9	−3.2	26.4	53 42.4	−2.3	27.0	54 35.7	−1.5	27.7	55 28.7	−0.7	28.4	73
74	49 06.1	−7.1	22.8	50 01.3	−6.5	23.3	50 56.3	−5.8	23.7	51 51.1	−5.1	24.3	52 45.7	−4.5	24.8	53 40.1	−3.8	25.4	54 34.2	−3.1	26.0	55 28.0	−2.3	26.6	74
75	48 59.0	−8.2	21.3	49 54.8	−7.7	21.7	50 50.5	−7.1	22.2	51 46.0	−6.5	22.6	52 41.2	−5.8	23.1	53 36.3	−5.2	23.7	54 31.1	−4.5	24.2	55 25.7	−3.7	24.8	75
76	48 50.8	−9.5	19.8	49 47.1	−8.9	20.2	50 43.4	−8.4	20.6	51 39.5	−7.8	21.0	52 35.4	−7.2	21.5	53 31.1	−6.6	22.0	54 26.6	−5.9	22.5	55 22.0	−5.3	23.1	76
77	48 41.3	−10.6	18.3	49 38.2	−10.1	18.6	50 35.0	−9.6	19.0	51 31.7	−9.1	19.4	52 28.2	−8.6	19.9	53 24.5	−8.0	20.3	54 20.7	−7.4	20.8	55 16.7	−6.8	21.3	77
78	48 30.7	−11.7	16.8	49 28.1	−11.3	17.1	50 25.4	−10.8	17.5	51 22.6	−10.4	17.9	52 19.6	−9.8	18.2	53 16.5	−9.3	18.7	54 13.3	−8.8	19.1	55 09.9	−8.2	19.6	78
79	48 19.0	−12.8	15.3	49 16.8	−12.4	15.6	50 14.6	−12.1	15.9	51 12.2	−11.6	16.3	52 09.8	−11.2	16.6	53 07.2	−10.7	17.0	54 04.5	−10.2	17.4	55 01.7	−9.7	17.8	79
80	48 06.2	−14.0	13.8	49 04.4	−13.6	14.1	50 02.5	−13.2	14.4	51 00.6	−12.9	14.7	51 58.6	−12.5	15.0	52 56.5	−12.1	15.4	53 54.3	−11.6	15.7	54 52.0	−11.2	16.1	80
81	47 52.2	−15.1	12.4	48 50.8	−14.8	12.6	49 49.3	−14.4	12.9	50 47.7	−14.1	13.2	51 46.1	−13.7	13.5	52 44.4	−13.3	13.8	53 42.7	−13.0	14.1	54 40.8	−12.5	14.4	81
82	47 37.1	−16.1	11.0	48 36.0	−15.8	11.2	49 34.9	−15.6	11.4	50 33.6	−15.2	11.6	51 32.4	−15.0	11.9	52 31.1	−14.7	12.2	53 29.7	−14.3	12.4	54 28.3	−14.0	12.7	82
83	47 21.0	−17.2	9.5	48 20.2	−17.0	9.7	49 19.3	−16.7	9.9	50 18.4	−16.5	10.1	51 17.4	−16.2	10.3	52 16.4	−15.9	10.6	53 15.4	−15.7	10.8	54 14.3	−15.3	11.1	83
84	47 03.8	−18.2	8.1	48 03.2	−18.0	8.3	49 02.6	−17.8	8.4	50 01.9	−17.6	8.6	51 01.2	−17.4	8.8	52 00.5	−17.2	9.0	52 59.7	−16.9	9.2	53 59.0	−16.7	9.4	84
85	46 45.6	−19.2	6.7	47 45.2	−19.0	6.9	48 44.8	−18.9	7.0	49 44.3	−18.7	7.1	50 43.8	−18.5	7.3	51 43.3	−18.3	7.4	52 42.8	−18.1	7.6	53 42.3	−18.0	7.8	85
86	46 26.4	−20.2	5.3	47 26.2	−20.1	5.4	48 25.9	−20.0	5.6	49 25.6	−19.8	5.7	50 25.3	−19.7	5.8	51 25.0	−19.6	5.9	52 24.7	−19.4	6.0	53 24.3	−19.2	6.2	86
87	46 06.2	−21.1	4.0	47 06.1	−21.1	4.1	48 05.9	−21.0	4.1	49 05.8	−20.9	4.2	50 05.6	−20.8	4.3	51 05.4	−20.7	4.4	52 05.3	−20.6	4.5	53 05.1	−20.5	4.6	87
88	45 45.1	−22.1	2.6	46 45.0	−22.0	2.7	47 44.9	−21.9	2.7	48 44.9	−22.0	2.8	49 44.8	−21.9	2.8	50 44.7	−21.8	2.9	51 44.7	−21.8	3.0	52 44.6	−21.7	3.0	88
89	45 23.0	−23.0	1.3	46 23.0	−23.0	1.3	47 23.0	−23.0	1.4	48 22.9	−22.9	1.4	49 22.9	−22.9	1.4	50 22.9	−22.9	1.4	51 22.9	−22.9	1.5	52 22.9	−22.9	1.5	89
90	45 00.0	−23.9	0.0	46 00.0	−23.9	0.0	47 00.0	−23.9	0.0	48 00.0	−23.9	0.0	49 00.0	−23.9	0.0	50 00.0	−24.0	0.0	51 00.0	−24.0	0.0	52 00.0	−24.0	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

67°, 293° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	16 02.3	−44.2	106.7	15 44.9	−44.9	107.0	15 27.3	−45.6	107.2	15 09.4	−46.3	107.5	14 51.2	−46.9	107.8	14 32.8	−47.6	108.0	14 14.1	−48.2	108.3	13 55.2	−48.8	108.5	0
1	15 18.1	−44.3	107.4	15 00.0	−45.0	107.7	14 41.7	−45.7	107.9	14 23.1	−46.3	108.2	14 04.3	−47.0	108.4	13 45.2	−47.6	108.6	13 25.9	−48.2	108.9	13 06.4	−48.8	109.1	1
2	14 33.8	−44.5	108.1	14 15.0	−45.1	108.4	13 56.0	−45.8	108.6	13 36.8	−46.5	108.8	13 17.3	−47.1	109.0	12 57.6	−47.7	109.3	12 37.7	−48.3	109.5	12 17.6	−48.9	109.7	2
3	13 49.3	−44.6	108.8	13 29.9	−45.3	109.0	13 10.2	−45.9	109.3	12 50.3	−46.6	109.5	12 30.2	−47.2	109.7	12 09.9	−47.8	109.9	11 49.4	−48.4	110.1	11 28.7	−49.0	110.3	3
4	13 04.7	−44.7	109.5	12 44.6	−45.3	109.7	12 24.3	−46.0	109.9	12 03.7	−46.6	110.1	11 43.0	−47.3	110.3	11 22.1	−47.9	110.5	11 01.0	−48.5	110.7	10 39.7	−49.1	110.9	4
5	12 20.0	−44.8	110.2	11 59.2	−45.4	110.4	11 38.3	−46.1	110.6	11 17.1	−46.7	110.8	10 55.7	−47.3	110.9	10 34.2	−48.0	111.1	10 12.5	−48.5	111.3	9 50.6	−49.1	111.5	5
6	11 35.2	−44.8	110.9	11 13.8	−45.5	111.0	10 52.2	−46.2	111.2	10 30.4	−46.8	111.4	10 08.4	−47.4	111.6	9 46.2	−48.0	111.7	9 24.0	−48.6	111.9	9 01.5	−49.1	112.0	6
7	10 50.4	−45.0	111.5	10 28.3	−45.7	111.7	10 06.0	−46.3	111.9	9 43.6	−46.9	112.1	9 21.0	−47.5	112.2	8 58.2	−48.0	112.3	8 35.4	−48.7	112.5	8 12.4	−49.3	112.6	7
8	10 05.4	−45.1	112.2	9 42.6	−45.7	112.4	9 19.7	−46.3	112.5	8 56.7	−47.0	112.7	8 33.5	−47.6	112.8	8 10.2	−48.2	112.9	7 46.7	−48.7	113.1	7 23.1	−49.2	113.2	8
9	9 20.3	−45.1	112.9	8 56.9	−45.7	113.0	8 33.4	−46.4	113.2	8 09.7	−47.0	113.3	7 45.9	−47.5	113.4	7 22.0	−48.1	113.5	6 58.0	−48.7	113.7	6 33.9	−49.3	113.8	9
10	8 35.2	−45.2	113.5	8 11.2	−45.9	113.7	7 47.0	−46.4	113.8	7 22.7	−47.0	113.9	6 58.4	−47.7	114.0	6 33.9	−48.3	114.1	6 09.3	−48.8	114.2	5 44.6	−49.4	114.3	10
11	7 50.0	−45.3	114.2	7 25.3	−45.8	114.3	7 00.6	−46.5	114.4	6 35.7	−47.1	114.5	6 10.7	−47.7	114.7	5 45.6	−48.2	114.7	5 20.5	−48.8	114.8	4 55.2	−49.3	114.9	11
12	7 04.7	−45.3	114.9	6 39.5	−46.0	115.0	6 14.1	−46.6	115.1	5 48.6	−47.1	115.2	5 23.0	−47.7	115.3	4 57.4	−48.3	115.3	4 31.7	−48.9	115.4	4 05.9	−49.4	115.5	12
13	6 19.4	−45.4	115.5	5 53.5	−46.0	115.6	5 27.5	−46.6	115.7	5 01.5	−47.2	115.8	4 35.3	−47.7	115.9	4 09.1	−48.3	115.9	3 42.8	−48.8	116.0	3 16.5	−49.4	116.1	13
14	5 34.0	−45.4	116.2	5 07.5	−46.0	116.3	4 40.9	−46.6	116.3	4 14.3	−47.2	116.4	3 47.6	−47.8	116.5	3 20.8	−48.3	116.5	2 54.0	−48.9	116.6	2 27.1	−49.4	116.6	14
15	4 48.6	−45.4	116.8	4 21.5	−46.0	116.9	3 54.3	−46.6	117.0	3 27.1	−47.2	117.0	2 59.8	−47.8	117.1	2 32.5	−48.4	117.1	2 05.1	−48.9	117.2	1 37.7	−49.5	117.2	15
16	4 03.2	−45.5	117.5	3 35.5	−46.1	117.6	3 07.7	−46.7	117.6	2 39.9	−47.3	117.6	2 12.0	−47.8	117.7	1 44.1	−48.4	117.7	1 16.2	−48.9	117.7	0 48.2	−49.4	117.8	16
17	3 17.7	−45.5	118.1	2 49.4	−46.1	118.2	2 21.0	−46.7	118.2	1 52.6	−47.2	118.3	1 24.2	−47.8	118.3	0 55.7	−48.3	118.3	0 27.3	−48.9	118.3	0 01.2	+49.4	61.7	17
18	2 32.2	−45.5	118.8	2 03.3	−46.1	118.8	1 34.3	−46.7	118.9	1 05.4	−47.3	118.9	0 36.4	−47.9	118.9	0 07.4	−48.4	118.9	0 21.6	+48.9	61.1	0 50.6	+49.4	61.1	18
19	1 46.7	−45.5	119.5	1 17.2	−46.2	119.5	0 47.6	−46.7	119.5	0 18.1	−46.7	119.5	0 11.5	+47.8	60.5	0 41.0	+48.4	60.5	1 10.5	+48.9	60.5	1 40.0	+49.5	60.5	19
20	1 01.1	−45.5	120.1	0 31.0	−46.1	120.1	0 00.9	−46.7	120.1	0 29.2	+47.2	59.9	0 59.3	+47.8	59.9	1 29.4	+48.3	59.9	1 59.4	+48.9	59.9	2 29.5	+49.4	60.0	20
21	0 15.6	−45.6	120.8	0 15.1	+46.1	59.2	0 45.8	+46.7	59.3	1 16.4	+47.2	59.3	1 47.1	+47.8	59.3	2 17.7	+48.4	59.3	2 48.3	+48.9	59.4	3 18.9	+49.4	59.4	21
22	0 30.0	+45.5	58.6	1 01.2	+46.1	58.6	1 32.5	+46.7	58.6	2 03.7	+47.2	58.7	2 34.9	+47.8	58.7	3 06.1	+48.3	58.7	3 37.2	+48.8	58.8	4 08.3	+49.3	58.8	22
23	1 15.5	+45.5	57.9	1 47.3	+46.2	58.0	2 19.2	+46.6	58.0	2 50.9	+47.3	58.0	3 22.7	+47.7	58.1	3 54.4	+48.3	58.1	4 26.0	+48.8	58.2	4 57.6	+49.3	58.3	23
24	2 01.0	+45.6	57.3	2 33.5	+46.0	57.3	3 05.8	+46.7	57.4	3 38.2	+47.2	57.4	4 10.4	+47.8	57.5	4 42.7	+48.2	57.5	5 14.8	+48.8	57.6	5 46.9	+49.3	57.7	24
25	2 46.6	+45.5	56.7	3 19.5	+46.1	56.7	3 52.5	+46.6	56.7	4 25.4	+47.1	56.8	4 58.2	+47.7	56.9	5 30.9	+48.3	56.9	6 03.6	+48.7	57.1	6 36.2	+49.3	57.1	25
26	3 32.1	+45.4	56.0	4 05.6	+46.0	56.0	4 39.1	+46.6	56.1	5 12.5	+47.1	56.2	5 45.9	+47.6	56.3	6 19.2	+48.2	56.3	6 52.4	+48.7	56.4	7 25.5	+49.2	56.5	26
27	4 17.5	+45.5	55.3	4 51.6	+46.0	55.4	5 25.7	+46.5	55.5	5 59.6	+47.1	55.6	6 33.5	+47.7	55.6	7 07.4	+48.1	55.7	7 41.1	+48.6	55.9	8 14.7	+49.2	56.0	27
28	5 03.0	+45.4	54.7	5 37.6	+46.0	54.8	6 12.2	+46.5	54.8	6 46.7	+47.1	54.9	7 21.2	+47.5	55.0	7 55.5	+48.1	55.1	8 29.7	+48.6	55.3	9 03.9	+49.1	55.4	28
29	5 48.4	+45.3	54.0	6 23.6	+45.9	54.1	6 58.7	+46.5	54.2	7 33.8	+47.0	54.3	8 08.7	+47.5	54.4	8 43.6	+48.0	54.5	9 18.3	+48.6	54.7	9 53.0	+49.0	54.8	29
30	6 33.7	+45.3	53.4	7 09.5	+45.8	53.5	7 45.2	+46.4	53.6	8 20.8	+46.9	53.7	8 56.2	+47.5	53.8	9 31.6	+48.0	53.9	10 06.9	+48.5	54.1	10 42.0	+49.0	54.2	30
31	7 19.0	+45.3	52.7	7 55.3	+45.8	52.8	8 31.6	+46.3	52.9	9 07.7	+46.8	53.0	9 43.7	+47.4	53.2	10 19.6	+47.9	53.3	10 55.4	+48.4	53.5	11 31.0	+48.9	53.6	31
32	8 04.3	+45.2	52.0	8 41.1	+45.8	52.2	9 17.9	+46.2	52.3	9 54.5	+46.8	52.4	10 31.1	+47.3	52.6	11 07.5	+47.8	52.7	11 43.8	+48.3	52.9	12 19.9	+48.9	53.0	32
33	8 49.5	+45.1	51.4	9 26.9	+45.6	51.5	10 04.1	+46.2	51.6	10 41.3	+46.7	51.8	11 18.4	+47.2	51.9	11 55.3	+47.8	52.1	12 32.1	+48.3	52.3	13 08.8	+48.7	52.4	33
34	9 34.6	+45.0	50.7	10 12.5	+45.6	50.8	10 50.3	+46.1	51.0	11 28.0	+46.7	51.1	12 05.6	+47.2	51.3	12 43.1	+47.6	51.5	13 20.4	+48.1	51.7	13 57.5	+48.7	51.8	34
35	10 19.6	+44.9	50.0	10 58.1	+45.5	50.2	11 36.4	+46.0	50.3	12 14.7	+46.5	50.5	12 52.8	+47.0	50.7	13 30.7	+47.6	50.9	14 08.5	+48.1	51.0	14 46.2	+48.5	51.2	35
36	11 04.5	+44.9	49.4	11 43.6	+45.3	49.5	12 22.4	+46.0	49.7	13 01.2	+46.4	49.8	13 39.8	+47.0	50.0	14 18.3	+47.4	50.2	14 56.6	+48.0	50.4	15 34.7	+48.5	50.6	36
37	11 49.4	+44.8	48.7	12 28.9	+45.3	48.8	13 08.4	+45.8	49.0	13 47.6	+46.4	49.2	14 26.8	+46.8	49.4	15 05.7	+47.4	49.6	15 44.6	+47.8	49.8	16 23.2	+48.4	50.0	37
38	12 34.2	+44.6	48.0	13 14.2	+45.2	48.2	13 54.2	+45.7	48.4	14 34.0	+46.2	48.5	15 13.6	+46.8	48.7	15 53.1	+47.3	49.0	16 32.4	+47.8	49.2	17 11.6	+48.2	49.4	38
39	13 18.8	+44.6	47.3	13 59.4	+45.1	47.5	14 39.9	+45.6	47.7	15 20.2	+46.1	47.9	16 00.4	+46.6	48.1	16 40.4	+47.1	48.3	17 20.2	+47.6	48.5	17 59.8	+48.1	48.8	39
40	14 03.4	+44.4	46.6	14 44.5	+44.9	46.8	15 25.5	+45.4	47.0	16 06.3	+46.0	47.2	16 47.0	+46.5	47.4	17 27.5	+47.0	47.7	18 07.8	+47.5	47.9	18 47.9	+48.0	48.1	40
41	14 47.8	+44.3	45.9	15 29.4	+44.9	46.1	16 10.9	+45.4	46.3	16 52.3	+45.8	46.5	17 33.5	+46.3	46.8	18 14.5	+46.8	47.0	18 55.3	+47.4	47.3	19 35.9	+47.9	47.5	41
42	15 32.1	+44.2	45.2	16 14.3	+44.7	45.4	16 56.3	+45.2	45.7	17 38.1	+45.8	45.9	18 19.8	+46.3	46.1	19 01.3	+46.8	46.4	19 42.7	+47.2	46.6	20 23.8	+47.7	46.9	42
43	16 16.3	+44.0	44.5	16 59.0	+44.5	44.7	17 41.5	+45.0	45.0	18 23.9	+45.5	45.2	19 06.1	+46.0	45.4	19 48.1	+46.5	45.7	20 29.9	+47.1	45.9	21 11.5	+47.6	46.2	43
44	17 00.3	+43.9	43.8	17 43.5	+44.4	44.0	18 26.5	+45.0	44.3	19 09.4	+45.4	44.5	19 52.1	+45.9	44.8	20 34.6	+46.5	45.0	21 17.0	+46.9	45.3	21 59.1	+47.4	45.6	44
45	17 44.2	+43.7	43.1	18 27.9	+44.2	43.3	19 11.5	+44.7	43.6	19 54.8	+45.3	43.8	20 38.0	+45.8	44.1	21 21.1	+46.2	44.3	22 03.9	+46.7	44.6	22 46.5	+47.2	44.9	45
46	18 27.9	+43.6	42.4	19 12.1	+44.1	42.6	19 56.2	+44.6	42.9	20 40.1	+45.1	43.1	21 23.8	+45.6	43.4	22 07.3	+46.1	43.6	22 50.6	+46.6	43.9	23 33.7	+47.1	44.2	46
47	19 11.5	+43.3	41.7	19 56.2	+43.9	41.9	20 40.8	+44.4	42.1	21 25.2	+44.9	42.4	22 09.4	+45.4	42.7	22 53.4	+45.9	42.9	23 37.2	+46.4	43.2	24 20.8	+46.9	43.6	47
48	19 54.8	+43.2	40.9	20 40.1	+43.7	41.2	21 25.2	+44.2	41.4	22 10.1	+44.7	41.7	22 54.8	+45.2	42.0	23 39.3	+45.7	42.3	24 23.6	+46.2	42.6	25 07.7	+46.7	42.9	48
49	20 38.0	+43.1	40.2	21 23.8	+43.5	40.4	22 09.4	+44.0	40.7	22 54.8	+44.5	41.0	23 40.0	+45.0	41.3	24 25.0	+45.5	41.5	25 09.8	+46.0	41.9	25 54.4	+46.5	42.2	49
50	21 21.1	+42.8	39.4	22 07.3	+43.3	39.7	22 53.4	+43.8	40.0	23 39.3	+44.3	40.2	24 25.0	+44.8	40.5	25 10.5	+45.3	40.8	25 55.8	+45.8	41.1	26 40.9	+46.2	41.5	50
51	22 03.9	+42.6	38.7	22 50.6	+43.1	38.9	23 37.2	+43.6	39.2	24 23.6	+44.1	39.5	25 09.8	+44.6	39.8	25 55.8	+45.1	40.1	26 41.6	+45.5	40.4	27 27.1	+46.1	40.8	51
52	22 46.5	+42.4	37.9	23 33.7	+42.9	38.2	24 20.8	+43.4	38.5	25 07.7	+43.8	38.8	25 54.4	+44.3	39.1	26 40.9	+44.8	39.4	27 27.1	+45.4	39.7	28 13.2	+45.8	40.0	52
53	23 28.9	+42.1	37.2	24 16.6	+42.6	37.4	25 04.2	+43.1	37.7	25 51.5	+43.7	38.0	26 38.7	+44.1	38.3	27 25.7	+44.6	38.6	28 12.5	+45.1	38.9	28 59.0	+45.6	39.3	53
54	24 11.0	+41.9	36.4	24 59.2	+42.4	36.7	25 47.3	+42.9	36.9	26 35.2	+43.3	37.2	27 22.8	+43.9	37.5	28 10.3	+44.4	37.9	28 57.6	+44.8	38.2	29 44.6	+45.3	38.5	54
55	24 52.9	+41.7	35.6	25 41.6	+42.2	35.9	26 30.2	+42.6	36.2	27 18.5	+43.1	36.5	28 06.7	+43.6	36.8	28 54.7	+44.0	37.1	29 42.4	+44.6	37.4	30 29.9	+45.1	37.8	55
56	25 34.6	+41.4	34.8	26 23.8	+41.9	35.1	27 12.8	+42.4	35.4	28 01.6	+42.9	35.7	28 50.3	+43.4	36.0	29 38.7	+43.8	36.3	30 27.0	+44.3	36.7	31 15.0	+44.8	37.0	56
57	26 16.0	+41.1	34.0	27 05.7	+41.6	34.3	27 55.2	+42.1	34.6	28 44.5	+42.5	34.9	29 33.6	+43.1	35.2	30 22.5	+43.6	35.5	31 11.3	+44.0	35.9	31 59.8	+44.5	36.2	57
58	26 57.1	+40.9	33.2	27 47.3	+41.3	33.5	28 37.3	+41.7	33.8	29 27.0	+42.3	34.1	30 16.7	+42.7	34.4	31 06.1	+43.2	34.7	31 55.3	+43.7	35.1	32 44.3	+44.1	35.4	58
59	27 38.0	+40.5	32.4	28 28.6	+41.0	32.7	29 19.0	+41.5	32.9	30 09.3	+42.0	33.3	30 59.4	+42.4	33.6	31 49.3	+42.9	33.9	32 39.0	+43.4	34.3	33 28.4	+43.9	34.6	59
60	28 18.5	+40.3	31.5	29 09.6	+40.7	31.8	30 00.5	+41.2	32.1	30 51.3	+41.6	32.4	31 41.8	+42.1	32.7	32 32.2	+42.6	33.1	33 22.4	+43.0	33.4	34 12.3	+43.5	33.8	60
61	28 58.8	+39.9	30.7	29 50.3	+40.4	31.0	30 41.7	+40.8	31.3	31 32.9	+41.3	31.6	32 23.9	+41.8	31.9	33 14.8	+42.2	32.2	34 05.4	+42.7	32.6	34 55.8	+43.2	33.0	61
62	29 38.7	+39.6	29.8	30 30.7	+40.0	30.1	31 22.5	+40.5	30.4	32 14.2	+40.9	30.7	33 05.7	+41.4	31.1	33 57.0	+41.9	31.4	34 48.1	+42.3	31.8	35 39.0	+42.8	32.1	62
63	30 18.3	+39.2	28.9	31 10.7	+39.7	29.2	32 03.0	+40.1	29.5	32 55.1	+40.6	29.9	33 47.1	+41.0	30.2	34 38.9	+41.5	30.5	35 30.4	+42.0	30.9	36 21.8	+42.5	31.3	63
64	30 57.5	+38.9	28.1	31 50.4	+39.3	28.4	32 43.1	+39.8	28.7	33 35.7	+40.2	29.0	34 28.1	+40.7	29.3	35 20.4	+41.1	29.6	36 12.4	+41.6	30.0	37 04.3	+42.0	30.4	64
65	31 36.4	+38.5	27.2	32 29.7	+39.0	27.5	33 22.9	+39.4	27.8	34 15.9	+39.8	28.1	35 08.8	+40.2	28.4	36 01.5	+40.7	28.8	36 54.0	+41.1	29.1	37 46.3	+41.6	29.5	65
66	32 14.9	+38.1	26.3	33 08.7	+38.5	26.6	34 02.3	+38.9	26.9	34 55.7	+39.4	27.2	35 49.0	+39.8	27.5	36 42.2	+40.2	27.8	37 35.1	+40.7	28.2	38 27.9	+41.2	28.6	66
67	32 53.0	+37.7	25.4	33 47.2	+38.1	25.6	34 41.2	+38.6	25.9	35 35.1	+39.0	26.2	36 28.8	+39.4	26.6	37 22.4	+39.9	26.9	38 15.8	+40.3	27.3	39 09.1	+40.7	27.6	67
68	33 30.7	+37.3	24.4	34 25.3	+37.7	24.7	35 19.8	+38.1	25.0	36 14.1	+38.5	25.3	37 08.2	+39.0	25.6	38 02.3	+39.3	25.9	38 56.1	+39.8	26.3	39 49.8	+40.3	26.7	68
69	34 08.0	+36.9	23.5	35 03.0	+37.2	23.8	35 57.9	+37.6	24.1	36 52.6	+38.1	24.4	37 47.2	+38.4	24.7	38 41.6	+38.9	25.0	39 35.9	+39.3	25.3	40 30.1	+39.7	25.7	69
70	34 44.9	+36.4	22.5	35 40.2	+36.8	22.8	36 35.5	+37.2	23.1	37 30.6	+37.6	23.4	38 25.6	+38.0	23.7	39 20.5	+38.4	24.0	40 15.2	+38.8	24.4	41 09.8	+39.3	24.7	70
71	35 21.3	+35.9	21.6	36 17.0	+36.3	21.8	37 12.7	+36.6	22.1	38 08.2	+37.0	22.4	39 03.6	+37.5	22.7	39 58.9	+37.8	23.0	40 54.0	+38.3	23.4	41 49.1	+38.6	23.7	71
72	35 57.2	+35.4	20.6	36 53.3	+35.8	20.8	37 49.3	+36.2	21.1	38 45.2	+36.6	21.4	39 41.1	+36.9	21.7	40 36.7	+37.2	22.0	41 32.3	+37.7	22.3	42 27.7	+38.2	22.7	72
73	36 32.6	+34.9	19.6	37 29.1	+35.3	19.8	38 25.5	+35.6	20.1	39 21.8	+36.0	20.4	40 18.0	+36.3	20.7	41 14.1	+36.7	21.0	42 10.0	+37.2	21.3	43 05.9	+37.5	21.6	73
74	37 07.5	+34.4	18.6	38 04.4	+34.7	18.8	39 01.1	+35.1	19.1	39 57.8	+35.4	19.3	40 54.3	+35.8	19.6	41 50.8	+36.2	19.9	42 47.2	+36.5	20.2	43 43.4	+36.9	20.6	74
75	37 41.9	+33.8	17.5	38 39.1	+34.1	17.8	39 36.2	+34.5	18.0	40 33.2	+34.8	18.3	41 30.1	+35.2	18.5	42 27.0	+35.5	18.8	43 23.7	+35.9	19.1	44 20.3	+36.3	19.5	75
76	38 15.7	+33.3	16.5	39 13.2	+33.6	16.7	40 10.7	+33.9	16.9	41 08.0	+34.2	17.2	42 05.3	+34.6	17.5	43 02.5	+34.9	17.7	43 59.6	+35.2	18.0	44 56.8	+35.6	18.3	76
77	38 49.0	+32.7	15.4	39 46.8	+33.0	15.6	40 44.6	+33.2	15.9	41 42.2	+33.6	16.1	42 39.9	+33.9	16.4	43 37.4	+34.2	16.6	44 34.8	+34.6	16.9	45 32.2	+34.9	17.2	77
78	39 21.7	+32.1	14.3	40 19.8	+32.3	14.5	41 17.8	+32.7	14.8	42 15.8	+33.0	15.0	43 13.8	+33.2	15.2	44 11.6	+33.5	15.5	45 09.4	+33.9	15.7	46 07.1	+34.2	16.0	78
79	39 53.8	+31.4	13.2	40 52.1	+31.7	13.4	41 50.5	+32.0	13.6	42 48.8	+32.2	13.9	43 47.0	+32.5	14.1	44 45.2	+32.8	14.3	45 43.3	+33.1	14.6	46 41.3	+33.4	14.8	79
80	40 25.2	+30.8	12.1	41 23.8	+31.1	12.3	42 22.5	+31.2	12.5	43 21.0	+31.5	12.7	44 19.5	+31.8	12.9	45 18.0	+32.0	13.1	46 16.4	+32.3	13.4	47 14.7	+32.6	13.6	80
81	40 56.0	+30.1	11.0	41 54.9	+30.3	11.2	42 53.7	+30.6	11.3	43 52.5	+30.8	11.5	44 51.3	+31.0	11.7	45 50.0	+31.3	11.9	46 48.7	+31.6	12.1	47 47.3	+31.9	12.4	81
82	41 26.1	+29.4	9.8	42 25.2	+29.6	10.0	43 24.3	+29.8	10.2	44 23.3	+30.1	10.3	45 22.3	+30.3	10.5	46 21.3	+30.5	10.7	47 20.3	+30.7	10.9	48 19.2	+30.9	11.1	82
83	41 55.5	+28.7	8.7	42 54.8	+28.9	8.8	43 54.1	+29.1	9.0	44 53.4	+29.2	9.1	45 52.6	+29.4	9.3	46 51.8	+29.7	9.4	47 51.0	+29.8	9.6	48 50.1	+30.1	9.8	83
84	42 24.2	+28.0	7.6	43 23.7	+28.1	7.6	44 23.2	+28.2	7.7	45 22.6	+28.4	7.9	46 22.0	+28.6	8.0	47 21.5	+28.7	8.2	48 20.8	+29.0	8.3	49 20.2	+29.1	8.5	84
85	42 52.2	+27.2	6.3	43 51.8	+27.3	6.4	44 51.4	+27.5	6.5	45 51.1	+27.5	6.6	46 50.6	+27.8	6.7	47 50.2	+27.9	6.9	48 49.8	+28.0	7.0	49 49.3	+28.2	7.1	85
86	43 19.4	+26.4	5.1	44 19.1	+26.5	5.1	45 18.9	+26.6	5.2	46 18.6	+26.8	5.3	47 18.4	+26.8	5.4	48 18.1	+27.0	5.5	49 17.8	+27.1	5.7	50 17.5	+27.2	5.8	86
87	43 45.8	+25.6	3.9	44 45.6	+25.7	3.9	45 45.5	+25.7	4.0	46 45.4	+25.8	4.0	47 45.2	+25.9	4.1	48 45.1	+25.9	4.2	49 44.9	+26.1	4.3	50 44.7	+26.2	4.4	87
88	44 11.4	+24.7	2.6	45 11.3	+24.8	2.6	46 11.2	+24.9	2.7	47 11.2	+24.9	2.7	48 11.1	+25.0	2.8	49 11.0	+25.0	2.8	50 11.0	+25.0	2.9	51 10.9	+25.1	2.9	88
89	44 36.1	+23.9	1.3	45 36.1	+23.9	1.3	46 36.1	+23.9	1.3	47 36.1	+23.9	1.4	48 36.1	+23.9	1.4	49 36.0	+24.0	1.4	50 36.0	+24.0	1.5	51 36.0	+24.0	1.5	89
90	45 00.0	+23.0	0.0	46 00.0	+23.0	0.0	47 00.0	+23.0	0.0	48 00.0	+22.9	0.0	49 00.0	+22.9	0.0	50 00.0	+22.9	0.0	51 00.0	+22.9	0.0	52 00.0	+22.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION · **L.H.A. 113°, 247°**

68°, 292° L.H.A.　　LATITUDE **SAME** NAME AS DECLINATION

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	15 21.6	+43.9	105.9	15 05.0	+44.6	106.2	14 48.1	+45.4	106.5	14 31.0	+46.0	106.7	14 13.6	+46.7	107.0	13 56.0	+47.3	107.2	13 38.1	+48.0	107.4	13 20.1	+48.5	107.7	0
1	16 05.5	+43.8	105.2	15 49.6	+44.5	105.5	15 33.5	+45.2	105.8	15 17.0	+45.9	106.0	15 00.3	+46.5	106.3	14 43.3	+47.2	106.6	14 26.1	+47.8	106.8	14 08.6	+48.5	107.1	1
2	16 49.3	+43.7	104.5	16 34.1	+44.4	104.8	16 18.7	+45.0	105.1	16 02.9	+45.7	105.4	15 46.8	+46.5	105.7	15 30.5	+47.1	105.9	15 13.9	+47.7	106.2	14 57.1	+48.3	106.4	2
3	17 33.0	+43.5	103.8	17 18.5	+44.2	104.1	17 03.7	+45.0	104.4	16 48.6	+45.7	104.7	16 33.3	+46.3	105.0	16 17.6	+47.0	105.3	16 01.6	+47.7	105.6	15 45.4	+48.3	105.8	3
4	18 16.5	+43.3	103.1	18 02.7	+44.1	103.4	17 48.7	+44.7	103.7	17 34.3	+45.5	104.0	17 19.6	+46.1	104.3	17 04.6	+46.8	104.6	16 49.3	+47.5	104.9	16 33.7	+48.1	105.2	4
5	18 59.8	+43.1	102.4	18 46.8	+43.9	102.7	18 33.4	+44.7	103.0	18 19.8	+45.3	103.3	18 05.7	+46.1	103.7	17 51.4	+46.7	104.0	17 36.8	+47.3	104.3	17 21.8	+48.0	104.6	5
6	19 42.9	+43.0	101.6	19 30.7	+43.7	102.0	19 18.1	+44.4	102.3	19 05.1	+45.2	102.6	18 51.8	+45.9	103.0	18 38.1	+46.6	103.3	18 24.1	+47.3	103.6	18 09.8	+47.9	104.0	6
7	20 25.9	+42.8	100.9	20 14.4	+43.5	101.2	20 02.5	+44.3	101.6	19 50.3	+45.0	101.9	19 37.7	+45.7	102.3	19 24.7	+46.4	102.6	19 11.4	+47.1	103.0	18 57.7	+47.8	103.3	7
8	21 08.7	+42.5	100.1	20 57.9	+43.4	100.5	20 46.8	+44.1	100.9	20 35.3	+44.8	101.2	20 23.4	+45.6	101.6	20 11.1	+46.3	102.0	19 58.5	+47.0	102.3	19 45.5	+47.6	102.7	8
9	21 51.2	+42.4	99.4	21 41.3	+43.1	99.8	21 30.9	+43.9	100.1	21 20.1	+44.7	100.5	21 09.0	+45.4	100.9	20 57.4	+46.1	101.3	20 45.5	+46.8	101.7	20 33.1	+47.5	102.0	9
10	22 33.6	+42.1	98.6	22 24.4	+43.0	99.0	22 14.8	+43.7	99.4	22 04.8	+44.5	99.8	21 54.4	+45.2	100.2	21 43.5	+46.0	100.6	21 32.3	+46.6	101.0	21 20.6	+47.4	101.4	10
11	23 15.7	+42.0	97.8	23 07.4	+42.7	98.3	22 58.5	+43.5	98.7	22 49.3	+44.2	99.1	22 39.6	+45.0	99.5	22 29.5	+45.7	99.9	22 18.9	+46.5	100.3	22 08.0	+47.1	100.7	11
12	23 57.7	+41.6	97.0	23 50.1	+42.5	97.5	23 42.0	+43.3	97.9	23 33.5	+44.1	98.4	23 24.6	+44.8	98.8	23 15.2	+45.6	99.2	23 05.4	+46.3	99.6	22 55.1	+47.0	100.1	12
13	24 39.3	+41.5	96.3	24 32.6	+42.2	96.7	24 25.3	+43.1	97.2	24 17.6	+43.8	97.6	24 09.4	+44.6	98.1	24 00.8	+45.3	98.5	23 51.7	+46.1	98.9	23 42.1	+46.9	99.4	13
14	25 20.8	+41.1	95.5	25 14.8	+42.0	95.9	25 08.4	+42.8	96.4	25 01.4	+43.7	96.9	24 54.0	+44.4	97.3	24 46.1	+45.2	97.8	24 37.8	+45.9	98.2	24 29.0	+46.6	98.7	14
15	26 01.9	+40.9	94.7	25 56.8	+41.7	95.1	25 51.2	+42.5	95.6	25 45.1	+43.3	96.1	25 38.4	+44.2	96.6	25 31.3	+45.0	97.1	25 23.7	+45.7	97.5	25 15.6	+46.4	98.0	15
16	26 42.8	+40.6	93.8	26 38.5	+41.5	94.3	26 33.7	+42.3	94.8	26 28.4	+43.2	95.3	26 22.6	+43.9	95.8	26 16.3	+44.7	96.3	26 09.4	+45.5	96.8	26 02.0	+46.3	97.3	16
17	27 23.4	+40.3	93.0	27 20.0	+41.2	93.5	27 16.0	+42.1	94.0	27 11.6	+42.8	94.6	27 06.5	+43.7	95.1	27 01.0	+44.4	95.6	26 54.9	+45.2	96.1	26 48.3	+46.0	96.6	17
18	28 03.7	+40.0	92.2	28 01.2	+40.9	92.7	27 58.1	+41.7	93.2	27 54.4	+42.6	93.8	27 50.2	+43.4	94.3	27 45.4	+44.3	94.8	27 40.1	+45.0	95.3	27 34.3	+45.8	95.9	18
19	28 43.7	+39.7	91.3	28 42.1	+40.5	91.9	28 39.8	+41.5	92.4	28 37.0	+42.3	93.0	28 33.6	+43.2	93.5	28 29.7	+43.9	94.0	28 25.1	+44.8	94.6	28 20.1	+45.5	95.1	19
20	29 23.4	+39.4	90.5	29 22.6	+40.3	91.0	29 21.3	+41.1	91.6	29 19.3	+42.0	92.2	29 16.8	+42.8	92.7	29 13.6	+43.7	93.3	29 09.9	+44.5	93.8	29 05.6	+45.3	94.4	20
21	30 02.8	+39.0	89.6	30 02.9	+39.9	90.2	30 02.4	+40.8	90.8	30 01.3	+41.7	91.3	29 59.6	+42.6	91.9	29 57.3	+43.4	92.5	29 54.4	+44.3	93.1	29 50.9	+45.1	93.6	21
22	30 41.8	+38.6	88.7	30 42.8	+39.6	89.3	30 43.2	+40.5	89.9	30 43.0	+41.4	90.5	30 42.2	+42.2	91.1	30 40.7	+43.1	91.7	30 38.7	+43.9	92.3	30 36.0	+44.7	92.9	22
23	31 20.4	+38.3	87.8	31 22.4	+39.2	88.4	31 23.7	+40.1	89.0	31 24.4	+41.0	89.7	31 24.4	+41.9	90.3	31 23.8	+42.8	90.9	31 22.6	+43.6	91.5	31 20.7	+44.5	92.1	23
24	31 58.7	+37.8	86.9	32 01.6	+38.8	87.5	32 03.8	+39.8	88.2	32 05.4	+40.7	88.8	32 06.3	+41.6	89.4	32 06.6	+42.5	90.0	32 06.2	+43.4	90.7	32 05.2	+44.2	91.3	24
25	32 36.5	+37.5	86.0	32 40.4	+38.4	86.6	32 43.6	+39.4	87.3	32 46.1	+40.3	87.9	32 47.9	+41.3	88.6	32 49.1	+42.1	89.2	32 49.6	+43.0	89.9	32 49.4	+43.9	90.5	25
26	33 14.0	+37.1	85.1	33 18.8	+38.1	85.7	33 23.0	+38.9	86.4	33 26.4	+39.9	87.0	33 29.2	+40.8	87.7	33 31.2	+41.8	88.4	33 32.6	+42.7	89.0	33 33.3	+43.5	89.7	26
27	33 51.1	+36.6	84.1	33 56.9	+37.6	84.8	34 01.9	+38.6	85.5	34 06.3	+39.6	86.1	34 10.0	+40.5	86.8	34 13.0	+41.4	87.5	34 15.3	+42.3	88.2	34 16.8	+43.2	88.9	27
28	34 27.7	+36.1	83.2	34 34.5	+37.1	83.9	34 40.5	+38.2	84.5	34 45.9	+39.1	85.2	34 50.5	+40.1	85.9	34 54.4	+41.0	86.6	34 57.6	+41.9	87.3	35 00.0	+42.9	88.0	28
29	35 03.8	+35.7	82.2	35 11.6	+36.7	82.9	35 18.7	+37.7	83.6	35 25.0	+38.7	84.3	35 30.6	+39.6	85.0	35 35.4	+40.6	85.7	35 39.5	+41.6	86.4	35 42.9	+42.5	87.2	29
30	35 39.5	+35.2	81.2	35 48.3	+36.2	81.9	35 56.4	+37.2	82.6	36 03.7	+38.2	83.4	36 10.2	+39.3	84.1	36 16.0	+40.2	84.8	36 21.1	+41.1	85.5	36 25.4	+42.1	86.3	30
31	36 14.7	+34.7	80.2	36 24.5	+35.8	80.9	36 33.6	+36.8	81.7	36 41.9	+37.8	82.4	36 49.5	+38.7	83.1	36 56.2	+39.8	83.9	37 02.2	+40.8	84.6	37 07.5	+41.6	85.4	31
32	36 49.4	+34.1	79.2	37 00.3	+35.2	79.9	37 10.4	+36.2	80.7	37 19.7	+37.3	81.4	37 28.2	+38.3	82.2	37 36.0	+39.3	82.9	37 43.0	+40.3	83.7	37 49.1	+41.3	84.5	32
33	37 23.5	+33.7	78.2	37 35.5	+34.6	78.9	37 46.6	+35.7	79.7	37 57.0	+36.8	80.4	38 06.5	+37.8	81.2	38 15.3	+38.8	82.0	38 23.3	+39.8	82.8	38 30.4	+40.8	83.6	33
34	37 57.2	+33.0	77.1	38 10.1	+34.2	77.9	38 22.3	+35.2	78.7	38 33.8	+36.2	79.4	38 44.3	+37.3	80.2	38 54.1	+38.4	81.0	39 03.1	+39.3	81.8	39 11.2	+40.4	82.6	34
35	38 30.2	+32.5	76.1	38 44.3	+33.5	76.8	38 57.5	+34.7	77.6	39 10.0	+35.7	78.4	39 21.6	+36.8	79.2	39 32.5	+37.8	80.0	39 42.4	+38.9	80.8	39 51.6	+39.8	81.7	35
36	39 02.7	+31.8	75.0	39 17.8	+33.0	75.8	39 32.2	+34.0	76.6	39 45.7	+35.1	77.4	39 58.4	+36.2	78.2	40 10.3	+37.3	79.0	40 21.3	+38.3	79.8	40 31.4	+39.4	80.7	36
37	39 34.5	+31.3	73.9	39 50.8	+32.3	74.7	40 06.2	+33.3	75.5	40 20.9	+34.5	76.3	40 34.6	+35.7	77.1	40 47.6	+36.7	78.0	40 59.6	+37.8	78.8	41 10.8	+38.9	79.7	37
38	40 05.8	+30.6	72.8	40 23.1	+31.7	73.6	40 39.7	+32.8	74.4	40 55.4	+33.9	75.2	41 10.3	+35.0	76.1	41 24.3	+36.1	76.9	41 37.4	+37.2	77.8	41 49.6	+38.3	78.7	38
39	40 36.4	+29.9	71.6	40 54.8	+31.1	72.5	41 12.5	+32.2	73.3	41 29.3	+33.3	74.1	41 45.3	+34.4	75.0	42 00.4	+35.5	75.9	42 14.6	+36.6	76.7	42 27.9	+37.7	77.6	39
40	41 06.3	+29.2	70.5	41 25.9	+30.4	71.3	41 44.7	+31.5	72.2	42 02.6	+32.7	73.0	42 19.7	+33.8	73.9	42 35.9	+34.9	74.8	42 51.2	+36.1	75.7	43 05.6	+37.2	76.6	40
41	41 35.5	+28.5	69.3	41 56.3	+29.6	70.2	42 16.2	+30.8	71.0	42 35.3	+31.9	71.9	42 53.5	+33.1	72.8	43 10.8	+34.3	73.7	43 27.3	+35.3	74.6	43 42.8	+36.4	75.5	41
42	42 04.0	+27.8	68.1	42 25.9	+29.0	69.0	42 47.0	+30.1	69.9	43 07.2	+31.3	70.7	43 26.6	+32.4	71.6	43 45.1	+33.5	72.5	44 02.6	+34.7	73.5	44 19.2	+35.9	74.4	42
43	42 31.8	+27.0	67.0	42 54.9	+28.1	67.8	43 17.1	+29.4	68.7	43 38.5	+30.5	69.6	43 59.0	+31.7	70.5	44 18.6	+32.9	71.4	44 37.3	+34.0	72.3	44 55.1	+35.1	73.3	43
44	42 58.8	+26.2	65.7	43 23.0	+27.4	66.6	43 46.5	+28.5	67.5	44 09.0	+29.8	68.4	44 30.7	+30.9	69.3	44 51.5	+32.1	70.2	45 11.3	+33.3	71.1	45 30.2	+34.5	72.1	44
45	43 25.0	+25.4	64.5	43 50.4	+26.6	65.4	44 15.0	+27.8	66.2	44 38.8	+28.9	67.1	45 01.6	+30.2	68.1	45 23.6	+31.3	69.0	45 44.6	+32.5	70.0	46 04.7	+33.7	70.9	45
46	43 50.4	+24.6	63.2	44 17.0	+25.8	64.1	44 42.8	+27.0	65.0	45 07.7	+28.2	65.9	45 31.8	+29.3	66.8	45 54.9	+30.6	67.8	46 17.1	+31.8	68.8	46 38.4	+33.0	69.7	46
47	44 15.0	+23.8	62.0	44 42.8	+24.9	62.9	45 09.8	+26.1	63.7	45 35.9	+27.3	64.7	46 01.1	+28.6	65.6	46 25.5	+29.7	66.5	46 48.9	+30.9	67.5	47 11.4	+32.1	68.5	47
48	44 38.8	+22.8	60.7	45 07.7	+24.1	61.6	45 35.9	+25.2	62.5	46 03.2	+26.5	63.4	46 29.7	+27.6	64.3	46 55.2	+28.9	65.3	47 19.8	+30.1	66.3	47 43.5	+31.3	67.3	48
49	45 01.6	+22.0	59.4	45 31.8	+23.1	60.3	46 01.1	+24.4	61.2	46 29.7	+25.5	62.1	46 57.3	+26.8	63.0	47 24.1	+28.0	64.0	47 49.9	+29.3	65.0	48 14.8	+30.5	66.0	49
50	45 23.6	+21.0	58.1	45 54.9	+22.2	58.9	46 25.5	+23.4	59.8	46 55.2	+24.6	60.8	47 24.1	+25.8	61.7	47 52.1	+27.1	62.7	48 19.2	+28.3	63.7	48 45.3	+29.6	64.7	50
51	45 44.6	+20.1	56.7	46 17.1	+21.3	57.6	46 48.9	+22.5	58.5	47 19.8	+23.7	59.4	47 49.9	+24.9	60.4	48 19.2	+26.1	61.3	48 47.5	+27.4	62.3	49 14.9	+28.6	63.4	51
52	46 04.7	+19.1	55.4	46 38.4	+20.3	56.2	47 11.4	+21.5	57.1	47 43.5	+22.7	58.1	48 14.8	+24.0	59.0	48 45.3	+25.2	60.0	49 14.9	+26.4	61.0	49 43.5	+27.7	62.0	52
53	46 23.8	+18.1	54.0	46 58.7	+19.3	54.9	47 32.9	+20.4	55.8	48 06.2	+21.7	56.7	48 38.8	+22.9	57.6	49 10.5	+24.1	58.6	49 41.3	+25.4	59.6	50 11.2	+26.7	60.6	53
54	46 41.9	+17.1	52.6	47 18.0	+18.3	53.5	47 53.3	+19.5	54.4	48 27.9	+20.7	55.3	49 01.7	+21.9	56.2	49 34.6	+23.1	57.2	50 06.7	+24.4	58.2	50 37.9	+25.6	59.2	54
55	46 59.0	+16.1	51.2	47 36.3	+17.2	52.1	48 12.8	+18.4	52.9	48 48.6	+19.5	53.9	49 23.6	+20.8	54.8	49 57.7	+22.1	55.8	50 31.1	+23.3	56.8	51 03.5	+24.6	57.8	55
56	47 15.1	+15.0	49.8	47 53.5	+16.1	50.6	48 31.2	+17.3	51.5	49 08.1	+18.4	52.4	49 44.4	+19.7	53.3	50 19.8	+20.9	54.3	50 54.4	+22.2	55.3	51 28.1	+23.4	56.3	56
57	47 30.1	+13.9	48.4	48 09.6	+15.1	49.2	48 48.5	+16.2	50.1	49 26.7	+17.3	51.0	50 04.1	+18.6	51.9	50 40.7	+19.8	52.8	51 16.6	+21.0	53.8	51 51.5	+22.4	54.9	57
58	47 44.0	+12.9	46.9	48 24.7	+13.9	47.7	49 04.7	+15.1	48.6	49 44.0	+16.3	49.5	50 22.7	+17.4	50.4	51 00.5	+18.7	51.3	51 37.6	+19.9	52.3	52 13.9	+21.1	53.3	58
59	47 56.9	+11.7	45.5	48 38.6	+12.9	46.3	49 19.8	+13.9	47.1	50 00.3	+15.1	48.0	50 40.1	+16.3	48.9	51 19.2	+17.4	49.8	51 57.5	+18.7	50.8	52 35.0	+20.0	51.8	59
60	48 08.6	+10.6	44.0	48 51.5	+11.6	44.8	49 33.7	+12.8	45.6	50 15.4	+13.9	46.5	50 56.4	+15.0	47.4	51 36.6	+16.3	48.3	52 16.2	+17.5	49.3	52 55.0	+18.7	50.2	60
61	48 19.2	+9.4	42.5	49 03.1	+10.5	43.3	49 46.5	+11.6	44.1	50 29.3	+12.7	45.0	51 11.4	+13.9	45.8	51 52.9	+15.0	46.7	52 33.7	+16.2	47.7	53 13.7	+17.4	48.7	61
62	48 28.6	+8.3	41.0	49 13.6	+9.4	41.8	49 58.1	+10.4	42.6	50 42.0	+11.4	43.4	51 25.3	+12.5	44.3	52 07.9	+13.7	45.2	52 49.9	+14.9	46.1	53 31.1	+16.1	47.1	62
63	48 36.9	+7.2	39.5	49 23.0	+8.1	40.3	50 08.5	+9.1	41.1	50 53.4	+10.3	41.9	51 37.8	+11.4	42.7	52 21.6	+12.5	43.6	53 04.8	+13.6	44.5	53 47.2	+14.8	45.4	63
64	48 44.1	+5.9	38.0	49 31.1	+6.9	38.8	50 17.6	+8.0	39.5	51 03.7	+8.9	40.3	51 49.2	+10.0	41.1	52 34.1	+11.1	42.0	53 18.4	+12.2	42.9	54 02.0	+13.4	43.8	64
65	48 50.0	+4.8	36.5	49 38.0	+5.7	37.2	50 25.6	+6.6	38.0	51 12.6	+7.7	38.7	51 59.2	+8.7	39.5	52 45.2	+9.8	40.3	53 30.6	+10.9	41.2	54 15.4	+12.1	42.1	65
66	48 54.8	+3.6	35.0	49 43.7	+4.5	35.7	50 32.2	+5.5	36.4	51 20.3	+6.4	37.1	52 07.9	+7.4	37.9	52 55.0	+8.4	38.7	53 41.5	+9.5	39.6	54 27.5	+10.6	40.4	66
67	48 58.4	+2.3	33.5	49 48.2	+3.2	34.1	50 37.7	+4.1	34.8	51 26.7	+5.1	35.5	52 15.3	+6.1	36.3	53 03.4	+7.1	37.1	53 51.0	+8.1	37.9	54 38.1	+9.2	38.8	67
68	49 00.7	+1.2	32.0	49 51.4	+2.0	32.6	50 41.8	+2.9	33.3	51 31.8	+3.8	33.9	52 21.4	+4.7	34.7	53 10.5	+5.7	35.5	53 59.1	+6.7	36.2	54 47.3	+7.7	37.0	68
69	49 01.9	-0.1	30.5	49 53.4	+0.8	31.0	50 44.7	+1.6	31.7	51 35.6	+2.4	32.3	52 26.1	+3.3	33.0	53 16.2	+4.3	33.8	54 05.8	+5.3	34.5	54 55.0	+6.3	35.3	69
70	49 01.8	-1.2	28.9	49 54.2	-0.5	29.5	50 46.3	+0.3	30.1	51 38.0	+1.2	30.7	52 29.4	+2.0	31.4	53 20.5	+2.8	32.1	54 11.1	+3.8	32.8	55 01.3	+4.8	33.6	70
71	49 00.6	-2.5	27.4	49 53.7	-1.7	27.9	50 46.6	-1.0	28.5	51 39.2	-0.2	29.1	52 31.4	+0.7	29.7	53 23.3	+1.5	30.4	54 14.9	+2.4	31.1	55 06.1	+3.3	31.8	71
72	48 58.1	-3.6	25.9	49 52.0	-3.0	26.4	50 45.6	-2.2	26.9	51 39.0	-1.5	27.5	52 32.1	-0.8	28.1	53 24.8	+0.1	28.7	54 17.3	+0.9	29.4	55 09.4	+1.8	30.1	72
73	48 54.5	-4.9	24.4	49 49.0	-4.2	24.8	50 43.4	-3.6	25.4	51 37.5	-2.9	25.9	52 31.3	-2.1	26.5	53 24.9	-1.3	27.1	54 18.2	-0.6	27.7	55 11.2	+0.2	28.3	73
74	48 49.6	-6.0	22.8	49 44.8	-5.4	23.3	50 39.8	-4.8	23.8	51 34.6	-4.1	24.3	52 29.2	-3.4	24.8	53 23.6	-2.8	25.4	54 17.6	-2.0	26.0	55 11.4	-1.2	26.6	74
75	48 43.6	-7.2	21.3	49 39.4	-6.6	21.8	50 35.0	-6.0	22.2	51 30.5	-5.5	22.7	52 25.8	-4.9	23.2	53 20.8	-4.1	23.7	54 15.6	-3.4	24.3	55 10.2	-2.9	24.8	75
76	48 36.4	-8.4	19.8	49 32.8	-7.9	20.2	50 29.0	-7.3	20.6	51 25.0	-6.7	21.1	52 20.9	-6.1	21.5	53 16.7	-5.6	22.0	54 12.2	-4.9	22.5	55 07.5	-4.2	23.1	76
77	48 28.0	-9.5	18.3	49 24.9	-9.1	18.7	50 21.7	-8.6	19.1	51 18.3	-8.0	19.5	52 14.8	-7.5	19.9	53 11.1	-6.9	20.4	54 07.3	-6.4	20.8	55 03.3	-5.8	21.4	77
78	48 18.5	-10.7	16.8	49 15.8	-10.2	17.2	50 13.1	-9.8	17.5	51 10.3	-9.4	17.9	52 07.3	-8.8	18.3	53 04.2	-8.3	18.7	54 00.9	-7.7	19.2	54 57.5	-7.1	19.6	78
79	48 07.8	-11.8	15.4	49 05.6	-11.4	15.7	50 03.3	-11.0	16.0	51 00.9	-10.5	16.3	51 58.5	-10.1	16.7	52 55.9	-9.7	17.1	53 53.2	-9.2	17.5	54 50.4	-8.7	17.9	79
80	47 56.0	-12.9	13.9	48 54.2	-12.6	14.2	49 52.3	-12.2	14.5	50 50.4	-11.8	14.8	51 48.4	-11.5	15.1	52 46.2	-11.0	15.4	53 44.0	-10.5	15.8	54 41.7	-10.1	16.2	80
81	47 43.1	-14.1	12.4	48 41.6	-13.7	12.7	49 40.1	-13.3	13.0	50 38.6	-13.1	13.2	51 36.9	-12.6	13.5	52 35.2	-12.3	13.8	53 33.5	-11.9	14.1	54 31.6	-11.5	14.5	81
82	47 29.0	-15.0	11.0	48 27.9	-14.8	11.2	49 26.8	-14.6	11.4	50 25.5	-14.2	11.7	51 24.3	-14.0	11.9	52 22.9	-13.6	12.2	53 21.6	-13.3	12.5	54 20.1	-12.9	12.8	82
83	47 14.0	-16.2	9.6	48 13.1	-15.9	9.8	49 12.2	-15.6	10.0	50 11.3	-15.4	10.2	51 10.3	-15.1	10.4	52 09.3	-14.8	10.6	53 08.3	-14.6	10.9	54 07.2	-14.3	11.1	83
84	46 57.8	-17.2	8.2	47 57.2	-17.0	8.3	48 56.6	-16.8	8.5	49 55.9	-16.6	8.7	50 55.2	-16.4	8.9	51 54.5	-16.2	9.2	52 53.7	-15.9	9.5	53 52.9	-15.9	9.5	84
85	46 40.6	-18.1	6.8	47 40.2	-18.0	6.9	48 39.8	-17.9	7.0	49 39.3	-17.7	7.2	50 38.8	-17.5	7.3	51 38.3	-17.3	7.5	52 37.8	-17.1	7.7	53 37.3	-17.0	7.8	85
86	46 22.5	-19.2	5.4	47 22.2	-19.1	5.5	48 21.9	-18.9	5.6	49 21.6	-18.8	5.7	50 21.3	-18.7	5.8	51 21.0	-18.5	5.9	52 20.7	-18.4	6.1	53 20.3	-18.2	6.2	86
87	46 03.3	-20.2	4.0	47 03.1	-20.0	4.1	48 03.0	-20.0	4.2	49 02.8	-19.9	4.2	50 02.6	-19.8	4.3	51 02.5	-19.7	4.4	52 02.3	-19.6	4.5	53 02.1	-19.6	4.6	87
88	45 43.1	-21.1	2.7	46 43.1	-21.1	2.7	47 43.0	-21.0	2.8	48 42.9	-20.9	2.8	49 42.8	-20.8	2.9	50 42.8	-20.9	2.9	51 42.7	-20.8	3.0	52 42.6	-20.7	3.1	88
89	45 22.0	-22.0	1.3	46 22.0	-22.0	1.3	47 22.0	-22.0	1.4	48 22.0	-22.0	1.4	49 22.0	-22.0	1.4	50 21.9	-21.9	1.5	51 21.9	-21.9	1.5	52 21.9	-21.9	1.5	89
90	45 00.0	-22.9	0.0	46 00.0	-22.9	0.0	47 00.0	-23.0	0.0	48 00.0	-23.0	0.0	49 00.0	-23.0	0.0	50 00.0	-23.0	0.0	51 00.0	-23.0	0.0	52 00.0	-23.0	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	15 21.6	−44.0	105.9	15 05.0	−44.8	106.2	14 48.1	−45.4	106.5	14 31.0	−46.1	106.7	14 13.6	−46.7	107.0	13 56.0	−47.4	107.2	13 38.1	−48.0	107.4	13 20.1	−48.7	107.7	0
1	14 37.6	−44.2	106.6	14 20.2	−44.8	106.9	14 02.7	−45.6	107.1	13 44.9	−46.2	107.4	13 26.9	−46.9	107.6	13 08.6	−47.5	107.8	12 50.1	−48.1	108.3	12 31.4	−48.7	108.3	1
2	13 53.4	−44.3	107.3	13 35.4	−45.0	107.6	13 17.1	−45.6	107.8	12 58.7	−46.4	108.0	12 40.0	−47.0	108.2	12 21.1	−47.6	108.5	12 02.0	−48.2	108.7	11 42.7	−48.8	108.9	2
3	13 09.1	−44.5	108.0	12 50.4	−45.1	108.3	12 31.5	−45.8	108.5	12 12.3	−46.4	108.7	11 53.0	−47.0	108.9	11 33.5	−47.6	109.1	11 13.8	−48.3	109.3	10 53.9	−48.8	109.5	3
4	12 24.6	−44.5	108.7	12 05.3	−45.2	108.9	11 45.7	−45.8	109.1	11 25.9	−46.5	109.3	11 06.0	−47.1	109.5	10 45.9	−47.8	109.7	10 25.5	−48.5	109.9	10 05.1	−48.9	110.0	4
5	11 40.1	−44.6	109.4	11 20.1	−45.3	109.6	10 59.9	−46.0	109.8	10 39.4	−46.5	110.0	10 18.9	−47.2	110.1	9 58.1	−47.8	110.3	9 37.2	−48.4	110.5	9 16.2	−49.0	110.6	5
6	10 55.5	−44.7	110.1	10 34.8	−45.4	110.3	10 13.9	−46.0	110.4	9 52.9	−46.7	110.6	9 31.7	−47.3	110.8	9 10.3	−47.8	110.9	8 48.8	−48.4	111.1	8 27.2	−49.0	111.2	6
7	10 10.8	−44.8	110.8	9 49.4	−45.4	110.9	9 27.9	−46.1	111.1	9 06.2	−46.7	111.2	8 44.4	−47.3	111.4	8 22.5	−48.0	111.5	8 00.4	−48.5	111.7	7 38.2	−49.1	111.8	7
8	9 26.0	−44.9	111.4	9 04.0	−45.5	111.6	8 41.8	−46.1	111.7	8 19.5	−46.7	111.9	7 57.1	−47.4	112.0	7 34.5	−47.9	112.1	7 11.9	−48.6	112.3	6 49.1	−49.1	112.4	8
9	8 41.1	−44.9	112.1	8 18.5	−45.6	112.3	7 55.7	−46.2	112.4	7 32.8	−46.9	112.5	7 09.7	−47.4	112.6	6 46.6	−48.0	112.7	6 23.3	−48.6	112.9	6 00.0	−49.2	113.0	9
10	7 56.2	−45.0	112.8	7 32.9	−45.7	112.9	7 09.5	−46.3	113.0	6 45.9	−46.8	113.1	6 22.3	−47.5	113.3	5 58.6	−48.1	113.4	5 34.7	−48.6	113.5	5 10.8	−49.2	113.5	10
11	7 11.2	−45.1	113.5	6 47.2	−45.6	113.6	6 23.2	−46.3	113.7	5 59.1	−47.0	113.8	5 34.8	−47.5	113.9	5 10.5	−48.1	114.0	4 46.1	−48.6	114.0	4 21.6	−49.2	114.1	11
12	6 26.1	−45.1	114.1	6 01.6	−45.8	114.2	5 36.9	−46.4	114.3	5 12.1	−46.9	114.4	4 47.3	−47.5	114.5	4 22.4	−48.1	114.6	3 57.5	−48.7	114.6	3 32.4	−49.2	114.7	12
13	5 41.0	−45.1	114.8	5 15.8	−45.8	114.9	4 50.5	−46.3	115.0	4 25.2	−47.0	115.0	3 59.8	−47.6	115.1	3 34.3	−48.1	115.2	3 08.8	−48.7	115.2	2 43.2	−49.3	115.3	13
14	4 55.9	−45.2	115.4	4 30.0	−45.8	115.5	4 04.2	−46.5	115.6	3 38.2	−47.0	115.6	3 12.2	−47.6	115.7	2 46.2	−48.2	115.8	2 20.1	−48.7	115.8	1 54.0	−49.3	115.8	14
15	4 10.7	−45.3	116.1	3 44.2	−45.8	116.2	3 17.7	−46.4	116.2	2 51.2	−47.0	116.3	2 24.6	−47.6	116.3	1 58.0	−48.2	116.3	1 31.4	−48.8	116.4	1 04.7	−49.3	116.4	15
16	3 25.4	−45.2	116.8	2 58.4	−45.9	116.8	2 31.3	−46.5	116.9	2 04.2	−47.1	116.9	1 37.0	−47.6	116.9	1 09.8	−48.1	116.9	0 42.6	−48.7	117.0	0 15.4	−49.3	117.0	16
17	2 40.2	−45.3	117.4	2 12.5	−45.9	117.5	1 44.8	−46.4	117.5	1 17.1	−47.0	117.5	0 49.4	−47.6	117.5	0 21.7	−48.2	117.5	0 06.1	+48.7	62.5	0 33.8	+49.3	62.5	17
18	1 54.9	−45.3	118.1	1 26.6	−45.9	118.1	0 58.4	−46.5	118.1	0 30.1	−47.1	118.1	0 01.8	−47.6	118.1	0 26.5	+48.2	61.9	0 54.8	+48.7	61.9	1 23.1	+49.2	61.9	18
19	1 09.6	−45.3	118.7	0 40.7	−45.9	118.7	0 11.9	−46.5	118.8	0 17.0	+47.0	61.2	0 45.8	+47.7	61.3	1 14.7	+48.2	61.3	1 43.5	+48.7	61.3	2 12.3	+49.3	61.3	19
20	0 24.3	−45.3	119.4	0 05.2	+45.8	60.6	0 34.6	+46.5	60.6	1 04.0	+47.1	60.6	1 33.5	+47.6	60.6	2 02.9	+48.1	60.7	2 32.2	+48.7	60.7	3 01.6	+49.2	60.7	20
21	0 21.0	+45.3	60.0	0 51.0	+45.9	60.0	1 21.1	+46.4	60.0	1 51.1	+47.0	60.0	2 21.1	+47.6	60.0	2 51.0	+48.2	60.1	3 20.9	+48.7	60.1	3 50.8	+49.2	60.2	21
22	1 06.3	+45.3	59.3	1 36.9	+45.9	59.3	2 07.5	+46.5	59.3	2 38.1	+47.0	59.4	3 08.7	+47.5	59.4	3 39.2	+48.1	59.5	4 09.6	+48.6	59.5	4 40.0	+49.2	59.6	22
23	1 51.6	+45.3	58.6	2 22.8	+45.9	58.7	2 54.0	+46.4	58.7	3 25.1	+47.0	58.8	3 56.2	+47.6	58.8	4 27.3	+48.1	58.9	4 58.2	+48.7	58.9	5 29.2	+49.1	59.0	23
24	2 36.9	+45.2	58.0	3 08.7	+45.8	58.0	3 40.4	+46.4	58.1	4 12.1	+47.0	58.1	4 43.8	+47.5	58.2	5 15.4	+48.0	58.3	5 46.9	+48.5	58.4	6 18.3	+49.1	58.4	24
25	3 22.1	+45.3	57.3	3 54.5	+45.8	57.4	4 26.8	+46.4	57.4	4 59.1	+46.9	57.5	5 31.3	+47.5	57.6	6 03.4	+48.0	57.7	6 35.4	+48.6	57.8	7 07.4	+49.1	57.9	25
26	4 07.4	+45.2	56.7	4 40.3	+45.8	56.7	5 13.2	+46.3	56.8	5 46.0	+46.9	56.9	6 18.8	+47.4	57.0	6 51.4	+48.0	57.1	7 24.0	+48.5	57.2	7 56.5	+49.0	57.3	26
27	4 52.6	+45.1	56.0	5 26.1	+45.7	56.1	5 59.5	+46.3	56.2	6 32.9	+46.8	56.3	7 06.2	+47.4	56.4	7 39.4	+47.9	56.5	8 12.5	+48.4	56.6	8 45.5	+48.9	56.7	27
28	5 37.7	+45.2	55.3	6 11.8	+45.7	55.4	6 45.8	+46.3	55.5	7 19.7	+46.8	55.6	7 53.6	+47.3	55.7	8 27.3	+47.8	55.9	9 00.9	+48.4	56.0	9 34.4	+48.9	56.1	28
29	6 22.9	+45.0	54.7	6 57.5	+45.6	54.8	7 32.1	+46.1	54.9	8 06.5	+46.7	55.0	8 40.9	+47.3	55.1	9 15.1	+47.8	55.2	9 49.3	+48.3	55.4	10 23.3	+48.8	55.5	29
30	7 07.9	+45.0	54.0	7 43.1	+45.6	54.1	8 18.2	+46.2	54.2	8 53.2	+46.7	54.4	9 28.2	+47.1	54.5	10 02.9	+47.8	54.6	10 37.6	+48.2	54.8	11 12.1	+48.8	54.9	30
31	7 52.9	+45.0	53.4	8 28.7	+45.5	53.5	9 04.4	+46.0	53.6	9 39.9	+46.6	53.7	10 15.3	+47.2	53.9	10 50.7	+47.6	54.0	11 25.8	+48.2	54.2	12 00.9	+48.7	54.3	31
32	8 37.9	+44.8	52.7	9 14.2	+45.4	52.8	9 50.4	+46.0	52.9	10 26.5	+46.5	53.1	11 02.5	+47.0	53.2	11 38.3	+47.6	53.4	12 14.0	+48.1	53.6	12 49.6	+48.6	53.7	32
33	9 22.7	+44.8	52.0	9 59.6	+45.4	52.1	10 36.4	+45.9	52.3	11 13.0	+46.4	52.4	11 49.5	+47.0	52.6	12 25.9	+47.5	52.8	13 02.1	+48.0	53.0	13 38.2	+48.5	53.1	33
34	10 07.5	+44.8	51.3	10 45.0	+45.2	51.5	11 22.3	+45.8	51.6	11 59.4	+46.4	51.8	12 36.5	+46.9	52.0	13 13.4	+47.4	52.1	13 50.1	+47.9	52.3	14 26.7	+48.4	52.5	34
35	10 52.3	+44.6	50.7	11 30.2	+45.2	50.8	12 08.1	+45.7	51.0	12 45.8	+46.2	51.1	13 23.4	+46.7	51.3	14 00.8	+47.3	51.5	14 38.0	+47.8	51.7	15 15.1	+48.3	51.9	35
36	11 36.9	+44.5	50.0	12 15.4	+45.1	50.1	12 53.8	+45.6	50.3	13 32.0	+46.2	50.5	14 10.1	+46.7	50.7	14 48.1	+47.2	50.9	15 25.8	+47.7	51.1	16 03.4	+48.2	51.3	36
37	12 21.4	+44.4	49.3	13 00.5	+44.9	49.5	13 39.4	+45.5	49.6	14 18.2	+46.0	49.8	14 56.8	+46.6	50.0	15 35.3	+47.0	50.2	16 13.5	+47.6	50.5	16 51.6	+48.1	50.7	37
38	13 05.8	+44.4	48.6	13 45.4	+44.9	48.8	14 24.9	+45.4	49.0	15 04.2	+45.9	49.2	15 43.4	+46.4	49.4	16 22.3	+47.0	49.6	17 01.1	+47.5	49.8	17 39.7	+48.0	50.1	38
39	13 50.2	+44.1	47.9	14 30.3	+44.7	48.1	15 10.3	+45.3	48.3	15 50.1	+45.8	48.5	16 29.8	+46.3	48.7	17 09.3	+46.8	48.9	17 48.6	+47.4	49.2	18 27.7	+47.9	49.4	39
40	14 34.3	+44.1	47.2	15 15.0	+44.6	47.4	15 55.6	+45.1	47.6	16 35.9	+45.7	47.8	17 16.1	+46.2	48.1	17 56.1	+46.7	48.3	18 36.0	+47.2	48.5	19 15.6	+47.7	48.8	40
41	15 18.4	+44.0	46.5	15 59.6	+44.5	46.7	16 40.7	+45.0	46.9	17 21.6	+45.5	47.2	18 02.3	+46.0	47.4	18 42.8	+46.6	47.6	19 23.2	+47.0	47.9	20 03.3	+47.6	48.2	41
42	16 02.4	+43.8	45.8	16 44.1	+44.3	46.0	17 25.7	+44.9	46.2	18 07.1	+45.4	46.5	18 48.3	+45.9	46.7	19 29.4	+46.4	47.0	20 10.2	+47.0	47.2	20 50.9	+47.4	47.5	42
43	16 46.2	+43.6	45.1	17 28.4	+44.2	45.3	18 10.6	+44.7	45.5	18 52.5	+45.2	45.8	19 34.2	+45.8	46.0	20 15.8	+46.3	46.3	20 57.2	+46.7	46.6	21 38.3	+47.3	46.8	43
44	17 29.8	+43.5	44.4	18 12.6	+44.0	44.6	18 55.3	+44.5	44.8	19 37.7	+45.1	45.1	20 20.0	+45.6	45.3	21 02.1	+46.1	45.6	21 43.9	+46.6	45.9	22 25.6	+47.1	46.2	44
45	18 13.3	+43.3	43.6	18 56.6	+43.9	43.9	19 39.8	+44.4	44.1	20 22.8	+44.9	44.4	21 05.6	+45.4	44.6	21 48.2	+45.9	44.9	22 30.5	+46.5	45.2	23 12.7	+46.9	45.5	45
46	18 56.6	+43.2	42.9	19 40.5	+43.7	43.2	20 24.2	+44.2	43.4	21 07.7	+44.7	43.7	21 51.0	+45.2	43.9	22 34.1	+45.7	44.2	23 17.0	+46.2	44.5	23 59.6	+46.8	44.8	46
47	19 39.8	+43.0	42.2	20 24.2	+43.5	42.4	21 08.4	+44.0	42.7	21 52.4	+44.5	43.0	22 36.2	+45.0	43.2	23 19.8	+45.6	43.5	24 03.2	+46.1	43.8	24 46.4	+46.5	44.1	47
48	20 22.8	+42.8	41.4	21 07.7	+43.3	41.7	21 52.4	+43.8	42.0	22 36.9	+44.3	42.2	23 21.2	+44.9	42.5	24 05.4	+45.3	42.8	24 49.3	+45.8	43.1	25 32.9	+46.4	43.4	48
49	21 05.6	+42.6	40.7	21 51.0	+43.1	40.9	22 36.2	+43.6	41.2	23 21.2	+44.2	41.5	24 06.1	+44.6	41.8	24 50.7	+45.1	42.1	25 35.1	+45.7	42.4	26 19.3	+46.2	42.7	49
50	21 48.2	+42.3	39.9	22 34.1	+42.9	40.2	23 19.8	+43.4	40.4	24 05.4	+43.9	40.8	24 50.7	+44.4	41.1	25 35.8	+45.0	41.4	26 20.8	+45.4	41.7	27 05.5	+45.9	42.0	50
51	22 30.5	+42.2	39.2	23 17.0	+42.6	39.4	24 03.2	+43.2	39.7	24 49.3	+43.6	40.0	25 35.1	+44.2	40.3	26 20.8	+44.7	40.6	27 06.2	+45.2	41.0	27 51.4	+45.7	41.3	51
52	23 12.7	+41.9	38.4	23 59.6	+42.5	38.7	24 46.4	+42.9	39.0	25 32.9	+43.5	39.2	26 19.3	+44.0	39.6	27 05.5	+44.4	39.9	27 51.4	+44.9	40.2	28 37.1	+45.5	40.6	52
53	23 54.6	+41.7	37.6	24 42.1	+42.2	37.9	25 29.3	+42.7	38.2	26 16.4	+43.2	38.5	27 03.3	+43.6	38.8	27 49.9	+44.2	39.1	28 36.3	+44.7	39.5	29 22.6	+45.2	39.8	53
54	24 36.3	+41.5	36.8	25 24.3	+41.9	37.1	26 12.0	+42.5	37.4	26 59.6	+42.9	37.7	27 46.9	+43.5	38.0	28 34.1	+43.9	38.4	29 21.0	+44.5	38.7	30 07.8	+44.9	39.1	54
55	25 17.8	+41.1	36.0	26 06.2	+41.7	36.3	26 54.5	+42.1	36.6	27 42.5	+42.7	36.9	28 30.4	+43.1	37.2	29 18.0	+43.7	37.6	30 05.5	+44.1	37.9	30 52.7	+44.7	38.3	55
56	25 58.9	+41.0	35.2	26 47.9	+41.4	35.5	27 36.6	+41.9	35.8	28 25.2	+42.4	36.1	29 13.5	+42.9	36.4	30 01.7	+43.4	36.8	30 49.6	+43.9	37.1	31 37.4	+44.3	37.5	56
57	26 39.9	+40.6	34.4	27 29.3	+41.1	34.7	28 18.5	+41.6	35.0	29 07.6	+42.1	35.3	29 56.4	+42.6	35.6	30 45.1	+43.1	36.0	31 33.5	+43.6	36.3	32 21.7	+44.1	36.7	57
58	27 20.5	+40.3	33.6	28 10.4	+40.8	33.9	29 00.1	+41.3	34.2	29 49.7	+41.7	34.5	30 39.0	+42.3	34.8	31 28.2	+42.7	35.2	32 17.1	+43.3	35.5	33 05.8	+43.8	35.9	58
59	28 00.8	+40.0	32.7	28 51.2	+40.5	33.0	29 41.4	+41.0	33.3	30 31.4	+41.5	33.7	31 21.3	+41.9	34.0	32 10.9	+42.5	34.3	33 00.4	+42.9	34.7	33 49.6	+43.4	35.1	59
60	28 40.8	+39.8	31.9	29 31.7	+40.2	32.2	30 22.4	+40.6	32.5	31 12.9	+41.1	32.8	32 03.2	+41.6	33.2	32 53.4	+42.1	33.5	33 43.3	+42.6	33.9	34 33.0	+43.1	34.3	60
61	29 20.6	+39.3	31.0	30 11.9	+39.8	31.3	31 03.0	+40.4	31.6	31 54.0	+40.8	32.0	32 44.8	+41.3	32.3	33 35.5	+41.7	32.7	34 25.9	+42.2	33.0	35 16.1	+42.7	33.4	61
62	29 59.9	+39.1	30.2	30 51.7	+39.5	30.5	31 43.4	+39.9	30.8	32 34.8	+40.4	31.1	33 26.1	+40.9	31.4	34 17.2	+41.4	31.8	35 08.1	+41.8	32.2	35 58.8	+42.3	32.5	62
63	30 39.0	+38.6	29.3	31 31.2	+39.1	29.6	32 23.3	+39.6	29.9	33 15.2	+40.1	30.2	34 07.0	+40.5	30.6	34 58.6	+40.9	30.9	35 49.9	+41.5	31.3	36 41.1	+42.0	31.7	63
64	31 17.6	+38.3	28.4	32 10.3	+38.8	28.7	33 02.9	+39.2	29.0	33 55.3	+39.6	29.3	34 47.5	+40.1	29.7	35 39.5	+40.6	30.0	36 31.4	+41.0	30.4	37 23.1	+41.5	30.8	64
65	31 55.9	+37.9	27.5	32 49.1	+38.3	27.8	33 42.1	+38.8	28.1	34 34.9	+39.3	28.4	35 27.6	+39.7	28.8	36 20.1	+40.2	29.1	37 12.4	+40.7	29.5	38 04.6	+41.1	29.9	65
66	32 33.8	+37.5	26.6	33 27.4	+37.9	26.9	34 20.9	+38.3	27.2	35 14.2	+38.8	27.5	36 07.3	+39.2	27.8	37 00.3	+39.7	28.2	37 53.1	+40.1	28.6	38 45.7	+40.6	28.9	66
67	33 11.3	+37.1	25.7	34 05.3	+37.5	25.9	34 59.2	+37.9	26.2	35 53.0	+38.3	26.6	36 46.6	+38.8	26.9	37 40.0	+39.2	27.2	38 33.2	+39.8	27.6	39 26.3	+40.2	28.0	67
68	33 48.4	+36.6	24.7	34 42.8	+37.1	25.0	35 37.1	+37.5	25.3	36 31.3	+37.9	25.6	37 25.4	+38.3	25.9	38 19.2	+38.8	26.3	39 13.0	+39.2	26.6	40 06.5	+39.7	27.0	68
69	34 25.0	+36.2	23.8	35 19.9	+36.6	24.0	36 14.6	+37.0	24.3	37 09.2	+37.4	24.6	38 03.7	+37.8	25.0	38 58.0	+38.3	25.3	39 52.2	+38.7	25.7	40 46.2	+39.2	26.0	69
70	35 01.2	+35.7	22.8	35 56.5	+36.1	23.1	36 51.6	+36.5	23.3	37 46.6	+37.0	23.7	38 41.5	+37.4	24.0	39 36.3	+37.8	24.3	40 30.9	+38.2	24.7	41 25.4	+38.6	25.0	70
71	35 36.9	+35.3	21.8	36 32.6	+35.6	22.1	37 28.1	+36.0	22.4	38 23.6	+36.4	22.7	39 18.9	+36.8	23.0	40 14.1	+37.2	23.3	41 09.1	+37.6	23.6	42 04.0	+38.1	24.0	71
72	36 12.2	+34.7	20.8	37 08.2	+35.1	21.1	38 04.1	+35.5	21.3	39 00.0	+35.8	21.6	39 55.7	+36.2	21.9	40 51.3	+36.6	22.3	41 46.7	+37.1	22.6	42 42.1	+37.5	22.9	72
73	36 46.9	+34.2	19.8	37 43.3	+34.6	20.0	38 39.6	+34.9	20.3	39 35.8	+35.3	20.6	40 31.9	+35.7	20.9	41 27.9	+36.1	21.2	42 23.8	+36.5	21.5	43 19.6	+36.8	21.9	73
74	37 21.1	+33.6	18.8	38 17.9	+34.0	19.0	39 14.5	+34.4	19.3	40 11.1	+34.7	19.5	41 07.6	+35.1	19.8	42 04.0	+35.5	20.1	43 00.3	+35.8	20.5	43 56.4	+36.3	20.8	74
75	37 54.7	+33.1	17.7	38 51.9	+33.4	18.0	39 48.9	+33.8	18.2	40 45.8	+34.2	18.5	41 42.7	+34.5	18.8	42 39.5	+34.8	19.0	43 36.1	+35.2	19.4	44 32.7	+35.6	19.7	75
76	38 27.8	+32.5	16.6	39 25.3	+32.8	16.9	40 22.7	+33.1	17.1	41 20.0	+33.4	17.4	42 17.2	+33.8	17.6	43 14.3	+34.2	17.9	44 11.3	+34.6	18.2	45 08.3	+34.9	18.5	76
77	39 00.3	+31.9	15.6	39 58.1	+32.2	15.8	40 55.8	+32.5	16.0	41 53.4	+32.9	16.3	42 51.0	+33.2	16.5	43 48.5	+33.5	16.8	44 45.9	+33.8	17.1	45 43.2	+34.2	17.4	77
78	39 32.2	+31.3	14.5	40 30.3	+31.6	14.7	41 28.3	+31.9	14.9	42 26.3	+32.1	15.1	43 24.2	+32.4	15.4	44 22.0	+32.7	15.6	45 19.7	+33.1	15.9	46 17.4	+33.4	16.2	78
79	40 03.5	+30.7	13.4	41 01.9	+30.9	13.6	42 00.2	+31.1	13.8	42 58.4	+31.5	14.0	43 56.6	+31.8	14.2	44 54.7	+32.1	14.5	45 52.8	+32.3	14.7	46 50.8	+32.7	15.0	79
80	40 34.2	+29.9	12.2	41 32.8	+30.2	12.4	42 31.3	+30.5	12.6	43 29.9	+30.7	12.8	44 28.4	+30.9	13.0	45 26.8	+31.2	13.3	46 25.1	+31.6	13.5	47 23.5	+31.8	13.8	80
81	41 04.1	+29.3	11.1	42 03.0	+29.5	11.3	43 01.8	+29.7	11.4	44 00.6	+30.0	11.6	44 59.3	+30.3	11.8	45 58.0	+30.5	11.8	46 56.7	+30.7	12.3	47 55.3	+31.1	12.5	81
82	41 33.4	+28.6	9.9	42 32.5	+28.8	10.1	43 31.5	+29.0	10.3	44 30.6	+29.2	10.4	45 29.6	+29.4	10.6	46 28.5	+29.7	10.8	47 27.4	+29.9	11.0	48 26.3	+30.1	11.2	82
83	42 02.0	+27.8	8.8	43 01.3	+28.0	8.9	44 00.5	+28.2	9.0	44 59.8	+28.3	9.2	45 59.0	+28.6	9.4	46 58.2	+28.8	9.5	47 57.3	+29.0	9.7	48 56.4	+29.3	9.9	83
84	42 29.8	+27.1	7.6	43 29.3	+27.2	7.7	44 28.7	+27.4	7.8	45 28.1	+27.6	7.9	46 27.6	+27.7	8.1	47 27.0	+27.9	8.2	48 26.3	+28.1	8.4	49 25.7	+28.2	8.6	84
85	42 56.9	+26.2	6.3	43 56.5	+26.4	6.4	44 56.1	+26.6	6.6	45 55.7	+26.7	6.7	46 55.3	+26.8	6.8	47 54.9	+26.9	6.9	48 54.4	+27.2	7.1	49 53.9	+27.4	7.2	85
86	43 23.1	+25.5	5.1	44 22.9	+25.6	5.2	45 22.7	+25.6	5.3	46 22.4	+25.8	5.4	47 22.1	+25.9	5.5	48 21.8	+26.1	5.6	49 21.6	+26.1	5.7	50 21.3	+26.2	5.8	86
87	43 48.6	+24.7	3.9	44 48.5	+24.7	3.9	45 48.3	+24.9	4.0	46 48.2	+24.9	4.1	47 48.0	+25.0	4.1	48 47.9	+25.2	4.2	49 47.7	+25.2	4.3	50 47.5	+25.3	4.4	87
88	44 13.3	+23.8	2.6	45 13.2	+23.9	2.6	46 13.2	+23.8	2.7	47 13.1	+23.9	2.7	48 13.0	+24.0	2.8	49 12.9	+24.1	2.8	50 12.9	+24.1	2.9	51 12.8	+24.2	3.0	88
89	44 37.1	+22.9	1.3	45 37.1	+22.9	1.3	46 37.0	+23.0	1.3	47 37.0	+23.0	1.4	48 37.0	+23.0	1.4	49 37.0	+23.0	1.4	50 37.0	+23.0	1.5	51 37.0	+23.0	1.5	89
90	45 00.0	+22.0	0.0	46 00.0	+22.0	0.0	47 00.0	+22.0	0.0	48 00.0	+22.0	0.0	49 00.0	+22.0	0.0	50 00.0	+21.9	0.0	51 00.0	+21.9	0.0	52 00.0	+21.9	0.0	90

	45°	46°	47°	48°	49°	50°	51°	52°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 112°, 248°

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	14 40.7	+43.8	105.2	14 24.9	+44.5	105.4	14 08.8	+45.2	105.7	13 52.5	+45.8	105.9	13 35.9	+46.5	106.2	13 19.1	+47.2	106.4	13 02.0	+47.9	106.6	12 44.8	+48.4	106.8	0
1	15 24.5	+43.7	104.5	15 09.4	+44.4	104.7	14 54.0	+45.1	105.0	14 38.3	+45.8	105.3	14 22.4	+46.5	105.5	14 06.3	+47.0	105.8	13 49.9	+47.7	106.0	13 33.2	+48.4	106.2	1
2	16 08.2	+43.5	103.8	15 53.8	+44.2	104.0	15 39.1	+44.9	104.3	15 24.1	+45.6	104.6	15 08.9	+46.3	104.9	14 53.3	+47.0	105.1	14 37.6	+47.6	105.4	14 21.6	+48.2	105.6	2
3	16 51.7	+43.4	103.0	16 38.0	+44.1	103.3	16 24.0	+44.8	103.6	16 09.7	+45.5	103.9	15 55.2	+46.2	104.2	15 40.3	+46.9	104.5	15 25.2	+47.5	104.7	15 09.8	+48.2	105.0	3
4	17 35.1	+43.2	102.3	17 22.1	+44.0	102.6	17 08.8	+44.7	102.9	16 55.2	+45.4	103.2	16 41.4	+46.0	103.5	16 27.2	+46.7	103.8	16 12.7	+47.4	104.1	15 58.0	+48.0	104.4	4
5	18 18.3	+43.0	101.6	18 06.1	+43.7	101.9	17 53.5	+44.5	102.2	17 40.6	+45.3	102.5	17 27.4	+46.0	102.9	17 13.9	+46.6	103.2	17 00.1	+47.3	103.5	16 46.0	+47.9	103.8	5
6	19 01.3	+42.9	100.9	18 49.8	+43.7	101.2	18 38.0	+44.4	101.5	18 25.9	+45.0	101.9	18 13.4	+45.7	102.2	18 00.5	+46.5	102.5	17 47.4	+47.1	102.8	17 33.9	+47.8	103.1	6
7	19 44.2	+42.6	100.1	19 33.5	+43.4	100.5	19 22.4	+44.2	100.8	19 10.9	+45.0	101.2	18 59.1	+45.7	101.5	18 47.0	+46.4	101.8	18 34.5	+47.1	102.2	18 21.7	+47.7	102.5	7
8	20 26.8	+42.5	99.4	20 16.9	+43.2	99.7	20 06.6	+44.0	100.1	19 55.9	+44.7	100.5	19 44.8	+45.5	100.8	19 33.4	+46.1	101.2	19 21.6	+46.8	101.5	19 09.4	+47.6	101.8	8
9	21 09.3	+42.3	98.6	21 00.1	+43.1	99.0	20 50.6	+43.8	99.4	20 40.6	+44.6	99.7	20 30.3	+45.3	100.1	20 19.5	+46.1	100.5	20 08.4	+46.8	100.8	19 57.0	+47.4	101.2	9
10	21 51.6	+42.1	97.9	21 43.2	+42.9	98.2	21 34.4	+43.6	98.6	21 25.2	+44.4	99.0	21 15.6	+45.1	99.4	21 05.6	+45.8	99.8	20 55.2	+46.5	100.2	20 44.4	+47.2	100.5	10
11	22 33.7	+41.8	97.1	22 26.1	+42.6	97.5	22 18.0	+43.5	97.9	22 09.6	+44.2	98.3	22 00.7	+45.0	98.7	21 51.4	+45.7	99.1	21 41.7	+46.4	99.5	21 31.6	+47.1	99.9	11
12	23 15.5	+41.6	96.3	23 08.7	+42.4	96.7	23 01.5	+43.2	97.2	22 53.8	+44.0	97.6	22 45.7	+44.7	98.0	22 37.1	+45.5	98.4	22 28.1	+46.2	98.8	22 18.7	+46.9	99.2	12
13	23 57.1	+41.4	95.5	23 51.1	+42.2	96.0	23 44.7	+43.0	96.4	23 37.8	+43.7	96.8	23 30.4	+44.6	97.3	23 22.6	+45.3	97.7	23 14.3	+46.1	98.1	23 05.6	+46.8	98.5	13
14	24 38.5	+41.1	94.7	24 33.3	+42.0	95.2	24 27.7	+42.7	95.6	24 21.5	+43.6	96.1	24 15.0	+44.3	96.5	24 07.9	+45.1	97.0	24 00.4	+45.8	97.4	23 52.4	+46.6	97.9	14
15	25 19.6	+40.9	93.9	25 15.3	+41.7	94.4	25 10.4	+42.5	94.9	25 05.1	+43.3	95.3	24 59.3	+44.1	95.8	24 53.0	+44.9	96.3	24 46.2	+45.7	96.7	24 39.0	+46.4	97.2	15
16	26 00.5	+40.5	93.1	25 57.0	+41.4	93.6	25 52.9	+42.3	94.1	25 48.4	+43.1	94.6	25 43.4	+43.9	95.0	25 37.9	+44.7	95.5	25 31.9	+45.4	96.0	25 25.4	+46.1	96.5	16
17	26 41.0	+40.3	92.3	26 38.4	+41.1	92.8	26 35.2	+42.0	93.3	26 31.5	+42.8	93.8	26 27.3	+43.6	94.3	26 22.6	+44.4	94.8	26 17.3	+45.2	95.3	26 11.5	+46.0	95.8	17
18	27 21.3	+40.0	91.5	27 19.5	+40.9	92.0	27 17.2	+41.7	92.5	27 14.3	+42.6	93.0	27 10.9	+43.4	93.5	27 07.0	+44.2	94.0	27 02.5	+45.0	94.5	26 57.5	+45.8	95.0	18
19	28 01.3	+39.7	90.6	28 00.4	+40.6	91.1	27 58.9	+41.5	91.7	27 56.9	+42.3	92.2	27 54.3	+43.1	92.7	27 51.2	+43.9	93.3	27 47.5	+44.7	93.8	27 43.3	+45.5	94.3	19
20	28 41.0	+39.3	89.8	28 41.0	+40.2	90.3	28 40.4	+41.1	90.9	28 39.2	+42.0	91.4	28 37.4	+42.9	91.9	28 35.1	+43.7	92.5	28 32.2	+44.5	93.0	28 28.8	+45.2	93.6	20
21	29 20.3	+39.1	88.9	29 21.2	+39.9	89.5	29 21.5	+40.8	90.0	29 21.2	+41.7	90.6	29 20.3	+42.5	91.1	29 18.8	+43.4	91.7	29 16.7	+44.2	92.3	29 14.0	+45.1	92.8	21
22	29 59.4	+38.6	88.0	30 01.1	+39.6	88.6	30 02.3	+40.5	89.2	30 02.9	+41.3	89.8	30 02.8	+42.3	90.3	30 02.2	+43.1	90.9	30 00.9	+43.9	91.5	29 59.1	+44.7	92.1	22
23	30 38.0	+38.3	87.1	30 40.7	+39.2	87.7	30 42.8	+40.1	88.3	30 44.2	+41.1	88.9	30 45.1	+41.9	89.5	30 45.3	+42.8	90.1	30 44.8	+43.7	90.7	30 43.8	+44.5	91.3	23
24	31 16.3	+37.9	86.2	31 19.9	+38.9	86.8	31 22.9	+39.8	87.5	31 25.3	+40.7	88.1	31 27.0	+41.6	88.7	31 28.1	+42.4	89.3	31 28.5	+43.3	89.9	31 28.3	+44.2	90.5	24
25	31 54.2	+37.6	85.3	31 58.8	+38.5	85.9	32 02.7	+39.4	86.6	32 06.0	+40.3	87.2	32 08.6	+41.2	87.8	32 10.5	+42.2	88.5	32 11.8	+43.0	89.1	32 12.5	+43.8	89.7	25
26	32 31.8	+37.1	84.4	32 37.3	+38.1	85.0	32 42.1	+39.1	85.7	32 46.3	+40.0	86.3	32 49.8	+40.9	87.0	32 52.7	+41.8	87.6	32 54.8	+42.7	88.3	32 56.3	+43.6	88.9	26
27	33 08.9	+36.7	83.5	33 15.4	+37.6	84.1	33 21.2	+38.6	84.8	33 26.3	+39.6	85.4	33 30.7	+40.6	86.1	33 34.5	+41.4	86.8	33 37.5	+42.4	87.4	33 39.9	+43.2	88.1	27
28	33 45.6	+36.2	82.5	33 53.0	+37.3	83.2	33 59.8	+38.2	83.9	34 05.9	+39.2	84.5	34 11.3	+40.1	85.2	34 15.9	+41.1	85.9	34 19.9	+42.0	86.6	34 23.1	+42.9	87.2	28
29	34 21.8	+35.8	81.6	34 30.3	+36.8	82.2	34 38.0	+37.8	82.9	34 45.1	+38.7	83.6	34 51.4	+39.7	84.3	34 57.0	+40.7	85.0	35 01.9	+41.6	85.7	35 06.0	+42.5	86.4	29
30	34 57.6	+35.3	80.6	35 07.1	+36.3	81.3	35 15.8	+37.4	82.0	35 23.8	+38.4	82.7	35 31.1	+39.3	83.4	35 37.7	+40.2	84.1	35 43.5	+41.2	84.8	35 48.5	+42.2	85.5	30
31	35 32.9	+34.9	79.6	35 43.4	+35.9	80.3	35 53.2	+36.8	81.0	36 02.2	+37.8	81.7	36 10.4	+38.9	82.5	36 17.9	+39.9	83.2	36 24.7	+40.8	83.9	36 30.7	+41.7	84.6	31
32	36 07.8	+34.3	78.6	36 19.3	+35.3	79.3	36 30.0	+36.4	80.0	36 40.0	+37.4	80.8	36 49.3	+38.4	81.5	36 57.8	+39.3	82.2	37 05.5	+40.3	83.0	37 12.4	+41.3	83.7	32
33	36 42.1	+33.8	77.6	36 54.6	+34.8	78.3	37 06.4	+35.9	79.0	37 17.4	+36.9	79.8	37 27.7	+37.9	80.5	37 37.1	+39.0	81.3	37 45.8	+39.9	82.1	37 53.7	+40.9	82.8	33
34	37 15.9	+33.2	76.5	37 29.4	+34.3	77.3	37 42.3	+35.3	78.0	37 54.3	+36.4	78.8	38 05.6	+37.4	79.6	38 16.1	+38.4	80.3	38 25.7	+39.5	81.1	38 34.6	+40.5	81.9	34
35	37 49.1	+32.7	75.5	38 03.7	+33.8	76.2	38 17.6	+34.8	77.0	38 30.7	+35.9	77.8	38 43.0	+36.9	78.6	38 54.5	+38.0	79.3	39 05.2	+39.0	80.1	39 15.1	+39.9	81.0	35
36	38 21.8	+32.0	74.4	38 37.5	+33.1	75.2	38 52.4	+34.3	76.0	39 06.6	+35.3	76.7	39 19.9	+36.4	77.5	39 32.5	+37.4	78.3	39 44.2	+38.4	79.2	39 55.0	+39.5	80.0	36
37	38 53.8	+31.5	73.3	39 10.6	+32.6	74.1	39 26.7	+33.6	74.9	39 41.9	+34.7	75.7	39 56.3	+35.8	76.5	40 09.9	+36.9	77.3	40 22.6	+37.9	78.2	40 34.5	+39.0	79.0	37
38	39 25.3	+30.8	72.2	39 43.2	+32.0	73.0	40 00.3	+33.1	73.8	40 16.6	+34.2	74.6	40 32.1	+35.2	75.5	40 46.8	+36.3	76.3	41 00.5	+37.4	77.1	41 13.5	+38.4	78.0	38
39	39 56.1	+30.2	71.1	40 15.2	+31.3	71.9	40 33.4	+32.4	72.7	40 50.8	+33.5	73.6	41 07.3	+34.7	74.4	41 23.1	+35.7	75.2	41 37.9	+36.8	76.1	41 51.9	+37.9	77.0	39
40	40 26.3	+29.6	70.0	40 46.5	+30.6	70.8	41 05.8	+31.8	71.6	41 24.3	+32.9	72.5	41 42.0	+34.0	73.3	41 58.8	+35.1	74.2	42 14.7	+36.2	75.0	42 29.8	+37.2	75.9	40
41	40 55.9	+28.8	68.8	41 17.1	+30.0	69.7	41 37.6	+31.1	70.5	41 57.2	+32.2	71.3	42 16.0	+33.3	72.2	42 33.9	+34.4	73.1	42 50.9	+35.6	74.0	43 07.0	+36.7	74.8	41
42	41 24.7	+28.1	67.7	41 47.1	+29.2	68.5	42 08.7	+30.4	69.3	42 29.4	+31.5	70.2	42 49.3	+32.7	71.1	43 08.3	+33.8	71.9	43 26.5	+34.9	72.8	43 43.7	+36.1	73.8	42
43	41 52.8	+27.4	66.5	42 16.3	+28.6	67.3	42 39.1	+29.6	68.2	43 00.9	+30.9	69.0	43 22.0	+31.9	69.9	43 42.1	+33.1	70.8	44 01.4	+34.3	71.7	44 19.8	+35.4	72.6	43
44	42 20.2	+26.6	65.3	42 44.9	+27.7	66.1	43 08.7	+28.9	67.0	43 31.8	+30.0	67.9	43 53.9	+31.3	68.7	44 15.2	+32.4	69.7	44 35.7	+33.5	70.6	44 55.2	+34.6	71.5	44
45	42 46.8	+25.8	64.1	43 12.6	+27.0	64.9	43 37.6	+28.2	65.8	44 01.8	+29.4	66.7	44 25.2	+30.5	67.6	44 47.6	+31.7	68.5	45 09.2	+32.8	69.4	45 29.8	+34.0	70.4	45
46	43 12.6	+25.0	62.8	43 39.6	+26.2	63.7	44 05.8	+27.4	64.6	44 31.2	+28.5	65.4	44 55.7	+29.7	66.3	45 19.3	+30.9	67.3	45 42.0	+32.1	68.2	46 03.8	+33.3	69.2	46
47	43 37.6	+24.2	61.6	44 05.8	+25.4	62.4	44 33.2	+26.5	63.3	44 59.7	+27.7	64.2	45 25.4	+28.9	65.1	45 50.2	+30.1	66.0	46 14.1	+31.2	67.0	46 37.1	+32.4	68.0	47
48	44 01.8	+23.4	60.3	44 31.2	+24.5	61.2	44 59.7	+25.7	62.1	45 27.4	+26.9	62.9	45 54.3	+28.0	63.9	46 20.3	+29.2	64.8	46 45.3	+30.5	65.8	47 09.5	+31.7	66.7	48
49	44 25.2	+22.4	59.0	44 55.7	+23.6	59.9	45 25.4	+24.8	60.8	45 54.3	+26.0	61.7	46 22.3	+27.2	62.6	46 49.5	+28.4	63.5	47 15.8	+29.6	64.5	47 41.2	+30.8	65.5	49
50	44 47.6	+21.6	57.7	45 19.3	+22.7	58.6	45 50.2	+23.9	59.5	46 20.3	+25.0	60.4	46 49.5	+26.3	61.3	47 17.9	+27.5	62.2	47 45.4	+28.7	63.2	48 12.0	+29.9	64.2	50
51	45 09.2	+20.6	56.4	45 42.0	+21.8	57.3	46 14.1	+23.0	58.1	46 45.3	+24.2	59.0	47 15.8	+25.4	60.0	47 45.4	+26.6	60.9	48 14.1	+27.8	61.9	48 41.9	+29.1	62.9	51
52	45 29.8	+19.7	55.1	46 03.8	+20.9	55.9	46 37.1	+22.0	56.8	47 09.5	+23.2	57.7	47 41.2	+24.4	58.6	48 12.0	+25.6	59.6	48 41.9	+26.9	60.6	49 11.0	+28.1	61.6	52
53	45 49.5	+18.8	53.7	46 24.7	+19.9	54.6	46 59.1	+21.0	55.4	47 32.7	+22.3	56.3	48 05.6	+23.4	57.3	48 37.6	+24.7	58.2	49 08.8	+25.9	59.2	49 39.1	+27.1	60.2	53
54	46 08.3	+17.7	52.4	46 44.6	+18.8	53.2	47 20.1	+20.1	54.1	47 55.0	+21.2	55.0	48 29.0	+22.5	55.9	49 02.3	+23.6	56.8	49 34.7	+24.8	57.8	50 06.2	+26.1	58.8	54
55	46 26.0	+16.7	51.0	47 03.4	+17.9	51.8	47 40.2	+19.0	52.7	48 16.2	+20.2	53.6	48 51.5	+21.3	54.5	49 25.9	+22.6	55.4	49 59.5	+23.9	56.4	50 32.3	+25.1	57.4	55
56	46 42.7	+15.7	49.6	47 21.3	+16.8	50.4	47 59.2	+18.0	51.3	48 36.4	+19.1	52.1	49 12.8	+20.4	53.1	49 48.5	+21.5	54.0	50 23.4	+22.7	55.0	50 57.4	+24.0	56.0	56
57	46 58.4	+14.7	48.2	47 38.1	+15.8	49.0	48 17.2	+16.9	49.8	48 55.5	+18.1	50.7	49 33.2	+19.2	51.6	50 10.0	+20.5	52.5	50 46.1	+21.7	53.5	51 21.4	+22.9	54.5	57
58	47 13.1	+13.6	46.8	47 53.9	+14.7	47.6	48 34.1	+15.8	48.4	49 13.6	+16.9	49.2	49 52.4	+18.1	50.1	50 30.5	+19.3	51.1	51 07.8	+20.5	52.0	51 44.3	+21.7	53.0	58
59	47 26.7	+12.5	45.3	48 08.6	+13.5	46.1	48 49.9	+14.7	46.9	49 30.5	+15.8	47.8	50 10.5	+17.0	48.7	50 49.8	+18.1	49.6	51 28.3	+19.3	50.5	52 06.0	+20.6	51.5	59
60	47 39.2	+11.3	43.9	48 22.1	+12.5	44.6	49 04.5	+13.6	45.4	49 46.3	+14.7	46.3	50 27.5	+15.7	47.2	51 07.9	+17.0	48.1	51 47.6	+18.2	49.0	52 26.6	+19.4	50.0	60
61	47 50.5	+10.3	42.4	48 34.6	+11.3	43.2	49 18.1	+12.3	44.0	50 01.0	+13.4	44.8	50 43.2	+14.6	45.6	51 24.9	+15.7	46.5	52 05.8	+16.9	47.5	52 46.0	+18.1	48.4	61
62	48 00.8	+9.2	40.9	48 45.9	+10.1	41.7	49 30.4	+11.2	42.5	50 14.4	+12.3	43.3	50 57.8	+13.4	44.1	51 40.6	+14.5	45.0	52 22.7	+15.7	45.9	53 04.1	+16.8	46.8	62
63	48 10.0	+8.0	39.5	48 56.0	+9.0	40.2	49 41.6	+10.0	40.9	50 26.7	+11.0	41.7	51 11.2	+12.1	42.5	51 55.1	+13.2	43.4	52 38.4	+14.3	44.3	53 20.9	+15.6	45.2	63
64	48 18.0	+6.8	38.0	49 05.0	+7.8	38.7	49 51.6	+8.8	39.4	50 37.7	+9.8	40.2	51 23.3	+10.9	41.0	52 08.3	+12.0	41.8	52 52.7	+13.1	42.7	53 36.5	+14.2	43.6	64
65	48 24.8	+5.7	36.5	49 12.8	+6.6	37.2	50 00.4	+7.6	37.9	50 47.5	+8.6	38.6	51 34.2	+9.5	39.4	52 20.3	+10.6	40.2	53 05.8	+11.7	41.1	53 50.7	+12.8	42.0	65
66	48 30.5	+4.4	35.0	49 19.4	+5.4	35.6	50 08.0	+6.3	36.3	50 56.1	+7.3	37.1	51 43.7	+8.3	37.8	52 30.9	+9.3	38.6	53 17.5	+10.4	39.4	54 03.5	+11.5	40.3	66
67	48 34.9	+3.4	33.5	49 24.8	+4.2	34.1	50 14.3	+5.1	34.8	51 03.4	+6.0	35.5	51 52.0	+7.0	36.2	52 40.2	+8.0	37.0	53 27.9	+9.0	37.8	54 15.0	+10.1	38.6	67
68	48 38.3	+2.1	32.0	49 29.0	+3.0	32.6	50 19.4	+3.8	33.2	51 09.4	+4.7	33.9	51 59.0	+5.6	34.6	52 48.2	+6.6	35.3	53 36.9	+7.6	36.1	54 25.1	+8.6	36.9	68
69	48 40.4	+0.9	30.4	49 32.0	+1.7	31.0	50 23.2	+2.6	31.6	51 14.1	+3.4	32.3	52 04.6	+4.3	33.0	52 54.8	+5.2	33.7	53 44.5	+6.1	34.4	54 33.7	+7.2	35.2	69
70	48 41.3	−0.2	28.9	49 33.7	+0.5	29.5	50 25.8	+1.3	30.1	51 17.5	+2.1	30.7	52 08.9	+3.0	31.4	53 00.0	+3.8	32.0	53 50.6	+4.8	32.8	54 40.9	+5.7	33.5	70
71	48 41.1	−1.5	27.4	49 34.2	−0.7	27.9	50 27.1	+0.0	28.5	51 19.6	+0.8	29.1	52 11.9	+1.6	29.7	53 03.8	+2.5	30.4	53 55.4	+3.3	31.1	54 46.6	+4.2	31.8	71
72	48 39.6	−2.6	25.9	49 33.5	−2.0	26.4	50 27.1	−1.3	26.9	51 20.4	−0.5	27.5	52 13.5	+0.3	28.1	53 06.3	+1.1	28.7	53 58.7	+1.9	29.4	54 50.8	+2.8	30.1	72
73	48 37.0	−3.9	24.4	49 31.5	−3.2	24.9	50 25.8	−2.5	25.4	51 19.9	−1.8	25.9	52 13.8	−1.1	26.5	53 07.4	−0.4	27.1	54 00.6	+0.5	27.7	54 53.6	+1.3	28.3	73
74	48 33.1	−5.0	22.9	49 28.3	−4.4	23.3	50 23.3	−3.7	23.8	51 18.1	−3.1	24.3	52 12.7	−2.4	24.8	53 07.0	−1.7	25.4	54 01.1	−1.0	26.0	54 54.9	−0.2	26.6	74
75	48 28.1	−6.1	21.4	49 23.9	−5.6	21.8	50 19.6	−5.1	22.2	51 15.0	−4.4	22.7	52 10.3	−3.8	23.2	53 05.3	−3.1	23.7	54 00.1	−2.4	24.3	54 54.7	−1.7	24.9	75
76	48 22.0	−7.4	19.9	49 18.3	−6.8	20.3	50 14.5	−6.2	20.7	51 10.6	−5.7	21.1	52 06.5	−5.1	21.6	53 02.2	−4.5	22.1	53 57.7	−3.9	22.6	54 53.0	−3.2	23.1	76
77	48 14.6	−8.5	18.4	49 11.5	−8.0	18.7	50 08.3	−7.5	19.1	51 04.9	−7.0	19.5	52 01.4	−6.5	20.0	52 57.7	−5.9	20.4	53 53.8	−5.3	20.9	54 49.8	−4.7	21.4	77
78	48 06.1	−9.6	16.9	49 03.5	−9.2	17.2	50 00.8	−8.8	17.6	50 57.9	−8.3	18.0	51 54.9	−7.7	18.3	52 51.8	−7.2	18.8	53 48.5	−6.7	19.2	54 45.1	−6.1	19.7	78
79	47 56.5	−10.7	15.4	48 54.3	−10.3	15.7	49 52.0	−9.9	16.0	50 49.6	−9.5	16.4	51 47.2	−9.1	16.7	52 44.6	−8.6	17.1	53 41.8	−8.1	17.5	54 39.0	−7.6	17.9	79
80	47 45.8	−11.9	14.0	48 44.0	−11.6	14.2	49 42.1	−11.2	14.5	50 40.1	−10.7	14.8	51 38.1	−10.4	15.1	52 36.0	−10.0	15.5	53 33.7	−9.5	15.8	54 31.4	−9.0	16.2	80
81	47 33.9	−13.0	12.5	48 32.4	−12.6	12.7	49 30.9	−12.3	13.0	50 29.4	−12.0	13.3	51 27.7	−11.6	13.6	52 26.0	−11.2	13.9	53 24.2	−10.8	14.2	54 22.4	−10.4	14.5	81
82	47 20.9	−14.0	11.1	48 19.8	−13.8	11.3	49 18.6	−13.5	11.5	50 17.4	−13.2	11.7	51 16.1	−12.9	12.0	52 14.8	−12.6	12.3	53 13.4	−12.2	12.5	54 11.9	−11.9	12.8	82
83	47 06.9	−15.1	9.6	48 06.0	−14.8	9.8	49 05.1	−14.6	10.0	50 04.2	−14.4	10.2	51 03.2	−14.1	10.4	52 02.2	−13.8	10.7	53 01.2	−13.6	10.9	54 00.0	−13.2	11.2	83
84	46 51.8	−16.2	8.2	47 51.2	−16.0	8.4	48 50.5	−15.7	8.5	49 49.8	−15.5	8.7	50 49.1	−15.3	8.8	51 48.4	−15.1	9.1	52 47.6	−14.8	9.3	53 46.8	−14.6	9.5	84
85	46 35.6	−17.1	6.8	47 35.2	−17.0	6.9	48 34.8	−16.9	7.1	49 34.3	−16.7	7.2	50 33.8	−16.5	7.4	51 33.3	−16.3	7.5	52 32.8	−16.1	7.7	53 32.2	−15.9	7.9	85
86	46 18.5	−18.2	5.4	47 18.2	−18.1	5.5	48 17.9	−17.9	5.6	49 17.6	−17.8	5.7	50 17.3	−17.6	5.9	51 17.0	−17.5	6.0	52 16.7	−17.4	6.1	53 16.3	−17.2	6.3	86
87	46 00.3	−19.2	4.0	47 00.1	−19.0	4.1	47 59.8	−19.0	4.2	48 59.8	−18.9	4.3	49 59.7	−18.8	4.4	50 59.5	−18.7	4.5	51 59.3	−18.6	4.6	52 59.1	−18.5	4.7	87
88	45 41.1	−20.1	2.7	46 41.1	−20.1	2.7	47 41.0	−20.0	2.8	48 40.9	−19.9	2.8	49 40.9	−19.9	2.9	50 40.8	−19.8	2.9	51 40.7	−19.8	3.0	52 40.6	−19.7	3.1	88
89	45 21.0	−21.0	1.3	46 21.0	−21.0	1.4	47 21.0	−21.0	1.4	48 21.0	−21.0	1.4	49 21.0	−21.0	1.4	50 21.0	−21.0	1.5	51 20.9	−20.9	1.5	52 20.9	−20.9	1.5	89
90	45 00.0	−22.0	0.0	46 00.0	−22.0	0.0	47 00.0	−22.0	0.0	48 00.0	−22.0	0.0	49 00.0	−22.0	0.0	50 00.0	−22.0	0.0	51 00.0	−22.1	0.0	52 00.0	−22.1	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	14 40.7	-43.9	105.2	14 24.9	-44.6	105.4	14 08.8	-45.3	105.7	13 52.5	-46.0	105.9	13 35.9	-46.6	106.2	13 19.1	-47.3	106.4	13 02.0	-47.9	106.6	12 44.8	-48.5	106.8	0
1	13 56.8	-44.0	105.9	13 40.3	-44.8	106.1	13 23.5	-45.4	106.4	13 06.5	-46.1	106.6	12 49.3	-46.8	106.8	12 31.8	-47.4	107.0	12 14.1	-48.0	107.2	11 56.3	-48.6	107.4	1
2	13 12.8	-44.2	106.6	12 55.5	-44.8	106.8	12 38.1	-45.5	107.0	12 20.4	-46.2	107.2	12 02.5	-46.8	107.4	11 44.4	-47.4	107.6	11 26.1	-48.0	107.8	11 07.7	-48.7	108.0	2
3	12 28.6	-44.2	107.3	12 10.7	-44.9	107.5	11 52.6	-45.6	107.7	11 34.2	-46.2	107.9	11 15.7	-46.9	108.1	10 57.0	-47.5	108.3	10 38.1	-48.2	108.5	10 19.0	-48.7	108.6	3
4	11 44.4	-44.4	108.0	11 25.8	-45.1	108.2	11 07.0	-45.7	108.4	10 48.0	-46.4	108.5	10 28.8	-47.0	108.7	10 09.5	-47.6	108.9	9 49.9	-48.1	109.1	9 30.3	-48.8	109.2	4
5	11 00.0	-44.4	108.7	10 40.7	-45.1	108.8	10 21.3	-45.8	109.0	10 01.6	-46.4	109.2	9 41.8	-47.0	109.4	9 21.9	-47.7	109.5	9 01.8	-48.3	109.7	8 41.5	-48.9	109.8	5
6	10 15.6	-44.6	109.3	9 55.6	-45.2	109.5	9 35.5	-45.9	109.7	9 15.2	-46.5	109.8	8 54.8	-47.1	110.0	8 34.2	-47.7	110.1	8 13.5	-48.3	110.3	7 52.6	-48.8	110.4	6
7	9 31.0	-44.6	110.0	9 10.4	-45.3	110.2	8 49.6	-45.9	110.3	8 28.7	-46.5	110.5	8 07.7	-47.2	110.6	7 46.5	-47.8	110.7	7 25.2	-48.4	110.9	7 03.8	-49.0	111.0	7
8	8 46.4	-44.7	110.7	8 25.1	-45.3	110.8	8 03.7	-46.0	111.0	7 42.2	-46.6	111.1	7 20.5	-47.2	111.2	6 58.7	-47.8	111.3	6 36.8	-48.4	111.5	6 14.8	-48.9	111.6	8
9	8 01.7	-44.7	111.4	7 39.8	-45.4	111.5	7 17.7	-46.0	111.6	6 55.6	-46.7	111.7	6 33.3	-47.3	111.9	6 10.9	-47.9	112.0	5 48.4	-48.4	112.1	5 25.9	-49.1	112.1	9
10	7 17.0	-44.8	112.0	6 54.4	-45.5	112.2	6 31.7	-46.1	112.3	6 08.9	-46.7	112.4	5 46.0	-47.3	112.5	5 23.0	-47.8	112.6	5 00.0	-48.5	112.6	4 36.8	-49.0	112.7	10
11	6 32.2	-44.9	112.7	6 08.9	-45.5	112.8	5 45.6	-46.1	112.9	5 22.2	-46.7	113.0	4 58.7	-47.3	113.1	4 35.2	-48.0	113.2	4 11.5	-48.5	113.2	3 47.8	-49.0	113.3	11
12	5 47.3	-44.9	113.4	5 23.4	-45.5	113.5	4 59.5	-46.2	113.6	4 35.5	-46.8	113.6	4 11.4	-47.4	113.7	3 47.2	-47.9	113.8	3 23.0	-48.5	113.8	2 58.8	-49.1	113.9	12
13	5 02.4	-45.0	114.1	4 37.9	-45.6	114.1	4 13.3	-46.2	114.2	3 48.7	-46.8	114.3	3 24.0	-47.4	114.3	2 59.3	-48.0	114.4	2 34.5	-48.5	114.4	2 09.7	-49.1	114.5	13
14	4 17.4	-45.0	114.7	3 52.3	-45.6	114.8	3 27.1	-46.2	114.8	3 01.9	-46.8	114.9	2 36.6	-47.3	114.9	2 11.3	-48.0	115.0	1 46.0	-48.5	115.0	1 20.6	-49.1	115.0	14
15	3 32.4	-45.0	115.4	3 06.7	-45.6	115.4	2 40.9	-46.2	115.5	2 15.1	-46.9	115.5	1 49.2	-47.4	115.5	1 23.3	-48.0	115.6	0 57.4	-48.5	115.6	0 31.5	-49.1	115.6	15
16	2 47.4	-45.0	116.0	2 21.1	-45.7	116.1	1 54.7	-46.3	116.1	1 28.2	-46.8	116.2	1 01.8	-47.4	116.2	0 35.3	-48.0	116.2	0 08.9	-48.6	116.2	0 17.6	+49.1	63.8	16
17	2 02.4	-45.1	116.7	1 35.4	-45.7	116.7	1 08.4	-46.2	116.8	0 41.4	-46.9	116.8	0 14.4	-47.5	116.8	0 12.7	+47.9	63.2	0 39.7	+48.5	63.2	1 06.7	+49.1	63.2	17
18	1 17.3	-45.0	117.4	0 49.7	-45.6	117.4	0 22.2	-46.3	117.4	0 05.5	+46.8	62.6	0 33.1	+47.4	62.6	1 00.6	+48.0	62.6	1 28.2	+48.6	62.6	1 55.8	+49.1	62.7	18
19	0 32.3	-45.1	118.0	0 04.1	-45.7	118.0	0 24.1	+46.3	62.0	0 52.3	+46.8	62.0	1 20.5	+47.4	62.0	1 48.6	+48.0	62.0	2 16.8	+48.5	62.1	2 44.9	+49.0	62.1	19
20	0 12.8	+45.1	61.3	0 41.6	+45.7	61.3	1 10.4	+46.2	61.3	1 39.1	+46.9	61.4	2 07.9	+47.4	61.4	2 36.6	+48.0	61.4	3 05.3	+48.5	61.5	3 33.9	+49.1	61.5	20
21	0 57.9	+45.0	60.7	1 27.3	+45.6	60.7	1 56.6	+46.3	60.7	2 26.0	+46.8	60.7	2 55.3	+47.4	60.8	3 24.6	+47.9	60.8	3 53.8	+48.5	60.9	4 23.0	+49.0	60.9	21
22	1 42.9	+45.1	60.0	2 12.9	+45.7	60.0	2 42.9	+46.2	60.1	3 12.8	+46.8	60.1	3 42.7	+47.3	60.2	4 12.5	+47.9	60.2	4 42.3	+48.4	60.3	5 12.0	+49.0	60.4	22
23	2 28.0	+45.0	59.3	2 58.6	+45.6	59.4	3 29.1	+46.2	59.4	3 59.6	+46.8	59.5	4 30.0	+47.4	59.5	5 00.4	+47.9	59.6	5 30.7	+48.4	59.7	6 01.0	+48.9	59.8	23
24	3 13.0	+45.0	58.7	3 44.2	+45.6	58.7	4 15.3	+46.2	58.8	4 46.4	+46.7	58.9	5 17.4	+47.2	58.9	5 48.3	+47.8	59.0	6 19.1	+48.4	59.1	6 49.9	+48.9	59.2	24
25	3 58.0	+45.0	58.1	4 29.8	+45.5	58.1	5 01.5	+46.1	58.1	5 33.1	+46.7	58.2	6 04.6	+47.3	58.3	6 36.1	+47.8	58.4	7 07.5	+48.3	58.5	7 38.8	+48.9	58.6	25
26	4 43.0	+44.9	57.3	5 15.3	+45.5	57.4	5 47.6	+46.1	57.5	6 19.8	+46.6	57.6	6 51.9	+47.2	57.7	7 23.9	+47.8	57.8	7 55.8	+48.3	57.9	8 27.7	+48.8	58.0	26
27	5 27.9	+44.9	56.7	6 00.8	+45.5	56.8	6 33.7	+46.0	56.9	7 06.4	+46.6	57.0	7 39.1	+47.1	57.1	8 11.7	+47.6	57.2	8 44.1	+48.2	57.3	9 16.5	+48.7	57.4	27
28	6 12.8	+44.8	56.0	6 46.3	+45.4	56.1	7 19.7	+46.0	56.2	7 53.0	+46.5	56.3	8 26.2	+47.1	56.4	8 59.3	+47.7	56.6	9 32.3	+48.2	56.7	10 05.2	+48.7	56.9	28
29	6 57.6	+44.8	55.3	7 31.7	+45.3	55.4	8 05.7	+45.9	55.6	8 39.5	+46.5	55.7	9 13.3	+47.0	55.8	9 47.0	+47.5	56.0	10 20.5	+48.1	56.1	10 53.9	+48.6	56.3	29
30	7 42.4	+44.7	54.7	8 17.0	+45.3	54.8	8 51.6	+45.8	54.9	9 26.0	+46.4	55.0	10 00.3	+47.0	55.2	10 34.5	+47.5	55.3	11 08.6	+48.0	55.5	11 42.5	+48.5	55.7	30
31	8 27.1	+44.7	54.0	9 02.3	+45.2	54.1	9 37.4	+45.8	54.3	10 12.4	+46.3	54.4	10 47.3	+46.8	54.6	11 22.0	+47.4	54.7	11 56.6	+47.9	54.9	12 31.0	+48.5	55.1	31
32	9 11.8	+44.5	53.3	9 47.5	+45.2	53.5	10 23.2	+45.7	53.6	10 58.7	+46.3	53.8	11 34.1	+46.8	53.9	12 09.4	+47.3	54.1	12 44.5	+47.9	54.3	13 19.5	+48.4	54.5	32
33	9 56.3	+44.5	52.6	10 32.7	+45.0	52.8	11 08.9	+45.6	52.9	11 45.0	+46.1	53.1	12 20.9	+46.7	53.3	12 56.7	+47.3	53.5	13 32.4	+47.7	53.6	14 07.9	+48.2	53.8	33
34	10 40.8	+44.4	52.0	11 17.7	+45.0	52.1	11 54.5	+45.5	52.3	12 31.1	+46.1	52.5	13 07.6	+46.6	52.6	13 44.0	+47.1	52.8	14 20.1	+47.7	53.0	14 56.1	+48.2	53.2	34
35	11 25.2	+44.3	51.3	12 02.7	+44.8	51.4	12 40.0	+45.4	51.6	13 17.2	+46.0	51.8	13 54.2	+46.5	52.0	14 31.1	+47.0	52.2	15 07.8	+47.6	52.4	15 44.3	+48.1	52.6	35
36	12 09.5	+44.2	50.6	12 47.5	+44.8	50.8	13 25.4	+45.3	50.9	14 03.2	+45.8	51.1	14 40.7	+46.4	51.3	15 18.1	+46.9	51.5	15 55.4	+47.4	51.8	16 32.4	+48.0	52.0	36
37	12 53.7	+44.1	49.9	13 32.3	+44.6	50.1	14 10.7	+45.2	50.3	14 49.0	+45.7	50.5	15 27.1	+46.3	50.7	16 05.0	+46.8	50.9	16 42.8	+47.3	51.1	17 20.4	+47.8	51.4	37
38	13 37.8	+44.0	49.2	14 16.9	+44.6	49.4	14 55.9	+45.1	49.6	15 34.7	+45.6	49.8	16 13.4	+46.1	50.0	16 51.8	+46.7	50.2	17 30.1	+47.2	50.5	18 08.2	+47.7	50.7	38
39	14 21.8	+43.8	48.5	15 01.5	+44.4	48.7	15 41.0	+44.9	48.9	16 20.3	+45.5	49.1	16 59.5	+46.0	49.3	17 38.5	+46.6	49.6	18 17.3	+47.1	49.8	18 55.9	+47.6	50.1	39
40	15 05.6	+43.7	47.8	15 45.9	+44.2	48.0	16 25.9	+44.8	48.2	17 05.8	+45.4	48.4	17 45.5	+45.9	48.7	18 25.1	+46.4	48.9	19 04.4	+46.9	49.2	19 43.5	+47.5	49.4	40
41	15 49.3	+43.6	47.1	16 30.1	+44.1	47.3	17 10.7	+44.7	47.5	17 51.2	+45.2	47.8	18 31.4	+45.7	48.0	19 11.5	+46.2	48.3	19 51.3	+46.8	48.5	20 31.0	+47.3	48.8	41
42	16 32.9	+43.5	46.4	17 14.2	+44.0	46.6	17 55.4	+44.5	46.8	18 36.4	+45.0	47.1	19 17.1	+45.6	47.3	19 57.7	+46.1	47.6	20 38.1	+46.6	47.8	21 18.3	+47.1	48.1	42
43	17 16.4	+43.2	45.6	17 58.2	+43.8	45.9	18 39.9	+44.4	46.1	19 21.4	+44.9	46.4	20 02.7	+45.4	46.6	20 43.8	+46.0	46.9	21 24.7	+46.5	47.2	22 05.4	+47.0	47.5	43
44	17 59.6	+43.1	44.9	18 42.0	+43.7	45.2	19 24.3	+44.1	45.4	20 06.3	+44.7	45.7	20 48.1	+45.3	45.9	21 29.8	+45.7	46.2	22 11.2	+46.3	46.5	22 52.4	+46.8	46.8	44
45	18 42.7	+43.0	44.2	19 25.7	+43.4	44.4	20 08.4	+44.0	44.7	20 51.0	+44.5	44.9	21 33.4	+45.0	45.2	22 15.5	+45.6	45.5	22 57.5	+46.1	45.8	23 39.2	+46.6	46.1	45
46	19 25.7	+42.7	43.4	20 09.1	+43.3	43.7	20 52.4	+43.9	44.0	21 35.5	+44.4	44.2	22 18.4	+44.9	44.5	23 01.1	+45.4	44.8	23 43.6	+45.9	45.1	24 25.8	+46.4	45.4	46
47	20 08.4	+42.6	42.7	20 52.4	+43.1	43.0	21 36.3	+43.6	43.2	22 19.9	+44.1	43.5	23 03.3	+44.7	43.8	23 46.5	+45.2	44.1	24 29.5	+45.7	44.4	25 12.2	+46.3	44.7	47
48	20 51.0	+42.4	41.9	21 35.5	+42.9	42.2	22 19.9	+43.4	42.5	23 04.0	+44.0	42.8	23 48.0	+44.4	43.1	24 31.7	+45.0	43.4	25 15.2	+45.5	43.7	25 58.5	+46.0	44.0	48
49	21 33.4	+42.1	41.2	22 18.4	+42.7	41.5	23 03.3	+43.2	41.7	23 48.0	+43.7	42.0	24 32.4	+44.3	42.3	25 16.7	+44.8	42.6	26 00.7	+45.3	43.0	26 44.5	+45.8	43.3	49
50	22 15.5	+42.0	40.4	23 01.1	+42.5	40.7	23 46.5	+43.0	41.0	24 31.7	+43.5	41.3	25 16.7	+44.0	41.6	26 01.5	+44.5	41.9	26 46.0	+45.1	42.2	27 30.3	+45.6	42.6	50
51	22 57.5	+41.7	39.6	23 43.6	+42.2	39.9	24 29.5	+42.7	40.2	25 15.2	+43.3	40.5	26 00.7	+43.8	40.8	26 46.0	+44.3	41.1	27 31.1	+44.8	41.5	28 15.9	+45.3	41.8	51
52	23 39.2	+41.5	38.9	24 25.8	+42.0	39.1	25 12.2	+42.5	39.4	25 58.5	+43.0	39.7	26 44.5	+43.5	40.1	27 30.3	+44.1	40.4	28 15.9	+44.6	40.7	29 01.2	+45.1	41.1	52
53	24 20.7	+41.2	38.1	25 07.8	+41.7	38.4	25 54.7	+42.3	38.7	26 41.5	+42.8	39.0	27 28.0	+43.3	39.3	28 14.4	+43.8	39.6	29 00.5	+44.3	40.0	29 46.3	+44.9	40.3	53
54	25 01.9	+40.9	37.3	25 49.5	+41.5	37.6	26 37.0	+42.0	37.9	27 24.3	+42.5	38.2	28 11.3	+43.0	38.5	28 58.2	+43.5	38.8	29 44.8	+44.0	39.2	30 31.2	+44.5	39.6	54
55	25 42.8	+40.7	36.5	26 31.0	+41.2	36.8	27 19.0	+41.7	37.1	28 06.8	+42.2	37.4	28 54.3	+42.8	37.7	29 41.7	+43.2	38.1	30 28.8	+43.8	38.4	31 15.7	+44.3	38.8	55
56	26 23.5	+40.5	35.6	27 12.2	+40.9	35.9	28 00.7	+41.4	36.3	28 49.0	+41.9	36.6	29 37.1	+42.4	36.9	30 24.9	+43.0	37.2	31 12.6	+43.4	37.6	32 00.0	+43.9	38.0	56
57	27 04.0	+40.1	34.8	27 53.1	+40.6	35.1	28 42.1	+41.1	35.4	29 30.9	+41.6	35.8	30 19.5	+42.1	36.1	31 07.9	+42.6	36.4	31 56.0	+43.2	36.8	32 43.9	+43.7	37.2	57
58	27 44.1	+39.8	34.0	28 33.7	+40.3	34.3	29 23.2	+40.8	34.6	30 12.5	+41.3	34.9	31 01.6	+41.8	35.3	31 50.5	+42.3	35.6	32 39.2	+42.8	36.0	33 27.6	+43.3	36.4	58
59	28 23.9	+39.5	33.1	29 14.0	+40.0	33.4	30 04.0	+40.5	33.8	30 53.8	+41.0	34.1	31 43.4	+41.5	34.4	32 32.8	+42.0	34.8	33 22.0	+42.4	35.2	34 10.9	+43.0	35.5	59
60	29 03.4	+39.1	32.3	29 54.0	+39.7	32.6	30 44.5	+40.1	32.9	31 34.8	+40.6	33.2	32 24.9	+41.1	33.6	33 14.8	+41.6	33.9	34 04.4	+42.2	34.3	34 53.9	+42.6	34.7	60
61	29 42.5	+38.9	31.4	30 33.7	+39.3	31.7	31 24.6	+39.8	32.0	32 15.4	+40.3	32.4	33 06.0	+40.7	32.7	33 56.4	+41.2	33.1	34 46.6	+41.7	33.4	35 36.5	+42.3	33.8	61
62	30 21.4	+38.4	30.5	31 13.0	+38.9	30.8	32 04.4	+39.4	31.1	32 55.7	+39.8	31.5	33 46.7	+40.4	31.8	34 37.6	+40.9	32.2	35 28.3	+41.4	32.6	36 18.8	+41.8	33.0	62
63	30 59.8	+38.1	29.6	31 51.9	+38.5	29.9	32 43.8	+39.0	30.3	33 35.5	+39.5	30.6	34 27.1	+40.0	30.9	35 18.5	+40.4	31.3	36 09.7	+40.9	31.7	37 00.6	+41.5	32.1	63
64	31 37.9	+37.7	28.7	32 30.4	+38.2	29.0	33 22.8	+38.6	29.3	34 15.0	+39.1	29.7	35 07.1	+39.5	30.0	35 58.9	+40.1	30.4	36 50.6	+40.5	30.8	37 42.1	+41.0	31.1	64
65	32 15.6	+37.3	27.8	33 08.6	+37.7	28.1	34 01.4	+38.2	28.4	34 54.1	+38.7	28.8	35 46.6	+39.2	29.1	36 39.0	+39.6	29.5	37 31.1	+40.1	29.8	38 23.1	+40.5	30.2	65
66	32 52.9	+36.9	26.9	33 46.3	+37.4	27.2	34 39.6	+37.8	27.5	35 32.8	+38.2	27.8	36 25.8	+38.7	28.2	37 18.6	+39.1	28.5	38 11.2	+39.6	28.9	39 03.6	+40.2	29.3	66
67	33 29.8	+36.4	25.9	34 23.7	+36.8	26.2	35 17.4	+37.3	26.5	36 11.0	+37.8	26.9	37 04.5	+38.2	27.2	37 57.7	+38.7	27.6	38 50.8	+39.2	27.9	39 43.8	+39.6	28.3	67
68	34 06.2	+36.0	25.0	35 00.5	+36.5	25.3	35 54.7	+36.9	25.6	36 48.8	+37.3	25.9	37 42.7	+37.7	26.2	38 36.4	+38.2	26.6	39 30.0	+38.6	27.0	40 23.4	+39.1	27.3	68
69	34 42.2	+35.5	24.0	35 37.0	+35.9	24.3	36 31.6	+36.3	24.6	37 26.1	+36.7	24.9	38 20.4	+37.2	25.2	39 14.6	+37.7	25.6	40 08.6	+38.1	26.0	41 02.5	+38.6	26.3	69
70	35 17.7	+35.1	23.0	36 12.9	+35.4	23.3	37 07.9	+35.9	23.6	38 02.8	+36.3	23.9	38 57.6	+36.7	24.2	39 52.3	+37.1	24.6	40 46.7	+37.6	24.9	41 41.1	+38.0	25.3	70
71	35 52.8	+34.5	22.0	36 48.3	+35.0	22.3	37 43.8	+35.3	22.6	38 39.1	+35.8	22.9	39 34.3	+36.2	23.2	40 29.4	+36.6	23.6	41 24.3	+37.0	23.9	42 19.1	+37.4	24.3	71
72	36 27.3	+34.0	21.0	37 23.3	+34.4	21.3	38 19.1	+34.8	21.6	39 14.9	+35.1	21.9	40 10.5	+35.6	22.2	41 06.0	+36.0	22.5	42 01.3	+36.4	22.9	42 56.5	+36.9	23.2	72
73	37 01.3	+33.5	20.0	37 57.7	+33.8	20.3	38 53.9	+34.2	20.5	39 50.0	+34.6	20.8	40 46.1	+35.0	21.1	41 42.0	+35.4	21.4	42 37.7	+35.9	21.8	43 33.4	+36.2	22.1	73
74	37 34.8	+32.9	18.9	38 31.5	+33.3	19.2	39 28.1	+33.6	19.5	40 24.6	+34.0	19.8	41 21.1	+34.3	20.0	42 17.4	+34.7	20.4	43 13.6	+35.1	20.7	44 09.6	+35.6	21.0	74
75	38 07.7	+32.3	17.9	39 04.8	+32.6	18.1	40 01.7	+33.1	18.4	40 58.6	+33.4	18.7	41 55.4	+33.8	19.0	42 52.1	+34.1	19.2	43 48.7	+34.5	19.6	44 45.2	+34.9	19.9	75
76	38 40.0	+31.8	16.8	39 37.4	+32.1	17.1	40 34.8	+32.4	17.3	41 32.0	+32.7	17.6	42 29.2	+33.1	17.8	43 26.2	+33.5	18.1	44 23.2	+33.8	18.4	45 20.1	+34.2	18.7	76
77	39 11.8	+31.1	15.7	40 09.5	+31.4	15.9	41 07.2	+31.7	16.2	42 04.7	+32.1	16.4	43 02.3	+32.4	16.7	43 59.7	+32.7	17.0	44 57.0	+33.1	17.3	45 54.3	+33.4	17.6	77
78	39 42.9	+30.5	14.6	40 40.9	+30.8	14.8	41 38.9	+31.1	15.1	42 36.8	+31.4	15.3	43 34.7	+31.6	15.5	44 32.4	+32.0	15.8	45 30.1	+32.4	16.1	46 27.7	+32.6	16.4	78
79	40 13.4	+29.8	13.5	41 11.7	+30.1	13.7	42 10.0	+30.3	13.9	43 08.2	+30.6	14.1	44 06.3	+31.0	14.4	45 04.4	+31.3	14.6	46 02.5	+31.5	14.9	47 00.4	+31.9	15.1	79
80	40 43.2	+29.1	12.4	41 41.8	+29.4	12.5	42 40.3	+29.7	12.7	43 38.8	+29.9	12.9	44 37.3	+30.2	13.2	45 35.7	+30.4	13.4	46 34.0	+30.8	13.6	47 32.3	+31.0	13.9	80
81	41 12.3	+28.4	11.2	42 11.2	+28.6	11.4	43 10.0	+28.9	11.6	44 08.7	+29.2	11.7	45 07.5	+29.4	11.9	46 06.1	+29.7	12.2	47 04.8	+29.9	12.4	48 03.3	+30.2	12.6	81
82	41 40.7	+27.7	10.0	42 39.8	+27.9	10.2	43 38.9	+28.1	10.3	44 37.9	+28.3	10.5	45 36.8	+28.6	10.7	46 35.8	+28.8	10.9	47 34.7	+29.0	11.1	48 33.5	+29.3	11.3	82
83	42 08.4	+27.0	8.8	43 07.7	+27.2	9.0	44 07.0	+27.3	9.1	45 06.2	+27.5	9.3	46 05.4	+27.7	9.4	47 04.6	+27.9	9.6	48 03.7	+28.2	9.8	49 02.8	+28.4	10.0	83
84	42 35.4	+26.2	7.6	43 34.9	+26.3	7.7	44 34.3	+26.5	7.9	45 33.7	+26.7	8.0	46 33.1	+26.9	8.2	47 32.5	+27.0	8.3	48 31.9	+27.2	8.5	49 31.2	+27.4	8.6	84
85	43 01.6	+25.3	6.4	44 01.2	+25.5	6.5	45 00.8	+25.6	6.6	46 00.4	+25.8	6.7	47 00.0	+25.9	6.9	47 59.5	+26.1	7.0	48 59.1	+26.2	7.1	49 58.6	+26.4	7.3	85
86	43 26.9	+24.6	5.1	44 26.7	+24.6	5.2	45 26.4	+24.8	5.3	46 26.2	+24.9	5.4	47 25.9	+25.0	5.5	48 25.6	+25.1	5.6	49 25.3	+25.3	5.7	50 25.0	+25.4	5.9	86
87	43 51.5	+23.7	3.9	44 51.3	+23.8	4.0	45 51.2	+23.9	4.0	46 51.1	+24.0	4.1	47 50.9	+24.0	4.2	48 50.7	+24.2	4.3	49 50.6	+24.2	4.4	50 50.4	+24.3	4.4	87
88	44 15.2	+22.8	2.6	45 15.1	+22.9	2.7	46 15.1	+22.9	2.7	47 15.0	+23.0	2.8	48 14.9	+23.1	2.8	49 14.9	+23.1	2.9	50 14.8	+23.1	2.9	51 14.7	+23.2	3.0	88
89	44 38.0	+22.0	1.3	45 38.0	+22.0	1.3	46 38.0	+22.0	1.4	47 38.0	+22.0	1.4	48 38.0	+22.0	1.4	49 38.0	+22.0	1.4	50 37.9	+22.1	1.5	51 37.9	+22.1	1.5	89
90	45 00.0	+21.0	0.0	46 00.0	+21.0	0.0	47 00.0	+21.0	0.0	48 00.0	+21.0	0.0	49 00.0	+21.0	0.0	50 00.0	+21.0	0.0	51 00.0	+20.9	0.0	52 00.0	+20.9	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 111°, 249°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	13 59.7	+43.7	104.4	13 44.7	+44.3	104.7	13 29.3	+45.1	104.9	13 13.8	+45.7	105.1	12 58.0	+46.4	105.4	12 42.0	+47.1	105.6	12 25.8	+47.7	105.8	12 09.3	+48.4	106.0	0
1	14 43.4	+43.5	103.7	14 29.0	+44.3	104.0	14 14.4	+45.0	104.2	13 59.5	+45.7	104.5	13 44.4	+46.3	104.7	13 29.1	+46.9	104.9	13 13.5	+47.6	105.2	12 57.7	+48.2	105.4	1
2	15 26.9	+43.4	103.0	15 13.3	+44.1	103.3	14 59.4	+44.8	103.5	14 45.2	+45.5	103.8	14 30.7	+46.2	104.1	14 16.0	+46.9	104.3	14 01.1	+47.5	104.5	13 45.9	+48.2	104.8	2
3	16 10.3	+43.3	102.3	15 57.4	+44.0	102.6	15 44.2	+44.7	102.9	15 30.7	+45.4	103.1	15 16.9	+46.1	103.4	15 02.9	+46.8	103.7	14 48.6	+47.4	103.9	14 34.1	+48.0	104.2	3
4	16 53.6	+43.1	101.6	16 41.4	+43.8	101.9	16 28.9	+44.6	102.2	16 16.1	+45.3	102.4	16 03.0	+46.0	102.7	15 49.7	+46.6	103.0	15 36.0	+47.3	103.3	15 22.1	+48.0	103.5	4
5	17 36.7	+42.9	100.8	17 25.2	+43.7	101.2	17 13.5	+44.4	101.5	17 01.4	+45.1	101.8	16 49.0	+45.8	102.1	16 36.3	+46.5	102.4	16 23.3	+47.2	102.6	16 10.1	+47.8	102.9	5
6	18 19.6	+42.8	100.1	18 08.9	+43.5	100.4	17 57.9	+44.2	100.8	17 46.5	+45.0	101.1	17 34.8	+45.7	101.4	17 22.8	+46.4	101.7	17 10.5	+47.1	102.0	16 57.9	+47.7	102.3	6
7	19 02.4	+42.5	99.4	18 52.4	+43.4	99.7	18 42.1	+44.1	100.0	18 31.5	+44.8	100.4	18 20.5	+45.6	100.7	18 09.2	+46.3	101.0	17 57.6	+46.9	101.3	17 45.6	+47.6	101.7	7
8	19 44.9	+42.4	98.6	19 35.8	+43.1	99.0	19 26.2	+44.0	99.3	19 16.3	+44.7	99.7	19 06.1	+45.4	100.0	18 55.5	+46.1	100.4	18 44.5	+46.8	100.7	18 33.2	+47.5	101.0	8
9	20 27.3	+42.2	97.9	20 18.9	+43.0	98.2	20 10.2	+43.7	98.6	20 01.0	+44.5	99.0	19 51.5	+45.2	99.3	19 41.6	+45.9	99.7	19 31.3	+46.6	100.0	19 20.7	+47.3	100.4	9
10	21 09.5	+42.0	97.1	21 01.9	+42.8	97.5	20 53.9	+43.6	97.9	20 45.5	+44.3	98.2	20 36.7	+45.1	98.6	20 27.5	+45.8	99.0	20 17.9	+46.5	99.4	20 08.0	+47.2	99.7	10
11	21 51.5	+41.8	96.3	21 44.7	+42.6	96.7	21 37.5	+43.3	97.1	21 29.8	+44.1	97.5	21 21.8	+44.8	97.9	21 13.3	+45.6	98.3	21 04.4	+46.4	98.7	20 55.2	+47.0	99.1	11
12	22 33.3	+41.6	95.6	22 27.3	+42.4	96.0	22 20.8	+43.2	96.4	22 13.9	+44.0	96.8	22 06.6	+44.7	97.2	21 58.9	+45.4	97.6	21 50.8	+46.1	98.0	21 42.2	+46.9	98.4	12
13	23 14.9	+41.3	94.8	23 09.7	+42.1	95.2	23 04.0	+42.9	95.6	22 57.9	+43.7	96.1	22 51.3	+44.5	96.5	22 44.3	+45.3	96.9	22 36.9	+46.0	97.3	22 29.1	+46.7	97.7	13
14	23 56.2	+41.1	94.0	23 51.8	+41.9	94.4	23 46.9	+42.7	94.9	23 41.6	+43.5	95.3	23 35.8	+44.3	95.7	23 29.6	+45.0	96.2	23 22.9	+45.8	96.6	23 15.8	+46.5	97.0	14
15	24 37.3	+40.8	93.2	24 33.7	+41.6	93.6	24 29.6	+42.5	94.1	24 25.1	+43.3	94.6	24 20.1	+44.1	95.0	24 14.6	+44.9	95.5	24 08.7	+45.6	95.9	24 02.3	+46.3	96.3	15
16	25 18.1	+40.5	92.4	25 15.3	+41.4	92.9	25 12.1	+42.2	93.3	25 08.4	+43.0	93.8	25 04.2	+43.8	94.3	24 59.5	+44.6	94.7	24 54.3	+45.4	95.2	24 48.6	+46.2	95.7	16
17	25 58.6	+40.3	91.6	25 56.7	+41.2	92.1	25 54.3	+42.0	92.5	25 51.4	+42.8	93.0	25 48.0	+43.6	93.5	25 44.1	+44.4	94.0	25 39.7	+45.2	94.5	25 34.8	+45.9	94.9	17
18	26 38.9	+40.0	90.7	26 37.9	+40.8	91.2	26 36.3	+41.7	91.7	26 34.2	+42.6	92.2	26 31.6	+43.4	92.7	26 28.5	+44.2	93.2	26 24.9	+44.9	93.7	26 20.7	+45.7	94.2	18
19	27 18.9	+39.7	89.9	27 18.7	+40.6	90.4	27 18.0	+41.4	90.9	27 16.8	+42.2	91.4	27 15.0	+43.1	92.0	27 12.7	+43.9	92.5	27 09.8	+44.7	93.0	27 06.4	+45.5	93.5	19
20	27 58.6	+39.3	89.1	27 59.3	+40.2	89.6	27 59.4	+41.2	90.1	27 59.0	+42.0	90.6	27 58.1	+42.8	91.2	27 56.6	+43.6	91.7	27 54.5	+44.5	92.2	27 51.9	+45.2	92.8	20
21	28 37.9	+39.1	88.2	28 39.5	+40.0	88.7	28 40.6	+40.8	89.3	28 41.0	+41.7	89.8	28 40.9	+42.6	90.4	28 40.2	+43.4	90.9	28 39.0	+44.2	91.5	28 37.1	+45.0	92.0	21
22	29 17.0	+38.7	87.3	29 19.5	+39.6	87.9	29 21.4	+40.5	88.5	29 22.7	+41.4	89.0	29 23.5	+42.2	89.6	29 23.6	+43.1	90.1	29 23.2	+43.9	90.7	29 22.1	+44.8	91.3	22
23	29 55.7	+38.3	86.4	29 59.1	+39.2	87.0	30 01.9	+40.2	87.6	30 04.1	+41.1	88.2	30 05.7	+41.9	88.8	30 06.7	+42.8	89.3	30 07.1	+43.6	89.9	30 06.9	+44.4	90.5	23
24	30 34.0	+38.0	85.6	30 38.3	+39.0	86.1	30 42.1	+39.8	86.7	30 45.2	+40.7	87.3	30 47.6	+41.7	87.9	30 49.5	+42.5	88.5	30 50.7	+43.4	89.1	30 51.3	+44.2	89.7	24
25	31 12.0	+37.6	84.7	31 17.3	+38.5	85.3	31 21.9	+39.5	85.9	31 25.9	+40.4	86.5	31 29.3	+41.2	87.1	31 32.0	+42.2	87.7	31 34.1	+43.0	88.3	31 35.5	+43.9	88.9	25
26	31 49.6	+37.2	83.7	31 55.8	+38.1	84.4	32 01.4	+39.1	85.0	32 06.3	+40.0	85.6	32 10.5	+41.0	86.2	32 14.2	+41.8	86.9	32 17.1	+42.7	87.5	32 19.4	+43.6	88.1	26
27	32 26.8	+36.7	82.8	32 33.9	+37.8	83.4	32 40.5	+38.7	84.1	32 46.3	+39.6	84.7	32 51.5	+40.6	85.4	32 56.0	+41.5	86.0	32 59.8	+42.4	86.7	33 03.0	+43.2	87.3	27
28	33 03.5	+36.4	81.9	33 11.7	+37.3	82.5	33 19.2	+38.3	83.2	33 25.9	+39.3	83.8	33 32.1	+40.1	84.5	33 37.5	+41.1	85.1	33 42.2	+42.0	85.8	33 46.2	+43.0	86.5	28
29	33 39.9	+35.9	80.9	33 49.0	+36.9	81.6	33 57.5	+37.8	82.2	34 05.2	+38.8	82.9	34 12.2	+39.8	83.6	34 18.6	+40.7	84.3	34 24.2	+41.7	85.0	34 29.2	+42.5	85.6	29
30	34 15.8	+35.4	80.0	34 25.9	+36.5	80.6	34 35.3	+37.5	81.3	34 44.0	+38.5	82.0	34 52.0	+39.4	82.7	34 59.3	+40.4	83.4	35 05.9	+41.2	84.1	35 11.7	+42.2	84.8	30
31	34 51.2	+35.0	79.0	35 02.4	+35.9	79.7	35 12.8	+37.0	80.4	35 22.5	+37.9	81.1	35 31.4	+39.0	81.8	35 39.7	+39.9	82.5	35 47.1	+40.9	83.2	35 53.9	+41.8	83.9	31
32	35 26.2	+34.5	78.0	35 38.3	+35.5	78.7	35 49.8	+36.5	79.4	36 00.4	+37.6	80.1	36 10.4	+38.5	80.8	36 19.6	+39.5	81.5	36 28.0	+40.5	82.3	36 35.7	+41.4	83.0	32
33	36 00.7	+33.9	77.0	36 13.8	+35.0	77.7	36 26.3	+36.0	78.4	36 38.0	+37.0	79.1	36 48.9	+38.0	79.9	36 59.1	+39.0	80.6	37 08.5	+40.0	81.4	37 17.1	+41.0	82.1	33
34	36 34.6	+33.5	76.0	36 48.8	+34.5	76.7	37 02.3	+35.5	77.4	37 15.0	+36.5	78.2	37 26.9	+37.6	78.9	37 38.1	+38.6	79.7	37 48.5	+39.5	80.4	37 58.1	+40.5	81.2	34
35	37 08.1	+32.8	74.9	37 23.3	+33.9	75.7	37 37.8	+35.0	76.4	37 51.5	+36.1	77.1	38 04.5	+37.0	77.9	38 16.7	+38.0	78.7	38 28.0	+39.1	79.5	38 38.6	+40.1	80.2	35
36	37 40.9	+32.3	73.9	37 57.2	+33.4	74.6	38 12.8	+34.4	75.4	38 27.6	+35.4	76.1	38 41.5	+36.6	76.9	38 54.7	+37.6	77.7	39 07.1	+38.6	78.5	39 18.7	+39.6	79.3	36
37	38 13.2	+31.8	72.8	38 30.6	+32.8	73.6	38 47.2	+33.9	74.3	39 03.0	+35.0	75.1	39 18.1	+36.0	75.9	39 32.3	+37.0	76.7	39 45.7	+38.1	77.5	39 58.3	+39.1	78.3	37
38	38 45.0	+31.1	71.7	39 03.4	+32.2	72.5	39 21.1	+33.3	73.3	39 38.0	+34.3	74.0	39 54.1	+35.4	74.8	40 09.3	+36.5	75.7	40 23.8	+37.5	76.5	40 37.4	+38.6	77.3	38
39	39 16.1	+30.4	70.6	39 35.6	+31.6	71.4	39 54.4	+32.6	72.2	40 12.3	+33.8	73.0	40 29.5	+34.8	73.8	40 45.8	+35.9	74.6	41 01.3	+37.0	75.5	41 16.0	+38.0	76.3	39
40	39 46.5	+29.9	69.5	40 07.2	+30.9	70.3	40 27.0	+32.1	71.1	40 46.1	+33.1	71.9	41 04.3	+34.2	72.7	41 21.7	+35.3	73.6	41 38.3	+36.4	74.4	41 54.0	+37.4	75.3	40
41	40 16.4	+29.1	68.4	40 38.1	+30.3	69.2	40 59.1	+31.3	70.0	41 19.2	+32.5	70.8	41 38.5	+33.6	71.6	41 57.0	+34.7	72.5	42 14.7	+35.8	73.3	42 31.4	+36.9	74.2	41
42	40 45.5	+28.5	67.2	41 08.4	+29.5	68.0	41 30.4	+30.7	68.8	41 51.7	+31.8	69.7	42 12.1	+33.0	70.5	42 31.7	+34.1	71.4	42 50.5	+35.1	72.2	43 08.3	+36.3	73.1	42
43	41 14.0	+27.7	66.0	41 37.9	+28.9	66.9	42 01.1	+30.0	67.7	42 23.5	+31.1	68.5	42 45.1	+32.2	69.4	43 05.8	+33.4	70.2	43 25.6	+34.5	71.1	43 44.6	+35.6	72.0	43
44	41 41.7	+27.0	64.9	42 06.8	+28.1	65.7	42 31.1	+29.3	66.5	42 54.6	+30.4	67.4	43 17.3	+31.6	68.2	43 39.2	+32.6	69.1	44 00.1	+33.8	70.0	44 20.2	+34.9	70.9	44
45	42 08.7	+26.2	63.7	42 34.9	+27.4	64.5	43 00.4	+28.5	65.3	43 25.0	+29.7	66.2	43 48.9	+30.8	67.0	44 11.8	+32.0	67.9	44 33.9	+33.1	68.9	44 55.1	+34.3	69.8	45
46	42 34.9	+25.5	62.4	43 02.3	+26.6	63.3	43 28.9	+27.8	64.1	43 54.7	+28.9	65.0	44 19.7	+30.0	65.9	44 43.8	+31.2	66.8	45 07.0	+32.4	67.7	45 29.4	+33.5	68.6	46
47	43 00.4	+24.6	61.2	43 28.9	+25.8	62.0	43 56.7	+26.9	62.9	44 23.6	+28.1	63.8	44 49.7	+29.3	64.6	45 15.0	+30.4	65.5	45 39.4	+31.6	66.5	46 02.9	+32.7	67.4	47
48	43 25.0	+23.9	60.0	43 54.7	+25.0	60.8	44 23.6	+26.1	61.6	44 51.7	+27.3	62.5	45 19.0	+28.4	63.4	45 45.4	+29.6	64.3	46 11.0	+30.8	65.3	46 35.6	+32.0	66.2	48
49	43 48.9	+22.9	58.7	44 19.7	+24.1	59.5	44 49.7	+25.3	60.4	45 19.0	+26.4	61.2	45 47.4	+27.6	62.1	46 15.0	+28.8	63.1	46 41.8	+30.0	64.0	47 07.6	+31.2	65.0	49
50	44 11.8	+22.1	57.4	44 43.8	+23.2	58.2	45 15.0	+24.4	59.1	45 45.4	+25.6	60.0	46 15.0	+26.8	60.9	46 43.8	+28.0	61.8	47 11.8	+29.1	62.7	47 38.8	+30.3	63.7	50
51	44 33.9	+21.2	56.1	45 07.0	+22.4	56.9	45 39.4	+23.5	57.8	46 11.0	+24.6	58.7	46 41.8	+25.8	59.6	47 11.8	+27.0	60.5	47 40.9	+28.2	61.4	48 09.1	+29.4	62.4	51
52	44 55.1	+20.3	54.8	45 29.4	+21.4	55.6	46 02.9	+22.6	56.5	46 35.6	+23.8	57.3	47 07.6	+24.9	58.2	47 38.8	+26.1	59.2	48 09.1	+27.3	60.1	48 38.5	+28.6	61.1	52
53	45 15.4	+19.3	53.5	45 50.8	+20.4	54.3	46 25.5	+21.6	55.1	46 59.4	+22.8	56.0	47 32.5	+24.0	56.9	48 04.9	+25.2	57.8	48 36.4	+26.4	58.8	49 07.1	+27.5	59.8	53
54	45 34.7	+18.4	52.1	46 11.2	+19.5	52.9	46 47.1	+20.6	53.8	47 22.2	+21.8	54.6	47 56.5	+23.0	55.5	48 30.1	+24.1	56.5	49 02.8	+25.4	57.4	49 34.6	+26.6	58.4	54
55	45 53.1	+17.4	50.7	46 30.7	+18.5	51.6	47 07.7	+19.6	52.4	47 44.0	+20.8	53.3	48 19.5	+21.9	54.2	48 54.2	+23.2	55.1	49 28.2	+24.3	56.0	50 01.2	+25.6	57.0	55
56	46 10.5	+16.4	49.4	46 49.2	+17.5	50.2	47 27.3	+18.7	51.0	48 04.8	+19.7	51.9	48 41.4	+21.0	52.8	49 17.4	+22.1	53.7	49 52.5	+23.3	54.6	50 26.8	+24.6	55.6	56
57	46 26.9	+15.3	48.0	47 06.7	+16.5	48.8	47 46.0	+17.5	49.6	48 24.5	+18.7	50.4	49 02.4	+19.8	51.3	49 39.5	+21.0	52.2	50 15.8	+22.3	53.2	50 51.4	+23.4	54.2	57
58	46 42.2	+14.3	46.6	47 23.2	+15.4	47.3	48 03.5	+16.5	48.2	48 43.2	+17.6	49.0	49 22.2	+18.8	49.9	50 00.5	+20.0	50.8	50 38.1	+21.1	51.7	51 14.8	+22.4	52.7	58
59	46 56.5	+13.3	45.1	47 38.6	+14.3	45.9	48 20.0	+15.4	46.7	49 00.8	+16.5	47.6	49 41.0	+17.6	48.4	50 20.5	+18.8	49.3	50 59.2	+20.0	50.2	51 37.2	+21.2	51.2	59
60	47 09.8	+12.2	43.7	47 52.9	+13.2	44.5	48 35.4	+14.3	45.3	49 17.3	+15.4	46.1	49 58.6	+16.5	46.9	50 39.3	+17.6	47.8	51 19.2	+18.8	48.7	51 58.4	+20.0	49.7	60
61	47 22.0	+11.1	42.3	48 06.1	+12.1	43.0	48 49.7	+13.2	43.8	49 32.7	+14.3	44.6	50 15.1	+15.4	45.4	50 56.9	+16.5	46.3	51 38.0	+17.6	47.2	52 18.4	+18.8	48.2	61
62	47 33.1	+9.9	40.8	48 18.2	+11.0	41.5	49 02.9	+12.0	42.3	49 47.0	+13.0	43.1	50 30.5	+14.1	43.9	51 13.4	+15.2	44.8	51 55.6	+16.4	45.7	52 37.2	+17.4	46.6	62
63	47 43.0	+8.9	39.4	48 29.2	+9.8	40.1	49 14.9	+10.8	40.8	50 00.0	+11.9	41.6	50 44.6	+12.9	42.4	51 28.6	+14.0	43.2	52 12.0	+15.2	44.1	52 54.8	+16.3	45.0	63
64	47 51.9	+7.7	37.9	48 39.0	+8.7	38.6	49 25.7	+9.6	39.3	50 11.9	+10.6	40.1	50 57.5	+11.7	40.8	51 42.6	+12.8	41.7	52 27.2	+13.8	42.5	53 11.1	+14.9	43.4	64
65	47 59.6	+6.6	36.4	48 47.7	+7.5	37.1	49 35.3	+8.5	37.8	50 22.5	+9.4	38.5	51 09.2	+10.4	39.3	51 55.4	+11.5	40.1	52 41.0	+12.5	40.9	53 26.0	+13.7	41.8	65
66	48 06.2	+5.4	34.9	48 55.2	+6.3	35.6	49 43.8	+7.2	36.2	50 31.9	+8.2	37.0	51 19.6	+9.2	37.7	52 06.9	+10.1	38.5	52 53.5	+11.3	39.3	53 39.7	+12.3	40.2	66
67	48 11.6	+4.2	33.4	49 01.5	+5.1	34.1	49 51.0	+6.0	34.7	50 40.1	+6.9	35.4	51 28.8	+7.8	36.1	52 17.0	+8.9	36.9	53 04.8	+9.8	37.7	53 52.0	+10.9	38.5	67
68	48 15.8	+3.1	31.9	49 06.6	+3.9	32.5	49 57.0	+4.7	33.2	50 47.0	+5.7	33.8	51 36.6	+6.6	34.5	52 25.9	+7.5	35.3	53 14.6	+8.5	36.0	54 02.9	+9.5	36.8	68
69	48 18.9	+1.9	30.4	49 10.5	+2.7	31.0	50 01.7	+3.6	31.6	50 52.7	+4.3	32.3	51 43.2	+5.3	32.9	52 33.4	+6.1	33.6	53 23.1	+7.1	34.4	54 12.4	+8.1	35.2	69
70	48 20.8	+0.7	28.9	49 13.2	+1.5	29.5	50 05.3	+2.2	30.1	50 57.0	+3.1	30.7	51 48.5	+3.9	31.3	52 39.5	+4.8	32.0	53 30.2	+5.7	32.7	54 20.5	+6.6	33.5	70
71	48 21.5	−0.4	27.4	49 14.7	+0.2	27.9	50 07.5	+1.0	28.5	51 00.1	+1.8	29.1	51 52.4	+2.6	29.7	52 44.3	+3.5	30.4	53 35.9	+4.3	31.0	54 27.1	+5.2	31.8	71
72	48 21.1	−1.7	25.9	49 14.9	−0.9	26.4	50 08.5	−0.2	26.9	51 01.9	+0.5	27.5	51 55.0	+1.2	28.1	52 47.8	+2.0	28.7	53 40.2	+2.9	29.4	54 32.3	+3.8	30.0	72
73	48 19.4	−2.8	24.4	49 14.0	−2.2	24.9	50 08.3	−1.5	25.4	51 02.4	−0.8	25.9	51 56.2	0.0	26.5	52 49.8	+0.7	27.0	53 43.1	+1.5	27.7	54 36.1	+2.3	28.3	73
74	48 16.6	−3.9	22.9	49 11.8	−3.3	23.4	50 06.8	−2.7	23.8	51 01.6	−2.1	24.3	51 56.2	−1.5	24.8	52 50.5	−0.7	25.4	53 44.6	0.0	26.0	54 38.4	+0.8	26.6	74
75	48 12.7	−5.2	21.4	49 08.5	−4.6	21.8	50 04.1	−4.0	22.3	50 59.5	−3.4	22.7	51 54.7	−2.7	23.2	52 49.8	−2.1	23.7	53 44.6	−1.4	24.3	54 39.2	−0.7	24.8	75
76	48 07.5	−6.3	19.9	49 03.9	−5.8	20.3	50 00.1	−5.3	20.7	50 56.1	−4.6	21.1	51 52.0	−4.1	21.6	52 47.7	−3.5	22.1	53 43.2	−2.8	22.6	54 38.5	−2.2	23.1	76
77	48 01.2	−7.4	18.4	48 58.1	−7.0	18.8	49 54.8	−6.4	19.2	50 51.5	−6.0	19.6	51 47.9	−5.4	20.0	52 44.2	−4.8	20.4	53 40.4	−4.3	20.9	54 36.3	−3.6	21.4	77
78	47 53.8	−8.6	16.9	48 51.1	−8.1	17.3	49 48.4	−7.7	17.6	50 45.5	−7.2	18.0	51 42.5	−6.7	18.4	52 39.4	−6.2	18.8	53 36.1	−5.6	19.2	54 32.7	−5.1	19.7	78
79	47 45.2	−9.7	15.5	48 43.0	−9.3	15.8	49 40.7	−8.9	16.1	50 38.3	−8.5	16.4	51 35.8	−8.0	16.8	52 33.2	−7.5	17.2	53 30.5	−7.1	17.5	54 27.6	−6.5	18.0	79
80	47 35.5	−10.8	14.0	48 33.7	−10.5	14.3	49 31.8	−10.1	14.6	50 29.8	−9.7	14.9	51 27.8	−9.3	15.2	52 25.7	−8.9	15.5	53 23.4	−8.4	15.9	54 21.1	−8.0	16.3	80
81	47 24.7	−11.9	12.5	48 23.2	−11.6	12.8	49 21.7	−11.3	13.0	50 20.1	−10.9	13.3	51 18.5	−10.6	13.6	52 16.8	−10.2	13.9	53 15.0	−9.8	14.2	54 13.1	−9.4	14.6	81
82	47 12.8	−13.0	11.1	48 11.6	−12.7	11.3	49 10.4	−12.4	11.5	50 09.2	−12.1	11.8	51 07.9	−11.8	12.0	52 06.6	−11.5	12.3	53 05.2	−11.2	12.6	54 03.7	−10.8	12.9	82
83	46 59.8	−14.1	9.7	47 58.9	−13.8	9.9	48 58.0	−13.6	10.0	49 57.1	−13.4	10.3	50 56.1	−13.1	10.5	51 55.1	−12.8	10.7	52 54.0	−12.5	10.9	53 52.9	−12.2	11.2	83
84	46 45.7	−15.1	8.2	47 45.1	−14.9	8.4	48 44.4	−14.7	8.6	49 43.7	−14.5	8.7	50 43.0	−14.2	8.8	51 42.3	−14.1	9.1	52 41.5	−13.8	9.3	53 40.7	−13.5	9.5	84
85	46 30.6	−16.1	6.8	47 30.2	−16.0	7.0	48 29.7	−15.8	7.1	49 29.2	−15.6	7.2	50 28.8	−15.5	7.4	51 28.2	−15.2	7.6	52 27.7	−15.1	7.7	53 27.2	−14.9	7.9	85
86	46 14.5	−17.2	5.4	47 14.2	−17.0	5.5	48 13.9	−16.9	5.6	49 13.6	−16.8	5.8	50 13.3	−16.6	5.9	51 13.0	−16.5	6.0	52 12.6	−16.3	6.1	53 12.3	−16.2	6.3	86
87	45 57.3	−18.1	4.1	46 57.2	−18.1	4.1	47 57.0	−18.0	4.2	48 57.0	−17.8	4.3	49 56.7	−17.8	4.3	50 56.5	−17.7	4.5	51 56.3	−17.6	4.6	52 56.1	−17.4	4.7	87
88	45 39.2	−19.1	2.7	46 39.1	−19.1	2.7	47 39.0	−19.0	2.8	48 39.0	−19.0	2.8	49 38.9	−18.9	2.9	50 38.8	−18.8	3.0	51 38.7	−18.8	3.0	52 38.6	−18.7	3.1	88
89	45 20.1	−20.1	1.3	46 20.0	−20.0	1.4	47 20.0	−20.0	1.4	48 20.0	−20.0	1.4	49 20.0	−20.0	1.4	50 20.0	−20.0	1.5	51 19.9	−19.9	1.5	52 19.9	−19.9	1.5	89
90	45 00.0	−21.0	0.0	46 00.0	−21.0	0.0	47 00.0	−21.0	0.0	48 00.0	−21.0	0.0	49 00.0	−21.0	0.0	50 00.0	−21.1	0.0	51 00.0	−21.1	0.0	52 00.0	−21.1	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	13 59.7	−43.8	104.4	13 44.7	−44.5	104.7	13 29.3	−45.1	104.9	13 13.8	−45.9	105.1	12 58.0	−46.5	105.4	12 42.0	−47.2	105.6	12 25.8	−47.8	105.8	12 09.3	−48.4	106.0	0
1	13 15.9	−43.9	105.1	13 00.2	−44.6	105.4	12 44.2	−45.3	105.6	12 27.9	−45.9	105.8	12 11.5	−46.6	106.0	11 54.8	−47.2	106.2	11 38.0	−47.9	106.4	11 20.9	−48.4	106.6	1
2	12 32.0	−44.0	105.8	12 15.6	−44.7	106.0	11 58.9	−45.4	106.3	11 42.0	−46.1	106.5	11 24.9	−46.7	106.7	11 07.6	−47.3	106.8	10 50.1	−47.9	107.0	10 32.5	−48.6	107.2	2
3	11 48.0	−44.1	106.5	11 30.9	−44.8	106.7	11 13.5	−45.5	106.9	10 55.9	−46.1	107.1	10 38.2	−46.8	107.3	10 20.3	−47.4	107.5	10 02.2	−48.0	107.6	9 43.9	−48.6	107.8	3
4	11 03.9	−44.2	107.2	10 46.1	−44.9	107.4	10 28.0	−45.5	107.6	10 09.8	−46.2	107.8	9 51.4	−46.8	107.9	9 32.9	−47.5	108.1	9 14.2	−48.1	108.2	8 55.3	−48.7	108.4	4
5	10 19.7	−44.3	107.9	10 01.2	−45.0	108.1	9 42.5	−45.6	108.2	9 23.6	−46.3	108.4	9 04.6	−46.9	108.6	8 45.4	−47.5	108.7	8 26.1	−48.1	108.9	8 06.6	−48.7	109.0	5
6	9 35.4	−44.3	108.6	9 16.2	−45.0	108.8	8 56.9	−45.7	108.9	8 37.3	−46.3	109.1	8 17.7	−47.0	109.2	7 57.9	−47.6	109.3	7 38.0	−48.2	109.5	7 17.9	−48.7	109.6	6
7	8 51.1	−44.5	109.3	8 31.2	−45.1	109.4	8 11.2	−45.8	109.6	7 51.0	−46.4	109.7	7 30.7	−47.0	109.8	7 10.3	−47.6	109.9	6 49.8	−48.2	110.1	6 29.2	−48.8	110.2	7
8	8 06.6	−44.5	110.0	7 46.1	−45.2	110.1	7 25.4	−45.8	110.2	7 04.6	−46.4	110.3	6 43.7	−47.0	110.4	6 22.7	−47.7	110.6	6 01.6	−48.3	110.7	5 40.4	−48.8	110.8	8
9	7 22.1	−44.6	110.6	7 00.9	−45.2	110.8	6 39.6	−45.9	110.9	6 18.2	−46.5	111.0	5 56.7	−47.2	111.1	5 35.0	−47.7	111.2	5 13.3	−48.3	111.3	4 51.5	−48.8	111.3	9
10	6 37.5	−44.6	111.3	6 15.7	−45.3	111.4	5 53.7	−45.9	111.5	5 31.7	−46.5	111.6	5 09.5	−47.1	111.7	4 47.3	−47.7	111.8	4 25.0	−48.3	111.8	4 02.7	−48.9	111.9	10
11	5 52.9	−44.7	112.0	5 30.4	−45.3	112.1	5 07.8	−45.9	112.2	4 45.2	−46.6	112.2	4 22.4	−47.2	112.3	3 59.6	−47.8	112.4	3 36.7	−48.3	112.4	3 13.8	−48.9	112.5	11
12	5 08.2	−44.7	112.7	4 45.1	−45.4	112.7	4 21.9	−46.0	112.8	3 58.6	−46.6	112.9	3 35.2	−47.2	112.9	3 11.8	−47.8	113.0	2 48.4	−48.4	113.0	2 24.9	−48.9	113.1	12
13	4 23.5	−44.7	113.3	3 59.7	−45.3	113.4	3 35.9	−46.0	113.4	3 12.0	−46.6	113.5	2 48.0	−47.2	113.6	2 24.0	−47.8	113.6	2 00.0	−48.3	113.6	1 36.0	−48.9	113.7	13
14	3 38.8	−44.8	114.0	3 14.4	−45.5	114.0	2 49.9	−46.0	114.1	2 25.4	−46.7	114.1	2 00.8	−47.2	114.2	1 36.2	−47.8	114.2	1 11.6	−48.3	114.2	0 47.0	−48.9	114.2	14
15	2 54.0	−44.8	114.7	2 28.9	−45.4	114.7	2 03.9	−46.1	114.7	1 38.7	−46.6	114.8	1 13.6	−47.2	114.8	0 48.4	−47.8	114.8	0 23.3	−48.4	114.8	0 01.9	+49.0	65.2	15
16	2 09.2	−44.8	115.3	1 43.5	−45.4	115.4	1 17.8	−46.0	115.4	0 52.1	−46.7	115.4	0 26.4	−47.3	115.4	0 00.6	−47.3	115.4	0 25.1	+48.4	64.6	0 50.9	+48.9	64.6	16
17	1 24.4	−44.9	116.0	0 58.1	−45.5	116.0	0 31.8	−46.1	116.0	0 05.4	−46.6	116.0	0 20.9	+47.2	64.0	0 47.2	+47.8	64.0	1 13.5	+48.4	64.0	1 39.8	+48.9	64.0	17
18	0 39.5	−44.8	116.7	0 12.6	−45.4	116.7	0 14.3	+46.1	63.3	0 41.2	+46.7	63.4	1 08.1	+47.3	63.4	1 35.0	+47.8	63.4	2 01.9	+48.3	63.4	2 28.7	+48.9	63.4	18
19	0 05.3	+44.8	62.7	0 32.8	+45.5	62.7	1 00.4	+46.0	62.7	1 27.9	+46.6	62.7	1 55.4	+47.2	62.7	2 22.8	+47.8	62.8	2 50.2	+48.4	62.8	3 17.6	+48.9	62.8	19
20	0 50.1	+44.9	62.0	1 18.3	+45.4	62.0	1 46.4	+46.0	62.1	2 14.5	+46.6	62.1	2 42.6	+47.2	62.1	3 10.6	+47.8	62.2	3 38.6	+48.3	62.2	4 06.5	+48.9	62.3	20
21	1 35.0	+44.8	61.4	2 03.7	+45.4	61.4	2 32.4	+46.1	61.4	3 01.1	+46.6	61.5	3 29.8	+47.1	61.5	3 58.4	+47.7	61.6	4 26.9	+48.3	61.6	4 55.4	+48.8	61.7	21
22	2 19.8	+44.8	60.7	2 49.1	+45.4	60.7	3 18.5	+46.0	60.8	3 47.7	+46.6	60.8	4 16.9	+47.2	60.9	4 46.1	+47.7	61.0	5 15.2	+48.2	61.0	5 44.2	+48.8	61.1	22
23	3 04.6	+44.8	60.0	3 34.5	+45.4	60.1	4 04.5	+45.9	60.1	4 34.3	+46.5	60.2	5 04.1	+47.1	60.3	5 33.8	+47.7	60.4	6 03.4	+48.3	60.4	6 33.0	+48.8	60.5	23
24	3 49.4	+44.7	59.4	4 19.9	+45.4	59.4	4 50.4	+45.9	59.5	5 20.8	+46.5	59.6	5 51.2	+47.1	59.6	6 21.5	+47.6	59.7	6 51.7	+48.1	59.8	7 21.8	+48.7	59.9	24
25	4 34.1	+44.7	58.7	5 05.3	+45.3	58.8	5 36.3	+45.9	58.8	6 07.3	+46.5	58.9	6 38.3	+47.0	59.0	7 09.1	+47.6	59.1	7 39.8	+48.2	59.2	8 10.5	+48.6	59.4	25
26	5 18.8	+44.7	58.0	5 50.6	+45.2	58.1	6 22.2	+45.9	58.2	6 53.8	+46.4	58.3	7 25.3	+47.0	58.4	7 56.7	+47.5	58.5	8 28.0	+48.0	58.6	8 59.1	+48.6	58.8	26
27	6 03.5	+44.6	57.3	6 35.8	+45.2	57.4	7 08.1	+45.7	57.5	7 40.2	+46.4	57.7	8 12.3	+46.9	57.8	8 44.2	+47.5	57.9	9 16.0	+48.0	58.0	9 47.7	+48.6	58.2	27
28	6 48.1	+44.5	56.7	7 21.0	+45.2	56.8	7 53.8	+45.7	56.9	8 26.6	+46.2	57.0	8 59.2	+46.8	57.1	9 31.7	+47.4	57.3	10 04.0	+48.0	57.4	10 36.3	+48.4	57.6	28
29	7 32.6	+44.5	56.0	8 06.2	+45.0	56.1	8 39.5	+45.7	56.2	9 12.8	+46.3	56.4	9 46.0	+46.8	56.5	10 19.1	+47.3	56.7	10 52.0	+47.8	56.8	11 24.7	+48.4	57.0	29
30	8 17.1	+44.5	55.3	8 51.2	+45.0	55.4	9 25.2	+45.6	55.6	9 59.1	+46.1	55.7	10 32.8	+46.7	55.9	11 06.4	+47.2	56.0	11 39.8	+47.8	56.2	12 13.1	+48.4	56.4	30
31	9 01.6	+44.3	54.6	9 36.2	+45.0	54.8	10 10.8	+45.5	54.9	10 45.2	+46.1	55.1	11 19.5	+46.6	55.2	11 53.6	+47.2	55.4	12 27.6	+47.7	55.6	13 01.5	+48.2	55.8	31
32	9 45.9	+44.5	54.0	10 21.2	+44.8	54.1	10 56.3	+45.4	54.3	11 31.3	+45.9	54.4	12 06.1	+46.5	54.6	12 40.8	+47.1	54.8	13 15.3	+47.6	55.0	13 49.7	+48.1	55.2	32
33	10 30.2	+44.2	53.3	11 06.0	+44.8	53.4	11 41.7	+45.3	53.6	12 17.2	+45.9	53.8	12 52.6	+46.4	53.9	13 27.9	+46.9	54.1	14 02.9	+47.5	54.3	14 37.8	+48.1	54.5	33
34	11 14.4	+44.1	52.7	11 50.8	+44.6	52.7	12 27.0	+45.2	52.9	13 03.1	+45.8	53.1	13 39.0	+46.4	53.3	14 14.8	+46.9	53.5	14 50.4	+47.5	53.7	15 25.9	+47.9	53.9	34
35	11 58.5	+43.9	51.9	12 35.4	+44.6	52.1	13 12.2	+45.1	52.2	13 48.9	+45.6	52.4	14 25.4	+46.2	52.6	15 01.7	+46.6	52.8	15 37.9	+47.2	53.1	16 13.8	+47.8	53.3	35
36	12 42.4	+43.9	51.2	13 20.0	+44.4	51.4	13 57.3	+45.0	51.6	14 34.5	+45.6	51.8	15 11.6	+46.1	52.0	15 48.5	+46.6	52.2	16 25.1	+47.2	52.4	17 01.6	+47.7	52.7	36
37	13 26.3	+43.8	50.5	14 04.4	+44.3	50.7	14 42.3	+44.9	50.9	15 20.1	+45.4	51.1	15 57.7	+46.0	51.3	16 35.1	+46.5	51.5	17 12.3	+47.1	51.8	17 49.3	+47.6	52.0	37
38	14 10.1	+43.6	49.8	14 48.7	+44.2	50.0	15 27.2	+44.8	50.2	16 05.5	+45.3	50.4	16 43.7	+45.8	50.6	17 21.6	+46.4	50.9	17 59.4	+46.9	51.1	18 36.9	+47.5	51.4	38
39	14 53.7	+43.5	49.1	15 32.9	+44.1	49.3	16 12.0	+44.6	49.5	16 50.8	+45.2	49.7	17 29.5	+45.7	50.0	18 08.0	+46.3	50.2	18 46.3	+46.8	50.5	19 24.4	+47.3	50.7	39
40	15 37.2	+43.4	48.4	16 17.0	+43.9	48.6	16 56.6	+44.4	48.8	17 36.0	+45.0	49.0	18 15.2	+45.6	49.3	18 54.3	+46.1	49.5	19 33.1	+46.6	49.8	20 11.7	+47.2	50.1	40
41	16 20.6	+43.2	47.7	17 00.9	+43.8	47.9	17 41.0	+44.4	48.1	18 21.0	+44.9	48.3	19 00.8	+45.4	48.6	19 40.4	+45.9	48.9	20 19.7	+46.5	49.1	20 58.9	+47.0	49.4	41
42	17 03.8	+43.0	46.9	17 44.7	+43.6	47.2	18 25.4	+44.1	47.4	19 05.9	+44.7	47.6	19 46.2	+45.3	47.9	20 26.3	+45.8	48.2	21 06.2	+46.3	48.5	21 45.9	+46.8	48.8	42
43	17 46.8	+42.9	46.2	18 28.3	+43.4	46.4	19 09.5	+44.0	46.7	19 50.6	+44.5	46.9	20 31.5	+45.0	47.2	21 12.1	+45.6	47.5	21 52.5	+46.2	47.8	22 32.7	+46.7	48.1	43
44	18 29.7	+42.7	45.5	19 11.7	+43.3	45.7	19 53.5	+43.8	46.0	20 35.1	+44.4	46.2	21 16.5	+44.9	46.5	21 57.7	+45.5	46.8	22 38.7	+46.0	47.1	23 19.4	+46.5	47.4	44
45	19 12.4	+42.6	44.7	19 55.0	+43.1	45.0	20 37.3	+43.7	45.2	21 19.5	+44.2	45.5	22 01.4	+44.8	45.8	22 43.2	+45.2	46.1	23 24.7	+45.8	46.4	24 05.9	+46.4	46.7	45
46	19 55.0	+42.3	44.0	20 38.1	+42.9	44.2	21 21.0	+43.4	44.5	22 03.7	+44.0	44.8	22 46.2	+44.5	45.1	23 28.4	+45.1	45.4	24 10.5	+45.5	45.7	24 52.3	+46.1	46.0	46
47	20 37.3	+42.2	43.2	21 21.0	+42.7	43.5	22 04.4	+43.3	43.8	22 47.7	+43.7	44.0	23 30.7	+44.3	44.3	24 13.5	+44.8	44.6	24 56.0	+45.4	45.0	25 38.4	+45.9	45.3	47
48	21 19.5	+41.9	42.5	22 03.7	+42.5	42.7	22 47.7	+43.0	43.0	23 31.4	+43.6	43.3	24 15.0	+44.1	43.6	24 58.3	+44.7	43.9	25 41.4	+45.2	44.2	26 24.3	+45.7	44.6	48
49	22 01.4	+41.8	41.7	22 46.2	+42.2	42.0	23 30.7	+42.8	42.2	24 15.0	+43.3	42.5	24 59.1	+43.9	42.9	25 43.0	+44.4	43.2	26 26.6	+44.9	43.5	27 10.0	+45.4	43.9	49
50	22 43.2	+41.5	40.9	23 28.4	+42.1	41.2	24 13.5	+42.5	41.5	24 58.3	+43.1	41.8	25 43.0	+43.6	42.1	26 27.4	+44.1	42.4	27 11.5	+44.7	42.8	27 55.4	+45.3	43.1	50
51	23 24.7	+41.2	40.1	24 10.5	+41.8	40.4	24 56.0	+42.4	40.7	25 41.4	+42.9	41.0	26 26.6	+43.4	41.3	27 11.5	+43.9	41.7	27 56.2	+44.5	42.0	28 40.7	+45.0	42.4	51
52	24 05.9	+41.0	39.3	24 52.3	+41.5	39.6	25 38.4	+42.0	39.9	26 24.3	+42.6	40.2	27 10.0	+43.1	40.6	27 55.4	+43.7	40.9	28 40.7	+44.2	41.3	29 25.7	+44.7	41.6	52
53	24 46.9	+40.8	38.5	25 33.8	+41.3	38.8	26 20.4	+41.8	39.1	27 06.9	+42.3	39.4	27 53.1	+42.9	39.8	28 39.1	+43.4	40.1	29 24.9	+43.9	40.5	30 10.4	+44.4	40.9	53
54	25 27.7	+40.5	37.7	26 15.1	+41.0	38.0	27 02.2	+41.6	38.3	27 49.2	+42.1	38.6	28 36.0	+42.5	39.0	29 22.5	+43.1	39.3	30 08.8	+43.6	39.7	30 54.8	+44.2	40.1	54
55	26 08.2	+40.2	36.9	26 56.1	+40.7	37.2	27 43.8	+41.2	37.5	28 31.3	+41.7	37.8	29 18.5	+42.3	38.2	30 05.6	+42.8	38.5	30 52.4	+43.3	38.9	31 39.0	+43.8	39.3	55
56	26 48.4	+39.9	36.1	27 36.8	+40.4	36.4	28 25.0	+41.0	36.7	29 13.0	+41.5	37.0	30 00.8	+42.0	37.4	30 48.4	+42.5	37.7	31 35.7	+43.1	38.1	32 22.8	+43.6	38.5	56
57	27 28.3	+39.6	35.2	28 17.2	+40.1	35.5	29 06.0	+40.6	35.9	29 54.5	+41.1	36.2	30 42.8	+41.7	36.5	31 30.9	+42.2	36.9	32 18.8	+42.7	37.3	33 06.4	+43.2	37.7	57
58	28 07.9	+39.3	34.4	28 57.3	+39.8	34.7	29 46.6	+40.3	35.0	30 35.6	+40.8	35.3	31 24.5	+41.3	35.7	32 13.1	+41.8	36.1	33 01.5	+42.3	36.4	33 49.6	+42.9	36.8	58
59	28 47.2	+39.0	33.5	29 37.1	+39.5	33.8	30 26.9	+39.9	34.2	31 16.4	+40.5	34.5	32 05.8	+41.0	34.8	32 54.9	+41.5	35.2	33 43.8	+42.0	35.6	34 32.5	+42.5	36.0	59
60	29 26.2	+38.6	32.6	30 16.6	+39.1	33.0	31 06.8	+39.6	33.3	31 56.9	+40.1	33.6	32 46.8	+40.6	34.0	33 36.4	+41.1	34.3	34 25.8	+41.7	34.7	35 15.0	+42.2	35.1	60
61	30 04.8	+38.2	31.8	30 55.7	+38.7	32.1	31 46.4	+39.3	32.4	32 37.0	+39.7	32.7	33 27.4	+40.2	33.1	34 17.5	+40.8	33.5	35 07.5	+41.2	33.8	35 57.2	+41.8	34.2	61
62	30 43.0	+37.9	30.9	31 34.4	+38.4	31.2	32 25.7	+38.8	31.5	33 16.7	+39.4	31.8	34 07.6	+39.9	32.2	34 58.3	+40.3	32.6	35 48.7	+40.9	33.0	36 39.0	+41.3	33.4	62
63	31 20.9	+37.5	30.0	32 12.8	+38.0	30.3	33 04.5	+38.5	30.6	33 56.1	+38.9	30.9	34 47.5	+39.4	31.3	35 38.6	+39.9	31.7	36 29.6	+40.4	32.0	37 20.3	+41.0	32.5	63
64	31 58.4	+37.1	29.1	32 50.8	+37.5	29.4	33 43.0	+38.0	29.7	34 35.0	+38.5	30.0	35 26.9	+39.0	30.4	36 18.5	+39.5	30.7	37 10.0	+40.0	31.1	38 01.3	+40.5	31.5	64
65	32 35.5	+36.7	28.1	33 28.3	+37.2	28.4	34 21.0	+37.6	28.8	35 13.5	+38.1	29.1	36 05.9	+38.5	29.4	36 58.0	+39.1	29.8	37 50.0	+39.5	30.1	38 41.8	+40.0	30.6	65
66	33 12.2	+36.2	27.2	34 05.5	+36.7	27.5	34 58.6	+37.2	27.8	35 51.6	+37.6	28.1	36 44.4	+38.1	28.5	37 37.1	+38.6	28.9	38 29.5	+39.1	29.2	39 21.8	+39.6	29.6	66
67	33 48.4	+35.8	26.2	34 42.2	+36.2	26.5	35 35.8	+36.7	26.8	36 29.2	+37.2	27.2	37 22.5	+37.7	27.5	38 15.7	+38.1	27.9	39 08.6	+38.6	28.3	40 01.4	+39.0	28.7	67
68	34 24.2	+35.4	25.3	35 18.4	+35.8	25.6	36 12.5	+36.2	25.9	37 06.4	+36.7	26.2	38 00.2	+37.1	26.5	38 53.8	+37.5	26.9	39 47.2	+38.0	27.3	40 40.4	+38.6	27.7	68
69	34 59.6	+34.8	24.3	35 54.2	+35.3	24.6	36 48.7	+35.7	24.9	37 43.1	+36.1	25.2	38 37.3	+36.6	25.5	39 31.3	+37.1	25.9	40 25.2	+37.5	26.3	41 19.0	+37.9	26.6	69
70	35 34.4	+34.4	23.3	36 29.5	+34.7	23.6	37 24.4	+35.2	23.9	38 19.2	+35.6	24.2	39 13.9	+36.0	24.5	40 08.4	+36.5	24.9	41 02.7	+37.0	25.2	41 56.9	+37.5	25.6	70
71	36 08.8	+33.8	22.3	37 04.2	+34.3	22.5	37 59.6	+34.6	22.8	38 54.8	+35.1	23.2	39 49.9	+35.5	23.5	40 44.9	+35.9	23.8	41 39.7	+36.4	24.2	42 34.4	+36.8	24.5	71
72	36 42.6	+33.3	21.2	37 38.5	+33.7	21.5	38 34.2	+34.1	21.8	39 29.9	+34.5	22.1	40 25.4	+34.9	22.4	41 20.8	+35.3	22.8	42 16.1	+35.7	23.1	43 11.2	+36.2	23.5	72
73	37 15.9	+32.7	20.2	38 12.2	+33.1	20.5	39 08.3	+33.5	20.7	40 04.4	+33.9	21.0	41 00.3	+34.3	21.3	41 56.1	+34.7	21.7	42 51.8	+35.2	22.0	43 47.4	+35.5	22.4	73
74	37 48.6	+32.2	19.1	38 45.3	+32.5	19.4	39 41.8	+32.9	19.7	40 38.3	+33.2	20.0	41 34.6	+33.7	20.3	42 30.8	+34.1	20.6	43 27.0	+34.4	20.9	44 22.9	+34.9	21.2	74
75	38 20.8	+31.6	18.1	39 17.8	+31.9	18.3	40 14.7	+32.3	18.6	41 11.5	+32.7	18.9	42 08.3	+33.0	19.1	43 04.9	+33.4	19.4	44 01.4	+33.8	19.8	44 57.8	+34.2	20.1	75
76	38 52.4	+30.9	17.0	39 49.7	+31.3	17.2	40 47.0	+31.6	17.5	41 44.2	+32.0	17.7	42 41.3	+32.3	18.0	43 38.3	+32.7	18.3	44 35.2	+33.1	18.6	45 32.0	+33.5	18.9	76
77	39 23.3	+30.4	15.9	40 21.0	+30.6	16.1	41 18.6	+31.0	16.3	42 16.2	+31.2	16.6	43 13.6	+31.6	16.9	44 11.0	+32.0	17.1	45 08.3	+32.3	17.4	46 05.5	+32.7	17.7	77
78	39 53.7	+29.6	14.8	40 51.6	+30.0	15.0	41 49.6	+30.2	15.2	42 47.4	+30.6	15.4	43 45.2	+30.9	15.7	44 43.0	+31.2	15.9	45 40.6	+31.6	16.2	46 38.2	+31.9	16.5	78
79	40 23.3	+29.0	13.6	41 21.6	+29.3	13.8	42 19.8	+29.6	14.0	43 18.0	+29.9	14.3	44 16.1	+30.2	14.5	45 14.2	+30.4	14.8	46 12.2	+30.8	15.0	47 10.1	+31.1	15.3	79
80	40 52.3	+28.3	12.5	41 50.9	+28.5	12.7	42 49.4	+28.8	12.9	43 47.9	+29.0	13.1	44 46.3	+29.3	13.3	45 44.6	+29.7	13.5	46 43.0	+29.9	13.8	47 41.2	+30.2	14.0	80
81	41 20.6	+27.6	11.3	42 19.4	+27.8	11.5	43 18.2	+28.1	11.7	44 16.9	+28.3	11.8	45 15.6	+28.6	12.1	46 14.3	+28.8	12.3	47 12.9	+29.1	12.5	48 11.4	+29.4	12.7	81
82	41 48.2	+26.8	10.1	42 47.2	+27.0	10.3	43 46.2	+27.3	10.4	44 45.2	+27.5	10.6	45 44.2	+27.7	10.8	46 43.1	+27.9	11.0	47 42.0	+28.2	11.2	48 40.8	+28.5	11.4	82
83	42 15.0	+26.0	8.9	43 14.2	+26.3	9.0	44 13.5	+26.4	9.2	45 12.7	+26.6	9.4	46 11.9	+26.8	9.5	47 11.0	+27.1	9.7	48 10.2	+27.3	9.9	49 09.3	+27.5	10.1	83
84	42 41.0	+25.3	7.7	43 40.5	+25.4	7.8	44 39.9	+25.6	7.9	45 39.3	+25.8	8.1	46 38.7	+26.0	8.2	47 38.1	+26.1	8.3	48 37.5	+26.3	8.5	49 36.8	+26.5	8.7	84
85	43 06.3	+24.5	6.4	44 05.9	+24.6	6.5	45 05.5	+24.7	6.7	46 05.1	+24.9	6.8	47 04.7	+25.0	6.9	48 04.2	+25.2	7.0	49 03.8	+25.3	7.2	50 03.3	+25.5	7.3	85
86	43 30.8	+23.6	5.2	44 30.5	+23.7	5.3	45 30.2	+23.9	5.4	46 30.0	+23.9	5.5	47 29.7	+24.1	5.6	48 29.4	+24.2	5.7	49 29.1	+24.3	5.8	50 28.8	+24.5	5.9	86
87	43 54.4	+22.7	3.9	44 54.2	+22.9	4.0	45 54.1	+22.9	4.1	46 53.9	+23.0	4.1	47 53.8	+23.1	4.2	48 53.6	+23.2	4.3	49 53.4	+23.3	4.4	50 53.3	+23.3	4.5	87
88	44 17.1	+21.9	2.6	45 17.1	+21.9	2.7	46 17.0	+22.0	2.7	47 16.9	+22.1	2.8	48 16.9	+22.1	2.8	49 16.8	+22.1	2.9	50 16.7	+22.2	2.9	51 16.6	+22.3	3.0	88
89	44 39.0	+21.0	1.3	45 39.0	+21.0	1.3	46 39.0	+21.0	1.4	47 39.0	+21.0	1.4	48 39.0	+21.0	1.4	49 38.9	+21.1	1.5	50 38.9	+21.1	1.5	51 38.9	+21.1	1.5	89
90	45 00.0	+20.1	0.0	46 00.0	+20.0	0.0	47 00.0	+20.0	0.0	48 00.0	+20.0	0.0	49 00.0	+20.0	0.0	50 00.0	+20.0	0.0	51 00.0	+19.9	0.0	52 00.0	+19.9	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 110°, 250°**

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	13 18.6	+43.5	103.7	13 04.3	+44.2	103.9	12 49.7	+45.0	104.1	12 35.0	+45.6	104.4	12 20.0	+46.3	104.6	12 04.8	+46.9	104.8	11 49.4	+47.6	105.0	11 33.8	+48.2	105.2	0
1	14 02.1	+43.4	103.0	13 48.5	+44.1	103.2	13 34.7	+44.8	103.5	13 20.6	+45.5	103.7	13 06.3	+46.2	103.9	12 51.7	+46.9	104.1	12 37.0	+47.5	104.4	12 22.0	+48.1	104.6	1
2	14 45.5	+43.3	102.3	14 32.6	+44.1	102.5	14 19.5	+44.7	102.8	14 06.1	+45.4	103.0	13 52.5	+46.1	103.3	13 38.6	+46.8	103.5	13 24.5	+47.4	103.7	13 10.1	+48.1	104.0	2
3	15 28.8	+43.1	101.5	15 16.7	+43.8	101.8	15 04.2	+44.6	102.1	14 51.5	+45.3	102.3	14 38.6	+46.0	102.6	14 25.4	+46.6	102.9	14 11.9	+47.3	103.1	13 58.2	+47.9	103.3	3
4	16 11.9	+43.0	100.8	16 00.5	+43.8	101.1	15 48.8	+44.5	101.4	15 36.8	+45.2	101.7	15 24.6	+45.8	101.9	15 12.0	+46.6	102.2	14 59.2	+47.2	102.5	14 46.1	+47.9	102.7	4
5	16 54.9	+42.9	100.1	16 44.3	+43.6	100.4	16 33.3	+44.3	100.7	16 22.0	+45.1	101.0	16 10.4	+45.8	101.3	15 58.6	+46.4	101.5	15 46.4	+47.1	101.8	15 34.0	+47.7	102.1	5
6	17 37.8	+42.7	99.4	17 27.9	+43.4	99.7	17 17.6	+44.2	100.0	17 07.1	+44.9	100.3	16 56.2	+45.6	100.6	16 45.0	+46.3	100.9	16 33.5	+47.0	101.2	16 21.7	+47.7	101.5	6
7	18 20.5	+42.5	98.6	18 11.3	+43.3	98.9	18 01.8	+44.0	99.3	17 52.0	+44.7	99.6	17 41.8	+45.5	99.9	17 31.3	+46.2	100.2	17 20.5	+46.9	100.5	17 09.4	+47.5	100.8	7
8	19 03.0	+42.3	97.9	18 54.6	+43.1	98.2	18 45.8	+43.9	98.6	18 36.7	+44.6	98.9	18 27.3	+45.3	99.2	18 17.5	+46.0	99.5	18 07.4	+46.7	99.9	17 56.9	+47.4	100.2	8
9	19 45.3	+42.1	97.1	19 37.7	+42.9	97.5	19 29.7	+43.6	97.8	19 21.3	+44.4	98.2	19 12.6	+45.1	98.5	19 03.5	+45.9	98.9	18 54.1	+46.5	99.2	18 44.3	+47.2	99.5	9
10	20 27.4	+41.9	96.4	20 20.6	+42.7	96.7	20 13.3	+43.5	97.1	20 05.7	+44.3	97.5	19 57.7	+45.0	97.8	19 49.4	+45.7	98.2	19 40.6	+46.5	98.5	19 31.5	+47.2	98.9	10
11	21 09.3	+41.8	95.6	21 03.3	+42.5	96.0	20 56.8	+43.3	96.4	20 50.0	+44.0	96.7	20 42.7	+44.8	97.1	20 35.1	+45.5	97.5	20 27.1	+46.2	97.8	20 18.7	+46.9	98.2	11
12	21 51.1	+41.5	94.8	21 45.8	+42.3	95.2	21 40.1	+43.1	95.6	21 34.0	+43.9	96.0	21 27.5	+44.7	96.4	21 20.6	+45.4	96.8	21 13.3	+46.1	97.2	21 05.6	+46.8	97.6	12
13	22 32.6	+41.3	94.1	22 28.1	+42.1	94.5	22 23.2	+42.9	94.9	22 17.9	+43.7	95.3	22 12.2	+44.4	95.7	22 06.0	+45.2	96.1	21 59.4	+46.0	96.5	21 52.4	+46.7	96.9	13
14	23 13.9	+41.0	93.3	23 10.2	+41.9	93.7	23 06.1	+42.7	94.1	23 01.6	+43.5	94.5	22 56.6	+44.3	95.0	22 51.2	+45.0	95.4	22 45.4	+45.7	95.8	22 39.1	+46.5	96.2	14
15	23 54.9	+40.8	92.5	23 52.1	+41.6	92.9	23 48.8	+42.4	93.4	23 45.1	+43.2	93.8	23 40.9	+44.0	94.2	23 36.2	+44.8	94.7	23 31.1	+45.6	95.1	23 25.6	+46.2	95.5	15
16	24 35.7	+40.5	91.7	24 33.7	+41.4	92.1	24 31.2	+42.3	92.6	24 28.3	+43.0	93.0	24 24.9	+43.8	93.5	24 21.0	+44.6	93.9	24 16.7	+45.3	94.4	24 11.8	+46.1	94.8	16
17	25 16.2	+40.3	90.8	25 15.1	+41.1	91.3	25 13.5	+41.9	91.8	25 11.3	+42.8	92.3	25 08.7	+43.6	92.7	25 05.6	+44.4	93.2	25 02.0	+45.2	93.7	24 57.9	+45.9	94.1	17
18	25 56.5	+40.0	90.0	25 56.2	+40.8	90.5	25 55.4	+41.7	91.0	25 54.1	+42.5	91.5	25 52.3	+43.3	92.0	25 50.0	+44.1	92.5	25 47.2	+44.9	92.9	25 43.8	+45.7	93.4	18
19	26 36.5	+39.7	89.2	26 37.0	+40.6	89.7	26 37.1	+41.4	90.2	26 36.6	+42.3	90.7	26 35.6	+43.1	91.2	26 34.1	+43.9	91.7	26 32.1	+44.7	92.2	26 29.5	+45.5	92.7	19
20	27 16.2	+39.3	88.4	27 17.6	+40.3	88.9	27 18.5	+41.2	89.4	27 18.9	+42.0	89.9	27 18.7	+42.8	90.4	27 18.0	+43.7	90.9	27 16.8	+44.4	91.5	27 15.0	+45.3	92.0	20
21	27 55.5	+39.1	87.5	27 57.9	+39.9	88.0	27 59.7	+40.8	88.6	28 00.9	+41.7	89.1	28 01.5	+42.6	89.6	28 01.7	+43.3	90.2	28 01.2	+44.2	90.7	28 00.2	+45.0	91.2	21
22	28 34.6	+38.7	86.6	28 37.8	+39.7	87.2	28 40.5	+40.5	87.7	28 42.6	+41.4	88.3	28 44.1	+42.3	88.8	28 45.0	+43.1	89.4	28 45.4	+43.9	89.9	28 45.2	+44.7	90.5	22
23	29 13.3	+38.4	85.8	29 17.5	+39.3	86.3	29 21.0	+40.2	86.9	29 24.0	+41.1	87.5	29 26.4	+41.9	88.0	29 28.1	+42.9	88.6	29 29.3	+43.7	89.1	29 29.9	+44.5	89.7	23
24	29 51.7	+38.1	84.9	29 56.8	+38.9	85.5	30 01.2	+39.9	86.0	30 05.1	+40.7	86.6	30 08.3	+41.7	87.2	30 11.0	+42.5	87.8	30 13.0	+43.3	88.4	30 14.4	+44.2	88.9	24
25	30 29.8	+37.6	84.0	30 35.7	+38.6	84.6	30 41.1	+39.5	85.2	30 45.8	+40.5	85.8	30 50.0	+41.3	86.4	30 53.5	+42.2	87.0	30 56.3	+43.1	87.6	30 58.6	+43.9	88.2	25
26	31 07.4	+37.3	83.1	31 14.3	+38.3	83.7	31 20.6	+39.2	84.3	31 26.3	+40.0	84.9	31 31.3	+41.0	85.5	31 35.7	+41.8	86.1	31 39.4	+42.7	86.7	31 42.5	+43.6	87.4	26
27	31 44.7	+36.9	82.2	31 52.6	+37.8	82.8	31 59.8	+38.8	83.4	32 06.3	+39.8	84.0	32 12.3	+40.6	84.6	32 17.5	+41.6	85.3	32 22.1	+42.5	85.9	32 26.1	+43.3	86.5	27
28	32 21.6	+36.4	81.2	32 30.4	+37.4	81.9	32 38.6	+38.3	82.5	32 46.1	+39.3	83.1	32 52.9	+40.3	83.8	32 59.1	+41.1	84.4	33 04.6	+42.0	85.1	33 09.4	+42.9	85.7	28
29	32 58.0	+36.1	80.3	33 07.8	+37.0	80.9	33 16.9	+38.0	81.6	33 25.4	+38.9	82.2	33 33.2	+39.8	82.9	33 40.2	+40.8	83.5	33 46.6	+41.7	84.2	33 52.3	+42.6	84.9	29
30	33 34.1	+35.5	79.3	33 44.8	+36.6	80.0	33 54.9	+37.6	80.7	34 04.3	+38.5	81.3	34 13.0	+39.5	82.0	34 21.0	+40.5	82.7	34 28.3	+41.4	83.3	34 34.9	+42.3	84.0	30
31	34 09.6	+35.2	78.4	34 21.4	+36.1	79.0	34 32.5	+37.1	79.7	34 42.8	+38.1	80.4	34 52.5	+39.1	81.1	35 01.5	+40.0	81.8	35 09.7	+40.9	82.5	35 17.2	+41.9	83.2	31
32	34 44.8	+34.6	77.4	34 57.5	+35.7	78.1	35 09.6	+36.6	78.8	35 20.9	+37.7	79.4	35 31.6	+38.6	80.1	35 41.5	+39.5	80.8	35 50.6	+40.6	81.6	35 59.1	+41.4	82.3	32
33	35 19.4	+34.1	76.4	35 33.2	+35.1	77.1	35 46.2	+36.2	77.8	35 58.6	+37.1	78.5	36 10.2	+38.1	79.2	36 21.0	+39.2	79.9	36 31.2	+40.1	80.7	36 40.5	+41.1	81.4	33
34	35 53.5	+33.7	75.4	36 08.3	+34.7	76.1	36 22.4	+35.7	76.8	36 35.7	+36.7	77.5	36 48.3	+37.7	78.2	37 00.2	+38.7	79.0	37 11.3	+39.7	79.7	37 21.6	+40.6	80.5	34
35	36 27.2	+33.0	74.3	36 43.0	+34.1	75.1	36 58.1	+35.1	75.8	37 12.4	+36.2	76.5	37 26.0	+37.3	77.3	37 38.9	+38.2	78.0	37 51.0	+39.2	78.8	38 02.2	+40.2	79.5	35
36	37 00.2	+32.6	73.3	37 17.1	+33.6	74.0	37 33.2	+34.7	74.8	37 48.6	+35.7	75.5	38 03.3	+36.7	76.3	38 17.1	+37.7	77.0	38 30.2	+38.7	77.8	38 42.4	+39.8	78.6	36
37	37 32.8	+31.9	72.3	37 50.7	+33.0	73.0	38 07.9	+34.1	73.7	38 24.3	+35.1	74.5	38 40.0	+36.1	75.3	38 54.8	+37.2	76.0	39 08.9	+38.2	76.8	39 22.2	+39.2	77.6	37
38	38 04.7	+31.4	71.2	38 23.7	+32.5	71.9	38 42.0	+33.5	72.7	38 59.4	+34.6	73.5	39 16.1	+35.6	74.2	39 32.0	+36.7	75.0	39 47.1	+37.7	75.8	40 01.4	+38.7	76.6	38
39	38 36.1	+30.8	70.1	38 56.2	+31.8	70.9	39 15.5	+32.9	71.6	39 34.0	+34.0	72.4	39 51.7	+35.1	73.2	40 08.7	+36.1	74.0	40 24.8	+37.2	74.8	40 40.1	+38.2	75.6	39
40	39 06.9	+30.1	69.0	39 28.0	+31.2	69.8	39 48.4	+32.3	70.5	40 08.0	+33.4	71.3	40 26.8	+34.5	72.1	40 44.8	+35.5	73.0	41 02.0	+36.6	73.8	41 18.3	+37.7	74.6	40
41	39 37.0	+29.5	67.9	39 59.2	+30.6	68.6	40 20.7	+31.6	69.4	40 41.4	+32.7	70.2	41 01.3	+33.8	71.1	41 20.3	+34.9	71.9	41 38.6	+36.0	72.7	41 56.0	+37.0	73.6	41
42	40 06.5	+28.8	66.7	40 29.8	+29.9	67.5	40 52.3	+31.0	68.3	41 14.1	+32.1	69.1	41 35.1	+33.2	70.0	41 55.2	+34.3	70.8	42 14.6	+35.3	71.6	42 33.0	+36.5	72.5	42
43	40 35.3	+28.1	65.6	40 59.7	+29.2	66.4	41 23.3	+30.4	67.2	41 46.2	+31.5	68.0	42 08.3	+32.5	68.8	42 29.5	+33.7	69.7	42 49.9	+34.8	70.6	43 09.5	+35.8	71.4	43
44	41 03.4	+27.4	64.4	41 28.9	+28.5	65.2	41 53.7	+29.6	66.0	42 17.7	+30.7	66.9	42 40.8	+31.9	67.7	43 03.2	+33.0	68.6	43 24.7	+34.1	69.4	43 45.3	+35.2	70.3	44
45	41 30.8	+26.6	63.2	41 57.4	+27.8	64.0	42 23.3	+28.9	64.9	42 48.4	+30.0	65.7	43 12.7	+31.1	66.5	43 36.2	+32.2	67.4	43 58.8	+33.4	68.3	44 20.5	+34.5	69.2	45
46	41 57.4	+25.9	62.0	42 25.2	+27.0	62.8	42 52.2	+28.1	63.7	43 18.4	+29.3	64.5	43 43.8	+30.4	65.4	44 08.4	+31.6	66.2	44 32.2	+32.6	67.1	44 55.0	+33.8	68.1	46
47	42 23.3	+25.1	60.8	42 52.2	+26.2	61.6	43 20.3	+27.4	62.5	43 47.7	+28.5	63.3	44 14.2	+29.7	64.2	44 40.0	+30.7	65.0	45 04.8	+32.0	66.0	45 28.8	+33.1	66.9	47
48	42 48.4	+24.3	59.6	43 18.4	+25.4	60.4	43 47.7	+26.5	61.2	44 16.2	+27.7	62.1	44 43.9	+28.8	62.9	45 10.7	+30.0	63.8	45 36.8	+31.1	64.8	46 01.9	+32.3	65.7	48
49	43 12.7	+23.5	58.3	43 43.8	+24.6	59.1	44 14.2	+25.8	60.0	44 43.9	+26.8	60.8	45 12.7	+28.0	61.7	45 40.7	+29.2	62.6	46 07.9	+30.4	63.5	46 34.2	+31.5	64.5	49
50	43 36.2	+22.6	57.1	44 08.4	+23.8	57.9	44 40.0	+24.8	58.7	45 10.7	+26.1	59.6	45 40.7	+27.2	60.4	46 09.9	+28.4	61.3	46 38.3	+29.5	62.3	47 05.7	+30.7	63.2	50
51	43 58.8	+21.7	55.8	44 32.2	+22.8	56.6	45 04.8	+24.0	57.4	45 36.8	+25.1	58.3	46 07.9	+26.3	59.2	46 38.3	+27.4	60.1	47 07.8	+28.6	61.0	47 36.4	+29.9	62.0	51
52	44 20.5	+20.9	54.5	44 55.0	+22.0	55.3	45 28.8	+23.1	56.1	46 01.9	+24.3	57.0	46 34.2	+25.4	57.9	47 05.7	+26.6	58.8	47 36.4	+27.8	59.7	48 06.3	+28.9	60.7	52
53	44 41.4	+19.9	53.2	45 17.0	+21.1	54.0	45 51.9	+22.2	54.8	46 26.2	+23.3	55.7	46 59.6	+24.5	56.5	47 32.3	+25.7	57.4	48 04.2	+26.8	58.4	48 35.2	+28.1	59.3	53
54	45 01.3	+19.0	51.8	45 38.1	+20.1	52.6	46 14.1	+21.3	53.5	46 49.5	+22.4	54.3	47 24.1	+23.5	55.2	47 58.0	+24.7	56.1	48 31.0	+25.9	57.0	49 03.3	+27.0	58.0	54
55	45 20.3	+18.0	50.5	45 58.2	+19.1	51.3	46 35.4	+20.2	52.1	47 11.9	+21.3	53.0	47 47.6	+22.6	53.8	48 22.7	+23.7	54.7	48 56.9	+24.9	55.7	49 30.3	+26.1	56.6	55
56	45 38.3	+17.1	49.1	46 17.3	+18.1	49.9	46 55.6	+19.3	50.7	47 33.2	+20.4	51.6	48 10.2	+21.5	52.4	48 46.4	+22.7	53.3	49 21.8	+23.9	54.3	49 56.4	+25.1	55.2	56
57	45 55.4	+16.1	47.8	46 35.4	+17.2	48.5	47 14.9	+18.2	49.3	47 53.6	+19.4	50.2	48 31.7	+20.5	51.0	49 09.1	+21.6	51.9	49 45.7	+22.8	52.9	50 21.5	+24.0	53.8	57
58	46 11.5	+15.0	46.4	46 52.6	+16.1	47.1	47 33.1	+17.2	47.9	48 13.0	+18.3	48.8	48 52.2	+19.4	49.6	49 30.7	+20.6	50.5	50 08.5	+21.7	51.4	50 45.5	+23.0	52.4	58
59	46 26.5	+14.0	45.0	47 08.7	+15.0	45.7	47 50.3	+16.1	46.5	48 31.3	+17.2	47.3	49 11.6	+18.3	48.2	49 51.3	+19.4	49.1	50 30.2	+20.7	50.0	51 08.5	+21.8	50.9	59
60	46 40.5	+13.0	43.6	47 23.7	+14.0	44.3	48 06.4	+15.0	45.1	48 48.5	+16.1	45.9	49 29.9	+17.2	46.7	50 10.7	+18.4	47.6	50 50.9	+19.5	48.5	51 30.3	+20.6	49.4	60
61	46 53.5	+11.9	42.1	47 37.7	+12.9	42.9	48 21.4	+14.0	43.6	49 04.6	+15.0	44.4	49 47.1	+16.1	45.2	50 29.1	+17.2	46.1	51 10.4	+18.3	47.0	51 50.9	+19.5	47.9	61
62	47 05.4	+10.8	40.7	47 50.6	+11.8	41.4	48 35.4	+12.7	42.2	49 19.6	+13.8	42.9	50 03.2	+14.9	43.7	50 46.3	+16.0	44.6	51 28.7	+17.1	45.5	52 10.4	+18.3	46.4	62
63	47 16.2	+9.7	39.2	48 02.4	+10.7	39.9	48 48.1	+11.7	40.7	49 33.4	+12.7	41.4	50 18.1	+13.7	42.2	51 02.3	+14.7	43.1	51 45.8	+15.9	43.9	52 28.7	+17.0	44.8	63
64	47 25.9	+8.5	37.8	48 13.1	+9.5	38.5	48 59.8	+10.5	39.2	49 46.1	+11.4	39.9	50 31.8	+12.5	40.7	51 17.0	+13.6	41.5	52 01.7	+14.6	42.4	52 45.7	+15.8	43.2	64
65	47 34.4	+7.5	36.3	48 22.6	+8.3	37.0	49 10.3	+9.3	37.7	49 57.5	+10.3	38.4	50 44.3	+11.3	39.2	51 30.6	+12.3	39.9	52 16.3	+13.4	40.8	53 01.5	+14.4	41.6	65
66	47 41.9	+6.3	34.8	48 30.9	+7.2	35.5	49 19.6	+8.1	36.2	50 07.8	+9.1	36.9	50 55.6	+10.0	37.6	51 42.9	+11.0	38.4	52 29.7	+12.0	39.2	53 15.9	+13.1	40.0	66
67	47 48.2	+5.2	33.4	48 38.1	+6.1	34.0	49 27.7	+6.9	34.6	50 16.9	+7.8	35.3	51 05.6	+8.8	36.0	51 53.9	+9.7	36.8	52 41.7	+10.7	37.6	53 29.0	+11.8	38.4	67
68	47 53.4	+4.0	31.9	48 44.2	+4.8	32.5	49 34.6	+5.7	33.1	50 24.7	+6.5	33.8	51 14.4	+7.4	34.5	52 03.6	+8.4	35.2	52 52.4	+9.4	35.9	53 40.8	+10.4	36.7	68
69	47 57.4	+2.9	30.4	48 49.0	+3.7	31.0	49 40.3	+4.5	31.6	50 31.2	+5.4	32.2	51 21.8	+6.2	32.9	52 12.0	+7.1	33.6	53 01.8	+8.0	34.3	53 51.2	+8.9	35.1	69
70	48 00.3	+1.7	28.9	48 52.7	+2.4	29.5	49 44.8	+3.2	30.0	50 36.6	+4.0	30.6	51 28.0	+4.9	31.3	52 19.1	+5.8	31.9	53 09.8	+6.7	32.6	54 00.1	+7.6	33.4	70
71	48 02.0	+0.5	27.4	48 55.1	+1.3	27.9	49 48.0	+2.0	28.5	50 40.6	+2.8	29.1	51 32.9	+3.6	29.7	52 24.9	+4.3	30.3	53 16.5	+5.2	31.0	54 07.7	+6.2	31.7	71
72	48 02.5	-0.6	25.9	48 56.4	0.0	26.4	49 50.0	+0.8	26.9	50 43.4	+1.5	27.5	51 36.5	+2.2	28.1	52 29.2	+3.1	28.7	53 21.7	+3.9	29.3	54 13.9	+4.7	30.0	72
73	48 01.9	-1.8	24.4	48 56.4	-1.1	24.9	49 50.8	-0.5	25.4	50 44.9	+0.2	25.9	51 38.7	+0.9	26.5	52 32.3	+1.6	27.0	53 25.6	+2.4	27.6	54 18.6	+3.2	28.3	73
74	48 00.1	-2.9	22.9	48 55.3	-2.3	23.4	49 50.3	-1.7	23.8	50 45.1	-1.1	24.3	51 39.6	-0.4	24.8	52 33.9	+0.4	25.4	53 28.0	+1.0	26.0	54 21.8	+1.8	26.6	74
75	47 57.2	-4.1	21.4	48 53.0	-3.6	21.8	49 48.6	-3.0	22.3	50 44.0	-2.4	22.7	51 39.2	-1.7	23.2	52 34.3	-1.1	23.7	53 29.1	-0.4	24.3	54 23.6	+0.4	24.9	75
76	47 53.1	-5.3	19.9	48 49.4	-4.7	20.3	49 45.6	-4.2	20.7	50 41.6	-3.6	21.2	51 37.5	-3.0	21.6	52 33.2	-2.4	22.1	53 28.7	-1.8	22.6	54 24.0	-1.2	23.1	76
77	47 47.8	-6.4	18.5	48 44.7	-5.9	18.8	49 41.4	-5.4	19.2	50 38.0	-4.9	19.6	51 34.5	-4.4	20.0	52 30.8	-3.8	20.5	53 26.9	-3.2	20.9	54 22.8	-2.6	21.4	77
78	47 41.4	-7.5	17.0	48 38.8	-7.1	17.3	49 36.0	-6.6	17.7	50 33.1	-6.2	18.0	51 30.1	-5.7	18.4	52 27.0	-5.2	18.8	53 23.7	-4.6	19.2	54 20.2	-4.0	19.7	78
79	47 33.9	-8.7	15.5	48 31.7	-8.3	15.8	49 29.4	-7.9	16.1	50 26.9	-7.4	16.5	51 24.4	-6.9	16.8	52 21.8	-6.5	17.2	53 19.1	-6.0	17.6	54 16.2	-5.5	18.0	79
80	47 25.2	-9.7	14.0	48 23.4	-9.4	14.3	49 21.5	-9.0	14.6	50 19.5	-8.6	14.9	51 17.5	-8.3	15.2	52 15.3	-7.8	15.6	53 13.1	-7.4	15.9	54 10.7	-6.9	16.3	80
81	47 15.5	-10.9	12.6	48 14.0	-10.6	12.8	49 12.5	-10.3	13.1	50 10.9	-9.9	13.4	51 09.2	-9.5	13.6	52 07.5	-9.2	13.9	53 05.7	-8.8	14.3	54 03.8	-8.4	14.6	81
82	47 04.6	-12.0	11.1	48 03.4	-11.6	11.4	49 02.2	-11.3	11.6	50 01.0	-11.1	11.8	50 59.7	-10.8	12.1	51 58.3	-10.4	12.3	52 56.9	-10.1	12.6	53 55.4	-9.7	12.9	82
83	46 52.6	-13.0	9.7	47 51.8	-12.8	9.9	48 50.9	-12.6	10.1	49 49.9	-12.3	10.3	50 48.9	-12.0	10.5	51 47.9	-11.7	10.7	52 46.8	-11.4	11.0	53 45.7	-11.1	11.2	83
84	46 39.6	-14.1	8.3	47 39.0	-13.9	8.4	48 38.3	-13.7	8.6	49 37.6	-13.4	8.8	50 36.9	-13.2	9.0	51 36.2	-13.0	9.2	52 35.4	-12.8	9.4	53 34.6	-12.5	9.6	84
85	46 25.5	-15.1	6.9	47 25.1	-15.0	7.0	48 24.6	-14.7	7.1	49 24.2	-14.6	7.3	50 23.7	-14.5	7.4	51 23.2	-14.3	7.6	52 22.6	-14.0	7.8	53 22.1	-13.9	7.9	85
86	46 10.4	-16.1	5.5	47 10.1	-16.0	5.6	48 09.9	-15.9	5.7	49 09.6	-15.8	5.8	50 09.2	-15.6	5.9	51 08.9	-15.4	6.0	52 08.6	-15.3	6.2	53 08.2	-15.1	6.3	86
87	45 54.3	-17.1	4.1	46 54.1	-17.0	4.2	47 54.0	-17.0	4.2	48 53.8	-16.8	4.3	49 53.6	-16.7	4.4	50 53.5	-16.7	4.5	51 53.3	-16.6	4.6	52 53.1	-16.4	4.7	87
88	45 37.2	-18.1	2.7	46 37.1	-18.1	2.8	47 37.0	-18.0	2.8	48 37.0	-18.0	2.9	49 36.9	-17.9	2.9	50 36.8	-17.8	3.0	51 36.7	-17.7	3.0	52 36.7	-17.7	3.1	88
89	45 19.1	-19.1	1.3	46 19.0	-19.0	1.4	47 19.0	-19.0	1.4	48 19.0	-19.0	1.4	49 19.0	-19.0	1.5	50 19.0	-19.0	1.5	51 19.0	-19.0	1.5	52 18.9	-18.9	1.5	89
90	45 00.0	-20.0	0.0	46 00.0	-20.0	0.0	47 00.0	-20.0	0.0	48 00.0	-20.0	0.0	49 00.0	-20.1	0.0	50 00.0	-20.1	0.0	51 00.0	-20.1	0.0	52 00.0	-20.1	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec
0	13 18.6	–43.7	103.7	13 04.3	–44.4	103.9	12 49.7	–45.0	104.1	12 35.0	–45.8	104.4	12 20.0	–46.4	104.6	12 04.8	–47.1	104.8	11 49.4	–47.7	105.0	11 33.8	–48.3	105.2	0
1	12 34.9	–43.7	104.4	12 19.9	–44.5	104.6	12 04.7	–45.2	104.8	11 49.2	–45.8	105.0	11 33.6	–46.5	105.2	11 17.7	–47.1	105.4	11 01.7	–47.8	105.6	10 45.5	–48.4	105.8	1
2	11 51.2	–43.9	105.1	11 35.4	–44.5	105.3	11 19.5	–45.2	105.5	11 03.4	–45.9	105.7	10 47.1	–46.6	105.9	10 30.6	–47.2	106.0	10 13.9	–47.8	106.2	9 57.1	–48.4	106.4	2
3	11 07.3	–44.0	105.8	10 50.9	–44.7	106.0	10 34.3	–45.4	106.2	10 17.5	–46.0	106.3	10 00.5	–46.8	106.5	9 43.4	–47.3	106.7	9 26.1	–47.9	106.9	9 08.7	–48.5	107.0	3
4	10 23.3	–44.0	106.5	10 06.2	–44.7	106.6	9 48.9	–45.4	106.8	9 31.5	–46.1	107.0	9 13.9	–46.7	107.1	8 56.1	–47.3	107.3	8 38.2	–47.9	107.4	8 20.2	–48.5	107.6	4
5	9 39.3	–44.2	107.2	9 21.5	–44.8	107.3	9 03.5	–45.4	107.5	8 45.4	–46.1	107.6	8 27.2	–46.8	107.8	8 08.8	–47.4	107.9	7 50.3	–48.0	108.0	7 31.6	–48.6	108.2	5
6	8 55.1	–44.2	107.9	8 36.7	–44.9	108.0	8 18.1	–45.6	108.1	7 59.3	–46.2	108.3	7 40.4	–46.8	108.4	7 21.4	–47.4	108.5	7 02.3	–48.1	108.7	6 43.0	–48.6	108.8	6
7	8 10.9	–44.2	108.5	7 51.8	–45.0	108.7	7 32.5	–45.6	108.8	7 13.1	–46.2	108.9	6 53.6	–46.9	109.0	6 34.0	–47.5	109.1	6 14.2	–48.0	109.3	5 54.4	–48.7	109.4	7
8	7 26.7	–44.4	109.2	7 06.8	–45.0	109.3	6 46.9	–45.6	109.5	6 26.9	–46.3	109.6	6 06.7	–46.9	109.7	5 46.5	–47.5	109.8	5 26.2	–48.2	109.9	5 07.7	–48.7	109.9	8
9	6 42.3	–44.4	109.9	6 21.8	–45.0	110.0	6 01.3	–45.7	110.1	5 40.6	–46.3	110.2	5 19.8	–46.9	110.3	4 59.0	–47.6	110.4	4 38.0	–48.1	110.5	4 17.0	–48.7	110.5	9
10	5 57.9	–44.4	110.6	5 36.8	–45.1	110.7	5 15.6	–45.8	110.8	4 54.3	–46.4	110.9	4 32.9	–47.0	110.9	4 11.4	–47.6	111.0	3 49.9	–48.2	111.1	3 28.3	–48.7	111.1	10
11	5 13.5	–44.5	111.2	4 51.7	–45.1	111.3	4 29.8	–45.7	111.4	4 07.9	–46.4	111.5	3 45.9	–47.0	111.5	3 23.8	–47.6	111.6	3 01.7	–48.2	111.7	2 39.6	–48.7	111.7	11
12	4 29.0	–44.5	111.9	4 06.6	–45.2	112.0	3 44.1	–45.9	112.1	3 21.5	–46.4	112.1	2 58.9	–47.0	112.2	2 36.2	–47.6	112.2	2 13.5	–48.2	112.2	1 50.8	–48.8	112.3	12
13	3 44.5	–44.6	112.6	3 21.4	–45.2	112.7	2 58.2	–45.8	112.7	2 35.1	–46.5	112.7	2 11.9	–47.1	112.8	1 48.6	–47.6	112.8	1 25.3	–48.2	112.8	1 02.0	–48.8	112.9	13
14	2 59.9	–44.6	113.3	2 36.2	–45.2	113.3	2 12.4	–45.8	113.3	1 48.6	–46.4	113.4	1 24.8	–47.1	113.4	1 01.0	–47.7	113.4	0 37.1	–48.2	113.4	0 13.2	–48.8	113.4	14
15	2 15.3	–44.6	113.9	1 51.0	–45.3	114.0	1 26.6	–45.9	114.0	1 02.2	–46.5	114.0	0 37.7	–47.0	114.0	0 13.3	–47.6	114.0	0 11.1	+48.2	66.0	0 35.6	+48.7	66.0	15
16	1 30.7	–44.6	114.6	1 05.7	–45.3	114.6	0 40.7	–45.8	114.6	0 15.7	–46.5	114.6	0 09.3	+47.1	65.4	0 34.3	+47.7	65.4	0 59.3	+48.3	65.4	1 24.3	+48.8	65.4	16
17	0 46.1	–44.6	115.3	0 20.5	–45.2	115.3	0 05.1	+45.9	64.7	0 30.8	+46.4	64.7	0 56.4	+47.0	64.7	1 22.0	+47.6	64.8	1 47.6	+48.2	64.8	2 13.1	+48.8	64.8	17
18	0 01.5	–44.6	115.9	0 24.7	+45.3	64.1	0 51.0	+45.8	64.1	1 17.2	+46.5	64.1	1 43.4	+47.1	64.1	2 09.6	+47.6	64.1	2 35.8	+48.1	64.2	3 01.9	+48.7	64.2	18
19	0 43.1	+44.6	63.4	1 10.0	+45.2	63.4	1 36.8	+45.9	63.4	2 03.7	+46.4	63.5	2 30.5	+47.0	63.5	2 57.2	+47.6	63.5	3 23.9	+48.2	63.6	3 50.6	+48.7	63.6	19
20	1 27.7	+44.6	62.7	1 55.2	+45.2	62.7	2 22.7	+45.8	62.8	2 50.1	+46.4	62.8	3 17.5	+47.0	62.9	3 44.8	+47.6	62.9	4 12.1	+48.1	63.0	4 39.3	+48.7	63.1	20
21	2 12.3	+44.6	62.1	2 40.4	+45.2	62.1	3 08.5	+45.8	62.1	3 36.5	+46.4	62.2	4 04.5	+47.0	62.2	4 32.4	+47.5	62.3	5 00.2	+48.1	62.4	5 28.0	+48.7	62.5	21
22	2 56.9	+44.6	61.4	3 25.6	+45.2	61.4	3 54.3	+45.8	61.5	4 22.9	+46.4	61.6	4 51.5	+46.9	61.6	5 19.9	+47.5	61.7	5 48.3	+48.1	61.8	6 16.7	+48.6	61.9	22
23	3 41.5	+44.5	60.7	4 10.8	+45.1	60.8	4 40.1	+45.7	60.8	5 09.3	+46.3	60.9	5 38.4	+46.9	61.0	6 07.4	+47.5	61.1	6 36.4	+48.0	61.2	7 05.3	+48.6	61.3	23
24	4 26.0	+44.5	60.0	4 55.9	+45.1	60.1	5 25.8	+45.7	60.2	5 55.6	+46.3	60.3	6 25.3	+46.8	60.4	6 54.9	+47.4	60.5	7 24.4	+48.0	60.6	7 53.9	+48.5	60.7	24
25	5 10.5	+44.4	59.4	5 41.0	+45.1	59.4	6 11.5	+45.6	59.5	6 41.9	+46.2	59.6	7 12.1	+46.8	59.7	7 42.3	+47.4	59.8	8 12.4	+47.9	60.0	8 42.4	+48.4	60.1	25
26	5 54.9	+44.4	58.7	6 26.1	+45.0	58.8	6 57.1	+45.6	58.9	7 28.1	+46.2	59.0	7 58.9	+46.8	59.1	8 29.7	+47.3	59.2	9 00.3	+47.9	59.4	9 30.8	+48.4	59.5	26
27	6 39.3	+44.4	58.0	7 11.1	+44.9	58.1	7 42.7	+45.5	58.2	8 14.3	+46.1	58.3	8 45.7	+46.7	58.5	9 17.0	+47.2	58.6	9 48.2	+47.8	58.8	10 19.2	+48.4	58.9	27
28	7 23.7	+44.3	57.3	7 56.0	+44.9	57.4	8 28.2	+45.5	57.6	9 00.4	+46.0	57.7	9 32.4	+46.6	57.8	10 04.2	+47.2	57.9	10 36.0	+47.7	58.1	11 07.6	+48.2	58.2	28
29	8 08.0	+44.2	56.7	8 40.9	+44.8	56.8	9 13.7	+45.4	56.9	9 46.4	+46.0	57.1	10 19.0	+46.5	57.2	10 51.4	+47.1	57.4	11 23.7	+47.6	57.5	11 55.8	+48.2	57.7	29
30	8 52.2	+44.1	56.0	9 25.7	+44.7	56.1	9 59.1	+45.3	56.2	10 32.4	+45.8	56.4	11 05.5	+46.4	56.6	11 38.5	+47.0	56.7	12 11.3	+47.6	56.9	12 44.0	+48.1	57.1	30
31	9 36.3	+44.1	55.3	10 10.4	+44.7	55.4	10 44.4	+45.2	55.6	11 18.2	+45.8	55.7	11 51.9	+46.4	55.9	12 25.5	+46.9	56.1	12 58.9	+47.5	56.3	13 32.1	+48.0	56.5	31
32	10 20.4	+43.9	54.6	10 55.1	+44.5	54.7	11 29.6	+45.2	54.9	12 04.0	+45.7	55.1	12 38.3	+46.3	55.3	13 12.4	+46.8	55.4	13 46.4	+47.3	55.6	14 20.1	+47.9	55.9	32
33	11 04.3	+43.9	53.9	11 39.6	+44.5	54.1	12 14.8	+45.0	54.2	12 49.7	+45.6	54.4	13 24.6	+46.1	54.6	13 59.2	+46.8	54.8	14 33.7	+47.3	55.0	15 08.0	+47.9	55.2	33
34	11 48.2	+43.8	53.2	12 24.1	+44.3	53.4	12 59.8	+44.9	53.6	13 35.3	+45.5	53.8	14 10.7	+46.1	53.9	14 46.0	+46.6	54.2	15 21.0	+47.2	54.4	15 55.9	+47.7	54.6	34
35	12 32.0	+43.6	52.5	13 08.4	+44.3	52.7	13 44.7	+44.8	52.9	14 20.8	+45.4	53.1	14 56.8	+45.9	53.3	15 32.6	+46.5	53.5	16 08.2	+47.0	53.7	16 43.6	+47.5	54.0	35
36	13 15.6	+43.6	51.8	13 52.7	+44.1	52.0	14 29.5	+44.7	52.2	15 06.2	+45.3	52.4	15 42.7	+45.9	52.6	16 19.1	+46.3	52.8	16 55.2	+46.9	53.1	17 31.1	+47.5	53.3	36
37	13 59.2	+43.4	51.1	14 36.8	+44.0	51.3	15 14.2	+44.6	51.5	15 51.5	+45.1	51.7	16 28.6	+45.6	51.9	17 05.4	+46.3	52.2	17 42.1	+46.8	52.4	18 18.6	+47.3	52.7	37
38	14 42.6	+43.3	50.4	15 20.8	+43.8	50.6	15 58.8	+44.4	50.8	16 36.6	+45.0	51.0	17 14.2	+45.6	51.3	17 51.7	+46.1	51.5	18 28.9	+46.7	51.8	19 05.9	+47.2	52.0	38
39	15 25.9	+43.2	49.7	16 04.6	+43.8	49.9	16 43.2	+44.3	50.1	17 21.6	+44.9	50.3	17 59.8	+45.4	50.6	18 37.8	+46.0	50.8	19 15.6	+46.5	51.1	19 53.1	+47.1	51.4	39
40	16 09.1	+43.0	48.9	16 48.4	+43.5	49.2	17 27.5	+44.1	49.4	18 06.5	+44.7	49.6	18 45.2	+45.3	49.9	19 23.8	+45.8	50.2	20 02.1	+46.3	50.4	20 40.2	+46.9	50.7	40
41	16 52.1	+42.8	48.2	17 31.9	+43.5	48.4	18 11.6	+44.0	48.7	18 51.2	+44.5	48.9	19 30.5	+45.1	49.2	20 09.6	+45.6	49.5	20 48.4	+46.2	49.8	21 27.1	+46.7	50.1	41
42	17 34.9	+42.7	47.5	18 15.4	+43.2	47.7	18 55.6	+43.8	48.0	19 35.7	+44.4	48.2	20 15.6	+44.9	48.5	20 55.2	+45.5	48.8	21 34.6	+46.0	49.1	22 13.8	+46.6	49.4	42
43	18 17.6	+42.5	46.7	18 58.6	+43.1	47.0	19 39.4	+43.7	47.2	20 20.1	+44.2	47.5	21 00.5	+44.7	47.8	21 40.7	+45.3	48.1	22 20.6	+45.9	48.4	23 00.4	+46.4	48.7	43
44	19 00.1	+42.3	46.0	19 41.7	+42.9	46.3	20 23.1	+43.4	46.5	21 04.3	+44.0	46.8	21 45.2	+44.6	47.1	22 26.0	+45.1	47.4	23 06.5	+45.6	47.7	23 46.8	+46.2	48.0	44
45	19 42.4	+42.2	45.2	20 24.6	+42.7	45.5	21 06.5	+43.3	45.8	21 48.3	+43.8	46.1	22 29.8	+44.4	46.4	23 11.1	+44.9	46.7	23 52.1	+45.5	47.0	24 33.0	+46.0	47.3	45
46	20 24.6	+41.9	44.5	21 07.3	+42.5	44.8	21 49.8	+43.1	45.0	22 32.1	+43.6	45.3	23 14.2	+44.1	45.6	23 56.0	+44.7	45.9	24 37.6	+45.3	46.3	25 19.0	+45.8	46.6	46
47	21 06.5	+41.8	43.7	21 49.8	+42.3	44.0	22 32.9	+42.8	44.3	23 15.7	+43.4	44.6	23 58.3	+44.0	44.9	24 40.7	+44.5	45.2	25 22.9	+45.0	45.5	26 04.8	+45.5	45.9	47
48	21 48.3	+41.5	43.0	22 32.1	+42.1	43.2	23 15.7	+42.6	43.5	23 59.1	+43.2	43.8	24 42.3	+43.7	44.1	25 25.2	+44.3	44.5	26 07.9	+44.8	44.8	26 50.3	+45.2	45.2	48
49	22 29.8	+41.3	42.2	23 14.2	+41.8	42.5	23 58.3	+42.4	42.8	24 42.3	+42.9	43.1	25 26.0	+43.5	43.4	26 09.5	+44.0	43.7	26 52.7	+44.6	44.1	27 35.7	+45.1	44.4	49
50	23 11.1	+41.1	41.4	23 56.0	+41.6	41.7	24 40.7	+42.2	42.0	25 25.2	+42.7	42.3	26 09.5	+43.3	42.6	26 53.5	+43.8	43.0	27 37.3	+44.3	43.3	28 20.8	+44.9	43.7	50
51	23 52.1	+40.9	40.6	24 37.6	+41.4	40.9	25 22.9	+41.9	41.2	26 07.9	+42.4	41.5	26 52.7	+43.0	41.8	27 37.3	+43.5	42.2	28 21.6	+44.1	42.5	29 05.7	+44.6	42.9	51
52	24 33.0	+40.5	39.8	25 19.0	+41.1	40.1	26 04.8	+41.6	40.4	26 50.3	+42.2	40.7	27 35.7	+42.7	41.1	28 20.8	+43.3	41.4	29 05.7	+43.8	41.8	29 50.3	+44.4	42.2	52
53	25 13.5	+40.3	39.0	26 00.1	+40.8	39.3	26 46.4	+41.3	39.6	27 32.5	+41.9	39.9	28 18.4	+42.5	40.3	29 04.1	+43.0	40.6	29 49.5	+43.5	41.0	30 34.7	+44.0	41.4	53
54	25 53.8	+40.0	38.2	26 40.9	+40.5	38.5	27 27.7	+41.1	38.8	28 14.4	+41.6	39.1	29 00.9	+42.1	39.5	29 47.1	+42.6	39.8	30 33.0	+43.2	40.2	31 18.7	+43.8	40.6	54
55	26 33.8	+39.7	37.3	27 21.4	+40.2	37.6	28 08.8	+40.8	38.0	28 56.0	+41.3	38.3	29 43.0	+41.8	38.6	30 29.7	+42.4	39.0	31 16.2	+43.0	39.4	32 02.5	+43.4	39.8	55
56	27 13.5	+39.4	36.5	28 01.6	+40.0	36.8	28 49.6	+40.4	37.1	29 37.3	+41.0	37.5	30 24.8	+41.6	37.8	31 12.1	+42.1	38.2	31 59.2	+42.6	38.6	32 45.9	+43.2	39.0	56
57	27 52.9	+39.1	35.6	28 41.6	+39.6	35.9	29 30.0	+40.2	36.3	30 18.3	+40.7	36.6	31 06.4	+41.1	37.0	31 54.2	+41.7	37.3	32 41.8	+42.2	37.7	33 29.1	+42.8	38.1	57
58	28 32.0	+38.7	34.8	29 21.2	+39.3	35.1	30 10.2	+39.8	35.4	30 59.0	+40.3	35.8	31 47.5	+40.9	36.1	32 35.9	+41.4	36.5	33 24.0	+41.9	36.9	34 11.9	+42.4	37.3	58
59	29 10.7	+38.5	33.9	30 00.5	+38.9	34.2	30 50.0	+39.4	34.6	31 39.3	+39.9	34.9	32 28.4	+40.5	35.3	33 17.3	+41.0	35.7	34 05.9	+41.6	36.0	34 54.3	+42.1	36.4	59
60	29 49.2	+38.0	33.0	30 39.4	+38.5	33.3	31 29.4	+39.1	33.7	32 19.2	+39.6	34.0	33 08.9	+40.1	34.4	33 58.3	+40.6	34.8	34 47.5	+41.1	35.1	35 36.4	+41.7	35.6	60
61	30 27.2	+37.7	32.1	31 17.9	+38.2	32.4	32 08.5	+38.7	32.8	32 58.8	+39.2	33.1	33 49.0	+39.7	33.5	34 38.9	+40.2	33.9	35 28.6	+40.8	34.3	36 18.1	+41.3	34.7	61
62	31 04.9	+37.3	31.2	31 56.1	+37.8	31.5	32 47.2	+38.3	31.9	33 38.0	+38.8	32.2	34 28.7	+39.3	32.6	35 19.1	+39.9	33.0	36 09.4	+40.3	33.4	36 59.4	+40.9	33.8	62
63	31 42.2	+36.9	30.3	32 33.9	+37.4	30.6	33 25.5	+37.9	31.0	34 16.8	+38.4	31.3	35 08.0	+38.9	31.7	35 59.0	+39.4	32.0	36 49.7	+39.9	32.4	37 40.3	+40.4	32.8	63
64	32 19.1	+36.5	29.4	33 11.3	+37.0	29.7	34 03.4	+37.4	30.0	34 55.2	+38.0	30.4	35 46.9	+38.4	30.7	36 38.4	+38.9	31.1	37 29.6	+39.5	31.5	38 20.7	+40.0	31.9	64
65	32 55.6	+36.1	28.4	33 48.3	+36.5	28.7	34 40.8	+37.0	29.1	35 33.2	+37.5	29.4	36 25.3	+38.0	29.8	37 17.3	+38.5	30.1	38 09.1	+39.0	30.5	39 00.7	+39.5	30.9	65
66	33 31.7	+35.6	27.5	34 24.8	+36.1	27.8	35 17.8	+36.6	28.1	36 10.7	+37.0	28.5	37 03.3	+37.5	28.8	37 55.8	+38.0	29.2	38 48.1	+38.5	29.6	39 40.2	+39.0	30.0	66
67	34 07.3	+35.1	26.5	35 00.9	+35.6	26.8	35 54.4	+36.0	27.1	36 47.7	+36.5	27.5	37 40.8	+37.0	27.8	38 33.8	+37.5	28.2	39 26.6	+38.0	28.6	40 19.2	+38.5	29.0	67
68	34 42.4	+34.7	25.5	35 36.5	+35.1	25.8	36 30.4	+35.6	26.1	37 24.2	+36.0	26.5	38 17.8	+36.5	26.8	39 11.3	+37.0	27.2	40 04.6	+37.4	27.6	40 57.7	+37.9	28.0	68
69	35 17.1	+34.2	24.5	36 11.6	+34.6	24.8	37 06.0	+35.0	25.1	38 00.2	+35.5	25.5	38 54.3	+36.0	25.8	39 48.3	+36.4	26.2	40 42.0	+36.9	26.5	41 35.6	+37.4	26.9	69
70	35 51.3	+33.6	23.5	36 46.2	+34.1	23.8	37 41.0	+34.6	24.1	38 35.7	+35.0	24.4	39 30.3	+35.4	24.8	40 24.7	+35.8	25.1	41 18.9	+36.3	25.5	42 13.0	+36.8	25.9	70
71	36 24.9	+33.1	22.5	37 20.3	+33.5	22.8	38 15.6	+33.9	23.1	39 10.7	+34.4	23.4	40 05.7	+34.8	23.7	41 00.5	+35.3	24.1	41 55.2	+35.8	24.4	42 49.8	+36.2	24.8	71
72	36 58.0	+32.6	21.5	37 53.8	+33.0	21.7	38 49.5	+33.4	22.0	39 45.1	+33.8	22.3	40 40.5	+34.2	22.7	41 35.8	+34.7	23.0	42 31.0	+35.1	23.4	43 26.0	+35.5	23.7	72
73	37 30.6	+32.0	20.4	38 26.8	+32.4	20.7	39 22.9	+32.8	21.0	40 18.9	+33.1	21.3	41 14.7	+33.6	21.6	42 10.5	+34.0	21.9	43 06.1	+34.4	22.2	44 01.5	+34.9	22.6	73
74	38 02.6	+31.4	19.3	38 59.2	+31.8	19.6	39 55.7	+32.1	19.9	40 52.0	+32.6	20.2	41 48.3	+33.0	20.5	42 44.5	+33.3	20.8	43 40.5	+33.8	21.1	44 36.4	+34.2	21.5	74
75	38 34.0	+30.8	18.2	39 31.0	+31.1	18.5	40 27.8	+31.5	18.8	41 24.6	+31.9	19.0	42 21.3	+32.2	19.3	43 17.8	+32.7	19.6	44 14.3	+33.0	20.0	45 10.6	+33.5	20.3	75
76	39 04.8	+30.2	17.1	40 02.1	+30.5	17.4	40 59.3	+30.9	17.6	41 56.5	+31.2	17.9	42 53.5	+31.6	18.2	43 50.5	+31.9	18.5	44 47.3	+32.3	18.8	45 44.1	+32.7	19.1	76
77	39 35.0	+29.5	16.0	40 32.6	+29.9	16.3	41 30.2	+30.2	16.5	42 27.7	+30.5	16.8	43 25.1	+30.8	17.0	44 22.4	+31.2	17.3	45 19.7	+31.5	17.6	46 16.8	+31.9	17.9	77
78	40 04.5	+28.9	14.9	41 02.5	+29.1	15.1	42 00.4	+29.5	15.3	42 58.2	+29.8	15.6	43 55.9	+30.1	15.8	44 53.6	+30.5	16.1	45 51.2	+30.8	16.4	46 48.7	+31.2	16.7	78
79	40 33.4	+28.1	13.7	41 31.6	+28.4	13.9	42 29.8	+28.7	14.2	43 28.0	+29.0	14.4	44 26.0	+29.4	14.6	45 24.1	+29.6	14.9	46 22.0	+30.0	15.2	47 19.9	+30.3	15.4	79
80	41 01.5	+27.4	12.6	42 00.0	+27.7	12.8	42 58.5	+28.0	13.0	43 57.0	+28.2	13.2	44 55.4	+28.5	13.4	45 53.7	+28.8	13.6	46 52.0	+29.1	13.9	47 50.2	+29.4	14.2	80
81	41 28.9	+26.7	11.4	42 27.7	+27.0	11.6	43 26.5	+27.2	11.8	44 25.2	+27.5	12.0	45 23.9	+27.7	12.2	46 22.5	+28.0	12.4	47 21.1	+28.2	12.6	48 19.6	+28.6	12.8	81
82	41 55.6	+26.0	10.2	42 54.7	+26.1	10.4	43 53.7	+26.4	10.5	44 52.7	+26.6	10.7	45 51.6	+26.8	10.9	46 50.5	+27.1	11.1	47 49.3	+27.4	11.3	48 48.2	+27.6	11.5	82
83	42 21.6	+25.1	9.0	43 20.8	+25.4	9.1	44 20.1	+25.5	9.3	45 19.3	+25.7	9.4	46 18.4	+26.0	9.6	47 17.6	+26.1	9.8	48 16.7	+26.4	10.0	49 15.8	+26.6	10.2	83
84	42 46.7	+24.4	7.9	43 46.2	+24.5	7.9	44 45.6	+24.7	8.0	45 45.0	+24.7	8.1	46 44.4	+25.0	8.2	47 43.7	+25.3	8.4	48 43.1	+25.4	8.5	49 42.4	+25.6	8.8	84
85	43 11.1	+23.5	6.5	44 10.7	+23.7	6.6	45 10.3	+23.8	6.7	46 09.9	+23.9	6.8	47 09.4	+24.1	7.0	48 09.0	+24.2	7.1	49 08.5	+24.4	7.2	50 08.0	+24.6	7.4	85
86	43 34.6	+22.7	5.2	44 34.4	+22.7	5.3	45 34.1	+22.9	5.4	46 33.8	+23.0	5.5	47 33.5	+23.2	5.6	48 33.2	+23.3	5.7	49 32.9	+23.4	5.8	50 32.6	+23.5	6.0	86
87	43 57.3	+21.8	3.9	44 57.1	+21.9	4.0	45 57.0	+22.0	4.1	46 56.8	+22.1	4.2	47 56.7	+22.1	4.2	48 56.5	+22.2	4.3	49 56.3	+22.4	4.5	50 56.1	+22.5	4.5	87
88	44 19.1	+20.9	2.6	45 19.0	+21.0	2.7	46 19.0	+21.0	2.7	47 18.9	+21.1	2.8	48 18.8	+21.1	2.8	49 18.7	+21.2	2.9	50 18.7	+21.2	3.0	51 18.6	+21.3	3.0	88
89	44 40.0	+20.0	1.3	45 40.0	+20.0	1.4	46 40.0	+20.0	1.4	47 40.0	+20.0	1.4	48 39.9	+20.1	1.4	49 39.9	+20.1	1.5	50 39.9	+20.1	1.5	51 39.9	+20.1	1.5	89
90	45 00.0	+19.1	0.0	46 00.0	+19.0	0.0	47 00.0	+19.0	0.0	48 00.0	+19.0	0.0	49 00.0	+19.0	0.0	50 00.0	+19.0	0.0	51 00.0	+19.0	0.0	52 00.0	+18.9	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°–Z   L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 109°, 251°**

145

72°, 288° L.H.A.

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	12 37.3	+43.4	102.9	12 23.7	+44.2	103.2	12 10.0	+44.8	103.4	11 56.0	+45.5	103.6	11 41.8	+46.2	103.8	11 27.4	+46.9	104.0	11 12.8	+47.5	104.2	10 58.0	+48.2	104.4	0
1	13 20.7	+43.3	102.2	13 07.9	+44.0	102.5	12 54.8	+44.7	102.7	12 41.5	+45.4	102.9	12 28.0	+46.1	103.1	12 14.3	+46.7	103.3	12 00.3	+47.4	103.5	11 46.2	+48.0	103.8	1
2	14 04.0	+43.2	101.5	13 51.9	+43.9	101.8	13 39.5	+44.7	102.0	13 26.9	+45.4	102.2	13 14.1	+46.0	102.5	13 01.0	+46.7	102.7	12 47.7	+47.4	102.9	12 34.2	+48.0	103.1	2
3	14 47.2	+43.0	100.8	14 35.8	+43.8	101.1	14 24.2	+44.5	101.3	14 12.3	+45.2	101.6	14 00.1	+45.9	101.8	13 47.7	+46.6	102.1	13 35.1	+47.2	102.3	13 22.2	+47.8	102.5	3
4	15 30.2	+42.9	100.1	15 19.6	+43.6	100.4	15 08.7	+44.3	100.6	14 57.5	+45.1	100.9	14 46.0	+45.8	101.1	14 34.3	+46.4	101.4	14 22.3	+47.1	101.7	14 10.0	+47.8	101.9	4
5	16 13.1	+42.8	99.4	16 03.2	+43.5	99.6	15 53.0	+44.3	99.9	15 42.6	+44.9	100.2	15 31.8	+45.6	100.5	15 20.7	+46.4	100.7	15 09.4	+47.0	101.0	14 57.8	+47.7	101.3	5
6	16 55.9	+42.6	98.6	16 46.7	+43.4	98.9	16 37.3	+44.1	99.2	16 27.5	+44.8	99.5	16 17.4	+45.6	99.8	16 07.1	+46.2	100.1	15 56.4	+46.9	100.4	15 45.5	+47.6	100.6	6
7	17 38.5	+42.4	97.9	17 30.1	+43.2	98.2	17 21.4	+43.9	98.5	17 12.3	+44.7	98.8	17 03.0	+45.4	99.1	16 53.3	+46.1	99.4	16 43.3	+46.8	99.7	16 33.1	+47.4	100.0	7
8	18 20.9	+42.2	97.1	18 13.3	+43.0	97.5	18 05.3	+43.8	97.8	17 57.0	+44.5	98.1	17 48.4	+45.2	98.4	17 39.4	+46.0	98.8	17 30.1	+46.7	99.1	17 20.5	+47.3	99.4	8
9	19 03.1	+42.1	96.4	18 56.3	+42.8	96.7	18 49.1	+43.6	97.1	18 41.5	+44.4	97.4	18 33.6	+45.1	97.7	18 25.4	+45.8	98.1	18 16.8	+46.5	98.4	18 07.8	+47.2	98.7	9
10	19 45.2	+41.9	95.6	19 39.1	+42.7	96.0	19 32.7	+43.4	96.3	19 25.9	+44.2	96.7	19 18.7	+44.9	97.0	19 11.2	+45.6	97.4	19 03.3	+46.3	97.7	18 55.0	+47.1	98.1	10
11	20 27.1	+41.7	94.9	20 21.8	+42.5	95.2	20 16.1	+43.3	95.6	20 10.1	+44.0	96.0	20 03.6	+44.8	96.3	19 56.8	+45.5	96.7	19 49.6	+46.2	97.1	19 42.1	+46.9	97.4	11
12	21 08.8	+41.4	94.1	21 04.3	+42.2	94.5	20 59.4	+43.0	94.9	20 54.1	+43.8	95.3	20 48.4	+44.6	95.6	20 42.3	+45.3	96.0	20 35.8	+46.1	96.4	20 29.0	+46.7	96.8	12
13	21 50.2	+41.3	93.3	21 46.5	+42.1	93.7	21 42.4	+42.9	94.1	21 37.9	+43.7	94.5	21 33.0	+44.4	94.9	21 27.6	+45.2	95.3	21 21.9	+45.9	95.7	21 15.7	+46.6	96.1	13
14	22 31.5	+41.0	92.5	22 28.6	+41.8	93.0	22 25.3	+42.6	93.4	22 21.6	+43.4	93.8	22 17.4	+44.2	94.2	22 12.8	+45.0	94.6	22 07.8	+45.7	95.0	22 02.3	+46.5	95.4	14
15	23 12.5	+40.8	91.7	23 10.4	+41.6	92.2	23 07.9	+42.5	92.6	23 05.0	+43.2	93.0	23 01.6	+44.0	93.5	22 57.8	+44.7	93.9	22 53.5	+45.5	94.3	22 48.8	+46.2	94.7	15
16	23 53.3	+40.5	90.9	23 52.0	+41.4	91.4	23 50.4	+42.1	91.8	23 48.2	+43.0	92.3	23 45.6	+43.8	92.7	23 42.5	+44.6	93.2	23 39.0	+45.3	93.6	23 35.0	+46.1	94.0	16
17	24 33.8	+40.3	90.1	24 33.4	+41.1	90.6	24 32.5	+42.0	91.1	24 31.2	+42.8	91.5	24 29.4	+43.5	92.0	24 27.1	+44.3	92.4	24 24.3	+45.1	92.9	24 21.1	+45.8	93.3	17
18	25 14.1	+39.9	89.3	25 14.5	+40.9	89.8	25 14.5	+41.7	90.3	25 14.0	+42.5	90.7	25 12.9	+43.4	91.2	25 11.4	+44.2	91.7	25 09.4	+44.9	92.1	25 06.9	+45.7	92.6	18
19	25 54.0	+39.8	88.5	25 55.4	+40.5	89.0	25 56.2	+41.4	89.5	25 56.5	+42.2	90.0	25 56.3	+43.1	90.4	25 55.6	+43.8	90.9	25 54.3	+44.7	91.4	25 52.6	+45.4	91.9	19
20	26 33.8	+39.4	87.7	26 35.9	+40.3	88.2	26 37.6	+41.2	88.7	26 38.7	+42.0	89.2	26 39.4	+42.8	89.7	26 39.4	+43.7	90.2	26 39.0	+44.5	90.7	26 38.0	+45.3	91.2	20
21	27 13.2	+39.1	86.8	27 16.2	+40.0	87.3	27 18.8	+40.8	87.8	27 20.7	+41.8	88.4	27 22.2	+42.5	88.9	27 23.1	+43.4	89.4	27 23.5	+44.1	89.9	27 23.3	+45.0	90.4	21
22	27 52.3	+38.7	86.0	27 56.2	+39.7	86.5	27 59.6	+40.6	87.0	28 02.5	+41.4	87.5	28 04.7	+42.3	88.1	28 06.5	+43.1	88.6	28 07.6	+44.0	89.1	28 08.3	+44.7	89.7	22
23	28 31.0	+38.5	85.1	28 35.9	+39.3	85.6	28 40.2	+40.2	86.2	28 43.9	+41.1	86.7	28 47.0	+42.0	87.3	28 49.6	+42.8	87.8	28 51.6	+43.6	88.4	28 53.0	+44.5	88.9	23
24	29 09.5	+38.1	84.2	29 15.2	+39.1	84.8	29 20.4	+39.9	85.3	29 25.0	+40.8	85.9	29 29.0	+41.7	86.5	29 32.4	+42.6	87.0	29 35.2	+43.4	87.6	29 37.5	+44.2	88.2	24
25	29 47.6	+37.7	83.3	29 54.3	+38.6	83.9	30 00.3	+39.6	84.5	30 05.8	+40.5	85.0	30 10.7	+41.4	85.6	30 15.0	+42.2	86.2	30 18.6	+43.1	86.8	30 21.7	+43.9	87.4	25
26	30 25.3	+37.4	82.4	30 32.9	+38.3	83.0	30 39.9	+39.3	83.6	30 46.3	+40.1	84.2	30 52.1	+41.0	84.8	30 57.2	+41.9	85.4	31 01.7	+42.8	86.0	31 05.6	+43.6	86.6	26
27	31 02.7	+37.0	81.5	31 11.2	+38.0	82.1	31 19.2	+38.8	82.7	31 26.4	+39.8	83.3	31 33.1	+40.7	83.9	31 39.1	+41.6	84.5	31 44.5	+42.5	85.2	31 49.2	+43.4	85.8	27
28	31 39.7	+36.6	80.6	31 49.2	+37.5	81.2	31 58.0	+38.5	81.8	32 06.2	+39.4	82.4	32 13.8	+40.3	83.1	32 20.7	+41.2	83.7	32 27.0	+42.1	84.3	32 32.6	+43.0	85.0	28
29	32 16.3	+36.1	79.7	32 26.7	+37.1	80.3	32 36.5	+38.1	80.9	32 45.6	+39.1	81.6	32 54.1	+40.0	82.2	33 01.9	+40.9	82.8	33 09.1	+41.8	83.5	33 15.6	+42.6	84.1	29
30	32 52.4	+35.7	78.7	33 03.8	+36.7	79.4	33 14.6	+37.6	80.0	33 24.7	+38.6	80.6	33 34.1	+39.6	81.3	33 42.8	+40.5	82.0	33 50.9	+41.4	82.6	33 58.2	+42.3	83.3	30
31	33 28.1	+35.3	77.8	33 40.5	+36.3	78.4	33 52.2	+37.3	79.1	34 03.3	+38.2	79.7	34 13.7	+39.1	80.4	34 23.3	+40.1	81.1	34 32.3	+41.0	81.7	34 40.5	+42.0	82.4	31
32	34 03.4	+34.8	76.8	34 16.8	+35.8	77.4	34 29.5	+36.8	78.1	34 41.5	+37.8	78.8	34 52.8	+38.8	79.5	35 03.4	+39.7	80.2	35 13.3	+40.7	80.9	35 22.5	+41.6	81.6	32
33	34 38.2	+34.3	75.8	34 52.6	+35.3	76.5	35 06.3	+36.3	77.2	35 19.3	+37.3	77.8	35 31.6	+38.3	78.5	35 43.1	+39.3	79.2	35 54.0	+40.2	80.0	36 04.1	+41.1	80.7	33
34	35 12.5	+33.9	74.8	35 27.9	+34.9	75.5	35 42.6	+35.9	76.2	35 56.6	+36.9	76.9	36 09.9	+37.8	77.6	36 22.4	+38.8	78.3	36 34.2	+39.8	79.0	36 45.2	+40.7	79.8	34
35	35 46.4	+33.3	73.8	36 02.8	+34.3	74.5	36 18.5	+35.3	75.2	36 33.4	+36.4	75.9	36 47.7	+37.4	76.6	37 01.2	+38.4	77.4	37 14.0	+39.3	78.1	37 26.0	+40.3	78.8	35
36	36 19.7	+32.7	72.8	36 37.1	+33.8	73.5	36 53.8	+34.9	74.2	37 09.8	+35.9	74.9	37 25.1	+36.8	75.6	37 39.6	+37.8	76.4	37 53.3	+38.9	77.1	38 06.3	+39.8	77.9	36
37	36 52.4	+32.2	71.7	37 10.9	+33.3	72.4	37 28.7	+34.3	73.2	37 45.7	+35.3	73.9	38 01.9	+36.4	74.6	38 17.4	+37.4	75.4	38 32.2	+38.4	76.2	38 46.1	+39.4	77.0	37
38	37 24.6	+31.7	70.7	37 44.2	+32.7	71.4	38 03.0	+33.7	72.1	38 21.0	+34.8	72.9	38 38.3	+35.8	73.6	38 54.8	+36.9	74.4	39 10.6	+37.8	75.2	39 25.5	+38.9	76.0	38
39	37 56.3	+31.0	69.6	38 16.9	+32.1	70.3	38 36.7	+33.2	71.1	38 55.8	+34.2	71.8	39 14.1	+35.3	72.6	39 31.7	+36.3	73.4	39 48.4	+37.4	74.2	40 04.4	+38.3	75.0	39
40	38 27.3	+30.5	68.5	38 49.0	+31.5	69.2	39 09.9	+32.5	70.0	39 30.0	+33.6	70.8	39 49.4	+34.7	71.6	40 08.0	+35.7	72.3	40 25.8	+36.8	73.2	40 42.7	+37.9	74.0	40
41	38 57.8	+29.8	67.4	39 20.5	+30.8	68.1	39 42.4	+32.0	68.9	40 03.6	+33.1	69.7	40 24.1	+34.1	70.5	40 43.7	+35.2	71.3	41 02.6	+36.2	72.1	41 20.6	+37.2	72.9	41
42	39 27.6	+29.1	66.3	39 51.3	+30.3	67.0	40 14.4	+31.3	67.8	40 36.7	+32.4	68.6	40 58.2	+33.5	69.4	41 18.9	+34.5	70.2	41 38.8	+35.6	71.1	41 57.8	+36.7	71.9	42
43	39 56.7	+28.5	65.1	40 21.6	+29.5	65.9	40 45.7	+30.7	66.7	41 09.1	+31.7	67.5	41 31.7	+32.8	68.3	41 53.4	+34.0	69.1	42 14.4	+35.0	70.0	42 34.5	+36.1	70.8	43
44	40 25.2	+27.7	64.0	40 51.1	+28.9	64.8	41 16.4	+29.9	65.5	41 40.8	+31.1	66.3	42 04.5	+32.1	67.2	42 27.4	+33.2	68.0	42 49.4	+34.4	68.9	43 10.6	+35.5	69.7	44
45	40 52.9	+27.1	62.8	41 20.0	+28.2	63.6	41 46.3	+29.3	64.4	42 11.9	+30.3	65.2	42 36.6	+31.5	66.0	43 00.6	+32.6	66.9	43 23.8	+33.6	67.7	43 46.1	+34.7	68.6	45
46	41 20.0	+26.3	61.6	41 48.2	+27.4	62.4	42 15.6	+28.5	63.2	42 42.2	+29.7	64.0	43 08.1	+30.8	64.9	43 33.2	+31.9	65.7	43 57.4	+33.0	66.6	44 20.8	+34.1	67.5	46
47	41 46.3	+25.6	60.4	42 15.6	+26.6	61.2	42 44.1	+27.8	62.0	43 11.9	+28.9	62.8	43 38.9	+30.0	63.7	44 05.1	+31.1	64.6	44 30.4	+32.3	65.4	44 54.9	+33.4	66.3	47
48	42 11.9	+24.7	59.2	42 42.2	+25.9	60.0	43 11.9	+27.0	60.8	43 40.8	+28.1	61.6	44 08.9	+29.2	62.5	44 36.2	+30.4	63.4	45 02.7	+31.5	64.2	45 28.3	+32.7	65.2	48
49	42 36.6	+24.0	58.0	43 08.1	+25.1	58.8	43 38.9	+26.2	59.6	44 08.9	+27.3	60.4	44 38.1	+28.5	61.3	45 06.6	+29.5	62.1	45 34.2	+30.7	63.0	46 01.0	+31.8	64.0	49
50	43 00.6	+23.2	56.7	43 33.2	+24.2	57.5	44 05.1	+25.3	58.3	44 36.2	+26.5	59.2	45 06.6	+27.6	60.0	45 36.1	+28.8	60.9	46 04.9	+29.9	61.8	46 32.8	+31.1	62.7	50
51	43 23.8	+22.3	55.5	43 57.4	+23.4	56.2	44 30.4	+24.5	57.1	45 02.7	+25.6	57.9	45 34.2	+26.8	58.8	46 04.9	+27.9	59.6	46 34.8	+29.1	60.5	47 03.9	+30.2	61.5	51
52	43 46.1	+21.4	54.2	44 20.8	+22.6	55.0	44 54.9	+23.7	55.8	45 28.3	+24.8	56.6	46 01.0	+25.9	57.5	46 32.8	+27.1	58.4	47 03.9	+28.2	59.3	47 34.1	+29.4	60.2	52
53	44 07.5	+20.5	52.9	44 43.4	+21.6	53.7	45 18.6	+22.7	54.5	45 53.1	+23.8	55.3	46 26.9	+25.0	56.2	46 59.9	+26.1	57.1	47 32.1	+27.3	58.0	48 03.5	+28.5	58.9	53
54	44 28.0	+19.6	51.6	45 05.0	+20.7	52.3	45 41.3	+21.8	53.2	46 16.9	+23.0	54.0	46 51.9	+24.0	54.8	47 26.0	+25.2	55.7	47 59.4	+26.4	56.6	48 32.0	+27.5	57.6	54
55	44 47.6	+18.7	50.2	45 25.7	+19.8	51.0	46 03.1	+20.9	51.8	46 39.9	+22.0	52.6	47 15.9	+23.1	53.5	47 51.2	+24.3	54.4	48 25.8	+25.4	55.3	48 59.5	+26.6	56.2	55
56	45 06.3	+17.8	48.9	45 45.5	+18.8	49.7	46 24.0	+19.9	50.5	47 01.9	+20.9	51.3	47 39.0	+22.2	52.1	48 15.5	+23.3	53.0	48 51.2	+24.4	53.9	49 26.1	+25.6	54.9	56
57	45 24.1	+16.7	47.5	46 04.3	+17.8	48.3	46 43.9	+18.9	49.1	47 22.8	+20.0	49.9	48 01.2	+21.1	50.8	48 38.8	+22.2	51.6	49 15.6	+23.4	52.5	49 51.7	+24.6	53.5	57
58	45 40.8	+15.8	46.2	46 22.1	+16.8	46.9	47 02.8	+17.8	47.7	47 42.8	+19.0	48.5	48 22.3	+20.0	49.3	49 01.0	+21.2	50.2	49 39.0	+22.4	51.1	50 16.3	+23.5	52.0	58
59	45 56.6	+14.7	44.8	46 38.9	+15.8	45.5	47 20.6	+16.9	46.3	48 01.8	+17.9	47.1	48 42.3	+19.0	47.9	49 22.2	+20.1	48.8	50 01.4	+21.3	49.7	50 39.8	+22.5	50.6	59
60	46 11.3	+13.8	43.4	46 54.7	+14.7	44.1	47 37.5	+15.7	44.9	48 19.7	+16.8	45.7	49 01.3	+17.8	46.5	49 42.3	+19.0	47.3	50 22.7	+20.1	48.2	51 02.3	+21.3	49.1	60
61	46 25.1	+12.6	42.0	47 09.4	+13.7	42.7	47 53.2	+14.7	43.4	48 36.5	+15.8	44.2	49 19.1	+16.8	45.0	50 01.3	+17.9	45.9	50 42.8	+19.0	46.7	51 23.6	+20.1	47.6	61
62	46 37.7	+11.6	40.6	47 23.1	+12.6	41.3	48 07.9	+13.6	42.0	48 52.3	+14.7	42.8	49 36.0	+15.7	43.5	50 19.2	+16.8	44.3	51 01.8	+17.8	45.2	51 43.7	+19.0	46.1	62
63	46 49.3	+10.6	39.1	47 35.7	+11.5	39.8	48 21.5	+12.5	40.5	49 06.9	+13.4	41.3	49 51.7	+14.5	42.1	50 36.0	+15.5	42.9	51 19.6	+16.7	43.7	52 02.7	+17.8	44.6	63
64	46 59.9	+9.4	37.7	47 47.2	+10.3	38.4	48 34.0	+11.3	39.1	49 20.3	+12.3	39.8	50 06.2	+13.3	40.5	50 51.5	+14.4	41.3	51 36.3	+15.4	42.2	52 20.5	+16.5	43.0	64
65	47 09.3	+8.4	36.2	47 57.5	+9.3	36.9	48 45.3	+10.1	37.6	49 32.6	+11.2	38.3	50 19.5	+12.1	39.0	51 05.9	+13.1	39.8	51 51.7	+14.1	40.6	52 37.0	+15.2	41.5	65
66	47 17.7	+7.2	34.8	48 06.8	+8.1	35.4	48 55.5	+9.0	36.1	49 43.8	+9.9	36.8	50 31.6	+10.9	37.5	51 19.0	+11.8	38.2	52 05.8	+12.9	39.0	52 52.2	+13.9	39.9	66
67	47 24.9	+6.1	33.3	48 14.9	+6.9	33.9	49 04.5	+7.8	34.6	49 53.7	+8.7	35.2	50 42.5	+9.6	35.9	51 30.8	+10.6	36.7	52 18.7	+11.6	37.4	53 06.1	+12.6	38.2	67
68	47 31.0	+5.0	31.8	48 21.8	+5.8	32.4	49 12.3	+6.6	33.0	50 02.4	+7.5	33.7	50 52.1	+8.4	34.4	51 41.4	+9.3	35.1	52 30.3	+10.3	35.8	53 18.7	+11.3	36.6	68
69	47 36.0	+3.8	30.4	48 27.6	+4.6	30.9	49 18.9	+5.4	31.5	50 09.9	+6.2	32.1	51 00.5	+7.1	32.8	51 50.7	+8.0	33.5	52 40.6	+8.9	34.2	53 30.0	+9.8	35.0	69
70	47 39.8	+2.7	28.9	48 32.2	+3.4	29.4	49 24.3	+4.2	30.0	50 16.1	+5.0	30.6	51 07.6	+5.8	31.2	51 58.7	+6.7	31.9	52 49.5	+7.6	32.6	53 39.8	+8.5	33.3	70
71	47 42.5	+1.5	27.4	48 35.6	+2.2	27.9	49 28.5	+3.0	28.5	50 21.1	+3.7	29.0	51 13.4	+4.5	29.6	52 05.4	+5.4	30.3	52 57.1	+6.2	30.9	53 48.3	+7.1	31.6	71
72	47 44.0	+0.4	25.9	48 37.8	+1.1	26.4	49 31.5	+1.7	26.9	50 24.8	+2.5	27.5	51 17.9	+3.3	28.0	52 10.8	+4.0	28.6	53 03.3	+4.8	29.3	53 55.4	+5.7	29.9	72
73	47 44.4	−0.8	24.4	48 38.9	−0.1	24.9	49 33.2	+0.5	25.4	50 27.3	+1.2	25.9	51 21.2	+1.9	26.4	52 14.8	+2.6	27.0	53 08.1	+3.4	27.6	54 01.1	+4.2	28.2	73
74	47 43.6	−1.9	22.9	48 38.8	−1.3	23.4	49 33.7	−0.7	23.8	50 28.5	0.0	24.3	51 23.1	+0.6	24.8	52 17.4	+1.3	25.4	53 11.5	+2.0	25.9	54 05.3	+2.8	26.5	74
75	47 41.7	−3.1	21.5	48 37.4	−2.5	21.9	49 33.0	−1.9	22.3	50 28.5	−1.2	22.8	51 23.7	−0.7	23.2	52 18.7	0.0	23.7	53 14.2	+0.7	24.3	54 08.1	+1.3	24.8	75
76	47 38.6	−4.2	20.0	48 34.9	−3.7	20.4	49 31.1	−3.2	20.8	50 27.1	−2.6	21.2	51 23.0	−2.0	21.6	52 18.7	−1.4	22.1	53 14.9	−0.8	22.6	54 09.4	−0.1	23.1	76
77	47 34.4	−5.4	18.5	48 31.2	−4.9	18.8	49 27.9	−4.3	19.2	50 24.5	−3.8	19.6	51 21.0	−3.3	20.0	52 17.3	−2.8	20.5	53 14.1	−2.2	20.9	54 09.3	−1.5	21.4	77
78	47 29.0	−6.5	17.0	48 26.3	−6.0	17.3	49 23.6	−5.6	17.7	50 20.7	−5.1	18.1	51 17.7	−4.7	18.4	52 14.5	−4.1	18.8	53 11.9	−3.5	19.3	54 07.8	−3.0	19.7	78
79	47 22.5	−7.6	15.5	48 20.3	−7.2	15.8	49 18.0	−6.8	16.2	50 15.6	−6.4	16.5	51 13.0	−5.9	16.8	52 10.4	−5.4	17.2	53 07.9	−5.0	17.6	54 04.8	−4.5	18.0	79
80	47 14.9	−8.7	14.1	48 13.1	−8.4	14.4	49 11.2	−8.0	14.6	50 09.2	−7.6	14.9	51 07.1	−7.2	15.3	52 05.0	−6.8	15.6	53 02.7	−6.3	15.9	54 00.3	−5.8	16.3	80
81	47 06.2	−9.8	12.6	48 04.7	−9.5	12.9	49 03.2	−9.2	13.1	50 01.6	−8.8	13.4	50 59.9	−8.4	13.7	51 58.2	−8.1	14.0	52 56.4	−7.7	14.3	53 54.5	−7.3	14.6	81
82	46 56.4	−10.9	11.2	47 55.2	−10.6	11.4	48 54.0	−10.3	11.6	49 52.8	−10.1	11.9	50 51.5	−9.8	12.1	51 50.1	−9.4	12.4	52 48.7	−9.1	12.6	53 47.2	−8.7	12.9	82
83	46 45.5	−12.0	9.7	47 44.6	−11.7	9.9	48 43.7	−11.5	10.1	49 42.7	−11.2	10.3	50 41.7	−10.9	10.5	51 40.7	−10.7	10.8	52 39.6	−10.4	11.0	53 38.5	−10.1	11.3	83
84	46 33.5	−13.0	8.3	47 32.9	−12.9	8.5	48 32.2	−12.6	8.6	49 31.5	−12.4	8.8	50 30.8	−12.2	9.0	51 30.0	−11.9	9.2	52 29.2	−11.7	9.4	53 28.4	−11.4	9.6	84
85	46 20.5	−14.1	6.9	47 20.0	−13.9	7.0	48 19.6	−13.8	7.2	49 19.1	−13.6	7.3	50 18.6	−13.4	7.5	51 18.1	−13.2	7.6	52 17.5	−13.0	7.8	53 17.0	−12.8	8.0	85
86	46 06.4	−15.1	5.5	47 06.1	−15.0	5.6	48 05.8	−14.8	5.7	49 05.5	−14.7	5.8	50 05.2	−14.6	5.9	51 04.9	−14.5	6.1	52 04.5	−14.3	6.2	53 04.2	−14.2	6.3	86
87	45 51.3	−16.1	4.1	46 51.1	−16.0	4.2	47 51.0	−16.0	4.3	48 50.8	−15.9	4.3	49 50.6	−15.7	4.4	50 50.4	−15.6	4.5	51 50.2	−15.5	4.6	52 50.0	−15.4	4.7	87
88	45 35.2	−17.1	2.7	46 35.1	−17.1	2.8	47 35.0	−17.0	2.8	48 34.9	−16.9	2.9	49 34.9	−16.9	2.9	50 34.8	−16.8	3.0	51 34.7	−16.7	3.1	52 34.6	−16.7	3.1	88
89	45 18.1	−18.1	1.4	46 18.0	−18.0	1.4	47 18.0	−18.0	1.4	48 18.0	−18.0	1.4	49 18.0	−18.0	1.5	50 18.0	−18.0	1.5	51 18.0	−18.0	1.5	52 17.9	−17.9	1.6	89
90	45 00.0	−19.0	0.0	46 00.0	−19.0	0.0	47 00.0	−19.0	0.0	48 00.0	−19.1	0.0	49 00.0	−19.1	0.0	50 00.0	−19.1	0.0	51 00.0	−19.1	0.0	52 00.0	−19.1	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	12 37.3	−43.5	102.9	12 23.7	−44.2	103.2	12 10.0	−45.0	103.4	11 56.0	−45.6	103.6	11 41.8	−46.3	103.8	11 27.4	−46.9	104.0	11 12.8	−47.5	104.2	10 58.0	−48.2	104.4	0
1	11 53.8	−43.7	103.6	11 39.5	−44.3	103.8	11 25.0	−45.0	104.0	11 10.4	−45.7	104.2	10 55.5	−46.3	104.4	10 40.5	−47.0	104.6	10 25.3	−47.7	104.8	10 09.8	−48.3	105.0	1
2	11 10.1	−43.7	104.3	10 55.2	−44.5	104.5	10 40.0	−45.1	104.7	10 24.7	−45.8	104.9	10 09.2	−46.5	105.1	9 53.5	−47.1	105.2	9 37.6	−47.7	105.4	9 21.6	−48.3	105.6	2
3	10 26.4	−43.8	105.0	10 10.7	−44.5	105.2	9 54.9	−45.2	105.4	9 38.9	−45.9	105.6	9 22.7	−46.5	105.7	9 06.4	−47.2	105.9	8 49.9	−47.8	106.0	8 33.3	−48.4	106.2	3
4	9 42.6	−43.9	105.7	9 26.2	−44.6	105.9	9 09.7	−45.3	106.1	8 53.0	−45.9	106.2	8 36.2	−46.6	106.4	8 19.2	−47.2	106.5	8 02.1	−47.8	106.6	7 44.9	−48.4	106.8	4
5	8 58.7	−44.0	106.4	8 41.6	−44.7	106.6	8 24.4	−45.3	106.7	8 07.1	−46.0	106.9	7 49.6	−46.6	107.0	7 32.0	−47.2	107.1	7 14.3	−47.9	107.2	6 56.5	−48.5	107.4	5
6	8 14.7	−44.1	107.1	7 56.9	−44.7	107.2	7 39.1	−45.4	107.4	7 21.1	−46.0	107.5	7 03.0	−46.7	107.6	6 44.8	−47.3	107.7	6 26.4	−47.9	107.9	6 08.0	−48.5	108.0	6
7	7 30.6	−44.1	107.8	7 12.2	−44.8	107.9	6 53.7	−45.5	108.0	6 35.1	−46.1	108.2	6 16.3	−46.7	108.3	5 57.5	−47.4	108.4	5 38.5	−47.9	108.5	5 19.5	−48.6	108.5	7
8	6 46.5	−44.2	108.5	6 27.4	−44.8	108.6	6 08.2	−45.5	108.7	5 49.0	−46.2	108.8	5 29.6	−46.8	108.9	5 10.1	−47.4	109.0	4 50.6	−48.0	109.1	4 30.9	−48.5	109.1	8
9	6 02.3	−44.2	109.2	5 42.6	−44.9	109.3	5 22.7	−45.5	109.4	5 02.8	−46.2	109.4	4 42.8	−46.8	109.5	4 22.7	−47.4	109.6	4 02.6	−48.0	109.7	3 42.4	−48.6	109.7	9
10	5 18.1	−44.3	109.8	4 57.7	−44.9	109.9	4 37.2	−45.6	110.0	4 16.6	−46.2	110.1	3 56.0	−46.8	110.1	3 35.3	−47.4	110.2	3 14.6	−48.1	110.3	2 53.8	−48.7	110.3	10
11	4 33.8	−44.3	110.5	4 12.8	−45.0	110.6	3 51.6	−45.6	110.7	3 30.4	−46.2	110.7	3 09.2	−46.9	110.8	2 47.9	−47.5	110.8	2 26.5	−48.0	110.9	2 05.1	−48.6	110.9	11
12	3 49.5	−44.3	111.2	3 27.8	−45.0	111.3	3 06.0	−45.6	111.3	2 44.2	−46.3	111.4	2 22.3	−46.8	111.4	2 00.4	−47.4	111.4	1 38.5	−48.1	111.5	1 16.5	−48.6	111.5	12
13	3 05.2	−44.4	111.9	2 42.8	−45.0	111.9	2 20.4	−45.6	112.0	1 57.9	−46.2	112.0	1 35.5	−46.9	112.0	1 13.0	−47.5	112.0	0 50.4	−48.0	112.1	0 27.9	−48.7	112.1	13
14	2 20.8	−44.4	112.5	1 57.8	−45.0	112.6	1 34.8	−45.7	112.6	1 11.7	−46.3	112.6	0 48.6	−46.9	112.6	0 25.5	−47.5	112.7	0 02.4	−48.1	112.7	0 20.8	+48.6	67.3	14
15	1 36.4	−44.4	113.2	1 12.8	−45.1	113.2	0 49.1	−45.7	113.3	0 25.4	−46.3	113.3	0 01.7	−46.9	113.3	0 22.0	+47.5	66.7	0 45.7	+48.1	66.7	1 09.4	+48.6	66.8	15
16	0 52.0	−44.3	113.9	0 27.7	−45.0	113.9	0 03.4	−45.6	113.9	0 20.9	+46.3	66.1	0 45.2	+46.9	66.1	1 09.5	+47.5	66.1	1 33.8	+48.0	66.1	1 58.0	+48.6	66.2	16
17	0 07.6	−44.4	114.6	0 17.3	+45.0	65.4	0 42.2	+45.7	65.4	1 07.2	+46.2	65.5	1 32.1	+46.8	65.5	1 57.0	+47.4	65.5	2 21.8	+48.1	65.5	2 46.5	+48.6	65.6	17
18	0 36.8	+44.4	64.8	1 02.3	+45.1	64.8	1 27.9	+45.6	64.8	1 53.4	+46.3	64.8	2 18.9	+46.9	64.9	2 44.4	+47.5	64.9	3 09.9	+48.0	64.9	3 35.2	+48.6	65.0	18
19	1 21.2	+44.4	64.1	1 47.4	+45.0	64.1	2 13.5	+45.7	64.1	2 39.7	+46.2	64.2	3 05.8	+46.8	64.2	3 31.9	+47.4	64.3	3 57.9	+48.0	64.3	4 23.8	+48.6	64.4	19
20	2 05.6	+44.3	63.4	2 32.4	+45.0	63.5	2 59.2	+45.6	63.5	3 25.9	+46.2	63.5	3 52.6	+46.8	63.6	4 19.3	+47.4	63.7	4 45.9	+47.9	63.7	5 12.4	+48.5	63.8	20
21	2 49.9	+44.4	62.7	3 17.4	+45.0	62.8	3 44.8	+45.6	62.8	4 12.1	+46.2	62.9	4 39.4	+46.8	63.0	5 06.7	+47.3	63.1	5 33.8	+47.9	63.1	6 00.9	+48.5	63.2	21
22	3 34.3	+44.3	62.1	4 02.4	+44.9	62.1	4 30.4	+45.5	62.2	4 58.3	+46.2	62.3	5 26.2	+46.7	62.3	5 54.0	+47.3	62.4	6 21.7	+47.9	62.5	6 49.4	+48.4	62.6	22
23	4 18.6	+44.3	61.4	4 47.3	+44.9	61.5	5 15.9	+45.5	61.5	5 44.5	+46.1	61.6	6 12.9	+46.7	61.7	6 41.3	+47.3	61.8	7 09.6	+47.8	61.9	7 37.8	+48.4	62.0	23
24	5 02.9	+44.2	60.7	5 32.2	+44.8	60.8	6 01.4	+45.5	60.9	6 30.6	+46.0	61.0	6 59.6	+46.7	61.1	7 28.6	+47.2	61.2	7 57.4	+47.8	61.3	8 26.2	+48.3	61.4	24
25	5 47.1	+44.2	60.0	6 17.0	+44.8	60.1	6 46.9	+45.4	60.2	7 16.6	+46.0	60.3	7 46.3	+46.6	60.5	8 15.8	+47.2	60.6	8 45.2	+47.7	60.7	9 14.5	+48.3	60.8	25
26	6 31.3	+44.1	59.4	7 01.8	+44.8	59.5	7 32.3	+45.3	59.6	8 02.6	+46.0	59.7	8 32.8	+46.6	59.8	9 03.0	+47.0	59.9	9 32.9	+47.7	60.1	10 02.8	+48.2	60.2	26
27	7 15.4	+44.1	58.7	7 46.6	+44.7	58.8	8 17.6	+45.3	58.9	8 48.6	+45.8	59.0	9 19.4	+46.4	59.2	9 50.0	+47.1	59.3	10 20.6	+47.6	59.5	10 51.0	+48.1	59.6	27
28	7 59.5	+44.0	58.0	8 31.3	+44.6	58.1	9 02.9	+45.2	58.2	9 34.4	+45.8	58.4	10 05.8	+46.4	58.5	10 37.1	+46.9	58.7	11 08.2	+47.5	58.9	11 39.1	+48.1	59.0	28
29	8 43.5	+44.0	57.3	9 15.9	+44.5	57.4	9 48.1	+45.1	57.6	10 20.2	+45.7	57.7	10 52.2	+46.3	57.9	11 24.0	+46.9	58.1	11 55.7	+47.4	58.2	12 27.2	+48.0	58.4	29
30	9 27.5	+43.8	56.6	10 00.4	+44.5	56.8	10 33.2	+45.1	56.9	11 05.9	+45.7	57.1	11 38.5	+46.2	57.2	12 10.9	+46.7	57.4	12 43.1	+47.3	57.6	13 15.2	+47.8	57.8	30
31	10 11.3	+43.8	55.9	10 44.9	+44.3	56.2	11 18.3	+44.9	56.2	11 51.6	+45.5	56.4	12 24.7	+46.1	56.6	12 57.6	+46.7	56.8	13 30.4	+47.3	57.0	14 03.0	+47.8	57.2	31
32	10 55.1	+43.7	55.2	11 29.2	+44.3	55.4	12 03.2	+44.9	55.6	12 37.1	+45.4	55.7	13 10.8	+46.0	55.9	13 44.3	+46.6	56.1	14 17.7	+47.1	56.3	14 50.8	+47.7	56.6	32
33	11 38.8	+43.5	54.5	12 13.5	+44.2	54.7	12 48.1	+44.7	54.9	13 22.5	+45.4	55.1	13 56.8	+45.9	55.3	14 30.9	+46.5	55.5	15 04.8	+47.0	55.7	15 38.5	+47.6	55.9	33
34	12 22.3	+43.5	53.8	12 57.7	+44.0	54.0	13 32.8	+44.7	54.2	14 07.9	+45.2	54.4	14 42.7	+45.8	54.6	15 17.4	+46.3	54.8	15 51.8	+46.9	55.1	16 26.1	+47.5	55.3	34
35	13 05.8	+43.3	53.1	13 41.7	+43.9	53.3	14 17.5	+44.5	53.5	14 53.1	+45.1	53.7	15 28.5	+45.7	53.9	16 03.7	+46.2	54.2	16 38.7	+46.8	54.4	17 13.6	+47.3	54.7	35
36	13 49.1	+43.2	52.4	14 25.6	+43.9	52.6	15 02.0	+44.4	52.8	15 38.2	+44.9	53.0	16 14.2	+45.5	53.3	16 49.9	+46.1	53.5	17 25.5	+46.7	53.7	18 00.9	+47.3	54.0	36
37	14 32.3	+43.1	51.7	15 09.5	+43.6	51.9	15 46.4	+44.2	52.1	16 23.1	+44.9	52.3	16 59.7	+45.4	52.6	17 36.0	+46.0	52.8	18 12.2	+46.5	53.1	18 48.1	+47.1	53.4	37
38	15 15.4	+43.0	51.0	15 53.1	+43.6	51.2	16 30.6	+44.2	51.4	17 08.0	+44.7	51.7	17 45.1	+45.2	51.9	18 22.0	+45.8	52.2	18 58.7	+46.4	52.4	19 35.2	+46.9	52.7	38
39	15 58.4	+42.8	50.2	16 36.7	+43.3	50.5	17 14.8	+43.9	50.7	17 52.7	+44.5	51.0	18 30.3	+45.2	51.2	19 07.8	+45.7	51.5	19 45.1	+46.2	51.7	20 22.1	+46.8	52.0	39
40	16 41.2	+42.6	49.5	17 20.0	+43.3	49.7	17 58.7	+43.8	50.0	18 37.2	+44.4	50.2	19 15.5	+44.9	50.5	19 53.5	+45.5	50.8	20 31.3	+46.1	51.1	21 08.9	+46.6	51.4	40
41	17 23.8	+42.5	48.8	18 03.3	+43.0	49.0	18 42.5	+43.7	49.3	19 21.6	+44.2	49.5	20 00.4	+44.8	49.8	20 39.0	+45.5	50.1	21 17.4	+45.9	50.4	21 55.5	+46.5	50.7	41
42	18 06.3	+42.3	48.0	18 46.3	+42.9	48.3	19 26.2	+43.4	48.5	20 05.8	+44.0	48.8	20 45.2	+44.6	49.1	21 24.3	+45.2	49.4	22 03.3	+45.7	49.7	22 42.0	+46.2	50.0	42
43	18 48.6	+42.2	47.3	19 29.2	+42.7	47.5	20 09.6	+43.3	47.8	20 49.8	+43.9	48.1	21 29.8	+44.4	48.4	22 09.5	+45.0	48.7	22 49.0	+45.5	49.0	23 28.2	+46.1	49.3	43
44	19 30.8	+41.9	46.5	20 11.9	+42.6	46.8	20 52.9	+43.1	47.1	21 33.7	+43.6	47.4	22 14.2	+44.2	47.7	22 54.5	+44.8	48.0	23 34.5	+45.4	48.3	24 14.3	+45.9	48.6	44
45	20 12.7	+41.8	45.8	20 54.5	+42.3	46.0	21 36.0	+42.9	46.3	22 17.3	+43.5	46.6	22 58.4	+44.0	46.9	23 39.3	+44.5	47.2	24 19.9	+45.1	47.6	25 00.2	+45.7	47.9	45
46	20 54.5	+41.5	45.0	21 36.8	+42.1	45.3	22 18.9	+42.7	45.6	23 00.8	+43.2	45.9	23 42.4	+43.8	46.2	24 23.8	+44.4	46.5	25 05.0	+44.9	46.8	25 45.9	+45.5	47.2	46
47	21 36.0	+41.3	44.3	22 18.9	+41.9	44.5	23 01.6	+42.4	44.8	23 44.0	+43.0	45.1	24 26.2	+43.6	45.4	25 08.2	+44.2	45.7	25 49.9	+44.7	46.1	26 31.4	+45.3	46.5	47
48	22 17.3	+41.1	43.5	23 00.8	+41.6	43.7	23 44.0	+42.2	44.0	24 27.0	+42.8	44.4	25 09.8	+43.4	44.7	25 52.4	+43.9	45.0	26 34.6	+44.5	45.4	27 16.7	+45.0	45.7	48
49	22 58.4	+40.9	42.7	23 42.4	+41.4	43.0	24 26.2	+42.0	43.3	25 09.8	+42.6	43.6	25 53.2	+43.1	43.9	26 36.3	+43.6	44.3	27 19.1	+44.2	44.6	28 01.7	+44.8	45.0	49
50	23 39.3	+40.6	41.9	24 23.8	+41.2	42.2	25 08.2	+41.7	42.5	25 52.4	+42.2	42.8	26 36.3	+42.8	43.1	27 19.9	+43.4	43.5	28 03.3	+44.0	43.8	28 46.5	+44.5	44.2	50
51	24 19.9	+40.3	41.1	25 05.0	+40.9	41.4	25 49.9	+41.5	41.7	26 34.6	+42.1	42.0	27 19.1	+42.6	42.3	28 03.3	+43.2	42.7	28 47.3	+43.7	43.1	29 31.0	+44.2	43.5	51
52	25 00.2	+40.1	40.2	25 45.9	+40.7	40.6	26 31.4	+41.2	40.9	27 16.7	+41.7	41.2	28 01.7	+42.3	41.6	28 46.5	+42.8	41.9	29 31.0	+43.4	42.3	30 15.2	+44.0	42.7	52
53	25 40.3	+39.8	39.4	26 26.6	+40.3	39.7	27 12.6	+40.9	40.1	27 58.4	+41.5	40.4	28 44.0	+42.0	40.7	29 29.3	+42.6	41.1	30 14.4	+43.1	41.5	30 59.2	+43.7	41.9	53
54	26 20.1	+39.5	38.6	27 06.9	+40.1	38.9	27 53.5	+40.6	39.2	28 39.9	+41.1	39.6	29 26.0	+41.7	39.9	30 11.9	+42.2	40.3	30 57.5	+42.8	40.7	31 42.9	+43.3	41.1	54
55	26 59.6	+39.2	37.7	27 47.0	+39.7	38.1	28 34.1	+40.3	38.4	29 21.0	+40.9	38.7	30 07.7	+41.4	39.1	30 54.1	+42.0	39.5	31 40.3	+42.5	39.9	32 26.2	+43.1	40.3	55
56	27 38.8	+38.9	36.9	28 26.7	+39.5	37.2	29 14.4	+40.0	37.6	30 01.9	+40.5	37.9	30 49.1	+41.1	38.3	31 36.1	+41.6	38.6	32 22.8	+42.2	39.0	33 09.3	+42.7	39.4	56
57	28 17.7	+38.6	36.0	29 06.2	+39.1	36.4	29 54.4	+39.6	36.7	30 42.4	+40.2	37.0	31 30.2	+40.7	37.4	32 17.7	+41.3	37.8	33 05.0	+41.8	38.2	33 52.0	+42.4	38.6	57
58	28 56.3	+38.2	35.2	29 45.3	+38.7	35.5	30 34.0	+39.3	35.8	31 22.6	+39.8	36.2	32 10.9	+40.3	36.5	32 59.0	+40.9	36.9	33 46.8	+41.4	37.3	34 34.4	+42.0	37.7	58
59	29 34.5	+37.9	34.3	30 24.0	+38.4	34.6	31 13.3	+38.9	34.9	32 02.4	+39.4	35.3	32 51.2	+40.0	35.7	33 39.9	+40.5	36.1	34 28.2	+41.1	36.5	35 16.4	+41.6	36.9	59
60	30 12.4	+37.5	33.4	31 02.4	+38.0	33.7	31 52.2	+38.5	34.1	32 41.8	+39.1	34.4	33 31.2	+39.6	34.8	34 20.4	+40.1	35.2	35 09.3	+40.7	35.6	35 58.0	+41.2	36.0	60
61	30 49.9	+37.1	32.5	31 40.4	+37.6	32.8	32 30.7	+38.2	33.1	33 20.9	+38.6	33.5	34 10.8	+39.2	33.9	35 00.5	+39.7	34.3	35 50.0	+40.2	34.7	36 39.2	+40.8	35.1	61
62	31 27.0	+36.7	31.6	32 18.0	+37.3	31.9	33 08.9	+37.7	32.2	33 59.5	+38.3	32.6	34 50.0	+38.8	33.0	35 40.2	+39.3	33.3	36 30.2	+39.9	33.7	37 20.0	+40.4	34.2	62
63	32 03.7	+36.3	30.6	32 55.3	+36.8	31.0	33 46.6	+37.3	31.3	34 37.8	+37.8	31.7	35 28.8	+38.3	32.0	36 19.5	+38.9	32.4	37 10.1	+39.4	32.8	38 00.4	+39.9	33.2	63
64	32 40.0	+35.9	29.7	33 32.1	+36.3	30.0	34 23.9	+36.9	30.3	35 15.6	+37.4	30.7	36 07.1	+37.9	31.1	36 58.4	+38.4	31.5	37 49.5	+38.9	31.9	38 40.3	+39.5	32.3	64
65	33 15.9	+35.4	28.7	34 08.4	+35.9	29.1	35 00.8	+36.4	29.4	35 53.0	+36.9	29.7	36 45.0	+37.4	30.1	37 36.8	+37.9	30.5	38 28.4	+38.4	30.9	39 19.8	+38.9	31.3	65
66	33 51.3	+35.0	27.8	34 44.3	+35.5	28.1	35 37.2	+35.9	28.4	36 29.9	+36.4	28.8	37 22.4	+36.9	29.1	38 14.7	+37.4	29.5	39 06.8	+37.9	29.9	39 58.7	+38.5	30.3	66
67	34 26.3	+34.5	26.8	35 19.8	+34.9	27.1	36 13.1	+35.4	27.4	37 06.3	+35.9	27.8	37 59.3	+36.4	28.1	38 52.1	+36.9	28.5	39 44.7	+37.4	28.9	40 37.2	+37.9	29.3	67
68	35 00.8	+34.0	25.8	35 54.7	+34.5	26.1	36 48.5	+35.0	26.4	37 42.2	+35.4	26.8	38 35.7	+35.9	27.1	39 29.0	+36.4	27.5	40 22.1	+36.9	27.9	41 15.1	+37.3	28.3	68
69	35 34.8	+33.5	24.8	36 29.2	+33.9	25.1	37 23.5	+34.3	25.4	38 17.6	+34.8	25.7	39 11.6	+35.3	26.1	40 05.4	+35.7	26.5	40 59.0	+36.3	26.8	41 52.4	+36.8	27.2	69
70	36 08.3	+32.9	23.8	37 03.1	+33.4	24.1	37 57.8	+33.9	24.4	38 52.4	+34.3	24.7	39 46.9	+34.7	25.0	40 41.1	+35.2	25.4	41 35.3	+35.6	25.8	42 29.2	+36.2	26.2	70
71	36 41.2	+32.4	22.7	37 36.5	+32.8	23.0	38 31.7	+33.2	23.3	39 26.7	+33.7	23.6	40 21.6	+34.1	24.0	41 16.3	+34.6	24.3	42 10.9	+35.1	24.7	43 05.4	+35.5	25.1	71
72	37 13.6	+31.9	21.7	38 09.3	+32.3	21.9	39 04.9	+32.7	22.2	40 00.4	+33.1	22.6	40 55.7	+33.5	22.9	41 50.9	+34.0	23.2	42 46.0	+34.4	23.6	43 40.9	+34.9	24.0	72
73	37 45.5	+31.2	20.6	38 41.6	+31.6	20.9	39 37.6	+32.0	21.2	40 33.5	+32.4	21.5	41 29.3	+32.8	21.8	42 24.9	+33.3	22.1	43 20.4	+33.8	22.5	44 15.8	+34.2	22.8	73
74	38 16.7	+30.7	19.5	39 13.2	+31.0	19.8	40 09.6	+31.4	20.1	41 05.9	+31.8	20.4	42 02.1	+32.2	20.7	42 58.2	+32.6	21.0	43 54.2	+33.0	21.3	44 50.0	+33.5	21.7	74
75	38 47.4	+30.0	18.4	39 44.2	+30.4	18.7	40 41.0	+30.8	18.9	41 37.7	+31.2	19.2	42 34.3	+31.6	19.5	43 30.8	+32.0	19.8	44 27.2	+32.4	20.2	45 23.5	+32.7	20.5	75
76	39 17.4	+29.3	17.3	40 14.6	+29.7	17.5	41 11.8	+30.1	17.8	42 08.9	+30.4	18.1	43 05.9	+30.8	18.4	44 02.8	+31.1	18.7	44 59.6	+31.5	19.0	45 56.2	+32.0	19.3	76
77	39 46.7	+28.8	16.2	40 44.3	+29.1	16.4	41 41.9	+29.3	16.7	42 39.3	+29.7	16.9	43 36.7	+30.0	17.2	44 33.9	+30.5	17.5	45 31.1	+30.8	17.8	46 28.2	+31.2	18.1	77
78	40 15.5	+28.0	15.0	41 13.4	+28.3	15.2	42 11.2	+28.7	15.5	43 09.0	+29.0	15.7	44 06.7	+29.3	16.0	45 04.4	+29.6	16.3	46 01.9	+30.0	16.5	46 59.4	+30.4	16.9	78
79	40 43.5	+27.3	13.9	41 41.7	+27.6	14.1	42 39.9	+27.9	14.3	43 38.0	+28.2	14.5	44 36.0	+28.5	14.8	45 34.0	+28.8	15.0	46 31.9	+29.2	15.3	47 29.8	+29.5	15.6	79
80	41 10.8	+26.5	12.7	42 09.3	+26.8	12.9	43 07.8	+27.1	13.1	44 06.2	+27.4	13.3	45 04.5	+27.7	13.5	46 02.8	+28.0	13.8	47 01.1	+28.3	14.0	47 59.3	+28.6	14.3	80
81	41 37.3	+25.9	11.5	42 36.1	+26.1	11.7	43 34.9	+26.3	11.9	44 33.6	+26.5	12.1	45 32.2	+26.9	12.3	46 30.8	+27.1	12.5	47 29.4	+27.4	12.7	48 27.9	+27.7	13.0	81
82	42 03.2	+25.0	10.3	43 02.2	+25.3	10.4	44 01.2	+25.5	10.6	45 00.1	+25.8	10.8	45 59.1	+25.9	11.0	46 57.9	+26.3	11.2	47 56.8	+26.4	11.4	48 55.6	+26.7	11.6	82
83	42 28.2	+24.3	9.0	43 27.5	+24.4	9.2	44 26.7	+24.6	9.3	45 25.9	+24.8	9.5	46 25.0	+25.1	9.7	47 24.2	+25.2	9.9	48 23.2	+25.6	10.1	49 22.3	+25.8	10.3	83
84	42 52.5	+23.4	7.8	43 51.9	+23.6	7.9	44 51.3	+23.8	8.1	45 50.7	+24.0	8.2	46 50.1	+24.1	8.4	47 49.4	+24.4	8.5	48 48.8	+24.5	8.7	49 48.1	+24.7	8.9	84
85	43 15.9	+22.6	6.5	44 15.5	+22.7	6.6	45 15.1	+22.9	6.8	46 14.7	+23.0	6.9	47 14.2	+23.2	7.0	48 13.8	+23.3	7.1	49 13.3	+23.5	7.3	50 12.8	+23.7	7.4	85
86	43 38.5	+21.7	5.3	44 38.2	+21.9	5.3	45 38.0	+21.9	5.4	46 37.7	+22.1	5.5	47 37.4	+22.2	5.6	48 37.1	+22.3	5.8	49 36.8	+22.4	5.9	50 36.5	+22.6	6.0	86
87	44 00.2	+20.9	4.0	45 00.1	+20.9	4.0	45 59.9	+21.0	4.1	46 59.8	+21.0	4.2	47 59.6	+21.2	4.3	48 59.4	+21.3	4.3	49 59.2	+21.4	4.4	50 59.1	+21.4	4.5	87
88	44 21.1	+19.9	2.7	45 21.0	+20.0	2.7	46 20.9	+20.1	2.8	47 20.8	+20.1	2.8	48 20.8	+20.1	2.9	49 20.7	+20.2	2.9	50 20.6	+20.3	3.0	51 20.5	+20.4	3.0	88
89	44 41.0	+19.0	1.3	45 41.0	+19.0	1.4	46 41.0	+19.0	1.4	47 40.9	+19.1	1.4	48 40.9	+19.1	1.4	49 40.9	+19.1	1.5	50 40.9	+19.1	1.5	51 40.9	+19.1	1.5	89
90	45 00.0	+18.1	0.0	46 00.0	+18.0	0.0	47 00.0	+18.0	0.0	48 00.0	+18.0	0.0	49 00.0	+18.0	0.0	50 00.0	+18.0	0.0	51 00.0	+18.0	0.0	52 00.0	+17.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 108°, 252°**

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LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	11 55.9	+43.3	102.2	11 43.1	+44.0	102.4	11 30.1	+44.7	102.6	11 16.9	+45.4	102.8	11 03.5	+46.1	103.0	10 49.9	+46.8	103.2	10 36.2	+47.4	103.4	10 22.2	+48.0	103.5	0
1	12 39.2	+43.2	101.5	12 27.1	+43.9	101.7	12 14.8	+44.7	101.9	12 02.3	+45.4	102.1	11 49.6	+46.0	102.3	11 36.7	+46.7	102.5	11 23.6	+47.3	102.7	11 10.2	+48.0	102.9	1
2	13 22.4	+43.1	100.8	13 11.0	+43.8	101.0	12 59.5	+44.5	101.2	12 47.7	+45.2	101.5	12 35.6	+45.9	101.7	12 23.4	+46.5	101.9	12 10.9	+47.2	102.1	11 58.2	+47.9	102.3	2
3	14 05.5	+42.9	100.1	13 54.8	+43.7	100.3	13 44.0	+44.4	100.5	13 32.9	+45.1	100.8	13 21.5	+45.8	101.0	13 09.9	+46.5	101.3	12 58.1	+47.2	101.5	12 46.1	+47.7	101.7	3
4	14 48.4	+42.8	99.3	14 38.5	+43.6	99.6	14 28.4	+44.3	99.9	14 18.0	+45.0	100.1	14 07.3	+45.7	100.4	13 56.4	+46.4	100.6	13 45.3	+47.0	100.8	13 33.8	+47.7	101.1	4
5	15 31.2	+42.7	98.6	15 22.1	+43.4	98.9	15 12.7	+44.1	99.2	15 03.0	+44.9	99.4	14 53.0	+45.6	99.7	14 42.8	+46.3	99.9	14 32.3	+46.9	100.2	14 21.5	+47.6	100.5	5
6	16 13.9	+42.5	97.9	16 05.5	+43.3	98.2	15 56.8	+44.1	98.5	15 47.9	+44.7	98.7	15 38.6	+45.5	99.0	15 29.1	+46.1	99.3	15 19.2	+46.9	99.6	15 09.1	+47.5	99.8	6
7	16 56.4	+42.4	97.1	16 48.8	+43.1	97.4	16 40.9	+43.8	97.7	16 32.6	+44.6	98.0	16 24.1	+45.3	98.3	16 15.2	+46.0	98.6	16 06.1	+46.7	98.9	15 56.6	+47.4	99.2	7
8	17 38.8	+42.2	96.4	17 31.9	+43.0	96.7	17 24.7	+43.7	97.0	17 17.2	+44.5	97.3	17 09.4	+45.2	97.7	17 01.2	+45.9	98.0	16 52.8	+46.6	98.3	16 44.0	+47.3	98.6	8
9	18 21.0	+42.0	95.7	18 14.9	+42.8	96.0	18 08.4	+43.6	96.3	18 01.7	+44.3	96.6	17 54.6	+45.0	97.0	17 47.1	+45.8	97.3	17 39.4	+46.4	97.6	17 31.3	+47.1	97.9	9
10	19 03.0	+41.8	94.9	18 57.7	+42.6	95.2	18 52.0	+43.4	95.6	18 46.0	+44.1	95.9	18 39.6	+44.9	96.3	18 32.9	+45.6	96.6	18 25.8	+46.3	96.9	18 18.4	+47.0	97.3	10
11	19 44.8	+41.6	94.1	19 40.3	+42.4	94.5	19 35.4	+43.2	94.9	19 30.1	+44.0	95.2	19 24.5	+44.7	95.6	19 18.5	+45.4	95.9	19 12.1	+46.2	96.3	19 05.4	+46.9	96.6	11
12	20 26.4	+41.5	93.4	20 22.7	+42.2	93.7	20 18.6	+43.0	94.1	20 14.1	+43.8	94.5	20 09.2	+44.5	94.9	20 03.9	+45.3	95.2	19 58.3	+46.0	95.6	19 52.3	+46.7	95.9	12
13	21 07.9	+41.2	92.6	21 04.9	+42.1	93.0	21 01.6	+42.8	93.4	20 57.9	+43.6	93.8	20 53.7	+44.4	94.1	20 49.2	+45.1	94.5	20 44.3	+45.8	94.9	20 39.0	+46.5	95.3	13
14	21 49.1	+41.0	91.8	21 47.0	+41.8	92.2	21 44.4	+42.7	92.6	21 41.5	+43.4	93.0	21 38.1	+44.2	93.4	21 34.3	+45.0	93.8	21 30.1	+45.7	94.2	21 25.5	+46.4	94.6	14
15	22 30.1	+40.7	91.0	22 28.8	+41.6	91.4	22 27.1	+42.4	91.9	22 24.9	+43.2	92.3	22 22.3	+44.0	92.7	22 19.3	+44.7	93.1	22 15.8	+45.5	93.5	22 11.9	+46.2	93.9	15
16	23 10.8	+40.6	90.2	23 10.4	+41.3	90.7	23 09.5	+42.1	91.1	23 08.1	+43.0	91.5	23 06.3	+43.7	91.9	23 04.0	+44.5	92.4	23 01.3	+45.3	92.8	22 58.1	+46.1	93.2	16
17	23 51.4	+40.3	89.4	23 51.7	+41.1	89.9	23 51.6	+42.0	90.3	23 51.1	+42.7	90.8	23 50.0	+43.6	91.2	23 48.5	+44.4	91.6	23 46.6	+45.1	92.1	23 44.2	+45.8	92.5	17
18	24 31.6	+40.0	88.6	24 32.8	+40.9	89.1	24 33.6	+41.7	89.5	24 33.8	+42.5	90.0	24 33.6	+43.3	90.4	24 32.9	+44.1	90.9	24 31.7	+44.9	91.4	24 30.0	+45.7	91.8	18
19	25 11.6	+39.8	87.8	25 13.7	+40.6	88.3	25 15.3	+41.4	88.7	25 16.3	+42.3	89.2	25 16.9	+43.1	89.7	25 17.0	+43.9	90.2	25 16.6	+44.7	90.6	25 15.7	+45.4	91.1	19
20	25 51.4	+39.4	87.0	25 54.3	+40.3	87.5	25 56.7	+41.2	87.9	25 58.6	+42.0	88.4	26 00.0	+42.8	88.9	26 00.9	+43.6	89.4	26 01.3	+44.4	89.9	26 01.1	+45.2	90.4	20
21	26 30.8	+39.2	86.1	26 34.6	+40.0	86.6	26 37.9	+40.9	87.1	26 40.6	+41.8	87.6	26 42.8	+42.6	88.1	26 44.5	+43.4	88.6	26 45.7	+44.2	89.1	26 46.3	+45.0	89.6	21
22	27 10.0	+38.8	85.3	27 14.6	+39.8	85.8	27 18.8	+40.6	86.3	27 22.4	+41.4	86.8	27 25.4	+42.3	87.3	27 27.9	+43.2	87.9	27 29.9	+43.9	88.4	27 31.3	+44.8	88.9	22
23	27 48.8	+38.5	84.4	27 54.4	+39.4	84.9	27 59.4	+40.3	85.5	28 03.8	+41.2	86.0	28 07.7	+42.0	86.5	28 11.1	+42.8	87.1	28 13.8	+43.7	87.6	28 16.1	+44.5	88.1	23
24	28 27.3	+38.2	83.6	28 33.8	+39.1	84.1	28 39.7	+39.9	84.6	28 45.0	+40.8	85.2	28 49.7	+41.8	85.7	28 53.9	+42.6	86.3	28 57.5	+43.4	86.8	29 00.6	+44.2	87.4	24
25	29 05.5	+37.8	82.7	29 12.9	+38.7	83.2	29 19.6	+39.7	83.8	29 25.8	+40.6	84.3	29 31.5	+41.4	84.9	29 36.5	+42.3	85.5	29 40.9	+43.2	86.0	29 44.8	+44.0	86.6	25
26	29 43.3	+37.5	81.8	29 51.6	+38.4	82.3	29 59.3	+39.3	82.9	30 06.4	+40.2	83.5	30 12.9	+41.1	84.1	30 18.8	+42.0	84.7	30 24.1	+42.8	85.2	30 28.8	+43.6	85.8	26
27	30 20.8	+37.1	80.9	30 30.0	+38.0	81.5	30 38.6	+38.9	82.0	30 46.6	+39.9	82.6	30 54.0	+40.7	83.2	31 00.8	+41.6	83.8	31 06.9	+42.5	84.4	31 12.4	+43.4	85.0	27
28	30 57.9	+36.7	80.0	31 08.0	+37.7	80.6	31 17.5	+38.6	81.2	31 26.5	+39.5	81.8	31 34.7	+40.5	82.4	31 42.4	+41.3	83.0	31 49.4	+42.2	83.6	31 55.8	+43.0	84.2	28
29	31 34.6	+36.3	79.0	31 45.7	+37.2	79.6	31 56.1	+38.2	80.3	32 06.0	+39.1	80.9	32 15.2	+40.0	81.5	32 23.7	+41.0	82.1	32 31.6	+41.9	82.8	32 38.8	+42.8	83.4	29
30	32 10.9	+35.8	78.1	32 22.9	+36.8	78.7	32 34.3	+37.8	79.3	32 45.1	+38.7	80.0	32 55.2	+39.7	80.6	33 04.7	+40.6	81.3	33 13.5	+41.5	81.9	33 21.6	+42.4	82.5	30
31	32 46.7	+35.5	77.2	32 59.7	+36.5	77.8	33 12.1	+37.4	78.4	33 23.8	+38.4	79.1	33 34.9	+39.3	79.7	33 45.3	+40.2	80.4	33 55.0	+41.1	81.0	34 04.0	+42.0	81.7	31
32	33 22.2	+34.9	76.2	33 36.2	+35.9	76.8	33 49.5	+36.9	77.5	34 02.2	+37.9	78.1	34 14.2	+38.8	78.8	34 25.5	+39.8	79.5	34 36.1	+40.7	80.2	34 46.0	+41.6	80.8	32
33	33 57.1	+34.6	75.2	34 12.1	+35.5	75.9	34 26.4	+36.5	76.5	34 40.1	+37.4	77.2	34 53.0	+38.5	77.9	35 05.3	+39.4	78.6	35 16.8	+40.3	79.3	35 27.6	+41.3	80.0	33
34	34 31.7	+34.0	74.2	34 47.6	+35.1	74.9	35 02.9	+36.1	75.6	35 17.5	+37.1	76.2	35 31.5	+38.0	76.9	35 44.7	+38.9	77.6	35 57.1	+39.9	78.3	36 08.9	+40.9	79.1	34
35	35 05.7	+33.5	73.2	35 22.7	+34.5	73.9	35 39.0	+35.5	74.6	35 54.6	+36.5	75.3	36 09.5	+37.5	76.0	36 23.6	+38.5	76.7	36 37.1	+39.4	77.4	36 49.8	+40.4	78.1	35
36	35 39.2	+33.0	72.2	35 57.2	+34.0	72.9	36 14.5	+35.1	73.6	36 31.1	+36.1	74.3	36 47.0	+37.0	75.0	37 02.1	+38.1	75.7	37 16.5	+39.1	76.5	37 30.2	+40.0	77.2	36
37	36 12.2	+32.5	71.2	36 31.2	+33.5	71.9	36 49.6	+34.5	72.6	37 07.2	+35.5	73.3	37 24.0	+36.6	74.0	37 40.2	+37.5	74.8	37 55.6	+38.5	75.5	38 10.2	+39.5	76.3	37
38	36 44.7	+31.9	70.1	37 04.7	+33.0	70.8	37 24.1	+34.0	71.6	37 42.7	+35.0	72.3	38 00.6	+36.0	73.0	38 17.7	+37.1	73.8	38 34.1	+38.1	74.5	38 49.7	+39.1	75.3	38
39	37 16.6	+31.3	69.1	37 37.7	+32.4	69.8	37 58.1	+33.4	70.5	38 17.7	+34.5	71.3	38 36.6	+35.5	72.0	38 54.8	+36.5	72.8	39 12.2	+37.5	73.5	39 28.8	+38.5	74.3	39
40	37 47.9	+30.8	68.0	38 10.1	+31.8	68.7	38 31.5	+32.8	69.5	38 52.2	+33.9	70.2	39 12.1	+34.9	71.0	39 31.3	+36.0	71.7	39 49.7	+37.0	72.5	40 07.3	+38.0	73.3	40
41	38 18.7	+30.1	66.9	38 41.9	+31.1	67.6	39 04.3	+32.3	68.4	39 26.1	+33.3	69.1	39 47.0	+34.4	69.9	40 07.3	+35.4	70.7	40 26.7	+36.4	71.5	40 45.3	+37.5	72.3	41
42	38 48.8	+29.5	65.8	39 13.0	+30.6	66.5	39 36.6	+31.6	67.3	39 59.4	+32.7	68.1	40 21.4	+33.8	68.8	40 42.7	+34.8	69.6	41 03.1	+35.9	70.5	41 22.8	+36.9	71.3	42
43	39 18.3	+28.8	64.7	39 43.6	+29.9	65.4	40 08.2	+31.0	66.2	40 32.1	+32.0	67.0	40 55.2	+33.1	67.8	41 17.5	+34.2	68.6	41 39.0	+35.3	69.4	41 59.7	+36.3	70.2	43
44	39 47.1	+28.2	63.5	40 13.5	+29.2	64.3	40 39.2	+30.3	65.1	41 04.1	+31.4	65.8	41 28.3	+32.4	66.6	41 51.7	+33.5	67.5	42 14.3	+34.6	68.3	42 36.0	+35.7	69.2	44
45	40 15.3	+27.4	62.4	40 42.7	+28.6	63.1	41 09.5	+29.6	63.9	41 35.5	+30.7	64.7	42 00.7	+31.9	65.5	42 25.2	+32.9	66.3	42 48.9	+34.0	67.2	43 11.7	+35.1	68.1	45
46	40 42.7	+26.8	61.2	41 11.3	+27.8	62.0	41 39.1	+28.9	62.8	42 06.2	+30.0	63.6	42 32.6	+31.1	64.4	42 58.1	+32.2	65.2	43 22.9	+33.3	66.1	43 46.8	+34.4	66.9	46
47	41 09.5	+26.0	60.0	41 39.1	+27.1	60.8	42 08.0	+28.2	61.6	42 36.2	+29.3	62.4	43 03.7	+30.3	63.2	43 30.3	+31.5	64.1	43 56.2	+32.5	64.9	44 21.2	+33.7	65.8	47
48	41 35.5	+25.2	58.8	42 06.2	+26.4	59.6	42 36.2	+27.5	60.4	43 05.5	+28.5	61.2	43 34.0	+29.7	62.0	44 01.8	+30.7	62.9	44 28.7	+31.9	63.7	44 54.9	+32.9	64.6	48
49	42 00.7	+24.5	57.6	42 32.6	+25.5	58.4	43 03.7	+26.6	59.2	43 34.0	+27.8	60.0	44 03.7	+28.8	60.8	44 32.5	+30.0	61.7	45 00.6	+31.1	62.6	45 27.8	+32.3	63.4	49
50	42 25.2	+23.7	56.4	42 58.1	+24.8	57.1	43 30.3	+25.9	57.9	44 01.8	+26.9	58.8	44 32.5	+28.1	59.6	45 02.5	+29.2	60.5	45 31.7	+30.3	61.3	46 00.1	+31.4	62.2	50
51	42 48.9	+22.8	55.1	43 22.9	+23.9	55.9	43 56.2	+25.0	56.7	44 28.7	+26.2	57.5	45 00.6	+27.2	58.3	45 31.7	+28.4	59.2	46 02.0	+29.5	60.1	46 31.5	+30.7	61.0	51
52	43 11.7	+22.0	53.9	43 46.8	+23.1	54.6	44 21.2	+24.1	55.4	44 54.9	+25.2	56.2	45 27.8	+26.4	57.1	46 00.1	+27.5	57.9	46 31.5	+28.7	58.8	47 02.2	+29.8	59.8	52
53	43 33.7	+21.1	52.6	44 09.9	+22.2	53.3	44 45.3	+23.3	54.1	45 20.1	+24.4	55.0	45 54.2	+25.5	55.8	46 27.6	+26.6	56.7	47 00.2	+27.7	57.6	47 32.0	+28.9	58.5	53
54	43 54.8	+20.3	51.3	44 32.1	+21.3	52.1	45 08.6	+22.4	52.8	45 44.5	+23.5	53.7	46 19.7	+24.6	54.5	46 54.2	+25.8	55.4	47 27.9	+26.9	56.3	48 00.9	+28.0	57.2	54
55	44 15.1	+19.3	50.0	44 53.4	+20.4	50.7	45 31.0	+21.5	51.5	46 08.0	+22.6	52.3	46 44.3	+23.7	53.2	47 20.0	+24.8	54.0	47 54.8	+26.0	54.9	48 28.9	+27.1	55.8	55
56	44 34.4	+18.4	48.7	45 13.8	+19.4	49.4	45 52.5	+20.5	50.2	46 30.6	+21.6	51.0	47 08.0	+22.7	51.8	47 44.8	+23.8	52.7	48 20.8	+24.9	53.6	48 56.0	+26.1	54.5	56
57	44 52.8	+17.5	47.3	45 33.2	+18.5	48.1	46 13.0	+19.6	48.8	46 52.2	+20.6	49.6	47 30.7	+21.8	50.5	48 08.6	+22.8	51.3	48 45.7	+24.0	52.2	49 22.1	+25.2	53.1	57
58	45 10.3	+16.4	46.0	45 51.7	+17.5	46.7	46 32.6	+18.5	47.5	47 12.8	+19.7	48.2	47 52.5	+20.7	49.1	48 31.4	+21.9	49.9	49 09.7	+23.0	50.8	49 47.3	+24.1	51.7	58
59	45 26.7	+15.5	44.6	46 09.2	+16.5	45.3	46 51.1	+17.6	46.1	47 32.5	+18.5	46.9	48 13.2	+19.6	47.7	48 53.3	+20.7	48.5	49 32.7	+21.9	49.4	50 11.4	+23.0	50.3	59
60	45 42.2	+14.5	43.2	46 25.7	+15.5	43.9	47 08.7	+16.5	44.7	47 51.0	+17.6	45.4	48 32.8	+18.7	46.2	49 14.0	+19.7	47.1	49 54.6	+20.8	47.9	50 34.4	+21.9	48.8	60
61	45 56.7	+13.5	41.8	46 41.2	+14.4	42.5	47 25.2	+15.4	43.3	48 08.6	+16.5	44.0	48 51.5	+17.5	44.8	49 33.7	+18.6	45.6	50 15.4	+19.7	46.5	50 56.3	+20.9	47.4	61
62	46 10.2	+12.4	40.4	46 55.6	+13.4	41.1	47 40.6	+14.4	41.8	48 25.1	+15.3	42.6	49 09.0	+16.4	43.3	49 52.3	+17.5	44.2	50 35.1	+18.5	45.0	51 17.2	+19.6	45.9	62
63	46 22.6	+11.4	39.0	47 09.0	+12.3	39.7	47 55.0	+13.2	40.4	48 40.4	+14.3	41.1	49 25.4	+15.2	41.9	50 09.8	+16.3	42.7	50 53.6	+17.4	43.5	51 36.8	+18.5	44.4	63
64	46 34.0	+10.3	37.6	47 21.3	+11.2	38.2	48 08.2	+12.2	38.9	48 54.7	+13.1	39.6	49 40.6	+14.2	40.4	50 26.1	+15.1	41.2	51 11.0	+16.2	42.0	51 55.3	+17.2	42.8	64
65	46 44.3	+9.2	36.1	47 32.5	+10.1	36.8	48 20.4	+11.0	37.4	49 07.8	+12.0	38.1	49 54.8	+12.9	38.8	50 41.2	+13.9	39.6	51 27.2	+14.9	40.4	52 12.5	+16.1	41.3	65
66	46 53.5	+8.1	34.7	47 42.6	+9.0	35.3	48 31.4	+9.9	36.0	49 19.8	+10.7	36.6	50 07.7	+11.7	37.4	50 55.1	+12.7	38.1	51 42.1	+13.7	38.9	52 28.6	+14.7	39.7	66
67	47 01.6	+7.0	33.2	47 51.6	+7.9	33.8	48 41.3	+8.7	34.5	49 30.5	+9.6	35.1	50 19.4	+10.5	35.8	51 07.8	+11.5	36.5	51 55.8	+12.4	37.3	52 43.3	+13.4	38.1	67
68	47 08.6	+5.9	31.8	47 59.5	+6.7	32.4	48 50.0	+7.5	33.0	49 40.1	+8.4	33.6	50 29.9	+9.3	34.3	51 19.3	+10.2	35.0	52 08.2	+11.2	35.7	52 56.7	+12.1	36.5	68
69	47 14.5	+4.8	30.3	48 06.2	+5.5	30.9	48 57.5	+6.4	31.5	49 48.5	+7.2	32.1	50 39.2	+8.0	32.7	51 29.5	+8.9	33.4	52 19.4	+9.8	34.1	53 08.8	+10.8	34.8	69
70	47 19.3	+3.6	28.8	48 11.7	+4.4	29.4	49 03.9	+5.1	29.9	49 55.7	+5.9	30.5	50 47.2	+6.8	31.2	51 38.4	+7.6	31.8	52 29.2	+8.5	32.5	53 19.6	+9.4	33.2	70
71	47 22.9	+2.6	27.4	48 16.1	+3.2	27.9	49 09.0	+4.0	28.4	50 01.6	+4.7	29.0	50 54.0	+5.4	29.6	51 46.0	+6.3	30.2	52 37.7	+7.1	30.9	53 29.0	+8.0	31.5	71
72	47 25.5	+1.3	25.9	48 19.3	+2.1	26.4	49 13.0	+2.7	26.9	50 06.3	+3.5	27.4	50 59.4	+4.2	28.0	51 52.3	+5.0	28.6	52 44.8	+5.8	29.2	53 37.0	+6.6	29.9	72
73	47 26.8	+0.3	24.4	48 21.4	+0.8	24.9	49 15.7	+1.5	25.4	50 09.8	+2.2	25.9	51 03.6	+3.0	26.4	51 57.3	+3.6	27.0	52 50.6	+4.4	27.6	53 43.6	+5.2	28.2	73
74	47 27.1	−0.9	22.9	48 22.2	−0.3	23.4	49 17.2	+0.3	23.8	50 12.0	+0.9	24.3	51 06.6	+1.6	24.8	52 00.9	+2.3	25.4	52 55.0	+3.0	25.9	53 48.8	+3.8	26.5	74
75	47 26.2	−2.1	21.5	48 21.9	−1.5	21.9	49 17.5	−0.9	22.3	50 12.9	−0.3	22.8	51 08.2	+0.3	23.2	52 03.2	+1.0	23.7	52 58.0	+1.6	24.3	53 52.6	+2.3	24.8	75
76	47 24.1	−3.2	20.0	48 20.4	−2.6	20.4	49 16.6	−2.1	20.8	50 12.6	−1.6	21.2	51 08.5	−1.0	21.6	52 04.2	−0.4	22.1	52 59.6	+0.3	22.6	53 54.9	+0.9	23.1	76
77	47 20.9	−4.3	18.5	48 17.8	−3.9	18.9	49 14.5	−3.4	19.2	50 11.0	−2.8	19.6	51 07.5	−2.3	20.0	52 03.8	−1.7	20.5	52 59.9	−1.1	20.9	53 55.8	−0.5	21.4	77
78	47 16.6	−5.4	17.0	48 13.9	−5.0	17.4	49 11.1	−4.5	17.7	50 08.2	−4.0	18.1	51 05.2	−3.6	18.5	52 02.1	−3.1	18.9	52 58.8	−2.6	19.3	53 55.3	−1.9	19.7	78
79	47 11.2	−6.6	15.6	48 08.9	−6.2	15.9	49 06.6	−5.8	16.2	50 04.2	−5.4	16.5	51 01.6	−4.8	16.9	51 59.0	−4.4	17.2	52 56.2	−3.9	17.6	53 53.4	−3.4	18.0	79
80	47 04.6	−7.7	14.1	48 02.7	−7.3	14.4	49 00.8	−6.9	14.7	49 58.8	−6.5	15.0	50 56.8	−6.2	15.3	51 54.6	−5.7	15.6	52 52.3	−5.3	16.0	53 50.0	−4.9	16.3	80
81	46 56.9	−8.8	12.7	47 55.4	−8.4	12.9	48 53.9	−8.1	13.2	49 52.3	−7.8	13.4	50 50.6	−7.4	13.7	51 48.9	−7.1	14.0	52 47.0	−6.6	14.3	53 45.1	−6.2	14.7	81
82	46 48.1	−9.8	11.2	47 47.0	−9.6	11.4	48 45.8	−9.3	11.6	49 44.5	−9.0	11.9	50 43.2	−8.7	12.1	51 41.8	−8.3	12.4	52 40.4	−8.0	12.7	53 38.9	−7.6	13.0	82
83	46 38.3	−11.0	9.8	47 37.4	−10.7	10.0	48 36.5	−10.5	10.2	49 35.5	−10.2	10.4	50 34.5	−9.9	10.6	51 33.5	−9.7	10.8	52 32.4	−9.3	11.0	53 31.3	−9.1	11.3	83
84	46 27.3	−11.9	8.3	47 26.7	−11.8	8.5	48 26.0	−11.6	8.7	49 25.3	−11.3	8.8	50 24.6	−11.1	9.0	51 23.8	−10.9	9.2	52 23.1	−10.7	9.4	53 22.2	−10.5	9.6	84
85	46 15.4	−13.1	6.9	47 14.9	−12.9	7.1	48 14.4	−12.7	7.2	49 14.0	−12.6	7.3	50 13.5	−12.4	7.5	51 12.9	−12.1	7.6	52 12.4	−12.0	7.8	53 11.8	−11.7	8.0	85
86	46 02.3	−14.1	5.5	47 02.0	−13.9	5.6	48 01.7	−13.8	5.7	49 01.4	−13.7	5.8	50 01.1	−13.5	6.0	51 00.8	−13.4	6.1	52 00.4	−13.2	6.2	53 00.1	−13.1	6.4	86
87	45 48.2	−15.1	4.1	46 48.1	−15.0	4.2	47 47.9	−14.9	4.3	48 47.7	−14.8	4.4	49 47.6	−14.8	4.4	50 47.4	−14.6	4.5	51 47.2	−14.5	4.6	52 47.0	−14.4	4.7	87
88	45 33.1	−16.0	2.7	46 33.1	−16.1	2.8	47 33.0	−16.0	2.8	48 32.9	−15.9	2.9	49 32.8	−15.8	2.9	50 32.8	−15.8	3.0	51 32.7	−15.8	3.1	52 32.6	−15.7	3.1	88
89	45 17.1	−17.1	1.4	46 17.0	−17.0	1.4	47 17.0	−17.0	1.4	48 17.0	−17.0	1.4	49 17.0	−17.0	1.5	50 17.0	−17.0	1.5	51 16.9	−16.9	1.5	52 16.9	−16.9	1.6	89
90	45 00.0	−18.0	0.0	46 00.0	−18.0	0.0	47 00.0	−18.1	0.0	48 00.0	−18.1	0.0	49 00.0	−18.1	0.0	50 00.0	−18.1	0.0	51 00.0	−18.1	0.0	52 00.0	−18.2	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	11 55.9	−43.4	102.2	11 43.1	−44.1	102.4	11 30.1	−44.8	102.6	11 16.9	−45.5	102.8	11 03.5	−46.2	103.0	10 49.9	−46.8	103.2	10 36.2	−47.5	103.4	10 22.2	−48.1	103.5	0
1	11 12.5	−43.6	102.9	10 59.0	−44.3	103.1	10 45.3	−44.9	103.3	10 31.4	−45.6	103.5	10 17.3	−46.2	103.8	10 03.1	−46.9	103.8	9 48.7	−47.6	104.0	9 34.1	−48.2	104.2	1
2	10 28.9	−43.6	103.6	10 14.7	−44.3	103.8	10 00.4	−45.0	104.0	9 45.8	−45.7	104.1	9 31.1	−46.3	104.4	9 16.2	−47.0	104.4	9 01.1	−47.6	104.6	8 45.9	−48.2	104.8	2
3	9 45.3	−43.6	104.3	9 30.4	−44.4	104.5	9 15.4	−45.1	104.8	9 00.1	−45.7	104.8	8 44.8	−46.4	104.9	8 29.2	−47.0	105.1	8 13.5	−47.6	105.2	7 57.7	−48.3	105.4	3
4	9 01.7	−43.8	105.0	8 46.0	−44.4	105.1	8 30.3	−45.1	105.3	8 14.4	−45.8	105.4	7 58.4	−46.5	105.6	7 42.2	−47.1	105.7	7 25.9	−47.7	105.8	7 09.4	−48.3	106.0	4
5	8 17.9	−43.9	105.7	8 01.6	−44.5	105.8	7 45.2	−45.2	106.0	7 28.6	−45.9	106.1	7 11.9	−46.5	106.2	6 55.1	−47.1	106.3	6 38.2	−47.8	106.4	6 21.1	−48.3	106.6	5
6	7 34.0	−43.9	106.4	7 17.1	−44.6	106.5	7 00.0	−45.3	106.6	6 42.7	−45.9	106.7	6 25.4	−46.6	106.8	6 08.0	−47.2	107.0	5 50.4	−47.8	107.1	5 32.8	−48.4	107.1	6
7	6 50.1	−43.9	107.1	6 32.5	−44.7	107.2	6 14.7	−45.3	107.5	5 56.8	−45.9	107.4	5 38.8	−46.5	107.5	5 20.8	−47.2	107.6	5 02.6	−47.8	107.7	4 44.4	−48.5	107.7	7
8	6 06.2	−44.0	107.7	5 47.8	−44.7	107.8	5 29.4	−45.3	107.9	5 10.9	−46.0	108.0	4 52.3	−46.7	108.1	4 33.6	−47.3	108.2	4 14.8	−47.9	108.3	3 55.9	−48.4	108.3	8
9	5 22.2	−44.1	108.4	5 03.1	−44.7	108.5	4 44.1	−45.4	108.6	4 24.9	−46.1	108.7	4 05.6	−46.6	108.7	3 46.3	−47.3	108.8	3 26.9	−47.8	108.9	3 07.5	−48.5	108.9	9
10	4 38.1	−44.1	109.1	4 18.4	−44.7	109.2	3 58.7	−45.4	109.3	3 38.8	−46.0	109.3	3 19.0	−46.7	109.4	2 59.0	−47.3	109.4	2 39.1	−47.9	109.5	2 19.0	−48.5	109.5	10
11	3 54.0	−44.1	109.8	3 33.7	−44.8	109.9	3 13.3	−45.5	109.9	2 52.8	−46.1	110.0	2 32.3	−46.7	110.0	2 11.7	−47.3	110.0	1 51.2	−48.0	110.1	1 30.5	−48.4	110.1	11
12	3 09.9	−44.2	110.5	2 48.9	−44.9	110.5	2 27.8	−45.5	110.6	2 06.7	−46.1	110.6	1 45.6	−46.7	110.6	1 24.4	−47.3	110.7	1 03.2	−47.9	110.7	0 42.1	−48.5	110.7	12
13	2 25.7	−44.2	111.2	2 04.0	−44.8	111.2	1 42.3	−45.4	111.2	1 20.6	−46.1	111.2	0 58.9	−46.7	111.3	0 37.1	−47.3	111.3	0 15.3	−47.9	111.3	0 06.4	+48.5	68.7	13
14	1 41.5	−44.2	111.8	1 19.2	−44.8	111.9	0 56.9	−45.5	111.9	0 34.5	−46.1	111.9	0 12.2	−46.8	111.9	0 10.2	+47.3	68.1	0 32.6	+47.9	68.1	0 54.9	+48.5	68.1	14
15	0 57.3	−44.2	112.5	0 34.4	−44.9	112.5	0 11.4	−45.5	112.5	0 11.6	+46.1	67.5	0 34.6	+46.7	67.5	0 57.5	+47.4	67.5	1 20.5	+47.9	67.5	1 43.4	+48.5	67.5	15
16	0 13.1	−44.2	113.2	0 10.5	+44.8	66.8	0 34.1	+45.5	66.8	0 57.7	+46.1	66.8	1 21.3	+46.7	66.9	1 44.9	+47.3	66.9	2 08.4	+47.9	66.9	2 31.9	+48.5	66.9	16
17	0 31.1	+44.2	66.1	0 55.3	+44.9	66.2	1 19.6	+45.4	66.2	1 43.8	+46.1	66.2	2 08.0	+46.7	66.2	2 32.2	+47.3	66.3	2 56.3	+47.9	66.3	3 20.4	+48.4	66.4	17
18	1 15.3	+44.1	65.5	1 40.2	+44.8	65.5	2 05.0	+45.5	65.5	2 29.9	+46.0	65.6	2 54.7	+46.7	65.6	3 19.5	+47.2	65.6	3 44.2	+47.8	65.7	4 08.8	+48.4	65.8	18
19	1 59.4	+44.2	64.8	2 25.0	+44.8	64.8	2 50.5	+45.4	64.9	3 15.9	+46.1	64.9	3 41.4	+46.6	65.0	4 06.7	+47.3	65.0	4 32.0	+47.8	65.1	4 57.2	+48.4	65.2	19
20	2 43.6	+44.2	64.1	3 09.8	+44.8	64.2	3 35.9	+45.4	64.2	4 02.0	+46.0	64.3	4 28.0	+46.6	64.3	4 54.0	+47.2	64.4	5 19.8	+47.8	64.5	5 45.6	+48.4	64.6	20
21	3 27.8	+44.1	63.4	3 54.6	+44.7	63.5	4 21.3	+45.4	63.6	4 48.0	+46.0	63.6	5 14.6	+46.6	63.7	5 41.2	+47.1	63.8	6 07.6	+47.7	63.9	6 34.0	+48.3	64.0	21
22	4 11.9	+44.1	62.8	4 39.3	+44.7	62.8	5 06.7	+45.3	62.9	5 34.0	+45.9	63.0	6 01.2	+46.5	63.1	6 28.3	+47.1	63.2	6 55.3	+47.7	63.3	7 22.3	+48.2	63.4	22
23	4 56.0	+44.0	62.1	5 24.0	+44.7	62.2	5 52.0	+45.3	62.2	6 19.9	+45.9	62.3	6 47.7	+46.5	62.4	7 15.4	+47.1	62.5	7 43.0	+47.7	62.7	8 10.5	+48.2	62.8	23
24	5 40.0	+44.0	61.4	6 08.7	+44.6	61.5	6 37.3	+45.2	61.6	7 05.8	+45.8	61.7	7 34.2	+46.4	61.8	8 02.5	+47.0	61.9	8 30.7	+47.6	62.0	8 58.7	+48.2	62.2	24
25	6 24.0	+43.9	60.7	6 53.3	+44.6	60.8	7 22.5	+45.2	60.9	7 51.6	+45.8	61.0	8 20.6	+46.4	61.2	8 49.5	+47.0	61.3	9 18.3	+47.5	61.4	9 46.9	+48.1	61.6	25
26	7 07.9	+43.9	60.0	7 37.9	+44.5	60.1	8 07.7	+45.1	60.3	8 37.4	+45.7	60.4	9 07.0	+46.3	60.5	9 36.5	+46.8	60.7	10 05.8	+47.4	60.8	10 35.0	+48.0	61.0	26
27	7 51.8	+43.8	59.3	8 22.4	+44.4	59.5	8 52.8	+45.0	59.6	9 23.1	+45.6	59.7	9 53.3	+46.2	59.9	10 23.3	+46.8	60.0	10 53.2	+47.4	60.2	11 23.0	+47.9	60.4	27
28	8 35.6	+43.8	58.6	9 06.8	+44.3	58.8	9 37.8	+45.0	58.9	10 08.7	+45.6	59.1	10 39.5	+46.1	59.2	11 10.1	+46.8	59.4	11 40.6	+47.3	59.6	12 10.9	+47.9	59.7	28
29	9 19.4	+43.6	58.0	9 51.1	+44.3	58.1	10 22.8	+44.9	58.2	10 54.3	+45.5	58.4	11 25.6	+46.1	58.6	11 56.9	+46.6	58.8	12 27.9	+47.2	58.9	12 58.8	+47.7	59.1	29
30	10 03.0	+43.6	57.3	10 35.4	+44.2	57.4	11 07.4	+44.7	57.6	11 39.8	+45.3	57.7	12 11.7	+46.0	57.9	12 43.5	+46.5	58.1	13 15.1	+47.1	58.3	13 46.5	+47.7	58.5	30
31	10 46.6	+43.5	56.6	11 19.6	+44.1	56.7	11 52.4	+44.7	56.9	12 25.1	+45.3	57.1	12 57.7	+45.8	57.3	13 30.0	+46.5	57.5	14 02.2	+47.0	57.7	14 34.2	+47.6	57.9	31
32	11 30.1	+43.3	55.9	12 03.7	+43.9	56.0	12 37.1	+44.6	56.2	13 10.4	+45.2	56.4	13 43.5	+45.8	56.6	14 16.5	+46.3	56.8	14 49.2	+46.9	57.0	15 21.8	+47.5	57.3	32
33	12 13.4	+43.3	55.1	12 47.6	+43.9	55.3	13 21.7	+44.5	55.5	13 55.6	+45.0	55.7	14 29.3	+45.6	55.9	15 02.8	+46.2	56.1	15 36.1	+46.8	56.4	16 09.2	+47.4	56.6	33
34	12 56.7	+43.1	54.4	13 31.5	+43.8	54.6	14 06.2	+44.3	54.8	14 40.6	+45.0	55.0	15 14.9	+45.5	55.3	15 49.0	+46.1	55.5	16 22.9	+46.7	55.7	16 56.6	+47.2	56.0	34
35	13 39.8	+43.1	53.7	14 15.3	+43.6	53.9	14 50.5	+44.2	54.1	15 25.6	+44.8	54.4	16 00.4	+45.4	54.6	16 35.1	+46.0	54.8	17 09.6	+46.5	55.1	17 43.8	+47.1	55.3	35
36	14 22.9	+42.9	53.0	14 58.9	+43.5	53.2	15 34.7	+44.1	53.4	16 10.4	+44.7	53.7	16 45.8	+45.3	53.9	17 21.1	+45.8	54.1	17 56.1	+46.4	54.4	18 30.9	+47.0	54.7	36
37	15 05.8	+42.7	52.3	15 42.4	+43.3	52.5	16 18.8	+44.0	52.7	16 55.1	+44.5	53.0	17 31.1	+45.1	53.2	18 06.9	+45.7	53.5	18 42.5	+46.3	53.7	19 17.9	+46.8	54.0	37
38	15 48.5	+42.6	51.6	16 25.7	+43.2	51.8	17 02.8	+43.8	52.0	17 39.6	+44.4	52.3	18 16.2	+45.0	52.5	18 52.6	+45.5	52.8	19 28.8	+46.1	53.1	20 04.7	+46.7	53.4	38
39	16 31.1	+42.5	50.8	17 08.9	+43.1	51.1	17 46.6	+43.6	51.3	18 24.0	+44.2	51.6	19 01.2	+44.8	51.8	19 38.1	+45.4	52.1	20 14.9	+45.9	52.4	20 51.4	+46.5	52.7	39
40	17 13.6	+42.3	50.1	17 52.0	+42.9	50.3	18 30.2	+43.5	50.6	19 08.2	+44.0	50.8	19 46.0	+44.6	51.1	20 23.5	+45.2	51.4	21 00.8	+45.8	51.7	21 37.9	+46.3	52.0	40
41	17 55.9	+42.1	49.3	18 34.9	+42.7	49.6	19 13.7	+43.3	49.9	19 52.2	+43.9	50.1	20 30.6	+44.5	50.4	21 08.7	+45.1	50.7	21 46.6	+45.6	51.0	22 24.2	+46.2	51.3	41
42	18 38.0	+41.9	48.6	19 17.6	+42.5	48.8	19 57.0	+43.1	49.1	20 36.1	+43.7	49.4	21 15.1	+44.2	49.7	21 53.8	+44.8	50.0	22 32.2	+45.4	50.3	23 10.4	+46.0	50.6	42
43	19 19.9	+41.8	47.8	20 00.1	+42.4	48.1	20 40.1	+42.9	48.4	21 19.8	+43.5	48.7	21 59.3	+44.1	49.0	22 38.6	+44.7	49.3	23 17.6	+45.3	49.6	23 56.4	+45.8	49.9	43
44	20 01.7	+41.5	47.1	20 42.5	+42.1	47.3	21 23.0	+42.7	47.6	22 03.3	+43.3	47.9	22 43.4	+43.9	48.2	23 23.3	+44.4	48.5	24 02.9	+45.0	48.9	24 42.2	+45.6	49.2	44
45	20 43.2	+41.4	46.3	21 24.6	+41.9	46.6	22 05.7	+42.5	46.9	22 46.6	+43.1	47.2	23 27.3	+43.7	47.5	24 07.7	+44.3	47.8	24 47.9	+44.8	48.2	25 27.8	+45.4	48.5	45
46	21 24.6	+41.1	45.5	22 06.5	+41.7	45.8	22 48.2	+42.3	46.1	23 29.7	+42.9	46.4	24 11.0	+43.4	46.7	24 52.0	+44.0	47.1	25 32.7	+44.6	47.4	26 13.2	+45.1	47.8	46
47	22 05.7	+40.9	44.7	22 48.2	+41.5	45.0	23 30.5	+42.1	45.3	24 12.6	+42.6	45.7	24 54.4	+43.2	46.0	25 36.0	+43.8	46.3	26 17.3	+44.4	46.7	26 58.3	+44.9	47.0	47
48	22 46.6	+40.7	43.9	23 29.7	+41.3	44.2	24 12.6	+41.8	44.6	24 55.2	+42.4	44.9	25 37.6	+43.0	45.2	26 19.8	+43.5	45.6	27 01.6	+44.2	45.9	27 43.2	+44.7	46.3	48
49	23 27.3	+40.4	43.1	24 11.0	+41.0	43.5	24 54.4	+41.6	43.8	25 37.6	+42.2	44.1	26 20.6	+42.7	44.4	27 03.3	+43.3	44.8	27 45.8	+43.8	45.2	28 27.9	+44.4	45.5	49
50	24 07.7	+40.2	42.3	24 52.0	+40.7	42.6	25 36.0	+41.3	43.0	26 19.8	+41.9	43.3	27 03.3	+42.5	43.6	27 46.6	+43.0	44.0	28 29.6	+43.6	44.4	29 12.3	+44.2	44.8	50
51	24 47.9	+39.9	41.5	25 32.7	+40.5	41.8	26 17.3	+41.0	42.2	27 01.6	+41.6	42.5	27 45.8	+42.1	42.9	28 29.6	+42.7	43.2	29 13.2	+43.3	43.6	29 56.5	+43.9	44.0	51
52	25 27.8	+39.6	40.7	26 13.2	+40.1	41.0	26 58.3	+40.8	41.3	27 43.2	+41.4	41.7	28 27.9	+41.9	42.0	29 12.3	+42.5	42.4	29 56.5	+43.0	42.8	30 40.4	+43.6	43.2	52
53	26 07.4	+39.3	39.9	26 53.3	+39.9	40.2	27 39.1	+40.4	40.5	28 24.6	+41.0	40.9	29 09.8	+41.6	41.2	29 54.8	+42.1	41.6	30 39.5	+42.7	42.0	31 24.0	+43.3	42.4	53
54	26 46.7	+39.0	39.0	27 33.2	+39.6	39.3	28 19.5	+40.1	39.7	29 05.6	+40.7	40.0	29 51.4	+41.3	40.4	30 36.9	+41.9	40.8	31 22.2	+42.4	41.2	32 07.3	+42.9	41.6	54
55	27 25.7	+38.7	38.2	28 12.8	+39.3	38.5	28 59.6	+39.9	38.8	29 46.3	+40.3	39.2	30 32.7	+40.9	39.6	31 18.8	+41.5	39.9	32 04.6	+42.1	40.3	32 50.2	+42.7	40.8	55
56	28 04.4	+38.4	37.3	28 52.1	+38.9	37.6	29 39.5	+39.4	38.0	30 26.6	+40.1	38.3	31 13.6	+40.6	38.7	32 00.3	+41.1	39.1	32 46.7	+41.7	39.5	33 32.9	+42.3	39.9	56
57	28 42.8	+38.1	36.4	29 31.0	+38.6	36.8	30 18.9	+39.2	37.1	31 06.7	+39.7	37.5	31 54.2	+40.2	37.8	32 41.4	+40.8	38.2	33 28.4	+41.4	38.6	34 15.2	+41.9	39.1	57
58	29 20.9	+37.6	35.5	30 09.6	+38.2	35.9	30 58.1	+38.7	36.2	31 46.4	+39.3	36.6	32 34.4	+39.9	37.0	33 22.2	+40.5	37.4	34 09.8	+41.0	37.8	34 57.1	+41.5	38.2	58
59	29 58.5	+37.3	34.7	30 47.8	+37.8	35.0	31 36.8	+38.4	35.3	32 25.7	+38.9	35.7	33 14.3	+39.5	36.1	34 02.7	+40.0	36.5	34 50.8	+40.6	36.9	35 38.6	+41.2	37.3	59
60	30 35.8	+37.0	33.7	31 25.6	+37.5	34.1	32 15.2	+38.0	34.4	33 04.6	+38.6	34.8	33 53.8	+39.1	35.2	34 42.7	+39.6	35.6	35 31.4	+40.2	36.0	36 19.8	+40.8	36.4	60
61	31 12.8	+36.5	32.8	32 03.1	+37.1	33.2	32 53.2	+37.6	33.5	33 43.2	+38.1	33.9	34 32.9	+38.6	34.3	35 22.3	+39.2	34.7	36 11.6	+39.7	35.1	37 00.6	+40.3	35.5	61
62	31 49.3	+36.1	31.9	32 40.2	+36.6	32.2	33 30.8	+37.2	32.6	34 21.3	+37.7	32.9	35 11.5	+38.2	33.3	36 01.5	+38.8	33.7	36 51.3	+39.3	34.1	37 40.9	+39.8	34.6	62
63	32 25.4	+35.7	31.0	33 16.8	+36.2	31.3	34 08.0	+36.7	31.6	34 59.0	+37.2	32.0	35 49.7	+37.8	32.4	36 40.3	+38.3	32.8	37 30.6	+38.9	33.2	38 20.7	+39.4	33.6	63
64	33 01.1	+35.3	30.0	33 53.0	+35.8	30.3	34 44.7	+36.3	30.7	35 36.2	+36.8	31.0	36 27.5	+37.3	31.4	37 18.6	+37.9	31.8	38 09.5	+38.4	32.2	39 00.1	+39.0	32.6	64
65	33 36.4	+34.8	29.4	34 28.8	+35.3	29.4	35 21.0	+35.8	29.7	36 13.0	+36.3	30.1	37 04.8	+36.8	30.4	37 56.5	+37.3	30.8	38 47.9	+37.9	31.2	39 39.1	+38.4	31.7	65
66	34 11.2	+34.3	28.0	35 04.1	+34.8	28.4	35 56.8	+35.3	28.7	36 49.3	+35.8	29.1	37 41.6	+36.3	29.4	38 33.8	+36.9	29.8	39 25.7	+37.4	30.2	40 17.5	+37.8	30.7	66
67	34 45.5	+33.8	27.1	35 38.9	+34.3	27.4	36 32.1	+34.7	27.7	37 25.1	+35.3	28.1	38 17.9	+35.8	28.4	39 10.6	+36.3	28.8	40 03.1	+36.8	29.2	40 55.3	+37.4	29.6	67
68	35 19.3	+33.3	26.0	36 13.2	+33.7	26.4	37 06.8	+34.3	26.7	38 00.4	+34.7	27.0	38 53.7	+35.2	27.4	39 46.9	+35.7	27.8	40 39.9	+36.2	28.2	41 32.7	+36.7	28.6	68
69	35 52.6	+32.8	25.0	36 46.9	+33.3	25.3	37 41.1	+33.7	25.7	38 35.1	+34.2	26.0	39 28.9	+34.7	26.4	40 22.6	+35.2	26.7	41 16.1	+35.7	27.1	42 09.4	+36.2	27.5	69
70	36 25.4	+32.3	24.0	37 20.2	+32.7	24.3	38 14.8	+33.1	24.6	39 09.3	+33.6	24.9	40 03.6	+34.1	25.3	40 57.8	+34.5	25.7	41 51.8	+35.0	26.1	42 45.6	+35.5	26.5	70
71	36 57.7	+31.7	22.9	37 52.9	+32.1	23.2	38 47.9	+32.6	23.5	39 42.9	+33.0	23.9	40 37.7	+33.4	24.2	41 32.3	+33.9	24.6	42 26.8	+34.4	25.0	43 21.1	+34.9	25.4	71
72	37 29.4	+31.1	21.9	38 25.0	+31.5	22.2	39 20.5	+31.9	22.5	40 15.9	+32.3	22.8	41 11.1	+32.8	23.1	42 06.2	+33.3	23.5	43 01.2	+33.7	23.8	43 56.0	+34.2	24.2	72
73	38 00.5	+30.4	20.8	38 56.5	+30.9	21.1	39 52.4	+31.3	21.4	40 48.2	+31.8	21.7	41 43.9	+32.2	22.0	42 39.5	+32.6	22.3	43 34.9	+33.1	22.7	44 30.2	+33.5	23.1	73
74	38 30.9	+29.9	19.7	39 27.4	+30.2	20.0	40 23.7	+30.7	20.2	41 20.0	+31.0	20.6	42 16.1	+31.5	20.9	43 12.1	+31.9	21.2	44 08.0	+32.3	21.5	45 03.7	+32.8	21.9	74
75	39 00.8	+29.2	18.6	39 57.6	+29.6	18.8	40 54.4	+30.0	19.1	41 51.0	+30.4	19.4	42 47.6	+30.7	19.7	43 44.0	+31.2	20.0	44 40.3	+31.6	20.4	45 36.5	+32.0	20.7	75
76	39 30.0	+28.6	17.4	40 27.2	+29.0	17.7	41 24.4	+29.2	18.0	42 21.4	+29.6	18.2	43 18.3	+30.1	18.5	44 15.2	+30.4	18.8	45 11.9	+30.8	19.2	46 08.5	+31.2	19.5	76
77	39 58.6	+27.9	16.3	40 56.2	+28.2	16.5	41 53.6	+28.6	16.8	42 51.0	+28.9	17.1	43 48.4	+29.2	17.3	44 45.6	+29.6	17.6	45 42.7	+30.0	17.9	46 39.7	+30.5	18.3	77
78	40 26.5	+27.2	15.1	41 24.4	+27.5	15.4	42 22.2	+27.8	15.6	43 19.9	+28.2	15.9	44 17.6	+28.5	16.1	45 15.2	+28.9	16.4	46 12.7	+29.2	16.7	47 10.2	+29.5	17.0	78
79	40 53.7	+26.4	14.0	41 51.9	+26.7	14.2	42 50.0	+27.1	14.4	43 48.1	+27.3	14.6	44 46.1	+27.7	14.9	45 44.1	+28.0	15.2	46 41.9	+28.4	15.4	47 39.7	+28.7	15.7	79
80	41 20.1	+25.7	12.8	42 18.6	+26.0	13.0	43 17.1	+26.2	13.2	44 15.4	+26.6	13.4	45 13.8	+26.8	13.6	46 12.1	+27.1	13.9	47 10.3	+27.4	14.1	48 08.4	+27.8	14.4	80
81	41 45.8	+25.0	11.6	42 44.6	+25.2	11.8	43 43.3	+25.4	11.9	44 42.0	+25.7	12.1	45 40.6	+26.0	12.4	46 39.2	+26.3	12.6	47 37.7	+26.6	12.8	48 36.2	+26.8	13.1	81
82	42 10.8	+24.1	10.3	43 09.8	+24.3	10.5	44 08.7	+24.6	10.7	45 07.7	+24.8	10.9	46 06.6	+25.1	11.1	47 05.5	+25.3	11.3	48 04.3	+25.6	11.5	49 03.0	+25.9	11.7	82
83	42 34.9	+23.3	9.1	43 34.1	+23.6	9.3	44 33.3	+23.8	9.4	45 32.5	+24.0	9.6	46 31.7	+24.1	9.8	47 30.8	+24.4	9.9	48 29.9	+24.6	10.1	49 28.9	+24.9	10.3	83
84	42 58.2	+22.5	7.9	43 57.7	+22.6	8.0	44 57.1	+22.8	8.1	45 56.5	+23.0	8.3	46 55.8	+23.2	8.4	47 55.2	+23.4	8.6	48 54.5	+23.6	8.7	49 53.8	+23.8	8.9	84
85	43 20.7	+21.7	6.6	44 20.3	+21.8	6.7	45 19.9	+22.0	6.8	46 19.5	+22.1	6.9	47 19.0	+22.3	7.1	48 18.6	+22.4	7.2	49 18.1	+22.6	7.3	50 17.6	+22.7	7.5	85
86	43 42.4	+20.8	5.3	44 42.1	+20.9	5.4	45 41.9	+21.0	5.5	46 41.6	+21.1	5.6	47 41.3	+21.2	5.7	48 41.0	+21.4	5.8	49 40.7	+21.5	5.9	50 40.3	+21.7	6.0	86
87	44 03.2	+19.8	4.0	45 03.0	+20.0	4.1	46 02.9	+20.0	4.1	47 02.7	+20.1	4.2	48 02.5	+20.2	4.3	49 02.4	+20.3	4.4	50 02.2	+20.4	4.5	51 02.0	+20.5	4.6	87
88	44 23.0	+19.0	2.7	45 23.0	+19.0	2.7	46 22.9	+19.0	2.8	47 22.8	+19.1	2.8	48 22.7	+19.2	2.9	49 22.7	+19.2	2.9	50 22.6	+19.3	3.0	51 22.5	+19.3	3.1	88
89	44 42.0	+18.0	1.3	45 42.0	+18.0	1.4	46 41.9	+18.1	1.4	47 41.9	+18.1	1.4	48 41.9	+18.1	1.4	49 41.9	+18.1	1.5	50 41.9	+18.1	1.5	51 41.8	+18.2	1.5	89
90	45 00.0	+17.1	0.0	46 00.0	+17.0	0.0	47 00.0	+17.0	0.0	48 00.0	+17.0	0.0	49 00.0	+17.0	0.0	50 00.0	+17.0	0.0	51 00.0	+16.9	0.0	52 00.0	+16.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 107°, 253°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	45° Hc / d / Z	46° Hc / d / Z	47° Hc / d / Z	48° Hc / d / Z	49° Hc / d / Z	50° Hc / d / Z	51° Hc / d / Z	52° Hc / d / Z	Dec.
0	11 14.4 +43.2 101.5	11 02.3 +44.0 101.7	10 50.1 +44.6 101.8	10 37.7 +45.3 102.0	10 25.1 +46.0 102.2	10 12.3 +46.7 102.4	9 59.4 +47.3 102.6	9 46.2 +48.0 102.7	0
1	11 57.6 +43.1 100.8	11 46.3 +43.8 101.0	11 34.7 +44.6 101.2	11 23.0 +45.3 101.4	11 11.1 +45.9 101.6	10 59.0 +46.6 101.7	10 46.7 +47.2 101.9	10 34.2 +47.8 102.1	1
2	12 40.7 +42.9 100.0	12 30.1 +43.7 100.3	12 19.3 +44.4 100.5	12 08.3 +45.1 100.7	11 57.0 +45.8 100.9	11 45.6 +46.5 101.1	11 33.9 +47.2 101.3	11 22.0 +47.8 101.5	2
3	13 23.6 +42.9 99.3	13 13.8 +43.6 99.6	13 03.7 +44.3 99.8	12 53.4 +45.0 100.0	12 42.8 +45.8 100.2	12 32.1 +46.4 100.5	12 21.1 +47.0 100.7	12 09.8 +47.7 100.9	3
4	14 06.5 +42.7 98.6	13 57.4 +43.5 98.9	13 48.0 +44.2 99.1	13 38.4 +44.9 99.3	13 28.6 +45.6 99.6	13 18.5 +46.3 99.8	13 08.1 +47.0 100.0	12 57.5 +47.7 100.3	4
5	14 49.2 +42.6 97.9	14 40.9 +43.3 98.1	14 32.2 +44.1 98.4	14 23.3 +44.8 98.7	14 14.2 +45.5 98.9	14 04.8 +46.2 99.2	13 55.1 +46.9 99.4	13 45.2 +47.5 99.6	5
6	15 31.8 +42.5 97.2	15 24.2 +43.2 97.4	15 16.3 +44.0 97.7	15 08.1 +44.7 98.0	14 59.7 +45.4 98.2	14 51.0 +46.0 98.5	14 42.0 +46.7 98.8	14 32.7 +47.4 99.0	6
7	16 14.3 +42.3 96.4	16 07.4 +43.1 96.7	16 00.3 +43.8 97.0	15 52.8 +44.6 97.3	15 45.1 +45.2 97.6	15 37.0 +46.0 97.8	15 28.7 +46.7 98.1	15 20.1 +47.3 98.4	7
8	16 56.6 +42.1 95.7	16 50.5 +42.9 96.0	16 44.1 +43.6 96.3	16 37.4 +44.4 96.6	16 30.3 +45.2 96.9	16 23.0 +45.8 97.2	16 15.4 +46.5 97.5	16 07.4 +47.2 97.7	8
9	17 38.7 +42.0 94.9	17 33.4 +42.7 95.2	17 27.7 +43.5 95.6	17 21.8 +44.2 95.9	17 15.5 +44.9 96.2	17 08.8 +45.7 96.5	17 01.9 +46.4 96.8	16 54.6 +47.1 97.1	9
10	18 20.7 +41.8 94.2	18 16.1 +42.6 94.5	18 11.2 +43.4 94.8	18 06.0 +44.1 95.2	18 00.4 +44.9 95.5	17 54.5 +45.6 95.8	17 48.3 +46.3 96.1	17 41.7 +47.0 96.4	10
11	19 02.5 +41.6 93.4	18 58.7 +42.4 93.8	18 54.6 +43.2 94.1	18 50.1 +43.9 94.4	18 45.3 +44.7 94.8	18 40.1 +45.4 95.1	18 34.6 +46.1 95.5	18 28.7 +46.8 95.8	11
12	19 44.1 +41.4 92.7	19 41.1 +42.2 93.0	19 37.8 +42.9 93.4	19 34.0 +43.8 93.7	19 30.0 +44.5 94.1	19 25.5 +45.3 94.4	19 20.7 +46.0 94.8	19 15.5 +46.7 95.1	12
13	20 25.5 +41.2 91.9	20 23.3 +42.0 92.3	20 20.7 +42.8 92.6	20 17.8 +43.6 93.0	20 14.5 +44.3 93.4	20 10.8 +45.0 93.7	20 06.7 +45.8 94.1	20 02.2 +46.5 94.5	13
14	21 06.7 +41.0 91.1	21 05.3 +41.8 91.5	21 03.5 +42.6 91.9	21 01.4 +43.4 92.3	20 58.8 +44.2 92.6	20 55.8 +44.9 93.0	20 52.5 +45.6 93.4	20 48.7 +46.4 93.8	14
15	21 47.7 +40.7 90.3	21 47.1 +41.6 90.7	21 46.1 +42.4 91.1	21 44.8 +43.1 91.5	21 43.0 +43.9 91.9	21 40.7 +44.8 92.3	21 38.1 +45.5 92.7	21 35.1 +46.1 93.1	15
16	22 28.4 +40.6 89.5	22 28.7 +41.4 89.9	22 28.5 +42.2 90.4	22 27.9 +43.0 90.8	22 26.9 +43.8 91.2	22 25.5 +44.5 91.6	22 23.6 +45.3 92.0	22 21.2 +46.1 92.4	16
17	23 09.0 +40.1 88.7	23 10.1 +41.1 89.2	23 10.7 +42.0 89.6	23 10.9 +42.8 90.0	23 10.7 +43.5 90.4	23 10.0 +44.3 90.9	23 08.9 +45.1 91.3	23 07.3 +45.8 91.7	17
18	23 49.2 +40.1 87.9	23 51.2 +40.9 88.4	23 52.7 +41.7 88.8	23 53.7 +42.5 89.3	23 54.2 +43.4 89.7	23 54.3 +44.1 90.1	23 53.9 +44.9 90.6	23 53.1 +45.6 91.0	18
19	24 29.3 +39.7 87.1	24 32.1 +40.6 87.6	24 34.4 +41.4 88.0	24 36.2 +42.3 88.5	24 37.6 +43.0 88.9	24 38.4 +43.9 89.4	24 38.8 +44.7 89.9	24 38.7 +45.5 90.3	19
20	25 09.0 +39.5 86.3	25 12.7 +40.3 86.8	25 15.8 +41.2 87.2	25 18.5 +42.0 87.7	25 20.6 +42.9 88.2	25 22.3 +43.7 88.6	25 23.5 +44.4 89.1	25 24.2 +45.2 89.6	20
21	25 48.5 +39.2 85.4	25 53.0 +40.1 85.9	25 57.0 +40.9 86.4	26 00.5 +41.8 86.9	26 03.5 +42.6 87.4	26 06.0 +43.4 87.9	26 07.9 +44.3 88.4	26 09.4 +45.0 88.9	21
22	26 27.7 +38.9 84.6	26 33.1 +39.8 85.1	26 37.9 +40.7 85.6	26 42.3 +41.5 86.1	26 46.1 +42.3 86.6	26 49.4 +43.2 87.1	26 52.2 +43.9 87.6	26 54.4 +44.8 88.1	22
23	27 06.6 +38.6 83.8	27 12.9 +39.4 84.3	27 18.6 +40.3 84.8	27 23.8 +41.2 85.3	27 28.4 +42.1 85.8	27 32.6 +42.9 86.3	27 36.1 +43.7 86.8	27 39.2 +44.5 87.4	23
24	27 45.2 +38.2 82.9	27 52.3 +39.2 83.4	27 58.9 +40.1 83.9	28 05.0 +40.9 84.5	28 10.5 +41.8 85.0	28 15.5 +42.6 85.5	28 19.8 +43.5 86.1	28 23.7 +44.2 86.6	24
25	28 23.4 +38.0 82.0	28 31.5 +38.8 82.6	28 39.0 +39.7 83.1	28 45.9 +40.6 83.6	28 52.3 +41.5 84.2	28 58.1 +42.3 84.7	29 03.3 +43.2 85.3	29 07.9 +44.0 85.8	25
26	29 01.4 +37.5 81.1	29 10.3 +38.5 81.7	29 18.7 +39.4 82.2	29 26.5 +40.3 82.8	29 33.8 +41.1 83.4	29 40.4 +42.0 83.9	29 46.5 +42.8 84.5	29 51.9 +43.7 85.1	26
27	29 38.9 +37.2 80.2	29 48.8 +38.1 80.8	29 58.1 +39.1 81.4	30 06.8 +40.0 81.9	30 14.9 +40.9 82.5	30 22.4 +41.8 83.1	30 29.3 +42.6 83.7	30 35.6 +43.5 84.3	27
28	30 16.1 +36.9 79.3	30 26.9 +37.8 79.9	30 37.2 +38.6 80.5	30 46.8 +39.6 81.1	30 55.8 +40.5 81.7	31 04.2 +41.3 82.3	31 11.9 +42.3 82.9	31 19.1 +43.1 83.5	28
29	30 53.0 +36.4 78.4	31 04.7 +37.4 79.0	31 15.8 +38.4 79.6	31 26.4 +39.2 80.2	31 36.3 +40.1 80.8	31 45.5 +41.1 81.4	31 54.2 +41.9 82.0	32 02.2 +42.8 82.6	29
30	31 29.4 +36.0 77.5	31 42.1 +37.0 78.1	31 54.2 +37.9 78.7	32 05.6 +38.9 79.3	32 16.4 +39.8 79.9	32 26.6 +40.7 80.6	32 36.1 +41.6 81.2	32 45.0 +42.4 81.8	30
31	32 05.4 +35.6 76.5	32 19.1 +36.5 77.2	32 32.1 +37.5 77.8	32 44.5 +38.4 78.4	32 56.2 +39.4 79.0	33 07.3 +40.3 79.7	33 17.7 +41.2 80.3	33 27.4 +42.2 81.0	31
32	32 41.0 +35.2 75.6	32 55.6 +36.2 76.2	33 09.6 +37.1 76.9	33 22.9 +38.1 77.5	33 35.6 +39.0 78.1	33 47.6 +39.9 78.8	33 58.9 +40.9 79.4	34 09.6 +41.7 80.1	32
33	33 16.2 +34.7 74.6	33 31.8 +35.7 75.3	33 46.7 +36.7 75.9	34 01.0 +37.6 76.6	34 14.6 +38.6 77.2	34 27.5 +39.5 77.9	34 39.8 +40.4 78.6	34 51.3 +41.4 79.2	33
34	33 50.9 +34.2 73.6	34 07.5 +35.2 74.3	34 23.4 +36.2 75.0	34 38.6 +37.2 75.6	34 53.2 +38.1 76.3	35 07.0 +39.1 77.0	35 20.2 +40.1 77.7	35 32.7 +41.0 78.4	34
35	34 25.1 +33.8 72.7	34 42.7 +34.7 73.3	34 59.6 +35.7 74.0	35 15.8 +36.7 74.7	35 31.3 +37.7 75.3	35 46.1 +38.7 76.0	36 00.3 +39.6 76.7	36 13.7 +40.5 77.5	35
36	34 58.9 +33.2 71.6	35 17.4 +34.3 72.3	35 35.3 +35.3 73.0	35 52.5 +36.3 73.7	36 09.0 +37.3 74.4	36 24.8 +38.2 75.1	36 39.9 +39.2 75.8	36 54.2 +40.1 76.5	36
37	35 32.1 +32.7 70.6	35 51.7 +33.7 71.3	36 10.6 +34.7 72.0	36 28.8 +35.7 72.7	36 46.3 +36.7 73.4	37 03.0 +37.8 74.1	37 19.1 +38.7 74.9	37 34.3 +39.7 75.6	37
38	36 04.8 +32.2 69.6	36 25.4 +33.2 70.3	36 45.3 +34.2 71.0	37 04.5 +35.2 71.7	37 23.0 +36.2 72.4	37 40.8 +37.2 73.2	37 57.8 +38.2 73.9	38 14.0 +39.2 74.7	38
39	36 37.0 +31.7 68.5	36 58.6 +32.7 69.2	37 19.5 +33.7 70.0	37 39.8 +34.7 70.7	37 59.2 +35.8 71.4	38 18.0 +36.7 72.2	38 36.0 +37.7 72.9	38 53.2 +38.8 73.7	39
40	37 08.7 +31.0 67.5	37 31.3 +32.1 68.2	37 53.2 +33.2 68.9	38 14.5 +34.1 69.6	38 35.0 +35.1 70.4	38 54.7 +36.2 71.1	39 13.7 +37.2 71.9	39 32.0 +38.2 72.7	40
41	37 39.7 +30.5 66.4	38 03.4 +31.5 67.1	38 26.4 +32.5 67.9	38 48.6 +33.6 68.6	39 10.1 +34.7 69.3	39 30.9 +35.7 70.1	39 50.9 +36.7 70.9	40 10.2 +37.7 71.7	41
42	38 10.2 +29.8 65.3	38 34.9 +30.9 66.0	38 58.9 +31.9 66.8	39 22.2 +33.0 67.5	39 44.8 +34.0 68.3	40 06.6 +35.0 69.1	40 27.6 +36.1 69.9	40 47.9 +37.1 70.7	42
43	38 40.0 +29.2 64.2	39 05.8 +30.2 64.9	39 30.8 +31.3 65.7	39 55.2 +32.3 66.4	40 18.8 +33.4 67.2	40 41.6 +34.5 68.0	41 03.7 +35.5 68.8	41 25.0 +36.6 69.6	43
44	39 09.2 +28.6 63.1	39 36.0 +29.6 63.8	40 02.1 +30.7 64.6	40 27.5 +31.8 65.3	40 52.2 +32.8 66.1	41 16.1 +33.9 66.9	41 39.2 +34.9 67.7	42 01.6 +35.9 68.6	44
45	39 37.8 +27.8 61.9	40 05.6 +29.0 62.7	40 32.8 +30.0 63.4	40 59.3 +31.0 64.2	41 25.0 +32.1 65.0	41 50.0 +33.2 65.8	42 14.1 +34.3 66.6	42 37.5 +35.4 67.5	45
46	40 05.6 +27.2 60.8	40 34.6 +28.2 61.5	41 02.8 +29.3 62.3	41 30.3 +30.4 63.1	41 57.1 +31.5 63.9	42 23.2 +32.5 64.7	42 48.4 +33.6 65.5	43 12.9 +34.7 66.4	46
47	40 32.8 +26.5 59.6	41 02.8 +27.5 60.4	41 32.1 +28.6 61.1	42 00.7 +29.7 61.9	42 28.6 +30.8 62.7	42 55.7 +31.8 63.6	43 22.5 +33.0 64.4	43 47.6 +34.0 65.3	47
48	40 59.3 +25.7 58.4	41 30.3 +26.8 59.2	42 00.7 +27.9 60.0	42 30.4 +29.0 60.8	42 59.4 +30.1 61.6	43 27.5 +31.2 62.4	43 55.0 +32.2 63.2	44 21.6 +33.3 64.1	48
49	41 25.0 +25.0 57.2	41 57.1 +26.1 58.0	42 28.6 +27.1 58.8	42 59.4 +28.1 59.6	43 29.4 +29.3 60.4	43 58.7 +30.3 61.2	44 27.2 +31.4 62.1	44 54.9 +32.6 62.9	49
50	41 50.0 +24.1 56.0	42 23.2 +25.2 56.8	42 55.7 +26.3 57.6	43 27.5 +27.5 58.3	43 58.7 +28.5 59.2	44 29.0 +29.6 60.0	44 58.6 +30.8 60.9	45 27.5 +31.8 61.7	50
51	42 14.1 +23.4 54.8	42 48.4 +24.5 55.5	43 22.0 +25.6 56.3	43 55.0 +26.6 57.1	44 27.2 +27.7 57.9	44 58.6 +28.9 58.8	45 29.4 +29.9 59.6	45 59.3 +31.0 60.5	51
52	42 37.5 +22.6 53.5	43 12.9 +23.6 54.3	43 47.6 +24.6 55.1	44 21.6 +25.7 55.9	44 54.9 +26.9 56.7	45 27.5 +27.9 57.5	45 59.3 +29.1 58.4	46 30.3 +30.2 59.3	52
53	43 00.1 +21.7 52.3	43 36.5 +22.8 53.0	44 12.2 +23.9 53.8	44 47.3 +25.0 54.6	45 21.8 +26.0 55.4	45 55.4 +27.2 56.3	46 28.4 +28.2 57.1	47 00.5 +29.4 58.0	53
54	43 21.8 +20.9 51.0	43 59.3 +21.9 51.7	44 36.1 +23.0 52.5	45 12.3 +24.0 53.3	45 47.8 +25.1 54.1	46 22.6 +26.2 55.0	46 56.6 +27.4 55.9	47 29.9 +28.5 56.8	54
55	43 42.7 +19.9 49.7	44 21.2 +21.0 50.5	44 59.1 +22.0 51.2	45 36.3 +23.2 52.0	46 12.9 +24.2 52.8	46 48.8 +25.4 53.7	47 24.0 +26.5 54.5	47 58.4 +27.6 55.4	55
56	44 02.6 +19.1 48.4	44 42.2 +20.1 49.1	45 21.1 +21.2 49.9	45 59.5 +22.2 50.7	46 37.1 +23.3 51.5	47 14.2 +24.4 52.3	47 50.5 +25.5 53.2	48 26.0 +26.7 54.1	56
57	44 21.7 +18.1 47.1	45 02.3 +19.1 47.8	45 42.3 +20.2 48.6	46 21.7 +21.2 49.3	47 00.4 +22.4 50.2	47 38.6 +23.4 51.0	48 16.0 +24.5 51.9	48 52.7 +25.6 52.8	57
58	44 39.8 +17.2 45.7	45 21.4 +18.2 46.5	46 02.5 +19.2 47.2	46 42.9 +20.3 48.0	47 22.8 +21.3 48.8	48 02.0 +22.4 49.6	48 40.5 +23.6 50.5	49 18.3 +24.7 51.4	58
59	44 57.0 +16.2 44.4	45 39.6 +17.3 45.1	46 21.7 +18.3 45.8	47 03.2 +19.3 46.6	47 44.1 +20.4 47.4	48 24.4 +21.4 48.2	49 04.1 +22.5 49.1	49 43.0 +23.7 50.0	59
60	45 13.2 +15.3 43.0	45 56.9 +16.2 43.7	46 39.9 +17.3 44.5	47 22.5 +18.2 45.2	48 04.5 +19.3 46.0	48 45.8 +20.4 46.8	49 26.6 +21.4 47.7	50 06.7 +22.5 48.5	60
61	45 28.5 +14.2 41.7	46 13.1 +15.2 42.3	46 57.2 +16.2 43.1	47 40.7 +17.3 43.8	48 23.8 +18.2 44.6	49 06.2 +19.3 45.4	49 48.0 +20.4 46.2	50 29.2 +21.5 47.1	61
62	45 42.7 +13.3 40.3	46 28.3 +14.2 40.9	47 13.4 +15.2 41.6	48 02.4 +16.2 42.4	48 42.0 +17.2 43.1	49 25.5 +18.2 43.9	50 08.4 +19.3 44.8	50 50.7 +20.3 45.6	62
63	45 56.0 +12.1 38.9	46 42.5 +13.1 39.5	47 28.5 +14.1 40.2	48 14.1 +15.0 40.9	48 59.2 +16.0 41.7	49 43.7 +17.1 42.5	50 27.7 +18.1 43.3	51 11.0 +19.2 44.1	63
64	46 08.1 +11.2 37.5	46 55.6 +12.0 38.1	47 42.6 +12.9 38.8	48 29.1 +13.9 39.5	49 15.2 +14.9 40.2	50 00.8 +15.9 41.0	50 45.8 +16.9 41.8	51 30.2 +18.0 42.6	64
65	46 19.3 +10.1 36.0	47 07.6 +11.0 36.7	47 55.5 +11.9 37.3	48 43.0 +12.8 38.0	49 30.1 +13.7 38.7	50 16.7 +14.7 39.5	51 02.7 +15.8 40.3	51 48.2 +16.8 41.1	65
66	46 29.4 +9.0 34.6	47 18.6 +9.8 35.2	48 07.4 +10.7 35.9	48 55.8 +11.7 36.5	49 43.8 +12.6 37.2	50 31.4 +13.5 38.0	51 18.5 +14.5 38.7	52 05.0 +15.5 39.5	66
67	46 38.4 +7.9 33.2	47 28.4 +8.8 33.8	48 18.1 +9.6 34.4	49 07.5 +10.4 35.0	49 56.4 +11.4 35.7	50 44.9 +12.3 36.4	51 33.0 +13.2 37.2	52 20.5 +14.3 37.9	67
68	46 46.3 +6.8 31.7	47 37.2 +7.6 32.3	48 27.7 +8.5 32.9	49 17.9 +9.3 33.5	50 07.8 +10.1 34.2	50 57.2 +11.1 34.8	51 46.2 +12.0 35.6	52 34.8 +13.0 36.3	68
69	46 53.1 +5.7 30.3	47 44.8 +6.5 30.8	48 36.2 +7.2 31.4	49 27.2 +8.1 32.0	50 17.9 +9.0 32.6	51 08.3 +9.8 33.3	51 58.2 +10.7 34.0	52 47.8 +11.6 34.7	69
70	46 58.8 +4.6 28.8	47 51.3 +5.3 29.3	48 43.4 +6.1 29.9	49 35.3 +6.9 30.5	50 26.9 +7.7 31.1	51 18.1 +8.5 31.7	52 08.9 +9.4 32.4	52 59.4 +10.3 33.1	70
71	47 03.4 +3.5 27.3	47 56.6 +4.2 27.9	48 49.5 +4.9 28.4	49 42.2 +5.6 28.9	50 34.6 +6.4 29.5	51 26.6 +7.2 30.1	52 18.3 +8.1 30.8	53 09.7 +8.9 31.5	71
72	47 06.9 +2.4 25.9	48 00.8 +3.0 26.4	48 54.4 +3.8 26.9	49 47.8 +4.5 27.4	50 41.0 +5.1 28.0	51 33.8 +6.0 28.5	52 26.4 +6.7 29.2	53 18.6 +7.6 29.8	72
73	47 09.3 +1.2 24.4	48 03.8 +1.9 24.9	48 58.2 +2.5 25.3	49 52.3 +3.2 25.9	50 46.1 +3.9 26.4	51 39.8 +4.6 26.9	52 33.1 +5.4 27.5	53 26.2 +6.1 28.1	73
74	47 10.5 +0.1 22.9	48 05.7 +0.7 23.4	49 00.7 +1.3 23.8	49 55.5 +1.9 24.3	50 50.0 +2.6 24.8	51 44.4 +3.3 25.3	52 38.5 +4.0 25.9	53 32.3 +4.8 26.5	74
75	47 10.6 -1.0 21.5	48 06.4 -0.5 21.9	49 02.0 +0.1 22.3	49 57.4 +0.7 22.7	50 52.6 +1.4 23.2	51 47.7 +1.9 23.7	52 42.5 +2.6 24.2	53 37.1 +3.3 24.8	75
76	47 09.6 -2.2 20.0	48 05.9 -1.6 20.4	49 02.1 -1.1 20.8	49 58.1 -0.5 21.2	50 54.0 0.0 21.6	51 49.6 +0.7 22.1	52 45.1 +1.3 22.6	53 40.4 +1.9 23.1	76
77	47 07.4 -3.2 18.5	48 04.3 -2.8 18.9	49 01.0 -2.3 19.3	49 57.6 -1.8 19.6	50 54.0 -1.3 20.1	51 50.3 -0.7 20.5	52 46.4 -0.1 20.9	53 42.3 +0.5 21.4	77
78	47 04.2 -4.4 17.1	48 01.5 -4.0 17.4	48 58.7 -3.5 17.7	49 55.8 -3.1 18.1	50 52.7 -2.5 18.5	51 49.6 -2.0 18.9	52 46.3 -1.5 19.3	53 42.8 -0.9 19.7	78
79	46 59.8 -5.6 15.6	47 57.5 -5.1 15.9	48 55.2 -4.7 16.2	49 52.7 -4.2 16.5	50 50.2 -3.8 16.9	51 47.6 -3.4 17.3	52 44.8 -2.9 17.6	53 41.9 -2.3 18.0	79
80	46 54.2 -6.6 14.1	47 52.4 -6.3 14.4	48 50.5 -5.9 14.7	49 48.5 -5.5 15.0	50 46.4 -5.1 15.3	51 44.2 -4.7 15.6	52 41.9 -4.2 16.0	53 39.6 -3.8 16.4	80
81	46 47.6 -7.7 12.7	47 46.1 -7.4 12.9	48 44.6 -7.1 13.2	49 43.0 -6.6 13.4	50 41.3 -6.4 13.7	51 39.5 -6.0 14.0	52 37.7 -5.6 14.3	53 35.8 -5.2 14.7	81
82	46 39.9 -8.8 11.2	47 38.7 -8.5 11.5	48 37.5 -8.2 11.7	49 36.2 -7.9 11.9	50 34.9 -7.6 12.2	51 33.5 -7.3 12.4	52 32.1 -7.0 12.7	53 30.6 -6.6 13.0	82
83	46 31.1 -9.9 9.8	47 30.2 -9.7 10.0	48 29.3 -9.4 10.2	49 28.3 -9.1 10.4	50 27.3 -8.9 10.6	51 26.2 -8.5 10.8	52 25.1 -8.2 11.1	53 24.0 -8.0 11.3	83
84	46 21.2 -11.0 8.4	47 20.5 -10.7 8.5	48 19.9 -10.6 8.7	49 19.2 -10.4 8.9	50 18.4 -10.1 9.1	51 17.7 -9.9 9.2	52 16.9 -9.7 9.5	53 16.0 -9.3 9.7	84
85	46 10.2 -12.0 6.9	47 09.8 -11.9 7.1	48 09.3 -11.7 7.2	49 08.8 -11.5 7.4	50 08.3 -11.3 7.5	51 07.8 -11.1 7.7	52 07.2 -10.9 7.8	53 06.7 -10.7 8.0	85
86	45 58.2 -13.0 5.5	46 57.9 -12.9 5.6	47 57.6 -12.7 5.7	48 57.3 -12.6 5.9	49 57.0 -12.5 6.0	50 56.7 -12.4 6.1	51 56.3 -12.2 6.2	52 56.0 -12.1 6.4	86
87	45 45.2 -14.1 4.1	46 45.0 -14.0 4.2	47 44.9 -13.9 4.3	48 44.7 -13.8 4.4	49 44.5 -13.7 4.5	50 44.3 -13.6 4.6	51 44.1 -13.4 4.7	52 43.9 -13.3 4.8	87
88	45 31.1 -15.0 2.7	46 31.0 -15.0 2.8	47 31.0 -15.0 2.8	48 30.9 -14.9 2.9	49 30.8 -14.8 3.0	50 30.7 -14.7 3.0	51 30.7 -14.8 3.1	52 30.6 -14.7 3.2	88
89	45 16.1 -16.1 1.4	46 16.0 -16.0 1.4	47 16.0 -16.0 1.4	48 16.0 -16.0 1.4	49 16.0 -16.0 1.5	50 16.0 -16.0 1.5	51 15.9 -15.9 1.5	52 15.9 -15.9 1.6	89
90	45 00.0 -17.0 0.0	46 00.0 -17.0 0.0	47 00.0 -17.1 0.0	48 00.0 -17.1 0.0	49 00.0 -17.1 0.0	50 00.0 -17.1 0.0	51 00.0 -17.1 0.0	52 00.0 -17.2 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	11 14.4	−43.4	101.5	11 02.3	−44.0	101.7	10 50.1	−44.7	101.8	10 37.7	−45.4	102.0	10 25.1	−46.1	102.2	10 12.3	−46.7	102.4	9 59.4	−47.4	102.6	9 46.2	−48.0	102.7	0
1	10 31.0	−43.4	102.2	10 18.3	−44.1	102.3	10 05.4	−44.8	102.5	9 52.3	−45.5	102.7	9 39.0	−46.1	102.9	9 25.6	−46.8	103.0	9 12.0	−47.5	103.2	8 58.2	−48.1	103.3	1
2	9 47.6	−43.4	102.9	9 34.2	−44.2	103.0	9 20.6	−44.9	103.2	9 06.8	−45.6	103.4	8 52.9	−46.3	103.5	8 38.8	−46.9	103.7	8 24.5	−47.5	103.8	8 10.1	−48.1	103.9	2
3	9 04.2	−43.6	103.6	8 50.0	−44.3	103.7	8 35.7	−44.9	103.9	8 21.2	−45.6	104.0	8 06.6	−46.2	104.2	7 51.9	−46.9	104.3	7 37.0	−47.5	104.4	7 22.0	−48.1	104.5	3
4	8 20.6	−43.6	104.3	8 05.7	−44.3	104.4	7 50.8	−45.1	104.5	7 35.6	−45.7	104.7	7 20.4	−46.4	104.8	7 05.0	−47.0	104.9	6 49.5	−47.6	105.0	6 33.9	−48.3	105.1	4
5	7 37.0	−43.7	105.0	7 21.4	−44.4	105.1	7 05.7	−45.0	105.2	6 49.9	−45.7	105.3	6 34.0	−46.3	105.4	6 18.0	−47.0	105.5	6 01.9	−47.7	105.6	5 45.6	−48.2	105.7	5
6	6 53.3	−43.8	105.6	6 37.0	−44.4	105.8	6 20.7	−45.1	105.9	6 04.2	−45.8	106.0	5 47.7	−46.5	106.1	5 31.0	−47.1	106.2	5 14.2	−47.6	106.3	4 57.4	−48.3	106.3	6
7	6 09.5	−43.8	106.3	5 52.6	−44.5	106.4	5 35.6	−45.2	106.5	5 18.4	−45.8	106.6	5 01.2	−46.4	106.7	4 43.9	−47.1	106.8	4 26.6	−47.7	106.9	4 09.1	−48.3	106.9	7
8	5 25.7	−43.9	107.0	5 08.1	−44.6	107.1	4 50.4	−45.2	107.2	4 32.6	−45.8	107.3	4 14.8	−46.5	107.3	3 56.8	−47.1	107.4	3 38.9	−47.8	107.5	3 20.8	−48.3	107.5	8
9	4 41.8	−43.9	107.7	4 23.5	−44.5	107.8	4 05.2	−45.3	107.9	3 46.8	−45.9	107.9	3 28.3	−46.6	108.0	3 09.7	−47.1	108.0	2 51.1	−47.7	108.1	2 32.5	−48.4	108.1	9
10	3 57.9	−43.9	108.4	3 39.0	−44.6	108.5	3 19.9	−45.2	108.6	3 00.9	−45.9	108.6	2 41.7	−46.5	108.7	2 22.6	−47.2	108.7	2 03.4	−47.8	108.7	1 44.1	−48.3	108.7	10
11	3 14.0	−44.0	109.1	2 54.4	−44.7	109.1	2 34.7	−45.3	109.2	2 15.0	−46.0	109.2	1 55.2	−46.5	109.2	1 35.4	−47.2	109.3	1 15.6	−47.8	109.3	0 55.8	−48.4	109.3	11
12	2 30.0	−43.9	109.8	2 09.7	−44.6	109.8	1 49.4	−45.3	109.8	1 29.0	−45.9	109.9	1 08.7	−46.6	109.9	0 48.3	−47.2	109.9	0 27.8	−47.7	109.9	0 07.4	−48.4	109.9	12
13	1 46.1	−44.0	110.4	1 25.1	−44.7	110.5	1 04.1	−45.3	110.5	0 43.1	−45.9	110.5	0 22.1	−46.6	110.5	0 01.1	−47.2	110.5	0 19.9	+47.8	69.5	0 41.0	+48.3	69.5	13
14	1 02.1	−44.0	111.1	0 40.4	−44.6	111.1	0 18.8	−45.3	111.1	0 02.8	+46.0	68.9	0 24.5	+46.5	68.9	0 46.1	+47.2	68.9	1 07.7	+47.8	68.9	1 29.3	+48.4	68.9	14
15	0 18.1	−44.1	111.8	0 04.2	+44.7	68.2	0 26.5	+45.3	68.2	0 48.8	+45.9	68.2	1 11.0	+46.6	68.2	1 33.3	+47.1	68.3	1 55.5	+47.7	68.3	2 17.7	+48.3	68.3	15
16	0 26.0	+44.0	67.5	0 48.9	+44.6	67.5	1 11.8	+45.3	67.6	1 34.7	+45.9	67.6	1 57.6	+46.5	67.6	2 20.4	+47.2	67.6	2 43.2	+47.8	67.7	3 06.0	+48.3	67.7	16
17	1 10.0	+44.0	66.8	1 33.5	+44.7	66.9	1 57.1	+45.3	66.9	2 20.6	+45.9	66.9	2 44.1	+46.5	67.0	3 07.6	+47.1	67.0	3 31.0	+47.7	67.1	3 54.3	+48.3	67.1	17
18	1 54.0	+43.9	66.2	2 18.2	+44.6	66.2	2 42.4	+45.2	66.2	3 06.5	+45.9	66.3	3 30.6	+46.5	66.3	3 54.7	+47.1	66.4	4 18.7	+47.7	66.5	4 42.6	+48.3	66.5	18
19	2 37.9	+44.0	65.5	3 02.8	+44.6	65.5	3 27.6	+45.3	65.6	3 52.4	+45.9	65.6	4 17.1	+46.5	65.7	4 41.8	+47.0	65.8	5 06.4	+47.6	65.8	5 30.9	+48.2	65.9	19
20	3 21.9	+43.9	64.8	3 47.4	+44.6	64.9	4 12.9	+45.2	64.9	4 38.3	+45.8	65.0	5 03.6	+46.4	65.1	5 28.8	+47.1	65.2	5 54.0	+47.6	65.2	6 19.1	+48.2	65.3	20
21	4 05.8	+43.9	64.1	4 32.0	+44.5	64.2	4 58.1	+45.1	64.3	5 24.1	+45.8	64.3	5 50.0	+46.4	64.4	6 15.9	+46.9	64.5	6 41.6	+47.6	64.6	7 07.3	+48.1	64.7	21
22	4 49.7	+43.9	63.4	5 16.5	+44.5	63.5	5 43.2	+45.1	63.6	6 09.9	+45.7	63.7	6 36.4	+46.3	63.8	7 02.8	+47.0	63.9	7 29.2	+47.6	64.0	7 55.4	+48.1	64.1	22
23	5 33.6	+43.8	62.8	6 01.0	+44.4	62.8	6 28.3	+45.1	62.9	6 55.6	+45.7	63.0	7 22.7	+46.3	63.2	7 49.8	+46.8	63.3	8 16.7	+47.4	63.4	8 43.5	+48.0	63.5	23
24	6 17.4	+43.7	62.1	6 45.4	+44.4	62.2	7 13.4	+45.0	62.3	7 41.3	+45.6	62.4	8 09.0	+46.2	62.5	8 36.6	+46.9	62.6	9 04.1	+47.4	62.8	9 31.5	+48.0	62.9	24
25	7 01.1	+43.7	61.4	7 29.8	+44.3	61.6	7 58.4	+44.9	61.6	8 26.9	+45.5	61.7	8 55.2	+46.2	61.9	9 23.5	+46.7	62.0	9 51.5	+47.4	62.2	10 19.5	+47.9	62.3	25
26	7 44.8	+43.6	60.7	8 14.1	+44.3	60.8	8 43.3	+44.9	60.9	9 12.4	+45.5	61.1	9 41.4	+46.1	61.2	10 10.2	+46.7	61.4	10 38.9	+47.2	61.5	11 07.4	+47.8	61.7	26
27	8 28.4	+43.6	60.0	8 58.4	+44.2	60.1	9 28.2	+44.8	60.3	9 57.9	+45.4	60.4	10 27.5	+45.9	60.6	10 56.9	+46.5	60.7	11 26.1	+47.2	60.9	11 55.2	+47.7	61.1	27
28	9 12.0	+43.4	59.3	9 42.6	+44.0	59.4	10 13.0	+44.7	59.6	10 43.3	+45.3	59.7	11 13.4	+46.0	59.9	11 43.4	+46.5	60.1	12 13.3	+47.1	60.3	12 42.9	+47.7	60.5	28
29	9 55.4	+43.4	58.6	10 26.6	+44.0	58.7	10 57.7	+44.6	58.9	11 28.6	+45.2	59.1	11 59.4	+45.8	59.3	12 29.9	+46.5	59.4	13 00.4	+46.9	59.6	13 30.6	+47.6	59.8	29
30	10 38.8	+43.3	57.9	11 10.6	+44.0	58.1	11 42.3	+44.5	58.2	12 13.8	+45.2	58.4	12 45.2	+45.7	58.6	13 16.4	+46.3	58.8	13 47.3	+46.9	59.0	14 18.2	+47.4	59.2	30
31	11 22.1	+43.2	57.2	11 54.6	+43.8	57.4	12 26.8	+44.5	57.5	12 59.0	+45.0	57.7	13 30.9	+45.6	57.9	14 02.7	+46.2	58.1	14 34.2	+46.8	58.4	15 05.6	+47.4	58.6	31
32	12 05.3	+43.1	56.5	12 38.4	+43.7	56.7	13 11.3	+44.3	56.9	13 44.0	+44.9	57.1	14 16.5	+45.4	57.3	14 48.9	+46.0	57.5	15 21.0	+46.7	57.7	15 53.0	+47.2	57.9	32
33	12 48.4	+42.9	55.8	13 22.1	+43.5	56.0	13 55.6	+44.1	56.2	14 28.9	+44.8	56.4	15 02.0	+45.4	56.6	15 34.9	+46.0	56.8	16 07.7	+46.5	57.1	16 40.2	+47.1	57.3	33
34	13 31.3	+42.9	55.0	14 05.6	+43.5	55.3	14 39.7	+44.1	55.5	15 13.7	+44.6	55.7	15 47.4	+45.2	55.9	16 20.9	+45.9	56.2	16 54.2	+46.5	56.4	17 27.3	+47.0	56.7	34
35	14 14.2	+42.7	54.3	14 49.1	+43.3	54.5	15 23.8	+43.9	54.8	15 58.3	+44.5	55.0	16 32.6	+45.2	55.2	17 06.8	+45.7	55.5	17 40.7	+46.2	55.7	18 14.3	+46.9	56.0	35
36	14 56.9	+42.6	53.6	15 32.4	+43.2	53.8	16 07.7	+43.8	54.1	16 42.8	+44.4	54.3	17 17.8	+44.9	54.5	17 52.5	+45.5	54.8	18 26.9	+46.2	55.1	19 01.2	+46.7	55.3	36
37	15 39.5	+42.4	52.9	16 15.6	+43.0	53.1	16 51.5	+43.5	53.3	17 27.2	+44.3	53.6	18 02.7	+44.9	53.8	18 38.0	+45.4	54.1	19 13.1	+46.0	54.4	19 47.9	+46.6	54.7	37
38	16 21.9	+42.3	52.1	16 58.6	+42.9	52.4	17 35.1	+43.5	52.6	18 11.5	+44.0	52.9	18 47.6	+44.6	53.1	19 23.4	+45.3	53.4	19 59.1	+45.8	53.7	20 34.5	+46.4	54.0	38
39	17 04.2	+42.1	51.4	17 41.5	+42.7	51.6	18 18.6	+43.3	51.9	18 55.5	+44.0	52.2	19 32.2	+44.5	52.4	20 08.7	+45.1	52.7	20 44.9	+45.7	53.0	21 20.9	+46.2	53.3	39
40	17 46.3	+41.9	50.6	18 24.2	+42.5	50.9	19 01.9	+43.2	51.2	19 39.5	+43.7	51.4	20 16.7	+44.4	51.7	20 53.8	+44.9	52.0	21 30.6	+45.5	52.3	22 07.1	+46.1	52.6	40
41	18 28.2	+41.8	49.9	19 06.7	+42.4	50.2	19 45.1	+42.9	50.4	20 23.2	+43.5	50.7	21 01.1	+44.1	51.0	21 38.7	+44.7	51.3	22 16.1	+45.3	51.6	22 53.2	+45.9	51.9	41
42	19 10.0	+41.5	49.1	19 49.1	+42.2	49.4	20 28.0	+42.8	49.7	21 06.7	+43.4	50.0	21 45.2	+44.0	50.3	22 23.4	+44.6	50.6	23 01.4	+45.1	50.9	23 39.1	+45.7	51.2	42
43	19 51.5	+41.4	48.4	20 31.3	+41.9	48.6	21 10.8	+42.6	48.9	21 50.1	+43.2	49.2	22 29.2	+43.7	49.5	23 08.0	+44.3	49.9	23 46.5	+44.9	50.2	24 24.8	+45.5	50.5	43
44	20 32.9	+41.2	47.6	21 13.2	+41.8	47.9	21 53.4	+42.3	48.2	22 33.3	+42.9	48.5	23 12.9	+43.5	48.8	23 52.3	+44.1	49.1	24 31.4	+44.7	49.5	25 10.3	+45.3	49.8	44
45	21 14.1	+40.9	46.8	21 55.0	+41.5	47.1	22 35.7	+42.2	47.4	23 16.2	+42.7	47.7	23 56.4	+43.4	48.0	24 36.4	+43.9	48.4	25 16.1	+44.6	48.7	25 55.6	+45.0	49.1	45
46	21 55.0	+40.7	46.0	22 36.5	+41.4	46.3	23 17.9	+41.9	46.6	23 58.9	+42.5	47.0	24 39.8	+43.0	47.3	25 20.3	+43.7	47.6	26 00.6	+44.3	48.0	26 40.6	+44.9	48.4	46
47	22 35.7	+40.5	45.2	23 17.9	+41.0	45.5	23 59.8	+41.6	45.9	24 41.4	+42.3	46.2	25 22.8	+42.9	46.5	26 04.0	+43.4	46.9	26 44.9	+44.0	47.2	27 25.5	+44.6	47.6	47
48	23 16.2	+40.2	44.4	23 58.9	+40.9	44.7	24 41.4	+41.4	45.1	25 23.7	+42.0	45.4	26 05.7	+42.6	45.7	26 47.4	+43.2	46.1	27 28.9	+43.7	46.5	28 10.1	+44.3	46.9	48
49	23 56.4	+40.0	43.6	24 39.8	+40.5	43.9	25 22.8	+41.2	44.3	26 05.7	+41.7	44.6	26 48.3	+42.3	45.0	27 30.6	+42.9	45.3	28 12.6	+43.5	45.7	28 54.4	+44.1	46.1	49
50	24 36.4	+39.7	42.8	25 20.3	+40.3	43.1	26 04.0	+40.9	43.5	26 47.4	+41.5	43.8	27 30.6	+42.0	44.2	28 13.5	+42.6	44.5	28 56.1	+43.3	44.9	29 38.5	+43.8	45.3	50
51	25 16.1	+39.5	42.0	26 00.6	+40.0	42.3	26 44.9	+40.6	42.6	27 28.9	+41.2	43.0	28 12.6	+41.8	43.4	28 56.1	+42.4	43.7	29 39.4	+42.9	44.1	30 22.3	+43.5	44.5	51
52	25 55.6	+39.1	41.2	26 40.6	+39.8	41.5	27 25.5	+40.3	41.8	28 10.1	+40.8	42.2	28 54.4	+41.5	42.5	29 38.5	+42.0	42.9	30 22.3	+42.6	43.3	31 05.8	+43.2	43.7	52
53	26 34.7	+38.9	40.3	27 20.4	+39.4	40.6	28 05.8	+40.0	41.0	28 50.9	+40.6	41.3	29 35.9	+41.1	41.7	30 20.5	+41.8	42.1	31 04.9	+42.3	42.5	31 49.0	+42.9	42.9	53
54	27 13.6	+38.5	39.5	27 59.8	+39.1	39.8	28 45.8	+39.6	40.1	29 31.5	+40.3	40.5	30 17.0	+40.8	40.9	31 02.3	+41.4	41.3	31 47.2	+42.0	41.7	32 31.9	+42.6	42.1	54
55	27 52.1	+38.2	38.6	28 38.9	+38.7	38.9	29 25.4	+39.4	39.3	30 11.8	+39.9	39.6	30 57.8	+40.5	40.0	31 43.7	+41.0	40.4	32 29.2	+41.6	40.8	33 14.5	+42.2	41.2	55
56	28 30.3	+37.8	37.7	29 17.6	+38.5	38.0	30 04.8	+39.0	38.4	30 51.7	+39.5	38.8	31 38.3	+40.2	39.2	32 24.7	+40.7	39.5	33 10.8	+41.3	40.0	33 56.7	+41.9	40.4	56
57	29 08.1	+37.5	36.8	29 56.1	+38.0	37.2	30 43.8	+38.6	37.5	31 31.2	+39.2	37.9	32 18.5	+39.7	38.3	33 05.4	+40.4	38.7	33 52.1	+40.9	39.1	34 38.6	+41.4	39.5	57
58	29 45.6	+37.2	35.9	30 34.1	+37.7	36.3	31 22.4	+38.2	36.6	32 10.4	+38.8	37.0	32 58.2	+39.4	37.4	33 45.8	+39.9	37.8	34 33.0	+40.6	38.2	35 20.0	+41.1	38.6	58
59	30 22.8	+36.7	35.0	31 11.8	+37.3	35.4	32 00.6	+37.9	35.7	32 49.2	+38.4	36.1	33 37.6	+39.0	36.5	34 25.7	+39.5	36.9	35 13.6	+40.1	37.3	36 01.1	+40.7	37.7	59
60	30 59.5	+36.4	34.1	31 49.1	+36.9	34.4	32 38.5	+37.4	34.8	33 27.6	+38.0	35.2	34 16.6	+38.5	35.6	35 05.2	+39.2	36.0	35 53.7	+39.7	36.4	36 41.8	+40.3	36.8	60
61	31 35.9	+35.9	33.2	32 26.0	+36.5	33.5	33 15.9	+37.1	33.9	34 05.6	+37.6	34.2	34 55.1	+38.2	34.6	35 44.4	+38.7	35.0	36 33.4	+39.2	35.5	37 22.1	+39.8	35.9	61
62	32 11.8	+35.6	32.2	33 02.5	+36.0	32.6	33 53.0	+36.5	32.9	34 43.2	+37.1	33.3	35 33.3	+37.6	33.7	36 23.1	+38.2	34.1	37 12.6	+38.8	34.5	38 01.9	+39.4	35.0	62
63	32 47.4	+35.0	31.3	33 38.5	+35.7	31.6	34 29.5	+36.2	32.0	35 20.3	+36.7	32.3	36 10.9	+37.2	32.7	37 01.3	+37.7	33.1	37 51.4	+38.3	33.6	38 41.3	+38.9	34.0	63
64	33 22.4	+34.7	30.3	34 14.2	+35.1	30.6	35 05.7	+35.6	31.0	35 57.0	+36.2	31.4	36 48.1	+36.8	31.8	37 39.0	+37.3	32.2	38 29.7	+37.8	32.6	39 20.2	+38.3	33.0	64
65	33 57.1	+34.1	29.3	34 49.3	+34.7	29.7	35 41.3	+35.2	30.0	36 33.2	+35.7	30.4	37 24.9	+36.2	30.8	38 16.3	+36.8	31.2	39 07.5	+37.3	31.6	39 58.5	+37.9	32.0	65
66	34 31.2	+33.7	28.3	35 24.0	+34.1	28.7	36 16.5	+34.7	29.0	37 08.9	+35.2	29.4	38 01.1	+35.7	29.8	38 53.1	+36.2	30.2	39 44.8	+36.8	30.6	40 36.4	+37.3	31.0	66
67	35 04.9	+33.1	27.3	35 58.1	+33.7	27.7	36 51.2	+34.1	28.0	37 44.1	+34.6	28.4	38 36.8	+35.1	28.7	39 29.3	+35.7	29.1	40 21.6	+36.2	29.5	41 13.7	+36.7	30.0	67
68	35 38.0	+32.7	26.3	36 31.8	+33.1	26.6	37 25.3	+33.6	27.0	38 18.7	+34.1	27.3	39 11.9	+34.6	27.7	40 05.0	+35.1	28.1	40 57.8	+35.6	28.5	41 50.4	+36.2	28.9	68
69	36 10.7	+32.1	25.3	37 04.9	+32.5	25.6	37 58.9	+33.0	25.9	38 52.8	+33.5	26.3	39 46.5	+34.0	26.6	40 40.1	+34.5	27.0	41 33.4	+35.0	27.4	42 26.6	+35.5	27.8	69
70	36 42.8	+31.5	24.2	37 37.4	+32.0	24.5	38 31.9	+32.5	24.9	39 26.3	+32.9	25.2	40 20.5	+33.4	25.6	41 14.6	+33.8	25.9	42 08.4	+34.4	26.3	43 02.1	+34.9	26.7	70
71	37 14.3	+30.9	23.1	38 09.4	+31.4	23.8	39 04.4	+31.8	23.8	39 59.2	+32.3	24.1	40 53.9	+32.8	24.5	41 48.4	+33.3	24.8	42 42.8	+33.7	25.2	43 37.0	+34.2	25.6	71
72	37 45.2	+30.4	22.1	38 40.8	+30.7	22.4	39 36.2	+31.2	22.7	40 31.5	+31.6	23.0	41 26.7	+32.1	23.3	42 21.7	+32.5	23.7	43 16.5	+33.1	24.1	44 11.2	+33.6	24.5	72
73	38 15.6	+29.7	21.0	39 11.5	+30.2	21.3	40 07.4	+30.6	21.6	41 03.1	+31.0	21.9	41 58.8	+31.4	22.2	42 54.2	+31.9	22.6	43 49.6	+32.3	22.9	44 44.8	+32.8	23.3	73
74	38 45.3	+29.1	19.9	39 41.7	+29.5	20.1	40 38.0	+29.8	20.4	41 34.1	+30.3	20.7	42 30.2	+30.7	21.1	43 26.1	+31.2	21.4	44 21.9	+31.6	21.8	45 17.6	+32.0	22.1	74
75	39 14.4	+28.4	18.7	40 11.2	+28.8	19.0	41 07.8	+29.2	19.3	42 04.4	+29.6	19.6	43 00.9	+30.0	19.9	43 57.3	+30.4	20.2	44 53.5	+30.8	20.5	45 49.6	+31.3	20.9	75
76	39 42.8	+27.8	17.6	40 40.0	+28.1	17.9	41 37.0	+28.5	18.1	42 34.0	+28.9	18.4	43 30.9	+29.2	18.7	44 27.7	+29.6	19.0	45 24.3	+30.1	19.3	46 20.9	+30.5	19.7	76
77	40 10.6	+27.0	16.4	41 08.1	+27.4	16.7	42 05.5	+27.8	16.9	43 02.9	+28.1	17.2	44 00.1	+28.5	17.5	44 57.3	+28.9	17.8	45 54.4	+29.2	18.1	46 51.4	+29.6	18.4	77
78	40 37.6	+26.3	15.3	41 35.5	+26.6	15.5	42 33.3	+26.9	15.7	43 31.0	+27.3	16.0	44 28.6	+27.7	16.3	45 26.2	+28.0	16.5	46 23.6	+28.4	16.8	47 21.0	+28.8	17.2	78
79	41 03.9	+25.6	14.1	42 02.1	+25.9	14.3	43 00.2	+26.2	14.5	43 58.3	+26.5	14.8	44 56.3	+26.8	15.0	45 54.2	+27.2	15.3	46 52.0	+27.5	15.6	47 49.8	+27.9	15.9	79
80	41 29.5	+24.9	12.9	42 28.0	+25.1	13.1	43 26.4	+25.4	13.3	44 24.8	+25.7	13.5	45 23.1	+26.0	13.7	46 21.4	+26.2	14.0	47 19.5	+26.6	14.3	48 17.7	+26.9	14.5	80
81	41 54.4	+24.0	11.7	42 53.1	+24.3	11.8	43 51.8	+24.6	12.0	44 50.5	+24.8	12.2	45 49.1	+25.1	12.5	46 47.6	+25.5	12.7	47 46.1	+25.7	12.9	48 44.6	+26.0	13.2	81
82	42 18.4	+23.2	10.4	43 17.4	+23.5	10.6	44 16.4	+23.7	10.8	45 15.3	+23.9	11.0	46 14.2	+24.2	11.2	47 13.0	+24.5	11.4	48 11.8	+24.7	11.6	49 10.6	+25.0	11.8	82
83	42 41.6	+22.5	9.2	43 40.9	+22.6	9.3	44 40.1	+22.8	9.5	45 39.2	+23.1	9.6	46 38.4	+23.2	9.8	47 37.5	+23.4	10.0	48 36.5	+23.7	10.2	49 35.6	+23.9	10.4	83
84	43 04.1	+21.5	7.9	44 03.5	+21.7	8.0	45 02.9	+21.9	8.2	46 02.3	+22.1	8.3	47 01.6	+22.3	8.4	48 00.9	+22.5	8.6	49 00.2	+22.7	8.8	49 59.5	+22.9	9.0	84
85	43 25.6	+20.7	6.6	44 25.2	+20.8	6.7	45 24.8	+21.0	6.9	46 24.4	+21.1	7.0	47 23.9	+21.3	7.1	48 23.4	+21.5	7.2	49 22.9	+21.7	7.4	50 22.4	+21.8	7.5	85
86	43 46.3	+19.8	5.3	44 46.0	+20.0	5.4	45 45.8	+20.0	5.5	46 45.5	+20.2	5.6	47 45.2	+20.3	5.7	48 44.9	+20.4	5.8	49 44.6	+20.5	6.0	50 44.2	+20.7	6.1	86
87	44 06.1	+18.9	4.0	45 06.0	+18.9	4.1	46 05.8	+19.1	4.2	47 05.7	+19.1	4.2	48 05.5	+19.2	4.3	49 05.3	+19.4	4.3	50 05.1	+19.5	4.5	51 04.9	+19.6	4.6	87
88	44 25.0	+18.0	2.7	45 24.9	+18.1	2.7	46 24.9	+18.0	2.8	47 24.8	+18.1	2.8	48 24.7	+18.2	2.9	49 24.7	+18.2	3.0	50 24.6	+18.3	3.0	51 24.5	+18.3	3.1	88
89	44 43.0	+17.0	1.4	45 43.0	+17.0	1.4	46 42.9	+17.1	1.4	47 42.9	+17.1	1.4	48 42.9	+17.1	1.5	49 42.9	+17.1	1.5	50 42.9	+17.1	1.5	51 42.8	+17.2	1.6	89
90	45 00.0	+16.1	0.0	46 00.0	+16.0	0.0	47 00.0	+16.0	0.0	48 00.0	+16.0	0.0	49 00.0	+16.0	0.0	50 00.0	+16.0	0.0	51 00.0	+15.9	0.0	52 00.0	+15.9	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 106°, 254°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°−Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	10 32.7	+43.1	100.7	10 21.5	+43.8	100.9	10 10.0	+44.5	101.1	9 58.4	+45.2	101.3	9 46.6	+45.9	101.4	9 34.6	+46.6	101.6	9 22.4	+47.3	101.8	9 10.1	+47.9	101.9	0
1	11 15.8	+43.0	100.0	11 05.3	+43.7	100.2	10 54.5	+44.5	100.4	10 43.6	+45.2	100.6	10 32.5	+45.8	100.8	10 21.2	+46.5	101.0	10 09.7	+47.1	101.1	9 58.0	+47.8	101.3	1
2	11 58.8	+42.9	99.3	11 49.0	+43.6	99.5	11 39.0	+44.3	99.7	11 28.8	+45.0	99.9	11 18.3	+45.8	100.1	11 07.7	+46.4	100.3	10 56.8	+47.1	100.5	10 45.8	+47.7	100.7	2
3	12 41.7	+42.8	98.6	12 32.6	+43.6	98.8	12 23.3	+44.3	99.0	12 13.8	+45.0	99.2	12 04.1	+45.6	99.5	11 54.1	+46.3	99.7	11 43.9	+47.0	99.9	11 33.5	+47.7	100.1	3
4	13 24.5	+42.7	97.9	13 16.2	+43.4	98.1	13 07.6	+44.1	98.3	12 58.8	+44.8	98.6	12 49.7	+45.5	98.8	12 40.4	+46.3	99.0	12 30.9	+46.9	99.2	12 21.2	+47.5	99.5	4
5	14 07.2	+42.5	97.1	13 59.6	+43.3	97.4	13 51.7	+44.0	97.6	13 43.6	+44.7	97.9	13 35.3	+45.4	98.1	13 26.7	+46.1	98.4	13 17.8	+46.8	98.6	13 08.7	+47.5	98.8	5
6	14 49.7	+42.4	96.4	14 42.9	+43.1	96.7	14 35.7	+43.9	96.9	14 28.3	+44.7	97.2	14 20.7	+45.3	97.5	14 12.8	+46.0	97.7	14 04.6	+46.7	98.0	13 56.2	+47.3	98.2	6
7	15 32.1	+42.2	95.6	15 26.0	+43.0	96.0	15 19.6	+43.8	96.2	15 13.0	+44.4	96.5	15 06.0	+45.2	96.8	14 58.8	+45.9	97.0	14 51.3	+46.6	97.3	14 43.5	+47.3	97.6	7
8	16 14.3	+42.1	94.9	16 09.0	+42.9	95.2	16 03.4	+43.6	95.5	15 57.4	+44.4	95.8	15 51.2	+45.1	96.1	15 44.7	+45.8	96.4	15 37.9	+46.5	96.7	15 30.8	+47.2	96.9	8
9	16 56.4	+41.9	94.2	16 51.9	+42.7	94.5	16 47.0	+43.5	94.8	16 41.8	+44.2	95.1	16 36.3	+44.9	95.4	16 30.5	+45.6	95.7	16 24.4	+46.3	96.0	16 18.0	+47.0	96.3	9
10	17 38.3	+41.8	93.5	17 34.6	+42.5	93.8	17 30.5	+43.3	94.1	17 26.0	+44.1	94.4	17 21.2	+44.8	94.7	17 16.1	+45.6	95.0	17 10.7	+46.3	95.3	17 05.0	+46.9	95.6	10
11	18 20.1	+41.6	92.7	18 17.1	+42.4	93.0	18 13.8	+43.1	93.4	18 10.1	+43.9	93.7	18 06.0	+44.7	94.0	18 01.7	+45.3	94.3	17 57.0	+46.0	94.7	17 51.9	+46.8	95.0	11
12	19 01.7	+41.4	91.9	18 59.5	+42.1	92.3	18 56.9	+43.0	92.6	18 54.0	+43.7	93.0	18 50.7	+44.5	93.3	18 47.0	+45.3	93.7	18 43.0	+46.0	94.0	18 38.7	+46.6	94.3	12
13	19 43.1	+41.2	91.2	19 41.6	+42.0	91.5	19 39.9	+42.7	91.9	19 37.7	+43.6	92.2	19 35.2	+44.3	92.6	19 32.3	+45.0	93.0	19 29.0	+45.8	93.3	19 25.3	+46.5	93.7	13
14	20 24.3	+40.9	90.4	20 23.6	+41.8	90.8	20 22.6	+42.6	91.1	20 21.3	+43.3	91.5	20 19.5	+44.1	91.9	20 17.3	+44.9	92.3	20 14.8	+45.6	92.6	20 11.8	+46.4	93.0	14
15	21 05.2	+40.8	89.6	21 05.4	+41.6	90.0	21 05.2	+42.4	90.4	21 04.6	+43.2	90.8	21 03.6	+44.0	91.2	21 02.2	+44.7	91.5	21 00.4	+45.4	91.9	20 58.2	+46.1	92.3	15
16	21 46.0	+40.5	88.8	21 47.0	+41.4	89.2	21 47.6	+42.2	89.6	21 47.8	+43.0	90.0	21 47.6	+43.7	90.4	21 46.9	+44.5	90.8	21 45.8	+45.3	91.2	21 44.3	+46.0	91.6	16
17	22 26.5	+40.3	88.0	22 28.4	+41.1	88.4	22 29.8	+42.0	88.9	22 30.8	+42.7	89.3	22 31.3	+43.6	89.7	22 31.4	+44.3	90.1	22 31.1	+45.1	90.5	22 30.3	+45.9	90.9	17
18	23 06.8	+40.1	87.2	23 09.5	+40.9	87.7	23 11.8	+41.7	88.1	23 13.5	+42.6	88.5	23 14.9	+43.3	88.9	23 15.7	+44.2	89.4	23 16.2	+44.9	89.8	23 16.2	+45.6	90.2	18
19	23 46.9	+39.8	86.4	23 50.4	+40.7	86.9	23 53.5	+41.5	87.3	23 56.1	+42.3	87.7	23 58.2	+43.1	88.2	23 59.9	+43.9	88.6	24 01.1	+44.6	89.1	24 01.8	+45.4	89.5	19
20	24 26.7	+39.5	85.6	24 31.1	+40.4	86.1	24 35.0	+41.2	86.5	24 38.4	+42.0	87.0	24 41.3	+42.9	87.4	24 43.8	+43.7	87.9	24 45.7	+44.5	88.3	24 47.2	+45.3	88.8	20
21	25 06.2	+39.3	84.8	25 11.5	+40.1	85.2	25 16.2	+41.0	85.7	25 20.4	+41.9	86.2	25 24.2	+42.6	86.7	25 27.5	+43.4	87.1	25 30.2	+44.2	87.6	25 32.5	+45.0	88.1	21
22	25 45.5	+39.0	83.9	25 51.6	+39.8	84.4	25 57.2	+40.7	84.9	26 02.3	+41.5	85.4	26 06.8	+42.4	85.9	26 10.9	+43.2	86.4	26 14.4	+44.0	86.9	26 17.5	+44.8	87.3	22
23	26 24.5	+38.6	83.1	26 31.4	+39.6	83.6	26 37.9	+40.4	84.1	26 43.8	+41.3	84.6	26 49.2	+42.1	85.1	26 54.1	+42.9	85.6	26 58.4	+43.8	86.1	27 02.3	+44.5	86.6	23
24	27 03.1	+38.4	82.2	27 11.0	+39.2	82.7	27 18.3	+40.1	83.2	27 25.1	+40.9	83.8	27 31.3	+41.9	84.3	27 37.0	+42.7	84.8	27 42.2	+43.5	85.3	27 46.8	+44.3	85.8	24
25	27 41.5	+38.0	81.4	27 50.2	+38.9	81.9	27 58.4	+39.8	82.4	28 06.0	+40.7	82.9	28 13.2	+41.5	83.5	28 19.7	+42.4	84.0	28 25.7	+43.2	84.5	28 31.1	+44.1	85.1	25
26	28 19.5	+37.7	80.5	28 29.1	+38.6	81.0	28 38.2	+39.5	81.6	28 46.7	+40.4	82.1	28 54.7	+41.2	82.6	29 02.1	+42.1	83.2	29 08.9	+42.9	83.7	29 15.2	+43.7	84.3	26
27	28 57.2	+37.3	79.6	29 07.7	+38.2	80.1	29 17.7	+39.1	80.7	29 27.1	+40.0	81.3	29 35.9	+41.0	81.8	29 44.2	+41.8	82.4	29 51.8	+42.7	82.9	29 58.9	+43.5	83.5	27
28	29 34.5	+36.9	78.7	29 45.9	+37.9	79.3	29 56.8	+38.8	79.8	30 07.1	+39.7	80.4	30 16.9	+40.5	81.0	30 26.0	+41.4	81.5	30 34.5	+42.3	82.1	30 42.4	+43.2	82.7	28
29	30 11.4	+36.6	77.8	30 23.8	+37.5	78.4	30 35.6	+38.5	78.9	30 46.8	+39.4	79.5	30 57.4	+40.3	80.1	31 07.4	+41.2	80.7	31 16.8	+42.0	81.3	31 25.6	+42.8	81.9	29
30	30 48.0	+36.2	76.9	31 01.3	+37.2	77.5	31 14.1	+38.0	78.0	31 26.2	+39.0	78.6	31 37.7	+39.9	79.2	31 48.6	+40.8	79.9	31 58.8	+41.7	80.5	32 08.4	+42.6	81.1	30
31	31 24.2	+35.8	75.9	31 38.5	+36.7	76.5	31 52.1	+37.7	77.1	32 05.2	+38.6	77.8	32 17.6	+39.5	78.4	32 29.4	+40.4	79.0	32 40.5	+41.3	79.6	32 51.0	+42.2	80.3	31
32	32 00.0	+35.3	75.0	32 15.2	+36.3	75.6	32 29.8	+37.3	76.2	32 43.8	+38.2	76.8	32 57.1	+39.1	77.5	33 09.8	+40.1	78.1	33 21.8	+41.0	78.8	33 33.2	+41.9	79.4	32
33	32 35.3	+34.9	74.0	32 51.5	+35.9	74.7	33 07.1	+36.8	75.3	33 22.0	+37.8	75.9	33 36.2	+38.8	76.6	33 49.9	+39.6	77.2	34 02.8	+40.6	77.9	34 15.1	+41.4	78.5	33
34	33 10.2	+34.5	73.1	33 27.4	+35.5	73.7	33 43.9	+36.4	74.3	33 59.8	+37.3	75.0	34 15.0	+38.3	75.6	34 29.5	+39.3	76.3	34 43.4	+40.2	77.0	34 56.5	+41.1	77.7	34
35	33 44.7	+34.0	72.1	34 02.8	+35.0	72.7	34 20.3	+35.9	73.4	34 37.1	+36.9	74.0	34 53.3	+37.9	74.7	35 08.8	+38.8	75.3	35 23.6	+39.7	76.1	35 37.6	+40.7	76.8	35
36	34 18.7	+33.5	71.1	34 37.8	+34.5	71.7	34 56.2	+35.5	72.4	35 14.0	+36.5	73.1	35 31.2	+37.4	73.8	35 47.6	+38.4	74.5	36 03.3	+39.4	75.2	36 18.3	+40.3	75.9	36
37	34 52.2	+33.0	70.1	35 12.3	+34.0	70.8	35 31.7	+35.0	71.4	35 50.5	+36.0	72.1	36 08.6	+36.9	72.8	36 26.0	+37.9	73.5	36 42.7	+38.9	74.2	36 58.6	+39.9	74.9	37
38	35 25.2	+32.4	69.1	35 46.3	+33.4	69.7	36 06.7	+34.5	70.4	36 26.5	+35.4	71.1	36 45.5	+36.5	71.8	37 03.9	+37.5	72.5	37 21.6	+38.4	73.3	37 38.5	+39.4	74.0	38
39	35 57.6	+31.9	68.0	36 19.7	+33.0	68.7	36 41.2	+33.9	69.4	37 01.9	+35.0	70.1	37 22.0	+36.0	70.8	37 41.4	+36.9	71.6	38 00.0	+37.9	72.3	38 17.9	+38.9	73.0	39
40	36 29.5	+31.4	67.0	36 52.7	+32.4	67.7	37 15.1	+33.4	68.4	37 36.9	+34.4	69.1	37 58.0	+35.4	69.8	38 18.3	+36.4	70.6	38 37.9	+37.4	71.3	38 56.8	+38.4	72.1	40
41	37 00.9	+30.8	65.9	37 25.1	+31.8	66.6	37 48.5	+32.9	67.3	38 11.3	+33.9	68.0	38 33.4	+34.9	68.8	38 54.7	+35.9	69.5	39 15.3	+36.9	70.3	39 35.2	+37.9	71.1	41
42	37 31.7	+30.2	64.8	37 56.9	+31.2	65.5	38 21.4	+32.2	66.3	38 45.2	+33.2	67.0	39 08.3	+34.3	67.7	39 30.6	+35.4	68.5	39 52.2	+36.4	69.3	40 13.1	+37.3	70.1	42
43	38 01.9	+29.6	63.7	38 28.1	+30.6	64.5	38 53.6	+31.7	65.2	39 18.4	+32.7	65.9	39 42.6	+33.7	66.7	40 06.0	+34.7	67.4	40 28.6	+35.8	68.2	40 50.4	+36.9	69.0	43
44	38 31.5	+28.9	62.6	38 58.7	+30.0	63.4	39 25.3	+31.0	64.1	39 51.1	+32.1	64.8	40 16.3	+33.1	65.6	40 40.7	+34.2	66.4	41 04.4	+35.2	67.2	41 27.3	+36.2	68.0	44
45	39 00.4	+28.3	61.5	39 28.7	+29.3	62.2	39 56.3	+30.4	63.0	40 23.2	+31.4	63.7	40 49.4	+32.5	64.5	41 14.9	+33.5	65.3	41 39.6	+34.5	66.1	42 03.5	+35.6	66.9	45
46	39 28.7	+27.6	60.4	39 58.0	+28.7	61.1	40 26.7	+29.7	61.8	40 54.6	+30.8	62.6	41 21.9	+31.8	63.4	41 48.4	+32.8	64.2	42 14.1	+34.0	65.0	42 39.1	+35.0	65.8	46
47	39 56.3	+26.9	59.2	40 26.7	+27.9	60.0	40 56.4	+29.0	60.7	41 25.4	+30.1	61.5	41 53.7	+31.1	62.2	42 21.2	+32.2	63.1	42 48.1	+33.2	63.9	43 14.1	+34.3	64.7	47
48	40 23.2	+26.2	58.1	40 54.6	+27.3	58.8	41 25.4	+28.3	59.5	41 55.5	+29.3	60.3	42 24.8	+30.4	61.1	42 53.4	+31.5	61.9	43 21.3	+32.6	62.7	43 48.4	+33.7	63.6	48
49	40 49.4	+25.5	56.9	41 21.9	+26.5	57.6	41 53.7	+27.5	58.4	42 24.8	+28.6	59.1	42 55.2	+29.7	59.9	43 24.9	+30.8	60.7	43 53.9	+31.8	61.6	44 22.1	+32.9	62.4	49
50	41 14.9	+24.7	55.7	41 48.4	+25.7	56.4	42 21.2	+26.9	57.2	42 53.4	+27.9	57.9	43 24.9	+29.0	58.7	43 55.7	+30.0	59.6	44 25.7	+31.2	60.4	44 55.0	+32.2	61.3	50
51	41 39.6	+23.9	54.5	42 14.1	+25.0	55.2	42 48.1	+26.0	55.9	43 21.3	+27.1	56.7	43 53.9	+28.2	57.5	44 25.7	+29.3	58.3	44 56.9	+30.3	59.2	45 27.2	+31.4	60.1	51
52	42 03.5	+23.1	53.2	42 39.1	+24.2	54.0	43 14.1	+25.2	54.7	43 48.4	+26.3	55.5	44 22.1	+27.3	56.3	44 55.0	+28.4	57.1	45 27.2	+29.5	58.0	45 58.6	+30.7	58.8	52
53	42 26.6	+22.3	52.0	43 03.3	+23.3	52.7	43 39.3	+24.4	53.5	44 14.7	+25.4	54.2	44 49.4	+26.5	55.0	45 23.4	+27.7	55.9	45 56.7	+28.8	56.7	46 29.3	+29.8	57.6	53
54	42 48.9	+21.5	50.7	43 26.6	+22.5	51.4	44 03.7	+23.5	52.2	44 40.1	+24.6	53.0	45 15.9	+25.7	53.8	45 51.1	+26.7	54.6	46 25.5	+27.8	55.5	46 59.1	+29.0	56.3	54
55	43 10.4	+20.6	49.4	43 49.1	+21.6	50.2	44 27.2	+22.7	50.9	45 04.7	+23.8	51.7	45 41.6	+24.8	52.5	46 17.8	+25.9	53.3	46 53.3	+27.0	54.2	47 28.1	+28.1	55.0	55
56	43 31.0	+19.7	48.1	44 10.7	+20.8	48.9	44 49.9	+21.8	49.6	45 28.5	+22.8	50.4	46 06.4	+23.9	51.2	46 43.7	+25.0	52.0	47 20.3	+26.0	52.8	47 56.2	+27.1	53.7	56
57	43 50.7	+18.8	46.8	44 31.5	+19.8	47.6	45 11.7	+20.8	48.3	45 51.3	+21.9	49.1	46 30.3	+22.9	49.8	47 08.7	+24.0	50.7	47 46.3	+25.2	51.5	48 23.3	+26.2	52.4	57
58	44 09.5	+17.9	45.5	44 51.3	+18.9	46.2	45 32.5	+19.9	47.0	46 13.2	+20.9	47.7	46 53.2	+22.0	48.5	47 32.7	+23.0	49.3	48 11.5	+24.1	50.2	48 49.5	+25.3	51.0	58
59	44 27.4	+16.9	44.2	45 10.2	+17.9	44.9	45 52.4	+18.9	45.6	46 34.1	+20.0	46.4	47 15.2	+21.0	47.1	47 55.7	+22.1	47.9	48 35.6	+23.1	48.8	49 14.8	+24.2	49.6	59
60	44 44.3	+16.0	42.8	45 28.1	+17.0	43.5	46 11.3	+18.0	44.2	46 54.1	+18.9	45.0	47 36.2	+20.0	45.7	48 17.8	+21.0	46.5	48 58.7	+22.1	47.4	49 39.0	+23.2	48.2	60
61	45 00.3	+15.1	41.5	45 45.1	+15.9	42.2	46 29.3	+16.9	42.9	47 13.0	+17.9	43.6	47 56.2	+18.9	44.3	48 38.8	+20.0	45.1	49 20.8	+21.1	46.0	50 02.2	+22.2	46.8	61
62	45 15.4	+14.0	40.1	46 01.0	+15.0	40.7	46 46.2	+15.9	41.5	47 30.9	+16.9	42.2	48 15.1	+17.9	42.9	48 58.8	+18.9	43.7	49 41.9	+19.9	44.5	50 24.4	+21.0	45.4	62
63	45 29.4	+13.0	38.7	46 16.0	+13.9	39.4	47 02.1	+14.9	40.0	47 47.8	+15.8	40.8	48 33.0	+16.8	41.5	49 17.7	+17.8	42.3	50 01.8	+18.9	43.1	50 45.4	+19.9	43.9	63
64	45 42.4	+12.0	37.3	46 29.9	+12.9	38.0	47 17.0	+13.8	38.6	48 03.6	+14.8	39.3	48 49.8	+15.7	40.0	49 35.5	+16.7	40.8	50 20.7	+17.7	41.6	51 05.3	+18.7	42.4	64
65	45 54.4	+10.9	35.9	46 42.8	+11.8	36.5	47 30.8	+12.7	37.2	48 18.4	+13.6	37.9	49 05.5	+14.6	38.6	49 52.2	+15.5	39.3	50 38.4	+16.5	40.1	51 24.0	+17.5	40.9	65
66	46 05.3	+9.9	34.5	46 54.6	+10.7	35.1	47 43.5	+11.6	35.7	48 32.0	+12.5	36.4	49 20.1	+13.4	37.1	50 07.7	+14.4	37.8	50 54.9	+15.3	38.5	51 41.5	+16.4	39.3	66
67	46 15.2	+8.8	33.1	47 05.3	+9.6	33.7	47 55.1	+10.4	34.3	48 44.5	+11.3	34.9	49 33.5	+12.2	35.6	50 22.1	+13.1	36.3	51 10.2	+14.1	37.0	51 57.9	+15.0	37.8	67
68	46 24.0	+7.8	31.6	47 14.9	+8.6	32.2	48 05.5	+9.4	32.8	48 55.8	+10.2	33.4	49 45.7	+11.0	34.1	50 35.2	+11.9	34.7	51 24.3	+12.8	35.5	52 12.9	+13.8	36.2	68
69	46 31.8	+6.6	30.2	47 23.5	+7.4	30.8	48 14.9	+8.2	31.3	49 06.0	+9.0	31.9	49 56.7	+9.9	32.5	50 47.1	+10.7	33.2	51 37.1	+11.6	33.9	52 26.7	+12.5	34.6	69
70	46 38.4	+5.6	28.8	47 30.9	+6.3	29.3	48 23.1	+7.0	29.8	49 15.0	+7.8	30.4	50 06.6	+8.6	31.0	50 57.8	+9.5	31.6	51 48.7	+10.3	32.3	52 39.2	+11.2	33.0	70
71	46 44.0	+4.4	27.3	47 37.2	+5.1	27.8	48 30.1	+5.9	28.3	49 22.8	+6.6	28.9	50 15.2	+7.3	29.5	51 07.3	+8.1	30.1	51 59.0	+9.0	30.7	52 50.4	+9.9	31.4	71
72	46 48.4	+3.4	25.9	47 42.3	+4.0	26.3	48 36.0	+4.6	26.8	49 29.4	+5.4	27.4	50 22.5	+6.2	27.9	51 15.4	+6.9	28.5	52 08.0	+7.7	29.1	53 00.3	+8.5	29.7	72
73	46 51.8	+2.2	24.4	47 46.3	+2.9	24.8	48 40.6	+3.5	25.3	49 34.8	+4.1	25.8	50 28.7	+4.8	26.3	51 22.3	+5.6	26.9	52 15.7	+6.3	27.5	53 08.8	+7.1	28.1	73
74	46 54.0	+1.1	22.9	47 49.2	+1.7	23.4	48 44.1	+2.4	23.8	49 38.9	+3.0	24.3	50 33.5	+3.6	24.8	51 27.9	+4.3	25.3	52 22.0	+5.0	25.9	53 15.9	+5.7	26.4	74
75	46 55.1	0.0	21.5	47 50.9	+0.5	21.9	48 46.5	+1.1	22.3	49 41.9	+1.7	22.7	50 37.1	+2.3	23.2	51 32.2	+2.9	23.7	52 27.0	+3.6	24.2	53 21.6	+4.3	24.8	75
76	46 55.1	−1.1	20.0	47 51.4	−0.6	20.4	48 47.6	−0.1	20.8	49 43.6	+0.5	21.2	50 39.4	+1.1	21.6	51 35.1	+1.7	22.1	52 30.6	+2.3	22.6	53 25.9	+3.0	23.1	76
77	46 54.0	−2.3	18.5	47 50.8	−1.8	18.9	48 47.5	−1.3	19.3	49 44.1	−0.8	19.6	50 40.5	−0.2	20.1	51 36.8	+0.3	20.5	52 32.9	+0.9	20.9	53 28.9	+1.5	21.4	77
78	46 51.7	−3.4	17.1	47 49.0	−2.9	17.5	48 46.2	−2.5	17.7	49 43.3	−2.0	18.1	50 40.3	−1.5	18.5	51 37.1	−1.0	18.9	52 33.8	−0.4	19.3	53 30.4	+0.1	19.7	78
79	46 48.3	−4.4	15.6	47 46.1	−4.1	15.9	48 43.7	−3.6	16.2	49 41.3	−3.2	16.6	50 38.8	−2.8	16.9	51 36.1	−2.3	17.3	52 33.4	−1.9	17.6	53 30.5	−1.4	18.1	79
80	46 43.9	−5.6	14.2	47 42.0	−5.2	14.4	48 40.1	−4.9	14.7	49 38.1	−4.5	15.0	50 36.0	−4.1	15.3	51 33.8	−3.6	15.7	52 31.5	−3.2	16.0	53 29.1	−2.7	16.4	80
81	46 38.3	−6.7	12.7	47 36.8	−6.4	13.0	48 35.2	−6.0	13.2	49 33.6	−5.7	13.5	50 31.9	−5.3	13.8	51 30.2	−5.0	14.0	52 28.3	−4.6	14.4	53 26.4	−4.1	14.7	81
82	46 31.6	−7.8	11.3	47 30.4	−7.5	11.5	48 29.2	−7.2	11.7	49 27.9	−6.9	11.9	50 26.6	−6.6	12.2	51 25.2	−6.2	12.4	52 23.8	−5.9	12.7	53 22.3	−5.6	13.0	82
83	46 23.8	−8.8	9.8	47 22.9	−8.6	10.0	48 22.0	−8.3	10.2	49 21.0	−8.0	10.4	50 20.0	−7.8	10.6	51 19.0	−7.5	10.9	52 17.9	−7.2	11.1	53 16.7	−6.9	11.4	83
84	46 15.0	−9.9	8.4	47 14.3	−9.7	8.6	48 13.7	−9.3	8.7	49 13.0	−9.3	8.9	50 12.2	−9.0	9.1	51 11.5	−8.9	9.3	52 10.9	−8.7	9.5	53 09.8	−8.3	9.7	84
85	46 05.4	−11.0	7.0	47 04.6	−10.8	7.1	48 04.2	−10.7	7.2	49 03.7	−10.5	7.4	50 03.2	−10.3	7.5	51 02.6	−10.0	7.7	52 02.1	−9.9	7.9	53 01.5	−9.6	8.0	85
86	45 54.1	−12.0	5.6	46 53.8	−11.8	5.7	47 53.5	−11.7	5.8	48 53.2	−11.6	5.9	49 52.9	−11.5	6.0	50 52.6	−11.4	6.1	51 52.2	−11.1	6.3	52 51.9	−11.1	6.4	86
87	45 42.1	−13.0	4.2	46 42.0	−13.0	4.2	47 41.8	−12.9	4.3	48 41.6	−12.7	4.4	49 41.4	−12.6	4.5	50 41.2	−12.5	4.7	51 41.1	−12.5	4.7	52 40.8	−12.3	4.8	87
88	45 29.1	−14.1	2.8	46 29.0	−14.0	2.8	47 28.9	−13.9	2.9	48 28.9	−13.9	2.9	49 28.8	−13.8	3.0	50 28.7	−13.8	3.0	51 28.6	−13.7	3.1	52 28.5	−13.6	3.2	88
89	45 15.0	−15.0	1.4	46 15.0	−15.0	1.4	47 15.0	−15.0	1.4	48 15.0	−15.0	1.5	49 15.0	−15.0	1.5	50 14.9	−14.9	1.5	51 14.9	−14.9	1.5	52 14.9	−14.9	1.6	89
90	45 00.0	−16.0	0.0	46 00.0	−16.0	0.0	47 00.0	−16.0	0.0	48 00.0	−16.1	0.0	49 00.0	−16.1	0.0	50 00.0	−16.1	0.0	51 00.0	−16.1	0.0	52 00.0	−16.2	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	10 32.7	−43.2	100.7	10 21.5	−44.0	100.9	10 10.0	−44.6	101.1	9 58.4	−45.3	101.3	9 46.6	−46.0	101.4	9 34.6	−46.7	101.6	9 22.4	−47.2	101.8	9 10.1	−47.9	101.9	0
1	9 49.5	−43.3	101.4	9 37.5	−44.0	101.6	9 25.4	−44.7	101.8	9 13.1	−45.4	101.9	9 00.6	−46.1	102.1	8 47.9	−46.7	102.2	8 35.2	−47.4	102.4	8 22.2	−48.0	102.5	1
2	9 06.2	−43.3	102.1	8 53.5	−44.0	102.3	8 40.7	−44.8	102.4	8 27.7	−45.5	102.6	8 14.5	−46.1	102.7	8 01.2	−46.7	102.9	7 47.8	−47.4	103.0	7 34.2	−48.0	103.1	2
3	8 22.9	−43.5	102.8	8 09.5	−44.2	103.0	7 55.9	−44.8	103.1	7 42.2	−45.5	103.2	7 28.4	−46.2	103.4	7 14.5	−46.9	103.5	7 00.4	−47.5	103.6	6 46.2	−48.1	103.7	3
4	7 39.4	−43.5	103.5	7 25.3	−44.2	103.7	7 11.1	−44.9	103.8	6 56.7	−45.5	103.9	6 42.2	−46.2	104.0	6 27.6	−46.8	104.1	6 12.9	−47.5	104.2	5 58.1	−48.1	104.3	4
5	6 55.9	−43.6	104.2	6 41.1	−44.3	104.3	6 26.2	−45.0	104.5	6 11.2	−45.7	104.6	5 56.0	−46.2	104.7	5 40.8	−46.9	104.8	5 25.4	−47.5	104.9	5 10.0	−48.1	104.9	5
6	6 12.3	−43.6	104.9	5 56.8	−44.3	105.0	5 41.2	−45.0	105.1	5 25.5	−45.6	105.2	5 09.8	−46.4	105.3	4 53.9	−47.0	105.4	4 37.9	−47.6	105.5	4 21.9	−48.2	105.5	6
7	5 28.7	−43.7	105.6	5 12.5	−44.3	105.7	4 56.2	−45.0	105.8	4 39.9	−45.7	105.9	4 23.4	−46.3	105.9	4 06.9	−47.0	106.0	3 50.3	−47.5	106.1	3 33.7	−48.2	106.1	7
8	4 45.0	−43.7	106.3	4 28.2	−44.4	106.4	4 11.2	−45.0	106.4	3 54.2	−45.7	106.5	3 37.1	−46.4	106.6	3 20.0	−47.0	106.6	3 02.8	−47.7	106.7	2 45.5	−48.2	106.7	8
9	4 01.3	−43.7	107.0	3 43.8	−44.4	107.0	3 26.2	−45.1	107.1	3 08.5	−45.8	107.2	2 50.7	−46.3	107.2	2 33.0	−47.0	107.3	2 15.1	−47.6	107.3	1 57.3	−48.2	107.3	9
10	3 17.6	−43.8	107.7	2 59.4	−44.5	107.7	2 41.1	−45.1	107.8	2 22.7	−45.7	107.8	2 04.4	−46.4	107.8	1 46.0	−47.1	107.9	1 27.5	−47.6	107.9	1 09.1	−48.3	107.9	10
11	2 33.8	−43.8	108.4	2 14.9	−44.5	108.4	1 56.0	−45.2	108.4	1 37.0	−45.8	108.5	1 18.0	−46.5	108.5	0 58.9	−47.0	108.5	0 39.9	−47.7	108.5	0 20.8	−48.2	108.5	11
12	1 50.0	−43.8	109.0	1 30.4	−44.4	109.1	1 10.8	−45.1	109.1	0 51.2	−45.8	109.1	0 31.5	−46.4	109.1	0 11.9	−47.0	109.1	0 07.8	+47.6	70.9	0 27.4	+48.2	70.9	12
13	1 06.2	−43.8	109.7	0 46.0	−44.5	109.7	0 25.7	−45.2	109.7	0 05.4	−45.8	109.8	0 14.9	+46.4	70.3	0 35.1	+47.1	70.3	0 55.4	+47.6	70.3	1 15.6	+48.3	70.3	13
14	0 22.4	−43.8	110.4	0 01.5	−44.5	110.4	0 19.5	+45.1	69.6	0 40.4	+45.7	69.6	1 01.3	+46.4	69.6	1 22.2	+47.0	69.6	1 43.0	+47.7	69.7	2 03.9	+48.2	69.7	14
15	0 21.4	+43.9	68.9	0 43.0	+44.5	68.9	1 04.6	+45.1	68.9	1 26.1	+45.8	69.0	1 47.7	+46.4	69.0	2 09.2	+47.0	69.0	2 30.7	+47.6	69.1	2 52.1	+48.2	69.1	15
16	1 05.3	+43.8	68.2	1 27.5	+44.5	68.2	1 49.7	+45.1	68.3	2 11.9	+45.8	68.3	2 34.1	+46.3	68.3	2 56.2	+47.0	68.4	3 18.3	+47.5	68.4	3 40.3	+48.2	68.5	16
17	1 49.1	+43.8	67.5	2 12.0	+44.4	67.6	2 34.8	+45.1	67.6	2 57.7	+45.7	67.7	3 20.4	+46.4	67.7	3 43.2	+46.9	67.8	4 05.8	+47.6	67.8	4 28.5	+48.1	67.9	17
18	2 32.9	+43.7	66.9	2 56.4	+44.5	66.9	3 19.9	+45.1	67.0	3 43.4	+45.7	67.0	4 06.8	+46.3	67.1	4 30.1	+47.0	67.1	4 53.4	+47.5	67.2	5 16.6	+48.1	67.3	18
19	3 16.6	+43.8	66.2	3 40.9	+44.3	66.2	4 05.0	+45.0	66.3	4 29.1	+45.7	66.4	4 53.1	+46.3	66.4	5 17.1	+46.8	66.5	5 40.9	+47.5	66.6	6 04.7	+48.1	66.7	19
20	4 00.4	+43.7	65.5	4 25.2	+44.4	65.6	4 50.0	+45.0	65.6	5 14.8	+45.6	65.7	5 39.4	+46.2	65.8	6 03.9	+46.9	65.9	6 28.4	+47.4	66.0	6 52.8	+48.0	66.1	20
21	4 44.1	+43.7	64.8	5 09.6	+44.3	64.9	5 35.0	+45.0	65.0	6 00.4	+45.6	65.1	6 25.6	+46.2	65.2	6 50.8	+46.8	65.3	7 15.8	+47.4	65.4	7 40.8	+48.0	65.5	21
22	5 27.8	+43.6	64.1	5 53.9	+44.3	64.2	6 20.0	+44.9	64.3	6 46.0	+45.5	64.4	7 11.8	+46.2	64.5	7 37.6	+46.7	64.6	8 03.2	+47.4	64.8	8 28.8	+47.9	64.9	22
23	6 11.4	+43.6	63.4	6 38.2	+44.2	63.5	7 04.9	+44.8	63.6	7 31.5	+45.4	63.7	7 58.0	+46.0	63.9	8 24.3	+46.7	64.0	8 50.6	+47.2	64.1	9 16.7	+47.8	64.3	23
24	6 55.0	+43.5	62.7	7 22.4	+44.2	62.8	7 49.7	+44.8	63.0	8 16.9	+45.4	63.1	8 44.0	+46.1	63.2	9 11.0	+46.6	63.4	9 37.8	+47.2	63.5	10 04.5	+47.8	63.7	24
25	7 38.5	+43.4	62.0	8 06.6	+44.0	62.2	8 34.5	+44.7	62.3	9 02.3	+45.4	62.4	9 30.1	+45.9	62.6	9 57.6	+46.6	62.7	10 25.0	+47.2	62.9	10 52.3	+47.7	63.1	25
26	8 21.9	+43.4	61.3	8 50.6	+44.0	61.5	9 19.2	+44.7	61.6	9 47.7	+45.2	61.8	10 16.0	+45.9	61.9	10 44.2	+46.4	62.1	11 12.2	+47.0	62.3	11 40.0	+47.6	62.4	26
27	9 05.3	+43.3	60.6	9 34.6	+44.0	60.8	10 03.9	+44.5	60.9	10 32.9	+45.2	61.1	11 01.9	+45.7	61.3	11 30.6	+46.4	61.4	11 59.2	+47.0	61.6	12 27.6	+47.6	61.8	27
28	9 48.6	+43.2	59.9	10 18.6	+43.8	60.1	10 48.4	+44.5	60.3	11 18.1	+45.1	60.4	11 47.6	+45.7	60.6	12 17.0	+46.3	60.8	12 46.2	+46.9	61.0	13 15.2	+47.4	61.2	28
29	10 31.8	+43.1	59.2	11 02.4	+43.7	59.4	11 32.9	+44.3	59.6	12 03.2	+44.9	59.8	12 33.3	+45.6	59.9	13 03.3	+46.2	60.1	13 33.1	+46.7	60.3	14 02.6	+47.4	60.6	29
30	11 14.9	+43.0	58.5	11 46.1	+43.7	58.7	12 17.2	+44.3	58.9	12 48.1	+44.9	59.1	13 18.9	+45.5	59.3	13 49.5	+46.0	59.5	14 19.8	+46.7	59.7	14 50.0	+47.3	59.9	30
31	11 57.9	+42.9	57.8	12 29.8	+43.5	58.0	13 01.5	+44.1	58.2	13 33.0	+44.8	58.4	14 04.4	+45.3	58.6	14 35.5	+46.0	58.8	15 06.5	+46.6	59.0	15 37.3	+47.1	59.3	31
32	12 40.8	+42.8	57.1	13 13.3	+43.4	57.3	13 45.6	+44.1	57.5	14 17.8	+44.6	57.7	14 49.7	+45.3	57.9	15 21.5	+45.8	58.2	15 53.1	+46.4	58.4	16 24.4	+47.0	58.6	32
33	13 23.6	+42.6	56.4	13 56.7	+43.3	56.6	14 29.7	+43.9	56.8	15 02.4	+44.5	57.0	15 35.0	+45.1	57.2	16 07.3	+45.8	57.5	16 39.5	+46.3	57.7	17 11.4	+46.9	58.0	33
34	14 06.2	+42.6	55.7	14 40.0	+43.2	55.9	15 13.6	+43.7	56.1	15 46.9	+44.4	56.3	16 20.1	+45.0	56.6	16 53.1	+45.6	56.8	17 25.8	+46.2	57.1	17 58.3	+46.8	57.3	34
35	14 48.8	+42.4	54.9	15 23.2	+43.0	55.2	15 57.3	+43.7	55.4	16 31.3	+44.3	55.6	17 05.1	+44.9	55.9	17 38.7	+45.4	56.1	18 12.0	+46.0	56.4	18 45.1	+46.6	56.7	35
36	15 31.2	+42.2	54.2	16 06.2	+42.8	54.4	16 41.0	+43.5	54.7	17 15.6	+44.1	54.9	17 50.0	+44.6	55.2	18 24.1	+45.3	55.4	18 58.0	+45.9	55.7	19 31.7	+46.5	56.0	36
37	16 13.4	+42.1	53.5	16 49.0	+42.8	53.7	17 24.5	+43.3	53.9	17 59.7	+43.9	54.2	18 34.6	+44.6	54.5	19 09.4	+45.1	54.8	19 43.9	+45.7	55.0	20 18.2	+46.3	55.3	37
38	16 55.5	+41.9	52.7	17 31.8	+42.5	53.0	18 07.8	+43.2	53.2	18 43.6	+43.8	53.5	19 19.2	+44.4	53.8	19 54.5	+45.0	54.1	20 29.6	+45.6	54.3	21 04.5	+46.1	54.7	38
39	17 37.4	+41.8	52.0	18 14.3	+42.4	52.2	18 51.0	+42.9	52.5	19 27.4	+43.6	52.8	20 03.6	+44.2	53.0	20 39.5	+44.8	53.3	21 15.2	+45.4	53.7	21 50.6	+46.0	54.0	39
40	18 19.2	+41.6	51.2	18 56.7	+42.2	51.5	19 33.9	+42.8	51.7	20 11.0	+43.4	52.0	20 47.8	+44.0	52.3	21 24.3	+44.6	52.6	22 00.6	+45.2	52.9	22 36.6	+45.8	53.3	40
41	19 00.8	+41.4	50.4	19 38.9	+42.0	50.7	20 16.7	+42.7	51.0	20 54.4	+43.2	51.3	21 31.8	+43.8	51.6	22 08.9	+44.5	51.9	22 45.8	+45.0	52.2	23 22.4	+45.6	52.6	41
42	19 42.2	+41.2	49.7	20 20.9	+41.8	50.0	20 59.4	+42.4	50.2	21 37.6	+43.0	50.6	22 15.6	+43.6	50.9	22 53.4	+44.2	51.2	23 30.8	+44.8	51.5	24 08.0	+45.4	51.9	42
43	20 23.4	+41.0	48.9	21 02.7	+41.6	49.2	21 41.8	+42.2	49.5	22 20.6	+42.8	49.8	22 59.2	+43.5	50.1	23 37.6	+44.0	50.4	24 15.6	+44.7	50.8	24 53.4	+45.2	51.1	43
44	21 04.4	+40.7	48.1	21 44.3	+41.4	48.4	22 24.0	+42.0	48.7	23 03.4	+42.6	49.0	23 42.7	+43.1	49.4	24 21.6	+43.8	49.7	25 00.3	+44.3	50.1	25 38.6	+45.0	50.4	44
45	21 45.1	+40.6	47.3	22 25.7	+41.1	47.6	23 06.0	+41.7	47.9	23 46.0	+42.4	48.3	24 25.8	+43.0	48.6	25 05.4	+43.5	49.0	25 44.6	+44.2	49.3	26 23.6	+44.8	49.7	45
46	22 25.7	+40.3	46.5	23 06.8	+40.9	46.8	23 47.7	+41.6	47.2	24 28.4	+42.1	47.5	25 08.8	+42.7	47.8	25 48.9	+43.4	48.2	26 28.8	+43.9	48.6	27 08.4	+44.5	48.9	46
47	23 06.0	+40.0	45.7	23 47.7	+40.7	46.1	24 29.3	+41.2	46.4	25 10.5	+41.9	46.7	25 51.5	+42.5	47.1	26 32.3	+43.0	47.4	27 12.7	+43.7	47.8	27 52.9	+44.2	48.2	47
48	23 46.0	+39.8	44.9	24 28.4	+40.4	45.2	25 10.5	+41.0	45.6	25 52.4	+41.6	45.9	26 34.0	+42.3	46.3	27 15.3	+42.8	46.6	27 56.4	+43.4	47.0	28 37.1	+44.0	47.4	48
49	24 25.8	+39.6	44.1	25 08.8	+40.1	44.4	25 51.5	+40.8	44.8	26 34.0	+41.3	45.1	27 16.2	+41.9	45.5	27 58.1	+42.6	45.8	28 39.8	+43.1	46.2	29 21.1	+43.8	46.6	49
50	25 05.4	+39.2	43.3	25 48.9	+39.9	43.6	26 32.3	+40.4	43.9	27 15.3	+41.1	44.3	27 58.1	+41.7	44.7	28 40.7	+42.2	45.0	29 22.9	+42.9	45.4	30 04.9	+43.4	45.9	50
51	25 44.6	+39.0	42.4	26 28.8	+39.6	42.8	27 12.7	+40.2	43.1	27 56.4	+40.7	43.5	28 39.8	+41.3	43.9	29 22.9	+42.0	44.2	30 05.8	+42.5	44.6	30 48.3	+43.2	45.1	51
52	26 23.6	+38.7	41.6	27 08.4	+39.2	41.9	27 52.9	+39.8	42.3	28 37.1	+40.5	42.6	29 21.1	+41.1	43.0	30 04.9	+41.6	43.4	30 48.3	+42.2	43.8	31 31.5	+42.8	44.2	52
53	27 02.3	+38.3	40.7	27 47.6	+39.0	41.1	28 32.7	+39.6	41.4	29 17.6	+40.1	41.8	30 02.2	+40.7	42.2	30 46.5	+41.3	42.6	31 30.5	+41.9	43.0	32 14.3	+42.5	43.4	53
54	27 40.6	+38.1	39.9	28 26.6	+38.6	40.2	29 12.3	+39.2	40.6	29 57.7	+39.8	40.9	30 42.9	+40.4	41.3	31 27.8	+41.0	41.7	32 12.4	+41.6	42.1	32 56.8	+42.1	42.6	54
55	28 18.7	+37.6	39.0	29 05.2	+38.2	39.3	29 51.5	+38.8	39.7	30 37.5	+39.4	40.1	31 23.3	+40.0	40.5	32 08.8	+40.6	40.9	32 54.0	+41.2	41.3	33 38.9	+41.8	41.7	55
56	28 56.3	+37.4	38.1	29 43.4	+37.9	38.5	30 30.3	+38.5	38.8	31 16.9	+39.1	39.2	32 03.3	+39.6	39.6	32 49.4	+40.2	40.0	33 35.2	+40.9	40.4	34 20.7	+41.5	40.9	56
57	29 33.7	+36.9	37.2	30 21.3	+37.6	37.6	31 08.8	+38.1	37.9	31 56.0	+38.7	38.3	32 42.9	+39.3	38.7	33 29.6	+39.9	39.1	34 16.1	+40.4	39.5	35 02.2	+41.0	40.0	57
58	30 10.6	+36.6	36.3	30 58.9	+37.1	36.7	31 46.9	+37.7	37.0	32 34.7	+38.3	37.4	33 22.2	+38.9	37.8	34 09.5	+39.5	38.2	34 56.5	+40.1	38.6	35 43.2	+40.7	39.1	58
59	30 47.2	+36.2	35.4	31 36.0	+36.8	35.7	32 24.6	+37.3	36.1	33 13.0	+37.9	36.5	34 01.1	+38.5	36.9	34 49.0	+39.0	37.3	35 36.6	+39.6	37.7	36 23.9	+40.2	38.2	59
60	31 23.4	+35.8	34.5	32 12.8	+36.3	34.8	33 01.9	+36.9	35.2	33 50.9	+37.4	35.6	34 39.6	+38.0	36.0	35 28.0	+38.6	36.4	36 16.2	+39.2	36.8	37 04.1	+39.8	37.2	60
61	31 59.2	+35.4	33.5	32 49.1	+35.9	33.9	33 38.8	+36.5	34.2	34 28.3	+37.1	34.6	35 17.6	+37.6	35.0	36 06.6	+38.2	35.4	36 55.4	+38.7	35.9	37 43.9	+39.3	36.3	61
62	32 34.6	+34.9	32.6	33 25.0	+35.5	32.9	34 15.3	+36.0	33.3	35 05.4	+36.5	33.7	35 55.2	+37.1	34.1	36 44.8	+37.7	34.5	37 34.1	+38.3	34.9	38 23.2	+38.8	35.3	62
63	33 09.5	+34.4	31.6	34 00.5	+35.0	31.9	34 51.3	+35.6	32.3	35 41.9	+36.1	32.7	36 32.3	+36.7	33.1	37 22.5	+37.2	33.5	38 12.4	+37.8	33.9	39 02.0	+38.4	34.4	63
64	33 43.9	+34.0	30.6	34 35.5	+34.5	31.0	35 26.9	+35.0	31.3	36 18.0	+35.6	31.7	37 09.0	+36.1	32.1	37 59.7	+36.7	32.5	38 50.2	+37.2	32.9	39 40.4	+37.8	33.4	64
65	34 17.9	+33.5	29.6	35 10.0	+34.0	30.0	36 01.9	+34.6	30.3	36 53.6	+35.1	30.7	37 45.1	+35.6	31.1	38 36.4	+36.1	31.5	39 27.4	+36.7	31.9	40 18.2	+37.3	32.4	65
66	34 51.4	+33.0	28.6	35 44.0	+33.5	28.9	36 36.5	+34.0	29.3	37 28.7	+34.5	29.7	38 20.7	+35.1	30.1	39 12.5	+35.7	30.5	40 04.1	+36.2	30.9	40 55.5	+36.7	31.3	66
67	35 24.4	+32.5	27.6	36 17.5	+33.0	27.9	37 10.5	+33.5	28.3	38 03.2	+34.0	28.6	38 55.8	+34.5	29.0	39 48.2	+35.0	29.4	40 40.3	+35.6	29.8	41 32.2	+36.2	30.3	67
68	35 56.9	+32.0	26.5	36 50.5	+32.4	26.9	37 44.0	+32.9	27.2	38 37.2	+33.4	27.6	39 30.3	+33.9	28.0	40 23.2	+34.5	28.4	41 15.9	+35.0	28.8	42 08.4	+35.5	29.2	68
69	36 28.9	+31.3	25.5	37 22.9	+31.9	25.8	38 16.9	+32.3	26.2	39 10.6	+32.9	26.5	40 04.2	+33.4	26.9	40 57.7	+33.8	27.3	41 50.9	+34.3	27.7	42 43.9	+34.9	28.1	69
70	37 00.2	+30.8	24.4	37 54.8	+31.2	24.8	38 49.2	+31.7	25.1	39 43.5	+32.2	25.4	40 37.6	+32.7	25.8	41 31.5	+33.2	26.2	42 25.2	+33.8	26.6	43 18.8	+34.2	27.0	70
71	37 31.0	+30.2	23.4	38 26.0	+30.7	23.7	39 20.9	+31.1	24.0	40 15.7	+31.6	24.3	41 10.3	+32.2	24.7	42 04.7	+32.5	25.1	42 59.0	+33.0	25.5	43 53.0	+33.6	25.9	71
72	38 01.2	+29.6	22.3	38 56.7	+30.0	22.6	39 52.0	+30.5	22.9	40 47.3	+30.9	23.2	41 42.3	+31.4	23.6	42 37.2	+31.9	23.9	43 32.0	+32.3	24.3	44 26.6	+32.8	24.7	72
73	38 30.8	+29.0	21.2	39 26.7	+29.4	21.5	40 22.5	+29.8	21.8	41 18.2	+30.2	22.1	42 13.7	+30.7	22.4	43 09.1	+31.1	22.8	44 04.3	+31.7	23.1	44 59.4	+32.1	23.5	73
74	38 59.8	+28.3	20.0	39 56.1	+28.7	20.3	40 52.3	+29.1	20.6	41 48.4	+29.5	20.9	42 44.4	+30.0	21.3	43 40.2	+30.4	21.6	44 36.0	+30.8	22.0	45 31.5	+31.4	22.3	74
75	39 28.1	+27.6	18.9	40 24.8	+28.0	19.2	41 21.4	+28.4	19.5	42 17.9	+28.8	19.8	43 14.4	+29.2	20.1	44 10.6	+29.7	20.4	45 06.8	+30.1	20.7	46 02.9	+30.5	21.1	75
76	39 55.7	+26.9	17.7	40 52.8	+27.3	18.0	41 49.8	+27.7	18.3	42 46.7	+28.1	18.6	43 43.6	+28.4	18.9	44 40.3	+28.9	19.2	45 36.9	+29.3	19.5	46 33.4	+29.7	19.9	76
77	40 22.6	+26.2	16.6	41 20.1	+26.6	16.8	42 17.5	+26.9	17.1	43 14.8	+27.3	17.4	44 12.0	+27.7	17.6	45 09.2	+28.0	17.9	46 06.2	+28.4	18.3	47 03.1	+28.9	18.6	77
78	40 48.8	+25.5	15.6	41 46.7	+25.8	15.6	42 44.4	+26.1	15.9	43 42.1	+26.5	16.1	44 39.7	+26.8	16.4	45 37.2	+27.2	16.7	46 34.6	+27.6	17.0	47 32.0	+27.9	17.3	78
79	41 14.3	+24.7	14.2	42 12.5	+25.0	14.4	43 10.5	+25.4	14.6	44 08.6	+25.6	14.9	45 06.5	+26.0	15.1	46 04.4	+26.3	15.4	47 02.2	+26.7	15.7	47 59.9	+27.1	16.0	79
80	41 39.0	+24.0	13.0	42 37.5	+24.2	13.2	43 35.9	+24.5	13.4	44 34.2	+24.8	13.6	45 32.5	+25.1	13.9	46 30.7	+25.4	14.1	47 28.9	+25.7	14.4	48 27.0	+26.1	14.6	80
81	42 03.0	+23.1	11.7	43 01.7	+23.4	11.9	44 00.4	+23.6	12.1	44 59.0	+23.9	12.3	45 57.6	+24.2	12.6	46 56.1	+24.5	12.8	47 54.6	+24.8	13.0	48 53.1	+25.1	13.3	81
82	42 26.1	+22.3	10.5	43 25.1	+22.5	10.7	44 24.0	+22.8	10.8	45 22.9	+23.1	11.0	46 21.8	+23.3	11.2	47 20.6	+23.6	11.4	48 19.4	+23.8	11.7	49 18.2	+24.1	11.9	82
83	42 48.4	+21.5	9.2	43 47.6	+21.7	9.4	44 46.8	+21.9	9.5	45 46.0	+22.1	9.7	46 45.1	+22.3	9.9	47 44.2	+22.6	10.1	48 43.2	+22.9	10.3	49 42.3	+23.0	10.5	83
84	43 09.9	+20.6	8.1	44 09.3	+20.8	8.1	45 08.7	+21.0	8.2	46 08.1	+21.1	8.4	47 07.4	+21.4	8.5	48 06.8	+21.5	8.7	49 06.1	+21.7	8.8	50 05.3	+22.0	9.1	84
85	43 30.5	+19.8	6.7	44 30.1	+19.9	6.8	45 29.7	+20.0	6.9	46 29.2	+20.2	7.0	47 28.8	+20.3	7.2	48 28.3	+20.5	7.3	49 27.8	+20.7	7.4	50 27.3	+20.9	7.6	85
86	43 50.3	+18.8	5.4	44 50.0	+18.9	5.5	45 49.7	+19.1	5.5	46 49.4	+19.2	5.7	47 49.1	+19.4	5.8	48 48.8	+19.5	5.9	49 48.5	+19.6	6.0	50 48.2	+19.7	6.1	86
87	44 09.1	+17.9	4.0	45 08.9	+18.0	4.1	46 08.8	+18.1	4.2	47 08.6	+18.2	4.3	48 08.5	+18.3	4.3	49 08.3	+18.3	4.4	50 08.1	+18.5	4.5	51 07.9	+18.6	4.6	87
88	44 27.0	+17.0	2.7	45 26.9	+17.1	2.8	46 26.9	+17.1	2.8	47 26.8	+17.2	2.9	48 26.7	+17.2	2.9	49 26.6	+17.3	3.0	50 26.6	+17.3	3.0	51 26.5	+17.3	3.1	88
89	44 44.0	+16.0	1.4	45 44.0	+16.0	1.4	46 44.0	+16.0	1.4	47 43.9	+16.1	1.4	48 43.9	+16.1	1.5	49 43.9	+16.1	1.5	50 43.9	+16.1	1.5	51 43.8	+16.2	1.6	89
90	45 00.0	+15.0	0.0	46 00.0	+15.0	0.0	47 00.0	+15.0	0.0	48 00.0	+15.0	0.0	49 00.0	+15.0	0.0	50 00.0	+14.9	0.0	51 00.0	+14.9	0.0	52 00.0	+14.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }   LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 105°, 255°**

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Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	9 51.0	+43.0	100.0	9 40.5	+43.7	100.2	9 29.8	+44.5	100.3	9 19.0	+45.1	100.5	9 07.9	+45.9	100.7	8 56.8	+46.5	100.8	8 45.4	+47.2	101.0	8 33.9	+47.8	101.1	0
1	10 34.0	+42.9	99.3	10 24.2	+43.7	99.5	10 14.3	+44.3	99.7	10 04.1	+45.1	99.8	9 53.8	+45.7	100.0	9 43.3	+46.4	100.2	9 32.6	+47.1	100.3	9 21.7	+47.7	100.5	1
2	11 16.9	+42.8	98.6	11 07.9	+43.5	98.8	10 58.6	+44.3	99.0	10 49.2	+44.9	99.2	10 39.5	+45.7	99.3	10 29.7	+46.3	99.5	10 19.7	+47.0	99.7	10 09.4	+47.7	99.9	2
3	11 59.7	+42.7	97.9	11 51.4	+43.5	98.1	11 42.9	+44.2	98.3	11 34.1	+44.9	98.5	11 25.2	+45.6	98.7	11 16.0	+46.3	98.9	11 06.7	+46.9	99.1	10 57.1	+47.6	99.3	3
4	12 42.4	+42.6	97.1	12 34.9	+43.3	97.4	12 27.1	+44.0	97.6	12 19.0	+44.8	97.8	12 10.8	+45.5	98.0	12 02.3	+46.2	98.2	11 53.6	+46.8	98.4	11 44.7	+47.5	98.6	4
5	13 25.0	+42.5	96.4	13 18.2	+43.2	96.7	13 11.1	+44.0	96.9	13 03.8	+44.7	97.1	12 56.3	+45.3	97.4	12 48.5	+46.0	97.6	12 40.4	+46.8	97.8	12 32.2	+47.4	98.0	5
6	14 07.5	+42.3	95.7	14 01.4	+43.1	95.9	13 55.1	+43.8	96.2	13 48.5	+44.5	96.4	13 41.6	+45.3	96.7	13 34.5	+46.0	96.9	13 27.2	+46.6	97.2	13 19.6	+47.3	97.4	6
7	14 49.8	+42.1	95.0	14 44.5	+43.0	95.2	14 38.9	+43.7	95.5	14 33.0	+44.5	95.7	14 26.9	+45.2	96.0	14 20.5	+45.9	96.3	14 13.8	+46.6	96.5	14 06.9	+47.2	96.8	7
8	15 32.0	+42.1	94.2	15 27.5	+42.8	94.5	15 22.6	+43.6	94.8	15 17.5	+44.3	95.0	15 12.1	+45.0	95.3	15 06.4	+45.7	95.6	15 00.4	+46.4	95.9	14 54.1	+47.1	96.1	8
9	16 14.1	+41.9	93.5	16 10.3	+42.7	93.8	16 06.2	+43.4	94.1	16 01.8	+44.2	94.3	15 57.1	+44.9	94.6	15 52.1	+45.6	94.9	15 46.8	+46.3	95.2	15 41.2	+47.0	95.5	9
10	16 56.0	+41.7	92.7	16 53.0	+42.5	93.0	16 49.6	+43.3	93.3	16 46.0	+44.0	93.6	16 42.0	+44.8	93.9	16 37.7	+45.5	94.2	16 33.1	+46.2	94.5	16 28.2	+46.9	94.8	10
11	17 37.7	+41.6	92.0	17 35.5	+42.3	92.3	17 32.9	+43.1	92.6	17 30.0	+43.9	92.9	17 26.8	+44.6	93.2	17 23.2	+45.3	93.6	17 19.3	+46.1	93.9	17 15.1	+46.7	94.2	11
12	18 19.3	+41.3	91.2	18 17.8	+42.2	91.6	18 16.0	+43.0	91.9	18 13.9	+43.7	92.2	18 11.4	+44.4	92.5	18 08.5	+45.2	92.9	18 05.4	+45.9	93.2	18 01.8	+46.6	93.5	12
13	19 00.6	+41.2	90.5	19 00.0	+42.0	90.8	18 59.0	+42.7	91.2	18 57.6	+43.5	91.5	18 55.8	+44.3	91.8	18 53.7	+45.1	92.2	18 51.3	+45.7	92.5	18 48.4	+46.5	92.9	13
14	19 41.8	+41.0	89.7	19 42.0	+41.8	90.0	19 41.7	+42.6	90.4	19 41.1	+43.4	90.8	19 40.1	+44.1	91.1	19 38.8	+44.8	91.5	19 37.0	+45.6	91.8	19 34.9	+46.3	92.2	14
15	20 22.8	+40.8	88.9	20 23.8	+41.5	89.3	20 24.3	+42.4	89.7	20 24.5	+43.2	90.0	20 24.2	+44.0	90.4	20 23.6	+44.7	90.8	20 22.6	+45.5	91.1	20 21.2	+46.2	91.5	15
16	21 03.6	+40.6	88.1	21 05.3	+41.4	88.5	21 06.7	+42.2	88.9	21 07.7	+42.9	89.3	21 08.2	+43.8	89.7	21 08.3	+44.6	90.1	21 08.1	+45.2	90.4	21 07.4	+46.0	90.8	16
17	21 44.2	+40.3	87.3	21 46.7	+41.2	87.7	21 48.9	+42.0	88.1	21 50.6	+42.8	88.5	21 52.0	+43.5	88.9	21 52.9	+44.3	89.3	21 53.3	+45.1	89.7	21 53.4	+45.8	90.1	17
18	22 24.5	+40.1	86.5	22 27.9	+40.9	87.0	22 30.9	+41.7	87.4	22 33.4	+42.6	87.8	22 35.5	+43.4	88.2	22 37.2	+44.1	88.6	22 38.4	+44.9	89.0	22 39.2	+45.7	89.4	18
19	23 04.6	+39.8	85.7	23 08.8	+40.7	86.2	23 12.6	+41.5	86.6	23 16.0	+42.3	87.0	23 18.9	+43.1	87.4	23 21.3	+43.9	87.9	23 23.3	+44.7	88.3	23 24.9	+45.4	88.7	19
20	23 44.4	+39.6	84.9	23 49.5	+40.4	85.4	23 54.1	+41.3	85.8	23 58.3	+42.1	86.2	24 02.0	+42.9	86.7	24 05.2	+43.7	87.1	24 08.0	+44.5	87.6	24 10.3	+45.3	88.0	20
21	24 24.0	+39.3	84.1	24 29.9	+40.2	84.5	24 35.4	+41.0	85.0	24 40.4	+41.9	85.5	24 44.9	+42.7	85.9	24 48.9	+43.5	86.4	24 52.5	+44.3	86.8	24 55.6	+45.0	87.3	21
22	25 03.3	+39.1	83.3	25 10.1	+39.9	83.7	25 16.4	+40.8	84.2	25 22.3	+41.6	84.7	25 27.6	+42.4	85.1	25 32.4	+43.3	85.6	25 36.8	+44.0	86.1	25 40.6	+44.8	86.6	22
23	25 42.4	+38.7	82.4	25 50.0	+39.6	82.9	25 57.2	+40.5	83.4	26 03.9	+41.3	83.9	26 10.0	+42.2	84.4	26 15.7	+42.9	84.8	26 20.8	+43.8	85.3	26 25.4	+44.6	85.8	23
24	26 21.1	+38.4	81.6	26 29.6	+39.4	82.1	26 37.7	+40.2	82.6	26 45.2	+41.0	83.1	26 52.2	+41.9	83.6	26 58.6	+42.8	84.1	27 04.6	+43.5	84.6	27 10.0	+44.3	85.1	24
25	26 59.5	+38.2	80.7	27 09.0	+39.0	81.2	27 17.9	+39.9	81.7	27 26.2	+40.8	82.2	27 34.1	+41.6	82.8	27 41.4	+42.4	83.3	27 48.1	+43.3	83.8	27 54.3	+44.1	84.3	25
26	27 37.7	+37.8	79.8	27 48.0	+38.7	80.4	27 57.8	+39.5	80.9	28 07.0	+40.5	81.4	28 15.7	+41.3	81.9	28 23.8	+42.2	82.5	28 31.4	+43.0	83.0	28 38.4	+43.8	83.6	26
27	28 15.5	+37.4	79.0	28 26.7	+38.3	79.5	28 37.3	+39.3	80.0	28 47.5	+40.1	80.6	28 57.0	+41.0	81.1	29 06.0	+41.9	81.7	29 14.4	+42.7	82.2	29 22.2	+43.6	82.8	27
28	28 52.9	+37.1	78.1	29 05.0	+38.1	78.6	29 16.6	+38.9	79.2	29 27.6	+39.8	79.7	29 38.0	+40.7	80.3	29 47.9	+41.5	80.8	29 57.1	+42.4	81.4	30 05.8	+43.2	82.0	28
29	29 30.0	+36.8	77.2	29 43.1	+37.6	77.7	29 55.5	+38.6	78.3	30 07.4	+39.5	78.9	30 18.7	+40.4	79.4	30 29.4	+41.3	80.0	30 39.5	+42.1	80.6	30 49.0	+43.0	81.2	29
30	30 06.8	+36.3	76.3	30 20.7	+37.3	76.8	30 34.1	+38.2	77.4	30 46.9	+39.1	78.0	30 59.1	+40.0	78.6	31 10.7	+40.9	79.2	31 21.6	+41.8	79.8	31 32.0	+42.6	80.4	30
31	30 43.1	+36.0	75.3	30 58.0	+36.9	75.9	31 12.3	+37.8	76.5	31 26.0	+38.7	77.1	31 39.1	+39.6	77.7	31 51.6	+40.5	78.3	32 03.4	+41.4	78.9	32 14.6	+42.3	79.5	31
32	31 19.1	+35.5	74.4	31 34.9	+36.5	75.0	31 50.1	+37.4	75.6	32 04.7	+38.4	76.2	32 18.7	+39.3	76.8	32 32.1	+40.2	77.4	32 44.8	+41.1	78.1	32 56.9	+42.0	78.7	32
33	31 54.6	+35.1	73.5	32 11.4	+36.0	74.1	32 27.5	+37.1	74.7	32 43.1	+37.9	75.3	32 58.0	+38.9	75.9	33 12.3	+39.8	76.5	33 25.9	+40.7	77.2	33 38.9	+41.6	77.8	33
34	32 29.7	+34.7	72.5	32 47.4	+35.7	73.1	33 04.6	+36.6	73.7	33 21.0	+37.6	74.4	33 36.9	+38.5	75.0	33 52.1	+39.4	75.6	34 06.6	+40.4	76.3	34 20.5	+41.2	77.0	34
35	33 04.4	+34.2	71.5	33 23.1	+35.2	72.2	33 41.2	+36.1	72.8	33 58.6	+37.1	73.4	34 15.4	+38.0	74.1	34 31.5	+39.0	74.7	34 47.0	+39.9	75.4	35 01.7	+40.9	76.1	35
36	33 38.6	+33.7	70.5	33 58.3	+34.7	71.2	34 17.3	+35.7	71.8	34 35.7	+36.7	72.5	34 53.4	+37.6	73.1	35 10.5	+38.6	73.8	35 26.9	+39.5	74.5	35 42.6	+40.4	75.2	36
37	34 12.3	+33.3	69.6	34 33.0	+34.2	70.2	34 53.0	+35.2	70.8	35 12.4	+36.1	71.5	35 31.0	+37.2	72.2	35 49.1	+38.1	72.9	36 06.4	+39.1	73.6	36 23.0	+40.0	74.3	37
38	34 45.6	+32.7	68.5	35 07.2	+33.8	69.2	35 28.2	+34.7	69.9	35 48.5	+35.8	70.5	36 08.2	+36.7	71.2	36 27.2	+37.6	71.9	36 45.5	+38.6	72.6	37 03.0	+39.6	73.3	38
39	35 18.3	+32.3	67.5	35 41.0	+33.2	68.2	36 02.9	+34.3	68.9	36 24.3	+35.2	69.5	36 44.9	+36.2	70.2	37 04.8	+37.2	70.9	37 24.1	+38.1	71.7	37 42.6	+39.1	72.4	39
40	35 50.6	+31.6	66.5	36 14.2	+32.7	67.2	36 37.2	+33.6	67.8	36 59.5	+34.6	68.5	37 21.1	+35.7	69.2	37 42.0	+36.7	70.0	38 02.2	+37.7	70.7	38 21.7	+38.6	71.4	40
41	36 22.2	+31.2	65.4	36 46.9	+32.1	66.1	37 10.8	+33.2	66.8	37 34.1	+34.2	67.5	37 56.8	+35.1	68.2	38 18.7	+36.1	68.9	38 39.9	+37.1	69.7	39 00.3	+38.1	70.5	41
42	36 53.4	+30.5	64.4	37 19.0	+31.6	65.1	37 44.0	+32.6	65.7	38 08.3	+33.6	66.5	38 31.9	+34.6	67.2	38 54.8	+35.6	67.9	39 17.0	+36.6	68.7	39 38.4	+37.6	69.5	42
43	37 23.9	+30.0	63.3	37 50.6	+30.9	64.0	38 16.6	+31.9	64.7	38 41.9	+33.0	65.4	39 06.5	+34.0	66.1	39 30.4	+35.0	66.9	39 53.6	+36.0	67.7	40 16.0	+37.1	68.4	43
44	37 53.9	+29.3	62.2	38 21.5	+30.4	62.9	38 48.5	+31.4	63.6	39 14.9	+32.4	64.3	39 40.5	+33.4	65.1	40 05.4	+34.5	65.8	40 29.6	+35.5	66.6	40 53.1	+36.5	67.4	44
45	38 23.2	+28.7	61.1	38 51.9	+29.7	61.8	39 19.9	+30.8	62.5	39 47.3	+31.8	63.2	40 13.9	+32.9	64.0	40 39.9	+33.8	64.8	41 05.1	+34.9	65.5	41 29.6	+35.9	66.3	45
46	38 51.9	+28.0	60.0	39 21.6	+29.1	60.7	39 50.7	+30.1	61.4	40 19.1	+31.1	62.1	40 46.8	+32.1	62.9	41 13.7	+33.2	63.7	41 40.0	+34.2	64.5	42 05.5	+35.3	65.3	46
47	39 19.9	+27.4	58.8	39 50.7	+28.4	59.5	40 20.8	+29.4	60.3	40 50.2	+30.5	61.0	41 18.9	+31.5	61.8	41 46.9	+32.6	62.6	42 14.2	+33.6	63.4	42 40.8	+34.6	64.2	47
48	39 47.3	+26.6	57.7	40 19.1	+27.7	58.4	40 50.2	+28.7	59.1	41 20.7	+29.7	59.9	41 50.4	+30.9	60.6	42 19.5	+31.9	61.4	42 47.8	+33.0	62.2	43 15.4	+34.0	63.1	48
49	40 13.9	+26.0	56.5	40 46.8	+26.9	57.2	41 18.9	+28.0	57.9	41 50.4	+29.1	58.7	42 21.3	+30.1	59.5	42 51.4	+31.1	60.3	43 20.8	+32.2	61.1	43 49.4	+33.3	61.9	49
50	40 39.9	+25.2	55.3	41 13.7	+26.3	56.0	41 46.9	+27.3	56.8	42 19.5	+28.3	57.5	42 51.4	+29.4	58.3	43 22.5	+30.5	59.1	43 53.0	+31.5	59.9	44 22.7	+32.6	60.8	50
51	41 05.1	+24.5	54.1	41 40.0	+25.5	54.8	42 14.2	+26.6	55.6	42 47.8	+27.6	56.3	43 20.8	+28.6	57.1	43 53.0	+29.7	57.9	44 24.5	+30.8	58.7	44 55.3	+31.8	59.6	51
52	41 29.6	+23.6	52.9	42 05.5	+24.7	53.6	42 40.8	+25.7	54.3	43 15.4	+26.8	55.1	43 49.4	+27.8	55.9	44 22.7	+28.9	56.7	44 55.3	+29.9	57.5	45 27.1	+31.1	58.4	52
53	41 53.2	+22.9	51.7	42 30.2	+23.9	52.4	43 06.5	+24.9	53.1	43 42.2	+26.0	53.9	44 17.2	+27.1	54.7	44 51.6	+28.1	55.5	45 25.2	+29.2	56.3	45 58.2	+30.2	57.2	53
54	42 16.1	+22.1	50.4	42 54.1	+23.1	51.1	43 31.4	+24.1	51.9	44 08.2	+25.1	52.6	44 44.3	+26.2	53.4	45 19.7	+27.3	54.2	45 54.4	+28.4	55.0	46 28.4	+29.5	55.9	54
55	42 38.2	+21.2	49.2	43 17.2	+22.2	49.9	43 55.5	+23.3	50.6	44 33.3	+24.3	51.4	45 10.5	+25.3	52.1	45 47.0	+26.4	52.9	46 22.8	+27.5	53.8	46 57.9	+28.5	54.6	55
56	42 59.4	+20.4	47.9	43 39.4	+21.4	48.6	44 18.8	+22.4	49.3	44 57.6	+23.4	50.1	45 35.8	+24.5	50.8	46 13.4	+25.5	51.7	46 50.3	+26.6	52.5	47 26.4	+27.7	53.3	56
57	43 19.8	+19.5	46.6	44 00.8	+20.4	47.3	44 41.2	+21.5	48.0	45 21.0	+22.5	48.8	46 00.3	+23.5	49.5	46 38.9	+24.6	50.3	47 16.9	+25.6	51.2	47 54.1	+26.8	52.0	57
58	43 39.3	+18.6	45.3	44 21.2	+19.6	46.0	45 02.7	+20.5	46.7	45 43.5	+21.6	47.4	46 23.8	+22.6	48.2	47 03.5	+23.7	49.0	47 42.5	+24.8	49.8	48 20.9	+25.8	50.7	58
59	43 57.9	+17.6	44.0	44 40.8	+18.6	44.7	45 23.2	+19.7	45.4	46 05.1	+20.6	46.1	46 46.4	+21.7	46.9	47 27.2	+22.7	47.6	48 07.3	+23.7	48.5	48 46.7	+24.8	49.3	59
60	44 15.5	+16.8	42.6	44 59.4	+17.7	43.3	45 42.9	+18.6	44.0	46 25.7	+19.7	44.7	47 08.1	+20.6	45.5	47 49.9	+21.6	46.3	48 31.0	+22.8	47.1	49 11.5	+23.9	47.9	60
61	44 32.3	+15.8	41.3	45 17.1	+16.8	42.0	46 01.5	+17.7	42.6	46 45.4	+18.6	43.4	47 28.7	+19.7	44.1	48 11.5	+20.7	44.9	48 53.8	+21.7	45.7	49 35.4	+22.7	46.5	61
62	44 48.1	+14.8	39.9	45 33.9	+15.7	40.6	46 19.2	+16.7	41.3	47 04.0	+17.7	42.0	47 48.4	+18.6	42.7	48 32.2	+19.6	43.5	49 15.5	+20.6	44.3	49 58.1	+21.7	45.1	62
63	45 02.9	+13.8	38.6	45 49.6	+14.7	39.2	46 35.9	+15.6	39.9	47 21.7	+16.5	40.6	48 07.0	+17.6	41.3	48 51.8	+18.6	42.0	49 36.1	+19.6	42.8	50 19.8	+20.6	43.6	63
64	45 16.7	+12.8	37.2	46 04.3	+13.7	37.8	46 51.5	+14.6	38.5	47 38.2	+15.6	39.1	48 24.6	+16.4	39.8	49 10.4	+17.4	40.6	49 55.7	+18.4	41.4	50 40.4	+19.5	42.2	64
65	45 29.5	+11.8	35.8	46 18.0	+12.6	36.4	47 06.1	+13.5	37.0	47 53.8	+14.4	37.7	48 41.0	+15.4	38.4	49 27.8	+16.3	39.1	50 14.1	+17.3	39.9	50 59.9	+18.3	40.7	65
66	45 41.3	+10.8	34.4	46 30.6	+11.6	35.0	47 19.6	+12.5	35.6	48 08.2	+13.3	36.3	48 56.4	+14.2	36.9	49 44.1	+15.2	37.6	50 31.4	+16.1	38.4	51 18.2	+17.1	39.1	66
67	45 52.1	+9.7	33.0	46 42.2	+10.6	33.6	47 32.1	+11.3	34.2	48 21.5	+12.2	34.8	49 10.6	+13.1	35.4	49 59.3	+14.0	36.1	50 47.5	+14.9	36.9	51 35.3	+15.9	37.6	67
68	46 01.8	+8.6	31.6	46 52.8	+9.4	32.1	47 43.4	+10.2	32.7	48 33.7	+11.1	33.3	49 23.7	+11.9	34.0	50 13.3	+12.7	34.6	51 02.4	+13.7	35.3	51 51.2	+14.6	36.0	68
69	46 10.4	+7.6	30.1	47 02.2	+8.3	30.7	47 53.6	+9.1	31.2	48 44.8	+9.9	31.8	49 35.6	+10.7	32.4	50 26.0	+11.6	33.1	51 16.1	+12.5	33.8	52 05.8	+13.4	34.5	69
70	46 18.0	+6.5	28.7	47 10.5	+7.2	29.2	48 02.7	+8.0	29.8	48 54.7	+8.7	30.3	49 46.3	+9.5	30.9	50 37.6	+10.4	31.5	51 28.6	+11.2	32.2	52 19.2	+12.0	32.9	70
71	46 24.5	+5.4	27.3	47 17.7	+6.1	27.8	48 10.7	+6.8	28.3	49 03.4	+7.6	28.8	49 55.8	+8.3	29.4	50 48.0	+9.0	30.0	51 39.8	+9.9	30.6	52 31.2	+10.8	31.3	71
72	46 29.9	+4.3	25.8	47 23.8	+5.0	26.3	48 17.5	+5.7	26.8	49 11.0	+6.3	27.3	50 04.1	+7.1	27.8	50 57.0	+7.9	28.4	51 49.7	+8.6	29.0	52 42.0	+9.4	29.7	72
73	46 34.2	+3.3	24.4	47 28.8	+3.8	24.8	48 23.2	+4.4	25.3	49 17.3	+5.1	25.8	50 11.2	+5.8	26.3	51 04.9	+6.5	26.8	51 58.3	+7.3	27.4	52 51.4	+8.0	28.0	73
74	46 37.5	+2.1	22.9	47 32.6	+2.7	23.3	48 27.6	+3.3	23.8	49 22.4	+4.0	24.3	50 17.0	+4.6	24.7	51 11.4	+5.3	25.3	52 05.6	+5.9	25.8	52 59.4	+6.7	26.4	74
75	46 39.6	+1.0	21.5	47 35.3	+1.6	21.9	48 30.9	+2.2	22.3	49 26.4	+2.7	22.7	50 21.6	+3.3	23.2	51 16.7	+3.9	23.7	52 11.5	+4.6	24.2	53 06.1	+5.4	24.7	75
76	46 40.6	-0.1	20.0	47 36.9	+0.4	20.4	48 33.1	+0.9	20.8	49 29.1	+1.5	21.2	50 24.9	+2.1	21.6	51 20.6	+2.7	22.1	52 16.1	+3.3	22.6	53 11.5	+3.9	23.1	76
77	46 40.5	-1.3	18.5	47 37.3	-0.8	18.9	48 34.0	-0.3	19.3	49 30.6	+0.2	19.6	50 27.0	+0.8	20.0	51 23.3	+1.3	20.5	52 19.4	+1.9	20.9	53 15.4	+2.5	21.4	77
78	46 39.2	-2.3	17.1	47 36.5	-1.9	17.4	48 33.7	-1.4	17.7	49 30.8	-0.9	18.1	50 27.8	-0.5	18.5	51 24.6	+0.1	18.9	52 21.3	+0.6	19.3	53 17.9	+1.1	19.7	78
79	46 36.9	-3.4	15.6	47 34.6	-3.0	15.9	48 32.3	-2.6	16.2	49 29.9	-2.2	16.6	50 27.3	-1.7	16.9	51 24.7	-1.3	17.3	52 21.9	-0.8	17.6	53 19.0	-0.3	18.1	79
80	46 33.5	-4.6	14.2	47 31.6	-4.2	14.4	48 29.7	-3.8	14.7	49 27.7	-3.4	15.0	50 25.6	-3.0	15.3	51 23.4	-2.6	15.7	52 21.1	-2.1	16.0	53 18.7	-1.7	16.4	80
81	46 28.9	-5.6	12.7	47 27.4	-5.3	13.0	48 25.9	-5.0	13.2	49 24.3	-4.7	13.5	50 22.6	-4.3	13.8	51 20.8	-3.9	14.1	52 19.0	-3.5	14.4	53 17.0	-3.1	14.7	81
82	46 23.3	-6.7	11.3	47 22.1	-6.4	11.5	48 20.9	-6.1	11.7	49 19.6	-5.8	12.0	50 18.3	-5.5	12.2	51 16.9	-5.2	12.5	52 15.5	-4.9	12.7	53 13.9	-4.4	13.0	82
83	46 16.6	-7.8	9.9	47 15.7	-7.6	10.0	48 14.8	-7.3	10.2	49 13.8	-7.1	10.4	50 12.8	-6.8	10.6	51 11.7	-6.5	10.9	52 10.6	-6.2	11.1	53 09.5	-5.9	11.4	83
84	46 08.8	-8.9	8.4	47 08.1	-8.6	8.6	48 07.5	-8.5	8.7	49 06.7	-8.2	8.9	50 06.0	-8.0	9.1	51 05.2	-7.7	9.3	52 04.4	-7.5	9.5	53 03.6	-7.3	9.7	84
85	45 59.9	-9.9	7.0	46 59.5	-9.8	7.1	47 59.0	-9.6	7.3	48 58.5	-9.4	7.4	49 58.0	-9.2	7.6	50 57.5	-9.1	7.7	51 56.9	-8.8	7.9	52 56.3	-8.6	8.1	85
86	45 50.0	-11.0	5.6	46 49.7	-10.8	5.7	47 49.4	-10.7	5.8	48 49.1	-10.6	5.9	49 48.8	-10.4	6.0	50 48.4	-10.2	6.1	51 48.1	-10.1	6.3	52 47.7	-9.9	6.4	86
87	45 39.0	-12.0	4.2	46 38.9	-11.9	4.2	47 38.7	-11.8	4.3	48 38.5	-11.7	4.4	49 38.4	-11.7	4.5	50 38.2	-11.5	4.6	51 38.0	-11.4	4.7	52 37.8	-11.3	4.8	87
88	45 27.0	-13.0	2.8	46 27.0	-13.0	2.8	47 26.9	-12.9	2.9	48 26.8	-12.8	2.9	49 26.7	-12.8	3.0	50 26.7	-12.8	3.0	51 26.6	-12.7	3.1	52 26.5	-12.6	3.2	88
89	45 14.0	-14.0	1.4	46 14.0	-14.0	1.4	47 14.0	-14.0	1.4	48 14.0	-14.0	1.5	49 13.9	-13.9	1.5	50 13.9	-13.9	1.5	51 13.9	-13.9	1.5	52 13.9	-13.9	1.6	89
90	45 00.0	-15.0	0.0	46 00.0	-15.0	0.0	47 00.0	-15.0	0.0	48 00.0	-15.1	0.0	49 00.0	-15.1	0.0	50 00.0	-15.1	0.0	51 00.0	-15.1	0.0	52 00.0	-15.1	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	9 51.0	−43.1	100.0	9 40.5	−43.8	100.2	9 29.8	−44.5	100.3	9 19.0	−45.3	100.5	9 07.9	−45.9	100.7	8 56.8	−46.6	100.8	8 45.4	−47.2	101.0	8 33.9	−47.8	101.1	0
1	9 07.9	−43.2	100.7	8 56.7	−43.9	100.9	8 45.3	−44.6	101.0	8 33.7	−45.3	101.2	8 22.0	−45.9	101.3	8 10.2	−46.6	101.5	7 58.2	−47.2	101.6	7 46.1	−47.9	101.7	1
2	8 24.7	−43.3	101.4	8 12.8	−44.0	101.5	8 00.7	−44.7	101.7	7 48.4	−45.3	101.8	7 36.1	−46.0	102.0	7 23.6	−46.7	102.1	7 11.0	−47.4	102.2	6 58.2	−47.9	102.3	2
3	7 41.4	−43.3	102.1	7 28.8	−44.1	102.2	7 16.0	−44.7	102.4	7 03.1	−45.4	102.5	6 50.1	−46.1	102.6	6 36.9	−46.7	102.7	6 23.6	−47.3	102.8	6 10.3	−48.0	102.9	3
4	6 58.1	−43.4	102.8	6 44.7	−44.0	102.9	6 31.3	−44.8	103.0	6 17.7	−45.5	103.1	6 04.0	−46.1	103.2	5 50.2	−46.8	103.4	5 36.3	−47.4	103.4	5 22.3	−48.0	103.5	4
5	6 14.7	−43.4	103.5	6 00.7	−44.2	103.6	5 46.5	−44.8	103.7	5 32.2	−45.5	103.8	5 17.9	−46.2	103.9	5 03.4	−46.8	104.0	4 48.9	−47.4	104.1	4 34.3	−48.1	104.1	5
6	5 31.3	−43.5	104.2	5 16.5	−44.2	104.3	5 01.7	−44.9	104.4	4 46.7	−45.5	104.5	4 31.7	−46.2	104.5	4 16.6	−46.8	104.6	4 01.5	−47.5	104.7	3 46.2	−48.1	104.7	6
7	4 47.8	−43.6	104.9	4 32.3	−44.2	105.0	4 16.8	−44.9	105.1	4 01.2	−45.6	105.1	3 45.5	−46.2	105.2	3 29.8	−46.9	105.2	3 14.0	−47.5	105.3	2 58.1	−48.0	105.3	7
8	4 04.2	−43.5	105.6	3 48.1	−44.2	105.6	3 31.9	−44.9	105.7	3 15.6	−45.6	105.8	2 59.3	−46.2	105.8	2 42.9	−46.8	105.9	2 26.5	−47.5	105.9	2 10.1	−48.1	105.9	8
9	3 20.7	−43.6	106.3	3 03.9	−44.3	106.3	2 47.0	−45.0	106.4	2 30.0	−45.6	106.4	2 13.1	−46.3	106.4	1 56.1	−46.9	106.5	1 39.0	−47.5	106.5	1 22.0	−48.2	106.5	9
10	2 37.1	−43.6	107.0	2 19.6	−44.3	107.0	2 02.0	−45.0	107.0	1 44.4	−45.6	107.1	1 26.8	−46.3	107.1	1 09.2	−46.9	107.1	0 51.5	−47.5	107.1	0 33.8	−48.1	107.1	10
11	1 53.5	−43.7	107.6	1 35.3	−44.3	107.7	1 17.0	−44.9	107.7	0 58.8	−45.6	107.7	0 40.5	−46.2	107.7	0 22.3	−46.9	107.7	0 04.0	−47.5	107.7	0 14.3	+48.1	72.3	11
12	1 09.8	−43.6	108.3	0 51.0	−44.4	108.3	0 32.1	−45.0	108.4	0 13.2	−45.7	108.4	0 05.7	+46.3	71.6	0 24.6	+46.9	71.6	0 43.5	+47.5	71.7	1 02.4	+48.1	71.7	12
13	0 26.2	−43.7	109.0	0 06.6	−44.3	109.0	0 12.9	+45.0	71.0	0 32.5	+45.6	71.0	0 52.0	+46.3	71.0	1 11.5	+46.9	71.0	1 31.0	+47.5	71.0	1 50.5	+48.1	71.1	13
14	0 17.5	+43.6	70.3	0 37.7	+44.3	70.3	0 57.9	+45.0	70.3	1 18.1	+45.6	70.3	1 38.3	+46.2	70.4	1 58.4	+46.9	70.4	2 18.5	+47.5	70.4	2 38.6	+48.1	70.5	14
15	1 01.1	+43.7	69.6	1 22.0	+44.3	69.6	1 42.9	+44.9	69.7	2 03.7	+45.6	69.7	2 24.5	+46.3	69.7	2 45.3	+46.8	69.8	3 06.0	+47.5	69.8	3 26.7	+48.0	69.9	15
16	1 44.8	+43.6	68.9	2 06.3	+44.3	69.0	2 27.8	+45.0	69.0	2 49.3	+45.6	69.0	3 10.8	+46.2	69.1	3 32.1	+46.9	69.1	3 53.5	+47.4	69.2	4 14.7	+48.1	69.3	16
17	2 28.4	+43.6	68.2	2 50.6	+44.3	68.3	3 12.8	+44.9	68.3	3 34.9	+45.6	68.4	3 57.0	+46.1	68.5	4 19.0	+46.8	68.5	4 40.9	+47.4	68.6	5 02.8	+48.0	68.7	17
18	3 12.0	+43.6	67.6	3 34.9	+44.2	67.6	3 57.7	+44.9	67.7	4 20.5	+45.5	67.7	4 43.1	+46.2	67.8	5 05.8	+46.7	67.9	5 28.3	+47.4	68.0	5 50.8	+47.9	68.1	18
19	3 55.6	+43.5	66.9	4 19.1	+44.2	66.9	4 42.6	+44.8	67.1	5 06.0	+45.5	67.1	5 29.3	+46.1	67.2	5 52.5	+46.8	67.3	6 15.7	+47.3	67.4	6 38.7	+47.9	67.5	19
20	4 39.1	+43.5	66.2	5 03.3	+44.2	66.3	5 27.4	+44.8	66.3	5 51.5	+45.4	66.4	6 15.4	+46.1	66.5	6 39.3	+46.6	66.6	7 03.0	+47.3	66.7	7 26.6	+47.9	66.9	20
21	5 22.6	+43.4	65.5	5 47.5	+44.1	65.6	6 12.2	+44.8	65.7	6 36.9	+45.4	65.8	7 01.5	+46.0	65.9	7 25.9	+46.6	66.0	7 50.3	+47.2	66.1	8 14.5	+47.8	66.2	21
22	6 06.0	+43.5	64.8	6 31.6	+44.0	64.9	6 57.0	+44.7	65.0	7 22.3	+45.3	65.1	7 47.5	+45.9	65.2	8 12.5	+46.6	65.4	8 37.5	+47.1	65.5	9 02.3	+47.8	65.6	22
23	6 49.5	+43.3	64.1	7 15.6	+44.0	64.2	7 41.7	+44.6	64.3	8 07.6	+45.3	64.5	8 33.4	+45.9	64.6	8 59.1	+46.5	64.7	9 24.6	+47.1	64.9	9 50.1	+47.6	65.0	23
24	7 32.8	+43.3	63.4	7 59.6	+43.9	63.5	8 26.3	+44.6	63.7	8 52.9	+45.1	63.8	9 19.3	+45.8	63.9	9 45.6	+46.4	64.1	10 11.7	+47.1	64.2	10 37.7	+47.6	64.4	24
25	8 16.1	+43.2	62.7	8 43.5	+43.9	62.8	9 10.9	+44.4	63.0	9 38.0	+45.2	63.1	10 05.1	+45.7	63.3	10 32.0	+46.3	63.4	10 58.8	+46.9	63.6	11 25.3	+47.6	63.8	25
26	8 59.3	+43.1	62.0	9 27.4	+43.7	62.1	9 55.3	+44.4	62.3	10 23.2	+45.0	62.5	10 50.8	+45.7	62.6	11 18.3	+46.3	62.8	11 45.7	+46.9	63.0	12 12.9	+47.4	63.2	26
27	9 42.4	+43.0	61.3	10 11.1	+43.7	61.4	10 39.7	+44.4	61.6	11 08.2	+44.9	61.8	11 36.5	+45.5	62.0	12 04.6	+46.2	62.1	12 32.6	+46.7	62.3	13 00.3	+47.4	62.5	27
28	10 25.4	+43.0	60.6	10 54.8	+43.6	60.8	11 24.1	+44.2	60.9	11 53.1	+44.9	61.1	12 22.0	+45.5	61.3	12 50.8	+46.0	61.5	13 19.3	+46.7	61.7	13 47.7	+47.2	61.9	28
29	11 08.4	+42.8	59.9	11 38.4	+43.5	60.0	12 08.3	+44.1	60.2	12 38.0	+44.7	60.4	13 07.5	+45.4	60.6	13 36.8	+46.0	60.8	14 06.0	+46.5	61.0	14 34.9	+47.2	61.3	29
30	11 51.2	+42.7	59.2	12 21.9	+43.3	59.3	12 52.4	+44.0	59.5	13 22.7	+44.6	59.7	13 52.9	+45.2	59.9	14 22.8	+45.9	60.2	14 52.5	+46.5	60.4	15 22.1	+47.0	60.6	30
31	12 33.9	+42.6	58.4	13 05.2	+43.3	58.6	13 36.4	+43.9	58.8	14 07.3	+44.5	59.1	14 38.1	+45.1	59.3	15 08.7	+45.7	59.5	15 39.0	+46.3	59.7	16 09.1	+46.9	60.0	31
32	13 16.5	+42.5	57.7	13 48.5	+43.1	57.9	14 20.3	+43.7	58.1	14 51.8	+44.4	58.4	15 23.2	+45.0	58.6	15 54.4	+45.6	58.8	16 25.3	+46.2	59.1	16 56.0	+46.8	59.3	32
33	13 59.0	+42.4	57.0	14 31.6	+43.0	57.2	15 04.0	+43.7	57.4	15 36.2	+44.3	57.7	16 08.2	+44.9	57.9	16 40.0	+45.5	58.2	17 11.5	+46.1	58.4	17 42.8	+46.7	58.7	33
34	14 41.4	+42.2	56.3	15 14.6	+42.9	56.5	15 47.7	+43.4	56.7	16 20.5	+44.1	57.0	16 53.1	+44.7	57.2	17 25.5	+45.3	57.5	17 57.6	+45.9	57.7	18 29.5	+46.5	58.0	34
35	15 23.6	+42.1	55.5	15 57.5	+42.7	55.8	16 31.1	+43.4	56.0	17 04.6	+44.0	56.3	17 37.8	+44.6	56.5	18 10.8	+45.2	56.8	18 43.5	+45.8	57.1	19 16.0	+46.4	57.3	35
36	16 05.7	+41.9	54.8	16 40.2	+42.6	55.0	17 14.5	+43.2	55.3	17 48.6	+43.8	55.5	18 22.4	+44.4	55.8	18 56.0	+45.0	56.1	19 29.3	+45.7	56.4	20 02.4	+46.3	56.7	36
37	16 47.6	+41.8	54.0	17 22.8	+42.4	54.3	17 57.7	+43.0	54.5	18 32.4	+43.6	54.8	19 06.8	+44.3	55.1	19 41.0	+44.9	55.4	20 15.0	+45.4	55.7	20 48.7	+46.0	56.0	37
38	17 29.4	+41.6	53.3	18 05.2	+42.2	53.5	18 40.7	+42.8	53.8	19 16.0	+43.5	54.1	19 51.1	+44.0	54.4	20 25.9	+44.7	54.7	21 00.4	+45.3	55.0	21 34.7	+45.9	55.3	38
39	18 11.0	+41.4	52.5	18 47.4	+42.0	52.8	19 23.5	+42.7	53.1	19 59.5	+43.3	53.4	20 35.1	+43.9	53.7	21 10.6	+44.5	54.0	21 45.7	+45.2	54.3	22 20.6	+45.7	54.6	39
40	18 52.4	+41.2	51.8	19 29.4	+41.9	52.0	20 06.2	+42.5	52.3	20 42.8	+43.0	52.6	21 19.0	+43.8	52.9	21 55.1	+44.3	53.2	22 30.9	+44.9	53.6	23 06.3	+45.6	53.9	40
41	19 33.6	+41.0	51.0	20 11.3	+41.6	51.3	20 48.7	+42.3	51.6	21 25.8	+42.9	51.9	22 02.8	+43.5	52.2	22 39.4	+44.1	52.5	23 15.8	+44.7	52.9	23 51.9	+45.3	53.2	41
42	20 14.6	+40.9	50.2	20 52.9	+41.5	50.5	21 31.0	+42.0	50.8	22 08.7	+42.7	51.1	22 46.3	+43.3	51.4	23 23.5	+43.9	51.8	24 00.5	+44.5	52.1	24 37.2	+45.1	52.5	42
43	20 55.5	+40.6	49.4	21 34.4	+41.2	49.7	22 13.0	+41.9	50.0	22 51.4	+42.5	50.4	23 29.6	+43.0	50.7	24 07.4	+43.7	51.0	24 45.0	+44.3	51.4	25 22.3	+44.9	51.8	43
44	21 36.1	+40.4	48.7	22 15.6	+41.0	49.0	22 54.9	+41.6	49.3	23 33.9	+42.2	49.6	24 12.6	+42.9	49.9	24 51.1	+43.5	50.3	25 29.3	+44.1	50.6	26 07.2	+44.7	51.0	44
45	22 16.5	+40.1	47.9	22 56.6	+40.8	48.2	23 36.5	+41.4	48.5	24 16.1	+42.0	48.8	24 55.5	+42.6	49.2	25 34.6	+43.2	49.5	26 13.4	+43.8	49.9	26 51.9	+44.4	50.3	45
46	22 56.6	+39.9	47.0	23 37.4	+40.5	47.4	24 17.9	+41.1	47.7	24 58.1	+41.8	48.0	25 38.1	+42.4	48.4	26 17.8	+43.0	48.7	26 57.2	+43.6	49.1	27 36.3	+44.2	49.5	46
47	23 36.5	+39.6	46.2	24 17.9	+40.2	46.5	24 59.0	+40.9	46.9	25 39.9	+41.5	47.2	26 20.5	+42.1	47.6	27 00.8	+42.7	48.0	27 40.8	+43.3	48.4	28 20.5	+44.0	48.8	47
48	24 16.1	+39.4	45.4	24 58.1	+40.0	45.7	25 39.9	+40.6	46.1	26 21.4	+41.2	46.4	27 02.6	+41.8	46.8	27 43.5	+42.4	47.2	28 24.1	+43.1	47.6	29 04.5	+43.6	48.0	48
49	24 55.5	+39.1	44.6	25 38.1	+39.7	44.9	26 20.5	+40.3	45.3	27 02.6	+40.9	45.6	27 44.4	+41.5	46.0	28 25.9	+42.2	46.4	29 07.2	+42.8	46.8	29 48.1	+43.4	47.2	49
50	25 34.6	+38.8	43.7	26 17.8	+39.4	44.1	27 00.8	+40.0	44.4	27 43.5	+40.6	44.8	28 25.9	+41.3	45.2	29 08.1	+41.9	45.6	29 50.0	+42.4	46.0	30 31.5	+43.1	46.4	50
51	26 13.4	+38.5	42.9	26 57.2	+39.1	43.2	27 40.8	+39.7	43.6	28 24.1	+40.4	44.0	29 07.2	+40.9	44.3	29 50.0	+41.5	44.7	30 32.4	+42.2	45.2	31 14.6	+42.7	45.6	51
52	26 51.9	+38.2	42.0	27 36.3	+38.8	42.4	28 20.5	+39.4	42.7	29 04.5	+40.0	43.1	29 48.1	+40.6	43.5	30 31.5	+41.2	43.9	31 14.6	+41.8	44.3	31 57.3	+42.5	44.8	52
53	27 30.1	+37.8	41.2	28 15.1	+38.5	41.5	28 59.9	+39.1	41.9	29 44.5	+39.6	42.3	30 28.7	+40.3	42.7	31 12.7	+40.9	43.1	31 56.4	+41.5	43.5	32 39.8	+42.1	43.9	53
54	28 07.9	+37.6	40.3	28 53.6	+38.1	40.6	29 39.0	+38.7	41.0	30 24.1	+39.4	41.4	31 09.0	+39.9	41.8	31 53.6	+40.5	42.2	32 37.9	+41.1	42.6	33 21.9	+41.7	43.1	54
55	28 45.5	+37.1	39.4	29 31.7	+37.8	39.8	30 17.7	+38.4	40.1	31 03.5	+38.9	40.5	31 48.9	+39.6	40.9	32 34.1	+40.2	41.3	33 19.0	+40.8	41.8	34 03.6	+41.4	42.2	55
56	29 22.6	+36.5	38.5	30 09.5	+37.4	38.9	30 56.1	+38.0	39.2	31 42.4	+38.6	39.6	32 28.5	+39.2	40.0	33 14.3	+39.8	40.4	33 59.8	+40.4	40.9	34 45.0	+41.0	41.3	56
57	29 59.4	+36.5	37.6	30 46.9	+37.0	38.0	31 34.1	+37.6	38.3	32 21.0	+38.2	38.7	33 07.7	+38.8	39.1	33 54.1	+39.4	39.5	34 40.2	+40.0	40.0	35 26.0	+40.6	40.4	57
58	30 35.9	+36.0	36.7	31 23.9	+36.6	37.0	32 11.7	+37.2	37.4	32 59.2	+37.8	37.8	33 46.5	+38.3	38.2	34 33.5	+38.9	38.6	35 20.2	+39.6	39.1	36 06.6	+40.2	39.5	58
59	31 11.9	+35.6	35.7	32 00.5	+36.2	36.1	32 48.9	+36.7	36.5	33 37.0	+37.3	36.9	34 24.8	+38.0	37.3	35 12.4	+38.6	37.7	35 59.8	+39.1	38.1	36 46.8	+39.8	38.6	59
60	31 47.5	+35.2	34.8	32 36.7	+35.8	35.2	33 25.6	+36.4	35.5	34 14.3	+36.9	35.9	35 02.8	+37.5	36.3	35 51.0	+38.1	36.8	36 38.9	+38.7	37.2	37 26.6	+39.2	37.7	60
61	32 22.7	+34.8	33.8	33 12.5	+35.3	34.2	34 02.0	+35.9	34.6	34 51.2	+36.5	35.0	35 40.3	+37.0	35.4	36 29.1	+37.6	35.8	37 17.6	+38.2	36.2	38 05.8	+38.9	36.7	61
62	32 57.5	+34.3	32.9	33 47.8	+34.8	33.3	34 37.9	+35.4	33.6	35 27.7	+36.0	34.0	36 17.3	+36.6	34.4	37 06.7	+37.2	34.8	37 55.8	+37.8	35.3	38 44.7	+38.3	35.7	62
63	33 31.8	+33.8	31.9	34 22.6	+34.4	32.3	35 13.3	+34.9	32.6	36 03.7	+35.5	33.0	36 53.9	+36.1	33.4	37 43.9	+36.6	33.8	38 33.6	+37.2	34.3	39 23.0	+37.8	34.7	63
64	34 05.6	+33.4	30.9	34 57.0	+33.9	31.3	35 48.2	+34.5	31.6	36 39.2	+35.0	32.0	37 30.0	+35.5	32.4	38 20.5	+36.1	32.8	39 10.8	+36.7	33.3	40 00.8	+37.3	33.7	64
65	34 39.0	+32.8	29.9	35 30.9	+33.4	30.3	36 22.7	+33.9	30.6	37 14.2	+34.4	31.0	38 05.5	+35.0	31.4	38 56.6	+35.6	31.8	39 47.5	+36.1	32.3	40 38.1	+36.7	32.7	65
66	35 11.8	+32.4	28.9	36 04.3	+32.8	29.2	36 56.6	+33.3	29.6	37 48.6	+34.0	30.0	38 40.5	+34.5	30.4	39 32.2	+35.0	30.8	40 23.6	+35.6	31.2	41 14.8	+36.1	31.7	66
67	35 44.2	+31.8	27.8	36 37.1	+32.3	28.2	37 29.9	+32.9	28.5	38 22.6	+33.3	28.9	39 15.0	+33.8	29.3	40 07.2	+34.4	29.7	40 59.2	+35.0	30.1	41 50.9	+35.6	30.6	67
68	36 16.0	+31.2	26.8	37 09.4	+31.8	27.1	38 02.8	+32.2	27.5	38 55.9	+32.7	27.9	39 48.8	+33.3	28.2	40 41.6	+33.8	28.6	41 34.2	+34.3	29.1	42 26.5	+34.9	29.5	68
69	36 47.2	+30.7	25.7	37 41.2	+31.1	26.1	38 35.0	+31.6	26.4	39 28.6	+32.2	26.8	40 22.1	+32.7	27.2	41 15.4	+33.2	27.6	42 08.5	+33.7	28.0	43 01.4	+34.3	28.4	69
70	37 17.9	+30.0	24.7	38 12.3	+30.6	25.0	39 06.6	+31.0	25.3	40 00.8	+31.5	25.7	40 54.8	+32.0	26.0	41 48.6	+32.5	26.4	42 42.2	+33.1	26.8	43 35.7	+33.5	27.3	70
71	37 47.9	+29.5	23.6	38 42.9	+29.9	23.9	39 37.6	+30.4	24.2	40 32.3	+30.8	24.6	41 26.8	+31.3	24.9	42 21.1	+31.9	25.3	43 15.3	+32.3	25.7	44 09.2	+32.9	26.1	71
72	38 17.4	+28.8	22.5	39 12.8	+29.2	22.8	40 08.0	+29.7	23.1	41 03.1	+30.2	23.4	41 58.1	+30.7	23.8	42 53.0	+31.1	24.2	43 47.6	+31.7	24.5	44 42.1	+32.2	25.0	72
73	38 46.2	+28.2	21.3	39 42.0	+28.6	21.6	40 37.7	+29.1	21.9	41 33.3	+29.5	22.3	42 28.8	+29.9	22.6	43 24.1	+30.4	23.0	44 19.3	+30.8	23.4	45 14.3	+31.3	23.8	73
74	39 14.4	+27.5	20.2	40 10.6	+27.9	20.5	41 06.8	+28.3	20.8	42 02.8	+28.8	21.1	42 58.7	+29.2	21.4	43 54.5	+29.7	21.8	44 50.1	+30.2	22.2	45 45.6	+30.6	22.5	74
75	39 41.9	+26.8	19.0	40 38.5	+27.2	19.3	41 35.1	+27.6	19.6	42 31.6	+28.0	19.9	43 27.9	+28.5	20.2	44 24.2	+28.8	20.6	45 20.3	+29.3	20.9	46 16.2	+29.8	21.3	75
76	40 08.7	+26.1	17.9	41 05.7	+26.5	18.1	42 02.7	+26.9	18.4	42 59.6	+27.2	18.7	43 56.4	+27.6	19.0	44 53.0	+28.1	19.3	45 49.6	+28.5	19.7	46 46.0	+28.9	20.0	76
77	40 34.8	+25.3	16.7	41 32.2	+25.7	17.0	42 29.6	+26.0	17.2	43 26.8	+26.5	17.5	44 24.0	+26.8	17.8	45 21.1	+27.2	18.1	46 18.1	+27.6	18.4	47 14.9	+28.1	18.8	77
78	41 00.1	+24.6	15.5	41 57.9	+25.0	15.8	42 55.6	+25.3	16.0	43 53.3	+25.6	16.3	44 50.8	+26.0	16.5	45 48.3	+26.4	16.8	46 45.7	+26.7	17.1	47 43.0	+27.1	17.4	78
79	41 24.7	+23.9	14.3	42 22.9	+24.1	14.5	43 20.9	+24.5	14.7	44 18.9	+24.8	15.0	45 16.8	+25.2	15.3	46 14.7	+25.4	15.5	47 12.4	+25.9	15.8	48 10.1	+26.2	16.1	79
80	41 48.6	+23.0	13.1	42 47.0	+23.3	13.3	43 45.4	+23.6	13.5	44 43.7	+23.9	13.7	45 42.0	+24.2	14.0	46 40.1	+24.6	14.2	47 38.3	+24.9	14.5	48 36.3	+25.3	14.8	80
81	42 11.6	+22.3	11.8	43 10.3	+22.5	12.0	44 09.0	+22.8	12.2	45 07.6	+23.1	12.4	46 06.2	+23.3	12.6	47 04.7	+23.6	12.8	48 03.2	+23.9	13.1	49 01.6	+24.2	13.4	81
82	42 33.9	+21.4	10.6	43 32.8	+21.7	10.7	44 31.8	+21.8	10.9	45 30.7	+22.1	11.1	46 29.5	+22.4	11.3	47 28.3	+22.7	11.5	48 27.1	+22.9	11.7	49 25.8	+23.2	12.0	82
83	42 55.3	+20.5	9.3	43 54.5	+20.7	9.4	44 53.6	+21.0	9.6	45 52.8	+21.2	9.8	46 51.9	+21.4	10.0	47 51.0	+21.6	10.1	48 50.0	+21.9	10.3	49 49.0	+22.2	10.6	83
84	43 15.8	+19.7	8.0	44 15.2	+19.8	8.1	45 14.6	+20.0	8.3	46 14.0	+20.2	8.4	47 13.3	+20.4	8.6	48 12.6	+20.6	8.8	49 11.9	+20.8	9.0	50 11.2	+21.0	9.1	84
85	43 35.5	+18.7	6.7	44 35.0	+19.0	6.8	45 34.6	+19.1	6.9	46 34.2	+19.2	7.1	47 33.7	+19.4	7.2	48 33.2	+19.6	7.3	49 32.7	+19.8	7.5	50 32.2	+19.9	7.6	85
86	43 54.2	+17.9	5.4	44 54.0	+17.9	5.5	45 53.7	+18.1	5.6	46 53.4	+18.2	5.7	47 53.1	+18.3	5.8	48 52.8	+18.5	5.9	49 52.5	+18.6	6.0	50 52.1	+18.8	6.2	86
87	44 12.1	+16.9	4.1	45 11.9	+17.1	4.1	46 11.8	+17.1	4.2	47 11.6	+17.2	4.3	48 11.4	+17.3	4.4	49 11.3	+17.3	4.5	50 11.1	+17.5	4.5	51 10.9	+17.6	4.6	87
88	44 29.0	+16.0	2.7	45 29.0	+16.0	2.8	46 28.9	+16.1	2.8	47 28.8	+16.1	2.9	48 28.7	+16.2	2.9	49 28.6	+16.3	3.0	50 28.6	+16.3	3.1	51 28.5	+16.4	3.1	88
89	44 45.0	+15.0	1.4	45 45.0	+15.0	1.4	46 45.0	+15.0	1.4	47 44.9	+15.1	1.4	48 44.9	+15.1	1.5	49 44.9	+15.1	1.5	50 44.9	+15.1	1.5	51 44.9	+15.1	1.6	89
90	45 00.0	+14.0	0.0	46 00.0	+14.0	0.0	47 00.0	+14.0	0.0	48 00.0	+14.0	0.0	49 00.0	+13.9	0.0	50 00.0	+13.9	0.0	51 00.0	+13.9	0.0	52 00.0	+13.9	0.0	90
	45°			46°			47°			48°			49°			50°			51°			52°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 104°, 256°

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	9 09.2	+42.9	99.3	8 59.4	+43.7	99.4	8 49.5	+44.4	99.6	8 39.4	+45.1	99.7	8 29.2	+45.8	99.9	8 18.8	+46.5	100.0	8 08.3	+47.1	100.2	7 57.6	+47.8	100.3	0
1	9 52.1	+42.8	98.6	9 43.1	+43.5	98.7	9 33.9	+44.3	98.9	9 24.5	+45.0	99.1	9 15.0	+45.6	99.2	9 05.3	+46.3	99.4	8 55.4	+47.0	99.5	8 45.4	+47.6	99.7	1
2	10 34.9	+42.8	97.9	10 26.6	+43.5	98.0	10 18.2	+44.2	98.2	10 09.5	+44.9	98.4	10 00.6	+45.6	98.6	9 51.6	+46.3	98.7	9 42.4	+46.9	98.9	9 33.0	+47.6	99.1	2
3	11 17.7	+42.6	97.1	11 10.1	+43.4	97.3	11 02.4	+44.1	97.5	10 54.4	+44.8	97.7	10 46.2	+45.6	97.9	10 37.9	+46.2	98.1	10 29.3	+46.9	98.3	10 20.6	+47.5	98.5	3
4	12 00.3	+42.6	96.4	11 53.5	+43.3	96.6	11 46.5	+44.0	96.8	11 39.2	+44.7	97.0	11 31.8	+45.5	97.2	11 24.1	+46.1	97.4	11 16.2	+46.8	97.6	11 08.1	+47.5	97.8	4
5	12 42.9	+42.4	95.7	12 36.8	+43.1	95.9	12 30.5	+43.9	96.1	12 23.9	+44.7	96.4	12 17.2	+45.3	96.6	12 10.2	+46.0	96.8	12 03.0	+46.7	97.0	11 55.6	+47.3	97.2	5
6	13 25.3	+42.3	95.0	13 19.9	+43.1	95.2	13 14.4	+43.8	95.4	13 08.6	+44.5	95.7	13 02.5	+45.2	95.9	12 56.2	+45.9	96.1	12 49.7	+46.6	96.4	12 42.9	+47.3	96.6	6
7	14 07.6	+42.1	94.2	14 03.0	+42.9	94.5	13 58.2	+43.6	94.7	13 53.1	+44.4	95.0	13 47.7	+45.1	95.2	13 42.1	+45.8	95.5	13 36.3	+46.5	95.7	13 30.2	+47.1	96.0	7
8	14 49.7	+42.0	93.5	14 45.9	+42.8	93.8	14 41.8	+43.6	94.0	14 37.5	+44.2	94.3	14 32.8	+45.0	94.6	14 27.9	+45.7	94.8	14 22.8	+46.4	95.1	14 17.3	+47.1	95.3	8
9	15 31.7	+41.9	92.8	15 28.7	+42.6	93.0	15 25.4	+43.4	93.3	15 21.7	+44.2	93.6	15 17.8	+44.9	93.9	15 13.6	+45.6	94.1	15 09.2	+46.3	94.4	15 04.4	+47.0	94.7	9
10	16 13.6	+41.7	92.0	16 11.3	+42.5	92.3	16 08.8	+43.2	92.6	16 05.9	+44.0	92.9	16 02.7	+44.7	93.2	15 59.2	+45.5	93.5	15 55.5	+46.1	93.7	15 51.4	+46.8	94.0	10
11	16 55.3	+41.5	91.3	16 53.8	+42.3	91.6	16 52.0	+43.1	91.9	16 49.9	+43.8	92.2	16 47.4	+44.6	92.5	16 44.7	+45.3	92.8	16 41.6	+46.0	93.1	16 38.2	+46.7	93.4	11
12	17 36.8	+41.4	90.5	17 36.1	+42.2	90.8	17 35.1	+42.9	91.1	17 33.7	+43.7	91.5	17 32.0	+44.5	91.8	17 30.0	+45.2	92.1	17 27.6	+45.9	92.4	17 24.9	+46.6	92.7	12
13	18 18.2	+41.2	89.8	18 18.3	+42.0	90.1	18 18.0	+42.8	90.4	18 17.4	+43.6	90.7	18 16.5	+44.3	91.1	18 15.2	+45.0	91.4	18 13.5	+45.8	91.7	18 11.5	+46.5	92.1	13
14	18 59.4	+41.0	89.0	19 00.3	+41.8	89.3	19 00.8	+42.6	89.7	19 01.0	+43.3	90.0	19 00.8	+44.1	90.4	19 00.2	+44.9	90.7	18 59.3	+45.6	91.1	18 58.0	+46.3	91.4	14
15	19 40.4	+40.8	88.2	19 42.1	+41.6	88.6	19 43.4	+42.4	88.9	19 44.3	+43.2	89.3	19 44.9	+43.9	89.6	19 45.1	+44.7	90.0	19 44.9	+45.4	90.4	19 44.3	+46.2	90.7	15
16	20 21.2	+40.6	87.4	20 23.7	+41.4	87.8	20 25.8	+42.2	88.2	20 27.5	+43.0	88.5	20 28.8	+43.8	88.9	20 29.8	+44.5	89.3	20 30.3	+45.3	89.7	20 30.5	+46.0	90.0	16
17	21 01.8	+40.3	86.6	21 05.1	+41.2	87.0	21 08.0	+42.0	87.4	21 10.5	+42.8	87.8	21 12.6	+43.6	88.2	21 14.3	+44.3	88.6	21 15.6	+45.1	89.0	21 16.5	+45.8	89.4	17
18	21 42.1	+40.2	85.9	21 46.3	+41.0	86.2	21 50.0	+41.8	86.6	21 53.3	+42.6	87.0	21 56.2	+43.4	87.5	21 58.6	+44.2	87.9	22 00.7	+44.9	88.3	22 02.3	+45.6	88.7	18
19	22 22.3	+39.9	85.0	22 27.3	+40.7	85.5	22 31.8	+41.5	85.9	22 35.9	+42.4	86.3	22 39.6	+43.1	86.7	22 42.8	+43.9	87.1	22 45.6	+44.7	87.5	22 47.9	+45.5	88.0	19
20	23 02.2	+39.6	84.2	23 08.0	+40.5	84.7	23 13.3	+41.4	85.1	23 18.3	+42.1	85.5	23 22.7	+43.0	85.9	23 26.7	+43.8	86.4	23 30.3	+44.5	86.8	23 33.4	+45.3	87.2	20
21	23 41.8	+39.4	83.4	23 48.5	+40.2	83.9	23 54.7	+41.1	84.3	24 00.4	+41.9	84.7	24 05.7	+42.7	85.2	24 10.5	+43.5	85.6	24 14.8	+44.3	86.1	24 18.7	+45.0	86.5	21
22	24 21.2	+39.1	82.6	24 28.7	+40.0	83.0	24 35.8	+40.8	83.5	24 42.3	+41.7	84.0	24 48.4	+42.5	84.4	24 54.0	+43.3	84.9	24 59.1	+44.1	85.3	25 03.7	+44.9	85.8	22
23	25 00.3	+38.9	81.8	25 08.7	+39.7	82.2	25 16.6	+40.5	82.7	25 24.0	+41.4	83.2	25 30.9	+42.2	83.6	25 37.3	+43.0	84.1	25 43.2	+43.8	84.6	25 48.6	+44.6	85.1	23
24	25 39.2	+38.5	80.9	25 48.4	+39.4	81.4	25 57.1	+40.3	81.9	26 05.4	+41.1	82.4	26 13.1	+42.0	82.8	26 20.3	+42.8	83.3	26 27.0	+43.6	83.8	26 33.2	+44.4	84.3	24
25	26 17.7	+38.3	80.1	26 27.8	+39.1	80.6	26 37.4	+40.0	81.0	26 46.5	+40.8	81.5	26 55.1	+41.6	82.0	27 03.1	+42.5	82.5	27 10.6	+43.4	83.1	27 17.6	+44.1	83.6	25
26	26 56.0	+37.9	79.2	27 06.9	+38.8	79.7	27 17.4	+39.7	80.2	27 27.3	+40.5	80.7	27 36.7	+41.5	81.2	27 45.6	+42.3	81.8	27 54.0	+43.0	82.3	28 01.7	+43.9	82.8	26
27	27 33.9	+37.6	78.3	27 45.7	+38.5	78.8	27 57.1	+39.4	79.4	28 07.9	+40.2	79.9	28 18.2	+41.1	80.4	28 27.9	+41.9	81.0	28 37.0	+42.8	81.5	28 45.6	+43.6	82.0	27
28	28 11.5	+37.2	77.4	28 24.2	+38.2	78.0	28 36.5	+39.0	78.5	28 48.1	+40.0	79.0	28 59.3	+40.8	79.6	29 09.8	+41.7	80.1	29 19.8	+42.5	80.7	29 29.2	+43.4	81.2	28
29	28 48.7	+36.9	76.6	29 02.4	+37.8	77.1	29 15.5	+38.7	77.6	29 28.1	+39.6	78.2	29 40.1	+40.4	78.7	29 51.5	+41.3	79.3	30 02.3	+42.2	79.9	30 12.6	+43.0	80.4	29
30	29 25.6	+36.5	75.7	29 40.2	+37.4	76.2	29 54.2	+38.4	76.8	30 07.7	+39.2	77.3	30 20.5	+40.2	77.9	30 32.8	+41.0	78.5	30 44.5	+41.9	79.0	30 55.6	+42.7	79.6	30
31	30 02.1	+36.1	74.7	30 17.6	+37.1	75.3	30 32.6	+37.9	75.9	30 46.9	+38.9	76.4	31 00.7	+39.8	77.0	31 13.8	+40.7	77.6	31 26.4	+41.6	78.2	31 38.3	+42.5	78.8	31
32	30 38.2	+35.8	73.8	30 54.7	+36.7	74.4	31 10.5	+37.6	75.0	31 25.8	+38.5	75.6	31 40.5	+39.4	76.2	31 54.5	+40.3	76.8	32 08.0	+41.2	77.4	32 20.8	+42.0	78.0	32
33	31 14.0	+35.3	72.9	31 31.4	+36.2	73.5	31 48.1	+37.2	74.1	32 04.3	+38.1	74.7	32 19.9	+39.0	75.3	32 34.8	+40.0	75.9	32 49.2	+40.8	76.5	33 02.8	+41.8	77.1	33
34	31 49.3	+34.9	71.9	32 07.6	+35.9	72.5	32 25.3	+36.8	73.1	32 42.4	+37.7	73.7	32 58.9	+38.7	74.4	33 14.8	+39.6	75.0	33 30.0	+40.5	75.6	33 44.6	+41.3	76.3	34
35	32 24.2	+34.5	71.0	32 43.5	+35.4	71.6	33 02.1	+36.4	72.2	33 20.2	+37.3	72.8	33 37.6	+38.2	73.4	33 54.4	+39.1	74.1	34 10.5	+40.1	74.7	34 25.9	+41.0	75.4	35
36	32 58.7	+34.0	70.0	33 18.9	+34.9	70.6	33 38.5	+35.9	71.2	33 57.5	+36.8	71.9	34 15.8	+37.8	72.5	34 33.5	+38.8	73.2	34 50.6	+39.6	73.8	35 06.9	+40.6	74.5	36
37	33 32.7	+33.5	69.0	33 53.8	+34.5	69.6	34 14.4	+35.4	70.3	34 34.3	+36.5	70.9	34 53.6	+37.4	71.6	35 12.3	+38.3	72.2	35 30.2	+39.3	72.9	35 47.5	+40.2	73.6	37
38	34 06.2	+33.0	68.0	34 28.3	+34.0	68.6	34 49.9	+34.9	69.3	35 10.8	+35.9	69.9	35 31.0	+36.9	70.6	35 50.6	+37.8	71.3	36 09.5	+38.8	72.0	36 27.7	+39.7	72.7	38
39	34 39.2	+32.5	67.0	35 02.3	+33.6	67.6	35 24.8	+34.5	68.3	35 46.7	+35.5	69.0	36 07.9	+36.4	69.6	36 28.4	+37.4	70.3	36 48.3	+38.3	71.0	37 07.4	+39.3	71.8	39
40	35 11.7	+32.0	66.0	35 35.9	+32.9	66.6	35 59.3	+34.0	67.3	36 22.2	+34.9	68.0	36 44.3	+36.0	68.7	37 05.8	+36.9	69.4	37 26.6	+37.9	70.1	37 46.7	+38.9	70.8	40
41	35 43.7	+31.5	64.9	36 08.8	+32.5	65.6	36 33.3	+33.4	66.3	36 57.1	+34.5	67.0	37 20.3	+35.4	67.7	37 42.7	+36.4	68.4	38 04.5	+37.4	69.1	38 25.6	+38.3	69.8	41
42	36 15.2	+30.9	63.9	36 41.3	+31.9	64.6	37 06.7	+32.9	65.2	37 31.6	+33.8	65.9	37 55.7	+34.9	66.6	38 19.1	+35.9	67.4	38 41.9	+36.8	68.1	39 03.9	+37.8	68.8	42
43	36 46.1	+30.3	62.8	37 13.2	+31.3	63.5	37 39.6	+32.4	64.2	38 05.4	+33.4	64.9	38 30.6	+34.3	65.6	38 55.0	+35.3	66.3	39 18.7	+36.4	67.1	39 41.7	+37.3	67.8	43
44	37 16.4	+29.7	61.7	37 44.5	+30.7	62.4	38 12.0	+31.7	63.1	38 38.8	+32.7	63.8	39 04.9	+33.7	64.5	39 30.3	+34.8	65.3	39 55.1	+35.7	66.0	40 19.0	+36.8	66.8	44
45	37 46.1	+29.1	60.6	38 15.2	+30.1	61.3	38 43.7	+31.1	62.0	39 11.5	+32.1	62.7	39 38.6	+33.2	63.5	40 05.1	+34.1	64.2	40 30.8	+35.2	65.0	40 55.8	+36.2	65.8	45
46	38 15.2	+28.5	59.5	38 45.3	+29.5	60.2	39 14.8	+30.5	60.9	39 43.6	+31.5	61.7	40 11.8	+32.5	62.4	40 39.2	+33.6	63.1	41 06.0	+34.6	63.9	41 32.0	+35.6	64.7	46
47	38 43.7	+27.8	58.4	39 14.8	+28.8	59.1	39 45.3	+29.8	59.8	40 15.1	+30.9	60.5	40 44.3	+31.9	61.3	41 12.8	+32.9	62.1	41 40.6	+33.9	62.8	42 07.6	+34.9	63.6	47
48	39 11.5	+27.1	57.3	39 43.6	+28.2	58.0	40 15.1	+29.2	58.7	40 46.0	+30.2	59.4	41 16.2	+31.2	60.2	41 45.7	+32.3	60.9	42 14.5	+33.3	61.7	42 42.5	+34.4	62.5	48
49	39 38.6	+26.5	56.1	40 11.8	+27.4	56.8	40 44.3	+28.5	57.5	41 16.2	+29.5	58.3	41 47.4	+30.6	59.0	42 18.0	+31.5	59.8	42 47.8	+32.6	60.6	43 16.9	+33.6	61.4	49
50	40 05.1	+25.7	54.9	40 39.2	+26.8	55.6	41 12.8	+27.8	56.4	41 45.7	+28.8	57.1	42 18.0	+29.8	57.9	42 49.5	+30.9	58.6	43 20.4	+31.9	59.4	43 50.5	+33.0	60.3	50
51	40 30.8	+25.0	53.8	41 06.0	+26.0	54.5	41 40.6	+27.0	55.2	42 14.5	+28.0	55.9	42 47.8	+29.1	56.7	43 20.4	+30.1	57.5	43 52.3	+31.2	58.3	44 23.5	+32.2	59.1	51
52	40 55.8	+24.2	52.6	41 32.0	+25.2	53.3	42 07.6	+26.2	54.0	42 42.5	+27.3	54.7	43 16.9	+28.3	55.5	43 50.5	+29.4	56.3	44 23.5	+30.4	57.1	44 55.7	+31.5	57.9	52
53	41 20.0	+23.5	51.3	41 57.2	+24.5	52.0	42 33.8	+25.5	52.8	43 09.8	+26.5	53.5	43 45.2	+27.5	54.3	44 19.9	+28.6	55.1	44 54.9	+29.7	55.9	45 27.2	+30.7	56.7	53
54	41 43.5	+22.7	50.1	42 21.7	+23.7	50.8	42 59.3	+24.7	51.5	43 36.3	+25.7	52.3	44 12.7	+26.8	53.0	44 48.5	+27.8	53.8	45 23.6	+28.8	54.6	45 57.9	+29.9	55.5	54
55	42 06.2	+21.8	48.9	42 45.4	+22.8	49.6	43 24.0	+23.8	50.3	44 02.0	+24.9	51.0	44 39.5	+25.9	51.8	45 16.3	+26.9	52.6	45 52.4	+28.0	53.4	46 27.8	+29.1	54.2	55
56	42 28.0	+21.0	47.6	43 08.2	+22.0	48.3	43 47.8	+23.0	49.0	44 26.9	+24.0	49.8	45 05.4	+25.0	50.5	45 43.2	+26.1	51.3	46 20.4	+27.1	52.1	46 56.9	+28.2	53.0	56
57	42 49.0	+20.2	46.3	43 30.2	+21.1	47.0	44 10.8	+22.2	47.7	44 50.9	+23.1	48.5	45 30.4	+24.1	49.2	46 09.3	+25.2	50.0	46 47.5	+26.3	50.8	47 25.1	+27.3	51.7	57
58	43 09.2	+19.3	45.1	43 51.3	+20.3	45.7	44 33.0	+21.2	46.4	45 14.0	+22.3	47.2	45 54.5	+23.3	47.9	46 34.5	+24.2	48.7	47 13.8	+25.3	49.5	47 52.4	+26.4	50.3	58
59	43 28.5	+18.4	43.8	44 11.6	+19.3	44.4	44 54.2	+20.3	45.1	45 36.3	+21.2	45.8	46 17.8	+22.3	46.6	46 58.7	+23.3	47.4	47 39.1	+24.3	48.2	48 18.8	+25.4	49.0	59
60	43 46.9	+17.4	42.4	44 30.9	+18.4	43.1	45 14.5	+19.3	43.8	45 57.5	+20.4	44.5	46 40.1	+21.3	45.2	47 22.0	+22.4	46.0	48 03.4	+23.4	46.8	48 44.2	+24.4	47.6	60
61	44 04.3	+16.6	41.1	44 49.3	+17.5	41.8	45 33.8	+18.4	42.4	46 17.9	+19.3	43.1	47 01.4	+20.4	43.9	47 44.4	+21.3	44.6	48 26.8	+22.4	45.4	49 08.6	+23.4	46.2	61
62	44 20.9	+15.6	39.8	45 06.8	+16.5	40.4	45 52.2	+17.5	41.1	46 37.2	+18.4	41.8	47 21.8	+19.3	42.5	48 05.7	+20.4	43.3	48 49.2	+21.3	44.0	49 32.0	+22.4	44.8	62
63	44 36.5	+14.6	38.4	45 23.3	+15.5	39.0	46 09.7	+16.4	39.7	46 55.6	+17.4	40.4	47 41.1	+18.3	41.1	48 26.1	+19.2	41.8	49 10.5	+20.3	42.6	49 54.4	+21.3	43.4	63
64	44 51.1	+13.6	37.0	45 38.8	+14.5	37.7	46 26.1	+15.4	38.3	47 13.0	+16.3	39.0	47 59.4	+17.2	39.7	48 45.3	+18.2	40.4	49 30.8	+19.1	41.1	50 15.7	+20.2	41.9	64
65	45 04.7	+12.7	35.7	45 53.3	+13.5	36.3	46 41.5	+14.3	36.9	47 29.3	+15.2	37.5	48 16.6	+16.2	38.2	49 03.5	+17.1	38.9	49 49.9	+18.1	39.7	50 35.9	+19.0	40.4	65
66	45 17.4	+11.6	34.3	46 06.8	+12.4	34.9	46 55.8	+13.3	35.5	47 44.5	+14.1	36.1	48 32.8	+15.0	36.8	49 20.6	+16.0	37.5	50 08.0	+16.9	38.2	50 54.9	+17.9	38.9	66
67	45 29.0	+10.6	32.9	46 19.2	+11.4	33.5	47 09.1	+12.2	34.0	47 58.6	+13.1	34.7	48 47.8	+13.9	35.3	49 36.6	+14.8	36.0	50 24.9	+15.7	36.7	51 12.8	+16.7	37.4	67
68	45 39.6	+9.6	31.5	46 30.6	+10.3	32.0	47 21.3	+11.1	32.6	48 11.7	+11.9	33.2	49 01.7	+12.8	33.8	49 51.4	+13.6	34.5	50 40.6	+14.6	35.2	51 29.5	+15.4	35.9	68
69	45 49.2	+8.5	30.1	46 40.9	+9.3	30.6	47 32.4	+10.0	31.1	48 23.6	+10.8	31.7	49 14.5	+11.6	32.3	50 05.0	+12.5	33.0	50 55.2	+13.3	33.6	51 44.9	+14.2	34.3	69
70	45 57.7	+7.4	28.6	46 50.2	+8.1	29.2	47 42.4	+8.9	29.7	48 34.4	+9.7	30.2	49 26.1	+10.4	30.8	50 17.5	+11.2	31.4	51 08.5	+12.1	32.1	51 59.1	+13.0	32.8	70
71	46 05.1	+6.4	27.2	46 58.3	+7.1	27.7	47 51.3	+7.8	28.2	48 44.1	+8.5	28.7	49 36.5	+9.3	29.3	50 28.7	+10.0	29.9	51 20.6	+10.8	30.5	52 12.1	+11.6	31.2	71
72	46 11.5	+5.2	25.8	47 05.4	+5.9	26.2	47 59.1	+6.6	26.7	48 52.6	+7.3	27.2	49 45.8	+8.0	27.7	50 38.7	+8.8	28.3	51 31.4	+9.5	28.9	52 23.7	+10.4	29.6	72
73	46 16.7	+4.2	24.3	47 11.3	+4.8	24.8	48 05.7	+5.4	25.2	48 59.9	+6.1	25.7	49 53.8	+6.8	26.2	50 47.5	+7.5	26.8	51 40.9	+8.2	27.4	52 34.1	+9.0	27.9	73
74	46 20.9	+3.1	22.9	47 16.1	+3.7	23.3	48 11.1	+4.3	23.8	49 06.0	+4.9	24.2	50 00.6	+5.5	24.7	50 55.0	+6.2	25.2	51 49.1	+7.0	25.8	52 43.1	+7.6	26.3	74
75	46 24.0	+2.1	21.5	47 19.8	+2.6	21.8	48 15.4	+3.1	22.3	49 10.9	+3.7	22.7	50 06.1	+4.3	23.2	51 01.2	+4.9	23.6	51 56.1	+5.6	24.1	52 50.7	+6.3	24.7	75
76	46 26.1	+0.9	20.0	47 22.4	+1.4	20.4	48 18.5	+2.0	20.8	49 14.6	+2.5	21.2	50 10.4	+3.1	21.6	51 06.1	+3.7	22.0	52 01.7	+4.2	22.5	52 57.0	+4.9	23.0	76
77	46 27.0	−0.2	18.5	47 23.8	+0.3	18.9	48 20.5	+0.8	19.3	49 17.1	+1.2	19.6	50 13.5	+1.8	20.0	51 09.8	+2.4	20.5	52 05.9	+3.0	20.9	53 01.9	+3.5	21.4	77
78	46 26.8	−1.3	17.1	47 24.1	−0.9	17.4	48 21.3	−0.4	17.7	49 18.3	+0.1	18.1	50 15.3	+0.6	18.5	51 12.2	+1.0	18.9	52 08.9	+1.6	19.3	53 05.4	+2.2	19.7	78
79	46 25.5	−2.4	15.6	47 23.2	−2.0	15.9	48 20.9	−1.6	16.2	49 18.4	−1.1	16.6	50 15.9	−0.7	16.9	51 13.2	−0.2	17.3	52 10.5	+0.2	17.6	53 07.6	+0.7	18.0	79
80	46 23.1	−3.5	14.2	47 21.2	−3.1	14.5	48 19.3	−2.8	14.7	49 17.3	−2.4	15.0	50 15.2	−2.0	15.3	51 13.0	−1.6	15.7	52 10.7	−1.1	16.0	53 08.3	−0.6	16.4	80
81	46 19.6	−4.6	12.8	47 18.1	−4.3	13.0	48 16.5	−3.9	13.2	49 14.9	−3.6	13.5	50 13.2	−3.2	13.8	51 11.4	−2.8	14.1	52 09.6	−2.5	14.4	53 07.7	−2.1	14.7	81
82	46 15.0	−5.7	11.3	47 13.8	−5.4	11.5	48 12.6	−5.1	11.7	49 11.3	−4.8	12.0	50 10.0	−4.5	12.2	51 08.6	−4.2	12.5	52 07.1	−3.8	12.8	53 05.6	−3.4	13.1	82
83	46 09.3	−6.7	9.9	47 08.4	−6.5	10.1	48 07.5	−6.3	10.2	49 06.5	−6.0	10.5	50 05.5	−5.7	10.7	51 04.4	−5.4	10.9	52 03.3	−5.1	11.1	53 02.2	−4.9	11.4	83
84	46 02.6	−7.8	8.4	47 01.9	−7.6	8.6	48 01.2	−7.4	8.8	49 00.5	−7.2	8.9	49 59.8	−7.0	9.1	50 59.0	−6.7	9.3	51 58.2	−6.5	9.5	52 57.3	−6.2	9.7	84
85	45 54.8	−8.9	7.0	46 54.3	−8.7	7.1	47 53.8	−8.5	7.3	48 53.3	−8.3	7.4	49 52.8	−8.2	7.6	50 52.3	−8.0	7.7	51 51.7	−7.7	7.9	52 51.1	−7.5	8.1	85
86	45 45.9	−10.0	5.6	46 45.6	−9.8	5.7	47 45.3	−9.7	5.8	48 45.0	−9.6	5.9	49 44.6	−9.3	6.0	50 44.3	−9.2	6.2	51 44.0	−9.1	6.3	52 43.6	−8.9	6.4	86
87	45 35.9	−10.9	4.2	46 35.8	−10.9	4.3	47 35.6	−10.6	4.3	48 35.4	−10.6	4.4	49 35.3	−10.5	4.5	50 35.1	−10.5	4.6	51 34.9	−10.4	4.7	52 34.7	−10.3	4.8	87
88	45 25.0	−12.0	2.8	46 24.9	−11.9	2.8	47 24.8	−11.8	2.9	48 24.8	−11.9	2.9	49 24.7	−11.8	3.0	50 24.6	−11.7	3.1	51 24.5	−11.6	3.1	52 24.4	−11.5	3.2	88
89	45 13.0	−13.0	1.4	46 13.0	−13.0	1.4	47 13.0	−13.0	1.4	48 12.9	−12.9	1.5	49 12.9	−12.9	1.5	50 12.9	−12.9	1.5	51 12.9	−12.9	1.6	52 12.9	−12.9	1.6	89
90	45 00.0	−14.0	0.0	46 00.0	−14.0	0.0	47 00.0	−14.0	0.0	48 00.0	−14.0	0.0	49 00.0	−14.1	0.0	50 00.0	−14.1	0.0	51 00.0	−14.1	0.0	52 00.0	−14.1	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | |

Dec.	45° (Hc, d, Z)	46° (Hc, d, Z)	47° (Hc, d, Z)	48° (Hc, d, Z)	49° (Hc, d, Z)	50° (Hc, d, Z)	51° (Hc, d, Z)	52° (Hc, d, Z)	Dec.
0	9 09.2 −43.1 99.3	8 59.4 −43.7 99.4	8 49.5 −44.4 99.6	8 39.4 −45.1 99.7	8 29.2 −45.8 99.9	8 18.8 −46.4 100.0	8 08.3 −47.1 100.2	7 57.6 −47.7 100.3	0
1	8 26.1 −43.0 100.0	8 15.7 −43.8 100.1	8 05.1 −44.6 100.3	7 54.3 −45.2 100.4	7 43.4 −45.9 100.5	7 32.4 −46.6 100.7	7 21.2 −47.2 100.8	7 09.9 −47.8 100.9	1
2	7 43.1 −43.2 100.7	7 31.9 −43.9 100.8	7 20.5 −44.5 100.9	7 09.1 −45.3 101.1	6 57.5 −45.9 101.2	6 45.8 −46.6 101.3	6 34.0 −47.2 101.4	6 22.1 −47.9 101.5	2
3	6 59.9 −43.2 101.4	6 48.0 −43.9 101.5	6 36.0 −44.6 101.6	6 23.8 −45.3 101.7	6 11.6 −46.0 101.8	5 59.2 −46.5 101.9	5 46.8 −47.3 102.0	5 34.2 −47.9 102.1	3
4	6 16.7 −43.3 102.1	6 04.1 −44.0 102.2	5 51.4 −44.7 102.3	5 38.5 −45.3 102.4	5 25.6 −46.0 102.5	5 12.6 −46.7 102.6	4 59.5 −47.3 102.7	4 46.3 −47.9 102.7	4
5	5 33.4 −43.3 102.8	5 20.1 −44.0 102.9	5 06.7 −44.7 103.0	4 53.2 −45.4 103.0	4 39.6 −46.1 103.1	4 25.9 −46.7 103.2	4 12.2 −47.3 103.3	3 58.4 −48.0 103.3	5
6	4 50.1 −43.4 103.5	4 36.1 −44.1 103.6	4 22.0 −44.8 103.6	4 07.8 −45.4 103.7	3 53.5 −46.0 103.8	3 39.2 −46.7 103.8	3 24.9 −47.4 103.9	3 10.4 −47.9 103.9	6
7	4 06.7 −43.4 104.2	3 52.0 −44.1 104.2	3 37.2 −44.8 104.3	3 22.4 −45.5 104.4	3 07.5 −46.1 104.4	2 52.5 −46.7 104.5	2 37.5 −47.4 104.5	2 22.5 −48.0 104.5	7
8	3 23.3 −43.4 104.9	3 07.9 −44.1 104.9	2 52.4 −44.8 105.0	2 36.9 −45.4 105.0	2 21.4 −46.2 105.0	2 05.8 −46.8 105.1	1 50.1 −47.4 105.1	1 34.5 −48.0 105.1	8
9	2 39.9 −43.5 105.5	2 23.8 −44.2 105.6	2 07.6 −44.8 105.6	1 51.5 −45.5 105.7	1 35.2 −46.1 105.7	1 19.0 −46.8 105.7	1 02.7 −47.3 105.7	0 46.5 −48.0 105.7	9
10	1 56.4 −43.4 106.2	1 39.6 −44.1 106.3	1 22.8 −44.8 106.3	1 06.0 −45.5 106.3	0 49.1 −46.1 106.3	0 32.2 −46.7 106.3	0 15.4 −47.4 106.3	0 01.5 +48.0 73.7	10
11	1 13.0 −43.5 106.9	0 55.5 −44.2 106.9	0 38.0 −44.9 107.0	0 20.5 −45.5 107.0	0 03.0 −46.2 107.0	0 14.5 +46.8 73.0	0 32.0 +47.4 73.0	0 49.5 +48.0 73.1	11
12	0 29.5 −43.5 107.6	0 11.3 −44.2 107.6	0 06.9 +44.8 72.4	0 25.0 +45.5 72.4	0 43.2 +46.1 72.4	1 01.3 +46.8 72.4	1 19.4 +47.4 72.4	1 37.5 +48.0 72.5	12
13	0 14.0 +43.5 71.7	0 32.9 +44.1 71.7	0 51.7 +44.8 71.7	1 10.5 +45.5 71.7	1 29.3 +46.1 71.8	1 48.1 +46.7 71.8	2 06.8 +47.4 71.8	2 25.5 +48.0 71.9	13
14	0 57.5 +43.5 71.0	1 17.0 +44.2 71.0	1 36.5 +44.8 71.0	1 56.0 +45.5 71.1	2 15.4 +46.1 71.1	2 34.8 +46.7 71.2	2 54.2 +47.3 71.2	3 13.5 +48.0 71.2	14
15	1 41.0 +43.4 70.3	2 01.2 +44.1 70.3	2 21.3 +44.8 70.4	2 41.5 +45.4 70.4	3 01.5 +46.1 70.5	3 21.6 +46.7 70.5	3 41.5 +47.4 70.6	4 01.5 +47.9 70.6	15
16	2 24.4 +43.5 69.6	2 45.3 +44.1 69.7	3 06.1 +44.8 69.7	3 26.9 +45.4 69.8	3 47.6 +46.1 69.8	4 08.3 +46.6 69.9	4 28.9 +47.3 70.0	4 49.4 +47.9 70.0	16
17	3 07.9 +43.4 68.9	3 29.4 +44.1 69.0	3 50.9 +44.7 69.1	4 12.3 +45.4 69.1	4 33.7 +46.0 69.2	4 54.9 +46.7 69.3	5 16.2 +47.2 69.3	5 37.3 +47.8 69.4	17
18	3 51.3 +43.4 68.2	4 13.5 +44.0 68.3	4 35.6 +44.7 68.4	4 57.7 +45.3 68.5	5 19.7 +46.0 68.5	5 41.6 +46.6 68.6	6 03.4 +47.2 68.7	6 25.1 +47.8 68.8	18
19	4 34.7 +43.3 67.6	4 57.5 +44.0 67.6	5 20.3 +44.7 67.7	5 43.0 +45.4 67.8	6 05.7 +45.9 67.9	6 28.2 +46.6 68.0	6 50.6 +47.2 68.1	7 12.9 +47.8 68.2	19
20	5 18.0 +43.3 66.9	5 41.5 +44.0 66.9	6 05.0 +44.6 67.0	6 28.4 +45.2 67.1	6 51.6 +45.9 67.3	7 14.8 +46.5 67.4	7 37.8 +47.1 67.5	8 00.7 +47.7 67.6	20
21	6 01.3 +43.2 66.2	6 25.5 +43.9 66.3	6 49.6 +44.6 66.4	7 13.6 +45.2 66.5	7 37.5 +45.8 66.6	8 01.3 +46.4 66.7	8 24.9 +47.0 66.9	8 48.4 +47.7 67.0	21
22	6 44.5 +43.2 65.5	7 09.4 +43.8 65.6	7 34.2 +44.5 65.7	7 58.8 +45.1 65.8	8 23.3 +45.8 65.9	8 47.7 +46.4 66.1	9 11.9 +47.0 66.2	9 36.1 +47.5 66.4	22
23	7 27.7 +43.1 64.8	7 53.2 +43.8 64.9	8 18.6 +44.5 65.0	8 43.9 +45.1 65.2	9 09.1 +45.7 65.3	9 34.1 +46.3 65.4	9 58.9 +46.9 65.6	10 23.6 +47.6 65.8	23
24	8 10.8 +43.1 64.1	8 37.0 +43.7 64.2	9 03.1 +44.3 64.3	9 29.0 +45.0 64.5	9 54.8 +45.6 64.6	10 20.4 +46.2 64.8	10 45.8 +46.9 65.0	11 11.2 +47.4 65.1	24
25	8 53.9 +42.9 63.4	9 20.7 +43.6 63.5	9 47.4 +44.3 63.7	10 14.0 +44.9 63.8	10 40.4 +45.5 64.0	11 06.6 +46.2 64.2	11 32.7 +46.7 64.3	11 58.6 +47.3 64.5	25
26	9 36.8 +42.9 62.7	10 04.3 +43.6 62.8	10 31.7 +44.1 63.0	10 58.9 +44.8 63.1	11 25.9 +45.4 63.3	11 52.8 +46.0 63.5	12 19.4 +46.7 63.7	12 45.9 +47.3 63.9	26
27	10 19.7 +42.8 61.9	10 47.9 +43.4 62.1	11 15.8 +44.1 62.3	11 43.7 +44.7 62.5	12 11.3 +45.4 62.6	12 38.8 +46.0 62.8	13 06.1 +46.6 63.0	13 33.2 +47.2 63.3	27
28	11 02.5 +42.7 61.2	11 31.3 +43.3 61.4	11 59.9 +44.0 61.6	12 28.4 +44.6 61.8	12 56.7 +45.2 62.0	13 24.8 +45.8 62.2	13 52.7 +46.4 62.4	14 20.4 +47.0 62.6	28
29	11 45.2 +42.5 60.5	12 14.6 +43.2 60.7	12 43.9 +43.9 60.9	13 13.0 +44.5 61.1	13 41.9 +45.1 61.3	14 10.6 +45.8 61.5	14 39.1 +46.4 61.7	15 07.4 +47.0 62.0	29
30	12 27.7 +42.5 59.8	12 57.8 +43.2 60.0	13 27.8 +43.7 60.2	13 57.5 +44.4 60.4	14 27.0 +45.0 60.6	14 56.4 +45.6 60.9	15 25.5 +46.2 61.1	15 54.4 +46.8 61.3	30
31	13 10.2 +42.3 59.1	13 41.0 +42.9 59.3	14 11.5 +43.6 59.5	14 41.9 +44.2 59.7	15 12.0 +44.9 59.9	15 42.0 +45.5 60.2	16 11.7 +46.1 60.4	16 41.2 +46.7 60.7	31
32	13 52.5 +42.2 58.3	14 23.9 +42.9 58.6	14 55.1 +43.5 58.8	15 26.1 +44.2 59.0	15 56.9 +44.8 59.2	16 27.5 +45.4 59.5	16 57.8 +46.0 59.8	17 27.9 +46.6 60.0	32
33	14 34.7 +42.1 57.6	15 06.8 +42.7 57.8	15 38.6 +43.4 58.1	16 10.3 +44.0 58.3	16 41.7 +44.6 58.6	17 12.9 +45.2 58.8	17 43.8 +45.9 59.1	18 14.5 +46.5 59.4	33
34	15 16.8 +41.9 56.9	15 49.5 +42.6 57.1	16 22.0 +43.2 57.3	16 54.3 +43.8 57.6	17 26.3 +44.5 57.9	17 58.1 +45.1 58.1	18 29.7 +45.7 58.4	19 01.0 +46.3 58.7	34
35	15 58.7 +41.8 56.1	16 32.1 +42.4 56.4	17 05.2 +43.0 56.6	17 38.1 +43.7 56.9	18 10.8 +44.3 57.1	18 43.2 +44.9 57.4	19 15.4 +45.5 57.7	19 47.3 +46.1 58.0	35
36	16 40.5 +41.6 55.4	17 14.5 +42.2 55.6	17 48.2 +42.9 55.9	18 21.8 +43.5 56.2	18 55.1 +44.1 56.4	19 28.1 +44.8 56.7	20 00.9 +45.4 57.0	20 33.4 +46.0 57.3	36
37	17 22.1 +41.4 54.6	17 56.7 +42.1 54.9	18 31.1 +42.7 55.2	19 05.3 +43.3 55.4	19 39.2 +44.0 55.7	20 12.9 +44.6 56.0	20 46.3 +45.2 56.3	21 19.4 +45.8 56.7	37
38	18 03.5 +41.3 53.9	18 38.8 +41.9 54.1	19 13.8 +42.6 54.4	19 48.6 +43.2 54.7	20 23.2 +43.8 55.0	20 57.5 +44.4 55.3	21 31.5 +45.0 55.6	22 05.2 +45.7 56.0	38
39	18 44.8 +41.1 53.1	19 20.7 +41.7 53.4	19 56.4 +42.3 53.7	20 31.8 +43.0 54.0	21 07.0 +43.6 54.3	21 41.9 +44.2 54.6	22 16.5 +44.9 54.9	22 50.9 +45.4 55.3	39
40	19 25.9 +40.8 52.3	20 02.4 +41.5 52.6	20 38.7 +42.2 52.9	21 14.8 +42.8 53.2	21 50.6 +43.4 53.5	22 26.1 +44.0 53.9	23 01.4 +44.6 54.2	23 36.3 +45.3 54.5	40
41	20 06.7 +40.7 51.5	20 43.9 +41.3 51.8	21 20.9 +41.9 52.1	21 57.6 +42.5 52.5	22 34.0 +43.2 52.8	23 10.1 +43.8 53.1	23 46.0 +44.4 53.5	24 21.6 +45.0 53.8	41
42	20 47.4 +40.5 50.8	21 25.2 +41.1 51.1	22 02.8 +41.7 51.4	22 40.1 +42.4 51.7	23 17.2 +43.0 52.0	23 53.9 +43.6 52.4	24 30.4 +44.3 52.7	25 06.6 +44.8 53.1	42
43	21 27.8 +40.2 50.0	22 06.3 +40.9 50.3	22 44.5 +41.5 50.6	23 22.5 +42.1 50.9	24 00.2 +42.7 51.3	24 37.5 +43.4 51.6	25 14.7 +43.9 52.0	25 51.4 +44.7 52.4	43
44	22 08.0 +40.0 49.2	22 47.2 +40.6 49.5	23 26.0 +41.3 49.8	24 04.6 +41.9 50.1	24 42.9 +42.5 50.5	25 20.9 +43.2 50.9	25 58.6 +43.8 51.2	26 36.1 +44.3 51.6	44
45	22 48.0 +39.8 48.4	23 27.8 +40.3 48.7	24 07.3 +41.0 49.0	24 46.5 +41.6 49.4	25 25.4 +42.3 49.7	26 04.1 +42.8 50.1	26 42.4 +43.5 50.5	27 20.4 +44.2 50.9	45
46	23 27.8 +39.5 47.5	24 08.1 +40.2 47.9	24 48.3 +40.7 48.2	25 28.1 +41.4 48.6	26 07.7 +42.0 48.9	26 46.9 +42.7 49.3	27 25.9 +43.3 49.7	28 04.6 +43.8 50.1	46
47	24 07.3 +39.2 46.7	24 48.3 +39.8 47.1	25 29.0 +40.5 47.4	26 09.5 +41.1 47.8	26 49.7 +41.7 48.1	27 29.6 +42.3 48.5	28 09.2 +42.9 48.9	28 48.4 +43.6 49.3	47
48	24 46.5 +38.9 45.9	25 28.1 +39.6 46.2	26 09.5 +40.2 46.6	26 50.6 +40.8 46.9	27 31.4 +41.4 47.3	28 11.9 +42.1 47.7	28 52.1 +42.7 48.1	29 32.0 +43.3 48.5	48
49	25 25.4 +38.7 45.1	26 07.7 +39.2 45.4	26 49.7 +39.9 45.8	27 31.4 +40.5 46.1	28 12.8 +41.2 46.5	28 54.0 +41.8 46.9	29 34.8 +42.4 47.3	30 15.3 +43.1 47.7	49
50	26 04.1 +38.3 44.2	26 46.9 +39.0 44.6	27 29.6 +39.6 44.9	28 11.9 +40.2 45.3	28 54.0 +40.8 45.7	29 35.8 +41.4 46.1	30 17.2 +42.1 46.5	30 58.4 +42.7 46.9	50
51	26 42.4 +38.0 43.3	27 25.9 +38.7 43.7	28 09.2 +39.2 44.1	28 52.1 +39.9 44.4	29 34.8 +40.5 44.8	30 17.2 +41.2 45.2	30 59.3 +41.8 45.7	31 41.1 +42.4 46.1	51
52	27 20.4 +37.7 42.5	28 04.6 +38.3 42.8	28 48.4 +39.0 43.2	29 32.0 +39.6 43.6	30 15.3 +40.2 44.0	30 58.4 +40.8 44.4	31 41.1 +41.4 44.8	32 23.5 +42.0 45.3	52
53	27 58.1 +37.4 41.6	28 42.9 +38.0 42.0	29 27.4 +38.6 42.3	30 11.6 +39.2 42.7	30 55.5 +39.9 43.1	31 39.2 +40.5 43.5	32 22.5 +41.1 44.0	33 05.5 +41.7 44.4	53
54	28 35.5 +37.0 40.7	29 20.9 +37.6 41.1	30 06.0 +38.2 41.5	30 50.8 +38.9 41.8	31 35.4 +39.4 42.2	32 19.6 +40.1 42.7	33 03.6 +40.7 43.1	33 47.2 +41.4 43.6	54
55	29 12.5 +36.7 39.8	29 58.5 +37.2 40.2	30 44.2 +37.9 40.6	31 29.7 +38.4 41.0	32 14.8 +39.1 41.4	32 59.7 +39.7 41.8	33 44.3 +40.3 42.2	34 28.6 +40.9 42.7	55
56	29 49.2 +36.2 38.9	30 35.7 +36.9 39.3	31 22.1 +37.5 39.7	32 08.1 +38.1 40.0	32 53.9 +38.7 40.5	33 39.4 +39.4 40.9	34 24.6 +40.0 41.3	35 09.5 +40.6 41.8	56
57	30 25.4 +35.9 38.0	31 12.6 +36.5 38.4	31 59.6 +37.0 38.7	32 46.2 +37.7 39.1	33 32.6 +38.3 39.5	34 18.8 +38.9 40.0	35 04.6 +39.5 40.4	35 50.1 +40.1 40.9	57
58	31 01.3 +35.5 37.1	31 49.1 +36.1 37.4	32 36.6 +36.7 37.8	33 23.9 +37.3 38.2	34 10.9 +37.9 38.6	34 57.7 +38.4 39.1	35 44.1 +39.1 39.5	36 30.2 +39.8 40.0	58
59	31 36.8 +35.1 36.1	32 25.2 +35.6 36.5	33 13.3 +36.2 36.9	34 01.2 +36.8 37.3	34 48.8 +37.4 37.7	35 36.1 +38.1 38.1	36 23.2 +38.7 38.6	37 10.0 +39.2 39.0	59
60	32 11.9 +34.6 35.2	33 00.8 +35.2 35.5	33 49.5 +35.8 35.9	34 38.0 +36.4 36.3	35 26.2 +37.0 36.7	36 14.2 +37.5 37.2	37 01.9 +38.1 37.6	37 49.2 +38.8 38.1	60
61	32 46.5 +34.1 34.2	33 36.0 +34.7 34.6	34 25.3 +35.3 34.9	35 14.4 +35.9 35.3	36 03.2 +36.5 35.8	36 51.7 +37.1 36.2	37 40.0 +37.7 36.6	38 28.0 +38.3 37.1	61
62	33 20.6 +33.7 33.2	34 10.7 +34.3 33.6	35 00.6 +34.8 34.0	35 50.3 +35.4 34.4	36 39.7 +36.0 34.8	37 28.8 +36.6 35.2	38 17.7 +37.2 35.7	39 06.3 +37.8 36.1	62
63	33 54.3 +33.2 32.2	34 45.0 +33.8 32.6	35 35.4 +34.4 33.0	36 25.7 +34.9 33.4	37 15.7 +35.5 33.8	38 05.4 +36.1 34.2	38 54.9 +36.7 34.6	39 44.1 +37.3 35.1	63
64	34 27.5 +32.7 31.2	35 18.8 +33.2 31.6	36 09.8 +33.8 31.9	37 00.6 +34.4 32.3	37 51.2 +34.9 32.7	38 41.5 +35.5 33.2	39 31.6 +36.1 33.6	40 21.4 +36.7 34.1	64
65	35 00.2 +32.2 30.2	35 52.0 +32.7 30.5	36 43.6 +33.3 30.9	37 35.0 +33.8 31.3	38 26.1 +34.4 31.7	39 17.0 +35.0 32.1	40 07.7 +35.6 32.6	40 58.1 +36.2 33.0	65
66	35 32.4 +31.7 29.1	36 24.7 +32.2 29.5	37 16.9 +32.7 29.9	38 08.8 +33.3 30.3	39 00.5 +33.8 30.7	39 52.0 +34.4 31.1	40 43.3 +34.9 31.5	41 34.3 +35.5 32.0	66
67	36 04.1 +31.1 28.1	36 56.9 +31.6 28.4	37 49.6 +32.1 28.8	38 42.1 +32.6 29.2	39 34.3 +33.3 29.6	40 26.4 +33.8 30.0	41 18.2 +34.4 30.5	42 09.8 +35.0 30.9	67
68	36 35.2 +30.5 27.0	37 28.5 +31.1 27.4	38 21.7 +31.6 27.7	39 14.7 +32.1 28.1	40 07.6 +32.6 28.5	41 00.2 +33.1 28.9	41 52.6 +33.7 29.4	42 44.8 +34.2 29.8	68
69	37 05.7 +29.9 26.0	37 59.6 +30.4 26.3	38 53.3 +30.9 26.7	39 46.8 +31.5 27.0	40 40.2 +31.9 27.4	41 33.3 +32.5 27.8	42 26.3 +33.0 28.2	43 19.0 +33.7 28.7	69
70	37 35.6 +29.4 24.9	38 30.0 +29.8 25.2	39 24.2 +30.3 25.5	40 18.3 +30.8 25.9	41 12.1 +31.3 26.3	42 05.8 +31.9 26.7	42 59.3 +32.4 27.1	43 52.7 +32.9 27.5	70
71	38 05.0 +28.6 23.8	38 59.8 +29.2 24.1	39 54.5 +29.6 24.4	40 49.1 +30.1 24.8	41 43.4 +30.7 25.2	42 37.7 +31.1 25.5	43 31.7 +31.7 25.9	44 25.6 +32.2 26.4	71
72	38 33.6 +28.1 22.6	39 29.0 +28.5 23.0	40 24.1 +29.0 23.3	41 19.2 +29.4 23.6	42 14.1 +29.9 24.0	43 08.8 +30.4 24.3	44 03.4 +30.9 24.8	44 57.8 +31.4 25.2	72
73	39 01.7 +27.4 21.5	39 57.5 +27.8 21.8	40 53.1 +28.3 22.1	41 48.6 +28.7 22.5	42 44.0 +29.2 22.8	43 39.2 +29.7 23.2	44 34.3 +30.1 23.6	45 29.2 +30.7 24.0	73
74	39 29.1 +26.7 20.4	40 25.3 +27.1 20.7	41 21.4 +27.5 21.0	42 17.3 +28.0 21.3	43 13.2 +28.4 21.6	44 08.9 +28.9 22.0	45 04.4 +29.4 22.4	45 59.9 +29.8 22.7	74
75	39 55.8 +26.0 19.2	40 52.4 +26.4 19.5	41 48.9 +26.8 19.8	42 45.3 +27.2 20.1	43 41.6 +27.6 20.4	44 37.8 +28.0 20.8	45 33.8 +28.5 21.1	46 29.7 +29.0 21.5	75
76	40 21.8 +25.2 18.0	41 18.8 +25.6 18.3	42 15.7 +26.0 18.6	43 12.5 +26.4 18.9	44 09.2 +26.9 19.2	45 05.8 +27.3 19.5	46 02.3 +27.7 19.9	46 58.7 +28.2 20.2	76
77	40 47.0 +24.5 16.8	41 44.4 +24.9 17.1	42 41.7 +25.2 17.4	43 38.9 +25.7 17.6	44 36.1 +26.0 17.9	45 33.1 +26.4 18.2	46 30.0 +26.9 18.6	47 26.9 +27.2 18.9	77
78	41 11.5 +23.8 15.6	42 09.3 +24.0 15.9	43 06.9 +24.5 16.1	44 04.6 +24.7 16.4	45 02.1 +25.1 16.7	45 59.5 +25.5 17.0	46 56.9 +25.9 17.3	47 54.1 +26.3 17.6	78
79	41 35.3 +22.9 14.4	42 33.3 +23.3 14.6	43 31.4 +23.6 14.9	44 29.3 +23.9 15.1	45 27.2 +24.3 15.4	46 25.0 +24.7 15.6	47 22.8 +25.0 15.9	48 20.4 +25.4 16.2	79
80	41 58.2 +22.2 13.2	42 56.6 +22.4 13.4	43 55.0 +22.7 13.6	44 53.2 +23.1 13.8	45 51.5 +23.3 14.1	46 49.7 +23.6 14.3	47 47.8 +24.0 14.6	48 45.8 +24.4 14.9	80
81	42 20.4 +21.3 11.9	43 19.0 +21.6 12.1	44 17.7 +21.8 12.3	45 16.3 +22.1 12.5	46 14.8 +22.5 12.7	47 13.3 +22.8 13.0	48 11.8 +23.0 13.2	49 10.2 +23.3 13.5	81
82	42 41.7 +20.4 10.6	43 40.6 +20.7 10.8	44 39.5 +21.0 11.0	45 38.4 +21.2 11.2	46 37.3 +21.4 11.4	47 36.1 +21.7 11.6	48 34.8 +22.0 11.8	49 33.5 +22.3 12.1	82
83	43 02.1 +19.6 9.3	44 01.3 +19.8 9.5	45 00.5 +20.0 9.7	45 59.6 +20.3 9.8	46 58.7 +20.5 10.0	47 57.8 +20.7 10.2	48 56.8 +21.0 10.4	49 55.8 +21.2 10.6	83
84	43 21.7 +18.7 8.1	44 21.1 +18.9 8.2	45 20.5 +19.1 8.3	46 19.9 +19.2 8.5	47 19.2 +19.5 8.6	48 18.5 +19.7 8.8	49 17.8 +19.9 9.0	50 17.0 +20.1 9.2	84
85	43 40.4 +17.8 6.7	44 40.0 +18.0 6.9	45 39.6 +18.1 7.0	46 39.1 +18.3 7.1	47 38.7 +18.4 7.2	48 38.2 +18.6 7.4	49 37.7 +18.7 7.5	50 37.1 +19.0 7.7	85
86	43 58.2 +16.9 5.4	44 58.0 +17.0 5.5	45 57.7 +17.1 5.6	46 57.4 +17.2 5.7	47 57.1 +17.4 5.8	48 56.8 +17.5 5.9	49 56.4 +17.7 6.1	50 56.1 +17.8 6.2	86
87	44 15.1 +15.9 4.1	45 15.0 +16.0 4.2	46 14.8 +16.1 4.2	47 14.6 +16.2 4.3	48 14.5 +16.2 4.4	49 14.3 +16.4 4.5	50 14.1 +16.5 4.6	51 13.9 +16.6 4.7	87
88	44 31.0 +15.0 2.7	45 31.0 +15.0 2.8	46 30.9 +15.1 2.8	47 30.8 +15.2 2.9	48 30.7 +15.2 2.9	49 30.7 +15.2 3.0	50 30.6 +15.3 3.1	51 30.5 +15.4 3.1	88
89	44 46.0 +14.0 1.4	45 46.0 +14.0 1.4	46 46.0 +14.0 1.4	47 46.0 +14.0 1.4	48 45.9 +14.1 1.5	49 45.9 +14.1 1.5	50 45.9 +14.1 1.5	51 45.9 +14.1 1.6	89
90	45 00.0 +13.0 0.0	46 00.0 +13.0 0.0	47 00.0 +13.0 0.0	48 00.0 +12.9 0.0	49 00.0 +12.9 0.0	50 00.0 +12.9 0.0	51 00.0 +12.9 0.0	52 00.0 +12.9 0.0	90
	45°	46°	47°	48°	49°	50°	51°	52°	

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z }

Dec.	Hc 45°	d	Z	Hc 46°	d	Z	Hc 47°	d	Z	Hc 48°	d	Z	Hc 49°	d	Z	Hc 50°	d	Z	Hc 51°	d	Z	Hc 52°	d	Z	Dec.
0	8 27.2	+42.9	98.5	8 18.2	+43.6	98.7	8 09.1	+44.3	98.8	7 59.8	+45.0	99.0	7 50.4	+45.7	99.1	7 40.8	+46.4	99.2	7 31.1	+47.0	99.4	7 21.3	+47.6	99.5	0
1	9 10.1	+42.8	97.8	9 01.8	+43.5	98.0	8 53.4	+44.2	98.2	8 44.8	+44.9	98.3	8 36.1	+45.6	98.5	8 27.2	+46.2	98.6	8 18.1	+47.0	98.8	8 08.9	+47.6	98.9	1
2	9 52.9	+42.6	97.1	9 45.3	+43.4	97.3	9 37.6	+44.2	97.5	9 29.7	+44.9	97.6	9 21.7	+45.5	97.8	9 13.4	+46.3	98.0	9 05.1	+46.8	98.1	8 56.5	+47.5	98.3	2
3	10 35.5	+42.6	96.4	10 28.7	+43.4	96.6	10 21.8	+44.0	96.8	10 14.6	+44.7	97.0	10 07.2	+45.5	97.1	9 59.7	+46.1	97.3	9 51.9	+46.8	97.5	9 44.0	+47.5	97.7	3
4	11 18.1	+42.5	95.7	11 12.1	+43.2	95.9	11 05.8	+44.0	96.1	10 59.3	+44.7	96.3	10 52.7	+45.3	96.5	10 45.8	+46.1	96.7	10 38.7	+46.8	96.9	10 31.5	+47.4	97.0	4
5	12 00.6	+42.4	95.0	11 55.3	+43.1	95.2	11 49.8	+43.8	95.4	11 44.0	+44.6	95.6	11 38.0	+45.3	95.8	11 31.9	+45.9	96.0	11 25.5	+46.6	96.2	11 18.9	+47.3	96.4	5
6	12 43.0	+42.2	94.3	12 38.4	+43.0	94.5	12 33.6	+43.8	94.7	12 28.6	+44.5	94.9	12 23.3	+45.2	95.1	12 17.8	+45.9	95.4	12 12.1	+46.6	95.6	12 06.2	+47.2	95.8	6
7	13 25.2	+42.1	93.5	13 21.4	+42.9	93.8	13 17.4	+43.6	94.0	13 13.1	+44.3	94.2	13 08.5	+45.1	94.5	13 03.7	+45.8	94.7	12 58.7	+46.4	94.9	12 53.4	+47.1	95.2	7
8	14 07.3	+42.0	92.8	14 04.3	+42.8	93.0	14 01.0	+43.5	93.3	13 57.4	+44.3	93.5	13 53.6	+44.9	93.8	13 49.5	+45.7	94.0	13 45.1	+46.4	94.3	13 40.5	+47.1	94.5	8
9	14 49.3	+41.9	92.1	14 47.1	+42.6	92.3	14 44.5	+43.4	92.6	14 41.7	+44.1	92.8	14 38.5	+44.9	93.1	14 35.2	+45.5	93.4	14 31.5	+46.3	93.6	14 27.6	+46.9	93.9	9
10	15 31.2	+41.7	91.3	15 29.7	+42.4	91.6	15 27.9	+43.2	91.9	15 25.8	+44.0	92.1	15 23.4	+44.7	92.4	15 20.7	+45.4	92.7	15 17.8	+46.1	93.0	15 14.5	+46.8	93.2	10
11	16 12.9	+41.5	90.6	16 12.1	+42.4	90.9	16 11.1	+43.1	91.1	16 09.8	+43.8	91.4	16 08.1	+44.6	91.7	16 06.1	+45.3	92.0	16 03.9	+46.0	92.3	16 01.3	+46.7	92.6	11
12	16 54.4	+41.4	89.8	16 54.5	+42.1	90.1	16 54.2	+42.9	90.4	16 53.6	+43.7	90.7	16 52.7	+44.4	91.0	16 51.4	+45.2	91.3	16 49.9	+45.9	91.6	16 48.0	+46.6	91.9	12
13	17 35.8	+41.2	89.0	17 36.6	+42.0	89.4	17 37.1	+42.8	89.7	17 37.3	+43.5	90.0	17 37.1	+44.3	90.3	17 36.6	+45.0	90.6	17 35.8	+45.7	91.0	17 34.6	+46.5	91.3	13
14	18 17.0	+41.0	88.3	18 18.6	+41.8	88.6	18 19.9	+42.6	88.9	18 20.8	+43.4	89.3	18 21.4	+44.1	89.6	18 21.6	+44.9	89.9	18 21.5	+45.6	90.3	18 21.1	+46.3	90.6	14
15	18 58.0	+40.8	87.5	19 00.4	+41.7	87.9	19 02.5	+42.4	88.2	19 04.2	+43.2	88.5	19 05.5	+44.0	88.9	19 06.5	+44.7	89.2	19 07.1	+45.5	89.6	19 07.4	+46.1	89.9	15
16	19 38.8	+40.6	86.7	19 42.1	+41.4	87.1	19 44.9	+42.2	87.5	19 47.4	+43.0	87.8	19 49.5	+43.8	88.2	19 51.2	+44.5	88.5	19 52.6	+45.2	88.9	19 53.5	+46.0	89.3	16
17	20 19.4	+40.5	86.0	20 23.5	+41.2	86.3	20 27.1	+42.1	86.7	20 30.4	+42.8	87.1	20 33.3	+43.6	87.4	20 35.7	+44.4	87.8	20 37.8	+45.1	88.2	20 39.5	+45.9	88.6	17
18	20 59.9	+40.1	85.2	21 04.7	+41.0	85.5	21 09.2	+41.8	85.9	21 13.2	+42.6	86.3	21 16.9	+43.4	86.7	21 20.1	+44.2	87.1	21 22.9	+45.0	87.5	21 25.4	+45.6	87.9	18
19	21 40.0	+40.0	84.4	21 45.7	+40.8	84.8	21 51.0	+41.6	85.2	21 55.8	+42.5	85.6	22 00.3	+43.2	86.0	22 04.3	+44.0	86.4	22 07.9	+44.7	86.8	22 11.0	+45.5	87.2	19
20	22 20.0	+39.7	83.6	22 26.5	+40.6	84.0	22 32.6	+41.4	84.4	22 38.3	+42.1	84.8	22 43.5	+43.0	85.2	22 48.3	+43.7	85.6	22 52.6	+44.6	86.1	22 56.5	+45.3	86.5	20
21	22 59.7	+39.5	82.8	23 07.1	+40.3	83.2	23 14.0	+41.1	83.6	23 20.4	+42.0	84.0	23 26.5	+42.7	84.5	23 32.0	+43.6	84.9	23 37.2	+44.3	85.3	23 41.8	+45.1	85.8	21
22	23 39.2	+39.2	81.9	23 47.4	+40.0	82.4	23 55.1	+40.9	82.8	24 02.4	+41.7	83.2	24 09.2	+42.6	83.7	24 15.6	+43.3	84.1	24 21.5	+44.1	84.6	24 26.9	+44.9	85.0	22
23	24 18.4	+38.9	81.1	24 27.4	+39.8	81.6	24 36.0	+40.7	82.0	24 44.1	+41.5	82.5	24 51.8	+42.3	82.9	24 58.9	+43.1	83.4	25 05.6	+43.9	83.8	25 11.8	+44.7	84.3	23
24	24 57.3	+38.7	80.3	25 07.2	+39.5	80.7	25 16.7	+40.3	81.2	25 25.6	+41.2	81.7	25 34.1	+42.0	82.1	25 42.0	+42.9	82.6	25 49.5	+43.7	83.1	25 56.5	+44.4	83.6	24
25	25 36.0	+38.3	79.4	25 46.7	+39.3	79.9	25 57.0	+40.1	80.4	26 06.8	+41.0	80.9	26 16.1	+41.8	81.3	26 24.9	+42.6	81.8	26 33.2	+43.4	82.3	26 40.9	+44.2	82.8	25
26	26 14.3	+38.1	78.6	26 26.0	+38.9	79.0	26 37.1	+39.8	79.5	26 47.8	+40.6	80.0	26 57.9	+41.5	80.5	27 07.5	+42.3	81.0	27 16.6	+43.1	81.5	27 25.1	+44.0	82.1	26
27	26 52.4	+37.7	77.7	27 04.9	+38.6	78.2	27 16.9	+39.5	78.7	27 28.4	+40.4	79.2	27 39.4	+41.2	79.7	27 49.8	+42.1	80.2	27 59.7	+42.9	80.8	28 09.1	+43.7	81.3	27
28	27 30.1	+37.4	76.8	27 43.5	+38.3	77.3	27 56.4	+39.2	77.9	28 08.8	+40.0	78.4	28 20.6	+40.9	78.9	28 31.9	+41.7	79.4	28 42.6	+42.6	80.0	28 52.8	+43.4	80.5	28
29	28 07.5	+37.0	75.9	28 21.8	+38.0	76.5	28 35.6	+38.8	77.0	28 48.8	+39.7	77.5	29 01.5	+40.6	78.1	29 13.6	+41.5	78.6	29 25.2	+42.3	79.2	29 36.2	+43.1	79.7	29
30	28 44.5	+36.7	75.0	28 59.8	+37.6	75.6	29 14.4	+38.5	76.1	29 28.5	+39.4	76.7	29 42.1	+40.3	77.2	29 55.1	+41.1	77.8	30 07.5	+42.0	78.3	30 19.3	+42.9	78.9	30
31	29 21.2	+36.4	74.1	29 37.4	+37.2	74.7	29 52.9	+38.2	75.2	30 07.9	+39.1	75.8	30 22.4	+39.9	76.4	30 36.2	+40.8	76.9	30 49.5	+41.7	77.5	31 02.2	+42.5	78.1	31
32	29 57.6	+35.9	73.2	30 14.6	+36.9	73.8	30 31.1	+37.8	74.3	30 47.0	+38.7	74.9	31 02.3	+39.6	75.5	31 17.0	+40.5	76.1	31 31.2	+41.3	76.7	31 44.7	+42.3	77.3	32
33	30 33.5	+35.5	72.3	30 51.5	+36.4	72.9	31 08.9	+37.3	73.4	31 25.7	+38.3	74.0	31 41.9	+39.2	74.6	31 57.5	+40.1	75.2	32 12.5	+41.0	75.8	32 26.9	+41.8	76.4	33
34	31 09.0	+35.2	71.4	31 27.9	+36.1	71.9	31 46.2	+37.0	72.5	32 04.0	+37.9	73.1	32 21.1	+38.8	73.7	32 37.6	+39.7	74.3	32 53.5	+40.6	75.0	33 08.7	+41.5	75.6	34
35	31 44.2	+34.7	70.4	32 04.0	+35.6	71.0	32 23.2	+36.6	71.6	32 41.9	+37.5	72.2	32 59.9	+38.4	72.8	33 17.3	+39.4	73.4	33 34.1	+40.3	74.1	33 50.2	+41.2	74.7	35
36	32 18.9	+34.2	69.4	32 39.6	+35.2	70.0	32 59.8	+36.2	70.7	33 19.4	+37.1	71.3	33 38.3	+38.1	71.9	33 56.7	+38.9	72.5	34 14.4	+39.8	73.2	34 31.4	+40.7	73.8	36
37	32 53.1	+33.8	68.5	33 14.8	+34.8	69.1	33 36.0	+35.7	69.7	33 56.5	+36.6	70.3	34 16.4	+37.5	71.0	34 35.6	+38.5	71.6	34 54.2	+39.4	72.3	35 12.1	+40.4	72.9	37
38	33 26.9	+33.3	67.5	33 49.6	+34.3	68.1	34 11.7	+35.2	68.7	34 33.1	+36.2	69.4	34 53.9	+37.2	70.0	35 14.1	+38.1	70.7	35 33.6	+39.0	71.4	35 52.5	+39.9	72.0	38
39	34 00.2	+32.9	66.5	34 23.9	+33.8	67.1	34 46.9	+34.8	67.7	35 09.3	+35.7	68.4	35 31.1	+36.7	69.1	35 52.2	+37.6	69.7	36 12.6	+38.6	70.4	36 32.4	+39.5	71.1	39
40	34 33.1	+32.3	65.5	34 57.7	+33.3	66.1	35 21.7	+34.2	66.8	35 45.0	+35.3	67.4	36 07.8	+36.1	68.1	36 29.8	+37.2	68.8	36 51.2	+38.1	69.5	37 11.9	+39.1	70.2	40
41	35 05.4	+31.8	64.4	35 31.0	+32.7	65.1	35 55.9	+33.8	65.7	36 20.3	+34.7	66.4	36 43.9	+35.7	67.1	37 07.0	+36.6	67.8	37 29.3	+37.6	68.5	37 51.0	+38.5	69.2	41
42	35 37.2	+31.2	63.4	36 03.7	+32.3	64.1	36 29.7	+33.2	64.7	36 55.0	+34.2	65.4	37 19.6	+35.2	66.1	37 43.6	+36.2	66.8	38 06.9	+37.1	67.5	38 29.5	+38.1	68.2	42
43	36 08.4	+30.7	62.4	36 36.0	+31.6	63.0	37 02.9	+32.6	63.7	37 29.2	+33.6	64.4	37 54.8	+34.6	65.1	38 19.8	+35.6	65.8	38 44.0	+36.6	66.5	39 07.6	+37.6	67.2	43
44	36 39.1	+30.1	61.3	37 07.6	+31.1	61.9	37 35.5	+32.1	62.6	38 02.8	+33.1	63.3	38 29.4	+34.1	64.0	38 55.4	+35.0	64.7	39 20.6	+36.1	65.5	39 45.2	+37.0	66.2	44
45	37 09.2	+29.5	60.2	37 38.7	+30.5	60.9	38 07.6	+31.5	61.6	38 35.9	+32.5	62.3	39 03.5	+33.5	63.0	39 30.4	+34.5	63.7	39 56.7	+35.4	64.4	40 22.2	+36.5	65.2	45
46	37 38.7	+28.9	59.1	38 09.2	+29.9	59.8	38 39.1	+30.9	60.5	39 08.4	+31.9	61.2	39 37.0	+32.9	61.9	40 04.9	+33.9	62.6	40 32.1	+34.9	63.4	40 58.7	+35.9	64.2	46
47	38 07.6	+28.3	58.0	38 39.1	+29.3	58.7	39 10.0	+30.3	59.4	39 40.3	+31.2	60.1	40 09.9	+32.2	60.8	40 38.8	+33.3	61.5	41 07.0	+34.3	62.3	41 34.6	+35.2	63.1	47
48	38 35.9	+27.6	56.9	39 08.4	+28.6	57.6	39 40.3	+29.6	58.2	40 11.5	+30.6	59.0	40 42.1	+31.7	59.7	41 12.1	+32.6	60.5	41 41.3	+33.7	61.2	42 09.8	+34.7	62.0	48
49	39 03.5	+26.9	55.7	39 37.0	+27.9	56.4	40 09.9	+28.9	57.1	40 42.1	+30.0	57.8	41 13.8	+30.9	58.6	41 44.7	+32.0	59.3	42 15.0	+33.0	60.1	42 44.5	+34.0	60.9	49
50	39 30.4	+26.3	54.6	40 04.9	+27.2	55.3	40 38.8	+28.2	56.0	41 12.1	+29.2	56.7	41 44.7	+30.3	57.4	42 16.7	+31.3	58.2	42 48.0	+32.3	59.0	43 18.5	+33.4	59.8	50
51	39 56.7	+25.5	53.4	40 32.1	+26.6	54.1	41 07.0	+27.6	54.8	41 41.3	+28.5	55.5	42 15.0	+29.5	56.3	42 48.0	+30.5	57.0	43 20.3	+31.6	57.8	43 51.9	+32.6	58.6	51
52	40 22.2	+24.8	52.2	40 58.7	+25.7	52.9	41 34.6	+26.7	53.6	42 09.8	+27.8	54.3	42 44.5	+28.8	55.1	43 18.5	+29.9	55.9	43 51.9	+30.8	56.6	44 24.5	+31.9	57.5	52
53	40 47.0	+24.0	51.0	41 24.4	+25.1	51.7	42 01.3	+26.1	52.4	42 37.6	+27.1	53.1	43 13.3	+28.1	53.9	43 48.4	+29.0	54.7	44 22.7	+30.1	55.4	44 56.4	+31.2	56.3	53
54	41 11.0	+23.3	49.8	41 49.5	+24.2	50.5	42 27.4	+25.2	51.2	43 04.7	+26.2	51.9	43 41.4	+27.2	52.7	44 17.4	+28.3	53.4	44 52.8	+29.4	54.2	45 27.6	+30.3	55.1	54
55	41 34.3	+22.5	48.6	42 13.7	+23.5	49.3	42 52.6	+24.4	50.0	43 30.9	+25.4	50.7	44 08.6	+26.5	51.4	44 45.7	+27.5	52.2	45 22.2	+28.5	53.0	45 57.9	+29.6	53.8	55
56	41 56.8	+21.6	47.3	42 37.2	+22.6	48.0	43 17.0	+23.6	48.7	43 56.3	+24.6	49.4	44 35.1	+25.6	50.2	45 13.2	+26.6	50.9	45 50.7	+27.6	51.7	46 27.5	+28.7	52.6	56
57	42 18.4	+20.8	46.1	42 59.8	+21.8	46.8	43 40.6	+22.8	47.4	44 20.9	+23.8	48.2	45 00.7	+24.7	48.9	45 39.8	+25.8	49.7	46 18.3	+26.8	50.5	46 56.2	+27.8	51.3	57
58	42 39.2	+20.0	44.8	43 21.6	+20.9	45.5	44 03.4	+21.8	46.2	44 44.7	+22.8	46.9	45 25.4	+23.9	47.6	46 05.6	+24.8	48.4	46 45.1	+25.9	49.2	47 24.0	+27.0	50.0	58
59	42 59.2	+19.1	43.5	43 42.5	+20.0	44.2	44 25.2	+21.0	44.9	45 07.5	+22.0	45.6	45 49.3	+22.9	46.3	46 30.4	+24.0	47.1	47 11.0	+25.0	47.8	47 51.0	+26.0	48.7	59
60	43 18.3	+18.2	42.2	44 02.5	+19.1	42.9	44 46.2	+20.1	43.5	45 29.5	+21.0	44.2	46 12.2	+22.0	45.0	46 54.4	+23.0	45.7	47 36.0	+24.0	46.5	48 17.0	+25.0	47.3	60
61	43 36.5	+17.3	40.9	44 21.6	+18.2	41.6	45 06.3	+19.1	42.2	45 50.5	+20.1	42.9	46 34.2	+21.0	43.6	47 17.4	+22.0	44.4	48 00.0	+23.0	45.1	48 42.0	+24.1	45.9	61
62	43 53.8	+16.4	39.6	44 39.8	+17.3	40.2	45 25.4	+18.2	40.9	46 10.6	+19.1	41.5	46 55.2	+20.1	42.2	47 39.4	+21.0	42.9	48 23.0	+22.0	43.7	49 06.1	+23.0	44.5	62
63	44 10.2	+15.4	38.3	44 57.1	+16.3	38.9	45 43.6	+17.2	39.5	46 29.7	+18.1	40.2	47 15.3	+19.0	40.9	48 00.4	+20.0	41.6	48 45.0	+21.0	42.3	49 29.1	+22.0	43.1	63
64	44 25.6	+14.4	36.9	45 13.4	+15.3	37.5	46 00.8	+16.2	38.1	46 47.8	+17.0	38.8	47 34.3	+18.0	39.5	48 20.4	+18.9	40.2	49 06.0	+19.9	40.9	49 51.1	+20.9	41.7	64
65	44 40.0	+13.5	35.5	45 28.7	+14.3	36.1	46 17.0	+15.1	36.7	47 04.8	+16.1	37.4	47 52.3	+16.9	38.0	48 39.3	+17.9	38.7	49 25.9	+18.8	39.5	50 12.0	+19.7	40.2	65
66	44 53.5	+12.5	34.2	45 43.0	+13.3	34.7	46 32.1	+14.1	35.3	47 20.9	+15.0	36.0	48 09.2	+15.9	36.6	48 57.2	+16.8	37.3	49 44.7	+17.7	38.0	50 31.7	+18.7	38.7	66
67	45 06.0	+11.5	32.8	45 56.3	+12.2	33.3	46 46.2	+13.1	33.9	47 35.9	+13.9	34.5	48 25.1	+14.8	35.2	49 14.0	+15.6	35.8	50 02.4	+16.5	36.5	50 50.4	+17.5	37.2	67
68	45 17.5	+10.4	31.4	46 08.5	+11.3	31.9	46 59.3	+11.9	32.5	47 49.8	+12.8	33.1	48 39.9	+13.6	33.7	49 29.6	+14.5	34.3	50 18.9	+15.4	35.0	51 07.9	+16.2	35.7	68
69	45 27.9	+9.4	30.0	46 19.8	+10.1	30.5	47 11.3	+10.9	31.1	48 02.6	+11.6	31.6	48 53.5	+12.5	32.2	49 44.1	+13.3	32.8	50 34.3	+14.2	33.5	51 24.1	+15.1	34.2	69
70	45 37.3	+8.4	28.6	46 29.9	+9.1	29.1	47 22.2	+9.8	29.6	48 14.2	+10.6	30.2	49 06.0	+11.3	30.7	49 57.4	+12.1	31.3	50 48.5	+12.9	32.0	51 39.2	+13.8	32.6	70
71	45 45.7	+7.3	27.2	46 39.0	+8.0	27.6	47 32.0	+8.7	28.1	48 24.8	+9.4	28.7	49 17.3	+10.1	29.2	50 09.5	+10.9	29.8	51 01.4	+11.7	30.4	51 53.0	+12.5	31.1	71
72	45 53.0	+6.3	25.7	46 47.0	+6.9	26.2	47 40.7	+7.6	26.7	48 34.2	+8.2	27.2	49 27.4	+9.0	27.7	50 20.4	+9.7	28.3	51 13.1	+10.5	28.9	52 05.5	+11.3	29.5	72
73	45 59.3	+5.1	24.3	46 53.9	+5.7	24.7	47 48.3	+6.4	25.2	48 42.4	+7.1	25.7	49 36.4	+7.7	26.2	50 30.1	+8.5	26.7	51 23.6	+9.1	27.3	52 16.8	+9.9	27.9	73
74	46 04.4	+4.1	22.9	46 59.6	+4.7	23.3	47 54.7	+5.2	23.7	48 49.5	+5.9	24.2	49 44.1	+6.6	24.7	50 38.6	+7.2	25.2	51 32.7	+7.9	25.7	52 26.7	+8.6	26.3	74
75	46 08.5	+3.0	21.4	47 04.3	+3.6	21.8	47 59.9	+4.2	22.2	48 55.4	+4.7	22.7	49 50.7	+5.3	23.1	50 45.8	+5.9	23.6	51 40.6	+6.6	24.1	52 35.3	+7.2	24.6	75
76	46 11.5	+2.0	20.0	47 07.9	+2.4	20.4	48 04.1	+2.9	20.7	49 00.1	+3.5	21.1	49 56.0	+4.0	21.6	50 51.7	+4.6	22.0	51 47.2	+5.3	22.5	52 42.5	+5.9	23.0	76
77	46 13.5	+0.8	18.5	47 10.3	+1.3	18.9	48 07.0	+1.8	19.2	49 03.6	+2.3	19.6	50 00.0	+2.8	20.0	50 56.3	+3.4	20.4	51 52.5	+3.9	20.9	52 48.4	+4.6	21.3	77
78	46 14.3	−0.3	17.1	47 11.6	+0.2	17.4	48 08.8	+0.6	17.7	49 05.9	+1.1	18.1	50 02.8	+1.6	18.5	50 59.7	+2.1	18.9	51 56.4	+2.6	19.3	52 53.1	+3.1	19.7	78
79	46 14.0	−1.3	15.7	47 11.8	−1.0	15.9	48 09.4	−0.5	16.2	49 07.0	−0.2	16.6	50 04.4	+0.3	16.9	51 01.8	+0.8	17.3	51 59.0	+1.3	17.6	52 56.1	+1.8	18.0	79
80	46 12.7	−2.5	14.2	47 10.8	−2.1	14.5	48 08.9	−1.8	14.7	49 06.8	−1.3	15.0	50 04.7	−0.9	15.3	51 02.6	−0.6	15.7	52 00.3	−0.1	16.0	52 57.9	+0.4	16.4	80
81	46 10.2	−3.5	12.8	47 08.7	−3.2	13.0	48 07.1	−2.9	13.3	49 05.5	−2.5	13.5	50 03.8	−2.2	13.8	51 02.0	−1.8	14.1	52 00.2	−1.4	14.4	52 57.3	−1.0	14.7	81
82	46 06.7	−4.7	11.3	47 05.5	−4.4	11.5	48 04.2	−4.0	11.8	49 03.0	−3.8	12.0	50 01.6	−3.4	12.2	51 00.2	−3.1	12.5	51 58.8	−2.8	12.8	52 57.3	−2.4	13.1	82
83	46 02.0	−5.7	9.9	47 01.1	−5.4	10.1	48 00.2	−5.2	10.3	48 59.2	−4.9	10.5	49 58.2	−4.7	10.7	50 57.1	−4.3	10.9	51 56.0	−4.1	11.1	52 54.9	−3.8	11.4	83
84	45 56.3	−6.7	8.5	46 55.7	−6.6	8.6	47 55.0	−6.4	8.8	48 54.3	−6.2	8.9	49 53.5	−5.9	9.1	50 52.8	−5.7	9.3	51 51.9	−5.4	9.5	52 51.1	−5.2	9.7	84
85	45 49.6	−7.9	7.0	46 49.1	−7.7	7.2	47 48.6	−7.5	7.3	48 48.1	−7.3	7.4	49 47.6	−7.1	7.6	50 47.1	−6.9	7.7	51 46.5	−6.7	7.9	52 45.9	−6.5	8.1	85
86	45 41.7	−8.8	5.6	46 41.4	−8.7	5.7	47 41.1	−8.6	5.8	48 40.8	−8.5	5.9	49 40.5	−8.3	6.1	50 40.2	−8.2	6.2	51 39.8	−8.0	6.3	52 39.4	−7.8	6.5	86
87	45 32.9	−10.0	4.2	46 32.7	−9.9	4.3	47 32.5	−9.6	4.3	48 32.2	−9.6	4.4	49 32.2	−9.6	4.5	50 32.0	−9.5	4.6	51 31.8	−9.3	4.7	52 31.6	−9.2	4.8	87
88	45 22.9	−10.9	2.8	46 22.9	−10.9	2.8	47 22.8	−10.9	2.9	48 22.7	−10.8	2.9	49 22.6	−10.7	3.0	50 22.5	−10.6	3.1	51 22.4	−10.5	3.1	52 22.4	−10.6	3.2	88
89	45 12.0	−12.0	1.4	46 12.0	−12.0	1.4	47 11.9	−11.9	1.4	48 11.9	−11.9	1.5	49 11.9	−11.9	1.5	50 11.9	−11.9	1.5	51 11.9	−11.9	1.6	52 11.8	−11.8	1.6	89
90	45 00.0	−13.0	0.0	46 00.0	−13.0	0.0	47 00.0	−13.0	0.0	48 00.0	−13.0	0.0	49 00.0	−13.0	0.0	50 00.0	−13.1	0.0	51 00.0	−13.1	0.0	52 00.0	−13.1	0.0	90

Dec.	45° (Hc d Z)	46° (Hc d Z)	47° (Hc d Z)	48° (Hc d Z)	49° (Hc d Z)	50° (Hc d Z)	51° (Hc d Z)	52° (Hc d Z)	Dec.
0	8 27.2 −42.9 98.5	8 18.2 −43.6 98.7	8 09.1 −44.4 98.8	7 59.8 −45.0 99.0	7 50.4 −45.8 99.1	7 40.8 −46.4 99.2	7 31.1 −47.1 99.4	7 21.3 −47.7 99.5	0
1	7 44.3 −43.0 99.3	7 34.6 −43.7 99.4	7 24.7 −44.4 99.5	7 14.8 −45.2 99.6	7 04.6 −45.7 99.8	6 54.4 −46.5 99.9	6 44.0 −47.1 100.0	6 33.6 −47.8 100.1	1
2	7 01.3 −43.0 100.0	6 50.9 −43.8 100.1	6 40.3 −44.5 100.2	6 29.6 −45.1 100.3	6 18.9 −45.9 100.4	6 07.9 −46.5 100.5	5 56.9 −47.1 100.6	5 45.8 −47.8 100.7	2
3	6 18.3 −43.2 100.7	6 07.1 −43.8 100.8	5 55.8 −44.5 100.9	5 44.5 −45.2 101.0	5 33.0 −45.9 101.1	5 21.4 −46.5 101.2	5 09.8 −47.2 101.2	4 58.0 −47.8 101.3	3
4	5 35.1 −43.1 101.4	5 23.3 −43.9 101.5	5 11.3 −44.6 101.5	4 59.3 −45.3 101.6	4 47.1 −45.9 101.7	4 34.9 −46.6 101.8	4 22.6 −47.2 101.9	4 10.2 −47.8 101.9	4
5	4 52.0 −43.2 102.1	4 39.4 −43.9 102.1	4 26.7 −44.6 102.2	4 14.0 −45.3 102.3	4 01.2 −45.9 102.4	3 48.3 −46.6 102.4	3 35.4 −47.3 102.5	3 22.4 −47.9 102.5	5
6	4 08.8 −43.3 102.8	3 55.5 −44.0 102.8	3 42.1 −44.6 102.9	3 28.7 −45.3 102.9	3 15.3 −46.0 103.0	3 01.7 −46.6 103.1	2 48.1 −47.2 103.1	2 34.5 −47.9 103.2	6
7	3 25.5 −43.3 103.4	3 11.5 −43.9 103.5	2 57.5 −44.7 103.5	2 43.4 −45.3 103.6	2 29.3 −46.0 103.6	2 15.1 −46.6 103.7	2 00.9 −47.3 103.7	1 46.6 −47.9 103.8	7
8	2 42.2 −43.3 104.1	2 27.6 −44.0 104.2	2 12.8 −44.6 104.2	1 58.1 −45.4 104.3	1 43.3 −46.0 104.3	1 28.5 −46.7 104.3	1 13.6 −47.3 104.4	0 58.7 −47.9 104.4	8
9	1 58.9 −43.3 104.8	1 43.6 −44.1 104.8	1 28.2 −44.7 104.9	1 12.7 −45.3 104.9	0 57.3 −46.0 104.9	0 41.8 −46.6 104.9	0 26.3 −47.3 105.0	0 10.8 −47.9 105.0	9
10	1 15.6 −43.3 105.5	0 59.5 −44.0 105.5	0 43.5 −44.7 105.6	0 27.4 −45.3 105.6	0 11.3 −46.1 105.6	0 04.8 +46.7 74.4	0 21.0 +47.2 74.4	0 37.1 +47.8 74.4	10
11	0 32.3 −43.3 106.2	0 15.5 −44.0 106.2	0 01.2 +44.7 73.8	0 18.0 +45.4 73.8	0 34.8 +46.0 73.8	0 51.5 +46.5 73.8	1 08.2 +47.3 73.8	1 24.9 +47.8 73.8	11
12	0 11.0 +43.4 73.1	0 28.5 +44.0 73.1	0 45.9 +44.7 73.1	1 03.4 +45.3 73.1	1 20.8 +46.0 73.1	1 38.2 +46.6 73.2	1 55.5 +47.3 73.2	2 12.8 +47.9 73.2	12
13	0 54.4 +43.3 72.4	1 12.5 +44.0 72.4	1 30.6 +44.7 72.4	1 48.7 +45.3 72.5	2 06.8 +46.0 72.5	2 24.8 +46.6 72.5	2 42.8 +47.2 72.6	3 00.7 +47.9 72.6	13
14	1 37.7 +43.3 71.7	1 56.5 +44.0 71.7	2 15.3 +44.7 71.8	2 34.0 +45.4 71.8	2 52.8 +45.9 71.9	3 11.4 +46.6 71.9	3 30.0 +47.2 72.0	3 48.6 +47.8 72.0	14
15	2 21.0 +43.3 71.0	2 40.5 +44.0 71.1	3 00.0 +44.6 71.1	3 19.4 +45.3 71.2	3 38.7 +46.0 71.2	3 58.0 +46.6 71.3	4 17.2 +47.2 71.3	4 36.4 +47.8 71.4	15
16	3 04.3 +43.3 70.3	3 24.5 +43.9 70.4	3 44.6 +44.6 70.4	4 04.7 +45.2 70.5	4 24.7 +45.9 70.6	4 44.6 +46.5 70.6	5 04.4 +47.2 70.7	5 24.2 +47.7 70.8	16
17	3 47.6 +43.2 69.6	4 08.4 +43.9 69.7	4 29.2 +44.6 69.8	4 49.9 +45.2 69.8	5 10.6 +45.8 69.9	5 31.1 +46.5 70.0	5 51.6 +47.1 70.1	6 11.9 +47.6 70.2	17
18	4 30.8 +43.2 68.9	4 52.3 +43.9 69.0	5 13.8 +44.5 69.1	5 35.1 +45.2 69.2	5 56.4 +45.8 69.3	6 17.6 +46.4 69.4	6 38.7 +47.0 69.5	6 59.7 +47.6 69.6	18
19	5 14.0 +43.1 68.2	5 36.2 +43.8 68.3	5 58.3 +44.5 68.4	6 20.3 +45.1 68.5	6 42.2 +45.8 68.6	7 04.0 +46.4 68.7	7 25.7 +47.1 68.8	7 47.3 +47.6 68.9	19
20	5 57.1 +43.1 67.5	6 20.0 +43.8 67.6	6 42.8 +44.4 67.7	7 05.4 +45.1 67.9	7 28.0 +45.7 68.0	7 50.4 +46.4 68.1	8 12.8 +46.9 68.2	8 34.9 +47.6 68.4	20
21	6 40.2 +43.0 66.8	7 03.8 +43.7 66.9	7 27.2 +44.4 67.1	7 50.5 +45.0 67.2	8 13.7 +45.7 67.3	8 36.8 +46.3 67.5	8 59.7 +46.9 67.6	9 22.5 +47.5 67.8	21
22	7 23.2 +43.0 66.1	7 47.5 +43.6 66.3	8 11.6 +44.2 66.4	8 35.5 +45.0 66.5	8 59.4 +45.5 66.7	9 23.1 +46.2 66.8	9 46.6 +46.8 67.0	10 10.0 +47.4 67.1	22
23	8 06.2 +42.9 65.4	8 31.1 +43.5 65.6	8 55.8 +44.3 65.7	9 20.5 +44.8 65.9	9 44.9 +45.5 66.0	10 09.3 +46.1 66.2	10 33.4 +46.6 66.3	10 57.4 +47.4 66.5	23
24	8 49.1 +42.8 64.7	9 14.6 +43.5 64.9	9 40.1 +44.1 65.0	10 05.3 +44.8 65.2	10 30.4 +45.4 65.3	10 55.4 +46.0 65.5	11 20.2 +46.6 65.7	11 44.8 +47.2 65.9	24
25	9 31.9 +42.7 64.0	9 58.1 +43.4 64.2	10 24.2 +44.0 64.3	10 50.1 +44.7 64.5	11 15.8 +45.4 64.7	11 41.4 +46.0 64.9	12 06.8 +46.6 65.1	12 32.0 +47.2 65.3	25
26	10 14.6 +42.7 63.3	10 41.5 +43.3 63.5	11 08.2 +44.0 63.6	11 34.8 +44.6 63.8	12 01.2 +45.2 64.0	12 27.4 +45.8 64.2	12 53.4 +46.5 64.4	13 19.2 +47.1 64.6	26
27	10 57.3 +42.5 62.6	11 24.8 +43.2 62.8	11 52.2 +43.8 62.9	12 19.4 +44.5 63.1	12 46.4 +45.1 63.3	13 13.2 +45.8 63.5	13 39.9 +46.3 63.8	14 06.3 +47.0 64.0	27
28	11 39.8 +42.4 61.9	12 08.0 +43.1 62.1	12 36.0 +43.8 62.2	13 03.9 +44.4 62.4	13 31.5 +45.1 62.7	13 59.0 +45.6 62.9	14 26.2 +46.3 63.1	14 53.3 +46.8 63.3	28
29	12 22.2 +42.3 61.1	12 51.1 +43.0 61.3	13 19.8 +43.6 61.5	13 48.3 +44.2 61.8	14 16.6 +44.9 62.0	14 44.6 +45.6 62.2	15 12.5 +46.1 62.4	15 40.1 +46.8 62.7	29
30	13 04.5 +42.2 60.4	13 34.1 +42.8 60.6	14 03.4 +43.5 60.8	14 32.5 +44.2 61.1	15 01.5 +44.7 61.3	15 30.2 +45.4 61.5	15 58.6 +46.1 61.8	16 26.9 +46.6 62.0	30
31	13 46.7 +42.1 59.7	14 16.9 +42.7 59.9	14 46.9 +43.4 60.1	15 16.7 +44.0 60.4	15 46.2 +44.7 60.6	16 15.6 +45.2 60.9	16 44.7 +45.9 61.1	17 13.5 +46.5 61.4	31
32	14 28.8 +41.9 59.0	14 59.6 +42.6 59.2	15 30.3 +43.2 59.4	16 00.7 +43.8 59.7	16 30.9 +44.5 59.9	17 00.8 +45.0 60.2	17 30.6 +45.7 60.4	18 00.0 +46.4 60.7	32
33	15 10.7 +41.8 58.2	15 42.2 +42.4 58.4	16 13.5 +43.1 58.7	16 44.5 +43.8 58.9	17 15.4 +44.3 59.2	17 46.0 +45.0 59.5	18 16.3 +45.6 59.8	18 46.4 +46.2 60.0	33
34	15 52.5 +41.5 57.5	16 24.6 +42.3 57.7	16 56.6 +42.9 58.0	17 28.3 +43.5 58.2	17 59.7 +44.2 58.5	18 31.0 +44.8 58.8	19 01.9 +45.5 59.1	19 32.6 +46.1 59.4	34
35	16 34.1 +41.4 56.7	17 06.9 +42.1 57.0	17 39.5 +42.7 57.2	18 11.8 +43.4 57.5	18 43.9 +44.1 57.8	19 15.8 +44.7 58.1	19 47.4 +45.3 58.4	20 18.7 +45.9 58.7	35
36	17 15.5 +41.3 56.0	17 49.0 +41.9 56.2	18 22.2 +42.6 56.5	18 55.2 +43.3 56.8	19 28.0 +43.9 57.1	20 00.5 +44.5 57.4	20 32.7 +45.1 57.7	21 04.6 +45.8 58.0	36
37	17 56.8 +41.1 55.2	18 30.9 +41.8 55.5	19 04.8 +42.4 55.8	19 38.5 +43.0 56.0	20 11.9 +43.6 56.3	20 45.0 +44.3 56.7	21 17.8 +45.0 57.0	21 50.4 +45.5 57.3	37
38	18 37.9 +40.9 54.4	19 12.7 +41.6 54.7	19 47.2 +42.3 55.0	20 21.5 +42.9 55.3	20 55.5 +43.6 55.6	21 29.3 +44.1 55.9	22 02.8 +44.7 56.3	22 35.9 +45.4 56.6	38
39	19 18.8 +40.8 53.7	19 54.3 +41.3 53.9	20 29.5 +42.0 54.2	21 04.4 +42.7 54.6	21 39.1 +43.3 54.9	22 13.4 +44.0 55.2	22 47.5 +44.6 55.5	23 21.3 +45.2 55.9	39
40	19 59.6 +40.5 52.9	20 35.6 +41.2 53.2	21 11.5 +41.8 53.5	21 47.1 +42.4 53.8	22 22.4 +43.0 54.1	22 57.4 +43.7 54.5	23 32.1 +44.4 54.8	24 06.5 +45.0 55.2	40
41	20 40.1 +40.3 52.1	21 16.8 +41.0 52.4	21 53.3 +41.6 52.7	22 29.5 +42.2 53.0	23 05.4 +42.9 53.4	23 41.1 +43.5 53.7	24 16.5 +44.1 54.1	24 51.5 +44.8 54.4	41
42	21 20.4 +40.0 51.3	21 57.8 +40.7 51.6	22 34.9 +41.4 51.9	23 11.7 +42.1 52.3	23 48.3 +42.7 52.6	24 24.6 +43.3 53.0	25 00.6 +43.9 53.3	25 36.3 +44.5 53.7	42
43	22 00.4 +39.9 50.5	22 38.5 +40.5 50.8	23 16.3 +41.1 51.1	23 53.8 +41.7 51.5	24 31.0 +42.4 51.8	25 07.9 +43.1 52.2	25 44.5 +43.7 52.6	26 20.8 +44.3 53.0	43
44	22 40.3 +39.6 49.7	23 19.0 +40.2 50.0	23 57.4 +40.9 50.3	24 35.5 +41.6 50.7	25 13.4 +42.2 51.1	25 51.0 +42.8 51.4	26 28.2 +43.4 51.8	27 05.1 +44.1 52.2	44
45	23 19.9 +39.3 48.9	23 59.2 +40.0 49.2	24 38.3 +40.6 49.5	25 17.1 +41.2 49.9	25 55.6 +41.9 50.3	26 33.8 +42.5 50.6	27 11.6 +43.2 51.0	27 49.2 +43.8 51.4	45
46	23 59.2 +39.1 48.0	24 39.2 +39.7 48.4	25 18.9 +40.3 48.7	25 58.3 +41.0 49.1	26 37.5 +41.6 49.5	27 16.3 +42.3 49.9	27 54.8 +42.9 50.3	28 33.0 +43.6 50.7	46
47	24 38.3 +38.8 47.2	25 18.9 +39.4 47.5	25 59.2 +40.1 47.9	26 39.3 +40.7 48.3	27 19.1 +41.4 48.7	27 58.6 +42.0 49.1	28 37.7 +42.7 49.5	29 16.6 +43.2 49.9	47
48	25 17.1 +38.5 46.4	25 58.3 +39.2 46.7	26 39.3 +39.8 47.1	27 20.0 +40.5 47.5	28 00.5 +41.0 47.8	28 40.6 +41.7 48.2	29 20.4 +42.3 48.7	29 59.8 +43.0 49.1	48
49	25 55.6 +38.2 45.5	26 37.5 +38.8 45.9	27 19.1 +39.5 46.2	28 00.5 +40.1 46.6	28 41.5 +40.8 47.0	29 22.3 +41.4 47.4	30 02.7 +42.0 47.8	30 42.8 +42.7 48.3	49
50	26 33.8 +37.8 44.7	27 16.3 +38.5 45.0	27 58.6 +39.1 45.4	28 40.6 +39.8 45.8	29 22.3 +40.4 46.2	30 03.7 +41.0 46.6	30 44.7 +41.7 47.0	31 25.5 +42.3 47.5	50
51	27 11.6 +37.6 43.8	27 54.8 +38.2 44.2	28 37.7 +38.9 44.5	29 20.4 +39.4 44.9	30 02.7 +40.1 45.3	30 44.7 +40.8 45.7	31 26.4 +41.4 46.2	32 07.8 +42.0 46.6	51
52	27 49.2 +37.2 42.9	28 33.0 +37.9 43.3	29 16.6 +38.4 43.7	29 59.8 +39.1 44.1	30 42.8 +39.7 44.5	31 25.5 +40.4 44.9	32 07.8 +41.0 45.3	32 48.8 +41.7 45.8	52
53	28 26.4 +36.9 42.0	29 10.9 +37.5 42.4	29 55.0 +38.2 42.8	30 38.9 +38.8 43.2	31 22.5 +39.4 43.6	32 05.9 +40.0 44.0	32 48.8 +40.7 44.5	33 31.5 +41.3 44.9	53
54	29 03.3 +36.5 41.1	29 48.4 +37.1 41.5	30 33.2 +37.7 41.9	31 17.7 +38.4 42.3	32 01.9 +39.1 42.7	32 45.9 +39.6 43.1	33 29.5 +40.3 43.6	34 12.8 +40.9 44.0	54
55	29 39.8 +36.1 40.2	30 25.5 +36.7 40.6	31 10.9 +37.4 41.0	31 56.1 +38.0 41.4	32 41.0 +38.6 41.8	33 25.5 +39.3 42.2	34 09.8 +39.9 42.7	34 53.7 +40.6 43.2	55
56	30 15.9 +35.8 39.3	31 02.2 +36.4 39.7	31 48.3 +37.0 40.1	32 34.1 +37.6 40.5	33 19.6 +38.2 40.9	34 04.8 +38.8 41.3	34 49.7 +39.5 41.8	35 34.3 +40.1 42.3	56
57	30 51.7 +35.3 38.4	31 38.6 +35.9 38.7	32 25.3 +36.5 39.1	33 11.7 +37.1 39.5	33 57.8 +37.8 40.0	34 43.6 +38.5 40.4	35 29.2 +39.0 40.9	36 14.4 +39.7 41.3	57
58	31 27.0 +34.9 37.4	32 14.5 +35.5 37.8	33 01.8 +36.1 38.2	33 48.8 +36.8 38.6	34 35.6 +37.4 39.0	35 22.1 +37.9 39.5	36 08.2 +38.6 39.9	36 54.1 +39.2 40.4	58
59	32 01.9 +34.5 36.5	32 50.0 +35.1 36.8	33 37.9 +35.7 37.2	34 25.6 +36.3 37.6	35 13.0 +36.9 38.1	36 00.0 +37.6 38.5	36 46.8 +38.2 39.0	37 33.3 +38.8 39.5	59
60	32 36.4 +34.0 35.5	33 25.1 +34.6 35.9	34 13.6 +35.2 36.3	35 01.9 +35.8 36.7	35 49.9 +36.4 37.1	36 37.6 +37.0 37.5	37 25.0 +37.7 38.0	38 12.1 +38.3 38.5	60
61	33 10.4 +33.6 34.5	33 59.7 +34.2 34.9	34 48.8 +34.8 35.3	35 37.7 +35.3 35.7	36 26.3 +35.9 36.1	37 14.6 +36.6 36.6	38 02.7 +37.1 37.0	38 50.4 +37.8 37.5	61
62	33 44.0 +33.0 33.5	34 33.9 +33.6 33.9	35 23.6 +34.2 34.3	36 13.0 +34.8 34.7	37 02.2 +35.5 35.1	37 51.2 +36.0 35.5	38 39.8 +36.7 36.0	39 28.2 +37.3 36.5	62
63	34 17.0 +32.6 32.5	35 07.5 +33.2 32.9	35 57.8 +33.7 33.3	36 47.8 +34.3 33.7	37 37.7 +34.8 34.1	38 27.2 +35.5 34.5	39 16.5 +36.1 35.0	40 05.5 +36.7 35.5	63
64	34 49.6 +32.1 31.5	35 40.7 +32.6 31.9	36 31.5 +33.2 32.2	37 22.1 +33.8 32.7	38 12.5 +34.4 33.1	39 02.7 +34.9 33.5	39 52.6 +35.5 34.0	40 42.2 +36.2 34.4	64
65	35 21.7 +31.5 30.5	36 13.3 +32.0 30.8	37 04.7 +32.6 31.2	37 55.9 +33.2 31.6	38 46.9 +33.8 32.0	39 37.6 +34.4 32.5	40 28.1 +35.0 32.9	41 18.4 +35.5 33.4	65
66	35 53.2 +30.9 29.4	36 45.3 +31.6 29.8	37 37.3 +32.1 30.2	38 29.1 +32.6 30.5	39 20.7 +33.2 31.0	40 12.0 +33.8 31.4	41 03.1 +34.4 31.8	41 53.9 +35.0 32.3	66
67	36 24.1 +30.4 28.3	37 16.9 +30.9 28.7	38 09.4 +31.5 29.1	39 01.7 +32.0 29.5	39 53.9 +32.5 29.9	40 45.8 +33.1 30.3	41 37.5 +33.7 30.7	42 28.9 +34.3 31.2	67
68	36 54.5 +29.8 27.3	37 47.8 +30.3 27.6	38 40.9 +30.8 28.0	39 33.7 +31.4 28.4	40 26.4 +32.0 28.8	41 18.9 +32.5 29.2	42 11.2 +33.0 29.6	43 03.2 +33.7 30.1	68
69	37 24.3 +29.2 26.2	38 18.1 +29.7 26.5	39 11.7 +30.2 26.9	40 05.1 +30.8 27.3	40 58.4 +31.2 27.7	41 51.4 +31.8 28.1	42 44.2 +32.4 28.5	43 36.9 +32.9 29.0	69
70	37 53.5 +28.6 25.1	38 47.8 +29.1 25.4	39 41.9 +29.6 25.8	40 35.9 +30.0 26.1	41 29.6 +30.6 26.5	42 23.2 +31.2 26.9	43 16.6 +31.7 27.4	44 09.8 +32.2 27.8	70
71	38 22.1 +27.9 24.0	39 16.9 +28.4 24.3	40 11.5 +28.9 24.6	41 05.9 +29.4 25.0	42 00.2 +29.9 25.4	42 54.4 +30.4 25.8	43 48.3 +31.0 26.2	44 42.0 +31.5 26.6	71
72	38 50.0 +27.3 22.8	39 45.3 +27.7 23.2	40 40.4 +28.2 23.5	41 35.3 +28.7 23.8	42 30.1 +29.2 24.2	43 24.8 +29.7 24.6	44 19.3 +30.2 25.0	45 13.5 +30.8 25.4	72
73	39 17.3 +26.6 21.7	40 13.0 +27.0 22.0	41 08.6 +27.5 22.3	42 04.0 +28.0 22.7	42 59.3 +28.4 23.0	43 54.5 +28.9 23.4	44 49.5 +29.4 23.8	45 44.3 +29.9 24.2	73
74	39 43.9 +25.9 20.5	40 40.0 +26.3 20.8	41 36.1 +26.7 21.1	42 32.0 +27.1 21.5	43 27.7 +27.7 21.8	44 23.4 +28.1 22.2	45 18.9 +28.6 22.5	46 14.2 +29.1 22.9	74
75	40 09.8 +25.1 19.3	41 06.3 +25.6 19.6	42 02.8 +26.0 19.9	42 59.1 +26.4 20.2	43 55.4 +26.8 20.6	44 51.5 +27.3 20.9	45 47.5 +27.7 21.3	46 43.3 +28.2 21.7	75
76	40 34.9 +24.4 18.2	41 31.9 +24.8 18.4	42 28.8 +25.2 18.7	43 25.5 +25.6 19.0	44 22.2 +26.0 19.3	45 18.8 +26.4 19.7	46 15.2 +26.9 20.0	47 11.5 +27.4 20.4	76
77	40 59.3 +23.7 16.9	41 56.7 +24.0 17.2	42 54.0 +24.3 17.5	43 51.1 +24.8 17.8	44 48.2 +25.2 18.1	45 45.2 +25.6 18.4	46 42.1 +26.0 18.7	47 38.9 +26.4 19.1	77
78	41 23.0 +22.8 15.7	42 20.7 +23.2 16.0	43 18.3 +23.6 16.2	44 15.9 +23.9 16.5	45 13.4 +24.3 16.8	46 10.8 +24.7 17.1	47 08.1 +25.1 17.4	48 05.3 +25.5 17.7	78
79	41 45.8 +22.1 14.5	42 43.9 +22.4 14.7	43 41.9 +22.7 15.0	44 39.8 +23.1 15.2	45 37.7 +23.4 15.5	46 35.5 +23.7 15.8	47 33.2 +24.1 16.1	48 30.8 +24.5 16.4	79
80	42 07.9 +21.2 13.2	43 06.3 +21.5 13.5	44 04.6 +21.8 13.7	45 02.9 +22.1 13.9	46 01.1 +22.4 14.2	46 59.2 +22.8 14.4	47 57.3 +23.1 14.7	48 55.3 +23.5 15.0	80
81	42 29.1 +20.4 12.0	43 27.8 +20.7 12.2	44 26.4 +21.0 12.4	45 25.0 +21.2 12.6	46 23.5 +21.6 12.8	47 22.0 +21.8 13.1	48 20.4 +22.2 13.3	49 18.8 +22.5 13.6	81
82	42 49.5 +19.5 10.7	43 48.5 +19.7 10.9	44 47.4 +20.0 11.1	45 46.2 +20.3 11.3	46 45.1 +20.5 11.5	47 43.8 +20.8 11.7	48 42.6 +21.1 11.9	49 41.3 +21.3 12.1	82
83	43 09.0 +18.7 9.4	44 08.2 +18.9 9.6	45 07.4 +19.0 9.7	46 06.5 +19.3 9.9	47 05.6 +19.5 10.1	48 04.6 +19.8 10.3	49 03.7 +20.0 10.5	50 02.6 +20.3 10.7	83
84	43 27.7 +17.7 8.1	44 27.1 +17.9 8.2	45 26.4 +18.2 8.4	46 25.8 +18.3 8.5	47 25.1 +18.5 8.7	48 24.4 +18.7 8.9	49 23.7 +18.9 9.0	50 22.9 +19.2 9.2	84
85	43 45.4 +16.8 6.8	44 45.0 +17.0 6.9	45 44.6 +17.1 7.0	46 44.1 +17.3 7.1	47 43.6 +17.5 7.3	48 43.1 +17.7 7.4	49 42.6 +17.8 7.6	50 42.1 +18.0 7.7	85
86	44 02.2 +15.9 5.4	45 02.0 +16.0 5.5	46 01.7 +16.1 5.6	47 01.4 +16.2 5.7	48 01.1 +16.4 5.9	49 00.8 +16.5 6.0	50 00.4 +16.7 6.1	51 00.1 +16.8 6.2	86
87	44 18.1 +15.0 4.1	45 18.0 +15.0 4.2	46 17.8 +15.1 4.2	47 17.6 +15.2 4.3	48 17.5 +15.3 4.4	49 17.3 +15.4 4.5	50 17.1 +15.5 4.6	51 16.9 +15.6 4.7	87
88	44 33.1 +13.9 2.7	45 33.0 +14.0 2.8	46 32.9 +14.1 2.8	47 32.8 +14.2 2.9	48 32.8 +14.2 3.0	49 32.7 +14.2 3.0	50 32.6 +14.3 3.1	51 32.5 +14.4 3.1	88
89	44 47.0 +13.0 1.4	45 47.0 +13.0 1.4	46 47.0 +13.0 1.4	47 47.0 +13.0 1.5	48 47.0 +13.0 1.5	49 46.9 +13.1 1.5	50 46.9 +13.1 1.5	51 46.9 +13.1 1.6	89
90	45 00.0 +12.0 0.0	46 00.0 +12.0 0.0	47 00.0 +11.9 0.0	48 00.0 +11.9 0.0	49 00.0 +11.9 0.0	50 00.0 +11.9 0.0	51 00.0 +11.9 0.0	52 00.0 +11.8 0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	7 45.2	+42.8	97.8	7 37.0	+43.5	98.0	7 28.6	+44.3	98.1	7 20.1	+44.9	98.2	7 11.5	+45.6	98.3	7 02.7	+46.3	98.5	6 53.8	+46.9	98.6	6 44.8	+47.6	98.7	0
1	8 28.0	+42.7	97.1	8 20.5	+43.5	97.3	8 12.9	+44.1	97.4	8 05.0	+44.9	97.6	7 57.1	+45.5	97.7	7 49.0	+46.2	97.8	7 40.7	+46.9	98.0	7 32.4	+47.5	98.1	1
2	9 10.7	+42.7	96.4	9 04.0	+43.3	96.6	8 57.0	+44.1	96.7	8 49.9	+44.8	96.9	8 42.6	+45.5	97.0	8 35.2	+46.2	97.2	8 27.6	+46.9	97.3	8 19.9	+47.5	97.5	2
3	9 53.4	+42.5	95.7	9 47.3	+43.3	95.9	9 41.1	+44.0	96.0	9 34.7	+44.7	96.2	9 28.1	+45.4	96.4	9 21.4	+46.1	96.5	9 14.5	+46.7	96.7	9 07.4	+47.4	96.9	3
4	10 35.9	+42.4	95.0	10 30.6	+43.2	95.2	10 25.1	+43.9	95.3	10 19.4	+44.6	95.5	10 13.5	+45.4	95.7	10 07.5	+46.0	95.9	10 01.2	+46.7	96.1	9 54.8	+47.3	96.2	4
5	11 18.3	+42.3	94.3	11 13.8	+43.0	94.5	11 09.0	+43.8	94.7	11 04.0	+44.6	94.8	10 58.9	+45.2	95.0	10 53.5	+45.9	95.2	10 47.9	+46.6	95.4	10 42.1	+47.3	95.6	5
6	12 00.6	+42.3	93.5	11 56.8	+43.0	93.7	11 52.8	+43.7	94.0	11 48.6	+44.4	94.2	11 44.1	+45.1	94.4	11 39.4	+45.9	94.6	11 34.5	+46.5	94.8	11 29.4	+47.2	95.0	6
7	12 42.9	+42.1	92.8	12 39.8	+42.9	93.0	12 36.5	+43.6	93.3	12 33.0	+44.3	93.5	12 29.2	+45.1	93.7	12 25.3	+45.7	93.9	12 21.0	+46.5	94.1	12 16.6	+47.1	94.4	7
8	13 25.0	+41.9	92.1	13 22.7	+42.7	92.3	13 20.1	+43.5	92.5	13 17.3	+44.2	92.8	13 14.3	+44.9	93.0	13 11.0	+45.6	93.3	13 07.5	+46.3	93.5	13 03.7	+47.0	93.7	8
9	14 06.9	+41.9	91.3	14 05.4	+42.6	91.6	14 03.6	+43.4	91.8	14 01.5	+44.1	92.1	13 59.2	+44.8	92.3	13 56.6	+45.6	92.6	13 53.8	+46.2	92.8	13 50.7	+46.9	93.1	9
10	14 48.8	+41.7	90.6	14 48.0	+42.5	90.9	14 47.0	+43.2	91.1	14 45.6	+44.0	91.4	14 44.0	+44.7	91.7	14 42.2	+45.4	91.9	14 40.0	+46.2	92.2	14 37.6	+46.8	92.4	10
11	15 30.5	+41.5	89.9	15 30.5	+42.3	90.1	15 30.2	+43.1	90.4	15 29.6	+43.8	90.7	15 28.7	+44.6	91.0	15 27.6	+45.3	91.2	15 26.2	+46.0	91.5	15 24.4	+46.7	91.8	11
12	16 12.0	+41.4	89.1	16 12.8	+42.1	89.4	16 13.3	+42.9	89.7	16 13.4	+43.7	90.0	16 13.3	+44.5	90.3	16 12.9	+45.1	90.6	16 12.2	+45.8	90.8	16 11.1	+46.6	91.1	12
13	16 53.4	+41.2	88.3	16 54.9	+42.1	88.7	16 56.2	+42.8	89.0	16 57.1	+43.6	89.3	16 57.8	+44.2	89.6	16 58.0	+45.1	89.9	16 58.0	+45.8	90.2	16 57.7	+46.4	90.5	13
14	17 34.6	+41.0	87.6	17 37.0	+41.8	87.9	17 39.0	+42.6	88.2	17 40.7	+43.4	88.5	17 42.0	+44.2	88.9	17 43.1	+44.8	89.2	17 43.8	+45.6	89.5	17 44.1	+46.3	89.8	14
15	18 15.6	+40.9	86.8	18 18.8	+41.6	87.1	18 21.6	+42.4	87.5	18 24.1	+43.2	87.8	18 26.2	+44.0	88.1	18 27.9	+44.8	88.5	18 29.4	+45.4	88.8	18 30.4	+46.2	89.1	15
16	18 56.5	+40.6	86.0	19 00.4	+41.5	86.4	19 04.0	+42.3	86.7	19 07.3	+43.0	87.1	19 10.2	+43.8	87.4	19 12.7	+44.5	87.8	19 14.8	+45.3	88.1	19 16.6	+46.0	88.5	16
17	19 37.1	+40.5	85.3	19 41.9	+41.3	85.6	19 46.3	+42.1	86.0	19 50.3	+42.9	86.3	19 54.0	+43.6	86.7	19 57.2	+44.4	87.1	20 00.1	+45.1	87.4	20 02.6	+45.9	87.8	17
18	20 17.6	+40.2	84.5	20 23.2	+41.0	84.9	20 28.4	+41.8	85.2	20 33.2	+42.6	85.6	20 37.6	+43.4	86.0	20 41.6	+44.2	86.3	20 45.2	+45.0	86.7	20 48.5	+45.7	87.1	18
19	20 57.8	+40.1	83.7	21 04.2	+40.9	84.1	21 10.2	+41.7	84.5	21 15.8	+42.5	84.8	21 21.0	+43.3	85.2	21 25.8	+44.0	85.6	21 30.2	+44.8	86.0	21 34.2	+45.5	86.4	19
20	21 37.9	+39.8	82.9	21 45.1	+40.6	83.3	21 51.9	+41.4	83.7	21 58.3	+42.2	84.1	22 04.3	+43.0	84.5	22 09.8	+43.8	84.9	22 15.0	+44.5	85.3	22 19.7	+45.3	85.7	20
21	22 17.7	+39.5	82.1	22 25.7	+40.4	82.5	22 33.3	+41.3	82.9	22 40.5	+42.1	83.3	22 47.3	+42.8	83.7	22 53.6	+43.7	84.2	22 59.5	+44.4	84.6	23 05.0	+45.1	85.0	21
22	22 57.2	+39.3	81.3	23 06.1	+40.1	81.7	23 14.6	+40.9	82.1	23 22.6	+41.8	82.5	23 30.1	+42.6	83.0	23 37.3	+43.4	83.4	23 43.9	+44.2	83.8	23 50.1	+45.0	84.3	22
23	23 36.5	+39.0	80.4	23 46.2	+39.9	80.9	23 55.5	+40.8	81.3	24 04.4	+41.5	81.8	24 12.7	+42.4	82.2	24 20.7	+43.1	82.6	24 28.1	+43.9	83.1	24 35.1	+44.7	83.6	23
24	24 15.5	+38.8	79.6	24 26.1	+39.7	80.1	24 36.3	+40.4	80.5	24 45.9	+41.3	81.0	24 55.1	+42.1	81.4	25 03.8	+42.9	81.9	25 12.0	+43.8	82.3	25 19.8	+44.5	82.8	24
25	24 54.3	+38.5	78.8	25 05.8	+39.3	79.2	25 16.7	+40.2	79.7	25 27.2	+41.1	80.2	25 37.2	+41.9	80.6	25 46.7	+42.7	81.1	25 55.8	+43.5	81.6	26 04.3	+44.3	82.1	25
26	25 32.8	+38.2	77.9	25 45.1	+39.0	78.4	25 56.9	+39.9	78.9	26 08.3	+40.7	79.4	26 19.1	+41.6	79.8	26 29.4	+42.4	80.3	26 39.3	+43.2	80.8	26 48.6	+44.0	81.3	26
27	26 11.0	+37.8	77.1	26 24.1	+38.8	77.6	26 36.8	+39.7	78.0	26 49.0	+40.5	78.5	27 00.7	+41.3	79.0	27 11.8	+42.2	79.5	27 22.5	+43.0	80.0	27 32.6	+43.8	80.6	27
28	26 48.8	+37.6	76.2	27 02.9	+38.4	76.7	27 16.5	+39.3	77.2	27 29.5	+40.2	77.7	27 42.0	+41.0	78.2	27 54.0	+41.9	78.7	28 05.5	+42.7	79.3	28 16.4	+43.5	79.8	28
29	27 26.4	+37.2	75.3	27 41.3	+38.1	75.8	27 55.8	+39.0	76.3	28 09.7	+39.8	76.9	28 23.0	+40.8	77.4	28 35.9	+41.5	77.9	28 48.2	+42.4	78.5	28 59.9	+43.2	79.0	29
30	28 03.6	+36.9	74.4	28 19.4	+37.8	75.0	28 34.8	+38.6	75.5	28 49.5	+39.6	76.0	29 03.8	+40.4	76.5	29 17.4	+41.3	77.1	29 30.6	+42.1	77.6	29 43.1	+43.0	78.2	30
31	28 40.5	+36.5	73.5	28 57.2	+37.4	74.1	29 13.4	+38.3	74.6	29 29.1	+39.2	75.2	29 44.2	+40.0	75.7	29 58.7	+40.9	76.3	30 12.7	+41.8	76.8	30 26.1	+42.6	77.4	31
32	29 17.0	+36.1	72.6	29 34.6	+37.1	73.2	29 51.7	+38.0	73.7	30 08.3	+38.8	74.3	30 24.2	+39.8	74.8	30 39.6	+40.7	75.4	30 54.5	+41.4	76.0	31 08.7	+42.3	76.6	32
33	29 53.1	+35.8	71.7	30 11.7	+36.7	72.3	30 29.7	+37.6	72.8	30 47.1	+38.5	73.4	31 04.0	+39.4	74.0	31 20.3	+40.2	74.6	31 35.9	+41.2	75.1	31 51.0	+42.0	75.7	33
34	30 28.9	+35.4	70.8	30 48.4	+36.3	71.4	31 07.3	+37.2	71.9	31 25.6	+38.1	72.5	31 43.4	+39.0	73.1	32 00.5	+39.9	73.7	32 17.1	+40.8	74.3	32 33.0	+41.7	74.9	34
35	31 04.3	+34.9	69.8	31 24.7	+35.8	70.4	31 44.5	+36.8	71.0	32 03.7	+37.7	71.6	32 22.4	+38.6	72.2	32 40.4	+39.5	72.8	32 57.9	+40.4	73.4	33 14.7	+41.3	74.0	35
36	31 39.2	+34.5	68.9	32 00.5	+35.5	69.5	32 21.3	+36.4	70.1	32 41.4	+37.3	70.7	33 01.0	+38.2	71.3	33 19.9	+39.2	71.9	33 38.3	+40.0	72.5	33 56.0	+40.9	73.2	36
37	32 13.7	+34.1	67.9	32 36.0	+35.0	68.5	32 57.7	+35.9	69.1	33 18.7	+36.9	69.7	33 39.2	+37.8	70.4	33 59.1	+38.7	71.0	34 18.3	+39.6	71.6	34 36.9	+40.5	72.3	37
38	32 47.8	+33.6	67.0	33 11.0	+34.6	67.6	33 33.6	+35.5	68.2	33 55.6	+36.5	68.8	34 17.0	+37.4	69.4	34 37.8	+38.3	70.1	34 57.9	+39.2	70.7	35 17.4	+40.1	71.4	38
39	33 21.4	+33.1	66.0	33 45.6	+34.0	66.6	34 09.1	+35.0	67.2	34 32.1	+35.9	67.8	34 54.4	+36.9	68.5	35 16.1	+37.8	69.1	35 37.1	+38.8	69.8	35 57.5	+39.7	70.5	39
40	33 54.5	+32.7	65.0	34 19.6	+33.6	65.6	34 44.1	+34.6	66.2	35 08.0	+35.5	66.9	35 31.3	+36.5	67.5	35 53.9	+37.4	68.2	36 15.9	+38.4	68.8	36 37.2	+39.3	69.5	40
41	34 27.2	+32.1	64.0	34 53.2	+33.1	64.6	35 18.7	+34.0	65.2	35 43.5	+35.1	65.9	36 07.8	+35.9	66.5	36 31.3	+37.0	67.2	36 54.3	+37.8	67.9	37 16.5	+38.8	68.6	41
42	34 59.3	+31.6	62.9	35 26.3	+32.6	63.6	35 52.7	+33.6	64.2	36 18.6	+34.5	64.9	36 43.7	+35.5	65.5	37 08.3	+36.4	66.2	37 32.1	+37.4	66.9	37 55.3	+38.3	67.6	42
43	35 30.9	+31.1	61.9	35 58.9	+32.0	62.5	36 26.3	+33.0	63.2	36 53.1	+33.9	63.8	37 19.2	+34.9	64.5	37 44.7	+35.9	65.2	38 09.5	+36.8	65.9	38 33.6	+37.8	66.7	43
44	36 02.0	+30.5	60.8	36 30.9	+31.5	61.5	36 59.3	+32.4	62.1	37 27.0	+33.4	62.8	37 54.1	+34.4	63.5	38 20.6	+35.3	64.2	38 46.3	+36.4	64.9	39 11.4	+37.3	65.7	44
45	36 32.5	+29.9	59.8	37 02.4	+30.9	60.4	37 31.7	+31.9	61.1	38 00.4	+32.9	61.8	38 28.5	+33.8	62.5	38 55.9	+34.8	63.2	39 22.7	+35.8	63.9	39 48.7	+36.8	64.6	45
46	37 02.4	+29.3	58.7	37 33.3	+30.3	59.3	38 03.6	+31.3	60.0	38 33.3	+32.3	60.7	39 02.3	+33.3	61.4	39 30.7	+34.3	62.1	39 58.5	+35.2	62.9	40 25.5	+36.2	63.6	46
47	37 31.7	+28.7	57.6	38 03.6	+29.7	58.2	38 34.9	+30.7	58.9	39 05.6	+31.6	59.6	39 35.6	+32.6	60.3	40 05.0	+33.6	61.0	40 33.7	+34.6	61.8	41 01.7	+35.6	62.6	47
48	38 00.4	+28.1	56.5	38 33.3	+29.0	57.1	39 05.6	+30.0	57.8	39 37.2	+31.0	58.5	40 08.2	+32.1	59.2	40 38.6	+33.0	60.0	41 08.3	+34.0	60.7	41 37.3	+35.0	61.5	48
49	38 28.5	+27.4	55.3	39 02.3	+28.4	56.0	39 35.6	+29.4	56.7	40 08.2	+30.4	57.4	40 40.3	+31.3	58.1	41 11.6	+32.4	58.9	41 42.3	+33.4	59.6	42 12.3	+34.4	60.4	49
50	38 55.9	+26.8	54.2	39 30.7	+27.8	54.9	40 05.0	+28.7	55.6	40 38.6	+29.7	56.3	41 11.6	+30.7	57.0	41 44.0	+31.7	57.7	42 15.7	+32.7	58.5	42 46.7	+33.7	59.3	50
51	39 22.7	+26.0	53.1	39 58.5	+27.0	53.7	40 33.7	+28.0	54.4	41 08.3	+29.0	55.1	41 42.3	+30.0	55.8	42 15.7	+31.0	56.6	42 48.4	+32.0	57.4	43 20.4	+33.0	58.1	51
52	39 48.7	+25.4	51.9	40 25.5	+26.3	52.6	41 01.7	+27.3	53.2	41 37.3	+28.3	53.9	42 12.3	+29.3	54.7	42 46.7	+30.3	55.4	43 20.4	+31.3	56.2	43 53.4	+32.4	57.0	52
53	40 14.1	+24.6	50.7	40 51.8	+25.6	51.4	41 29.0	+26.5	52.1	42 05.6	+27.5	52.8	42 41.6	+28.5	53.5	43 17.0	+29.5	54.2	43 51.7	+30.6	55.0	44 25.8	+31.6	55.8	53
54	40 38.7	+23.8	49.5	41 17.4	+24.8	50.2	41 55.5	+25.8	50.9	42 33.1	+26.8	51.6	43 10.1	+27.8	52.3	43 46.5	+28.8	53.0	44 22.3	+29.8	53.8	44 57.4	+30.8	54.6	54
55	41 02.5	+23.1	48.3	41 42.2	+24.0	49.0	42 21.3	+25.0	49.6	42 59.9	+26.0	50.3	43 37.9	+27.0	51.1	44 15.3	+28.0	51.8	44 52.1	+29.0	52.6	45 28.2	+30.0	53.4	55
56	41 25.6	+22.3	47.1	42 06.2	+23.3	47.7	42 46.3	+24.2	48.4	43 25.9	+25.2	49.1	44 04.9	+26.2	49.8	44 43.3	+27.2	50.5	45 21.1	+28.2	51.4	45 58.2	+29.2	52.2	56
57	41 47.9	+21.5	45.8	42 29.5	+22.4	46.5	43 10.5	+23.4	47.1	43 51.1	+24.3	47.8	44 31.1	+25.3	48.6	45 10.5	+26.3	49.3	45 49.3	+27.3	50.1	46 27.4	+28.4	50.9	57
58	42 09.4	+20.6	44.6	42 51.9	+21.6	45.2	43 33.9	+22.5	45.9	44 15.4	+23.5	46.6	44 56.4	+24.5	47.3	45 36.8	+25.5	48.0	46 16.6	+26.5	48.8	46 55.8	+27.5	49.6	58
59	42 30.0	+19.8	43.3	43 13.5	+20.7	43.9	43 56.4	+21.7	44.6	44 38.9	+22.6	45.3	45 20.9	+23.5	46.0	46 02.3	+24.5	46.7	46 43.1	+25.6	47.5	47 23.3	+26.6	48.3	59
60	42 49.8	+19.0	42.0	43 34.2	+19.8	42.6	44 18.1	+20.8	43.3	45 01.5	+21.7	44.0	45 44.4	+22.7	44.7	46 26.8	+23.7	45.4	47 08.7	+24.6	46.2	47 49.9	+25.6	47.0	60
61	43 08.8	+18.0	40.7	43 54.0	+19.0	41.3	44 38.9	+19.8	42.0	45 23.2	+20.8	42.7	46 07.1	+21.7	43.4	46 50.5	+22.7	44.1	47 33.3	+23.7	44.8	48 15.5	+24.7	45.6	61
62	43 26.8	+17.1	39.4	44 13.0	+18.0	40.0	44 58.7	+18.9	40.7	45 44.0	+19.7	41.3	46 28.8	+20.8	42.0	47 13.2	+21.7	42.7	47 57.0	+22.6	43.5	48 40.2	+23.7	44.3	62
63	43 43.9	+16.2	38.1	44 31.0	+17.0	38.7	45 17.6	+18.0	39.3	46 03.8	+18.9	40.0	46 49.6	+19.7	40.6	47 34.9	+20.7	41.4	48 19.6	+21.7	42.1	49 03.9	+22.7	42.9	63
64	44 00.1	+15.3	36.7	44 48.0	+16.2	37.3	45 35.6	+16.9	37.9	46 22.7	+17.8	38.6	47 09.3	+18.8	39.3	47 55.6	+19.7	40.0	48 41.3	+20.6	40.7	49 26.6	+21.6	41.4	64
65	44 15.4	+14.3	35.4	45 04.2	+15.1	36.0	45 52.5	+16.0	36.6	46 40.5	+16.8	37.2	47 28.1	+17.7	37.9	48 15.3	+18.6	38.5	49 01.9	+19.6	39.3	49 48.2	+20.5	40.0	65
66	44 29.7	+13.4	34.0	45 19.3	+14.1	34.6	46 08.5	+14.9	35.2	46 57.3	+15.8	35.8	47 45.8	+16.7	36.4	48 33.9	+17.5	37.1	49 21.5	+18.5	37.8	50 08.7	+19.4	38.5	66
67	44 43.1	+12.3	32.7	45 33.4	+13.1	33.2	46 23.4	+14.0	33.8	47 13.1	+14.8	34.4	48 02.5	+15.6	35.0	48 51.4	+16.5	35.7	49 40.0	+17.3	36.3	50 28.1	+18.2	37.1	67
68	44 55.4	+11.3	31.3	45 46.5	+12.1	31.8	46 37.4	+12.8	32.4	47 27.9	+13.6	33.0	48 18.1	+14.4	33.6	49 07.9	+15.3	34.2	49 57.3	+16.2	34.9	50 46.3	+17.1	35.6	68
69	45 06.7	+10.4	29.9	45 58.6	+11.1	30.4	46 50.2	+11.8	30.9	47 41.5	+12.6	31.5	48 32.5	+13.4	32.1	49 23.2	+14.2	32.7	50 13.5	+15.0	33.4	51 03.4	+15.9	34.0	69
70	45 17.1	+9.3	28.5	46 09.7	+10.0	29.0	47 02.0	+10.7	29.5	47 54.1	+11.5	30.1	48 45.9	+12.2	30.6	49 37.4	+13.0	31.2	50 28.5	+13.8	31.8	51 19.3	+14.7	32.5	70
71	45 26.4	+8.2	27.1	46 19.7	+8.9	27.6	47 12.7	+9.6	28.1	48 05.6	+10.3	28.6	48 58.1	+11.1	29.2	49 50.4	+11.8	29.7	50 42.3	+12.6	30.3	51 34.0	+13.4	30.9	71
72	45 34.6	+7.2	25.7	46 28.6	+7.8	26.1	47 22.3	+8.5	26.6	48 15.9	+9.2	27.1	49 09.2	+9.8	27.6	50 02.2	+10.6	28.2	50 54.9	+11.4	28.8	51 47.4	+12.1	29.4	72
73	45 41.8	+6.2	24.3	46 36.4	+6.8	24.7	47 30.8	+7.4	25.1	48 25.1	+8.0	25.6	49 19.0	+8.7	26.1	50 12.8	+9.4	26.6	51 06.3	+10.1	27.2	51 59.5	+10.9	27.8	73
74	45 48.0	+5.0	22.8	46 43.2	+5.6	23.2	47 38.2	+6.3	23.7	48 33.1	+6.8	24.1	49 27.7	+7.5	24.6	50 22.2	+8.1	25.1	51 16.4	+8.8	25.6	52 10.4	+9.5	26.2	74
75	45 53.0	+4.0	21.4	46 48.8	+4.6	21.8	47 44.5	+5.1	22.2	48 39.9	+5.7	22.6	49 35.2	+6.3	23.1	50 30.3	+6.9	23.5	51 25.2	+7.6	24.0	52 19.9	+8.2	24.6	75
76	45 57.0	+3.0	20.0	46 53.4	+3.4	20.3	47 49.6	+3.9	20.7	48 45.6	+4.5	21.1	49 41.5	+5.1	21.5	50 37.2	+5.7	22.0	51 32.8	+6.2	22.4	52 28.1	+6.9	22.9	76
77	46 00.0	+1.8	18.5	46 56.8	+2.3	18.9	47 53.5	+2.8	19.2	48 50.1	+3.3	19.6	49 46.6	+3.8	20.0	50 42.9	+4.3	20.4	51 39.0	+5.0	20.8	52 35.0	+5.5	21.3	77
78	46 01.8	+0.8	17.1	46 59.1	+1.2	17.4	47 56.3	+1.7	17.7	48 53.4	+2.1	18.1	49 50.4	+2.6	18.4	50 47.2	+3.1	18.8	51 44.0	+3.6	19.2	52 40.5	+4.2	19.7	78
79	46 02.6	-0.4	15.7	47 00.3	+0.1	15.9	47 58.0	+0.4	16.2	48 55.5	+0.9	16.6	49 53.0	+1.3	16.9	50 50.3	+1.8	17.3	51 47.6	+2.3	17.6	52 44.7	+2.8	18.0	79
80	46 02.2	-1.4	14.2	47 00.4	-1.1	14.5	47 58.4	-0.7	14.8	48 56.4	-0.3	15.0	49 54.3	+0.1	15.3	50 52.1	+0.6	15.7	51 49.9	+0.9	16.0	52 47.5	+1.4	16.4	80
81	46 00.8	-2.5	12.8	46 59.3	-2.2	13.0	47 57.7	-1.8	13.3	48 56.1	-1.5	13.5	49 54.4	-1.1	13.8	50 52.7	-0.8	14.1	51 50.8	-0.4	14.4	52 48.9	0.0	14.7	81
82	45 58.3	-3.5	11.3	46 57.1	-3.3	11.5	47 55.9	-3.0	11.8	48 54.6	-2.7	12.0	49 53.3	-2.4	12.2	50 51.9	-2.1	12.5	51 50.4	-1.7	12.8	52 48.9	-1.3	13.1	82
83	45 54.8	-4.7	9.9	46 53.8	-4.4	10.1	47 52.9	-4.2	10.3	48 51.9	-3.9	10.5	49 50.9	-3.6	10.7	50 49.8	-3.3	10.9	51 48.7	-3.0	11.2	52 47.6	-2.8	11.4	83
84	45 50.1	-5.7	8.4	46 49.4	-5.5	8.6	47 48.7	-5.3	8.8	48 48.0	-5.1	9.0	49 47.3	-4.9	9.1	50 46.5	-4.6	9.3	51 45.7	-4.4	9.5	52 44.8	-4.1	9.8	84
85	45 44.4	-6.8	7.0	46 43.9	-6.6	7.2	47 43.4	-6.4	7.3	48 42.9	-6.2	7.5	49 42.4	-6.1	7.6	50 41.9	-5.9	7.8	51 41.3	-5.7	7.9	52 40.7	-5.4	8.1	85
86	45 37.6	-7.9	5.6	46 37.3	-7.7	5.7	47 37.0	-7.6	5.8	48 36.7	-7.5	5.9	49 36.3	-7.2	6.1	50 36.0	-7.1	6.2	51 35.6	-6.9	6.3	52 35.3	-6.8	6.5	86
87	45 29.7	-8.8	4.2	46 29.6	-8.8	4.3	47 29.4	-8.7	4.4	48 29.2	-8.6	4.4	49 29.1	-8.5	4.5	50 28.9	-8.4	4.6	51 28.7	-8.3	4.7	52 28.5	-8.2	4.8	87
88	45 20.9	-10.0	2.8	46 20.8	-9.9	2.8	47 20.7	-9.8	2.9	48 20.6	-9.7	3.0	49 20.6	-9.7	3.0	50 20.5	-9.7	3.1	51 20.4	-9.6	3.1	52 20.3	-9.5	3.2	88
89	45 10.9	-10.9	1.4	46 10.9	-10.9	1.4	47 10.9	-10.9	1.4	48 10.9	-10.9	1.5	49 10.9	-10.9	1.5	50 10.8	-10.8	1.5	51 10.8	-10.8	1.6	52 10.8	-10.8	1.6	89
90	45 00.0	-12.0	0.0	46 00.0	-12.0	0.0	47 00.0	-12.0	0.0	48 00.0	-12.0	0.0	49 00.0	-12.0	0.0	50 00.0	-12.0	0.0	51 00.0	-12.1	0.0	52 00.0	-12.1	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	7 45.2	−42.8	97.8	7 37.0	−43.6	98.0	7 28.6	−44.3	98.1	7 20.1	−45.0	98.2	7 11.5	−45.7	98.3	7 02.7	−46.3	98.5	6 53.8	−47.0	98.6	6 44.8	−47.7	98.7	0
1	7 02.4	−42.9	98.5	6 53.4	−43.6	98.7	6 44.3	−44.3	98.8	6 35.1	−45.0	98.9	6 25.8	−45.7	99.0	6 16.4	−46.4	99.1	6 06.8	−47.0	99.2	5 57.1	−47.6	99.3	1
2	6 19.5	−43.0	99.2	6 09.8	−43.7	99.3	6 00.0	−44.4	99.4	5 50.1	−45.1	99.6	5 40.1	−45.8	99.7	5 30.0	−46.4	99.7	5 19.8	−47.1	99.8	5 09.5	−47.7	99.9	2
3	5 36.5	−43.0	99.9	5 26.1	−43.7	100.0	5 15.6	−44.4	100.1	5 05.0	−45.1	100.2	4 54.3	−45.8	100.3	4 43.6	−46.5	100.4	4 32.7	−47.1	100.5	4 21.8	−47.8	100.5	3
4	4 53.5	−43.1	100.6	4 42.4	−43.8	100.7	4 31.2	−44.5	100.8	4 19.9	−45.2	100.9	4 08.5	−45.8	100.9	3 57.1	−46.5	101.0	3 45.6	−47.1	101.1	3 34.0	−47.7	101.1	4
5	4 10.4	−43.1	101.3	3 58.6	−43.8	101.4	3 46.7	−44.5	101.5	3 34.7	−45.2	101.5	3 22.7	−45.9	101.6	3 10.6	−46.5	101.7	2 58.5	−47.2	101.7	2 46.3	−47.8	101.8	5
6	3 27.3	−43.1	102.0	3 14.8	−43.9	102.1	3 02.2	−44.5	102.1	2 49.5	−45.2	102.2	2 36.8	−45.8	102.2	2 24.1	−46.5	102.3	2 11.3	−47.2	102.3	1 58.5	−47.8	102.4	6
7	2 44.2	−43.2	102.7	2 30.9	−43.8	102.8	2 17.7	−44.6	102.9	2 04.3	−45.2	102.9	1 51.0	−45.9	102.9	1 37.6	−46.5	102.9	1 24.1	−47.1	102.9	1 10.7	−47.8	103.0	7
8	2 01.0	−43.1	103.4	1 47.1	−43.9	103.5	1 33.1	−44.6	103.5	1 19.1	−45.2	103.5	1 05.1	−45.9	103.5	0 51.0	−46.5	103.5	0 37.0	−47.2	103.6	0 22.9	−47.8	103.6	8
9	1 17.9	−43.2	104.1	1 03.2	−43.9	104.1	0 48.5	−44.5	104.2	0 33.9	−45.3	104.2	0 19.2	−45.9	104.2	0 04.5	−46.6	104.2	0 10.2	+47.2	75.8	0 24.9	+47.8	75.8	9
10	0 34.7	−43.2	104.8	0 19.3	−43.9	104.8	0 04.0	−44.6	104.8	0 11.4	+45.2	75.2	0 26.7	+45.9	75.2	0 42.1	+46.5	75.2	0 57.4	+47.2	75.2	1 12.7	+47.8	75.2	10
11	0 08.5	+43.2	74.5	0 24.6	+43.8	74.5	0 40.6	+44.6	74.5	0 56.6	+45.2	74.5	1 12.6	+45.9	74.5	1 28.6	+46.5	74.6	1 44.6	+47.1	74.6	2 00.5	+47.8	74.6	11
12	0 51.7	+43.2	73.8	1 08.4	+43.9	73.8	1 25.2	+44.5	73.8	1 41.8	+45.3	73.9	1 58.5	+45.9	73.9	2 15.1	+46.6	73.9	2 31.7	+47.2	74.0	2 48.3	+47.7	74.0	12
13	1 34.9	+43.2	73.1	1 52.3	+43.9	73.1	2 09.7	+44.5	73.2	2 27.1	+45.2	73.2	2 44.4	+45.8	73.2	3 01.7	+46.5	73.3	3 18.9	+47.1	73.3	3 36.0	+47.8	73.4	13
14	2 18.1	+43.1	72.4	2 36.2	+43.8	72.4	2 54.2	+44.6	72.5	3 12.3	+45.1	72.5	3 30.2	+45.9	72.6	3 48.1	+46.5	72.7	4 06.0	+47.1	72.7	4 23.8	+47.7	72.8	14
15	3 01.2	+43.1	71.7	3 20.0	+43.8	71.8	3 38.8	+44.4	71.8	3 57.4	+45.2	71.9	4 16.1	+45.8	72.0	4 34.6	+46.4	72.0	4 53.1	+47.0	72.1	5 11.5	+47.6	72.2	15
16	3 44.3	+43.1	71.0	4 03.8	+43.8	71.1	4 23.2	+44.5	71.2	4 42.6	+45.1	71.2	5 01.9	+45.7	71.3	5 21.0	+46.4	71.4	5 40.1	+47.1	71.5	5 59.1	+47.7	71.6	16
17	4 27.4	+43.1	70.3	4 47.6	+43.7	70.4	5 07.7	+44.4	70.5	5 27.7	+45.1	70.6	5 47.6	+45.7	70.7	6 07.4	+46.4	70.8	6 27.2	+46.9	70.9	6 46.8	+47.6	71.0	17
18	5 10.5	+43.0	69.6	5 31.3	+43.7	69.7	5 52.1	+44.3	69.8	6 12.8	+45.0	69.9	6 33.3	+45.7	70.0	6 53.8	+46.3	70.1	7 14.1	+47.0	70.2	7 34.4	+47.5	70.4	18
19	5 53.5	+42.9	68.9	6 15.0	+43.6	68.9	6 36.4	+44.3	69.1	6 57.8	+44.9	69.2	7 19.0	+45.6	69.4	7 40.1	+46.2	69.5	8 01.1	+46.8	69.6	8 21.9	+47.5	69.7	19
20	6 36.4	+42.9	68.2	6 58.6	+43.6	68.3	7 20.7	+44.3	68.4	7 42.7	+44.9	68.6	8 04.6	+45.5	68.7	8 26.3	+46.2	68.8	8 47.9	+46.8	69.0	9 09.4	+47.4	69.1	20
21	7 19.3	+42.8	67.5	7 42.2	+43.5	67.6	8 05.0	+44.1	67.8	8 27.6	+44.8	67.9	8 50.1	+45.5	68.0	9 12.5	+46.1	68.2	9 34.7	+46.7	68.3	9 56.8	+47.3	68.5	21
22	8 02.1	+42.8	66.8	8 25.7	+43.4	66.9	8 49.1	+44.1	67.1	9 12.4	+44.8	67.2	9 35.6	+45.4	67.4	9 58.6	+46.0	67.5	10 21.4	+46.7	67.7	10 44.1	+47.3	67.8	22
23	8 44.9	+42.7	66.1	9 09.1	+43.4	66.2	9 33.2	+44.0	66.4	9 57.2	+44.7	66.5	10 21.0	+45.3	66.7	10 44.6	+46.0	66.9	11 08.1	+46.6	67.1	11 31.4	+47.2	67.2	23
24	9 27.6	+42.5	65.4	9 52.5	+43.2	65.5	10 17.2	+44.0	65.7	10 41.9	+44.5	65.9	11 06.3	+45.2	66.0	11 30.6	+45.8	66.2	11 54.7	+46.5	66.4	12 18.6	+47.1	66.6	24
25	10 10.1	+42.5	64.7	10 35.7	+43.2	64.8	11 01.2	+43.8	65.0	11 26.4	+44.5	65.2	11 51.5	+45.2	65.4	12 16.4	+45.8	65.6	12 41.2	+46.3	65.8	13 05.7	+47.0	66.0	25
26	10 52.6	+42.4	64.0	11 18.9	+43.1	64.1	11 45.0	+43.7	64.3	12 10.9	+44.4	64.5	12 36.7	+45.0	64.7	13 02.2	+45.7	64.9	13 27.5	+46.3	65.1	13 52.7	+46.9	65.3	26
27	11 35.0	+42.3	63.2	12 02.0	+42.9	63.4	12 28.7	+43.7	63.6	12 55.3	+44.3	63.8	13 21.7	+44.9	64.0	13 47.9	+45.5	64.2	14 13.8	+46.2	64.5	14 39.6	+46.8	64.7	27
28	12 17.3	+42.2	62.5	12 44.9	+42.9	62.7	13 12.4	+43.5	62.9	13 39.6	+44.1	63.1	14 06.6	+44.8	63.3	14 33.4	+45.5	63.6	15 00.0	+46.1	63.8	15 26.4	+46.7	64.0	28
29	12 59.5	+42.0	61.8	13 27.8	+42.7	62.0	13 55.9	+43.3	62.2	14 23.7	+44.1	62.4	14 51.4	+44.7	62.7	15 18.9	+45.3	62.9	15 46.1	+45.9	63.1	16 13.1	+46.5	63.4	29
30	13 41.5	+42.0	61.0	14 10.5	+42.6	61.3	14 39.2	+43.3	61.5	15 07.8	+43.9	61.7	15 36.1	+44.5	62.0	16 04.2	+45.2	62.2	16 32.0	+45.8	62.5	16 59.6	+46.5	62.7	30
31	14 23.5	+41.7	60.3	14 53.1	+42.4	60.5	15 22.5	+43.1	60.8	15 51.7	+43.7	61.0	16 20.6	+44.4	61.3	16 49.4	+45.0	61.6	17 17.8	+45.7	61.8	17 46.1	+46.3	62.1	31
32	15 05.2	+41.7	59.6	15 35.5	+42.3	59.8	16 05.6	+43.0	60.0	16 35.4	+43.7	60.3	17 05.0	+44.3	60.6	17 34.4	+44.9	60.8	18 03.5	+45.6	61.1	18 32.4	+46.1	61.4	32
33	15 46.9	+41.4	58.8	16 17.8	+42.2	59.1	16 48.6	+42.8	59.3	17 19.1	+43.4	59.6	17 49.3	+44.1	59.9	18 19.3	+44.8	60.1	18 49.1	+45.3	60.4	19 18.5	+46.0	60.7	33
34	16 28.3	+41.4	58.1	17 00.0	+42.0	58.3	17 31.4	+42.6	58.6	18 02.5	+43.3	58.9	18 33.4	+44.0	59.1	19 04.1	+44.6	59.4	19 34.4	+45.3	59.7	20 04.5	+45.9	60.0	34
35	17 09.7	+41.1	57.3	17 42.0	+41.8	57.6	18 14.0	+42.5	57.8	18 45.8	+43.1	58.1	19 17.4	+43.7	58.4	19 48.7	+44.4	58.7	20 19.7	+45.0	59.0	20 50.4	+45.7	59.4	35
36	17 50.8	+41.0	56.5	18 23.8	+41.6	56.8	18 56.5	+42.3	57.1	19 28.9	+43.0	57.4	20 01.1	+43.6	57.7	20 33.1	+44.2	58.0	21 04.7	+44.9	58.3	21 36.1	+45.5	58.7	36
37	18 31.8	+40.8	55.8	19 05.4	+41.4	56.1	19 38.8	+42.1	56.3	20 11.9	+42.8	56.7	20 44.7	+43.5	57.0	21 17.3	+44.1	57.3	21 49.6	+44.7	57.6	22 21.6	+45.3	58.0	37
38	19 12.6	+40.5	55.0	19 46.8	+41.3	55.3	20 20.9	+41.9	55.6	20 54.7	+42.5	55.9	21 28.2	+43.2	56.2	22 01.4	+43.8	56.6	22 34.3	+44.5	56.9	23 06.9	+45.1	57.3	38
39	19 53.1	+40.4	54.2	20 28.1	+41.0	54.5	21 02.8	+41.7	54.8	21 37.2	+42.4	55.1	22 11.4	+43.0	55.5	22 45.2	+43.7	55.8	23 18.8	+44.3	56.2	23 52.0	+45.0	56.5	39
40	20 33.5	+40.2	53.4	21 09.1	+40.9	53.7	21 44.5	+41.5	54.1	22 19.6	+42.1	54.4	22 54.4	+42.8	54.7	23 28.9	+43.4	55.1	24 03.1	+44.1	55.4	24 37.0	+44.7	55.8	40
41	21 13.7	+39.9	52.6	21 50.0	+40.5	52.9	22 26.0	+41.2	53.3	23 01.7	+41.9	53.6	23 37.2	+42.5	54.0	24 12.3	+43.2	54.3	24 47.2	+43.8	54.7	25 21.7	+44.5	55.1	41
42	21 53.6	+39.7	51.8	22 30.5	+40.4	52.2	23 07.2	+41.0	52.5	23 43.6	+41.7	52.8	24 19.7	+42.3	53.2	24 55.5	+43.0	53.6	25 31.0	+43.6	53.9	26 06.2	+44.2	54.3	42
43	22 33.3	+39.5	51.0	23 10.9	+40.1	51.3	23 48.2	+40.8	51.7	24 25.3	+41.4	52.0	25 02.0	+42.1	52.4	25 38.5	+42.7	52.8	26 14.6	+43.4	53.2	26 50.4	+44.0	53.6	43
44	23 12.8	+39.1	50.2	23 51.0	+39.9	50.5	24 29.0	+40.5	50.9	25 06.7	+41.1	51.2	25 44.1	+41.9	51.6	26 21.2	+42.5	52.0	26 58.0	+43.1	52.4	27 34.4	+43.8	52.8	44
45	23 51.9	+39.0	49.4	24 30.9	+39.6	49.7	25 09.5	+40.3	50.1	25 47.9	+40.9	50.4	26 26.0	+41.5	50.8	27 03.7	+42.2	51.2	27 41.1	+42.9	51.6	28 18.2	+43.5	52.0	45
46	24 30.9	+38.6	48.5	25 10.5	+39.3	48.9	25 49.8	+39.9	49.3	26 28.8	+40.6	49.6	27 07.5	+41.3	50.0	27 45.9	+41.9	50.4	28 24.0	+42.5	50.8	29 01.7	+43.2	51.2	46
47	25 09.5	+38.4	47.7	25 49.8	+39.0	48.1	26 29.7	+39.7	48.4	27 09.4	+40.3	48.8	27 48.8	+41.0	49.2	28 27.8	+41.7	49.6	29 06.5	+42.3	50.0	29 44.9	+43.0	50.5	47
48	25 47.9	+38.1	46.8	26 28.8	+38.7	47.2	27 09.4	+39.4	47.6	27 49.7	+40.1	48.0	28 29.8	+40.6	48.4	29 09.5	+41.3	48.8	29 48.8	+42.0	49.2	30 27.9	+42.6	49.6	48
49	26 26.0	+37.7	46.0	27 07.5	+38.4	46.4	27 48.8	+39.0	46.7	28 29.8	+39.7	47.1	29 10.4	+40.4	47.5	29 50.8	+41.0	47.9	30 30.8	+41.7	48.4	31 10.5	+42.3	48.8	49
50	27 03.7	+37.4	45.1	27 45.9	+38.1	45.5	28 27.8	+38.7	45.9	29 09.5	+39.3	46.3	29 50.8	+40.0	46.7	30 31.8	+40.7	47.1	31 12.5	+41.3	47.5	31 52.8	+42.0	48.0	50
51	27 41.1	+37.1	44.2	28 24.0	+37.7	44.6	29 06.5	+38.4	45.0	29 48.8	+39.1	45.4	30 30.8	+39.7	45.8	31 12.5	+40.3	46.2	31 53.8	+41.0	46.7	32 34.8	+41.6	47.1	51
52	28 18.2	+36.7	43.3	29 01.7	+37.4	43.7	29 44.9	+38.0	44.1	30 27.9	+38.6	44.5	31 10.5	+39.3	44.9	31 52.8	+40.0	45.4	32 34.8	+40.6	45.8	33 16.4	+41.3	46.3	52
53	28 54.9	+36.4	42.4	29 39.1	+37.0	42.8	30 22.9	+37.7	43.2	31 06.5	+38.3	43.6	31 49.8	+39.0	44.1	32 32.8	+39.6	44.5	33 15.4	+40.2	44.9	33 57.7	+40.9	45.4	53
54	29 31.3	+36.0	41.5	30 16.1	+36.6	41.9	31 00.6	+37.3	42.3	31 44.8	+37.9	42.7	32 28.7	+38.6	43.2	33 12.4	+39.2	43.6	33 55.6	+39.9	44.1	34 38.6	+40.5	44.5	54
55	30 07.3	+35.6	40.6	30 52.7	+36.3	41.0	31 37.9	+36.8	41.4	32 22.7	+37.5	41.8	33 07.3	+38.2	42.2	33 51.6	+38.8	42.7	34 35.5	+39.5	43.2	35 19.1	+40.1	43.6	55
56	30 42.9	+35.2	39.7	31 29.0	+35.8	40.1	32 14.7	+36.5	40.5	33 00.2	+37.1	40.9	33 45.5	+37.7	41.3	34 30.4	+38.3	41.8	35 15.0	+39.0	42.2	35 59.2	+39.7	42.7	56
57	31 18.1	+34.8	38.7	32 04.8	+35.4	39.1	32 51.2	+36.0	39.5	33 37.3	+36.7	39.9	34 23.2	+37.3	40.4	35 08.7	+38.0	40.8	35 54.0	+38.6	41.3	36 38.9	+39.2	41.8	57
58	31 52.9	+34.3	37.8	32 40.2	+34.9	38.2	33 27.2	+35.6	38.6	34 14.0	+36.2	39.0	35 00.5	+36.8	39.4	35 46.7	+37.5	39.9	36 32.6	+38.1	40.4	37 18.1	+38.8	40.8	58
59	32 27.2	+33.9	36.8	33 15.1	+34.5	37.2	34 02.8	+35.1	37.6	34 50.2	+35.8	38.0	35 37.3	+36.4	38.5	36 24.2	+37.0	38.9	37 10.7	+37.7	39.4	37 56.9	+38.3	39.9	59
60	33 01.1	+33.4	35.8	33 49.6	+34.1	36.2	34 37.9	+34.7	36.6	35 26.0	+35.2	37.0	36 13.7	+35.9	37.5	37 01.2	+36.5	37.9	37 48.4	+37.1	38.4	38 35.2	+37.8	38.9	60
61	33 34.5	+33.0	34.8	34 23.7	+33.5	35.2	35 12.6	+34.1	35.6	36 01.2	+34.8	36.0	36 49.6	+35.4	36.5	37 37.7	+36.0	36.9	38 25.5	+36.6	37.4	39 13.0	+37.3	37.9	61
62	34 07.5	+32.4	33.8	34 57.2	+33.0	34.2	35 46.7	+33.6	34.6	36 36.0	+34.2	35.0	37 25.0	+34.8	35.5	38 13.7	+35.5	35.9	39 02.1	+36.1	36.4	39 50.3	+36.7	36.9	62
63	34 39.9	+32.0	32.8	35 30.2	+32.6	33.2	36 20.3	+33.1	33.6	37 10.2	+33.7	34.0	37 59.8	+34.3	34.4	38 49.2	+34.9	34.9	39 38.2	+35.6	35.4	40 27.0	+36.2	35.8	63
64	35 11.9	+31.3	31.8	36 02.8	+31.9	32.2	36 53.4	+32.6	32.6	37 43.9	+33.1	33.0	38 34.1	+33.8	33.4	39 24.1	+34.3	33.8	40 13.8	+34.9	34.3	41 03.2	+35.6	34.8	64
65	35 43.2	+30.9	30.7	36 34.7	+31.4	31.1	37 26.0	+32.0	31.5	38 17.0	+32.6	31.9	39 07.9	+33.1	32.3	39 58.4	+33.8	32.8	40 48.7	+34.4	33.2	41 38.8	+35.0	33.7	65
66	36 14.1	+30.3	29.7	37 06.1	+30.9	30.0	37 58.0	+31.4	30.4	38 49.6	+32.0	30.8	39 41.0	+32.5	31.3	40 32.2	+33.1	31.7	41 23.1	+33.7	32.2	42 13.8	+34.3	32.6	66
67	36 44.4	+29.7	28.6	37 37.0	+30.2	29.0	38 29.4	+30.7	29.3	39 21.6	+31.3	29.7	40 13.5	+32.0	30.2	41 05.3	+32.5	30.6	41 56.8	+33.1	31.0	42 48.1	+33.7	31.5	67
68	37 14.1	+29.0	27.5	38 07.2	+29.6	27.9	39 00.1	+30.2	28.2	39 52.9	+30.7	28.6	40 45.5	+31.2	29.0	41 37.8	+31.8	29.4	42 29.9	+32.4	29.9	43 21.8	+33.0	30.4	68
69	37 43.1	+28.5	26.4	38 36.8	+29.0	26.8	39 30.3	+29.5	27.1	40 23.6	+30.0	27.5	41 16.7	+30.6	27.9	42 09.6	+31.2	28.3	43 02.3	+31.7	28.8	43 54.8	+32.3	29.2	69
70	38 11.6	+27.8	25.3	39 05.8	+28.3	25.6	39 59.8	+28.8	26.0	40 53.6	+29.4	26.4	41 47.3	+29.9	26.8	42 40.8	+30.4	27.2	43 34.0	+31.0	27.6	44 27.1	+31.6	28.1	70
71	38 39.4	+27.2	24.2	39 34.1	+27.6	24.5	40 28.6	+28.2	24.8	41 23.0	+28.6	25.2	42 17.2	+29.1	25.6	43 11.2	+29.7	26.0	44 05.0	+30.3	26.4	44 58.7	+30.8	26.9	71
72	39 06.6	+26.4	23.0	40 01.7	+27.0	23.3	40 56.8	+27.4	23.7	41 51.6	+27.9	24.0	42 46.3	+28.5	24.4	43 40.9	+28.9	24.8	44 35.3	+29.4	25.2	45 29.5	+30.0	25.6	72
73	39 33.0	+25.8	21.9	40 28.7	+26.2	22.2	41 24.2	+26.7	22.5	42 19.5	+27.2	22.8	43 14.8	+27.6	23.2	44 09.8	+28.2	23.6	45 04.7	+28.7	24.0	45 59.5	+29.2	24.4	73
74	39 58.8	+25.1	20.7	40 54.9	+25.5	21.0	41 50.9	+25.9	21.3	42 46.7	+26.4	21.6	43 42.4	+26.9	22.0	44 38.0	+27.3	22.3	45 33.4	+27.8	22.7	46 28.7	+28.3	23.1	74
75	40 23.9	+24.3	19.5	41 20.4	+24.7	19.8	42 16.8	+25.1	20.1	43 13.1	+25.6	20.4	44 09.3	+26.0	20.7	45 05.3	+26.5	21.1	46 01.2	+27.0	21.5	46 57.0	+27.4	21.9	75
76	40 48.2	+23.5	18.3	41 45.1	+24.0	18.6	42 41.9	+24.4	18.9	43 38.7	+24.7	19.2	44 35.3	+25.2	19.5	45 31.8	+25.6	19.8	46 28.2	+26.1	20.2	47 24.4	+26.6	20.5	76
77	41 11.7	+22.8	17.1	42 09.1	+23.1	17.3	43 06.3	+23.5	17.6	44 03.4	+24.0	17.9	45 00.5	+24.3	18.2	45 57.4	+24.8	18.5	46 54.3	+25.1	18.9	47 51.0	+25.6	19.2	77
78	41 34.5	+22.0	15.8	42 32.2	+22.3	16.1	43 29.8	+22.7	16.3	44 27.4	+23.0	16.6	45 24.8	+23.4	16.9	46 22.2	+23.8	17.2	47 19.4	+24.3	17.5	48 16.6	+24.7	17.9	78
79	41 56.5	+21.1	14.6	42 54.5	+21.5	14.8	43 52.5	+21.8	15.1	44 50.4	+22.2	15.3	45 48.2	+22.5	15.6	46 46.0	+22.9	15.9	47 43.7	+23.2	16.2	48 41.2	+23.7	16.5	79
80	42 17.6	+20.4	13.3	43 16.0	+20.6	13.5	44 14.3	+20.9	13.8	45 12.6	+21.2	14.0	46 10.7	+21.6	14.3	47 08.9	+21.9	14.5	48 06.9	+22.3	14.8	49 04.9	+22.6	15.1	80
81	42 38.0	+19.4	12.0	43 36.6	+19.7	12.2	44 35.2	+20.0	12.5	45 33.8	+20.3	12.7	46 32.3	+20.6	12.9	47 30.8	+20.9	13.1	48 29.2	+21.2	13.4	49 27.5	+21.5	13.7	81
82	42 57.4	+18.6	10.8	43 56.3	+18.9	10.9	44 55.2	+19.1	11.1	45 54.1	+19.3	11.3	46 52.9	+19.6	11.5	47 51.7	+19.8	11.7	48 50.4	+20.1	12.0	49 49.0	+20.5	12.2	82
83	43 16.0	+17.7	9.5	44 15.2	+17.9	9.6	45 14.3	+18.1	9.8	46 13.4	+18.4	10.0	47 12.5	+18.6	10.1	48 11.5	+18.9	10.3	49 10.5	+19.1	10.5	50 09.5	+19.4	10.8	83
84	43 33.7	+16.7	8.1	44 33.1	+16.9	8.3	45 32.4	+17.2	8.4	46 31.8	+17.3	8.6	47 31.1	+17.5	8.7	48 30.4	+17.7	8.9	49 29.6	+18.0	9.1	50 28.9	+18.2	9.3	84
85	43 50.4	+15.9	6.8	44 50.0	+16.0	6.9	45 49.6	+16.1	7.1	46 49.1	+16.3	7.2	47 48.6	+16.5	7.3	48 48.1	+16.7	7.5	49 47.6	+16.9	7.6	50 47.1	+17.0	7.8	85
86	44 06.3	+14.9	5.5	45 06.0	+15.0	5.6	46 05.7	+15.2	5.7	47 05.4	+15.3	5.8	48 05.1	+15.4	5.9	49 04.8	+15.5	6.0	50 04.5	+15.6	6.1	51 04.1	+15.8	6.3	86
87	44 21.2	+13.9	4.1	45 21.0	+14.0	4.2	46 20.9	+14.1	4.3	47 20.7	+14.2	4.3	48 20.5	+14.3	4.4	49 20.3	+14.4	4.5	50 20.1	+14.5	4.6	51 19.9	+14.6	4.7	87
88	44 35.1	+12.9	2.8	45 35.0	+13.0	2.8	46 35.0	+13.0	2.9	47 34.9	+13.1	2.9	48 34.8	+13.2	3.0	49 34.7	+13.3	3.0	50 34.6	+13.3	3.1	51 34.5	+13.4	3.2	88
89	44 48.0	+12.0	1.4	45 48.0	+12.0	1.4	46 48.0	+12.0	1.4	47 48.0	+12.0	1.5	48 48.0	+12.0	1.5	49 48.0	+12.0	1.5	50 47.9	+12.1	1.6	51 47.9	+12.1	1.6	89
90	45 00.0	+10.9	0.0	46 00.0	+10.9	0.0	47 00.0	+10.9	0.0	48 00.0	+10.9	0.0	49 00.0	+10.9	0.0	50 00.0	+10.8	0.0	51 00.0	+10.8	0.0	52 00.0	+10.8	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 101°, 259°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	7 03.2	+42.7	97.1	6 55.7	+43.4	97.2	6 48.1	+44.1	97.3	6 40.3	+44.9	97.5	6 32.5	+45.5	97.6	6 24.5	+46.2	97.7	6 16.4	+46.9	97.8	6 08.2	+47.6	97.9	0
1	7 45.9	+42.6	96.4	7 39.1	+43.4	96.5	7 32.2	+44.1	96.7	7 25.2	+44.8	96.8	7 18.0	+45.5	96.9	7 10.7	+46.2	97.1	7 03.3	+46.9	97.2	6 55.8	+47.4	97.3	1
2	8 28.5	+42.6	95.7	8 22.5	+43.3	95.8	8 16.3	+44.1	96.0	8 10.0	+44.8	96.1	8 03.5	+45.5	96.3	7 56.9	+46.1	96.4	7 50.2	+46.7	96.5	7 43.2	+47.5	96.7	2
3	9 11.1	+42.5	95.0	9 05.8	+43.3	95.1	9 00.4	+43.9	95.3	8 54.8	+44.6	95.5	8 49.0	+45.3	95.6	8 43.0	+46.1	95.8	8 36.9	+46.7	95.9	8 30.7	+47.3	96.1	3
4	9 53.6	+42.4	94.3	9 49.1	+43.1	94.4	9 44.3	+43.9	94.6	9 39.4	+44.6	94.8	9 34.3	+45.3	94.9	9 29.1	+46.0	95.1	9 23.6	+46.7	95.3	9 18.0	+47.4	95.4	4
5	10 36.0	+42.3	93.5	10 32.2	+43.0	93.7	10 28.2	+43.8	93.9	10 24.0	+44.5	94.1	10 19.6	+45.2	94.3	10 15.1	+45.9	94.5	10 10.3	+46.6	94.6	10 05.4	+47.2	94.8	5
6	11 18.3	+42.2	92.8	11 15.2	+43.0	93.0	11 12.0	+43.7	93.2	11 08.5	+44.4	93.4	11 04.8	+45.1	93.6	11 01.0	+45.8	93.8	10 56.9	+46.5	94.0	10 52.6	+47.1	94.2	6
7	12 00.5	+42.1	92.1	11 58.2	+42.8	92.3	11 55.7	+43.5	92.5	11 52.9	+44.3	92.7	11 49.9	+45.1	92.9	11 46.8	+45.7	93.1	11 43.4	+46.4	93.4	11 39.7	+47.1	93.6	7
8	12 42.6	+41.9	91.4	12 41.0	+42.7	91.6	12 39.2	+43.5	91.8	12 37.2	+44.2	92.0	12 35.0	+44.9	92.3	12 32.5	+45.6	92.5	12 29.8	+46.3	92.7	12 26.8	+47.0	92.9	8
9	13 24.5	+41.8	90.6	13 23.7	+42.6	90.9	13 22.7	+43.3	91.1	13 21.4	+44.1	91.3	13 19.9	+44.8	91.6	13 18.1	+45.5	91.8	13 16.1	+46.2	92.1	13 13.8	+46.9	92.3	9
10	14 06.3	+41.7	89.9	14 06.3	+42.5	90.1	14 06.0	+43.3	90.4	14 05.5	+44.0	90.6	14 04.7	+44.7	90.9	14 03.6	+45.4	91.1	14 02.3	+46.1	91.4	14 00.7	+46.8	91.6	10
11	14 48.0	+41.6	89.1	14 48.8	+42.3	89.4	14 49.3	+43.0	89.7	14 49.5	+43.8	89.9	14 49.4	+44.6	90.2	14 49.0	+45.3	90.5	14 48.4	+46.0	90.7	14 47.5	+46.7	91.0	11
12	15 29.6	+41.4	88.4	15 31.1	+42.2	88.7	15 32.3	+43.0	89.0	15 33.3	+43.7	89.2	15 34.0	+44.4	89.5	15 34.3	+45.2	89.8	15 34.4	+45.9	90.1	15 34.2	+46.5	90.3	12
13	16 11.0	+41.2	87.6	16 13.3	+42.0	87.9	16 15.3	+42.8	88.2	16 17.0	+43.6	88.5	16 18.4	+44.3	88.8	16 19.5	+45.0	89.1	16 20.3	+45.7	89.4	16 20.7	+46.5	89.7	13
14	16 52.2	+41.1	86.9	16 55.3	+41.9	87.2	16 58.1	+42.6	87.5	17 00.6	+43.4	87.8	17 02.7	+44.1	88.1	17 04.5	+44.9	88.4	17 06.0	+45.6	88.7	17 07.2	+46.3	89.0	14
15	17 33.3	+40.9	86.1	17 37.2	+41.7	86.4	17 40.7	+42.5	86.8	17 44.0	+43.2	87.1	17 46.8	+44.0	87.4	17 49.4	+44.7	87.7	17 51.6	+45.5	88.0	17 53.5	+46.2	88.4	15
16	18 14.2	+40.7	85.4	18 18.9	+41.5	85.7	18 23.2	+42.3	86.0	18 27.2	+43.1	86.3	18 30.8	+43.9	86.7	18 34.1	+44.6	87.0	18 37.1	+45.3	87.3	18 39.7	+46.0	87.7	16
17	18 54.9	+40.5	84.6	19 00.4	+41.3	84.9	19 05.5	+42.1	85.3	19 10.3	+42.9	85.6	19 14.7	+43.6	86.0	19 18.7	+44.4	86.3	19 22.4	+45.2	86.7	19 25.7	+45.9	87.0	17
18	19 35.4	+40.3	83.8	19 41.7	+41.1	84.2	19 47.6	+41.9	84.5	19 53.2	+42.7	84.9	19 58.3	+43.5	85.2	20 03.1	+44.3	85.6	20 07.6	+44.9	86.0	20 11.6	+45.7	86.3	18
19	20 15.7	+40.1	83.0	20 22.8	+40.9	83.4	20 29.5	+41.8	83.8	20 35.9	+42.5	84.1	20 41.8	+43.3	84.5	20 47.4	+44.0	84.9	20 52.5	+44.8	85.3	20 57.3	+45.6	85.6	19
20	20 55.8	+39.9	82.2	21 03.7	+40.7	82.6	21 11.3	+41.5	83.0	21 18.4	+42.3	83.4	21 25.1	+43.1	83.8	21 31.4	+43.9	84.1	21 37.3	+44.7	84.5	21 42.9	+45.3	84.9	20
21	21 35.7	+39.6	81.4	21 44.4	+40.5	81.8	21 52.8	+41.3	82.2	22 00.7	+42.1	82.6	22 08.2	+42.9	83.0	22 15.3	+43.7	83.4	22 22.0	+44.4	83.8	22 28.2	+45.2	84.2	21
22	22 15.3	+39.4	80.6	22 24.9	+40.2	81.0	22 34.1	+41.0	81.4	22 42.8	+41.9	81.8	22 51.1	+42.7	82.3	22 59.0	+43.4	82.7	23 06.4	+44.2	83.1	23 13.4	+45.0	83.5	22
23	22 54.7	+39.2	79.8	23 05.1	+40.0	80.2	23 15.1	+40.8	80.6	23 24.7	+41.6	81.1	23 33.8	+42.4	81.5	23 42.4	+43.3	81.9	23 50.6	+44.1	82.4	23 58.4	+44.8	82.8	23
24	23 33.9	+38.8	79.0	23 45.1	+39.8	79.4	23 55.9	+40.6	79.8	24 06.3	+41.4	80.3	24 16.2	+42.2	80.7	24 25.7	+43.0	81.2	24 34.7	+43.8	81.6	24 43.2	+44.5	82.1	24
25	24 12.7	+38.6	78.1	24 24.9	+39.4	78.6	24 36.5	+40.3	79.0	24 47.7	+41.1	79.5	24 58.4	+42.0	79.9	25 08.7	+42.7	80.4	25 18.5	+43.5	80.9	25 27.7	+44.4	81.3	25
26	24 51.3	+38.4	77.3	25 04.3	+39.2	77.7	25 16.8	+40.1	78.2	25 28.8	+40.9	78.7	25 40.4	+41.7	79.1	25 51.4	+42.6	79.6	26 02.0	+43.3	80.1	26 12.1	+44.1	80.6	26
27	25 29.7	+38.0	76.4	25 43.5	+38.9	76.9	25 56.9	+39.7	77.4	26 09.7	+40.6	77.9	26 22.1	+41.4	78.3	26 34.0	+42.2	78.8	26 45.3	+43.1	79.3	26 56.2	+43.9	79.8	27
28	26 07.7	+37.7	75.6	26 22.4	+38.6	76.1	26 36.6	+39.5	76.5	26 50.3	+40.3	77.0	27 03.5	+41.2	77.5	27 16.2	+42.0	78.0	27 28.4	+42.8	78.5	27 40.1	+43.6	79.1	28
29	26 45.4	+37.4	74.7	27 01.0	+38.3	75.2	27 16.1	+39.1	75.7	27 30.6	+40.0	76.2	27 44.7	+40.8	76.7	27 58.2	+41.7	77.2	28 11.2	+42.5	77.7	28 23.7	+43.3	78.3	29
30	27 22.8	+37.1	73.8	27 39.3	+37.9	74.3	27 55.2	+38.8	74.8	28 10.6	+39.7	75.4	28 25.5	+40.6	75.9	28 39.9	+41.4	76.4	28 53.7	+42.3	76.9	29 07.0	+43.1	77.5	30
31	27 59.9	+36.7	72.9	28 17.2	+37.6	73.5	28 34.0	+38.5	74.0	28 50.3	+39.4	74.5	29 06.1	+40.2	75.0	29 21.3	+41.1	75.6	29 36.0	+41.9	76.1	29 50.1	+42.7	76.7	31
32	28 36.6	+36.3	72.0	28 54.8	+37.3	72.6	29 12.5	+38.2	73.1	29 29.7	+39.0	73.6	29 46.3	+39.9	74.2	30 02.4	+40.7	74.7	30 17.9	+41.6	75.3	30 32.8	+42.5	75.9	32
33	29 12.9	+36.0	71.1	29 32.1	+36.9	71.7	29 50.7	+37.7	72.2	30 08.7	+38.7	72.8	30 26.2	+39.6	73.3	30 43.1	+40.5	73.9	30 59.5	+41.3	74.5	31 15.3	+42.1	75.0	33
34	29 48.9	+35.6	70.2	30 09.0	+36.5	70.8	30 28.4	+37.5	71.3	30 47.4	+38.3	71.9	31 05.8	+39.2	72.4	31 23.6	+40.0	73.0	31 40.8	+40.9	73.6	31 57.4	+41.8	74.2	34
35	30 24.5	+35.2	69.3	30 45.5	+36.1	69.8	31 05.9	+37.0	70.4	31 25.7	+37.9	71.0	31 45.0	+38.8	71.6	32 03.6	+39.8	72.2	32 21.7	+40.6	72.8	32 39.2	+41.5	73.4	35
36	30 59.7	+34.8	68.3	31 21.6	+35.7	68.9	31 42.9	+36.6	69.5	32 03.6	+37.5	70.1	32 23.8	+38.4	70.7	32 43.4	+39.3	71.3	33 02.3	+40.2	71.9	33 20.7	+41.1	72.5	36
37	31 34.5	+34.3	67.4	31 57.3	+35.2	68.0	32 19.5	+36.2	68.6	32 41.1	+37.2	69.1	33 02.2	+38.0	69.7	33 22.7	+38.9	70.4	33 42.5	+39.9	71.0	34 01.8	+40.7	71.6	37
38	32 08.8	+33.9	66.4	32 32.5	+34.9	67.0	32 55.7	+35.8	67.6	33 18.3	+36.7	68.2	33 40.2	+37.6	68.8	34 01.6	+38.5	69.5	34 22.4	+39.4	70.1	34 42.5	+40.3	70.7	38
39	32 42.7	+33.5	65.5	33 07.4	+34.4	66.0	33 31.5	+35.3	66.6	33 55.0	+36.2	67.3	34 17.8	+37.2	67.9	34 40.1	+38.1	68.5	35 01.8	+39.0	69.2	35 22.8	+39.9	69.8	39
40	33 16.2	+32.9	64.5	33 41.8	+33.9	65.1	34 06.8	+34.8	65.7	34 31.2	+35.8	66.3	34 55.0	+36.7	66.9	35 18.2	+37.7	67.6	35 40.8	+38.5	68.2	36 02.7	+39.5	68.9	40
41	33 49.1	+32.5	63.5	34 15.7	+33.4	64.1	34 41.6	+34.4	64.7	35 07.0	+35.3	65.3	35 31.7	+36.3	66.0	35 55.9	+37.1	66.6	36 19.3	+38.2	67.3	36 42.2	+39.0	68.0	41
42	34 21.6	+32.0	62.4	34 49.1	+32.9	63.1	35 16.0	+33.9	63.7	35 42.3	+34.8	64.3	36 08.0	+35.7	65.0	36 33.0	+36.7	65.6	36 57.5	+37.6	66.3	37 21.2	+38.6	67.0	42
43	34 53.6	+31.4	61.4	35 22.0	+32.4	62.0	35 49.9	+33.3	62.7	36 17.1	+34.3	63.3	36 43.7	+35.3	64.0	37 09.7	+36.2	64.7	37 35.1	+37.1	65.4	37 59.8	+38.1	66.1	43
44	35 25.0	+30.9	60.4	35 54.4	+31.9	61.0	36 23.2	+32.8	61.6	36 51.4	+33.8	62.3	37 19.0	+34.7	63.0	37 45.9	+35.7	63.7	38 12.2	+36.7	64.4	38 37.9	+37.5	65.1	44
45	35 55.9	+30.4	59.3	36 26.3	+31.2	59.9	36 56.0	+32.3	60.6	37 25.2	+33.2	61.3	37 53.7	+34.2	61.9	38 21.6	+35.1	62.6	38 48.9	+36.1	63.3	39 15.4	+37.1	64.1	45
46	36 26.3	+29.7	58.2	36 57.5	+30.8	58.9	37 28.3	+31.6	59.5	37 58.4	+32.6	60.2	38 27.9	+33.6	60.9	38 56.7	+34.6	61.6	39 25.0	+35.5	62.3	39 52.5	+36.5	63.1	46
47	36 56.0	+29.2	57.2	37 28.3	+30.1	57.8	37 59.9	+31.1	58.5	38 31.0	+32.1	59.1	39 01.5	+33.0	59.8	39 31.3	+34.0	60.5	40 00.5	+35.0	61.3	40 29.0	+35.9	62.0	47
48	37 25.2	+28.5	56.1	37 58.4	+29.5	56.7	38 31.0	+30.5	57.4	39 03.1	+31.4	58.1	39 34.5	+32.4	58.8	40 05.3	+33.4	59.5	40 35.5	+34.3	60.2	41 04.9	+35.4	61.0	48
49	37 53.7	+27.9	55.0	38 27.9	+28.8	55.6	39 01.5	+29.8	56.3	39 34.5	+30.8	57.0	40 06.9	+31.8	57.7	40 38.7	+32.8	58.4	41 09.8	+33.8	59.1	41 40.3	+34.7	59.9	49
50	38 21.6	+27.3	53.8	38 56.7	+28.3	54.5	39 31.3	+29.2	55.1	40 05.3	+30.2	55.8	40 38.7	+31.1	56.5	41 11.5	+32.1	57.3	41 43.6	+33.1	58.0	42 15.4	+34.0	58.8	50
51	38 48.9	+26.5	52.7	39 25.0	+27.5	53.3	40 00.5	+28.5	54.0	40 35.5	+29.4	54.7	41 09.8	+30.5	55.4	41 43.6	+31.4	56.1	42 16.7	+32.4	56.9	42 49.1	+33.4	57.7	51
52	39 15.4	+25.9	51.5	39 52.5	+26.8	52.2	40 29.0	+27.8	52.9	41 04.9	+28.8	53.5	41 40.3	+29.7	54.3	42 15.0	+30.8	55.0	42 49.1	+31.8	55.7	43 22.5	+32.8	56.5	52
53	39 41.3	+25.2	50.4	40 19.3	+26.2	51.0	40 56.8	+27.1	51.7	41 33.7	+28.1	52.4	42 10.0	+29.1	53.1	42 45.8	+30.0	53.8	43 20.9	+31.0	54.6	43 55.3	+32.0	55.4	53
54	40 06.5	+24.4	49.2	40 45.5	+25.3	49.8	41 23.9	+26.3	50.5	42 01.8	+27.3	51.2	42 39.1	+28.3	51.9	43 15.8	+29.3	52.6	43 51.9	+30.3	53.4	44 27.3	+31.3	54.2	54
55	40 30.9	+23.7	48.0	41 10.8	+24.7	48.6	41 50.2	+25.6	49.3	42 29.1	+26.5	50.0	43 07.4	+27.5	50.7	43 45.1	+28.5	51.4	44 22.2	+29.5	52.2	44 58.6	+30.5	53.0	55
56	40 54.6	+23.0	46.8	41 35.5	+23.8	47.4	42 15.8	+24.8	48.1	42 55.6	+25.8	48.8	43 34.9	+26.7	49.5	44 13.6	+27.7	50.2	44 51.7	+28.7	51.0	45 29.1	+29.8	51.8	56
57	41 17.6	+22.1	45.6	41 59.3	+23.1	46.2	42 40.6	+24.0	46.8	43 21.4	+24.9	47.5	44 01.6	+25.9	48.2	44 41.3	+26.9	49.0	45 20.4	+27.9	49.7	45 58.9	+28.9	50.5	57
58	41 39.7	+21.3	44.3	42 22.4	+22.2	44.9	43 04.6	+23.2	45.6	43 46.3	+24.2	46.3	44 27.5	+25.1	47.0	45 08.2	+26.0	47.7	45 48.3	+27.0	48.5	46 27.8	+28.0	49.3	58
59	42 01.0	+20.5	43.1	42 44.6	+21.4	43.7	43 27.8	+22.3	44.3	44 10.5	+23.2	45.0	44 52.6	+24.2	45.7	45 34.2	+25.2	46.4	46 15.3	+26.2	47.2	46 55.8	+27.2	48.0	59
60	42 21.5	+19.7	41.8	43 06.0	+20.6	42.4	43 50.1	+21.5	43.0	44 33.7	+22.4	43.7	45 16.8	+23.3	44.4	45 59.4	+24.3	45.1	46 41.5	+25.2	45.9	47 23.0	+26.2	46.7	60
61	42 41.2	+18.7	40.5	43 26.6	+19.6	41.1	44 11.6	+20.5	41.8	44 56.1	+21.5	42.4	45 40.1	+22.4	43.1	46 23.7	+23.3	43.8	47 06.7	+24.3	44.6	47 49.2	+25.3	45.3	61
62	42 59.9	+17.9	39.2	43 46.2	+18.8	39.8	44 32.1	+19.6	40.4	45 17.6	+20.5	41.1	46 02.5	+21.5	41.8	46 47.0	+22.4	42.5	47 31.0	+23.4	43.2	48 14.5	+24.3	44.0	62
63	43 17.8	+17.0	37.9	44 05.0	+17.8	38.5	44 51.7	+18.7	39.1	45 38.1	+19.6	39.7	46 24.0	+20.5	40.4	47 09.4	+21.5	41.1	47 54.4	+22.4	41.8	48 38.8	+23.4	42.6	63
64	43 34.8	+16.1	36.6	44 22.8	+16.9	37.2	45 10.4	+17.8	37.8	45 57.7	+18.6	38.4	46 44.5	+19.5	39.0	47 30.9	+20.4	39.7	48 16.8	+21.3	40.4	49 02.2	+22.3	41.2	64
65	43 50.9	+15.1	35.2	44 39.7	+16.0	35.8	45 28.2	+16.8	36.4	46 16.3	+17.6	37.0	47 04.0	+18.5	37.6	47 51.3	+19.4	38.3	48 38.1	+20.3	39.0	49 24.5	+21.2	39.8	65
66	44 06.0	+14.2	33.9	44 55.7	+14.9	34.5	45 45.0	+15.7	35.0	46 33.9	+16.6	35.6	47 22.5	+17.4	36.3	48 10.7	+18.3	36.9	48 58.4	+19.2	37.6	49 45.7	+20.2	38.3	66
67	44 20.2	+13.2	32.5	45 10.6	+14.0	33.1	46 00.7	+14.8	33.6	46 50.5	+15.6	34.2	47 39.9	+16.4	34.8	48 29.0	+17.2	35.5	49 17.6	+18.2	36.2	50 05.9	+19.0	36.9	67
68	44 33.4	+12.2	31.2	45 24.6	+13.0	31.7	46 15.5	+13.7	32.2	47 06.1	+14.5	32.8	47 56.3	+15.4	33.4	48 46.2	+16.2	34.0	49 35.8	+17.0	34.7	50 24.9	+18.0	35.4	68
69	44 45.6	+11.3	29.8	45 37.6	+11.9	30.3	46 29.2	+12.7	30.8	47 20.6	+13.4	31.4	48 11.7	+14.2	32.0	49 02.4	+15.0	32.6	49 52.8	+15.8	33.2	50 42.8	+16.7	33.9	69
70	44 56.9	+10.2	28.4	45 49.5	+10.9	28.9	46 41.9	+11.6	29.4	47 34.0	+12.4	29.9	48 25.9	+13.1	30.5	49 17.4	+13.9	31.1	50 08.6	+14.7	31.7	50 59.5	+15.5	32.4	70
71	45 07.1	+9.2	27.0	46 00.4	+9.9	27.5	46 53.5	+10.5	28.0	47 46.4	+11.2	28.5	48 39.0	+11.9	29.0	49 31.3	+12.7	29.6	50 23.3	+13.5	30.2	51 15.0	+14.3	30.8	71
72	45 16.3	+8.1	25.6	46 10.3	+8.7	26.1	47 04.0	+9.5	26.5	47 57.6	+10.1	27.0	48 50.9	+10.8	27.5	49 44.0	+11.5	28.1	50 36.8	+12.3	28.7	51 29.3	+13.0	29.3	72
73	45 24.4	+7.1	24.2	46 19.0	+7.7	24.6	47 13.5	+8.3	25.1	48 07.7	+9.0	25.6	49 01.7	+9.7	26.0	49 55.5	+10.3	26.6	50 49.1	+11.0	27.1	51 42.3	+11.8	27.7	73
74	45 31.5	+6.1	22.8	46 26.7	+6.7	23.2	47 21.8	+7.2	23.6	48 16.7	+7.8	24.1	49 11.4	+8.4	24.5	50 05.8	+9.1	25.0	50 59.9	+9.8	25.6	51 54.1	+10.6	26.1	74
75	45 37.6	+5.0	21.4	46 33.4	+5.5	21.8	47 29.0	+6.1	22.2	48 24.5	+6.7	22.6	49 19.8	+7.3	23.0	50 14.9	+7.9	23.5	51 09.9	+8.5	24.0	52 04.6	+9.2	24.5	75
76	45 42.6	+3.9	19.9	46 38.9	+4.4	20.3	47 35.1	+5.0	20.7	48 31.2	+5.4	21.1	49 27.1	+6.0	21.5	50 22.8	+6.6	21.9	51 18.4	+7.2	22.4	52 13.8	+7.8	22.9	76
77	45 46.5	+2.8	18.5	46 43.3	+3.4	18.9	47 40.1	+3.8	19.2	48 36.6	+4.4	19.6	49 33.1	+4.8	20.0	50 29.4	+5.4	20.4	51 25.6	+5.9	20.8	52 21.6	+6.5	21.3	77
78	45 49.3	+1.7	17.1	46 46.7	+2.2	17.4	47 43.9	+2.6	17.7	48 41.0	+3.1	18.1	49 37.9	+3.6	18.4	50 34.8	+4.1	18.8	51 31.5	+4.6	19.2	52 28.1	+5.2	19.6	78
79	45 51.1	+0.7	15.7	46 48.9	+1.1	15.9	47 46.5	+1.5	16.2	48 44.1	+1.9	16.6	49 41.5	+2.4	16.9	50 38.9	+2.8	17.2	51 36.1	+3.3	17.6	52 33.3	+3.8	18.0	79
80	45 51.8	–0.4	14.2	46 50.0	–0.1	14.5	47 48.0	+0.4	14.7	48 46.0	+0.7	15.0	49 43.9	+1.1	15.3	50 41.7	+1.6	15.7	51 39.4	+2.0	16.0	52 37.1	+2.4	16.4	80
81	45 51.4	–1.4	12.8	46 49.9	–1.1	13.0	47 48.4	–0.8	13.3	48 46.7	–0.4	13.5	49 45.0	–0.1	13.7	50 43.3	+0.2	14.1	51 41.4	+0.7	14.4	52 39.5	+1.1	14.7	81
82	45 50.0	–2.5	11.3	46 48.8	–2.3	11.6	47 47.6	–2.0	11.8	48 46.3	–1.7	12.0	49 44.9	–1.3	12.2	50 43.5	–1.0	12.5	51 42.1	–0.7	12.8	52 40.6	–0.3	13.1	82
83	45 47.5	–3.7	9.9	46 46.5	–3.3	10.1	47 45.6	–3.1	10.3	48 44.6	–2.8	10.5	49 43.6	–2.6	10.7	50 42.5	–2.3	10.9	51 41.4	–2.0	11.2	52 40.3	–1.7	11.4	83
84	45 43.8	–4.6	8.5	46 43.2	–4.3	8.6	47 42.5	–4.3	8.8	48 41.8	–4.1	9.0	49 41.0	–3.8	9.2	50 40.2	–3.5	9.3	51 39.4	–3.3	9.6	52 38.6	–3.1	9.8	84
85	45 39.2	–5.8	7.1	46 38.7	–5.6	7.2	47 38.2	–5.4	7.3	48 37.7	–5.2	7.5	49 37.2	–5.0	7.6	50 36.7	–4.9	7.8	51 36.1	–4.6	7.9	52 35.5	–4.4	8.1	85
86	45 33.4	–6.8	5.6	46 33.1	–6.6	5.7	47 32.8	–6.5	5.8	48 32.5	–6.4	6.0	49 32.2	–6.3	6.1	50 31.8	–6.1	6.2	51 31.5	–6.0	6.3	52 31.1	–5.8	6.5	86
87	45 26.6	–7.8	4.2	46 26.5	–7.8	4.3	47 26.3	–7.5	4.4	48 26.1	–7.5	4.5	49 25.9	–7.4	4.6	50 25.7	–7.3	4.6	51 25.5	–7.2	4.7	52 25.3	–7.1	4.8	87
88	45 18.8	–8.9	2.8	46 18.7	–8.8	2.9	47 18.6	–8.7	2.9	48 18.6	–8.7	3.0	49 18.5	–8.7	3.0	50 18.4	–8.6	3.1	51 18.3	–8.5	3.2	52 18.2	–8.4	3.2	88
89	45 09.9	–9.9	1.4	46 09.9	–9.9	1.4	47 09.9	–9.9	1.4	48 09.9	–9.9	1.5	49 09.8	–9.8	1.5	50 09.8	–9.8	1.5	51 09.8	–9.8	1.6	52 09.8	–9.8	1.6	89
90	45 00.0	–10.9	0.0	46 00.0	–10.9	0.0	47 00.0	–11.0	0.0	48 00.0	–11.0	0.0	49 00.0	–11.0	0.0	50 00.0	–11.0	0.0	51 00.0	–11.0	0.0	52 00.0	–11.1	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

	45°			46°			47°			48°			49°			50°			51°			52°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
0	7 03.2	−42.8	97.1	6 55.7	−43.5	97.2	6 48.1	−44.2	97.3	6 40.3	−44.9	97.5	6 32.5	−45.6	97.6	6 24.5	−46.3	97.7	6 16.4	−46.9	97.8	6 08.2	−47.5	97.9	0
1	6 20.4	−42.8	97.8	6 12.2	−43.6	97.9	6 03.9	−44.3	98.0	5 55.4	−44.9	98.1	5 46.9	−45.7	98.2	5 38.2	−46.3	98.3	5 29.5	−47.0	98.4	5 20.7	−47.7	98.5	1
2	5 37.6	−42.9	98.5	5 28.6	−43.6	98.6	5 19.6	−44.3	98.7	5 10.5	−45.0	98.8	5 01.2	−45.6	98.9	4 51.9	−46.3	99.0	4 42.5	−47.0	99.1	4 33.0	−47.6	99.1	2
3	4 54.7	−43.0	99.2	4 45.0	−43.6	99.3	4 35.3	−44.4	99.4	4 25.5	−45.1	99.5	4 15.6	−45.8	99.5	4 05.6	−46.4	99.6	3 55.5	−47.0	99.7	3 45.4	−47.7	99.7	3
4	4 11.7	−42.9	99.9	4 01.4	−43.7	100.0	3 50.9	−44.4	100.1	3 40.4	−45.1	100.1	3 29.8	−45.7	100.2	3 19.2	−46.4	100.2	3 08.5	−47.1	100.3	2 57.7	−47.6	100.4	4
5	3 28.8	−43.0	100.6	3 17.7	−43.7	100.7	3 06.5	−44.4	100.7	2 55.3	−45.1	100.8	2 44.1	−45.8	100.8	2 32.8	−46.4	100.9	2 21.4	−47.0	100.9	2 10.1	−47.7	101.0	5
6	2 45.8	−43.1	101.3	2 34.0	−43.8	101.4	2 22.1	−44.4	101.4	2 10.2	−45.1	101.4	1 58.3	−45.8	101.5	1 46.4	−46.5	101.5	1 34.4	−47.1	101.5	1 22.4	−47.8	101.6	6
7	2 02.7	−43.0	102.0	1 50.2	−43.7	102.0	1 37.7	−44.4	102.1	1 25.1	−45.1	102.1	1 12.5	−45.8	102.1	0 59.9	−46.4	102.1	0 47.3	−47.1	102.2	0 34.6	−47.7	102.2	7
8	1 19.7	−43.1	102.7	1 06.5	−43.8	102.7	0 53.3	−44.5	102.8	0 40.0	−45.1	102.8	0 26.7	−45.8	102.8	0 13.5	−46.5	102.8	0 00.2	−47.1	102.8	0 13.1	+47.7	77.2	8
9	0 36.6	−43.0	103.4	0 22.7	−43.7	103.4	0 08.8	−44.4	103.4	0 05.1	+45.2	76.6	0 19.1	+45.7	76.6	0 33.0	+46.4	76.6	0 46.9	+47.1	76.6	1 00.8	+47.7	76.6	9
10	0 06.4	+43.1	75.9	0 21.0	+43.8	75.9	0 35.6	+44.5	75.9	0 50.3	+45.1	75.9	1 04.8	+45.8	75.9	1 19.4	+46.4	76.0	1 34.0	+47.0	76.0	1 48.5	+47.7	76.0	10
11	0 49.5	+43.1	75.2	1 04.8	+43.7	75.2	1 20.1	+44.4	75.2	1 35.4	+45.1	75.3	1 50.6	+45.8	75.3	2 05.8	+46.5	75.3	2 21.0	+47.1	75.4	2 36.2	+47.7	75.4	11
12	1 32.5	+43.1	74.5	1 48.5	+43.8	74.5	2 04.5	+44.5	74.6	2 20.5	+45.1	74.6	2 36.4	+45.7	74.6	2 52.3	+46.4	74.7	3 08.1	+47.0	74.7	3 23.9	+47.6	74.8	12
13	2 15.6	+43.0	73.8	2 32.3	+43.7	73.8	2 49.0	+44.3	73.9	3 05.6	+45.0	73.9	3 22.1	+45.8	74.0	3 38.7	+46.3	74.1	3 55.1	+47.0	74.1	4 11.5	+47.6	74.2	13
14	2 58.6	+43.0	73.1	3 16.0	+43.7	73.2	3 33.3	+44.4	73.2	3 50.6	+45.1	73.3	4 07.9	+45.7	73.3	4 25.0	+46.4	73.4	4 42.1	+47.0	73.5	4 59.1	+47.6	73.6	14
15	3 41.6	+42.9	72.4	3 59.7	+43.6	72.5	4 17.7	+44.3	72.5	4 35.7	+45.0	72.6	4 53.6	+45.6	72.7	5 11.4	+46.3	72.8	5 29.1	+46.9	72.9	5 46.7	+47.6	73.0	15
16	4 24.5	+43.0	71.7	4 43.3	+43.6	71.8	5 02.0	+44.3	71.9	5 20.7	+44.9	72.0	5 39.2	+45.6	72.0	5 57.7	+46.2	72.1	6 16.0	+46.9	72.2	6 34.3	+47.5	72.3	16
17	5 07.5	+42.8	71.0	5 26.9	+43.6	71.1	5 46.3	+44.3	71.2	6 05.6	+44.9	71.3	6 24.8	+45.6	71.4	6 43.9	+46.2	71.5	7 02.9	+46.8	71.6	7 21.8	+47.4	71.7	17
18	5 50.3	+42.8	70.3	6 10.5	+43.5	70.4	6 30.6	+44.2	70.5	6 50.5	+44.9	70.6	7 10.4	+45.5	70.7	7 30.1	+46.2	70.9	7 49.7	+46.8	71.0	8 09.2	+47.4	71.1	18
19	6 33.1	+42.8	69.6	6 54.0	+43.5	69.7	7 14.8	+44.1	69.8	7 35.4	+44.8	69.9	7 55.9	+45.4	70.1	8 16.3	+46.1	70.2	8 36.5	+46.7	70.4	8 56.6	+47.4	70.5	19
20	7 15.9	+42.7	68.9	7 37.5	+43.3	69.0	7 58.9	+44.0	69.1	8 20.2	+44.7	69.3	8 41.3	+45.4	69.4	9 02.4	+46.0	69.6	9 23.2	+46.7	69.7	9 44.0	+47.2	69.9	20
21	7 58.6	+42.6	68.2	8 20.8	+43.4	68.3	8 42.9	+44.0	68.5	9 04.9	+44.7	68.6	9 26.7	+45.3	68.8	9 48.4	+45.9	68.9	10 09.9	+46.6	69.1	10 31.2	+47.2	69.2	21
22	8 41.2	+42.6	67.5	9 04.2	+43.2	67.6	9 26.9	+43.9	67.9	9 49.6	+44.5	67.9	10 12.0	+45.2	68.1	10 34.3	+45.9	68.3	10 56.5	+46.5	68.4	11 18.4	+47.1	68.6	22
23	9 23.8	+42.4	66.8	9 47.4	+43.1	66.9	10 10.8	+43.8	67.1	10 34.1	+44.5	67.2	10 57.2	+45.2	67.4	11 20.2	+45.8	67.6	11 43.0	+46.4	67.8	12 05.5	+47.1	68.0	23
24	10 06.2	+42.4	66.0	10 30.5	+43.1	66.2	10 54.6	+43.8	66.4	11 18.6	+44.4	66.6	11 42.4	+45.0	66.7	12 06.0	+45.6	66.9	12 29.4	+46.3	67.1	12 52.6	+46.9	67.3	24
25	10 48.6	+42.3	65.3	11 13.6	+42.9	65.5	11 38.4	+43.6	65.7	12 03.0	+44.3	65.9	12 27.4	+44.9	66.1	12 51.6	+45.6	66.3	13 15.7	+46.2	66.5	13 39.5	+46.9	66.7	25
26	11 30.9	+42.1	64.6	11 56.5	+42.9	64.8	12 22.0	+43.5	65.0	12 47.3	+44.1	65.2	13 12.3	+44.9	65.4	13 37.2	+45.5	65.6	14 01.9	+46.1	65.8	14 26.4	+46.7	66.1	26
27	12 13.0	+42.1	63.9	12 39.4	+42.7	64.1	13 05.5	+43.4	64.3	13 31.4	+44.1	64.5	13 57.2	+44.7	64.7	14 22.7	+45.4	64.9	14 48.0	+46.0	65.2	15 13.1	+46.6	65.4	27
28	12 55.1	+41.9	63.1	13 22.1	+42.6	63.3	13 48.9	+43.3	63.6	14 15.5	+43.9	63.8	14 41.9	+44.6	64.0	15 08.1	+45.2	64.3	15 34.0	+45.9	64.5	15 59.7	+46.5	64.8	28
29	13 37.0	+41.8	62.4	14 04.7	+42.4	62.6	14 32.2	+43.1	62.9	14 59.4	+43.8	63.1	15 26.5	+44.4	63.3	15 53.3	+45.1	63.6	16 19.9	+45.7	63.8	16 46.2	+46.4	64.1	29
30	14 18.8	+41.6	61.7	14 47.1	+42.4	61.9	15 15.3	+43.0	62.1	15 43.2	+43.7	62.4	16 10.9	+44.4	62.6	16 38.4	+45.0	62.9	17 05.6	+45.6	63.2	17 32.6	+46.2	63.4	30
31	15 00.4	+41.5	60.9	15 29.5	+42.2	61.2	15 58.3	+42.9	61.4	16 26.9	+43.5	61.7	16 55.3	+44.1	61.9	17 23.4	+44.8	62.2	17 51.2	+45.5	62.5	18 18.8	+46.1	62.8	31
32	15 41.9	+41.4	60.2	16 11.7	+42.0	60.4	16 41.2	+42.7	60.7	17 10.4	+43.4	60.9	17 39.4	+44.1	61.2	18 08.2	+44.7	61.5	18 36.7	+45.3	61.8	19 04.9	+46.0	62.1	32
33	16 23.3	+41.2	59.4	16 53.7	+41.9	59.7	17 23.9	+42.5	59.9	17 53.8	+43.2	60.2	18 23.5	+43.8	60.5	18 52.9	+44.5	60.8	19 22.0	+45.2	61.1	19 50.9	+45.8	61.4	33
34	17 04.5	+41.0	58.7	17 35.6	+41.6	58.9	18 06.4	+42.4	59.2	18 37.0	+43.0	59.5	19 07.3	+43.7	59.8	19 37.4	+44.3	60.1	20 07.2	+45.0	60.4	20 36.7	+45.6	60.7	34
35	17 45.5	+40.8	57.9	18 17.2	+41.6	58.2	18 48.8	+42.2	58.5	19 20.0	+42.9	58.8	19 51.0	+43.5	59.1	20 21.7	+44.2	59.4	20 52.2	+44.8	59.7	21 22.3	+45.4	60.0	35
36	18 26.3	+40.7	57.1	18 58.8	+41.3	57.4	19 31.0	+42.0	57.7	20 02.9	+42.6	58.0	20 34.5	+43.4	58.3	21 05.9	+44.0	58.6	21 37.0	+44.6	59.0	22 07.7	+45.3	59.3	36
37	19 07.0	+40.4	56.3	19 40.1	+41.1	56.6	20 13.0	+41.8	56.9	20 45.5	+42.5	57.3	21 17.9	+43.1	57.6	21 49.9	+43.8	57.9	22 21.6	+44.4	58.3	22 53.0	+45.1	58.6	37
38	19 47.4	+40.3	55.6	20 21.2	+40.9	55.9	20 54.8	+41.6	56.2	21 28.0	+42.3	56.5	22 01.0	+42.9	56.8	22 33.7	+43.5	57.2	23 06.0	+44.3	57.5	23 38.1	+44.9	57.9	38
39	20 27.7	+40.0	54.8	21 02.1	+40.8	55.1	21 36.4	+41.3	55.4	22 10.3	+42.0	55.7	22 43.9	+42.7	56.1	23 17.2	+43.4	56.4	23 50.3	+44.0	56.8	24 23.0	+44.6	57.2	39
40	21 07.7	+39.8	54.0	21 42.9	+40.4	54.3	22 17.7	+41.2	54.6	22 52.3	+41.8	55.0	23 26.6	+42.5	55.3	24 00.6	+43.2	55.7	24 34.3	+43.8	56.0	25 07.6	+44.5	56.4	40
41	21 47.5	+39.5	53.2	22 23.3	+40.3	53.5	22 58.9	+40.9	53.8	23 34.1	+41.6	54.2	24 09.1	+42.3	54.5	24 43.8	+42.9	54.9	25 18.1	+43.5	55.3	25 52.1	+44.2	55.7	41
42	22 27.1	+39.3	52.4	23 03.6	+40.0	52.7	23 39.8	+40.7	53.0	24 15.7	+41.4	53.4	24 51.4	+42.0	53.8	25 26.7	+42.6	54.1	26 01.6	+43.4	54.5	26 36.3	+44.0	54.9	42
43	23 06.4	+39.1	51.5	23 43.6	+39.7	51.9	24 20.5	+40.4	52.2	24 57.1	+41.0	52.6	25 33.4	+41.7	53.0	26 09.3	+42.4	53.4	26 45.0	+43.0	53.8	27 20.3	+43.7	54.2	43
44	23 45.5	+38.8	50.7	24 23.3	+39.5	51.1	25 00.9	+40.1	51.4	25 38.1	+40.9	51.8	26 15.1	+41.5	52.2	26 51.7	+42.2	52.6	27 28.0	+42.8	53.0	28 04.0	+43.4	53.4	44
45	24 24.3	+38.5	49.9	25 02.8	+39.2	50.2	25 41.0	+39.9	50.6	26 19.0	+40.5	51.0	26 56.6	+41.2	51.4	27 33.9	+41.8	51.8	28 10.8	+42.6	52.2	28 47.4	+43.2	52.6	45
46	25 02.8	+38.2	49.0	25 42.0	+38.9	49.4	26 20.9	+39.6	49.8	26 59.5	+40.2	50.2	27 37.8	+40.9	50.5	28 15.7	+41.6	51.0	28 53.4	+42.2	51.4	29 30.6	+42.9	51.8	46
47	25 41.0	+38.0	48.2	26 20.9	+38.6	48.5	27 00.5	+39.2	48.9	27 39.7	+40.0	49.3	28 18.7	+40.6	49.7	28 57.3	+41.3	50.1	29 35.6	+41.9	50.6	30 13.5	+42.6	51.0	47
48	26 19.0	+37.6	47.3	26 59.5	+38.3	47.7	27 39.7	+39.0	48.1	28 19.7	+39.6	48.5	28 59.3	+40.3	48.9	29 38.6	+40.9	49.3	30 17.5	+41.6	49.7	30 56.1	+42.3	50.2	48
49	26 56.6	+37.3	46.4	27 37.8	+37.9	46.8	28 18.7	+38.6	47.2	28 59.3	+39.3	47.6	29 39.6	+39.9	48.0	30 19.5	+40.7	48.5	30 59.1	+41.3	48.9	31 38.4	+42.0	49.4	49
50	27 33.9	+36.9	45.6	28 15.7	+37.7	45.9	28 57.3	+38.3	46.3	29 38.6	+38.9	46.7	30 19.5	+39.6	47.2	31 00.2	+40.2	47.6	31 40.4	+41.0	48.1	32 20.4	+41.6	48.5	50
51	28 10.8	+36.6	44.7	28 53.4	+37.2	45.1	29 35.6	+37.9	45.5	30 17.5	+38.6	45.9	30 59.1	+39.3	46.3	31 40.4	+40.0	46.7	32 21.4	+40.6	47.2	33 02.0	+41.2	47.7	51
52	28 47.4	+36.3	43.8	29 30.6	+36.9	44.2	30 13.5	+37.6	44.6	30 56.1	+38.2	45.0	31 38.4	+38.9	45.4	32 20.4	+39.5	45.9	33 02.0	+40.2	46.3	33 43.2	+40.9	46.8	52
53	29 23.7	+35.9	42.9	30 07.5	+36.6	43.3	30 51.1	+37.2	43.7	31 34.3	+37.9	44.1	32 17.3	+38.5	44.5	32 59.9	+39.2	45.0	33 42.2	+39.8	45.4	34 24.1	+40.5	45.9	53
54	29 59.6	+35.4	41.9	30 44.1	+36.1	42.3	31 28.3	+36.7	42.7	32 12.2	+37.4	43.2	32 55.8	+38.1	43.6	33 39.1	+38.7	44.1	34 22.0	+39.4	44.5	35 04.6	+40.1	45.0	54
55	30 35.0	+35.1	41.0	31 20.2	+35.7	41.4	32 05.0	+36.4	41.8	32 49.6	+37.0	42.2	33 33.9	+37.7	42.7	34 17.8	+38.4	43.1	35 01.4	+39.0	43.6	35 44.7	+39.7	44.1	55
56	31 10.1	+34.7	40.1	31 55.9	+35.3	40.5	32 41.4	+35.9	40.9	33 26.6	+36.6	41.3	34 11.6	+37.2	41.7	34 56.2	+37.9	42.2	35 40.4	+38.6	42.7	36 24.4	+39.2	43.2	56
57	31 44.8	+34.2	39.1	32 31.2	+34.8	39.5	33 17.3	+35.5	39.9	34 03.2	+36.2	40.3	34 48.8	+36.8	40.8	35 34.1	+37.4	41.3	36 19.0	+38.1	41.7	37 03.6	+38.8	42.2	57
58	32 19.0	+33.7	38.1	33 06.0	+34.4	38.5	33 52.8	+35.1	38.9	34 39.4	+35.6	39.4	35 25.6	+36.3	39.8	36 11.5	+37.0	40.3	36 57.1	+37.7	40.8	37 42.4	+38.3	41.3	58
59	32 52.7	+33.4	37.2	33 40.4	+34.0	37.6	34 27.9	+34.5	38.0	35 15.0	+35.2	38.4	36 01.9	+35.9	38.8	36 48.5	+36.5	39.3	37 34.8	+37.1	39.8	38 20.7	+37.8	40.3	59
60	33 26.1	+32.8	36.2	34 14.4	+33.4	36.6	35 02.4	+34.1	37.0	35 50.2	+34.7	37.4	36 37.8	+35.3	37.8	37 25.0	+36.0	38.3	38 11.9	+36.6	38.8	38 58.5	+37.3	39.3	60
61	33 58.9	+32.3	35.2	34 47.8	+32.9	35.5	35 36.5	+33.6	36.0	36 24.9	+34.2	36.4	37 13.1	+34.8	36.8	38 01.0	+35.4	37.3	38 48.5	+36.1	37.8	39 35.8	+36.8	38.3	61
62	34 31.2	+31.8	34.1	35 20.7	+32.5	34.5	36 10.1	+33.0	34.9	36 59.1	+33.7	35.4	37 47.9	+34.3	35.8	38 36.4	+34.9	36.3	39 24.6	+35.6	36.8	40 12.6	+36.2	37.3	62
63	35 03.0	+31.3	33.1	35 53.2	+31.8	33.5	36 43.1	+32.4	33.9	37 32.8	+33.0	34.3	38 22.2	+33.7	34.8	39 11.3	+34.4	35.2	40 00.2	+35.0	35.7	40 48.8	+35.6	36.2	63
64	35 34.3	+30.7	32.1	36 25.0	+31.3	32.4	37 15.5	+32.0	32.8	38 05.8	+32.5	33.3	38 55.9	+33.1	33.7	39 45.7	+33.7	34.2	40 35.2	+34.3	34.6	41 24.4	+35.0	35.1	64
65	36 05.0	+30.2	31.0	36 56.3	+30.8	31.4	37 47.5	+31.3	31.8	38 38.3	+32.0	32.2	39 29.0	+32.5	32.6	40 19.4	+33.1	33.1	41 09.5	+33.8	33.6	41 59.4	+34.4	34.1	65
66	36 35.2	+29.6	29.9	37 27.1	+30.1	30.3	38 18.8	+30.7	30.7	39 10.3	+31.3	31.1	40 01.5	+31.9	31.5	40 52.5	+32.5	32.0	41 43.3	+33.1	32.5	42 33.8	+33.7	32.9	66
67	37 04.8	+28.9	28.8	37 57.2	+29.5	29.2	38 49.5	+30.1	29.6	39 41.6	+30.6	30.0	40 33.4	+31.2	30.4	41 25.0	+31.9	30.9	42 16.4	+32.4	31.3	43 07.5	+33.1	31.8	67
68	37 33.7	+28.4	27.7	38 26.7	+28.9	28.1	39 19.6	+29.4	28.5	40 12.2	+30.0	28.9	41 04.6	+30.6	29.3	41 56.9	+31.1	29.7	42 48.8	+31.8	30.2	43 40.6	+32.3	30.7	68
69	38 02.1	+27.7	26.6	38 55.6	+28.3	27.0	39 49.0	+28.8	27.4	40 42.2	+29.3	27.7	41 35.2	+29.9	28.2	42 28.0	+30.5	28.6	43 20.6	+31.0	29.0	44 12.9	+31.7	29.5	69
70	38 29.8	+27.0	25.5	39 23.9	+27.5	25.8	40 17.8	+28.1	26.2	41 11.5	+28.6	26.6	42 05.1	+29.2	27.0	42 58.5	+29.7	27.4	43 51.6	+30.3	27.8	44 44.6	+30.8	28.3	70
71	38 56.8	+26.4	24.3	39 51.4	+26.9	24.7	40 45.9	+27.3	25.0	41 40.1	+27.9	25.4	42 34.3	+28.4	25.8	43 28.2	+28.9	26.2	44 21.9	+29.5	26.6	45 15.4	+30.1	27.1	71
72	39 23.2	+25.7	23.2	40 18.3	+26.2	23.5	41 13.2	+26.7	23.9	42 08.0	+27.2	24.2	43 02.7	+27.8	24.6	43 57.1	+28.3	25.0	44 51.4	+28.7	25.3	45 45.5	+29.3	25.9	72
73	39 48.9	+25.0	22.0	40 44.5	+25.4	22.3	41 39.9	+25.9	22.7	42 35.2	+26.4	23.0	43 30.5	+26.9	23.4	44 25.3	+27.4	23.8	45 20.1	+27.9	24.2	46 14.8	+28.4	24.6	73
74	40 13.9	+24.2	20.8	41 09.9	+24.6	21.1	42 05.8	+25.1	21.5	43 01.6	+25.5	21.8	43 57.2	+26.1	22.2	44 52.7	+26.5	22.5	45 48.0	+27.1	22.9	46 43.2	+27.6	23.3	74
75	40 38.1	+23.4	19.6	41 34.5	+23.9	19.9	42 30.9	+24.3	20.2	43 27.1	+24.8	20.6	44 23.3	+25.2	20.9	45 19.2	+25.7	21.3	46 15.1	+26.2	21.6	47 10.8	+26.7	22.0	75
76	41 01.5	+22.7	18.4	41 58.4	+23.1	18.7	42 55.2	+23.5	19.0	43 51.9	+23.9	19.3	44 48.5	+24.3	19.6	45 44.9	+24.8	20.0	46 41.3	+25.2	20.3	47 37.5	+25.7	20.7	76
77	41 24.2	+21.9	17.2	42 21.5	+22.3	17.4	43 18.7	+22.7	17.7	44 15.8	+23.1	18.0	45 12.8	+23.5	18.3	46 09.7	+23.9	18.7	47 06.5	+24.3	19.0	48 03.2	+24.8	19.4	77
78	41 46.1	+21.1	16.0	42 43.8	+21.4	16.2	43 41.4	+21.8	16.4	44 38.9	+22.1	16.7	45 36.3	+22.5	17.0	46 33.6	+23.0	17.3	47 30.8	+23.4	17.6	48 28.0	+23.8	18.0	78
79	42 07.2	+20.2	14.7	43 05.2	+20.6	14.9	44 03.2	+20.9	15.2	45 01.0	+21.3	15.4	45 58.8	+21.7	15.7	46 56.6	+22.0	16.0	47 54.2	+22.4	16.3	48 51.8	+22.7	16.6	79
80	42 27.4	+19.4	13.4	43 25.8	+19.7	13.6	44 24.1	+20.0	13.8	45 22.3	+20.3	14.1	46 20.5	+20.6	14.3	47 18.6	+21.0	14.6	48 16.6	+21.3	14.9	49 14.5	+21.7	15.2	80
81	42 46.8	+18.6	12.1	43 45.5	+18.8	12.3	44 44.1	+19.0	12.5	45 42.6	+19.4	12.7	46 41.1	+19.7	13.0	47 39.6	+19.9	13.2	48 37.9	+20.3	13.3	49 36.2	+20.7	13.8	81
82	43 05.4	+17.6	10.8	44 04.3	+17.8	11.0	45 03.1	+18.2	11.2	46 02.0	+18.4	11.4	47 00.8	+18.6	11.6	47 59.5	+19.0	11.8	48 58.2	+19.3	12.1	49 56.9	+19.5	12.3	82
83	43 23.0	+16.7	9.5	44 22.1	+17.0	9.7	45 21.3	+17.1	9.8	46 20.4	+17.4	10.0	47 19.4	+17.7	10.2	48 18.5	+17.9	10.4	49 17.5	+18.1	10.6	50 16.4	+18.4	10.8	83
84	43 39.7	+15.8	8.3	44 39.1	+16.0	8.3	45 38.4	+16.2	8.5	46 37.8	+16.3	8.6	47 37.1	+16.5	8.8	48 36.4	+16.8	8.9	49 35.6	+17.0	9.1	50 34.8	+17.3	9.3	84
85	43 55.5	+14.8	6.8	44 55.1	+15.0	7.0	45 54.6	+15.2	7.1	46 54.1	+15.4	7.2	47 53.7	+15.5	7.4	48 53.2	+15.6	7.5	49 52.6	+15.9	7.7	50 52.1	+16.0	7.8	85
86	44 10.3	+13.9	5.5	45 10.1	+14.0	5.6	46 09.8	+14.1	5.7	47 09.5	+14.2	5.8	48 09.2	+14.4	5.9	49 08.8	+14.6	6.0	50 08.5	+14.7	6.2	51 08.1	+14.9	6.3	86
87	44 24.2	+12.9	4.1	45 24.1	+13.0	4.2	46 23.9	+13.1	4.3	47 23.7	+13.2	4.4	48 23.6	+13.2	4.5	49 23.4	+13.5	4.6	50 23.2	+13.5	4.7	51 23.0	+13.6	4.7	87
88	44 37.1	+12.0	2.8	45 37.1	+12.0	2.8	46 37.0	+12.0	2.9	47 36.9	+12.1	2.9	48 36.8	+12.2	3.0	49 36.8	+12.2	3.0	50 36.7	+12.3	3.1	51 36.6	+12.3	3.2	88
89	44 49.1	+10.9	1.4	45 49.1	+10.9	1.4	46 49.0	+11.0	1.4	47 49.0	+11.0	1.5	48 49.0	+11.0	1.5	49 49.0	+11.0	1.5	50 49.0	+11.0	1.6	51 48.9	+11.1	1.6	89
90	45 00.0	+9.9	0.0	46 00.0	+9.9	0.0	47 00.0	+9.9	0.0	48 00.0	+9.9	0.0	49 00.0	+9.8	0.0	50 00.0	+9.8	0.0	51 00.0	+9.8	0.0	52 00.0	+9.8	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 100°, 260°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	6 21.0	+42.7	96.4	6 14.3	+43.4	96.5	6 07.5	+44.1	96.6	6 00.5	+44.8	96.7	5 53.4	+45.5	96.8	5 46.3	+46.1	96.9	5 39.0	+46.8	97.0	5 31.6	+47.5	97.1	0
1	7 03.7	+42.6	95.7	6 57.7	+43.3	95.8	6 51.6	+44.0	95.9	6 45.3	+44.8	96.0	6 38.9	+45.5	96.2	6 32.4	+46.2	96.3	6 25.8	+46.8	96.4	6 19.1	+47.4	96.5	1
2	7 46.3	+42.5	95.0	7 41.0	+43.3	95.1	7 35.6	+44.0	95.2	7 30.1	+44.7	95.4	7 24.4	+45.4	95.5	7 18.6	+46.0	95.6	7 12.6	+46.7	95.8	7 06.5	+47.4	95.9	2
3	8 28.8	+42.5	94.3	8 24.3	+43.2	94.4	8 19.6	+43.9	94.6	8 14.8	+44.6	94.7	8 09.8	+45.3	94.8	8 04.6	+46.0	95.0	7 59.3	+46.7	95.1	7 53.9	+47.3	95.3	3
4	9 11.3	+42.3	93.5	9 07.5	+43.1	93.7	9 03.5	+43.9	93.9	8 59.4	+44.5	94.0	8 55.1	+45.3	94.2	8 50.6	+46.0	94.3	8 46.0	+46.6	94.5	8 41.2	+47.3	94.6	4
5	9 53.6	+42.3	92.8	9 50.6	+43.0	93.0	9 47.4	+43.7	93.2	9 43.9	+44.5	93.3	9 40.4	+45.1	93.5	9 36.6	+45.9	93.7	9 32.6	+46.6	93.9	9 28.5	+47.2	94.0	5
6	10 35.9	+42.2	92.1	10 33.6	+42.9	92.3	10 31.1	+43.7	92.5	10 28.4	+44.4	92.7	10 25.5	+45.1	92.8	10 22.5	+45.7	93.0	10 19.2	+46.5	93.2	10 15.7	+47.2	93.4	6
7	11 18.1	+42.0	91.4	11 16.5	+42.8	91.6	11 14.8	+43.5	91.8	11 12.8	+44.3	92.0	11 10.6	+45.0	92.2	11 08.2	+45.7	92.4	11 05.7	+46.5	92.6	11 02.9	+47.0	92.8	7
8	12 00.1	+42.0	90.7	11 59.3	+42.7	90.9	11 58.3	+43.5	91.1	11 57.1	+44.2	91.3	11 55.6	+44.9	91.5	11 53.9	+45.7	91.7	11 52.0	+46.3	91.9	11 49.9	+47.0	92.1	8
9	12 42.1	+41.8	89.9	12 42.0	+42.6	90.1	12 41.8	+43.3	90.4	12 41.3	+44.1	90.6	12 40.5	+44.8	90.8	12 39.6	+45.5	91.0	12 38.3	+46.2	91.3	12 36.9	+46.9	91.5	9
10	13 23.9	+41.7	89.2	13 24.6	+42.5	89.4	13 25.1	+43.2	89.7	13 25.4	+43.9	89.9	13 25.3	+44.7	90.1	13 25.1	+45.4	90.4	13 24.5	+46.1	90.6	13 23.8	+46.8	90.9	10
11	14 05.6	+41.6	88.4	14 07.1	+42.3	88.7	14 08.3	+43.1	88.9	14 09.3	+43.9	89.2	14 10.0	+44.6	89.5	14 10.5	+45.3	89.7	14 10.6	+46.0	90.0	14 10.6	+46.6	90.2	11
12	14 47.2	+41.4	87.7	14 49.4	+42.2	88.0	14 51.4	+43.0	88.2	14 53.2	+43.7	88.5	14 54.6	+44.4	88.8	14 55.8	+45.1	89.0	14 56.6	+45.9	89.3	14 57.2	+46.6	89.6	12
13	15 28.6	+41.3	86.9	15 31.6	+42.1	87.2	15 34.4	+42.8	87.5	15 36.9	+43.5	87.8	15 39.0	+44.4	88.1	15 40.9	+45.1	88.3	15 42.5	+45.8	88.6	15 43.8	+46.5	88.9	13
14	16 09.9	+41.1	86.2	16 13.7	+41.9	86.5	16 17.2	+42.7	86.8	16 20.4	+43.5	87.1	16 23.4	+44.1	87.4	16 26.0	+44.9	87.7	16 28.3	+45.6	88.0	16 30.3	+46.3	88.2	14
15	16 51.0	+40.9	85.4	16 55.6	+41.7	85.7	16 59.9	+42.5	86.0	17 03.9	+43.2	86.3	17 07.5	+44.1	86.7	17 10.9	+44.7	87.0	17 13.9	+45.5	87.3	17 16.6	+46.2	87.6	15
16	17 31.9	+40.8	84.7	17 37.3	+41.6	85.0	17 42.4	+42.3	85.3	17 47.1	+43.2	85.6	17 51.6	+43.8	85.9	17 55.6	+44.6	86.3	17 59.4	+45.3	86.6	18 02.8	+46.0	86.9	16
17	18 12.7	+40.5	83.9	18 18.9	+41.4	84.2	18 24.7	+42.2	84.6	18 30.3	+42.9	84.9	18 35.4	+43.7	85.2	18 40.2	+44.5	85.6	18 44.7	+45.2	85.9	18 48.8	+45.9	86.2	17
18	18 53.2	+40.4	83.1	19 00.3	+41.1	83.5	19 06.9	+42.0	83.8	19 13.2	+42.8	84.2	19 19.1	+43.6	84.5	19 24.7	+44.3	84.8	19 29.9	+45.0	85.2	19 34.7	+45.8	85.6	18
19	19 33.6	+40.2	82.3	19 41.4	+41.0	82.7	19 48.9	+41.8	83.0	19 56.0	+42.5	83.4	20 02.7	+43.3	83.8	20 09.0	+44.1	84.1	20 14.9	+44.9	84.5	20 20.5	+45.6	84.9	19
20	20 13.8	+40.0	81.5	20 22.4	+40.8	81.9	20 30.7	+41.6	82.3	20 38.5	+42.4	82.7	20 46.0	+43.2	83.0	20 53.1	+43.9	83.4	20 59.8	+44.7	83.8	21 06.1	+45.4	84.2	20
21	20 53.8	+39.7	80.8	21 03.2	+40.6	81.1	21 12.3	+41.3	81.5	21 20.9	+42.2	81.9	21 29.2	+42.9	82.3	21 37.0	+43.8	82.7	21 44.5	+44.5	83.1	21 51.5	+45.2	83.5	21
22	21 33.5	+39.5	79.9	21 43.8	+40.3	80.3	21 53.6	+41.2	80.7	22 03.1	+41.9	81.1	22 12.1	+42.8	81.5	22 20.8	+43.5	81.9	22 29.0	+44.3	82.3	22 36.7	+45.1	82.8	22
23	22 13.0	+39.3	79.1	22 24.1	+40.1	79.5	22 34.8	+40.9	79.9	22 45.0	+41.8	80.4	22 54.9	+42.5	80.8	23 04.3	+43.3	81.2	23 13.3	+44.0	81.6	23 21.8	+44.8	82.0	23
24	22 52.3	+39.0	78.3	23 04.2	+39.8	78.7	23 15.7	+40.7	79.2	23 26.8	+41.5	79.6	23 37.4	+42.3	80.0	23 47.6	+43.1	80.4	23 57.3	+43.9	80.9	24 06.6	+44.7	81.3	24
25	23 31.3	+38.7	77.5	23 44.0	+39.6	77.9	23 56.4	+40.4	78.4	24 08.3	+41.2	78.8	24 19.7	+42.1	79.2	24 30.7	+42.9	79.7	24 41.2	+43.7	80.1	24 51.3	+44.4	80.6	25
26	24 10.0	+38.5	76.7	24 23.6	+39.4	77.1	24 36.8	+40.2	77.5	24 49.5	+41.0	78.0	25 01.8	+41.9	78.4	25 13.6	+42.6	78.9	25 24.9	+43.4	79.4	25 35.7	+44.2	79.8	26
27	24 48.5	+38.2	75.8	25 03.0	+39.0	76.3	25 17.0	+39.9	76.7	25 30.5	+40.7	77.2	25 43.6	+41.5	77.7	25 56.2	+42.3	78.1	26 08.3	+43.1	78.6	26 19.9	+43.9	79.1	27
28	25 26.7	+37.9	75.0	25 42.0	+38.7	75.4	25 56.9	+39.5	75.9	26 11.2	+40.5	76.4	26 25.1	+41.3	76.8	26 38.5	+42.1	77.3	26 51.4	+43.0	77.8	27 03.8	+43.7	78.3	28
29	26 04.5	+37.6	74.1	26 20.7	+38.5	74.6	26 36.5	+39.3	75.1	26 51.7	+40.1	75.5	27 06.4	+41.0	76.0	27 20.6	+41.9	76.5	27 34.4	+42.6	77.0	27 47.5	+43.5	77.6	29
30	26 42.1	+37.3	73.2	26 59.2	+38.1	73.7	27 15.8	+39.0	74.2	27 31.8	+39.9	74.7	27 47.4	+40.7	75.2	28 02.5	+41.5	75.7	28 17.0	+42.4	76.2	28 31.0	+43.2	76.8	30
31	27 19.4	+36.9	72.4	27 37.3	+37.8	72.8	27 54.8	+38.6	73.4	28 11.7	+39.5	73.9	28 28.1	+40.4	74.4	28 44.0	+41.2	74.9	28 59.4	+42.0	75.4	29 14.2	+42.9	76.0	31
32	27 56.3	+36.6	71.5	28 15.1	+37.5	72.0	28 33.4	+38.4	72.5	28 51.2	+39.2	73.0	29 08.5	+40.1	73.5	29 25.2	+41.0	74.1	29 41.4	+41.8	74.6	29 57.1	+42.5	75.2	32
33	28 32.9	+36.2	70.6	28 52.6	+37.1	71.1	29 11.8	+38.0	71.6	29 30.4	+38.9	72.1	29 48.6	+39.7	72.7	30 06.2	+40.5	73.2	30 23.2	+41.4	73.8	30 39.6	+42.3	74.4	33
34	29 09.1	+35.8	69.7	29 29.7	+36.7	70.2	29 49.8	+37.6	70.7	30 09.3	+38.5	71.3	30 28.3	+39.4	71.8	30 46.7	+40.3	72.4	31 04.6	+41.1	72.9	31 21.9	+42.0	73.5	34
35	29 44.9	+35.4	68.7	30 06.4	+36.4	69.3	30 27.4	+37.2	69.8	30 47.8	+38.1	70.4	31 07.7	+39.0	70.9	31 27.0	+39.9	71.5	31 45.7	+40.8	72.1	32 03.9	+41.6	72.7	35
36	30 20.3	+35.1	67.8	30 42.8	+35.9	68.3	31 04.6	+36.9	68.9	31 25.9	+37.8	69.5	31 46.7	+38.7	70.0	32 06.9	+39.5	70.6	32 26.5	+40.4	71.2	32 45.5	+41.3	71.8	36
37	30 55.4	+34.6	66.9	31 18.7	+35.6	67.4	31 41.5	+36.4	68.0	32 03.7	+37.4	68.6	32 25.4	+38.2	69.1	32 46.4	+39.2	69.7	33 06.9	+40.0	70.4	33 26.8	+40.9	71.0	37
38	31 30.0	+34.2	65.9	31 54.3	+35.1	66.5	32 17.9	+36.1	67.0	32 41.1	+36.9	67.6	33 03.6	+37.9	68.2	33 25.6	+38.7	68.8	33 46.9	+39.7	69.5	34 07.7	+40.5	70.1	38
39	32 04.2	+33.8	64.9	32 29.4	+34.7	65.5	32 54.0	+35.6	66.1	33 18.0	+36.5	66.7	33 41.5	+37.4	67.3	34 04.3	+38.3	67.9	34 26.6	+39.2	68.6	34 48.2	+40.1	69.2	39
40	32 38.0	+33.3	64.0	33 04.1	+34.2	64.5	33 29.6	+35.1	65.1	33 54.5	+36.1	65.7	34 18.9	+37.0	66.4	34 42.6	+37.9	67.0	35 05.8	+38.8	67.6	35 28.3	+39.7	68.3	40
41	33 11.3	+32.8	63.0	33 38.3	+33.7	63.6	34 04.7	+34.7	64.2	34 30.6	+35.6	64.8	34 55.9	+36.5	65.5	35 20.5	+37.5	66.0	35 44.6	+38.3	66.7	36 08.0	+39.3	67.4	41
42	33 44.1	+32.3	62.0	34 12.0	+33.3	62.6	34 39.4	+34.2	63.2	35 06.2	+35.1	63.8	35 32.4	+36.0	64.4	35 58.0	+37.0	65.1	36 22.9	+37.9	65.7	36 47.3	+38.8	66.4	42
43	34 16.4	+31.8	60.9	34 45.3	+32.7	61.5	35 13.6	+33.7	62.2	35 41.3	+34.6	62.8	36 08.4	+35.6	63.4	36 35.0	+36.5	64.1	37 00.8	+37.5	64.8	37 26.1	+38.3	65.5	43
44	34 48.2	+31.3	59.9	35 18.0	+32.3	60.5	35 47.3	+33.1	61.1	36 15.9	+34.1	61.8	36 44.0	+35.0	62.4	37 11.5	+35.9	63.1	37 38.3	+36.9	63.8	38 04.4	+37.9	64.5	44
45	35 19.5	+30.8	58.9	35 50.3	+31.6	59.5	36 20.4	+32.7	60.1	36 50.0	+33.6	60.8	37 19.0	+34.6	61.4	37 47.4	+35.5	62.1	38 15.2	+36.4	62.8	38 42.3	+37.3	63.5	45
46	35 50.3	+30.1	57.8	36 21.9	+31.2	58.4	36 53.1	+32.0	59.1	37 23.6	+33.0	59.7	37 53.6	+33.9	60.4	38 22.9	+34.9	61.1	38 51.6	+35.9	61.8	39 19.6	+36.9	62.5	46
47	36 20.4	+29.6	56.7	36 53.1	+30.5	57.4	37 25.1	+31.5	58.0	37 56.6	+32.4	58.7	38 27.5	+33.4	59.3	38 57.8	+34.4	60.0	39 27.5	+35.3	60.7	39 56.5	+36.2	61.5	47
48	36 50.0	+29.0	55.7	37 23.6	+30.0	56.3	37 56.6	+30.9	56.9	38 29.1	+31.8	57.6	39 00.9	+32.8	58.3	39 32.2	+33.7	59.0	40 02.8	+34.7	59.7	40 32.7	+35.7	60.4	48
49	37 19.0	+28.4	54.6	37 53.6	+29.3	55.2	38 27.5	+30.3	55.8	39 00.9	+31.3	56.5	39 33.7	+32.2	57.2	40 05.9	+33.2	57.9	40 37.5	+34.1	58.6	41 08.4	+35.1	59.4	49
50	37 47.4	+27.8	53.5	38 22.9	+28.7	54.1	38 57.8	+29.7	54.7	39 32.2	+30.6	55.4	40 05.9	+31.6	56.1	40 39.1	+32.5	56.8	41 11.6	+33.5	57.5	41 43.5	+34.5	58.3	50
51	38 15.2	+27.1	52.3	38 51.6	+28.0	53.0	39 27.5	+29.0	53.6	40 02.8	+29.9	54.3	40 37.5	+30.9	55.0	41 11.6	+31.9	55.7	41 45.1	+32.9	56.4	42 18.0	+33.8	57.2	51
52	38 42.3	+26.4	51.2	39 19.6	+27.4	51.8	39 56.5	+28.3	52.5	40 32.7	+29.3	53.2	41 08.4	+30.2	53.8	41 43.5	+31.2	54.6	42 18.0	+32.2	55.3	42 51.8	+33.2	56.1	52
53	39 08.7	+25.8	50.0	39 47.0	+26.7	50.7	40 24.8	+27.6	51.3	41 02.0	+28.6	52.0	41 38.6	+29.6	52.7	42 14.7	+30.5	53.4	42 50.2	+31.4	54.2	43 25.0	+32.4	54.9	53
54	39 34.5	+25.0	48.9	40 13.7	+25.9	49.5	40 52.4	+26.9	50.2	41 30.6	+27.8	50.8	42 08.2	+28.8	51.5	42 45.2	+29.8	52.2	43 21.6	+30.8	53.0	43 57.4	+31.8	53.8	54
55	39 59.5	+24.3	47.7	40 39.6	+25.3	48.3	41 19.3	+26.1	49.0	41 58.4	+27.1	49.6	42 37.0	+28.1	50.3	43 15.0	+29.0	51.1	43 52.4	+30.0	51.8	44 29.2	+31.0	52.6	55
56	40 23.8	+23.5	46.5	41 04.9	+24.4	47.1	41 45.4	+25.4	47.8	42 25.5	+26.4	48.4	43 05.1	+27.2	49.1	43 44.0	+28.3	49.9	44 22.4	+29.3	50.6	45 00.2	+30.2	51.4	56
57	40 47.3	+22.8	45.3	41 29.3	+23.7	45.9	42 10.8	+24.7	46.5	42 51.9	+25.5	47.2	43 32.3	+26.5	47.9	44 12.3	+27.4	48.6	44 51.7	+28.4	49.4	45 30.4	+29.4	50.1	57
58	41 10.1	+22.0	44.1	41 53.0	+22.9	44.7	42 35.5	+23.8	45.3	43 17.4	+24.7	46.0	43 58.8	+25.7	46.7	44 39.7	+26.7	47.4	45 20.1	+27.6	48.1	45 59.8	+28.6	48.9	58
59	41 32.1	+21.2	42.8	42 15.9	+22.1	43.4	42 59.3	+23.0	44.1	43 42.1	+23.9	44.7	44 24.5	+24.8	45.4	45 06.4	+25.8	46.1	45 47.7	+26.7	46.9	46 28.4	+27.7	47.6	59
60	41 53.3	+20.4	41.6	42 38.0	+21.2	42.2	43 22.2	+22.2	42.8	44 06.0	+23.1	43.4	44 49.3	+24.0	44.1	45 32.2	+24.9	44.8	46 14.4	+25.9	45.6	46 56.2	+26.8	46.3	60
61	42 13.7	+19.5	40.3	42 59.2	+20.4	40.9	43 44.4	+21.2	41.5	44 29.1	+22.1	42.2	45 13.3	+23.1	42.8	45 57.1	+24.0	43.5	46 40.3	+25.0	44.3	47 23.0	+25.9	45.0	61
62	42 33.2	+18.6	39.0	43 19.6	+19.5	39.6	44 05.6	+20.4	40.2	44 51.2	+21.3	40.9	45 36.4	+22.1	41.5	46 21.1	+23.0	42.2	47 05.3	+24.0	42.9	47 49.0	+25.0	43.7	62
63	42 51.8	+17.8	37.7	43 39.1	+18.6	38.3	44 26.0	+19.4	38.9	45 12.5	+20.3	39.5	45 58.5	+21.2	40.2	46 44.1	+22.2	40.9	47 29.3	+23.0	41.6	48 13.9	+24.0	42.3	63
64	43 09.6	+16.8	36.4	43 57.7	+17.7	37.0	44 45.4	+18.6	37.6	45 32.8	+19.4	38.2	46 19.7	+20.3	38.8	47 06.3	+21.1	39.5	47 52.3	+22.1	40.2	48 37.9	+23.0	40.9	64
65	43 26.4	+16.0	35.1	44 15.4	+16.7	35.6	45 04.0	+17.6	36.2	45 52.2	+18.4	36.8	46 40.0	+19.3	37.4	47 27.4	+20.1	38.1	48 14.4	+21.0	38.8	49 00.9	+22.0	39.5	65
66	43 42.4	+15.0	33.8	44 32.1	+15.8	34.3	45 21.5	+16.6	34.9	46 10.6	+17.4	35.5	46 59.3	+18.2	36.1	47 47.5	+19.1	36.7	48 35.4	+20.0	37.4	49 22.9	+20.9	38.1	66
67	43 57.4	+14.1	32.4	44 47.9	+14.8	32.9	45 38.1	+15.6	33.5	46 28.0	+16.4	34.1	47 17.5	+17.2	34.7	48 06.6	+18.1	35.3	48 55.4	+18.9	36.0	49 43.8	+19.8	36.7	67
68	44 11.5	+13.1	31.1	45 02.7	+13.9	31.6	45 53.7	+14.6	32.1	46 44.4	+15.3	32.7	47 34.7	+16.2	33.3	48 24.7	+17.0	33.9	49 14.3	+17.8	34.5	50 03.6	+18.6	35.2	68
69	44 24.6	+12.1	29.7	45 16.6	+12.8	30.2	46 08.3	+13.5	30.7	46 59.7	+14.3	31.3	47 50.9	+15.0	31.8	48 41.7	+15.8	32.4	49 32.1	+16.7	33.1	50 22.2	+17.6	33.7	69
70	44 36.7	+11.1	28.3	45 29.4	+11.8	28.8	46 21.8	+12.5	29.3	47 14.0	+13.2	29.8	48 05.9	+14.0	30.4	48 57.5	+14.8	31.0	49 48.8	+15.6	31.6	50 39.8	+16.3	32.2	70
71	44 47.8	+10.1	26.9	45 41.2	+10.8	27.4	46 34.3	+11.5	27.9	47 27.2	+12.2	28.4	48 19.9	+12.9	28.9	49 12.3	+13.6	29.5	50 04.4	+14.3	30.1	50 56.1	+15.2	30.7	71
72	44 57.9	+9.1	25.6	45 52.0	+9.7	26.0	46 45.8	+10.4	26.5	47 39.4	+11.0	26.9	48 32.8	+11.7	27.5	49 25.9	+12.4	28.0	50 18.7	+13.2	28.6	51 11.3	+13.9	29.1	72
73	45 07.0	+8.1	24.2	46 01.7	+8.6	24.6	46 56.2	+9.2	25.0	47 50.4	+9.9	25.5	48 44.5	+10.5	26.0	49 38.3	+11.2	26.5	50 31.9	+11.9	27.0	51 25.2	+12.7	27.6	73
74	45 15.1	+7.0	22.8	46 10.3	+7.6	23.1	47 05.4	+8.2	23.6	48 00.3	+8.8	24.0	48 55.0	+9.4	24.5	49 49.5	+10.1	25.0	50 43.8	+10.7	25.5	51 37.9	+11.4	26.0	74
75	45 22.1	+6.0	21.3	46 17.9	+6.5	21.7	47 13.6	+7.1	22.1	48 09.1	+7.6	22.5	49 04.4	+8.3	23.0	49 59.6	+8.8	23.4	50 54.5	+9.5	23.9	51 49.3	+10.1	24.4	75
76	45 28.1	+4.9	19.9	46 24.4	+5.5	20.3	47 20.7	+5.9	20.6	48 16.7	+6.5	21.0	49 12.7	+7.0	21.5	50 08.4	+7.6	21.9	51 04.0	+8.2	22.3	51 59.4	+8.8	22.8	76
77	45 33.0	+3.9	18.5	46 29.9	+4.3	18.8	47 26.6	+4.8	19.2	48 23.2	+5.3	19.5	49 19.7	+5.8	19.9	50 16.0	+6.4	20.3	51 12.2	+6.9	20.8	52 08.2	+7.5	21.2	77
78	45 36.9	+2.8	17.1	46 34.2	+3.2	17.4	47 31.4	+3.7	17.7	48 28.5	+4.1	18.0	49 25.5	+4.6	18.4	50 22.4	+5.1	18.8	51 19.1	+5.6	19.2	52 15.7	+6.2	19.6	78
79	45 39.7	+1.7	15.6	46 37.4	+2.1	15.9	47 35.1	+2.5	16.2	48 32.6	+3.0	16.5	49 30.1	+3.4	16.9	50 27.5	+3.8	17.2	51 24.7	+4.3	17.6	52 21.9	+4.8	18.0	79
80	45 41.4	+0.7	14.2	46 39.5	+1.0	14.5	47 37.6	+1.4	14.7	48 35.6	+1.7	15.0	49 33.5	+2.2	15.3	50 31.3	+2.6	15.7	51 29.0	+3.0	16.0	52 26.7	+3.4	16.3	80
81	45 42.1	−0.5	12.8	46 40.5	−0.1	13.0	47 39.0	+0.2	13.3	48 37.3	+0.6	13.5	49 35.7	+0.9	13.8	50 33.9	+1.3	14.1	51 32.0	+1.7	14.4	52 30.1	+2.1	14.7	81
82	45 41.6	−1.4	11.3	46 40.4	−1.2	11.6	47 39.2	−0.9	11.8	48 37.9	−0.6	12.0	49 36.6	−0.3	12.2	50 35.2	0.0	12.5	51 33.7	+0.4	12.8	52 32.2	+0.7	13.1	82
83	45 40.2	−2.6	9.9	46 39.2	−2.3	10.1	47 38.3	−2.1	10.3	48 37.3	−1.8	10.5	49 36.3	−1.5	10.7	50 35.2	−1.2	10.9	51 34.1	−0.9	11.2	52 32.9	−0.6	11.4	83
84	45 37.6	−3.6	8.5	46 36.9	−3.4	8.6	47 36.2	−3.2	8.8	48 35.5	−2.9	9.0	49 34.8	−2.8	9.2	50 34.0	−2.5	9.4	51 33.2	−2.3	9.6	52 32.3	−2.0	9.8	84
85	45 34.0	−4.7	7.1	46 33.5	−4.5	7.2	47 33.0	−4.3	7.3	48 32.5	−4.2	7.5	49 32.0	−4.0	7.6	50 31.5	−3.8	7.8	51 30.9	−3.6	8.0	52 30.3	−3.4	8.1	85
86	45 29.3	−5.8	5.6	46 29.0	−5.7	5.7	47 28.7	−5.5	5.9	48 28.3	−5.3	6.0	49 28.0	−5.2	6.1	50 27.7	−5.1	6.2	51 27.3	−4.9	6.3	52 26.9	−4.7	6.5	86
87	45 23.5	−6.8	4.2	46 23.3	−6.7	4.3	47 23.2	−6.6	4.4	48 23.0	−6.5	4.5	49 22.8	−6.4	4.6	50 22.6	−6.3	4.6	51 22.4	−6.2	4.7	52 22.2	−6.1	4.9	87
88	45 16.7	−7.8	2.8	46 16.6	−7.7	2.9	47 16.6	−7.8	2.9	48 16.5	−7.7	3.0	49 16.4	−7.6	3.0	50 16.3	−7.5	3.1	51 16.2	−7.4	3.2	52 16.1	−7.4	3.2	88
89	45 08.9	−8.9	1.4	46 08.9	−8.9	1.4	47 08.8	−8.8	1.5	48 08.8	−8.8	1.5	49 08.8	−8.8	1.5	50 08.8	−8.8	1.5	51 08.8	−8.8	1.6	52 08.7	−8.7	1.6	89
90	45 00.0	−9.9	0.0	46 00.0	−9.9	0.0	47 00.0	−9.9	0.0	48 00.0	−10.0	0.0	49 00.0	−10.0	0.0	50 00.0	−10.0	0.0	51 00.0	−10.0	0.0	52 00.0	−10.0	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	6 21.0	−42.7	96.4	6 14.3	−43.4	96.5	6 07.5	−44.2	96.6	6 00.5	−44.9	96.7	5 53.4	−45.5	96.8	5 46.3	−46.3	96.9	5 39.0	−46.9	97.0	5 31.6	−47.5	97.1	0
1	5 38.3	−42.7	97.1	5 30.9	−43.5	97.2	5 23.3	−44.2	97.3	5 15.6	−44.9	97.4	5 07.9	−45.6	97.5	5 00.0	−46.2	97.6	4 52.1	−46.9	97.6	4 44.1	−47.6	97.7	1
2	4 55.6	−42.8	97.8	4 47.4	−43.6	97.9	4 39.1	−44.2	98.0	4 30.7	−44.9	98.0	4 22.3	−45.6	98.1	4 13.8	−46.3	98.2	4 05.2	−46.9	98.3	3 56.5	−47.5	98.3	2
3	4 12.8	−42.9	98.5	4 03.8	−43.5	98.6	3 54.9	−44.3	98.6	3 45.7	−44.9	98.7	3 36.7	−45.7	98.8	3 27.5	−46.3	98.8	3 18.3	−47.0	98.9	3 09.0	−47.6	98.9	3
4	3 29.9	−42.9	99.2	3 20.3	−43.6	99.3	3 10.6	−44.3	99.3	3 00.8	−44.9	99.4	2 51.0	−45.6	99.4	2 41.2	−46.3	99.5	2 31.3	−47.0	99.5	2 21.4	−47.7	99.6	4
5	2 47.0	−42.9	99.9	2 36.7	−43.6	100.0	2 26.3	−44.3	100.0	2 15.9	−45.1	100.0	2 05.4	−45.7	100.1	1 54.9	−46.4	100.1	1 44.3	−47.0	100.1	1 33.7	−47.6	100.2	5
6	2 04.1	−42.9	100.6	1 53.1	−43.7	100.6	1 42.0	−44.4	100.7	1 30.8	−45.0	100.7	1 19.7	−45.7	100.7	1 08.5	−46.3	100.7	0 57.3	−47.0	100.8	0 46.1	−47.6	100.8	6
7	1 21.2	−42.8	101.3	1 09.4	−43.6	101.3	0 57.6	−44.3	101.3	0 45.8	−45.0	101.4	0 34.0	−45.7	101.4	0 22.2	−46.4	101.4	0 10.3	−47.0	101.4	0 01.5	−47.6	78.6	7
8	0 38.3	−43.0	102.0	0 25.8	−43.7	102.0	0 13.3	−44.4	102.0	0 00.8	−45.0	102.0	0 11.7	+45.7	78.0	0 24.2	+46.3	78.0	0 36.7	+47.0	78.0	0 49.1	+47.7	78.0	8
9	0 04.7	+42.9	77.3	0 17.9	+43.6	77.3	0 31.1	+44.3	77.3	0 44.2	+45.1	77.3	0 57.4	+45.7	77.3	1 10.5	+46.4	77.4	1 23.7	+47.0	77.4	1 36.8	+47.6	77.4	9
10	0 47.6	+43.0	76.6	1 01.5	+43.7	76.6	1 15.4	+44.3	76.6	1 29.3	+45.0	76.7	1 43.1	+45.7	76.7	1 56.9	+46.3	76.7	2 10.7	+46.9	76.8	2 24.4	+47.6	76.8	10
11	1 30.6	+42.9	75.9	1 45.2	+43.6	75.9	1 59.7	+44.3	76.0	2 14.3	+45.0	76.0	2 28.8	+45.6	76.0	2 43.2	+46.3	76.1	2 57.6	+47.0	76.1	3 12.0	+47.6	76.2	11
12	2 13.5	+42.9	75.2	2 28.8	+43.6	75.2	2 44.0	+44.3	75.3	2 59.3	+44.9	75.3	3 14.4	+45.7	75.4	3 29.5	+46.3	75.4	3 44.6	+46.9	75.5	3 59.6	+47.5	75.6	12
13	2 56.4	+42.9	74.5	3 12.4	+43.6	74.6	3 28.3	+44.3	74.6	3 44.2	+45.0	74.7	4 00.1	+45.6	74.7	4 15.8	+46.3	74.8	4 31.5	+46.9	74.9	4 47.1	+47.5	75.0	13
14	3 39.3	+42.8	73.8	3 56.0	+43.5	73.9	4 12.6	+44.2	73.9	4 29.2	+44.9	74.0	4 45.7	+45.5	74.1	5 02.1	+46.2	74.2	5 18.4	+46.9	74.3	5 34.6	+47.5	74.3	14
15	4 22.1	+42.8	73.1	4 39.5	+43.5	73.2	4 56.8	+44.2	73.3	5 14.1	+44.8	73.3	5 31.2	+45.5	73.4	5 48.3	+46.2	73.5	6 05.3	+46.8	73.6	6 22.1	+47.4	73.7	15
16	5 04.9	+42.8	72.4	5 23.0	+43.5	72.5	5 41.0	+44.1	72.6	5 58.9	+44.8	72.7	6 16.7	+45.5	72.8	6 34.5	+46.1	72.9	6 52.1	+46.7	73.0	7 09.5	+47.4	73.1	16
17	5 47.7	+42.7	71.7	6 06.5	+43.4	71.8	6 25.1	+44.1	71.9	6 43.7	+44.8	72.0	7 02.2	+45.4	72.1	7 20.6	+46.0	72.2	7 38.8	+46.7	72.4	7 56.9	+47.4	72.5	17
18	6 30.4	+42.6	71.0	6 49.9	+43.3	71.1	7 09.2	+44.1	71.2	7 28.5	+44.7	71.3	7 47.6	+45.4	71.5	8 06.6	+46.1	71.6	8 25.5	+46.7	71.7	8 44.3	+47.2	71.9	18
19	7 13.0	+42.6	70.3	7 33.2	+43.3	70.4	7 53.3	+43.9	70.5	8 13.2	+44.6	70.7	8 33.0	+45.3	70.8	8 52.7	+45.9	70.9	9 12.2	+46.5	71.1	9 31.5	+47.2	71.3	19
20	7 55.6	+42.5	69.6	8 16.5	+43.2	69.7	8 37.2	+43.9	69.8	8 57.8	+44.6	70.0	9 18.3	+45.2	70.1	9 38.6	+45.9	70.3	9 58.7	+46.6	70.5	10 18.7	+47.2	70.6	20
21	8 38.1	+42.4	68.9	8 59.7	+43.1	69.0	9 21.1	+43.8	69.1	9 42.4	+44.4	69.3	10 03.5	+45.1	69.5	10 24.5	+45.7	69.6	10 45.3	+46.4	69.8	11 05.9	+47.0	70.0	21
22	9 20.5	+42.4	68.1	9 42.8	+43.0	68.3	10 04.9	+43.7	68.5	10 26.8	+44.4	68.6	10 48.6	+45.1	68.8	11 10.2	+45.7	69.0	11 31.7	+46.3	69.2	11 52.9	+47.0	69.4	22
23	10 02.9	+42.2	67.4	10 25.8	+43.0	67.6	10 48.6	+43.6	67.8	11 11.2	+44.3	67.9	11 33.7	+44.9	68.1	11 55.9	+45.6	68.3	12 18.0	+46.3	68.5	12 39.9	+46.9	68.7	23
24	10 45.1	+42.2	66.7	11 08.8	+42.8	66.9	11 32.2	+43.6	67.1	11 55.5	+44.2	67.3	12 18.6	+44.9	67.4	12 41.5	+45.6	67.7	13 04.3	+46.1	67.9	13 26.8	+46.7	68.1	24
25	11 27.3	+42.0	66.0	11 51.6	+42.7	66.2	12 15.8	+43.4	66.4	12 39.7	+44.1	66.6	13 03.5	+44.7	66.8	13 27.1	+45.4	67.0	13 50.4	+46.0	67.2	14 13.5	+46.7	67.4	25
26	12 09.3	+41.9	65.2	12 34.3	+42.6	65.4	12 59.2	+43.3	65.6	13 23.8	+44.0	65.9	13 48.2	+44.7	66.1	14 12.5	+45.2	66.3	14 36.4	+46.0	66.5	15 00.2	+46.6	66.8	26
27	12 51.2	+41.8	64.5	13 16.9	+42.5	64.7	13 42.5	+43.1	64.9	14 07.8	+43.8	65.2	14 32.9	+44.5	65.4	14 57.7	+45.2	65.6	15 22.4	+45.8	65.9	15 46.8	+46.4	66.1	27
28	13 33.0	+41.7	63.8	13 59.4	+42.4	64.0	14 25.6	+43.1	64.2	14 51.6	+43.7	64.5	15 17.4	+44.4	64.7	15 42.9	+45.0	65.0	16 08.2	+45.7	65.2	16 33.2	+46.3	65.5	28
29	14 14.7	+41.5	63.0	14 41.8	+42.2	63.3	15 08.7	+42.9	63.5	15 35.3	+43.6	63.7	16 01.8	+44.2	64.0	16 27.9	+44.9	64.3	16 53.9	+45.5	64.5	17 19.5	+46.2	64.8	29
30	14 56.2	+41.4	62.3	15 24.0	+42.1	62.5	15 51.6	+42.7	62.8	16 18.9	+43.4	63.0	16 46.0	+44.1	63.3	17 12.8	+44.8	63.6	17 39.4	+45.4	63.9	18 05.7	+46.1	64.1	30
31	15 37.6	+41.2	61.5	16 06.1	+41.9	61.8	16 34.3	+42.6	62.0	17 02.3	+43.3	62.3	17 30.1	+43.9	62.6	17 57.6	+44.6	62.9	18 24.8	+45.3	63.2	18 51.8	+45.9	63.5	31
32	16 18.8	+41.1	60.8	16 48.0	+41.8	61.0	17 16.9	+42.5	61.3	17 45.6	+43.1	61.6	18 14.0	+43.8	61.9	18 42.2	+44.4	62.2	19 10.1	+45.1	62.5	19 37.7	+45.7	62.8	32
33	16 59.9	+40.9	60.0	17 29.8	+41.6	60.3	17 59.4	+42.3	60.6	18 28.7	+43.0	60.9	18 57.8	+43.6	61.1	19 26.6	+44.3	61.5	19 55.2	+44.9	61.8	20 23.4	+45.6	62.1	33
34	17 40.8	+40.7	59.3	18 11.4	+41.4	59.5	18 41.7	+42.1	59.8	19 11.7	+42.8	60.1	19 41.4	+43.5	60.4	20 10.9	+44.1	60.7	20 40.1	+44.8	61.1	21 09.0	+45.4	61.4	34
35	18 21.5	+40.6	58.5	18 52.8	+41.2	58.8	19 23.8	+41.9	59.1	19 54.5	+42.5	59.4	20 24.9	+43.2	59.7	20 55.0	+43.9	60.0	21 24.9	+44.5	60.3	21 54.4	+45.2	60.7	35
36	19 02.1	+40.3	57.7	19 34.0	+41.0	58.0	20 05.7	+41.7	58.3	20 37.0	+42.4	58.6	21 08.1	+43.1	58.9	21 38.9	+43.8	59.3	22 09.4	+44.4	59.6	22 39.6	+45.0	60.0	36
37	19 42.4	+40.1	56.9	20 15.0	+40.8	57.2	20 47.4	+41.5	57.5	21 19.4	+42.2	57.9	21 51.2	+42.9	58.2	22 22.7	+43.5	58.5	22 53.8	+44.2	58.9	23 24.6	+44.9	59.3	37
38	20 22.5	+39.9	56.1	20 55.8	+40.6	56.4	21 28.9	+41.3	56.8	22 01.6	+42.0	57.1	22 34.1	+42.6	57.4	23 06.2	+43.3	57.8	23 38.0	+44.0	58.2	24 09.5	+44.6	58.5	38
39	21 02.4	+39.7	55.3	21 36.4	+40.4	55.6	22 10.2	+41.0	56.0	22 43.6	+41.7	56.3	23 16.7	+42.4	56.7	23 49.5	+43.1	57.0	24 22.0	+43.7	57.4	24 54.1	+44.4	57.8	39
40	21 42.1	+39.5	54.5	22 16.8	+40.2	54.9	22 51.2	+40.8	55.2	23 25.3	+41.5	55.5	23 59.1	+42.2	55.9	24 32.6	+42.8	56.3	25 05.7	+43.5	56.7	25 38.5	+44.2	57.1	40
41	22 21.6	+39.2	53.7	22 57.0	+39.9	54.0	23 32.0	+40.6	54.4	24 06.8	+41.3	54.8	24 41.3	+41.9	55.1	25 15.4	+42.6	55.5	25 49.2	+43.3	55.9	26 22.7	+43.9	56.3	41
42	23 00.8	+38.9	52.9	23 36.9	+39.6	53.2	24 12.6	+40.3	53.6	24 48.1	+41.0	54.0	25 23.2	+41.7	54.3	25 58.0	+42.4	54.7	26 32.5	+43.0	55.1	27 06.6	+43.7	55.5	42
43	23 39.7	+38.7	52.1	24 16.5	+39.4	52.4	24 52.9	+40.1	52.8	25 29.1	+40.7	53.2	26 04.9	+41.4	53.5	26 40.4	+42.1	53.9	27 15.5	+42.8	54.3	27 50.3	+43.5	54.8	43
44	24 18.4	+38.4	51.2	24 55.9	+39.0	51.6	25 33.0	+39.8	52.0	26 09.8	+40.5	52.3	26 46.3	+41.1	52.7	27 22.5	+41.8	53.1	27 58.3	+42.5	53.6	28 33.8	+43.1	54.0	44
45	24 56.8	+38.1	50.4	25 34.9	+38.8	50.7	26 12.8	+39.4	51.1	26 50.3	+40.1	51.5	27 27.4	+40.9	51.9	28 04.3	+41.5	52.3	28 40.8	+42.2	52.8	29 16.9	+42.9	53.2	45
46	25 34.9	+37.9	49.5	26 13.7	+38.5	49.9	26 52.2	+39.2	50.3	27 30.4	+39.9	50.7	28 08.3	+40.5	51.1	28 45.8	+41.2	51.5	29 23.0	+41.9	51.9	29 59.8	+42.6	52.4	46
47	26 12.8	+37.5	48.7	26 52.2	+38.2	49.0	27 31.4	+38.9	49.4	28 10.3	+39.5	49.8	28 48.8	+40.3	50.2	29 27.0	+40.9	50.7	30 04.9	+41.6	51.1	30 42.4	+42.2	51.6	47
48	26 50.3	+37.1	47.8	27 30.4	+37.9	48.2	28 10.3	+38.5	48.6	28 49.8	+39.3	49.0	29 29.1	+39.9	49.4	30 07.9	+40.6	49.8	30 46.5	+41.2	50.3	31 24.6	+41.9	50.7	48
49	27 27.4	+36.9	46.9	28 08.3	+37.5	47.3	28 48.8	+38.2	47.7	29 29.1	+38.8	48.1	30 09.0	+39.5	48.5	30 48.5	+40.3	49.0	31 27.7	+40.9	49.4	32 06.5	+41.6	49.9	49
50	28 04.3	+36.5	46.0	28 45.8	+37.2	46.4	29 27.0	+37.9	46.8	30 07.9	+38.6	47.2	30 48.5	+39.2	47.7	31 28.8	+39.8	48.1	32 08.6	+40.6	48.6	32 48.1	+41.3	49.1	50
51	28 40.8	+36.1	45.1	29 23.0	+36.8	45.5	30 04.9	+37.5	45.9	30 46.5	+38.1	46.3	31 27.7	+38.8	46.8	32 08.6	+39.5	47.2	32 49.2	+40.2	47.7	33 29.4	+40.9	48.2	51
52	29 16.9	+35.8	44.2	29 59.8	+36.4	44.6	30 42.4	+37.0	45.0	31 24.6	+37.8	45.4	32 06.5	+38.5	45.9	32 48.1	+39.2	46.3	33 29.4	+39.8	46.8	34 10.3	+40.5	47.3	52
53	29 52.7	+35.3	43.3	30 36.2	+36.0	43.7	31 19.4	+36.7	44.1	32 02.4	+37.4	44.5	32 45.0	+38.0	45.0	33 27.3	+38.7	45.4	34 09.2	+39.4	46.0	34 50.8	+40.0	46.4	53
54	30 28.0	+35.0	42.3	31 12.2	+35.7	42.7	31 56.1	+36.3	43.2	32 39.8	+36.9	43.6	33 23.0	+37.7	44.0	34 06.0	+38.3	44.5	34 48.6	+39.0	45.0	35 30.8	+39.7	45.5	54
55	31 03.0	+34.5	41.4	31 47.9	+35.1	41.8	32 32.4	+35.9	42.2	33 16.7	+36.5	42.7	34 00.7	+37.2	43.1	34 44.3	+37.9	43.6	35 27.6	+38.6	44.1	36 10.5	+39.3	44.6	55
56	31 37.5	+34.1	40.4	32 23.0	+34.8	40.8	33 08.3	+35.4	41.3	33 53.2	+36.1	41.7	34 37.9	+36.7	42.2	35 22.2	+37.4	42.6	36 06.2	+38.1	43.1	36 49.8	+38.8	43.6	56
57	32 11.6	+33.7	39.5	32 57.8	+34.3	39.9	33 43.7	+35.0	40.3	34 29.3	+35.6	40.7	35 14.6	+36.3	41.2	35 59.6	+37.0	41.7	36 44.3	+37.6	42.2	37 28.6	+38.3	42.7	57
58	32 45.3	+33.2	38.5	33 32.1	+33.8	38.9	34 18.7	+34.5	39.3	35 04.9	+35.2	39.8	35 50.9	+35.8	40.2	36 36.6	+36.4	40.7	37 21.9	+37.1	41.2	38 06.9	+37.8	41.7	58
59	33 18.5	+32.7	37.5	34 05.9	+33.4	37.9	34 53.2	+33.9	38.3	35 40.1	+34.6	38.8	36 26.7	+35.3	39.2	37 13.0	+36.0	39.7	37 59.0	+36.7	40.2	38 44.7	+37.3	40.7	59
60	33 51.2	+32.2	36.5	34 39.3	+32.8	36.9	35 27.1	+33.5	37.3	36 14.7	+34.2	37.8	37 02.0	+34.8	38.2	37 49.0	+35.4	38.7	38 35.7	+36.1	39.2	39 22.0	+36.8	39.7	60
61	34 23.4	+31.7	35.5	35 12.1	+32.4	35.9	36 00.6	+33.0	36.3	36 48.9	+33.5	36.7	37 36.8	+34.2	37.2	38 24.4	+34.9	37.7	39 11.8	+35.5	38.2	39 58.8	+36.2	38.7	61
62	34 55.1	+31.2	34.4	35 44.5	+31.7	34.8	36 33.6	+32.4	35.3	37 22.4	+33.1	35.7	38 11.0	+33.7	36.2	38 59.3	+34.4	36.7	39 47.3	+35.0	37.3	40 35.0	+35.7	37.6	62
63	35 26.3	+30.6	33.4	36 16.2	+31.3	33.8	37 06.0	+31.8	34.2	37 55.5	+32.4	34.6	38 44.7	+33.1	35.1	39 33.7	+33.7	35.6	40 22.3	+34.4	36.1	41 10.7	+35.0	36.6	63
64	35 56.9	+30.0	32.3	36 47.5	+30.6	32.7	37 37.8	+31.3	33.1	38 27.9	+31.9	33.6	39 17.8	+32.5	34.0	40 07.4	+33.1	34.5	40 56.7	+33.8	35.0	41 45.7	+34.5	35.5	64
65	36 26.9	+29.5	31.3	37 18.1	+30.1	31.7	38 09.1	+30.6	32.1	38 59.8	+31.3	32.5	39 50.3	+31.9	32.9	40 40.5	+32.5	33.4	41 30.5	+33.1	33.9	42 20.2	+33.8	34.4	65
66	36 56.4	+28.9	30.2	37 48.2	+29.4	30.6	38 39.7	+30.1	31.0	39 31.1	+30.6	31.4	40 22.2	+31.2	31.8	41 13.0	+31.9	32.3	42 03.6	+32.5	32.8	42 54.0	+33.1	33.3	66
67	37 25.3	+28.2	29.1	38 17.6	+28.8	29.5	39 09.8	+29.4	29.9	40 01.7	+30.0	30.3	40 53.4	+30.6	30.7	41 44.9	+31.2	31.1	42 36.1	+31.8	31.6	43 27.1	+32.4	32.1	67
68	37 53.5	+27.7	28.0	38 46.4	+28.2	28.3	39 39.2	+28.7	28.7	40 31.7	+29.3	29.1	41 24.0	+29.9	29.6	42 16.1	+30.4	30.0	43 07.9	+31.1	30.5	43 59.5	+31.7	30.9	68
69	38 21.2	+26.9	26.8	39 14.6	+27.5	27.2	40 07.9	+28.0	27.6	41 01.0	+28.6	28.0	41 53.9	+29.1	28.4	42 46.5	+29.8	28.8	43 39.0	+30.3	29.3	44 31.2	+30.9	29.8	69
70	38 48.1	+26.3	25.7	39 42.1	+26.8	26.0	40 35.9	+27.4	26.4	41 29.6	+27.8	26.8	42 23.0	+28.5	27.2	43 16.3	+29.0	27.6	44 09.3	+29.6	28.1	45 02.1	+30.2	28.6	70
71	39 14.4	+25.6	24.5	40 08.9	+26.1	24.9	41 03.3	+26.6	25.2	41 57.4	+27.2	25.6	42 51.5	+27.6	26.0	43 45.3	+28.2	26.4	44 38.9	+28.8	26.9	45 32.3	+29.4	27.3	71
72	39 40.0	+24.9	23.4	40 35.0	+25.4	23.7	41 29.9	+25.8	24.0	42 24.6	+26.3	24.4	43 19.1	+26.9	24.8	44 13.5	+27.4	25.2	45 07.7	+28.0	25.6	46 01.7	+28.5	26.1	72
73	40 04.9	+24.1	22.2	41 00.4	+24.6	22.5	41 55.7	+25.1	22.8	42 50.9	+25.6	23.2	43 46.0	+26.1	23.6	44 40.9	+26.6	24.0	45 35.7	+27.1	24.4	46 30.2	+27.7	24.8	73
74	40 29.0	+23.4	21.0	41 25.0	+23.8	21.3	42 20.8	+24.3	21.6	43 16.5	+24.8	22.0	44 12.1	+25.2	22.3	45 07.5	+25.8	22.7	46 02.8	+26.3	23.1	46 57.9	+26.8	23.5	74
75	40 52.4	+22.6	19.8	41 48.8	+23.0	20.1	42 45.1	+23.5	20.4	43 41.3	+23.9	20.7	44 37.3	+24.4	21.0	45 33.3	+24.8	21.4	46 29.1	+25.3	21.8	47 24.7	+25.9	22.2	75
76	41 15.0	+21.8	18.5	42 11.8	+22.2	18.8	43 08.6	+22.6	19.1	44 05.2	+23.1	19.4	45 01.7	+23.5	19.8	45 58.1	+24.0	20.1	46 54.4	+24.4	20.5	47 50.6	+24.9	20.9	76
77	41 36.8	+21.0	17.3	42 34.0	+21.4	17.6	43 31.2	+21.8	17.8	44 28.3	+22.2	18.1	45 25.2	+22.6	18.5	46 22.1	+23.0	18.8	47 18.8	+23.5	19.1	48 15.5	+23.9	19.5	77
78	41 57.8	+20.2	16.0	42 55.4	+20.6	16.3	43 53.0	+20.9	16.6	44 50.5	+21.3	16.8	45 47.8	+21.7	17.1	46 45.1	+22.1	17.4	47 42.3	+22.5	17.8	48 39.4	+22.9	18.1	78
79	42 18.0	+19.3	14.8	43 16.0	+19.6	15.0	44 13.9	+20.0	15.2	45 11.7	+20.4	15.5	46 09.5	+20.7	15.8	47 07.2	+21.1	16.1	48 04.8	+21.5	16.4	49 02.3	+21.9	16.7	79
80	42 37.3	+18.5	13.5	43 35.6	+18.8	13.7	44 33.9	+19.1	13.9	45 32.1	+19.4	14.2	46 30.2	+19.8	14.4	47 28.3	+20.1	14.7	48 26.3	+20.5	15.0	49 24.2	+20.9	15.3	80
81	42 55.8	+17.5	12.2	43 54.4	+17.8	12.4	44 53.0	+18.1	12.6	45 51.5	+18.4	12.8	46 50.0	+18.7	13.1	47 48.4	+19.1	13.3	48 46.8	+19.3	13.6	49 45.1	+19.7	13.8	81
82	43 13.3	+16.7	10.9	44 12.2	+17.0	11.1	45 11.1	+17.2	11.2	46 09.9	+17.5	11.4	47 08.7	+17.7	11.7	48 07.5	+18.0	11.9	49 06.1	+18.3	12.1	50 04.8	+18.6	12.4	82
83	43 30.0	+15.8	9.6	44 29.2	+15.9	9.7	45 28.3	+16.2	9.9	46 27.4	+16.4	10.1	47 26.4	+16.7	10.3	48 25.5	+16.9	10.5	49 24.4	+17.2	10.7	50 23.4	+17.4	10.9	83
84	45.8	+14.8	8.2	44 45.1	+15.0	8.4	45 44.5	+15.2	8.5	46 43.8	+15.4	8.7	47 43.1	+15.6	8.8	48 42.4	+15.8	9.0	49 41.6	+16.1	9.2	50 40.8	+16.3	9.4	84
85	44 00.6	+13.8	6.9	45 00.1	+14.0	7.0	45 59.7	+14.1	7.1	46 59.2	+14.3	7.2	47 58.7	+14.5	7.4	48 58.2	+14.7	7.5	49 57.7	+14.8	7.7	50 57.1	+15.1	7.9	85
86	44 14.4	+12.9	5.5	45 14.1	+13.0	5.6	46 13.8	+13.2	5.7	47 13.5	+13.3	5.8	48 13.2	+13.4	5.9	49 12.9	+13.5	6.1	50 12.5	+13.7	6.2	51 12.2	+13.8	6.3	86
87	44 27.3	+11.9	4.2	45 27.1	+12.0	4.2	46 27.0	+12.1	4.3	47 26.8	+12.2	4.4	48 26.6	+12.3	4.5	49 26.4	+12.4	4.6	50 26.2	+12.5	4.7	51 26.0	+12.6	4.8	87
88	44 39.2	+10.9	2.8	45 39.1	+11.0	2.8	46 39.1	+11.0	2.9	47 39.0	+11.0	2.9	48 38.9	+11.1	3.0	49 38.8	+11.2	3.1	50 38.7	+11.3	3.1	51 38.6	+11.4	3.2	88
89	44 50.1	+9.9	1.4	45 50.1	+9.9	1.4	46 50.1	+9.9	1.4	47 50.0	+10.0	1.5	48 50.0	+10.0	1.5	49 50.0	+10.0	1.5	50 50.0	+10.0	1.6	51 50.0	+10.0	1.6	89
90	45 00.0	+8.9	0.0	46 00.0	+8.9	0.0	47 00.0	+8.8	0.0	48 00.0	+8.8	0.0	49 00.0	+8.8	0.0	50 00.0	+8.8	0.0	51 00.0	+8.8	0.0	52 00.0	+8.7	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	5 38.9	+42.6	95.7	5 32.9	+43.3	95.8	5 26.8	+44.0	95.9	5 20.6	+44.8	96.0	5 14.3	+45.5	96.1	5 07.9	+46.2	96.1	5 01.5	+46.8	96.2	4 54.9	+47.5	96.3	0
1	6 21.5	+42.5	95.0	6 16.2	+43.3	95.1	6 10.8	+44.0	95.2	6 05.4	+44.7	95.3	5 59.8	+45.4	95.4	5 54.1	+46.1	95.5	5 48.3	+46.7	95.6	5 42.4	+47.4	95.7	1
2	7 04.0	+42.5	94.3	6 59.5	+43.2	94.4	6 54.8	+44.0	94.5	6 50.1	+44.6	94.6	6 45.2	+45.3	94.7	6 40.2	+46.0	94.9	6 35.0	+46.7	95.0	6 29.8	+47.3	95.1	2
3	7 46.5	+42.4	93.5	7 42.7	+43.2	93.7	7 38.8	+43.9	93.8	7 34.7	+44.6	93.9	7 30.5	+45.3	94.1	7 26.2	+46.0	94.2	7 21.7	+46.7	94.3	7 17.1	+47.3	94.5	3
4	8 28.9	+42.3	92.8	8 25.9	+43.0	93.0	8 22.7	+43.8	93.1	8 19.3	+44.5	93.3	8 15.8	+45.2	93.4	8 12.2	+45.9	93.6	8 08.4	+46.6	93.7	8 04.4	+47.3	93.8	4
5	9 11.2	+42.3	92.1	9 08.9	+43.0	92.3	9 06.5	+43.7	92.4	9 03.8	+44.5	92.6	9 01.0	+45.2	92.8	8 58.1	+45.8	92.9	8 55.0	+46.5	93.1	8 51.7	+47.1	93.2	5
6	9 53.5	+42.2	91.4	9 51.9	+43.0	91.6	9 50.2	+43.7	91.7	9 48.3	+44.4	91.9	9 46.2	+45.1	92.1	9 43.9	+45.8	92.3	9 41.5	+46.4	92.4	9 38.8	+47.2	92.6	6
7	10 35.7	+42.0	90.7	10 34.9	+42.8	90.9	10 33.9	+43.5	91.0	10 32.7	+44.2	91.2	10 31.3	+44.9	91.4	10 29.7	+45.7	91.6	10 27.9	+46.4	91.8	10 26.0	+47.0	92.0	7
8	11 17.7	+42.0	89.9	11 17.7	+42.7	90.1	11 17.4	+43.5	90.3	11 16.9	+44.2	90.5	11 16.3	+44.9	90.7	11 15.4	+45.6	90.9	11 14.3	+46.3	91.1	11 13.0	+47.0	91.3	8
9	11 59.7	+41.8	89.2	12 00.4	+42.6	89.4	12 00.9	+43.3	89.6	12 01.1	+44.1	89.9	12 01.2	+44.8	90.1	12 01.0	+45.5	90.3	12 00.6	+46.2	90.5	12 00.0	+46.8	90.7	9
10	12 41.5	+41.7	88.5	12 43.0	+42.4	88.7	12 44.2	+43.2	88.9	12 45.2	+44.0	89.2	12 46.0	+44.7	89.4	12 46.5	+45.4	89.6	12 46.8	+46.1	89.8	12 46.8	+46.8	90.1	10
11	13 23.2	+41.6	87.7	13 25.4	+42.4	88.0	13 27.4	+43.2	88.2	13 29.2	+43.8	88.5	13 30.7	+44.5	88.7	13 31.9	+45.3	88.9	13 32.9	+46.0	89.2	13 33.6	+46.7	89.4	11
12	14 04.8	+41.4	87.0	14 07.8	+42.2	87.3	14 10.6	+42.9	87.5	14 13.0	+43.8	87.8	14 15.2	+44.5	88.0	14 17.2	+45.2	88.3	14 18.9	+45.9	88.5	14 20.3	+46.6	88.8	12
13	14 46.2	+41.4	86.3	14 50.0	+42.1	86.5	14 53.5	+42.9	86.8	14 56.8	+43.6	87.0	14 59.7	+44.3	87.3	15 02.4	+45.0	87.6	15 04.8	+45.7	87.9	15 06.9	+46.4	88.1	13
14	15 27.6	+41.1	85.5	15 32.1	+41.9	85.8	15 36.4	+42.7	86.1	15 40.4	+43.4	86.3	15 44.0	+44.3	86.6	15 47.4	+45.0	86.9	15 50.5	+45.7	87.2	15 53.3	+46.4	87.5	14
15	16 08.7	+41.0	84.7	16 14.0	+41.8	85.0	16 19.1	+42.5	85.3	16 23.8	+43.3	85.6	16 28.3	+44.0	85.9	16 32.4	+44.8	86.2	16 36.2	+45.5	86.5	16 39.7	+46.2	86.8	15
16	16 49.7	+40.8	84.0	16 55.8	+41.6	84.3	17 01.6	+42.4	84.6	17 07.1	+43.2	84.9	17 12.3	+43.9	85.2	17 17.2	+44.6	85.5	17 21.7	+45.4	85.8	17 25.9	+46.1	86.1	16
17	17 30.5	+40.7	83.2	17 37.4	+41.5	83.5	17 44.0	+42.3	83.8	17 50.3	+43.0	84.2	17 56.2	+43.8	84.5	18 01.8	+44.5	84.8	18 07.1	+45.2	85.1	18 12.0	+45.9	85.5	17
18	18 11.2	+40.4	82.4	18 18.9	+41.2	82.8	18 26.3	+42.0	83.1	18 33.3	+42.8	83.4	18 40.0	+43.6	83.8	18 46.3	+44.3	84.1	18 52.3	+45.1	84.4	18 57.9	+45.8	84.8	18
19	18 51.6	+40.3	81.7	19 00.1	+41.1	82.0	19 08.3	+41.9	82.3	19 16.1	+42.7	82.7	19 23.6	+43.4	83.0	19 30.6	+44.2	83.4	19 37.4	+44.9	83.7	19 43.7	+45.7	84.1	19
20	19 31.9	+40.0	80.9	19 41.2	+40.9	81.2	19 50.2	+41.6	81.6	19 58.8	+42.4	81.9	20 07.0	+43.2	82.3	20 14.8	+44.0	82.7	20 22.3	+44.7	83.0	20 29.4	+45.4	83.4	20
21	20 11.9	+39.9	80.1	20 22.1	+40.6	80.5	20 31.8	+41.5	80.8	20 41.2	+42.3	81.2	20 50.2	+43.0	81.6	20 58.8	+43.8	81.9	21 07.0	+44.6	82.3	21 14.8	+45.3	82.7	21
22	20 51.8	+39.6	79.3	21 02.7	+40.5	79.7	21 13.3	+41.2	80.0	21 23.5	+42.0	80.4	21 33.2	+42.9	80.8	21 42.6	+43.6	81.2	21 51.6	+44.3	81.6	22 00.1	+45.1	82.0	22
23	21 31.4	+39.4	78.5	21 43.2	+40.2	78.9	21 54.5	+41.1	79.3	22 05.5	+41.8	79.7	22 16.1	+42.6	80.1	22 26.2	+43.4	80.5	22 35.9	+44.2	80.9	22 45.2	+44.9	81.3	23
24	22 10.8	+39.1	77.7	22 23.4	+39.9	78.1	22 35.6	+40.8	78.5	22 47.3	+41.6	78.9	22 58.7	+42.4	79.3	23 09.6	+43.2	79.7	23 20.1	+44.0	80.1	23 30.1	+44.8	80.6	24
25	22 49.9	+38.9	76.9	23 03.3	+39.8	77.3	23 16.4	+40.5	77.7	23 28.9	+41.4	78.1	23 41.1	+42.2	78.5	23 52.8	+43.0	79.0	24 04.1	+43.7	79.4	24 14.9	+44.5	79.8	25
26	23 28.8	+38.6	76.0	23 43.1	+39.4	76.4	23 56.9	+40.3	76.9	24 10.3	+41.1	77.3	24 23.3	+41.9	77.8	24 35.8	+42.7	78.2	24 47.8	+43.5	78.6	24 59.4	+44.3	79.1	26
27	24 07.4	+38.3	75.2	24 22.5	+39.2	75.6	24 37.2	+40.0	76.1	24 51.4	+40.9	76.5	25 05.2	+41.7	77.0	25 18.5	+42.5	77.4	25 31.3	+43.3	77.9	25 43.7	+44.0	78.4	27
28	24 45.7	+38.1	74.3	25 01.7	+38.9	74.8	25 17.2	+39.8	75.2	25 32.3	+40.6	75.7	25 46.9	+41.4	76.2	26 01.0	+42.2	76.6	26 14.6	+43.0	77.1	26 27.7	+43.8	77.6	28
29	25 23.8	+37.8	73.5	25 40.6	+38.6	73.9	25 57.0	+39.5	74.4	26 12.9	+40.3	74.9	26 28.3	+41.1	75.4	26 43.2	+41.9	75.8	26 57.6	+42.8	76.3	27 11.5	+43.6	76.8	29
30	26 01.6	+37.4	72.6	26 19.2	+38.4	73.1	26 36.5	+39.1	73.6	26 53.2	+40.0	74.1	27 09.4	+40.9	74.5	27 25.1	+41.7	75.0	27 40.4	+42.5	75.5	27 55.1	+43.3	76.1	30
31	26 39.0	+37.1	71.8	26 57.6	+37.9	72.2	27 15.6	+38.7	72.7	27 33.2	+39.7	73.2	27 50.3	+40.5	73.7	28 06.8	+41.4	74.2	28 22.9	+42.2	74.8	28 38.4	+43.0	75.3	31
32	27 16.1	+36.8	70.9	27 35.5	+37.7	71.4	27 54.5	+38.5	71.9	28 12.9	+39.4	72.4	28 30.8	+40.3	72.9	28 48.2	+41.1	73.4	29 05.1	+41.9	73.9	29 21.4	+42.7	74.5	32
33	27 52.9	+36.5	70.0	28 13.2	+37.3	70.5	28 33.0	+38.2	71.0	28 52.3	+39.1	71.5	29 11.1	+39.9	72.0	29 29.3	+40.8	72.6	29 47.0	+41.6	73.1	30 04.1	+42.5	73.7	33
34	28 29.4	+36.0	69.1	28 50.5	+37.0	69.6	29 11.2	+37.8	70.1	29 31.4	+38.7	70.6	29 51.0	+39.6	71.2	30 10.1	+40.4	71.7	30 28.6	+41.3	72.3	30 46.6	+42.1	72.8	34
35	29 05.4	+35.7	68.2	29 27.5	+36.6	68.7	29 49.0	+37.5	69.2	30 10.1	+38.3	69.8	30 30.6	+39.2	70.3	30 50.5	+40.1	70.9	31 09.9	+40.9	71.4	31 28.7	+41.8	72.0	35
36	29 41.1	+35.4	67.2	30 04.1	+36.2	67.8	30 26.5	+37.1	68.3	30 48.4	+38.0	68.9	31 09.8	+38.8	69.4	31 30.6	+39.7	70.0	31 50.8	+40.6	70.6	32 10.5	+41.4	71.2	36
37	30 16.5	+34.9	66.3	30 40.3	+35.8	66.9	31 03.6	+36.7	67.4	31 26.4	+37.5	68.0	31 48.6	+38.5	68.5	32 10.3	+39.4	69.1	32 31.4	+40.2	69.7	32 51.9	+41.1	70.3	37
38	30 51.4	+34.5	65.3	31 16.1	+35.4	65.9	31 40.3	+36.3	66.5	32 04.0	+37.2	67.0	32 27.1	+38.1	67.6	32 49.7	+39.0	68.2	33 11.6	+39.9	68.8	33 33.0	+40.7	69.4	38
39	31 25.9	+34.0	64.4	31 51.5	+35.0	65.0	32 16.6	+35.9	65.5	32 41.2	+36.8	66.1	33 05.2	+37.7	66.7	33 28.7	+38.5	67.3	33 51.5	+39.4	67.9	34 13.7	+40.4	68.6	39
40	31 59.9	+33.7	63.4	32 26.5	+34.5	64.0	32 52.5	+35.5	64.6	33 18.0	+36.3	65.2	33 42.9	+37.3	65.8	34 07.2	+38.2	66.4	34 30.9	+39.1	67.0	34 54.1	+39.9	67.7	40
41	32 33.6	+33.1	62.5	33 01.0	+34.1	63.0	33 28.0	+35.0	63.6	33 54.3	+36.0	64.2	34 20.2	+36.8	64.8	34 45.4	+37.7	65.5	35 10.0	+38.6	66.1	35 34.0	+39.5	66.7	41
42	33 06.7	+32.7	61.5	33 35.1	+33.6	62.1	34 03.0	+34.5	62.6	34 30.3	+35.4	63.3	34 57.0	+36.3	63.9	35 23.1	+37.2	64.5	35 48.6	+38.2	65.2	36 13.5	+39.1	65.8	42
43	33 39.4	+32.2	60.5	34 08.7	+33.1	61.1	34 37.5	+34.0	61.7	35 05.7	+34.9	62.3	35 33.3	+35.9	62.9	36 00.3	+36.8	63.5	36 26.8	+37.7	64.2	36 52.6	+38.6	64.9	43
44	34 11.6	+31.7	59.5	34 41.8	+32.6	60.0	35 11.5	+33.5	60.7	35 40.6	+34.5	61.3	36 09.2	+35.4	61.9	36 37.1	+36.3	62.6	37 04.5	+37.2	63.2	37 31.2	+38.1	63.9	44
45	34 43.3	+31.1	58.4	35 14.4	+32.1	59.0	35 45.0	+33.1	59.6	36 15.1	+33.9	60.3	36 44.6	+34.8	60.9	37 13.4	+35.8	61.6	37 41.7	+36.7	62.2	38 09.3	+37.7	62.9	45
46	35 14.4	+30.6	57.4	35 46.5	+31.6	58.0	36 18.1	+32.4	58.6	36 49.0	+33.4	59.2	37 19.4	+34.4	59.9	37 49.2	+35.3	60.6	38 18.4	+36.2	61.2	38 47.0	+37.1	61.9	46
47	35 45.0	+30.1	56.3	36 18.1	+30.9	56.9	36 50.5	+31.9	57.6	37 22.4	+32.9	58.2	37 53.8	+33.7	58.9	38 24.5	+34.7	59.5	38 54.6	+35.7	60.2	39 24.1	+36.6	60.9	47
48	36 15.1	+29.5	55.3	36 49.0	+30.4	55.9	37 22.4	+31.4	56.5	37 55.3	+32.2	57.1	38 27.5	+33.2	57.8	38 59.2	+34.2	58.5	39 30.3	+35.1	59.2	40 00.7	+36.0	59.9	48
49	36 44.6	+28.8	54.2	37 19.4	+29.8	54.8	37 53.8	+30.7	55.4	38 27.5	+31.7	56.1	39 00.7	+32.7	56.7	39 33.4	+33.5	57.4	40 05.4	+34.5	58.1	40 36.7	+35.5	58.8	49
50	37 13.4	+28.3	53.1	37 49.2	+29.2	53.7	38 24.5	+30.1	54.3	38 59.2	+31.1	55.0	39 33.4	+32.0	55.6	40 06.9	+33.0	56.3	40 39.9	+33.9	57.1	41 12.2	+34.9	57.8	50
51	37 41.7	+27.6	52.0	38 18.4	+28.6	52.6	38 54.6	+29.5	53.2	39 30.3	+30.4	53.9	40 05.4	+31.3	54.5	40 39.9	+32.3	55.2	41 13.8	+33.2	56.0	41 47.0	+34.3	56.7	51
52	38 09.3	+27.0	50.8	38 47.0	+27.9	51.5	39 24.1	+28.8	52.1	40 00.7	+29.7	52.7	40 36.7	+30.7	53.4	41 12.2	+31.6	54.1	41 47.0	+32.6	54.8	42 21.3	+33.5	55.6	52
53	38 36.3	+26.3	49.7	39 14.9	+27.2	50.3	39 52.9	+28.2	51.0	40 30.4	+29.1	51.6	41 07.4	+30.0	52.3	41 43.8	+31.0	53.0	42 19.6	+32.0	53.7	42 54.8	+32.9	54.5	53
54	39 02.6	+25.6	48.5	39 42.1	+26.5	49.2	40 21.1	+27.4	49.8	40 59.5	+28.4	50.5	41 37.4	+29.3	51.1	42 14.8	+30.3	51.8	42 51.6	+31.2	52.6	43 27.7	+32.2	53.3	54
55	39 28.2	+24.9	47.4	40 08.6	+25.8	48.0	40 48.5	+26.7	48.6	41 27.9	+27.7	49.3	42 06.8	+28.6	50.0	42 45.1	+29.5	50.7	43 22.8	+30.5	51.4	43 59.9	+31.5	52.1	55
56	39 53.1	+24.2	46.2	40 34.4	+25.1	46.8	41 15.2	+26.0	47.4	41 55.6	+26.9	48.1	42 35.4	+27.8	48.8	43 14.6	+28.8	49.5	43 53.3	+29.8	50.2	44 31.4	+30.7	51.0	56
57	40 17.3	+23.4	45.0	40 59.5	+24.3	45.6	41 41.2	+25.2	46.2	42 22.5	+26.1	46.9	43 03.2	+27.1	47.6	43 43.4	+28.0	48.3	44 23.1	+29.0	49.0	45 02.1	+30.0	49.7	57
58	40 40.7	+22.6	43.8	41 23.8	+23.5	44.4	42 06.4	+24.5	45.0	42 48.6	+25.4	45.7	43 30.3	+26.3	46.3	44 11.4	+27.3	47.0	44 52.1	+28.1	47.8	45 32.1	+29.1	48.5	58
59	41 03.3	+21.9	42.6	41 47.3	+22.8	43.2	42 30.9	+23.6	43.8	43 14.0	+24.5	44.4	43 56.6	+25.4	45.1	44 38.7	+26.3	45.8	45 20.2	+27.4	46.5	46 01.2	+28.3	47.3	59
60	41 25.2	+21.1	41.3	42 10.1	+21.9	41.9	42 54.5	+22.8	42.5	43 38.5	+23.7	43.2	44 22.0	+24.6	43.8	45 05.0	+25.6	44.5	45 47.6	+26.4	45.2	46 29.5	+27.5	46.0	60
61	41 46.3	+20.2	40.1	42 32.0	+21.1	40.7	43 17.3	+22.0	41.3	44 02.2	+22.8	41.9	44 46.6	+23.8	42.6	45 30.6	+24.6	43.2	46 14.0	+25.6	44.0	46 57.0	+26.5	44.7	61
62	42 06.5	+19.4	38.8	42 53.1	+20.2	39.4	43 39.3	+21.1	40.0	44 25.0	+22.0	40.6	45 10.4	+22.8	41.3	45 55.2	+23.8	41.9	46 39.6	+24.7	42.6	47 23.5	+25.6	43.4	62
63	42 25.9	+18.6	37.5	43 13.3	+19.4	38.1	44 00.4	+20.1	38.7	44 47.0	+21.0	39.3	45 33.2	+21.9	39.9	46 19.0	+22.8	40.6	47 04.3	+23.7	41.3	47 49.1	+24.7	42.0	63
64	42 44.5	+17.6	36.2	43 32.7	+18.4	36.8	44 20.5	+19.3	37.4	45 08.0	+20.2	38.0	45 55.1	+21.0	38.6	46 41.8	+21.9	39.3	47 28.0	+22.8	40.0	48 13.8	+23.7	40.7	64
65	43 02.1	+16.8	34.9	43 51.1	+17.6	35.5	44 39.8	+18.4	36.0	45 28.2	+19.1	36.6	46 16.1	+20.0	37.3	47 03.7	+20.8	37.9	47 50.8	+21.7	38.6	48 37.5	+22.6	39.3	65
66	43 18.9	+15.8	33.6	44 08.7	+16.6	34.1	44 58.2	+17.4	34.7	45 47.3	+18.2	35.3	46 36.1	+19.0	35.9	47 24.5	+19.9	36.5	48 12.5	+20.8	37.2	49 00.1	+21.7	37.9	66
67	43 34.7	+14.9	32.3	44 25.3	+15.6	32.8	45 15.6	+16.4	33.3	46 05.5	+17.2	33.9	46 55.1	+18.1	34.5	47 44.4	+18.8	35.1	48 33.3	+19.7	35.8	49 21.8	+20.5	36.4	67
68	43 49.6	+14.0	30.9	44 40.9	+14.7	31.4	45 32.0	+15.4	32.0	46 22.7	+16.2	32.5	47 13.2	+16.9	33.1	48 03.2	+17.8	33.7	48 53.0	+18.6	34.3	49 42.3	+19.5	35.0	68
69	44 03.6	+13.0	29.6	44 55.6	+13.7	30.1	45 47.4	+14.4	30.6	46 38.9	+15.2	31.1	47 30.1	+15.9	31.7	48 21.0	+16.7	32.3	49 11.6	+17.5	32.9	50 01.8	+18.3	33.5	69
70	44 16.6	+12.0	28.2	45 09.3	+12.7	28.7	46 01.8	+13.4	29.2	46 54.1	+14.1	29.7	47 46.0	+14.9	30.3	48 37.7	+15.6	30.8	49 29.1	+16.4	31.4	50 20.1	+17.2	32.0	70
71	44 28.6	+11.1	26.9	45 22.0	+11.7	27.3	46 15.2	+12.4	27.8	47 08.2	+13.0	28.3	48 00.9	+13.7	28.8	48 53.3	+14.5	29.4	49 45.5	+15.2	29.9	50 37.3	+16.0	30.5	71
72	44 39.7	+10.0	25.5	45 33.7	+10.7	25.9	46 27.6	+11.3	26.4	47 21.2	+12.0	26.9	48 14.6	+12.7	27.4	49 07.8	+13.3	27.9	50 00.7	+14.1	28.4	50 53.3	+14.8	29.0	72
73	44 49.7	+9.0	24.1	45 44.4	+9.6	24.5	46 38.9	+10.2	24.9	47 33.2	+10.8	25.4	48 27.3	+11.5	25.9	49 21.1	+12.2	26.4	50 14.8	+12.8	26.9	51 08.1	+13.6	27.5	73
74	44 58.7	+8.0	22.7	45 54.0	+8.5	23.1	46 49.1	+9.1	23.5	47 44.0	+9.7	23.9	48 38.8	+10.3	24.4	49 33.3	+11.0	24.9	50 27.6	+11.7	25.4	51 21.7	+12.3	25.9	74
75	45 06.7	+7.0	21.3	46 02.5	+7.5	21.7	46 58.2	+8.0	22.1	47 53.7	+8.6	22.5	48 49.1	+9.2	22.9	49 44.3	+9.8	23.4	50 39.3	+10.4	23.8	51 34.0	+11.1	24.4	75
76	45 13.7	+5.9	19.9	46 10.0	+6.4	20.2	47 06.2	+7.0	20.6	48 02.3	+7.5	21.0	48 58.3	+8.0	21.4	49 54.1	+8.5	21.8	50 49.7	+9.1	22.3	51 45.1	+9.8	22.8	76
77	45 19.6	+4.8	18.5	46 16.4	+5.4	18.8	47 13.2	+5.8	19.1	48 09.8	+6.3	19.5	49 06.3	+6.8	19.9	50 02.6	+7.4	20.3	50 58.8	+7.9	20.7	51 54.9	+8.4	21.2	77
78	45 24.4	+3.8	17.1	46 21.8	+4.2	17.4	47 19.0	+4.7	17.7	48 16.1	+5.1	18.0	49 13.1	+5.6	18.4	50 10.0	+6.1	18.7	51 06.7	+6.6	19.1	52 03.3	+7.2	19.6	78
79	45 28.2	+2.8	15.6	46 26.0	+3.1	15.9	47 23.6	+3.6	16.2	48 21.2	+4.0	16.5	49 18.7	+4.4	16.8	50 16.1	+4.8	17.2	51 13.3	+5.3	17.6	52 10.5	+5.8	17.9	79
80	45 31.0	+1.7	14.2	46 29.1	+2.1	14.5	47 27.2	+2.4	14.7	48 25.2	+2.8	15.0	49 23.1	+3.2	15.3	50 20.9	+3.6	15.6	51 18.6	+4.1	16.0	52 16.3	+4.5	16.3	80
81	45 32.7	+0.6	12.8	46 31.2	+0.9	13.0	47 29.6	+1.3	13.3	48 28.0	+1.6	13.5	49 26.3	+1.9	13.8	50 24.5	+2.3	14.1	51 22.7	+2.7	14.4	52 20.8	+3.1	14.7	81
82	45 33.3	–0.5	11.4	46 32.1	–0.2	11.6	47 30.9	+0.1	11.8	48 29.6	+0.4	12.0	49 28.2	+0.8	12.2	50 26.8	+1.1	12.5	51 25.4	+1.4	12.8	52 23.9	+1.7	13.1	82
83	45 32.8	–1.5	9.9	46 31.9	–1.2	10.1	47 31.0	–1.0	10.3	48 30.0	–0.8	10.5	49 29.0	–0.5	10.7	50 27.9	–0.2	10.9	51 26.8	+0.1	11.2	52 25.6	+0.4	11.4	83
84	45 31.3	–2.6	8.5	46 30.7	–2.4	8.7	47 30.0	–2.2	8.8	48 29.2	–1.9	9.0	49 28.5	–1.7	9.2	50 27.7	–1.5	9.4	51 26.9	–1.2	9.6	52 26.0	–0.9	9.8	84
85	45 28.7	–3.6	7.1	46 28.3	–3.5	7.2	47 27.8	–3.3	7.3	48 27.3	–3.1	7.5	49 26.8	–3.0	7.6	50 26.2	–2.7	7.8	51 25.7	–2.6	8.0	52 25.1	–2.3	8.1	85
86	45 25.1	–4.7	5.6	46 24.8	–4.6	5.8	47 24.5	–4.4	5.9	48 24.2	–4.3	6.0	49 23.8	–4.1	6.1	50 23.5	–4.0	6.2	51 23.1	–3.8	6.4	52 22.8	–3.7	6.5	86
87	45 20.4	–5.6	4.2	46 20.2	–5.5	4.3	47 20.1	–5.4	4.4	48 19.9	–5.5	4.5	49 19.7	–5.4	4.6	50 19.5	–5.3	4.7	51 19.3	–5.2	4.8	52 19.1	–5.0	4.9	87
88	45 14.6	–6.8	2.8	46 14.6	–6.8	2.9	47 14.5	–6.7	2.9	48 14.4	–6.6	3.0	49 14.3	–6.5	3.0	50 14.2	–6.5	3.1	51 14.1	–6.4	3.2	52 14.1	–6.4	3.2	88
89	45 07.8	–7.8	1.4	46 07.8	–7.8	1.4	47 07.8	–7.8	1.5	48 07.8	–7.8	1.5	49 07.8	–7.8	1.5	50 07.7	–7.7	1.5	51 07.7	–7.7	1.6	52 07.7	–7.7	1.6	89
90	45 00.0	–8.9	0.0	46 00.0	–8.9	0.0	47 00.0	–8.9	0.0	48 00.0	–8.9	0.0	49 00.0	–8.9	0.0	50 00.0	–9.0	0.0	51 00.0	–9.0	0.0	52 00.0	–9.0	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	5 38.9	−42.7	95.7	5 32.9	−43.4	95.8	5 26.8	−44.1	95.9	5 20.6	−44.8	96.0	5 14.3	−45.5	96.1	5 07.9	−46.1	96.1	5 01.5	−46.8	96.2	4 54.9	−47.5	96.3	0
1	4 56.2	−42.7	96.4	4 49.5	−43.4	96.5	4 42.7	−44.2	96.5	4 35.8	−44.8	96.6	4 28.8	−45.5	96.7	4 21.8	−46.2	96.8	4 14.7	−46.9	96.9	4 07.4	−47.5	96.9	1
2	4 13.5	−42.7	97.1	4 06.1	−43.5	97.2	3 58.5	−44.1	97.2	3 51.0	−44.9	97.3	3 43.3	−45.6	97.4	3 35.6	−46.2	97.4	3 27.8	−46.9	97.5	3 19.9	−47.5	97.5	2
3	3 30.8	−42.8	97.8	3 22.6	−43.5	97.8	3 14.4	−44.2	97.9	3 06.1	−44.9	98.0	2 57.7	−45.5	98.0	2 49.4	−46.2	98.1	2 40.9	−46.9	98.1	2 32.4	−47.5	98.2	3
4	2 48.0	−42.8	98.5	2 39.1	−43.5	98.5	2 30.2	−44.3	98.6	2 21.2	−44.9	98.6	2 12.2	−45.6	98.7	2 03.1	−46.2	98.7	1 54.0	−46.9	98.7	1 44.9	−47.6	98.8	4
5	2 05.2	−42.8	99.2	1 55.6	−43.6	99.2	1 45.9	−44.2	99.3	1 36.3	−45.0	99.3	1 26.6	−45.6	99.3	1 16.9	−46.3	99.3	1 07.1	−46.9	99.4	0 57.3	−47.5	99.4	5
6	1 22.4	−42.9	99.9	1 12.0	−43.5	99.9	1 01.7	−44.2	99.9	0 51.3	−44.9	100.0	0 41.0	−45.6	100.0	0 30.6	−46.3	100.0	0 20.2	−46.9	100.0	0 09.8	−47.6	100.0	6
7	0 39.5	−42.8	100.6	0 28.5	−43.5	100.6	0 17.5	−44.3	100.6	0 06.4	−44.9	100.6	0 04.6	+45.7	79.4	0 15.7	+45.6	79.4	0 26.7	+47.0	79.4	0 37.8	+47.5	79.4	7
8	0 03.3	+42.8	78.7	0 15.0	+43.6	78.7	0 26.8	+44.2	78.7	0 38.5	+45.0	78.7	0 50.3	+45.6	78.7	1 02.0	+46.2	78.8	1 13.7	+46.9	78.8	1 25.3	+47.6	78.8	8
9	0 46.1	+42.9	78.0	0 58.6	+43.5	78.0	1 11.0	+44.3	78.0	1 23.5	+44.9	78.1	1 35.9	+45.6	78.1	1 48.2	+46.3	78.1	2 00.6	+46.9	78.1	2 12.9	+47.5	78.2	9
10	1 29.0	+42.8	77.3	1 42.1	+43.5	77.3	1 55.3	+44.2	77.4	2 08.4	+44.9	77.4	2 21.5	+45.5	77.4	2 34.5	+46.2	77.5	2 47.5	+46.8	77.5	3 00.4	+47.5	77.6	10
11	2 11.8	+42.8	76.6	2 25.6	+43.6	76.6	2 39.5	+44.2	76.7	2 53.3	+44.9	76.7	3 07.0	+45.6	76.8	3 20.7	+46.2	76.8	3 34.3	+46.9	76.9	3 47.9	+47.5	77.0	11
12	2 54.6	+42.7	75.9	3 09.2	+43.4	76.0	3 23.7	+44.2	76.0	3 38.2	+44.8	76.1	3 52.6	+45.5	76.1	4 06.9	+46.2	76.2	4 21.2	+46.8	76.3	4 35.4	+47.5	76.3	12
13	3 37.3	+42.8	75.2	3 52.6	+43.5	75.3	4 07.9	+44.1	75.3	4 23.0	+44.8	75.4	4 38.1	+45.5	75.5	4 53.1	+46.1	75.6	5 08.0	+46.8	75.7	5 22.9	+47.4	75.7	13
14	4 20.1	+42.7	74.5	4 36.1	+43.4	74.6	4 52.0	+44.1	74.7	5 07.8	+44.8	74.7	5 23.6	+45.4	74.8	5 39.2	+46.1	74.9	5 54.8	+46.7	75.0	6 10.3	+47.3	75.1	14
15	5 02.8	+42.6	73.8	5 19.5	+43.3	73.9	5 36.1	+44.0	74.0	5 52.6	+44.7	74.1	6 09.0	+45.4	74.2	6 25.3	+46.1	74.3	6 41.5	+46.7	74.4	6 57.6	+47.4	74.5	15
16	5 45.4	+42.6	73.1	6 02.8	+43.3	73.2	6 20.1	+44.0	73.3	6 37.3	+44.7	73.4	6 54.4	+45.4	73.5	7 11.4	+46.0	73.6	7 28.2	+46.7	73.8	7 45.0	+47.2	73.9	16
17	6 28.0	+42.5	72.4	6 46.1	+43.3	72.5	7 04.1	+44.0	72.6	7 22.0	+44.6	72.7	7 39.8	+45.2	72.8	7 57.4	+45.9	73.0	8 14.9	+46.6	73.1	8 32.2	+47.2	73.3	17
18	7 10.5	+42.5	71.7	7 29.4	+43.1	71.8	7 48.1	+43.8	71.9	8 06.6	+44.6	72.0	8 25.0	+45.2	72.2	8 43.3	+45.9	72.3	9 01.5	+46.5	72.5	9 19.4	+47.2	72.6	18
19	7 53.0	+42.4	71.0	8 12.5	+43.1	71.2	8 31.9	+43.8	71.2	8 51.2	+44.4	71.4	9 10.2	+45.2	71.5	9 29.2	+45.8	71.7	9 48.0	+46.4	71.8	10 06.6	+47.1	72.0	19
20	8 35.4	+42.3	70.2	8 55.6	+43.1	70.4	9 15.7	+43.7	70.5	9 35.6	+44.4	70.7	9 55.4	+45.0	70.9	10 15.0	+45.7	71.0	10 34.4	+46.4	71.2	10 53.7	+47.0	71.4	20
21	9 17.7	+42.3	69.5	9 38.7	+42.9	69.7	9 59.4	+43.6	69.8	10 20.0	+44.3	70.0	10 40.4	+45.0	70.2	11 00.7	+45.6	70.4	11 20.8	+46.2	70.5	11 40.7	+46.9	70.7	21
22	10 00.0	+42.1	68.8	10 21.6	+42.8	69.0	10 43.0	+43.6	69.1	11 04.3	+44.2	69.3	11 25.4	+44.9	69.5	11 46.3	+45.6	69.7	12 07.0	+46.2	69.9	12 27.6	+46.8	70.1	22
23	10 42.1	+42.1	68.1	11 04.4	+42.8	68.3	11 26.6	+43.4	68.4	11 48.5	+44.1	68.6	12 10.3	+44.8	68.8	12 31.9	+45.4	69.0	12 53.2	+46.1	69.2	13 14.4	+46.7	69.5	23
24	11 24.2	+41.9	67.3	11 47.2	+42.6	67.5	12 10.0	+43.3	67.7	12 32.6	+44.0	67.9	12 55.1	+44.7	68.1	13 17.3	+45.3	68.4	13 39.3	+46.0	68.6	14 01.1	+46.6	68.8	24
25	12 06.1	+41.8	66.6	12 29.8	+42.5	66.8	12 53.3	+43.2	67.0	13 16.6	+43.9	67.2	13 39.8	+44.5	67.5	14 02.6	+45.3	67.7	14 25.3	+45.9	67.9	14 47.7	+46.5	68.2	25
26	12 47.9	+41.7	65.9	13 12.3	+42.4	66.1	13 36.5	+43.1	66.3	14 00.5	+43.8	66.5	14 24.3	+44.5	66.8	14 47.9	+45.1	67.0	15 11.2	+45.7	67.3	15 34.2	+46.4	67.5	26
27	13 29.6	+41.6	65.1	13 54.7	+42.3	65.4	14 19.6	+43.0	65.6	14 44.3	+43.6	65.8	15 08.8	+44.3	66.1	15 33.0	+44.9	66.3	15 56.9	+45.7	66.6	16 20.6	+46.3	66.9	27
28	14 11.2	+41.4	64.4	14 37.0	+42.1	64.6	15 02.6	+42.8	64.9	15 27.9	+43.5	65.1	15 53.1	+44.1	65.4	16 17.9	+44.9	65.6	16 42.6	+45.4	65.9	17 06.9	+46.2	66.2	28
29	14 52.6	+41.3	63.7	15 19.1	+42.0	63.9	15 45.4	+42.7	64.1	16 11.4	+43.4	64.4	16 37.2	+44.1	64.7	17 02.8	+44.7	64.9	17 28.0	+45.4	65.2	17 53.1	+46.0	65.5	29
30	15 33.9	+41.1	62.9	16 01.1	+41.8	63.2	16 28.1	+42.5	63.4	16 54.8	+43.2	63.7	17 21.3	+43.8	64.0	17 47.5	+44.5	64.2	18 13.4	+45.2	64.5	18 39.1	+45.8	64.8	30
31	16 15.0	+41.0	62.1	16 42.9	+41.7	62.4	17 10.6	+42.3	62.7	17 38.0	+43.0	63.0	18 05.1	+43.8	63.2	18 32.0	+44.4	63.5	18 58.6	+45.1	63.8	19 24.9	+45.7	64.2	31
32	16 56.0	+40.8	61.4	17 24.6	+41.5	61.7	17 52.9	+42.2	61.9	18 21.0	+42.9	62.2	18 48.9	+43.5	62.5	19 16.4	+44.2	62.8	19 43.7	+44.8	63.1	20 10.6	+45.5	63.5	32
33	17 36.8	+40.6	60.6	18 06.1	+41.3	60.9	18 35.1	+42.0	61.2	19 03.9	+42.7	61.5	19 32.4	+43.4	61.8	20 00.6	+44.1	62.1	20 28.5	+44.8	62.4	20 56.1	+45.4	62.8	33
34	18 17.4	+40.4	59.8	18 47.4	+41.1	60.1	19 17.1	+41.9	60.4	19 46.6	+42.5	60.7	20 15.8	+43.2	61.1	20 44.7	+43.8	61.4	21 13.3	+44.5	61.7	21 41.5	+45.2	62.1	34
35	18 57.8	+40.2	59.1	19 28.5	+41.0	59.4	19 59.0	+41.6	59.7	20 29.1	+42.3	60.0	20 59.0	+43.0	60.3	21 28.5	+43.7	60.7	21 57.8	+44.3	61.0	22 26.7	+45.0	61.4	35
36	19 38.0	+40.1	58.3	20 09.5	+40.7	58.6	20 40.6	+41.4	58.9	21 11.4	+42.1	59.2	21 42.0	+42.8	59.6	22 12.2	+43.5	59.9	22 42.1	+44.2	60.3	23 11.7	+44.8	60.6	36
37	20 18.1	+39.8	57.5	20 50.2	+40.5	57.8	21 22.0	+41.2	58.1	21 53.5	+41.9	58.5	22 24.8	+42.5	58.8	22 55.7	+43.2	59.2	23 26.3	+43.9	59.5	23 56.5	+44.6	59.9	37
38	20 57.9	+39.6	56.7	21 30.7	+40.3	57.0	22 03.2	+41.0	57.3	22 35.4	+41.7	57.7	23 07.3	+42.4	58.0	23 38.9	+43.1	58.4	24 10.2	+43.7	58.8	24 41.1	+44.4	59.2	38
39	21 37.5	+39.3	55.9	22 11.0	+40.0	56.2	22 44.2	+40.7	56.6	23 17.1	+41.4	56.9	23 49.7	+42.1	57.3	24 22.0	+42.8	57.7	24 53.9	+43.5	58.0	25 25.5	+44.1	58.4	39
40	22 16.8	+39.1	55.1	22 51.0	+39.8	55.4	23 24.9	+40.5	55.8	23 58.5	+41.2	56.1	24 31.8	+41.9	56.5	25 04.8	+42.5	56.9	25 37.4	+43.2	57.3	26 09.6	+43.9	57.7	40
41	22 55.9	+38.8	54.2	23 30.8	+39.6	54.6	24 05.4	+40.3	55.0	24 39.7	+41.0	55.3	25 13.7	+41.6	55.7	25 47.3	+42.3	56.1	26 20.6	+43.0	56.5	26 53.5	+43.7	56.9	41
42	23 34.7	+38.6	53.4	24 10.4	+39.2	53.8	24 45.7	+39.9	54.1	25 20.7	+40.6	54.5	25 55.3	+41.4	54.9	26 29.6	+42.1	55.3	27 03.6	+42.7	55.7	27 37.2	+43.4	56.2	42
43	24 13.3	+38.3	52.6	24 49.6	+39.0	52.9	25 25.6	+39.7	53.3	26 01.3	+40.4	53.7	26 36.7	+41.1	54.1	27 11.7	+41.7	54.5	27 46.3	+42.5	54.9	28 20.6	+43.1	55.4	43
44	24 51.6	+38.0	51.7	25 28.6	+38.7	52.1	26 05.3	+39.4	52.5	26 41.7	+40.1	52.9	27 17.8	+40.7	53.3	27 53.4	+41.5	53.7	28 28.8	+42.2	54.1	29 03.7	+42.9	54.6	44
45	25 29.6	+37.7	50.9	26 07.3	+38.4	51.3	26 44.7	+39.1	51.6	27 21.8	+39.8	52.0	27 58.5	+40.5	52.5	28 34.9	+41.2	52.9	29 11.0	+41.8	53.3	29 46.6	+42.6	53.8	45
46	26 07.3	+37.4	50.0	26 45.7	+38.1	50.4	27 23.8	+38.8	50.8	28 01.6	+39.5	51.2	28 39.0	+40.2	51.6	29 16.1	+40.9	52.1	29 52.8	+41.6	52.5	30 29.2	+42.2	53.0	46
47	26 44.7	+37.1	49.1	27 23.8	+37.8	49.5	28 02.6	+38.5	49.9	28 41.1	+39.1	50.3	29 19.2	+39.9	50.8	29 57.0	+40.5	51.2	30 34.4	+41.2	51.7	31 11.4	+41.9	52.1	47
48	27 21.8	+36.7	48.3	28 01.6	+37.4	48.6	28 41.1	+38.1	49.1	29 20.2	+38.9	49.5	29 59.1	+39.5	49.9	30 37.5	+40.2	50.4	31 15.6	+40.9	50.8	31 53.3	+41.6	51.3	48
49	27 58.5	+36.4	47.4	28 39.0	+37.1	47.8	29 19.2	+37.8	48.2	29 59.1	+38.4	48.6	30 38.6	+39.1	49.0	31 17.7	+39.9	49.5	31 56.5	+40.6	50.0	32 34.9	+41.3	50.4	49
50	28 34.9	+36.1	46.5	29 16.1	+36.7	46.9	29 57.0	+37.4	47.3	30 37.5	+38.1	47.7	31 17.7	+38.8	48.2	31 57.6	+39.5	48.6	32 37.1	+40.1	49.1	33 16.2	+40.8	49.6	50
51	29 11.0	+35.6	45.5	29 52.8	+36.4	46.0	30 34.4	+37.0	46.4	31 15.6	+37.7	46.8	31 56.5	+38.4	47.3	32 37.1	+39.1	47.7	33 17.2	+39.8	48.2	33 57.0	+40.5	48.7	51
52	29 46.6	+35.3	44.6	30 29.2	+35.9	45.0	31 11.4	+36.6	45.5	31 53.3	+37.3	45.9	32 34.9	+38.0	46.3	33 16.2	+38.7	46.8	33 57.0	+39.4	47.3	34 37.5	+40.1	47.8	52
53	30 21.9	+34.8	43.7	31 05.1	+35.5	44.1	31 48.0	+36.2	44.5	32 30.6	+36.9	45.0	33 12.9	+37.6	45.4	33 54.9	+38.2	45.9	34 36.4	+39.0	46.4	35 17.6	+39.7	46.9	53
54	30 56.7	+34.4	42.7	31 40.6	+35.1	43.2	32 24.2	+35.8	43.6	33 07.5	+36.5	44.0	33 50.5	+37.2	44.5	34 33.1	+37.9	45.0	35 15.4	+38.6	45.5	35 57.3	+39.3	46.0	54
55	31 31.1	+34.0	41.8	32 15.7	+34.7	42.2	33 00.0	+35.4	42.6	33 44.0	+36.1	43.1	34 27.7	+36.7	43.5	35 11.0	+37.4	44.0	35 54.0	+38.1	44.5	36 36.6	+38.8	45.0	55
56	32 05.1	+33.6	40.8	32 50.4	+34.2	41.2	33 35.4	+34.9	41.7	34 20.1	+35.5	42.1	35 04.4	+36.3	42.6	35 48.4	+37.0	43.1	36 32.1	+37.6	43.6	37 15.4	+38.3	44.1	56
57	32 38.7	+33.1	39.8	33 24.6	+33.8	40.2	34 10.3	+34.4	40.7	34 55.6	+35.1	41.1	35 40.7	+35.7	41.6	36 25.4	+36.4	42.1	37 09.7	+37.2	42.6	37 53.7	+37.8	43.1	57
58	33 11.8	+32.6	38.8	33 58.4	+33.3	39.3	34 44.7	+33.9	39.7	35 30.7	+34.6	40.1	36 16.4	+35.3	40.6	37 01.8	+36.0	41.1	37 46.9	+36.6	41.6	38 31.5	+37.4	42.1	58
59	33 44.4	+32.1	37.8	34 31.7	+32.7	38.2	35 18.6	+33.5	38.7	36 05.3	+34.1	39.1	36 51.7	+34.8	39.6	37 37.8	+35.4	40.1	38 23.5	+36.1	40.6	39 08.9	+36.8	41.1	59
60	34 16.5	+31.6	36.8	35 04.4	+32.3	37.2	35 52.1	+32.8	37.7	36 39.4	+33.6	38.1	37 26.5	+34.2	38.6	38 13.2	+34.9	39.1	38 59.6	+35.6	39.6	39 45.7	+36.3	40.1	60
61	34 48.1	+31.1	35.8	35 36.7	+31.7	36.2	36 24.9	+32.4	36.6	37 13.0	+33.0	37.1	38 00.7	+33.6	37.5	38 48.1	+34.3	38.0	39 35.2	+35.0	38.5	40 22.0	+35.7	39.1	61
62	35 19.2	+30.5	34.7	36 08.4	+31.1	35.1	36 57.3	+31.8	35.5	37 46.0	+32.4	36.0	38 34.3	+33.1	36.5	39 22.4	+33.8	36.9	40 10.2	+34.4	37.5	40 57.7	+35.1	38.0	62
63	35 49.7	+30.0	33.7	36 39.5	+30.6	34.1	37 29.1	+31.2	34.5	38 18.4	+31.8	35.0	39 07.4	+32.5	35.4	39 56.2	+33.1	35.9	40 44.6	+33.8	36.4	41 32.8	+34.5	36.9	63
64	36 19.7	+29.3	32.6	37 10.1	+30.0	33.0	38 00.3	+30.6	33.4	38 50.2	+31.3	33.9	39 39.9	+31.9	34.3	40 29.3	+32.6	34.8	41 18.4	+33.2	35.3	42 07.3	+33.8	35.8	64
65	36 49.0	+28.8	31.5	37 40.1	+29.4	31.9	38 30.9	+30.0	32.3	39 21.5	+30.6	32.8	40 11.8	+31.2	33.2	41 01.9	+31.8	33.7	41 51.6	+32.5	34.2	42 41.1	+33.2	34.7	65
66	37 17.8	+28.2	30.4	38 09.5	+28.7	30.8	39 00.9	+29.3	31.2	39 51.9	+29.9	31.7	40 43.0	+30.6	32.1	41 33.7	+31.2	32.6	42 24.1	+31.9	33.1	43 14.3	+32.5	33.6	66
67	37 46.0	+27.5	29.3	38 38.2	+28.1	29.7	39 30.2	+28.7	30.1	40 22.0	+29.3	30.5	41 13.6	+29.9	31.0	42 04.9	+30.5	31.4	42 56.0	+31.1	31.9	43 46.8	+31.8	32.4	67
68	38 13.5	+26.9	28.2	39 06.3	+27.4	28.6	39 58.9	+28.0	29.0	40 51.3	+28.6	29.4	41 42.7	+29.2	29.8	42 35.4	+29.8	30.3	43 27.1	+30.4	30.7	44 18.6	+31.0	31.2	68
69	38 40.4	+26.2	27.0	39 33.7	+26.8	27.4	40 26.9	+27.3	27.8	41 19.9	+27.8	28.2	42 12.7	+28.4	28.6	43 05.2	+29.0	29.1	43 57.5	+29.7	29.5	44 49.6	+30.3	30.0	69
70	39 06.6	+25.5	25.9	40 00.5	+26.0	26.2	40 54.2	+26.6	26.6	41 47.7	+27.2	27.0	42 41.1	+27.7	27.4	43 34.2	+28.3	27.9	44 27.2	+28.8	28.3	45 19.9	+29.4	28.8	70
71	39 32.1	+24.8	24.7	40 26.5	+25.3	25.1	41 20.8	+25.8	25.4	42 14.9	+26.3	25.8	43 08.8	+26.9	26.2	44 02.5	+27.5	26.6	44 56.0	+28.1	27.1	45 49.3	+28.7	27.6	71
72	39 56.9	+24.0	23.5	40 51.8	+24.6	23.9	41 46.6	+25.1	24.2	42 41.2	+25.6	24.6	43 35.7	+26.1	25.0	44 30.0	+26.6	25.4	45 24.1	+27.2	25.8	46 18.0	+27.8	26.3	72
73	40 20.9	+23.3	22.3	41 16.4	+23.7	22.7	42 11.7	+24.2	23.0	43 06.8	+24.8	23.4	44 01.8	+25.3	23.7	44 56.6	+25.9	24.1	45 51.3	+26.4	24.6	46 45.8	+26.9	25.0	73
74	40 44.2	+22.6	21.1	41 40.1	+23.0	21.4	42 35.9	+23.5	21.8	43 31.6	+24.0	22.1	44 27.1	+24.4	22.5	45 22.5	+24.9	22.9	46 17.7	+25.4	23.3	47 12.7	+26.0	23.7	74
75	41 06.8	+21.7	19.9	42 03.1	+22.2	20.2	42 59.4	+22.6	20.5	43 55.5	+23.1	20.8	44 51.5	+23.6	21.2	45 47.4	+24.0	21.6	46 43.1	+24.6	22.0	47 38.7	+25.1	22.4	75
76	41 28.5	+20.9	18.6	42 25.3	+21.4	18.9	43 22.0	+21.8	19.2	44 18.6	+22.2	19.6	45 15.1	+22.6	19.9	46 11.4	+23.2	20.2	47 07.7	+23.6	20.6	48 03.8	+24.0	21.0	76
77	41 49.4	+20.2	17.4	42 46.7	+20.5	17.7	43 43.8	+20.9	18.0	44 40.8	+21.3	18.3	45 37.7	+21.8	18.6	46 34.6	+22.1	18.9	47 31.3	+22.6	19.3	48 27.8	+23.1	19.6	77
78	42 09.6	+19.2	16.1	43 07.2	+19.6	16.4	44 04.7	+20.0	16.7	45 02.1	+20.4	16.9	45 59.5	+20.8	17.2	46 56.7	+21.2	17.6	47 53.9	+21.6	17.9	48 50.9	+22.1	18.2	78
79	42 28.8	+18.4	14.8	43 26.8	+18.7	15.1	44 24.7	+19.1	15.3	45 22.5	+19.5	15.6	46 20.3	+19.8	15.9	47 17.9	+20.2	16.2	48 15.5	+20.6	16.5	49 13.0	+21.0	16.8	79
80	42 47.2	+17.5	13.6	43 45.5	+17.9	13.8	44 43.8	+18.1	14.0	45 42.0	+18.4	14.3	46 40.1	+18.8	14.5	47 38.1	+19.2	14.8	48 36.1	+19.5	15.1	49 34.0	+19.9	15.4	80
81	43 04.7	+16.7	12.2	44 03.4	+16.9	12.4	45 01.9	+17.2	12.7	46 00.4	+17.5	12.9	46 58.9	+17.8	13.1	47 57.3	+18.1	13.4	48 55.6	+18.5	13.6	49 53.9	+18.8	13.9	81
82	43 21.4	+15.7	10.9	44 20.3	+15.9	11.1	45 19.1	+16.2	11.3	46 17.9	+16.5	11.5	47 16.7	+16.8	11.7	48 15.4	+17.1	11.9	49 14.1	+17.3	12.2	50 12.7	+17.7	12.4	82
83	43 37.1	+14.7	9.6	44 36.2	+15.0	9.8	45 35.3	+15.2	9.9	46 34.4	+15.5	10.1	47 33.5	+15.7	10.3	48 32.5	+15.9	10.5	49 31.4	+16.3	10.7	50 30.4	+16.5	10.9	83
84	43 51.8	+13.8	8.3	44 51.2	+14.0	8.4	45 50.5	+14.2	8.5	46 49.9	+14.4	8.7	47 49.2	+14.6	8.9	48 48.4	+14.9	9.0	49 47.7	+15.0	9.2	50 46.9	+15.3	9.4	84
85	44 05.6	+12.9	6.9	45 05.2	+13.0	7.0	46 04.7	+13.2	7.1	47 04.3	+13.3	7.3	48 03.8	+13.5	7.4	49 03.3	+13.7	7.6	50 02.7	+13.9	7.7	51 02.1	+14.1	7.9	85
86	44 18.5	+11.9	5.5	45 18.2	+12.0	5.6	46 17.9	+12.1	5.7	47 17.6	+12.3	5.8	48 17.3	+12.4	6.0	49 17.0	+12.5	6.1	50 16.6	+12.7	6.2	51 16.3	+12.8	6.3	86
87	44 30.4	+10.9	4.2	45 30.2	+11.0	4.2	46 30.0	+11.1	4.3	47 29.9	+11.1	4.4	48 29.7	+11.3	4.5	49 29.5	+11.4	4.6	50 29.3	+11.5	4.7	51 29.1	+11.6	4.8	87
88	44 41.3	+9.8	2.8	45 41.2	+9.9	2.8	46 41.1	+10.0	2.9	47 41.0	+10.1	2.9	48 41.0	+10.1	3.0	49 40.9	+10.1	3.1	50 40.8	+10.2	3.1	51 40.7	+10.3	3.2	88
89	44 51.1	+8.9	1.4	45 51.1	+8.9	1.4	46 51.1	+8.9	1.4	47 51.1	+8.9	1.5	48 51.1	+8.9	1.5	49 51.0	+9.0	1.5	50 51.0	+9.0	1.6	51 51.0	+9.0	1.6	89
90	45 00.0	+7.8	0.0	46 00.0	+7.8	0.0	47 00.0	+7.8	0.0	48 00.0	+7.8	0.0	49 00.0	+7.8	0.0	50 00.0	+7.7	0.0	51 00.0	+7.7	0.0	52 00.0	+7.7	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 98°, 262°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	4 56.6	+42.6	95.0	4 51.4	+43.3	95.0	4 46.1	+44.0	95.1	4 40.6	+44.8	95.2	4 35.2	+45.4	95.3	4 29.6	+46.1	95.4	4 23.9	+46.8	95.5	4 18.2	+47.4	95.5	0
1	5 39.2	+42.5	94.3	5 34.7	+43.2	94.4	5 30.1	+43.9	94.4	5 25.4	+44.6	94.5	5 20.6	+45.3	94.6	5 15.7	+46.0	94.7	5 10.7	+46.7	94.8	5 05.6	+47.3	94.9	1
2	6 21.7	+42.4	93.5	6 17.9	+43.2	93.7	6 14.0	+43.9	93.8	6 10.0	+44.7	93.9	6 05.9	+45.3	94.0	6 01.7	+46.0	94.1	5 57.4	+46.6	94.2	5 52.9	+47.4	94.3	2
3	7 04.1	+42.4	92.8	7 01.1	+43.1	93.0	6 57.9	+43.9	93.1	6 54.7	+44.5	93.2	6 51.2	+45.3	93.3	6 47.7	+46.0	93.4	6 44.0	+46.7	93.6	6 40.3	+47.2	93.7	3
4	7 46.5	+42.3	92.1	7 44.2	+43.1	92.3	7 41.8	+43.8	92.4	7 39.2	+44.5	92.5	7 36.5	+45.2	92.7	7 33.7	+45.9	92.8	7 30.7	+46.5	92.9	7 27.5	+47.3	93.1	4
5	8 28.8	+42.3	91.4	8 27.3	+43.0	91.6	8 25.6	+43.7	91.7	8 23.7	+44.5	91.8	8 21.7	+45.2	92.0	8 19.6	+45.8	92.1	8 17.2	+46.5	92.3	8 14.8	+47.1	92.4	5
6	9 11.1	+42.1	90.7	9 10.3	+42.9	90.8	9 09.3	+43.6	91.0	9 08.2	+44.3	91.2	9 06.9	+45.0	91.3	9 05.4	+45.7	91.5	9 03.7	+46.5	91.6	9 01.9	+47.1	91.8	6
7	9 53.2	+42.1	90.0	9 53.2	+42.8	90.1	9 52.9	+43.6	90.3	9 52.5	+44.3	90.5	9 51.9	+45.0	90.7	9 51.1	+45.7	90.8	9 50.2	+46.3	91.0	9 49.0	+47.1	91.2	7
8	10 35.3	+41.9	89.2	10 36.0	+42.7	89.4	10 36.5	+43.4	89.6	10 36.8	+44.2	89.8	10 36.9	+44.9	90.0	10 36.8	+45.6	90.2	10 36.5	+46.3	90.4	10 36.1	+46.9	90.5	8
9	11 17.2	+41.9	88.5	11 18.7	+42.6	88.7	11 19.9	+43.4	88.9	11 21.0	+44.1	89.1	11 21.8	+44.8	89.3	11 22.4	+45.5	89.5	11 22.8	+46.2	89.7	11 23.0	+46.9	89.9	9
10	11 59.1	+41.7	87.8	12 01.3	+42.5	88.0	12 03.3	+43.2	88.2	12 05.1	+44.0	88.4	12 06.6	+44.7	88.6	12 07.9	+45.4	88.8	12 09.0	+46.1	89.1	12 09.9	+46.8	89.3	10
11	12 40.8	+41.6	87.0	12 43.8	+42.4	87.3	12 46.5	+43.2	87.5	12 49.1	+43.8	87.7	12 51.3	+44.6	87.9	12 53.3	+45.4	88.2	12 55.1	+46.0	88.4	12 56.7	+46.7	88.6	11
12	13 22.4	+41.5	86.3	13 26.2	+42.2	86.5	13 29.7	+43.0	86.8	13 32.9	+43.8	87.0	13 35.9	+44.5	87.3	13 38.7	+45.2	87.5	13 41.1	+45.9	87.7	13 43.4	+46.6	88.0	12
13	14 03.9	+41.4	85.6	14 08.4	+42.2	85.8	14 12.7	+42.9	86.1	14 16.7	+43.6	86.3	14 20.4	+44.4	86.6	14 23.9	+45.0	86.8	14 27.0	+45.8	87.1	14 30.0	+46.5	87.3	13
14	14 45.3	+41.2	84.8	14 50.6	+41.9	85.1	14 55.6	+42.7	85.3	15 00.3	+43.5	85.6	15 04.8	+44.2	85.9	15 08.9	+45.0	86.1	15 12.8	+45.7	86.4	15 16.5	+46.3	86.7	14
15	15 26.5	+41.0	84.1	15 32.5	+41.9	84.3	15 38.3	+42.6	84.6	15 43.8	+43.4	84.9	15 49.0	+44.1	85.2	15 53.9	+44.8	85.5	15 58.5	+45.6	85.7	16 02.8	+46.3	86.0	15
16	16 07.5	+40.9	83.3	16 14.4	+41.7	83.6	16 20.9	+42.5	83.9	16 27.2	+43.3	84.2	16 33.1	+44.0	84.5	16 38.7	+44.7	84.8	16 44.1	+45.4	85.1	16 49.1	+46.1	85.4	16
17	16 48.4	+40.7	82.5	16 56.1	+41.5	82.8	17 03.4	+42.3	83.1	17 10.4	+43.0	83.4	17 17.1	+43.8	83.8	17 23.4	+44.6	84.1	17 29.5	+45.2	84.4	17 35.2	+46.0	84.7	17
18	17 29.1	+40.6	81.8	17 37.6	+41.3	82.1	17 45.7	+42.1	82.4	17 53.4	+42.9	82.7	18 00.9	+43.6	83.0	18 08.0	+44.4	83.4	18 14.7	+45.2	83.7	18 21.2	+45.8	84.0	18
19	18 09.7	+40.3	81.0	18 18.9	+41.1	81.3	18 27.8	+41.9	81.6	18 36.3	+42.7	82.0	18 44.5	+43.5	82.3	18 52.4	+44.2	82.7	18 59.9	+44.9	83.0	19 07.0	+45.7	83.3	19
20	18 50.0	+40.2	80.2	19 00.0	+41.0	80.6	19 09.7	+41.8	80.9	19 19.0	+42.6	81.2	19 28.0	+43.3	81.6	19 36.6	+44.1	81.9	19 44.8	+44.8	82.3	19 52.7	+45.5	82.6	20
21	19 30.2	+39.9	79.4	19 41.0	+40.8	79.8	19 51.5	+41.5	80.1	20 01.6	+42.3	80.5	20 11.3	+43.1	80.9	20 20.7	+43.8	81.2	20 29.6	+44.6	81.6	20 38.2	+45.4	82.0	21
22	20 10.1	+39.8	78.6	20 21.8	+40.5	79.0	20 33.0	+41.4	79.4	20 43.9	+42.2	79.7	20 54.4	+42.9	80.1	21 04.5	+43.7	80.5	21 14.2	+44.5	80.9	21 23.6	+45.2	81.3	22
23	20 49.9	+39.5	77.8	21 02.3	+40.3	78.2	21 14.4	+41.1	78.6	21 26.1	+41.9	79.0	21 37.3	+42.8	79.4	21 48.2	+43.5	79.7	21 58.7	+44.2	80.1	22 08.8	+44.9	80.5	23
24	21 29.4	+39.2	77.0	21 42.6	+40.1	77.4	21 55.5	+40.9	77.8	22 08.0	+41.7	78.2	22 20.1	+42.5	78.6	22 31.7	+43.3	79.0	22 42.9	+44.1	79.4	22 53.7	+44.8	79.8	24
25	22 08.6	+39.1	76.2	22 22.7	+39.9	76.6	22 36.4	+40.7	77.0	22 49.7	+41.5	77.4	23 02.6	+42.2	77.8	23 15.0	+43.1	78.3	23 27.0	+43.8	78.7	23 38.5	+44.6	79.1	25
26	22 47.7	+38.8	75.4	23 02.6	+39.6	75.8	23 17.1	+40.4	76.2	23 31.2	+41.2	76.6	23 44.8	+42.1	77.1	23 58.1	+42.8	77.5	24 10.8	+43.6	77.9	24 23.1	+44.4	78.4	26
27	23 26.5	+38.5	74.6	23 42.2	+39.4	75.0	23 57.5	+40.2	75.4	24 12.4	+41.0	75.8	24 26.9	+41.8	76.3	24 40.9	+42.6	76.7	24 54.4	+43.4	77.2	25 07.5	+44.2	77.6	27
28	24 05.0	+38.2	73.7	24 21.6	+39.0	74.2	24 37.7	+39.9	74.6	24 53.4	+40.8	75.0	25 08.7	+41.5	75.5	25 23.5	+42.4	75.9	25 37.8	+43.2	76.4	25 51.7	+43.9	76.9	28
29	24 43.2	+37.9	72.9	25 00.6	+38.8	73.3	25 17.6	+39.7	73.8	25 34.2	+40.4	74.2	25 50.2	+41.3	74.7	26 05.9	+42.0	75.2	26 21.0	+42.9	75.6	26 35.6	+43.7	76.1	29
30	25 21.1	+37.7	72.0	25 39.4	+38.5	72.5	25 57.3	+39.3	72.9	26 14.6	+40.2	73.4	26 31.5	+41.0	73.9	26 47.9	+41.9	74.4	27 03.9	+42.6	74.9	27 19.3	+43.4	75.4	30
31	25 58.8	+37.3	71.2	26 17.9	+38.2	71.6	26 36.6	+39.1	72.1	26 54.8	+39.9	72.6	27 12.5	+40.8	73.1	27 29.8	+41.5	73.6	27 46.5	+42.4	74.1	28 02.7	+43.2	74.6	31
32	26 36.1	+37.0	70.3	26 56.1	+37.9	70.8	27 15.7	+38.7	71.2	27 34.7	+39.6	71.7	27 53.3	+40.4	72.2	28 11.3	+41.3	72.7	28 28.9	+42.0	73.3	28 45.9	+42.9	73.8	32
33	27 13.1	+36.7	69.4	27 34.0	+37.5	69.9	27 54.4	+38.4	70.4	28 14.3	+39.2	70.9	28 33.7	+40.1	71.4	28 52.6	+40.9	71.9	29 10.9	+41.8	72.4	29 28.8	+42.5	73.0	33
34	27 49.8	+36.3	68.5	28 11.5	+37.2	69.0	28 32.8	+38.1	69.5	28 53.5	+39.0	70.0	29 13.8	+39.8	70.5	29 33.5	+40.6	71.1	29 52.7	+41.4	71.6	30 11.3	+42.3	72.2	34
35	28 26.1	+36.0	67.6	28 48.7	+36.9	68.1	29 10.9	+37.7	68.6	29 32.5	+38.6	69.2	29 53.6	+39.4	69.7	30 14.1	+40.3	70.2	30 34.1	+41.2	70.8	30 53.6	+42.0	71.3	35
36	29 02.1	+35.6	66.7	29 25.6	+36.5	67.2	29 48.6	+37.3	67.7	30 11.1	+38.2	68.3	30 33.0	+39.1	68.8	30 54.4	+40.0	69.4	31 15.3	+40.8	69.9	31 35.6	+41.6	70.5	36
37	29 37.7	+35.2	65.8	30 02.1	+36.1	66.3	30 25.9	+37.0	66.8	30 49.3	+37.8	67.4	31 12.1	+38.7	67.9	31 34.4	+39.5	68.5	31 56.1	+40.4	69.1	32 17.2	+41.3	69.7	37
38	30 12.9	+34.8	64.8	30 38.2	+35.6	65.4	31 02.9	+36.6	65.9	31 27.1	+37.5	66.5	31 50.8	+38.3	67.0	32 13.9	+39.2	67.6	32 36.5	+40.1	68.2	32 58.5	+40.9	68.8	38
39	30 47.7	+34.4	63.9	31 13.8	+35.3	64.4	31 39.5	+36.2	65.0	32 04.6	+37.0	65.5	32 29.1	+38.0	66.1	32 53.1	+38.9	66.7	33 16.6	+39.7	67.3	33 39.4	+40.6	67.9	39
40	31 22.1	+33.9	62.9	31 49.1	+34.9	63.5	32 15.7	+35.7	64.0	32 41.6	+36.7	64.6	33 07.1	+37.5	65.2	33 32.0	+38.4	65.8	33 56.3	+39.2	66.4	34 20.0	+40.1	67.0	40
41	31 56.0	+33.5	62.0	32 24.0	+34.4	62.5	32 51.4	+35.3	63.1	33 18.3	+36.2	63.7	33 44.6	+37.1	64.3	34 10.4	+38.0	64.9	34 35.5	+38.9	65.5	35 00.1	+39.8	66.1	41
42	32 29.5	+33.1	61.0	32 58.4	+33.9	61.5	33 26.7	+34.9	62.1	33 54.5	+35.7	62.7	34 21.7	+36.7	63.3	34 48.4	+37.5	63.9	35 14.4	+38.5	64.6	35 39.9	+39.3	65.2	42
43	33 02.6	+32.6	60.0	33 32.3	+33.5	60.6	34 01.6	+34.3	61.1	34 30.2	+35.3	61.7	34 58.4	+36.1	62.4	35 25.9	+37.1	63.0	35 52.9	+37.9	63.6	36 19.2	+38.9	64.3	43
44	33 35.2	+32.0	59.0	34 05.8	+33.0	59.6	34 35.9	+33.9	60.2	35 05.5	+34.8	60.8	35 34.5	+35.8	61.4	36 03.0	+36.6	62.0	36 30.8	+37.6	62.7	36 58.1	+38.4	63.3	44
45	34 07.2	+31.6	58.0	34 38.8	+32.5	58.6	35 09.8	+33.4	59.1	35 40.3	+34.3	59.8	36 10.3	+35.2	60.4	36 39.6	+36.1	61.0	37 08.4	+37.0	61.7	37 36.5	+37.9	62.4	45
46	34 38.8	+31.0	56.9	35 11.3	+31.9	57.5	35 43.2	+32.9	58.1	36 14.6	+33.8	58.7	36 45.5	+34.7	59.4	37 15.7	+35.6	60.0	37 45.4	+36.5	60.7	38 14.4	+37.5	61.4	46
47	35 09.8	+30.5	55.8	35 43.2	+31.4	56.5	36 16.1	+32.3	57.1	36 48.4	+33.2	57.7	37 20.2	+34.1	58.4	37 51.3	+35.1	59.0	38 21.9	+36.0	59.7	38 51.9	+36.9	60.4	47
48	35 40.3	+30.0	54.8	36 14.6	+30.9	55.4	36 48.4	+31.8	56.0	37 21.6	+32.7	56.7	37 54.3	+33.6	57.3	38 26.4	+34.5	58.0	38 57.9	+35.5	58.7	39 28.8	+36.4	59.4	48
49	36 10.3	+29.3	53.8	36 45.5	+30.2	54.4	37 20.2	+31.1	55.0	37 54.3	+32.1	55.6	38 27.9	+33.0	56.3	39 00.9	+34.0	56.9	39 33.4	+34.9	57.6	40 05.2	+35.8	58.3	49
50	36 39.6	+28.8	52.7	37 15.7	+29.7	53.3	37 51.3	+30.6	53.9	38 26.4	+31.5	54.5	39 00.9	+32.5	55.2	39 34.9	+33.4	55.9	40 08.3	+34.3	56.6	40 41.0	+35.2	57.3	50
51	37 08.4	+28.1	51.6	37 45.4	+29.0	52.2	38 21.9	+30.0	52.8	38 57.9	+30.9	53.5	39 33.4	+31.8	54.1	40 08.3	+32.7	54.8	40 42.6	+33.6	55.5	41 16.2	+34.7	56.2	51
52	37 36.5	+27.5	50.5	38 14.4	+28.5	51.1	38 51.9	+29.3	51.7	39 28.8	+30.3	52.3	40 05.2	+31.2	53.0	40 41.0	+32.1	53.7	41 16.2	+33.1	54.4	41 50.9	+34.0	55.1	52
53	38 04.0	+26.9	49.4	38 42.9	+27.7	50.0	39 21.2	+28.7	50.6	39 59.1	+29.5	51.2	40 36.4	+30.5	51.9	41 13.1	+31.5	52.6	41 49.3	+32.4	53.3	42 24.9	+33.3	54.0	53
54	38 30.9	+26.2	48.2	39 10.6	+27.1	48.8	39 49.9	+28.0	49.4	40 28.6	+29.0	50.1	41 06.9	+29.8	50.7	41 44.6	+30.7	51.4	42 21.7	+31.7	52.1	42 58.2	+32.7	52.9	54
55	38 57.1	+25.5	47.1	39 37.7	+26.4	47.7	40 17.9	+27.3	48.3	40 57.6	+28.2	48.9	41 36.7	+29.1	49.6	42 15.3	+30.1	50.3	42 53.4	+31.0	51.0	43 30.9	+31.9	51.7	55
56	39 22.6	+24.7	45.9	40 04.1	+25.7	46.5	40 45.2	+26.5	47.1	41 25.8	+27.4	47.8	42 05.8	+28.4	48.4	42 45.4	+29.3	49.1	43 24.4	+30.3	49.8	44 02.8	+31.2	50.6	56
57	39 47.3	+24.1	44.7	40 29.8	+24.9	45.3	41 11.7	+25.9	45.9	41 53.2	+26.8	46.6	42 34.2	+27.7	47.2	43 14.7	+28.6	47.9	43 54.7	+29.5	48.6	44 34.0	+30.5	49.4	57
58	40 11.4	+23.3	43.5	40 54.7	+24.2	44.1	41 37.6	+25.0	44.7	42 20.0	+25.9	45.4	43 01.9	+26.9	46.0	43 43.3	+27.8	46.7	44 24.2	+28.7	47.4	45 04.5	+29.7	48.1	58
59	40 34.7	+22.6	42.3	41 18.9	+23.4	42.9	42 02.6	+24.3	43.5	42 45.9	+25.2	44.1	43 28.8	+26.0	44.8	44 11.1	+27.0	45.5	44 52.9	+27.9	46.2	45 34.2	+28.8	46.9	59
60	40 57.3	+21.7	41.1	41 42.3	+22.6	41.7	42 26.9	+23.5	42.3	43 11.1	+24.3	42.9	43 54.8	+25.3	43.5	44 38.1	+26.1	44.2	45 20.8	+27.1	44.9	46 03.0	+28.1	45.6	60
61	41 19.0	+21.0	39.8	42 04.9	+21.8	40.4	42 50.4	+22.6	41.0	43 35.4	+23.6	41.6	44 20.1	+24.4	42.3	45 04.2	+25.3	42.9	45 47.9	+26.2	43.6	46 31.1	+27.1	44.4	61
62	41 40.0	+20.1	38.6	42 26.7	+21.0	39.2	43 13.0	+21.8	39.7	43 59.0	+22.6	40.4	44 44.5	+23.5	41.0	45 29.5	+24.4	41.7	46 14.1	+25.3	42.4	46 58.2	+26.3	43.1	62
63	42 00.1	+19.3	37.3	42 47.7	+20.1	37.9	43 34.8	+21.0	38.5	44 21.6	+21.8	39.1	45 08.0	+22.6	39.7	45 53.9	+23.5	40.4	46 39.4	+24.4	41.0	47 24.5	+25.3	41.7	63
64	42 19.4	+18.5	36.1	43 07.8	+19.2	36.6	43 55.8	+20.0	37.2	44 43.4	+20.9	37.8	45 30.6	+21.7	38.4	46 17.4	+22.6	39.0	47 03.8	+23.5	39.7	47 49.8	+24.3	40.4	64
65	42 37.9	+17.5	34.8	43 27.0	+18.3	35.3	44 15.8	+19.2	35.9	45 04.3	+19.9	36.4	45 52.3	+20.8	37.0	46 40.0	+21.6	37.7	47 27.3	+22.5	38.3	48 14.1	+23.4	39.0	65
66	42 55.4	+16.7	33.5	43 45.3	+17.5	34.0	44 34.9	+18.2	34.5	45 24.2	+19.0	35.1	46 13.1	+19.8	35.7	47 01.6	+20.7	36.3	47 49.8	+21.5	37.0	48 37.5	+22.4	37.6	66
67	43 12.1	+15.7	32.1	44 02.8	+16.4	32.7	44 53.1	+17.3	33.2	45 43.2	+18.0	33.7	46 32.9	+18.8	34.3	47 22.3	+19.6	34.9	48 11.3	+20.4	35.6	48 59.9	+21.3	36.2	67
68	43 27.8	+14.9	30.8	44 19.2	+15.6	31.3	45 10.4	+16.4	31.8	46 01.2	+17.0	32.4	46 51.7	+17.8	32.9	47 41.9	+18.6	33.5	48 31.7	+19.4	34.2	49 21.2	+20.2	34.8	68
69	43 42.7	+13.9	29.5	44 34.8	+14.6	30.0	45 26.6	+15.3	30.5	46 18.2	+16.0	31.0	47 09.5	+16.8	31.5	48 00.5	+17.5	32.1	48 51.1	+18.3	32.7	49 41.4	+19.2	33.4	69
70	43 56.6	+12.9	28.1	44 49.4	+13.5	28.6	45 41.9	+14.3	29.1	46 34.2	+15.0	29.6	47 26.3	+15.7	30.1	48 18.0	+16.5	30.7	49 09.4	+17.3	31.3	50 00.6	+18.0	31.9	70
71	44 09.5	+11.9	26.8	45 02.9	+12.6	27.2	45 56.2	+13.2	27.7	46 49.2	+13.9	28.2	47 42.0	+14.6	28.7	48 34.5	+15.3	29.3	49 26.7	+16.1	29.8	50 18.6	+16.8	30.4	71
72	44 21.4	+11.0	25.4	45 15.5	+11.6	25.8	46 09.4	+12.2	26.3	47 03.1	+12.9	26.8	47 56.6	+13.5	27.2	48 49.8	+14.2	27.8	49 42.8	+14.9	28.3	50 35.4	+15.7	28.9	72
73	44 32.4	+10.0	24.0	45 27.1	+10.6	24.4	46 21.6	+11.2	24.9	47 16.0	+11.7	25.3	48 10.1	+12.4	25.8	49 04.0	+13.1	26.3	49 57.7	+13.7	26.8	50 51.1	+14.5	27.4	73
74	44 42.4	+8.9	22.6	45 37.7	+9.5	23.0	46 32.8	+10.1	23.4	47 27.7	+10.7	23.9	48 22.5	+11.3	24.3	49 17.1	+11.9	24.8	50 11.4	+12.6	25.3	51 05.6	+13.2	25.8	74
75	44 51.3	+7.9	21.2	45 47.2	+8.4	21.6	46 42.9	+9.0	22.0	47 38.4	+9.6	22.4	48 33.8	+10.1	22.8	49 29.0	+10.7	23.3	50 24.0	+11.4	23.8	51 18.8	+12.0	24.3	75
76	44 59.2	+6.9	19.8	45 55.6	+7.4	20.2	46 51.9	+7.9	20.6	47 48.0	+8.4	20.9	48 43.9	+9.0	21.3	49 39.7	+9.6	21.8	50 35.4	+10.1	22.2	51 30.8	+10.7	22.7	76
77	45 06.1	+5.9	18.4	46 03.0	+6.3	18.8	46 59.8	+6.8	19.1	47 56.4	+7.3	19.5	48 52.9	+7.8	19.8	49 49.3	+8.3	20.2	50 45.5	+8.8	20.7	51 41.5	+9.5	21.1	77
78	45 12.0	+4.8	17.0	46 09.3	+5.3	17.3	47 06.6	+5.6	17.7	48 03.7	+6.1	18.0	49 00.7	+6.6	18.3	49 57.6	+7.1	18.7	50 54.3	+7.6	19.1	51 51.0	+8.1	19.5	78
79	45 16.8	+3.8	15.6	46 14.6	+4.1	15.9	47 12.2	+4.6	16.2	48 09.8	+5.0	16.5	49 07.3	+5.4	16.8	50 04.7	+5.8	17.2	51 01.9	+6.4	17.5	51 59.1	+6.8	17.9	79
80	45 20.6	+2.7	14.2	46 18.7	+3.1	14.4	47 16.8	+3.4	14.7	48 14.8	+3.8	15.0	49 12.7	+4.2	15.3	50 10.5	+4.6	15.6	51 08.3	+5.0	15.9	52 05.9	+5.5	16.3	80
81	45 23.3	+1.6	12.8	46 21.8	+1.9	13.0	47 20.2	+2.3	13.2	48 18.6	+2.6	13.5	49 16.9	+3.0	13.8	50 15.1	+3.4	14.1	51 13.3	+3.7	14.4	52 11.4	+4.1	14.7	81
82	45 24.9	+0.6	11.3	46 23.7	+0.9	11.6	47 22.5	+1.2	11.8	48 21.2	+1.5	12.0	49 19.9	+1.8	12.2	50 18.5	+2.1	12.5	51 17.0	+2.5	12.8	52 15.5	+2.8	13.0	82
83	45 25.5	−0.4	9.9	46 24.6	−0.2	10.1	47 23.7	0.0	10.3	48 22.7	+0.3	10.5	49 21.7	+0.5	10.7	50 20.6	+0.8	10.9	51 19.5	+1.1	11.2	52 18.3	+1.5	11.4	83
84	45 25.1	−1.6	8.5	46 24.4	−1.4	8.7	47 23.7	−1.1	8.8	48 23.0	−0.9	9.0	49 22.2	−0.7	9.2	50 21.4	−0.4	9.4	51 20.6	−0.2	9.6	52 19.8	0.0	9.8	84
85	45 23.5	−2.6	7.1	46 23.0	−2.4	7.2	47 22.6	−2.3	7.3	48 22.1	−2.1	7.5	49 21.5	−1.8	7.6	50 21.0	−1.7	7.8	51 20.4	−1.5	8.0	52 19.8	−1.2	8.1	85
86	45 20.9	−3.6	5.7	46 20.6	−3.5	5.8	47 20.3	−3.4	5.9	48 20.0	−3.3	6.0	49 19.7	−3.1	6.1	50 19.3	−2.9	6.2	51 18.9	−2.7	6.4	52 18.6	−2.7	6.5	86
87	45 17.3	−4.7	4.2	46 17.1	−4.6	4.3	47 16.9	−4.5	4.4	48 16.7	−4.4	4.5	49 16.6	−4.4	4.6	50 16.4	−4.2	4.7	51 16.2	−4.1	4.8	52 15.9	−3.9	4.9	87
88	45 12.6	−5.8	2.8	46 12.5	−5.7	2.9	47 12.4	−5.6	2.9	48 12.3	−5.6	3.0	49 12.2	−5.5	3.0	50 12.2	−5.5	3.1	51 12.1	−5.4	3.2	52 12.0	−5.4	3.2	88
89	45 06.8	−6.8	1.4	46 06.8	−6.8	1.4	47 06.8	−6.8	1.5	48 06.7	−6.7	1.5	49 06.7	−6.7	1.5	50 06.7	−6.7	1.5	51 06.7	−6.7	1.6	52 06.6	−6.6	1.6	89
90	45 00.0	−7.8	0.0	46 00.0	−7.8	0.0	47 00.0	−7.9	0.0	48 00.0	−7.9	0.0	49 00.0	−7.9	0.0	50 00.0	−7.9	0.0	51 00.0	−7.9	0.0	52 00.0	−8.0	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	4 56.6	−42.6	95.0	4 51.4	−43.4	95.0	4 46.1	−44.1	95.1	4 40.6	−44.7	95.2	4 35.2	−45.5	95.3	4 29.6	−46.1	95.4	4 23.9	−46.8	95.5	4 18.2	−47.5	95.5	0
1	4 14.0	−42.6	95.7	4 08.0	−43.3	95.7	4 02.0	−44.1	95.8	3 55.9	−44.8	95.9	3 49.7	−45.5	95.9	3 43.5	−46.2	96.0	3 37.1	−46.8	96.1	3 30.7	−47.4	96.1	1
2	3 31.4	−42.7	96.4	3 24.7	−43.4	96.4	3 17.9	−44.1	96.5	3 11.1	−44.8	96.5	3 04.2	−45.5	96.6	2 57.3	−46.2	96.7	2 50.3	−46.8	96.7	2 43.3	−47.5	96.8	2
3	2 48.7	−42.7	97.1	2 41.3	−43.5	97.1	2 33.8	−44.1	97.2	2 26.3	−44.8	97.2	2 18.7	−45.5	97.3	2 11.1	−46.2	97.3	2 03.5	−46.8	97.3	1 55.8	−47.5	97.4	3
4	2 06.0	−42.7	97.8	1 57.8	−43.5	97.8	1 49.7	−44.2	97.8	1 41.5	−44.9	97.9	1 33.2	−45.5	97.9	1 25.0	−46.2	97.9	1 16.7	−46.8	98.0	1 08.3	−47.4	98.0	4
5	1 23.3	−42.8	98.5	1 14.4	−43.5	98.5	1 05.5	−44.1	98.5	0 56.6	−44.9	98.5	0 47.7	−45.5	98.6	0 38.8	−46.2	98.6	0 29.8	−46.8	98.6	0 20.9	−47.5	98.6	5
6	0 40.5	−42.7	99.2	0 30.9	−43.4	99.2	0 21.4	−44.2	99.2	0 11.8	−44.9	99.2	0 02.2	−45.6	99.2	0 07.4	+46.2	80.8	0 17.0	+46.9	80.8	0 26.6	+47.5	80.8	6
7	0 02.2	+42.8	80.1	0 12.5	+43.5	80.1	0 22.8	+44.2	80.1	0 33.1	+44.9	80.1	0 43.4	+45.5	80.1	0 53.6	+46.2	80.2	1 03.9	+46.8	80.2	1 14.1	+47.5	80.2	7
8	0 44.9	+42.8	79.4	0 56.0	+43.4	79.4	1 07.0	+44.1	79.4	1 18.0	+44.8	79.5	1 28.9	+45.5	79.5	1 39.8	+46.2	79.5	1 50.7	+46.9	79.5	2 01.6	+47.5	79.6	8
9	1 27.7	+42.7	78.7	1 39.4	+43.4	78.7	1 51.1	+44.2	78.8	2 02.8	+44.8	78.8	2 14.4	+45.5	78.8	2 26.0	+46.2	78.9	2 37.6	+46.8	78.9	2 49.1	+47.4	79.0	9
10	2 10.4	+42.7	78.0	2 22.8	+43.5	78.0	2 35.3	+44.1	78.1	2 47.6	+44.8	78.1	2 59.9	+45.5	78.2	3 12.2	+46.1	78.2	3 24.4	+46.8	78.3	3 36.5	+47.5	78.4	10
11	2 53.1	+42.7	77.3	3 06.3	+43.3	77.4	3 19.4	+44.1	77.4	3 32.4	+44.8	77.5	3 45.4	+45.5	77.5	3 58.3	+46.1	77.6	4 11.2	+46.7	77.7	4 24.0	+47.4	77.7	11
12	3 35.8	+42.6	76.6	3 49.6	+43.4	76.7	4 03.5	+44.0	76.7	4 17.2	+44.7	76.8	4 30.9	+45.4	76.9	4 44.4	+46.1	77.0	4 57.9	+46.8	77.0	5 11.4	+47.3	77.1	12
13	4 18.4	+42.6	75.9	4 33.0	+43.3	76.0	4 47.5	+44.0	76.0	5 01.9	+44.7	76.1	5 16.3	+45.3	76.2	5 30.5	+46.0	76.3	5 44.7	+46.6	76.4	5 58.7	+47.3	76.5	13
14	5 01.0	+42.6	75.2	5 16.3	+43.3	75.3	5 31.5	+44.0	75.4	5 46.6	+44.7	75.5	6 01.6	+45.4	75.6	6 16.5	+46.0	75.7	6 31.3	+46.7	75.8	6 46.0	+47.3	75.9	14
15	5 43.6	+42.5	74.5	5 59.6	+43.2	74.6	6 15.5	+43.9	74.7	6 31.3	+44.6	74.8	6 47.0	+45.2	74.9	7 02.5	+46.0	75.0	7 18.0	+46.6	75.1	7 33.3	+47.2	75.3	15
16	6 26.1	+42.4	73.8	6 42.8	+43.1	73.9	6 59.4	+43.8	74.0	7 15.9	+44.5	74.1	7 32.2	+45.2	74.2	7 48.5	+45.8	74.4	8 04.6	+46.5	74.5	8 20.5	+47.2	74.6	16
17	7 08.5	+42.4	73.1	7 25.9	+43.1	73.2	7 43.2	+43.8	73.3	8 00.4	+44.5	73.4	8 17.4	+45.2	73.6	8 34.3	+45.8	73.7	8 51.1	+46.4	73.9	9 07.7	+47.1	74.0	17
18	7 50.9	+42.3	72.3	8 09.0	+43.0	72.5	8 27.0	+43.7	72.6	8 44.9	+44.4	72.8	9 02.6	+45.1	72.9	9 20.1	+45.8	73.1	9 37.5	+46.4	73.2	9 54.8	+47.0	73.4	18
19	8 33.2	+42.2	71.6	8 52.0	+43.0	71.7	9 10.7	+43.7	71.9	9 29.3	+44.3	72.1	9 47.7	+45.0	72.2	10 05.9	+45.6	72.4	10 23.9	+46.3	72.6	10 41.8	+46.9	72.8	19
20	9 15.4	+42.2	70.9	9 35.0	+42.8	71.1	9 54.4	+43.5	71.2	10 13.6	+44.2	71.4	10 32.7	+44.9	71.6	10 51.5	+45.6	71.7	11 10.2	+46.0	71.9	11 28.7	+46.9	72.1	20
21	9 57.6	+42.0	70.2	10 17.8	+42.8	70.4	10 37.9	+43.5	70.5	10 57.8	+44.2	70.7	11 17.6	+44.8	70.9	11 37.1	+45.5	71.1	11 56.5	+46.1	71.3	12 15.6	+46.8	71.5	21
22	10 39.6	+42.0	69.5	11 00.6	+42.6	69.6	11 21.4	+43.3	69.8	11 42.0	+44.0	70.0	12 02.4	+44.7	70.2	12 22.6	+45.4	70.4	12 42.6	+46.0	70.6	13 02.4	+46.7	70.8	22
23	11 21.6	+41.8	68.7	11 43.2	+42.6	68.9	12 04.7	+43.3	69.1	12 26.0	+43.9	69.3	12 47.1	+44.6	69.5	13 08.0	+45.2	69.7	13 28.6	+46.0	70.0	13 49.1	+46.5	70.2	23
24	12 03.4	+41.7	68.0	12 25.8	+42.4	68.2	12 48.0	+43.1	68.4	13 09.9	+43.9	68.6	13 31.7	+44.5	68.8	13 53.2	+45.2	69.1	14 14.6	+45.8	69.3	14 35.6	+46.5	69.5	24
25	12 45.1	+41.6	67.3	13 08.2	+42.3	67.5	13 31.1	+43.0	67.7	13 53.8	+43.7	67.9	14 16.2	+44.4	68.2	14 38.4	+45.1	68.4	15 00.4	+45.7	68.6	15 22.1	+46.4	68.9	25
26	13 26.7	+41.5	66.5	13 50.5	+42.2	66.7	14 14.1	+42.9	67.0	14 37.5	+43.5	67.2	15 00.6	+44.2	67.5	15 23.5	+44.9	67.7	15 46.1	+45.6	68.0	16 08.5	+46.2	68.2	26
27	14 08.2	+41.3	65.8	14 32.7	+42.1	66.0	14 57.0	+42.7	66.3	15 21.0	+43.5	66.5	15 44.8	+44.1	66.8	16 08.4	+44.8	67.0	16 31.7	+45.4	67.3	16 54.7	+46.1	67.6	27
28	14 49.5	+41.2	65.0	15 14.8	+41.8	65.3	15 39.7	+42.6	65.5	16 04.5	+43.2	65.8	16 28.9	+44.0	66.1	16 53.2	+44.6	66.3	17 17.1	+45.3	66.6	17 40.8	+46.0	66.9	28
29	15 30.7	+41.1	64.3	15 56.6	+41.8	64.5	16 22.3	+42.5	64.8	16 47.7	+43.2	65.1	17 12.9	+43.8	65.3	17 37.8	+44.5	65.6	18 02.4	+45.2	65.9	18 26.8	+45.8	66.2	29
30	16 11.8	+40.8	63.5	16 38.4	+41.6	63.8	17 04.8	+42.2	64.1	17 30.9	+43.0	64.3	17 56.7	+43.7	64.6	18 22.3	+44.3	64.9	18 47.6	+45.0	65.2	19 12.6	+45.7	65.5	30
31	16 52.6	+40.7	62.8	17 20.0	+41.4	63.0	17 47.0	+42.2	63.3	18 13.9	+42.8	63.6	18 40.4	+43.5	63.9	19 06.6	+44.2	64.2	19 32.6	+44.8	64.5	19 58.3	+45.5	64.9	31
32	17 33.3	+40.5	62.0	18 01.4	+41.2	62.3	18 29.2	+41.9	62.6	18 56.7	+42.6	62.9	19 23.9	+43.3	63.2	19 50.8	+44.0	63.5	20 17.4	+44.7	63.8	20 43.8	+45.3	64.2	32
33	18 13.8	+40.4	61.2	18 42.6	+41.1	61.5	19 11.1	+41.7	61.8	19 39.3	+42.4	62.1	20 07.2	+43.1	62.4	20 34.8	+43.8	62.8	21 02.1	+44.5	63.1	21 29.1	+45.2	63.5	33
34	18 54.2	+40.1	60.4	19 23.7	+40.8	60.7	19 52.8	+41.6	61.0	20 21.7	+42.3	61.4	20 50.3	+43.0	61.7	21 18.6	+43.7	62.0	21 46.6	+44.3	62.4	22 14.3	+44.9	62.7	34
35	19 34.3	+39.9	59.6	20 04.5	+40.6	60.0	20 34.4	+41.3	60.3	21 04.0	+42.0	60.6	21 33.3	+42.7	60.9	22 02.3	+43.4	61.3	22 30.9	+44.1	61.7	22 59.2	+44.8	62.0	35
36	20 14.2	+39.8	58.9	20 45.1	+40.5	59.2	21 15.7	+41.2	59.5	21 46.0	+41.9	59.8	22 16.0	+42.5	60.2	22 45.7	+43.2	60.6	23 15.0	+43.9	60.9	23 44.0	+44.6	61.3	36
37	20 54.0	+39.4	58.2	21 25.6	+40.2	58.4	21 56.9	+40.9	58.7	22 27.9	+41.6	59.1	22 58.5	+42.3	59.4	23 28.9	+43.0	59.8	23 58.9	+43.7	60.2	24 28.6	+44.3	60.6	37
38	21 33.4	+39.3	57.2	22 05.8	+39.9	57.6	22 37.8	+40.6	57.9	23 09.5	+41.3	58.3	23 40.8	+42.1	58.7	24 11.9	+42.8	59.0	24 42.6	+43.4	59.4	25 12.9	+44.2	59.8	38
39	22 12.7	+39.0	56.4	22 45.7	+39.7	56.8	23 18.4	+40.5	57.1	23 50.8	+41.2	57.5	24 22.9	+41.8	57.9	24 54.7	+42.5	58.3	25 26.0	+43.3	58.7	25 57.1	+43.9	59.1	39
40	22 51.7	+38.7	55.6	23 25.4	+39.5	56.0	23 58.9	+40.1	56.3	24 32.0	+40.8	56.7	25 04.7	+41.6	57.1	25 37.2	+42.3	57.5	26 09.3	+42.9	57.9	26 41.0	+43.6	58.3	40
41	23 30.4	+38.5	54.8	24 04.9	+39.2	55.1	24 39.0	+39.9	55.5	25 12.8	+40.7	55.9	25 46.3	+41.3	56.3	26 19.5	+42.0	56.7	26 52.2	+42.7	57.1	27 24.6	+43.4	57.5	41
42	24 08.9	+38.2	53.9	24 44.1	+38.9	54.3	25 18.9	+39.7	54.7	25 53.5	+40.3	55.1	26 27.6	+41.1	55.5	27 01.5	+41.7	55.9	27 34.9	+42.4	56.3	28 08.0	+43.1	56.8	42
43	24 47.1	+37.9	53.1	25 23.0	+38.6	53.5	25 58.6	+39.3	53.9	26 33.8	+40.0	54.2	27 08.7	+40.7	54.7	27 43.2	+41.4	55.1	28 17.3	+42.2	55.5	28 51.1	+42.9	56.0	43
44	25 25.0	+37.7	52.2	26 01.6	+38.4	52.6	26 37.9	+39.0	53.0	27 13.8	+39.8	53.4	27 49.4	+40.5	53.8	28 24.6	+41.2	54.3	28 59.5	+41.8	54.7	29 34.0	+42.5	55.2	44
45	26 02.7	+37.3	51.4	26 40.0	+38.0	51.8	27 16.9	+38.8	52.2	27 53.6	+39.4	52.6	28 29.9	+40.1	53.0	29 05.8	+40.8	53.4	29 41.3	+41.6	53.9	30 16.5	+42.3	54.4	45
46	26 40.0	+36.9	50.5	27 18.0	+37.7	50.9	27 55.7	+38.4	51.3	28 33.0	+39.1	51.7	29 10.0	+39.8	52.1	29 46.6	+40.6	52.6	30 22.9	+41.2	53.1	30 58.8	+41.9	53.5	46
47	27 16.9	+36.7	49.6	27 55.7	+37.3	50.0	28 34.1	+38.0	50.4	29 12.1	+38.7	50.8	29 49.8	+39.4	51.3	30 27.2	+39.9	51.7	31 04.1	+40.9	52.2	31 40.7	+41.6	52.7	47
48	27 53.6	+36.3	48.7	28 33.0	+37.0	49.1	29 12.1	+37.7	49.5	29 50.8	+38.4	50.0	30 29.3	+39.1	50.4	31 07.3	+39.9	50.9	31 45.0	+40.5	51.4	32 22.3	+41.2	51.8	48
49	28 29.9	+35.9	47.8	29 10.0	+36.6	48.2	29 49.8	+37.4	48.6	30 29.3	+38.0	49.1	31 08.4	+38.8	49.5	31 47.2	+39.4	50.0	32 25.5	+40.2	50.5	33 03.5	+40.9	51.0	49
50	29 05.8	+35.5	46.9	29 46.6	+36.3	47.3	30 27.2	+36.9	47.8	31 07.3	+37.7	48.2	31 47.2	+38.3	48.6	32 26.6	+39.1	49.1	33 05.7	+39.8	49.6	33 44.4	+40.5	50.1	50
51	29 41.3	+35.2	46.0	30 22.9	+35.9	46.4	31 04.1	+36.6	46.8	31 45.0	+37.3	47.3	32 25.5	+38.0	47.7	33 05.7	+38.7	48.2	33 45.5	+39.4	48.7	34 24.9	+40.1	49.2	51
52	30 16.5	+34.8	45.0	30 58.8	+35.4	45.5	31 40.7	+36.1	45.9	32 22.3	+36.8	46.3	33 03.5	+37.6	46.8	33 44.4	+38.3	47.3	34 24.9	+39.0	47.8	35 05.0	+39.7	48.3	52
53	30 51.3	+34.5	44.1	31 34.2	+35.0	44.5	32 16.8	+35.8	45.0	32 59.1	+36.5	45.4	33 41.1	+37.1	45.9	34 22.7	+37.8	46.3	35 03.9	+38.5	46.9	35 44.7	+39.3	47.4	53
54	31 25.6	+33.9	43.1	32 09.2	+34.6	43.6	32 52.6	+35.3	44.0	33 35.6	+36.0	44.5	34 18.2	+36.7	44.9	35 00.5	+37.4	45.4	35 42.4	+38.1	45.9	36 24.0	+38.8	46.5	54
55	31 59.5	+33.5	42.2	32 43.8	+34.2	42.6	33 27.9	+34.8	43.0	34 11.6	+35.5	43.5	34 54.9	+36.2	44.0	35 37.9	+37.0	44.5	36 20.5	+37.7	45.0	37 02.8	+38.4	45.5	55
56	32 33.0	+33.1	41.2	33 18.0	+33.7	41.6	34 02.7	+34.4	42.1	34 47.1	+35.0	42.5	35 31.1	+35.8	43.0	36 14.9	+36.4	43.5	36 58.2	+37.2	44.0	37 41.2	+37.8	44.5	56
57	33 06.0	+32.5	40.2	33 51.7	+33.2	40.6	34 37.1	+33.8	41.1	35 22.1	+34.6	41.5	36 06.9	+35.3	42.0	36 51.3	+36.0	42.5	37 35.4	+36.6	43.0	38 19.0	+37.3	43.6	57
58	33 38.5	+32.0	39.2	34 24.9	+32.7	39.6	35 10.9	+33.4	40.1	35 56.7	+34.1	40.5	36 42.2	+34.7	41.0	37 27.3	+35.4	41.5	38 12.0	+36.2	42.0	38 56.4	+36.9	42.5	58
59	34 10.5	+31.5	38.2	34 57.6	+32.1	38.6	35 44.3	+32.8	39.0	36 30.8	+33.5	39.5	37 16.9	+34.2	40.0	38 02.7	+34.9	40.5	38 48.2	+35.6	41.0	39 33.3	+36.3	41.5	59
60	34 42.0	+31.0	37.1	35 29.7	+31.7	37.6	36 17.1	+32.4	38.0	37 04.3	+33.0	38.5	37 51.1	+33.7	38.9	38 37.6	+34.4	39.4	39 23.8	+35.0	40.0	40 09.6	+35.7	40.5	60
61	35 13.0	+30.4	36.1	36 01.4	+31.0	36.5	36 49.5	+31.7	37.0	37 37.3	+32.4	37.4	38 24.8	+33.0	37.9	39 12.0	+33.7	38.4	39 58.8	+34.5	38.9	40 45.3	+35.2	39.4	61
62	35 43.4	+29.9	35.0	36 32.4	+30.6	35.4	37 21.2	+31.2	35.9	38 09.7	+31.8	36.3	38 57.8	+32.5	36.8	39 45.7	+33.2	37.3	40 33.3	+33.8	37.8	41 20.5	+34.5	38.4	62
63	36 13.3	+29.3	34.0	37 03.0	+29.9	34.4	37 52.4	+30.5	34.8	38 41.5	+31.2	35.3	39 30.3	+31.9	35.7	40 18.9	+32.5	36.2	41 07.1	+33.3	36.7	41 55.0	+34.0	37.3	63
64	36 42.6	+28.7	32.9	37 32.9	+29.3	33.3	38 22.9	+30.0	33.7	39 12.7	+30.6	34.2	40 02.2	+31.2	34.6	40 51.4	+31.9	35.1	41 40.4	+32.5	35.6	42 29.0	+33.2	36.2	64
65	37 11.3	+28.1	31.8	38 02.2	+28.7	32.2	38 52.9	+29.3	32.6	39 43.3	+29.9	33.0	40 33.4	+30.6	33.5	41 23.3	+31.3	34.0	42 12.9	+31.9	34.5	43 02.2	+32.6	35.0	65
66	37 39.4	+27.4	30.7	38 30.9	+28.0	31.1	39 22.2	+28.6	31.5	40 13.2	+29.3	31.9	41 04.0	+29.9	32.4	41 54.6	+30.5	32.9	42 44.8	+31.2	33.3	43 34.8	+31.9	33.9	66
67	38 06.8	+26.8	29.5	38 58.9	+27.4	29.9	39 50.8	+28.0	30.3	40 42.5	+28.6	30.8	41 33.9	+29.2	31.2	42 25.1	+29.8	31.7	43 16.0	+30.5	32.2	44 06.7	+31.1	32.7	67
68	38 33.6	+26.1	28.4	39 26.3	+26.7	28.8	40 18.8	+27.3	29.2	41 11.1	+27.8	29.6	42 03.1	+28.5	30.0	42 54.9	+29.1	30.5	43 46.5	+29.7	31.0	44 37.8	+30.4	31.5	68
69	38 59.7	+25.5	27.2	39 53.0	+26.0	27.6	40 46.1	+26.5	28.0	41 38.9	+27.1	28.4	42 31.6	+27.7	28.9	43 24.0	+28.3	29.3	44 16.2	+29.0	29.8	45 08.2	+29.5	30.3	69
70	39 25.2	+24.7	26.1	40 19.0	+25.2	26.4	41 12.6	+25.8	26.8	42 06.0	+26.4	27.2	42 59.3	+26.9	27.7	43 52.3	+27.6	28.1	44 45.2	+28.1	28.6	45 37.7	+28.8	29.0	70
71	39 49.9	+24.0	24.9	40 44.2	+24.5	25.2	41 38.4	+25.0	25.6	42 32.4	+25.6	26.0	43 26.2	+26.2	26.4	44 19.9	+26.7	26.8	45 13.3	+27.3	27.3	46 06.5	+27.9	27.8	71
72	40 13.9	+23.2	23.7	41 08.7	+23.8	24.0	42 03.4	+24.3	24.4	42 58.0	+24.8	24.8	43 52.4	+25.3	25.2	44 46.6	+25.9	25.6	45 40.6	+26.5	26.0	46 34.4	+27.1	26.5	72
73	40 37.1	+22.5	22.5	41 32.5	+22.9	22.8	42 27.7	+23.4	23.2	43 22.8	+23.9	23.5	44 17.7	+24.5	23.9	45 12.5	+25.0	24.3	46 07.1	+25.5	24.7	47 01.5	+26.1	25.2	73
74	40 59.6	+21.6	21.3	41 55.4	+22.2	21.6	42 51.1	+22.7	21.9	43 46.7	+23.2	22.3	44 42.2	+23.6	22.6	45 37.5	+24.1	23.0	46 32.6	+24.7	23.4	47 27.6	+25.2	23.9	74
75	41 21.2	+20.9	20.0	42 17.6	+21.3	20.3	43 13.8	+21.7	20.6	44 09.9	+22.2	21.0	45 05.8	+22.7	21.3	46 01.6	+23.2	21.7	46 57.3	+23.7	22.1	47 52.8	+24.2	22.5	75
76	41 42.1	+20.1	18.8	42 38.9	+20.4	19.1	43 35.5	+20.9	19.4	44 32.1	+21.3	19.7	45 28.5	+21.8	20.0	46 24.8	+22.3	20.4	47 21.0	+22.8	20.8	48 17.0	+23.3	21.2	76
77	42 02.2	+19.2	17.5	42 59.3	+19.6	17.8	43 56.4	+20.0	18.1	44 53.4	+20.5	18.4	45 50.3	+20.9	18.7	46 47.1	+21.3	19.0	47 43.8	+21.7	19.4	48 40.3	+22.2	19.8	77
78	42 21.4	+18.3	16.2	43 18.9	+18.8	16.5	44 16.4	+19.1	16.8	45 13.9	+19.4	17.0	46 11.2	+19.9	17.3	47 08.4	+20.3	17.7	48 05.5	+20.8	18.0	49 02.5	+21.2	18.3	78
79	42 39.7	+17.5	14.9	43 37.7	+17.8	15.2	44 35.5	+18.2	15.4	45 33.3	+18.6	15.7	46 31.1	+18.9	16.0	47 28.7	+19.3	16.3	48 26.3	+19.6	16.6	49 23.7	+20.1	16.9	79
80	42 57.2	+16.6	13.6	43 55.5	+16.9	13.8	44 53.7	+17.2	14.1	45 51.9	+17.5	14.3	46 50.0	+17.9	14.6	47 48.0	+18.2	14.9	48 45.9	+18.7	15.2	49 43.8	+19.0	15.5	80
81	43 13.8	+15.6	12.3	44 12.4	+15.9	12.5	45 10.9	+16.2	12.7	46 09.4	+16.5	13.0	47 07.9	+16.8	13.2	48 06.2	+17.1	13.5	49 04.6	+17.5	13.7	50 02.8	+17.9	14.0	81
82	43 29.4	+14.7	11.0	44 28.3	+15.0	11.2	45 27.1	+15.3	11.4	46 26.0	+15.5	11.6	47 24.7	+15.8	11.8	48 23.4	+16.1	12.0	49 22.1	+16.4	12.2	50 20.7	+16.7	12.5	82
83	43 44.1	+13.8	9.6	44 43.3	+14.0	9.8	45 42.4	+14.2	10.0	46 41.5	+14.5	10.2	47 40.5	+14.7	10.3	48 39.5	+15.0	10.6	49 38.5	+15.2	10.8	50 37.4	+15.5	11.0	83
84	43 57.9	+12.9	8.3	44 57.3	+13.0	8.4	45 56.6	+13.2	8.6	46 56.0	+13.4	8.7	47 55.2	+13.7	8.9	48 54.5	+13.9	9.0	49 53.7	+14.1	9.2	50 52.9	+14.4	9.5	84
85	44 10.8	+11.8	6.9	45 10.3	+12.0	7.0	46 09.8	+12.2	7.2	47 09.4	+12.3	7.3	48 08.9	+12.5	7.4	49 08.4	+12.7	7.6	50 07.8	+12.9	7.8	51 07.3	+13.0	7.9	85
86	44 22.6	+10.9	5.6	45 22.3	+11.0	5.7	46 22.0	+11.1	5.8	47 21.7	+11.3	5.9	48 21.4	+11.4	6.0	49 21.1	+11.5	6.1	50 20.7	+11.7	6.2	51 20.3	+11.9	6.4	86
87	44 33.5	+9.8	4.2	45 33.3	+10.0	4.3	46 33.1	+10.1	4.3	47 33.0	+10.1	4.4	48 32.8	+10.3	4.5	49 32.6	+10.3	4.6	50 32.4	+10.4	4.7	51 32.2	+10.6	4.8	87
88	44 43.3	+8.9	2.8	45 43.3	+8.9	2.8	46 43.2	+8.9	2.9	47 43.1	+9.0	3.0	48 43.0	+9.1	3.0	49 42.9	+9.2	3.1	50 42.8	+9.3	3.1	51 42.8	+9.2	3.2	88
89	44 52.2	+7.8	1.4	45 52.2	+7.8	1.4	46 52.1	+7.9	1.5	47 52.1	+7.9	1.5	48 52.1	+7.9	1.5	49 52.1	+7.9	1.5	50 52.1	+7.9	1.6	51 52.0	+8.0	1.6	89
90	45 00.0	+6.8	0.0	46 00.0	+6.8	0.0	47 00.0	+6.8	0.0	48 00.0	+6.7	0.0	49 00.0	+6.7	0.0	50 00.0	+6.7	0.0	51 00.0	+6.7	0.0	52 00.0	+6.6	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z ; L.H.A. less than 180°............Zn=180°+Z } LATITUDE **SAME** NAME AS DECLINATION L.H.A. 97°, 263°

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LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	4 14.3	+42.5	94.3	4 09.8	+43.3	94.3	4 05.3	+44.0	94.4	4 00.6	+44.7	94.5	3 55.9	+45.4	94.5	3 51.2	+46.0	94.6	3 46.3	+46.7	94.7	3 41.4	+47.4	94.7	0
1	4 56.8	+42.5	93.5	4 53.1	+43.2	93.6	4 49.3	+43.9	93.7	4 45.3	+44.7	93.8	4 41.3	+45.3	93.9	4 37.2	+46.0	94.0	4 33.0	+46.7	94.0	4 28.8	+47.3	94.1	1
2	5 39.3	+42.5	92.8	5 36.3	+43.2	92.9	5 33.2	+43.9	93.0	5 30.0	+44.6	93.1	5 26.6	+45.3	93.2	5 23.2	+46.0	93.3	5 19.7	+46.6	93.4	5 16.1	+47.3	93.5	2
3	6 21.8	+42.3	92.1	6 19.5	+43.1	92.2	6 17.1	+43.8	92.3	6 14.6	+44.5	92.5	6 11.9	+45.3	92.6	6 09.2	+45.9	92.7	6 06.3	+46.6	92.8	6 03.4	+47.2	92.9	3
4	7 04.1	+42.3	91.4	7 02.6	+43.0	91.5	7 00.9	+43.8	91.7	6 59.1	+44.5	91.8	6 57.2	+45.2	91.9	6 55.1	+45.9	92.0	6 52.9	+46.6	92.1	6 50.6	+47.2	92.3	4
5	7 46.4	+42.2	90.7	7 45.6	+43.0	90.8	7 44.7	+43.7	91.0	7 43.6	+44.4	91.1	7 42.4	+45.1	91.2	7 41.0	+45.8	91.4	7 39.5	+46.5	91.5	7 37.8	+47.2	91.6	5
6	8 28.6	+42.2	90.0	8 28.6	+42.9	90.1	8 28.4	+43.6	90.3	8 28.0	+44.4	90.4	8 27.5	+45.1	90.6	8 26.8	+45.8	90.7	8 26.0	+46.4	90.9	8 25.0	+47.1	91.0	6
7	9 10.8	+42.1	89.3	9 11.5	+42.8	89.4	9 12.0	+43.6	89.6	9 12.4	+44.2	89.7	9 12.6	+44.9	89.9	9 12.6	+45.7	90.0	9 12.4	+46.4	90.2	9 12.1	+47.0	90.4	7
8	9 52.9	+41.9	88.5	9 54.3	+42.7	88.7	9 55.6	+43.4	88.9	9 56.6	+44.2	89.1	9 57.5	+44.9	89.2	9 58.3	+45.6	89.4	9 58.8	+46.3	89.6	9 59.1	+47.0	89.8	8
9	10 34.8	+41.9	87.8	10 37.0	+42.7	88.0	10 39.0	+43.4	88.2	10 40.8	+44.1	88.4	10 42.4	+44.9	88.6	10 43.9	+45.5	88.7	10 45.1	+46.2	88.9	10 46.1	+46.9	89.1	9
10	11 16.7	+41.8	87.1	11 19.7	+42.5	87.3	11 22.4	+43.3	87.5	11 24.9	+44.0	87.7	11 27.3	+44.7	87.9	11 29.4	+45.4	88.1	11 31.3	+46.1	88.3	11 33.0	+46.8	88.5	10
11	11 58.5	+41.6	86.3	12 02.2	+42.4	86.6	12 05.7	+43.1	86.8	12 08.9	+43.9	87.0	12 12.0	+44.6	87.2	12 14.8	+45.3	87.4	12 17.4	+46.0	87.6	12 19.8	+46.7	87.9	11
12	12 40.1	+41.5	85.6	12 44.6	+42.3	85.8	12 48.8	+43.1	86.1	12 52.8	+43.8	86.3	12 56.6	+44.5	86.5	13 00.1	+45.3	86.7	13 03.4	+46.0	87.0	13 06.5	+46.6	87.2	12
13	13 21.6	+41.4	84.9	13 26.9	+42.2	85.1	13 31.9	+42.9	85.3	13 36.6	+43.7	85.6	13 41.1	+44.4	85.8	13 45.4	+45.1	86.1	13 49.4	+45.8	86.3	13 53.1	+46.5	86.6	13
14	14 03.0	+41.3	84.1	14 09.1	+42.0	84.4	14 14.8	+42.8	84.6	14 20.3	+43.5	84.9	14 25.5	+44.3	85.1	14 30.5	+45.0	85.4	14 35.2	+45.7	85.6	14 39.6	+46.4	85.9	14
15	14 44.3	+41.1	83.4	14 51.1	+41.9	83.6	14 57.6	+42.7	83.9	15 03.8	+43.5	84.2	15 09.8	+44.2	84.4	15 15.5	+44.9	84.7	15 20.9	+45.6	85.0	15 26.0	+46.3	85.3	15
16	15 25.4	+41.0	82.6	15 33.0	+41.7	82.9	15 40.3	+42.5	83.2	15 47.3	+43.2	83.5	15 54.0	+44.0	83.7	16 00.4	+44.7	84.0	16 06.5	+45.4	84.3	16 12.3	+46.1	84.6	16
17	16 06.4	+40.8	81.9	16 14.7	+41.6	82.1	16 22.8	+42.3	82.4	16 30.5	+43.1	82.7	16 38.0	+43.8	83.0	16 45.1	+44.6	83.3	16 51.9	+45.3	83.6	16 58.4	+46.1	83.9	17
18	16 47.2	+40.6	81.1	16 56.3	+41.4	81.4	17 05.1	+42.2	81.7	17 13.6	+43.0	82.0	17 21.8	+43.7	82.3	17 29.7	+44.4	82.6	17 37.2	+45.2	82.9	17 44.5	+45.8	83.3	18
19	17 27.8	+40.5	80.3	17 37.7	+41.3	80.6	17 47.3	+42.1	81.0	17 56.6	+42.8	81.3	18 05.5	+43.6	81.6	18 14.1	+44.3	81.9	18 22.4	+45.0	82.2	18 30.3	+45.8	82.6	19
20	18 08.3	+40.2	79.5	18 19.0	+41.0	79.9	18 29.4	+41.8	80.2	18 39.4	+42.6	80.5	18 49.1	+43.4	80.9	18 58.4	+44.2	81.2	19 07.4	+44.9	81.5	19 16.1	+45.6	81.9	20
21	18 48.5	+40.1	78.8	19 00.0	+40.9	79.1	19 11.2	+41.7	79.4	19 22.0	+42.5	79.8	19 32.5	+43.2	80.1	19 42.6	+43.9	80.5	19 52.3	+44.7	80.8	20 01.7	+45.4	81.2	21
22	19 28.6	+39.8	78.0	19 40.9	+40.7	78.3	19 52.9	+41.4	78.7	20 04.5	+42.2	79.0	20 15.7	+43.0	79.4	20 26.5	+43.8	79.8	20 37.0	+44.5	80.1	20 47.1	+45.3	80.5	22
23	20 08.4	+39.7	77.2	20 21.6	+40.4	77.5	20 34.3	+41.3	77.9	20 46.7	+42.0	78.3	20 58.7	+42.8	78.7	21 10.3	+43.6	79.0	21 21.5	+44.4	79.4	21 32.4	+45.0	79.8	23
24	20 48.1	+39.4	76.4	21 02.0	+40.3	76.8	21 15.6	+41.0	77.1	21 28.7	+41.9	77.5	21 41.5	+42.6	77.9	21 53.9	+43.4	78.3	22 05.9	+44.1	78.7	22 17.4	+44.9	79.1	24
25	21 27.5	+39.2	75.6	21 42.3	+40.0	76.0	21 56.6	+40.8	76.3	22 10.6	+41.6	76.7	22 24.1	+42.4	77.1	22 37.3	+43.2	77.5	22 50.0	+44.0	78.0	23 02.3	+44.7	78.4	25
26	22 06.7	+38.9	74.8	22 22.3	+39.7	75.2	22 37.4	+40.6	75.6	22 52.2	+41.4	76.0	23 06.5	+42.2	76.4	23 20.5	+42.9	76.8	23 34.0	+43.7	77.2	23 47.0	+44.5	77.6	26
27	22 45.6	+38.7	73.9	23 02.0	+39.5	74.3	23 18.0	+40.3	74.8	23 33.6	+41.1	75.2	23 48.7	+41.9	75.6	24 03.4	+42.7	76.0	24 17.7	+43.5	76.5	24 31.5	+44.3	76.9	27
28	23 24.3	+38.4	73.1	23 41.5	+39.3	73.5	23 58.3	+40.1	73.9	24 14.7	+40.9	74.4	24 30.6	+41.7	74.8	24 46.1	+42.5	75.3	25 01.2	+43.3	75.7	25 15.8	+44.0	76.2	28
29	24 02.7	+38.2	72.3	24 20.8	+39.0	72.7	24 38.4	+39.8	73.1	24 55.6	+40.6	73.6	25 12.3	+41.5	74.0	25 28.6	+42.3	74.5	25 44.5	+43.0	74.9	25 59.8	+43.8	75.4	29
30	24 40.9	+37.8	71.4	24 59.8	+38.6	71.9	25 18.2	+39.5	72.3	25 36.2	+40.4	72.8	25 53.8	+41.2	73.2	26 10.9	+41.9	73.7	26 27.5	+42.8	74.2	26 43.6	+43.6	74.6	30
31	25 18.7	+37.6	70.6	25 38.4	+38.4	71.0	25 57.7	+39.3	71.5	26 16.6	+40.0	71.9	26 35.0	+40.8	72.4	26 52.8	+41.7	72.9	27 10.3	+42.5	73.4	27 27.2	+43.3	73.9	31
32	25 56.3	+37.2	69.7	26 16.8	+38.1	70.2	26 37.0	+38.9	70.6	26 56.6	+39.8	71.1	27 15.8	+40.6	71.6	27 34.5	+41.5	72.1	27 52.8	+42.2	72.6	28 10.5	+43.0	73.1	32
33	26 33.5	+36.9	68.8	26 54.9	+37.8	69.3	27 15.9	+38.6	69.8	27 36.4	+39.5	70.3	27 56.4	+40.3	70.8	28 16.0	+41.1	71.3	28 35.0	+41.9	71.8	28 53.5	+42.7	72.3	33
34	27 10.4	+36.6	67.9	27 32.7	+37.4	68.4	27 54.5	+38.3	68.9	28 15.9	+39.1	69.4	28 36.7	+40.0	69.9	28 57.1	+40.8	70.4	29 16.9	+41.7	71.0	29 36.2	+42.5	71.5	34
35	27 47.0	+36.2	67.0	28 10.1	+37.1	67.5	28 32.8	+38.0	68.0	28 55.0	+38.8	68.5	29 16.7	+39.7	69.1	29 37.9	+40.5	69.6	29 58.6	+41.3	70.1	30 18.7	+42.1	70.7	35
36	28 23.2	+35.9	66.1	28 47.2	+36.8	66.6	29 10.8	+37.6	67.2	29 33.8	+38.5	67.7	29 56.4	+39.3	68.2	30 18.4	+40.2	68.7	30 39.9	+41.0	69.3	31 00.8	+41.8	69.8	36
37	28 59.1	+35.5	65.2	29 24.0	+36.4	65.7	29 48.4	+37.2	66.3	30 12.3	+38.1	66.8	30 35.7	+38.9	67.3	30 58.6	+39.8	67.9	31 20.9	+40.6	68.4	31 42.6	+41.5	69.0	37
38	29 34.6	+35.1	64.3	30 00.4	+35.9	64.8	30 25.6	+36.9	65.3	30 50.4	+37.7	65.9	31 14.6	+38.6	66.4	31 38.4	+39.4	67.0	32 01.5	+40.3	67.6	32 24.1	+41.2	68.2	38
39	30 09.7	+34.7	63.4	30 36.3	+35.6	63.9	31 02.5	+36.4	64.4	31 28.1	+37.4	65.0	31 53.2	+38.2	65.5	32 17.8	+39.1	66.1	32 41.8	+39.9	66.7	33 05.3	+40.7	67.3	39
40	30 44.4	+34.3	62.4	31 11.9	+35.2	63.0	31 38.9	+36.1	63.5	32 05.5	+36.9	64.1	32 31.4	+37.8	64.6	32 56.9	+38.6	65.2	33 21.7	+39.6	65.8	33 46.0	+40.4	66.4	40
41	31 18.7	+33.8	61.5	31 47.1	+34.7	62.0	32 15.0	+35.6	62.6	32 42.4	+36.5	63.1	33 09.2	+37.4	63.7	33 35.5	+38.3	64.3	34 01.3	+39.1	64.9	34 26.4	+40.0	65.5	41
42	31 52.5	+33.4	60.5	32 21.8	+34.3	61.0	32 50.6	+35.2	61.6	33 18.9	+36.1	62.2	33 46.6	+37.0	62.8	34 13.8	+37.8	63.4	34 40.4	+38.7	64.0	35 06.4	+39.6	64.6	42
43	32 25.9	+33.0	59.5	32 56.1	+33.9	60.1	33 25.8	+34.7	60.6	33 55.0	+35.6	61.2	34 23.6	+36.5	61.8	34 51.6	+37.4	62.4	35 19.1	+38.3	63.1	35 46.0	+39.2	63.7	43
44	32 58.9	+32.4	58.5	33 30.0	+33.3	59.1	34 00.5	+34.3	59.7	34 30.6	+35.1	60.2	35 00.1	+36.0	60.9	35 29.0	+37.0	61.5	35 57.4	+37.8	62.1	36 25.2	+38.7	62.8	44
45	33 31.3	+32.0	57.5	34 03.3	+32.9	58.1	34 34.8	+33.8	58.7	35 05.7	+34.7	59.3	35 36.1	+35.6	59.9	36 06.0	+36.4	60.5	36 35.2	+37.4	61.1	37 03.9	+38.2	61.8	45
46	34 03.3	+31.5	56.5	34 36.2	+32.4	57.1	35 08.6	+33.2	57.7	35 40.4	+34.1	58.3	36 11.7	+35.0	58.9	36 42.4	+36.0	59.5	37 12.6	+36.8	60.2	37 42.1	+37.8	60.8	46
47	34 34.8	+30.9	55.5	35 08.6	+31.8	56.0	35 41.8	+32.7	56.6	36 14.5	+33.7	57.2	36 46.7	+34.6	57.9	37 18.4	+35.4	58.5	37 49.4	+36.4	59.2	38 19.9	+37.2	59.8	47
48	35 05.7	+30.4	54.4	35 40.4	+31.3	55.0	36 14.5	+32.2	55.6	36 48.2	+33.1	56.2	37 21.3	+34.0	56.8	37 53.8	+34.9	57.5	38 25.8	+35.8	58.2	38 57.1	+36.7	58.8	48
49	35 36.1	+29.9	53.4	36 11.7	+30.7	53.9	36 46.7	+31.7	54.5	37 21.3	+32.5	55.2	37 55.3	+33.4	55.8	38 28.7	+34.4	56.5	39 01.6	+35.2	57.1	39 33.8	+36.2	57.8	49
50	36 06.0	+29.2	52.3	36 42.4	+30.2	52.9	37 18.4	+31.0	53.5	37 53.8	+32.0	54.1	38 28.7	+32.9	54.7	39 03.1	+33.7	55.4	39 36.8	+34.7	56.1	40 10.0	+35.6	56.8	50
51	36 35.2	+28.7	51.2	37 12.6	+29.5	51.8	37 49.4	+30.5	52.4	38 25.8	+31.3	53.0	39 01.6	+32.2	53.7	39 36.8	+33.2	54.3	40 11.5	+34.1	55.0	40 45.6	+35.1	55.7	51
52	37 03.9	+28.0	50.1	37 42.1	+28.9	50.7	38 19.9	+29.8	51.3	38 57.1	+30.7	51.9	39 33.8	+31.7	52.6	40 10.0	+32.6	53.2	40 45.6	+33.5	53.9	41 20.7	+34.4	54.6	52
53	37 31.9	+27.4	49.0	38 11.0	+28.3	49.6	38 49.7	+29.2	50.2	39 27.8	+30.1	50.8	40 05.5	+31.0	51.5	40 42.6	+31.9	52.1	41 19.1	+32.9	52.8	41 55.1	+33.7	53.5	53
54	37 59.3	+26.8	47.9	38 39.3	+27.7	48.5	39 18.9	+28.5	49.1	39 57.9	+29.5	49.7	40 36.5	+30.3	50.4	41 14.5	+31.3	51.0	41 52.0	+32.1	51.7	42 28.8	+33.1	52.4	54
55	38 26.1	+26.1	46.7	39 07.0	+26.9	47.3	39 47.4	+27.9	47.9	40 27.4	+28.7	48.6	41 06.8	+29.7	49.2	41 45.8	+30.5	49.9	42 24.1	+31.5	50.6	43 01.9	+32.5	51.3	55
56	38 52.2	+25.4	45.6	39 33.9	+26.3	46.2	40 15.3	+27.1	46.8	40 56.1	+28.1	47.4	41 36.5	+28.9	48.1	42 16.3	+29.9	48.7	42 55.6	+30.8	49.4	43 34.4	+31.7	50.1	56
57	39 17.6	+24.7	44.4	40 00.2	+25.6	45.0	40 42.4	+26.5	45.6	41 24.2	+27.3	46.2	42 05.4	+28.2	46.9	42 46.2	+29.1	47.5	43 26.4	+30.1	48.2	44 06.1	+31.0	49.0	57
58	39 42.3	+23.9	43.2	40 25.8	+24.8	43.8	41 08.9	+25.6	44.4	41 51.5	+26.5	45.0	42 33.6	+27.5	45.7	43 15.3	+28.4	46.4	43 56.5	+29.2	47.0	44 37.1	+30.2	47.8	58
59	40 06.2	+23.3	42.0	40 50.6	+24.1	42.6	41 34.5	+25.0	43.2	42 18.0	+25.8	43.8	43 01.1	+26.7	44.5	43 43.7	+27.6	45.1	44 25.7	+28.5	45.8	45 07.3	+29.4	46.5	59
60	40 29.5	+22.4	40.8	41 14.7	+23.3	41.4	41 59.5	+24.1	42.0	42 43.8	+25.0	42.6	43 27.8	+25.9	43.2	44 11.3	+26.7	43.9	44 54.2	+27.7	44.6	45 36.7	+28.6	45.3	60
61	40 51.9	+21.7	39.6	41 38.0	+22.5	40.2	42 23.6	+23.3	40.8	43 08.8	+24.2	41.4	43 53.7	+25.0	42.0	44 38.0	+26.0	42.7	45 21.9	+26.8	43.3	46 05.3	+27.7	44.0	61
62	41 13.6	+20.9	38.4	42 00.5	+21.6	38.9	42 46.9	+22.5	39.5	43 33.0	+23.4	40.1	44 18.7	+24.2	40.7	45 04.0	+25.0	41.4	45 48.7	+26.0	42.1	46 33.0	+26.9	42.8	62
63	41 34.5	+20.0	37.1	42 22.1	+20.9	37.7	43 09.4	+21.7	38.2	43 56.4	+22.5	38.8	44 42.9	+23.3	39.4	45 29.0	+24.2	40.1	46 14.7	+25.1	40.8	46 59.9	+26.0	41.5	63
64	41 54.5	+19.2	35.9	42 43.0	+20.0	36.4	43 31.1	+20.8	37.0	44 18.9	+21.6	37.5	45 06.2	+22.5	38.1	45 53.2	+23.3	38.8	46 39.8	+24.1	39.4	47 25.9	+25.0	40.1	64
65	42 13.7	+18.4	34.6	43 03.0	+19.1	35.1	43 51.9	+19.9	35.7	44 40.5	+20.7	36.2	45 28.7	+21.5	36.8	46 16.5	+22.4	37.5	47 03.9	+23.2	38.1	47 50.9	+24.1	38.8	65
66	42 32.1	+17.5	33.3	43 22.1	+18.2	33.8	44 11.8	+19.0	34.3	45 01.2	+19.7	34.9	45 50.2	+20.6	35.5	46 38.9	+21.3	36.1	47 27.1	+22.3	36.7	48 15.0	+23.1	37.4	66
67	42 49.6	+16.6	32.0	43 40.3	+17.3	32.5	44 30.8	+18.0	33.0	45 20.9	+18.8	33.6	46 10.8	+19.5	34.1	47 00.2	+20.4	34.7	47 49.4	+21.2	35.4	48 38.1	+22.1	36.0	67
68	43 06.2	+15.6	30.7	43 57.6	+16.4	31.2	44 48.9	+17.1	31.7	45 39.7	+17.9	32.2	46 30.3	+18.7	32.8	47 20.6	+19.4	33.3	48 10.6	+20.2	34.0	49 00.2	+21.0	34.6	68
69	43 21.8	+14.8	29.4	44 14.0	+15.4	29.8	45 05.9	+16.2	30.3	45 57.6	+16.8	30.8	46 49.0	+17.5	31.4	47 40.0	+18.4	32.0	48 30.8	+19.1	32.5	49 21.2	+19.9	33.2	69
70	43 36.6	+13.8	28.0	44 29.4	+14.5	28.5	45 22.1	+15.1	29.0	46 14.4	+15.9	29.5	47 06.5	+16.6	30.0	47 58.4	+17.3	30.5	48 49.9	+18.0	31.1	49 41.1	+18.8	31.7	70
71	43 50.4	+12.9	26.7	44 43.9	+13.5	27.1	45 37.2	+14.1	27.6	46 30.3	+14.8	28.1	47 23.1	+15.5	28.6	48 15.7	+16.2	29.1	49 07.9	+17.0	29.7	49 59.9	+17.7	30.2	71
72	44 03.3	+11.8	25.3	44 57.4	+12.5	25.7	45 51.3	+13.2	26.2	46 45.1	+13.7	26.7	47 38.6	+14.4	27.1	48 31.9	+15.1	27.7	49 24.9	+15.8	28.2	50 17.6	+16.6	28.8	72
73	44 15.1	+10.9	24.0	45 09.9	+11.5	24.4	46 04.5	+12.0	24.8	46 58.8	+12.7	25.2	47 53.0	+13.3	25.7	48 47.0	+13.9	26.2	49 40.7	+14.6	26.7	50 34.2	+15.3	27.2	73
74	44 26.0	+10.0	22.6	45 21.4	+10.4	23.0	46 15.5	+11.6	23.4	47 11.5	+11.6	23.8	48 06.3	+12.2	24.2	49 00.9	+12.9	24.7	49 55.3	+13.5	25.2	50 49.5	+14.2	25.7	74
75	44 36.0	+8.9	21.2	45 31.8	+9.4	21.6	46 27.6	+9.9	21.9	47 23.1	+10.5	22.3	48 18.5	+11.1	22.8	49 13.8	+11.6	23.2	50 08.8	+12.3	23.7	51 03.7	+12.9	24.2	75
76	44 44.9	+7.8	19.8	45 41.2	+8.4	20.1	46 37.5	+8.9	20.5	47 33.6	+9.4	20.9	48 29.6	+9.9	21.3	49 25.4	+10.5	21.7	50 21.1	+11.1	22.2	51 16.6	+11.6	22.6	76
77	44 52.7	+6.9	18.4	45 49.6	+7.3	18.7	46 46.4	+7.8	19.1	47 43.0	+8.3	19.4	48 39.5	+8.8	19.8	49 35.9	+9.3	20.2	50 32.2	+9.8	20.6	51 28.2	+10.4	21.0	77
78	44 59.6	+5.8	17.0	45 56.9	+6.3	17.3	46 54.2	+6.6	17.6	47 51.3	+7.1	17.9	48 48.3	+7.6	18.3	49 45.2	+8.1	18.7	50 42.0	+8.6	19.1	51 38.6	+9.2	19.5	78
79	45 05.4	+4.8	15.6	46 03.2	+5.1	15.9	47 00.8	+5.6	16.2	47 58.4	+6.0	16.5	48 55.9	+6.4	16.8	49 53.3	+6.9	17.1	50 50.6	+7.3	17.5	51 47.8	+7.8	17.9	79
80	45 10.2	+3.7	14.2	46 08.3	+4.1	14.4	47 06.4	+4.4	14.7	48 04.4	+4.8	15.0	49 02.3	+5.2	15.3	50 00.2	+5.6	15.6	50 57.9	+6.1	15.9	51 55.6	+6.4	16.3	80
81	45 13.9	+2.7	12.8	46 12.4	+3.0	13.0	47 10.8	+3.4	13.2	48 09.2	+3.7	13.5	49 07.5	+4.0	13.8	50 05.8	+4.4	14.0	51 04.0	+4.7	14.3	52 02.0	+5.2	14.6	81
82	45 16.6	+1.6	11.3	46 15.4	+1.9	11.5	47 14.2	+2.2	11.8	48 12.9	+2.5	12.0	49 11.5	+2.8	12.2	50 10.2	+3.1	12.5	51 08.7	+3.5	12.7	52 07.2	+3.8	13.0	82
83	45 18.2	+0.6	9.9	46 17.3	+0.8	10.1	47 16.4	+1.0	10.3	48 15.4	+1.3	10.5	49 14.3	+1.6	10.7	50 13.3	+1.9	10.9	51 12.2	+2.1	11.2	52 11.0	+2.5	11.4	83
84	45 18.8	−0.5	8.5	46 18.1	−0.3	8.7	47 17.4	−0.1	8.8	48 16.7	+0.1	9.0	49 15.9	+0.4	9.2	50 15.2	+0.6	9.4	51 14.3	+0.9	9.6	52 13.5	+1.1	9.8	84
85	45 18.3	−1.6	7.1	46 17.8	−1.4	7.2	47 17.3	−1.2	7.3	48 16.8	−1.0	7.5	49 16.3	−0.8	7.6	50 15.8	−0.7	7.8	51 15.2	−0.4	8.0	52 14.6	−0.2	8.1	85
86	45 16.7	−2.6	5.7	46 16.4	−2.4	5.8	47 16.1	−2.3	5.9	48 15.8	−2.2	6.0	49 15.5	−2.1	6.1	50 15.1	−1.9	6.2	51 14.8	−1.8	6.4	52 14.4	−1.6	6.5	86
87	45 14.1	−3.6	4.2	46 14.0	−3.6	4.3	47 13.8	−3.5	4.4	48 13.6	−3.4	4.5	49 13.4	−3.3	4.6	50 13.2	−3.1	4.7	51 13.0	−3.0	4.8	52 12.8	−2.9	4.9	87
88	45 10.5	−4.7	2.8	46 10.4	−4.7	2.9	47 10.3	−4.6	2.9	48 10.2	−4.5	3.0	49 10.1	−4.4	3.0	50 10.1	−4.4	3.1	51 10.0	−4.4	3.2	52 09.9	−4.3	3.2	88
89	45 05.8	−5.8	1.4	46 05.7	−5.7	1.4	47 05.7	−5.7	1.5	48 05.7	−5.7	1.5	49 05.7	−5.7	1.5	50 05.7	−5.7	1.6	51 05.6	−5.6	1.6	52 05.6	−5.6	1.6	89
90	45 00.0	−6.8	0.0	46 00.0	−6.8	0.0	47 00.0	−6.8	0.0	48 00.0	−6.8	0.0	49 00.0	−6.9	0.0	50 00.0	−6.9	0.0	51 00.0	−6.9	0.0	52 00.0	−6.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec
0	4 14.3	−42.5	94.3	4 09.8	−43.3	94.3	4 05.3	−44.0	94.4	4 00.6	−44.7	94.5	3 55.9	−45.4	94.5	3 51.2	−46.1	94.6	3 46.3	−46.7	94.7	3 41.4	−47.4	94.7	0
1	3 31.8	−42.6	95.0	3 26.5	−43.3	95.0	3 21.3	−44.1	95.1	3 15.9	−44.7	95.1	3 10.5	−45.4	95.2	3 05.1	−46.1	95.2	2 59.6	−46.8	95.3	2 54.0	−47.4	95.3	1
2	2 49.2	−42.6	95.7	2 43.2	−43.3	95.7	2 37.2	−44.0	95.8	2 31.2	−44.8	95.8	2 25.1	−45.4	95.9	2 19.0	−46.1	95.9	2 12.8	−46.8	95.9	2 06.6	−47.4	96.0	2
3	2 06.6	−42.7	96.4	1 59.9	−43.4	96.4	1 53.2	−44.1	96.4	1 46.4	−44.7	96.5	1 39.7	−45.5	96.5	1 32.9	−46.2	96.5	1 26.0	−46.8	96.6	1 19.2	−47.5	96.6	3
4	1 23.9	−42.6	97.1	1 16.5	−43.4	97.1	1 09.1	−44.1	97.1	1 01.7	−44.8	97.1	0 54.2	−45.5	97.2	0 46.7	−46.1	97.2	0 39.2	−46.8	97.2	0 31.7	−47.4	97.2	4
5	0 41.3	−42.7	97.8	0 33.1	−43.3	97.8	0 25.0	−44.1	97.8	0 16.9	−44.8	97.8	0 08.7	−45.4	97.8	0 00.6	−46.2	97.8	0 07.6	+46.8	82.2	0 15.7	+47.4	82.2	5
6	0 01.4	+42.6	81.5	0 10.2	+43.4	81.5	0 19.1	+44.1	81.5	0 27.9	+44.8	81.5	0 36.7	+45.5	81.5	0 45.6	+46.1	81.6	0 54.4	+46.7	81.6	1 03.1	+47.5	81.6	6
7	0 44.0	+42.7	80.8	0 53.6	+43.4	80.8	1 03.2	+44.0	80.9	1 12.7	+44.8	80.9	1 22.2	+45.5	80.9	1 31.7	+46.1	80.9	1 41.1	+46.8	80.9	1 50.6	+47.4	81.0	7
8	1 26.7	+42.6	80.1	1 37.0	+43.3	80.1	1 47.2	+44.1	80.2	1 57.5	+44.7	80.2	2 07.7	+45.4	80.2	2 17.8	+46.1	80.3	2 27.9	+46.8	80.3	2 38.0	+47.4	80.4	8
9	2 09.3	+42.7	79.4	2 20.3	+43.4	79.5	2 31.3	+44.0	79.5	2 42.2	+44.8	79.5	2 53.1	+45.4	79.6	3 03.9	+46.1	79.6	3 14.7	+46.7	79.7	3 25.4	+47.4	79.7	9
10	2 52.0	+42.5	78.7	3 03.7	+43.3	78.8	3 15.3	+44.1	78.8	3 27.0	+44.7	78.9	3 38.5	+45.4	78.9	3 50.0	+46.0	79.0	4 01.4	+46.7	79.1	4 12.8	+47.3	79.1	10
11	3 34.5	+42.6	78.0	3 47.0	+43.3	78.1	3 59.4	+43.9	78.1	4 11.7	+44.6	78.2	4 23.9	+45.3	78.3	4 36.0	+46.1	78.4	4 48.1	+46.7	78.4	5 00.1	+47.3	78.5	11
12	4 17.1	+42.5	77.3	4 30.3	+43.2	77.4	4 43.3	+44.0	77.4	4 56.3	+44.7	77.5	5 09.2	+45.4	77.6	5 22.1	+45.9	77.7	5 34.8	+46.6	77.8	5 47.4	+47.3	77.9	12
13	4 59.6	+42.5	76.6	5 13.5	+43.2	76.7	5 27.3	+43.9	76.8	5 41.0	+44.6	76.9	5 54.6	+45.2	77.0	6 08.0	+46.0	77.1	6 21.4	+46.6	77.2	6 34.7	+47.2	77.3	13
14	5 42.1	+42.4	75.9	5 56.7	+43.1	76.0	6 11.2	+43.8	76.1	6 25.6	+44.5	76.2	6 39.8	+45.2	76.3	6 54.0	+45.9	76.4	7 08.0	+46.5	76.5	7 21.9	+47.2	76.7	14
15	6 24.5	+42.4	75.2	6 39.8	+43.1	75.3	6 55.0	+43.8	75.4	7 10.1	+44.5	75.5	7 25.0	+45.2	75.6	7 39.9	+45.8	75.8	7 54.5	+46.5	75.9	8 09.1	+47.1	76.0	15
16	7 06.9	+42.3	74.5	7 22.9	+43.0	74.6	7 38.8	+43.7	74.7	7 54.6	+44.4	74.8	8 10.2	+45.1	75.0	8 25.7	+45.7	75.1	8 41.0	+46.4	75.3	8 56.2	+47.1	75.4	16
17	7 49.2	+42.2	73.7	8 05.9	+43.0	73.9	8 22.5	+43.7	74.0	8 39.0	+44.3	74.2	8 55.3	+45.0	74.3	9 11.4	+45.7	74.5	9 27.4	+46.4	74.6	9 43.3	+46.9	74.8	17
18	8 31.4	+42.1	73.0	8 48.9	+42.8	73.2	9 06.2	+43.5	73.3	9 23.3	+44.3	73.5	9 40.3	+44.9	73.6	9 57.1	+45.6	73.8	10 13.8	+46.2	74.0	10 30.2	+46.9	74.1	18
19	9 13.5	+42.1	72.3	9 31.7	+42.8	72.5	9 49.7	+43.5	72.6	10 07.6	+44.1	72.8	10 25.2	+44.9	73.0	10 42.7	+45.5	73.1	11 00.0	+46.2	73.3	11 17.1	+46.9	73.5	19
20	9 55.6	+42.0	71.6	10 14.5	+42.7	71.7	10 33.2	+43.4	71.9	10 51.7	+44.1	72.1	11 10.1	+44.7	72.3	11 28.2	+45.5	72.5	11 46.2	+46.1	72.7	12 04.0	+46.7	72.9	20
21	10 37.6	+41.8	70.9	10 57.2	+42.5	71.0	11 16.6	+43.3	71.2	11 35.8	+44.0	71.4	11 54.8	+44.7	71.6	12 13.7	+45.3	71.8	12 32.3	+46.0	72.0	12 50.7	+46.7	72.2	21
22	11 19.4	+41.8	70.1	11 39.7	+42.5	70.3	11 59.9	+43.1	70.5	12 19.8	+43.9	70.7	12 39.5	+44.6	70.9	12 59.0	+45.2	71.1	13 18.3	+45.9	71.4	13 37.4	+46.5	71.6	22
23	12 01.2	+41.6	69.4	12 22.2	+42.4	69.6	12 43.0	+43.1	69.8	13 03.7	+43.7	70.0	13 24.1	+44.4	70.2	13 44.2	+45.2	70.5	14 04.2	+45.8	70.7	14 23.9	+46.4	70.9	23
24	12 42.8	+41.6	68.7	13 04.6	+42.2	68.9	13 26.1	+42.9	69.1	13 47.4	+43.7	69.3	14 08.5	+44.3	69.5	14 29.4	+45.0	69.8	14 50.0	+45.6	70.0	15 10.3	+46.4	70.3	24
25	13 24.4	+41.3	67.9	13 46.8	+42.1	68.1	14 09.0	+42.9	68.4	14 31.1	+43.5	68.6	14 52.8	+44.2	68.8	15 14.4	+44.8	69.1	15 35.6	+45.6	69.4	15 56.7	+46.2	69.6	25
26	14 05.7	+41.3	67.2	14 28.9	+42.0	67.4	14 51.9	+42.6	67.6	15 14.6	+43.3	67.9	15 37.0	+44.1	68.1	15 59.2	+44.8	68.4	16 21.2	+45.4	68.7	16 42.9	+46.0	69.0	26
27	14 47.0	+41.1	66.4	15 10.9	+41.8	66.7	15 34.5	+42.6	66.9	15 57.9	+43.3	67.2	16 21.1	+43.9	67.4	16 44.0	+44.6	67.7	17 06.6	+45.3	68.0	17 28.9	+46.0	68.3	27
28	15 28.1	+40.9	65.7	15 52.7	+41.7	65.9	16 17.1	+42.3	66.2	16 41.2	+43.0	66.4	17 05.0	+43.8	66.7	17 28.6	+44.4	67.0	17 51.9	+45.1	67.3	18 14.9	+45.8	67.6	28
29	16 09.0	+40.8	64.9	16 34.4	+41.5	65.2	16 59.4	+42.3	65.4	17 24.2	+43.0	65.7	17 48.8	+43.6	66.0	18 13.0	+44.3	66.3	18 37.0	+45.0	66.6	19 00.7	+45.6	66.9	29
30	16 49.8	+40.7	64.1	17 15.9	+41.3	64.4	17 41.7	+42.0	64.7	18 07.2	+42.7	65.0	18 32.4	+43.4	65.3	18 57.3	+44.2	65.6	19 22.0	+44.8	65.9	19 46.3	+45.5	66.2	30
31	17 30.5	+40.4	63.4	17 57.2	+41.2	63.7	18 23.7	+41.9	63.9	18 49.9	+42.6	64.2	19 15.8	+43.3	64.6	19 41.5	+43.9	64.9	20 06.8	+44.6	65.2	20 31.8	+45.3	65.5	31
32	18 10.9	+40.2	62.6	18 38.4	+40.9	62.9	19 05.6	+41.7	63.2	19 32.5	+42.4	63.5	19 59.1	+43.1	63.8	20 25.4	+43.8	64.2	20 51.4	+44.5	64.5	21 17.1	+45.1	64.8	32
33	18 51.1	+40.1	61.8	19 19.3	+40.8	62.1	19 47.3	+41.5	62.4	20 14.9	+42.2	62.7	20 42.2	+42.9	63.1	21 09.2	+43.6	63.4	21 35.9	+44.3	63.8	22 02.2	+45.0	64.1	33
34	19 31.2	+39.8	61.0	20 00.1	+40.6	61.3	20 28.8	+41.2	61.7	20 57.1	+42.0	62.0	21 25.1	+42.7	62.3	21 52.8	+43.4	62.7	22 20.2	+44.0	63.0	22 47.2	+44.7	63.4	34
35	20 11.0	+39.7	60.2	20 40.7	+40.3	60.5	21 10.0	+41.1	60.9	21 39.1	+41.8	61.2	22 07.8	+42.5	61.6	22 36.2	+43.2	61.9	23 04.2	+43.9	62.3	23 31.9	+44.6	62.7	35
36	20 50.7	+39.4	59.4	21 21.0	+40.2	59.8	21 51.1	+40.8	60.1	22 20.9	+41.5	60.4	22 50.3	+42.2	60.8	23 19.4	+42.9	61.2	23 48.1	+43.7	61.6	24 16.5	+44.3	62.0	36
37	21 30.1	+39.1	58.6	22 01.2	+39.9	59.0	22 31.9	+40.7	59.3	23 02.4	+41.3	59.7	23 32.5	+42.1	60.0	24 02.3	+42.8	60.4	24 31.8	+43.4	60.8	25 00.8	+44.2	61.2	37
38	22 09.2	+38.9	57.8	22 41.1	+39.6	58.1	23 12.6	+40.3	58.5	23 43.7	+41.1	58.9	24 14.6	+41.8	59.3	24 45.1	+42.5	59.7	25 15.2	+43.2	60.1	25 45.0	+43.9	60.5	38
39	22 48.1	+38.7	57.0	23 20.7	+39.4	57.3	23 52.9	+40.1	57.7	24 24.8	+40.8	58.1	24 56.4	+41.5	58.5	25 27.6	+42.2	58.9	25 58.4	+42.9	59.3	26 28.9	+43.6	59.7	39
40	23 26.8	+38.4	56.1	24 00.1	+39.1	56.5	24 33.0	+39.9	56.9	25 05.6	+40.6	57.3	25 37.9	+41.3	57.7	26 09.8	+42.0	58.1	26 41.3	+42.7	58.5	27 12.5	+43.4	58.9	40
41	24 05.2	+38.1	55.3	24 39.2	+38.9	55.7	25 12.9	+39.5	56.1	25 46.2	+40.3	56.5	26 19.2	+41.0	56.9	26 51.8	+41.7	57.3	27 24.0	+42.4	57.7	27 55.9	+43.1	58.2	41
42	24 43.3	+37.9	54.5	25 18.1	+38.5	54.8	25 52.4	+39.3	55.2	26 26.5	+40.0	55.6	27 00.2	+40.7	56.0	27 33.5	+41.4	56.5	28 06.4	+42.2	56.9	28 39.0	+42.8	57.4	42
43	25 21.2	+37.5	53.6	25 56.6	+38.3	54.0	26 31.7	+39.0	54.4	27 06.5	+39.7	54.8	27 40.9	+40.4	55.2	28 14.9	+41.2	55.7	28 48.6	+41.8	56.1	29 21.8	+42.6	56.6	43
44	25 58.7	+37.2	52.7	26 34.9	+37.9	53.1	27 10.7	+38.7	53.5	27 46.2	+39.4	54.0	28 21.3	+40.1	54.4	28 56.1	+40.8	54.8	29 30.4	+41.6	55.3	30 04.4	+42.2	55.8	44
45	26 35.9	+36.9	51.9	27 12.8	+37.6	52.3	27 49.4	+38.3	52.7	28 25.6	+39.0	53.1	29 01.4	+39.8	53.5	29 36.9	+40.5	54.0	30 12.0	+41.2	54.5	30 46.6	+42.0	54.9	45
46	27 12.8	+36.6	51.0	27 50.4	+37.3	51.4	28 27.7	+38.0	51.8	29 04.6	+38.8	52.2	29 41.2	+39.4	52.7	30 17.4	+40.1	53.1	30 53.2	+40.9	53.6	31 28.6	+41.6	54.1	46
47	27 49.4	+36.2	50.1	28 27.7	+36.9	50.5	29 05.7	+37.7	50.9	29 43.4	+38.3	51.4	30 20.6	+39.1	51.8	30 57.5	+39.9	52.3	31 34.1	+40.5	52.8	32 10.2	+41.2	53.3	47
48	28 25.6	+35.8	49.2	29 04.6	+36.6	49.6	29 43.4	+37.2	50.0	30 21.7	+38.0	50.5	30 59.7	+38.8	50.9	31 37.4	+39.4	51.4	32 14.6	+40.2	51.9	32 51.4	+40.9	52.4	48
49	29 01.4	+35.5	48.3	29 41.2	+36.2	48.7	30 20.6	+36.9	49.1	30 59.7	+37.7	49.6	31 38.5	+38.3	50.0	32 16.8	+39.1	50.5	32 54.8	+39.8	51.0	33 32.3	+40.5	51.5	49
50	29 36.9	+35.1	47.3	30 17.4	+35.8	47.8	30 57.5	+36.6	48.2	31 37.4	+37.2	48.7	32 16.8	+38.0	49.1	32 55.9	+38.7	49.6	33 34.6	+39.4	50.1	34 12.8	+40.2	50.6	50
51	30 12.0	+34.6	46.4	30 53.2	+35.4	46.8	31 34.1	+36.1	47.3	32 14.6	+36.8	47.7	32 54.8	+37.5	48.2	33 34.6	+38.2	48.7	34 14.0	+39.0	49.2	34 53.0	+39.7	49.7	51
52	30 46.6	+34.3	45.5	31 28.6	+34.9	45.9	32 10.2	+35.7	46.3	32 51.4	+36.4	46.8	33 32.3	+37.1	47.3	34 12.8	+37.9	47.8	34 53.0	+38.5	48.3	35 32.7	+39.3	48.8	52
53	31 20.9	+33.8	44.5	32 03.5	+34.6	44.9	32 45.9	+35.2	45.4	33 27.8	+36.0	45.8	34 09.4	+36.7	46.3	34 50.7	+37.4	46.8	35 31.5	+38.2	47.3	36 12.0	+38.9	47.9	53
54	31 54.7	+33.4	43.5	32 38.1	+34.1	44.0	33 21.1	+34.8	44.4	34 03.8	+35.5	44.9	34 46.1	+36.2	45.4	35 28.1	+36.9	45.9	36 09.7	+37.6	46.4	36 50.9	+38.4	46.9	54
55	32 28.1	+32.9	42.5	33 12.2	+33.6	43.0	33 55.9	+34.3	43.4	34 39.3	+35.0	43.9	35 22.3	+35.8	44.4	36 05.0	+36.5	44.9	36 47.3	+37.2	45.4	37 29.3	+37.9	46.0	55
56	33 01.0	+32.5	41.5	33 45.8	+33.1	42.0	34 30.2	+33.8	42.4	35 14.3	+34.6	42.9	35 58.1	+35.2	43.4	36 41.5	+36.0	43.9	37 24.5	+36.7	44.4	38 07.2	+37.4	45.0	56
57	33 33.5	+31.9	40.5	34 18.9	+32.6	41.0	35 04.0	+33.4	41.4	35 48.9	+34.0	41.9	36 33.3	+34.8	42.4	37 17.5	+35.4	42.9	38 01.2	+36.2	43.4	38 44.6	+36.9	44.0	57
58	34 05.4	+31.4	39.5	34 51.5	+32.1	40.0	35 37.4	+32.8	40.4	36 22.9	+33.5	40.9	37 08.1	+34.2	41.4	37 52.9	+34.9	41.9	38 37.4	+35.6	42.4	39 21.5	+36.4	43.0	58
59	34 36.8	+30.9	38.5	35 23.6	+31.6	38.9	36 10.2	+32.2	39.4	36 56.4	+32.9	39.9	37 42.3	+33.6	40.3	38 27.8	+34.4	40.9	39 13.0	+35.1	41.4	39 57.9	+35.8	41.9	59
60	35 07.7	+30.4	37.4	35 55.2	+31.1	37.9	36 42.4	+31.7	38.3	37 29.3	+32.4	38.8	38 15.9	+33.1	39.3	39 02.2	+33.8	39.8	39 48.1	+34.5	40.3	40 33.7	+35.2	40.9	60
61	35 38.1	+29.8	36.4	36 26.3	+30.4	36.8	37 14.1	+31.2	37.3	38 01.7	+31.8	37.7	38 49.0	+32.5	38.2	39 36.0	+33.2	38.7	40 22.6	+33.9	39.3	41 08.9	+34.6	39.8	61
62	36 07.9	+29.2	35.3	36 56.7	+29.9	35.7	37 45.3	+30.5	36.2	38 33.5	+31.2	36.7	39 21.5	+31.9	37.1	40 09.2	+32.6	37.7	40 56.5	+33.3	38.2	41 43.5	+34.0	38.7	62
63	36 37.1	+28.6	34.2	37 26.6	+29.2	34.7	38 15.8	+29.9	35.1	39 04.7	+30.6	35.6	39 53.4	+31.3	36.0	40 41.8	+31.9	36.5	41 29.8	+32.6	37.1	42 17.5	+33.3	37.6	63
64	37 05.7	+28.0	33.1	37 55.8	+28.7	33.6	38 45.7	+29.3	34.0	39 35.3	+30.0	34.5	40 24.7	+30.6	34.9	41 13.7	+31.3	35.4	42 02.4	+32.0	35.9	42 50.8	+32.7	36.5	64
65	37 33.7	+27.4	32.0	38 24.5	+28.0	32.4	39 15.0	+28.6	32.9	40 05.3	+29.2	33.3	40 55.3	+29.9	33.8	41 45.0	+30.6	34.3	42 34.4	+31.3	34.8	43 23.5	+32.0	35.3	65
66	38 01.1	+26.7	30.9	38 52.5	+27.3	31.3	39 43.6	+28.0	31.7	40 34.5	+28.6	32.2	41 25.2	+29.2	32.6	42 15.6	+29.9	33.1	43 05.7	+30.5	33.6	43 55.5	+31.2	34.2	66
67	38 27.8	+26.1	29.8	39 19.8	+26.6	30.2	40 11.6	+27.2	30.6	41 03.1	+27.9	31.0	41 54.4	+28.5	31.5	42 45.4	+29.2	32.0	43 36.2	+29.8	32.5	44 26.7	+30.5	33.0	67
68	38 53.9	+25.3	28.6	39 46.4	+26.0	29.0	40 38.8	+26.5	29.4	41 31.0	+27.1	29.8	42 22.9	+27.7	30.3	43 14.6	+28.4	30.8	44 06.0	+29.0	31.3	44 57.2	+29.7	31.8	68
69	39 19.2	+24.7	27.4	40 12.4	+25.2	27.8	41 05.3	+25.8	28.2	41 58.1	+26.4	28.6	42 50.6	+27.0	29.1	43 43.0	+27.6	29.5	44 35.0	+28.3	30.0	45 26.9	+28.8	30.5	69
70	39 43.9	+23.9	26.3	40 37.6	+24.5	26.6	41 31.1	+25.1	27.0	42 24.5	+25.6	27.4	43 17.6	+26.2	27.9	44 10.6	+26.8	28.3	45 03.3	+27.4	28.8	45 55.7	+28.1	29.3	70
71	40 07.8	+23.2	25.1	41 02.1	+23.7	25.4	41 56.2	+24.2	25.8	42 50.1	+24.8	26.2	43 43.8	+25.4	26.6	44 37.4	+25.9	27.1	45 30.7	+26.5	27.5	46 23.8	+27.2	28.0	71
72	40 31.0	+22.4	23.8	41 25.8	+22.9	24.2	42 20.4	+23.4	24.6	43 14.9	+24.0	25.0	44 09.2	+24.5	25.4	45 03.3	+25.1	25.8	45 57.2	+25.7	26.2	46 51.0	+26.2	26.7	72
73	40 53.4	+21.6	22.6	41 48.7	+22.1	23.0	42 43.8	+22.7	23.3	43 38.9	+23.1	23.7	44 33.7	+23.7	24.1	45 28.4	+24.2	24.5	46 22.9	+24.8	24.9	47 17.2	+25.4	25.4	73
74	41 15.0	+20.8	21.4	42 10.8	+21.3	21.7	43 06.5	+21.7	22.1	44 02.0	+22.3	22.4	44 57.4	+22.8	22.8	45 52.6	+23.3	23.2	46 47.7	+23.8	23.6	47 42.6	+24.4	24.0	74
75	41 35.8	+20.0	20.1	42 32.1	+20.4	20.4	43 28.2	+20.9	20.8	44 24.3	+21.4	21.1	45 20.2	+21.8	21.5	46 15.9	+22.4	21.9	47 11.5	+22.9	22.3	48 07.0	+23.4	22.7	75
76	41 55.8	+19.2	18.9	42 52.5	+19.6	19.2	43 49.1	+20.1	19.5	44 45.7	+20.4	19.8	45 42.0	+21.0	20.2	46 38.3	+21.4	20.5	47 34.4	+21.9	20.9	48 30.4	+22.4	21.3	76
77	42 15.0	+18.3	17.6	43 12.1	+18.7	17.9	44 09.2	+19.1	18.2	45 06.1	+19.6	18.5	46 03.0	+19.9	18.8	46 59.7	+20.4	19.1	47 56.3	+20.9	19.5	48 52.8	+21.4	19.9	77
78	42 33.3	+17.4	16.3	43 30.8	+17.8	16.6	44 28.3	+18.2	16.8	45 25.7	+18.5	17.1	46 22.9	+19.0	17.4	47 20.1	+19.4	17.8	48 17.2	+19.9	18.1	49 14.2	+20.3	18.5	78
79	42 50.7	+16.5	15.0	43 48.6	+16.9	15.2	44 46.5	+17.2	15.5	45 44.2	+17.6	15.8	46 41.9	+18.0	16.1	47 39.5	+18.4	16.4	48 37.1	+18.7	16.7	49 34.5	+19.2	17.0	79
80	43 07.2	+15.6	13.7	44 05.5	+15.9	13.9	45 03.7	+16.2	14.2	46 01.8	+16.6	14.4	46 59.9	+17.0	14.7	47 57.9	+17.3	14.9	48 55.8	+17.7	15.2	49 53.7	+18.1	15.6	80
81	43 22.8	+14.7	12.4	44 21.4	+15.0	12.6	45 19.9	+15.3	12.9	46 18.4	+15.6	13.0	47 16.9	+15.9	13.3	48 15.2	+16.3	13.5	49 13.5	+16.6	13.8	50 11.8	+16.9	14.1	81
82	43 37.5	+13.8	11.0	44 36.4	+14.0	11.2	45 35.2	+14.3	11.4	46 34.0	+14.6	11.6	47 32.8	+14.8	11.8	48 31.5	+15.1	12.1	49 30.1	+15.5	12.3	50 28.7	+15.8	12.6	82
83	43 51.3	+12.8	9.7	44 50.4	+13.0	9.8	45 49.5	+13.3	10.0	46 48.6	+13.5	10.2	47 47.6	+13.7	10.4	48 46.6	+14.0	10.6	49 45.6	+14.2	10.8	50 44.5	+14.5	11.0	83
84	44 04.1	+11.8	8.3	45 03.4	+12.0	8.5	46 02.8	+12.2	8.6	47 02.1	+12.4	8.8	48 01.3	+12.7	8.9	49 00.6	+12.9	9.1	49 59.8	+13.1	9.3	50 59.0	+13.4	9.5	84
85	44 15.9	+10.8	7.0	45 15.4	+11.0	7.1	46 15.0	+11.1	7.2	47 14.5	+11.3	7.3	48 14.0	+11.5	7.5	49 13.5	+11.7	7.6	50 12.9	+11.9	7.8	51 12.4	+12.0	8.0	85
86	44 26.7	+9.9	5.6	45 26.4	+10.0	5.7	46 26.1	+10.1	5.8	47 25.8	+10.3	5.9	48 25.5	+10.4	6.0	49 25.2	+10.5	6.1	50 24.8	+10.7	6.2	51 24.4	+10.9	6.4	86
87	44 36.6	+8.8	4.2	45 36.4	+8.9	4.3	46 36.2	+9.0	4.3	47 36.1	+9.1	4.4	48 35.9	+9.2	4.5	49 35.7	+9.3	4.6	50 35.5	+9.4	4.7	51 35.3	+9.5	4.8	87
88	44 45.4	+7.8	2.8	45 45.3	+7.9	2.9	46 45.2	+8.0	2.9	47 45.2	+8.0	3.0	48 45.1	+8.2	3.0	49 45.0	+8.1	3.1	50 44.9	+8.2	3.1	51 44.8	+8.3	3.2	88
89	44 53.2	+6.8	1.4	45 53.2	+6.8	1.4	46 53.2	+6.8	1.5	47 53.2	+6.8	1.5	48 53.1	+6.9	1.5	49 53.1	+6.9	1.5	50 53.1	+6.9	1.6	51 53.1	+6.9	1.6	89
90	45 00.0	+5.8	0.0	46 00.0	+5.7	0.0	47 00.0	+5.7	0.0	48 00.0	+5.7	0.0	49 00.0	+5.7	0.0	50 00.0	+5.7	0.0	51 00.0	+5.6	0.0	52 00.0	+5.6	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   L.H.A. 96°, 264°

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	3 32.0	+42.5	93.5	3 28.3	+43.2	93.6	3 24.5	+43.9	93.7	3 20.6	+44.6	93.7	3 16.7	+45.3	93.8	3 12.7	+46.0	93.8	3 08.7	+46.6	93.9	3 04.6	+47.3	93.9	0
1	4 14.5	+42.4	92.8	4 11.5	+43.2	92.9	4 08.4	+43.9	93.0	4 05.2	+44.7	93.1	4 02.0	+45.3	93.1	3 58.7	+46.0	93.2	3 55.3	+46.7	93.3	3 51.9	+47.3	93.3	1
2	4 56.9	+42.4	92.1	4 54.7	+43.1	92.2	4 52.3	+43.9	92.3	4 49.9	+44.5	92.4	4 47.3	+45.3	92.5	4 44.7	+46.0	92.5	4 42.0	+46.6	92.6	4 39.2	+47.3	92.7	2
3	5 39.3	+42.4	91.4	5 37.8	+43.1	91.5	5 36.2	+43.8	91.6	5 34.4	+44.5	91.7	5 32.6	+45.2	91.8	5 30.7	+45.9	91.9	5 28.6	+46.6	92.0	5 26.5	+47.2	92.1	3
4	6 21.7	+42.3	90.7	6 20.9	+43.0	90.8	6 20.0	+43.8	90.9	6 19.0	+44.5	91.0	6 17.8	+45.2	91.1	6 16.6	+45.8	91.3	6 15.2	+46.5	91.4	6 13.7	+47.2	91.5	4
5	7 04.0	+42.2	90.0	7 03.9	+43.0	90.1	7 03.8	+43.7	90.2	7 03.5	+44.4	90.4	7 03.0	+45.1	90.5	7 02.4	+45.9	90.6	7 01.7	+46.5	90.7	7 00.9	+47.2	90.9	5
6	7 46.2	+42.2	89.3	7 46.9	+42.9	89.4	7 47.5	+43.6	89.5	7 47.9	+44.3	89.7	7 48.1	+45.1	89.8	7 48.3	+45.7	90.0	7 48.2	+46.5	90.1	7 48.1	+47.1	90.2	6
7	8 28.4	+42.1	88.6	8 29.8	+42.8	88.7	8 31.1	+43.6	88.9	8 32.2	+44.3	89.0	8 33.2	+45.0	89.2	8 34.0	+45.7	89.3	8 34.7	+46.3	89.5	8 35.2	+47.0	89.6	7
8	9 10.5	+42.0	87.8	9 12.6	+42.8	88.0	9 14.7	+43.4	88.2	9 16.5	+44.2	88.3	9 18.2	+44.9	88.5	9 19.7	+45.6	88.6	9 21.0	+46.3	88.8	9 22.2	+47.0	89.0	8
9	9 52.5	+41.9	87.1	9 55.4	+42.6	87.3	9 58.1	+43.4	87.5	10 00.7	+44.1	87.6	10 03.1	+44.8	87.8	10 05.3	+45.5	88.0	10 07.3	+46.2	88.2	10 09.2	+46.8	88.3	9
10	10 34.4	+41.8	86.4	10 38.0	+42.6	86.6	10 41.5	+43.3	86.8	10 44.8	+44.1	86.9	10 47.9	+44.8	87.1	10 50.8	+45.5	87.3	10 53.5	+46.2	87.5	10 56.0	+46.9	87.7	10
11	11 16.2	+41.6	85.6	11 20.6	+42.5	85.8	11 24.8	+43.2	86.0	11 28.9	+43.9	86.2	11 32.7	+44.6	86.5	11 36.3	+45.4	86.7	11 39.7	+46.0	86.9	11 42.9	+46.7	87.1	11
12	11 57.8	+41.6	84.9	12 03.1	+42.3	85.1	12 08.0	+43.1	85.3	12 12.8	+43.8	85.6	12 17.3	+44.6	85.8	12 21.7	+45.2	86.0	12 25.7	+46.0	86.2	12 29.6	+46.6	86.4	12
13	12 39.4	+41.5	84.2	12 45.4	+42.2	84.4	12 51.1	+43.0	84.6	12 56.6	+43.7	84.9	13 01.9	+44.4	85.1	13 06.9	+45.2	85.3	13 11.7	+45.8	85.5	13 16.2	+46.6	85.8	13
14	13 20.9	+41.3	83.4	13 27.6	+42.1	83.7	13 34.1	+42.8	83.9	13 40.3	+43.6	84.2	13 46.3	+44.4	84.4	13 52.1	+45.0	84.6	13 57.5	+45.8	84.9	14 02.8	+46.4	85.1	14
15	14 02.2	+41.2	82.7	14 09.7	+42.0	82.9	14 16.9	+42.8	83.2	14 23.9	+43.5	83.4	14 30.7	+44.2	83.7	14 37.1	+44.9	84.0	14 43.3	+45.6	84.2	14 49.2	+46.3	84.5	15
16	14 43.4	+41.0	81.9	14 51.7	+41.8	82.2	14 59.7	+42.5	82.5	15 07.4	+43.3	82.7	15 14.9	+44.0	83.0	15 22.0	+44.8	83.3	15 28.9	+45.5	83.5	15 35.5	+46.2	83.8	16
17	15 24.4	+40.9	81.2	15 33.5	+41.6	81.5	15 42.2	+42.5	81.7	15 50.7	+43.2	82.0	15 58.9	+44.0	82.3	16 06.8	+44.7	82.6	16 14.4	+45.4	82.9	16 21.7	+46.1	83.2	17
18	16 05.3	+40.7	80.4	16 15.1	+41.5	80.7	16 24.7	+42.3	81.0	16 33.9	+43.1	81.3	16 42.9	+43.7	81.6	16 51.5	+44.5	81.9	16 59.8	+45.2	82.2	17 07.8	+45.9	82.5	18
19	16 46.0	+40.6	79.7	16 56.6	+41.4	80.0	17 07.0	+42.1	80.3	17 17.0	+42.8	80.6	17 26.6	+43.7	80.9	17 36.0	+44.4	81.2	17 45.0	+45.1	81.5	17 53.7	+45.9	81.8	19
20	17 26.6	+40.4	78.9	17 38.0	+41.2	79.2	17 49.1	+41.9	79.5	17 59.8	+42.7	79.8	18 10.3	+43.4	80.1	18 20.4	+44.2	80.5	18 30.1	+45.0	80.8	18 39.6	+45.6	81.1	20
21	18 07.0	+40.1	78.1	18 19.2	+40.9	78.4	18 31.0	+41.8	78.8	18 42.5	+42.6	79.1	18 53.7	+43.3	79.4	19 04.6	+44.0	79.8	19 15.1	+44.7	80.1	19 25.2	+45.5	80.4	21
22	18 47.1	+40.0	77.3	19 00.1	+40.8	77.7	19 12.8	+41.6	78.0	19 25.1	+42.3	78.3	19 37.0	+43.2	78.7	19 48.6	+43.9	79.0	19 59.8	+44.7	79.4	20 10.7	+45.3	79.8	22
23	19 27.1	+39.8	76.5	19 40.9	+40.6	76.9	19 54.4	+41.3	77.2	20 07.4	+42.2	77.6	20 20.2	+42.9	77.9	20 32.5	+43.7	78.3	20 44.5	+44.4	78.7	20 56.0	+45.2	79.1	23
24	20 06.9	+39.6	75.7	20 21.5	+40.4	76.1	20 35.7	+41.2	76.5	20 49.6	+42.0	76.8	21 03.1	+42.7	77.2	21 16.2	+43.5	77.6	21 28.9	+44.2	78.0	21 41.2	+45.0	78.3	24
25	20 46.5	+39.3	74.9	21 01.9	+40.1	75.3	21 16.9	+41.0	75.7	21 31.6	+41.7	76.1	21 45.8	+42.5	76.4	21 59.7	+43.3	76.8	22 13.1	+44.1	77.2	22 26.2	+44.8	77.6	25
26	21 25.8	+39.1	74.1	21 42.0	+39.9	74.5	21 57.9	+40.7	74.9	22 13.3	+41.5	75.3	22 28.3	+42.3	75.7	22 43.0	+43.0	76.1	22 57.2	+43.8	76.5	23 11.0	+44.6	76.9	26
27	22 04.9	+38.9	73.3	22 21.9	+39.7	73.7	22 38.6	+40.5	74.1	22 54.8	+41.3	74.5	23 10.6	+42.1	74.9	23 26.0	+42.9	75.3	23 41.0	+43.6	75.8	23 55.6	+44.4	76.2	27
28	22 43.8	+38.6	72.5	23 01.6	+39.5	72.9	23 19.1	+40.2	73.3	23 36.1	+41.1	73.7	23 52.7	+41.9	74.1	24 08.9	+42.6	74.6	24 24.6	+43.5	75.0	24 40.0	+44.1	75.4	28
29	23 22.4	+38.3	71.7	23 41.1	+39.1	72.1	23 59.3	+40.0	72.5	24 17.2	+40.8	72.9	24 34.6	+41.6	73.4	24 51.5	+42.4	73.8	25 08.1	+43.1	74.2	25 24.1	+44.0	74.7	29
30	24 00.7	+38.1	70.8	24 20.2	+38.9	71.2	24 39.3	+39.7	71.7	24 58.0	+40.5	72.1	25 16.2	+41.3	72.6	25 33.9	+42.2	73.0	25 51.2	+42.9	73.5	26 08.1	+43.6	73.9	30
31	24 38.8	+37.7	70.0	24 59.1	+38.6	70.4	25 19.0	+39.5	70.8	25 38.5	+40.2	71.3	25 57.5	+41.1	71.8	26 16.1	+41.8	72.2	26 34.1	+42.7	72.7	26 51.7	+43.5	73.2	31
32	25 16.5	+37.5	69.1	25 37.7	+38.3	69.6	25 58.5	+39.1	70.0	26 18.7	+40.0	70.5	26 38.6	+40.8	70.9	26 57.9	+41.6	71.4	27 16.8	+42.4	71.9	27 35.2	+43.2	72.4	32
33	25 54.0	+37.2	68.2	26 16.0	+38.0	68.7	26 37.6	+38.8	69.2	26 58.7	+39.7	69.6	27 19.4	+40.4	70.1	27 39.5	+41.3	70.6	27 59.2	+42.1	71.1	28 18.4	+42.9	71.6	33
34	26 31.2	+36.8	67.4	26 54.0	+37.7	67.8	27 16.4	+38.6	68.3	27 38.4	+39.3	68.8	27 59.8	+40.2	69.3	28 20.8	+41.0	69.8	28 41.3	+41.8	70.3	29 01.3	+42.6	70.8	34
35	27 08.0	+36.5	66.5	27 31.7	+37.4	67.0	27 55.0	+38.2	67.4	28 17.7	+39.1	67.9	28 40.0	+39.9	68.4	29 01.8	+40.7	69.0	29 23.1	+41.5	69.5	29 43.9	+42.3	70.0	35
36	27 44.5	+36.1	65.6	28 09.1	+37.0	66.1	28 33.2	+37.8	66.6	28 56.8	+38.7	67.1	29 19.9	+39.5	67.6	29 42.5	+40.4	68.1	30 04.6	+41.2	68.6	30 26.2	+42.0	69.2	36
37	28 20.6	+35.8	64.7	28 46.1	+36.6	65.2	29 11.0	+37.5	65.7	29 35.5	+38.3	66.2	29 59.4	+39.2	66.7	30 22.9	+40.0	67.3	30 45.8	+40.9	67.8	31 08.2	+41.7	68.4	37
38	28 56.4	+35.4	63.8	29 22.7	+36.3	64.3	29 48.5	+37.2	64.8	30 13.8	+38.0	65.3	30 38.6	+38.9	65.8	31 02.9	+39.7	66.4	31 26.7	+40.5	66.9	31 49.9	+41.4	67.5	38
39	29 31.8	+35.1	62.8	29 59.0	+35.9	63.4	30 25.7	+36.7	63.9	30 51.8	+37.6	64.4	31 17.5	+38.5	65.0	31 42.6	+39.3	65.5	32 07.2	+40.2	66.1	32 31.3	+41.0	66.7	39
40	30 06.9	+34.6	61.9	30 34.9	+35.5	62.4	31 02.4	+36.4	63.0	31 29.4	+37.3	63.5	31 56.0	+38.0	64.1	32 21.9	+39.0	64.6	32 47.4	+39.8	65.2	33 12.3	+40.6	65.8	40
41	30 41.5	+34.2	61.0	31 10.4	+35.0	61.5	31 38.8	+35.9	62.0	32 06.7	+36.8	62.6	32 34.0	+37.7	63.1	33 00.9	+38.5	63.7	33 27.2	+39.4	64.3	33 52.9	+40.2	64.9	41
42	31 15.7	+33.8	60.0	31 45.4	+34.7	60.5	32 14.7	+35.5	61.1	32 43.5	+36.4	61.6	33 11.7	+37.3	62.2	33 39.4	+38.1	62.8	34 06.6	+38.9	63.4	34 33.1	+39.9	64.0	42
43	31 49.5	+33.3	59.0	32 20.1	+34.2	59.6	32 50.2	+35.1	60.1	33 19.9	+35.9	60.7	33 49.0	+36.8	61.3	34 17.5	+37.7	61.9	34 45.5	+38.6	62.5	35 13.0	+39.4	63.1	43
44	32 22.8	+32.9	58.1	32 54.3	+33.7	58.6	33 25.3	+34.6	59.2	33 55.8	+35.5	59.7	34 25.8	+36.4	60.3	34 55.2	+37.3	60.9	35 24.1	+38.1	61.5	35 52.4	+39.0	62.2	44
45	32 55.7	+32.3	57.1	33 28.0	+33.3	57.6	33 59.9	+34.2	58.2	34 31.3	+35.0	58.8	35 02.2	+35.9	59.4	35 32.5	+36.8	60.0	36 02.2	+37.7	60.6	36 31.4	+38.5	61.2	45
46	33 28.0	+31.9	56.1	34 01.3	+32.8	56.6	34 34.1	+33.6	57.2	35 06.3	+34.6	57.8	35 38.1	+35.4	58.4	36 09.3	+36.3	59.0	36 39.9	+37.2	59.6	37 09.9	+38.1	60.3	46
47	33 59.9	+31.4	55.0	34 34.1	+32.2	55.6	35 07.7	+33.2	56.2	35 40.9	+34.0	56.8	36 13.5	+34.9	57.4	36 45.6	+35.8	58.0	37 17.1	+36.7	58.6	37 48.0	+37.6	59.3	47
48	34 31.3	+30.9	54.0	35 06.3	+31.8	54.6	35 40.9	+32.6	55.1	36 14.9	+33.5	55.7	36 48.4	+34.4	56.4	37 21.4	+35.3	57.0	37 53.8	+36.2	57.6	38 25.6	+37.1	58.3	48
49	35 02.2	+30.3	53.0	35 38.1	+31.2	53.5	36 13.5	+32.1	54.1	36 48.4	+33.0	54.7	37 22.8	+33.9	55.3	37 56.7	+34.7	56.0	38 30.0	+35.6	56.6	39 02.7	+36.5	57.3	49
50	35 32.5	+29.7	51.9	36 09.3	+30.6	52.5	36 45.6	+31.5	53.1	37 21.4	+32.4	53.7	37 56.7	+33.3	54.3	38 31.4	+34.2	54.9	39 05.6	+35.1	55.6	39 39.2	+36.0	56.3	50
51	36 02.2	+29.2	50.8	36 39.9	+30.0	51.4	37 17.1	+30.9	52.0	37 53.8	+31.8	52.6	38 30.0	+32.7	53.2	39 05.6	+33.6	53.9	39 40.7	+34.5	54.5	40 15.2	+35.4	55.2	51
52	36 31.4	+28.6	49.7	37 09.9	+29.5	50.3	37 48.0	+30.3	50.9	38 25.6	+31.2	51.5	39 02.7	+32.1	52.2	39 39.2	+33.0	52.8	40 15.2	+33.9	53.5	40 50.6	+34.8	54.2	52
53	37 00.0	+27.9	48.6	37 39.4	+28.8	49.2	38 18.3	+29.8	49.8	38 56.8	+30.6	50.4	39 34.8	+31.5	51.1	40 12.2	+32.4	51.7	40 49.1	+33.3	52.4	41 25.4	+34.2	53.1	53
54	37 27.9	+27.4	47.5	38 08.2	+28.2	48.1	38 48.1	+29.0	48.7	39 27.4	+30.0	49.3	40 06.3	+30.8	50.0	40 44.6	+31.7	50.6	41 22.4	+32.7	51.3	41 59.6	+33.6	52.0	54
55	37 55.3	+26.6	46.4	38 36.4	+27.6	47.0	39 17.1	+28.4	47.6	39 57.4	+29.2	48.2	40 37.1	+30.2	48.8	41 16.3	+31.1	49.5	41 55.1	+31.9	50.2	42 33.2	+32.9	50.9	55
56	38 21.9	+26.1	45.3	39 04.0	+26.8	45.8	39 45.5	+27.8	46.4	40 26.6	+28.7	47.1	41 07.3	+29.5	47.7	41 47.4	+30.4	48.3	42 27.0	+31.3	49.0	43 06.1	+32.2	49.7	56
57	38 48.0	+25.3	44.1	39 30.8	+26.2	44.7	40 13.3	+27.0	45.3	40 55.3	+27.9	45.9	41 36.8	+28.8	46.5	42 17.8	+29.7	47.2	42 58.3	+30.6	47.9	43 38.3	+31.5	48.6	57
58	39 13.3	+24.6	43.0	39 57.0	+25.5	43.5	40 40.3	+26.3	44.1	41 23.2	+27.1	44.7	42 05.6	+28.0	45.3	42 47.5	+28.9	46.0	43 28.9	+29.8	46.7	44 09.8	+30.7	47.4	58
59	39 37.9	+23.9	41.8	40 22.5	+24.7	42.3	41 06.6	+25.6	42.9	41 50.3	+26.4	43.5	42 33.6	+27.3	44.2	43 16.4	+28.2	44.8	43 58.7	+29.1	45.5	44 40.5	+30.0	46.2	59
60	40 01.8	+23.1	40.6	40 47.2	+23.9	41.1	41 32.2	+24.8	41.7	42 16.7	+25.7	42.3	43 00.9	+26.5	42.9	43 44.6	+27.4	43.6	44 27.8	+28.3	44.3	45 10.5	+29.2	45.0	60
61	40 24.9	+22.4	39.4	41 11.1	+23.2	39.9	41 57.0	+24.0	40.5	42 42.4	+24.8	41.1	43 27.4	+25.7	41.7	44 12.0	+26.5	42.4	44 56.1	+27.4	43.0	45 39.7	+28.3	43.7	61
62	40 47.3	+21.6	38.1	41 34.3	+22.4	38.7	42 21.0	+23.2	39.3	43 07.2	+24.1	39.8	43 53.1	+24.9	40.5	44 38.5	+25.8	41.1	45 23.5	+26.6	41.8	46 08.0	+27.5	42.4	62
63	41 08.9	+20.8	36.9	41 56.7	+21.6	37.4	42 44.2	+22.4	38.0	43 31.3	+23.2	38.6	44 18.0	+24.0	39.2	45 04.3	+24.8	39.8	45 50.1	+25.8	40.5	46 35.5	+26.7	41.2	63
64	41 29.7	+20.0	35.7	42 18.3	+20.8	36.2	43 06.6	+21.5	36.7	43 54.5	+22.3	37.3	44 42.0	+23.1	37.9	45 29.1	+24.0	38.5	46 15.9	+24.8	39.2	47 02.2	+25.7	39.8	64
65	41 49.7	+19.1	34.4	42 39.1	+19.8	34.9	43 28.1	+20.7	35.5	44 16.8	+21.4	36.0	45 05.1	+22.3	36.6	45 53.1	+23.1	37.2	46 40.7	+23.9	37.9	47 27.9	+24.7	38.5	65
66	42 08.8	+18.3	33.1	42 58.9	+19.1	33.6	43 48.8	+19.7	34.2	44 38.2	+20.6	34.7	45 27.4	+21.3	35.3	46 16.2	+22.1	35.9	47 04.6	+23.0	36.5	47 52.6	+23.8	37.2	66
67	42 27.1	+17.4	31.8	43 18.0	+18.1	32.3	44 08.5	+18.9	32.8	44 58.8	+19.6	33.4	45 48.7	+20.4	33.9	46 38.3	+21.2	34.5	47 27.6	+21.9	35.1	48 16.4	+22.8	35.8	67
68	42 44.5	+16.6	30.5	43 36.1	+17.2	31.0	44 27.4	+17.9	31.5	45 18.4	+18.6	32.0	46 09.1	+19.4	32.6	46 59.5	+20.2	33.2	47 49.5	+21.0	33.8	48 39.2	+21.8	34.4	68
69	43 01.1	+15.6	29.2	43 53.3	+16.3	29.7	44 45.3	+17.0	30.2	45 37.0	+17.7	30.7	46 28.5	+18.4	31.2	47 19.7	+19.1	31.8	48 10.5	+19.9	32.4	49 01.0	+20.7	33.0	69
70	43 16.7	+14.7	27.9	44 09.6	+15.3	28.4	45 02.3	+16.0	28.8	45 54.7	+16.7	29.3	46 46.9	+17.4	29.8	47 38.8	+18.1	30.4	48 30.4	+18.9	30.9	49 21.7	+19.7	31.5	70
71	43 31.4	+13.7	26.6	44 24.9	+14.4	27.0	45 18.3	+15.0	27.5	46 11.4	+15.7	27.9	47 04.3	+16.4	28.4	47 56.9	+17.1	29.0	48 49.3	+17.8	29.5	49 41.4	+18.5	30.1	71
72	43 45.1	+12.8	25.2	44 39.3	+13.4	25.6	45 33.3	+14.0	26.1	46 27.1	+14.7	26.5	47 20.7	+15.3	27.0	48 14.0	+16.0	27.5	49 07.1	+16.7	28.1	49 59.9	+17.4	28.6	72
73	43 57.9	+11.9	23.9	44 52.7	+12.4	24.3	45 47.3	+13.0	24.7	46 41.8	+13.6	25.1	47 36.0	+14.2	25.6	48 30.0	+14.9	26.1	49 23.8	+15.5	26.6	50 17.3	+16.2	27.1	73
74	44 09.8	+10.8	22.5	45 05.1	+11.4	22.9	46 00.3	+12.0	23.3	46 55.4	+12.5	23.7	47 50.2	+13.1	24.1	48 44.9	+13.7	24.6	49 39.3	+14.4	25.1	50 33.5	+15.1	25.6	74
75	44 20.6	+9.9	21.1	45 16.5	+10.4	21.5	46 12.3	+10.9	21.9	47 07.9	+11.4	22.3	48 03.3	+12.0	22.7	48 58.6	+12.6	23.1	49 53.7	+13.2	23.6	50 48.6	+13.8	24.1	75
76	44 30.5	+8.9	19.8	45 26.9	+9.3	20.1	46 23.2	+9.8	20.4	47 19.3	+10.4	20.8	48 15.3	+10.9	21.2	49 11.2	+11.4	21.6	50 06.9	+12.0	22.1	51 02.4	+12.6	22.5	76
77	44 39.4	+7.8	18.4	45 36.2	+8.3	18.7	46 33.0	+8.8	19.0	47 29.7	+9.2	19.4	48 26.2	+9.8	19.7	49 22.6	+10.3	20.1	50 18.9	+10.8	20.5	51 15.0	+11.4	21.0	77
78	44 47.2	+6.8	17.0	45 44.5	+7.3	17.3	46 41.8	+7.7	17.6	47 38.9	+8.1	17.9	48 36.0	+8.6	18.3	49 32.9	+9.1	18.6	50 29.7	+9.5	19.0	51 26.4	+10.0	19.4	78
79	44 54.0	+5.8	15.6	45 51.8	+6.1	15.8	46 49.5	+6.5	16.1	47 47.0	+7.0	16.4	48 44.6	+7.4	16.8	49 42.0	+7.8	17.1	50 39.2	+8.4	17.4	51 36.4	+8.8	17.8	79
80	44 59.8	+4.7	14.2	45 57.9	+5.1	14.4	46 56.0	+5.5	14.7	47 54.0	+5.9	15.0	48 52.0	+6.2	15.2	49 49.8	+6.6	15.6	50 47.6	+7.0	15.9	51 45.2	+7.5	16.2	80
81	45 04.5	+3.8	12.7	46 03.0	+4.1	13.0	47 01.5	+4.3	13.2	47 59.9	+4.6	13.5	48 58.2	+5.0	13.7	49 56.4	+5.4	14.0	50 54.6	+5.8	14.3	51 52.7	+6.2	14.6	81
82	45 08.3	+2.6	11.3	46 07.1	+2.9	11.5	47 05.8	+3.2	11.8	48 04.5	+3.4	12.0	49 03.2	+3.8	12.2	50 01.8	+4.2	12.5	51 00.4	+4.5	12.7	51 58.9	+4.8	13.0	82
83	45 10.9	+1.6	9.9	46 10.0	+1.8	10.1	47 09.0	+2.1	10.3	48 08.1	+2.3	10.5	49 07.0	+2.7	10.7	50 06.0	+2.9	10.9	51 04.9	+3.2	11.1	52 03.7	+3.5	11.4	83
84	45 12.5	+0.6	8.5	46 11.8	+0.8	8.7	47 11.1	+1.0	8.8	48 10.4	+1.2	9.0	49 09.7	+1.4	9.2	50 08.9	+1.6	9.4	51 08.1	+1.9	9.6	52 07.2	+2.2	9.8	84
85	45 13.1	−0.6	7.1	46 12.6	−0.3	7.2	47 12.1	−0.2	7.3	48 11.6	0.0	7.5	49 11.1	+0.2	7.6	50 10.5	+0.4	7.8	51 10.0	+0.6	8.0	52 09.4	+0.8	8.1	85
86	45 12.5	−1.5	5.7	46 12.3	−1.5	5.8	47 11.9	−1.3	5.9	48 11.6	−1.1	6.0	49 11.3	−1.0	6.1	50 10.9	−0.8	6.2	51 10.6	−0.7	6.4	52 10.2	−0.5	6.5	86
87	45 11.0	−2.6	4.2	46 10.8	−2.4	4.3	47 10.6	−2.4	4.4	48 10.5	−2.4	4.5	49 10.3	−2.2	4.6	50 10.1	−2.1	4.7	51 09.9	−2.0	4.8	52 09.7	−1.9	4.9	87
88	45 08.4	−3.7	2.8	46 08.3	−3.6	2.9	47 08.2	−3.5	2.9	48 08.1	−3.4	3.0	49 08.1	−3.5	3.0	50 08.0	−3.4	3.1	51 07.9	−3.3	3.2	52 07.8	−3.2	3.2	88
89	45 04.7	−4.7	1.4	46 04.7	−4.7	1.4	47 04.7	−4.7	1.5	48 04.7	−4.7	1.5	49 04.6	−4.6	1.5	50 04.6	−4.6	1.6	51 04.6	−4.6	1.6	52 04.6	−4.6	1.6	89
90	45 00.0	−5.7	0.0	46 00.0	−5.8	0.0	47 00.0	−5.8	0.0	48 00.0	−5.8	0.0	49 00.0	−5.8	0.0	50 00.0	−5.8	0.0	51 00.0	−5.9	0.0	52 00.0	−5.9	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	3 32.0	−42.5	93.5	3 28.3	−43.3	93.6	3 24.5	−44.0	93.7	3 20.6	−44.7	93.7	3 16.7	−45.4	93.8	3 12.7	−46.1	93.8	3 08.7	−46.8	93.9	3 04.6	−47.4	93.9	0
1	2 49.5	−42.6	94.2	2 45.0	−43.3	94.3	2 40.5	−44.0	94.3	2 35.9	−44.7	94.4	2 31.3	−45.4	94.4	2 26.6	−46.0	94.5	2 21.9	−46.7	94.5	2 17.2	−47.4	94.6	1
2	2 06.9	−42.5	95.0	2 01.7	−43.3	95.0	1 56.5	−44.0	95.0	1 51.2	−44.7	95.1	1 45.9	−45.4	95.1	1 40.6	−46.1	95.1	1 35.2	−46.7	95.1	1 29.8	−47.4	95.2	2
3	1 24.4	−42.6	95.7	1 18.4	−43.3	95.7	1 12.5	−44.0	95.7	1 06.5	−44.7	95.7	1 00.5	−45.4	95.7	0 54.5	−46.1	95.8	0 48.5	−46.8	95.8	0 42.4	−47.4	95.8	3
4	0 41.8	−42.6	96.4	0 35.1	−43.3	96.4	0 28.5	−44.1	96.4	0 21.8	−44.7	96.4	0 15.1	−45.4	96.4	0 08.4	−46.1	96.4	0 01.7	−46.7	96.4	0 05.0	+47.3	83.6	4
5	0 00.8	+42.6	82.9	0 08.2	+43.3	82.9	0 15.6	+44.0	82.9	0 22.9	+44.8	82.9	0 30.3	+45.4	83.0	0 37.7	+46.0	83.0	0 45.0	+46.7	83.0	0 52.3	+47.4	83.0	5
6	0 43.4	+42.6	82.2	0 51.5	+43.3	82.2	0 59.6	+44.0	82.3	1 07.7	+44.7	82.3	1 15.7	+45.4	82.3	1 23.7	+46.1	82.3	1 31.7	+46.8	82.3	1 39.7	+47.4	82.4	6
7	1 26.0	+42.5	81.5	1 34.8	+43.3	81.6	1 43.6	+44.0	81.6	1 52.4	+44.7	81.6	2 01.1	+45.4	81.6	2 09.8	+46.1	81.7	2 18.5	+46.7	81.7	2 27.1	+47.4	81.8	7
8	2 08.5	+42.6	80.8	2 18.1	+43.3	80.9	2 27.6	+44.0	80.9	2 37.1	+44.6	80.9	2 46.5	+45.4	81.0	2 55.9	+46.0	81.0	3 05.2	+46.7	81.1	3 14.5	+47.3	81.1	8
9	2 51.1	+42.5	80.1	3 01.4	+43.2	80.2	3 11.6	+43.9	80.2	3 21.7	+44.7	80.3	3 31.9	+45.3	80.3	3 41.9	+46.0	80.4	3 51.9	+46.6	80.5	4 01.8	+47.3	80.5	9
10	3 33.6	+42.5	79.4	3 44.6	+43.2	79.5	3 55.5	+44.0	79.5	4 06.4	+44.6	79.6	4 17.2	+45.3	79.7	4 27.9	+46.0	79.8	4 38.5	+46.7	79.8	4 49.1	+47.3	79.9	10
11	4 16.1	+42.4	78.7	4 27.8	+43.2	78.8	4 39.5	+43.8	78.9	4 51.0	+44.6	78.9	5 02.5	+45.2	79.0	5 13.9	+45.9	79.1	5 25.2	+46.6	79.2	5 36.4	+47.2	79.3	11
12	4 58.5	+42.4	78.0	5 11.0	+43.1	78.1	5 23.3	+43.9	78.2	5 35.6	+44.5	78.3	5 47.7	+45.3	78.4	5 59.8	+45.9	78.5	6 11.8	+46.5	78.6	6 23.6	+47.2	78.7	12
13	5 40.9	+42.4	77.3	5 54.1	+43.1	77.4	6 07.2	+43.8	77.5	6 20.1	+44.5	77.6	6 33.0	+45.1	77.7	6 45.7	+45.8	77.8	6 58.3	+46.5	77.9	7 10.8	+47.1	78.1	13
14	6 23.3	+42.3	76.6	6 37.2	+43.0	76.7	6 51.0	+43.7	76.8	7 04.6	+44.4	76.9	7 18.1	+45.1	77.0	7 31.5	+45.8	77.2	7 44.8	+46.4	77.3	7 57.9	+47.1	77.4	14
15	7 05.6	+42.2	75.9	7 20.2	+42.9	76.0	7 34.7	+43.6	76.1	7 49.0	+44.4	76.2	8 03.2	+45.1	76.4	8 17.3	+45.7	76.5	8 31.2	+46.4	76.7	8 45.0	+47.0	76.8	15
16	7 47.8	+42.2	75.1	8 03.1	+42.9	75.3	8 18.3	+43.6	75.4	8 33.4	+44.3	75.6	8 48.3	+44.9	75.7	9 03.0	+45.6	75.9	9 17.6	+46.3	76.0	9 32.0	+47.0	76.2	16
17	8 30.0	+42.1	74.4	8 46.0	+42.8	74.6	9 01.9	+43.5	74.7	9 17.7	+44.2	74.9	9 33.2	+44.9	75.0	9 48.6	+45.6	75.2	10 03.9	+46.2	75.4	10 19.0	+46.8	75.5	17
18	9 12.1	+41.9	73.7	9 28.8	+42.7	73.9	9 45.4	+43.4	74.0	10 01.9	+44.1	74.2	10 18.1	+44.8	74.4	10 34.2	+45.5	74.5	10 50.1	+46.2	74.7	11 05.8	+46.8	74.9	18
19	9 54.0	+41.9	73.0	10 11.5	+42.6	73.2	10 28.8	+43.4	73.3	10 46.0	+44.0	73.5	11 02.9	+44.7	73.7	11 19.7	+45.4	73.9	11 36.3	+46.0	74.1	11 52.6	+46.7	74.3	19
20	10 35.9	+41.8	72.2	10 54.1	+42.6	72.4	11 12.2	+43.2	72.6	11 30.0	+43.9	72.8	11 47.6	+44.7	73.0	12 05.1	+45.3	73.2	12 22.3	+46.0	73.4	12 39.3	+46.7	73.6	20
21	11 17.7	+41.7	71.5	11 36.7	+42.4	71.7	11 55.4	+43.1	71.9	12 13.9	+43.9	72.1	12 32.3	+44.5	72.3	12 50.4	+45.2	72.5	13 08.3	+45.8	72.8	13 26.0	+46.5	73.0	21
22	11 59.4	+41.6	70.8	12 19.1	+42.3	71.0	12 38.5	+43.0	71.2	12 57.8	+43.7	71.4	13 16.8	+44.4	71.6	13 35.6	+45.1	71.9	13 54.1	+45.8	72.1	14 12.5	+46.4	72.3	22
23	12 41.0	+41.4	70.0	13 01.4	+42.1	70.3	13 21.5	+42.9	70.5	13 41.5	+43.6	70.7	14 01.2	+44.3	70.9	14 20.7	+44.9	71.2	14 39.9	+45.6	71.4	14 58.9	+46.3	71.7	23
24	13 22.4	+41.4	69.3	13 43.5	+42.1	69.5	14 04.4	+42.8	69.8	14 25.1	+43.4	70.0	14 45.5	+44.1	70.2	15 05.6	+44.9	70.5	15 25.5	+45.6	70.7	15 45.2	+46.2	71.0	24
25	14 03.8	+41.1	68.6	14 25.6	+41.9	68.8	14 47.2	+42.6	69.0	15 08.5	+43.3	69.3	15 29.6	+44.0	69.5	15 50.5	+44.7	69.8	16 11.1	+45.3	70.1	16 31.4	+46.0	70.3	25
26	14 44.9	+41.1	67.8	15 07.5	+41.7	68.0	15 29.8	+42.5	68.3	15 51.8	+43.2	68.6	16 13.6	+43.9	68.8	16 35.2	+44.5	69.1	16 56.4	+45.3	69.4	17 17.4	+45.9	69.7	26
27	15 26.0	+40.8	67.0	15 49.2	+41.7	67.3	16 12.3	+42.3	67.6	16 35.0	+43.1	67.8	16 57.5	+43.8	68.1	17 19.7	+44.5	68.4	17 41.7	+45.1	68.7	18 03.3	+45.8	69.0	27
28	16 06.8	+40.8	66.3	16 30.9	+41.4	66.6	16 54.6	+42.2	66.8	17 18.1	+42.8	67.1	17 41.3	+43.5	67.4	18 04.2	+44.2	67.7	18 26.8	+44.9	68.0	18 49.1	+45.6	68.3	28
29	16 47.6	+40.5	65.5	17 12.3	+41.3	65.8	17 36.8	+42.0	66.1	18 00.9	+42.7	66.4	18 24.8	+43.4	66.7	18 48.4	+44.1	67.0	19 11.7	+44.8	67.3	19 34.7	+45.5	67.6	29
30	17 28.1	+40.4	64.7	17 53.6	+41.1	65.0	18 18.8	+41.8	65.3	18 43.6	+42.6	65.6	19 08.2	+43.3	66.0	19 32.5	+44.0	66.3	19 56.5	+44.7	66.6	20 20.2	+45.3	66.9	30
31	18 08.5	+40.2	64.0	18 34.7	+40.9	64.3	19 00.6	+41.6	64.6	19 26.2	+42.3	64.9	19 51.5	+43.0	65.2	20 16.5	+43.7	65.5	20 41.2	+44.4	65.9	21 05.5	+45.1	66.2	31
32	18 48.7	+39.9	63.2	19 15.6	+40.7	63.5	19 42.2	+41.4	63.8	20 08.5	+42.2	64.1	20 34.5	+42.9	64.5	21 00.2	+43.6	64.8	21 25.6	+44.3	65.2	21 50.6	+45.0	65.5	32
33	19 28.6	+39.8	62.4	19 56.3	+40.5	62.7	20 23.6	+41.3	63.0	20 50.7	+41.9	63.4	21 17.4	+42.7	63.7	21 43.8	+43.4	64.1	22 09.9	+44.0	64.4	22 35.6	+44.7	64.8	33
34	20 08.4	+39.6	61.6	20 36.8	+40.3	61.9	21 04.9	+41.0	62.3	21 32.6	+41.8	62.6	22 00.1	+42.4	63.0	22 27.2	+43.1	63.3	22 53.9	+43.9	63.7	23 20.3	+44.6	64.1	34
35	20 48.0	+39.3	60.8	21 17.1	+40.0	61.1	21 45.9	+40.8	61.5	22 14.4	+41.5	61.8	22 42.5	+42.3	62.2	23 10.3	+42.9	62.6	23 37.8	+43.6	63.0	24 04.9	+44.3	63.4	35
36	21 27.3	+39.1	60.0	21 57.1	+39.9	60.3	22 26.7	+40.5	60.7	22 55.9	+41.3	61.1	23 24.8	+42.0	61.4	23 53.3	+42.7	61.8	24 21.4	+43.4	62.2	24 49.2	+44.1	62.6	36
37	22 06.4	+38.8	59.2	22 37.0	+39.6	59.5	23 07.2	+40.4	59.9	23 37.2	+41.0	60.3	24 06.8	+41.7	60.7	24 36.0	+42.5	61.0	25 04.8	+43.2	61.5	25 33.3	+43.9	61.9	37
38	22 45.2	+38.6	58.3	23 16.6	+39.3	58.7	23 47.6	+40.0	59.1	24 18.2	+40.8	59.5	24 48.5	+41.5	59.9	25 18.5	+42.2	60.3	25 48.0	+43.0	60.7	26 17.2	+43.6	61.1	38
39	23 23.8	+38.4	57.5	23 55.9	+39.1	57.9	24 27.6	+39.8	58.3	24 59.0	+40.5	58.7	25 30.0	+41.3	59.1	26 00.7	+42.0	59.5	26 31.0	+42.6	59.9	27 00.8	+43.4	60.3	39
40	24 02.2	+38.0	56.7	24 35.0	+38.7	57.1	25 07.4	+39.5	57.4	25 39.5	+40.3	57.8	26 11.3	+40.9	58.3	26 42.7	+41.6	58.7	27 13.6	+42.5	59.1	27 44.2	+43.2	59.6	40
41	24 40.2	+37.8	55.8	25 13.7	+38.5	56.2	25 46.9	+39.3	56.6	26 19.8	+39.9	57.0	26 52.2	+40.7	57.4	27 24.3	+41.5	57.9	27 56.1	+42.1	58.3	28 27.4	+42.8	58.8	41
42	25 18.0	+37.4	55.0	25 52.2	+38.2	55.4	26 26.2	+38.9	55.8	26 59.7	+39.7	56.2	27 32.9	+40.4	56.6	28 05.8	+41.1	57.1	28 38.2	+41.8	57.5	29 10.2	+42.6	58.0	42
43	25 55.4	+37.2	54.1	26 30.4	+37.9	54.5	27 05.1	+38.6	54.9	27 39.4	+39.4	55.3	28 13.3	+40.1	55.8	28 46.9	+40.8	56.2	29 20.0	+41.6	56.7	29 52.8	+42.2	57.2	43
44	26 32.6	+36.8	53.2	27 08.3	+37.6	53.6	27 43.7	+38.3	54.1	28 18.8	+39.0	54.5	28 53.4	+39.8	54.9	29 27.7	+40.5	55.4	30 01.6	+41.2	55.9	30 35.0	+42.0	56.3	44
45	27 09.4	+36.5	52.3	27 45.9	+37.2	52.8	28 22.0	+38.0	53.2	28 57.8	+38.7	53.6	29 33.2	+39.4	54.1	30 08.2	+40.1	54.5	30 42.8	+40.9	55.0	31 17.0	+41.6	55.5	45
46	27 45.9	+36.1	51.4	28 23.1	+36.9	51.9	29 00.0	+37.6	52.3	29 36.5	+38.3	52.7	30 12.6	+39.1	53.2	30 48.3	+39.9	53.7	31 23.7	+40.5	54.2	31 58.6	+41.3	54.7	46
47	28 22.0	+35.8	50.5	29 00.0	+36.5	51.0	29 37.6	+37.2	51.4	30 14.8	+38.0	51.9	30 51.7	+38.7	52.3	31 28.2	+39.4	52.8	32 04.2	+40.2	53.3	32 39.9	+40.9	53.8	47
48	28 57.8	+35.4	49.6	29 36.5	+36.1	50.1	30 14.8	+36.9	50.5	30 52.8	+37.6	51.0	31 30.4	+38.3	51.4	32 07.6	+39.1	51.9	32 44.4	+39.8	52.4	33 20.8	+40.5	52.9	48
49	29 33.2	+35.0	48.7	30 12.6	+35.7	49.1	30 51.7	+36.5	49.6	31 30.4	+37.2	50.0	32 08.7	+38.0	50.5	32 46.7	+38.7	51.0	33 24.2	+39.4	51.5	34 01.3	+40.2	52.0	49
50	30 08.2	+34.6	47.8	30 48.3	+35.4	48.2	31 28.2	+36.0	48.7	32 07.6	+36.8	49.1	32 46.7	+37.5	49.6	33 25.4	+38.2	50.1	34 03.6	+39.1	50.6	34 41.5	+39.8	51.1	50
51	30 42.8	+34.2	46.8	31 23.7	+34.9	47.3	32 04.2	+35.7	47.7	32 44.4	+36.4	48.2	33 24.2	+37.1	48.7	34 03.6	+37.9	49.2	34 42.7	+38.6	49.7	35 21.3	+39.3	50.2	51
52	31 17.0	+33.7	45.9	31 58.6	+34.5	46.3	32 39.9	+35.2	46.8	33 20.8	+35.9	47.2	34 01.3	+36.7	47.7	34 41.5	+37.4	48.2	35 21.3	+38.1	48.8	36 00.6	+38.9	49.3	52
53	31 50.7	+33.3	44.9	32 33.1	+34.0	45.3	33 15.1	+34.7	45.8	33 56.7	+35.5	46.3	34 38.0	+36.2	46.8	35 18.9	+37.0	47.3	35 59.4	+37.7	47.8	36 39.5	+38.4	48.4	53
54	32 24.0	+32.9	43.9	33 07.1	+33.6	44.4	33 49.8	+34.3	44.8	34 32.2	+35.0	45.3	35 14.2	+35.8	45.8	35 55.9	+36.5	46.3	36 37.1	+37.2	46.8	37 17.9	+38.0	47.4	54
55	32 56.9	+32.4	42.9	33 40.7	+33.0	43.4	34 24.1	+33.8	43.8	35 07.2	+34.6	44.3	35 50.0	+35.2	44.8	36 32.4	+35.9	45.3	37 14.3	+36.8	45.9	37 55.9	+37.5	46.4	55
56	33 29.3	+31.8	41.9	34 13.7	+32.6	42.4	34 57.9	+33.3	42.8	35 41.8	+34.0	43.3	36 25.2	+34.8	43.8	37 08.3	+35.5	44.3	37 51.1	+36.2	44.9	38 33.4	+36.9	45.4	56
57	34 01.1	+31.4	40.9	34 46.3	+32.1	41.3	35 31.2	+32.8	41.8	36 15.8	+33.5	42.3	37 00.0	+34.2	42.8	37 43.8	+35.0	43.3	38 27.3	+35.7	43.9	39 10.3	+36.5	44.4	57
58	34 32.5	+30.8	39.9	35 18.4	+31.5	40.3	36 04.0	+32.2	40.8	36 49.3	+32.9	41.3	37 34.2	+33.7	41.8	38 18.8	+34.4	42.3	39 03.0	+35.1	42.8	39 46.8	+35.9	43.4	58
59	35 03.3	+30.3	38.8	35 49.9	+31.0	39.3	36 36.2	+31.7	39.7	37 22.2	+32.4	40.2	38 07.9	+33.1	40.7	38 53.2	+33.8	41.2	39 38.1	+34.6	41.8	40 22.7	+35.2	42.3	59
60	35 33.6	+29.7	37.8	36 20.9	+30.4	38.2	37 07.9	+31.1	38.7	37 54.6	+31.8	39.1	38 41.0	+32.5	39.6	39 27.0	+33.2	40.2	40 12.7	+33.9	40.7	40 57.9	+34.7	41.3	60
61	36 03.3	+29.2	36.7	36 51.3	+29.8	37.1	37 39.0	+30.5	37.6	38 26.4	+31.2	38.1	39 13.5	+31.9	38.6	40 00.2	+32.6	39.1	40 46.6	+33.4	39.6	41 32.6	+34.1	40.2	61
62	36 32.5	+28.5	35.6	37 21.1	+29.3	36.0	38 09.5	+29.9	36.5	38 57.6	+30.6	37.0	39 45.4	+31.3	37.5	40 32.8	+32.1	38.0	41 20.0	+32.7	38.5	42 06.7	+33.4	39.1	62
63	37 01.0	+28.0	34.5	37 50.4	+28.6	34.9	38 39.4	+29.3	35.4	39 28.2	+29.9	35.9	40 16.7	+30.6	36.4	41 04.8	+31.3	36.9	41 52.7	+32.0	37.4	42 40.1	+32.8	38.0	63
64	37 29.0	+27.3	33.4	38 19.0	+27.9	33.8	39 08.7	+28.6	34.3	39 58.1	+29.3	34.7	40 47.3	+29.9	35.2	41 36.1	+30.7	35.7	42 24.7	+31.3	36.3	43 12.9	+32.1	36.8	64
65	37 56.3	+26.6	32.3	38 46.9	+27.3	32.7	39 37.3	+27.9	33.1	40 27.4	+28.6	33.6	41 17.2	+29.3	34.1	42 06.8	+29.9	34.5	42 56.5	+30.7	35.0	43 45.0	+31.3	35.5	65
66	38 22.9	+26.0	31.1	39 14.2	+26.6	31.5	40 05.2	+27.2	32.0	40 56.0	+27.9	32.4	41 46.5	+28.5	32.9	42 36.7	+29.2	33.4	43 26.7	+29.8	33.9	44 16.3	+30.6	34.5	66
67	38 48.9	+25.3	30.0	39 40.8	+25.9	30.4	40 32.4	+26.6	30.8	41 23.9	+27.1	31.3	42 15.0	+27.8	31.7	43 05.9	+28.5	32.2	43 56.5	+29.2	32.7	44 46.9	+29.8	33.3	67
68	39 14.2	+24.6	28.8	40 06.7	+25.2	29.2	40 59.0	+25.8	29.6	41 51.0	+26.4	30.1	42 42.8	+27.0	30.5	43 34.4	+27.7	31.0	44 25.7	+28.3	31.5	45 16.7	+29.0	32.0	68
69	39 38.8	+23.9	27.6	40 31.9	+24.4	28.0	41 24.8	+25.0	28.4	42 17.4	+25.6	28.9	43 09.8	+26.3	29.3	44 02.1	+26.8	29.8	44 54.0	+27.5	30.3	45 45.7	+28.2	30.8	69
70	40 02.7	+23.1	26.4	40 56.3	+23.7	26.8	41 49.8	+24.2	27.2	42 43.0	+24.9	27.6	43 36.1	+25.4	28.1	44 28.9	+26.1	28.5	45 21.5	+26.7	29.0	46 13.9	+27.3	29.5	70
71	40 25.8	+22.4	25.2	41 20.0	+22.9	25.6	42 14.0	+23.5	26.0	43 07.9	+24.0	26.4	44 01.5	+24.6	26.8	44 55.0	+25.2	27.3	45 48.2	+25.8	27.7	46 41.2	+26.4	28.2	71
72	40 48.2	+21.5	24.0	41 42.9	+22.1	24.4	42 37.5	+22.6	24.7	43 31.9	+23.2	25.1	44 26.1	+23.7	25.5	45 20.2	+24.3	26.0	46 14.0	+24.9	26.4	47 07.6	+25.5	26.9	72
73	41 09.7	+20.8	22.8	42 05.0	+21.3	23.1	43 00.1	+21.8	23.5	43 55.1	+22.3	23.8	44 49.8	+22.9	24.2	45 44.5	+23.4	24.7	46 38.9	+24.0	25.1	47 33.1	+24.6	25.6	73
74	41 30.5	+19.9	21.5	42 26.3	+20.4	21.8	43 21.9	+20.9	22.2	44 17.4	+21.4	22.6	45 12.7	+21.9	22.9	46 07.9	+22.4	23.3	47 02.9	+23.0	23.8	47 57.7	+23.6	24.2	74
75	41 50.4	+19.2	20.2	42 46.7	+19.5	20.6	43 42.8	+20.0	20.9	44 38.8	+20.5	21.2	45 34.6	+21.0	21.6	46 30.3	+21.6	22.0	47 25.9	+22.0	22.4	48 21.3	+22.6	22.8	75
76	42 09.6	+18.2	19.0	43 06.2	+18.7	19.3	44 02.8	+19.2	19.6	44 59.3	+19.6	19.9	45 55.6	+20.1	20.3	46 51.9	+20.5	20.6	47 47.9	+21.1	21.0	48 43.9	+21.5	21.4	76
77	42 27.8	+17.4	17.7	43 24.9	+17.8	18.0	44 22.0	+18.2	18.3	45 18.9	+18.6	18.6	46 15.7	+19.1	18.9	47 12.4	+19.5	19.3	48 09.0	+20.0	19.6	49 05.4	+20.5	20.0	77
78	42 45.2	+16.5	16.4	43 42.7	+16.9	16.7	44 40.2	+17.2	16.9	45 37.5	+17.7	17.2	46 34.8	+18.0	17.5	47 31.9	+18.5	17.9	48 29.0	+18.9	18.2	49 25.9	+19.4	18.6	78
79	43 01.7	+15.6	15.1	43 59.6	+15.9	15.3	44 57.4	+16.3	15.6	45 55.2	+16.6	15.9	46 52.8	+17.1	16.1	47 50.4	+17.5	16.5	48 47.9	+17.9	16.8	49 45.3	+18.3	17.1	79
80	43 17.3	+14.6	13.7	44 15.5	+15.0	14.0	45 13.7	+15.3	14.2	46 11.8	+15.7	14.5	47 09.9	+16.0	14.7	48 07.9	+16.4	15.0	49 05.8	+16.8	15.3	50 03.6	+17.2	15.6	80
81	43 31.9	+13.7	12.4	44 30.5	+14.0	12.6	45 29.0	+14.3	12.8	46 27.5	+14.6	13.1	47 25.9	+15.0	13.3	48 24.3	+15.3	13.6	49 22.6	+15.6	13.8	50 20.8	+16.0	14.1	81
82	43 45.6	+12.8	11.1	44 44.5	+13.0	11.3	45 43.3	+13.3	11.5	46 42.1	+13.6	11.7	47 40.9	+13.8	11.9	48 39.5	+14.2	12.1	49 38.2	+14.5	12.4	50 36.8	+14.8	12.6	82
83	43 58.4	+11.8	9.7	44 57.5	+12.1	9.9	45 56.6	+12.3	10.1	46 55.7	+12.5	10.2	47 54.7	+12.8	10.4	48 53.7	+13.0	10.6	49 52.7	+13.2	10.9	50 51.6	+13.5	11.1	83
84	44 10.2	+10.8	8.5	45 09.6	+11.0	8.6	46 09.0	+11.2	8.8	47 08.2	+11.4	8.8	48 07.5	+11.6	9.0	49 06.7	+11.9	9.2	50 05.9	+12.1	9.3	51 05.1	+12.4	9.5	84
85	44 21.0	+9.8	7.0	45 20.6	+10.0	7.1	46 20.1	+10.2	7.2	47 19.6	+10.3	7.4	48 19.1	+10.5	7.5	49 18.6	+10.7	7.7	50 18.0	+10.9	7.8	51 17.5	+11.1	8.0	85
86	44 30.8	+8.9	5.6	45 30.6	+8.9	5.7	46 30.3	+9.0	5.8	47 29.9	+9.3	5.9	48 29.6	+9.4	6.0	49 29.3	+9.5	6.1	50 28.9	+9.7	6.3	51 28.6	+9.8	6.4	86
87	44 39.7	+7.8	4.3	45 39.5	+7.9	4.3	46 39.3	+8.0	4.4	47 39.2	+8.0	4.4	48 39.0	+8.2	4.5	49 38.8	+8.3	4.6	50 38.6	+8.4	4.7	51 38.4	+8.5	4.8	87
88	44 47.5	+6.8	2.8	45 47.4	+6.8	2.9	46 47.3	+6.9	2.9	47 47.2	+7.0	3.0	48 47.2	+7.0	3.0	49 47.1	+7.1	3.1	50 47.0	+7.1	3.2	51 46.9	+7.2	3.2	88
89	44 54.3	+5.7	1.4	45 54.2	+5.8	1.4	46 54.2	+5.8	1.5	47 54.2	+5.8	1.5	48 54.2	+5.8	1.5	49 54.2	+5.8	1.5	50 54.1	+5.9	1.6	51 54.1	+5.9	1.6	89
90	45 00.0	+4.7	0.0	46 00.0	+4.7	0.0	47 00.0	+4.7	0.0	48 00.0	+4.7	0.0	49 00.0	+4.6	0.0	50 00.0	+4.6	0.0	51 00.0	+4.6	0.0	52 00.0	+4.6	0.0	90

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	Hc 45°	d	Z	Hc 46°	d	Z	Hc 47°	d	Z	Hc 48°	d	Z	Hc 49°	d	Z	Hc 50°	d	Z	Hc 51°	d	Z	Hc 52°	d	Z	Dec.
0	2 49.6	+42.5	92.8	2 46.6	+43.2	92.9	2 43.6	+43.9	92.9	2 40.5	+44.6	93.0	2 37.4	+45.3	93.0	2 34.2	+46.0	93.1	2 31.0	+46.6	93.1	2 27.7	+47.3	93.2	0
1	3 32.1	+42.4	92.1	3 29.8	+43.2	92.2	3 27.5	+43.9	92.2	3 25.1	+44.6	92.3	3 22.7	+45.3	92.4	3 20.2	+46.0	92.4	3 17.6	+46.7	92.5	3 15.0	+47.3	92.5	1
2	4 14.5	+42.4	91.4	4 13.0	+43.1	91.5	4 11.4	+43.9	91.6	4 09.7	+44.6	91.6	4 08.0	+45.3	91.7	4 06.2	+45.9	91.8	4 04.3	+46.6	91.9	4 02.3	+47.3	91.9	2
3	4 56.9	+42.4	90.7	4 56.1	+43.1	90.8	4 55.3	+43.8	90.9	4 54.3	+44.5	91.0	4 53.3	+45.2	91.0	4 52.1	+45.9	91.1	4 50.9	+46.6	91.2	4 49.6	+47.2	91.3	3
4	5 39.3	+42.3	90.0	5 39.2	+43.1	90.1	5 39.1	+43.7	90.2	5 38.8	+44.5	90.3	5 38.5	+45.1	90.4	5 38.0	+45.9	90.5	5 37.5	+46.5	90.6	5 36.8	+47.2	90.7	4
5	6 21.6	+42.2	89.3	6 22.3	+42.9	89.4	6 22.8	+43.8	89.5	6 23.3	+44.4	89.6	6 23.6	+45.2	89.7	6 23.9	+45.8	89.8	6 24.0	+46.5	90.0	6 24.0	+47.1	90.1	5
6	7 03.8	+42.2	88.6	7 05.2	+43.0	88.7	7 06.6	+43.6	88.8	7 07.7	+44.4	88.9	7 08.8	+45.0	89.1	7 09.7	+45.7	89.2	7 10.5	+46.4	89.3	7 11.1	+47.1	89.4	6
7	7 46.0	+42.1	87.8	7 48.2	+42.8	88.0	7 50.2	+43.6	88.1	7 52.1	+44.3	88.3	7 53.8	+45.0	88.4	7 55.4	+45.7	88.5	7 56.9	+46.4	88.7	7 58.2	+47.1	88.8	7
8	8 28.1	+42.0	87.1	8 31.0	+42.8	87.3	8 33.8	+43.5	87.4	8 36.4	+44.2	87.6	8 38.8	+45.0	87.7	8 41.1	+45.7	87.9	8 43.3	+46.3	88.0	8 45.3	+46.9	88.2	8
9	9 10.1	+41.9	86.4	9 13.8	+42.7	86.6	9 17.3	+43.4	86.7	9 20.6	+44.2	86.9	9 23.8	+44.8	87.1	9 26.8	+45.5	87.2	9 29.6	+46.2	87.4	9 32.2	+46.9	87.6	9
10	9 52.0	+41.7	85.7	9 56.5	+42.5	85.9	10 00.7	+43.3	86.0	10 04.8	+44.0	86.2	10 08.6	+44.8	86.4	10 12.3	+45.5	86.6	10 15.8	+46.2	86.7	10 19.1	+46.9	86.9	10
11	10 33.9	+41.7	85.0	10 39.0	+42.5	85.1	10 44.0	+43.3	85.3	10 48.8	+44.0	85.5	10 53.4	+44.7	85.7	10 57.8	+45.4	85.9	11 02.0	+46.1	86.1	11 06.0	+46.7	86.3	11
12	11 15.6	+41.6	84.2	11 21.5	+42.4	84.4	11 27.3	+43.1	84.6	11 32.8	+43.9	84.8	11 38.1	+44.6	85.0	11 43.2	+45.3	85.2	11 48.1	+46.0	85.4	11 52.7	+46.7	85.6	12
13	11 57.2	+41.6	83.5	12 03.9	+42.3	83.7	12 10.4	+43.0	83.9	12 16.7	+43.7	84.1	12 22.7	+44.5	84.3	12 28.5	+45.2	84.6	12 34.1	+45.9	84.8	12 39.4	+46.6	85.0	13
14	12 38.8	+41.3	82.7	12 46.2	+42.2	83.0	12 53.4	+42.9	83.2	13 00.4	+43.7	83.4	13 07.2	+44.4	83.7	13 13.7	+45.1	83.9	13 20.0	+45.7	84.1	13 26.0	+46.5	84.4	14
15	13 20.1	+41.3	82.0	13 28.4	+42.0	82.2	13 36.3	+42.8	82.5	13 44.1	+43.5	82.7	13 51.6	+44.2	83.0	13 58.8	+45.0	83.2	14 05.7	+45.7	83.5	14 12.5	+46.3	83.7	15
16	14 01.4	+41.1	81.3	14 10.4	+41.9	81.5	14 19.1	+42.7	81.8	14 27.6	+43.4	82.0	14 35.8	+44.2	82.3	14 43.8	+44.8	82.5	14 51.4	+45.6	82.8	14 58.8	+46.3	83.1	16
17	14 42.5	+41.0	80.5	14 52.3	+41.8	80.8	15 01.8	+42.5	81.0	15 11.0	+43.3	81.3	15 20.0	+44.0	81.6	15 28.6	+44.7	81.8	15 37.0	+45.4	82.1	15 45.1	+46.1	82.4	17
18	15 23.5	+40.8	79.7	15 34.1	+41.6	80.0	15 44.3	+42.4	80.3	15 54.3	+43.1	80.6	16 04.0	+43.8	80.9	16 13.3	+44.6	81.1	16 22.4	+45.3	81.4	16 31.2	+46.0	81.7	18
19	16 04.3	+40.7	79.0	16 15.7	+41.4	79.3	16 26.7	+42.2	79.6	16 37.4	+43.0	79.9	16 47.8	+43.7	80.1	16 57.9	+44.5	80.4	17 07.7	+45.2	80.7	17 17.2	+45.9	81.1	19
20	16 45.0	+40.5	78.2	16 57.1	+41.3	78.5	17 08.9	+42.0	78.8	17 20.4	+42.8	79.1	17 31.5	+43.6	79.4	17 42.4	+44.3	79.7	17 52.9	+45.0	80.1	18 03.1	+45.7	80.4	20
21	17 25.5	+40.3	77.4	17 38.4	+41.1	77.8	17 50.9	+41.9	78.1	18 03.2	+42.6	78.4	18 15.1	+43.4	78.7	18 26.7	+44.1	79.0	18 37.9	+44.9	79.4	18 48.8	+45.6	79.7	21
22	18 05.8	+40.1	76.7	18 19.5	+40.9	77.0	18 32.8	+41.7	77.3	18 45.8	+42.5	77.6	18 58.5	+43.2	78.0	19 10.8	+44.0	78.3	19 22.8	+44.7	78.7	19 34.4	+45.4	79.0	22
23	18 45.9	+39.9	75.9	19 00.4	+40.7	76.2	19 14.5	+41.5	76.6	19 28.3	+42.3	76.9	19 41.7	+43.0	77.2	19 54.8	+43.8	77.6	20 07.5	+44.5	78.0	20 19.8	+45.3	78.3	23
24	19 25.8	+39.8	75.1	19 41.1	+40.5	75.4	19 56.0	+41.3	75.8	20 10.6	+42.0	76.1	20 24.7	+42.9	76.5	20 38.6	+43.6	76.9	20 52.0	+44.4	77.2	21 05.1	+45.1	77.6	24
25	20 05.6	+39.5	74.3	20 21.6	+40.3	74.7	20 37.3	+41.1	75.0	20 52.6	+41.9	75.4	21 07.6	+42.7	75.8	21 22.2	+43.4	76.1	21 36.4	+44.1	76.5	21 50.2	+44.9	76.9	25
26	20 45.1	+39.2	73.5	21 01.9	+40.1	73.9	21 18.4	+40.9	74.2	21 34.5	+41.7	74.6	21 50.3	+42.4	75.0	22 05.6	+43.2	75.4	22 20.5	+44.0	75.8	22 35.1	+44.7	76.2	26
27	21 24.3	+39.1	72.7	21 42.0	+39.9	73.1	21 59.3	+40.6	73.4	22 16.2	+41.4	73.8	22 32.7	+42.2	74.2	22 48.8	+43.0	74.6	23 04.5	+43.7	75.0	23 19.8	+44.5	75.5	27
28	22 03.4	+38.8	71.9	22 21.9	+39.6	72.3	22 39.9	+40.5	72.7	22 57.6	+41.2	73.1	23 14.9	+42.0	73.5	23 31.8	+42.8	74.0	23 48.2	+43.6	74.3	24 04.3	+44.2	74.7	28
29	22 42.2	+38.5	71.0	23 01.5	+39.3	71.4	23 20.4	+40.1	71.8	23 38.8	+41.0	72.3	23 56.9	+41.8	72.7	24 14.6	+42.5	73.1	24 31.8	+43.3	73.5	24 48.5	+44.1	74.0	29
30	23 20.7	+38.3	70.2	23 40.8	+39.1	70.6	24 00.5	+39.9	71.0	24 19.8	+40.7	71.5	24 38.7	+41.5	71.9	24 57.1	+42.3	72.3	25 15.1	+43.1	72.8	25 32.6	+43.9	73.2	30
31	23 59.0	+38.0	69.4	24 19.9	+38.8	69.8	24 40.4	+39.7	70.2	25 00.5	+40.5	70.7	25 20.2	+41.2	71.1	25 39.4	+42.0	71.6	25 58.2	+42.8	72.0	26 16.5	+43.5	72.5	31
32	24 37.0	+37.7	68.5	24 58.7	+38.6	69.0	25 20.1	+39.3	69.4	25 41.0	+40.1	69.8	26 01.4	+41.0	70.3	26 21.4	+41.8	70.8	26 41.0	+42.5	71.2	27 00.0	+43.4	71.7	32
33	25 14.7	+37.4	67.7	25 37.3	+38.2	68.1	25 59.4	+39.1	68.6	26 21.1	+39.9	69.0	26 42.4	+40.7	69.5	27 03.2	+41.5	70.0	27 23.5	+42.3	70.4	27 43.4	+43.1	70.9	33
34	25 52.1	+37.1	66.8	26 15.5	+37.9	67.2	26 38.5	+38.8	67.7	27 01.0	+39.6	68.2	27 23.1	+40.4	68.7	27 44.7	+41.2	69.1	28 05.8	+42.0	69.6	28 26.5	+42.8	70.1	34
35	26 29.2	+36.7	65.9	26 53.4	+37.7	66.4	27 17.3	+38.4	66.9	27 40.6	+39.3	67.3	28 03.5	+40.1	67.8	28 25.9	+40.9	68.3	28 47.8	+41.8	68.8	29 09.3	+42.5	69.3	35
36	27 05.9	+36.5	65.0	27 31.1	+37.2	65.5	27 55.7	+38.1	66.0	28 19.9	+38.9	66.5	28 43.6	+39.8	67.0	29 06.8	+40.6	67.5	29 29.6	+41.4	68.0	29 51.8	+42.2	68.5	36
37	27 42.4	+36.1	64.1	28 08.3	+37.0	64.6	28 33.8	+37.8	65.1	28 58.8	+38.6	65.6	29 23.4	+39.4	66.1	29 47.4	+40.3	66.6	30 11.0	+41.0	67.2	30 34.0	+41.9	67.7	37
38	28 18.5	+35.7	63.2	28 45.3	+36.5	63.7	29 11.6	+37.4	64.2	29 37.4	+38.3	64.7	30 02.8	+39.1	65.2	30 27.7	+39.9	65.8	30 52.0	+40.8	66.3	31 15.9	+41.5	66.9	38
39	28 54.2	+35.3	62.3	29 21.8	+36.2	62.8	29 49.0	+37.1	63.3	30 15.7	+37.9	63.8	30 41.9	+38.7	64.4	31 07.6	+39.6	64.9	31 32.8	+40.4	65.5	31 57.4	+41.3	66.0	39
40	29 29.5	+35.0	61.4	29 58.0	+35.8	61.9	30 26.1	+36.6	62.4	30 53.6	+37.5	62.9	31 20.6	+38.4	63.5	31 47.2	+39.2	64.0	32 13.2	+40.0	64.6	32 38.7	+40.8	65.2	40
41	30 04.5	+34.5	60.5	30 33.8	+35.5	61.0	31 02.7	+36.3	61.5	31 31.1	+37.1	62.0	31 59.0	+38.0	62.6	32 26.4	+38.8	63.1	32 53.2	+39.7	63.7	33 19.5	+40.5	64.3	41
42	30 39.0	+34.2	59.5	31 09.3	+34.9	60.0	31 39.0	+35.8	60.6	32 08.2	+36.7	61.1	32 37.0	+37.5	61.7	33 05.2	+38.4	62.2	33 32.9	+39.2	62.8	34 00.0	+40.1	63.4	42
43	31 13.2	+33.7	58.6	31 44.2	+34.6	59.1	32 14.8	+35.5	59.6	32 44.9	+36.3	60.2	33 14.5	+37.2	60.7	33 43.6	+38.0	61.3	34 12.1	+38.9	61.9	34 40.1	+39.7	62.5	43
44	31 46.9	+33.2	57.6	32 18.8	+34.1	58.1	32 50.3	+35.0	58.7	33 21.2	+35.9	59.2	33 51.7	+36.7	59.8	34 21.6	+37.6	60.4	34 51.0	+38.4	61.0	35 19.8	+39.3	61.6	44
45	32 20.1	+32.8	56.6	32 52.9	+33.7	57.1	33 25.3	+34.5	57.7	33 57.1	+35.4	58.3	34 28.4	+36.2	58.8	34 59.2	+37.1	59.4	35 29.4	+38.0	60.0	35 59.1	+38.9	60.7	45
46	32 52.9	+32.4	55.6	33 26.6	+33.2	56.1	33 59.8	+34.0	56.7	34 32.5	+34.9	57.3	35 04.6	+35.8	57.9	35 36.3	+36.7	58.5	36 07.4	+37.5	59.1	36 38.0	+38.3	59.7	46
47	33 25.3	+31.8	54.6	33 59.8	+32.7	55.1	34 33.8	+33.6	55.7	35 07.4	+34.4	56.3	35 40.4	+35.3	56.9	36 13.0	+36.1	57.5	36 44.9	+37.1	58.1	37 16.3	+38.0	58.8	47
48	33 57.1	+31.3	53.6	34 32.5	+32.1	54.1	35 07.4	+33.0	54.7	35 41.8	+33.9	55.3	36 15.7	+34.8	55.9	36 49.1	+35.7	56.5	37 22.0	+36.5	57.1	37 54.3	+37.4	57.8	48
49	34 28.4	+30.8	52.5	35 04.6	+31.7	53.1	35 40.4	+32.6	53.7	36 15.7	+33.4	54.3	36 50.5	+34.3	54.9	37 24.8	+35.1	55.5	37 58.5	+36.0	56.1	38 31.7	+36.9	56.8	49
50	34 59.2	+30.2	51.5	35 36.3	+31.1	52.1	36 13.0	+31.9	52.6	36 49.1	+32.9	53.2	37 24.8	+33.7	53.8	37 59.9	+34.6	54.5	38 34.5	+35.5	55.1	39 08.6	+36.3	55.8	50
51	35 29.4	+29.7	50.4	36 07.4	+30.6	51.0	36 44.9	+31.4	51.6	37 22.0	+32.3	52.2	37 58.5	+33.2	52.8	38 34.5	+34.1	53.4	39 10.0	+34.9	54.1	39 44.9	+35.9	54.7	51
52	35 59.1	+29.1	49.4	36 38.0	+29.9	49.9	37 16.3	+30.9	50.5	37 54.3	+31.7	51.1	38 31.7	+32.5	51.7	39 08.6	+33.4	52.4	39 44.9	+34.4	53.0	40 20.8	+35.2	53.7	52
53	36 28.2	+28.5	48.3	37 07.9	+29.4	48.8	37 47.2	+30.2	49.4	38 26.0	+31.0	50.0	39 04.2	+32.0	50.6	39 42.0	+32.9	51.3	40 19.3	+33.7	51.9	40 56.0	+34.6	52.6	53
54	36 56.7	+27.9	47.2	37 37.3	+28.7	47.8	38 17.4	+29.6	48.3	38 57.0	+30.5	48.9	39 36.2	+31.4	49.6	40 14.9	+32.2	50.2	40 53.0	+33.1	50.9	41 30.6	+34.0	51.5	54
55	37 24.6	+27.3	46.1	38 06.0	+28.1	46.6	38 47.0	+29.0	47.2	39 27.5	+29.8	47.8	40 07.6	+30.7	48.4	40 47.1	+31.6	49.1	41 26.1	+32.5	49.7	42 04.6	+33.4	50.4	55
56	37 51.9	+26.6	45.0	38 34.1	+27.5	45.5	39 16.0	+28.3	46.1	39 57.3	+29.2	46.7	40 38.3	+30.0	47.3	41 18.7	+30.9	48.0	41 58.6	+31.8	48.6	42 38.0	+32.7	49.3	56
57	38 18.5	+26.0	43.8	39 01.6	+26.8	44.4	39 44.3	+27.6	45.0	40 26.5	+28.5	45.6	41 08.3	+29.3	46.2	41 49.6	+30.2	46.8	42 30.4	+31.1	47.5	43 10.7	+32.0	48.2	57
58	38 44.5	+25.2	42.7	39 28.4	+26.1	43.2	40 11.9	+26.9	43.8	40 55.0	+27.8	44.4	41 37.6	+28.7	45.0	42 19.8	+29.5	45.6	43 01.5	+30.4	46.3	43 42.7	+31.3	47.0	58
59	39 09.7	+24.6	41.5	39 54.5	+25.3	42.1	40 38.8	+26.2	42.6	41 22.8	+27.0	43.2	42 06.3	+27.9	43.8	42 49.3	+28.8	44.5	43 31.9	+29.6	45.1	44 13.6	+30.5	45.8	59
60	39 34.3	+23.8	40.3	40 19.8	+24.7	40.9	41 05.0	+25.5	41.4	41 49.8	+26.3	42.0	42 34.2	+27.1	42.6	43 18.1	+28.0	43.3	44 01.5	+28.9	43.9	44 44.5	+29.7	44.6	60
61	39 58.1	+23.1	39.1	40 44.5	+23.8	39.7	41 30.5	+24.7	40.2	42 16.1	+25.5	40.8	43 01.3	+26.3	41.4	43 46.1	+27.2	42.0	44 30.4	+28.1	42.7	45 14.2	+29.0	43.4	61
62	40 21.2	+22.3	37.9	41 08.3	+23.1	38.5	41 55.2	+23.9	39.0	42 41.6	+24.7	39.6	43 27.6	+25.6	40.2	44 13.3	+26.3	40.9	44 58.5	+27.2	41.5	45 43.2	+28.1	42.1	62
63	40 43.5	+21.5	36.7	41 31.4	+22.4	37.2	42 19.1	+23.0	37.8	43 06.3	+23.9	38.3	43 53.2	+24.7	38.9	44 39.6	+25.6	39.5	45 25.7	+26.4	40.2	46 11.3	+27.3	40.9	63
64	41 05.0	+20.8	35.5	41 53.8	+21.5	36.0	42 42.1	+22.3	36.5	43 30.2	+23.0	37.1	44 17.9	+23.8	37.7	45 05.2	+24.7	38.3	45 52.1	+25.5	38.9	46 38.6	+26.3	39.6	64
65	41 25.8	+19.9	34.2	42 15.3	+20.6	34.7	43 04.4	+21.4	35.2	43 53.2	+22.2	35.8	44 41.7	+23.0	36.4	45 29.9	+23.7	37.0	46 17.6	+24.6	37.6	47 04.9	+25.5	38.3	65
66	41 45.7	+19.1	33.0	42 35.9	+19.8	33.4	43 25.8	+20.6	34.0	44 15.4	+21.3	34.5	45 04.7	+22.1	35.1	45 53.6	+22.9	35.7	46 42.2	+23.7	36.3	47 30.4	+24.5	36.9	66
67	42 04.8	+18.2	31.7	42 55.7	+19.0	32.2	43 46.4	+19.6	32.7	44 36.7	+20.4	33.2	45 26.8	+21.1	33.8	46 16.5	+21.9	34.3	47 05.9	+22.7	34.9	47 54.9	+23.5	35.6	67
68	42 23.0	+17.4	30.4	43 14.7	+18.0	30.9	44 06.0	+18.8	31.4	44 57.1	+19.5	31.9	45 47.9	+20.2	32.4	46 38.4	+21.0	33.0	47 28.6	+21.7	33.6	48 18.4	+22.5	34.2	68
69	42 40.4	+16.5	29.1	43 32.7	+17.2	29.6	44 24.8	+17.8	30.0	45 16.6	+18.5	30.5	46 08.1	+19.3	31.1	46 59.4	+20.0	31.6	47 50.3	+20.8	32.2	48 40.9	+21.5	32.8	69
70	42 56.9	+15.5	27.8	43 49.9	+16.2	28.2	44 42.6	+16.9	28.7	45 35.1	+17.6	29.2	46 27.4	+18.2	29.7	47 19.4	+18.9	30.2	48 11.1	+19.6	30.8	49 02.4	+20.5	31.4	70
71	43 12.4	+14.7	26.5	44 06.1	+15.2	26.9	44 59.5	+15.9	27.3	45 52.7	+16.5	27.8	46 45.6	+17.2	28.3	47 38.3	+17.9	28.8	48 30.7	+18.7	29.4	49 22.9	+19.3	29.9	71
72	43 27.1	+13.7	25.1	44 21.3	+14.3	25.5	45 15.4	+14.9	26.0	46 09.2	+15.5	26.4	47 02.8	+16.2	26.9	47 56.2	+16.9	27.4	48 49.4	+17.5	27.9	49 42.9	+18.3	28.5	72
73	43 40.8	+12.8	23.8	44 35.6	+13.4	24.2	45 30.3	+13.9	24.6	46 24.7	+14.5	25.0	47 19.0	+15.1	25.5	48 13.1	+15.7	26.0	49 06.9	+16.4	26.5	50 00.5	+17.1	27.0	73
74	43 53.6	+11.8	22.4	44 49.0	+12.3	22.8	45 44.2	+12.9	23.2	46 39.2	+13.5	23.6	47 34.1	+14.1	24.1	48 28.8	+14.7	24.5	49 23.3	+15.3	25.0	50 17.6	+15.9	25.5	74
75	44 05.4	+10.8	21.1	45 01.3	+11.3	21.4	45 57.1	+11.8	21.8	46 52.7	+12.4	22.2	47 48.2	+12.9	22.6	48 43.5	+13.5	23.0	49 38.6	+14.1	23.5	50 33.5	+14.8	24.0	75
76	44 16.2	+9.8	19.7	45 12.6	+10.3	20.0	46 08.9	+10.8	20.4	47 05.1	+11.3	20.8	48 01.1	+11.9	21.1	48 57.0	+12.4	21.6	49 52.7	+13.0	22.0	50 48.3	+13.5	22.4	76
77	44 26.0	+8.8	18.3	45 22.9	+9.3	18.6	46 19.7	+9.7	19.0	47 16.4	+10.2	19.3	48 13.0	+10.7	19.7	49 09.4	+11.2	20.1	50 05.7	+11.7	20.5	51 01.8	+12.3	20.9	77
78	44 34.8	+7.8	16.9	45 32.2	+8.2	17.2	46 29.4	+8.6	17.5	47 26.6	+9.1	17.9	48 23.7	+9.5	18.2	49 20.6	+10.0	18.6	50 17.4	+10.5	19.0	51 14.1	+11.0	19.3	78
79	44 42.6	+6.8	15.5	45 40.4	+7.2	15.8	46 38.1	+7.6	16.1	47 35.7	+8.0	16.4	48 33.2	+8.4	16.7	49 30.6	+8.9	17.0	50 27.9	+9.3	17.4	51 25.1	+9.8	17.8	79
80	44 49.4	+5.8	14.1	45 47.6	+6.1	14.4	46 45.7	+6.4	14.6	47 43.7	+6.8	14.9	48 41.6	+7.2	15.2	49 39.5	+7.6	15.5	50 37.2	+8.1	15.8	51 34.9	+8.5	16.2	80
81	44 55.2	+4.7	12.7	45 53.7	+5.0	13.0	46 52.1	+5.2	13.2	47 50.5	+5.7	13.4	48 48.8	+6.1	13.7	49 47.1	+6.4	14.0	50 45.3	+6.8	14.3	51 43.4	+7.2	14.6	81
82	44 59.9	+3.7	11.3	45 58.7	+4.0	11.5	46 57.5	+4.2	11.7	47 56.2	+4.6	12.0	48 54.9	+4.8	12.2	49 53.5	+5.2	12.4	50 52.1	+5.5	12.7	51 50.6	+5.8	13.0	82
83	45 03.6	+2.6	9.9	46 02.7	+2.9	10.1	47 01.7	+3.2	10.3	48 00.8	+3.4	10.5	48 59.7	+3.7	10.7	49 58.7	+3.9	10.9	50 57.6	+4.2	11.1	51 56.4	+4.6	11.4	83
84	45 06.2	+1.6	8.5	46 05.6	+1.8	8.6	47 04.9	+2.0	8.8	48 04.2	+2.2	9.0	49 03.4	+2.5	9.2	50 02.6	+2.7	9.3	51 01.8	+3.0	9.5	52 01.0	+3.2	9.8	84
85	45 07.8	+0.6	7.1	46 07.4	+0.7	7.2	47 06.9	+0.9	7.3	48 06.4	+1.0	7.5	49 05.9	+1.2	7.6	50 05.3	+1.5	7.8	51 04.8	+1.6	8.0	52 04.2	+1.8	8.1	85
86	45 08.4	−0.6	5.7	46 08.1	−0.4	5.8	47 07.8	−0.3	5.9	48 07.4	−0.1	6.0	49 07.1	0.0	6.1	50 06.8	+0.1	6.2	51 06.4	+0.3	6.4	52 06.0	+0.5	6.5	86
87	45 07.8	−1.5	4.2	46 07.7	−1.5	4.3	47 07.5	−1.4	4.4	48 07.3	−1.3	4.5	49 07.1	−1.1	4.6	50 06.9	−1.0	4.7	51 06.7	−0.9	4.8	52 06.5	−0.7	4.9	87
88	45 06.3	−2.6	2.8	46 06.2	−2.6	2.9	47 06.1	−2.5	2.9	48 06.0	−2.4	3.0	49 06.0	−2.4	3.0	50 05.9	−2.3	3.1	51 05.8	−2.3	3.2	52 05.7	−2.2	3.2	88
89	45 03.7	−3.7	1.4	46 03.6	−3.6	1.4	47 03.6	−3.6	1.5	48 03.6	−3.6	1.5	49 03.6	−3.6	1.5	50 03.6	−3.6	1.6	51 03.5	−3.5	1.6	52 03.5	−3.5	1.6	89
90	45 00.0	−4.7	0.0	46 00.0	−4.7	0.0	47 00.0	−4.7	0.0	48 00.0	−4.8	0.0	49 00.0	−4.8	0.0	50 00.0	−4.8	0.0	51 00.0	−4.8	0.0	52 00.0	−4.9	0.0	90

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	2 49.6	−42.5	92.8	2 46.6	−43.2	92.9	2 43.6	−43.9	92.9	2 40.5	−44.6	93.0	2 37.4	−45.4	93.0	2 34.2	−46.0	93.1	2 31.0	−46.7	93.1	2 27.7	−47.3	93.2	0
1	2 07.1	−42.5	93.5	2 03.4	−43.2	93.6	1 59.7	−44.0	93.6	1 55.9	−44.7	93.6	1 52.0	−45.3	93.7	1 48.2	−46.1	93.7	1 44.3	−46.7	93.7	1 40.4	−47.4	93.8	1
2	1 24.6	−42.5	94.2	1 20.2	−43.3	94.3	1 15.7	−44.0	94.3	1 11.2	−44.7	94.3	1 06.7	−45.4	94.3	1 02.1	−46.0	94.4	0 57.6	−46.7	94.4	0 53.0	−47.3	94.4	2
3	0 42.1	−42.5	94.9	0 36.9	−43.2	95.0	0 31.7	−43.9	95.0	0 26.5	−44.6	95.0	0 21.3	−45.3	95.0	0 16.1	−46.0	95.0	0 10.9	−46.7	95.0	0 05.7	−47.4	95.0	3
4	0 00.4	+42.5	84.3	0 06.3	+43.3	84.3	0 12.2	+44.0	84.3	0 18.1	+44.7	84.4	0 24.0	+45.4	84.4	0 29.9	+46.1	84.4	0 35.8	+46.7	84.4	0 41.7	+47.3	84.4	4
5	0 42.9	+42.6	83.6	0 49.6	+43.2	83.7	0 56.2	+44.0	83.7	1 02.8	+44.7	83.7	1 09.4	+45.4	83.7	1 16.0	+46.0	83.7	1 22.5	+46.7	83.7	1 29.0	+47.3	83.8	5
6	1 25.5	+42.5	82.9	1 32.8	+43.3	83.0	1 40.2	+43.9	83.0	1 47.5	+44.6	83.0	1 54.8	+45.3	83.1	2 02.0	+46.0	83.1	2 09.2	+46.7	83.1	2 16.4	+47.3	83.2	6
7	2 08.0	+42.5	82.2	2 16.1	+43.2	82.3	2 24.1	+43.9	82.3	2 32.1	+44.7	82.3	2 40.1	+45.3	82.4	2 48.0	+46.0	82.4	2 55.9	+46.6	82.5	3 03.7	+47.3	82.5	7
8	2 50.5	+42.4	81.5	2 59.3	+43.2	81.6	3 08.0	+44.0	81.6	3 16.8	+44.6	81.7	3 25.4	+45.3	81.7	3 34.0	+46.0	81.8	3 42.5	+46.7	81.9	3 51.0	+47.3	81.9	8
9	3 32.9	+42.5	80.8	3 42.5	+43.1	80.9	3 52.0	+43.8	80.9	4 01.4	+44.5	81.0	4 10.7	+45.3	81.1	4 20.0	+45.9	81.2	4 29.2	+46.5	81.2	4 38.3	+47.2	81.3	9
10	4 15.4	+42.4	80.1	4 25.6	+43.1	80.2	4 35.8	+43.9	80.3	4 45.9	+44.6	80.3	4 56.0	+45.2	80.4	5 05.9	+45.9	80.5	5 15.7	+46.6	80.6	5 25.5	+47.2	80.7	10
11	4 57.7	+42.4	79.4	5 08.7	+43.1	79.5	5 19.7	+43.7	79.6	5 30.5	+44.4	79.7	5 41.2	+45.2	79.8	5 51.8	+45.8	79.9	6 02.3	+46.5	80.0	6 12.7	+47.2	80.1	11
12	5 40.1	+42.3	78.7	5 51.8	+43.0	78.8	6 03.4	+43.8	78.9	6 14.9	+44.5	79.0	6 26.4	+45.1	79.1	6 37.6	+45.8	79.2	6 48.8	+46.5	79.3	6 59.9	+47.1	79.4	12
13	6 22.4	+42.2	78.0	6 34.8	+43.0	78.1	6 47.2	+43.6	78.2	6 59.4	+44.4	78.3	7 11.5	+45.0	78.4	7 23.4	+45.8	78.6	7 35.3	+46.4	78.7	7 47.0	+47.0	78.8	13
14	7 04.6	+42.2	77.3	7 17.8	+42.9	77.4	7 30.8	+43.7	77.5	7 43.8	+44.3	77.6	7 56.5	+45.0	77.8	8 09.2	+45.7	77.9	8 21.7	+46.3	78.1	8 34.0	+47.0	78.2	14
15	7 46.8	+42.1	76.5	8 00.7	+42.8	76.7	8 14.5	+43.5	76.8	8 28.1	+44.2	77.0	8 41.5	+45.0	77.1	8 54.9	+45.6	77.3	9 08.0	+46.3	77.4	9 21.0	+46.9	77.6	15
16	8 28.9	+42.0	75.8	8 43.5	+42.8	76.0	8 58.0	+43.5	76.1	9 12.3	+44.2	76.3	9 26.5	+44.8	76.4	9 40.5	+45.5	76.6	9 54.3	+46.2	76.8	10 07.9	+46.9	76.9	16
17	9 10.9	+41.9	75.1	9 26.3	+42.6	75.3	9 41.5	+43.3	75.4	9 56.5	+44.1	75.6	10 11.3	+44.8	75.8	10 26.0	+45.4	75.9	10 40.5	+46.1	76.1	10 54.8	+46.8	76.3	17
18	9 52.8	+41.9	74.4	10 08.9	+42.6	74.5	10 24.8	+43.3	74.7	10 40.6	+43.9	74.9	10 56.1	+44.7	75.1	11 11.4	+45.4	75.3	11 26.6	+46.0	75.5	11 41.6	+46.7	75.7	18
19	10 34.7	+41.7	73.6	10 51.5	+42.5	73.8	11 08.1	+43.2	74.0	11 24.5	+43.9	74.2	11 40.8	+44.6	74.4	11 56.8	+45.3	74.6	12 12.6	+46.0	74.8	12 28.3	+46.6	75.0	19
20	11 16.4	+41.6	72.9	11 34.0	+42.3	73.1	11 51.3	+43.1	73.3	12 08.4	+43.8	73.5	12 25.4	+44.4	73.7	12 42.1	+45.1	73.9	12 58.6	+45.9	74.1	13 14.9	+46.5	74.4	20
21	11 58.0	+41.6	72.2	12 16.3	+42.3	72.4	12 34.4	+42.9	72.6	12 52.2	+43.7	72.8	13 09.8	+44.4	73.0	13 27.2	+45.1	73.3	13 44.4	+45.7	73.5	14 01.4	+46.3	73.7	21
22	12 39.6	+41.3	71.4	12 58.6	+42.1	71.7	13 17.3	+42.9	71.9	13 35.9	+43.5	72.1	13 54.2	+44.3	72.3	14 12.3	+44.9	72.6	14 30.1	+45.7	72.8	14 47.7	+46.3	73.1	22
23	13 20.9	+41.3	70.7	13 40.7	+42.0	70.9	14 00.2	+42.7	71.2	14 19.4	+43.5	71.4	14 38.5	+44.1	71.6	14 57.2	+44.9	71.9	15 15.8	+45.5	72.1	15 34.0	+46.2	72.4	23
24	14 02.2	+41.1	69.9	14 22.7	+41.8	70.2	14 42.9	+42.6	70.4	15 02.9	+43.3	70.7	15 22.6	+44.0	70.9	15 42.1	+44.6	71.2	16 01.3	+45.3	71.5	16 20.2	+46.0	71.7	24
25	14 43.3	+41.0	69.2	15 04.5	+41.7	69.4	15 25.5	+42.4	69.7	15 46.2	+43.1	70.0	16 06.6	+43.8	70.2	16 26.7	+44.6	70.5	16 46.6	+45.3	70.8	17 06.2	+45.9	71.1	25
26	15 24.3	+40.8	68.4	15 46.2	+41.6	68.7	16 07.9	+42.3	69.0	16 29.3	+43.0	69.2	16 50.4	+43.7	69.5	17 11.3	+44.4	69.8	17 31.9	+45.0	70.1	17 52.1	+45.8	70.4	26
27	16 05.1	+40.7	67.7	16 27.8	+41.4	67.9	16 50.2	+42.1	68.2	17 12.3	+42.8	68.5	17 34.1	+43.6	68.8	17 55.7	+44.2	69.1	18 16.9	+45.0	69.4	18 37.9	+45.6	69.7	27
28	16 45.8	+40.5	66.9	17 09.2	+41.2	67.2	17 32.3	+42.0	67.5	17 55.1	+42.7	67.8	18 17.7	+43.4	68.1	18 39.9	+44.1	68.4	19 01.9	+44.8	68.7	19 23.5	+45.5	69.0	28
29	17 26.3	+40.3	66.1	17 50.4	+41.1	66.4	18 14.3	+41.7	66.7	18 37.8	+42.5	67.0	19 01.1	+43.2	67.3	19 24.0	+43.9	67.7	19 46.7	+44.6	68.0	20 09.0	+45.3	68.3	29
30	18 06.6	+40.1	65.4	18 31.5	+40.8	65.7	18 56.0	+41.6	66.0	19 20.3	+42.3	66.3	19 44.3	+43.0	66.6	20 07.9	+43.8	66.9	20 31.3	+44.4	67.3	20 54.3	+45.1	67.6	30
31	18 46.7	+39.9	64.6	19 12.3	+40.7	64.9	19 37.6	+41.4	65.2	20 02.6	+42.2	65.5	20 27.3	+42.9	65.9	20 51.7	+43.5	66.2	21 15.7	+44.3	66.6	21 39.4	+44.9	66.9	31
32	19 26.6	+39.7	63.8	19 53.0	+40.4	64.1	20 19.0	+41.2	64.4	20 44.8	+41.9	64.8	21 10.2	+42.6	65.1	21 35.2	+43.4	65.5	22 00.0	+44.0	65.8	22 24.3	+44.8	66.2	32
33	20 06.3	+39.5	63.0	20 33.4	+40.3	63.3	21 00.2	+41.0	63.7	21 26.7	+41.7	64.0	21 52.8	+42.4	64.4	22 18.6	+43.1	64.7	22 44.0	+43.9	65.1	23 09.1	+44.5	65.5	33
34	20 45.8	+39.3	62.2	21 13.7	+40.0	62.5	21 41.2	+40.7	62.9	22 08.4	+41.5	63.2	22 35.2	+42.2	63.6	23 01.7	+43.0	64.0	23 27.9	+43.6	64.4	23 53.6	+44.4	64.8	34
35	21 25.1	+39.0	61.4	21 53.7	+39.8	61.7	22 21.9	+40.6	62.1	22 49.9	+41.2	62.5	23 17.4	+42.0	62.8	23 44.7	+42.7	63.2	24 11.5	+43.4	63.6	24 38.0	+44.1	64.0	35
36	22 04.1	+38.8	60.6	22 33.5	+39.5	60.9	23 02.5	+40.2	61.3	23 31.1	+41.0	61.7	23 59.4	+41.8	62.0	24 27.4	+42.4	62.4	24 54.9	+43.2	62.9	25 22.1	+43.9	63.3	36
37	22 42.9	+38.6	59.7	23 13.0	+39.3	60.1	23 42.7	+40.1	60.5	24 12.1	+40.8	60.9	24 41.2	+41.5	61.3	25 09.8	+42.2	61.7	25 38.1	+42.9	62.1	26 06.0	+43.6	62.5	37
38	23 21.5	+38.2	58.9	23 52.3	+39.0	59.3	24 22.8	+39.7	59.7	24 52.9	+40.5	60.1	25 22.7	+41.2	60.5	25 52.0	+42.0	60.9	26 21.0	+42.7	61.3	26 49.6	+43.5	61.8	38
39	23 59.7	+38.0	58.1	24 31.3	+38.7	58.4	25 02.5	+39.5	58.8	25 33.4	+40.2	59.2	26 03.9	+41.0	59.7	26 34.0	+41.7	60.1	27 03.7	+42.5	60.5	27 33.1	+43.1	61.0	39
40	24 37.7	+37.7	57.2	25 10.0	+38.5	57.6	25 42.0	+39.2	58.0	26 13.6	+40.0	58.4	26 44.9	+40.6	58.8	27 15.7	+41.4	59.3	27 46.2	+42.1	59.7	28 16.2	+42.9	60.2	40
41	25 15.4	+37.4	56.4	25 48.5	+38.1	56.7	26 21.2	+38.9	57.2	26 53.6	+39.6	57.6	27 25.5	+40.4	58.0	27 57.1	+41.1	58.5	28 28.3	+41.8	58.9	28 59.1	+42.5	59.4	41
42	25 52.8	+37.1	55.5	26 26.6	+37.9	55.9	27 00.1	+38.6	56.3	27 33.2	+39.3	56.7	28 05.9	+40.1	57.2	28 38.2	+40.8	57.6	29 10.1	+41.6	58.1	29 41.6	+42.3	58.6	42
43	26 29.9	+36.8	54.6	27 04.5	+37.5	55.0	27 38.7	+38.2	55.4	28 12.5	+39.0	55.9	28 46.0	+39.7	56.3	29 19.0	+40.5	56.8	29 51.7	+41.2	57.3	30 23.9	+42.0	57.8	43
44	27 06.7	+36.4	53.7	27 42.0	+37.2	54.1	28 16.9	+38.0	54.6	28 51.5	+38.7	55.0	29 25.7	+39.5	55.5	29 59.5	+40.2	55.9	30 32.9	+40.9	56.4	31 05.9	+41.6	56.9	44
45	27 43.1	+36.1	52.8	28 19.2	+36.8	53.3	28 54.9	+37.6	53.7	29 30.2	+38.3	54.1	30 05.2	+39.0	54.6	30 39.7	+39.8	55.1	31 13.8	+40.6	55.6	31 47.5	+41.3	56.1	45
46	28 19.2	+35.7	51.9	28 56.0	+36.5	52.4	29 32.5	+37.2	52.8	30 08.5	+38.0	53.3	30 44.2	+38.7	53.7	31 19.5	+39.5	54.2	31 54.4	+40.2	54.7	32 28.8	+41.0	55.2	46
47	28 54.9	+35.3	51.0	29 32.5	+36.0	51.4	30 09.7	+36.8	51.9	30 46.5	+37.6	52.4	31 22.9	+38.4	52.8	31 59.0	+39.1	53.3	32 34.6	+39.8	53.8	33 09.8	+40.6	54.4	47
48	29 30.2	+35.0	50.1	30 08.5	+35.7	50.5	30 46.5	+36.4	51.0	31 24.1	+37.2	51.4	32 01.3	+37.9	51.9	32 38.1	+38.7	52.4	33 14.4	+39.5	52.9	33 50.4	+40.2	53.5	48
49	30 05.2	+34.5	49.1	30 44.2	+35.3	49.6	31 22.9	+36.1	50.1	32 01.3	+36.8	50.5	32 39.2	+37.6	51.0	33 16.8	+38.3	51.5	33 53.9	+39.0	52.0	34 30.6	+39.8	52.6	49
50	30 39.7	+34.1	48.2	31 19.5	+34.9	48.6	31 59.0	+35.6	49.1	32 38.1	+36.3	49.6	33 16.8	+37.1	50.1	33 55.1	+37.8	50.6	34 32.9	+38.7	51.1	35 10.4	+39.4	51.7	50
51	31 13.8	+33.7	47.2	31 54.4	+34.4	47.7	32 34.6	+35.2	48.2	33 14.4	+36.0	48.6	33 53.9	+36.7	49.1	34 32.9	+37.5	49.7	35 11.6	+38.2	50.2	35 49.8	+38.9	50.7	51
52	31 47.5	+33.3	46.3	32 28.8	+34.0	46.7	33 09.8	+34.7	47.2	33 50.4	+35.5	47.7	34 30.6	+36.2	48.2	35 10.4	+37.0	48.7	35 49.8	+37.7	49.2	36 28.7	+38.5	49.8	52
53	32 20.8	+32.8	45.3	33 02.8	+33.5	45.7	33 44.5	+34.3	46.2	34 25.9	+35.0	46.7	35 06.8	+35.8	47.2	35 47.4	+36.5	47.7	36 27.5	+37.3	48.3	37 07.2	+38.0	48.8	53
54	32 53.6	+32.3	44.3	33 36.3	+33.1	44.8	34 18.8	+33.8	45.2	35 00.9	+34.5	45.7	35 42.6	+35.2	46.2	36 23.9	+36.0	46.8	37 04.8	+36.7	47.3	37 45.2	+37.6	47.9	54
55	33 25.9	+31.8	43.3	34 09.4	+32.5	43.7	34 52.6	+33.2	44.2	35 35.4	+34.0	44.7	36 17.8	+34.8	45.2	36 59.9	+35.5	45.8	37 41.5	+36.3	46.3	38 22.8	+37.0	46.9	55
56	33 57.7	+31.3	42.3	34 41.9	+32.1	42.7	35 25.8	+32.8	43.2	36 09.4	+33.5	43.7	36 52.6	+34.2	44.2	37 35.4	+35.0	44.7	38 17.8	+35.7	45.3	38 59.8	+36.5	45.9	56
57	34 29.0	+30.8	41.2	35 14.0	+31.5	41.7	35 58.6	+32.2	42.2	36 42.9	+32.9	42.7	37 26.8	+33.7	43.2	38 10.4	+34.4	43.7	38 53.5	+35.2	44.3	39 36.3	+35.9	44.8	57
58	34 59.8	+30.2	40.2	35 45.5	+30.9	40.6	36 30.8	+31.7	41.1	37 15.8	+32.4	41.6	38 00.5	+33.1	42.1	38 44.8	+33.9	42.7	39 28.7	+34.7	43.2	40 12.2	+35.4	43.8	58
59	35 30.0	+29.7	39.1	36 16.4	+30.4	39.5	37 02.5	+31.1	40.1	37 48.2	+31.8	40.6	38 33.6	+32.6	41.1	39 18.7	+33.3	41.6	40 03.4	+34.0	42.2	40 47.6	+34.8	42.7	59
60	35 59.7	+29.1	38.1	36 46.8	+29.8	38.5	37 33.6	+30.5	39.0	38 20.0	+31.2	39.5	39 06.2	+31.9	40.0	39 52.0	+32.6	40.5	40 37.4	+33.4	41.1	41 22.4	+34.2	41.7	60
61	36 28.8	+28.5	37.0	37 16.6	+29.2	37.4	38 04.1	+29.8	37.9	38 51.2	+30.6	38.4	39 38.1	+31.3	38.9	40 24.6	+32.1	39.4	41 10.8	+32.8	40.0	41 56.6	+33.5	40.6	61
62	36 57.3	+27.9	35.9	37 45.8	+28.5	36.3	38 33.9	+29.3	36.8	39 21.8	+30.0	37.3	40 09.4	+30.7	37.8	40 56.7	+31.3	38.3	41 43.6	+32.1	38.9	42 30.1	+32.8	39.4	62
63	37 25.2	+27.2	34.8	38 14.3	+27.9	35.2	39 03.2	+28.6	35.7	39 51.8	+29.3	36.2	40 40.1	+30.0	36.7	41 28.0	+30.7	37.2	42 15.7	+31.4	37.7	43 02.9	+32.2	38.3	63
64	37 52.4	+26.6	33.6	38 42.2	+27.3	34.1	39 31.8	+27.9	34.5	40 21.1	+28.6	35.0	41 10.1	+29.3	35.5	41 58.7	+30.1	36.0	42 47.1	+30.7	36.6	43 35.1	+31.5	37.1	64
65	38 19.0	+25.9	32.5	39 09.5	+26.6	32.9	39 59.7	+27.3	33.4	40 49.7	+27.9	33.9	41 39.4	+28.6	34.4	42 28.8	+29.2	34.9	43 17.8	+30.0	35.4	44 06.6	+30.7	36.0	65
66	38 44.9	+25.3	31.3	39 36.1	+25.9	31.8	40 27.0	+26.5	32.2	41 17.6	+27.2	32.7	42 08.0	+27.8	33.2	42 58.0	+28.6	33.7	43 47.8	+29.2	34.2	44 37.3	+29.9	34.8	66
67	39 10.2	+24.5	30.2	40 02.0	+25.1	30.6	40 53.5	+25.8	31.0	41 44.8	+26.4	31.5	42 35.8	+27.1	32.0	43 26.6	+27.7	32.5	44 17.0	+28.5	33.0	45 07.2	+29.1	33.5	67
68	39 34.7	+23.9	29.0	40 27.1	+24.4	29.4	41 19.3	+25.0	29.8	42 11.2	+25.7	30.3	43 02.9	+26.3	30.8	43 54.3	+27.0	31.2	44 45.5	+27.6	31.8	45 36.3	+28.4	32.3	68
69	39 58.6	+23.0	27.8	40 51.5	+23.7	28.2	41 44.3	+24.2	28.6	42 36.9	+24.8	29.1	43 29.2	+25.5	29.5	44 21.3	+26.1	30.0	45 13.1	+26.8	30.5	46 04.7	+27.4	31.0	69
70	40 21.6	+22.3	26.6	41 15.2	+22.9	27.0	42 08.5	+23.5	27.4	43 01.7	+24.1	27.8	43 54.7	+24.6	28.3	44 47.4	+25.3	28.7	45 39.9	+25.9	29.2	46 32.1	+26.6	29.7	70
71	40 43.9	+21.6	25.4	41 38.1	+22.0	25.8	42 32.0	+22.6	26.2	43 25.8	+23.2	26.6	44 19.3	+23.8	27.0	45 12.7	+24.4	27.5	46 05.8	+25.0	27.9	46 58.7	+25.7	28.4	71
72	41 05.5	+20.7	24.1	42 00.1	+21.3	24.5	42 54.6	+21.8	24.9	43 49.0	+22.3	25.3	44 43.1	+23.0	25.7	45 37.1	+23.5	26.2	46 30.8	+24.2	26.6	47 24.4	+24.7	27.1	72
73	41 26.2	+19.9	22.9	42 21.4	+20.4	23.2	43 16.4	+21.0	23.6	44 11.3	+21.5	24.0	45 06.1	+22.0	24.4	46 00.6	+22.6	24.8	46 55.0	+23.1	25.3	47 49.1	+23.8	25.7	73
74	41 46.1	+19.1	21.6	42 41.8	+19.6	22.0	43 37.4	+20.0	22.3	44 32.8	+20.6	22.7	45 28.1	+21.1	23.1	46 23.2	+21.6	23.5	47 18.1	+22.2	23.9	48 12.9	+22.8	24.4	74
75	42 05.2	+18.2	20.4	43 01.4	+18.6	20.7	43 57.4	+19.2	21.0	44 53.4	+19.6	21.4	45 49.2	+20.1	21.7	46 44.8	+20.7	22.1	47 40.3	+21.2	22.5	48 35.7	+21.7	23.0	75
76	42 23.4	+17.3	19.1	43 20.0	+17.8	19.4	44 16.6	+18.2	19.7	45 13.0	+18.7	20.0	46 09.3	+19.2	20.4	47 05.5	+19.7	20.8	48 01.5	+20.2	21.2	48 57.4	+20.7	21.6	76
77	42 40.7	+16.5	17.8	43 37.8	+16.9	18.1	44 34.8	+17.3	18.4	45 31.7	+17.7	18.7	46 28.5	+18.2	19.0	47 25.2	+18.6	19.4	48 21.7	+19.1	19.7	49 18.1	+19.6	20.1	77
78	42 57.2	+15.5	16.5	43 54.7	+15.9	16.7	44 52.1	+16.3	17.0	45 49.4	+16.8	17.3	46 46.7	+17.1	17.6	47 43.8	+17.6	18.0	48 40.8	+18.1	18.3	49 37.7	+18.5	18.7	78
79	43 12.7	+14.7	15.1	44 10.6	+15.0	15.4	45 08.4	+15.4	15.7	46 06.2	+15.7	15.9	47 03.8	+16.1	16.2	48 01.4	+16.5	16.5	48 58.9	+16.9	16.9	49 56.2	+17.4	17.2	79
80	43 27.4	+13.7	13.8	44 25.6	+14.0	14.0	45 23.8	+14.3	14.3	46 21.9	+14.7	14.5	47 19.9	+15.1	14.8	48 17.9	+15.4	15.1	49 15.8	+15.8	15.4	50 13.6	+16.2	15.7	80
81	43 41.1	+12.7	12.5	44 39.6	+13.1	12.7	45 38.1	+13.4	13.1	46 36.6	+13.5	13.1	47 35.0	+14.0	13.4	48 33.3	+14.4	13.6	49 31.6	+14.7	13.9	50 29.8	+15.0	14.2	81
82	43 53.8	+11.8	11.1	44 52.7	+12.0	11.3	45 51.5	+12.3	11.5	46 50.2	+12.6	11.7	47 49.0	+12.9	11.9	48 47.7	+13.1	12.2	49 46.3	+13.5	12.4	50 44.8	+13.9	12.7	82
83	44 05.6	+10.8	9.7	45 04.7	+11.0	9.9	46 03.8	+11.3	10.1	47 02.8	+11.6	10.3	48 01.9	+11.7	10.5	49 00.8	+12.1	10.7	49 59.8	+12.3	10.9	50 58.7	+12.6	11.1	83
84	44 16.4	+9.8	8.4	45 15.7	+10.0	8.5	46 15.1	+10.2	8.7	47 14.4	+10.4	8.8	48 13.6	+10.7	9.0	49 12.9	+10.8	9.2	50 12.1	+11.1	9.4	51 11.3	+11.3	9.6	84
85	44 26.2	+8.8	7.0	45 25.7	+9.0	7.1	46 25.3	+9.1	7.2	47 24.8	+9.3	7.4	48 24.3	+9.5	7.5	49 23.7	+9.7	7.7	50 23.2	+9.9	7.8	51 22.6	+10.1	8.0	85
86	44 35.0	+7.8	5.6	45 34.7	+7.9	5.7	46 34.4	+8.0	5.8	47 34.1	+8.2	5.9	48 33.8	+8.3	6.0	49 33.4	+8.5	6.2	50 33.1	+8.6	6.3	51 32.7	+8.8	6.4	86
87	44 42.8	+6.8	4.2	45 42.6	+6.9	4.3	46 42.4	+7.0	4.4	47 42.3	+7.0	4.4	48 42.1	+7.1	4.5	49 41.9	+7.3	4.6	50 41.7	+7.4	4.7	51 41.5	+7.5	4.8	87
88	44 49.6	+5.7	2.8	45 49.5	+5.8	2.9	46 49.4	+5.9	2.9	47 49.3	+5.9	3.0	48 49.2	+6.0	3.0	49 49.2	+6.0	3.1	50 49.1	+6.1	3.2	51 49.0	+6.1	3.2	88
89	44 55.3	+4.7	1.4	45 55.3	+4.7	1.4	46 55.3	+4.7	1.5	47 55.2	+4.8	1.5	48 55.2	+4.8	1.5	49 55.2	+4.8	1.5	50 55.2	+4.8	1.6	51 55.1	+4.9	1.6	89
90	45 00.0	+3.7	0.0	46 00.0	+3.6	0.0	47 00.0	+3.6	0.0	48 00.0	+3.6	0.0	49 00.0	+3.6	0.0	50 00.0	+3.6	0.0	51 00.0	+3.5	0.0	52 00.0	+3.5	0.0	90

| | 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 94°, 266°**

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	2 07.3	+42.4	92.1	2 05.0	+43.2	92.2	2 02.7	+43.9	92.2	2 00.4	+44.6	92.2	1 58.1	+45.3	92.3	1 55.7	+46.0	92.3	1 53.2	+46.7	92.3	1 50.8	+47.3	92.4	0
1	2 49.7	+42.4	91.4	2 48.2	+43.1	91.5	2 46.6	+43.9	91.5	2 45.0	+44.6	91.6	2 43.4	+45.2	91.6	2 41.7	+45.9	91.7	2 39.9	+46.6	91.7	2 38.1	+47.3	91.7	1
2	3 32.1	+42.4	90.7	3 31.3	+43.2	90.8	3 30.5	+43.9	90.8	3 29.6	+44.6	90.9	3 28.6	+45.3	91.0	3 27.6	+45.9	91.0	3 26.5	+46.6	91.1	3 25.4	+47.2	91.1	2
3	4 14.5	+42.3	90.0	4 14.5	+43.0	90.1	4 14.4	+43.6	90.1	4 14.2	+44.5	90.2	4 13.9	+45.2	90.3	4 13.5	+45.9	90.3	4 13.1	+46.6	90.4	4 12.6	+47.2	90.5	3
4	4 56.8	+42.3	89.3	4 57.5	+43.1	89.4	4 58.2	+43.7	89.5	4 58.7	+44.5	89.5	4 59.1	+45.2	89.6	4 59.4	+45.9	89.7	4 59.7	+46.5	89.8	4 59.8	+47.2	89.9	4
5	5 39.1	+42.3	88.6	5 40.6	+43.0	88.7	5 41.9	+43.7	88.8	5 43.2	+44.4	88.9	5 44.3	+45.1	89.0	5 45.3	+45.8	89.1	5 46.2	+46.5	89.2	5 47.0	+47.2	89.3	5
6	6 21.4	+42.2	87.9	6 23.6	+42.9	88.0	6 25.6	+43.7	88.1	6 27.6	+44.4	88.2	6 29.4	+45.1	88.3	6 31.1	+45.8	88.4	6 32.7	+46.5	88.5	6 34.2	+47.1	88.7	6
7	7 03.6	+42.1	87.1	7 06.5	+42.9	87.3	7 09.3	+43.6	87.4	7 12.0	+44.3	87.5	7 14.5	+45.0	87.6	7 16.9	+45.7	87.8	7 19.2	+46.4	87.9	7 21.3	+47.0	88.0	7
8	7 45.7	+42.1	86.4	7 49.4	+42.8	86.6	7 52.9	+43.5	86.7	7 56.3	+44.2	86.8	7 59.5	+45.0	87.0	8 02.6	+45.7	87.1	8 05.6	+46.3	87.3	8 08.3	+47.0	87.4	8
9	8 27.8	+41.9	85.7	8 32.2	+42.7	85.9	8 36.4	+43.5	86.0	8 40.5	+44.2	86.2	8 44.5	+44.9	86.3	8 48.3	+45.5	86.5	8 51.9	+46.3	86.6	8 55.3	+47.0	86.8	9
10	9 09.7	+41.9	85.0	9 14.9	+42.6	85.1	9 19.9	+43.4	85.3	9 24.7	+44.1	85.5	9 29.4	+44.8	85.6	9 33.8	+45.6	85.8	9 38.2	+46.1	86.0	9 42.3	+46.8	86.1	10
11	9 51.6	+41.8	84.3	9 57.5	+42.6	84.4	10 03.3	+43.3	84.6	10 08.8	+44.0	84.8	10 14.2	+44.7	85.0	10 19.4	+45.4	85.1	10 24.3	+46.2	85.3	10 29.1	+46.8	85.5	11
12	10 33.4	+41.7	83.5	10 40.1	+42.4	83.7	10 46.6	+43.2	83.9	10 52.8	+44.0	84.1	10 58.9	+44.6	84.3	11 04.8	+45.3	84.5	11 10.5	+46.0	84.7	11 15.9	+46.7	84.9	12
13	11 15.1	+41.6	82.8	11 22.5	+42.4	83.0	11 29.8	+43.0	83.2	11 36.8	+43.8	83.4	11 43.5	+44.6	83.6	11 50.1	+45.3	83.8	11 56.5	+45.9	84.0	12 02.6	+46.6	84.2	13
14	11 56.7	+41.5	82.1	12 04.9	+42.2	82.3	12 12.8	+43.0	82.5	12 20.6	+43.7	82.7	12 28.1	+44.4	82.9	12 35.4	+45.1	83.1	12 42.4	+45.9	83.4	12 49.2	+46.6	83.6	14
15	12 38.2	+41.3	81.3	12 47.1	+42.1	81.5	12 55.8	+42.9	81.8	13 04.3	+43.6	82.0	13 12.5	+44.3	82.2	13 20.5	+45.1	82.5	13 28.3	+45.7	82.7	13 35.8	+46.4	82.9	15
16	13 19.5	+41.2	80.6	13 29.2	+42.0	80.8	13 38.7	+42.7	81.0	13 47.9	+43.5	81.3	13 56.8	+44.3	81.5	14 05.6	+44.9	81.8	14 14.0	+45.6	82.0	14 22.2	+46.3	82.3	16
17	14 00.7	+41.1	79.8	14 11.2	+41.8	80.1	14 21.4	+42.6	80.3	14 31.4	+43.3	80.6	14 41.1	+44.0	80.8	14 50.5	+44.8	81.1	14 59.6	+45.5	81.4	15 08.5	+46.2	81.6	17
18	14 41.8	+40.9	79.1	14 53.0	+41.7	79.3	15 04.0	+42.5	79.6	15 14.7	+43.2	79.9	15 25.1	+44.0	80.1	15 35.3	+44.6	80.4	15 45.1	+45.4	80.7	15 54.7	+46.1	81.0	18
19	15 22.7	+40.8	78.3	15 34.7	+41.6	78.6	15 46.5	+42.3	78.9	15 57.9	+43.1	79.1	16 09.1	+43.8	79.4	16 19.9	+44.6	79.7	16 30.5	+45.2	80.0	16 40.8	+45.9	80.3	19
20	16 03.5	+40.6	77.6	16 16.3	+41.4	77.8	16 28.8	+42.1	78.1	16 41.0	+42.9	78.4	16 52.9	+43.6	78.7	17 04.5	+44.4	79.0	17 15.7	+45.2	79.3	17 26.7	+45.8	79.6	20
21	16 44.1	+40.5	76.8	16 57.7	+41.2	77.1	17 10.9	+42.0	77.4	17 23.9	+42.8	77.7	17 36.5	+43.5	78.0	17 48.9	+44.2	78.3	18 00.9	+44.9	78.6	18 12.5	+45.7	78.9	21
22	17 24.6	+40.2	76.0	17 38.9	+41.1	76.3	17 52.9	+41.9	76.6	18 06.7	+42.5	77.0	18 20.0	+43.4	77.3	18 33.1	+44.1	77.6	18 45.8	+44.8	77.9	18 58.2	+45.5	78.3	22
23	18 04.8	+40.1	75.2	18 20.0	+40.8	75.6	18 34.8	+41.6	75.9	18 49.2	+42.4	76.2	19 03.4	+43.1	76.5	19 17.2	+43.9	76.9	19 30.6	+44.6	77.2	19 43.7	+45.3	77.6	23
24	18 44.9	+39.9	74.5	19 00.8	+40.7	74.8	19 16.4	+41.4	75.1	19 31.6	+42.3	75.5	19 46.5	+43.0	75.8	20 01.1	+43.7	76.2	20 15.2	+44.5	76.5	20 29.0	+45.2	76.9	24
25	19 24.8	+39.7	73.7	19 41.5	+40.5	74.0	19 57.8	+41.3	74.4	20 13.9	+42.0	74.7	20 29.5	+42.8	75.1	20 44.8	+43.5	75.4	20 59.7	+44.3	75.8	21 14.2	+45.0	76.2	25
26	20 04.5	+39.4	72.9	20 22.0	+40.2	73.2	20 39.1	+41.0	73.6	20 55.9	+41.8	73.9	21 12.3	+42.6	74.3	21 28.3	+43.4	74.7	21 44.0	+44.1	75.1	21 59.2	+44.9	75.5	26
27	20 43.9	+39.2	72.1	21 02.2	+40.0	72.4	21 20.1	+40.9	72.8	21 37.7	+41.6	73.2	21 54.9	+42.4	73.6	22 11.7	+43.1	73.9	22 28.1	+43.9	74.3	22 44.1	+44.6	74.7	27
28	21 23.1	+39.0	71.3	21 42.2	+39.8	71.6	22 01.0	+40.5	72.0	22 19.3	+41.4	72.4	22 37.3	+42.1	72.8	22 54.8	+42.9	73.2	23 12.0	+43.6	73.6	23 28.7	+44.4	74.0	28
29	22 02.1	+38.8	70.4	22 22.0	+39.6	70.8	22 41.5	+40.4	71.2	23 00.7	+41.1	71.6	23 19.4	+41.9	72.0	23 37.7	+42.7	72.4	23 55.6	+43.5	72.9	24 13.1	+44.2	73.3	29
30	22 40.9	+38.5	69.6	23 01.6	+39.3	70.0	23 21.9	+40.1	70.4	23 41.8	+40.9	70.8	24 01.3	+41.7	71.2	24 20.4	+42.5	71.7	24 39.1	+43.2	72.1	24 57.3	+44.0	72.5	30
31	23 19.4	+38.2	68.8	23 40.9	+39.0	69.2	24 02.0	+39.9	69.6	24 22.7	+40.7	70.0	24 43.0	+41.4	70.4	25 02.9	+42.2	70.9	25 22.3	+43.0	71.3	25 41.3	+43.7	71.8	31
32	23 57.6	+37.9	67.9	24 19.9	+38.8	68.3	24 41.9	+39.5	68.8	25 03.4	+40.3	69.2	25 24.4	+41.2	69.6	25 45.1	+42.0	70.1	26 05.3	+42.7	70.6	26 25.0	+43.5	71.0	32
33	24 35.5	+37.7	67.1	24 58.7	+38.5	67.5	25 21.4	+39.3	67.9	25 43.7	+40.1	68.4	26 05.6	+40.9	68.8	26 27.1	+41.6	69.3	26 48.0	+42.5	69.8	27 08.5	+43.3	70.2	33
34	25 13.2	+37.3	66.2	25 37.2	+38.1	66.7	26 00.7	+39.0	67.1	26 23.8	+39.9	67.6	26 46.5	+40.6	68.0	27 08.7	+41.5	68.5	27 30.5	+42.2	69.0	27 51.8	+43.0	69.5	34
35	25 50.5	+37.1	65.3	26 15.3	+37.9	65.8	26 39.7	+38.7	66.3	27 03.7	+39.5	66.7	27 27.1	+40.4	67.2	27 50.2	+41.1	67.7	28 12.7	+41.9	68.2	28 34.8	+42.7	68.7	35
36	26 27.6	+36.7	64.5	26 53.2	+37.6	64.9	27 18.4	+38.4	65.4	27 43.2	+39.2	65.9	28 07.5	+40.0	66.4	28 31.3	+40.8	66.9	28 54.6	+41.6	67.4	29 17.5	+42.4	67.9	36
37	27 04.3	+36.4	63.6	27 30.8	+37.2	64.1	27 56.8	+38.0	64.5	28 22.4	+38.8	65.0	28 47.5	+39.7	65.5	29 12.1	+40.5	66.0	29 36.2	+41.3	66.5	29 59.9	+42.1	67.1	37
38	27 40.7	+36.0	62.7	28 08.0	+36.8	63.2	28 34.8	+37.7	63.7	29 01.2	+38.6	64.1	29 27.2	+39.3	64.7	29 52.6	+40.2	65.2	30 17.5	+41.0	65.7	30 42.0	+41.8	66.2	38
39	28 16.7	+35.7	61.8	28 44.8	+36.6	62.3	29 12.5	+37.4	62.8	29 39.8	+38.1	63.3	30 06.5	+39.0	63.8	30 32.8	+39.8	64.3	30 58.5	+40.7	64.8	31 23.8	+41.4	65.4	39
40	28 52.4	+35.3	60.9	29 21.4	+36.1	61.4	29 49.9	+37.0	61.9	30 17.9	+37.8	62.4	30 45.5	+38.7	62.9	31 12.6	+39.5	63.4	31 39.2	+40.3	64.0	32 05.2	+41.1	64.5	40
41	29 27.7	+34.9	60.0	29 57.5	+35.7	60.5	30 26.9	+36.5	61.0	30 55.7	+37.5	61.5	31 24.2	+38.2	62.0	31 52.1	+39.1	62.6	32 19.5	+39.9	63.1	32 46.3	+40.8	63.7	41
42	30 02.6	+34.5	59.0	30 33.2	+35.4	59.5	31 03.4	+36.2	60.0	31 33.2	+37.0	60.6	32 02.4	+37.9	61.1	32 31.2	+38.7	61.7	32 59.4	+39.5	62.2	33 27.1	+40.3	62.8	42
43	30 37.1	+34.1	58.1	31 08.6	+34.9	58.6	31 39.6	+35.8	59.1	32 10.2	+36.6	59.6	32 40.3	+37.5	60.2	33 09.9	+38.3	60.7	33 38.9	+39.2	61.3	34 07.4	+40.0	61.9	43
44	31 11.2	+33.6	57.1	31 43.5	+34.5	57.6	32 15.4	+35.4	58.2	32 46.8	+36.2	58.7	33 17.8	+37.0	59.3	33 48.2	+37.9	59.8	34 18.1	+38.7	60.4	34 47.4	+39.6	61.0	44
45	31 44.8	+33.2	56.1	32 18.0	+34.1	56.7	32 50.8	+34.9	57.2	33 23.0	+35.8	57.7	33 54.8	+36.6	58.3	34 26.1	+37.4	58.9	34 56.8	+38.3	59.5	35 27.0	+39.1	60.1	45
46	32 18.0	+32.8	55.2	32 52.1	+33.6	55.7	33 25.7	+34.4	56.2	33 58.8	+35.3	56.8	34 31.4	+36.2	57.4	35 03.5	+37.0	57.9	35 35.1	+37.9	58.5	36 06.1	+38.7	59.2	46
47	32 50.8	+32.2	54.2	33 25.7	+33.1	54.7	34 00.1	+34.0	55.2	34 34.1	+34.8	55.8	35 07.6	+35.6	56.4	35 40.5	+36.6	57.0	36 13.0	+37.3	57.6	36 44.8	+38.3	58.2	47
48	33 23.0	+31.8	53.2	33 58.8	+32.6	53.7	34 34.1	+33.5	54.2	35 08.9	+34.3	54.8	35 43.2	+35.2	55.4	36 17.1	+36.0	56.0	36 50.3	+37.0	56.6	37 23.1	+37.8	57.2	48
49	33 54.8	+31.3	52.1	34 31.4	+32.1	52.7	35 07.6	+32.9	53.2	35 43.2	+33.9	53.8	36 18.4	+34.7	54.4	36 53.1	+35.5	55.0	37 27.3	+36.4	55.6	38 00.9	+37.2	56.3	49
50	34 26.1	+30.7	51.1	35 03.5	+31.6	51.6	35 40.5	+32.5	52.2	36 17.1	+33.2	52.8	36 53.1	+34.2	53.4	37 28.6	+35.1	54.0	38 03.7	+35.8	54.6	38 38.1	+36.8	55.3	50
51	34 56.8	+30.2	50.1	35 35.1	+31.0	50.6	36 13.0	+31.8	51.2	36 50.3	+32.8	51.7	37 27.3	+33.6	52.3	38 03.7	+34.4	53.0	38 39.5	+35.4	53.6	39 14.9	+36.2	54.2	51
52	35 27.0	+29.6	49.0	36 06.1	+30.5	49.5	36 44.8	+31.4	50.1	37 23.1	+32.2	50.7	38 00.9	+33.0	51.3	38 38.1	+33.9	51.9	39 14.9	+34.7	52.6	39 51.1	+35.6	53.2	52
53	35 56.6	+29.1	47.9	36 36.6	+29.9	48.5	37 16.2	+30.7	49.0	37 55.3	+31.6	49.6	38 33.9	+32.4	50.2	39 12.0	+33.3	50.9	39 49.6	+34.2	51.5	40 26.7	+35.1	52.2	53
54	36 25.7	+28.4	46.8	37 06.5	+29.3	47.4	37 46.9	+30.2	48.0	38 26.9	+31.0	48.5	39 06.3	+31.9	49.2	39 45.3	+32.8	49.8	40 23.8	+33.6	50.4	41 01.8	+34.5	51.1	54
55	36 54.1	+27.9	45.7	37 35.8	+28.7	46.3	38 17.1	+29.5	46.9	38 57.9	+30.3	47.4	39 38.2	+31.2	48.1	40 18.1	+32.0	48.7	40 57.4	+33.0	49.3	41 36.3	+33.8	50.0	55
56	37 22.0	+27.2	44.6	38 04.5	+28.0	45.2	38 46.6	+28.8	45.7	39 28.2	+29.7	46.3	40 09.4	+30.6	46.9	40 50.1	+31.5	47.5	41 30.4	+32.3	48.2	42 10.1	+33.2	48.9	56
57	37 49.2	+26.6	43.5	38 32.5	+27.4	44.1	39 15.4	+28.3	44.6	39 57.9	+29.1	45.2	40 40.0	+29.9	45.8	41 21.6	+30.7	46.4	42 02.7	+31.6	47.1	42 43.3	+32.5	47.8	57
58	38 15.8	+25.9	42.4	38 59.9	+26.7	42.9	39 43.7	+27.5	43.5	40 27.0	+28.3	44.1	41 09.9	+29.2	44.7	41 52.3	+30.1	45.3	42 34.3	+30.9	45.9	43 15.8	+31.8	46.6	58
59	38 41.7	+25.2	41.2	39 26.6	+26.0	41.8	40 11.2	+26.8	42.3	40 55.3	+27.7	42.9	41 39.1	+28.5	43.5	42 22.4	+29.3	44.1	43 05.2	+30.2	44.8	43 47.6	+31.0	45.4	59
60	39 06.9	+24.5	40.1	39 52.6	+25.3	40.6	40 38.0	+26.1	41.1	41 23.0	+26.9	41.7	42 07.6	+27.7	42.3	42 51.7	+28.6	42.9	43 35.4	+29.5	43.6	44 18.6	+30.4	44.3	60
61	39 31.4	+23.8	38.9	40 17.9	+24.6	39.4	41 04.1	+25.4	40.0	41 49.9	+26.2	40.5	42 35.3	+27.0	41.1	43 20.3	+27.8	41.7	44 04.9	+28.6	42.4	44 49.0	+29.5	43.0	61
62	39 55.2	+23.0	37.7	40 42.5	+23.8	38.2	41 29.5	+24.6	38.7	42 16.1	+25.4	39.3	43 02.3	+26.2	39.9	43 48.1	+27.1	40.5	44 33.5	+27.9	41.1	45 18.5	+28.7	41.8	62
63	40 18.2	+22.3	36.5	41 06.3	+23.0	37.0	41 54.1	+23.8	37.5	42 41.5	+24.6	38.1	43 28.5	+25.4	38.7	44 15.2	+26.2	39.3	45 01.4	+27.0	39.9	45 47.2	+27.9	40.6	63
64	40 40.5	+21.5	35.3	41 29.3	+22.3	35.8	42 17.9	+23.0	36.3	43 06.1	+23.7	36.8	43 53.9	+24.6	37.4	44 41.4	+25.3	38.0	45 28.4	+26.2	38.6	46 15.1	+27.0	39.3	64
65	41 02.0	+20.7	34.0	41 51.6	+21.4	34.5	42 40.9	+22.1	35.0	43 29.8	+23.0	35.6	44 18.5	+23.7	36.2	45 06.7	+24.5	36.7	45 54.6	+25.3	37.3	46 42.1	+26.2	38.0	65
66	41 22.7	+19.9	32.8	42 13.0	+20.6	33.3	43 03.0	+21.3	33.8	43 52.8	+22.0	34.3	44 42.2	+22.8	34.9	45 31.2	+23.6	35.4	46 19.9	+24.4	36.0	47 08.3	+25.2	36.7	66
67	41 42.6	+19.0	31.5	42 33.6	+19.7	32.0	43 24.3	+20.5	32.5	44 14.8	+21.2	33.0	45 05.0	+21.9	33.5	45 54.8	+22.7	34.1	46 44.3	+23.5	34.7	47 33.5	+24.2	35.3	67
68	42 01.6	+18.2	30.2	42 53.3	+18.9	30.7	43 44.8	+19.6	31.2	44 36.0	+20.3	31.7	45 26.9	+21.0	32.2	46 17.5	+21.7	32.8	47 07.8	+22.5	33.4	47 57.7	+23.3	34.0	68
69	42 19.8	+17.3	29.0	43 12.2	+18.0	29.4	44 04.4	+18.6	29.9	44 56.3	+19.3	30.4	45 47.9	+20.0	30.9	46 39.2	+20.8	31.4	47 30.3	+21.5	32.0	48 21.0	+22.3	32.6	69
70	42 37.1	+16.5	27.7	43 30.2	+17.0	28.1	44 23.0	+17.7	28.5	45 15.6	+18.4	29.0	46 07.9	+19.1	29.5	47 00.0	+19.8	30.1	47 51.8	+20.5	30.6	48 43.3	+21.2	31.2	70
71	42 53.6	+15.5	26.3	43 47.2	+16.2	26.8	44 40.7	+16.8	27.2	45 34.0	+17.4	27.7	46 27.0	+18.1	28.2	47 19.8	+18.7	28.7	48 12.3	+19.4	29.2	49 04.5	+20.2	29.8	71
72	43 09.1	+14.6	25.0	44 03.4	+15.2	25.4	44 57.5	+15.8	25.9	45 51.4	+16.4	26.3	46 45.1	+17.0	26.8	47 38.5	+17.7	27.3	48 31.7	+18.4	27.8	49 24.7	+19.1	28.3	72
73	43 23.7	+13.7	23.7	44 18.6	+14.2	24.1	45 13.3	+14.8	24.5	46 07.8	+15.4	24.9	47 02.1	+16.0	25.4	47 56.2	+16.7	25.8	48 50.1	+17.3	26.3	49 43.8	+17.9	26.9	73
74	43 37.4	+12.7	22.3	44 32.8	+13.3	22.7	45 28.1	+13.8	23.1	46 23.2	+14.4	23.5	47 18.1	+15.0	23.9	48 12.9	+15.5	24.4	49 07.4	+16.2	24.9	50 01.7	+16.8	25.4	74
75	43 50.1	+11.8	21.0	44 46.1	+12.3	21.3	45 41.9	+12.8	21.7	46 37.6	+13.3	22.1	47 33.1	+13.8	22.5	48 28.4	+14.5	22.9	49 23.6	+15.0	23.4	50 18.5	+15.7	23.9	75
76	44 01.9	+10.8	19.6	44 58.4	+11.2	20.0	45 54.7	+11.7	20.3	46 50.9	+12.2	20.7	47 46.9	+12.8	21.1	48 42.9	+13.3	21.5	49 38.6	+13.9	21.9	50 34.2	+14.4	22.4	76
77	44 12.7	+9.8	18.3	45 09.6	+10.3	18.6	46 06.4	+10.7	18.9	47 03.1	+11.2	19.3	47 59.7	+11.7	19.6	48 56.2	+12.1	20.0	49 52.5	+12.7	20.4	50 48.6	+13.3	20.8	77
78	44 22.5	+8.8	16.9	45 19.9	+9.2	17.2	46 17.1	+9.6	17.5	47 14.3	+10.1	17.8	48 11.4	+10.5	18.1	49 08.3	+11.0	18.5	50 05.2	+11.5	18.9	51 01.9	+12.0	19.3	78
79	44 31.3	+7.8	15.5	45 29.1	+8.1	15.8	46 26.8	+8.5	16.1	47 24.4	+9.0	16.4	48 21.9	+9.4	16.7	49 19.3	+9.9	17.0	50 16.7	+10.2	17.3	51 13.9	+10.7	17.7	79
80	44 39.1	+6.8	14.1	45 37.2	+7.2	14.4	46 35.3	+7.5	14.6	47 33.4	+7.8	14.9	48 31.3	+8.2	15.2	49 29.2	+8.6	15.5	50 26.9	+9.1	15.8	51 24.6	+9.5	16.1	80
81	44 45.9	+5.7	12.7	45 44.4	+6.0	12.9	46 42.8	+6.4	13.2	47 41.2	+6.7	13.4	48 39.5	+7.1	13.7	49 37.8	+7.4	14.0	50 36.0	+7.8	14.2	51 34.1	+8.2	14.6	81
82	44 51.6	+4.7	11.3	45 50.4	+5.0	11.5	46 49.2	+5.3	11.7	47 47.9	+5.5	11.9	48 46.6	+5.9	12.2	49 45.2	+6.2	12.4	50 43.8	+6.5	12.7	51 42.3	+6.9	13.0	82
83	44 56.3	+3.7	9.9	45 55.4	+3.9	10.1	46 54.5	+4.1	10.3	47 53.5	+4.4	10.5	48 52.5	+4.6	10.7	49 51.4	+5.0	10.9	50 50.3	+5.3	11.1	51 49.2	+5.5	11.4	83
84	45 00.0	+2.6	8.5	45 59.3	+2.8	8.6	46 58.6	+3.1	8.8	47 57.9	+3.3	9.0	48 57.1	+3.5	9.1	49 56.4	+3.7	9.3	50 55.6	+4.1	9.5	51 54.7	+4.2	9.7	84
85	45 02.6	+1.6	7.1	46 02.1	+1.8	7.2	47 01.7	+1.9	7.3	48 01.2	+2.1	7.5	49 00.6	+2.3	7.6	50 00.1	+2.5	7.8	50 59.5	+2.7	7.9	51 58.9	+2.9	8.1	85
86	45 04.2	+0.5	5.7	46 03.9	+0.6	5.8	47 03.6	+0.8	5.9	48 03.3	+0.9	6.0	49 02.9	+1.1	6.1	50 02.6	+1.2	6.2	51 02.2	+1.4	6.4	52 01.8	+1.6	6.5	86
87	45 04.7	−0.5	4.2	46 04.5	−0.4	4.3	47 04.4	−0.4	4.4	48 04.2	−0.2	4.5	49 04.0	−0.1	4.6	50 03.8	0.0	4.7	51 03.6	+0.1	4.8	52 03.4	+0.2	4.9	87
88	45 04.2	−1.6	2.8	46 04.1	−1.5	2.9	47 04.0	−1.4	2.9	48 04.0	−1.4	3.0	49 03.9	−1.4	3.0	50 03.8	−1.3	3.1	51 03.7	−1.2	3.2	52 03.6	−1.1	3.2	88
89	45 02.6	−2.6	1.4	46 02.6	−2.6	1.4	47 02.6	−2.6	1.5	48 02.6	−2.6	1.5	49 02.5	−2.5	1.5	50 02.5	−2.5	1.6	51 02.5	−2.5	1.6	52 02.5	−2.5	1.6	89
90	45 00.0	−3.7	0.0	46 00.0	−3.7	0.0	47 00.0	−3.7	0.0	48 00.0	−3.7	0.0	49 00.0	−3.7	0.0	50 00.0	−3.8	0.0	51 00.0	−3.8	0.0	52 00.0	−3.8	0.0	90
	45°			**46°**			**47°**			**48°**			**49°**			**50°**			**51°**			**52°**			

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	2 07.3	−42.5	92.1	2 05.0	−43.2	92.2	2 02.7	−43.9	92.2	2 00.4	−44.6	92.2	1 58.1	−45.4	92.3	1 55.7	−46.0	92.3	1 53.2	−46.6	92.3	1 50.8	−47.3	92.4	0
1	1 24.8	−42.5	92.8	1 21.8	−43.2	92.9	1 18.8	−43.9	92.9	1 15.8	−44.6	92.9	1 12.7	−45.3	92.9	1 09.7	−46.0	92.9	1 06.6	−46.7	93.0	1 03.5	−47.3	93.0	1
2	0 42.3	−42.5	93.5	0 38.6	−43.2	93.5	0 34.9	−43.9	93.6	0 31.2	−44.7	93.6	0 27.4	−45.3	93.6	0 23.7	−46.0	93.6	0 19.9	−46.7	93.6	0 16.2	−47.4	93.6	2
3	0 00.2	+42.5	85.8	0 04.6	+43.2	85.8	0 09.0	+44.0	85.8	0 13.5	+44.6	85.8	0 17.9	+45.3	85.8	0 22.3	+46.0	85.8	0 26.8	+46.6	85.8	0 31.2	+47.3	85.8	3
4	0 42.7	+42.4	85.1	0 47.8	+43.2	85.1	0 53.0	+43.9	85.1	0 58.1	+44.6	85.1	1 03.2	+45.4	85.1	1 08.3	+46.0	85.1	1 13.4	+46.7	85.2	1 18.5	+47.3	85.2	4
5	1 25.1	+42.5	84.3	1 31.0	+43.2	84.4	1 36.9	+43.9	84.4	1 42.7	+44.7	84.4	1 48.6	+45.3	84.5	1 54.3	+46.0	84.5	2 00.1	+46.6	84.5	2 05.8	+47.3	84.6	5
6	2 07.6	+42.4	83.6	2 14.2	+43.2	83.7	2 20.8	+43.9	83.7	2 27.4	+44.6	83.8	2 33.9	+45.2	83.8	2 40.3	+46.0	83.8	2 46.7	+46.6	83.9	2 53.1	+47.2	83.9	6
7	2 50.0	+42.5	82.9	2 57.4	+43.1	83.0	3 04.7	+43.9	83.1	3 12.0	+44.6	83.1	3 19.1	+45.3	83.1	3 26.3	+45.9	83.2	3 33.3	+46.6	83.3	3 40.3	+47.3	83.3	7
8	3 32.5	+42.3	82.2	3 40.5	+43.2	82.3	3 48.6	+43.8	82.4	3 56.5	+44.6	82.4	4 04.4	+45.2	82.5	4 12.2	+45.9	82.6	4 19.9	+46.6	82.6	4 27.6	+47.2	82.7	8
9	4 14.8	+42.4	81.5	4 23.7	+43.0	81.6	4 32.4	+43.8	81.7	4 41.1	+44.5	81.7	4 49.6	+45.2	81.8	4 58.1	+45.9	81.9	5 06.5	+46.5	82.0	5 14.8	+47.2	82.1	9
10	4 57.2	+42.3	80.8	5 06.7	+43.1	80.9	5 16.2	+43.7	81.0	5 25.6	+44.4	81.1	5 34.8	+45.2	81.2	5 44.0	+45.8	81.3	5 53.0	+46.5	81.4	6 02.0	+47.1	81.5	10
11	5 39.5	+42.2	80.1	5 49.8	+43.0	80.2	5 59.9	+43.7	80.3	6 10.0	+44.4	80.4	6 20.0	+45.1	80.5	6 29.8	+45.8	80.6	6 39.5	+46.5	80.7	6 49.1	+47.1	80.8	11
12	6 21.7	+42.2	79.4	6 32.8	+42.9	79.5	6 43.6	+43.7	79.6	6 54.4	+44.3	79.7	7 05.1	+45.0	79.8	7 15.6	+45.7	80.0	7 26.0	+46.3	80.1	7 36.2	+47.1	80.2	12
13	7 03.9	+42.2	78.7	7 15.7	+42.8	78.8	7 27.3	+43.5	78.9	7 38.7	+44.3	79.0	7 50.1	+45.0	79.2	8 01.3	+45.6	79.3	8 12.3	+46.4	79.5	8 23.3	+46.9	79.6	13
14	7 46.1	+42.0	77.9	7 58.5	+42.8	78.1	8 10.8	+43.6	78.2	8 23.0	+44.2	78.4	8 35.1	+44.9	78.5	8 46.9	+45.6	78.7	8 58.7	+46.2	78.8	9 10.2	+46.9	79.0	14
15	8 28.1	+42.0	77.2	8 41.3	+42.7	77.4	8 54.4	+43.4	77.5	9 07.2	+44.2	77.7	9 20.0	+44.8	77.8	9 32.5	+45.5	78.0	9 44.9	+46.2	78.2	9 57.1	+46.9	78.3	15
16	9 10.1	+41.9	76.5	9 24.0	+42.6	76.7	9 37.8	+43.3	76.8	9 51.4	+44.0	77.0	10 04.8	+44.7	77.2	10 18.0	+45.5	77.3	10 31.1	+46.1	77.5	10 44.0	+46.7	77.7	16
17	9 52.0	+41.8	75.8	10 06.6	+42.6	75.9	10 21.1	+43.3	76.1	10 35.4	+44.0	76.3	10 49.5	+44.7	76.5	11 03.5	+45.3	76.7	11 17.2	+46.0	76.9	11 30.7	+46.7	77.1	17
18	10 33.8	+41.7	75.0	10 49.2	+42.4	75.2	11 04.4	+43.1	75.4	11 19.4	+43.8	75.6	11 34.2	+44.6	75.8	11 48.8	+45.3	76.0	12 03.2	+45.9	76.2	12 17.4	+46.6	76.4	18
19	11 15.5	+41.5	74.3	11 31.6	+42.3	74.5	11 47.5	+43.1	74.7	12 03.2	+43.8	74.9	12 18.8	+44.4	75.1	12 34.1	+45.1	75.3	12 49.1	+45.9	75.5	13 04.0	+46.5	75.8	19
20	11 57.0	+41.5	73.6	12 13.9	+42.2	73.8	12 30.6	+42.9	74.0	12 47.0	+43.6	74.2	13 03.2	+44.4	74.4	13 19.2	+45.0	74.7	13 35.0	+45.7	74.9	13 50.5	+46.4	75.1	20
21	12 38.5	+41.4	72.8	12 56.1	+42.1	73.1	13 13.5	+42.8	73.3	13 30.6	+43.6	73.5	13 47.6	+44.2	73.7	14 04.2	+45.0	74.0	14 20.7	+45.6	74.2	14 36.9	+46.3	74.5	21
22	13 19.9	+41.2	72.1	13 38.2	+41.9	72.3	13 56.3	+42.7	72.6	14 14.2	+43.4	72.8	14 31.8	+44.1	73.0	14 49.2	+44.8	73.3	15 06.3	+45.5	73.5	15 23.2	+46.1	73.8	22
23	14 01.1	+41.0	71.3	14 20.1	+41.9	71.6	14 39.0	+42.5	71.8	14 57.6	+43.2	72.1	15 15.9	+44.0	72.3	15 34.0	+44.6	72.6	15 51.8	+45.3	72.9	16 09.3	+46.0	73.1	23
24	14 42.1	+41.0	70.6	15 02.0	+41.6	70.8	15 21.5	+42.4	71.1	15 40.8	+43.2	71.4	15 59.9	+43.8	71.6	16 18.6	+44.6	71.9	16 37.1	+45.3	72.2	16 55.3	+46.0	72.5	24
25	15 23.1	+40.7	69.8	15 43.6	+41.5	70.1	16 03.9	+42.3	70.4	16 24.0	+42.9	70.6	16 43.7	+43.7	70.9	17 03.2	+44.4	71.2	17 22.4	+45.0	71.5	17 41.3	+45.7	71.8	25
26	16 03.8	+40.7	69.1	16 25.1	+41.4	69.3	16 46.2	+42.1	69.6	17 06.9	+42.8	69.9	17 27.4	+43.5	70.2	17 47.6	+44.2	70.5	18 07.4	+45.0	70.8	18 27.0	+45.6	71.1	26
27	16 44.5	+40.4	68.3	17 06.5	+41.2	68.6	17 28.3	+41.9	68.9	17 49.7	+42.7	69.2	18 10.9	+43.4	69.5	18 31.8	+44.1	69.8	18 52.4	+44.8	70.1	19 12.6	+45.5	70.4	27
28	17 24.9	+40.3	67.5	17 47.7	+41.0	67.8	18 10.2	+41.7	68.1	18 32.4	+42.5	68.4	18 54.3	+43.2	68.8	19 15.9	+43.9	69.1	19 37.2	+44.6	69.4	19 58.1	+45.3	69.7	28
29	18 05.2	+40.0	66.8	18 28.7	+40.8	67.1	18 51.9	+41.6	67.4	19 14.9	+42.3	67.7	19 37.5	+43.0	68.0	19 59.8	+43.7	68.3	20 21.8	+44.4	68.7	20 43.4	+45.1	69.0	29
30	18 45.2	+39.9	66.0	19 09.5	+40.6	66.3	19 33.5	+41.4	66.6	19 57.2	+42.1	66.9	20 20.5	+42.8	67.3	20 43.5	+43.6	67.6	21 06.2	+44.2	68.0	21 28.5	+45.0	68.3	30
31	19 25.1	+39.7	65.2	19 50.1	+40.5	65.5	20 14.9	+41.1	65.8	20 39.3	+41.9	66.2	21 03.3	+42.7	66.5	21 27.1	+43.3	66.9	21 50.4	+44.1	67.2	22 13.5	+44.7	67.6	31
32	20 04.8	+39.4	64.4	20 30.6	+40.2	64.7	20 56.0	+41.0	65.1	21 21.2	+41.7	65.4	21 46.0	+42.4	65.8	22 10.4	+43.2	66.1	22 34.5	+43.9	66.5	22 58.2	+44.6	66.9	32
33	20 44.2	+39.3	63.6	21 10.8	+39.9	63.9	21 37.0	+40.7	64.3	22 02.9	+41.4	64.6	22 28.4	+42.2	65.0	22 53.6	+42.9	65.4	23 18.4	+43.6	65.8	23 42.8	+44.3	66.2	33
34	21 23.5	+38.9	62.8	21 50.7	+39.8	63.1	22 17.7	+40.5	63.5	22 44.3	+41.3	63.9	23 10.6	+42.0	64.2	23 36.5	+42.7	64.6	24 02.0	+43.4	65.0	24 27.1	+44.2	65.4	34
35	22 02.4	+38.8	61.9	22 30.5	+39.5	62.3	22 58.2	+40.3	62.7	23 25.6	+41.0	63.1	23 52.6	+41.7	63.5	24 19.2	+42.5	63.9	24 45.4	+43.2	64.3	25 11.3	+43.9	64.7	35
36	22 41.2	+38.5	61.1	23 10.0	+39.2	61.5	23 38.5	+40.0	61.9	24 06.6	+40.7	62.3	24 34.3	+41.5	62.7	25 01.7	+42.2	63.1	25 28.6	+43.0	63.5	25 55.2	+43.7	63.9	36
37	23 19.7	+38.2	60.3	23 49.2	+39.0	60.7	24 18.5	+39.7	61.1	24 47.3	+40.5	61.5	25 15.8	+41.2	61.9	25 43.9	+41.9	62.3	26 11.6	+42.7	62.7	26 38.9	+43.4	63.2	37
38	23 57.9	+37.9	59.4	24 28.2	+38.7	59.8	24 58.2	+39.4	60.2	25 27.8	+40.2	60.6	25 57.0	+41.0	61.1	26 25.8	+41.7	61.5	26 54.3	+42.4	61.9	27 22.3	+43.1	62.4	38
39	24 35.8	+37.7	58.6	25 06.9	+38.4	59.0	25 37.6	+39.2	59.4	26 08.0	+39.9	59.8	26 38.0	+40.6	60.2	27 07.5	+41.5	60.7	27 36.7	+42.2	61.1	28 05.4	+42.9	61.6	39
40	25 13.5	+37.3	57.7	25 45.3	+38.1	58.1	26 16.8	+38.9	58.6	26 47.9	+39.7	59.0	27 18.6	+40.4	59.4	27 49.0	+41.1	59.9	28 18.9	+41.8	60.3	28 48.3	+42.6	60.8	40
41	25 50.8	+37.1	56.9	26 23.4	+37.9	57.3	26 55.7	+38.6	57.7	27 27.6	+39.3	58.1	27 59.0	+40.1	58.6	28 30.1	+40.8	59.0	29 00.7	+41.6	59.5	29 30.9	+42.4	60.0	41
42	26 27.9	+36.7	56.0	27 01.3	+37.4	56.4	27 34.3	+38.2	56.8	28 06.9	+39.0	57.3	28 39.1	+39.8	57.7	29 10.9	+40.5	58.2	29 42.3	+41.3	58.7	30 13.3	+42.0	59.2	42
43	27 04.6	+36.4	55.1	27 38.7	+37.2	55.5	28 12.5	+37.9	56.0	28 45.9	+38.6	56.4	29 18.9	+39.4	56.9	29 51.4	+40.2	57.4	30 23.6	+40.9	57.9	30 55.3	+41.6	58.4	43
44	27 41.0	+36.0	54.2	28 15.9	+36.8	54.6	28 50.4	+37.6	55.1	29 24.5	+38.3	55.5	29 58.3	+39.1	56.0	30 31.6	+39.8	56.5	31 04.5	+40.6	57.0	31 36.9	+41.4	57.5	44
45	28 17.0	+35.7	53.3	28 52.7	+36.4	53.7	29 28.0	+37.2	54.2	30 02.9	+37.9	54.7	30 37.4	+38.7	55.1	31 11.4	+39.5	55.6	31 45.1	+40.2	56.1	32 18.3	+41.0	56.7	45
46	28 52.7	+35.3	52.4	29 29.1	+36.1	52.8	30 05.2	+36.8	53.3	30 40.8	+37.6	53.8	31 16.1	+38.3	54.3	31 50.9	+39.1	54.8	32 25.3	+39.9	55.3	32 59.3	+40.6	55.8	46
47	29 28.0	+34.9	51.5	30 05.2	+35.6	51.9	30 42.0	+36.4	52.4	31 18.4	+37.2	52.9	31 54.4	+38.0	53.3	32 30.0	+38.7	53.9	33 05.2	+39.5	54.4	33 39.9	+40.3	54.9	47
48	30 02.9	+34.5	50.5	30 40.8	+35.3	51.0	31 18.4	+36.0	51.5	31 55.6	+36.8	51.9	32 32.4	+37.5	52.4	33 08.7	+38.4	52.9	33 44.7	+39.1	53.5	34 20.2	+39.8	54.0	48
49	30 37.4	+34.0	49.6	31 16.1	+34.8	50.0	31 54.4	+35.6	50.5	32 32.4	+36.3	51.0	33 09.9	+37.2	51.5	33 47.1	+37.9	52.0	34 23.8	+38.6	52.6	35 00.0	+39.5	53.1	49
50	31 11.4	+33.7	48.6	31 50.9	+34.4	49.1	32 30.0	+35.2	49.6	33 08.7	+36.0	50.1	33 47.1	+36.7	50.6	34 25.0	+37.4	51.1	35 02.4	+38.3	51.6	35 39.5	+39.0	52.2	50
51	31 45.1	+33.2	47.7	32 25.3	+34.0	48.1	33 05.2	+34.7	48.6	33 44.7	+35.5	49.1	34 23.8	+36.2	49.6	35 02.4	+37.1	50.1	35 40.7	+37.8	50.7	36 18.5	+38.5	51.2	51
52	32 18.3	+32.7	46.7	32 59.3	+33.5	47.1	33 39.9	+34.3	47.6	34 20.2	+35.0	48.1	35 00.0	+35.8	48.6	35 39.5	+36.5	49.2	36 18.5	+37.3	49.7	36 57.0	+38.1	50.3	52
53	32 51.0	+32.3	45.7	33 32.8	+33.0	46.1	34 14.2	+33.7	46.6	34 55.2	+34.5	47.1	35 35.8	+35.3	47.7	36 16.0	+36.1	48.2	36 55.8	+36.8	48.7	37 35.1	+37.6	49.3	53
54	33 23.3	+31.8	44.7	34 05.8	+32.5	45.1	34 47.9	+33.3	45.6	35 29.7	+34.0	46.1	36 11.1	+34.8	46.7	36 52.1	+35.6	47.2	37 32.6	+36.3	47.8	38 12.7	+37.1	48.3	54
55	33 55.1	+31.2	43.6	34 38.3	+32.0	44.1	35 21.2	+32.7	44.6	36 03.7	+33.5	45.1	36 45.9	+34.2	45.6	37 27.6	+35.0	46.2	38 08.9	+35.8	46.7	38 49.8	+36.6	47.3	55
56	34 26.3	+30.8	42.6	35 10.3	+31.5	43.1	35 53.9	+32.3	43.6	36 37.2	+33.0	44.1	37 20.1	+33.8	44.6	38 02.6	+34.5	45.2	38 44.7	+35.3	45.7	39 26.4	+36.0	46.3	56
57	34 57.1	+30.1	41.6	35 41.8	+30.9	42.0	36 26.2	+31.6	42.5	37 10.2	+32.4	43.0	37 53.9	+33.1	43.6	38 37.1	+34.0	44.1	39 20.0	+34.7	44.7	40 02.4	+35.5	45.3	57
58	35 27.2	+29.7	40.5	36 12.7	+30.4	41.0	36 57.8	+31.1	41.5	37 42.6	+31.8	42.0	38 27.0	+32.6	42.5	39 11.1	+33.3	43.1	39 54.7	+34.1	43.6	40 37.9	+34.9	44.2	58
59	35 56.9	+29.0	39.4	36 43.1	+29.7	39.9	37 28.9	+30.5	40.4	38 14.4	+31.3	40.9	38 59.6	+32.0	41.4	39 44.4	+32.7	42.0	40 28.8	+33.5	42.5	41 12.8	+34.3	43.1	59
60	36 25.9	+28.5	38.4	37 12.8	+29.2	38.8	37 59.4	+29.9	39.3	38 45.7	+30.6	39.8	39 31.6	+31.3	40.3	40 17.1	+32.1	40.9	41 02.3	+32.8	41.5	41 47.1	+33.6	42.0	60
61	36 54.4	+27.8	37.3	37 42.0	+28.5	37.7	38 29.3	+29.2	38.2	39 16.3	+29.9	38.7	40 02.9	+30.7	39.2	40 49.2	+31.5	39.8	41 35.1	+32.2	40.3	42 20.7	+32.9	40.9	61
62	37 22.2	+27.2	36.2	38 10.5	+27.9	36.7	38 58.5	+28.6	37.1	39 46.2	+29.4	37.6	40 33.6	+30.1	38.1	41 20.7	+30.7	38.7	42 07.3	+31.6	39.2	42 53.6	+32.3	39.8	62
63	37 49.4	+26.6	35.0	38 38.4	+27.3	35.5	39 27.1	+28.0	36.0	40 15.6	+28.6	36.4	41 03.7	+29.3	37.0	41 51.4	+30.1	37.5	42 38.9	+30.8	38.1	43 25.9	+31.6	38.6	63
64	38 16.0	+25.9	33.9	39 05.7	+26.5	34.3	39 55.1	+27.2	34.8	40 44.2	+27.9	35.3	41 33.0	+28.7	35.8	42 21.5	+29.4	36.3	43 09.7	+30.1	36.9	43 57.5	+30.8	37.5	64
65	38 41.9	+25.2	32.7	39 32.2	+25.9	33.2	40 22.3	+26.5	33.6	41 12.1	+27.2	34.1	42 01.7	+27.9	34.6	42 50.9	+28.6	35.1	43 39.8	+29.3	35.7	44 28.3	+30.1	36.3	65
66	39 07.1	+24.5	31.6	39 58.1	+25.1	32.0	40 48.8	+25.8	32.5	41 39.3	+26.5	32.9	42 29.6	+27.1	33.4	43 19.5	+27.8	33.9	44 09.1	+28.6	34.5	44 58.4	+29.3	35.0	66
67	39 31.6	+23.8	30.4	40 23.2	+24.4	30.8	41 14.6	+25.1	31.3	42 05.8	+25.7	31.7	42 56.7	+26.4	32.2	43 47.3	+27.1	32.7	44 37.7	+27.7	33.2	45 27.7	+28.4	33.8	67
68	39 55.4	+23.0	29.2	40 47.6	+23.7	29.6	41 39.7	+24.3	30.0	42 31.5	+24.9	30.5	43 23.1	+25.5	31.0	44 14.4	+26.2	31.5	45 05.4	+26.9	32.0	45 56.1	+27.7	32.5	68
69	40 18.4	+22.3	28.0	41 11.3	+22.9	28.4	42 04.0	+23.4	28.8	42 56.4	+24.1	29.3	43 48.6	+24.8	29.7	44 40.6	+25.4	30.2	45 32.3	+26.1	30.7	46 23.8	+26.7	31.3	69
70	40 40.7	+21.5	26.8	41 34.2	+22.0	27.2	42 27.4	+22.7	27.6	43 20.5	+23.3	28.0	44 13.4	+23.9	28.5	45 06.0	+24.5	28.9	45 58.4	+25.2	29.4	46 50.5	+25.8	30.0	70
71	41 02.2	+20.7	25.5	41 56.2	+21.3	25.9	42 50.1	+21.8	26.3	43 43.8	+22.4	26.7	44 37.3	+23.0	27.2	45 30.5	+23.6	27.6	46 23.6	+24.2	28.1	47 16.3	+25.0	28.6	71
72	41 22.9	+19.8	24.3	42 17.5	+20.4	24.7	43 11.9	+21.0	25.0	44 06.2	+21.5	25.5	45 00.3	+22.1	25.9	45 54.1	+22.8	26.3	46 47.8	+23.3	26.8	47 41.3	+23.9	27.3	72
73	41 42.7	+19.1	23.0	42 37.9	+19.5	23.4	43 32.9	+20.1	23.8	44 27.7	+20.6	24.1	45 22.4	+21.2	24.6	46 16.9	+21.7	25.0	47 11.1	+22.4	25.4	48 05.2	+23.0	25.9	73
74	42 01.8	+18.2	21.8	42 57.4	+18.7	22.1	43 53.0	+19.1	22.5	44 48.3	+19.7	22.8	45 43.6	+20.2	23.2	46 38.6	+20.8	23.6	47 33.5	+21.3	24.1	48 28.2	+21.9	24.5	74
75	42 20.0	+17.3	20.5	43 16.1	+17.8	20.8	44 12.1	+18.3	21.1	45 08.0	+18.8	21.5	46 03.8	+19.3	21.9	46 59.4	+19.8	22.3	47 54.8	+20.4	22.7	48 50.1	+20.9	23.1	75
76	42 37.3	+16.4	19.2	43 33.9	+16.9	19.5	44 30.4	+17.3	19.8	45 26.8	+17.8	20.1	46 23.1	+18.2	20.5	47 19.2	+18.8	20.9	48 15.2	+19.3	21.3	49 11.0	+19.8	21.7	76
77	42 53.7	+15.5	17.9	43 50.8	+15.9	18.1	44 47.7	+16.4	18.5	45 44.6	+16.8	18.8	46 41.3	+17.3	19.1	47 38.0	+17.7	19.5	48 34.5	+18.2	19.8	49 30.8	+18.8	20.2	77
78	43 09.2	+14.6	16.5	44 06.7	+15.0	16.8	45 04.1	+15.4	17.1	46 01.4	+15.8	17.4	46 58.6	+16.2	17.7	47 55.7	+16.7	18.1	48 52.7	+17.1	18.4	49 49.6	+17.6	18.8	78
79	43 23.8	+13.7	15.2	44 21.7	+14.0	15.5	45 19.5	+14.4	15.7	46 17.2	+14.8	16.0	47 14.8	+15.2	16.3	48 12.4	+15.6	16.6	49 09.8	+16.0	16.9	50 07.2	+16.4	17.3	79
80	43 37.5	+12.7	13.9	44 35.7	+13.1	14.1	45 33.9	+13.4	14.3	46 32.0	+13.7	14.6	47 30.0	+14.1	14.9	48 28.0	+14.5	15.2	49 25.8	+14.9	15.5	50 23.6	+15.3	15.8	80
81	43 50.2	+11.8	12.5	44 48.8	+12.0	12.7	45 47.3	+12.3	12.9	46 45.7	+12.7	13.2	47 44.1	+13.0	13.4	48 42.5	+13.3	13.7	49 40.7	+13.7	14.0	50 38.9	+14.1	14.3	81
82	44 02.0	+10.8	11.1	45 00.8	+11.1	11.3	45 59.6	+11.4	11.5	46 58.4	+11.6	11.8	47 57.1	+11.9	12.0	48 55.8	+12.2	12.2	49 54.4	+12.5	12.5	50 53.0	+12.8	12.7	82
83	44 12.8	+9.8	9.8	45 11.9	+10.0	9.9	46 11.0	+10.2	10.1	47 10.0	+10.5	10.3	48 09.0	+10.8	10.5	49 08.0	+11.0	10.7	50 06.9	+11.3	10.9	51 05.8	+11.6	11.2	83
84	44 22.6	+8.8	8.5	45 21.9	+9.0	8.7	46 21.2	+9.2	8.7	47 20.5	+9.4	8.9	48 19.8	+9.6	9.0	49 19.0	+9.9	9.2	50 18.2	+10.1	9.4	51 17.4	+10.4	9.6	84
85	44 31.4	+7.7	7.0	45 30.9	+7.9	7.1	46 30.4	+8.1	7.3	47 29.9	+8.3	7.4	48 29.4	+8.5	7.5	49 28.9	+8.7	7.7	50 28.3	+8.9	7.9	51 27.8	+9.0	8.0	85
86	44 39.1	+6.8	5.6	45 38.8	+6.9	5.7	46 38.5	+7.1	5.8	47 38.2	+7.2	5.9	48 37.9	+7.3	6.1	49 37.6	+7.4	6.2	50 37.2	+7.6	6.3	51 36.8	+7.8	6.4	86
87	44 45.9	+5.7	4.2	45 45.7	+5.9	4.4	46 45.6	+5.9	4.4	47 45.4	+6.0	4.5	48 45.2	+6.1	4.5	49 45.0	+6.2	4.6	50 44.8	+6.3	4.7	51 44.6	+6.5	4.8	87
88	44 51.6	+4.7	2.8	45 51.6	+4.7	2.9	46 51.5	+4.8	2.9	47 51.4	+4.9	3.0	48 51.3	+5.0	3.0	49 51.2	+5.0	3.1	50 51.1	+5.1	3.2	51 51.1	+5.1	3.2	88
89	44 56.3	+3.7	1.4	45 56.3	+3.7	1.4	46 56.3	+3.7	1.5	47 56.3	+3.7	1.5	48 56.3	+3.7	1.5	49 56.2	+3.8	1.6	50 56.2	+3.8	1.6	51 56.2	+3.8	1.6	89
90	45 00.0	+2.6	0.0	46 00.0	+2.6	0.0	47 00.0	+2.6	0.0	48 00.0	+2.6	0.0	49 00.0	+2.5	0.0	50 00.0	+2.5	0.0	51 00.0	+2.5	0.0	52 00.0	+2.5	0.0	90

| | 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 93°, 267°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	1 24.8	+42.5	91.4	1 23.4	+43.1	91.4	1 21.8	+43.9	91.5	1 20.3	+44.6	91.5	1 18.7	+45.3	91.5	1 17.1	+46.0	91.5	1 15.5	+46.6	91.6	1 13.9	+47.3	91.6	0
1	2 07.3	+42.4	90.7	2 06.5	+43.2	90.7	2 05.7	+43.9	90.8	2 04.9	+44.6	90.8	2 04.0	+45.3	90.9	2 03.1	+45.9	90.9	2 02.1	+46.7	90.9	2 01.2	+47.2	91.0	1
2	2 49.7	+42.4	90.0	2 49.7	+43.1	90.0	2 49.6	+43.8	90.1	2 49.5	+44.5	90.1	2 49.3	+45.2	90.2	2 49.0	+46.0	90.2	2 48.8	+46.6	90.3	2 48.4	+47.3	90.3	2
3	3 32.1	+42.3	89.3	3 32.8	+43.1	89.4	3 33.4	+43.8	89.4	3 34.0	+44.5	89.5	3 34.5	+45.2	89.5	3 35.0	+45.9	89.6	3 35.4	+46.5	89.7	3 35.7	+47.2	89.7	3
4	4 14.4	+42.3	88.6	4 15.9	+43.0	88.7	4 17.2	+43.8	88.7	4 18.5	+44.5	88.8	4 19.7	+45.2	88.9	4 20.9	+45.9	89.0	4 21.9	+46.6	89.0	4 22.9	+47.2	89.1	4
5	4 56.7	+42.3	87.9	4 58.9	+43.0	88.0	5 01.0	+43.8	88.0	5 03.0	+44.5	88.1	5 04.9	+45.2	88.2	5 06.8	+45.8	88.3	5 08.5	+46.5	88.4	5 10.1	+47.2	88.5	5
6	5 39.0	+42.2	87.2	5 41.9	+43.0	87.3	5 44.8	+43.6	87.4	5 47.5	+44.4	87.5	5 50.1	+45.1	87.6	5 52.6	+45.8	87.7	5 55.0	+46.4	87.8	5 57.3	+47.1	87.9	6
7	6 21.2	+42.1	86.4	6 24.9	+42.9	86.6	6 28.4	+43.7	86.7	6 31.9	+44.3	86.8	6 35.2	+45.0	86.9	6 38.4	+45.7	87.0	6 41.4	+46.5	87.1	6 44.4	+47.1	87.2	7
8	7 03.4	+42.1	85.7	7 07.8	+42.8	85.8	7 12.1	+43.5	86.0	7 16.2	+44.3	86.1	7 20.2	+45.0	86.2	7 24.1	+45.7	86.4	7 27.9	+46.3	86.5	7 31.5	+47.0	86.6	8
9	7 45.5	+42.0	85.0	7 50.6	+42.8	85.1	7 55.6	+43.5	85.3	8 00.5	+44.2	85.4	8 05.2	+44.9	85.6	8 09.8	+45.6	85.7	8 14.2	+46.3	85.8	8 18.5	+46.9	86.0	9
10	8 27.5	+41.9	84.3	8 33.4	+42.7	84.4	8 39.1	+43.5	84.6	8 44.7	+44.2	84.7	8 50.1	+44.9	84.9	8 55.4	+45.6	85.2	9 00.5	+46.2	85.2	9 05.4	+46.9	85.4	10
11	9 09.4	+41.9	83.6	9 16.1	+42.6	83.7	9 22.6	+43.3	83.9	9 28.9	+44.0	84.1	9 35.0	+44.8	84.2	9 41.0	+45.4	84.4	9 46.7	+46.2	84.6	9 52.3	+46.9	84.7	11
12	9 51.3	+41.8	82.8	9 58.7	+42.5	83.0	10 05.9	+43.3	83.2	10 12.9	+44.0	83.4	10 19.8	+44.7	83.5	10 26.4	+45.4	83.7	10 32.9	+46.1	83.9	10 39.2	+46.7	84.1	12
13	10 33.1	+41.6	82.1	10 41.2	+42.4	82.3	10 49.2	+43.1	82.5	10 56.9	+43.9	82.7	11 04.5	+44.6	82.9	11 11.8	+45.3	83.1	11 19.0	+45.9	83.3	11 25.9	+46.7	83.5	13
14	11 14.7	+41.6	81.4	11 23.6	+42.3	81.6	11 32.3	+43.1	81.8	11 40.8	+43.8	82.0	11 49.1	+44.5	82.2	11 57.1	+45.2	82.4	12 04.9	+45.9	82.6	12 12.6	+46.5	82.8	14
15	11 56.3	+41.4	80.6	12 05.9	+42.2	80.8	12 15.4	+42.9	81.1	12 24.6	+43.6	81.3	12 33.6	+44.3	81.5	12 42.3	+45.1	81.7	12 50.8	+45.8	81.9	12 59.1	+46.5	82.2	15
16	12 37.7	+41.3	79.9	12 48.1	+42.1	80.1	12 58.3	+42.8	80.3	13 08.2	+43.6	80.6	13 17.9	+44.3	80.8	13 27.4	+45.0	81.0	13 36.6	+45.7	81.3	13 45.6	+46.4	81.5	16
17	13 19.0	+41.2	79.2	13 30.2	+41.9	79.4	13 41.1	+42.7	79.6	13 51.8	+43.4	79.9	14 02.2	+44.2	80.1	14 12.4	+44.9	80.4	14 22.3	+45.6	80.6	14 32.0	+46.3	80.9	17
18	14 00.2	+41.0	78.4	14 12.1	+41.8	78.7	14 23.8	+42.6	78.9	14 35.2	+43.3	79.2	14 46.4	+44.0	79.4	14 57.3	+44.7	79.7	15 07.9	+45.5	79.9	15 18.3	+46.1	80.2	18
19	14 41.2	+40.9	77.7	14 53.9	+41.7	77.9	15 06.4	+42.4	78.2	15 18.5	+43.2	78.4	15 30.4	+43.9	78.7	15 42.0	+44.7	79.0	15 53.4	+45.3	79.3	16 04.4	+46.0	79.5	19
20	15 22.1	+40.8	76.9	15 35.6	+41.5	77.2	15 48.8	+42.3	77.4	16 01.7	+43.0	77.7	16 14.3	+43.8	78.0	16 26.7	+44.4	78.3	16 38.7	+45.2	78.6	16 50.4	+45.9	78.9	20
21	16 02.9	+40.6	76.1	16 17.1	+41.4	76.4	16 31.1	+42.1	76.7	16 44.7	+42.9	77.0	16 58.1	+43.6	77.3	17 11.1	+44.4	77.6	17 23.9	+45.0	77.9	17 36.3	+45.8	78.2	21
22	16 43.5	+40.4	75.4	16 58.5	+41.2	75.7	17 13.2	+41.9	76.0	17 27.6	+42.7	76.3	17 41.7	+43.4	76.6	17 55.5	+44.2	76.9	18 08.9	+44.9	77.2	18 22.1	+45.6	77.5	22
23	17 23.9	+40.2	74.6	17 39.7	+41.0	74.9	17 55.1	+41.8	75.2	18 10.3	+42.5	75.5	18 25.1	+43.3	75.8	18 39.7	+44.0	76.2	18 53.8	+44.8	76.5	19 07.7	+45.4	76.8	23
24	18 04.1	+40.0	73.8	18 20.7	+40.8	74.1	18 36.9	+41.6	74.4	18 52.8	+42.4	74.8	19 08.4	+43.1	75.1	19 23.7	+43.8	75.4	19 38.6	+44.6	75.8	19 53.1	+45.3	76.1	24
25	18 44.1	+39.9	73.0	19 01.5	+40.6	73.4	19 18.5	+41.4	73.7	19 35.2	+42.2	74.0	19 51.5	+43.0	74.4	20 07.5	+43.7	74.7	20 23.2	+44.4	75.1	20 38.4	+45.1	75.4	25
26	19 24.0	+39.6	72.2	19 42.1	+40.4	72.6	19 59.9	+41.2	72.9	20 17.4	+41.9	73.3	20 34.5	+42.7	73.6	20 51.2	+43.5	74.0	21 07.6	+44.2	74.4	21 23.5	+45.0	74.7	26
27	20 03.6	+39.4	71.4	20 22.5	+40.3	71.8	20 41.1	+41.0	72.1	20 59.3	+41.8	72.5	21 17.2	+42.5	72.9	21 34.7	+43.3	73.3	21 51.8	+44.0	73.6	22 08.5	+44.7	74.0	27
28	20 43.0	+39.2	70.6	21 02.8	+39.9	71.0	21 22.1	+40.8	71.4	21 41.1	+41.6	71.7	21 59.7	+42.3	72.1	22 18.0	+43.0	72.5	22 35.8	+43.8	72.9	22 53.2	+44.6	73.3	28
29	21 22.2	+39.0	69.8	21 42.7	+39.8	70.2	22 02.9	+40.5	70.6	22 22.7	+41.3	71.0	22 42.0	+42.1	71.3	23 01.0	+42.9	71.7	23 19.6	+43.6	72.2	23 37.8	+44.3	72.6	29
30	22 01.2	+38.7	69.0	22 22.5	+39.5	69.4	22 43.4	+40.3	69.8	23 04.0	+41.1	70.2	23 24.1	+41.9	70.6	23 43.9	+42.6	71.0	24 03.2	+43.4	71.4	24 22.1	+44.2	71.8	30
31	22 39.9	+38.4	68.2	23 02.0	+39.3	68.6	23 23.7	+40.1	69.0	23 45.1	+40.8	69.4	24 06.0	+41.6	69.8	24 26.5	+42.4	70.2	24 46.6	+43.2	70.6	25 06.3	+43.9	71.1	31
32	23 18.3	+38.2	67.3	23 41.3	+39.0	67.7	24 03.8	+39.8	68.2	24 25.9	+40.6	68.6	24 47.6	+41.4	69.0	25 08.9	+42.2	69.4	25 29.8	+42.9	69.9	25 50.2	+43.7	70.3	32
33	23 56.5	+37.9	66.5	24 20.3	+38.7	66.9	24 43.6	+39.5	67.3	25 06.5	+40.3	67.8	25 29.0	+41.1	68.2	25 51.1	+41.8	68.6	26 12.7	+42.6	69.1	26 33.9	+43.4	69.6	33
34	24 34.4	+37.7	65.7	24 59.0	+38.4	66.1	25 23.1	+39.2	66.5	25 46.8	+40.1	66.9	26 10.1	+40.8	67.4	26 32.9	+41.7	67.8	26 55.3	+42.4	68.3	27 17.3	+43.1	68.8	34
35	25 12.1	+37.3	64.8	25 37.4	+38.1	65.2	26 02.3	+39.0	65.7	26 26.9	+39.7	66.1	26 50.9	+40.6	66.6	27 14.6	+41.3	67.0	27 37.7	+42.2	67.5	28 00.4	+42.9	68.0	35
36	25 49.4	+37.0	63.9	26 15.5	+37.9	64.4	26 41.3	+38.6	64.8	27 06.6	+39.5	65.3	27 31.5	+40.2	65.7	27 55.9	+41.0	66.2	28 19.9	+41.8	66.7	28 43.3	+42.6	67.2	36
37	26 26.4	+36.7	63.0	26 53.4	+37.5	63.5	27 19.9	+38.4	64.0	27 46.1	+39.1	64.4	28 11.7	+40.0	64.9	28 36.9	+40.8	65.4	29 01.7	+41.5	65.9	29 25.9	+42.4	66.4	37
38	27 03.1	+36.3	62.2	27 30.9	+37.1	62.6	27 58.3	+37.9	63.1	28 25.2	+38.8	63.6	28 51.7	+39.6	64.1	29 17.7	+40.4	64.6	29 43.2	+41.2	65.1	30 08.3	+42.0	65.6	38
39	27 39.4	+36.0	61.3	28 08.0	+36.9	61.7	28 36.2	+37.7	62.2	29 04.0	+38.5	62.7	29 31.3	+39.3	63.2	29 58.1	+40.1	63.7	30 24.4	+40.9	64.2	30 50.3	+41.7	64.8	39
40	28 15.4	+35.6	60.4	28 44.9	+36.4	60.8	29 13.9	+37.3	61.3	29 42.5	+38.1	61.8	30 10.6	+38.9	62.3	30 38.2	+39.7	62.8	31 05.3	+40.6	63.4	31 32.0	+41.3	63.9	40
41	28 51.0	+35.3	59.4	29 21.3	+36.1	59.9	29 51.2	+36.9	60.4	30 20.6	+37.7	60.9	30 49.5	+38.5	61.4	31 17.9	+39.4	62.0	31 45.9	+40.2	62.5	32 13.3	+41.0	63.1	41
42	29 26.3	+34.9	58.5	29 57.4	+35.7	59.0	30 28.1	+36.5	59.5	30 58.3	+37.4	60.0	31 28.0	+38.2	60.5	31 57.3	+39.0	61.1	32 26.1	+39.8	61.6	32 54.3	+40.6	62.2	42
43	30 01.2	+34.4	57.6	30 33.1	+35.3	58.1	31 04.6	+36.2	58.6	31 35.7	+36.9	59.1	32 06.2	+37.8	59.6	32 36.3	+38.6	60.2	33 05.9	+39.4	60.7	33 34.9	+40.3	61.3	43
44	30 35.6	+34.1	56.6	31 08.4	+34.9	57.1	31 40.8	+35.7	57.6	32 12.6	+36.6	58.2	32 44.0	+37.4	58.7	33 14.9	+38.2	59.3	33 45.3	+39.1	59.8	34 15.2	+39.9	60.4	44
45	31 09.7	+33.6	55.7	31 43.3	+34.4	56.2	32 16.5	+35.3	56.7	32 49.2	+36.1	57.2	33 21.4	+37.0	57.8	33 53.1	+37.8	58.3	34 24.4	+38.6	58.9	34 55.1	+39.4	59.5	45
46	31 43.3	+33.2	54.7	32 17.7	+34.1	55.2	32 51.8	+34.8	55.7	33 25.3	+35.7	56.3	33 58.4	+36.5	56.8	34 30.9	+37.4	57.4	35 03.0	+38.2	58.0	35 34.5	+39.0	58.6	46
47	32 16.5	+32.7	53.7	32 51.8	+33.5	54.2	33 26.6	+34.4	54.8	34 01.0	+35.2	55.3	34 34.9	+36.0	55.9	35 08.3	+36.9	56.5	35 41.2	+37.7	57.1	36 13.5	+38.6	57.7	47
48	32 49.2	+32.2	52.7	33 25.3	+33.1	53.2	34 01.0	+33.9	53.8	34 36.2	+34.7	54.3	35 10.9	+35.6	54.9	35 45.2	+36.4	55.5	36 18.9	+37.3	56.1	36 52.1	+38.1	56.7	48
49	33 21.4	+31.7	51.7	33 58.4	+32.5	52.2	34 34.9	+33.4	52.8	35 10.9	+34.3	53.3	35 46.5	+35.1	53.9	36 21.6	+35.9	54.5	36 56.2	+36.8	55.1	37 30.2	+37.7	55.7	49
50	33 53.1	+31.3	50.7	34 30.9	+32.1	51.2	35 08.3	+32.9	51.8	35 45.2	+33.7	52.3	36 21.6	+34.6	52.9	36 57.5	+35.5	53.5	37 33.0	+36.2	54.1	38 07.9	+37.1	54.8	50
51	34 24.4	+30.7	49.7	35 03.0	+31.5	50.2	35 41.2	+32.3	50.7	36 18.9	+33.2	51.3	36 56.2	+34.0	51.9	37 33.0	+34.9	52.5	38 09.2	+35.8	53.1	38 45.0	+36.6	53.8	51
52	34 55.1	+30.1	48.6	35 34.5	+31.0	49.2	36 13.5	+31.9	49.7	36 52.1	+32.7	50.3	37 30.2	+33.5	50.9	38 07.9	+34.3	51.5	38 45.0	+35.2	52.1	39 21.6	+36.1	52.7	52
53	35 25.2	+29.6	47.6	36 05.5	+30.4	48.1	36 45.4	+31.2	48.7	37 24.8	+32.1	49.2	38 03.7	+33.0	49.8	38 42.2	+33.8	50.5	39 20.2	+34.6	51.0	39 57.7	+35.4	51.7	53
54	35 54.8	+29.0	46.5	36 35.9	+29.9	47.0	37 16.6	+30.7	47.6	37 56.9	+31.5	48.2	38 36.7	+32.3	48.7	39 16.0	+33.2	49.4	39 54.8	+34.1	50.0	40 33.1	+35.0	50.6	54
55	36 23.8	+28.5	45.4	37 05.8	+29.2	45.9	37 47.3	+30.0	46.5	38 28.4	+30.9	47.1	39 09.0	+31.7	47.7	39 49.2	+32.6	48.3	40 28.9	+33.4	48.9	41 08.1	+34.2	49.6	55
56	36 52.3	+27.8	44.3	37 35.0	+28.6	44.8	38 17.3	+29.5	45.4	38 59.3	+30.2	46.0	39 40.7	+31.1	46.6	40 21.8	+31.9	47.2	41 02.3	+32.8	47.8	41 42.3	+33.7	48.5	56
57	37 20.1	+27.2	43.2	38 03.6	+28.0	43.7	38 46.8	+28.8	44.3	39 29.5	+29.6	44.9	40 11.8	+30.5	45.4	40 53.7	+31.3	46.1	41 35.1	+32.1	46.7	42 16.0	+33.0	47.4	57
58	37 47.3	+26.5	42.1	38 31.6	+27.3	42.6	39 15.6	+28.1	43.2	39 59.1	+29.0	43.7	40 42.3	+29.8	44.3	41 25.0	+30.6	44.9	42 07.2	+31.5	45.6	42 49.0	+32.3	46.2	58
59	38 13.8	+25.9	40.9	38 58.9	+26.7	41.5	39 43.7	+27.5	42.0	40 28.1	+28.3	42.6	41 12.1	+29.0	43.2	41 55.6	+29.9	43.8	42 38.7	+30.8	44.4	43 21.3	+31.6	45.1	59
60	38 39.7	+25.1	39.8	39 25.6	+25.9	40.3	40 11.2	+26.7	40.9	40 56.4	+27.5	41.4	41 41.1	+28.4	42.0	42 25.5	+29.2	42.6	43 09.5	+30.0	43.2	43 52.9	+30.9	43.9	60
61	39 04.8	+24.5	38.6	39 51.5	+25.3	39.1	40 37.9	+26.0	39.7	41 23.9	+26.8	40.2	42 09.5	+27.6	40.8	42 54.7	+28.5	41.4	43 39.5	+29.3	42.0	44 23.8	+30.1	42.7	61
62	39 29.3	+23.8	37.4	40 16.8	+24.5	38.0	41 03.9	+25.3	38.5	41 50.7	+26.1	39.0	42 37.1	+26.9	39.6	43 23.2	+27.6	40.2	44 08.8	+28.5	40.8	44 53.9	+29.4	41.5	62
63	39 53.1	+23.0	36.2	40 41.3	+23.7	36.8	41 29.2	+24.5	37.3	42 16.8	+25.3	37.8	43 04.0	+26.1	38.4	43 50.8	+26.9	39.0	44 37.3	+27.6	39.6	45 23.3	+28.5	40.2	63
64	40 16.1	+22.2	35.0	41 05.0	+23.0	35.5	41 53.7	+23.7	36.1	42 42.1	+24.4	36.6	43 30.1	+25.2	37.2	44 17.7	+26.0	37.7	45 04.9	+26.9	38.4	45 51.8	+27.7	39.0	64
65	40 38.3	+21.5	33.8	41 28.0	+22.2	34.3	42 17.4	+22.9	34.8	43 06.5	+23.7	35.3	43 55.3	+24.4	35.9	44 43.7	+25.2	36.5	45 31.8	+26.0	37.1	46 19.5	+26.8	37.7	65
66	40 59.8	+20.7	32.6	41 50.2	+21.4	33.1	42 40.3	+22.1	33.6	43 30.2	+22.8	34.1	44 19.7	+23.6	34.6	45 08.9	+24.4	35.2	45 57.8	+25.1	35.8	46 46.3	+25.9	36.4	66
67	41 20.5	+19.8	31.3	42 11.6	+20.5	31.8	43 02.4	+21.3	32.3	43 53.0	+21.9	32.8	44 43.3	+22.7	33.3	45 33.3	+23.4	33.9	46 22.9	+24.2	34.5	47 12.2	+24.9	35.1	67
68	41 40.3	+19.0	30.1	42 32.1	+19.7	30.5	43 23.7	+20.3	31.0	44 14.9	+21.1	31.5	45 06.0	+21.7	32.0	45 56.7	+22.5	32.6	46 47.1	+23.2	33.1	47 37.1	+24.1	33.7	68
69	41 59.3	+18.2	28.8	42 51.8	+18.8	29.2	43 44.0	+19.5	29.7	44 36.0	+20.2	30.2	45 27.7	+20.9	30.7	46 19.2	+21.5	31.2	47 10.3	+22.3	31.8	48 01.2	+23.0	32.4	69
70	42 17.5	+17.3	27.5	43 10.6	+17.9	28.0	44 03.5	+18.5	28.4	44 56.2	+19.2	28.9	45 48.6	+19.9	29.4	46 40.7	+20.6	29.9	47 32.6	+21.3	30.4	48 24.2	+22.0	31.0	70
71	42 34.8	+16.4	26.2	43 28.5	+17.0	26.6	44 22.0	+17.7	27.1	45 15.4	+18.2	27.5	46 08.5	+18.9	28.0	47 01.3	+19.6	28.5	47 53.9	+20.3	29.0	48 46.2	+21.0	29.6	71
72	42 51.2	+15.5	24.9	43 45.5	+16.1	25.3	44 39.7	+16.7	25.7	45 33.6	+17.3	26.2	46 27.4	+17.9	26.6	47 20.9	+18.6	27.1	48 14.2	+19.2	27.6	49 07.2	+19.9	28.2	72
73	43 06.7	+14.6	23.6	44 01.6	+15.2	24.0	44 56.4	+15.7	24.4	45 50.9	+16.3	24.8	46 45.3	+16.9	25.2	47 39.4	+17.6	25.7	48 33.4	+18.1	26.2	49 27.1	+18.8	26.7	73
74	43 21.3	+13.7	22.3	44 16.8	+14.1	22.6	45 12.1	+14.7	23.0	46 07.2	+15.3	23.4	47 02.2	+15.8	23.8	47 57.0	+16.4	24.3	48 51.5	+17.1	24.8	49 45.9	+17.7	25.2	74
75	43 35.0	+12.7	20.9	44 30.9	+13.2	21.3	45 26.8	+13.7	21.6	46 22.5	+14.2	22.0	47 18.0	+14.8	22.4	48 13.4	+15.4	22.8	49 08.6	+15.9	23.3	50 03.6	+16.6	23.8	75
76	43 47.7	+11.7	19.6	44 44.1	+12.3	19.9	45 40.5	+12.7	20.2	46 36.7	+13.2	20.6	47 32.8	+13.7	21.0	48 28.8	+14.2	21.4	49 24.5	+14.8	21.8	50 20.2	+15.3	22.3	76
77	43 59.4	+10.8	18.2	44 56.4	+11.2	18.5	45 53.2	+11.7	18.8	46 49.9	+12.2	19.2	47 46.5	+12.6	19.5	48 43.0	+13.1	19.9	49 39.3	+13.7	20.3	50 35.5	+14.2	20.7	77
78	44 10.2	+9.8	16.8	45 07.6	+10.2	17.1	46 04.9	+10.6	17.4	47 02.1	+11.0	17.8	47 59.1	+11.5	18.1	48 56.1	+12.0	18.5	49 53.0	+12.4	18.9	50 49.7	+13.0	19.2	78
79	44 20.0	+8.7	15.5	45 17.8	+9.1	15.7	46 15.5	+9.5	16.0	47 13.1	+9.9	16.3	48 10.6	+10.4	16.6	49 08.1	+10.8	16.9	50 05.4	+11.3	17.3	51 02.7	+11.7	17.7	79
80	44 28.7	+7.8	14.1	45 26.9	+8.1	14.3	46 25.0	+8.5	14.6	47 23.0	+8.9	14.9	48 21.0	+9.2	15.1	49 18.9	+9.6	15.4	50 16.7	+10.0	15.8	51 14.4	+10.4	16.1	80
81	44 36.5	+6.8	12.7	45 35.0	+7.1	12.9	46 33.5	+7.4	13.1	47 31.9	+7.7	13.4	48 30.2	+8.1	13.6	49 28.5	+8.4	13.9	50 26.7	+8.8	14.2	51 24.8	+9.2	14.5	81
82	44 43.3	+5.7	11.3	45 42.1	+6.0	11.5	46 40.9	+6.3	11.7	47 39.6	+6.5	11.9	48 38.3	+6.9	12.2	49 36.9	+7.2	12.4	50 35.5	+7.5	12.7	51 34.0	+7.9	12.9	82
83	44 49.0	+4.7	9.9	45 48.1	+4.9	10.1	46 47.2	+5.2	10.2	47 46.2	+5.4	10.4	48 45.2	+5.7	10.6	49 44.1	+6.0	10.9	50 43.0	+6.3	11.1	51 41.9	+6.6	11.3	83
84	44 53.7	+3.7	8.5	45 53.0	+3.9	8.6	46 52.4	+4.0	8.8	47 51.6	+4.3	8.9	48 50.9	+4.5	9.1	49 50.1	+4.8	9.3	50 49.3	+5.0	9.5	51 48.5	+5.2	9.7	84
85	44 57.4	+2.6	7.1	45 56.9	+2.8	7.2	46 56.4	+3.0	7.3	47 55.9	+3.2	7.5	48 55.4	+3.3	7.6	49 54.9	+3.5	7.8	50 54.3	+3.7	7.9	51 53.7	+4.0	8.1	85
86	45 00.0	+1.6	5.7	45 59.7	+1.7	5.8	46 59.4	+1.8	5.9	47 59.1	+1.9	6.0	48 58.7	+2.2	6.1	49 58.4	+2.3	6.2	50 58.0	+2.5	6.4	51 57.7	+2.5	6.5	86
87	45 01.6	+0.5	4.2	46 01.4	+0.6	4.3	47 01.2	+0.7	4.4	48 01.0	+0.9	4.5	49 00.9	+0.9	4.6	50 00.7	+1.0	4.7	51 00.5	+1.1	4.8	52 00.2	+1.3	4.9	87
88	45 02.1	–0.5	2.8	46 02.0	–0.4	2.9	47 01.9	–0.4	2.9	48 01.9	–0.4	3.0	49 01.8	–0.3	3.0	50 01.7	–0.2	3.1	51 01.6	–0.2	3.2	52 01.5	–0.1	3.2	88
89	45 01.6	–1.6	1.4	46 01.6	–1.6	1.4	47 01.5	–1.5	1.5	48 01.5	–1.5	1.5	49 01.5	–1.5	1.5	50 01.5	–1.5	1.6	51 01.4	–1.4	1.6	52 01.4	–1.4	1.6	89
90	45 00.0	–2.6	0.0	46 00.0	–2.6	0.0	47 00.0	–2.7	0.0	48 00.0	–2.7	0.0	49 00.0	–2.7	0.0	50 00.0	–2.7	0.0	51 00.0	–2.7	0.0	52 00.0	–2.8	0.0	90

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	1 24.8	−42.4	91.4	1 23.4	−43.2	91.4	1 21.8	−43.9	91.5	1 20.3	−44.6	91.5	1 18.7	−45.3	91.5	1 17.1	−46.0	91.5	1 15.5	−46.6	91.6	1 13.9	−47.3	91.6	0
1	0 42.4	−42.5	92.1	0 40.2	−43.2	92.1	0 37.9	−43.9	92.1	0 35.7	−44.6	92.2	0 33.4	−45.3	92.2	0 31.1	−45.9	92.2	0 28.9	−46.7	92.2	0 26.6	−47.3	92.2	1
2	0 00.1	+42.4	87.2	0 03.0	+43.2	87.2	0 06.0	+43.9	87.2	0 08.9	+44.6	87.2	0 11.9	+45.3	87.2	0 14.8	+46.0	87.2	0 17.8	+46.6	87.2	0 20.7	+47.3	87.2	2
3	0 42.5	+42.4	86.5	0 46.2	+43.2	86.5	0 49.9	+43.9	86.5	0 53.5	+44.6	86.5	0 57.2	+45.3	86.5	1 00.8	+46.0	86.5	1 04.4	+46.7	86.6	1 08.0	+47.3	86.6	3
4	1 24.9	+42.5	85.8	1 29.4	+43.1	85.8	1 33.8	+43.9	85.8	1 38.1	+44.6	85.8	1 42.5	+45.3	85.9	1 46.8	+45.9	85.9	1 51.1	+46.6	85.9	1 55.3	+47.3	86.0	4
5	2 07.4	+42.4	85.1	2 12.5	+43.2	85.1	2 17.7	+43.8	85.1	2 22.7	+44.6	85.2	2 27.8	+45.2	85.2	2 32.7	+46.0	85.3	2 37.7	+46.6	85.3	2 42.6	+47.2	85.3	5
6	2 49.8	+42.4	84.3	2 55.7	+43.1	84.4	3 01.5	+43.9	84.4	3 07.3	+44.5	84.5	3 13.0	+45.3	84.6	3 18.7	+45.9	84.6	3 24.3	+46.6	84.7	3 29.8	+47.3	84.7	6
7	3 32.2	+42.3	83.6	3 38.8	+43.1	83.7	3 45.4	+43.8	83.8	3 51.8	+44.6	83.8	3 58.3	+45.2	83.9	4 04.6	+45.9	84.0	4 10.9	+46.5	84.0	4 17.1	+47.2	84.1	7
8	4 14.5	+42.3	82.9	4 21.9	+43.0	83.0	4 29.2	+43.7	83.1	4 36.4	+44.4	83.2	4 43.5	+45.1	83.2	4 50.5	+45.8	83.3	4 57.4	+46.5	83.4	5 04.3	+47.1	83.5	8
9	4 56.8	+42.3	82.2	5 04.9	+43.0	82.3	5 12.9	+43.7	82.4	5 20.8	+44.5	82.5	5 28.6	+45.2	82.6	5 36.3	+45.8	82.7	5 43.9	+46.5	82.8	5 51.4	+47.2	82.9	9
10	5 39.1	+42.3	81.5	5 47.9	+43.0	81.6	5 56.6	+43.7	81.7	6 05.3	+44.3	81.8	6 13.8	+45.0	81.9	6 22.1	+45.8	81.9	6 30.4	+46.4	82.1	6 38.6	+47.0	82.2	10
11	6 21.3	+42.2	80.8	6 30.9	+42.9	80.9	6 40.3	+43.6	81.0	6 49.6	+44.4	81.1	6 58.8	+45.0	81.2	7 07.9	+45.7	81.4	7 16.8	+46.4	81.5	7 25.6	+47.1	81.6	11
12	7 03.5	+42.1	80.1	7 13.8	+42.8	80.2	7 23.9	+43.6	80.3	7 34.0	+44.2	80.4	7 43.8	+45.0	80.6	7 53.6	+45.6	80.7	8 03.2	+46.3	80.9	8 12.7	+46.9	81.0	12
13	7 45.6	+42.0	79.4	7 56.6	+42.8	79.5	8 07.5	+43.5	79.6	8 18.2	+44.2	79.8	8 28.8	+44.9	79.9	8 39.2	+45.6	80.1	8 49.5	+46.3	80.2	8 59.6	+46.9	80.4	13
14	8 27.6	+41.9	78.6	8 39.4	+42.6	78.8	8 51.0	+43.4	78.9	9 02.4	+44.1	79.1	9 13.7	+44.8	79.2	9 24.8	+45.5	79.4	9 35.8	+46.1	79.6	9 46.5	+46.9	79.7	14
15	9 09.5	+41.9	77.9	9 22.0	+42.6	78.1	9 34.4	+43.3	78.2	9 46.5	+44.0	78.4	9 58.5	+44.7	78.6	10 10.3	+45.4	78.7	10 21.9	+46.1	78.9	10 33.4	+46.7	79.1	15
16	9 51.4	+41.8	77.2	10 04.6	+42.5	77.4	10 17.7	+43.2	77.5	10 30.5	+44.0	77.7	10 43.2	+44.7	77.9	10 55.7	+45.4	78.1	11 08.0	+46.0	78.3	11 20.1	+46.7	78.5	16
17	10 33.2	+41.6	76.4	10 47.1	+42.4	76.6	11 00.9	+43.1	76.8	11 14.5	+43.8	77.0	11 27.9	+44.5	77.2	11 41.1	+45.2	77.4	11 54.0	+45.9	77.6	12 06.8	+46.6	77.8	17
18	11 14.8	+41.6	75.7	11 29.5	+42.3	75.9	11 44.0	+43.0	76.1	11 58.3	+43.8	76.3	12 12.4	+44.5	76.5	12 26.3	+45.1	76.7	12 39.9	+45.9	77.0	12 53.4	+46.5	77.2	18
19	11 56.4	+41.4	75.0	12 11.8	+42.2	75.2	12 27.0	+43.0	75.4	12 42.1	+43.6	75.6	12 56.9	+44.3	75.8	13 11.4	+45.1	76.0	13 25.8	+45.7	76.3	13 39.9	+46.4	76.5	19
20	12 37.8	+41.3	74.2	12 54.0	+42.0	74.5	13 10.0	+42.7	74.7	13 25.7	+43.5	74.9	13 41.2	+44.2	75.1	13 56.5	+44.9	75.4	14 11.5	+45.6	75.6	14 26.3	+46.2	75.9	20
21	13 19.1	+41.2	73.5	13 36.0	+42.0	73.7	13 52.7	+42.7	74.0	14 09.2	+43.4	74.2	14 25.4	+44.1	74.4	14 41.4	+44.8	74.7	14 57.1	+45.5	75.0	15 12.5	+46.2	75.2	21
22	14 00.3	+41.0	72.7	14 18.0	+41.8	73.0	14 35.4	+42.5	73.2	14 52.6	+43.2	73.5	15 09.5	+44.0	73.7	15 26.2	+44.6	74.0	15 42.6	+45.3	74.3	15 58.7	+46.0	74.5	22
23	14 41.3	+40.9	72.0	14 59.8	+41.6	72.2	15 17.9	+42.4	72.5	15 35.8	+43.1	72.8	15 53.5	+43.8	73.0	16 10.8	+44.6	73.3	16 27.9	+45.3	73.6	16 44.7	+45.9	73.9	23
24	15 22.2	+40.8	71.2	15 41.4	+41.5	71.5	16 00.3	+42.2	71.8	16 18.9	+43.0	72.0	16 37.3	+43.7	72.3	16 55.4	+44.4	72.6	17 13.2	+45.0	72.9	17 30.6	+45.8	73.2	24
25	16 03.0	+40.6	70.5	16 22.9	+41.3	70.8	16 42.5	+42.1	71.0	17 01.9	+42.8	71.3	17 21.0	+43.5	71.6	17 39.8	+44.2	71.9	17 58.2	+45.0	72.2	18 16.4	+45.6	72.5	25
26	16 43.6	+40.4	69.7	17 04.2	+41.2	70.0	17 24.6	+41.9	70.3	17 44.7	+42.7	70.6	18 04.5	+43.4	70.9	18 24.0	+44.1	71.2	18 43.2	+44.8	71.5	19 02.0	+45.5	71.8	26
27	17 24.0	+40.2	68.9	17 45.4	+41.0	69.2	18 06.5	+41.7	69.5	18 27.4	+42.4	69.8	18 47.9	+43.2	70.2	19 08.1	+43.9	70.5	19 28.0	+44.6	70.8	19 47.5	+45.3	71.1	27
28	18 04.2	+40.0	68.2	18 26.4	+40.8	68.5	18 48.2	+41.6	68.8	19 09.8	+42.3	69.1	19 31.1	+43.0	69.4	19 52.0	+43.8	69.7	20 12.6	+44.4	70.1	20 32.8	+45.2	70.5	28
29	18 44.2	+39.9	67.4	19 07.2	+40.6	67.7	19 29.8	+41.3	68.0	19 52.1	+42.1	68.3	20 14.1	+42.8	68.7	20 35.7	+43.6	69.0	20 57.0	+44.3	69.4	21 18.0	+44.9	69.7	29
30	19 24.1	+39.6	66.6	19 47.8	+40.4	66.9	20 11.1	+41.2	67.2	20 34.2	+41.9	67.6	20 56.9	+42.6	67.9	21 19.3	+43.3	68.3	21 41.3	+44.1	68.7	22 02.9	+44.8	69.0	30
31	20 03.7	+39.4	65.8	20 28.2	+40.1	66.1	20 52.3	+40.9	66.5	21 16.1	+41.7	66.8	21 39.5	+42.4	67.2	22 02.6	+43.2	67.5	22 25.4	+43.8	67.9	22 47.7	+44.6	68.3	31
32	20 43.1	+39.2	65.0	21 08.3	+40.0	65.3	21 33.2	+40.7	65.7	21 57.8	+41.4	66.0	22 21.9	+42.2	66.4	22 45.8	+42.9	66.8	23 09.2	+43.7	67.2	23 32.3	+44.4	67.6	32
33	21 22.3	+39.0	64.2	21 48.3	+39.7	64.5	22 13.9	+40.5	64.9	22 39.2	+41.3	65.3	23 04.1	+42.0	65.6	23 28.7	+42.7	66.0	23 52.9	+43.4	66.4	24 16.7	+44.1	66.8	33
34	22 01.3	+38.7	63.3	22 28.0	+39.5	63.7	22 54.4	+40.3	64.1	23 20.5	+40.9	64.5	23 46.1	+41.8	64.9	24 11.4	+42.5	65.3	24 36.3	+43.2	65.7	25 00.8	+44.0	66.1	34
35	22 40.0	+38.4	62.5	23 07.5	+39.2	62.9	23 34.7	+39.9	63.3	24 01.4	+40.8	63.7	24 27.9	+41.5	64.1	24 53.9	+42.2	64.5	25 19.5	+43.0	64.9	25 44.8	+43.7	65.4	35
36	23 18.4	+38.2	61.7	23 46.7	+39.0	62.1	24 14.6	+39.8	62.5	24 42.2	+40.5	62.9	25 09.4	+41.2	63.3	25 36.1	+42.0	63.7	26 02.5	+42.7	64.1	26 28.5	+43.4	64.6	36
37	23 56.6	+37.9	60.8	24 25.7	+38.7	61.2	24 54.4	+39.4	61.6	25 22.7	+40.2	62.1	25 50.6	+41.0	62.5	26 18.1	+41.7	62.9	26 45.2	+42.5	63.4	27 11.9	+43.2	63.8	37
38	24 34.5	+37.6	60.0	25 04.4	+38.3	60.4	25 33.8	+39.2	60.8	26 02.9	+39.9	61.2	26 31.6	+40.6	61.7	26 59.8	+41.5	62.1	27 27.7	+42.2	62.6	27 55.1	+42.9	63.0	38
39	25 12.1	+37.4	59.1	25 42.7	+38.1	59.5	26 13.0	+38.8	60.0	26 42.8	+39.6	60.4	27 12.2	+40.4	60.8	27 41.3	+41.1	61.3	28 09.9	+41.9	61.8	28 38.0	+42.7	62.2	39
40	25 49.5	+37.0	58.3	26 20.8	+37.8	58.7	26 51.8	+38.6	59.1	27 22.4	+39.4	59.6	27 52.6	+40.1	60.0	28 22.4	+40.9	60.5	28 51.8	+41.6	60.9	29 20.7	+42.3	61.4	40
41	26 26.5	+36.7	57.4	26 58.6	+37.5	57.8	27 30.4	+38.2	58.3	28 01.8	+39.0	58.7	28 32.7	+39.8	59.2	29 03.3	+40.5	59.6	29 33.4	+41.3	60.1	30 03.0	+42.1	60.6	41
42	27 03.2	+36.3	56.5	27 36.1	+37.1	56.9	28 08.6	+37.9	57.4	28 40.8	+38.6	57.8	29 12.5	+39.4	58.3	29 43.8	+40.2	58.8	30 14.7	+40.9	59.3	30 45.1	+41.7	59.8	42
43	27 39.5	+36.0	55.6	28 13.2	+36.8	56.0	28 46.5	+37.6	56.5	29 19.4	+38.4	57.0	29 51.9	+39.1	57.4	30 24.0	+39.9	57.9	30 55.6	+40.7	58.4	31 26.8	+41.4	59.0	43
44	28 15.5	+35.6	54.7	28 50.0	+36.4	55.1	29 24.1	+37.2	55.6	29 57.8	+37.9	56.1	30 31.0	+38.8	56.6	31 03.9	+39.5	57.1	31 36.3	+40.2	57.6	32 08.2	+41.1	58.1	44
45	28 51.1	+35.3	53.8	29 26.4	+36.0	54.2	30 01.3	+36.8	54.7	30 35.7	+37.6	55.2	31 09.8	+38.3	55.7	31 43.4	+39.1	56.2	32 16.5	+40.0	56.7	32 49.3	+40.6	57.2	45
46	29 26.4	+34.9	52.9	30 02.4	+35.7	53.3	30 38.1	+36.4	53.8	31 13.3	+37.2	54.3	31 48.1	+38.0	54.8	32 22.5	+38.8	55.3	32 56.5	+39.5	55.8	33 29.9	+40.3	56.4	46
47	30 01.3	+34.4	51.9	30 38.1	+35.2	52.4	31 14.5	+36.0	52.9	31 50.5	+36.8	53.4	32 26.1	+37.6	53.9	33 01.3	+38.3	54.4	33 36.0	+39.1	54.9	34 10.2	+40.0	55.5	47
48	30 35.7	+34.1	51.0	31 13.3	+34.8	51.4	31 50.5	+35.6	51.9	32 27.3	+36.4	52.4	33 03.7	+37.1	52.9	33 39.6	+38.0	53.5	34 15.1	+38.8	54.0	34 50.2	+39.5	54.6	48
49	31 09.8	+33.6	50.0	31 48.1	+34.4	50.5	32 26.1	+35.2	51.0	33 03.7	+35.9	51.5	33 40.8	+36.8	52.0	34 17.6	+37.5	52.5	34 53.9	+38.2	53.1	35 29.7	+39.0	53.6	49
50	31 43.4	+33.1	49.0	32 22.5	+34.0	49.5	33 01.3	+34.7	50.0	33 39.6	+35.5	50.5	34 17.6	+36.3	51.0	34 55.1	+37.0	51.6	35 32.1	+37.9	52.1	36 08.7	+38.7	52.7	50
51	32 16.5	+32.8	48.1	32 56.5	+33.4	48.5	33 36.0	+34.2	49.0	34 15.1	+35.1	49.5	34 53.9	+35.8	50.1	35 32.1	+36.6	50.6	36 10.0	+37.4	51.2	36 47.4	+38.1	51.8	51
52	32 49.3	+32.2	47.1	33 29.9	+33.0	47.5	34 10.2	+33.8	48.0	34 50.2	+34.5	48.6	35 29.7	+35.3	49.1	36 08.7	+36.2	49.6	36 47.4	+36.9	50.2	37 25.5	+37.7	50.8	52
53	33 21.5	+31.7	46.1	34 02.9	+32.5	46.5	34 44.0	+33.3	47.0	35 24.7	+34.0	47.6	36 05.0	+34.8	48.1	36 44.9	+35.6	48.6	37 24.3	+36.4	49.2	38 03.2	+37.2	49.8	53
54	33 53.2	+31.2	45.0	34 35.4	+32.0	45.5	35 17.3	+32.7	46.0	35 58.7	+33.6	46.5	36 39.8	+34.3	47.1	37 20.5	+35.0	47.6	38 00.7	+35.8	48.2	38 40.4	+36.7	48.8	54
55	34 24.4	+30.7	44.0	35 07.4	+31.5	44.5	35 50.0	+32.3	45.0	36 32.3	+33.0	45.5	37 14.1	+33.8	46.1	37 55.5	+34.6	46.6	38 36.5	+35.4	47.2	39 17.1	+36.1	47.8	55
56	34 55.1	+30.2	43.0	35 38.9	+30.9	43.5	36 22.3	+31.6	44.0	37 05.3	+32.4	44.5	37 47.9	+33.2	45.0	38 30.1	+34.0	45.6	39 11.9	+34.7	46.1	39 53.2	+35.6	46.7	56
57	35 25.3	+29.6	41.9	36 09.8	+30.3	42.4	36 53.9	+31.1	42.9	37 37.7	+31.8	43.4	38 21.1	+32.6	44.0	39 04.1	+33.4	44.5	39 46.6	+34.2	45.1	40 28.8	+35.0	45.7	57
58	35 54.9	+29.0	40.8	36 40.1	+29.8	41.3	37 25.0	+30.5	41.8	38 09.5	+31.3	42.3	38 53.7	+32.0	42.9	39 37.5	+32.8	43.4	40 20.8	+33.6	44.0	41 03.8	+34.3	44.6	58
59	36 23.9	+28.4	39.8	37 09.9	+29.1	40.2	37 55.5	+29.9	40.7	38 40.8	+30.7	41.3	39 25.7	+31.4	41.8	40 10.3	+32.1	42.4	40 54.4	+33.0	42.9	41 38.1	+33.8	43.5	59
60	36 52.3	+27.8	38.7	37 39.0	+28.6	39.1	38 25.4	+29.3	39.6	39 11.5	+30.0	40.1	39 57.1	+30.8	40.7	40 42.4	+31.6	41.2	41 27.4	+32.3	41.8	42 11.9	+33.1	42.4	60
61	37 20.1	+27.2	37.5	38 07.6	+27.9	38.0	38 54.7	+28.6	38.5	39 41.5	+29.3	39.0	40 27.9	+30.1	39.6	41 14.0	+30.8	40.1	41 59.7	+31.6	40.7	42 45.0	+32.4	41.3	61
62	37 47.3	+26.6	36.4	38 35.5	+27.2	36.9	39 23.3	+27.9	37.4	40 10.8	+28.7	37.9	40 58.0	+29.4	38.4	41 44.8	+30.2	39.0	42 31.3	+30.9	39.5	43 17.4	+31.7	40.1	62
63	38 13.9	+25.8	35.3	39 02.7	+26.6	35.7	39 51.2	+27.3	36.2	40 39.5	+28.0	36.7	41 27.4	+28.7	37.3	42 15.0	+29.4	37.8	43 02.2	+30.2	38.4	43 49.1	+30.9	39.0	63
64	38 39.7	+25.2	34.1	39 29.3	+25.8	34.6	40 18.5	+26.6	35.1	41 07.5	+27.2	35.6	41 56.1	+28.0	36.1	42 44.4	+28.8	36.6	43 32.4	+29.5	37.2	44 20.0	+30.3	37.8	64
65	39 04.9	+24.5	33.0	39 55.1	+25.2	33.4	40 45.1	+25.8	33.9	41 34.7	+26.5	34.4	42 24.1	+27.2	34.9	43 13.2	+27.9	35.5	44 01.9	+28.7	36.0	44 50.3	+29.4	36.6	65
66	39 29.4	+23.7	31.8	40 20.3	+24.4	32.2	41 10.9	+25.0	32.7	42 01.2	+25.8	33.2	42 51.3	+26.5	33.7	43 41.1	+27.1	34.2	44 30.6	+27.8	34.8	45 19.7	+28.6	35.3	66
67	39 53.1	+23.0	30.6	40 44.7	+23.6	31.0	41 35.9	+24.3	31.5	42 27.0	+25.0	32.0	43 17.8	+25.6	32.4	44 08.2	+26.4	33.0	44 58.4	+27.1	33.5	45 48.3	+27.8	34.1	67
68	40 16.1	+22.3	29.4	41 08.3	+22.9	29.8	42 00.2	+23.5	30.3	42 52.0	+24.1	30.7	43 43.4	+24.8	31.2	44 34.6	+25.5	31.8	45 25.5	+26.2	32.2	46 16.1	+26.9	32.8	68
69	40 38.4	+21.4	28.2	41 31.2	+22.0	28.6	42 23.7	+22.7	29.0	43 16.1	+23.3	29.5	44 08.2	+24.0	29.9	45 00.1	+24.6	30.4	45 51.7	+25.3	31.0	46 43.0	+26.0	31.5	69
70	40 59.8	+20.7	26.9	41 53.2	+21.3	27.3	42 46.4	+21.9	27.8	43 39.4	+22.5	28.2	44 32.2	+23.1	28.7	45 24.7	+23.8	29.1	46 17.0	+24.4	29.6	47 09.0	+25.1	30.2	70
71	41 20.5	+19.9	25.7	42 14.5	+20.4	26.1	43 08.3	+21.0	26.5	44 01.9	+21.6	26.9	44 55.3	+22.2	27.4	45 48.5	+22.8	27.8	46 41.4	+23.5	28.3	47 34.1	+24.1	28.8	71
72	41 40.4	+19.0	24.4	42 34.9	+19.6	24.8	43 29.3	+20.1	25.2	44 23.5	+20.7	25.6	45 17.5	+21.3	26.0	46 11.3	+21.9	26.5	47 04.9	+22.5	27.0	47 58.2	+23.2	27.5	72
73	41 59.4	+18.1	23.1	42 54.5	+18.7	23.5	43 49.4	+19.2	23.9	44 44.2	+19.8	24.3	45 38.8	+20.3	24.7	46 33.2	+20.9	25.1	47 27.4	+21.5	25.6	48 21.4	+22.2	26.1	73
74	42 17.5	+17.3	21.9	43 13.2	+17.7	22.2	44 08.6	+18.3	22.6	45 04.0	+18.8	23.0	45 59.1	+19.4	23.4	46 54.1	+20.0	23.8	47 48.9	+20.5	24.2	48 43.6	+21.1	24.7	74
75	42 34.8	+16.4	20.6	43 30.9	+16.9	20.9	44 26.9	+17.4	21.2	45 22.8	+17.9	21.6	46 18.5	+18.4	22.0	47 14.1	+18.9	22.4	48 09.4	+19.5	22.8	49 04.7	+20.0	23.3	75
76	42 51.2	+15.5	19.3	43 47.8	+16.0	19.6	44 44.3	+16.4	19.9	45 40.7	+16.9	20.2	46 36.9	+17.4	20.6	47 33.0	+17.9	21.0	48 28.9	+18.4	21.4	49 24.7	+19.0	21.8	76
77	43 06.7	+14.6	17.9	44 03.8	+15.0	18.2	45 00.7	+15.5	18.5	45 57.6	+15.8	18.9	46 54.3	+16.3	19.2	47 50.9	+16.8	19.6	48 47.3	+17.4	20.0	49 43.7	+17.8	20.4	77
78	43 21.3	+13.7	16.6	44 18.8	+14.0	16.9	45 16.2	+14.4	17.2	46 13.4	+14.9	17.5	47 10.6	+15.3	17.8	48 07.7	+15.7	18.1	49 04.7	+16.2	18.5	50 01.5	+16.7	18.9	78
79	43 35.0	+12.7	15.3	44 32.8	+13.1	15.5	45 30.6	+13.5	15.8	46 28.3	+13.8	16.1	47 25.9	+14.2	16.4	48 23.4	+14.7	16.7	49 20.9	+15.0	17.0	50 18.2	+15.5	17.4	79
80	43 47.7	+11.7	13.9	44 45.9	+12.1	14.1	45 44.1	+12.4	14.4	46 42.1	+12.8	14.7	47 40.1	+13.2	14.9	48 38.1	+13.5	15.2	49 35.9	+13.9	15.5	50 33.7	+14.3	15.9	80
81	43 59.4	+10.8	12.6	44 58.0	+11.0	12.8	45 56.5	+11.3	13.0	46 54.9	+11.7	13.2	47 53.3	+12.0	13.5	48 51.6	+12.3	13.7	49 49.8	+12.8	14.0	50 48.0	+13.1	14.3	81
82	44 10.2	+9.8	11.2	45 09.0	+10.1	11.4	46 07.8	+10.4	11.6	47 06.6	+10.6	11.8	48 05.3	+10.9	12.0	49 04.0	+11.2	12.3	50 02.6	+11.5	12.5	51 01.1	+11.9	12.8	82
83	44 20.0	+8.8	9.8	45 19.1	+9.0	10.0	46 18.2	+9.2	10.2	47 17.2	+9.5	10.3	48 16.2	+9.8	10.5	49 15.2	+10.0	10.8	50 14.1	+10.3	11.0	51 13.0	+10.6	11.2	83
84	44 28.8	+7.7	8.4	45 28.1	+8.0	8.6	46 27.4	+8.2	8.7	47 26.7	+8.4	8.9	48 26.0	+8.6	9.1	49 25.2	+9.1	9.2	50 24.4	+9.1	9.4	51 23.6	+9.6	9.6	84
85	44 36.5	+6.8	7.0	45 36.1	+6.9	7.2	46 35.6	+7.1	7.3	47 35.1	+7.3	7.4	48 34.6	+7.5	7.6	49 34.1	+7.6	7.7	50 33.5	+7.9	7.9	51 32.9	+8.1	8.1	85
86	44 43.3	+5.7	5.6	45 43.0	+5.9	5.7	46 42.7	+6.0	5.8	47 42.4	+6.1	5.9	48 42.1	+6.2	6.1	49 41.7	+6.4	6.2	50 41.4	+6.5	6.3	51 41.0	+6.7	6.5	86
87	44 49.0	+4.7	4.2	45 48.9	+4.8	4.4	46 48.7	+4.9	4.4	47 48.5	+5.0	4.5	48 48.3	+5.1	4.6	49 48.1	+5.2	4.6	50 47.9	+5.3	4.7	51 47.7	+5.4	4.9	87
88	44 53.7	+3.7	2.8	45 53.7	+3.7	2.9	46 53.6	+3.7	2.9	47 53.5	+3.8	3.0	48 53.4	+3.9	3.0	49 53.3	+4.0	3.1	50 53.2	+4.1	3.2	51 53.1	+4.1	3.2	88
89	44 57.4	+2.6	1.4	45 57.4	+2.6	1.4	46 57.3	+2.7	1.5	47 57.3	+2.7	1.5	48 57.3	+2.7	1.5	49 57.3	+2.7	1.6	50 57.3	+2.7	1.6	51 57.2	+2.8	1.6	89
90	45 00.0	+1.6	0.0	46 00.0	+1.6	0.0	47 00.0	+1.5	0.0	48 00.0	+1.5	0.0	49 00.0	+1.5	0.0	50 00.0	+1.5	0.0	51 00.0	+1.4	0.0	52 00.0	+1.4	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 92°, 268°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	0 42.4	+42.5	90.7	0 41.7	+43.1	90.7	0 40.9	+43.9	90.7	0 40.1	+44.6	90.7	0 39.4	+45.2	90.8	0 38.6	+45.9	90.8	0 37.8	+46.6	90.8	0 36.9	+47.3	90.8	0
1	1 24.9	+42.4	90.0	1 24.8	+43.2	90.0	1 24.8	+43.9	90.0	1 24.7	+44.6	90.1	1 24.6	+45.3	90.1	1 24.5	+46.0	90.1	1 24.4	+46.6	90.1	1 24.2	+47.3	90.2	1
2	2 07.3	+42.4	89.3	2 08.0	+43.1	89.3	2 08.7	+43.8	89.4	2 09.3	+44.6	89.4	2 09.9	+45.3	89.4	2 10.5	+45.9	89.5	2 11.0	+46.6	89.5	2 11.5	+47.2	89.6	2
3	2 49.7	+42.3	88.6	2 51.1	+43.1	88.6	2 52.5	+43.8	88.7	2 53.9	+44.5	88.7	2 55.2	+45.2	88.8	2 56.4	+45.9	88.8	2 57.6	+46.6	88.9	2 58.7	+47.3	88.9	3
4	3 32.0	+42.4	87.9	3 34.2	+43.1	87.9	3 36.3	+43.8	88.0	3 38.4	+44.5	88.1	3 40.4	+45.2	88.1	3 42.3	+45.9	88.2	3 44.2	+46.5	88.3	3 46.0	+47.2	88.3	4
5	4 14.4	+42.3	87.2	4 17.3	+43.0	87.2	4 20.1	+43.8	87.3	4 22.9	+44.5	87.4	4 25.6	+45.2	87.5	4 28.2	+45.9	87.5	4 30.7	+46.6	87.6	4 33.2	+47.2	87.7	5
6	4 56.7	+42.2	86.5	5 00.3	+43.0	86.5	5 03.9	+43.7	86.6	5 07.4	+44.4	86.7	5 10.8	+45.1	86.8	5 14.1	+45.8	86.9	5 17.3	+46.4	87.0	5 20.4	+47.1	87.1	6
7	5 38.9	+42.2	85.7	5 43.3	+42.9	85.8	5 47.6	+43.7	85.9	5 51.8	+44.4	86.0	5 55.9	+45.1	86.1	5 59.9	+45.7	86.2	6 03.7	+46.5	86.4	6 07.5	+47.1	86.5	7
8	6 21.1	+42.1	85.0	6 26.2	+42.9	85.1	6 31.3	+43.6	85.2	6 36.2	+44.3	85.4	6 41.0	+45.0	85.5	6 45.6	+45.8	85.6	6 50.2	+46.4	85.7	6 54.6	+47.0	85.8	8
9	7 03.2	+42.1	84.3	7 09.1	+42.8	84.4	7 14.9	+43.5	84.6	7 20.5	+44.3	84.7	7 26.0	+45.0	84.8	7 31.4	+45.6	84.9	7 36.6	+46.3	85.1	7 41.6	+47.0	85.2	9
10	7 45.3	+42.0	83.6	7 51.9	+42.8	83.7	7 58.4	+43.5	83.9	8 04.8	+44.2	84.0	8 11.0	+44.9	84.1	8 17.0	+45.6	84.3	8 22.9	+46.3	84.4	8 28.6	+47.0	84.6	10
11	8 27.3	+41.9	82.9	8 34.7	+42.7	83.0	8 41.9	+43.4	83.2	8 49.0	+44.1	83.3	8 55.9	+44.8	83.5	9 02.6	+45.5	83.6	9 09.2	+46.2	83.8	9 15.6	+46.8	84.0	11
12	9 09.2	+41.9	82.1	9 17.4	+42.5	82.3	9 25.3	+43.3	82.5	9 33.1	+44.0	82.6	9 40.7	+44.7	82.8	9 48.1	+45.5	83.0	9 55.4	+46.1	83.1	10 02.4	+46.8	83.3	12
13	9 51.1	+41.7	81.4	9 59.9	+42.5	81.6	10 08.6	+43.2	81.8	10 17.1	+44.0	81.9	10 25.4	+44.7	82.1	10 33.6	+45.3	82.3	10 41.5	+46.0	82.5	10 49.2	+46.7	82.7	13
14	10 32.8	+41.6	80.7	10 42.4	+42.4	80.9	10 51.8	+43.2	81.1	11 01.1	+43.8	81.3	11 10.1	+44.6	81.4	11 18.9	+45.3	81.6	11 27.5	+46.0	81.8	11 35.9	+46.7	82.0	14
15	11 14.4	+41.6	80.0	11 24.8	+42.3	80.2	11 35.0	+43.0	80.4	11 44.9	+43.8	80.6	11 54.7	+44.4	80.8	12 04.2	+45.2	81.0	12 13.5	+45.9	81.2	12 22.6	+46.5	81.4	15
16	11 56.0	+41.4	79.2	12 07.1	+42.2	79.4	12 18.0	+42.9	79.6	12 28.7	+43.6	79.9	12 39.1	+44.4	80.1	12 49.4	+45.0	80.3	12 59.4	+45.7	80.5	13 09.1	+46.5	80.8	16
17	12 37.4	+41.3	78.5	12 49.3	+42.0	78.7	13 00.9	+42.8	78.9	13 12.3	+43.4	79.2	13 23.5	+44.2	79.4	13 34.4	+45.0	79.6	13 45.1	+45.7	79.9	13 55.6	+46.3	80.1	17
18	13 18.7	+41.2	77.7	13 31.3	+41.9	78.0	13 43.7	+42.7	78.2	13 55.9	+43.4	78.4	14 07.7	+44.2	78.7	14 19.4	+44.8	78.9	14 30.8	+45.5	79.2	14 41.9	+46.2	79.4	18
19	13 59.9	+41.0	77.0	14 13.2	+41.8	77.2	14 26.4	+42.5	77.5	14 39.3	+43.2	77.7	14 51.9	+44.0	78.0	15 04.2	+44.7	78.3	15 16.3	+45.4	78.5	15 28.1	+46.1	78.8	19
20	14 40.9	+40.9	76.2	14 55.0	+41.7	76.5	15 08.9	+42.4	76.7	15 22.5	+43.2	77.0	15 35.9	+43.8	77.3	15 48.9	+44.6	77.6	16 01.7	+45.3	77.8	16 14.2	+46.0	78.1	20
21	15 21.8	+40.7	75.5	15 36.7	+41.5	75.7	15 51.3	+42.3	76.0	16 05.7	+43.0	76.3	16 19.7	+43.8	76.6	16 33.5	+44.5	76.9	16 47.0	+45.2	77.2	17 00.2	+45.9	77.4	21
22	16 02.5	+40.5	74.7	16 18.2	+41.3	75.0	16 33.6	+42.0	75.3	16 48.7	+42.8	75.6	17 03.5	+43.5	75.9	17 18.0	+44.3	76.2	17 32.2	+45.0	76.5	17 46.1	+45.7	76.8	22
23	16 43.0	+40.4	73.9	16 59.5	+41.1	74.2	17 15.6	+42.0	74.5	17 31.5	+42.7	74.8	17 47.0	+43.4	75.1	18 02.3	+44.1	75.5	18 17.2	+44.8	75.8	18 31.8	+45.5	76.1	23
24	17 23.4	+40.2	73.2	17 40.6	+41.0	73.5	17 57.6	+41.7	73.8	18 14.2	+42.5	74.1	18 30.4	+43.3	74.4	18 46.4	+44.0	74.7	19 02.0	+44.7	75.1	19 17.3	+45.4	75.4	24
25	18 03.6	+40.0	72.4	18 21.6	+40.8	72.7	18 39.3	+41.6	73.0	18 56.7	+42.3	73.3	19 13.7	+43.1	73.7	19 30.4	+43.8	74.0	19 46.7	+44.6	74.4	20 02.7	+45.3	74.7	25
26	18 43.6	+39.9	71.6	19 02.4	+40.6	71.9	19 20.9	+41.3	72.3	19 39.0	+42.1	72.6	19 56.8	+42.8	72.9	20 14.2	+43.6	73.3	20 31.3	+44.3	73.6	20 48.0	+45.0	74.0	26
27	19 23.5	+39.6	70.8	19 43.0	+40.4	71.1	20 02.2	+41.2	71.5	20 21.1	+42.0	71.8	20 39.6	+42.7	72.2	20 57.8	+43.4	72.6	21 15.6	+44.2	72.9	21 33.0	+44.9	73.3	27
28	20 03.1	+39.4	70.0	20 23.4	+40.2	70.4	20 43.4	+41.0	70.7	21 03.1	+41.7	71.1	21 22.3	+42.5	71.4	21 41.2	+43.3	71.8	21 59.8	+43.9	72.2	22 17.9	+44.7	72.6	28
29	20 42.5	+39.2	69.2	21 03.6	+40.0	69.6	21 24.4	+40.7	69.9	21 44.8	+41.5	70.3	22 04.8	+42.3	70.7	22 24.5	+43.0	71.1	22 43.7	+43.8	71.5	23 02.6	+44.5	71.9	29
30	21 21.7	+38.9	68.4	21 43.6	+39.7	68.8	22 05.1	+40.5	69.1	22 26.3	+41.3	69.5	22 47.1	+42.0	69.9	23 07.5	+42.8	70.3	23 27.5	+43.6	70.7	23 47.1	+44.3	71.1	30
31	22 00.6	+38.7	67.6	22 23.3	+39.5	68.0	22 45.6	+40.3	68.3	23 07.6	+41.0	68.7	23 29.1	+41.9	69.1	23 50.3	+42.6	69.5	24 11.1	+43.3	70.0	24 31.4	+44.1	70.4	31
32	22 39.3	+38.4	66.8	23 02.8	+39.2	67.1	23 25.9	+40.0	67.5	23 48.6	+40.8	67.9	24 11.0	+41.5	68.4	24 32.9	+42.3	68.8	24 54.4	+43.1	69.2	25 15.5	+43.8	69.6	32
33	23 17.7	+38.2	65.9	23 42.0	+39.0	66.3	24 05.9	+39.8	66.7	24 29.4	+40.6	67.1	24 52.5	+41.3	67.6	25 15.2	+42.1	68.0	25 37.5	+42.8	68.4	25 59.3	+43.6	68.9	33
34	23 55.9	+37.9	65.1	24 21.0	+38.7	65.5	24 45.7	+39.4	65.9	25 10.0	+40.2	66.3	25 33.8	+41.1	66.8	25 57.3	+41.8	67.2	26 20.3	+42.6	67.7	26 42.9	+43.4	68.1	34
35	24 33.8	+37.6	64.2	24 59.7	+38.4	64.6	25 25.1	+39.3	65.1	25 50.2	+40.0	65.5	26 14.9	+40.8	66.0	26 39.1	+41.6	66.4	27 02.9	+42.4	66.9	27 26.3	+43.1	67.3	35
36	25 11.4	+37.3	63.4	25 38.1	+38.1	63.8	26 04.4	+38.9	64.2	26 30.2	+39.7	64.7	26 55.7	+40.5	65.1	27 20.7	+41.3	65.6	27 45.3	+42.0	66.1	28 09.4	+42.8	66.6	36
37	25 48.7	+36.9	62.5	26 16.2	+37.8	62.9	26 43.3	+38.6	63.4	27 09.9	+39.4	63.8	27 36.2	+40.2	64.3	28 02.0	+40.9	64.8	28 27.3	+41.8	65.3	28 52.2	+42.5	65.8	37
38	26 25.6	+36.7	61.6	26 54.0	+37.4	62.1	27 21.9	+38.2	62.5	27 49.3	+39.1	63.0	28 16.4	+39.8	63.5	28 42.9	+40.7	63.9	29 09.1	+41.4	64.4	29 34.7	+42.2	65.0	38
39	27 02.3	+36.3	60.7	27 31.4	+37.2	61.2	28 00.1	+38.0	61.6	28 28.4	+38.8	62.1	28 56.2	+39.6	62.6	29 23.6	+40.4	63.1	29 50.5	+41.2	63.6	30 16.9	+42.0	64.1	39
40	27 38.6	+36.0	59.8	28 08.6	+36.8	60.3	28 38.1	+37.6	60.8	29 07.2	+38.4	61.3	29 35.8	+39.2	61.7	30 04.0	+40.0	62.3	30 31.7	+40.8	62.8	30 58.9	+41.6	63.3	40
41	28 14.6	+35.6	58.9	28 45.4	+36.4	59.4	29 15.7	+37.2	59.9	29 45.6	+38.0	60.4	30 15.0	+38.9	60.9	30 44.0	+39.6	61.4	31 12.5	+40.4	61.9	31 40.5	+41.2	62.5	41
42	28 50.2	+35.2	58.0	29 21.8	+36.0	58.5	29 52.9	+36.9	59.0	30 23.6	+37.7	59.5	30 53.9	+38.5	60.0	31 23.6	+39.3	60.5	31 52.9	+40.1	61.1	32 21.7	+40.9	61.6	42
43	29 25.4	+34.9	57.1	29 57.8	+35.7	57.6	30 29.8	+36.5	58.1	31 01.3	+37.3	58.6	31 32.4	+38.1	59.1	32 03.2	+39.0	59.6	32 33.0	+39.8	60.2	33 02.6	+40.6	60.7	43
44	30 00.3	+34.4	56.2	30 33.5	+35.3	56.6	31 06.3	+36.1	57.1	31 38.6	+36.9	57.7	32 10.5	+37.7	58.2	32 41.9	+38.5	58.7	33 12.8	+39.3	59.3	33 43.2	+40.1	59.8	44
45	30 34.7	+34.1	55.2	31 08.8	+34.8	55.7	31 42.4	+35.6	56.2	32 15.5	+36.5	56.7	32 48.2	+37.3	57.3	33 20.4	+38.1	57.8	33 52.1	+39.0	58.4	34 23.3	+39.8	59.0	45
46	31 08.8	+33.6	54.2	31 43.6	+34.4	54.7	32 18.0	+35.3	55.3	32 52.0	+36.1	55.8	33 25.5	+36.9	56.3	33 58.5	+37.7	56.9	34 31.1	+38.5	57.5	35 03.1	+39.3	58.0	46
47	31 42.4	+33.1	53.2	32 18.0	+34.0	53.8	32 53.3	+34.8	54.3	33 28.1	+35.6	54.8	34 02.4	+36.4	55.4	34 36.2	+37.3	55.9	35 09.6	+38.1	56.5	35 42.4	+38.9	57.1	47
48	32 15.5	+32.7	52.3	32 52.0	+33.5	52.8	33 28.1	+34.3	53.3	34 03.7	+35.1	53.9	34 38.8	+36.0	54.4	35 13.5	+36.8	55.0	35 47.7	+37.6	55.6	36 21.3	+38.5	56.2	48
49	32 48.2	+32.2	51.3	33 25.5	+33.0	51.8	34 02.4	+33.8	52.3	34 38.8	+34.7	52.9	35 14.8	+35.5	53.4	35 50.3	+36.3	54.0	36 25.3	+37.2	54.6	36 59.8	+38.0	55.2	49
50	33 20.4	+31.7	50.3	33 58.5	+32.6	50.8	34 36.2	+33.4	51.3	35 13.5	+34.2	51.9	35 50.3	+35.0	52.4	36 26.6	+35.9	53.0	37 02.5	+36.6	53.6	37 37.8	+37.5	54.2	50
51	33 52.1	+31.2	49.3	34 31.1	+32.0	49.8	35 09.6	+32.8	50.3	35 47.7	+33.6	50.9	36 25.3	+34.5	51.4	37 02.5	+35.3	52.0	37 39.1	+36.2	52.6	38 15.3	+37.0	53.3	51
52	34 23.3	+30.7	48.2	35 03.1	+31.5	48.8	35 42.4	+32.3	49.3	36 21.3	+33.2	49.8	36 59.8	+34.0	50.4	37 37.8	+34.8	51.0	38 15.3	+35.6	51.6	38 52.3	+36.5	52.2	52
53	34 54.0	+30.1	47.2	35 34.6	+30.9	47.7	36 14.7	+31.8	48.3	36 54.5	+32.6	48.8	37 33.8	+33.4	49.4	38 12.6	+34.2	50.0	38 50.9	+35.1	50.6	39 28.8	+35.9	51.2	53
54	35 24.1	+29.6	46.1	36 05.5	+30.4	46.7	36 46.5	+31.2	47.2	37 27.1	+32.0	47.8	38 07.2	+32.8	48.3	38 46.8	+33.7	48.9	39 26.0	+34.5	49.5	40 04.7	+35.3	50.2	54
55	35 53.7	+29.0	45.1	36 35.9	+29.8	45.6	37 17.7	+30.6	46.1	37 59.1	+31.4	46.7	38 40.0	+32.2	47.3	39 20.5	+33.1	47.9	40 00.5	+33.9	48.5	40 40.0	+34.8	49.1	55
56	36 22.7	+28.4	44.0	37 05.7	+29.2	44.5	37 48.3	+30.0	45.0	38 30.5	+30.8	45.6	39 12.2	+31.7	46.2	39 53.6	+32.4	46.8	40 34.4	+33.3	47.4	41 14.8	+34.1	48.0	56
57	36 51.1	+27.8	42.9	37 34.9	+28.6	43.4	38 18.3	+29.4	43.9	39 01.3	+30.2	44.5	39 43.9	+31.0	45.1	40 26.0	+31.9	45.7	41 07.7	+32.7	46.3	41 48.9	+33.5	46.9	57
58	37 18.9	+27.2	41.8	38 03.5	+27.9	42.3	38 47.7	+28.7	42.8	39 31.5	+29.5	43.4	40 14.9	+30.3	44.0	40 57.9	+31.1	44.6	41 40.4	+32.0	45.2	42 22.4	+32.9	45.8	58
59	37 46.1	+26.5	40.7	38 31.4	+27.3	41.2	39 16.4	+28.1	41.7	40 01.0	+28.9	42.3	40 45.2	+29.7	42.8	41 29.0	+30.5	43.4	42 12.4	+31.3	44.0	42 55.3	+32.1	44.7	59
60	38 12.6	+25.8	39.5	38 58.7	+26.6	40.0	39 44.5	+27.4	40.6	40 29.9	+28.1	41.1	41 14.9	+29.0	41.7	41 59.5	+29.8	42.3	42 43.7	+30.6	42.9	43 27.4	+31.5	43.5	60
61	38 38.4	+25.2	38.4	39 25.3	+25.9	38.9	40 11.9	+26.6	39.4	40 58.0	+27.5	39.9	41 43.9	+28.2	40.5	42 29.3	+29.0	41.1	43 14.3	+29.9	41.7	43 58.9	+30.7	42.3	61
62	39 03.6	+24.4	37.2	39 51.2	+25.2	37.7	40 38.5	+26.0	38.2	41 25.5	+26.7	38.8	42 12.1	+27.5	39.3	42 58.3	+28.3	39.9	43 44.2	+29.1	40.5	44 29.6	+29.9	41.1	62
63	39 28.0	+23.8	36.0	40 16.4	+24.5	36.5	41 04.5	+25.2	37.0	41 52.2	+26.0	37.6	42 39.6	+26.7	38.1	43 26.6	+27.6	38.7	44 13.3	+28.3	39.3	44 59.5	+29.1	39.9	63
64	39 51.8	+23.0	34.8	40 40.9	+23.7	35.3	41 29.7	+24.4	35.8	42 18.2	+25.2	36.3	43 06.3	+26.0	36.9	43 54.2	+26.7	37.5	44 41.6	+27.5	38.1	45 28.6	+28.3	38.7	64
65	40 14.8	+22.2	33.6	41 04.6	+22.9	34.1	41 54.1	+23.7	34.6	42 43.4	+24.4	35.1	43 32.3	+25.1	35.7	44 20.9	+25.9	36.3	45 09.1	+26.7	36.8	45 56.9	+27.5	37.4	65
66	40 37.0	+21.4	32.4	41 27.5	+22.2	32.9	42 17.8	+22.8	33.4	43 07.8	+23.5	33.9	43 57.4	+24.3	34.4	44 46.8	+25.0	35.0	45 35.8	+25.8	35.5	46 24.4	+26.6	36.1	66
67	40 58.4	+20.7	31.2	41 49.7	+21.3	31.6	42 40.6	+22.0	32.1	43 31.3	+22.7	32.6	44 21.7	+23.4	33.1	45 11.8	+24.2	33.7	46 01.6	+24.9	34.2	46 51.0	+25.7	34.8	67
68	41 19.1	+19.8	29.9	42 11.0	+20.5	30.4	43 02.6	+21.2	30.8	43 54.0	+21.9	31.3	44 45.1	+22.6	31.8	45 36.0	+23.2	32.4	46 26.5	+24.0	32.9	47 16.7	+24.7	33.5	68
69	41 38.9	+19.0	28.7	42 31.5	+19.6	29.1	43 23.8	+20.3	29.5	44 15.9	+21.0	30.0	45 07.7	+21.6	30.5	45 59.2	+22.4	31.0	46 50.5	+23.0	31.6	47 41.4	+23.8	32.2	69
70	41 57.9	+18.2	27.4	42 51.1	+18.8	27.8	43 44.1	+19.4	28.2	44 36.8	+20.1	28.7	45 29.3	+20.7	29.2	46 21.6	+21.3	29.7	47 13.5	+22.1	30.2	48 05.2	+22.8	30.8	70
71	42 16.1	+17.3	26.1	43 09.9	+17.8	26.5	44 03.5	+18.4	26.9	44 56.9	+19.1	27.4	45 50.0	+19.8	27.9	46 42.9	+20.5	28.3	47 35.6	+21.1	28.9	48 28.0	+21.8	29.4	71
72	42 33.4	+16.4	24.8	43 27.7	+17.1	25.2	44 21.9	+17.6	25.6	45 16.0	+18.1	26.0	46 09.8	+18.7	26.5	47 03.4	+19.4	27.0	47 56.7	+20.1	27.5	48 49.8	+20.8	28.0	72
73	42 49.8	+15.5	23.5	43 44.7	+16.1	23.9	44 39.5	+16.6	24.3	45 34.1	+17.2	24.7	46 28.5	+17.8	25.1	47 22.8	+18.3	25.6	48 16.8	+19.0	26.1	49 10.6	+19.6	26.6	73
74	43 05.3	+14.5	22.2	44 00.8	+15.0	22.5	44 56.1	+15.6	22.9	45 51.3	+16.2	23.3	46 46.3	+16.7	23.7	47 41.1	+17.4	24.2	48 35.8	+17.9	24.6	49 30.2	+18.6	25.1	74
75	43 19.8	+13.7	20.8	44 15.8	+14.2	21.2	45 11.7	+14.7	21.5	46 07.5	+15.1	21.9	47 03.0	+15.7	22.3	47 58.5	+16.2	22.7	48 53.7	+16.8	23.2	49 48.8	+17.4	23.6	75
76	43 33.5	+12.7	19.5	44 30.0	+13.1	19.8	45 26.4	+13.6	20.2	46 22.6	+14.2	20.5	47 18.7	+14.7	20.9	48 14.7	+15.2	21.3	49 10.5	+15.8	21.7	50 06.2	+16.3	22.2	76
77	43 46.2	+11.7	18.1	44 43.1	+12.2	18.5	45 40.0	+12.6	18.8	46 36.8	+13.0	19.1	47 33.4	+13.5	19.5	48 29.9	+14.0	19.8	49 26.3	+14.5	20.2	50 22.5	+15.1	20.7	77
78	43 57.9	+10.8	16.8	44 55.3	+11.2	17.1	45 52.6	+11.6	17.4	46 49.8	+12.0	17.7	47 46.9	+12.5	18.0	48 43.9	+13.0	18.4	49 40.8	+13.4	18.7	50 37.6	+13.9	19.1	78
79	44 08.7	+9.7	15.4	45 06.5	+10.1	15.7	46 04.2	+10.5	16.0	47 01.8	+11.0	16.3	47 59.4	+11.3	16.6	48 56.9	+11.7	16.9	49 54.2	+12.2	17.2	50 51.5	+12.6	17.6	79
80	44 18.4	+8.8	14.0	45 16.6	+9.1	14.3	46 14.7	+9.5	14.5	47 12.8	+9.8	14.8	48 10.7	+10.3	15.1	49 08.6	+10.6	15.4	50 06.4	+11.0	15.7	51 04.1	+11.5	16.0	80
81	44 27.2	+7.8	12.7	45 25.7	+8.1	12.9	46 24.2	+8.4	13.1	47 22.6	+8.7	13.4	48 21.0	+9.0	13.6	49 19.2	+9.4	13.9	50 17.4	+9.8	14.2	51 15.6	+10.1	14.5	81
82	44 35.0	+6.7	11.3	45 33.8	+7.0	11.5	46 32.6	+7.3	11.7	47 31.3	+7.6	11.9	48 30.0	+7.9	12.1	49 28.6	+8.3	12.4	50 27.2	+8.6	12.6	51 25.7	+8.9	12.9	82
83	44 41.7	+5.8	9.9	45 40.8	+6.0	10.0	46 39.9	+6.2	10.2	47 38.9	+6.5	10.4	48 37.9	+6.7	10.6	49 36.9	+7.0	10.8	50 35.8	+7.3	11.1	51 34.6	+7.6	11.3	83
84	44 47.5	+4.7	8.5	45 46.8	+4.9	8.6	46 46.1	+5.1	8.8	47 45.4	+5.3	8.9	48 44.6	+5.6	9.1	49 43.9	+5.8	9.3	50 43.1	+6.0	9.5	51 42.2	+6.3	9.7	84
85	44 52.2	+3.6	7.1	45 51.7	+3.8	7.2	46 51.2	+4.0	7.3	47 50.7	+4.2	7.5	48 50.2	+4.4	7.6	49 49.7	+4.5	7.8	50 49.1	+4.8	7.9	51 48.5	+5.0	8.1	85
86	44 55.8	+2.6	5.7	45 55.5	+2.8	5.8	46 55.2	+2.9	5.9	47 54.9	+3.0	6.0	48 54.6	+3.1	6.1	49 54.2	+3.3	6.2	50 53.9	+3.4	6.3	51 53.5	+3.6	6.5	86
87	44 58.4	+1.6	4.2	45 58.3	+1.7	4.3	46 58.1	+1.9	4.4	47 57.9	+2.0	4.5	48 57.7	+2.0	4.6	49 57.5	+2.1	4.7	50 57.3	+2.2	4.8	51 57.1	+2.3	4.9	87
88	45 00.0	+0.5	2.8	45 59.9	+0.6	2.9	46 59.8	+0.7	2.9	47 59.8	+0.7	3.0	48 59.7	+0.7	3.0	49 59.6	+0.8	3.1	50 59.5	+0.9	3.2	51 59.4	+1.0	3.2	88
89	45 00.5	−0.5	1.4	46 00.5	−0.5	1.4	47 00.5	−0.5	1.5	48 00.5	−0.5	1.5	49 00.4	−0.4	1.5	50 00.4	−0.4	1.6	51 00.4	−0.4	1.6	52 00.4	−0.4	1.6	89
90	45 00.0	−1.6	0.0	46 00.0	−1.6	0.0	47 00.0	−1.6	0.0	48 00.0	−1.6	0.0	49 00.0	−1.6	0.0	50 00.0	−1.7	0.0	51 00.0	−1.7	0.0	52 00.0	−1.7	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	0 42.4	−42.4	90.7	0 41.7	−43.2	90.7	0 40.9	−43.9	90.7	0 40.1	−44.5	90.7	0 39.4	−45.3	90.8	0 38.6	−46.0	90.8	0 37.8	−46.7	90.8	0 36.9	−47.2	90.8	0
1	0 00.0	−42.4	91.4	0 01.5	+43.2	88.6	0 03.0	+43.9	88.6	0 04.4	+44.6	88.6	0 05.9	+45.3	88.6	0 07.4	+46.0	88.6	0 08.9	+46.6	88.6	0 10.3	+47.3	88.6	1
2	0 42.4	+42.5	87.9	0 44.7	+43.1	87.9	0 46.9	+43.8	87.9	0 49.0	+44.6	87.9	0 51.2	+45.3	87.9	0 53.4	+45.9	87.9	0 55.5	+46.6	88.0	0 57.6	+47.3	88.0	2
3	1 24.9	+42.4	87.2	1 27.8	+43.2	87.2	1 30.7	+43.9	87.2	1 33.6	+44.6	87.2	1 36.5	+45.3	87.3	1 39.3	+46.0	87.3	1 42.1	+46.6	87.3	1 44.9	+47.3	87.4	3
4	2 07.3	+42.4	86.5	2 11.0	+43.1	86.5	2 14.6	+43.8	86.5	2 18.2	+44.6	86.6	2 21.8	+45.2	86.6	2 25.3	+45.9	86.7	2 28.7	+46.6	86.7	2 32.2	+47.2	86.7	4
5	2 49.7	+42.3	85.8	2 54.1	+43.1	85.8	2 58.4	+43.9	85.9	3 02.8	+44.5	85.9	3 07.0	+45.2	86.0	3 11.2	+45.9	86.0	3 15.3	+46.6	86.1	3 19.4	+47.2	86.1	5
6	3 32.0	+42.4	85.0	3 37.2	+43.1	85.1	3 42.3	+43.8	85.2	3 47.3	+44.5	85.2	3 52.2	+45.2	85.3	3 57.1	+45.9	85.4	4 01.9	+46.6	85.4	4 06.6	+47.2	85.5	6
7	4 14.4	+42.3	84.3	4 20.3	+43.0	84.4	4 26.1	+43.7	84.5	4 31.8	+44.5	84.6	4 37.4	+45.2	84.6	4 43.0	+45.8	84.7	4 48.5	+46.5	84.8	4 53.8	+47.2	84.9	7
8	4 56.7	+42.2	83.6	5 03.3	+43.0	83.7	5 09.8	+43.7	83.8	5 16.2	+44.5	83.9	5 22.6	+45.1	84.0	5 28.8	+45.8	84.1	5 35.0	+46.4	84.2	5 41.0	+47.1	84.3	8
9	5 38.9	+42.2	82.9	5 46.3	+42.9	83.0	5 53.5	+43.7	83.1	6 00.7	+44.3	83.2	6 07.7	+45.1	83.3	6 14.6	+45.8	83.4	6 21.4	+46.4	83.5	6 28.1	+47.1	83.7	9
10	6 21.1	+42.2	82.2	6 29.2	+42.9	82.3	6 37.2	+43.6	82.4	6 45.0	+44.3	82.5	6 52.8	+45.0	82.7	7 00.4	+45.7	82.8	7 07.8	+46.4	82.9	7 15.2	+47.0	83.0	10
11	7 03.3	+42.0	81.5	7 12.1	+42.8	81.6	7 20.8	+43.5	81.7	7 29.3	+44.3	81.9	7 37.8	+44.9	82.0	7 46.1	+45.6	82.1	7 54.2	+46.3	82.3	8 02.2	+47.0	82.4	11
12	7 45.3	+42.0	80.8	7 54.9	+42.7	80.9	8 04.3	+43.5	81.0	8 13.6	+44.2	81.2	8 22.7	+44.9	81.3	8 31.7	+45.6	81.5	8 40.5	+46.3	81.6	8 49.2	+46.9	81.8	12
13	8 27.3	+41.9	80.0	8 37.6	+42.7	80.2	8 47.8	+43.4	80.3	8 57.8	+44.1	80.5	9 07.6	+44.8	80.6	9 17.3	+45.5	80.8	9 26.8	+46.1	81.0	9 36.1	+46.8	81.1	13
14	9 09.2	+41.9	79.3	9 20.3	+42.6	79.5	9 31.2	+43.3	79.6	9 41.9	+44.0	79.8	9 52.4	+44.7	80.0	10 02.8	+45.4	80.1	10 12.9	+46.1	80.3	10 22.9	+46.8	80.5	14
15	9 51.1	+41.7	78.6	10 02.9	+42.4	78.8	10 14.5	+43.2	78.9	10 25.9	+43.9	79.1	10 37.1	+44.7	79.3	10 48.2	+45.3	79.5	10 59.0	+46.0	79.7	11 09.7	+46.7	79.9	15
16	10 32.8	+41.7	77.9	10 45.3	+42.4	78.0	10 57.7	+43.1	78.2	11 09.8	+43.9	78.4	11 21.8	+44.5	78.6	11 33.5	+45.2	78.8	11 45.0	+46.0	79.0	11 56.4	+46.6	79.2	16
17	11 14.5	+41.5	77.1	11 27.7	+42.3	77.3	11 40.8	+43.0	77.5	11 53.7	+43.7	77.7	12 06.3	+44.5	77.9	12 18.7	+45.2	78.1	12 31.0	+45.8	78.4	12 43.0	+46.5	78.6	17
18	11 56.0	+41.4	76.4	12 10.1	+42.2	76.6	12 23.8	+42.9	76.8	12 37.4	+43.6	77.0	12 50.8	+44.3	77.2	13 03.9	+45.0	77.5	13 16.8	+45.7	77.7	13 29.5	+46.3	77.9	18
19	12 37.4	+41.3	75.6	12 52.2	+42.0	75.8	13 06.7	+42.8	76.1	13 21.0	+43.5	76.3	13 35.1	+44.2	76.6	13 48.9	+44.9	76.8	14 02.5	+45.6	77.0	14 15.8	+46.3	77.3	19
20	13 18.7	+41.2	74.9	13 34.2	+41.9	75.1	13 49.5	+42.6	75.4	14 04.5	+43.4	75.6	14 19.3	+44.1	75.9	14 33.8	+44.8	76.1	14 48.1	+45.5	76.4	15 02.1	+46.2	76.6	20
21	13 59.9	+41.0	74.2	14 16.1	+41.8	74.4	14 32.1	+42.6	74.6	14 47.9	+43.2	74.9	15 03.4	+44.0	75.2	15 18.6	+44.7	75.4	15 33.6	+45.4	75.7	15 48.3	+46.1	76.0	21
22	14 40.9	+40.9	73.4	14 57.9	+41.6	73.7	15 14.7	+42.3	73.9	15 31.1	+43.2	74.2	15 47.4	+43.8	74.4	16 03.3	+44.6	74.7	16 19.0	+45.2	75.0	16 34.4	+45.9	75.3	22
23	15 21.8	+40.7	72.6	15 39.5	+41.5	72.9	15 57.0	+42.3	73.2	16 14.3	+42.9	73.5	16 31.2	+43.7	73.7	16 47.9	+44.4	74.0	17 04.2	+45.1	74.3	17 20.3	+45.8	74.6	23
24	16 02.5	+40.5	71.9	16 21.0	+41.3	72.2	16 39.3	+42.0	72.4	16 57.2	+42.8	72.7	17 14.9	+43.5	73.0	17 32.3	+44.2	73.3	17 49.3	+45.0	73.6	18 06.1	+45.6	73.9	24
25	16 43.0	+40.4	71.1	17 02.3	+41.2	71.4	17 21.3	+41.9	71.7	17 40.0	+42.7	72.0	17 58.4	+43.4	72.3	18 16.5	+44.1	72.6	18 34.3	+44.8	72.9	18 51.7	+45.5	73.3	25
26	17 23.4	+40.2	70.3	17 43.5	+40.9	70.6	18 03.2	+41.7	70.9	18 22.7	+42.4	71.3	18 41.8	+43.2	71.6	19 00.6	+43.9	71.9	19 19.1	+44.6	72.2	19 37.2	+45.3	72.6	26
27	18 03.6	+40.1	69.6	18 24.4	+40.8	69.9	18 44.9	+41.6	70.2	19 05.1	+42.3	70.5	19 25.0	+43.0	70.8	19 44.5	+43.8	71.2	20 03.7	+44.5	71.5	20 22.5	+45.2	71.9	27
28	18 43.7	+39.8	68.8	19 05.2	+40.6	69.1	19 26.5	+41.3	69.4	19 47.4	+42.1	69.8	20 08.0	+42.8	70.1	20 28.3	+43.5	70.4	20 48.2	+44.2	70.8	21 07.7	+45.0	71.2	28
29	19 23.5	+39.6	68.0	19 45.8	+40.4	68.3	20 07.8	+41.2	68.7	20 29.5	+41.9	69.0	20 50.8	+42.7	69.3	21 11.8	+43.4	69.7	21 32.4	+44.1	70.1	21 52.7	+44.8	70.5	29
30	20 03.1	+39.4	67.2	20 26.2	+40.2	67.5	20 49.0	+40.9	67.9	21 11.4	+41.7	68.2	21 33.5	+42.4	68.6	21 55.2	+43.1	69.0	22 16.5	+43.9	69.3	22 37.5	+44.6	69.7	30
31	20 42.5	+39.2	66.4	21 06.4	+39.9	66.7	21 29.9	+40.7	67.1	21 53.1	+41.4	67.5	22 15.9	+42.2	67.8	22 38.3	+43.0	68.3	23 00.4	+43.7	68.6	23 22.1	+44.4	69.0	31
32	21 21.7	+38.9	65.6	21 46.3	+39.7	65.9	22 10.6	+40.5	66.3	22 34.5	+41.3	66.7	22 58.1	+42.0	67.1	23 21.3	+42.7	67.5	23 44.1	+43.5	67.9	24 06.5	+44.2	68.3	32
33	22 00.6	+38.7	64.8	22 26.0	+39.5	65.1	22 51.1	+40.2	65.5	23 15.8	+41.0	65.9	23 40.1	+41.8	66.3	24 04.0	+42.5	66.7	24 27.6	+43.2	67.1	24 50.7	+44.0	67.5	33
34	22 39.3	+38.4	63.9	23 05.5	+39.2	64.3	23 31.3	+40.0	64.7	23 56.8	+40.7	65.1	24 21.9	+41.5	65.5	24 46.5	+42.3	65.9	25 10.8	+43.0	66.3	25 34.7	+43.7	66.8	34
35	23 17.7	+38.2	63.1	23 44.7	+38.9	63.5	24 11.3	+39.7	63.9	24 37.5	+40.5	64.3	25 03.4	+41.2	64.7	25 28.8	+42.0	65.1	25 53.8	+42.8	65.6	26 18.4	+43.5	66.0	35
36	23 55.9	+37.9	62.2	24 23.6	+38.7	62.6	24 51.0	+39.5	63.1	25 18.0	+40.2	63.5	25 44.6	+41.0	63.9	26 10.8	+41.7	64.3	26 36.6	+42.5	64.8	27 01.9	+43.3	65.2	36
37	24 33.8	+37.6	61.4	25 02.3	+38.4	61.8	25 30.5	+39.1	62.2	25 58.2	+40.0	62.6	26 25.6	+40.7	63.1	26 52.5	+41.5	63.5	27 19.1	+42.2	64.0	27 45.2	+42.9	64.5	37
38	25 11.4	+37.3	60.5	25 40.7	+38.1	61.0	26 09.6	+38.9	61.4	26 38.2	+39.6	61.8	27 06.3	+40.4	62.3	27 34.0	+41.2	62.7	28 01.3	+41.9	63.2	28 28.1	+42.7	63.7	38
39	25 48.7	+37.0	59.7	26 18.8	+37.7	60.1	26 48.5	+38.5	60.5	27 17.8	+39.3	61.0	27 46.7	+40.1	61.4	28 15.2	+40.9	61.9	28 43.2	+41.7	62.4	29 10.8	+42.4	62.9	39
40	26 25.7	+36.6	58.8	26 56.5	+37.5	59.2	27 27.0	+38.3	59.7	27 57.1	+39.1	60.1	28 26.8	+39.8	60.6	28 56.1	+40.5	61.1	29 24.9	+41.3	61.6	29 53.2	+42.1	62.1	40
41	27 02.3	+36.3	57.9	27 34.0	+37.1	58.3	28 05.3	+37.9	58.8	28 36.2	+38.6	59.3	29 06.6	+39.5	59.7	29 36.6	+40.0	60.2	30 06.2	+41.0	60.7	30 35.3	+41.8	61.2	41
42	27 38.6	+36.0	57.0	28 11.1	+36.8	57.5	28 43.2	+37.5	57.9	29 14.8	+38.4	58.4	29 46.1	+39.1	58.9	30 16.9	+39.9	59.4	30 47.2	+40.7	59.9	31 17.1	+41.5	60.4	42
43	28 14.6	+35.6	56.1	28 47.9	+36.4	56.6	29 20.7	+37.2	57.0	29 53.2	+38.0	57.5	30 25.2	+38.8	58.0	30 56.8	+39.5	58.5	31 27.9	+40.3	59.0	31 58.6	+41.1	59.5	43
44	28 50.2	+35.3	55.2	29 24.3	+36.0	55.6	29 57.9	+36.9	56.1	30 31.2	+37.6	56.6	31 04.0	+38.4	57.1	31 36.3	+39.2	57.6	32 08.2	+40.0	58.1	32 39.7	+40.7	58.7	44
45	29 25.5	+34.8	54.3	30 00.3	+35.6	54.7	30 34.8	+36.4	55.2	31 08.8	+37.2	55.7	31 42.4	+38.0	56.2	32 15.5	+38.8	56.7	32 48.2	+39.6	57.3	33 20.4	+40.4	57.8	45
46	30 00.3	+34.5	53.3	30 35.9	+35.3	53.8	31 11.2	+36.0	54.3	31 46.0	+36.8	54.8	32 20.4	+37.6	55.3	32 54.3	+38.4	55.8	33 27.8	+39.2	56.4	34 00.8	+40.0	56.9	46
47	30 34.8	+34.0	52.4	31 11.2	+34.8	52.9	31 47.2	+35.6	53.3	32 22.8	+36.4	53.8	32 58.0	+37.2	54.4	33 32.7	+38.0	54.9	34 07.0	+38.8	55.5	34 40.8	+39.6	56.0	47
48	31 08.8	+33.6	51.4	31 46.0	+34.4	51.9	32 22.8	+35.2	52.4	32 59.2	+36.0	52.9	33 35.2	+36.8	53.4	34 10.7	+37.6	54.0	34 45.8	+38.3	54.5	35 20.4	+39.1	55.1	48
49	31 42.4	+33.1	50.4	32 20.4	+33.9	50.9	32 58.0	+34.7	51.4	33 35.2	+35.5	51.9	34 12.0	+36.3	52.5	34 48.3	+37.1	53.0	35 24.1	+38.0	53.6	35 59.5	+38.7	54.2	49
50	32 15.5	+32.7	49.5	32 54.3	+33.5	50.0	33 32.7	+34.3	50.5	34 10.7	+35.1	51.0	34 48.3	+35.8	51.5	35 25.4	+36.7	52.1	36 02.1	+37.4	52.6	36 38.2	+38.3	53.2	50
51	32 48.2	+32.2	48.5	33 27.8	+33.0	49.0	34 07.0	+33.8	49.5	34 45.8	+34.6	50.0	35 24.1	+35.4	50.5	36 02.1	+36.1	51.1	36 39.5	+37.0	51.7	37 16.5	+37.8	52.3	51
52	33 20.4	+31.7	47.5	34 00.8	+32.5	48.0	34 40.8	+33.3	48.5	35 20.4	+34.0	49.0	35 59.5	+34.9	49.5	36 38.2	+35.7	50.1	37 16.5	+36.5	50.7	37 54.3	+37.2	51.3	52
53	33 52.1	+31.2	46.4	34 33.3	+32.0	46.9	35 14.1	+32.7	47.4	35 54.4	+33.6	48.0	36 34.4	+34.3	48.5	37 13.9	+35.2	49.1	37 53.0	+35.9	49.7	38 31.5	+36.8	50.3	53
54	34 23.3	+30.7	45.4	35 05.3	+31.4	45.9	35 46.8	+32.3	46.4	36 28.0	+33.0	46.9	37 08.7	+33.9	47.5	37 49.1	+34.6	48.1	38 28.9	+35.4	48.7	39 08.3	+36.2	49.3	54
55	34 54.0	+30.2	44.4	35 36.7	+30.9	44.9	36 19.1	+31.6	45.4	37 01.0	+32.5	45.9	37 42.6	+33.2	46.5	38 23.7	+34.0	47.0	39 04.3	+34.9	47.6	39 44.5	+35.7	48.2	55
56	35 24.2	+29.5	43.3	36 07.6	+30.4	43.8	36 50.7	+31.2	44.3	37 33.5	+31.9	44.9	38 15.8	+32.7	45.4	38 57.7	+33.5	46.0	39 39.2	+34.3	46.6	40 20.2	+35.1	47.2	56
57	35 53.7	+29.0	42.2	36 38.0	+29.7	42.7	37 21.9	+30.5	43.2	38 05.4	+31.3	43.8	38 48.5	+32.1	44.3	39 31.2	+32.9	44.9	40 13.5	+33.7	45.5	40 55.3	+34.5	46.1	57
58	36 22.7	+28.4	41.2	37 07.7	+29.2	41.6	37 52.4	+29.9	42.2	38 36.7	+30.7	42.7	39 20.6	+31.5	43.2	40 04.1	+32.2	43.8	40 47.2	+33.0	44.4	41 29.8	+33.9	45.0	58
59	36 51.1	+27.8	40.1	37 36.9	+28.5	40.5	38 22.3	+29.3	41.1	39 07.4	+30.0	41.6	39 52.1	+30.8	42.1	40 36.3	+31.7	42.7	41 20.2	+32.4	43.3	42 03.7	+33.2	43.9	59
60	37 18.9	+27.2	38.9	38 05.4	+27.9	39.4	38 51.6	+28.6	39.9	39 37.4	+29.4	40.5	40 22.9	+30.2	41.0	41 08.0	+30.9	41.6	41 52.6	+31.8	42.2	42 36.9	+32.5	42.8	60
61	37 46.1	+26.5	37.8	38 33.3	+27.3	38.3	39 20.2	+28.0	38.8	40 06.8	+28.8	39.3	40 53.1	+29.4	39.9	41 38.9	+30.3	40.4	42 24.4	+31.0	41.0	43 09.4	+31.9	41.6	61
62	38 12.6	+25.8	36.7	39 00.6	+26.5	37.2	39 48.2	+27.3	37.7	40 35.6	+28.0	38.2	41 22.5	+28.8	38.7	42 09.2	+29.5	39.3	42 55.4	+30.3	39.9	43 41.3	+31.1	40.5	62
63	38 38.4	+25.2	35.5	39 27.1	+25.9	36.0	40 15.5	+26.6	36.5	41 03.6	+27.3	37.0	41 51.3	+28.1	37.5	42 38.7	+28.8	38.1	43 25.7	+29.6	38.7	44 12.4	+30.3	39.3	63
64	39 03.6	+24.5	34.4	39 53.0	+25.1	34.8	40 42.1	+25.8	35.3	41 30.9	+26.6	35.8	42 19.4	+27.3	36.4	43 07.5	+28.1	36.9	43 55.3	+28.8	37.5	44 42.7	+29.6	38.1	64
65	39 28.1	+23.7	33.2	40 18.1	+24.4	33.6	41 07.9	+25.1	34.1	41 57.5	+25.8	34.6	42 46.7	+26.5	35.1	43 35.6	+27.2	35.7	44 24.1	+28.1	36.3	45 12.3	+28.8	36.9	65
66	39 51.8	+23.0	32.0	40 42.5	+23.7	32.4	41 33.0	+24.4	32.9	42 23.3	+25.0	33.4	43 13.2	+25.7	33.9	44 02.8	+26.5	34.5	44 52.2	+27.1	35.0	45 41.1	+28.0	35.6	66
67	40 14.8	+22.2	30.8	41 06.2	+22.9	31.2	41 57.4	+23.5	31.7	42 48.3	+24.2	32.2	43 38.9	+25.0	32.7	44 29.3	+25.6	33.2	45 19.3	+26.4	33.8	46 09.1	+27.1	34.3	67
68	40 37.0	+21.4	29.6	41 29.1	+22.1	30.0	42 20.9	+22.7	30.5	43 12.5	+23.4	30.9	44 03.9	+24.0	31.4	44 54.9	+24.8	31.9	45 45.7	+25.5	32.5	46 36.2	+26.2	33.0	68
69	40 58.4	+20.7	28.3	41 51.2	+21.2	28.8	42 43.6	+21.9	29.2	43 35.9	+22.5	29.7	44 27.9	+23.2	30.1	45 19.7	+23.9	30.6	46 11.2	+24.5	31.2	47 02.4	+25.2	31.7	69
70	41 19.1	+19.8	27.1	42 12.4	+20.5	27.5	43 05.5	+21.1	27.9	43 58.4	+21.7	28.4	44 51.1	+22.3	28.8	45 43.6	+22.9	29.3	46 35.7	+23.7	29.8	47 27.6	+24.4	30.4	70
71	41 38.9	+19.0	25.8	42 32.9	+19.5	26.2	43 26.6	+20.1	26.6	44 20.1	+20.8	27.1	45 13.4	+21.4	27.5	46 06.5	+22.1	28.0	46 59.4	+22.7	28.5	47 52.0	+23.3	29.0	71
72	41 57.9	+18.2	24.6	42 52.4	+18.7	24.9	43 46.7	+19.3	25.3	44 40.9	+19.8	25.8	45 34.8	+20.5	26.2	46 28.6	+21.0	26.7	47 22.1	+21.7	27.1	48 15.3	+22.4	27.6	72
73	42 16.1	+17.3	23.3	43 11.1	+17.8	23.6	44 06.0	+18.4	24.0	45 00.7	+19.0	24.4	45 55.3	+19.5	24.8	46 49.6	+20.1	25.3	47 43.8	+20.7	25.8	48 37.7	+21.3	26.2	73
74	42 33.4	+16.4	22.0	43 28.9	+16.9	22.3	44 24.4	+17.4	22.7	45 19.7	+17.9	23.1	46 14.8	+18.5	23.5	47 09.7	+19.1	23.9	48 04.5	+19.6	24.4	48 59.0	+20.3	24.8	74
75	42 49.8	+15.5	20.7	43 45.8	+16.0	21.0	44 41.8	+16.5	21.3	45 37.6	+17.0	21.7	46 33.3	+17.5	22.1	47 28.8	+18.0	22.5	48 24.1	+18.6	22.9	49 19.3	+19.2	23.4	75
76	43 05.3	+14.5	19.3	44 01.8	+15.1	19.7	44 58.3	+15.5	20.0	45 54.6	+16.0	20.3	46 50.8	+16.5	20.7	47 46.8	+17.0	21.1	48 42.7	+17.5	21.5	49 38.5	+18.0	21.9	76
77	43 19.8	+13.7	18.0	44 16.9	+14.0	18.3	45 13.8	+14.5	18.6	46 10.6	+14.9	19.0	47 07.3	+15.4	19.3	48 03.8	+15.9	19.7	49 00.2	+16.5	20.1	49 56.5	+17.0	20.5	77
78	43 33.5	+12.7	16.7	44 30.9	+13.1	16.9	45 28.3	+13.5	17.2	46 25.5	+13.9	17.6	47 22.7	+14.3	17.9	48 19.7	+14.8	18.3	49 16.7	+15.2	18.6	50 13.5	+15.7	19.0	78
79	43 46.2	+11.7	15.3	44 44.0	+12.1	15.6	45 41.8	+12.4	15.9	46 39.4	+12.9	16.1	47 37.0	+13.3	16.4	48 34.5	+13.7	16.8	49 31.9	+14.2	17.1	50 29.2	+14.6	17.4	79
80	43 57.9	+10.8	14.0	44 56.1	+11.1	14.2	45 54.2	+11.5	14.4	46 52.3	+11.8	14.7	47 50.3	+12.2	15.0	48 48.2	+12.6	15.3	49 46.1	+12.9	15.6	50 43.8	+13.4	15.9	80
81	44 08.7	+9.7	12.6	45 07.2	+10.1	12.8	46 05.7	+10.4	13.0	47 04.1	+10.7	13.3	48 02.5	+11.0	13.5	49 00.8	+11.4	13.8	49 59.0	+11.8	14.1	50 57.2	+12.1	14.4	81
82	44 18.4	+8.8	11.2	45 17.3	+9.0	11.4	46 16.1	+9.3	11.6	47 14.8	+9.6	11.8	48 13.5	+9.9	12.1	49 12.2	+10.2	12.3	50 10.8	+10.5	12.6	51 09.3	+10.9	12.8	82
83	44 27.2	+7.8	9.8	45 26.3	+8.0	10.0	46 25.4	+8.2	10.2	47 24.4	+8.5	10.4	48 23.4	+8.8	10.6	49 22.4	+9.0	10.8	50 21.3	+9.3	11.0	51 20.2	+9.6	11.2	83
84	44 35.0	+6.7	8.4	45 34.3	+7.0	8.6	46 33.6	+7.2	8.7	47 32.9	+7.4	8.9	48 32.2	+7.6	9.1	49 31.4	+7.9	9.3	50 30.6	+8.1	9.5	51 29.8	+8.3	9.7	84
85	44 41.7	+5.8	7.0	45 41.3	+5.9	7.2	46 40.8	+6.1	7.3	47 40.3	+6.2	7.4	48 39.8	+6.4	7.6	49 39.3	+6.6	7.7	50 38.7	+6.8	7.9	51 38.1	+7.0	8.1	85
86	44 47.5	+4.7	5.6	45 47.2	+4.8	5.7	46 46.9	+4.9	5.8	47 46.5	+5.1	6.0	48 46.2	+5.3	6.1	49 45.9	+5.4	6.2	50 45.5	+5.6	6.3	51 45.1	+5.7	6.5	86
87	44 52.2	+3.6	4.2	45 52.0	+3.7	4.3	46 51.8	+3.9	4.4	47 51.6	+4.0	4.5	48 51.5	+4.0	4.6	49 51.3	+4.1	4.7	50 51.1	+4.2	4.8	51 50.8	+4.4	4.9	87
88	44 55.8	+2.6	2.8	45 55.7	+2.7	2.9	46 55.7	+2.7	2.9	47 55.6	+2.8	3.0	48 55.5	+2.8	3.0	49 55.4	+2.9	3.1	50 55.3	+3.0	3.2	51 55.2	+3.1	3.2	88
89	44 58.4	+1.6	1.4	45 58.4	+1.6	1.4	46 58.4	+1.6	1.5	47 58.4	+1.6	1.5	48 58.4	+1.6	1.5	49 58.3	+1.7	1.6	50 58.3	+1.7	1.6	51 58.3	+1.7	1.6	89
90	45 00.0	+0.5	0.0	46 00.0	+0.5	0.0	47 00.0	+0.5	0.0	48 00.0	+0.5	0.0	49 00.0	+0.4	0.0	50 00.0	+0.4	0.0	51 00.0	+0.4	0.0	52 00.0	+0.4	0.0	90

45°	46°	47°	48°	49°	50°	51°	52°

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 91°, 269°**

Dec.	45° Hc	d	Z	46° Hc	d	Z	47° Hc	d	Z	48° Hc	d	Z	49° Hc	d	Z	50° Hc	d	Z	51° Hc	d	Z	52° Hc	d	Z	Dec.
0	0 00.0	+42.4	90.0	0 00.0	+43.2	90.0	0 00.0	+43.9	90.0	0 00.0	+44.6	90.0	0 00.0	+45.3	90.0	0 00.0	+46.0	90.0	0 00.0	+46.6	90.0	0 00.0	+47.3	90.0	0
1	0 42.4	+42.4	89.3	0 43.2	+43.1	89.3	0 43.9	+43.9	89.3	0 44.6	+44.6	89.3	0 45.3	+45.3	89.3	0 46.0	+45.9	89.4	0 46.6	+46.7	89.4	0 47.3	+47.3	89.4	1
2	1 24.8	+42.5	88.6	1 26.3	+43.2	88.6	1 27.8	+43.8	88.6	1 29.2	+44.5	88.7	1 30.6	+45.2	88.7	1 31.9	+46.0	88.7	1 33.3	+46.6	88.7	1 34.6	+47.2	88.8	2
3	2 07.3	+42.3	87.9	2 09.5	+43.1	87.9	2 11.6	+43.9	88.0	2 13.7	+44.6	88.0	2 15.8	+45.3	88.0	2 17.9	+45.9	88.1	2 19.9	+46.6	88.1	2 21.8	+47.3	88.2	3
4	2 49.6	+42.4	87.2	2 52.6	+43.1	87.2	2 55.5	+43.8	87.3	2 58.3	+44.5	87.3	3 01.1	+45.2	87.4	3 03.8	+45.9	87.4	3 06.5	+46.5	87.5	3 09.1	+47.2	87.5	4
5	3 32.0	+42.3	86.5	3 35.7	+43.0	86.5	3 39.3	+43.8	86.6	3 42.8	+44.5	86.6	3 46.3	+45.2	86.7	3 49.7	+45.9	86.8	3 53.0	+46.6	86.8	3 56.3	+47.2	86.9	5
6	4 14.3	+42.3	85.7	4 18.7	+43.1	85.8	4 23.1	+43.7	85.9	4 27.3	+44.5	86.0	4 31.5	+45.1	86.1	4 35.6	+45.8	86.1	4 39.6	+46.5	86.2	4 43.5	+47.2	86.3	6
7	4 56.6	+42.3	85.0	5 01.8	+42.9	85.1	5 06.8	+43.7	85.2	5 11.8	+44.4	85.3	5 16.6	+45.2	85.4	5 21.4	+45.8	85.5	5 26.1	+46.4	85.6	5 30.7	+47.1	85.7	7
8	5 38.9	+42.1	84.3	5 44.7	+43.0	84.4	5 50.5	+43.7	84.5	5 56.2	+44.4	84.6	6 01.8	+45.0	84.7	6 07.2	+45.8	84.8	6 12.5	+46.5	84.9	6 17.8	+47.1	85.1	8
9	6 21.0	+42.2	83.6	6 27.7	+42.8	83.7	6 34.2	+43.6	83.8	6 40.6	+44.3	84.0	6 46.8	+45.0	84.1	6 53.0	+45.7	84.2	6 59.0	+46.3	84.3	7 04.9	+47.0	84.4	9
10	7 03.2	+42.0	82.9	7 10.5	+42.8	83.0	7 17.8	+43.5	83.1	7 24.9	+44.2	83.3	7 31.8	+45.0	83.4	7 38.7	+45.6	83.5	7 45.3	+46.4	83.7	7 51.9	+47.0	83.8	10
11	7 45.2	+42.0	82.2	7 53.3	+42.8	82.3	8 01.3	+43.5	82.4	8 09.1	+44.2	82.6	8 16.8	+44.9	82.7	8 24.3	+45.6	82.9	8 31.7	+46.2	83.0	8 38.9	+46.9	83.2	11
12	8 27.2	+42.0	81.5	8 36.1	+42.6	81.6	8 44.8	+43.4	81.8	8 53.3	+44.1	81.9	9 01.7	+44.8	82.1	9 09.9	+45.5	82.2	9 17.9	+46.2	82.4	9 25.8	+46.8	82.5	12
13	9 09.2	+41.8	80.7	9 18.7	+42.6	80.9	9 28.2	+43.3	81.1	9 37.4	+44.0	81.2	9 46.5	+44.7	81.4	9 55.4	+45.4	81.6	10 04.1	+46.1	81.7	10 12.6	+46.8	81.9	13
14	9 51.0	+41.7	80.0	10 01.3	+42.5	80.2	10 11.5	+43.2	80.3	10 21.4	+44.0	80.5	10 31.2	+44.7	80.7	10 40.8	+45.3	80.9	10 50.2	+46.0	81.1	10 59.4	+46.7	81.3	14
15	10 32.7	+41.7	79.3	10 43.8	+42.4	79.5	10 54.7	+43.1	79.6	11 05.4	+43.8	79.8	11 15.9	+44.5	80.0	11 26.1	+45.3	80.2	11 36.2	+46.0	80.4	11 46.1	+46.6	80.6	15
16	11 14.4	+41.5	78.5	11 26.2	+42.2	78.7	11 37.8	+43.0	78.9	11 49.2	+43.7	79.1	12 00.4	+44.5	79.3	12 11.4	+45.1	79.6	12 22.2	+45.8	79.8	12 32.7	+46.5	80.0	16
17	11 55.9	+41.4	77.8	12 08.4	+42.2	78.0	12 20.8	+42.9	78.2	12 32.9	+43.7	78.4	12 44.9	+44.3	78.7	12 56.5	+45.1	78.9	13 08.0	+45.7	79.1	13 19.2	+46.4	79.3	17
18	12 37.3	+41.3	77.1	12 50.6	+42.0	77.3	13 03.7	+42.8	77.5	13 16.6	+43.5	77.7	13 29.2	+44.2	78.0	13 41.6	+44.9	78.2	13 53.7	+45.7	78.4	14 05.6	+46.3	78.7	18
19	13 18.6	+41.1	76.3	13 32.6	+42.0	76.5	13 46.5	+42.6	76.8	14 00.1	+43.4	77.0	14 13.4	+44.1	77.3	14 26.5	+44.8	77.5	14 39.4	+45.5	77.8	14 51.9	+46.2	78.0	19
20	13 59.7	+41.0	75.6	14 14.6	+41.7	75.8	14 29.1	+42.6	76.1	14 43.5	+43.2	76.3	14 57.5	+44.0	76.6	15 11.3	+44.7	76.8	15 24.9	+45.4	77.1	15 38.1	+46.1	77.4	20
21	14 40.7	+40.9	74.8	14 56.3	+41.7	75.1	15 11.7	+42.3	75.3	15 26.7	+43.1	75.6	15 41.5	+43.9	75.9	15 56.0	+44.6	76.1	16 10.3	+45.2	76.4	16 24.2	+46.0	76.7	21
22	15 21.6	+40.7	74.1	15 38.0	+41.4	74.3	15 54.0	+42.3	74.6	16 09.8	+43.0	74.9	16 25.4	+43.7	75.2	16 40.6	+44.4	75.4	16 55.5	+45.1	75.7	17 10.2	+45.8	76.0	22
23	16 02.3	+40.6	73.3	16 19.4	+41.4	73.6	16 36.3	+42.0	73.9	16 52.8	+42.8	74.1	17 09.1	+43.5	74.4	17 25.0	+44.3	74.7	17 40.6	+45.0	75.0	17 56.0	+45.6	75.4	23
24	16 42.9	+40.4	72.5	17 00.8	+41.1	72.8	17 18.3	+41.9	73.1	17 35.6	+42.7	73.4	17 52.6	+43.4	73.7	18 09.3	+44.1	74.0	18 25.6	+44.8	74.3	18 41.6	+45.6	74.7	24
25	17 23.3	+40.2	71.8	17 41.9	+41.0	72.1	18 00.2	+41.8	72.4	18 18.3	+42.4	72.7	18 36.0	+43.2	73.0	18 53.4	+43.9	73.3	19 10.4	+44.7	73.6	19 27.2	+45.3	74.0	25
26	18 03.5	+40.0	71.0	18 22.9	+40.8	71.3	18 42.0	+41.5	71.6	19 00.7	+42.3	71.9	19 19.2	+43.0	72.3	19 37.3	+43.8	72.6	19 55.1	+44.5	72.9	20 12.5	+45.2	73.3	26
27	18 43.5	+39.8	70.2	19 03.7	+40.5	70.5	19 23.5	+41.4	70.8	19 43.0	+42.1	71.2	20 02.2	+42.9	71.5	20 21.1	+43.6	71.9	20 39.6	+44.3	72.2	20 57.7	+45.0	72.6	27
28	19 23.3	+39.6	69.4	19 44.2	+40.4	69.7	20 04.9	+41.1	70.1	20 25.1	+42.0	70.4	20 45.1	+42.6	70.8	21 04.7	+43.4	71.1	21 23.9	+44.1	71.5	21 42.7	+44.9	71.9	28
29	20 02.9	+39.4	68.6	20 24.6	+40.2	68.9	20 46.0	+41.0	69.3	21 07.1	+41.7	69.6	21 27.7	+42.5	70.0	21 48.1	+43.2	70.4	22 08.0	+43.9	70.8	22 27.6	+44.6	71.2	29
30	20 42.3	+39.2	67.8	21 04.8	+39.9	68.1	21 27.0	+40.7	68.5	21 48.8	+41.4	68.9	22 10.2	+42.2	69.3	22 31.3	+42.9	69.6	22 51.9	+43.8	70.0	23 12.2	+44.5	70.4	30
31	21 21.5	+38.9	67.0	21 44.7	+39.8	67.3	22 07.7	+40.5	67.7	22 30.2	+41.3	68.1	22 52.4	+42.0	68.5	23 14.2	+42.8	68.9	23 35.7	+43.5	69.3	23 56.7	+44.2	69.7	31
32	22 00.4	+38.7	66.2	22 24.5	+39.4	66.5	22 48.2	+40.2	66.9	23 11.5	+41.0	67.3	23 34.4	+41.8	67.7	23 57.0	+42.5	68.1	24 19.2	+43.2	68.5	24 40.9	+44.0	69.0	32
33	22 39.1	+38.4	65.3	23 03.9	+39.2	65.7	23 28.4	+40.0	66.1	23 52.5	+40.8	66.5	24 16.2	+41.6	66.9	24 39.5	+42.3	67.3	25 02.4	+43.1	67.8	25 24.9	+43.8	68.2	33
34	23 17.5	+38.1	64.5	23 43.1	+39.0	64.9	24 08.4	+39.7	65.3	24 33.3	+40.5	65.7	24 57.8	+41.2	66.1	25 21.8	+42.1	66.6	25 45.5	+42.8	67.0	26 08.7	+43.6	67.4	34
35	23 55.6	+37.9	63.7	24 22.1	+38.7	64.1	24 48.1	+39.5	64.5	25 13.8	+40.2	64.9	25 39.0	+41.1	65.3	26 03.9	+41.8	65.8	26 28.3	+42.5	66.2	26 52.3	+43.3	66.7	35
36	24 33.5	+37.6	62.8	25 00.8	+38.3	63.2	25 27.6	+39.2	63.6	25 54.0	+40.0	64.1	26 20.1	+40.7	64.5	26 45.7	+41.5	65.0	27 10.8	+42.3	65.4	27 35.6	+43.0	65.9	36
37	25 11.1	+37.3	61.9	25 39.1	+38.1	62.4	26 06.8	+38.8	62.8	26 34.0	+39.7	63.2	27 00.8	+40.4	63.7	27 27.2	+41.2	64.2	27 53.1	+42.0	64.6	28 18.6	+42.7	65.1	37
38	25 48.4	+37.0	61.1	26 17.2	+37.8	61.5	26 45.6	+38.6	61.9	27 13.7	+39.3	62.4	27 41.2	+40.2	62.9	28 08.4	+40.9	63.3	28 35.1	+41.7	63.8	29 01.3	+42.5	64.3	38
39	26 25.4	+36.6	60.2	26 55.0	+37.5	60.6	27 24.2	+38.3	61.1	27 53.0	+39.1	61.5	28 21.4	+39.8	62.0	28 49.3	+40.6	62.5	29 16.8	+41.4	63.0	29 43.8	+42.2	63.5	39
40	27 02.0	+36.4	59.3	27 32.5	+37.1	59.8	28 02.5	+37.9	60.2	28 32.1	+38.7	60.7	29 01.2	+39.5	61.2	29 29.9	+40.3	61.7	29 58.2	+41.0	62.2	30 26.0	+41.8	62.7	40
41	27 38.4	+35.9	58.4	28 09.6	+36.7	58.9	28 40.4	+37.6	59.3	29 10.8	+38.3	59.8	29 40.7	+39.2	60.3	30 10.2	+40.0	60.8	30 39.2	+40.8	61.3	31 07.8	+41.5	61.8	41
42	28 14.3	+35.6	57.5	28 46.3	+36.5	58.0	29 18.0	+37.2	58.4	29 49.1	+38.0	58.9	30 19.9	+38.8	59.4	30 50.2	+39.6	59.9	31 20.0	+40.4	60.5	31 49.3	+41.2	61.0	42
43	28 49.9	+35.3	56.6	29 22.8	+36.0	57.1	29 55.2	+36.8	57.5	30 27.1	+37.7	58.0	30 58.7	+38.4	58.5	31 29.8	+39.2	59.1	32 00.4	+40.0	59.6	32 30.5	+40.8	60.1	43
44	29 25.2	+34.8	55.7	29 58.8	+35.6	56.1	30 32.0	+36.5	56.6	31 04.8	+37.2	57.1	31 37.1	+38.1	57.6	32 09.0	+38.9	58.2	32 40.4	+39.7	58.7	33 11.3	+40.5	59.3	44
45	30 00.0	+34.4	54.7	30 34.4	+35.3	55.2	31 08.5	+36.0	55.7	31 42.0	+36.9	56.2	32 15.2	+37.6	56.7	32 47.9	+38.4	57.3	33 20.1	+39.2	57.8	33 51.8	+40.0	58.4	45
46	30 34.4	+34.1	53.8	31 09.7	+34.8	54.3	31 44.5	+35.6	54.8	32 18.9	+36.4	55.3	32 52.8	+37.3	55.8	33 26.3	+38.1	56.4	33 59.3	+38.9	56.9	34 31.8	+39.7	57.5	46
47	31 08.5	+33.5	52.8	31 44.5	+34.4	53.3	32 20.1	+35.2	53.8	32 55.3	+36.0	54.3	33 30.1	+36.8	54.9	34 04.4	+37.6	55.4	34 38.2	+38.4	56.0	35 11.5	+39.2	56.6	47
48	31 42.0	+33.2	51.9	32 18.9	+33.9	52.3	32 55.3	+34.8	52.9	33 31.3	+35.6	53.4	34 06.9	+36.4	53.9	34 42.0	+37.2	54.5	35 16.6	+38.0	55.0	35 50.7	+38.9	55.6	48
49	32 15.2	+32.7	50.9	32 52.8	+33.5	51.4	33 30.1	+34.3	51.9	34 06.9	+35.1	52.4	34 43.3	+35.9	53.0	35 19.2	+36.7	53.5	35 54.6	+37.6	54.1	36 29.6	+38.3	54.7	49
50	32 47.9	+32.2	49.9	33 26.3	+33.0	50.4	34 04.4	+33.8	50.9	34 42.0	+34.6	51.4	35 19.2	+35.4	52.0	35 55.9	+36.3	52.5	36 32.2	+37.0	53.1	37 07.9	+37.9	53.7	50
51	33 20.1	+31.7	48.9	33 59.3	+32.5	49.4	34 38.2	+33.3	49.9	35 16.6	+34.1	50.4	35 54.6	+35.0	51.0	36 32.2	+35.7	51.6	37 09.2	+36.6	52.1	37 45.8	+37.4	52.8	51
52	33 51.8	+31.2	47.9	34 31.8	+32.0	48.4	35 11.5	+32.8	48.9	35 50.7	+33.7	49.4	36 29.6	+34.4	50.0	37 07.9	+35.2	50.6	37 45.8	+36.0	51.1	38 23.2	+36.9	51.8	52
53	34 23.0	+30.6	46.8	35 03.8	+31.5	47.3	35 44.3	+32.3	47.9	36 24.4	+33.0	48.4	37 04.0	+33.9	49.0	37 43.1	+34.7	49.5	38 21.8	+35.6	50.1	39 00.1	+36.3	50.8	53
54	34 53.6	+30.2	45.8	35 35.3	+30.9	46.3	36 16.6	+31.7	46.8	36 57.4	+32.5	47.4	37 37.9	+33.3	47.9	38 17.8	+34.2	48.5	38 57.4	+34.9	49.1	39 36.4	+35.8	49.7	54
55	35 23.8	+29.5	44.7	36 06.2	+30.4	45.2	36 48.3	+31.1	45.8	37 29.9	+32.0	46.3	38 11.2	+32.7	46.9	38 52.0	+33.6	47.4	39 32.3	+34.4	48.1	40 12.2	+35.2	48.7	55
56	35 53.3	+29.0	43.6	36 36.6	+29.7	44.2	37 19.4	+30.6	44.7	38 01.9	+31.3	45.2	38 43.9	+32.2	45.8	39 25.6	+32.9	46.4	40 06.7	+33.8	47.0	40 47.4	+34.6	47.6	56
57	36 22.3	+28.4	42.6	37 06.3	+29.2	43.1	37 50.0	+29.9	43.6	38 33.2	+30.8	44.1	39 16.1	+31.5	44.7	39 58.5	+32.4	45.3	40 40.5	+33.2	45.9	41 22.0	+34.0	46.5	57
58	36 50.7	+27.8	41.5	37 35.5	+28.6	42.0	38 19.9	+29.4	42.5	39 04.0	+30.1	43.0	39 47.6	+31.0	43.6	40 30.9	+31.7	44.2	41 13.7	+32.5	44.8	41 56.0	+33.4	45.4	58
59	37 18.5	+27.2	40.4	38 04.1	+27.9	40.9	38 49.3	+28.7	41.4	39 34.1	+29.6	41.9	40 18.6	+30.2	42.5	41 02.6	+31.0	43.1	41 46.2	+31.9	43.7	42 29.4	+32.7	44.3	59
60	37 45.7	+26.5	39.2	38 32.0	+27.2	39.7	39 18.0	+28.0	40.2	40 03.6	+28.8	40.8	40 48.8	+29.6	41.3	41 33.6	+30.4	41.9	42 18.1	+31.1	42.5	43 02.1	+32.0	43.2	60
61	38 12.2	+25.8	38.1	38 59.2	+26.6	38.6	39 46.0	+27.3	39.1	40 32.4	+28.1	39.6	41 18.4	+28.8	40.2	42 04.0	+29.7	40.8	42 49.2	+30.5	41.4	43 34.1	+31.2	42.0	61
62	38 38.0	+25.2	36.9	39 25.8	+25.9	37.4	40 13.3	+26.7	37.9	41 00.5	+27.3	38.5	41 47.2	+28.2	39.0	42 33.7	+28.9	39.6	43 19.7	+29.7	40.2	44 05.3	+30.6	40.8	62
63	39 03.2	+24.4	35.8	39 51.7	+25.2	36.3	40 39.9	+25.9	36.8	41 27.8	+26.7	37.3	42 15.4	+27.4	37.8	43 02.6	+28.2	38.4	43 49.4	+29.0	39.0	44 35.9	+29.7	39.6	63
64	39 27.6	+23.7	34.6	40 16.9	+24.4	35.1	41 05.8	+25.2	35.6	41 54.5	+25.8	36.1	42 42.8	+26.6	36.6	43 30.8	+27.4	37.2	44 18.4	+28.1	37.8	45 05.6	+29.0	38.4	64
65	39 51.3	+23.0	33.4	40 41.3	+23.7	33.9	41 31.0	+24.4	34.4	42 20.3	+25.1	34.9	43 09.4	+25.8	35.4	43 58.2	+26.5	36.0	44 46.5	+27.4	36.5	45 34.6	+28.1	37.1	65
66	40 14.3	+22.2	32.2	41 05.0	+22.9	32.7	41 55.4	+23.5	33.1	42 45.4	+24.3	33.6	43 35.2	+25.1	34.2	44 24.7	+25.8	34.7	45 13.9	+26.5	35.3	46 02.7	+27.3	35.9	66
67	40 36.5	+21.5	31.0	41 27.9	+22.1	31.4	42 18.9	+22.8	31.9	43 09.7	+23.5	32.4	44 00.3	+24.1	32.9	44 50.5	+24.9	33.4	45 40.4	+25.6	34.0	46 30.0	+26.4	34.6	67
68	40 58.0	+20.6	29.7	41 50.0	+21.3	30.2	42 41.7	+22.0	30.6	43 33.2	+22.6	31.1	44 24.4	+23.3	31.6	45 15.4	+24.0	32.1	46 06.0	+24.8	32.7	46 56.4	+25.4	33.3	68
69	41 18.6	+19.9	28.5	42 11.3	+20.4	28.9	43 03.7	+21.1	29.4	43 55.8	+21.8	29.8	44 47.7	+22.5	30.3	45 39.4	+23.1	30.8	46 30.8	+23.8	31.4	47 21.8	+24.6	31.9	69
70	41 38.5	+19.0	27.2	42 31.7	+19.6	27.7	43 24.8	+20.2	28.1	44 17.6	+20.8	28.5	45 10.2	+21.5	29.0	46 02.5	+22.2	29.5	46 54.6	+22.8	30.0	47 46.4	+23.6	30.6	70
71	41 57.5	+18.1	26.0	42 51.3	+18.7	26.4	43 45.0	+19.3	26.8	44 38.4	+20.0	27.2	45 31.7	+20.5	27.7	46 24.7	+21.2	28.1	47 17.4	+21.9	28.7	48 10.0	+22.5	29.2	71
72	42 15.6	+17.3	24.7	43 10.0	+17.9	25.1	44 04.3	+18.4	25.5	44 58.4	+19.0	25.9	45 52.2	+19.7	26.3	46 45.9	+20.2	26.8	47 39.3	+20.9	27.3	48 32.5	+21.6	27.8	72
73	42 32.9	+16.4	23.4	43 27.9	+16.9	23.8	44 22.7	+17.5	24.1	45 17.4	+18.0	24.6	46 11.9	+18.6	25.0	47 06.1	+19.3	25.4	48 00.2	+19.9	25.9	48 54.1	+20.5	26.4	73
74	42 49.3	+15.5	22.1	43 44.8	+16.0	22.4	44 40.2	+16.5	22.8	45 35.4	+17.1	23.2	46 30.5	+17.6	23.6	47 25.4	+18.2	24.0	48 20.1	+18.8	24.5	49 14.6	+19.4	25.0	74
75	43 04.8	+14.5	20.8	44 00.8	+15.1	21.1	44 56.7	+15.6	21.4	45 52.5	+16.1	21.8	46 48.1	+16.6	22.2	47 43.6	+17.1	22.6	48 38.9	+17.7	23.1	49 34.0	+18.3	23.5	75
76	43 19.3	+13.7	19.4	44 15.9	+14.1	19.7	45 12.3	+14.6	20.1	46 08.6	+15.0	20.4	47 04.7	+15.6	20.8	48 00.7	+16.1	21.2	48 56.6	+16.6	21.6	49 52.3	+17.2	22.0	76
77	43 33.0	+12.7	18.1	44 30.0	+13.1	18.4	45 26.9	+13.5	18.7	46 23.6	+14.1	19.0	47 20.3	+14.5	19.4	48 16.8	+15.0	19.8	49 13.2	+15.5	20.1	50 09.5	+16.0	20.6	77
78	43 45.7	+11.7	16.7	44 43.1	+12.1	17.0	45 40.4	+12.6	17.3	46 37.7	+12.9	17.6	47 34.8	+13.4	17.9	48 31.8	+13.9	18.3	49 28.7	+14.4	18.7	50 25.5	+14.9	19.0	78
79	43 57.4	+10.8	15.4	44 55.2	+11.1	15.6	45 53.0	+11.5	15.9	46 50.6	+11.9	16.2	47 48.2	+12.3	16.5	48 45.7	+12.7	16.8	49 43.1	+13.1	17.2	50 40.3	+13.7	17.5	79
80	44 08.2	+9.7	14.0	45 06.3	+10.2	14.2	46 04.5	+10.4	14.5	47 02.5	+10.8	14.8	48 00.5	+11.2	15.0	48 58.4	+11.6	15.3	49 56.2	+12.0	15.7	50 54.0	+12.4	16.0	80
81	44 17.9	+8.8	12.6	45 16.5	+9.0	12.8	46 14.9	+9.4	13.1	47 13.3	+9.8	13.3	48 11.7	+10.1	13.6	49 10.0	+10.4	13.8	50 08.2	+10.8	14.1	51 06.4	+11.1	14.4	81
82	44 26.7	+7.8	11.2	45 25.5	+8.1	11.4	46 24.3	+8.3	11.6	47 23.1	+8.6	11.9	48 21.8	+8.9	12.1	49 20.4	+9.2	12.3	50 19.0	+9.5	12.6	51 17.5	+9.9	12.9	82
83	44 34.5	+6.7	9.9	45 33.6	+7.0	10.0	46 32.6	+7.3	10.2	47 31.7	+7.5	10.4	48 30.7	+7.7	10.6	49 29.6	+8.0	10.8	50 28.5	+8.3	11.0	51 27.4	+8.6	11.3	83
84	44 41.2	+5.7	8.5	45 40.6	+5.9	8.6	46 39.9	+6.1	8.8	47 39.2	+6.3	9.0	48 38.4	+6.6	9.1	49 37.6	+6.9	9.3	50 36.8	+7.1	9.5	51 36.0	+7.3	9.7	84
85	44 46.9	+4.7	7.1	45 46.5	+4.8	7.2	46 46.0	+5.0	7.3	47 45.5	+5.2	7.4	48 45.0	+5.4	7.6	49 44.5	+5.5	7.8	50 43.9	+5.8	7.9	51 43.3	+6.0	8.1	85
86	44 51.6	+3.7	5.6	45 51.3	+3.8	5.7	46 51.0	+4.0	5.9	47 50.7	+4.1	6.0	48 50.4	+4.2	6.1	49 50.0	+4.4	6.2	50 49.7	+4.5	6.3	51 49.3	+4.7	6.5	86
87	44 55.3	+2.6	4.2	45 55.1	+2.7	4.3	46 55.0	+2.9	4.4	47 54.8	+2.9	4.5	48 54.6	+3.0	4.6	49 54.4	+3.1	4.7	50 54.2	+3.3	4.8	51 54.0	+3.3	4.9	87
88	44 57.9	+1.6	2.8	45 57.8	+1.7	2.9	46 57.8	+1.6	2.9	47 57.7	+1.7	3.0	48 57.6	+1.8	3.0	49 57.5	+1.9	3.1	50 57.4	+2.0	3.2	51 57.3	+2.0	3.2	88
89	44 59.5	+0.5	1.4	45 59.5	+0.5	1.4	46 59.4	+0.6	1.5	47 59.4	+0.6	1.5	48 59.4	+0.6	1.5	49 59.4	+0.6	1.6	50 59.4	+0.6	1.6	51 59.3	+0.7	1.6	89
90	45 00.0	–0.5	0.0	46 00.0	–0.5	0.0	47 00.0	–0.6	0.0	48 00.0	–0.6	0.0	49 00.0	–0.6	0.0	50 00.0	–0.6	0.0	51 00.0	–0.6	0.0	52 00.0	–0.7	0.0	90

| 45° | | | 46° | | | 47° | | | 48° | | | 49° | | | 50° | | | 51° | | | 52° | | | |

Dec.	45° Hc	45° d	45° Z	46° Hc	46° d	46° Z	47° Hc	47° d	47° Z	48° Hc	48° d	48° Z	49° Hc	49° d	49° Z	50° Hc	50° d	50° Z	51° Hc	51° d	51° Z	52° Hc	52° d	52° Z	Dec.
0	0 00.0	+42.4	90.0	0 00.0	+43.2	90.0	0 00.0	+43.9	90.0	0 00.0	+44.6	90.0	0 00.0	+45.3	90.0	0 00.0	+46.0	90.0	0 00.0	+46.6	90.0	0 00.0	+47.3	90.0	0
1	0 42.4	+42.4	89.3	0 43.2	+43.1	89.3	0 43.9	+43.9	89.3	0 44.6	+44.6	89.3	0 45.3	+45.3	89.3	0 46.0	+45.9	89.4	0 46.6	+46.7	89.4	0 47.3	+47.3	89.4	1
2	1 24.8	+42.5	88.6	1 26.3	+43.2	88.6	1 27.8	+43.8	88.6	1 29.2	+44.5	88.7	1 30.6	+45.2	88.7	1 31.9	+46.0	88.7	1 33.3	+46.6	88.7	1 34.6	+47.2	88.8	2
3	2 07.3	+42.3	87.9	2 09.5	+43.1	87.9	2 11.6	+43.9	88.0	2 13.7	+44.6	88.0	2 15.8	+45.3	88.0	2 17.9	+45.9	88.1	2 19.9	+46.6	88.1	2 21.8	+47.3	88.2	3
4	2 49.6	+42.4	87.2	2 52.6	+43.1	87.2	2 55.5	+43.8	87.3	2 58.3	+44.5	87.3	3 01.1	+45.2	87.4	3 03.8	+45.9	87.4	3 06.5	+46.5	87.5	3 09.1	+47.2	87.5	4
5	3 32.0	+42.3	86.5	3 35.7	+43.0	86.5	3 39.3	+43.8	86.6	3 42.8	+44.5	86.6	3 46.3	+45.2	86.7	3 49.7	+45.9	86.8	3 53.0	+46.6	86.8	3 56.3	+47.2	86.9	5
6	4 14.3	+42.3	85.7	4 18.7	+43.1	85.8	4 23.1	+43.7	85.9	4 27.3	+44.5	86.0	4 31.5	+45.1	86.1	4 35.6	+45.8	86.1	4 39.6	+46.5	86.2	4 43.5	+47.2	86.3	6
7	4 56.6	+42.3	85.1	5 01.8	+42.9	85.1	5 06.8	+43.7	85.3	5 11.8	+44.4	85.3	5 16.6	+45.2	85.4	5 21.4	+45.8	85.5	5 26.1	+46.4	85.6	5 30.7	+47.1	85.7	7
8	5 38.9	+42.1	84.3	5 44.7	+43.0	84.4	5 50.5	+43.7	84.5	5 56.2	+44.4	84.6	6 01.8	+45.0	84.7	6 07.2	+45.8	84.8	6 12.5	+46.4	84.9	6 17.8	+47.1	85.1	8
9	6 21.0	+42.2	83.6	6 27.7	+42.8	83.7	6 34.2	+43.6	83.8	6 40.6	+44.3	84.0	6 46.8	+45.0	84.1	6 53.0	+45.7	84.2	6 59.0	+46.3	84.3	7 04.9	+47.0	84.4	9
10	7 03.2	+42.0	82.9	7 10.5	+42.8	83.0	7 17.8	+43.5	83.1	7 24.9	+44.2	83.3	7 31.8	+45.0	83.4	7 38.7	+45.6	83.5	7 45.3	+46.3	83.7	7 51.9	+47.0	83.8	10
11	7 45.2	+42.0	82.2	7 53.3	+42.8	82.3	8 01.3	+43.5	82.4	8 09.1	+44.2	82.6	8 16.8	+44.9	82.7	8 24.3	+45.6	82.9	8 31.7	+46.2	83.0	8 38.9	+46.9	83.2	11
12	8 27.2	+42.0	81.5	8 36.1	+42.6	81.6	8 44.8	+43.4	81.8	8 53.3	+44.1	81.9	9 01.7	+44.8	82.1	9 09.9	+45.5	82.2	9 17.9	+46.2	82.4	9 25.8	+46.8	82.5	12
13	9 09.2	+41.8	80.7	9 18.7	+42.6	80.9	9 28.2	+43.3	81.1	9 37.4	+44.0	81.2	9 46.5	+44.7	81.4	9 55.4	+45.3	81.6	10 04.1	+46.1	81.7	10 12.6	+46.8	81.9	13
14	9 51.0	+41.7	80.0	10 01.3	+42.5	80.2	10 11.5	+43.2	80.3	10 21.4	+44.0	80.5	10 31.2	+44.7	80.7	10 40.8	+45.3	80.9	10 50.2	+46.0	81.1	10 59.4	+46.7	81.3	14
15	10 32.7	+41.7	79.3	10 43.8	+42.4	79.5	10 54.7	+43.1	79.6	11 05.4	+43.8	79.8	11 15.9	+44.5	80.0	11 26.1	+45.3	80.2	11 36.2	+46.0	80.4	11 46.1	+46.6	80.6	15
16	11 14.4	+41.5	78.5	11 26.2	+42.2	78.7	11 37.8	+43.0	78.9	11 49.2	+43.7	79.1	12 00.4	+44.5	79.3	12 11.4	+45.1	79.6	12 22.2	+45.8	79.8	12 32.7	+46.5	80.0	16
17	11 55.9	+41.4	77.8	12 08.4	+42.2	78.0	12 20.8	+42.9	78.2	12 32.9	+43.7	78.4	12 44.9	+44.3	78.7	12 56.5	+45.1	78.9	13 08.0	+45.7	79.1	13 19.2	+46.4	79.3	17
18	12 37.3	+41.3	77.1	12 50.6	+42.0	77.3	13 03.7	+42.8	77.5	13 16.6	+43.5	77.7	13 29.2	+44.2	78.0	13 41.6	+44.9	78.2	13 53.7	+45.7	78.4	14 05.6	+46.3	78.7	18
19	13 18.6	+41.1	76.3	13 32.6	+42.0	76.5	13 46.5	+42.6	76.8	14 00.1	+43.4	77.0	14 13.4	+44.1	77.3	14 26.5	+44.8	77.5	14 39.4	+45.5	77.8	14 51.9	+46.2	78.0	19
20	13 59.7	+41.0	75.6	14 14.6	+41.7	75.8	14 29.1	+42.6	76.1	14 43.5	+43.2	76.3	14 57.5	+44.0	76.6	15 11.3	+44.7	76.8	15 24.9	+45.4	77.1	15 38.1	+46.1	77.4	20
21	14 40.7	+40.9	74.8	14 56.3	+41.7	75.1	15 11.7	+42.3	75.3	15 26.7	+43.1	75.6	15 41.5	+43.9	75.9	15 56.0	+44.6	76.1	16 10.3	+45.2	76.4	16 24.2	+46.0	76.7	21
22	15 21.6	+40.7	74.1	15 38.0	+41.4	74.3	15 54.0	+42.3	74.6	16 09.8	+43.0	74.9	16 25.4	+43.7	75.2	16 40.6	+44.4	75.4	16 55.5	+45.1	75.7	17 10.2	+45.8	76.0	22
23	16 02.3	+40.6	73.3	16 19.4	+41.4	73.6	16 36.3	+42.0	73.9	16 52.8	+42.8	74.1	17 09.1	+43.5	74.4	17 25.0	+44.3	74.7	17 40.6	+45.0	75.0	17 56.0	+45.6	75.4	23
24	16 42.9	+40.4	72.5	17 00.8	+41.1	72.8	17 18.3	+41.9	73.1	17 35.6	+42.7	73.4	17 52.6	+43.4	73.7	18 09.3	+44.1	74.0	18 25.6	+44.8	74.3	18 41.6	+45.6	74.7	24
25	17 23.3	+40.2	71.8	17 41.9	+41.0	72.1	18 00.2	+41.8	72.4	18 18.3	+42.4	72.7	18 36.0	+43.2	73.0	18 53.4	+43.9	73.3	19 10.4	+44.7	73.6	19 27.2	+45.3	74.0	25
26	18 03.5	+40.0	71.0	18 22.9	+40.8	71.3	18 42.0	+41.5	71.6	19 00.7	+42.3	71.9	19 19.2	+43.0	72.3	19 37.3	+43.8	72.6	19 55.1	+44.5	72.9	20 12.5	+45.2	73.3	26
27	18 43.5	+39.8	70.2	19 03.7	+40.5	70.5	19 23.5	+41.4	70.8	19 43.0	+42.1	71.2	20 02.2	+42.9	71.5	20 21.1	+43.6	71.9	20 39.6	+44.3	72.2	20 57.7	+45.0	72.6	27
28	19 23.3	+39.6	69.4	19 44.2	+40.4	69.7	20 04.9	+41.1	70.1	20 25.1	+42.0	70.4	20 45.1	+42.6	70.8	21 04.7	+43.4	71.1	21 23.9	+44.1	71.5	21 42.7	+44.9	71.9	28
29	20 02.9	+39.4	68.6	20 24.6	+40.2	68.9	20 46.0	+41.0	69.3	21 07.1	+41.7	69.6	21 27.7	+42.5	70.0	21 48.1	+43.2	70.4	22 08.0	+43.9	70.8	22 27.6	+44.6	71.2	29
30	20 42.3	+39.2	67.8	21 04.8	+39.9	68.1	21 27.0	+40.7	68.5	21 48.8	+41.4	68.9	22 10.2	+42.2	69.3	22 31.3	+42.9	69.6	22 51.9	+43.8	70.0	23 12.2	+44.5	70.4	30
31	21 21.5	+38.9	67.0	21 44.7	+39.8	67.3	22 07.7	+40.5	67.7	22 30.2	+41.3	68.1	22 52.4	+42.0	68.5	23 14.2	+42.8	68.9	23 35.7	+43.5	69.3	23 56.7	+44.2	69.7	31
32	22 00.4	+38.7	66.2	22 24.5	+39.4	66.5	22 48.2	+40.2	66.9	23 11.5	+41.0	67.3	23 34.4	+41.8	67.7	23 57.0	+42.5	68.1	24 19.2	+43.2	68.5	24 40.9	+44.0	69.0	32
33	22 39.1	+38.4	65.3	23 03.9	+39.2	65.7	23 28.4	+40.0	66.1	23 52.5	+40.8	66.5	24 16.2	+41.6	66.9	24 39.5	+42.3	67.3	25 02.4	+43.1	67.8	25 24.9	+43.8	68.2	33
34	23 17.5	+38.1	64.5	23 43.1	+39.0	64.9	24 08.4	+39.7	65.3	24 33.3	+40.5	65.7	24 57.8	+41.2	66.1	25 21.8	+42.1	66.6	25 45.5	+42.8	67.0	26 08.7	+43.6	67.4	34
35	23 55.6	+37.9	63.7	24 22.1	+38.7	64.1	24 48.1	+39.5	64.5	25 13.8	+40.2	64.9	25 39.0	+41.1	65.3	26 03.9	+41.8	65.8	26 28.3	+42.5	66.2	26 52.3	+43.3	66.7	35
36	24 33.5	+37.6	62.8	25 00.8	+38.3	63.2	25 27.6	+39.2	63.6	25 54.0	+40.0	64.1	26 20.1	+40.7	64.5	26 45.7	+41.5	65.0	27 10.8	+42.3	65.4	27 35.6	+43.0	65.9	36
37	25 11.1	+37.3	61.9	25 39.1	+38.1	62.4	26 06.8	+38.8	62.8	26 34.0	+39.7	63.2	27 00.8	+40.4	63.7	27 27.2	+41.2	64.2	27 53.1	+42.0	64.6	28 18.6	+42.7	65.1	37
38	25 48.4	+37.0	61.1	26 17.2	+37.8	61.5	26 45.6	+38.6	61.9	27 13.7	+39.3	62.4	27 41.2	+40.2	62.9	28 08.4	+40.9	63.3	28 35.1	+41.7	63.8	29 01.3	+42.5	64.3	38
39	26 25.4	+36.6	60.2	26 55.0	+37.5	60.6	27 24.2	+38.3	61.1	27 53.0	+39.1	61.5	28 21.4	+39.8	62.0	28 49.3	+40.6	62.5	29 16.8	+41.4	63.0	29 43.8	+42.2	63.5	39
40	27 02.0	+36.4	59.3	27 32.5	+37.1	59.8	28 02.5	+37.9	60.2	28 32.1	+38.7	60.7	29 01.2	+39.5	61.2	29 29.9	+40.3	61.7	29 58.2	+41.0	62.2	30 26.0	+41.8	62.7	40
41	27 38.4	+35.9	58.4	28 09.6	+36.7	58.9	28 40.4	+37.6	59.3	29 10.8	+38.3	59.8	29 40.7	+39.2	60.3	30 10.2	+40.0	60.8	30 39.2	+40.8	61.3	31 07.8	+41.5	61.8	41
42	28 14.3	+35.7	57.5	28 46.3	+36.5	58.0	29 18.0	+37.2	58.4	29 49.1	+38.0	58.9	30 19.9	+38.8	59.4	30 50.2	+39.6	59.9	31 20.0	+40.4	60.5	31 49.3	+41.2	61.0	42
43	28 49.9	+35.3	56.6	29 22.8	+36.0	57.1	29 55.2	+36.8	57.5	30 27.1	+37.7	58.0	30 58.7	+38.4	58.5	31 29.8	+39.2	59.1	32 00.4	+40.0	59.6	32 30.5	+40.8	60.1	43
44	29 25.2	+34.8	55.7	29 58.8	+35.6	56.1	30 32.0	+36.5	56.6	31 04.8	+37.2	57.1	31 37.1	+38.1	57.6	32 09.0	+38.9	58.2	32 40.4	+39.7	58.7	33 11.3	+40.5	59.3	44
45	30 00.0	+34.4	54.7	30 34.4	+35.3	55.2	31 08.5	+36.0	55.7	31 42.0	+36.9	56.2	32 15.2	+37.6	56.7	32 47.9	+38.4	57.3	33 20.1	+39.2	57.8	33 51.8	+40.0	58.4	45
46	30 34.4	+34.1	53.8	31 09.7	+34.8	54.3	31 44.5	+35.6	54.8	32 18.9	+36.4	55.3	32 52.8	+37.3	55.8	33 26.3	+38.1	56.4	33 59.3	+38.9	56.9	34 31.8	+39.7	57.5	46
47	31 08.5	+33.5	52.8	31 44.5	+34.4	53.3	32 20.1	+35.2	53.8	32 55.3	+36.0	54.3	33 30.1	+36.8	54.9	34 04.4	+37.6	55.4	34 38.2	+38.4	56.0	35 11.5	+39.2	56.6	47
48	31 42.0	+33.2	51.9	32 18.9	+33.9	52.3	32 55.3	+34.8	52.9	33 31.3	+35.6	53.4	34 06.9	+36.4	53.9	34 42.0	+37.2	54.5	35 16.6	+38.0	55.0	35 50.7	+38.9	55.6	48
49	32 15.2	+32.7	50.9	32 52.8	+33.5	51.4	33 30.1	+34.3	51.9	34 06.9	+35.1	52.4	34 43.3	+35.9	53.0	35 19.2	+36.7	53.5	35 54.6	+37.6	54.1	36 29.6	+38.3	54.7	49
50	32 47.9	+32.2	49.9	33 26.3	+33.0	50.4	34 04.4	+33.8	50.9	34 42.0	+34.6	51.4	35 19.2	+35.4	52.0	35 55.9	+36.3	52.5	36 32.2	+37.0	53.1	37 07.9	+37.9	53.7	50
51	33 20.1	+31.7	48.9	33 59.3	+32.5	49.4	34 38.2	+33.3	49.9	35 16.6	+34.1	50.4	35 54.6	+35.0	51.0	36 32.2	+35.7	51.6	37 09.2	+36.6	52.1	37 45.8	+37.4	52.8	51
52	33 51.8	+31.2	47.9	34 31.8	+32.0	48.4	35 11.5	+32.8	48.9	35 50.7	+33.7	49.4	36 29.6	+34.4	50.0	37 07.9	+35.2	50.6	37 45.8	+36.0	51.1	38 23.2	+36.9	51.8	52
53	34 23.0	+30.6	46.8	35 03.8	+31.5	47.3	35 44.3	+32.3	47.9	36 24.4	+33.0	48.4	37 04.0	+33.9	49.0	37 43.1	+34.7	49.5	38 21.8	+35.6	50.1	39 00.1	+36.3	50.8	53
54	34 53.6	+30.2	45.8	35 35.3	+30.9	46.3	36 16.6	+31.7	46.8	36 57.4	+32.5	47.4	37 37.9	+33.3	47.9	38 17.8	+34.2	48.5	38 57.4	+34.9	49.1	39 36.4	+35.8	49.7	54
55	35 23.8	+29.5	44.7	36 06.2	+30.4	45.2	36 48.3	+31.1	45.8	37 29.9	+32.0	46.3	38 11.2	+32.7	46.9	38 52.0	+33.6	47.4	39 32.3	+34.4	48.1	40 12.2	+35.2	48.7	55
56	35 53.3	+29.0	43.6	36 36.6	+29.7	44.2	37 19.4	+30.6	44.7	38 01.9	+31.3	45.2	38 43.9	+32.2	45.8	39 25.6	+32.9	46.4	40 06.7	+33.8	47.0	40 47.4	+34.6	47.6	56
57	36 22.3	+28.4	42.6	37 06.3	+29.2	43.1	37 50.0	+29.9	43.6	38 33.2	+30.8	44.1	39 16.1	+31.5	44.7	39 58.5	+32.4	45.3	40 40.5	+33.2	45.9	41 22.0	+34.0	46.5	57
58	36 50.7	+27.8	41.5	37 35.5	+28.6	42.0	38 19.9	+29.4	42.5	39 04.0	+30.1	43.0	39 47.6	+31.0	43.6	40 30.9	+31.7	44.2	41 13.7	+32.5	44.8	41 56.0	+33.4	45.4	58
59	37 18.5	+27.2	40.4	38 04.1	+27.9	40.9	38 49.3	+28.7	41.4	39 34.1	+29.5	41.9	40 18.6	+30.2	42.5	41 02.6	+31.0	43.1	41 46.2	+31.9	43.7	42 29.4	+32.7	44.3	59
60	37 45.7	+26.5	39.2	38 32.0	+27.2	39.7	39 18.0	+28.0	40.2	40 03.6	+28.8	40.8	40 48.8	+29.6	41.3	41 33.6	+30.4	41.9	42 18.1	+31.1	42.5	43 02.1	+32.0	43.2	60
61	38 12.2	+25.8	38.1	38 59.2	+26.6	38.6	39 46.0	+27.3	39.1	40 32.4	+28.1	39.6	41 18.4	+28.8	40.2	42 04.0	+29.7	40.8	42 49.2	+30.5	41.4	43 34.1	+31.2	42.0	61
62	38 38.0	+25.2	36.9	39 25.8	+25.9	37.4	40 13.3	+26.6	37.9	41 00.5	+27.3	38.5	41 47.2	+28.2	39.0	42 33.7	+28.9	39.6	43 19.7	+29.7	40.2	44 05.3	+30.6	40.8	62
63	39 03.2	+24.4	35.8	39 51.7	+25.2	36.3	40 39.9	+25.9	36.8	41 27.8	+26.7	37.3	42 15.4	+27.4	37.8	43 02.6	+28.2	38.4	43 49.4	+29.0	39.0	44 35.9	+29.7	39.6	63
64	39 27.6	+23.7	34.6	40 16.9	+24.4	35.1	41 05.8	+25.2	35.6	41 54.5	+25.8	36.1	42 42.8	+26.6	36.6	43 30.8	+27.4	37.2	44 18.4	+28.1	37.8	45 05.6	+29.0	38.4	64
65	39 51.3	+23.0	33.4	40 41.3	+23.7	33.9	41 31.0	+24.4	34.4	42 20.3	+25.1	34.9	43 09.4	+25.8	35.4	43 58.2	+26.5	36.0	44 46.5	+27.4	36.5	45 34.6	+28.1	37.1	65
66	40 14.3	+22.2	32.2	41 05.0	+22.9	32.7	41 55.4	+23.5	33.1	42 45.4	+24.3	33.6	43 35.2	+25.1	34.2	44 24.7	+25.8	34.7	45 13.9	+26.5	35.3	46 02.7	+27.3	35.9	66
67	40 36.5	+21.5	31.0	41 27.9	+22.1	31.4	42 18.9	+22.8	31.9	43 09.7	+23.5	32.4	44 00.3	+24.1	32.9	44 50.5	+24.9	33.4	45 40.4	+25.6	34.0	46 30.0	+26.4	34.6	67
68	40 58.0	+20.6	29.7	41 50.0	+21.3	30.2	42 41.7	+22.0	30.6	43 33.2	+22.6	31.1	44 24.4	+23.3	31.6	45 15.4	+24.0	32.1	46 06.0	+24.8	32.7	46 56.4	+25.4	33.3	68
69	41 18.6	+19.9	28.5	42 11.3	+20.4	28.9	43 03.7	+21.1	29.4	43 55.8	+21.8	29.8	44 47.7	+22.5	30.3	45 39.4	+23.1	30.8	46 30.8	+23.8	31.4	47 21.8	+24.6	31.9	69
70	41 38.5	+19.0	27.2	42 31.7	+19.6	27.7	43 24.8	+20.2	28.1	44 17.6	+20.8	28.5	45 10.2	+21.5	29.0	46 02.5	+22.2	29.5	46 54.6	+22.8	30.0	47 46.4	+23.6	30.6	70
71	41 57.5	+18.1	26.0	42 51.3	+18.7	26.4	43 45.0	+19.3	26.8	44 38.4	+20.0	27.2	45 31.7	+20.5	27.7	46 24.7	+21.2	28.2	47 17.4	+21.9	28.7	48 10.0	+22.5	29.2	71
72	42 15.6	+17.3	24.7	43 10.0	+17.9	25.1	44 04.3	+18.4	25.5	44 58.4	+19.0	25.9	45 52.2	+19.7	26.3	46 45.9	+20.2	26.8	47 39.3	+20.9	27.3	48 32.5	+21.6	27.8	72
73	42 32.9	+16.4	23.4	43 27.9	+16.9	23.8	44 22.7	+17.5	24.1	45 17.4	+18.0	24.6	46 11.9	+18.6	25.0	47 06.1	+19.3	25.4	48 00.2	+19.9	25.9	48 54.1	+20.5	26.4	73
74	42 49.3	+15.5	22.1	43 44.8	+16.0	22.4	44 40.2	+16.5	22.8	45 35.4	+17.1	23.2	46 30.5	+17.6	23.6	47 25.4	+18.2	24.0	48 20.1	+18.8	24.5	49 14.6	+19.4	25.0	74
75	43 04.8	+14.5	20.8	44 00.8	+15.1	21.1	44 56.7	+15.6	21.4	45 52.5	+16.1	21.8	46 48.1	+16.6	22.2	47 43.6	+17.1	22.6	48 38.9	+17.7	23.1	49 34.0	+18.3	23.5	75
76	43 19.3	+13.7	19.4	44 15.9	+14.1	19.7	45 12.3	+14.6	20.1	46 08.6	+15.0	20.4	47 04.7	+15.6	20.8	48 00.7	+16.1	21.2	48 56.6	+16.6	21.6	49 52.3	+17.2	22.0	76
77	43 33.0	+12.7	18.1	44 30.0	+13.1	18.4	45 26.9	+13.5	18.7	46 23.6	+14.1	19.0	47 20.3	+14.5	19.4	48 16.8	+15.0	19.8	49 13.2	+15.5	20.1	50 09.5	+16.0	20.6	77
78	43 45.7	+11.7	16.7	44 43.1	+12.1	17.0	45 40.4	+12.6	17.3	46 37.7	+12.9	17.6	47 34.8	+13.4	18.0	48 31.8	+13.9	18.3	49 28.7	+14.4	18.7	50 25.5	+14.8	19.0	78
79	43 57.4	+10.8	15.4	44 55.2	+11.1	15.6	45 53.0	+11.5	15.9	46 50.6	+11.9	16.2	47 48.2	+12.3	16.5	48 45.7	+12.7	16.8	49 43.1	+13.1	17.2	50 40.3	+13.7	17.5	79
80	44 08.2	+9.7	14.0	45 06.3	+10.2	14.2	46 04.5	+10.4	14.5	47 02.5	+10.8	14.8	48 00.5	+11.2	15.0	48 58.4	+11.6	15.3	49 56.2	+12.0	15.7	50 54.0	+12.4	16.0	80
81	44 17.9	+8.8	12.6	45 16.5	+9.0	12.8	46 14.9	+9.4	13.1	47 13.3	+9.8	13.3	48 11.7	+10.1	13.6	49 10.0	+10.4	13.8	50 08.2	+10.8	14.1	51 06.4	+11.1	14.4	81
82	44 26.7	+7.8	11.2	45 25.5	+8.1	11.4	46 24.3	+8.3	11.6	47 23.1	+8.6	11.9	48 21.8	+8.9	12.1	49 20.4	+9.2	12.3	50 19.0	+9.5	12.6	51 17.5	+9.9	12.9	82
83	44 34.5	+6.7	9.9	45 33.6	+7.0	10.0	46 32.6	+7.3	10.2	47 31.7	+7.5	10.4	48 30.7	+7.7	10.6	49 29.6	+8.0	10.8	50 28.5	+8.3	11.0	51 27.4	+8.6	11.3	83
84	44 41.2	+5.7	8.5	45 40.6	+5.9	8.6	46 39.9	+6.1	8.8	47 39.2	+6.3	8.9	48 38.4	+6.6	9.1	49 37.6	+6.9	9.2	50 36.8	+7.1	9.5	51 36.0	+7.3	9.7	84
85	44 46.9	+4.7	7.1	45 46.5	+4.8	7.2	46 46.0	+5.0	7.3	47 45.5	+5.2	7.4	48 45.0	+5.4	7.6	49 44.5	+5.5	7.8	50 43.9	+5.8	7.9	51 43.3	+6.0	8.1	85
86	44 51.6	+3.7	5.6	45 51.3	+3.8	5.7	46 51.0	+4.0	5.9	47 50.7	+4.1	6.0	48 50.4	+4.2	6.1	49 50.0	+4.4	6.2	50 49.7	+4.5	6.3	51 49.3	+4.7	6.5	86
87	44 55.3	+2.6	4.2	45 55.1	+2.7	4.3	46 55.0	+2.8	4.4	47 54.8	+2.9	4.5	48 54.6	+3.0	4.6	49 54.4	+3.1	4.7	50 54.2	+3.2	4.8	51 54.0	+3.3	4.9	87
88	44 57.9	+1.6	2.8	45 57.8	+1.7	2.9	46 57.8	+1.6	2.9	47 57.7	+1.7	3.0	48 57.6	+1.8	3.0	49 57.5	+1.9	3.1	50 57.4	+2.0	3.2	51 57.3	+2.0	3.2	88
89	44 59.5	+0.5	1.4	45 59.5	+0.5	1.4	46 59.4	+0.6	1.5	47 59.4	+0.6	1.5	48 59.4	+0.6	1.5	49 59.4	+0.6	1.6	50 59.4	+0.6	1.6	51 59.3	+0.7	1.6	89
90	45 00.0	−0.5	0.0	46 00.0	−0.5	0.0	47 00.0	−0.6	0.0	48 00.0	−0.6	0.0	49 00.0	−0.6	0.0	50 00.0	−0.6	0.0	51 00.0	−0.6	0.0	52 00.0	−0.7	0.0	90

| 45° | 46° | 47° | 48° | 49° | 50° | 51° | 52° |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION · **L.H.A. 90°, 270°**

*No entries for contrary name appear on this page.

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	30 00.0	+60.0	180.0	0
1	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	31 00.0	+60.0	180.0	1
2	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	32 00.0	+60.0	180.0	2
3	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	33 00.0	+60.0	180.0	3
4	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	34 00.0	+60.0	180.0	4
5	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	35 00.0	+60.0	180.0	5
6	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	36 00.0	+60.0	180.0	6
7	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	37 00.0	+60.0	180.0	7
8	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	38 00.0	+60.0	180.0	8
9	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	39 00.0	+60.0	180.0	9
10	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	40 00.0	+60.0	180.0	10
11	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	41 00.0	+60.0	180.0	11
12	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	42 00.0	+60.0	180.0	12
13	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	43 00.0	+60.0	180.0	13
14	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	44 00.0	+60.0	180.0	14
15	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	45 00.0	+60.0	180.0	15
16	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	46 00.0	+60.0	180.0	16
17	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	47 00.0	+60.0	180.0	17
18	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	48 00.0	+60.0	180.0	18
19	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	49 00.0	+60.0	180.0	19
20	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	50 00.0	+60.0	180.0	20
21	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	51 00.0	+60.0	180.0	21
22	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	52 00.0	+60.0	180.0	22
23	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	53 00.0	+60.0	180.0	23
24	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	54 00.0	+60.0	180.0	24
25	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	55 00.0	+60.0	180.0	25
26	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	56 00.0	+60.0	180.0	26
27	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	57 00.0	+60.0	180.0	27
28	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	58 00.0	+60.0	180.0	28
29	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	59 00.0	+60.0	180.0	29
30	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	60 00.0	+60.0	180.0	30
31	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	61 00.0	+60.0	180.0	31
32	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	62 00.0	+60.0	180.0	32
33	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	63 00.0	+60.0	180.0	33
34	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	64 00.0	+60.0	180.0	34
35	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	65 00.0	+60.0	180.0	35
36	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	66 00.0	+60.0	180.0	36
37	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	67 00.0	+60.0	180.0	37
38	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	68 00.0	+60.0	180.0	38
39	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	69 00.0	+60.0	180.0	39
40	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	70 00.0	+60.0	180.0	40
41	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	71 00.0	+60.0	180.0	41
42	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	72 00.0	+60.0	180.0	42
43	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	73 00.0	+60.0	180.0	43
44	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	74 00.0	+60.0	180.0	44
45	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	75 00.0	+60.0	180.0	45
46	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	76 00.0	+60.0	180.0	46
47	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	77 00.0	+60.0	180.0	47
48	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	78 00.0	+60.0	180.0	48
49	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	79 00.0	+60.0	180.0	49
50	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	80 00.0	+60.0	180.0	50
51	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	81 00.0	+60.0	180.0	51
52	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	82 00.0	+60.0	180.0	52
53	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	83 00.0	+60.0	180.0	53
54	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	84 00.0	+60.0	180.0	54
55	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	85 00.0	+60.0	180.0	55
56	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	86 00.0	+60.0	180.0	56
57	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	87 00.0	+60.0	180.0	57
58	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	88 00.0	+60.0	180.0	58
59	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	89 00.0	+60.0	180.0	59
60	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	90 00.0	−60.0	90.0	60
61	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	89 00.0	−60.0	0.0	61
62	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	88 00.0	−60.0	0.0	62
63	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	87 00.0	−60.0	0.0	63
64	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	86 00.0	−60.0	0.0	64
65	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	85 00.0	−60.0	0.0	65
66	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	84 00.0	−60.0	0.0	66
67	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	83 00.0	−60.0	0.0	67
68	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	82 00.0	−60.0	0.0	68
69	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	81 00.0	−60.0	0.0	69
70	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	80 00.0	−60.0	0.0	70
71	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	79 00.0	−60.0	0.0	71
72	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	78 00.0	−60.0	0.0	72
73	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	77 00.0	−60.0	0.0	73
74	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	76 00.0	−60.0	0.0	74
75	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	75 00.0	−60.0	0.0	75
76	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	74 00.0	−60.0	0.0	76
77	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	73 00.0	−60.0	0.0	77
78	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	72 00.0	−60.0	0.0	78
79	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	71 00.0	−60.0	0.0	79
80	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	70 00.0	−60.0	0.0	80
81	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	69 00.0	−60.0	0.0	81
82	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	68 00.0	−60.0	0.0	82
83	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	67 00.0	−60.0	0.0	83
84	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	66 00.0	−60.0	0.0	84
85	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	65 00.0	−60.0	0.0	85
86	57 00.0	−60.0	0.0	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	64 00.0	−60.0	0.0	86
87	56 00.0	−60.0	0.0	57 00.0	−60.0	0.0	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	63 00.0	−60.0	0.0	87
88	55 00.0	−60.0	0.0	56 00.0	−60.0	0.0	57 00.0	−60.0	0.0	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	62 00.0	−60.0	0.0	88
89	54 00.0	−60.0	0.0	55 00.0	−60.0	0.0	56 00.0	−60.0	0.0	57 00.0	−60.0	0.0	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	61 00.0	−60.0	0.0	89
90	53 00.0	−60.0	0.0	54 00.0	−60.0	0.0	55 00.0	−60.0	0.0	56 00.0	−60.0	0.0	57 00.0	−60.0	0.0	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	37 00.0 −60.0 180.0	36 00.0 −60.0 180.0	35 00.0 −60.0 180.0	34 00.0 −60.0 180.0	33 00.0 −60.0 180.0	32 00.0 −60.0 180.0	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	0
1	36 00.0 −60.0 180.0	35 00.0 −60.0 180.0	34 00.0 −60.0 180.0	33 00.0 −60.0 180.0	32 00.0 −60.0 180.0	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	1
2	35 00.0 −60.0 180.0	34 00.0 −60.0 180.0	33 00.0 −60.0 180.0	32 00.0 −60.0 180.0	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	2
3	34 00.0 −60.0 180.0	33 00.0 −60.0 180.0	32 00.0 −60.0 180.0	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	3
4	33 00.0 −60.0 180.0	32 00.0 −60.0 180.0	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	4
5	32 00.0 −60.0 180.0	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	5
6	31 00.0 −60.0 180.0	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	6
7	30 00.0 −60.0 180.0	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	7
8	29 00.0 −60.0 180.0	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	8
9	28 00.0 −60.0 180.0	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	9
10	27 00.0 −60.0 180.0	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	10
11	26 00.0 −60.0 180.0	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	11
12	25 00.0 −60.0 180.0	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	12
13	24 00.0 −60.0 180.0	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	13
14	23 00.0 −60.0 180.0	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	14
15	22 00.0 −60.0 180.0	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	15
16	21 00.0 −60.0 180.0	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	16
17	20 00.0 −60.0 180.0	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	17
18	19 00.0 −60.0 180.0	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	18
19	18 00.0 −60.0 180.0	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	19
20	17 00.0 −60.0 180.0	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	20
21	16 00.0 −60.0 180.0	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	21
22	15 00.0 −60.0 180.0	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	22
23	14 00.0 −60.0 180.0	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	23
24	13 00.0 −60.0 180.0	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	24
25	12 00.0 −60.0 180.0	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	25
26	11 00.0 −60.0 180.0	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	26
27	10 00.0 −60.0 180.0	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	27
28	9 00.0 −60.0 180.0	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	28
29	8 00.0 −60.0 180.0	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	29
30	7 00.0 −60.0 180.0	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	30
31	6 00.0 −60.0 180.0	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	31
32	5 00.0 −60.0 180.0	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	32
33	4 00.0 −60.0 180.0	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	33
34	3 00.0 −60.0 180.0	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	34
35	2 00.0 −60.0 180.0	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	35
36	1 00.0 −60.0 180.0	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	36
37	0 00.0 +60.0 0.0	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	37
38	1 00.0 +60.0 0.0	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	38
39	2 00.0 +60.0 0.0	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	39
40	3 00.0 +60.0 0.0	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	40
41	4 00.0 +60.0 0.0	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	41
42	5 00.0 +60.0 0.0	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	42
43	6 00.0 +60.0 0.0	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	43
44	7 00.0 +60.0 0.0	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	44
45	8 00.0 +60.0 0.0	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	45
46	9 00.0 +60.0 0.0	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	46
47	10 00.0 +60.0 0.0	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	47
48	11 00.0 +60.0 0.0	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	48
49	12 00.0 +60.0 0.0	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	49
50	13 00.0 +60.0 0.0	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	50
51	14 00.0 +60.0 0.0	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	51
52	15 00.0 +60.0 0.0	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	52
53	16 00.0 +60.0 0.0	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	53
54	17 00.0 +60.0 0.0	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	54
55	18 00.0 +60.0 0.0	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	55
56	19 00.0 +60.0 0.0	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	56
57	20 00.0 +60.0 0.0	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	57
58	21 00.0 +60.0 0.0	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	58
59	22 00.0 +60.0 0.0	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	59
60	23 00.0 +60.0 0.0	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	60
61	24 00.0 +60.0 0.0	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	61
62	25 00.0 +60.0 0.0	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	62
63	26 00.0 +60.0 0.0	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	63
64	27 00.0 +60.0 0.0	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	64
65	28 00.0 +60.0 0.0	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	65
66	29 00.0 +60.0 0.0	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	66
67	30 00.0 +60.0 0.0	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	67
68	31 00.0 +60.0 0.0	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	68
69	32 00.0 +60.0 0.0	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	69
70	33 00.0 +60.0 0.0	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	70
71	34 00.0 +60.0 0.0	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	71
72	35 00.0 +60.0 0.0	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	72
73	36 00.0 +60.0 0.0	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	73
74	37 00.0 +60.0 0.0	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	74
75	38 00.0 +60.0 0.0	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	75
76	39 00.0 +60.0 0.0	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	76
77	40 00.0 +60.0 0.0	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	77
78	41 00.0 +60.0 0.0	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	78
79	42 00.0 +60.0 0.0	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	79
80	43 00.0 +60.0 0.0	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	80
81	44 00.0 +60.0 0.0	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	81
82	45 00.0 +60.0 0.0	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	82
83	46 00.0 +60.0 0.0	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	83
84	47 00.0 +60.0 0.0	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	84
85	48 00.0 +60.0 0.0	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	55 00.0 +60.0 0.0	85
86	49 00.0 +60.0 0.0	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	55 00.0 +60.0 0.0	56 00.0 +60.0 0.0	86
87	50 00.0 +60.0 0.0	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	55 00.0 +60.0 0.0	56 00.0 +60.0 0.0	57 00.0 +60.0 0.0	87
88	51 00.0 +60.0 0.0	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	55 00.0 +60.0 0.0	56 00.0 +60.0 0.0	57 00.0 +60.0 0.0	58 00.0 +60.0 0.0	88
89	52 00.0 +60.0 0.0	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	55 00.0 +60.0 0.0	56 00.0 +60.0 0.0	57 00.0 +60.0 0.0	58 00.0 +60.0 0.0	59 00.0 +60.0 0.0	89
90	53 00.0 +60.0 0.0	54 00.0 +60.0 0.0	55 00.0 +60.0 0.0	56 00.0 +60.0 0.0	57 00.0 +60.0 0.0	58 00.0 +60.0 0.0	59 00.0 +60.0 0.0	60 00.0 +60.0 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 180°, 180°

Dec.	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec.
0	36 59.6 +60.0 178.7	35 59.6 +60.0 178.8	34 59.6 +60.0 178.8	33 59.6 +60.0 178.8	32 59.7 +60.0 178.8	31 59.7 +60.0 178.8	30 59.7 +60.0 178.8	29 59.7 +60.0 178.8	0
1	37 59.6 +60.0 178.7	36 59.6 +60.0 178.7	35 59.6 +60.0 178.8	34 59.7 +60.0 178.8	33 59.7 +59.9 178.8	32 59.7 +60.0 178.8	31 59.7 +60.0 178.8	30 59.7 +60.0 178.8	1
2	38 59.6 +60.0 178.7	37 59.6 +60.0 178.7	36 59.6 +60.0 178.7	35 59.7 +60.0 178.8	34 59.7 +59.9 178.8	33 59.7 +60.0 178.8	32 59.7 +60.0 178.8	31 59.7 +60.0 178.8	2
3	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	37 59.6 +60.0 178.7	36 59.7 +60.0 178.7	35 59.6 +60.0 178.8	34 59.7 +60.0 178.8	33 59.7 +60.0 178.8	32 59.7 +60.0 178.8	3
4	40 59.6 +60.0 178.7	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	37 59.6 +60.0 178.7	36 59.6 +60.0 178.7	35 59.7 +60.0 178.8	34 59.7 +60.0 178.8	33 59.7 +60.0 178.8	4
5	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	37 59.6 +60.0 178.7	36 59.7 +59.9 178.8	35 59.7 +60.0 178.8	34 59.7 +60.0 178.8	5
6	42 59.6 +60.0 178.6	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	37 59.6 +60.0 178.7	36 59.7 +60.0 178.8	35 59.7 +60.0 178.8	6
7	43 59.6 +60.0 178.6	42 59.6 +60.0 178.6	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	39 59.6 +60.0 178.7	38 59.6 +60.0 178.7	37 59.7 +60.0 178.7	36 59.7 +60.0 178.7	7
8	44 59.6 +60.0 178.6	43 59.6 +60.0 178.6	42 59.6 +60.0 178.6	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	39 59.6 +60.0 178.7	38 59.7 +60.0 178.7	37 59.7 +60.0 178.7	8
9	45 59.6 +59.9 178.6	44 59.6 +60.0 178.6	43 59.6 +60.0 178.6	42 59.6 +60.0 178.6	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	39 59.7 +59.9 178.7	38 59.7 +60.0 178.7	9
10	46 59.5 +60.0 178.5	45 59.6 +60.0 178.6	44 59.6 +60.0 178.6	43 59.6 +60.0 178.6	42 59.6 +60.0 178.7	41 59.6 +60.0 178.7	40 59.6 +60.0 178.7	39 59.7 +60.0 178.7	10
11	47 59.5 +60.0 178.5	46 59.6 +60.0 178.6	45 59.6 +60.0 178.6	44 59.6 +60.0 178.6	43 59.6 +60.0 178.6	42 59.6 +60.0 178.7	41 59.6 +60.0 178.7	40 59.7 +60.0 178.7	11
12	48 59.5 +60.0 178.5	47 59.6 +59.9 178.5	46 59.6 +60.0 178.6	45 59.6 +60.0 178.6	44 59.6 +60.0 178.6	43 59.6 +60.0 178.6	42 59.6 +60.0 178.7	41 59.7 +60.0 178.7	12
13	49 59.5 +60.0 178.5	48 59.5 +60.0 178.5	47 59.6 +60.0 178.5	46 59.6 +60.0 178.6	45 59.6 +60.0 178.6	44 59.6 +60.0 178.6	43 59.6 +60.0 178.6	42 59.7 +59.9 178.7	13
14	50 59.5 +60.0 178.5	49 59.5 +60.0 178.5	48 59.6 +59.9 178.5	47 59.6 +60.0 178.6	46 59.6 +60.0 178.6	45 59.6 +60.0 178.6	44 59.6 +60.0 178.6	43 59.6 +60.0 178.7	14
15	51 59.5 +60.0 178.4	50 59.5 +60.0 178.5	49 59.5 +60.0 178.5	48 59.6 +60.0 178.5	47 59.6 +60.0 178.6	46 59.6 +60.0 178.6	45 59.6 +60.0 178.6	44 59.6 +60.0 178.6	15
16	52 59.5 +60.0 178.4	51 59.5 +60.0 178.4	50 59.5 +60.0 178.5	49 59.6 +60.0 178.5	48 59.6 +60.0 178.5	47 59.6 +60.0 178.6	46 59.6 +60.0 178.6	45 59.6 +60.0 178.6	16
17	53 59.5 +60.0 178.4	52 59.5 +60.0 178.4	51 59.5 +60.0 178.4	50 59.6 +59.9 178.5	49 59.6 +60.0 178.5	48 59.6 +60.0 178.5	47 59.6 +60.0 178.6	46 59.6 +60.0 178.6	17
18	54 59.5 +60.0 178.3	53 59.5 +60.0 178.4	52 59.5 +60.0 178.4	51 59.5 +60.0 178.5	50 59.6 +60.0 178.5	49 59.6 +60.0 178.5	48 59.6 +60.0 178.5	47 59.6 +60.0 178.6	18
19	55 59.5 +59.9 178.3	54 59.5 +60.0 178.4	53 59.5 +60.0 178.4	52 59.5 +60.0 178.4	51 59.6 +60.0 178.5	50 59.6 +60.0 178.5	49 59.6 +60.0 178.5	48 59.6 +60.0 178.6	19
20	56 59.5 +59.9 178.3	55 59.5 +60.0 178.3	54 59.5 +60.0 178.4	53 59.5 +60.0 178.4	52 59.6 +59.9 178.4	51 59.6 +60.0 178.5	50 59.6 +60.0 178.5	49 59.6 +60.0 178.5	20
21	57 59.4 +60.0 178.2	56 59.5 +60.0 178.3	55 59.5 +60.0 178.3	54 59.5 +60.0 178.4	53 59.5 +60.0 178.4	52 59.6 +60.0 178.4	51 59.6 +60.0 178.5	50 59.6 +60.0 178.5	21
22	58 59.4 +60.0 178.2	57 59.5 +60.0 178.3	56 59.5 +60.0 178.3	55 59.5 +60.0 178.3	54 59.5 +60.0 178.4	53 59.6 +60.0 178.4	52 59.6 +60.0 178.5	51 59.6 +60.0 178.5	22
23	59 59.4 +60.0 178.2	58 59.5 +59.9 178.2	57 59.5 +60.0 178.3	56 59.5 +60.0 178.3	55 59.5 +60.0 178.4	54 59.6 +59.9 178.4	53 59.6 +60.0 178.4	52 59.6 +60.0 178.5	23
24	60 59.4 +60.0 178.1	59 59.4 +60.0 178.2	58 59.5 +60.0 178.2	57 59.5 +60.0 178.3	56 59.5 +60.0 178.3	55 59.5 +60.0 178.4	54 59.6 +60.0 178.4	53 59.6 +60.0 178.4	24
25	61 59.4 +60.0 178.1	60 59.4 +60.0 178.1	59 59.5 +59.9 178.2	58 59.5 +60.0 178.2	57 59.5 +60.0 178.3	56 59.5 +60.0 178.3	55 59.6 +60.0 178.4	54 59.6 +60.0 178.4	25
26	62 59.4 +59.9 178.0	61 59.4 +60.0 178.1	60 59.4 +60.0 178.1	59 59.4 +60.0 178.2	58 59.5 +60.0 178.2	57 59.5 +60.0 178.3	56 59.6 +59.9 178.3	55 59.6 +60.0 178.4	26
27	63 59.4 +59.9 178.0	62 59.4 +60.0 178.0	61 59.4 +60.0 178.1	60 59.4 +60.0 178.1	59 59.5 +59.9 178.2	58 59.5 +60.0 178.2	57 59.5 +60.0 178.3	56 59.6 +60.0 178.4	27
28	64 59.3 +60.0 177.9	63 59.4 +59.9 177.9	62 59.4 +60.0 178.0	61 59.4 +60.0 178.1	60 59.5 +60.0 178.2	59 59.5 +60.0 178.2	58 59.5 +60.0 178.3	57 59.6 +60.0 178.3	28
29	65 59.3 +60.0 177.9	64 59.4 +59.9 177.9	63 59.4 +60.0 178.0	62 59.4 +60.0 178.1	61 59.4 +60.0 178.1	60 59.5 +60.0 178.2	59 59.5 +60.0 178.3	58 59.6 +59.9 178.3	29
30	66 59.3 +60.0 177.8	65 59.3 +60.0 177.9	64 59.4 +60.0 178.0	63 59.4 +60.0 178.0	62 59.5 +59.9 178.1	61 59.5 +60.0 178.2	60 59.5 +60.0 178.2	59 59.5 +60.0 178.3	30
31	67 59.3 +60.0 177.7	66 59.3 +60.0 177.7	65 59.4 +59.9 177.9	64 59.4 +60.0 178.0	63 59.4 +60.0 178.0	62 59.5 +60.0 178.1	61 59.5 +60.0 178.2	60 59.5 +60.0 178.2	31
32	68 59.3 +59.9 177.6	67 59.3 +60.0 177.7	66 59.3 +60.0 177.8	65 59.3 +60.0 177.9	64 59.4 +60.0 178.0	63 59.5 +59.9 178.1	62 59.5 +60.0 178.1	61 59.5 +60.0 178.2	32
33	69 59.2 +60.0 177.5	68 59.3 +60.0 177.7	67 59.3 +60.0 177.8	66 59.4 +60.0 177.9	65 59.4 +60.0 177.9	64 59.4 +60.0 178.0	63 59.5 +60.0 178.1	62 59.5 +60.0 178.2	33
34	70 59.2 +59.9 177.5	69 59.3 +59.9 177.6	68 59.3 +60.0 177.7	67 59.3 +60.0 177.8	66 59.4 +59.9 177.9	65 59.4 +60.0 177.9	64 59.4 +60.0 178.0	63 59.5 +60.0 178.1	34
35	71 59.2 +59.9 177.4	70 59.2 +60.0 177.5	69 59.3 +60.0 177.6	68 59.3 +59.9 177.7	67 59.4 +60.0 177.8	66 59.4 +60.0 177.9	65 59.5 +59.9 178.0	64 59.5 +60.0 178.1	35
36	72 59.1 +60.0 177.2	71 59.2 +60.0 177.4	70 59.3 +59.9 177.5	69 59.3 +60.0 177.6	68 59.4 +59.9 177.7	67 59.4 +60.0 177.8	66 59.4 +60.0 177.9	65 59.5 +60.0 178.0	36
37	73 59.1 +59.9 177.1	72 59.2 +59.9 177.3	71 59.2 +60.0 177.4	70 59.3 +59.9 177.5	69 59.3 +60.0 177.7	68 59.4 +60.0 177.7	67 59.4 +60.0 177.8	66 59.5 +59.9 177.9	37
38	74 59.0 +60.0 177.0	73 59.1 +60.0 177.1	72 59.2 +60.0 177.3	71 59.3 +59.9 177.5	70 59.3 +60.0 177.6	69 59.3 +59.9 177.7	68 59.4 +60.0 177.8	67 59.4 +60.0 177.9	38
39	75 59.0 +59.9 176.8	74 59.1 +59.9 177.0	73 59.2 +59.9 177.2	72 59.2 +60.0 177.3	71 59.3 +59.9 177.5	70 59.3 +60.0 177.6	69 59.4 +60.0 177.7	68 59.4 +60.0 177.8	39
40	76 58.9 +60.0 176.6	75 59.0 +60.0 176.8	74 59.1 +60.0 177.0	73 59.2 +59.9 177.2	72 59.3 +59.9 177.4	71 59.3 +60.0 177.5	70 59.4 +59.9 177.6	69 59.4 +60.0 177.8	40
41	77 58.9 +59.9 176.4	76 59.0 +59.9 176.6	75 59.1 +59.9 176.9	74 59.1 +60.0 177.1	73 59.2 +59.9 177.3	72 59.3 +59.9 177.4	71 59.3 +60.0 177.5	70 59.4 +59.9 177.7	41
42	78 58.8 +59.9 176.1	77 58.9 +59.9 176.4	76 59.0 +59.9 176.7	75 59.1 +59.9 176.9	74 59.2 +59.9 177.1	73 59.3 +59.9 177.3	72 59.3 +60.0 177.5	71 59.4 +59.9 177.6	42
43	79 58.7 +59.9 175.8	78 58.9 +59.9 176.2	77 58.9 +60.0 176.5	76 59.0 +60.0 176.8	75 59.1 +60.0 177.0	74 59.2 +60.0 177.2	73 59.3 +59.9 177.4	72 59.3 +60.0 177.5	43
44	80 58.6 +59.8 175.4	79 58.7 +59.9 176.0	78 58.9 +59.9 176.2	77 59.0 +59.9 176.5	76 59.0 +60.0 176.8	75 59.2 +59.9 177.0	74 59.3 +59.9 177.2	73 59.3 +60.0 177.4	44
45	81 58.4 +59.8 174.9	80 58.6 +59.9 175.5	79 58.8 +59.9 175.9	78 58.9 +59.9 176.3	77 59.0 +60.0 176.6	76 59.1 +60.0 176.9	75 59.2 +60.0 177.1	74 59.3 +59.9 177.3	45
46	82 58.2 +59.7 174.3	81 58.5 +59.8 175.0	80 58.7 +59.8 175.6	79 58.8 +59.9 176.0	78 59.0 +59.9 176.4	77 59.1 +59.9 176.7	76 59.2 +59.9 176.9	75 59.2 +60.0 177.1	46
47	83 57.9 +59.7 173.5	82 58.3 +59.7 174.4	81 58.5 +59.9 175.1	80 58.7 +59.9 175.6	79 58.9 +59.9 176.1	78 59.0 +59.9 176.4	77 59.1 +60.0 176.7	76 59.2 +60.0 177.0	47
48	84 57.6 +59.5 172.4	83 58.0 +59.7 173.6	82 58.4 +59.7 174.5	81 58.6 +59.8 175.2	80 58.8 +59.7 175.7	79 58.9 +59.9 176.2	78 59.1 +59.9 176.5	77 59.2 +59.9 176.8	48
49	85 57.1 +59.1 170.7	84 57.7 +59.5 172.5	83 58.1 +59.7 173.7	82 58.4 +59.8 174.6	81 58.7 +59.8 175.3	80 58.8 +59.9 175.8	79 59.0 +59.9 176.2	78 59.1 +59.9 176.6	49
50	86 56.2 +58.2 167.9	85 57.2 +59.1 170.9	84 57.8 +59.5 172.7	83 58.2 +59.7 173.9	82 58.5 +59.8 174.7	81 58.7 +59.9 175.4	80 58.9 +59.9 175.9	79 59.0 +59.9 176.3	50
51	87 54.4 +55.4• 162.5	86 56.3 +58.4 168.1	85 57.3 +59.2 171.0	84 57.9 +59.5 172.8	83 58.3 +59.7 174.0	82 58.6 +59.8 174.8	81 58.8 +59.9 175.5	80 58.9 +59.9 176.0	51
52	88 49.8 +34.1• 148.3	87 54.7 +55.5• 162.9	86 56.5 +58.4 168.4	85 57.4 +59.3 171.2	84 58.0 +59.6 173.0	83 58.4 +59.7 174.1	82 58.6 +59.8 175.0	81 58.8 +59.9 175.6	52
53	89 23.9 −33.7• 89.6	88 34.5 +34.5• 148.9	87 54.9 +55.7• 163.2	86 56.7 +58.5 168.6	85 57.6 +59.2 171.4	84 58.1 +59.6 173.1	83 58.5 +59.7 174.3	82 58.7 +59.8 175.1	53
54	88 50.2 −55.3• 30.3	89 24.7 −34.1• 89.6	88 50.6 +35.0• 149.4	87 55.2 +55.8• 163.6	86 56.8 +58.5 168.9	85 57.7 +59.3 171.6	84 58.2 +59.6 173.3	83 58.5 +59.8 174.4	54
55	87 54.9 −58.2 16.0	88 50.6 −55.4• 29.7	89 25.6 −34.6• 89.6	88 51.0 +35.4• 150.1	87 55.4 +56.1• 164.0	86 57.0 +58.6 169.2	85 57.8 +59.3 171.8	84 58.3 +59.6 173.4	55
56	86 56.7 −59.1 10.5	87 55.2 −58.4 15.6	88 51.0 −55.6• 29.1	89 26.4 −34.9• 89.6	88 51.5 +35.8• 150.7	87 55.6 +56.3• 164.3	86 57.1 +58.6 169.4	85 57.9 +59.4 172.0	56
57	85 57.6 −59.5 7.8	86 56.8 −59.1 10.3	87 55.4 −58.4 15.2	88 51.5 −55.9• 28.5	89 27.3 −35.4• 89.6	88 51.9 +36.3• 151.3	87 55.9 +56.4• 164.7	86 57.3 +58.8 169.7	57
58	84 58.1 −59.6 6.1	85 57.7 −59.5 7.5	86 57.0 −59.2 10.0	87 55.6 −58.5 14.8	88 51.9 −56.0• 27.8	89 28.2 −35.9• 89.6	88 52.3 +36.8• 152.0	87 56.1 +56.6• 165.1	58
59	83 58.5 −59.8 4.9	84 58.2 −59.7 5.9	85 57.8 −59.5 7.3	86 57.1 −59.2 9.7	87 55.7 −58.6 14.4	88 52.3 −56.2• 27.2	89 29.1 −36.4• 89.6	88 52.7 +37.3• 152.7	59
60	82 58.7 −59.8 4.1	83 58.5 −59.7 4.8	84 58.3 −59.7 5.7	85 57.9 −59.7 7.1	86 57.3 −59.3 9.5	87 56.1 −58.7 14.0	88 52.7 −56.4• 26.5	89 30.0 −36.9• 89.6	60
61	81 58.9 −59.8 3.5	82 58.8 −59.8 4.0	83 58.6 −59.8 4.6	84 58.4 −59.7 5.5	85 58.0 −59.5 6.9	86 57.4 −59.3 9.2	87 56.3 −58.7 13.6	88 53.1 −56.6• 25.8	61
62	80 59.1 −59.9 3.0	81 59.0 −59.9 3.4	82 58.8 −59.8 3.8	83 58.7 −59.8 4.5	84 58.5 −59.7 5.4	85 58.1 −59.5 6.7	86 57.6 −59.3 8.9	87 56.5 −58.8 13.2	62
63	79 59.2 −59.9 2.6	80 59.1 −59.9 2.9	81 59.0 −59.8 3.3	82 58.9 −59.8 3.7	83 58.8 −59.8 4.3	84 58.6 −59.7 5.0	85 58.3 −59.7 6.5	86 57.7 −59.3 8.6	63
64	78 59.3 −59.9 2.3	79 59.2 −59.9 2.5	80 59.2 −59.9 2.8	81 59.1 −59.9 3.1	82 59.0 −59.9 3.6	83 58.8 −59.8 4.2	84 58.6 −59.7 5.0	85 58.4 −59.7 6.3	64
65	77 59.4 −60.0 2.0	78 59.3 −59.9 2.2	79 59.3 −59.9 2.4	80 59.2 −59.9 2.7	81 59.1 −59.8 3.0	82 59.0 −59.9 3.5	83 58.9 −59.8 4.0	84 58.7 −59.7 4.8	65
66	76 59.4 −59.9 1.8	77 59.4 −59.9 2.0	78 59.4 −59.9 2.1	79 59.3 −59.9 2.3	80 59.2 −59.9 2.6	81 59.2 −59.9 2.9	82 59.1 −59.8 3.3	83 59.0 −59.8 3.9	66
67	75 59.5 −60.0 1.6	76 59.5 −60.0 1.7	77 59.4 −59.9 1.9	78 59.4 −59.9 2.0	79 59.4 −60.0 2.2	80 59.3 −59.9 2.5	81 59.2 −59.8 2.8	82 59.2 −59.9 3.2	67
68	74 59.5 −59.9 1.4	75 59.5 −60.0 1.5	76 59.5 −60.0 1.7	77 59.5 −59.9 1.8	78 59.4 −59.9 2.0	79 59.4 −59.9 2.2	80 59.4 −59.9 2.4	81 59.3 −59.9 2.7	68
69	73 59.6 −60.0 1.3	74 59.6 −60.0 1.4	75 59.6 −60.0 1.5	76 59.5 −59.9 1.6	77 59.5 −59.9 1.7	78 59.5 −59.9 1.9	79 59.4 −59.9 2.1	80 59.4 −59.9 2.3	69
70	72 59.6 −59.9 1.2	73 59.6 −59.9 1.2	74 59.6 −60.0 1.3	75 59.6 −59.9 1.4	76 59.6 −59.9 1.5	77 59.5 −59.9 1.6	78 59.5 −59.9 1.8	79 59.5 −59.9 2.0	70
71	71 59.7 −59.9 1.1	72 59.7 −60.0 1.1	73 59.7 −59.9 1.2	74 59.6 −59.9 1.3	75 59.6 −59.9 1.3	76 59.6 −60.0 1.4	77 59.6 −60.0 1.6	78 59.6 −60.0 1.7	71
72	70 59.7 −59.9 0.9	71 59.7 −60.0 1.0	72 59.7 −60.0 1.1	73 59.7 −60.0 1.1	74 59.7 −60.0 1.2	75 59.6 −59.9 1.3	76 59.6 −59.9 1.4	77 59.6 −59.9 1.5	72
73	69 59.7 −59.9 0.9	70 59.7 −59.9 0.9	71 59.7 −60.0 0.9	72 59.7 −59.9 1.0	73 59.7 −60.0 1.1	74 59.7 −59.9 1.1	75 59.7 −59.9 1.2	76 59.7 −59.9 1.3	73
74	68 59.8 −60.0 0.8	69 59.8 −60.0 0.8	70 59.7 −59.9 0.8	71 59.7 −60.0 0.9	72 59.7 −59.9 0.9	73 59.7 −59.9 1.0	74 59.7 −59.9 1.1	75 59.7 −59.9 1.1	74
75	67 59.8 −60.0 0.7	68 59.8 −60.0 0.7	69 59.8 −60.0 0.8	70 59.8 −60.0 0.8	71 59.8 −60.0 0.8	72 59.8 −60.0 0.9	73 59.7 −59.9 0.9	74 59.7 −59.9 1.0	75
76	66 59.8 −60.0 0.6	67 59.8 −60.0 0.6	68 59.8 −60.0 0.7	69 59.8 −60.0 0.7	70 59.8 −60.0 0.7	71 59.8 −60.0 0.7	72 59.8 −60.0 0.8	73 59.8 −59.9 0.9	76
77	65 59.8 −60.0 0.6	66 59.8 −60.0 0.6	67 59.8 −60.0 0.6	68 59.8 −60.0 0.6	69 59.8 −60.0 0.7	70 59.8 −60.0 0.7	71 59.8 −60.0 0.7	72 59.8 −60.0 0.8	77
78	64 59.9 −59.9 0.5	65 59.9 −59.9 0.5	66 59.9 −59.9 0.5	67 59.8 −59.9 0.5	68 59.8 −59.9 0.5	69 59.8 −59.9 0.6	70 59.8 −60.0 0.6	71 59.8 −60.0 0.6	78
79	63 59.9 −60.0 0.4	64 59.9 −59.9 0.5	65 59.9 −59.9 0.5	66 59.9 −59.9 0.5	67 59.9 −59.9 0.5	68 59.9 −59.9 0.5	69 59.8 −59.9 0.6	70 59.8 −59.9 0.6	79
80	62 59.9 −60.0 0.4	63 59.9 −60.0 0.4	64 59.9 −60.0 0.4	65 59.9 −60.0 0.4	66 59.9 −60.0 0.4	67 59.9 −60.0 0.5	68 59.9 −59.9 0.5	69 59.9 −60.0 0.5	80
81	61 59.9 −60.0 0.3	62 59.9 −60.0 0.3	63 59.9 −60.0 0.3	64 59.9 −60.0 0.4	65 59.9 −60.0 0.4	66 59.9 −60.0 0.4	67 59.9 −60.0 0.4	68 59.9 −60.0 0.4	81
82	60 59.9 −60.0 0.3	61 59.9 −60.0 0.3	62 59.9 −60.0 0.3	63 59.9 −60.0 0.3	64 59.9 −60.0 0.3	65 59.9 −60.0 0.3	66 59.9 −60.0 0.4	67 59.9 −60.0 0.4	82
83	59 59.9 −60.0 0.2	60 59.9 −60.0 0.2	61 59.9 −60.0 0.3	62 59.9 −60.0 0.3	63 59.9 −60.0 0.3	64 59.9 −60.0 0.3	65 59.9 −60.0 0.3	66 59.9 −60.0 0.3	83
84	58 59.9 −60.0 0.2	59 59.9 −60.0 0.2	60 59.9 −60.0 0.2	61 59.9 −60.0 0.2	62 59.9 −59.9 0.2	63 59.9 −60.0 0.2	64 59.9 −60.0 0.3	65 59.9 −60.0 0.3	84
85	57 59.9 −59.9 0.2	58 59.9 −59.9 0.2	59 59.9 −59.9 0.2	60 59.9 −59.9 0.2	61 59.9 −59.9 0.2	62 59.9 −59.9 0.2	63 59.9 −59.9 0.2	64 59.9 −59.9 0.2	85
86	57 00.0 −60.0 0.1	58 00.0 −60.0 0.1	59 00.0 −60.0 0.1	60 00.0 −60.0 0.1	61 00.0 −60.0 0.1	62 00.0 −60.0 0.1	63 00.0 −60.0 0.2	64 00.0 −60.0 0.2	86
87	56 00.0 −60.0 0.1	57 00.0 −60.0 0.1	58 00.0 −60.0 0.1	59 00.0 −60.0 0.1	60 00.0 −60.0 0.1	61 00.0 −60.0 0.1	62 00.0 −60.0 0.1	63 00.0 −60.0 0.1	87
88	55 00.0 −60.0 0.1	56 00.0 −60.0 0.1	57 00.0 −60.0 0.1	58 00.0 −60.0 0.1	59 00.0 −60.0 0.1	60 00.0 −60.0 0.1	61 00.0 −60.0 0.1	62 00.0 −60.0 0.1	88
89	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	61 00.0 −60.0 0.0	89
90	53 00.0 −60.0 0.0	54 00.0 −60.0 0.0	55 00.0 −60.0 0.0	56 00.0 −60.0 0.0	57 00.0 −60.0 0.0	58 00.0 −60.0 0.0	59 00.0 −60.0 0.0	60 00.0 −60.0 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 59.6	−60.0	178.7	35 59.6	−60.0	178.8	34 59.6	−60.0	178.8	33 59.6	−59.9	178.8	32 59.7	−60.0	178.8	31 59.7	−60.0	178.8	30 59.7	−60.0	178.8	29 59.7	−60.0	178.8	0
1	35 59.6	−60.0	178.8	34 59.6	−60.0	178.8	33 59.6	−60.0	178.8	32 59.7	−60.0	178.8	31 59.7	−60.0	178.8	30 59.7	−60.0	178.8	29 59.7	−60.0	178.8	28 59.7	−60.0	178.9	1
2	34 59.6	−60.0	178.8	33 59.6	−60.0	178.8	32 59.6	−60.0	178.8	31 59.7	−60.0	178.8	30 59.7	−60.0	178.8	29 59.7	−60.0	178.8	28 59.7	−60.0	178.9	27 59.7	−60.0	178.9	2
3	33 59.6	−60.0	178.8	32 59.6	−60.0	178.8	31 59.6	−59.9	178.8	30 59.7	−60.0	178.8	29 59.7	−60.0	178.8	28 59.7	−60.0	178.9	27 59.7	−60.0	178.9	26 59.7	−60.0	178.9	3
4	32 59.6	−60.0	178.8	31 59.6	−60.0	178.8	30 59.7	−60.0	178.8	29 59.7	−60.0	178.8	28 59.7	−60.0	178.9	27 59.7	−60.0	178.9	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	4
5	31 59.6	−60.0	178.8	30 59.6	−60.0	178.8	29 59.7	−60.0	178.8	28 59.7	−60.0	178.9	27 59.7	−60.0	178.9	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	5
6	30 59.6	−60.0	178.8	29 59.6	−59.9	178.9	28 59.7	−60.0	178.9	27 59.7	−60.0	178.9	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	6
7	29 59.6	−60.0	178.9	28 59.7	−60.0	178.9	27 59.7	−60.0	178.9	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	7
8	28 59.6	−60.0	178.9	27 59.7	−60.0	178.9	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	21 59.7	−60.0	178.9	8
9	27 59.6	−59.9	178.9	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	21 59.7	−60.0	178.9	20 59.7	−60.0	178.9	9
10	26 59.7	−60.0	178.9	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	21 59.7	−60.0	178.9	20 59.7	−60.0	178.9	19 59.7	−60.0	178.9	10
11	25 59.7	−60.0	178.9	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	21 59.7	−60.0	178.9	20 59.7	−60.0	178.9	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	11
12	24 59.7	−60.0	178.9	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	21 59.7	−60.0	178.9	20 59.7	−60.0	179.0	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	12
13	23 59.7	−60.0	178.9	22 59.7	−60.0	178.9	21 59.7	−60.0	179.0	20 59.7	−60.0	179.0	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	13
14	22 59.7	−60.0	178.9	21 59.7	−60.0	179.0	20 59.7	−60.0	179.0	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14
15	21 59.7	−60.0	179.0	20 59.7	−60.0	179.0	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	15
16	20 59.7	−60.0	179.0	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	16
17	19 59.7	−60.0	179.0	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	12 59.7	−60.0	179.0	17
18	18 59.7	−60.0	179.0	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	12 59.7	−60.0	179.0	11 59.7	−60.0	179.0	18
19	17 59.7	−60.0	179.0	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	12 59.7	−60.0	179.0	11 59.7	−60.0	179.0	10 59.7	−59.9	179.0	19
20	16 59.7	−60.0	179.0	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	12 59.7	−60.0	179.0	11 59.7	−60.0	179.0	10 59.7	−60.0	179.0	9 59.8	−60.0	179.0	20
21	15 59.7	−60.0	179.0	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	12 59.7	−60.0	179.0	11 59.7	−60.0	179.0	10 59.7	−60.0	179.0	9 59.7	−60.0	179.1	8 59.8	−60.0	179.1	21
22	14 59.7	−60.0	179.0	13 59.7	−60.0	179.0	12 59.7	−60.0	179.0	11 59.7	−60.0	179.1	10 59.7	−60.0	179.1	9 59.7	−60.0	179.1	8 59.7	−60.0	179.1	7 59.8	−60.0	179.1	22
23	13 59.7	−60.0	179.1	12 59.7	−60.0	179.1	11 59.7	−60.0	179.1	10 59.7	−60.0	179.1	9 59.7	−60.0	179.1	8 59.7	−60.0	179.1	7 59.7	−59.9	179.1	6 59.8	−60.0	179.1	23
24	12 59.7	−60.0	179.1	11 59.7	−60.0	179.1	10 59.7	−60.0	179.1	9 59.7	−60.0	179.1	8 59.7	−60.0	179.1	7 59.7	−60.0	179.1	6 59.8	−60.0	179.1	5 59.8	−60.0	179.1	24
25	11 59.7	−60.0	179.1	10 59.7	−60.0	179.1	9 59.7	−60.0	179.1	8 59.7	−60.0	179.1	7 59.7	−60.0	179.1	6 59.7	−60.0	179.1	5 59.8	−60.0	179.1	4 59.8	−60.0	179.1	25
26	10 59.7	−60.0	179.1	9 59.7	−60.0	179.1	8 59.7	−60.0	179.1	7 59.7	−60.0	179.1	6 59.7	−60.0	179.1	5 59.7	−59.9	179.1	4 59.8	−60.0	179.1	3 59.8	−60.0	179.1	26
27	9 59.7	−60.0	179.1	8 59.7	−60.0	179.1	7 59.7	−60.0	179.1	6 59.7	−60.0	179.1	5 59.7	−60.0	179.1	4 59.8	−60.0	179.1	3 59.8	−60.0	179.1	2 59.8	−60.0	179.1	27
28	8 59.7	−60.0	179.1	7 59.7	−60.0	179.1	6 59.7	−60.0	179.1	5 59.7	−60.0	179.1	4 59.7	−60.0	179.1	3 59.8	−60.0	179.1	2 59.8	−60.0	179.1	1 59.8	−60.0	179.1	28
29	7 59.7	−60.0	179.1	6 59.7	−60.0	179.1	5 59.7	−60.0	179.1	4 59.7	−60.0	179.1	3 59.7	−59.9	179.1	2 59.8	−60.0	179.1	1 59.8	−60.0	179.1	0 59.8	−60.0	179.1	29
30	6 59.7	−60.0	179.1	5 59.7	−60.0	179.1	4 59.7	−60.0	179.1	3 59.7	−60.0	179.1	2 59.8	−60.0	179.1	1 59.8	−60.0	179.1	0 59.8	−60.0	179.1	0 00.2	+60.0	0.9	30
31	5 59.7	−60.0	179.1	4 59.7	−60.0	179.1	3 59.7	−60.0	179.1	2 59.7	−59.9	179.1	1 59.8	−60.0	179.1	0 59.8	−60.0	179.1	0 00.2	+60.0	0.9	1 00.2	+60.0	0.9	31
32	4 59.7	−60.0	179.1	3 59.7	−60.0	179.1	2 59.7	−60.0	179.2	1 59.8	−60.0	179.2	0 59.8	−60.0	179.2	0 00.2	+60.0	0.8	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	32
33	3 59.7	−60.0	179.2	2 59.7	−60.0	179.2	1 59.7	−59.9	179.2	0 59.8	−60.0	179.2	0 00.2	+60.0	0.8	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	33
34	2 59.7	−60.0	179.2	1 59.7	−60.0	179.2	0 59.8	−60.0	179.2	0 00.2	+60.0	0.8	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	34
35	1 59.7	−60.0	179.2	0 59.7	−59.9	179.2	0 00.2	+60.0	0.8	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	35
36	0 59.7	−60.0	179.2	0 00.2	+60.0	0.8	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	6 00.2	+60.0	0.8	36
37	0 00.3	+59.9	0.8	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	6 00.2	+60.0	0.8	7 00.2	+60.0	0.8	37
38	1 00.2	+60.0	0.8	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	6 00.2	+60.0	0.8	7 00.2	+60.0	0.8	8 00.2	+60.0	0.8	38
39	2 00.2	+60.0	0.8	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	6 00.2	+60.0	0.8	7 00.2	+60.0	0.8	8 00.2	+60.0	0.8	9 00.2	+60.0	0.8	39
40	3 00.2	+60.0	0.8	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	6 00.2	+60.0	0.8	7 00.2	+60.0	0.8	8 00.2	+60.0	0.8	9 00.2	+60.0	0.8	10 00.2	+60.0	0.8	40
41	4 00.2	+60.0	0.8	5 00.2	+60.0	0.8	6 00.2	+60.0	0.8	7 00.2	+60.0	0.8	8 00.2	+60.0	0.8	9 00.2	+60.0	0.8	10 00.2	+60.0	0.8	11 00.2	+60.0	0.8	41
42	5 00.2	+60.0	0.7	6 00.2	+60.0	0.7	7 00.2	+60.0	0.7	8 00.2	+60.0	0.8	9 00.2	+60.0	0.8	10 00.2	+60.0	0.8	11 00.2	+60.0	0.8	12 00.2	+60.0	0.8	42
43	6 00.2	+60.0	0.7	7 00.2	+60.0	0.7	8 00.2	+60.0	0.7	9 00.2	+60.0	0.7	10 00.2	+60.0	0.7	11 00.2	+60.0	0.7	12 00.2	+60.0	0.7	13 00.2	+60.0	0.8	43
44	7 00.2	+60.0	0.7	8 00.2	+60.0	0.7	9 00.2	+60.0	0.7	10 00.2	+60.0	0.7	11 00.2	+60.0	0.7	12 00.2	+60.0	0.7	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	44
45	8 00.2	+60.0	0.7	9 00.2	+60.0	0.7	10 00.2	+60.0	0.7	11 00.2	+60.0	0.7	12 00.2	+60.0	0.7	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	15 00.2	+60.0	0.7	45
46	9 00.2	+60.0	0.7	10 00.2	+60.0	0.7	11 00.2	+60.0	0.7	12 00.2	+60.0	0.7	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	15 00.2	+60.0	0.7	16 00.2	+60.0	0.7	46
47	10 00.2	+60.0	0.7	11 00.2	+60.0	0.7	12 00.2	+60.0	0.7	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	15 00.2	+60.0	0.7	16 00.2	+60.0	0.7	17 00.2	+60.0	0.7	47
48	11 00.2	+60.0	0.7	12 00.2	+60.0	0.7	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	15 00.2	+60.0	0.7	16 00.2	+60.0	0.7	17 00.2	+60.0	0.7	18 00.2	+60.0	0.7	48
49	12 00.2	+60.0	0.7	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	15 00.2	+60.0	0.7	16 00.2	+60.0	0.7	17 00.2	+60.0	0.7	18 00.2	+60.0	0.7	19 00.2	+60.0	0.7	49
50	13 00.2	+60.0	0.7	14 00.2	+60.0	0.7	15 00.2	+60.0	0.7	16 00.2	+60.0	0.7	17 00.2	+60.0	0.7	18 00.2	+60.0	0.7	19 00.2	+60.0	0.7	20 00.2	+60.0	0.7	50
51	14 00.2	+60.0	0.6	15 00.2	+60.0	0.6	16 00.2	+60.0	0.6	17 00.2	+60.0	0.6	18 00.2	+60.0	0.7	19 00.2	+60.0	0.7	20 00.2	+60.0	0.7	21 00.2	+60.0	0.7	51
52	15 00.2	+60.0	0.6	16 00.2	+60.0	0.6	17 00.2	+60.0	0.6	18 00.2	+60.0	0.6	19 00.2	+60.0	0.6	20 00.2	+60.0	0.6	21 00.2	+60.0	0.7	22 00.2	+60.0	0.7	52
53	16 00.2	+60.0	0.6	17 00.2	+60.0	0.6	18 00.2	+60.0	0.6	19 00.2	+60.0	0.6	20 00.2	+60.0	0.6	21 00.2	+60.0	0.6	22 00.2	+60.0	0.6	23 00.2	+60.0	0.7	53
54	17 00.2	+60.0	0.6	18 00.2	+60.0	0.6	19 00.2	+60.0	0.6	20 00.2	+60.0	0.6	21 00.2	+60.0	0.6	22 00.2	+60.0	0.6	23 00.2	+60.0	0.6	24 00.2	+60.0	0.6	54
55	18 00.2	+60.0	0.6	19 00.2	+60.0	0.6	20 00.2	+60.0	0.6	21 00.2	+60.0	0.6	22 00.2	+60.0	0.6	23 00.2	+60.0	0.6	24 00.2	+60.0	0.6	25 00.2	+60.0	0.6	55
56	19 00.2	+60.0	0.6	20 00.2	+60.0	0.6	21 00.2	+60.0	0.6	22 00.2	+60.0	0.6	23 00.2	+60.0	0.6	24 00.2	+60.0	0.6	25 00.2	+60.0	0.6	26 00.2	+60.0	0.6	56
57	20 00.2	+60.0	0.6	21 00.2	+60.0	0.6	22 00.2	+60.0	0.6	23 00.2	+60.0	0.6	24 00.2	+60.0	0.6	25 00.2	+60.0	0.6	26 00.2	+60.0	0.6	27 00.2	+60.0	0.6	57
58	21 00.2	+60.0	0.6	22 00.2	+60.0	0.6	23 00.2	+60.0	0.6	24 00.2	+60.0	0.6	25 00.2	+60.0	0.6	26 00.2	+60.0	0.6	27 00.2	+60.0	0.6	28 00.2	+60.0	0.6	58
59	22 00.2	+60.0	0.6	23 00.2	+60.0	0.6	24 00.2	+60.0	0.6	25 00.2	+60.0	0.6	26 00.2	+60.0	0.6	27 00.2	+60.0	0.6	28 00.2	+60.0	0.6	29 00.2	+60.0	0.6	59
60	23 00.2	+60.0	0.5	24 00.2	+60.0	0.5	25 00.2	+60.0	0.5	26 00.2	+60.0	0.5	27 00.2	+60.0	0.6	28 00.2	+60.0	0.6	29 00.2	+60.0	0.6	30 00.2	+59.9	0.6	60
61	24 00.2	+60.0	0.5	25 00.2	+60.0	0.5	26 00.2	+60.0	0.5	27 00.2	+60.0	0.5	28 00.2	+60.0	0.5	29 00.2	+60.0	0.6	30 00.2	+59.9	0.6	31 00.1	+60.0	0.6	61
62	25 00.2	+60.0	0.5	26 00.2	+60.0	0.5	27 00.2	+60.0	0.5	28 00.2	+60.0	0.5	29 00.2	+59.9	0.5	30 00.2	+59.9	0.5	31 00.1	+60.0	0.5	32 00.1	+60.0	0.6	62
63	26 00.2	+60.0	0.5	27 00.2	+60.0	0.5	28 00.2	+60.0	0.5	29 00.2	+59.9	0.5	30 00.1	+60.0	0.5	31 00.1	+60.0	0.5	32 00.1	+60.0	0.5	33 00.1	+60.0	0.5	63
64	27 00.2	+60.0	0.5	28 00.2	+59.9	0.5	29 00.2	+59.9	0.5	30 00.1	+60.0	0.5	31 00.1	+60.0	0.5	32 00.1	+60.0	0.5	33 00.1	+60.0	0.5	34 00.1	+60.0	0.5	64
65	28 00.2	+59.9	0.5	29 00.1	+60.0	0.5	30 00.1	+60.0	0.5	31 00.1	+60.0	0.5	32 00.1	+60.0	0.5	33 00.1	+60.0	0.5	34 00.1	+60.0	0.5	35 00.1	+60.0	0.5	65
66	29 00.1	+60.0	0.5	30 00.1	+60.0	0.5	31 00.1	+60.0	0.5	32 00.1	+60.0	0.5	33 00.1	+60.0	0.5	34 00.1	+60.0	0.5	35 00.1	+60.0	0.5	36 00.1	+60.0	0.5	66
67	30 00.1	+60.0	0.5	31 00.1	+60.0	0.5	32 00.1	+60.0	0.5	33 00.1	+60.0	0.5	34 00.1	+60.0	0.5	35 00.1	+60.0	0.5	36 00.1	+60.0	0.5	37 00.1	+60.0	0.5	67
68	31 00.1	+60.0	0.4	32 00.1	+60.0	0.4	33 00.1	+60.0	0.4	34 00.1	+60.0	0.4	35 00.1	+60.0	0.5	36 00.1	+60.0	0.5	37 00.1	+60.0	0.5	38 00.1	+60.0	0.5	68
69	32 00.1	+60.0	0.4	33 00.1	+60.0	0.4	34 00.1	+60.0	0.4	35 00.1	+60.0	0.4	36 00.1	+60.0	0.4	37 00.1	+60.0	0.4	38 00.1	+60.0	0.5	39 00.1	+60.0	0.5	69
70	33 00.1	+60.0	0.4	34 00.1	+60.0	0.4	35 00.1	+60.0	0.4	36 00.1	+60.0	0.4	37 00.1	+60.0	0.4	38 00.1	+60.0	0.4	39 00.1	+60.0	0.4	40 00.1	+60.0	0.4	70
71	34 00.1	+60.0	0.4	35 00.1	+60.0	0.4	36 00.1	+60.0	0.4	37 00.1	+60.0	0.4	38 00.1	+60.0	0.4	39 00.1	+60.0	0.4	40 00.1	+60.0	0.4	41 00.1	+60.0	0.4	71
72	35 00.1	+60.0	0.4	36 00.1	+60.0	0.4	37 00.1	+60.0	0.4	38 00.1	+60.0	0.4	39 00.1	+60.0	0.4	40 00.1	+60.0	0.4	41 00.1	+60.0	0.4	42 00.1	+60.0	0.4	72
73	36 00.1	+60.0	0.4	37 00.1	+60.0	0.4	38 00.1	+60.0	0.4	39 00.1	+60.0	0.4	40 00.1	+60.0	0.4	41 00.1	+60.0	0.4	42 00.1	+60.0	0.4	43 00.1	+60.0	0.4	73
74	37 00.1	+60.0	0.3	38 00.1	+60.0	0.3	39 00.1	+60.0	0.4	40 00.1	+60.0	0.4	41 00.1	+60.0	0.4	42 00.1	+60.0	0.4	43 00.1	+60.0	0.4	44 00.1	+60.0	0.4	74
75	38 00.1	+60.0	0.3	39 00.1	+60.0	0.3	40 00.1	+60.0	0.3	41 00.1	+60.0	0.3	42 00.1	+60.0	0.3	43 00.1	+60.0	0.3	44 00.1	+60.0	0.3	45 00.1	+60.0	0.4	75
76	39 00.1	+60.0	0.3	40 00.1	+60.0	0.3	41 00.1	+60.0	0.3	42 00.1	+60.0	0.3	43 00.1	+60.0	0.3	44 00.1	+60.0	0.3	45 00.1	+60.0	0.3	46 00.1	+60.0	0.3	76
77	40 00.1	+60.0	0.3	41 00.1	+60.0	0.3	42 00.1	+60.0	0.3	43 00.1	+60.0	0.3	44 00.1	+60.0	0.3	45 00.1	+60.0	0.3	46 00.1	+60.0	0.3	47 00.1	+60.0	0.3	77
78	41 00.1	+60.0	0.3	42 00.1	+60.0	0.3	43 00.1	+60.0	0.3	44 00.1	+60.0	0.3	45 00.1	+60.0	0.3	46 00.1	+60.0	0.3	47 00.1	+60.0	0.3	48 00.1	+60.0	0.3	78
79	42 00.1	+60.0	0.3	43 00.1	+60.0	0.3	44 00.1	+60.0	0.3	45 00.1	+60.0	0.3	46 00.1	+60.0	0.3	47 00.1	+60.0	0.3	48 00.1	+60.0	0.3	49 00.1	+60.0	0.3	79
80	43 00.1	+60.0	0.2	44 00.1	+60.0	0.2	45 00.1	+60.0	0.2	46 00.1	+60.0	0.2	47 00.1	+60.0	0.2	48 00.1	+60.0	0.2	49 00.1	+60.0	0.3	50 00.1	+60.0	0.3	80
81	44 00.1	+60.0	0.2	45 00.1	+60.0	0.2	46 00.1	+60.0	0.2	47 00.1	+60.0	0.2	48 00.1	+60.0	0.2	49 00.1	+60.0	0.2	50 00.1	+60.0	0.2	51 00.1	+60.0	0.2	81
82	45 00.1	+60.0	0.2	46 00.1	+60.0	0.2	47 00.1	+60.0	0.2	48 00.1	+60.0	0.2	49 00.1	+60.0	0.2	50 00.1	+60.0	0.2	51 00.1	+60.0	0.2	52 00.1	+60.0	0.2	82
83	46 00.1	+59.9	0.2	47 00.1	+59.9	0.2	48 00.1	+59.9	0.2	49 00.1	+59.9	0.2	50 00.1	+59.9	0.2	51 00.1	+59.9	0.2	52 00.1	+59.9	0.2	53 00.1	+59.9	0.2	83
84	47 00.1	+60.0	0.2	48 00.0	+60.0	0.2	49 00.0	+60.0	0.2	50 00.0	+60.0	0.2	51 00.0	+60.0	0.2	52 00.0	+60.0	0.2	53 00.0	+60.0	0.2	54 00.0	+60.0	0.2	84
85	48 00.0	+60.0	0.1	49 00.0	+60.0	0.1	50 00.0	+60.0	0.1	51 00.0	+60.0	0.1	52 00.0	+60.0	0.1	53 00.0	+60.0	0.1	54 00.0	+60.0	0.1	55 00.0	+60.0	0.1	85
86	49 00.0	+60.0	0.1	50 00.0	+60.0	0.1	51 00.0	+60.0	0.1	52 00.0	+60.0	0.1	53 00.0	+60.0	0.1	54 00.0	+60.0	0.1	55 00.0	+60.0	0.1	56 00.0	+60.0	0.1	86
87	50 00.0	+60.0	0.1	51 00.0	+60.0	0.1	52 00.0	+60.0	0.1	53 00.0	+60.0	0.1	54 00.0	+60.0	0.1	55 00.0	+60.0	0.1	56 00.0	+60.0	0.1	57 00.0	+60.0	0.1	87
88	51 00.0	+60.0	0.1	52 00.0	+60.0	0.1	53 00.0	+60.0	0.1	54 00.0	+60.0	0.1	55 00.0	+60.0	0.1	56 00.0	+60.0	0.1	57 00.0	+60.0	0.1	58 00.0	+60.0	0.1	88
89	52 00.0	+60.0	0.0	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	89
90	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 179°, 181°**

2°, 358° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°−Z

Dec.	53°			54°			55°			56°			57°			58°			59°			60°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	36 58.4	+60.0	177.5	35 58.5	+60.0	177.5	34 58.5	+60.0	177.6	33 58.6	+60.0	177.6	32 58.6	+60.0	177.6	31 58.7	+60.0	177.6	30 58.7	+60.0	177.7	29 58.8	+60.0	177.7	0
1	37 58.4	+60.0	177.5	36 58.5	+59.9	177.5	35 58.5	+60.0	177.6	34 58.6	+60.0	177.6	33 58.6	+60.0	177.6	32 58.7	+60.0	177.6	31 58.7	+60.0	177.7	30 58.8	+60.0	177.7	1
2	38 58.4	+60.0	177.5	37 58.4	+60.0	177.5	36 58.5	+60.0	177.5	35 58.6	+59.9	177.5	34 58.6	+60.0	177.6	33 58.7	+59.9	177.6	32 58.7	+60.0	177.6	31 58.8	+60.0	177.6	2
3	39 58.4	+59.9	177.4	38 58.4	+60.0	177.4	37 58.5	+60.0	177.5	36 58.5	+60.0	177.5	35 58.6	+60.0	177.5	34 58.6	+60.0	177.5	33 58.7	+60.0	177.6	32 58.8	+59.9	177.6	3
4	40 58.3	+60.0	177.4	39 58.4	+60.0	177.4	38 58.5	+59.9	177.4	37 58.5	+60.0	177.5	36 58.6	+60.0	177.5	35 58.6	+60.0	177.5	34 58.7	+60.0	177.6	33 58.7	+60.0	177.6	4
5	41 58.3	+60.0	177.3	40 58.4	+60.0	177.4	39 58.4	+60.0	177.4	38 58.5	+60.0	177.4	37 58.6	+59.9	177.5	36 58.6	+60.0	177.5	35 58.7	+60.0	177.5	34 58.7	+60.0	177.6	5
6	42 58.3	+60.0	177.3	41 58.4	+59.9	177.3	40 58.4	+60.0	177.4	39 58.5	+60.0	177.4	38 58.5	+60.0	177.4	37 58.6	+60.0	177.5	36 58.7	+59.9	177.5	35 58.7	+60.0	177.5	6
7	43 58.3	+59.9	177.2	42 58.3	+60.0	177.3	41 58.4	+60.0	177.3	40 58.5	+59.9	177.4	39 58.5	+60.0	177.4	38 58.6	+60.0	177.4	37 58.6	+60.0	177.5	36 58.7	+60.0	177.5	7
8	44 58.2	+60.0	177.2	43 58.3	+60.0	177.2	42 58.4	+59.9	177.3	41 58.4	+60.0	177.3	40 58.5	+60.0	177.4	39 58.6	+59.9	177.4	38 58.6	+60.0	177.5	37 58.7	+60.0	177.5	8
9	45 58.2	+60.0	177.1	44 58.3	+60.0	177.2	43 58.4	+59.9	177.3	42 58.4	+60.0	177.3	41 58.5	+60.0	177.3	40 58.5	+60.0	177.4	39 58.6	+60.0	177.4	38 58.7	+60.0	177.5	9
10	46 58.2	+59.9	177.1	45 58.3	+59.9	177.2	44 58.3	+60.0	177.2	43 58.4	+60.0	177.3	42 58.5	+59.9	177.3	41 58.5	+60.0	177.4	40 58.6	+60.0	177.4	39 58.7	+59.9	177.4	10
11	47 58.2	+59.9	177.1	46 58.2	+60.0	177.1	45 58.3	+60.0	177.2	44 58.4	+60.0	177.2	43 58.4	+60.0	177.3	42 58.5	+60.0	177.3	41 58.6	+60.0	177.4	40 58.6	+60.0	177.4	11
12	48 58.1	+60.0	177.0	47 58.2	+60.0	177.1	46 58.3	+60.0	177.1	45 58.4	+59.9	177.2	44 58.4	+60.0	177.2	43 58.5	+60.0	177.3	42 58.6	+59.9	177.3	41 58.6	+60.0	177.4	12
13	49 58.1	+59.9	177.0	48 58.2	+59.9	177.0	47 58.3	+59.9	177.1	46 58.3	+60.0	177.1	45 58.4	+60.0	177.2	44 58.5	+59.9	177.2	43 58.5	+60.0	177.3	42 58.6	+60.0	177.3	13
14	50 58.1	+59.9	176.9	49 58.1	+60.0	177.0	48 58.2	+60.0	177.0	47 58.3	+60.0	177.1	46 58.4	+59.9	177.2	45 58.5	+59.9	177.2	44 58.5	+60.0	177.3	43 58.6	+60.0	177.3	14
15	51 58.0	+60.0	176.9	50 58.1	+60.0	176.9	49 58.2	+60.0	177.0	48 58.3	+59.9	177.1	47 58.4	+59.9	177.1	46 58.4	+60.0	177.2	45 58.5	+60.0	177.2	44 58.6	+60.0	177.3	15
16	52 58.0	+60.0	176.8	51 58.1	+59.9	176.9	50 58.2	+59.9	176.9	49 58.2	+60.0	177.0	48 58.3	+60.0	177.1	47 58.4	+60.0	177.1	46 58.5	+60.0	177.1	45 58.6	+59.9	177.2	16
17	53 58.0	+59.9	176.7	52 58.0	+60.0	176.8	51 58.1	+60.0	176.9	50 58.2	+60.0	177.0	49 58.3	+60.0	177.0	48 58.4	+60.0	177.1	47 58.5	+59.9	177.1	46 58.5	+60.0	177.2	17
18	54 57.9	+60.0	176.7	53 58.0	+60.0	176.8	52 58.1	+60.0	176.8	51 58.2	+60.0	176.9	50 58.3	+59.9	177.0	49 58.4	+60.0	177.0	48 58.4	+60.0	177.1	47 58.5	+60.0	177.2	18
19	55 57.9	+59.9	176.6	54 58.0	+59.9	176.7	53 58.1	+59.9	176.8	52 58.2	+59.9	176.9	51 58.2	+60.0	176.9	50 58.3	+60.0	177.0	49 58.4	+60.0	177.0	48 58.5	+59.9	177.1	19
20	56 57.8	+60.0	176.6	55 57.9	+60.0	176.6	54 58.0	+60.0	176.7	53 58.1	+60.0	176.8	52 58.2	+59.9	176.9	51 58.3	+60.0	176.9	50 58.4	+60.0	177.0	49 58.5	+59.9	177.1	20
21	57 57.8	+59.9	176.5	56 57.9	+59.9	176.6	55 58.0	+60.0	176.7	54 58.1	+60.0	176.7	53 58.2	+60.0	176.8	52 58.3	+59.9	176.9	51 58.4	+59.9	177.0	50 58.4	+60.0	177.0	21
22	58 57.7	+60.0	176.4	57 57.8	+60.0	176.5	56 58.0	+59.9	176.6	55 58.1	+59.9	176.7	54 58.2	+59.9	176.8	53 58.2	+60.0	176.8	52 58.3	+60.0	176.9	51 58.4	+60.0	177.0	22
23	59 57.7	+59.9	176.3	58 57.8	+60.0	176.4	57 57.9	+60.0	176.5	56 58.0	+60.0	176.6	55 58.1	+60.0	176.7	54 58.2	+60.0	176.8	53 58.3	+60.0	176.9	52 58.4	+59.9	176.9	23
24	60 57.6	+60.0	176.2	59 57.8	+59.9	176.3	58 57.9	+59.9	176.5	57 58.0	+59.9	176.6	56 58.1	+59.9	176.6	55 58.2	+60.0	176.7	54 58.3	+60.0	176.8	53 58.4	+59.9	176.9	24
25	61 57.6	+59.9	176.1	60 57.7	+59.9	176.2	59 57.8	+59.9	176.4	58 57.9	+59.9	176.5	57 58.1	+59.9	176.6	56 58.2	+59.9	176.6	55 58.3	+59.9	176.7	54 58.3	+60.0	176.8	25
26	62 57.5	+59.9	176.0	61 57.6	+60.0	176.2	60 57.8	+59.9	176.3	59 57.9	+59.9	176.4	58 58.0	+59.9	176.5	57 58.1	+60.0	176.6	56 58.2	+60.0	176.7	55 58.3	+60.0	176.8	26
27	63 57.4	+60.0	175.9	62 57.6	+59.9	176.1	61 57.7	+60.0	176.2	60 57.8	+60.0	176.3	59 58.0	+59.9	176.4	58 58.1	+59.9	176.5	57 58.2	+60.0	176.6	56 58.3	+59.9	176.7	27
28	64 57.4	+59.9	175.8	63 57.5	+60.0	176.0	62 57.7	+59.9	176.1	61 57.8	+59.9	176.2	60 57.9	+60.0	176.4	59 58.0	+60.0	176.5	58 58.2	+59.9	176.5	57 58.3	+59.9	176.7	28
29	65 57.3	+59.9	175.7	64 57.5	+59.9	175.9	63 57.6	+59.9	176.0	62 57.7	+60.0	176.1	61 57.9	+59.9	176.3	60 58.0	+59.9	176.4	59 58.1	+60.0	176.5	58 58.2	+60.0	176.6	29
30	66 57.2	+59.9	175.6	65 57.4	+59.9	175.7	64 57.5	+60.0	175.9	63 57.7	+59.9	176.1	62 57.8	+60.0	176.2	61 58.0	+59.9	176.3	60 58.1	+60.0	176.4	59 58.2	+59.9	176.5	30
31	67 57.1	+59.9	175.4	66 57.3	+59.9	175.6	65 57.4	+60.0	175.8	64 57.6	+59.9	175.9	63 57.8	+59.9	176.1	62 57.9	+59.9	176.2	61 58.0	+59.9	176.3	60 58.1	+60.0	176.5	31
32	68 57.0	+59.9	175.3	67 57.2	+59.9	175.5	66 57.4	+59.9	175.7	65 57.5	+59.9	175.8	64 57.7	+59.9	176.0	63 57.9	+59.9	176.1	62 58.0	+59.9	176.3	61 58.1	+60.0	176.4	32
33	69 56.9	+59.9	175.1	68 57.1	+59.9	175.3	67 57.3	+59.9	175.5	66 57.5	+59.9	175.7	65 57.6	+60.0	175.9	64 57.8	+59.9	176.0	63 57.9	+60.0	176.2	62 58.1	+59.9	176.3	33
34	70 56.8	+59.9	174.9	69 57.0	+59.9	175.2	68 57.2	+59.9	175.4	67 57.4	+59.9	175.6	66 57.6	+59.9	175.8	65 57.7	+60.0	175.9	64 57.9	+59.9	176.1	63 58.0	+60.0	176.2	34
35	71 56.7	+59.8	174.7	70 56.9	+59.9	175.0	69 57.1	+59.9	175.2	68 57.3	+59.9	175.4	67 57.5	+59.9	175.6	66 57.7	+59.9	175.8	65 57.8	+60.0	176.0	64 58.0	+59.9	176.1	35
36	72 56.5	+59.9	174.5	71 56.8	+59.8	174.8	70 57.0	+59.9	175.0	69 57.2	+59.9	175.3	68 57.4	+59.9	175.5	67 57.6	+59.9	175.7	66 57.7	+59.9	175.9	65 57.9	+60.0	176.0	36
37	73 56.4	+59.9	174.2	72 56.6	+59.9	174.6	71 56.9	+59.8	174.8	70 57.1	+59.9	175.1	69 57.3	+59.9	175.3	68 57.5	+59.9	175.5	67 57.7	+59.9	175.7	66 57.9	+59.9	175.9	37
38	74 56.2	+59.8	173.9	73 56.5	+59.8	174.3	72 56.8	+59.8	174.6	71 57.0	+59.9	174.9	70 57.2	+59.9	175.2	69 57.4	+60.0	175.4	68 57.6	+59.9	175.6	67 57.8	+59.9	175.8	38
39	75 56.0	+59.7	173.6	74 56.3	+59.8	174.0	73 56.6	+59.9	174.4	72 56.9	+59.8	174.7	71 57.1	+59.9	175.0	70 57.4	+59.9	175.2	69 57.6	+59.9	175.5	68 57.7	+60.0	175.7	39
40	76 55.7	+59.7	173.2	75 56.1	+59.8	173.7	74 56.5	+59.8	174.1	73 56.8	+59.8	174.5	72 57.0	+59.9	174.8	71 57.3	+59.8	175.0	70 57.5	+59.9	175.3	69 57.7	+59.9	175.5	40
41	77 55.4	+59.7	172.8	76 55.9	+59.7	173.3	75 56.3	+59.7	173.8	74 56.6	+59.8	174.2	73 56.9	+59.8	174.5	72 57.1	+59.9	174.8	71 57.4	+59.9	175.1	70 57.6	+59.9	175.3	41
42	78 55.1	+59.6	172.2	77 55.6	+59.7	172.9	76 56.0	+59.8	173.4	75 56.4	+59.8	173.9	74 56.7	+59.8	174.3	73 57.0	+59.8	174.6	72 57.3	+59.8	174.9	71 57.5	+59.9	175.2	42
43	79 54.7	+59.5	171.6	78 55.3	+59.6	172.3	77 55.8	+59.7	173.0	76 56.2	+59.8	173.5	75 56.6	+59.8	174.0	74 56.9	+59.8	174.4	73 57.1	+59.9	174.7	72 57.4	+59.8	175.0	43
44	80 54.2	+59.4	170.9	79 54.9	+59.6	171.8	78 55.5	+59.6	172.5	77 56.0	+59.7	173.1	76 56.4	+59.7	173.6	75 56.7	+59.8	174.1	74 57.0	+59.9	174.5	73 57.3	+59.8	174.8	44
45	81 53.6	+59.3	169.9	80 54.5	+59.4	171.0	79 55.1	+59.6	171.9	78 55.7	+59.6	172.6	77 56.1	+59.7	173.2	76 56.5	+59.8	173.7	75 56.9	+59.8	174.2	74 57.1	+59.9	174.5	45
46	82 52.9	+59.0	168.7	81 53.9	+59.3	170.1	80 54.7	+59.4	171.2	79 55.3	+59.6	172.0	78 55.9	+59.6	172.7	77 56.3	+59.7	173.3	76 56.7	+59.8	173.8	75 57.0	+59.8	174.3	46
47	83 51.9	+58.7	167.1	82 53.2	+59.0	168.9	81 54.1	+59.3	170.3	80 54.9	+59.5	171.3	79 55.5	+59.6	172.2	78 56.0	+59.7	172.9	77 56.5	+59.7	173.5	76 56.8	+59.8	174.0	47
48	84 50.5	+57.9	164.9	83 52.2	+58.7	167.4	82 53.5	+59.0	169.1	81 54.4	+59.3	170.5	80 55.1	+59.5	171.5	79 55.7	+59.7	172.3	78 56.2	+59.7	173.0	77 56.6	+59.8	173.6	48
49	85 48.4	+56.7	161.8	84 50.9	+58.0	165.2	83 52.5	+58.8	167.6	82 53.7	+59.2	169.3	81 54.7	+59.3	170.6	80 55.4	+59.5	171.7	79 55.9	+59.7	172.5	78 56.4	+59.7	173.1	49
50	86 45.1	+54.0•	156.7	85 48.9	+56.9	162.1	84 51.3	+58.1	165.5	83 52.9	+58.8	167.9	82 54.0	+59.2	169.5	81 54.9	+59.4	170.8	80 55.6	+59.5	171.8	79 56.1	+59.7	172.6	50
51	87 39.1	+46.4•	147.6	86 45.8	+54.2•	157.1	85 49.4	+57.0	162.4	84 51.7	+58.2	165.8	83 53.2	+58.8	168.1	82 54.3	+59.2	169.8	81 55.1	+59.5	171.0	80 55.7	+59.6	172.0	51
52	88 25.5	+22.3•	128.6	87 40.0	+46.8•	148.2	86 46.4	+54.4•	157.6	85 49.9	+57.1	162.8	84 52.0	+58.4	166.1	83 53.5	+58.9	168.3	82 54.6	+59.2	170.0	81 55.4	+59.5	171.2	52
53	88 47.8	−21.0•	89.2	88 26.8	+22.7•	129.2	87 40.8	+47.3•	148.7	86 47.0	+54.7•	158.0	85 50.0	+57.3	163.2	84 52.4	+58.4	166.4	83 53.8	+59.0	168.6	82 54.9	+59.0	168.9	53
54	88 26.8	−46.0•	49.1	88 49.5	−21.4•	89.2	88 28.1	+23.1•	129.9	87 41.7	+47.6•	149.3	86 47.6	+54.9•	158.5	85 50.8	+57.4	163.5	84 52.8	+58.5	166.7	83 54.2	+59.0	168.9	54
55	87 40.8	−53.8•	29.6	88 28.1	−46.4•	48.5	88 51.2	−21.9•	89.2	88 29.3	+23.6•	130.6	87 42.5	+48.1•	150.0	86 48.2	+55.2•	159.0	85 51.3	+57.5	163.9	84 53.2	+58.5	167.0	55
56	86 47.0	−56.6•	20.4	87 41.7	−54.1•	29.0	88 29.3	−46.8•	47.7	88 52.9	−22.3•	89.2	88 30.6	+24.0•	131.3	87 43.4	+48.5•	150.5	86 48.8	+55.4•	159.3	85 51.7	+57.7	164.3	56
57	85 50.4	−58.0	15.2	86 47.6	−56.8	19.9	87 42.5	−54.3•	28.4	88 30.6	−47.2•	47.0	88 54.6	−22.7•	89.2	88 31.9	+24.5•	132.1	87 44.2	+49.0•	151.2	86 49.4	+55.6•	159.9	57
58	84 52.4	−58.6	11.9	85 50.8	−58.0	14.8	86 48.2	−56.9	19.4	87 43.4	−54.6•	27.7	88 31.9	−47.7•	46.2	88 56.4	−23.2•	89.2	88 33.2	+25.0•	132.9	87 45.0	+49.5•	151.9	58
59	83 53.8	−58.9	9.7	84 52.4	−58.6	11.6	85 51.3	−58.1	14.4	86 48.7	−57.1	18.9	87 44.2	−54.8•	27.1	88 33.2	−48.2•	45.4	88 58.3	−23.7•	89.1	88 34.5	+25.5•	133.7	59
60	82 54.9	−59.3	8.1	83 54.2	−59.1	9.5	84 53.2	−58.7	11.3	85 51.7	−58.1	14.0	86 49.4	−57.2	18.4	87 45.0	−55.0•	26.4	88 34.5	−48.6•	44.6	89 00.0	−24.2•	89.1	60
61	81 55.6	−59.4	6.9	82 55.1	−59.2	7.9	83 54.5	−59.1	9.2	84 53.6	−58.8	11.0	85 52.2	−58.3	13.6	86 50.0	−57.4	17.8	87 45.9	−55.3•	25.7	88 35.8	−49.1•	43.7	61
62	80 56.2	−59.5	6.0	81 55.9	−59.5	6.7	82 55.7	−59.4	7.6	83 54.9	−58.8	8.9	84 53.9	−58.8	10.6	85 52.6	−58.3	13.2	86 50.6	−57.5	17.3	87 46.7	−55.6•	25.0	62
63	79 56.7	−59.6	5.2	80 56.4	−59.5	5.8	81 56.1	−59.5	6.5	82 55.7	−59.4	7.4	83 55.1	−59.0	8.6	84 54.3	−58.9	10.3	85 53.1	−58.5	12.8	86 51.1	−57.6	16.8	63
64	78 57.1	−59.7	4.6	79 56.9	−59.6	5.0	80 56.6	−59.5	5.6	81 56.3	−59.5	6.3	82 55.9	−59.4	7.1	83 55.4	−59.2	8.3	84 54.6	−58.9	9.9	85 53.5	−58.5	12.3	64
65	77 57.4	−59.7	4.1	78 57.3	−59.7	4.4	79 57.1	−59.6	4.8	80 56.8	−59.5	5.4	81 56.5	−59.5	6.0	82 56.2	−59.4	6.9	83 55.7	−59.3	8.0	84 55.1	−59.0	9.6	65
66	76 57.7	−59.7	3.6	77 57.6	−59.7	3.9	78 57.4	−59.7	4.3	79 57.3	−59.7	4.7	80 57.0	−59.6	5.2	81 56.8	−59.5	5.8	82 56.4	−59.3	6.6	83 55.9	−59.2	7.7	66
67	75 58.0	−59.8	3.2	76 57.9	−59.8	3.5	77 57.7	−59.7	3.7	78 57.6	−59.7	4.1	79 57.4	−59.6	4.5	80 57.2	−59.6	5.0	81 57.0	−59.6	5.6	82 56.7	−59.5	6.4	67
68	74 58.2	−59.8	2.9	75 58.1	−59.8	3.1	76 58.0	−59.8	3.3	77 57.8	−59.7	3.6	78 57.7	−59.7	3.9	79 57.5	−59.7	4.3	80 57.4	−59.6	4.8	81 57.2	−59.6	5.4	68
69	73 58.4	−59.9	2.6	74 58.3	−59.8	2.8	75 58.2	−59.8	3.0	76 58.1	−59.8	3.2	77 58.0	−59.7	3.4	78 57.9	−59.7	3.7	79 57.8	−59.7	4.1	80 57.6	−59.7	4.6	69
70	72 58.5	−59.8	2.3	73 58.5	−59.9	2.5	74 58.4	−59.8	2.6	75 58.3	−59.8	2.8	76 58.3	−59.8	3.0	77 58.2	−59.8	3.3	78 58.1	−59.8	3.6	79 57.9	−59.7	3.9	70
71	71 58.7	−59.9	2.1	72 58.6	−59.8	2.2	73 58.6	−59.9	2.4	74 58.5	−59.8	2.5	75 58.5	−59.9	2.7	76 58.3	−59.8	2.9	77 58.3	−59.8	3.1	78 58.2	−59.8	3.4	71
72	70 58.8	−59.9	1.9	71 58.8	−59.9	2.0	72 58.7	−59.9	2.1	73 58.7	−59.9	2.2	74 58.6	−59.9	2.4	75 58.6	−59.9	2.6	76 58.5	−59.9	2.7	77 58.4	−59.8	3.0	72
73	69 58.9	−59.9	1.7	70 58.9	−59.9	1.8	71 58.9	−59.9	1.9	72 58.8	−59.9	2.0	73 58.8	−59.9	2.1	74 58.7	−59.9	2.3	75 58.7	−59.9	2.4	76 58.6	−59.8	2.6	73
74	68 59.0	−59.9	1.5	69 59.0	−59.9	1.6	70 59.0	−59.9	1.7	71 59.0	−59.9	1.8	72 58.9	−59.9	1.9	73 58.9	−59.9	2.0	74 58.9	−59.9	2.1	75 58.8	−59.8	2.3	74
75	67 59.1	−59.9	1.4	68 59.1	−59.9	1.4	69 59.1	−59.9	1.5	70 59.1	−59.8	1.6	71 59.0	−59.8	1.6	72 59.0	−59.9	1.8	73 59.0	−59.9	1.9	74 59.0	−59.9	2.0	75
76	66 59.2	−59.9	1.2	67 59.2	−59.9	1.3	68 59.2	−59.9	1.3	69 59.2	−59.9	1.4	70 59.2	−59.8	1.5	71 59.1	−59.9	1.6	72 59.1	−59.9	1.7	73 59.1	−59.9	1.8	76
77	65 59.3	−59.9	1.1	66 59.3	−59.9	1.2	67 59.3	−59.9	1.2	68 59.3	−60.0	1.3	69 59.3	−60.0	1.3	70 59.2	−59.9	1.4	71 59.2	−59.9	1.5	72 59.2	−59.9	1.5	77
78	64 59.4	−60.0	1.0	65 59.4	−60.0	1.0	66 59.4	−59.9	1.1	67 59.4	−59.9	1.1	68 59.3	−59.9	1.2	69 59.3	−59.9	1.3	70 59.3	−59.9	1.3	71 59.3	−59.9	1.2	78
79	63 59.5	−60.0	0.9	64 59.4	−60.0	0.9	65 59.4	−59.9	0.9	66 59.4	−59.9	1.0	67 59.4	−59.9	1.0	68 59.4	−59.9	1.1	69 59.4	−59.9	1.1	70 59.4	−59.9	1.2	79
80	62 59.5	−59.9	0.8	63 59.5	−59.9	0.8	64 59.5	−59.9	0.8	65 59.5	−59.9	0.9	66 59.5	−59.9	0.9	67 59.5	−59.9	0.9	68 59.5	−60.0	1.0	69 59.5	−60.0	1.0	80
81	61 59.6	−59.9	0.7	62 59.6	−59.9	0.7	63 59.6	−59.9	0.7	64 59.6	−59.9	0.7	65 59.6	−60.0	0.8	66 59.6	−59.9	0.8	67 59.5	−59.9	0.8	68 59.5	−59.9	0.9	81
82	60 59.6	−59.9	0.6	61 59.6	−59.9	0.6	62 59.6	−59.9	0.6	63 59.6	−59.9	0.6	64 59.6	−59.9	0.7	65 59.6	−59.9	0.7	66 59.6	−59.9	0.7	67 59.6	−59.9	0.7	82
83	59 59.7	−60.0	0.5	60 59.7	−60.0	0.5	61 59.7	−60.0	0.5	62 59.7	−60.0	0.5	63 59.7	−60.0	0.6	64 59.7	−60.0	0.6	65 59.7	−60.0	0.6	66 59.7	−59.9	0.6	83
84	58 59.7	−59.9	0.4	59 59.7	−59.9	0.4	60 59.7	−59.9	0.4	61 59.7	−59.9	0.4	62 59.7	−59.9	0.5	63 59.7	−59.9	0.5	64 59.7	−59.9	0.5	65 59.7	−59.9	0.5	84
85	57 59.8	−59.9	0.3	58 59.8	−59.9	0.3	59 59.8	−59.9	0.3	60 59.8	−59.9	0.4	61 59.8	−59.9	0.4	62 59.8	−60.0	0.4	63 59.8	−60.0	0.4	64 59.8	−59.9	0.4	85
86	56 59.8	−59.9	0.3	57 59.8	−59.9	0.3	58 59.8	−59.9	0.3	59 59.8	−59.9	0.3	60 59.8	−59.9	0.3	61 59.8	−59.9	0.3	62 59.8	−59.9	0.3	63 59.8	−59.9	0.3	86
87	55 59.9	−59.9	0.2	56 59.9	−59.9	0.2	57 59.9	−59.9	0.2	58 59.9	−60.0	0.2	59 59.9	−60.0	0.2	60 59.9	−60.0	0.2	61 59.9	−60.0	0.2	62 59.9	−60.0	0.2	87
88	54 59.9	−59.9	0.1	55 59.9	−59.9	0.1	56 59.9	−59.9	0.1	57 59.9	−59.9	0.1	58 59.9	−59.9	0.1	59 59.9	−59.9	0.1	60 59.9	−59.9	0.1	61 59.9	−59.9	0.1	88
89	54 00.0	−60.0	0.1	55 00.0	−60.0	0.1	56 00.0	−60.0	0.1	57 00.0	−60.0	0.1	58 00.0	−60.0	0.1	59 00.0	−60.0	0.1	60 00.0	−60.0	0.1	61 00.0	−60.0	0.1	89
90	53 00.0	−60.0	0.0	54 00.0	−60.0	0.0	55 00.0	−60.0	0.0	56 00.0	−60.0	0.0	57 00.0	−60.0	0.0	58 00.0	−60.0	0.0	59 00.0	−60.0	0.0	60 00.0	−60.0	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

2°, 358° L.H.A.   LATITUDE SAME NAME AS DECLINATION

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 58.4	−60.0	177.5	35 58.5	−60.0	177.5	34 58.5	−59.9	177.6	33 58.6	−60.0	177.6	32 58.6	−59.9	177.6	31 58.7	−60.0	177.6	30 58.7	−59.9	177.7	29 58.8	−60.0	177.7	0
1	35 58.4	−59.9	177.5	34 58.5	−60.0	177.6	33 58.6	−60.0	177.6	32 58.6	−60.0	177.6	31 58.6	−60.0	177.6	30 58.7	−60.0	177.7	29 58.8	−60.0	177.7	28 58.8	−60.0	177.7	1
2	34 58.5	−60.0	177.6	33 58.5	−60.0	177.6	32 58.6	−60.0	177.6	31 58.6	−60.0	177.6	30 58.6	−60.0	177.7	29 58.7	−60.0	177.7	28 58.8	−60.0	177.7	27 58.8	−60.0	177.7	2
3	33 58.5	−60.0	177.6	32 58.5	−59.9	177.6	31 58.6	−60.0	177.6	30 58.6	−59.9	177.7	29 58.7	−60.0	177.7	28 58.7	−60.0	177.7	27 58.7	−59.9	177.7	26 58.8	−60.0	177.7	3
4	32 58.5	−60.0	177.6	31 58.6	−60.0	177.6	30 58.6	−60.0	177.7	29 58.7	−60.0	177.7	28 58.7	−60.0	177.7	27 58.7	−59.9	177.7	26 58.8	−60.0	177.7	25 58.8	−60.0	177.8	4
5	31 58.5	−60.0	177.7	30 58.6	−60.0	177.7	29 58.6	−60.0	177.7	28 58.7	−60.0	177.7	27 58.7	−60.0	177.7	26 58.8	−60.0	177.8	25 58.8	−60.0	177.8	24 58.8	−59.9	177.8	5
6	30 58.5	−59.9	177.7	29 58.6	−60.0	177.7	28 58.6	−60.0	177.7	27 58.7	−60.0	177.7	26 58.7	−60.0	177.8	25 58.8	−60.0	177.8	24 58.8	−60.0	177.8	23 58.9	−60.0	177.8	6
7	29 58.6	−60.0	177.7	28 58.6	−60.0	177.7	27 58.6	−59.9	177.8	26 58.7	−60.0	177.8	25 58.7	−59.9	177.8	24 58.8	−60.0	177.8	23 58.8	−60.0	177.8	22 58.9	−60.0	177.9	7
8	28 58.6	−60.0	177.7	27 58.6	−60.0	177.8	26 58.7	−60.0	177.8	25 58.7	−60.0	177.8	24 58.8	−60.0	177.8	23 58.8	−60.0	177.8	22 58.8	−59.9	177.8	21 58.9	−60.0	177.9	8
9	27 58.6	−60.0	177.8	26 58.6	−59.9	177.8	25 58.7	−60.0	177.8	24 58.7	−60.0	177.8	23 58.8	−60.0	177.8	22 58.8	−60.0	177.9	21 58.9	−60.0	177.9	20 58.9	−60.0	177.9	9
10	26 58.6	−60.0	177.8	25 58.7	−60.0	177.8	24 58.7	−60.0	177.8	23 58.7	−59.9	177.8	22 58.8	−60.0	177.9	21 58.8	−60.0	177.9	20 58.9	−60.0	177.9	19 58.9	−60.0	177.9	10
11	25 58.6	−60.0	177.8	24 58.7	−60.0	177.8	23 58.7	−60.0	177.9	22 58.8	−60.0	177.9	21 58.8	−60.0	177.9	20 58.8	−60.0	177.9	19 58.9	−60.0	177.9	18 58.9	−60.0	177.9	11
12	24 58.6	−59.9	177.8	23 58.7	−60.0	177.9	22 58.7	−60.0	177.9	21 58.8	−60.0	177.9	20 58.8	−60.0	177.9	19 58.8	−59.9	177.9	18 58.9	−60.0	177.9	17 58.9	−60.0	177.9	12
13	23 58.7	−60.0	177.9	22 58.7	−60.0	177.9	21 58.7	−59.9	177.9	20 58.8	−60.0	177.9	19 58.8	−60.0	177.9	18 58.8	−60.0	177.9	17 58.9	−60.0	178.0	16 58.9	−60.0	178.0	13
14	22 58.7	−60.0	177.9	21 58.7	−60.0	177.9	20 58.8	−60.0	177.9	19 58.8	−60.0	177.9	18 58.8	−60.0	177.9	17 58.9	−60.0	178.0	16 58.9	−60.0	178.0	15 58.9	−59.9	178.0	14
15	21 58.7	−60.0	177.9	20 58.7	−60.0	177.9	19 58.8	−60.0	177.9	18 58.8	−60.0	178.0	17 58.8	−59.9	178.0	16 58.9	−60.0	178.0	15 58.9	−60.0	178.0	14 59.0	−60.0	178.0	15
16	20 58.7	−60.0	177.9	19 58.7	−59.9	178.0	18 58.8	−60.0	178.0	17 58.8	−60.0	178.0	16 58.9	−60.0	178.0	15 58.9	−60.0	178.0	14 58.9	−60.0	178.0	13 59.0	−60.0	178.0	16
17	19 58.7	−60.0	178.0	18 58.8	−60.0	178.0	17 58.8	−60.0	178.0	16 58.8	−60.0	178.0	15 58.9	−60.0	178.0	14 58.9	−60.0	178.0	13 58.9	−60.0	178.0	12 59.0	−60.0	178.0	17
18	18 58.7	−60.0	178.0	17 58.8	−60.0	178.0	16 58.8	−60.0	178.0	15 58.8	−59.9	178.0	14 58.9	−60.0	178.0	13 58.9	−60.0	178.0	12 58.9	−59.9	178.0	11 59.0	−60.0	178.1	18
19	17 58.7	−59.9	178.0	16 58.8	−60.0	178.0	15 58.8	−60.0	178.0	14 58.9	−60.0	178.0	13 58.9	−60.0	178.1	12 58.9	−60.0	178.1	11 59.0	−60.0	178.1	10 59.0	−60.0	178.1	19
20	16 58.8	−60.0	178.0	15 58.8	−60.0	178.0	14 58.8	−60.0	178.1	13 58.9	−60.0	178.1	12 58.9	−60.0	178.1	11 58.9	−60.0	178.1	10 59.0	−60.0	178.1	9 59.0	−60.0	178.1	20
21	15 58.8	−60.0	178.1	14 58.8	−60.0	178.1	13 58.8	−59.9	178.1	12 58.9	−60.0	178.1	11 58.9	−60.0	178.1	10 58.9	−59.9	178.1	9 59.0	−60.0	178.1	8 59.0	−60.0	178.1	21
22	14 58.8	−60.0	178.1	13 58.8	−60.0	178.1	12 58.9	−60.0	178.1	11 58.9	−60.0	178.1	10 58.9	−60.0	178.1	9 59.0	−60.0	178.1	8 59.0	−60.0	178.1	7 59.0	−60.0	178.1	22
23	13 58.8	−60.0	178.1	12 58.8	−59.9	178.1	11 58.9	−60.0	178.1	10 58.9	−60.0	178.1	9 58.9	−60.0	178.1	8 59.0	−60.0	178.1	7 59.0	−60.0	178.1	6 59.0	−60.0	178.1	23
24	12 58.8	−60.0	178.1	11 58.9	−60.0	178.1	10 58.9	−60.0	178.1	9 58.9	−59.9	178.1	8 58.9	−59.9	178.2	7 59.0	−60.0	178.2	6 59.0	−60.0	178.2	5 59.0	−60.0	178.2	24
25	11 58.8	−60.0	178.1	10 58.9	−60.0	178.2	9 58.9	−60.0	178.2	8 58.9	−60.0	178.2	7 59.0	−60.0	178.2	6 59.0	−60.0	178.2	5 59.0	−60.0	178.2	4 59.0	−59.9	178.2	25
26	10 58.8	−59.9	178.2	9 58.9	−60.0	178.2	8 58.9	−60.0	178.2	7 58.9	−60.0	178.2	6 59.0	−60.0	178.2	5 59.0	−60.0	178.2	4 59.0	−60.0	178.2	3 59.1	−60.0	178.2	26
27	9 58.9	−60.0	178.2	8 58.9	−60.0	178.2	7 58.9	−60.0	178.2	6 58.9	−59.9	178.2	5 59.0	−60.0	178.2	4 59.0	−60.0	178.2	3 59.0	−60.0	178.2	2 59.1	−60.0	178.2	27
28	8 58.9	−60.0	178.2	7 58.9	−60.0	178.2	6 58.9	−60.0	178.2	5 59.0	−60.0	178.2	4 59.0	−60.0	178.2	3 59.0	−60.0	178.2	2 59.0	−59.9	178.2	1 59.1	−60.0	178.2	28
29	7 58.9	−60.0	178.2	6 58.9	−60.0	178.2	5 58.9	−59.9	178.2	4 59.0	−60.0	178.2	3 59.0	−60.0	178.2	2 59.0	−60.0	178.2	1 59.1	−60.0	178.2	0 59.1	−60.0	178.3	29
30	6 58.9	−60.0	178.3	5 58.9	−60.0	178.3	4 59.0	−60.0	178.3	3 59.0	−60.0	178.3	2 59.0	−60.0	178.3	1 59.0	−60.0	178.3	0 59.1	−60.0	178.3	0 00.9	+60.0	1.7	30
31	5 58.9	−60.0	178.3	4 58.9	−59.9	178.3	3 59.0	−60.0	178.3	2 59.0	−60.0	178.3	1 59.0	−60.0	178.3	0 59.0	−59.9	178.3	0 00.9	+60.0	1.7	1 00.9	+60.0	1.7	31
32	4 58.9	−60.0	178.3	3 59.0	−60.0	178.3	2 59.0	−60.0	178.3	1 59.0	−60.0	178.3	0 59.0	−60.0	178.3	0 00.9	+60.0	1.7	1 00.9	+60.0	1.7	2 00.9	+60.0	1.7	32
33	3 58.9	−59.9	178.3	2 59.0	−60.0	178.3	1 59.0	−60.0	178.3	0 59.0	−60.0	178.3	0 01.0	+59.9	1.7	1 00.9	+60.0	1.7	2 00.9	+60.0	1.7	3 00.9	+60.0	1.7	33
34	2 59.0	−60.0	178.3	1 59.0	−60.0	178.3	0 59.0	−60.0	178.3	0 01.0	+60.0	1.7	1 00.9	+60.0	1.7	2 00.9	+60.0	1.7	3 00.9	+60.0	1.7	3 00.9	+60.0	1.7	34
35	1 59.0	−60.0	178.4	0 59.0	−60.0	178.4	0 01.0	+60.0	1.6	1 01.0	+59.9	1.6	2 00.9	+60.0	1.6	3 00.9	+60.0	1.6	4 00.9	+60.0	1.6	5 00.9	+60.0	1.6	35
36	0 59.0	−60.0	178.4	0 01.0	+60.0	1.6	1 01.0	+60.0	1.6	2 00.9	+60.0	1.6	3 00.9	+60.0	1.6	4 00.9	+60.0	1.6	5 00.9	+59.9	1.6	6 00.9	+59.9	1.6	36
37	0 01.0	+60.0	1.6	1 01.0	+60.0	1.6	2 01.0	+59.9	1.6	3 00.9	+60.0	1.6	4 00.9	+60.0	1.6	5 00.9	+60.0	1.6	6 00.9	+60.0	1.6	7 00.8	+60.0	1.6	37
38	1 01.0	+60.0	1.6	2 01.0	+60.0	1.6	3 00.9	+60.0	1.6	4 00.9	+60.0	1.6	5 00.9	+60.0	1.6	6 00.9	+60.0	1.6	7 00.9	+59.9	1.6	8 00.8	+60.0	1.6	38
39	2 01.0	+60.0	1.6	3 01.0	+59.9	1.6	4 00.9	+60.0	1.6	5 00.9	+60.0	1.6	6 00.9	+60.0	1.6	7 00.9	+60.0	1.6	8 00.8	+60.0	1.6	9 00.8	+60.0	1.6	39
40	3 01.0	+60.0	1.5	4 00.9	+60.0	1.5	5 00.9	+60.0	1.5	6 00.9	+60.0	1.5	7 00.9	+60.0	1.5	8 00.9	+59.9	1.5	9 00.8	+60.0	1.6	10 00.8	+60.0	1.6	40
41	4 01.0	+59.9	1.5	5 00.9	+60.0	1.5	6 00.9	+60.0	1.5	7 00.9	+60.0	1.5	8 00.9	+60.0	1.5	9 00.9	+59.9	1.5	10 00.8	+60.0	1.5	11 00.8	+60.0	1.5	41
42	5 00.9	+60.0	1.5	6 00.9	+60.0	1.5	7 00.9	+60.0	1.5	8 00.9	+60.0	1.5	9 00.9	+59.9	1.5	10 00.8	+60.0	1.5	11 00.8	+60.0	1.5	12 00.8	+60.0	1.5	42
43	6 00.9	+60.0	1.5	7 00.9	+60.0	1.5	8 00.9	+60.0	1.5	9 00.9	+60.0	1.5	10 00.8	+60.0	1.5	11 00.8	+60.0	1.5	12 00.8	+60.0	1.5	13 00.8	+60.0	1.5	43
44	7 00.9	+60.0	1.4	8 00.9	+60.0	1.5	9 00.9	+60.0	1.5	10 00.9	+59.9	1.5	11 00.8	+60.0	1.5	12 00.8	+60.0	1.5	13 00.8	+60.0	1.5	14 00.8	+60.0	1.5	44
45	8 00.9	+60.0	1.4	9 00.9	+60.0	1.4	10 00.9	+60.0	1.4	11 00.8	+60.0	1.4	12 00.8	+60.0	1.4	13 00.8	+60.0	1.5	14 00.8	+60.0	1.5	15 00.8	+60.0	1.5	45
46	9 00.9	+60.0	1.4	10 00.9	+60.0	1.4	11 00.9	+59.9	1.4	12 00.9	+60.0	1.4	13 00.8	+60.0	1.4	14 00.8	+60.0	1.4	15 00.8	+60.0	1.4	16 00.8	+59.9	1.4	46
47	10 00.9	+60.0	1.4	11 00.9	+59.9	1.4	12 00.8	+60.0	1.4	13 00.8	+60.0	1.4	14 00.8	+60.0	1.4	15 00.8	+60.0	1.4	16 00.8	+60.0	1.4	17 00.7	+60.0	1.4	47
48	11 00.9	+59.9	1.4	12 00.8	+60.0	1.4	13 00.8	+60.0	1.4	14 00.8	+60.0	1.4	15 00.8	+60.0	1.4	16 00.8	+60.0	1.4	17 00.8	+59.9	1.4	18 00.7	+60.0	1.4	48
49	12 00.8	+60.0	1.3	13 00.8	+60.0	1.3	14 00.8	+60.0	1.4	15 00.8	+60.0	1.4	16 00.8	+60.0	1.4	17 00.8	+60.0	1.4	18 00.7	+60.0	1.4	19 00.7	+60.0	1.4	49
50	13 00.8	+60.0	1.3	14 00.8	+60.0	1.3	15 00.8	+60.0	1.3	16 00.8	+60.0	1.3	17 00.8	+60.0	1.3	18 00.8	+59.9	1.3	19 00.7	+60.0	1.4	20 00.7	+60.0	1.4	50
51	14 00.8	+60.0	1.3	15 00.8	+60.0	1.3	16 00.8	+60.0	1.3	17 00.8	+60.0	1.3	18 00.8	+59.9	1.3	19 00.7	+60.0	1.3	20 00.7	+60.0	1.3	21 00.7	+60.0	1.3	51
52	15 00.8	+60.0	1.3	16 00.8	+60.0	1.3	17 00.8	+60.0	1.3	18 00.8	+59.9	1.3	19 00.7	+60.0	1.3	20 00.7	+60.0	1.3	21 00.7	+60.0	1.3	22 00.7	+60.0	1.3	52
53	16 00.8	+60.0	1.3	17 00.8	+60.0	1.3	18 00.8	+59.9	1.3	19 00.7	+60.0	1.3	20 00.7	+60.0	1.3	21 00.7	+60.0	1.3	22 00.7	+60.0	1.3	23 00.7	+60.0	1.3	53
54	17 00.8	+60.0	1.2	18 00.8	+59.9	1.2	19 00.7	+60.0	1.3	20 00.7	+60.0	1.3	21 00.7	+60.0	1.3	22 00.7	+60.0	1.3	23 00.7	+60.0	1.3	24 00.7	+60.0	1.3	54
55	18 00.8	+59.9	1.2	19 00.7	+60.0	1.2	20 00.7	+60.0	1.2	21 00.7	+60.0	1.2	22 00.7	+60.0	1.2	23 00.7	+60.0	1.2	24 00.7	+60.0	1.3	25 00.7	+60.0	1.3	55
56	19 00.7	+60.0	1.2	20 00.7	+60.0	1.2	21 00.7	+60.0	1.2	22 00.7	+60.0	1.2	23 00.7	+60.0	1.2	24 00.7	+60.0	1.2	25 00.7	+60.0	1.2	26 00.7	+59.9	1.2	56
57	20 00.7	+60.0	1.2	21 00.7	+60.0	1.2	22 00.7	+60.0	1.2	23 00.7	+60.0	1.2	24 00.7	+60.0	1.2	25 00.7	+60.0	1.2	26 00.7	+59.9	1.2	27 00.6	+60.0	1.2	57
58	21 00.7	+60.0	1.1	22 00.7	+60.0	1.2	23 00.7	+60.0	1.2	24 00.7	+60.0	1.2	25 00.7	+60.0	1.2	26 00.7	+59.9	1.2	27 00.6	+60.0	1.2	28 00.6	+60.0	1.2	58
59	22 00.7	+60.0	1.1	23 00.7	+60.0	1.1	24 00.7	+60.0	1.1	25 00.7	+60.0	1.1	26 00.7	+59.9	1.1	27 00.6	+60.0	1.2	28 00.6	+60.0	1.2	29 00.6	+60.0	1.2	59
60	23 00.7	+60.0	1.1	24 00.7	+60.0	1.1	25 00.7	+59.9	1.1	26 00.7	+59.9	1.1	27 00.6	+60.0	1.1	28 00.6	+60.0	1.1	29 00.6	+60.0	1.1	30 00.6	+60.0	1.2	60
61	24 00.7	+60.0	1.1	25 00.7	+59.9	1.1	26 00.6	+60.0	1.1	27 00.6	+60.0	1.1	28 00.6	+60.0	1.1	29 00.6	+60.0	1.1	30 00.6	+60.0	1.1	31 00.6	+60.0	1.1	61
62	25 00.7	+59.9	1.0	26 00.6	+60.0	1.0	27 00.6	+60.0	1.1	28 00.6	+60.0	1.1	29 00.6	+60.0	1.1	30 00.6	+60.0	1.1	31 00.6	+60.0	1.1	32 00.6	+60.0	1.1	62
63	26 00.6	+60.0	1.0	27 00.6	+60.0	1.0	28 00.6	+60.0	1.0	29 00.6	+60.0	1.0	30 00.6	+60.0	1.0	31 00.6	+60.0	1.1	32 00.6	+60.0	1.1	33 00.6	+60.0	1.1	63
64	27 00.6	+60.0	1.0	28 00.6	+60.0	1.0	29 00.6	+60.0	1.0	30 00.6	+60.0	1.0	31 00.6	+60.0	1.0	32 00.6	+60.0	1.0	33 00.6	+59.9	1.0	34 00.6	+59.9	1.1	64
65	28 00.6	+60.0	1.0	29 00.6	+60.0	1.0	30 00.6	+60.0	1.0	31 00.6	+60.0	1.0	32 00.6	+60.0	1.0	33 00.5	+60.0	1.0	34 00.5	+60.0	1.0	35 00.5	+60.0	1.0	65
66	29 00.6	+60.0	0.9	30 00.6	+60.0	0.9	31 00.6	+60.0	0.9	32 00.6	+59.9	1.0	33 00.6	+59.9	1.0	34 00.5	+60.0	1.0	35 00.5	+60.0	1.0	36 00.5	+60.0	1.0	66
67	30 00.6	+60.0	0.9	31 00.6	+59.9	0.9	32 00.6	+59.9	0.9	33 00.5	+60.0	0.9	34 00.5	+60.0	0.9	35 00.5	+60.0	1.0	36 00.5	+60.0	1.0	37 00.5	+60.0	1.0	67
68	31 00.6	+59.9	0.9	32 00.5	+60.0	0.9	33 00.5	+60.0	0.9	34 00.5	+60.0	0.9	35 00.5	+60.0	0.9	36 00.5	+60.0	0.9	37 00.5	+60.0	0.9	38 00.5	+60.0	1.0	68
69	32 00.5	+60.0	0.8	33 00.5	+60.0	0.9	34 00.5	+60.0	0.9	35 00.5	+60.0	0.9	36 00.5	+60.0	0.9	37 00.5	+60.0	0.9	38 00.5	+60.0	0.9	39 00.5	+60.0	0.9	69
70	33 00.5	+60.0	0.8	34 00.5	+60.0	0.8	35 00.5	+60.0	0.8	36 00.5	+60.0	0.8	37 00.5	+60.0	0.9	38 00.5	+60.0	0.9	39 00.5	+60.0	0.9	40 00.5	+60.0	0.9	70
71	34 00.5	+60.0	0.8	35 00.5	+60.0	0.8	36 00.5	+60.0	0.8	37 00.5	+60.0	0.8	38 00.5	+60.0	0.8	39 00.5	+59.9	0.8	40 00.5	+59.9	0.8	41 00.5	+59.9	0.9	71
72	35 00.5	+60.0	0.8	36 00.5	+60.0	0.8	37 00.5	+59.9	0.8	38 00.5	+59.9	0.8	39 00.5	+59.9	0.8	40 00.4	+60.0	0.8	41 00.4	+60.0	0.8	42 00.4	+60.0	0.8	72
73	36 00.5	+59.9	0.7	37 00.5	+59.9	0.7	38 00.4	+60.0	0.7	39 00.4	+60.0	0.8	40 00.4	+60.0	0.8	41 00.4	+60.0	0.8	42 00.4	+60.0	0.8	43 00.4	+60.0	0.8	73
74	37 00.4	+60.0	0.7	38 00.4	+60.0	0.7	39 00.4	+60.0	0.7	40 00.4	+60.0	0.7	41 00.4	+60.0	0.7	42 00.4	+60.0	0.7	43 00.4	+60.0	0.8	44 00.4	+60.0	0.8	74
75	38 00.4	+60.0	0.7	39 00.4	+60.0	0.7	40 00.4	+60.0	0.7	41 00.4	+60.0	0.7	42 00.4	+60.0	0.7	43 00.4	+60.0	0.7	44 00.4	+60.0	0.7	45 00.4	+60.0	0.7	75
76	39 00.4	+60.0	0.6	40 00.4	+60.0	0.6	41 00.4	+60.0	0.6	42 00.4	+60.0	0.7	43 00.4	+60.0	0.7	44 00.4	+60.0	0.7	45 00.4	+59.9	0.7	46 00.4	+59.9	0.7	76
77	40 00.4	+59.9	0.6	41 00.4	+59.9	0.6	42 00.4	+59.9	0.6	43 00.4	+59.9	0.6	44 00.4	+59.9	0.6	45 00.4	+59.9	0.6	46 00.3	+60.0	0.6	47 00.3	+60.0	0.7	77
78	41 00.3	+60.0	0.6	42 00.3	+60.0	0.6	43 00.3	+60.0	0.6	44 00.3	+60.0	0.6	45 00.3	+60.0	0.6	46 00.3	+60.0	0.6	47 00.3	+60.0	0.6	48 00.3	+60.0	0.6	78
79	42 00.3	+60.0	0.5	43 00.3	+60.0	0.5	44 00.3	+60.0	0.5	45 00.3	+60.0	0.5	46 00.3	+60.0	0.5	47 00.3	+60.0	0.6	48 00.3	+60.0	0.6	49 00.3	+60.0	0.6	79
80	43 00.3	+60.0	0.5	44 00.3	+60.0	0.5	45 00.3	+60.0	0.5	46 00.3	+60.0	0.5	47 00.3	+60.0	0.5	48 00.3	+60.0	0.5	49 00.3	+60.0	0.5	50 00.3	+60.0	0.5	80
81	44 00.3	+59.9	0.5	45 00.3	+59.9	0.4	46 00.3	+59.9	0.5	47 00.3	+59.9	0.5	48 00.3	+59.9	0.5	49 00.3	+59.9	0.5	50 00.3	+59.9	0.5	51 00.3	+59.9	0.5	81
82	45 00.2	+60.0	0.4	46 00.2	+60.0	0.4	47 00.2	+60.0	0.4	48 00.2	+60.0	0.4	49 00.2	+60.0	0.4	50 00.2	+60.0	0.4	51 00.2	+60.0	0.4	52 00.2	+60.0	0.5	82
83	46 00.2	+60.0	0.4	47 00.2	+60.0	0.4	48 00.2	+60.0	0.4	49 00.2	+60.0	0.4	50 00.2	+60.0	0.4	51 00.2	+60.0	0.4	52 00.2	+60.0	0.4	53 00.2	+60.0	0.4	83
84	47 00.2	+60.0	0.3	48 00.2	+60.0	0.3	49 00.2	+60.0	0.3	50 00.2	+60.0	0.3	51 00.2	+60.0	0.3	52 00.2	+60.0	0.3	53 00.2	+60.0	0.3	54 00.2	+60.0	0.4	84
85	48 00.2	+59.9	0.3	49 00.2	+59.9	0.3	50 00.2	+59.9	0.3	51 00.2	+59.9	0.3	52 00.2	+59.9	0.3	53 00.2	+59.9	0.3	54 00.2	+59.9	0.3	55 00.2	+59.9	0.3	85
86	49 00.1	+60.0	0.2	50 00.1	+60.0	0.2	51 00.1	+60.0	0.2	52 00.1	+60.0	0.2	53 00.1	+60.0	0.2	54 00.1	+60.0	0.2	55 00.1	+60.0	0.2	56 00.1	+60.0	0.2	86
87	50 00.1	+60.0	0.2	51 00.1	+60.0	0.2	52 00.1	+60.0	0.2	53 00.1	+60.0	0.2	54 00.1	+60.0	0.2	55 00.1	+60.0	0.2	56 00.1	+60.0	0.2	57 00.1	+60.0	0.2	87
88	51 00.1	+59.9	0.1	52 00.1	+59.9	0.1	53 00.1	+59.9	0.1	54 00.1	+59.9	0.1	55 00.1	+59.9	0.1	56 00.1	+59.9	0.1	57 00.1	+59.9	0.1	58 00.1	+59.9	0.1	88
89	52 00.0	+60.0	0.1	53 00.0	+60.0	0.1	54 00.0	+60.0	0.1	55 00.0	+60.0	0.1	56 00.0	+60.0	0.1	57 00.0	+60.0	0.1	58 00.0	+60.0	0.1	59 00.0	+60.0	0.1	89
90	53 00.0	+60.0	0.0	54 00.0	+60.0	0.0	55 00.0	+60.0	0.0	56 00.0	+60.0	0.0	57 00.0	+60.0	0.0	58 00.0	+60.0	0.0	59 00.0	+60.0	0.0	60 00.0	+60.0	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z
LATITUDE SAME NAME AS DECLINATION **L.H.A. 178°, 182°**

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 56.5	+59.9	176.2	35 56.6	+59.9	176.3	34 56.7	+60.0	176.3	33 56.8	+60.0	176.4	32 56.9	+60.0	176.4	31 57.1	+59.9	176.5	30 57.2	+59.9	176.5	29 57.3	+60.0	176.5	0
1	37 56.4	+60.0	176.2	36 56.5	+59.9	176.2	35 56.7	+59.9	176.3	34 56.8	+59.9	176.3	33 56.9	+60.0	176.4	32 57.0	+60.0	176.4	31 57.1	+60.0	176.5	30 57.3	+59.9	176.5	1
2	38 56.4	+59.9	176.1	37 56.5	+59.9	176.2	36 56.6	+60.0	176.2	35 56.7	+60.0	176.3	34 56.9	+60.0	176.3	33 57.0	+60.0	176.4	32 57.1	+60.0	176.4	31 57.2	+59.9	176.5	2
3	39 56.3	+60.0	176.1	38 56.4	+60.0	176.1	37 56.6	+59.9	176.2	36 56.7	+60.0	176.3	35 56.8	+60.0	176.3	34 57.0	+59.9	176.3	33 57.1	+59.9	176.4	32 57.2	+59.9	176.4	3
4	40 56.3	+59.9	176.0	39 56.4	+59.9	176.1	38 56.5	+60.0	176.2	37 56.7	+59.9	176.2	36 56.8	+60.0	176.3	35 56.9	+59.9	176.3	34 57.0	+60.0	176.3	33 57.2	+59.9	176.4	4
5	41 56.2	+59.9	176.0	40 56.3	+60.0	176.0	39 56.5	+59.9	176.1	38 56.6	+60.0	176.2	37 56.8	+59.9	176.2	36 56.9	+60.0	176.3	35 57.0	+60.0	176.3	34 57.1	+60.0	176.4	5
6	42 56.1	+60.0	175.9	41 56.3	+59.9	176.0	40 56.4	+60.0	176.0	39 56.6	+59.9	176.1	38 56.7	+60.0	176.2	37 56.9	+59.9	176.2	36 57.0	+59.9	176.3	35 57.1	+59.9	176.3	6
7	43 56.1	+59.9	175.9	42 56.2	+60.0	175.9	41 56.4	+59.9	176.1	40 56.5	+59.9	176.1	39 56.7	+59.9	176.1	38 56.8	+60.0	176.2	37 56.9	+60.0	176.2	36 57.1	+59.9	176.3	7
8	44 56.0	+60.0	175.8	43 56.2	+59.9	175.9	42 56.3	+60.0	175.9	41 56.5	+59.9	176.0	40 56.6	+60.0	176.1	39 56.8	+59.9	176.1	38 56.9	+60.0	176.2	37 57.0	+60.0	176.2	8
9	45 56.0	+59.9	175.7	44 56.1	+60.0	175.8	43 56.3	+59.9	175.9	42 56.4	+60.0	176.0	41 56.6	+59.9	176.0	40 56.7	+60.0	176.1	39 56.9	+59.9	176.1	38 57.0	+60.0	176.2	9
10	46 55.9	+59.9	175.7	45 56.1	+59.9	175.7	44 56.2	+60.0	175.8	43 56.4	+59.9	175.9	42 56.5	+60.0	176.0	41 56.7	+59.9	176.0	40 56.8	+60.0	176.0	39 57.0	+59.9	176.1	10
11	47 55.8	+60.0	175.6	46 56.0	+59.9	175.7	45 56.2	+59.9	175.8	44 56.3	+60.0	175.8	43 56.5	+59.9	175.9	42 56.7	+59.9	176.0	41 56.8	+59.9	176.0	40 56.9	+60.0	176.1	11
12	48 55.8	+59.9	175.5	47 56.0	+59.9	175.6	46 56.1	+60.0	175.7	45 56.3	+59.9	175.8	44 56.5	+59.9	175.9	43 56.6	+60.0	175.9	42 56.8	+59.9	176.0	41 56.9	+60.0	176.1	12
13	49 55.7	+59.9	175.5	48 55.9	+59.9	175.5	47 56.1	+59.9	175.6	46 56.2	+60.0	175.7	45 56.4	+60.0	175.8	44 56.6	+59.9	175.9	43 56.7	+60.0	175.9	42 56.9	+59.9	176.0	13
14	50 55.6	+60.0	175.4	49 55.8	+59.9	175.5	48 56.0	+59.9	175.6	47 56.2	+59.9	175.7	46 56.4	+59.9	175.7	45 56.5	+60.0	175.8	44 56.7	+59.9	175.9	43 56.8	+60.0	176.0	14
15	51 55.6	+59.9	175.3	50 55.8	+59.9	175.4	49 55.9	+60.0	175.5	48 56.1	+60.0	175.6	47 56.3	+59.9	175.7	46 56.5	+59.9	175.8	45 56.6	+59.9	175.8	44 56.8	+59.9	175.9	15
16	52 55.5	+59.9	175.2	51 55.7	+59.9	175.3	50 55.9	+59.9	175.4	49 56.1	+59.9	175.5	48 56.2	+60.0	175.6	47 56.4	+59.9	175.7	46 56.6	+59.9	175.7	45 56.7	+60.0	175.9	16
17	53 55.4	+59.9	175.1	52 55.6	+59.9	175.2	51 55.8	+59.9	175.3	50 56.0	+59.9	175.4	49 56.2	+59.9	175.5	48 56.4	+59.9	175.7	47 56.5	+59.9	175.7	46 56.7	+59.9	175.8	17
18	54 55.3	+59.9	175.0	53 55.5	+59.9	175.2	52 55.7	+60.0	175.3	51 55.9	+60.0	175.4	50 56.1	+60.0	175.5	49 56.3	+60.0	175.6	48 56.5	+59.9	175.7	47 56.7	+59.9	175.7	18
19	55 55.2	+59.9	174.9	54 55.4	+60.0	175.0	53 55.7	+59.9	175.2	52 55.9	+59.9	175.3	51 56.1	+59.9	175.4	50 56.3	+59.9	175.6	49 56.4	+60.0	175.6	48 56.6	+59.9	175.7	19
20	56 55.1	+59.9	174.8	55 55.4	+59.9	175.0	54 55.6	+59.9	175.1	53 55.8	+59.9	175.2	52 56.0	+59.9	175.3	51 56.2	+59.9	175.4	50 56.4	+59.9	175.5	49 56.6	+59.9	175.6	20
21	57 55.0	+59.9	174.7	56 55.3	+59.9	174.9	55 55.5	+59.9	175.0	54 55.7	+59.9	175.1	53 55.9	+60.0	175.2	52 56.1	+60.0	175.4	51 56.3	+59.9	175.5	50 56.5	+60.0	175.6	21
22	58 54.9	+59.9	174.6	57 55.2	+59.9	174.8	56 55.4	+60.0	175.0	55 55.6	+60.0	175.0	54 55.9	+59.9	175.2	53 56.1	+59.9	175.3	52 56.3	+59.9	175.5	51 56.5	+59.9	175.5	22
23	59 54.8	+59.9	174.5	58 55.1	+59.8	174.8	57 55.3	+59.9	174.8	56 55.6	+59.9	174.9	55 55.8	+59.9	175.1	54 56.0	+59.9	175.2	53 56.2	+59.9	175.3	52 56.4	+60.0	175.4	23
24	60 54.7	+59.8	174.4	59 54.9	+59.9	174.5	58 55.2	+59.9	174.7	57 55.5	+59.9	174.8	56 55.7	+59.9	175.0	55 55.9	+59.9	175.1	54 56.1	+59.9	175.2	53 56.3	+60.0	175.3	24
25	61 54.5	+59.9	174.2	60 54.8	+59.8	174.3	59 55.1	+59.9	174.6	58 55.4	+59.9	174.7	57 55.6	+59.9	174.9	56 55.8	+60.0	175.0	55 56.0	+59.9	175.1	54 56.2	+59.9	175.2	25
26	62 54.4	+59.8	174.1	61 54.7	+59.9	174.3	60 55.0	+59.9	174.4	59 55.3	+59.9	174.6	58 55.5	+59.9	174.8	57 55.8	+59.9	174.9	56 56.0	+59.9	175.1	55 56.2	+59.9	175.2	26
27	63 54.2	+59.9	173.9	62 54.6	+59.8	174.1	61 54.9	+59.9	174.3	60 55.2	+59.9	174.5	59 55.4	+59.9	174.7	58 55.7	+59.9	174.8	57 55.9	+60.0	175.0	56 56.1	+60.0	175.1	27
28	64 54.1	+59.8	173.7	63 54.4	+59.9	173.9	62 54.8	+59.8	174.2	61 55.1	+59.8	174.4	60 55.3	+59.9	174.5	59 55.6	+59.9	174.7	58 55.8	+60.0	174.9	57 56.1	+59.9	175.0	28
29	65 53.9	+59.8	173.6	64 54.3	+59.8	173.8	63 54.6	+59.9	174.0	62 54.9	+59.8	174.2	61 55.2	+59.9	174.4	60 55.5	+59.9	174.6	59 55.8	+59.9	174.8	58 56.0	+59.9	174.9	29
30	66 53.7	+59.8	173.4	65 54.1	+59.8	173.6	64 54.5	+59.8	173.9	63 54.8	+59.9	174.1	62 55.1	+59.9	174.3	61 55.4	+59.8	174.5	60 55.7	+59.9	174.6	59 55.9	+59.9	174.8	30
31	67 53.5	+59.8	173.2	66 53.9	+59.8	173.5	65 54.3	+59.8	173.7	64 54.7	+59.8	173.9	63 55.0	+59.9	174.1	62 55.3	+59.9	174.3	61 55.6	+59.9	174.5	60 55.8	+60.0	174.7	31
32	68 53.3	+59.8	172.9	67 53.7	+59.8	173.2	66 54.1	+59.9	173.5	65 54.5	+59.8	173.8	64 54.9	+59.9	174.0	63 55.2	+59.8	174.2	62 55.5	+59.9	174.4	61 55.7	+60.0	174.6	32
33	69 53.1	+59.7	172.7	68 53.5	+59.8	173.0	67 54.0	+59.8	173.3	66 54.4	+59.8	173.6	65 54.7	+59.9	173.8	64 55.1	+59.8	174.1	63 55.4	+59.9	174.3	62 55.7	+59.9	174.5	33
34	70 52.8	+59.7	172.4	69 53.3	+59.8	172.8	68 53.8	+59.7	173.1	67 54.2	+59.8	173.4	66 54.6	+59.8	173.6	65 54.9	+59.9	173.9	64 55.3	+59.8	174.1	63 55.6	+59.8	174.3	34
35	71 52.5	+59.7	172.1	70 53.1	+59.7	172.5	69 53.5	+59.8	172.8	68 54.0	+59.8	173.2	67 54.4	+59.8	173.5	66 54.8	+59.8	173.7	65 55.1	+59.9	174.0	64 55.4	+59.8	174.2	35
36	72 52.2	+59.6	171.7	71 52.8	+59.7	172.2	70 53.3	+59.7	172.6	69 53.8	+59.8	172.9	68 54.2	+59.8	173.2	67 54.6	+59.8	173.5	66 55.0	+59.8	173.8	65 55.3	+59.9	174.0	36
37	73 51.8	+59.6	171.4	72 52.5	+59.6	171.9	71 53.0	+59.7	172.3	70 53.5	+59.7	172.7	69 54.0	+59.8	173.0	68 54.4	+59.8	173.3	67 54.8	+59.9	173.6	66 55.2	+59.9	173.9	37
38	74 51.4	+59.5	170.9	73 52.1	+59.6	171.5	72 52.7	+59.7	171.9	71 53.3	+59.7	172.4	70 53.8	+59.7	172.8	69 54.3	+59.8	173.1	68 54.7	+59.8	173.4	67 55.1	+59.8	173.7	38
39	75 50.9	+59.5	170.4	74 51.7	+59.6	171.0	73 52.4	+59.6	171.6	72 53.0	+59.7	172.1	71 53.6	+59.7	172.5	70 54.1	+59.7	172.9	69 54.5	+59.8	173.2	68 54.9	+59.8	173.5	39
40	76 50.4	+59.4	169.9	75 51.3	+59.5	170.6	74 52.0	+59.6	171.2	73 52.7	+59.6	171.7	72 53.3	+59.7	172.2	71 53.8	+59.8	172.6	70 54.3	+59.7	173.0	69 54.7	+59.9	173.3	40
41	77 49.8	+59.2	169.2	76 50.8	+59.4	170.1	75 51.6	+59.5	170.7	74 52.3	+59.5	171.3	73 53.0	+59.7	171.8	72 53.6	+59.7	172.3	71 54.1	+59.7	172.7	70 54.6	+59.7	173.0	41
42	78 49.0	+59.3	168.4	77 50.2	+59.3	169.4	76 51.1	+59.5	170.2	75 51.9	+59.6	170.8	74 52.7	+59.6	171.4	73 53.3	+59.7	171.9	72 53.9	+59.7	172.4	71 54.3	+59.8	172.8	42
43	79 48.2	+58.9	167.5	78 49.5	+59.1	168.6	77 50.6	+59.4	169.5	76 51.5	+59.4	170.3	75 52.3	+59.5	171.0	74 53.0	+59.6	171.6	73 53.6	+59.7	172.1	72 54.1	+59.7	172.5	43
44	80 47.1	+58.7	166.4	79 48.6	+59.0	167.7	78 49.9	+59.2	168.8	77 50.9	+59.3	169.7	76 51.8	+59.5	170.5	75 52.6	+59.6	171.1	74 53.3	+59.6	171.7	73 53.9	+59.7	172.2	44
45	81 45.8	+58.3	165.0	80 47.6	+58.8	166.6	79 49.1	+59.0	167.9	78 50.3	+59.3	169.0	77 51.3	+59.4	169.9	76 52.2	+59.5	170.6	75 52.9	+59.6	171.3	74 53.6	+59.7	171.8	45
46	82 44.1	+57.9	163.3	81 46.4	+58.4	165.3	80 48.1	+58.8	166.9	79 49.6	+59.0	168.1	78 50.7	+59.3	169.2	77 51.7	+59.4	170.0	76 52.5	+59.6	170.8	75 53.3	+59.6	171.4	46
47	83 42.0	+57.0	161.0	82 44.8	+57.8	163.6	81 46.9	+58.5	165.5	80 48.6	+58.7	167.1	79 50.0	+59.1	168.3	78 51.1	+59.4	169.4	77 52.1	+59.4	170.2	76 52.9	+59.6	170.9	47
48	84 39.0	+55.7	157.9	83 42.7	+57.1	161.4	82 45.4	+58.0	163.9	81 47.5	+58.5	165.8	80 49.1	+59.0	167.3	79 50.5	+59.1	168.5	78 51.5	+59.4	169.6	77 52.5	+59.4	170.4	48
49	85 34.7	+53.3•	153.6	84 39.8	+55.9	158.3	83 43.4	+57.3	161.7	82 46.0	+58.1	164.2	81 48.1	+58.6	166.1	80 49.6	+59.0	167.6	79 50.9	+59.2	168.8	78 51.9	+59.4	169.8	49
50	86 28.0	+48.7•	146.9	86 35.7	+53.6•	154.0	84 40.7	+56.0	158.7	83 44.1	+57.4	162.0	82 46.7	+58.2	164.5	81 48.6	+58.7	166.3	80 50.1	+59.0	167.8	79 51.3	+59.3	169.0	50
51	87 16.7	+38.4•	136.1	86 29.3	+49.1•	147.5	85 36.7	+53.9•	154.5	84 41.5	+56.3	159.1	83 44.9	+57.5	162.4	82 47.3	+58.3	164.8	81 49.1	+58.8	166.6	80 50.6	+59.1	168.1	51
52	87 55.1	+16.6•	117.5	87 18.4	+38.9•	136.7	86 30.6	+49.4•	148.0	85 37.8	+54.1•	155.0	84 42.4	+56.4	159.6	83 45.6	+57.6	162.8	82 47.9	+58.4	165.1	81 49.7	+58.8	166.9	52
53	88 11.7	−14.4•	88.8	87 57.3	+16.9•	118.1	87 20.0	+39.5•	137.4	86 31.6	+49.8•	148.6	85 38.8	+54.4•	155.1	84 43.2	+56.5	160.0	83 46.3	+57.8	163.1	82 48.5	+58.5	165.4	53
54	87 57.3	−37.3•	59.5	88 14.2	−14.7•	88.8	87 59.5	+17.3•	118.6	87 21.7	+40.0•	138.1	86 33.2	+50.2•	149.2	85 39.8	+54.6•	156.0	84 44.1	+56.7	160.4	83 47.0	+57.9	163.5	54
55	87 20.0	−48.1•	40.2	87 59.5	−37.8•	58.9	88 16.8	−15.1•	88.8	88 01.7	+17.7•	119.2	88 23.4	+40.6•	138.8	86 34.4	+50.7•	149.8	85 40.8	+54.9•	156.5	84 44.9	+56.9	160.9	55
56	86 31.9	−53.1•	28.9	87 21.7	−48.5•	39.5	88 01.7	−38.3•	58.3	88 19.4	−15.4•	88.8	88 04.0	+18.0•	119.9	88 02.5	+41.1•	139.5	86 35.7	+51.0•	150.5	85 41.8	+55.2•	157.0	56
57	85 38.8	−55.6	22.1	86 33.2	−53.4•	28.3	87 23.4	−49.0•	38.8	88 04.0	−38.9•	57.6	88 22.0	−15.8•	88.7	88 06.2	+18.4•	120.5	87 26.7	+41.8•	140.2	86 37.0	+51.4•	151.1	57
58	84 43.2	−56.9	17.5	85 39.8	−55.7	21.5	86 34.4	−53.6•	27.7	87 25.1	−49.4•	38.0	88 06.2	−39.5•	56.9	88 24.6	−16.1•	88.7	88 08.5	+18.8•	121.3	87 28.4	+42.3•	141.0	58
59	83 46.3	−57.8	14.4	84 44.1	−57.1	17.1	85 38.8	−55.9	21.0	86 35.7	−53.9•	27.0	87 26.7	−49.7•	37.2	88 05.7	−40.1•	56.2	88 08.5	−16.6•	88.7	88 10.7	+19.3•	122.0	59
60	82 48.5	−58.3	12.1	83 47.0	−57.9	14.0	84 44.9	−57.2	16.6	85 41.8	−56.1	20.4	86 37.0	−54.2•	26.3	87 28.4	−50.2•	36.4	88 10.7	−40.7•	55.4	88 30.0	−17.0•	88.7	60
61	81 50.2	−58.6	10.3	82 49.1	−58.4	11.7	83 47.7	−58.0	13.6	84 45.7	−57.3	16.1	85 42.8	−56.3	19.8	86 38.2	−54.5•	25.6	87 30.0	−50.6•	35.6	88 13.0	−41.3•	54.6	61
62	80 51.6	−59.0	8.9	81 50.7	−58.7	10.0	82 49.7	−58.4	11.4	83 48.4	−58.1	13.2	84 46.5	−57.5	15.7	85 43.7	−56.4	19.3	86 39.3	−54.7•	24.9	87 31.1	−51.1•	34.7	62
63	79 52.6	−59.1	7.8	80 52.0	−59.0	8.6	81 51.3	−58.8	9.7	82 50.3	−58.5	11.0	83 49.0	−58.1	12.7	84 47.3	−57.6	15.2	85 44.7	−56.7	18.7	86 40.6	−55.0•	24.2	63
64	78 53.5	−59.2	6.8	79 53.0	−59.1	7.5	80 52.5	−59.0	8.3	81 51.8	−58.9	9.3	82 50.9	−58.6	10.6	83 49.7	−58.3	12.3	84 48.0	−57.7	14.7	85 45.6	−56.8	18.1	64
65	77 54.3	−59.4	6.1	78 53.9	−59.4	6.6	79 53.5	−59.2	7.2	80 52.9	−59.0	8.0	81 52.3	−58.9	9.0	82 51.4	−58.6	10.2	83 50.3	−58.3	11.9	84 48.8	−57.9	14.2	65
66	76 54.9	−59.5	5.4	77 54.6	−59.4	5.8	78 54.3	−59.4	6.4	79 53.9	−59.2	7.0	80 53.4	−59.1	7.7	81 52.8	−59.0	8.7	82 52.0	−58.8	9.9	83 50.9	−58.4	11.5	66
67	75 55.4	−59.5	4.8	76 55.2	−59.5	5.2	77 54.9	−59.4	5.6	78 54.6	−59.3	6.1	79 54.3	−59.3	6.7	80 53.8	−59.2	7.4	81 53.2	−59.0	8.3	82 52.5	−58.8	9.5	67
68	74 55.9	−59.6	4.3	75 55.7	−59.5	4.6	76 55.5	−59.5	5.0	77 55.3	−59.5	5.4	78 55.0	−59.4	5.9	79 54.6	−59.3	6.4	80 54.2	−59.2	7.1	81 53.7	−59.1	8.0	68
69	73 56.3	−59.6	3.9	74 56.2	−59.6	4.1	75 56.0	−59.6	4.4	76 55.8	−59.5	4.8	77 55.6	−59.5	5.1	78 55.3	−59.4	5.6	79 55.0	−59.3	6.1	80 54.6	−59.2	6.8	69
70	72 56.7	−59.7	3.5	73 56.6	−59.7	3.7	74 56.4	−59.6	4.0	75 56.3	−59.6	4.2	76 56.1	−59.5	4.5	77 55.9	−59.5	4.9	78 55.7	−59.5	5.3	79 55.4	−59.4	5.9	70
71	71 57.0	−59.7	3.2	72 56.9	−59.7	3.3	73 56.7	−59.6	3.5	74 56.7	−59.6	3.8	75 56.6	−59.7	4.0	76 56.4	−59.6	4.3	77 56.2	−59.5	4.7	78 56.0	−59.5	5.1	71
72	70 57.3	−59.7	2.8	71 57.2	−59.7	3.0	72 57.1	−59.7	3.2	73 57.1	−59.7	3.4	74 56.9	−59.6	3.6	75 56.8	−59.6	3.8	76 56.7	−59.6	4.1	77 56.5	−59.6	4.4	72
73	69 57.6	−59.8	2.6	70 57.5	−59.7	2.7	71 57.4	−59.7	2.8	72 57.4	−59.7	3.0	73 57.3	−59.7	3.2	74 57.2	−59.7	3.4	75 57.1	−59.7	3.6	76 56.9	−59.6	3.9	73
74	68 57.8	−59.8	2.3	69 57.8	−59.8	2.4	70 57.7	−59.7	2.5	71 57.7	−59.8	2.7	72 57.6	−59.7	2.8	73 57.5	−59.7	3.0	74 57.4	−59.7	3.2	75 57.3	−59.7	3.4	74
75	67 58.0	−59.8	2.1	68 58.0	−59.8	2.2	69 57.9	−59.8	2.3	70 57.9	−59.8	2.4	71 57.9	−59.8	2.5	72 57.8	−59.7	2.6	73 57.7	−59.7	2.8	74 57.6	−59.7	3.0	75
76	66 58.2	−59.8	1.9	67 58.2	−59.8	1.9	68 58.2	−59.8	2.0	69 58.1	−59.8	2.1	70 58.1	−59.8	2.2	71 58.0	−59.7	2.3	72 58.0	−59.8	2.4	73 57.9	−59.7	2.6	76
77	65 58.4	−59.8	1.7	66 58.4	−59.8	1.7	67 58.4	−59.8	1.8	68 58.3	−59.8	1.9	69 58.3	−59.8	2.0	70 58.3	−59.8	2.1	71 58.2	−59.7	2.2	72 58.2	−59.8	2.3	77
78	64 58.6	−59.9	1.5	65 58.6	−59.8	1.5	66 58.6	−59.8	1.6	67 58.5	−59.8	1.7	68 58.5	−59.8	1.7	69 58.5	−59.8	1.8	70 58.4	−59.8	1.9	71 58.4	−59.8	2.0	78
79	63 58.8	−59.9	1.3	64 58.8	−59.9	1.4	65 58.7	−59.8	1.4	66 58.7	−59.8	1.5	67 58.7	−59.8	1.5	68 58.7	−59.8	1.6	69 58.6	−59.8	1.7	70 58.6	−59.8	1.8	79
80	62 58.9	−59.8	1.1	63 58.9	−59.9	1.2	64 58.9	−59.9	1.2	65 58.9	−59.9	1.3	66 58.9	−59.9	1.3	67 58.8	−59.8	1.4	68 58.8	−59.8	1.5	69 58.8	−59.8	1.5	80
81	61 59.1	−59.9	1.0	62 59.0	−59.8	1.0	63 59.0	−59.9	1.1	64 59.0	−59.8	1.1	65 59.0	−59.9	1.2	66 59.0	−59.9	1.2	67 58.9	−59.8	1.3	68 58.9	−59.8	1.3	81
82	60 59.2	−59.9	0.9	61 59.2	−59.9	0.9	62 59.2	−59.9	0.9	63 59.2	−59.9	1.0	64 59.1	−59.8	1.0	65 59.1	−59.9	1.0	66 59.1	−59.8	1.1	67 59.1	−59.8	1.1	82
83	59 59.3	−59.9	0.7	60 59.3	−59.9	0.8	61 59.3	−59.9	0.8	62 59.3	−59.9	0.8	63 59.3	−59.9	0.8	64 59.3	−59.9	0.9	65 59.3	−59.9	0.9	66 59.2	−59.9	0.9	83
84	58 59.4	−59.9	0.6	59 59.4	−59.9	0.6	60 59.4	−59.9	0.6	61 59.4	−59.9	0.6	62 59.4	−59.9	0.7	63 59.4	−59.9	0.7	64 59.4	−59.9	0.7	65 59.4	−59.9	0.8	84
85	57 59.5	−59.9	0.5	58 59.5	−59.9	0.5	59 59.5	−59.9	0.5	60 59.5	−59.9	0.5	61 59.5	−59.9	0.6	62 59.5	−59.9	0.6	63 59.5	−59.9	0.6	64 59.5	−59.9	0.6	85
86	56 59.6	−59.9	0.4	57 59.6	−59.9	0.4	58 59.6	−59.9	0.4	59 59.6	−59.9	0.4	60 59.6	−59.9	0.4	61 59.6	−59.9	0.4	62 59.6	−59.9	0.5	63 59.6	−59.9	0.5	86
87	55 59.7	−59.9	0.3	56 59.7	−59.9	0.3	57 59.7	−59.9	0.3	58 59.7	−59.9	0.3	59 59.7	−59.9	0.3	60 59.7	−59.9	0.3	61 59.7	−59.9	0.3	62 59.7	−59.9	0.3	87
88	54 59.8	−59.9	0.2	55 59.8	−59.9	0.2	56 59.8	−59.9	0.2	57 59.8	−59.9	0.2	58 59.8	−59.9	0.2	59 59.8	−59.9	0.2	60 59.8	−59.9	0.2	61 59.8	−59.9	0.2	88
89	53 59.9	−59.9	0.1	54 59.9	−59.9	0.1	55 59.9	−59.9	0.1	56 59.9	−59.9	0.1	57 59.9	−59.9	0.1	58 59.9	−59.9	0.1	59 59.9	−59.9	0.1	60 59.9	−59.9	0.1	89
90	53 00.0	−59.9	0.0	54 00.0	−59.9	0.0	55 00.0	−59.9	0.0	56 00.0	−59.9	0.0	57 00.0	−59.9	0.0	58 00.0	−59.9	0.0	59 00.0	−59.9	0.0	60 00.0	−59.9	0.0	90

53°	54°	55°	56°	57°	58°	59°	60°

3°, 357° L.H.A.   **LATITUDE SAME NAME AS DECLINATION**

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 56.5	−60.0	176.2	35 56.6	−60.0	176.3	34 56.7	−60.0	176.3	33 56.8	−59.9	176.4	32 56.9	−59.9	176.4	31 57.1	−60.0	176.5	30 57.2	−60.0	176.5	29 57.3	−60.0	176.5	0
1	35 56.5	−60.0	176.3	34 56.6	−59.9	176.4	33 56.7	−59.9	176.4	32 56.8	−60.0	176.4	31 56.9	−60.0	176.5	30 57.1	−60.0	176.5	29 57.1	−59.9	176.5	28 57.3	−59.9	176.6	1
2	34 56.5	−59.9	176.3	33 56.7	−60.0	176.4	32 56.8	−60.0	176.4	31 56.9	−60.0	176.5	30 57.0	−60.0	176.5	29 57.1	−59.9	176.5	28 57.2	−59.9	176.6	27 57.3	−59.9	176.6	2
3	33 56.6	−60.0	176.4	32 56.7	−60.0	176.4	31 56.8	−59.9	176.5	30 56.9	−59.9	176.5	29 57.0	−59.9	176.5	28 57.2	−60.0	176.6	27 57.3	−60.0	176.6	26 57.4	−60.0	176.7	3
4	32 56.6	−59.9	176.4	31 56.7	−60.0	176.5	30 56.9	−60.0	176.5	29 57.0	−60.0	176.5	28 57.1	−60.0	176.6	27 57.2	−60.0	176.6	26 57.3	−60.0	176.6	25 57.4	−59.9	176.7	4
5	31 56.7	−60.0	176.5	30 56.8	−60.0	176.5	29 56.9	−59.9	176.6	28 57.0	−60.0	176.6	27 57.1	−60.0	176.6	26 57.2	−60.0	176.6	25 57.3	−60.0	176.7	24 57.4	−60.0	176.7	5
6	30 56.7	−59.9	176.5	29 56.8	−59.9	176.6	28 56.9	−59.9	176.6	27 57.0	−59.9	176.6	26 57.1	−59.9	176.7	25 57.2	−59.9	176.7	24 57.3	−59.9	176.7	23 57.4	−59.9	176.7	6
7	29 56.8	−60.0	176.6	28 56.9	−60.0	176.6	27 57.0	−60.0	176.6	26 57.1	−60.0	176.6	25 57.2	−60.0	176.7	24 57.3	−60.0	176.7	23 57.4	−60.0	176.7	22 57.5	−60.0	176.8	7
8	28 56.8	−60.0	176.6	27 56.9	−60.0	176.6	26 57.0	−60.0	176.7	25 57.1	−60.0	176.7	24 57.2	−60.0	176.7	23 57.3	−60.0	176.7	22 57.4	−60.0	176.8	21 57.5	−60.0	176.8	8
9	27 56.8	−59.9	176.6	26 56.9	−59.9	176.7	25 57.0	−59.9	176.7	24 57.1	−59.9	176.7	23 57.2	−59.9	176.8	22 57.3	−60.0	176.8	21 57.4	−60.0	176.8	20 57.5	−60.0	176.8	9
10	26 56.9	−60.0	176.7	25 57.0	−60.0	176.7	24 57.1	−60.0	176.7	23 57.2	−60.0	176.8	22 57.3	−60.0	176.8	21 57.3	−59.9	176.8	20 57.4	−59.9	176.8	19 57.5	−59.9	176.9	10
11	25 56.9	−60.0	176.7	24 57.0	−60.0	176.8	23 57.1	−60.0	176.8	22 57.2	−60.0	176.8	21 57.2	−59.9	176.8	20 57.4	−60.0	176.8	19 57.5	−60.0	176.9	18 57.6	−60.0	176.9	11
12	24 56.9	−59.9	176.8	23 57.0	−59.9	176.8	22 57.1	−59.9	176.8	21 57.2	−59.9	176.8	20 57.3	−60.0	176.9	19 57.4	−60.0	176.9	18 57.5	−60.0	176.9	17 57.6	−60.0	176.9	12
13	23 57.0	−60.0	176.8	22 57.1	−60.0	176.8	21 57.2	−60.0	176.8	20 57.3	−60.0	176.9	19 57.3	−59.9	176.9	18 57.4	−59.9	176.9	17 57.5	−60.0	176.9	16 57.6	−60.0	176.9	13
14	22 57.0	−60.0	176.8	21 57.1	−60.0	176.9	20 57.2	−60.0	176.9	19 57.3	−60.0	176.9	18 57.4	−60.0	176.9	17 57.5	−60.0	176.9	16 57.5	−59.9	177.0	15 57.6	−60.0	177.0	14
15	21 57.0	−59.9	176.9	20 57.1	−59.9	176.9	19 57.2	−59.9	176.9	18 57.3	−60.0	176.9	17 57.4	−60.0	177.0	16 57.5	−60.0	177.0	15 57.6	−60.0	177.0	14 57.6	−59.9	177.0	15
16	20 57.1	−60.0	176.9	19 57.2	−60.0	176.9	18 57.3	−60.0	177.0	17 57.3	−59.9	177.0	16 57.4	−60.0	177.0	15 57.5	−60.0	177.0	14 57.6	−60.0	177.0	13 57.7	−60.0	177.0	16
17	19 57.1	−60.0	176.9	18 57.2	−60.0	177.0	17 57.3	−60.0	177.0	16 57.4	−60.0	177.0	15 57.4	−59.9	177.0	14 57.5	−59.9	177.0	13 57.6	−60.0	177.0	12 57.7	−60.0	177.1	17
18	18 57.1	−59.9	177.0	17 57.2	−59.9	177.0	16 57.3	−60.0	177.0	15 57.4	−60.0	177.0	14 57.5	−60.0	177.0	13 57.6	−60.0	177.1	12 57.6	−59.9	177.1	11 57.7	−60.0	177.1	18
19	17 57.2	−60.0	177.0	16 57.3	−60.0	177.0	15 57.3	−59.9	177.0	14 57.4	−59.9	177.1	13 57.5	−60.0	177.1	12 57.6	−60.0	177.1	11 57.7	−60.0	177.1	10 57.7	−59.9	177.1	19
20	16 57.2	−60.0	177.1	15 57.3	−60.0	177.1	14 57.4	−60.0	177.1	13 57.4	−59.9	177.1	12 57.5	−59.9	177.1	11 57.6	−60.0	177.1	10 57.7	−60.0	177.1	9 57.8	−60.0	177.1	20
21	15 57.2	−59.9	177.1	14 57.3	−59.9	177.1	13 57.4	−60.0	177.1	12 57.5	−60.0	177.1	11 57.5	−60.0	177.1	10 57.6	−59.9	177.1	9 57.7	−60.0	177.2	8 57.8	−60.0	177.2	21
22	14 57.3	−60.0	177.1	13 57.4	−60.0	177.1	12 57.4	−59.9	177.1	11 57.5	−59.9	177.2	10 57.6	−60.0	177.2	9 57.6	−59.9	177.2	8 57.7	−60.0	177.2	7 57.8	−60.0	177.2	22
23	13 57.3	−60.0	177.2	12 57.4	−60.0	177.2	11 57.5	−60.0	177.2	10 57.5	−59.9	177.2	9 57.6	−60.0	177.2	8 57.7	−60.0	177.2	7 57.7	−59.9	177.2	6 57.8	−60.0	177.2	23
24	12 57.3	−59.9	177.2	11 57.4	−60.0	177.2	10 57.5	−60.0	177.2	9 57.6	−60.0	177.2	8 57.6	−59.9	177.2	7 57.7	−60.0	177.2	6 57.8	−60.0	177.2	5 57.8	−59.9	177.2	24
25	11 57.4	−60.0	177.2	10 57.4	−59.9	177.2	9 57.5	−60.0	177.3	8 57.5	−59.9	177.3	7 57.6	−60.0	177.3	6 57.7	−60.0	177.3	5 57.7	−59.9	177.3	4 57.9	−60.0	177.3	25
26	10 57.4	−60.0	177.3	9 57.5	−60.0	177.3	8 57.5	−59.9	177.3	7 57.6	−60.0	177.3	6 57.6	−59.9	177.3	5 57.7	−59.9	177.3	4 57.8	−60.0	177.3	3 57.9	−60.0	177.3	26
27	9 57.4	−59.9	177.3	8 57.5	−60.0	177.3	7 57.6	−60.0	177.3	6 57.6	−59.9	177.3	5 57.7	−60.0	177.3	4 57.8	−60.0	177.3	3 57.8	−59.9	177.3	2 57.9	−60.0	177.3	27
28	8 57.5	−60.0	177.3	7 57.5	−59.9	177.3	6 57.6	−60.0	177.4	5 57.7	−60.0	177.4	4 57.7	−59.9	177.4	3 57.8	−60.0	177.4	2 57.9	−60.0	177.3	1 57.9	−60.0	177.4	28
29	7 57.5	−60.0	177.4	6 57.6	−60.0	177.4	5 57.6	−59.9	177.4	4 57.7	−60.0	177.4	3 57.8	−60.0	177.4	2 57.8	−59.9	177.4	1 57.9	−60.0	177.4	0 57.9	−59.9	177.4	29
30	6 57.5	−59.9	177.4	5 57.6	−60.0	177.4	4 57.7	−60.0	177.4	3 57.7	−59.9	177.4	2 57.8	−60.0	177.4	1 57.8	−59.9	177.4	0 57.9	−60.0	177.4	0 02.0	+60.0	2.6	30
31	5 57.6	−60.0	177.4	4 57.6	−59.9	177.4	3 57.7	−60.0	177.4	2 57.7	−59.9	177.4	1 57.8	−60.0	177.5	0 57.9	−60.0	177.4	0 02.1	+60.0	2.6	1 02.0	+60.0	2.6	31
32	4 57.6	−60.0	177.4	3 57.6	−59.9	177.5	2 57.7	−60.0	177.5	1 57.8	−60.0	177.5	0 57.8	−60.0	177.5	0 02.1	+60.0	2.5	1 02.1	+59.9	2.5	2 02.0	+60.0	2.5	32
33	3 57.6	−60.0	177.5	2 57.7	−60.0	177.5	1 57.7	−59.9	177.5	0 57.8	−60.0	177.5	0 02.2	+59.9	2.5	1 02.1	+60.0	2.5	2 02.0	+60.0	2.5	3 02.0	+60.0	2.5	33
34	2 57.6	−59.9	177.5	1 57.7	−60.0	177.5	0 57.7	−60.0	177.5	0 02.2	+60.0	2.5	1 02.2	+60.0	2.5	2 02.1	+60.0	2.5	3 02.0	+60.0	2.5	4 02.0	+59.9	2.5	34
35	1 57.7	−60.0	177.5	0 57.7	−59.9	177.5	0 02.2	+60.0	2.5	1 02.2	+59.9	2.5	2 02.1	+60.0	2.5	3 02.0	+60.0	2.5	4 02.0	+60.0	2.5	5 01.9	+60.0	2.5	35
36	0 57.7	−60.0	177.6	0 02.2	+60.0	2.4	1 02.2	+60.0	2.4	2 02.1	+60.0	2.4	3 02.1	+60.0	2.4	4 02.0	+60.0	2.4	5 02.0	+59.9	2.4	6 01.9	+60.0	2.4	36
37	0 02.3	+59.9	2.4	1 02.2	+60.0	2.4	2 02.2	+59.9	2.4	3 02.1	+60.0	2.4	4 02.1	+59.9	2.4	5 02.0	+60.0	2.4	6 01.9	+60.0	2.4	7 01.9	+60.0	2.4	37
38	1 02.2	+60.0	2.4	2 02.2	+60.0	2.4	3 02.1	+60.0	2.4	4 02.1	+60.0	2.4	5 02.0	+59.9	2.4	6 02.0	+60.0	2.4	7 01.9	+60.0	2.4	8 01.9	+59.9	2.4	38
39	2 02.2	+60.0	2.3	3 02.2	+59.9	2.3	4 02.1	+60.0	2.3	5 02.1	+59.9	2.3	6 02.0	+60.0	2.3	7 02.0	+59.9	2.3	8 01.9	+60.0	2.3	9 01.9	+59.9	2.4	39
40	3 02.2	+59.9	2.3	4 02.1	+60.0	2.3	5 02.1	+60.0	2.3	6 02.0	+60.0	2.3	7 02.0	+60.0	2.3	8 01.9	+60.0	2.3	9 01.9	+60.0	2.3	10 01.8	+60.0	2.3	40
41	4 02.1	+60.0	2.3	5 02.1	+60.0	2.3	6 02.1	+59.9	2.3	7 02.0	+60.0	2.3	8 02.0	+60.0	2.3	9 01.9	+60.0	2.3	10 01.9	+59.9	2.3	11 01.8	+60.0	2.3	41
42	5 02.1	+60.0	2.2	6 02.1	+59.9	2.2	7 02.0	+60.0	2.2	8 02.0	+60.0	2.3	9 01.9	+60.0	2.3	10 01.9	+60.0	2.3	11 01.8	+60.0	2.3	12 01.8	+60.0	2.3	42
43	6 02.1	+60.0	2.2	7 02.0	+60.0	2.2	8 02.0	+60.0	2.2	9 02.0	+59.9	2.2	10 01.9	+60.0	2.2	11 01.9	+59.9	2.2	12 01.8	+60.0	2.2	13 01.8	+59.9	2.3	43
44	7 02.1	+59.9	2.2	8 02.0	+60.0	2.2	9 02.0	+59.9	2.2	10 01.9	+60.0	2.2	11 01.9	+60.0	2.2	12 01.8	+60.0	2.2	13 01.8	+60.0	2.2	14 01.7	+60.0	2.2	44
45	8 02.0	+60.0	2.1	9 02.0	+60.0	2.1	10 01.9	+60.0	2.2	11 01.9	+60.0	2.2	12 01.9	+59.9	2.2	13 01.8	+60.0	2.2	14 01.8	+59.9	2.2	15 01.7	+60.0	2.2	45
46	9 02.0	+60.0	2.1	10 02.0	+59.9	2.1	11 01.9	+60.0	2.1	12 01.9	+59.9	2.1	13 01.8	+60.0	2.1	14 01.8	+60.0	2.1	15 01.7	+60.0	2.2	16 01.7	+60.0	2.2	46
47	10 02.0	+59.9	2.1	11 01.9	+60.0	2.1	12 01.9	+60.0	2.1	13 01.8	+60.0	2.1	14 01.8	+60.0	2.1	15 01.8	+59.9	2.1	16 01.7	+60.0	2.1	17 01.7	+60.0	2.1	47
48	11 01.9	+60.0	2.0	12 01.9	+60.0	2.1	13 01.9	+59.9	2.1	14 01.8	+60.0	2.1	15 01.8	+60.0	2.1	16 01.7	+60.0	2.1	17 01.7	+60.0	2.1	18 01.7	+59.9	2.1	48
49	12 01.9	+60.0	2.0	13 01.9	+59.9	2.0	14 01.8	+60.0	2.0	15 01.8	+60.0	2.0	16 01.8	+59.9	2.0	17 01.7	+60.0	2.1	18 01.7	+59.9	2.1	19 01.6	+60.0	2.1	49
50	13 01.9	+59.9	2.0	14 01.8	+60.0	2.0	15 01.8	+60.0	2.0	16 01.8	+59.9	2.0	17 01.7	+60.0	2.0	18 01.7	+60.0	2.0	19 01.6	+60.0	2.0	20 01.6	+60.0	2.1	50
51	14 01.8	+60.0	1.9	15 01.8	+60.0	2.0	16 01.8	+59.9	2.0	17 01.7	+60.0	2.0	18 01.7	+60.0	2.0	19 01.7	+59.9	2.0	20 01.6	+60.0	2.0	21 01.6	+60.0	2.0	51
52	15 01.8	+60.0	1.9	16 01.8	+59.9	1.9	17 01.7	+60.0	1.9	18 01.7	+60.0	1.9	19 01.7	+60.0	2.0	20 01.6	+60.0	2.0	21 01.6	+60.0	2.0	22 01.6	+59.9	2.0	52
53	16 01.8	+60.0	1.9	17 01.7	+60.0	1.9	18 01.7	+60.0	1.9	19 01.7	+59.9	1.9	20 01.6	+60.0	1.9	21 01.6	+60.0	1.9	22 01.6	+59.9	1.9	23 01.5	+60.0	2.0	53
54	17 01.7	+60.0	1.8	18 01.7	+60.0	1.9	19 01.7	+59.9	1.9	20 01.6	+60.0	1.9	21 01.6	+60.0	1.9	22 01.6	+60.0	1.9	23 01.5	+60.0	1.9	24 01.5	+60.0	1.9	54
55	18 01.7	+60.0	1.8	19 01.7	+59.9	1.8	20 01.6	+60.0	1.8	21 01.6	+60.0	1.8	22 01.6	+60.0	1.9	23 01.6	+59.9	1.9	24 01.5	+60.0	1.9	25 01.5	+60.0	1.9	55
56	19 01.7	+59.9	1.8	20 01.6	+60.0	1.8	21 01.6	+60.0	1.8	22 01.6	+59.9	1.8	23 01.6	+59.9	1.8	24 01.5	+60.0	1.8	25 01.5	+60.0	1.9	26 01.5	+59.9	1.9	56
57	20 01.6	+60.0	1.7	21 01.6	+60.0	1.7	22 01.6	+59.9	1.8	23 01.5	+60.0	1.8	24 01.5	+60.0	1.8	25 01.5	+60.0	1.8	26 01.5	+59.9	1.8	27 01.4	+60.0	1.8	57
58	21 01.6	+60.0	1.7	22 01.6	+59.9	1.7	23 01.6	+59.9	1.7	24 01.5	+60.0	1.7	25 01.5	+60.0	1.7	26 01.5	+59.9	1.8	27 01.4	+60.0	1.8	28 01.4	+60.0	1.8	58
59	22 01.6	+59.9	1.7	23 01.5	+60.0	1.7	24 01.5	+60.0	1.7	25 01.5	+59.9	1.7	26 01.5	+59.9	1.7	27 01.4	+60.0	1.7	28 01.4	+60.0	1.7	29 01.4	+59.9	1.8	59
60	23 01.5	+60.0	1.6	24 01.5	+60.0	1.6	25 01.5	+59.9	1.7	26 01.5	+59.9	1.7	27 01.4	+60.0	1.7	28 01.4	+60.0	1.7	29 01.4	+60.0	1.7	30 01.4	+59.9	1.7	60
61	24 01.5	+60.0	1.6	25 01.5	+59.9	1.6	26 01.5	+59.9	1.6	27 01.4	+60.0	1.6	28 01.4	+60.0	1.6	29 01.4	+60.0	1.7	30 01.4	+59.9	1.7	31 01.3	+60.0	1.7	61
62	25 01.5	+60.0	1.6	26 01.4	+60.0	1.6	27 01.4	+60.0	1.6	28 01.4	+59.9	1.6	29 01.4	+59.9	1.6	30 01.3	+60.0	1.6	31 01.3	+60.0	1.7	32 01.3	+60.0	1.7	62
63	26 01.4	+60.0	1.5	27 01.4	+59.9	1.5	28 01.4	+59.9	1.5	29 01.4	+59.9	1.6	30 01.3	+60.0	1.6	31 01.3	+60.0	1.6	32 01.3	+60.0	1.6	33 01.3	+59.9	1.6	63
64	27 01.4	+60.0	1.5	28 01.4	+59.9	1.5	29 01.4	+59.9	1.5	30 01.3	+60.0	1.5	31 01.3	+60.0	1.5	32 01.3	+60.0	1.6	33 01.3	+59.9	1.6	34 01.2	+60.0	1.6	64
65	28 01.4	+60.0	1.4	29 01.3	+60.0	1.4	30 01.3	+60.0	1.5	31 01.3	+59.9	1.5	32 01.3	+59.9	1.5	33 01.3	+59.9	1.5	34 01.2	+60.0	1.5	35 01.2	+60.0	1.5	65
66	29 01.3	+60.0	1.4	30 01.3	+59.9	1.4	31 01.3	+59.9	1.4	32 01.3	+59.9	1.4	33 01.2	+60.0	1.4	34 01.2	+60.0	1.5	35 01.2	+60.0	1.5	36 01.2	+59.9	1.5	66
67	30 01.3	+59.9	1.4	31 01.3	+59.9	1.4	32 01.2	+60.0	1.4	33 01.2	+60.0	1.4	34 01.2	+60.0	1.4	35 01.2	+60.0	1.4	36 01.2	+59.9	1.4	37 01.2	+59.9	1.5	67
68	31 01.2	+60.0	1.3	32 01.2	+60.0	1.3	33 01.2	+60.0	1.3	34 01.2	+59.9	1.4	35 01.2	+59.9	1.4	36 01.2	+59.9	1.4	37 01.1	+60.0	1.4	38 01.1	+60.0	1.4	68
69	32 01.2	+60.0	1.3	33 01.2	+59.9	1.3	34 01.2	+59.9	1.3	35 01.2	+59.9	1.3	36 01.1	+60.0	1.3	37 01.1	+60.0	1.3	38 01.1	+60.0	1.4	39 01.1	+60.0	1.4	69
70	33 01.2	+59.9	1.2	34 01.1	+60.0	1.2	35 01.1	+60.0	1.3	36 01.1	+60.0	1.3	37 01.1	+60.0	1.3	38 01.1	+59.9	1.3	39 01.1	+59.9	1.3	40 01.1	+59.9	1.3	70
71	34 01.1	+60.0	1.2	35 01.1	+60.0	1.2	36 01.1	+59.9	1.2	37 01.1	+59.9	1.2	38 01.1	+59.9	1.2	39 01.0	+60.0	1.2	40 01.0	+60.0	1.3	41 01.0	+60.0	1.3	71
72	35 01.1	+60.0	1.1	36 01.1	+59.9	1.1	37 01.0	+60.0	1.2	38 01.0	+60.0	1.2	39 01.0	+60.0	1.2	40 01.0	+60.0	1.2	41 01.0	+59.9	1.2	42 01.0	+59.9	1.2	72
73	36 01.0	+60.0	1.1	37 01.0	+60.0	1.1	38 01.0	+59.9	1.1	39 01.0	+59.9	1.1	40 01.0	+59.9	1.1	41 01.0	+59.9	1.2	42 00.9	+60.0	1.2	43 00.9	+60.0	1.2	73
74	37 01.0	+59.9	1.0	38 01.0	+59.9	1.0	39 01.0	+59.9	1.1	40 00.9	+60.0	1.1	41 00.9	+60.0	1.1	42 00.9	+60.0	1.1	43 00.9	+60.0	1.1	44 00.9	+59.9	1.1	74
75	38 00.9	+60.0	1.0	39 00.9	+60.0	1.0	40 00.9	+59.9	1.0	41 00.9	+59.9	1.0	42 00.9	+59.9	1.0	43 00.9	+59.9	1.0	44 00.9	+59.9	1.1	45 00.9	+60.0	1.1	75
76	39 00.9	+59.9	0.9	40 00.9	+59.9	0.9	41 00.9	+59.9	1.0	42 00.9	+59.9	1.0	43 00.8	+60.0	1.0	44 00.8	+60.0	1.0	45 00.8	+59.9	1.0	46 00.8	+60.0	1.0	76
77	40 00.8	+60.0	0.9	41 00.8	+60.0	0.9	42 00.8	+60.0	0.9	43 00.8	+59.9	0.9	44 00.8	+59.9	0.9	45 00.8	+59.9	0.9	46 00.8	+59.9	1.0	47 00.8	+59.9	1.0	77
78	41 00.8	+60.0	0.8	42 00.8	+59.9	0.8	43 00.8	+59.9	0.9	44 00.7	+60.0	0.9	45 00.7	+60.0	0.9	46 00.7	+60.0	0.9	47 00.7	+59.9	0.9	48 00.7	+59.9	0.9	78
79	42 00.7	+60.0	0.8	43 00.7	+60.0	0.8	44 00.7	+60.0	0.8	45 00.7	+59.9	0.8	46 00.7	+59.9	0.8	47 00.7	+59.9	0.8	48 00.7	+59.9	0.9	49 00.7	+59.9	0.9	79
80	43 00.7	+59.9	0.7	44 00.7	+59.9	0.7	45 00.7	+59.9	0.7	46 00.7	+59.9	0.7	47 00.6	+60.0	0.7	48 00.6	+60.0	0.8	49 00.6	+60.0	0.8	50 00.6	+60.0	0.8	80
81	44 00.6	+60.0	0.7	45 00.6	+60.0	0.7	46 00.6	+60.0	0.7	47 00.6	+59.9	0.7	48 00.6	+59.9	0.7	49 00.6	+59.9	0.7	50 00.6	+59.9	0.7	51 00.6	+59.9	0.7	81
82	45 00.6	+60.0	0.6	46 00.6	+59.9	0.6	47 00.6	+59.9	0.6	48 00.5	+60.0	0.6	49 00.5	+60.0	0.6	50 00.5	+60.0	0.6	51 00.5	+60.0	0.7	52 00.5	+59.9	0.7	82
83	46 00.5	+59.9	0.5	47 00.5	+59.9	0.5	48 00.5	+59.9	0.5	49 00.5	+59.9	0.6	50 00.5	+59.9	0.6	51 00.5	+59.9	0.6	52 00.5	+59.9	0.6	53 00.5	+59.9	0.6	83
84	47 00.4	+60.0	0.5	48 00.4	+60.0	0.5	49 00.4	+60.0	0.5	50 00.4	+60.0	0.5	51 00.4	+60.0	0.5	52 00.4	+60.0	0.5	53 00.4	+60.0	0.5	54 00.4	+60.0	0.5	84
85	48 00.4	+60.0	0.4	49 00.4	+59.9	0.4	50 00.4	+59.9	0.4	51 00.4	+59.9	0.4	52 00.4	+59.9	0.4	53 00.4	+59.9	0.4	54 00.4	+59.9	0.5	55 00.4	+59.9	0.5	85
86	49 00.3	+59.9	0.3	50 00.3	+59.9	0.3	51 00.3	+59.9	0.3	52 00.3	+59.9	0.3	53 00.3	+59.9	0.3	54 00.3	+59.9	0.4	55 00.3	+59.9	0.4	56 00.3	+59.9	0.4	86
87	50 00.2	+60.0	0.2	51 00.2	+60.0	0.2	52 00.2	+60.0	0.3	53 00.2	+60.0	0.3	54 00.2	+59.9	0.3	55 00.2	+60.0	0.3	56 00.2	+60.0	0.3	57 00.2	+59.9	0.3	87
88	51 00.2	+60.0	0.2	52 00.2	+59.9	0.2	53 00.2	+59.9	0.2	54 00.2	+59.9	0.2	55 00.2	+59.9	0.2	56 00.2	+59.9	0.2	57 00.2	+59.9	0.2	58 00.2	+59.9	0.2	88
89	52 00.1	+59.9	0.1	53 00.1	+59.9	0.1	54 00.1	+59.9	0.1	55 00.1	+59.9	0.1	56 00.1	+59.9	0.1	57 00.1	+59.9	0.1	58 00.1	+59.9	0.1	59 00.1	+59.9	0.1	89
90	53 00.0	+59.9	0.0	54 00.0	+59.9	0.0	55 00.0	+59.9	0.0	56 00.0	+59.9	0.0	57 00.0	+59.9	0.0	58 00.0	+59.9	0.0	59 00.0	+59.9	0.0	60 00.0	+59.9	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 177°, 183°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 53.7	+59.9	175.0	35 53.9	+59.9	175.1	34 54.1	+60.0	175.1	33 54.4	+59.9	175.2	32 54.6	+59.9	175.2	31 54.8	+59.9	175.3	30 55.0	+59.9	175.3	29 55.2	+59.9	175.4	0
1	37 53.6	+59.9	174.9	36 53.8	+60.0	175.0	35 54.1	+59.9	175.1	34 54.3	+59.9	175.1	33 54.5	+59.9	175.2	32 54.7	+60.0	175.2	31 54.9	+60.0	175.3	30 55.1	+60.0	175.3	1
2	38 53.5	+59.9	174.9	37 53.8	+59.9	174.9	36 54.0	+59.9	175.0	35 54.2	+59.9	175.1	34 54.4	+60.0	175.1	33 54.7	+59.9	175.2	32 54.9	+59.9	175.2	31 55.1	+59.9	175.3	2
3	39 53.4	+59.9	174.8	38 53.7	+59.9	174.9	37 53.9	+59.9	174.9	36 54.1	+60.0	175.0	35 54.4	+59.9	175.1	34 54.6	+59.9	175.1	33 54.8	+60.0	175.2	32 55.0	+60.0	175.2	3
4	40 53.3	+60.0	174.7	39 53.6	+59.9	174.9	38 53.8	+60.0	174.9	37 54.1	+59.9	174.9	36 54.3	+59.9	175.0	35 54.5	+60.0	175.1	34 54.8	+59.9	175.1	33 55.0	+59.9	175.2	4
5	41 53.3	+59.9	174.6	40 53.5	+59.9	174.7	39 53.8	+59.9	174.8	38 54.0	+59.9	174.9	37 54.2	+60.0	174.9	36 54.5	+59.9	175.0	35 54.7	+59.9	175.1	34 54.9	+60.0	175.1	5
6	42 53.2	+59.9	174.6	41 53.4	+59.9	174.7	40 53.7	+59.9	174.7	39 53.9	+59.9	174.8	38 54.2	+59.9	174.9	37 54.4	+59.9	175.0	36 54.6	+60.0	175.0	35 54.9	+59.9	175.1	6
7	43 53.1	+59.9	174.5	42 53.3	+59.9	174.6	41 53.6	+59.9	174.7	40 53.8	+60.0	174.7	39 54.1	+59.9	174.8	38 54.3	+60.0	174.9	37 54.6	+59.9	175.0	36 54.8	+59.9	175.0	7
8	44 52.9	+59.9	174.4	43 53.2	+59.9	174.5	42 53.5	+59.9	174.6	41 53.8	+59.9	174.7	40 54.0	+59.9	174.8	39 54.3	+59.9	174.8	38 54.5	+59.9	174.9	37 54.7	+60.0	175.0	8
9	45 52.8	+59.9	174.3	44 53.1	+59.9	174.4	43 53.4	+59.9	174.5	42 53.7	+59.9	174.6	41 53.9	+60.0	174.7	40 54.2	+59.9	174.8	39 54.4	+59.9	174.8	38 54.7	+59.9	174.9	9
10	46 52.7	+59.9	174.3	45 53.0	+59.9	174.3	44 53.3	+59.9	174.4	43 53.6	+59.9	174.5	42 53.9	+59.9	174.6	41 54.1	+59.9	174.7	40 54.4	+59.9	174.8	39 54.6	+60.0	174.9	10
11	47 52.6	+59.9	174.1	46 52.9	+59.9	174.3	45 53.2	+59.9	174.4	44 53.5	+59.9	174.5	43 53.8	+59.9	174.5	42 54.0	+60.0	174.6	41 54.3	+59.9	174.7	40 54.6	+59.9	174.8	11
12	48 52.5	+59.9	174.0	47 52.8	+59.9	174.2	46 53.1	+59.9	174.3	45 53.4	+59.9	174.4	44 53.7	+59.9	174.5	43 54.0	+59.9	174.6	42 54.2	+60.0	174.7	41 54.5	+59.9	174.7	12
13	49 52.4	+59.8	173.9	48 52.7	+59.9	174.1	47 53.0	+59.9	174.2	46 53.3	+59.9	174.3	45 53.6	+59.9	174.4	44 53.9	+59.9	174.6	43 54.2	+59.9	174.6	42 54.4	+60.0	174.7	13
14	50 52.2	+59.9	173.8	49 52.6	+59.9	174.0	48 52.9	+59.9	174.1	47 53.2	+59.9	174.2	46 53.5	+59.9	174.3	45 53.8	+59.9	174.4	44 54.1	+59.9	174.5	43 54.4	+59.9	174.6	14
15	51 52.1	+59.9	173.7	50 52.5	+59.8	173.9	49 52.8	+59.9	174.0	48 53.1	+59.9	174.1	47 53.4	+59.9	174.2	46 53.7	+59.9	174.3	45 54.0	+59.9	174.4	44 54.3	+59.9	174.5	15
16	52 52.0	+59.9	173.6	51 52.3	+59.9	173.8	50 52.7	+59.9	173.9	49 53.0	+59.9	174.0	48 53.3	+59.9	174.1	47 53.6	+59.9	174.2	46 53.9	+59.9	174.3	45 54.2	+59.9	174.5	16
17	53 51.8	+59.9	173.5	52 52.2	+59.8	173.7	51 52.5	+59.9	173.8	50 52.9	+59.9	173.9	49 53.2	+59.9	174.1	48 53.5	+59.9	174.2	47 53.8	+60.0	174.3	46 54.1	+60.0	174.4	17
18	54 51.7	+59.8	173.4	53 52.0	+59.9	173.5	52 52.4	+59.9	173.7	51 52.8	+59.9	173.8	50 53.1	+59.9	174.0	49 53.4	+59.9	174.1	48 53.8	+59.9	174.2	47 54.1	+59.9	174.3	18
19	55 51.5	+59.9	173.3	54 51.9	+59.8	173.4	53 52.3	+59.9	173.6	52 52.7	+59.8	173.7	51 53.0	+59.9	173.9	50 53.3	+59.9	174.0	49 53.7	+59.9	174.1	48 54.0	+59.9	174.2	19
20	56 51.3	+59.8	173.1	55 51.7	+59.9	173.3	54 52.1	+59.9	173.5	53 52.5	+59.9	173.6	52 52.9	+59.9	173.8	51 53.2	+59.9	173.9	50 53.6	+59.9	174.0	49 53.9	+59.9	174.2	20
21	57 51.1	+59.8	173.0	56 51.6	+59.8	173.2	55 52.0	+59.8	173.3	54 52.4	+59.8	173.5	53 52.8	+59.9	173.7	52 53.1	+59.9	173.8	51 53.5	+59.9	173.9	50 53.8	+59.9	174.1	21
22	58 50.9	+59.8	172.8	57 51.4	+59.8	173.0	56 51.8	+59.9	173.2	55 52.2	+59.9	173.4	54 52.6	+59.9	173.5	53 53.0	+59.9	173.7	52 53.4	+59.9	173.8	51 53.7	+59.9	173.9	22
23	59 50.7	+59.9	172.7	58 51.2	+59.8	172.9	57 51.7	+59.8	173.1	56 52.1	+59.8	173.3	55 52.5	+59.9	173.4	54 52.9	+59.9	173.6	53 53.3	+59.8	173.7	52 53.6	+59.9	173.9	23
24	60 50.5	+59.8	172.5	59 51.0	+59.8	172.7	58 51.5	+59.8	172.9	57 51.9	+59.9	173.1	56 52.4	+59.8	173.3	55 52.8	+59.9	173.5	54 53.1	+59.9	173.6	53 53.5	+59.9	173.8	24
25	61 50.3	+59.8	172.3	60 50.8	+59.8	172.5	59 51.3	+59.9	172.8	58 51.8	+59.8	173.0	57 52.2	+59.9	173.2	56 52.6	+59.9	173.4	55 53.0	+59.9	173.5	54 53.4	+59.9	173.7	25
26	62 50.1	+59.7	172.1	61 50.6	+59.8	172.4	60 51.1	+59.8	172.6	59 51.6	+59.8	172.8	58 52.1	+59.8	173.0	57 52.5	+59.9	173.2	56 52.9	+59.9	173.4	55 53.3	+59.9	173.6	26
27	63 49.8	+59.7	171.9	62 50.4	+59.7	172.2	61 50.9	+59.8	172.4	60 51.4	+59.8	172.7	59 51.9	+59.9	172.9	58 52.3	+59.9	173.1	57 52.8	+59.8	173.3	56 53.2	+59.8	173.5	27
28	64 49.5	+59.7	171.7	63 50.1	+59.7	172.0	62 50.7	+59.7	172.2	61 51.2	+59.8	172.5	60 51.7	+59.8	172.7	59 52.2	+59.8	172.9	58 52.6	+59.9	173.2	57 53.0	+59.9	173.4	28
29	65 49.2	+59.7	171.4	64 49.8	+59.8	171.8	63 50.4	+59.8	172.0	62 51.0	+59.8	172.3	61 51.5	+59.8	172.6	60 52.0	+59.8	172.8	59 52.5	+59.8	173.0	58 52.9	+59.9	173.2	29
30	66 48.9	+59.6	171.2	65 49.6	+59.6	171.5	64 50.2	+59.7	171.8	63 50.8	+59.7	172.1	62 51.3	+59.8	172.4	61 51.8	+59.8	172.6	60 52.3	+59.9	172.9	59 52.8	+59.8	173.1	30
31	67 48.5	+59.6	170.9	66 49.2	+59.7	171.3	65 49.9	+59.7	171.6	64 50.5	+59.8	171.9	63 51.1	+59.8	172.2	62 51.6	+59.8	172.5	61 52.1	+59.9	172.7	60 52.6	+59.8	173.0	31
32	68 48.1	+59.6	170.6	67 48.9	+59.6	171.0	66 49.6	+59.7	171.4	65 50.3	+59.7	171.7	64 50.9	+59.7	172.0	63 51.4	+59.8	172.3	62 52.0	+59.8	172.5	61 52.5	+59.8	172.8	32
33	69 47.7	+59.5	170.2	68 48.5	+59.6	170.7	67 49.3	+59.6	171.1	66 50.0	+59.7	171.4	65 50.6	+59.8	171.8	64 51.2	+59.8	172.1	63 51.8	+59.8	172.4	62 52.3	+59.8	172.6	33
34	70 47.2	+59.4	169.9	69 48.1	+59.5	170.4	68 48.9	+59.6	170.8	67 49.7	+59.6	171.2	66 50.4	+59.7	171.5	65 51.0	+59.7	171.9	64 51.6	+59.7	172.2	63 52.1	+59.8	172.5	34
35	71 46.7	+59.4	169.5	70 47.7	+59.5	170.0	69 48.5	+59.6	170.5	68 49.3	+59.7	170.9	67 50.1	+59.7	171.3	66 50.7	+59.7	171.6	65 51.3	+59.8	172.0	64 51.9	+59.8	172.3	35
36	72 46.1	+59.4	169.0	71 47.2	+59.4	169.6	70 48.1	+59.6	170.1	69 49.0	+59.6	170.6	68 49.7	+59.7	171.0	67 50.4	+59.7	171.4	66 51.1	+59.7	171.7	65 51.7	+59.8	172.1	36
37	73 45.5	+59.3	168.5	72 46.6	+59.4	169.2	71 47.7	+59.4	169.7	70 48.6	+59.5	170.2	69 49.4	+59.6	170.7	68 50.1	+59.7	171.1	67 50.8	+59.8	171.5	66 51.5	+59.7	171.9	37
38	74 44.8	+59.2	167.9	73 46.0	+59.3	168.7	72 47.1	+59.4	169.3	71 48.1	+59.5	169.9	70 49.0	+59.6	170.4	69 49.8	+59.7	170.8	68 50.6	+59.6	171.2	67 51.2	+59.8	171.6	38
39	75 44.0	+59.0	167.3	74 45.3	+59.3	168.1	73 46.5	+59.4	168.8	72 47.6	+59.5	169.4	71 48.6	+59.5	170.0	70 49.5	+59.6	170.5	69 50.2	+59.7	171.0	68 51.0	+59.7	171.4	39
40	76 43.0	+58.9	166.6	75 44.6	+59.1	167.5	74 45.9	+59.2	168.3	73 47.1	+59.3	169.0	72 48.1	+59.5	169.6	71 49.1	+59.5	170.1	70 49.9	+59.6	170.6	69 50.7	+59.6	171.1	40
41	77 41.9	+58.8	165.7	76 43.7	+58.9	166.7	75 45.1	+59.2	167.6	74 46.4	+59.3	168.4	73 47.6	+59.4	169.1	72 48.6	+59.5	169.7	71 49.5	+59.6	170.3	70 50.3	+59.7	170.8	41
42	78 40.7	+58.6	164.7	77 42.6	+58.8	165.9	76 44.3	+59.0	166.9	75 45.7	+59.2	167.8	74 47.0	+59.3	168.6	73 48.1	+59.4	169.3	72 49.1	+59.5	169.9	71 50.0	+59.6	170.4	42
43	79 39.1	+58.2	163.5	78 41.4	+58.5	164.9	77 43.3	+58.8	166.1	76 44.9	+59.1	167.1	75 46.3	+59.2	168.0	74 47.5	+59.4	168.8	73 48.6	+59.5	169.5	72 49.6	+59.5	170.1	43
44	80 37.3	+57.7	162.1	79 39.9	+58.3	163.8	78 42.1	+58.6	165.2	77 44.0	+58.9	166.3	76 45.5	+59.1	167.3	75 46.9	+59.3	168.2	74 48.1	+59.4	169.0	73 49.1	+59.5	169.6	44
45	81 35.0	+57.2	160.3	80 38.2	+57.8	162.4	79 40.7	+58.4	164.0	78 42.9	+58.7	165.4	77 44.6	+59.0	166.6	76 46.2	+59.1	167.6	75 47.5	+59.3	168.4	74 48.6	+59.5	169.1	45
46	82 32.2	+56.3	158.1	81 36.0	+57.3	160.6	80 39.1	+57.9	162.6	79 41.5	+58.5	164.3	78 43.6	+58.7	165.6	77 45.3	+59.0	166.8	76 46.8	+59.2	167.8	75 48.1	+59.3	168.6	46
47	83 28.5	+55.0	155.3	82 33.3	+56.5	157.8	81 37.0	+57.4	161.0	80 40.0	+58.0	162.9	79 42.3	+58.5	164.6	78 44.3	+58.8	165.9	77 46.0	+59.0	167.0	76 47.4	+59.2	167.9	47
48	84 23.5	+53.0•	151.5	83 29.8	+55.2	155.7	82 34.4	+56.6	158.8	81 38.0	+57.5	161.3	80 40.8	+58.2	163.2	79 43.1	+58.6	164.8	78 45.0	+58.9	166.2	77 46.6	+59.2	167.3	48
49	85 16.5	+49.6•	146.2	84 25.0	+53.3•	151.9	83 31.0	+55.4	156.1	82 35.5	+56.8	159.2	81 39.0	+57.6	161.6	80 41.7	+58.2	163.6	79 43.9	+58.7	165.1	78 45.8	+58.9	166.4	49
50	86 06.1	+43.6•	138.7	85 18.3	+49.9•	146.8	84 26.4	+53.6•	152.4	83 32.3	+55.6	156.5	82 36.6	+56.9	159.6	81 39.9	+57.8	162.0	80 42.6	+58.3	163.9	79 44.7	+58.7	165.4	50
51	86 49.7	+32.4•	127.5	86 08.2	+44.1•	139.3	85 20.0	+50.3•	147.3	84 27.9	+53.8•	152.9	83 33.5	+55.8	157.0	82 37.7	+57.0	160.0	81 40.9	+57.8	162.3	80 43.4	+58.4	164.2	51
52	87 22.1	+13.5•	110.7	86 52.3	+32.9•	128.1	86 10.3	+44.5•	140.0	85 21.7	+50.7•	147.9	84 29.3	+54.1•	153.4	83 34.7	+56.1	157.4	82 38.7	+57.3	160.4	81 41.8	+58.0	162.7	52
53	87 35.6	−10.4•	88.4	87 25.2	+13.8•	111.2	86 54.8	+34.6•	129.4	86 12.4	+45.0•	140.6	85 23.4	+50.8•	148.3	84 30.8	+54.3•	154.0	83 36.0	+56.5	158.3	82 39.8	+57.4	160.4	53
54	87 25.2	−30.4•	65.6	87 39.0	−10.7•	88.4	87 28.3	+14.1•	111.7	86 57.4	+34.0•	129.4	86 14.5	+45.5•	141.3	85 25.1	+51.5•	149.1	84 32.2	+54.6•	154.5	83 37.2	+56.4	158.3	54
55	86 54.8	−42.4•	48.0	87 28.3	−30.9•	65.1	87 42.4	−11.0•	88.4	87 31.4	+14.4•	112.2	87 00.0	+34.6•	130.1	86 16.6	+46.0•	142.0	85 26.8	+51.9•	149.7	84 33.6	+54.9•	155.0	55
56	86 12.4	−49.4•	36.1	86 57.4	−42.9•	47.3	87 31.4	−31.4•	64.5	87 45.8	−11.2•	88.3	87 34.6	+14.7•	112.7	87 02.6	+35.2•	130.9	86 18.7	+46.5•	142.7	85 28.5	+52.2•	150.4	56
57	85 23.4	−52.6•	28.2	86 14.5	−49.4•	35.4	87 00.0	−43.4•	46.6	87 34.6	−32.0•	64.0	87 49.3	−11.5•	88.3	87 37.8	+15.0•	113.3	87 05.2	+35.8•	131.6	86 20.7	+47.1•	143.4	57
58	84 30.8	−54.8	22.7	85 25.1	−52.9•	27.6	86 16.6	−49.8•	34.7	87 02.6	−43.9•	45.8	87 37.8	−32.6•	63.4	87 52.8	−11.8•	88.3	87 41.0	+15.4•	113.9	87 07.8	+36.4•	132.4	58
59	83 36.0	−56.2	18.8	84 32.2	−53.2•	22.2	85 26.8	−53.2•	26.9	86 18.7	−50.2•	33.9	87 05.2	−44.5•	45.0	87 41.0	−33.2•	62.7	87 56.4	−12.2•	88.3	87 44.2	+15.8•	114.5	59
60	82 39.8	−57.0	15.9	83 37.2	−56.3	18.3	84 33.6	−55.2	21.6	85 28.5	−53.5•	26.2	86 20.7	−50.5•	33.2	87 07.8	−45.1•	44.1	87 44.2	−33.8•	62.1	88 00.0	−12.5•	88.3	60
61	81 42.8	−57.7	13.6	82 40.9	−57.2	15.4	83 38.4	−56.5	17.8	84 35.0	−55.5	21.0	85 30.2	−53.8•	25.5	86 22.7	−50.9•	32.4	87 10.4	−45.6•	43.3	87 47.5	−34.6•	61.4	61
62	80 45.1	−58.1	11.8	81 43.7	−57.3	13.2	82 41.9	−57.0	14.9	83 39.5	−56.6	17.2	84 36.4	−55.3•	20.4	85 31.8	−54.1•	24.8	86 24.2	−51.4•	31.6	87 12.9	−46.2•	42.4	62
63	79 47.0	−58.5	10.3	80 45.9	−58.2	11.6	81 44.6	−57.9	12.7	82 42.9	−57.4	14.5	83 40.7	−56.8	16.7	84 37.7	−55.9	19.8	85 33.4	−54.4•	24.1	86 26.7	−51.7•	30.7	63
64	78 48.5	−58.7	9.1	79 47.7	−58.5	9.9	80 46.7	−58.3	11.0	81 45.5	−58.0	12.3	82 43.9	−57.6	14.0	83 41.8	−56.9	16.2	84 39.0	−56.0	19.1	85 35.0	−54.7•	23.4	64
65	77 49.8	−58.9	8.0	78 49.2	−58.8	8.7	79 48.4	−58.6	9.6	80 47.5	−58.4	10.6	81 46.3	−58.0	11.9	82 44.9	−57.7	13.5	83 43.0	−57.2	15.6	84 40.3	−56.2	18.5	65
66	76 50.9	−59.0	7.2	77 50.4	−58.9	7.7	78 49.8	−58.8	8.4	79 49.1	−58.6	9.2	80 48.3	−58.2	10.2	81 47.2	−58.2	11.5	82 45.8	−57.8	13.0	83 44.1	−57.3	15.1	66
67	75 51.9	−59.2	6.4	76 51.5	−59.1	6.9	77 51.0	−59.0	7.4	78 50.5	−58.9	8.1	79 49.8	−58.7	8.9	80 49.0	−58.5	9.8	81 48.0	−58.2	11.0	82 46.8	−57.9	12.5	67
68	74 52.7	−59.2	5.7	75 52.4	−59.2	6.1	76 52.0	−59.2	6.6	77 51.6	−59.0	7.1	78 51.1	−58.9	7.8	79 50.5	−58.8	8.5	80 49.8	−58.6	9.4	81 48.9	−58.4	10.6	68
69	73 53.5	−59.4	5.2	74 53.2	−59.3	5.5	75 52.9	−59.2	5.9	76 52.6	−59.2	6.3	77 52.2	−59.1	6.8	78 51.7	−59.0	7.4	79 51.2	−58.9	8.2	80 50.5	−58.7	9.0	69
70	72 54.1	−59.4	4.7	73 53.9	−59.4	4.9	74 53.7	−59.4	5.3	75 53.4	−59.3	5.6	76 53.1	−59.2	6.0	77 52.7	−59.1	6.5	78 52.3	−59.0	7.1	79 51.8	−58.9	7.8	70
71	71 54.7	−59.5	4.2	72 54.5	−59.4	4.4	73 54.3	−59.4	4.7	74 54.1	−59.3	5.0	75 53.9	−59.3	5.3	76 53.6	−59.2	5.7	77 53.3	−59.2	6.2	78 52.9	−59.1	6.8	71
72	70 55.2	−59.6	3.8	71 55.1	−59.6	4.0	72 54.9	−59.4	4.2	73 54.8	−59.4	4.5	74 54.6	−59.4	4.7	75 54.4	−59.3	5.1	76 54.1	−59.3	5.5	77 53.8	−59.2	5.9	72
73	69 55.7	−59.6	3.4	70 55.6	−59.6	3.6	71 55.5	−59.6	3.8	72 55.3	−59.5	4.0	73 55.2	−59.4	4.2	74 55.0	−59.4	4.5	75 54.8	−59.4	4.8	76 54.6	−59.4	5.2	73
74	68 56.1	−59.6	3.1	69 56.0	−59.6	3.2	70 55.9	−59.5	3.4	71 55.8	−59.5	3.6	72 55.7	−59.5	3.8	73 55.5	−59.5	4.0	74 55.4	−59.4	4.2	75 55.2	−59.4	4.5	74
75	67 56.5	−59.7	2.8	68 56.4	−59.6	2.9	69 56.4	−59.7	3.0	70 56.3	−59.6	3.2	71 56.2	−59.6	3.3	72 56.1	−59.6	3.5	73 56.0	−59.5	3.7	74 55.8	−59.5	4.0	75
76	66 56.9	−59.7	2.5	67 56.8	−59.6	2.6	68 56.8	−59.7	2.7	69 56.7	−59.6	2.8	70 56.6	−59.6	3.0	71 56.5	−59.6	3.1	72 56.4	−59.5	3.3	73 56.3	−59.5	3.5	76
77	65 57.2	−59.7	2.2	66 57.2	−59.7	2.3	67 57.1	−59.7	2.4	68 57.1	−59.7	2.5	69 57.0	−59.6	2.6	70 56.9	−59.6	2.8	71 56.9	−59.7	2.9	72 56.8	−59.6	3.1	77
78	64 57.5	−59.7	2.0	65 57.5	−59.7	2.0	66 57.4	−59.7	2.1	67 57.4	−59.7	2.2	68 57.4	−59.7	2.3	69 57.3	−59.7	2.4	70 57.2	−59.6	2.5	71 57.2	−59.7	2.7	78
79	63 57.8	−59.7	1.7	64 57.8	−59.7	1.8	65 57.7	−59.7	1.9	66 57.7	−59.7	1.9	67 57.7	−59.7	2.0	68 57.6	−59.7	2.1	69 57.6	−59.7	2.2	70 57.5	−59.6	2.3	79
80	62 58.1	−59.8	1.5	63 58.1	−59.8	1.6	64 58.0	−59.7	1.6	65 58.0	−59.7	1.7	66 58.0	−59.7	1.8	67 57.9	−59.7	1.9	68 57.9	−59.7	1.9	69 57.9	−59.7	2.0	80
81	61 58.3	−59.7	1.3	62 58.3	−59.7	1.4	63 58.3	−59.8	1.4	64 58.3	−59.8	1.5	65 58.2	−59.7	1.6	66 58.2	−59.7	1.6	67 58.2	−59.8	1.7	68 58.2	−59.7	1.7	81
82	60 58.6	−59.7	1.1	61 58.5	−59.7	1.2	62 58.5	−59.7	1.2	63 58.5	−59.8	1.3	64 58.5	−59.8	1.3	65 58.5	−59.8	1.4	66 58.5	−59.8	1.4	67 58.4	−59.7	1.5	82
83	59 58.8	−59.9	1.0	60 58.8	−59.8	1.0	61 58.8	−59.8	1.0	62 58.7	−59.7	1.1	63 58.7	−59.7	1.1	64 58.7	−59.8	1.2	65 58.7	−59.8	1.2	66 58.7	−59.8	1.2	83
84	58 59.0	−59.8	0.8	59 59.0	−59.8	0.8	60 59.0	−59.8	0.9	61 59.0	−59.8	0.9	62 59.0	−59.8	0.9	63 58.9	−59.8	1.0	64 58.9	−59.8	1.0	65 58.9	−59.8	1.0	84
85	57 59.2	−59.8	0.7	58 59.2	−59.8	0.7	59 59.2	−59.9	0.7	60 59.2	−59.8	0.7	61 59.2	−59.8	0.7	62 59.1	−59.8	0.8	63 59.1	−59.8	0.8	64 59.1	−59.8	0.8	85
86	56 59.4	−59.9	0.5	57 59.4	−59.9	0.5	58 59.3	−59.8	0.5	59 59.3	−59.8	0.6	60 59.3	−59.8	0.6	61 59.3	−59.8	0.6	62 59.3	−59.8	0.6	63 59.3	−59.8	0.6	86
87	55 59.5	−59.8	0.4	56 59.5	−59.8	0.4	57 59.5	−59.8	0.4	58 59.5	−59.9	0.4	59 59.5	−59.8	0.4	60 59.5	−59.8	0.4	61 59.5	−59.9	0.4	62 59.5	−59.8	0.5	87
88	54 59.7	−59.8	0.2	55 59.7	−59.8	0.2	56 59.7	−59.8	0.3	57 59.7	−59.9	0.3	58 59.7	−59.9	0.3	59 59.7	−59.9	0.3	60 59.7	−59.9	0.3	61 59.7	−59.9	0.3	88
89	53 59.9	−59.9	0.1	54 59.9	−59.9	0.1	55 59.9	−59.9	0.1	56 59.8	−59.8	0.1	57 59.8	−59.8	0.1	58 59.8	−59.8	0.1	59 59.8	−59.8	0.1	60 59.8	−59.8	0.1	89
90	53 00.0	−59.9	0.0	54 00.0	−59.9	0.0	55 00.0	−59.9	0.0	56 00.0	−59.9	0.0	57 00.0	−59.9	0.0	58 00.0	−59.9	0.0	59 00.0	−59.9	0.0	60 00.0	−59.9	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 53.7	−59.9	175.0	35 53.9	−59.9	175.1	34 54.1	−59.9	175.1	33 54.4	−60.0	175.2	32 54.6	−60.0	175.2	31 54.8	−60.0	175.3	30 55.0	−60.0	175.3	29 55.2	−60.0	175.4	0
1	35 53.8	−59.9	175.1	34 54.0	−59.9	175.1	33 54.2	−59.9	175.2	32 54.4	−59.9	175.2	31 54.6	−59.9	175.3	30 54.8	−60.0	175.3	29 55.0	−59.9	175.4	28 55.2	−59.9	175.4	1
2	34 53.9	−60.0	175.1	33 54.1	−60.0	175.2	32 54.3	−59.9	175.2	31 54.5	−59.9	175.3	30 54.7	−60.0	175.3	29 54.9	−60.0	175.4	28 55.1	−60.0	175.4	27 55.3	−59.9	175.5	2
3	33 53.9	−59.9	175.2	32 54.1	−59.9	175.2	31 54.3	−59.9	175.3	30 54.5	−59.9	175.3	29 54.7	−59.9	175.4	28 54.9	−59.9	175.4	27 55.1	−59.9	175.5	26 55.3	−59.9	175.5	3
4	32 54.0	−59.9	175.2	31 54.2	−59.9	175.3	30 54.4	−59.9	175.3	29 54.6	−59.9	175.4	28 54.8	−59.9	175.4	27 55.0	−60.0	175.5	26 55.2	−60.0	175.5	25 55.4	−60.0	175.6	4
5	31 54.1	−59.9	175.3	30 54.3	−59.9	175.4	29 54.5	−60.0	175.4	28 54.7	−60.0	175.4	27 54.9	−60.0	175.5	26 55.0	−59.9	175.5	25 55.2	−59.9	175.6	24 55.4	−60.0	175.6	5
6	30 54.2	−60.0	175.4	29 54.4	−60.0	175.4	28 54.5	−59.9	175.5	27 54.7	−59.9	175.5	26 54.9	−59.9	175.5	25 55.1	−60.0	175.6	24 55.3	−60.0	175.6	23 55.4	−59.9	175.6	6
7	29 54.2	−59.9	175.4	28 54.4	−59.9	175.5	27 54.6	−59.9	175.5	26 54.8	−59.9	175.6	25 55.0	−59.9	175.6	24 55.1	−59.9	175.6	23 55.3	−59.9	175.7	22 55.5	−59.9	175.7	7
8	28 54.3	−59.9	175.5	27 54.5	−59.9	175.5	26 54.7	−60.0	175.6	25 54.8	−59.9	175.6	24 55.0	−59.9	175.6	23 55.2	−60.0	175.7	22 55.4	−60.0	175.7	21 55.5	−59.9	175.7	8
9	27 54.4	−60.0	175.5	26 54.5	−59.9	175.6	25 54.7	−59.9	175.6	24 54.9	−59.9	175.6	23 55.1	−60.0	175.7	22 55.2	−59.9	175.7	21 55.4	−59.9	175.7	20 55.6	−60.0	175.8	9
10	26 54.4	−59.9	175.6	25 54.6	−59.9	175.6	24 54.8	−60.0	175.7	23 55.0	−60.0	175.7	22 55.1	−59.9	175.7	21 55.3	−60.0	175.8	20 55.5	−60.0	175.8	19 55.6	−59.9	175.8	10
11	25 54.5	−59.9	175.6	24 54.7	−60.0	175.7	23 54.8	−59.9	175.7	22 55.0	−59.9	175.7	21 55.2	−60.0	175.8	20 55.3	−59.9	175.8	19 55.5	−59.9	175.8	18 55.7	−60.0	175.8	11
12	24 54.6	−60.0	175.7	23 54.7	−59.9	175.7	22 54.9	−60.0	175.8	21 55.1	−60.0	175.8	20 55.2	−59.9	175.8	19 55.4	−60.0	175.8	18 55.5	−59.9	175.9	17 55.7	−60.0	175.9	12
13	23 54.6	−59.9	175.7	22 54.8	−60.0	175.8	21 55.0	−59.9	175.8	20 55.1	−59.9	175.8	19 55.3	−60.0	175.9	18 55.4	−59.9	175.9	17 55.6	−60.0	175.9	16 55.7	−59.9	175.9	13
14	22 54.7	−59.9	175.8	21 54.9	−60.0	175.8	20 55.0	−59.9	175.8	19 55.2	−59.9	175.9	18 55.3	−59.9	175.9	17 55.5	−59.9	175.9	16 55.6	−59.9	175.9	15 55.8	−59.9	176.0	14
15	21 54.8	−60.0	175.8	20 54.9	−59.9	175.9	19 55.1	−60.0	175.9	18 55.2	−59.9	175.9	17 55.4	−60.0	175.9	16 55.5	−59.9	176.0	15 55.7	−60.0	176.0	14 55.8	−59.9	176.0	15
16	20 54.8	−59.9	175.9	19 55.0	−60.0	175.9	18 55.1	−59.9	175.9	17 55.3	−60.0	176.0	16 55.4	−59.9	176.0	15 55.6	−60.0	176.0	14 55.7	−60.0	176.0	13 55.9	−60.0	176.0	16
17	19 54.9	−60.0	175.9	18 55.0	−59.9	176.0	17 55.2	−60.0	176.0	16 55.3	−60.0	176.0	15 55.5	−60.0	176.0	14 55.6	−59.9	176.0	13 55.7	−59.9	176.1	12 55.9	−59.9	176.1	17
18	18 54.9	−59.9	176.0	17 55.1	−60.0	176.0	16 55.2	−59.9	176.0	15 55.4	−60.0	176.0	14 55.5	−59.9	176.1	13 55.7	−60.0	176.1	12 55.8	−60.0	176.1	11 55.9	−59.9	176.1	18
19	17 55.0	−60.0	176.0	16 55.1	−59.9	176.0	15 55.3	−60.0	176.1	14 55.4	−59.9	176.1	13 55.6	−60.0	176.1	12 55.7	−59.9	176.1	11 55.8	−59.9	176.1	10 56.0	−59.9	176.2	19
20	16 55.0	−59.9	176.1	15 55.2	−60.0	176.1	14 55.3	−59.9	176.1	13 55.5	−60.0	176.1	12 55.6	−60.0	176.1	11 55.7	−59.9	176.2	10 55.9	−60.0	176.2	9 56.0	−59.9	176.2	20
21	15 55.1	−59.9	176.1	14 55.2	−59.9	176.1	13 55.4	−59.9	176.2	12 55.5	−59.9	176.2	11 55.6	−59.9	176.2	10 55.8	−60.0	176.2	9 55.9	−59.9	176.2	8 56.0	−59.9	176.2	21
22	14 55.2	−60.0	176.2	13 55.3	−59.9	176.2	12 55.4	−59.9	176.2	11 55.6	−60.0	176.2	10 55.7	−59.9	176.2	9 55.8	−59.9	176.2	8 56.0	−60.0	176.2	7 56.1	−59.9	176.3	22
23	13 55.2	−59.9	176.2	12 55.4	−60.0	176.2	11 55.5	−59.9	176.2	10 55.6	−59.9	176.3	9 55.7	−59.9	176.3	8 55.9	−60.0	176.3	7 56.0	−59.9	176.3	6 56.1	−59.9	176.3	23
24	12 55.3	−60.0	176.3	11 55.4	−59.9	176.3	10 55.5	−59.9	176.3	9 55.7	−60.0	176.3	8 55.8	−60.0	176.3	7 55.9	−60.0	176.3	6 56.0	−59.9	176.3	5 56.2	−60.0	176.3	24
25	11 55.3	−59.9	176.3	10 55.5	−60.0	176.3	9 55.6	−60.0	176.3	8 55.7	−59.9	176.4	7 55.8	−59.9	176.3	6 55.9	−60.0	176.4	5 56.1	−60.0	176.4	4 56.2	−60.0	176.4	25
26	10 55.4	−60.0	176.3	9 55.5	−59.9	176.4	8 55.6	−59.9	176.4	7 55.8	−60.0	176.4	6 55.9	−60.0	176.4	5 56.0	−60.0	176.4	4 56.1	−60.0	176.4	3 56.2	−60.0	176.4	26
27	9 55.4	−59.9	176.4	8 55.6	−60.0	176.4	7 55.7	−60.0	176.4	6 55.8	−59.9	176.4	5 55.9	−59.9	176.4	4 56.0	−59.9	176.4	3 56.1	−59.9	176.4	2 56.3	−60.0	176.4	27
28	8 55.5	−59.9	176.4	7 55.6	−59.9	176.5	6 55.7	−59.9	176.5	5 55.8	−59.9	176.5	4 56.0	−60.0	176.5	3 56.0	−59.9	176.5	2 56.2	−60.0	176.5	1 56.3	−59.9	176.5	28
29	7 55.5	−59.9	176.5	6 55.7	−60.0	176.5	5 55.8	−59.9	176.5	4 55.9	−60.0	176.5	3 56.0	−60.0	176.5	2 56.1	−59.9	176.5	1 56.2	−59.9	176.5	0 56.3	−59.9	176.5	29
30	6 55.6	−59.9	176.5	5 55.7	−59.9	176.5	4 55.8	−59.9	176.5	3 55.9	−59.9	176.5	2 56.0	−59.9	176.5	1 56.2	−60.0	176.5	0 56.3	−60.0	176.5	0 03.6	+60.0	3.5	30
31	5 55.7	−60.0	176.6	4 55.8	−59.9	176.6	3 55.9	−60.0	176.6	2 56.0	−59.9	176.6	1 56.0	−59.9	176.6	1 56.1	−59.9	176.6	0 56.2	−60.0	176.6	1 03.6	+60.0	3.4	31
32	4 55.7	−59.9	176.6	3 55.8	−59.9	176.6	2 55.9	−59.9	176.6	1 56.0	−59.9	176.6	0 56.1	−59.9	176.6	0 03.8	+59.9	3.4	1 03.7	+59.9	3.4	2 03.6	+59.9	3.4	32
33	3 55.8	−60.0	176.6	2 55.9	−60.0	176.6	1 56.0	−60.0	176.6	0 56.1	−60.0	176.6	0 03.8	+60.0	3.4	1 03.7	+60.0	3.4	2 03.6	+59.9	3.4	3 03.5	+59.9	3.4	33
34	2 55.8	−59.9	176.7	1 55.9	−59.9	176.7	0 56.0	−59.9	176.7	0 03.9	+59.9	3.3	1 03.8	+59.9	3.3	2 03.7	+59.9	3.3	3 03.6	+59.9	3.3	4 03.5	+59.9	3.3	34
35	1 55.9	−60.0	176.7	0 56.0	−60.0	176.7	0 03.9	+60.0	3.3	1 03.8	+60.0	3.3	2 03.7	+60.0	3.3	3 03.6	+60.0	3.3	4 03.6	+60.0	3.3	5 03.4	+59.9	3.3	35
36	0 55.9	−59.9	176.8	0 04.0	+59.9	3.2	1 03.9	+59.9	3.2	2 03.8	+59.9	3.2	3 03.7	+60.0	3.2	4 03.6	+59.9	3.2	5 03.5	+59.9	3.2	6 03.4	+59.9	3.3	36
37	0 04.0	+60.0	3.2	1 03.9	+60.0	3.2	2 03.8	+60.0	3.2	3 03.7	+60.0	3.2	4 03.7	+59.9	3.2	5 03.6	+59.9	3.2	6 03.5	+59.9	3.2	7 03.4	+59.9	3.2	37
38	1 04.0	+59.9	3.2	2 03.9	+60.0	3.2	3 03.8	+59.9	3.2	4 03.7	+60.0	3.2	5 03.6	+60.0	3.2	6 03.5	+60.0	3.2	7 03.4	+60.0	3.2	8 03.3	+60.0	3.2	38
39	2 03.9	+60.0	3.1	3 03.8	+60.0	3.1	4 03.7	+60.0	3.1	5 03.7	+59.9	3.1	6 03.6	+59.9	3.1	7 03.5	+59.9	3.1	8 03.4	+59.9	3.1	9 03.3	+60.0	3.1	39
40	3 03.9	+59.9	3.1	4 03.8	+59.9	3.1	5 03.7	+59.9	3.1	6 03.6	+60.0	3.1	7 03.5	+60.0	3.1	8 03.4	+60.0	3.1	9 03.3	+60.0	3.1	10 03.3	+59.9	3.1	40
41	4 03.8	+60.0	3.0	5 03.7	+60.0	3.0	6 03.6	+60.0	3.0	7 03.6	+59.9	3.0	8 03.5	+59.9	3.0	9 03.4	+59.9	3.1	10 03.3	+59.9	3.1	11 03.2	+60.0	3.1	41
42	5 03.8	+59.9	3.0	6 03.7	+59.9	3.0	7 03.6	+59.9	3.0	8 03.5	+60.0	3.0	9 03.4	+60.0	3.0	10 03.3	+60.0	3.0	11 03.3	+59.9	3.0	12 03.2	+59.9	3.0	42
43	6 03.7	+60.0	2.9	7 03.6	+60.0	2.9	8 03.5	+60.0	3.0	9 03.5	+59.9	3.0	10 03.4	+59.9	3.0	11 03.3	+59.9	3.0	12 03.2	+60.0	3.0	13 03.1	+60.0	3.0	43
44	7 03.7	+59.9	2.9	8 03.6	+59.9	2.9	9 03.5	+59.9	2.9	10 03.4	+59.9	2.9	11 03.3	+60.0	2.9	12 03.3	+59.9	2.9	13 03.2	+59.9	3.0	14 03.1	+60.0	3.0	44
45	8 03.6	+59.9	2.9	9 03.5	+60.0	2.9	10 03.4	+60.0	2.9	11 03.4	+59.9	2.9	12 03.3	+59.9	2.9	13 03.2	+59.9	2.9	14 03.1	+60.0	2.9	15 03.1	+59.9	2.9	45
46	9 03.5	+60.0	2.8	10 03.5	+59.9	2.8	11 03.4	+59.9	2.8	12 03.3	+60.0	2.8	13 03.3	+59.9	2.9	14 03.2	+59.9	2.9	15 03.1	+60.0	2.9	16 03.0	+60.0	2.9	46
47	10 03.5	+59.9	2.8	11 03.4	+60.0	2.8	12 03.3	+60.0	2.8	13 03.3	+59.9	2.8	14 03.2	+59.9	2.8	15 03.2	+59.9	2.8	16 03.1	+59.9	2.8	17 03.0	+59.9	2.9	47
48	11 03.4	+60.0	2.7	12 03.4	+59.9	2.7	13 03.3	+59.9	2.7	14 03.2	+60.0	2.8	15 03.2	+59.9	2.8	16 03.1	+60.0	2.8	17 03.0	+60.0	2.8	18 02.9	+60.0	2.8	48
49	12 03.4	+59.9	2.7	13 03.3	+60.0	2.7	14 03.2	+60.0	2.7	15 03.2	+59.9	2.7	16 03.1	+60.0	2.7	17 03.0	+60.0	2.7	18 03.0	+59.9	2.8	19 02.9	+60.0	2.8	49
50	13 03.3	+60.0	2.6	14 03.3	+59.9	2.6	15 03.2	+59.9	2.7	16 03.1	+59.9	2.7	17 03.1	+59.9	2.7	18 03.0	+59.9	2.7	19 02.9	+60.0	2.7	20 02.9	+59.9	2.7	50
51	14 03.3	+59.9	2.6	15 03.2	+60.0	2.6	16 03.1	+60.0	2.6	17 03.1	+59.9	2.6	18 03.0	+60.0	2.6	19 03.0	+59.9	2.6	20 02.9	+59.9	2.7	21 02.8	+60.0	2.7	51
52	15 03.2	+60.0	2.5	16 03.2	+59.9	2.6	17 03.1	+59.9	2.6	18 03.0	+60.0	2.6	19 03.0	+59.9	2.6	20 02.9	+60.0	2.6	21 02.9	+59.9	2.6	22 02.8	+59.9	2.7	52
53	16 03.2	+59.9	2.5	17 03.1	+60.0	2.5	18 03.0	+60.0	2.5	19 03.0	+59.9	2.5	20 02.9	+60.0	2.5	21 02.9	+59.9	2.6	22 02.8	+60.0	2.6	23 02.7	+60.0	2.6	53
54	17 03.1	+59.9	2.5	18 03.0	+60.0	2.5	19 03.0	+59.9	2.5	20 02.9	+59.9	2.5	21 02.9	+59.9	2.5	22 02.8	+59.9	2.5	23 02.8	+59.9	2.6	24 02.7	+59.9	2.6	54
55	18 03.0	+60.0	2.4	19 03.0	+59.9	2.4	20 02.9	+60.0	2.4	21 02.9	+59.9	2.5	22 02.8	+60.0	2.5	23 02.8	+59.9	2.5	24 02.7	+60.0	2.5	25 02.7	+59.9	2.5	55
56	19 03.0	+59.9	2.4	20 02.9	+60.0	2.4	21 02.9	+59.9	2.4	22 02.8	+60.0	2.4	23 02.8	+59.9	2.4	24 02.7	+59.9	2.4	25 02.7	+59.9	2.5	26 02.6	+60.0	2.5	56
57	20 02.9	+60.0	2.3	21 02.9	+59.9	2.3	22 02.8	+59.9	2.3	23 02.8	+59.9	2.4	24 02.7	+60.0	2.4	25 02.7	+59.9	2.4	26 02.6	+60.0	2.4	27 02.6	+59.9	2.4	57
58	21 02.9	+59.9	2.3	22 02.8	+60.0	2.3	23 02.8	+59.9	2.3	24 02.7	+60.0	2.3	25 02.7	+59.9	2.3	26 02.6	+60.0	2.4	27 02.6	+59.9	2.4	28 02.5	+59.9	2.4	58
59	22 02.8	+59.9	2.2	23 02.8	+59.9	2.2	24 02.7	+60.0	2.3	25 02.7	+59.9	2.3	26 02.6	+59.9	2.3	27 02.6	+59.9	2.3	28 02.5	+59.9	2.3	29 02.5	+59.9	2.4	59
60	23 02.7	+60.0	2.2	24 02.7	+59.9	2.2	25 02.7	+59.9	2.2	26 02.6	+59.9	2.2	27 02.6	+59.9	2.2	28 02.5	+59.9	2.3	29 02.5	+59.9	2.2	30 02.4	+60.0	2.3	60
61	24 02.7	+59.9	2.1	25 02.6	+60.0	2.1	26 02.6	+59.9	2.2	27 02.5	+60.0	2.2	28 02.5	+59.9	2.2	29 02.5	+59.9	2.2	30 02.4	+59.9	2.2	31 02.4	+59.9	2.3	61
62	25 02.6	+59.9	2.1	26 02.6	+59.9	2.1	27 02.5	+59.9	2.1	28 02.5	+59.9	2.1	29 02.4	+59.9	2.1	30 02.4	+59.9	2.2	31 02.4	+59.9	2.2	32 02.3	+59.9	2.2	62
63	26 02.5	+60.0	2.0	27 02.5	+59.9	2.0	28 02.5	+59.9	2.1	29 02.4	+59.9	2.1	30 02.4	+59.9	2.1	31 02.4	+59.9	2.1	32 02.3	+60.0	2.1	33 02.3	+59.9	2.2	63
64	27 02.5	+59.9	2.0	28 02.4	+60.0	2.0	29 02.4	+59.9	2.0	30 02.4	+59.9	2.0	31 02.3	+60.0	2.0	32 02.3	+59.9	2.1	33 02.3	+59.9	2.1	34 02.2	+60.0	2.1	64
65	28 02.4	+59.9	1.9	29 02.4	+59.9	1.9	30 02.3	+60.0	2.0	31 02.3	+59.9	2.0	32 02.3	+59.9	2.0	33 02.2	+60.0	2.0	34 02.2	+59.9	2.0	35 02.2	+59.9	2.1	65
66	29 02.3	+60.0	1.9	30 02.3	+59.9	1.9	31 02.3	+59.9	1.9	32 02.2	+60.0	1.9	33 02.2	+59.9	1.9	34 02.2	+59.9	2.0	35 02.1	+60.0	2.0	36 02.1	+59.9	2.0	66
67	30 02.3	+59.9	1.8	31 02.2	+60.0	1.8	32 02.2	+59.9	1.8	33 02.2	+59.9	1.9	34 02.1	+60.0	1.9	35 02.1	+60.0	1.9	36 02.1	+59.9	1.9	37 02.0	+60.0	2.0	67
68	31 02.2	+60.0	1.7	32 02.2	+59.9	1.8	33 02.1	+60.0	1.8	34 02.1	+59.9	1.8	35 02.1	+59.9	1.8	36 02.1	+59.9	1.9	37 02.0	+60.0	1.9	38 02.0	+59.9	1.9	68
69	32 02.1	+60.0	1.7	33 02.1	+59.9	1.7	34 02.1	+59.9	1.7	35 02.0	+60.0	1.7	36 02.0	+60.0	1.8	37 02.0	+59.9	1.8	38 02.0	+59.9	1.8	39 01.9	+60.0	1.8	69
70	33 02.1	+59.9	1.6	34 02.0	+60.0	1.6	35 02.0	+59.9	1.7	36 02.0	+59.9	1.7	37 02.0	+59.9	1.7	38 01.9	+60.0	1.7	39 01.9	+59.9	1.8	40 01.9	+59.9	1.8	70
71	34 02.0	+59.9	1.6	35 02.0	+59.9	1.6	36 01.9	+60.0	1.6	37 01.9	+59.9	1.6	38 01.9	+59.9	1.6	39 01.9	+59.9	1.7	40 01.8	+60.0	1.7	41 01.8	+59.9	1.7	71
72	35 01.9	+59.9	1.5	36 01.9	+59.9	1.5	37 01.9	+59.9	1.5	38 01.8	+60.0	1.6	39 01.8	+59.9	1.6	40 01.8	+59.9	1.6	41 01.8	+59.9	1.6	42 01.7	+60.0	1.7	72
73	36 01.8	+59.9	1.4	37 01.8	+60.0	1.5	38 01.8	+59.9	1.5	39 01.8	+59.9	1.5	40 01.7	+60.0	1.5	41 01.7	+59.9	1.5	42 01.7	+59.9	1.6	43 01.7	+59.9	1.6	73
74	37 01.7	+60.0	1.4	38 01.7	+59.9	1.4	39 01.7	+59.9	1.4	40 01.7	+59.9	1.4	41 01.7	+59.9	1.5	42 01.6	+60.0	1.5	43 01.6	+60.0	1.5	44 01.6	+59.9	1.5	74
75	38 01.7	+59.9	1.3	39 01.6	+60.0	1.4	40 01.6	+59.9	1.4	41 01.6	+59.9	1.4	42 01.6	+59.9	1.4	43 01.6	+59.9	1.4	44 01.6	+59.9	1.4	45 01.5	+60.0	1.5	75
76	39 01.6	+59.9	1.2	40 01.6	+59.9	1.3	41 01.5	+60.0	1.3	42 01.5	+59.9	1.3	43 01.5	+59.9	1.3	44 01.5	+59.9	1.3	45 01.5	+59.9	1.4	46 01.5	+59.9	1.4	76
77	40 01.5	+59.9	1.2	41 01.5	+59.9	1.2	42 01.5	+59.9	1.2	43 01.4	+60.0	1.2	44 01.4	+59.9	1.2	45 01.4	+59.9	1.3	46 01.4	+59.9	1.3	47 01.4	+59.9	1.3	77
78	41 01.4	+59.9	1.1	42 01.4	+59.9	1.1	43 01.4	+59.9	1.1	44 01.3	+60.0	1.1	45 01.3	+59.9	1.1	46 01.3	+59.9	1.2	47 01.3	+59.9	1.2	48 01.3	+59.9	1.2	78
79	42 01.3	+59.9	1.0	43 01.3	+59.9	1.0	44 01.3	+59.9	1.1	45 01.3	+59.9	1.1	46 01.3	+59.9	1.1	47 01.2	+60.0	1.1	48 01.2	+59.9	1.1	49 01.2	+59.9	1.2	79
80	43 01.2	+59.9	0.9	44 01.2	+59.9	1.0	45 01.2	+59.9	1.0	46 01.2	+59.9	1.0	47 01.2	+59.9	1.0	48 01.2	+59.9	1.0	49 01.1	+59.9	1.1	50 01.1	+59.9	1.1	80
81	44 01.1	+59.9	0.9	45 01.1	+59.9	0.9	46 01.1	+59.9	0.9	47 01.1	+59.9	0.9	48 01.1	+59.9	0.9	49 01.1	+59.9	0.9	50 01.0	+60.0	0.9	51 01.0	+59.9	1.0	81
82	45 01.0	+59.9	0.8	46 01.0	+59.9	0.8	47 01.0	+59.9	0.8	48 01.0	+59.9	0.8	49 01.0	+59.9	0.8	50 01.0	+59.9	0.9	51 01.0	+59.9	0.9	52 00.9	+59.9	0.9	82
83	46 00.9	+59.9	0.7	47 00.9	+59.9	0.7	48 00.9	+59.9	0.7	49 00.9	+59.9	0.7	50 00.9	+59.8	0.8	51 00.9	+59.9	0.8	52 00.9	+59.9	0.8	53 00.8	+59.9	0.8	83
84	47 00.8	+59.9	0.6	48 00.8	+59.9	0.6	49 00.8	+59.9	0.6	50 00.8	+59.8	0.7	51 00.8	+59.8	0.7	52 00.8	+59.8	0.7	53 00.7	+59.9	0.7	54 00.7	+59.9	0.7	84
85	48 00.7	+59.9	0.5	49 00.7	+59.8	0.5	50 00.7	+59.8	0.5	51 00.6	+59.9	0.6	52 00.6	+59.9	0.6	53 00.6	+59.9	0.6	54 00.6	+59.9	0.6	55 00.6	+59.9	0.6	85
86	49 00.5	+59.9	0.4	50 00.5	+59.9	0.4	51 00.5	+59.9	0.4	52 00.5	+59.9	0.5	53 00.5	+59.9	0.5	54 00.5	+59.9	0.5	55 00.5	+59.9	0.5	56 00.5	+59.9	0.5	86
87	50 00.4	+59.9	0.3	51 00.4	+59.9	0.3	52 00.4	+59.9	0.3	53 00.4	+59.9	0.3	54 00.4	+59.8	0.4	55 00.4	+59.8	0.4	56 00.4	+59.9	0.4	57 00.4	+59.9	0.4	87
88	51 00.3	+59.8	0.2	52 00.3	+59.8	0.2	53 00.3	+59.8	0.2	54 00.3	+59.8	0.2	55 00.3	+59.8	0.2	56 00.3	+59.9	0.2	57 00.3	+59.9	0.3	58 00.3	+59.9	0.3	88
89	52 00.1	+59.9	0.1	53 00.1	+59.9	0.1	54 00.1	+59.9	0.1	55 00.1	+59.9	0.1	56 00.1	+59.9	0.1	57 00.1	+59.9	0.1	58 00.1	+59.9	0.1	59 00.1	+59.9	0.1	89
90	53 00.0	+59.9	0.0	54 00.0	+59.9	0.0	55 00.0	+59.9	0.0	56 00.0	+59.8	0.0	57 00.0	+59.8	0.0	58 00.0	+59.9	0.0	59 00.0	+59.8	0.0	60 00.0	+59.8	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION **L.H.A. 176°, 184°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec.
0	36 50.2 +59.8 173.7	35 50.5 +59.9 173.8	34 50.8 +59.9 173.9	33 51.2 +59.9 174.0	32 51.5 +59.9 174.0	31 51.8 +59.9 174.1	30 52.1 +60.0 174.2	29 52.5 +59.9 174.2	0
1	37 50.0 +59.9 173.7	36 50.4 +59.9 173.7	35 50.7 +59.9 173.8	34 51.1 +59.9 173.9	33 51.4 +59.9 174.0	32 51.7 +60.0 174.0	31 52.1 +59.9 174.1	30 52.4 +59.9 174.2	1
2	38 49.9 +59.8 173.6	37 50.3 +59.8 173.7	36 50.6 +59.9 173.8	35 51.0 +59.9 173.8	34 51.3 +59.9 173.9	33 51.7 +59.9 174.0	32 52.0 +59.9 174.1	31 52.3 +59.9 174.1	2
3	39 49.7 +59.9 173.5	38 50.1 +59.9 173.5	37 50.5 +59.9 173.7	36 50.9 +59.8 173.8	35 51.2 +59.9 173.8	34 51.6 +59.9 173.9	33 51.9 +59.9 174.0	32 52.2 +59.9 174.1	3
4	40 49.6 +59.9 173.4	39 50.0 +59.9 173.5	38 50.4 +59.9 173.6	37 50.7 +59.9 173.7	36 51.1 +59.9 173.8	35 51.5 +59.9 173.8	34 51.8 +59.9 173.9	33 52.1 +60.0 174.0	4
5	41 49.5 +59.8 173.3	40 49.9 +59.8 173.4	39 50.3 +59.8 173.5	38 50.6 +59.9 173.6	37 51.0 +59.9 173.7	36 51.4 +59.9 173.8	35 51.7 +59.9 173.8	34 52.1 +59.9 173.9	5
6	42 49.3 +59.9 173.2	41 49.7 +59.9 173.3	40 50.1 +59.9 173.4	39 50.5 +59.9 173.5	38 50.9 +59.9 173.6	37 51.3 +59.9 173.7	36 51.6 +59.9 173.8	35 52.0 +59.9 173.9	6
7	43 49.2 +59.8 173.1	42 49.6 +59.8 173.3	41 50.0 +59.9 173.3	40 50.4 +59.9 173.4	39 50.8 +59.9 173.5	38 51.2 +59.8 173.6	37 51.5 +59.9 173.7	36 51.9 +59.9 173.8	7
8	44 49.0 +59.9 173.0	43 49.4 +59.9 173.1	42 49.9 +59.8 173.2	41 50.3 +59.8 173.3	40 50.7 +59.9 173.4	39 51.0 +59.9 173.6	38 51.4 +59.9 173.6	37 51.8 +59.9 173.7	8
9	45 48.8 +59.9 172.9	44 49.3 +59.8 173.0	43 49.7 +59.9 173.1	42 50.1 +59.9 173.3	41 50.5 +59.9 173.4	40 50.9 +59.9 173.4	39 51.3 +59.9 173.6	38 51.7 +59.9 173.7	9
10	46 48.7 +59.8 172.8	45 49.1 +59.8 172.9	44 49.6 +59.9 173.0	43 50.0 +59.9 173.2	42 50.4 +59.9 173.3	41 50.8 +59.9 173.3	40 51.2 +59.9 173.5	39 51.6 +59.9 173.6	10
11	47 48.5 +59.8 172.7	46 49.0 +59.8 172.8	45 49.4 +59.9 172.9	44 49.9 +59.8 173.1	43 50.3 +59.9 173.2	42 50.7 +59.9 173.3	41 51.1 +59.9 173.4	40 51.5 +59.9 173.5	11
12	48 48.3 +59.8 172.6	47 48.8 +59.8 172.7	46 49.3 +59.8 172.8	45 49.7 +59.9 173.0	44 50.2 +59.8 173.1	43 50.6 +59.9 173.2	42 51.0 +59.9 173.3	41 51.4 +59.9 173.4	12
13	49 48.1 +59.8 172.4	48 48.6 +59.8 172.6	47 49.1 +59.8 172.7	46 49.6 +59.8 172.9	45 50.0 +59.9 173.0	44 50.5 +59.9 173.1	43 50.9 +59.9 173.3	42 51.3 +59.9 173.3	13
14	50 47.9 +59.8 172.3	49 48.4 +59.8 172.5	48 48.9 +59.8 172.6	47 49.4 +59.8 172.8	46 49.9 +59.8 172.9	45 50.3 +59.9 173.0	44 50.8 +59.8 173.1	43 51.2 +59.9 173.3	14
15	51 47.7 +59.8 172.2	50 48.2 +59.8 172.3	49 48.7 +59.9 172.5	48 49.2 +59.9 172.7	47 49.7 +59.8 172.8	46 50.2 +59.9 172.9	45 50.6 +59.9 173.1	44 51.1 +59.9 173.2	15
16	52 47.5 +59.7 172.0	51 48.0 +59.8 172.2	50 48.6 +59.8 172.4	49 49.1 +59.8 172.5	48 49.6 +59.8 172.7	47 50.1 +59.8 172.8	46 50.5 +59.9 173.0	45 51.0 +59.9 173.1	16
17	53 47.2 +59.8 171.9	52 47.8 +59.8 172.1	51 48.4 +59.8 172.3	50 48.9 +59.8 172.4	49 49.4 +59.9 172.6	48 49.9 +59.9 172.7	47 50.4 +59.8 172.8	46 50.8 +59.9 173.0	17
18	54 47.0 +59.7 171.7	53 47.6 +59.8 171.9	52 48.2 +59.8 172.1	51 48.7 +59.8 172.3	50 49.3 +59.8 172.5	49 49.8 +59.8 172.6	48 50.2 +59.8 172.8	47 50.7 +59.9 172.9	18
19	55 46.7 +59.7 171.6	54 47.4 +59.7 171.8	53 48.0 +59.7 172.0	52 48.5 +59.8 172.2	51 49.1 +59.8 172.3	50 49.6 +59.8 172.5	49 50.1 +59.9 172.7	48 50.6 +59.9 172.8	19
20	56 46.5 +59.7 171.4	55 47.1 +59.8 171.6	54 47.7 +59.8 171.8	53 48.3 +59.8 172.0	52 48.9 +59.8 172.2	51 49.4 +59.8 172.4	50 50.0 +59.8 172.5	49 50.5 +59.8 172.7	20
21	57 46.2 +59.7 171.2	56 46.9 +59.7 171.5	55 47.5 +59.8 171.7	54 48.1 +59.8 171.9	53 48.7 +59.8 172.1	52 49.3 +59.8 172.3	51 49.8 +59.8 172.4	50 50.3 +59.9 172.6	21
22	58 45.9 +59.7 171.0	57 46.6 +59.7 171.3	56 47.3 +59.7 171.5	55 47.9 +59.8 171.7	54 48.5 +59.8 171.9	53 49.1 +59.8 172.1	52 49.6 +59.9 172.3	51 50.2 +59.8 172.5	22
23	59 45.6 +59.6 170.8	58 46.3 +59.7 171.1	57 47.0 +59.7 171.3	56 47.7 +59.7 171.6	55 48.3 +59.8 171.8	54 48.9 +59.8 172.0	53 49.5 +59.8 172.2	52 50.0 +59.9 172.4	23
24	60 45.2 +59.7 170.6	59 46.0 +59.7 170.9	58 46.7 +59.7 171.2	57 47.4 +59.8 171.4	56 48.1 +59.7 171.6	55 48.7 +59.8 171.9	54 49.3 +59.8 172.1	53 49.9 +59.8 172.2	24
25	61 44.9 +59.6 170.4	60 45.7 +59.6 170.7	59 46.4 +59.7 171.0	58 47.2 +59.7 171.2	57 47.8 +59.8 171.5	56 48.5 +59.8 171.7	55 49.1 +59.8 171.9	54 49.7 +59.8 172.1	25
26	62 44.5 +59.6 170.2	61 45.3 +59.7 170.5	60 46.1 +59.7 170.8	59 46.9 +59.7 171.0	58 47.6 +59.7 171.3	57 48.3 +59.7 171.5	56 48.9 +59.8 171.8	55 49.5 +59.8 172.0	26
27	63 44.1 +59.5 169.9	62 45.0 +59.6 170.2	61 45.8 +59.7 170.6	60 46.6 +59.7 170.8	59 47.3 +59.7 171.1	58 48.0 +59.8 171.4	57 48.7 +59.8 171.6	56 49.3 +59.8 171.8	27
28	64 43.6 +59.6 169.6	63 44.6 +59.6 170.0	62 45.5 +59.6 170.3	61 46.3 +59.7 170.6	60 47.1 +59.7 170.9	59 47.8 +59.7 171.2	58 48.5 +59.7 171.5	57 49.1 +59.8 171.7	28
29	65 43.2 +59.5 169.3	64 44.2 +59.5 169.7	63 45.1 +59.6 170.1	62 46.0 +59.6 170.4	61 46.8 +59.7 170.7	60 47.5 +59.7 171.0	59 48.2 +59.8 171.3	58 48.9 +59.7 171.5	29
30	66 42.7 +59.4 169.0	65 43.7 +59.5 169.4	64 44.7 +59.6 169.8	63 45.6 +59.6 170.2	62 46.5 +59.7 170.5	61 47.3 +59.7 170.8	60 48.0 +59.7 171.1	59 48.7 +59.8 171.4	30
31	67 42.1 +59.4 168.6	66 43.2 +59.5 169.1	65 44.3 +59.5 169.5	64 45.2 +59.6 169.9	63 46.1 +59.7 170.3	62 46.9 +59.7 170.6	61 47.7 +59.7 170.9	60 48.5 +59.7 171.2	31
32	68 41.5 +59.3 168.3	67 42.7 +59.4 168.8	66 43.8 +59.5 169.2	65 44.8 +59.6 169.6	64 45.8 +59.6 170.0	63 46.6 +59.7 170.4	62 47.5 +59.7 170.7	61 48.2 +59.7 171.0	32
33	69 40.8 +59.3 167.8	68 42.1 +59.4 168.4	67 43.3 +59.5 168.9	66 44.4 +59.5 169.3	65 45.4 +59.6 169.7	64 46.3 +59.6 170.1	63 47.2 +59.7 170.5	62 48.0 +59.7 170.8	33
34	70 40.1 +59.2 167.4	69 41.5 +59.3 168.0	68 42.8 +59.4 168.5	67 43.9 +59.5 169.0	66 45.0 +59.5 169.5	65 45.9 +59.6 169.9	64 46.9 +59.6 170.3	63 47.7 +59.7 170.6	34
35	71 39.3 +59.1 166.9	70 40.8 +59.2 167.5	69 42.2 +59.3 168.1	68 43.4 +59.4 168.7	67 44.5 +59.5 169.1	66 45.5 +59.6 169.6	65 46.5 +59.6 170.0	64 47.4 +59.6 170.4	35
36	72 38.4 +59.0 166.3	71 40.0 +59.2 167.0	70 41.5 +59.3 167.7	69 42.8 +59.4 168.3	68 44.0 +59.5 168.8	67 45.1 +59.5 169.3	66 46.1 +59.6 169.7	65 47.0 +59.7 170.1	36
37	73 37.4 +58.9 165.7	72 39.2 +59.1 166.5	71 40.8 +59.2 167.2	70 42.2 +59.3 167.8	69 43.5 +59.4 168.4	68 44.6 +59.5 168.9	67 45.7 +59.6 169.4	66 46.7 +59.6 169.8	37
38	74 36.3 +58.8 165.0	73 38.3 +58.9 165.9	72 40.0 +59.1 166.7	71 41.5 +59.2 167.4	70 42.9 +59.3 168.0	69 44.1 +59.4 168.6	68 45.3 +59.5 169.1	67 46.3 +59.6 169.5	38
39	75 35.1 +58.5 164.2	74 37.2 +58.8 165.2	73 39.1 +59.0 166.1	72 40.7 +59.2 166.9	71 42.2 +59.3 167.5	70 43.6 +59.3 168.2	69 44.8 +59.5 168.7	68 45.9 +59.5 169.2	39
40	76 33.6 +58.4 163.3	75 36.0 +58.6 164.4	74 38.1 +58.8 165.4	73 39.9 +59.0 166.3	72 41.5 +59.2 167.0	71 42.9 +59.4 167.7	70 44.3 +59.4 168.3	69 45.4 +59.5 168.9	40
41	77 32.0 +58.2 162.3	76 34.6 +58.4 163.5	75 36.9 +58.7 164.6	74 38.9 +58.9 165.6	73 40.7 +59.1 166.5	72 42.3 +59.2 167.2	71 43.7 +59.3 167.9	70 44.9 +59.5 168.5	41
42	78 30.0 +57.7 161.0	77 33.0 +58.2 162.5	76 35.6 +58.5 163.8	75 37.8 +58.8 164.9	74 39.8 +58.9 165.8	73 41.5 +59.1 166.7	72 43.0 +59.3 167.4	71 44.4 +59.4 168.1	42
43	79 27.7 +57.2 159.6	78 31.2 +57.7 161.3	77 34.1 +58.2 162.8	76 36.6 +58.5 164.0	75 38.7 +58.8 165.1	74 40.6 +59.0 166.0	73 42.3 +59.2 166.9	72 43.8 +59.3 167.6	43
44	80 24.9 +56.6 157.9	79 28.9 +57.4 159.9	78 32.3 +57.9 161.6	77 35.1 +58.3 163.0	76 37.5 +58.7 164.3	75 39.6 +58.9 165.3	74 41.5 +59.0 166.3	73 43.1 +59.2 167.1	44
45	81 21.5 +55.8 155.8	80 26.3 +56.7 158.2	79 30.2 +57.4 160.2	78 33.4 +58.0 161.9	77 36.2 +58.3 163.3	76 38.5 +58.7 164.5	75 40.5 +59.0 165.6	74 42.3 +59.1 166.5	45
46	82 17.3 +54.5 153.2	81 23.0 +56.0 156.2	80 27.6 +56.9 158.6	79 31.4 +57.6 160.6	78 34.5 +58.1 162.2	77 37.2 +58.5 163.6	76 39.5 +58.7 164.8	75 41.4 +59.0 165.8	46
47	83 11.8 +52.8• 149.9	82 19.0 +54.5 153.6	81 24.5 +56.1 156.6	80 29.0 +57.0 158.9	79 32.6 +57.7 160.9	78 35.7 +58.2 162.5	77 38.2 +58.6 163.8	76 40.4 +58.8 165.1	47
48	84 04.6 +50.2• 145.6	83 13.7 +53.1• 150.4	82 20.6 +55.0 154.0	81 26.0 +56.3 157.0	80 30.3 +57.2 159.3	79 33.9 +57.8 161.2	78 36.8 +58.3 162.8	77 39.2 +58.7 164.2	48
49	84 54.8 +45.9• 139.8	84 06.8 +50.5• 146.1	83 15.6 +53.4• 150.8	82 22.3 +55.2 154.5	81 27.5 +56.5 157.4	80 31.7 +57.3 159.7	79 35.1 +57.9 161.6	78 37.9 +58.4 163.1	49
50	85 40.7 +39.1• 132.0	84 57.3 +46.4• 140.4	84 09.0 +50.8• 146.7	83 17.5 +53.6• 151.3	82 24.0 +55.4 154.9	81 29.0 +56.6 157.8	80 33.0 +57.6 160.0	79 36.3 +58.0 161.9	50
51	85 19.8 +28.0• 121.0	85 43.7 +39.6• 132.6	84 59.8 +46.9• 141.0	84 11.1 +51.2• 147.2	83 19.4 +53.9 151.9	82 25.6 +55.5 155.4	81 30.4 +56.8 158.2	80 34.3 +57.6 160.4	51
52	86 47.8 +11.7• 106.2	86 23.3 +28.5• 121.6	85 46.7 +40.1• 133.2	85 02.3 +47.3• 141.6	84 13.3 +51.6• 147.8	83 21.2 +54.2 152.4	82 27.2 +55.9 155.9	81 31.9 +56.9 158.6	52
53	86 59.5 − 7.7• 88.0	86 51.8 +11.9• 106.6	86 26.8 +29.0• 122.2	85 48.4 +40.7• 133.9	85 04.9 +47.7• 142.3	84 15.4 +52.0• 148.4	83 23.1 +54.5 152.9	82 28.8 +56.1 156.4	53
54	86 51.8 −25.0• 69.4	87 03.7 − 7.9• 88.0	86 55.8 +12.2• 107.0	86 30.3 +29.5• 122.8	85 52.6 +41.2• 134.6	85 07.4 +48.1• 142.9	84 17.6 +52.2• 149.0	83 24.9 +54.8 153.5	54
55	86 26.8 −37.2• 53.8	86 55.8 −25.5• 69.0	87 08.0 − 8.2• 88.0	86 59.8 +12.5• 107.4	86 33.8 +30.1• 123.5	85 55.5 +41.9• 135.3	85 09.8 +48.7• 143.6	84 19.7 +52.6• 149.6	55
56	85 49.6 −47.4• 42.0	86 30.3 −37.7• 53.1	87 00.6 −26.0• 68.5	87 12.3 − 8.4• 87.9	87 03.9 +12.7• 107.8	86 37.4 +30.7• 124.2	85 58.5 +42.4• 136.0	85 12.3 +49.1• 144.5	56
57	85 04.9 −49.5• 33.6	85 52.6 −45.2• 41.3	86 33.8 −38.3• 52.4	87 03.9 −26.5• 68.0	87 16.6 − 8.5• 87.9	87 08.1 +13.0• 108.3	86 40.9 +31.3• 124.9	86 01.4 +43.0• 136.8	57
58	84 15.4 −52.3• 27.5	85 07.4 −49.8• 32.9	85 55.5 −45.7• 40.5	86 37.4 −38.9• 51.6	87 08.1 −27.2• 67.5	87 21.1 − 8.9• 87.9	87 12.2 +13.3• 108.8	86 44.4 +32.0• 125.7	58
59	83 23.1 −54.3 22.9	84 17.6 −52.7• 26.8	85 09.8 −50.1• 32.2	85 58.5 −46.3• 39.8	86 40.9 −39.5• 50.9	87 22.2 −27.8• 66.9	87 25.5 − 9.1• 87.9	87 16.4 +13.6• 109.3	59
60	82 28.8 −55.5 19.5	83 24.9 −54.5 22.3	84 19.7 −53.0• 26.2	85 12.3 −50.6• 31.4	86 01.4 −46.7• 38.9	86 44.4 −40.0• 50.0	87 16.4 −28.4• 66.4	87 30.0 − 9.4• 87.8	60
61	81 33.3 −56.4 16.7	82 30.4 −55.7 18.9	83 26.7 −54.7 21.7	84 21.7 −53.2• 25.5	85 14.7 −50.9• 30.7	86 04.4 −47.2• 38.1	86 48.0 −40.7• 49.2	87 20.6 −29.1• 65.7	61
62	80 36.9 −57.1 14.5	81 34.7 −56.6 16.2	82 32.0 −55.9 18.4	83 28.5 −54.9 21.1	84 23.8 −53.5• 24.8	85 17.2 −51.4• 29.9	86 07.3 −47.7• 37.2	86 51.5 −41.3• 48.3	62
63	79 39.8 −57.6 12.7	80 38.1 −57.2 14.1	81 36.1 −56.7 15.7	82 33.6 −56.1 17.8	83 30.3 −55.2 20.5	84 25.8 −53.8• 24.1	85 19.6 −51.8• 29.0	86 10.2 −48.3• 36.3	63
64	78 42.2 −58.0 11.2	79 40.9 −57.7 12.3	80 39.4 −57.4 13.6	81 37.5 −56.9 15.2	82 35.1 −56.3 17.2	83 32.0 −55.4 19.8	84 27.8 −54.1 23.3	85 21.9 −52.1• 28.2	64
65	77 44.2 −58.3 10.0	78 43.2 −58.1 10.9	79 42.0 −57.8 11.9	80 40.6 −57.5 13.1	81 38.8 −57.0 14.7	82 36.6 −56.5 16.8	83 33.7 −55.6 19.2	84 29.8 −54.4 22.6	65
66	76 45.9 −58.5 8.9	77 45.1 −58.3 9.6	78 44.2 −58.2 10.5	79 43.1 −57.9 11.5	80 41.8 −57.6 12.7	81 40.1 −57.1 14.2	82 38.1 −56.7 16.1	83 35.4 −55.9 18.8	66
67	75 47.4 −58.7 8.0	76 46.8 −58.6 8.6	77 46.0 −58.4 9.2	78 45.2 −58.3 10.1	79 44.2 −58.0 11.0	80 43.0 −57.8 12.2	81 41.4 −57.3 13.6	82 39.5 −56.8 15.5	67
68	74 48.7 −58.9 7.2	75 48.2 −58.8 7.7	76 47.6 −58.6 8.2	77 46.9 −58.5 8.9	78 46.2 −58.4 9.8	79 45.2 −58.1 10.6	80 44.1 −57.9 11.7	81 42.7 −57.5 13.1	68
69	73 49.8 −59.0 6.4	74 49.4 −58.9 6.9	75 49.0 −58.8 7.3	76 48.4 −58.7 7.9	77 47.8 −58.6 8.5	78 47.1 −58.4 9.3	79 46.3 −58.3 10.1	80 45.2 −57.9 11.2	69
70	72 50.8 −59.1 5.8	73 50.5 −59.0 6.1	74 50.1 −58.9 6.5	75 49.7 −58.9 7.0	76 49.2 −58.7 7.5	77 48.7 −58.7 8.1	78 48.0 −58.5 8.8	79 47.3 −58.4 9.7	70
71	71 51.7 −59.1 5.2	72 51.5 −59.2 5.5	73 51.2 −59.1 5.9	74 50.8 −59.0 6.2	75 50.5 −59.0 6.7	76 50.0 −58.8 7.2	77 49.5 −58.7 7.7	78 48.9 −58.6 8.4	71
72	70 52.6 −59.3 4.7	71 52.3 −59.2 5.0	72 52.1 −59.2 5.2	73 51.8 −59.1 5.6	74 51.5 −59.0 5.9	75 51.2 −59.0 6.3	76 50.8 −58.9 6.8	77 50.3 −58.8 7.3	72
73	69 53.3 −59.3 4.2	70 53.1 −59.3 4.5	71 52.9 −59.2 4.7	72 52.7 −59.2 5.0	73 52.5 −59.2 5.3	74 52.2 −59.1 5.6	75 51.9 −59.0 6.0	76 51.5 −58.9 6.4	73
74	68 54.0 −59.4 3.8	69 53.8 −59.3 4.0	70 53.7 −59.4 4.2	71 53.5 −59.3 4.4	72 53.3 −59.3 4.7	73 53.1 −59.2 5.0	74 52.9 −59.2 5.3	75 52.6 −59.1 5.6	74
75	67 54.6 −59.4 3.4	68 54.5 −59.4 3.6	69 54.3 −59.4 3.8	70 54.2 −59.4 4.0	71 54.0 −59.3 4.2	72 53.9 −59.3 4.4	73 53.7 −59.3 4.7	74 53.5 −59.2 5.0	75
76	66 55.1 −59.4 3.1	67 55.0 −59.4 3.2	68 54.9 −59.4 3.4	69 54.8 −59.4 3.5	70 54.7 −59.4 3.7	71 54.6 −59.3 3.9	72 54.4 −59.3 4.1	73 54.3 −59.3 4.4	76
77	65 55.7 −59.5 2.8	66 55.6 −59.5 2.9	67 55.5 −59.5 3.0	68 55.4 −59.5 3.1	69 55.3 −59.4 3.3	70 55.2 −59.4 3.4	71 55.1 −59.4 3.6	72 55.0 −59.4 3.8	77
78	64 56.1 −59.5 2.5	65 56.1 −59.5 2.5	66 56.0 −59.6 2.7	67 55.9 −59.5 2.8	68 55.9 −59.5 2.9	69 55.8 −59.5 3.0	70 55.7 −59.5 3.2	71 55.6 −59.5 3.3	78
79	63 56.6 −59.6 2.2	64 56.5 −59.5 2.3	65 56.5 −59.6 2.3	66 56.4 −59.5 2.4	67 56.4 −59.6 2.5	68 56.3 −59.5 2.7	69 56.2 −59.5 2.8	70 56.2 −59.5 2.9	79
80	62 57.0 −59.6 1.9	63 57.0 −59.6 2.0	64 56.9 −59.6 2.0	65 56.9 −59.6 2.1	66 56.8 −59.5 2.2	67 56.8 −59.6 2.3	68 56.7 −59.6 2.4	69 56.7 −59.6 2.5	80
81	61 57.4 −59.7 1.7	62 57.4 −59.6 1.7	63 57.3 −59.6 1.8	64 57.3 −59.6 1.8	65 57.3 −59.7 1.8	66 57.2 −59.6 2.0	67 57.2 −59.6 2.1	68 57.1 −59.6 2.2	81
82	60 57.7 −59.7 1.4	61 57.7 −59.6 1.5	62 57.7 −59.6 1.5	63 57.7 −59.7 1.6	64 57.7 −59.7 1.6	65 57.6 −59.6 1.7	66 57.6 −59.6 1.8	67 57.6 −59.6 1.9	82
83	59 58.1 −59.7 1.2	60 58.1 −59.7 1.3	61 58.1 −59.7 1.3	62 58.0 −59.6 1.3	63 58.0 −59.6 1.4	64 58.0 −59.7 1.4	65 58.0 −59.7 1.5	66 58.0 −59.7 1.6	83
84	58 58.4 −59.7 1.0	59 58.4 −59.7 1.0	60 58.4 −59.7 1.1	61 58.4 −59.7 1.1	62 58.4 −59.7 1.1	63 58.3 −59.6 1.2	64 58.3 −59.7 1.2	65 58.3 −59.7 1.3	84
85	57 58.7 −59.7 0.8	58 58.7 −59.7 0.8	59 58.7 −59.7 0.9	60 58.7 −59.7 0.9	61 58.7 −59.7 0.9	62 58.7 −59.7 1.0	63 58.7 −59.7 1.0	64 58.7 −59.7 1.0	85
86	56 59.0 −59.7 0.6	57 59.0 −59.7 0.7	58 59.0 −59.7 0.7	59 59.0 −59.7 0.7	60 59.0 −59.7 0.7	61 59.0 −59.7 0.7	62 59.0 −59.8 0.8	63 59.0 −59.8 0.8	86
87	55 59.3 −59.7 0.5	56 59.3 −59.7 0.5	57 59.3 −59.8 0.5	58 59.3 −59.8 0.5	59 59.3 −59.8 0.5	60 59.3 −59.8 0.5	61 59.2 −59.7 0.6	62 59.2 −59.7 0.6	87
88	54 59.5 −59.7 0.3	55 59.5 −59.7 0.3	56 59.5 −59.7 0.3	57 59.5 −59.7 0.3	58 59.5 −59.8 0.3	59 59.5 −59.8 0.3	60 59.5 −59.7 0.4	61 59.5 −59.7 0.4	88
89	53 59.8 −59.8 0.1	54 59.8 −59.8 0.2	55 59.8 −59.8 0.2	56 59.8 −59.8 0.2	57 59.8 −59.8 0.2	58 59.8 −59.8 0.2	59 59.8 −59.8 0.2	60 59.8 −59.8 0.2	89
90	53 00.0 −59.8 0.0	54 00.0 −59.8 0.0	55 00.0 −59.8 0.0	56 00.0 −59.8 0.0	57 00.0 −59.8 0.0	58 00.0 −59.8 0.0	59 00.0 −59.8 0.0	60 00.0 −59.8 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 5°, 355°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 50.2	−59.9	173.7	35 50.5	−59.9	173.8	34 50.8	−59.8	173.9	33 51.2	−59.9	174.0	32 51.5	−59.9	174.0	31 51.8	−59.9	174.1	30 52.1	−59.9	174.2	29 52.5	−60.0	174.2	0
1	35 50.3	−59.9	173.8	34 50.6	−59.9	173.9	33 51.0	−59.9	174.0	32 51.3	−59.9	174.0	31 51.6	−59.9	174.1	30 51.9	−59.9	174.2	29 52.2	−59.9	174.2	28 52.5	−59.9	174.3	1
2	34 50.4	−59.9	173.9	33 50.7	−59.8	174.0	32 51.1	−59.9	174.0	31 51.4	−59.9	174.1	30 51.7	−59.9	174.2	29 52.0	−59.9	174.2	28 52.3	−59.9	174.3	27 52.6	−59.9	174.3	2
3	33 50.5	−59.9	174.0	32 50.9	−59.9	174.1	31 51.2	−59.9	174.1	30 51.5	−59.9	174.2	29 51.8	−59.9	174.2	28 52.1	−59.9	174.3	27 52.4	−59.9	174.4	26 52.7	−60.0	174.4	3
4	32 50.6	−59.8	174.1	31 51.0	−59.9	174.1	30 51.3	−59.9	174.2	29 51.6	−59.9	174.2	28 51.9	−59.9	174.3	27 52.2	−59.9	174.4	26 52.5	−59.9	174.4	25 52.7	−59.9	174.5	4
5	31 50.8	−59.9	174.1	30 51.1	−59.9	174.2	29 51.4	−59.9	174.3	28 51.7	−59.9	174.3	27 52.0	−59.9	174.4	26 52.3	−60.0	174.4	25 52.5	−59.9	174.5	24 52.8	−59.9	174.5	5
6	30 50.9	−59.9	174.2	29 51.2	−59.9	174.3	28 51.5	−59.9	174.3	27 51.8	−59.9	174.4	26 52.1	−60.0	174.4	25 52.3	−59.9	174.5	24 52.6	−59.9	174.5	23 52.9	−59.9	174.6	6
7	29 51.0	−59.9	174.3	28 51.3	−59.9	174.3	27 51.6	−59.9	174.4	26 51.9	−60.0	174.4	25 52.2	−59.9	174.5	24 52.4	−59.9	174.5	23 52.7	−59.9	174.6	22 53.0	−59.9	174.6	7
8	28 51.1	−59.9	174.3	27 51.4	−59.9	174.4	26 51.7	−59.9	174.4	25 51.9	−59.9	174.5	24 52.2	−59.9	174.5	23 52.5	−59.9	174.6	22 52.8	−59.9	174.6	21 53.0	−59.9	174.7	8
9	27 51.2	−59.9	174.4	26 51.5	−59.9	174.5	25 51.8	−59.9	174.5	24 52.0	−59.9	174.6	23 52.3	−59.9	174.6	22 52.6	−59.9	174.6	21 52.8	−59.9	174.7	20 53.1	−60.0	174.7	9
10	26 51.3	−59.9	174.5	25 51.6	−59.9	174.5	24 51.9	−60.0	174.6	23 52.1	−59.9	174.6	22 52.4	−59.9	174.7	21 52.7	−60.0	174.7	20 53.0	−59.9	174.7	19 53.1	−59.9	174.8	10
11	25 51.4	−59.9	174.5	24 51.7	−59.9	174.6	23 51.9	−59.9	174.6	22 52.2	−59.9	174.7	21 52.5	−60.0	174.7	20 52.7	−59.9	174.7	19 53.0	−59.9	174.8	18 53.2	−59.9	174.8	11
12	24 51.5	−59.9	174.6	23 51.8	−59.9	174.7	22 52.0	−59.9	174.7	21 52.3	−59.9	174.7	20 52.5	−59.9	174.8	19 52.8	−59.9	174.8	18 53.0	−59.9	174.8	17 53.3	−60.0	174.9	12
13	23 51.6	−59.9	174.7	22 51.9	−59.9	174.7	21 52.1	−59.9	174.7	20 52.4	−60.0	174.8	19 52.6	−59.9	174.8	18 52.9	−59.9	174.9	17 53.1	−59.9	174.9	16 53.3	−59.9	174.9	13
14	22 51.7	−59.9	174.7	21 52.0	−60.0	174.8	20 52.2	−59.9	174.8	19 52.4	−59.9	174.8	18 52.7	−59.9	174.9	17 52.9	−59.9	174.9	16 53.2	−59.9	174.9	15 53.4	−59.9	175.0	14
15	21 51.8	−59.9	174.8	20 52.0	−59.9	174.8	19 52.3	−59.9	174.9	18 52.5	−59.9	174.9	17 52.8	−60.0	174.9	16 53.0	−59.9	175.0	15 53.2	−59.9	175.0	14 53.5	−59.9	175.0	15
16	20 51.9	−59.9	174.9	19 52.1	−59.9	174.9	18 52.4	−59.9	174.9	17 52.6	−59.9	174.9	16 52.8	−59.9	175.0	15 53.1	−60.0	175.0	14 53.3	−59.9	175.0	13 53.5	−59.9	175.1	16
17	19 52.0	−59.9	174.9	18 52.2	−59.9	174.9	17 52.5	−59.9	175.0	16 52.7	−59.9	175.0	15 52.9	−59.9	175.0	14 53.1	−59.9	175.1	13 53.4	−60.0	175.1	12 53.6	−59.9	175.1	17
18	18 52.1	−59.9	175.0	17 52.3	−59.9	175.0	16 52.5	−59.9	175.0	15 52.8	−59.9	175.1	14 53.0	−59.9	175.1	13 53.2	−59.9	175.1	12 53.4	−59.9	175.1	11 53.6	−59.9	175.1	18
19	17 52.2	−59.9	175.0	16 52.4	−59.9	175.1	15 52.6	−59.9	175.1	14 52.8	−59.9	175.1	13 53.1	−60.0	175.1	12 53.3	−59.9	175.2	11 53.5	−59.9	175.2	10 53.7	−59.9	175.2	19
20	16 52.3	−59.9	175.1	15 52.5	−59.9	175.1	14 52.7	−59.9	175.1	13 52.9	−59.9	175.2	12 53.1	−59.9	175.2	11 53.3	−59.9	175.2	10 53.6	−60.0	175.2	9 53.8	−59.9	175.2	20
21	15 52.4	−60.0	175.1	14 52.6	−59.9	175.2	13 52.8	−59.9	175.2	12 53.0	−59.9	175.2	11 53.2	−59.9	175.2	10 53.4	−59.9	175.2	9 53.6	−59.9	175.3	8 53.8	−59.9	175.3	21
22	14 52.4	−59.9	175.2	13 52.7	−60.0	175.2	12 52.9	−60.0	175.2	11 53.1	−60.0	175.3	10 53.3	−60.0	175.3	9 53.5	−60.0	175.3	8 53.7	−60.0	175.3	7 53.9	−60.0	175.3	22
23	13 52.5	−59.9	175.3	12 52.7	−59.9	175.3	11 52.9	−59.9	175.3	10 53.1	−59.9	175.3	9 53.3	−59.9	175.3	8 53.5	−60.0	175.3	7 53.7	−59.9	175.4	6 53.9	−59.9	175.4	23
24	12 52.6	−59.9	175.3	11 52.8	−59.9	175.3	10 53.0	−59.9	175.3	9 53.2	−59.9	175.4	8 53.4	−59.9	175.4	7 53.6	−59.9	175.4	6 53.8	−59.9	175.4	5 54.0	−60.0	175.4	24
25	11 52.7	−59.9	175.4	10 52.9	−59.9	175.4	9 53.1	−59.9	175.4	8 53.2	−60.0	175.4	7 53.5	−60.0	175.4	6 53.7	−60.0	175.4	5 53.9	−60.0	175.4	4 54.0	−59.9	175.4	25
26	10 52.8	−59.9	175.4	9 53.0	−59.9	175.4	8 53.2	−60.0	175.5	7 53.4	−60.0	175.5	6 53.5	−59.9	175.5	5 53.7	−59.9	175.5	4 53.9	−59.9	175.5	3 54.1	−59.9	175.5	26
27	9 52.9	−59.9	175.5	8 53.1	−60.0	175.5	7 53.2	−59.9	175.5	6 53.4	−59.9	175.5	5 53.6	−59.9	175.5	4 53.8	−59.9	175.5	3 54.0	−59.9	175.5	2 54.2	−59.9	175.5	27
28	8 53.0	−60.0	175.5	7 53.1	−59.9	175.5	6 53.3	−59.9	175.6	5 53.5	−60.0	175.6	4 53.7	−60.0	175.6	3 53.8	−59.9	175.6	2 54.0	−59.9	175.6	1 54.2	−59.9	175.6	28
29	7 53.0	−59.9	175.6	6 53.2	−59.9	175.6	5 53.4	−60.0	175.6	4 53.6	−60.0	175.6	3 53.8	−60.0	175.6	2 53.9	−59.9	175.6	1 54.1	−59.9	175.6	0 54.3	−60.0	175.6	29
30	6 53.1	−59.9	175.6	5 53.3	−59.9	175.6	4 53.5	−59.9	175.7	3 53.6	−59.9	175.7	2 53.8	−59.9	175.7	1 54.0	−59.9	175.7	0 54.2	−60.0	175.7	0 05.7	+59.9	4.3	30
31	5 53.2	−59.9	175.7	4 53.4	−59.9	175.7	3 53.6	−60.0	175.7	2 53.7	−59.9	175.7	1 53.9	−59.9	175.7	0 54.0	−60.0	175.7	0 05.8	+59.9	4.3	1 05.6	+59.9	4.3	31
32	4 53.3	−59.9	175.7	3 53.5	−60.0	175.8	2 53.6	−59.9	175.8	1 53.8	−59.9	175.8	0 54.0	−60.0	175.8	0 05.9	+59.9	4.2	1 05.7	+60.0	4.2	2 05.6	+59.9	4.2	32
33	3 53.4	−59.9	175.8	2 53.5	−59.9	175.8	1 53.7	−59.9	175.8	0 53.9	−60.0	175.8	0 06.0	+59.9	4.2	1 05.8	+60.0	4.2	2 05.7	+60.0	4.2	3 05.5	+59.9	4.2	33
34	2 53.5	−60.0	175.9	1 53.6	−59.9	175.9	0 53.8	−59.9	175.9	0 06.1	+59.9	4.1	1 06.0	+59.9	4.1	2 05.8	+60.0	4.1	3 05.7	+59.9	4.1	4 05.4	+59.9	4.2	34
35	1 53.5	−59.9	175.9	0 53.7	−59.9	175.9	0 06.1	+60.0	4.1	1 06.1	+59.9	4.0	2 05.9	+60.0	4.0	3 05.8	+59.9	4.0	4 05.6	+59.9	4.1	5 05.4	+59.9	4.1	35
36	0 53.6	−59.9	176.0	0 06.2	+59.9	4.0	1 06.1	+59.9	4.0	2 06.0	+59.9	4.0	3 05.9	+59.9	4.0	4 05.7	+59.9	4.0	5 05.5	+59.9	4.0	6 05.3	+60.0	4.1	36
37	0 06.3	+59.9	4.0	1 06.1	+60.0	4.0	2 06.0	+59.9	4.0	3 05.8	+59.9	4.0	4 05.7	+59.9	4.0	5 05.6	+59.9	4.0	6 05.4	+59.9	4.0	7 05.3	+59.9	4.0	37
38	1 06.2	+59.9	3.9	2 06.1	+59.9	3.9	3 05.9	+59.9	3.9	4 05.8	+60.0	3.9	5 05.7	+59.9	3.9	6 05.5	+59.9	3.9	7 05.3	+60.0	3.9	8 05.2	+59.9	4.0	38
39	2 06.1	+59.9	3.9	3 06.0	+59.9	3.9	4 05.8	+60.0	3.9	5 05.7	+59.9	3.9	6 05.6	+59.9	3.9	7 05.4	+60.0	3.9	8 05.3	+59.9	3.9	9 05.1	+60.0	3.9	39
40	3 06.0	+60.0	3.8	4 05.9	+59.9	3.8	5 05.8	+59.9	3.8	6 05.6	+60.0	3.8	7 05.5	+59.9	3.9	8 05.4	+59.9	3.9	9 05.2	+60.0	3.9	10 05.1	+59.9	3.9	40
41	4 06.0	+59.9	3.8	5 05.8	+59.9	3.8	6 05.7	+60.0	3.8	7 05.6	+59.9	3.8	8 05.5	+59.9	3.8	9 05.3	+59.9	3.8	10 05.2	+59.9	3.8	11 05.0	+59.9	3.8	41
42	5 05.9	+59.9	3.7	6 05.7	+60.0	3.7	7 05.6	+59.9	3.7	8 05.5	+59.9	3.8	9 05.4	+59.9	3.8	10 05.2	+60.0	3.8	11 05.1	+59.9	3.8	12 05.0	+59.9	3.8	42
43	6 05.8	+59.9	3.7	7 05.7	+59.9	3.7	8 05.5	+59.9	3.7	9 05.4	+59.9	3.7	10 05.3	+59.9	3.7	11 05.2	+59.9	3.7	12 05.0	+60.0	3.7	13 04.9	+59.9	3.8	43
44	7 05.7	+59.9	3.6	8 05.6	+59.9	3.6	9 05.5	+59.9	3.6	10 05.3	+60.0	3.7	11 05.2	+60.0	3.7	12 05.1	+59.9	3.7	13 05.0	+59.9	3.7	14 04.8	+60.0	3.7	44
45	8 05.6	+59.9	3.6	9 05.5	+59.9	3.6	10 05.4	+59.9	3.6	11 05.3	+59.9	3.6	12 05.2	+59.9	3.6	13 05.0	+59.9	3.6	14 04.9	+59.9	3.6	15 04.8	+60.0	3.7	45
46	9 05.5	+60.0	3.5	10 05.4	+59.9	3.5	11 05.3	+59.9	3.5	12 05.2	+59.9	3.5	13 05.1	+59.9	3.6	14 05.0	+59.9	3.6	15 04.9	+60.0	3.6	16 04.7	+60.0	3.6	46
47	10 05.5	+59.9	3.5	11 05.3	+60.0	3.5	12 05.2	+60.0	3.5	13 05.1	+59.9	3.5	14 05.0	+60.0	3.5	15 04.9	+60.0	3.5	16 04.8	+59.9	3.5	17 04.7	+59.9	3.6	47
48	11 05.4	+59.9	3.4	12 05.3	+59.9	3.4	13 05.2	+59.9	3.4	14 05.0	+60.0	3.4	15 04.9	+60.0	3.5	16 04.8	+59.9	3.5	17 04.7	+59.9	3.5	18 04.6	+59.9	3.5	48
49	12 05.3	+59.9	3.4	13 05.2	+59.9	3.4	14 05.1	+59.9	3.4	15 05.0	+59.9	3.4	16 04.9	+59.9	3.4	17 04.8	+59.9	3.4	18 04.6	+60.0	3.4	19 04.5	+60.0	3.5	49
50	13 05.2	+59.9	3.3	14 05.1	+59.9	3.3	15 05.0	+59.9	3.3	16 04.9	+59.9	3.3	17 04.8	+59.9	3.4	18 04.7	+60.0	3.4	19 04.6	+59.9	3.4	20 04.5	+59.9	3.4	50
51	14 05.1	+59.9	3.2	15 05.0	+59.9	3.2	16 04.9	+59.9	3.3	17 04.8	+59.9	3.3	18 04.7	+59.9	3.3	19 04.6	+60.0	3.3	20 04.5	+60.0	3.3	21 04.4	+59.9	3.4	51
52	15 05.0	+59.9	3.2	16 04.9	+59.9	3.2	17 04.8	+59.9	3.2	18 04.7	+60.0	3.2	19 04.6	+60.0	3.2	20 04.5	+60.0	3.3	21 04.4	+60.0	3.3	22 04.3	+59.9	3.3	52
53	16 04.9	+59.9	3.1	17 04.8	+60.0	3.1	18 04.7	+59.9	3.2	19 04.7	+59.9	3.1	20 04.6	+59.9	3.2	21 04.5	+59.9	3.2	22 04.4	+59.9	3.2	23 04.3	+59.9	3.3	53
54	17 04.8	+59.9	3.1	18 04.8	+59.9	3.1	19 04.7	+59.9	3.1	20 04.6	+59.9	3.1	21 04.5	+59.9	3.1	22 04.4	+59.9	3.2	23 04.3	+59.9	3.2	24 04.2	+59.9	3.2	54
55	18 04.7	+60.0	3.0	19 04.7	+59.9	3.0	20 04.6	+59.9	3.1	21 04.5	+59.9	3.1	22 04.4	+59.9	3.1	23 04.3	+59.9	3.1	24 04.2	+60.0	3.1	25 04.1	+60.0	3.2	55
56	19 04.7	+59.9	3.0	20 04.6	+59.9	3.0	21 04.5	+59.9	3.0	22 04.4	+59.9	3.0	23 04.3	+59.9	3.0	24 04.2	+60.0	3.0	25 04.2	+59.9	3.1	26 04.1	+59.9	3.1	56
57	20 04.6	+59.9	2.9	21 04.5	+59.9	2.9	22 04.4	+59.9	2.9	23 04.3	+59.9	3.0	24 04.2	+60.0	3.0	25 04.2	+59.9	3.0	26 04.1	+59.9	3.0	27 04.0	+59.9	3.1	57
58	21 04.5	+59.9	2.8	22 04.4	+59.9	2.9	23 04.3	+59.9	2.9	24 04.2	+60.0	2.9	25 04.2	+59.9	2.9	26 04.1	+59.9	2.9	27 04.0	+59.9	3.0	28 03.9	+60.0	3.0	58
59	22 04.4	+59.9	2.8	23 04.3	+59.9	2.8	24 04.2	+60.0	2.8	25 04.2	+59.9	2.8	26 04.1	+59.9	2.9	27 04.0	+59.9	2.9	28 03.9	+60.0	2.9	29 03.9	+59.9	2.9	59
60	23 04.3	+59.9	2.7	24 04.2	+59.9	2.7	25 04.1	+59.9	2.8	26 04.1	+59.9	2.8	27 04.0	+59.9	2.8	28 03.9	+59.9	2.8	29 03.9	+60.0	2.9	30 03.8	+59.9	2.9	60
61	24 04.2	+59.9	2.7	25 04.1	+59.9	2.7	26 04.0	+60.0	2.7	27 04.0	+59.9	2.7	28 03.9	+59.9	2.7	29 03.8	+60.0	2.7	30 03.8	+59.9	2.8	31 03.7	+59.9	2.8	61
62	25 04.1	+59.9	2.6	26 04.0	+60.0	2.6	27 04.0	+59.9	2.6	28 03.9	+59.9	2.7	29 03.8	+59.9	2.7	30 03.8	+59.9	2.7	31 03.7	+59.9	2.7	32 03.6	+59.9	2.8	62
63	26 04.0	+59.9	2.5	27 03.9	+59.9	2.5	28 03.9	+59.9	2.6	29 03.8	+59.9	2.6	30 03.7	+59.9	2.6	31 03.7	+59.9	2.6	32 03.6	+59.9	2.7	33 03.5	+60.0	2.7	63
64	27 03.9	+59.9	2.5	28 03.8	+59.9	2.5	29 03.8	+59.9	2.5	30 03.7	+59.9	2.5	31 03.6	+60.0	2.6	32 03.6	+59.9	2.6	33 03.5	+59.9	2.6	34 03.5	+59.9	2.6	64
65	28 03.8	+59.9	2.4	29 03.7	+59.9	2.4	30 03.7	+59.9	2.4	31 03.6	+59.9	2.5	32 03.5	+59.9	2.5	33 03.5	+59.9	2.5	34 03.4	+59.9	2.5	35 03.4	+59.9	2.6	65
66	29 03.7	+59.9	2.3	30 03.6	+59.9	2.3	31 03.6	+59.9	2.4	32 03.5	+59.9	2.4	33 03.5	+59.9	2.4	34 03.4	+59.9	2.4	35 03.3	+60.0	2.5	36 03.3	+59.9	2.5	66
67	30 03.6	+59.9	2.3	31 03.5	+59.9	2.3	32 03.5	+59.9	2.3	33 03.4	+59.9	2.3	34 03.4	+59.9	2.4	35 03.3	+59.9	2.4	36 03.3	+59.9	2.4	37 03.2	+59.9	2.4	67
68	31 03.4	+59.9	2.2	32 03.4	+59.9	2.2	33 03.4	+59.9	2.2	34 03.3	+59.9	2.3	35 03.3	+59.9	2.3	36 03.2	+59.9	2.3	37 03.2	+59.9	2.3	38 03.1	+59.9	2.4	68
69	32 03.3	+59.9	2.1	33 03.3	+59.9	2.1	34 03.2	+59.9	2.2	35 03.2	+59.9	2.2	36 03.2	+59.9	2.2	37 03.1	+59.9	2.2	38 03.1	+59.9	2.3	39 03.0	+59.9	2.3	69
70	33 03.2	+59.9	2.0	34 03.2	+59.9	2.1	35 03.1	+59.9	2.1	36 03.1	+59.9	2.1	37 03.1	+59.8	2.1	38 03.0	+59.9	2.2	39 03.0	+59.9	2.2	40 02.9	+59.9	2.2	70
71	34 03.1	+59.9	2.0	35 03.1	+59.9	2.0	36 03.0	+59.9	2.0	37 03.0	+59.9	2.0	38 02.9	+59.9	2.1	39 02.9	+59.9	2.1	40 02.9	+59.9	2.1	41 02.8	+59.9	2.2	71
72	35 03.0	+59.8	1.9	36 02.9	+59.9	1.9	37 02.9	+59.9	1.9	38 02.9	+59.9	2.0	39 02.8	+59.9	2.0	40 02.8	+59.9	2.0	41 02.8	+59.9	2.0	42 02.7	+59.9	2.1	72
73	36 02.8	+59.9	1.8	37 02.8	+59.9	1.8	38 02.8	+59.9	1.9	39 02.8	+59.8	1.9	40 02.7	+59.9	1.9	41 02.7	+59.9	1.9	42 02.7	+59.9	2.0	43 02.6	+59.9	2.0	73
74	37 02.7	+59.9	1.7	38 02.7	+59.8	1.7	39 02.7	+59.9	1.8	40 02.6	+59.9	1.8	41 02.6	+59.9	1.8	42 02.6	+59.9	1.8	43 02.5	+59.9	1.9	44 02.5	+59.9	1.9	74
75	38 02.6	+59.9	1.6	39 02.6	+59.9	1.6	40 02.5	+59.9	1.7	41 02.5	+59.9	1.7	42 02.5	+59.9	1.7	43 02.5	+59.8	1.8	44 02.4	+59.9	1.8	45 02.4	+59.9	1.8	75
76	39 02.5	+59.8	1.6	40 02.4	+59.9	1.6	41 02.4	+59.9	1.6	42 02.4	+59.9	1.6	43 02.4	+59.8	1.7	44 02.3	+59.9	1.7	45 02.3	+59.9	1.7	46 02.3	+59.9	1.7	76
77	40 02.3	+59.9	1.5	41 02.3	+59.9	1.5	42 02.3	+59.9	1.5	43 02.3	+59.8	1.5	44 02.2	+59.9	1.6	45 02.2	+59.9	1.6	46 02.2	+59.9	1.6	47 02.2	+59.8	1.6	77
78	41 02.2	+59.9	1.4	42 02.2	+59.9	1.4	43 02.1	+59.9	1.4	44 02.1	+59.9	1.4	45 02.1	+59.8	1.5	46 02.1	+59.9	1.5	47 02.1	+59.8	1.5	48 02.0	+59.9	1.6	78
79	42 02.0	+59.9	1.3	43 02.0	+59.9	1.3	44 02.0	+59.8	1.3	45 02.0	+59.9	1.3	46 02.0	+59.8	1.4	47 01.9	+59.9	1.4	48 01.9	+59.9	1.4	49 01.9	+59.9	1.5	79
80	43 01.9	+59.8	1.2	44 01.9	+59.8	1.2	45 01.8	+59.9	1.2	46 01.8	+59.9	1.2	47 01.8	+59.8	1.3	48 01.8	+59.8	1.3	49 01.8	+59.8	1.3	50 01.8	+59.8	1.3	80
81	44 01.7	+59.8	1.1	45 01.7	+59.8	1.1	46 01.7	+59.8	1.1	47 01.7	+59.8	1.1	48 01.7	+59.8	1.2	49 01.7	+59.8	1.2	50 01.6	+59.9	1.2	51 01.6	+59.9	1.2	81
82	45 01.5	+59.8	1.0	46 01.5	+59.8	1.0	47 01.5	+59.8	1.0	48 01.5	+59.8	1.0	49 01.5	+59.8	1.1	50 01.5	+59.8	1.1	51 01.5	+59.8	1.1	52 01.5	+59.8	1.1	82
83	46 01.4	+59.8	0.9	47 01.4	+59.8	0.9	48 01.4	+59.8	0.9	49 01.4	+59.8	0.9	50 01.4	+59.8	0.9	51 01.3	+59.9	1.0	52 01.3	+59.9	1.0	53 01.3	+59.9	1.0	83
84	47 01.2	+59.8	0.8	48 01.2	+59.8	0.8	49 01.2	+59.8	0.8	50 01.2	+59.8	0.8	51 01.2	+59.8	0.8	52 01.2	+59.8	0.8	53 01.2	+59.8	0.9	54 01.2	+59.8	0.9	84
85	48 01.0	+59.8	0.7	49 01.0	+59.8	0.7	50 01.0	+59.8	0.7	51 01.0	+59.8	0.7	52 01.0	+59.8	0.7	53 01.0	+59.8	0.7	54 01.0	+59.8	0.7	55 01.0	+59.8	0.8	85
86	49 00.8	+59.8	0.5	50 00.8	+59.8	0.5	51 00.8	+59.8	0.6	52 00.8	+59.8	0.6	53 00.8	+59.8	0.6	54 00.8	+59.8	0.6	55 00.8	+59.8	0.6	56 00.8	+59.8	0.6	86
87	50 00.6	+59.8	0.4	51 00.6	+59.8	0.4	52 00.6	+59.8	0.4	53 00.6	+59.8	0.4	54 00.6	+59.8	0.4	55 00.6	+59.8	0.4	56 00.6	+59.8	0.5	57 00.6	+59.8	0.5	87
88	51 00.4	+59.8	0.3	52 00.4	+59.8	0.3	53 00.4	+59.8	0.3	54 00.4	+59.8	0.3	55 00.4	+59.8	0.3	56 00.4	+59.8	0.3	57 00.4	+59.8	0.3	58 00.4	+59.8	0.3	88
89	52 00.2	+59.8	0.1	53 00.2	+59.8	0.1	54 00.2	+59.8	0.1	55 00.2	+59.8	0.2	56 00.2	+59.8	0.2	57 00.2	+59.8	0.2	58 00.2	+59.8	0.2	59 00.2	+59.8	0.2	89
90	53 00.0	+59.8	0.0	54 00.0	+59.8	0.0	55 00.0	+59.8	0.0	56 00.0	+59.8	0.0	57 00.0	+59.8	0.0	58 00.0	+59.8	0.0	59 00.0	+59.8	0.0	60 00.0	+59.8	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 175°, 185°

6°, 354° L.H.A.   LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 45.8	+59.8	172.5	35 46.3	+59.9	172.6	34 46.8	+59.9	172.7	33 47.3	+59.9	172.8	32 47.8	+59.8	172.9	31 48.2	+59.9	172.9	30 48.7	+59.9	173.0	29 49.1	+59.9	173.1	0
1	37 45.6	+59.9	172.4	36 46.2	+59.8	172.5	35 46.7	+59.9	172.6	34 47.2	+59.9	172.7	33 47.6	+59.9	172.8	32 48.1	+59.9	172.9	31 48.6	+59.9	172.9	30 49.0	+59.9	173.0	1
2	38 45.5	+59.8	172.3	37 46.0	+59.8	172.4	36 46.5	+59.8	172.5	35 47.0	+59.8	172.6	34 47.5	+59.9	172.7	33 48.0	+59.8	172.8	32 48.5	+59.9	172.9	31 48.9	+59.9	172.9	2
3	39 45.3	+59.7	172.2	38 45.8	+59.8	172.3	37 46.3	+59.9	172.4	36 46.9	+59.8	172.5	35 47.4	+59.8	172.6	34 47.8	+59.9	172.8	33 48.3	+59.9	172.9	32 48.8	+59.9	172.9	3
4	40 45.0	+59.8	172.1	39 45.6	+59.8	172.2	38 46.2	+59.8	172.3	37 46.7	+59.8	172.4	36 47.2	+59.8	172.5	35 47.7	+59.9	172.6	34 48.2	+59.9	172.7	33 48.7	+59.9	172.9	4
5	41 44.8	+59.8	172.0	40 45.4	+59.8	172.1	39 46.0	+59.8	172.2	38 46.5	+59.9	172.3	37 47.1	+59.8	172.4	36 47.6	+59.8	172.5	35 48.1	+59.9	172.6	34 48.6	+59.9	172.7	5
6	42 44.6	+59.8	171.9	41 45.2	+59.8	172.0	40 45.8	+59.8	172.1	39 46.4	+59.8	172.2	38 46.9	+59.9	172.3	37 47.4	+59.9	172.4	36 47.9	+59.8	172.5	35 48.4	+59.9	172.6	6
7	43 44.4	+59.7	171.7	42 45.0	+59.8	171.9	41 45.6	+59.8	172.1	40 46.2	+59.8	172.1	39 46.7	+59.9	172.2	38 47.3	+59.8	172.3	37 47.8	+59.9	172.5	36 48.3	+59.9	172.5	7
8	44 44.2	+59.7	171.6	43 44.8	+59.8	171.8	42 45.4	+59.8	171.9	41 46.0	+59.8	172.0	40 46.6	+59.8	172.1	39 47.1	+59.9	172.3	38 47.7	+59.8	172.4	37 48.2	+59.8	172.5	8
9	45 43.9	+59.7	171.4	44 44.6	+59.7	171.6	43 45.2	+59.8	171.8	42 45.8	+59.8	171.9	41 46.4	+59.8	172.0	40 47.0	+59.8	172.2	39 47.5	+59.9	172.3	38 48.0	+59.9	172.4	9
10	46 43.7	+59.7	171.4	45 44.3	+59.8	171.5	44 45.0	+59.7	171.7	43 45.6	+59.8	171.8	42 46.2	+59.8	171.9	41 46.8	+59.8	172.0	40 47.4	+59.8	172.2	39 47.9	+59.9	172.3	10
11	47 43.4	+59.8	171.2	46 44.1	+59.8	171.4	45 44.8	+59.7	171.5	44 45.4	+59.8	171.7	43 46.0	+59.8	171.8	42 46.6	+59.9	172.0	41 47.2	+59.8	172.1	40 47.8	+59.8	172.2	11
12	48 43.1	+59.8	171.1	47 43.9	+59.7	171.3	46 44.5	+59.8	171.4	45 45.2	+59.8	171.6	44 45.8	+59.8	171.7	43 46.5	+59.8	171.9	42 47.1	+59.8	172.0	41 47.6	+59.9	172.1	12
13	49 42.9	+59.7	170.9	48 43.6	+59.7	171.1	47 44.3	+59.8	171.3	46 45.0	+59.8	171.5	45 45.6	+59.8	171.6	44 46.3	+59.8	171.8	43 46.9	+59.8	171.9	42 47.5	+59.8	172.0	13
14	50 42.6	+59.7	170.8	49 43.3	+59.8	171.0	48 44.1	+59.7	171.2	47 44.8	+59.7	171.3	46 45.4	+59.8	171.5	45 46.1	+59.8	171.6	44 46.7	+59.8	171.8	43 47.3	+59.9	171.9	14
15	51 42.3	+59.7	170.6	50 43.1	+59.7	170.8	49 43.8	+59.7	171.0	48 44.5	+59.8	171.2	47 45.2	+59.8	171.4	46 45.9	+59.8	171.5	45 46.5	+59.9	171.7	44 47.2	+59.8	171.8	15
16	52 42.0	+59.6	170.5	51 42.8	+59.7	170.7	50 43.5	+59.8	170.9	49 44.3	+59.7	171.1	48 45.0	+59.8	171.2	47 45.7	+59.8	171.4	46 46.4	+59.8	171.6	45 47.0	+59.8	171.7	16
17	53 41.6	+59.7	170.3	52 42.5	+59.7	170.5	51 43.3	+59.7	170.7	50 44.0	+59.8	170.9	49 44.8	+59.7	171.1	48 45.5	+59.8	171.3	47 46.2	+59.8	171.4	46 46.8	+59.8	171.6	17
18	54 41.3	+59.6	170.1	53 42.2	+59.6	170.3	52 43.0	+59.7	170.6	51 43.8	+59.7	170.8	50 44.5	+59.8	171.0	49 45.3	+59.7	171.1	48 46.0	+59.8	171.3	47 46.6	+59.9	171.5	18
19	55 40.9	+59.6	169.9	54 41.8	+59.7	170.2	53 42.7	+59.7	170.4	52 43.5	+59.7	170.6	51 44.3	+59.7	170.8	50 45.0	+59.8	171.0	49 45.8	+59.7	171.2	48 46.5	+59.8	171.3	19
20	56 40.5	+59.6	169.7	55 41.5	+59.6	170.0	54 42.4	+59.6	170.2	53 43.2	+59.7	170.4	52 44.0	+59.7	170.7	51 44.8	+59.7	170.9	50 45.6	+59.7	171.1	49 46.3	+59.8	171.3	20
21	57 40.1	+59.6	169.5	56 41.1	+59.6	169.8	55 42.0	+59.7	170.0	54 42.9	+59.7	170.3	53 43.8	+59.7	170.5	52 44.6	+59.7	170.7	51 45.3	+59.8	170.9	50 46.1	+59.8	171.1	21
22	58 39.7	+59.5	169.3	57 40.7	+59.6	169.6	56 41.7	+59.6	169.9	55 42.6	+59.7	170.1	54 43.5	+59.7	170.3	53 44.3	+59.7	170.6	52 45.1	+59.8	170.8	51 45.9	+59.7	171.0	22
23	59 39.2	+59.6	169.0	58 40.3	+59.6	169.3	57 41.3	+59.6	169.6	56 42.3	+59.6	169.9	55 43.2	+59.7	170.2	54 44.0	+59.8	170.4	53 44.9	+59.7	170.6	52 45.6	+59.8	170.9	23
24	60 38.8	+59.4	168.8	59 39.9	+59.5	169.1	58 40.9	+59.6	169.4	57 41.9	+59.7	169.7	56 42.9	+59.6	170.0	55 43.8	+59.7	170.2	54 44.6	+59.7	170.5	53 45.4	+59.8	170.7	24
25	61 38.2	+59.5	168.5	60 39.4	+59.5	168.9	59 40.5	+59.6	169.2	58 41.6	+59.6	169.5	57 42.5	+59.7	169.8	56 43.5	+59.6	170.1	55 44.3	+59.7	170.3	54 45.2	+59.7	170.6	25
26	62 37.7	+59.4	168.2	61 38.9	+59.4	168.6	60 40.1	+59.5	168.9	59 41.2	+59.5	169.3	58 42.2	+59.6	169.6	57 43.1	+59.7	169.9	56 44.1	+59.7	170.1	55 44.9	+59.7	170.4	26
27	63 37.1	+59.4	167.9	62 38.4	+59.4	168.3	61 39.6	+59.5	168.7	60 40.7	+59.6	169.0	59 41.8	+59.6	169.4	58 42.8	+59.7	169.7	57 43.8	+59.6	170.0	56 44.6	+59.7	170.2	27
28	64 36.5	+59.3	167.6	63 37.9	+59.4	168.0	62 39.1	+59.4	168.4	61 40.3	+59.5	168.8	60 41.4	+59.6	169.1	59 42.5	+59.6	169.5	58 43.4	+59.7	169.8	57 44.3	+59.7	170.1	28
29	65 35.8	+59.3	167.2	64 37.3	+59.3	167.7	63 38.6	+59.4	168.1	62 39.8	+59.5	168.5	61 41.0	+59.5	168.9	60 42.1	+59.6	169.3	59 43.1	+59.7	169.6	58 44.1	+59.7	169.9	29
30	66 35.1	+59.2	166.8	65 36.6	+59.3	167.3	64 38.0	+59.4	167.8	63 39.3	+59.5	168.2	62 40.5	+59.5	168.6	61 41.7	+59.6	169.0	60 42.8	+59.6	169.3	59 43.8	+59.6	169.7	30
31	67 34.3	+59.1	166.4	66 35.9	+59.3	167.0	65 37.4	+59.3	167.5	64 38.8	+59.4	167.9	63 40.0	+59.4	168.3	62 41.3	+59.5	168.7	61 42.4	+59.6	169.1	60 43.4	+59.7	169.4	31
32	68 33.4	+59.1	166.0	67 35.2	+59.1	166.6	66 36.7	+59.3	167.1	65 38.2	+59.4	167.6	64 39.5	+59.5	168.0	63 40.8	+59.5	168.5	62 42.0	+59.5	168.9	61 43.1	+59.6	169.2	32
33	69 32.5	+59.0	165.5	68 34.3	+59.1	166.1	67 36.0	+59.2	166.7	66 37.6	+59.3	167.2	65 39.0	+59.4	167.7	64 40.3	+59.5	168.2	63 41.5	+59.6	168.6	62 42.7	+59.6	169.0	33
34	70 31.5	+58.8	164.9	69 33.4	+59.1	165.6	68 35.2	+59.2	166.3	67 36.9	+59.2	166.8	66 38.4	+59.3	167.4	65 39.8	+59.4	167.9	64 41.1	+59.5	168.3	63 42.3	+59.6	168.7	34
35	71 30.3	+58.8	164.3	70 32.5	+58.9	165.1	69 34.4	+59.1	165.8	68 36.1	+59.2	166.4	67 37.7	+59.3	167.0	66 39.2	+59.4	167.5	65 40.6	+59.4	168.0	64 41.9	+59.5	168.4	35
36	72 29.1	+58.6	163.7	71 31.4	+58.8	164.5	70 33.5	+58.9	165.3	69 35.3	+59.1	166.0	68 37.0	+59.3	166.6	67 38.6	+59.3	167.2	66 40.1	+59.4	167.7	65 41.4	+59.5	168.1	36
37	73 27.7	+58.4	162.9	72 30.2	+58.6	163.8	71 32.4	+58.9	164.7	70 34.4	+59.1	165.5	69 36.3	+59.1	166.1	68 37.9	+59.3	166.8	67 39.5	+59.3	167.3	66 40.9	+59.4	167.8	37
38	74 26.1	+58.2	162.1	73 28.8	+58.5	163.2	72 31.3	+58.7	164.1	71 33.5	+58.9	164.9	70 35.4	+59.0	165.6	69 37.2	+59.2	166.3	68 38.8	+59.4	166.9	67 40.3	+59.4	167.5	38
39	75 24.3	+58.0	161.2	74 27.3	+58.3	162.4	73 30.0	+58.6	163.4	72 32.4	+58.8	164.3	71 34.5	+59.0	165.1	70 36.4	+59.1	165.8	69 38.2	+59.2	166.5	68 39.7	+59.4	167.1	39
40	76 22.3	+57.7	160.1	75 25.6	+58.1	161.4	74 28.6	+58.3	162.6	73 31.2	+58.6	163.6	72 33.5	+58.8	164.5	71 35.5	+59.0	165.3	70 37.4	+59.2	166.0	69 39.1	+59.3	166.7	40
41	77 20.0	+57.2	158.9	76 23.7	+57.8	160.4	75 26.9	+58.2	161.7	74 29.8	+58.4	162.8	73 32.3	+58.7	163.8	72 34.5	+59.0	164.7	71 36.6	+59.0	165.5	70 38.4	+59.2	166.2	41
42	78 17.2	+56.8	157.5	77 21.5	+57.3	159.2	76 25.1	+57.8	160.7	75 28.2	+58.3	162.0	74 31.0	+58.5	163.1	73 33.5	+58.7	164.1	72 35.6	+59.0	164.9	71 37.6	+59.1	165.7	42
43	79 14.0	+56.2	155.8	78 18.8	+57.0	157.8	77 22.9	+57.5	159.5	76 26.5	+57.9	161.0	75 29.5	+58.4	162.2	74 32.2	+58.6	163.3	73 34.6	+58.8	164.3	72 36.7	+59.0	165.2	43
44	80 10.2	+55.3	153.9	79 15.8	+56.3	156.2	78 20.4	+57.1	158.2	77 24.4	+57.0•	159.8	76 27.9	+58.0	161.3	75 30.8	+58.4	162.5	74 33.4	+58.7	163.6	73 35.7	+58.9	164.6	44
45	81 05.5	+54.2	151.5	80 12.1	+55.5	154.3	79 17.5	+56.5	156.6	78 22.1	+57.1	158.5	77 25.9	+57.7	160.1	76 29.2	+58.2	161.6	75 32.1	+58.5	162.8	74 34.6	+58.8	163.9	45
46	81 59.7	+52.7	148.6	81 07.6	+54.4	151.9	80 14.0	+55.7	154.7	79 19.2	+56.7	156.9	78 23.6	+57.4	158.8	77 27.4	+57.8	160.5	76 30.6	+58.2	161.9	75 33.4	+58.5	163.1	46
47	82 52.4	+50.5•	144.9	82 02.0	+53.0	149.0	81 09.7	+54.7	152.5	80 15.9	+55.9	155.1	79 21.0	+56.8	157.3	78 25.2	+57.5	159.2	77 28.8	+58.0	160.8	76 31.9	+58.4	162.2	47
48	83 42.9	+47.3•	140.3	82 55.0	+50.8•	145.4	82 04.4	+53.2	149.5	81 11.8	+54.9	152.8	80 17.8	+56.1	155.5	79 22.7	+56.9	157.7	78 26.8	+57.6	159.6	77 30.3	+58.1	161.1	48
49	84 30.2	+42.5•	134.3	83 45.8	+47.7•	140.9	82 57.6	+51.2•	146.0	82 06.7	+53.5	150.0	81 13.9	+55.1	153.3	80 19.6	+56.3	155.9	79 24.4	+57.1	158.1	78 28.4	+57.7	159.9	49
50	85 12.7	+35.4•	126.4	84 33.5	+43.1•	134.9	83 48.8	+48.1•	141.4	83 00.2	+51.5•	146.5	82 09.0	+53.8	150.5	81 15.9	+55.4	153.7	80 21.5	+56.5	156.3	79 26.1	+57.3	158.5	50
51	85 48.1	+24.8•	116.0	85 16.6	+35.8•	127.0	84 36.9	+43.5•	135.5	83 51.7	+48.6•	142.0	83 02.8	+51.8•	147.1	82 11.3	+54.1	151.1	81 18.0	+55.6	154.2	80 23.4	+56.6	156.8	51
52	86 12.9	+10.5•	102.9	85 52.4	+25.3•	116.6	85 20.4	+36.5•	127.6	84 40.3	+44.0•	136.1	83 54.6	+49.0•	142.7	83 05.4	+52.2•	147.7	82 13.6	+54.3	151.6	81 20.0	+55.8	154.7	52
53	86 23.4	− .7•	87.6	86 17.7	+10.8•	103.2	85 56.9	+25.7•	117.1	85 24.3	+37.0•	128.3	84 43.6	+44.6•	136.8	83 57.6	+49.4•	143.3	83 07.9	+52.6•	148.3	82 15.8	+54.6	152.1	53
54	86 17.7	−20.8•	71.9	86 28.5	− 5.9•	87.6	86 22.6	+11.0•	103.6	86 01.3	+26.2•	117.7	85 28.2	+37.6•	128.9	84 47.0	+45.1•	137.5	84 00.5	+49.8•	143.9	83 10.4	+53.0•	148.9	54
55	85 56.9	−32.6•	58.0	86 22.6	−21.3•	71.6	86 33.6	− 6.1•	87.5	86 27.5	+11.3•	103.9	86 05.8	+26.7•	118.3	85 32.1	+38.1•	129.6	84 50.3	+45.7•	138.2	84 03.4	+50.3•	144.6	55
56	85 24.3	−46.0•	46.9	86 01.3	−33.1•	57.4	86 28.2	−21.2•	71.1	86 38.8	− 6.3•	87.5	86 32.5	+11.5•	104.3	86 10.2	+27.4•	118.9	85 36.0	+38.8•	130.4	84 53.7	+46.1•	138.9	56
57	84 43.6	−46.0•	38.3	85 28.2	−41.2•	46.1	86 05.8	−33.7•	56.7	86 32.5	−22.3•	70.7	86 44.0	− 6.4•	87.5	86 37.6	+11.7•	104.7	86 14.8	+27.8•	119.6	85 39.8	+39.5•	131.2	57
58	83 57.6	−49.7•	31.8	84 47.0	−46.5•	37.5	85 32.1	−41.8•	45.4	86 10.2	−34.2•	56.0	86 37.6	−22.8•	70.3	86 49.3	− 6.7•	87.5	86 42.6	+12.0•	105.1	86 19.3	+28.5•	120.3	58
59	83 07.9	−52.1•	26.8	84 00.5	−50.1•	31.0	84 47.0	−46.9•	36.8	85 30.0	−42.3•	44.6	86 14.1	−35.0•	55.3	86 42.6	−23.3•	69.8	86 48.7	− 6.8•	87.4	86 47.8	+12.3•	105.6	59
60	82 15.8	−53.8	22.8	83 10.4	−52.4	26.1	84 03.4	−50.4•	30.3	84 53.7	−47.5•	36.0	85 39.8	−42.8•	43.7	86 19.3	−35.6•	54.5	86 47.8	−24.0•	69.3	87 00.1	− 7.2•	87.4	60
61	81 22.0	−55.0	19.7	82 18.0	−54.0	22.2	83 13.0	−52.7	25.4	84 06.2	−50.8•	29.6	84 57.0	−47.9•	35.1	85 43.7	−43.4•	42.9	86 23.8	−36.2•	53.7	86 52.9	−24.6•	68.7	61
62	80 27.0	−55.9	17.2	81 24.0	−55.2	19.2	82 20.3	−54.3	21.6	83 15.4	−53.0	24.7	84 09.1	−51.2•	28.8	85 00.3	−48.4•	34.3	85 47.6	−44.1•	42.0	86 28.3	−36.9•	52.9	62
63	79 31.1	−56.6	15.1	80 28.8	−56.1	16.7	81 26.0	−55.5	18.6	82 22.4	−54.5	21.0	83 17.9	−53.3	24.0	84 11.9	−51.6•	28.0	85 03.5	−48.9•	33.4	85 51.4	−44.7•	41.1	63
64	78 34.5	−57.2	13.4	79 32.7	−56.8	14.6	80 30.5	−56.2	16.1	81 27.9	−55.6	18.0	82 24.6	−54.8	20.3	83 20.3	−53.6	23.3	84 14.6	−51.9•	27.2	85 06.7	−49.3•	32.5	64
65	77 37.3	−57.5	11.9	78 35.9	−57.2	12.9	79 34.3	−56.9	14.1	80 32.3	−56.5	15.6	81 29.8	−55.9	17.3	82 26.7	−55.0	19.6	83 22.7	−53.9	22.5	84 17.4	−52.4•	26.4	65
66	76 39.8	−57.9	10.6	77 38.7	−57.7	11.5	78 37.4	−57.4	12.4	79 35.8	−57.0	13.6	80 34.0	−56.7	15.0	81 31.7	−56.1	16.8	82 28.8	−55.3	19.0	83 25.0	−54.2	21.8	66
67	75 41.9	−58.2	9.5	76 41.0	−58.0	10.2	77 40.0	−57.8	11.0	78 38.8	−57.5	12.0	79 37.3	−57.1	13.1	80 35.6	−56.8	14.5	81 33.5	−56.3	16.2	82 30.8	−55.5	18.3	67
68	74 43.7	−58.3	8.5	75 43.0	−58.2	9.1	76 42.2	−58.0	9.8	77 41.3	−57.9	10.6	78 40.2	−57.7	11.5	79 38.8	−57.3	12.6	80 37.2	−56.9	13.9	81 35.3	−56.5	15.5	68
69	73 45.4	−58.6	7.7	74 44.8	−58.4	8.2	75 44.1	−58.3	8.7	76 43.4	−58.2	9.4	77 42.5	−57.9	10.1	78 41.5	−57.7	11.0	79 40.3	−57.5	12.1	80 38.8	−57.1	13.3	69
70	72 46.8	−58.7	6.9	73 46.4	−58.7	7.4	74 45.8	−58.5	7.8	75 45.2	−58.4	8.4	76 44.6	−58.3	9.0	77 43.8	−58.1	9.7	78 42.8	−57.8	10.5	79 41.7	−57.6	11.5	70
71	71 48.1	−58.8	6.3	72 47.7	−58.7	6.6	73 47.3	−58.7	7.0	74 46.8	−58.5	7.4	75 46.3	−58.5	8.0	76 45.7	−58.4	8.5	77 45.0	−58.2	9.2	78 44.1	−58.0	10.0	71
72	70 49.3	−59.0	5.6	71 49.0	−58.9	5.9	72 48.6	−58.9	6.3	73 48.3	−58.8	6.7	74 47.8	−58.6	7.1	75 47.3	−58.5	7.6	76 46.8	−58.4	8.1	77 46.1	−58.2	8.8	72
73	69 50.3	−59.0	5.1	70 50.1	−59.0	5.3	71 49.8	−58.9	5.6	72 49.5	−58.9	5.9	73 49.2	−58.8	6.3	74 48.8	−58.7	6.7	75 48.4	−58.7	7.2	76 47.9	−58.6	7.7	73
74	68 51.3	−59.1	4.6	69 51.1	−59.1	4.8	70 50.9	−59.0	5.0	71 50.6	−58.9	5.3	72 50.4	−59.0	5.6	73 50.1	−58.9	5.9	74 49.7	−58.8	6.3	75 49.3	−58.7	6.8	74
75	67 52.2	−59.2	4.1	68 52.0	−59.1	4.3	69 51.9	−59.2	4.5	70 51.7	−59.1	4.7	71 51.4	−59.0	5.0	72 51.2	−59.0	5.3	73 50.9	−58.9	5.6	74 50.6	−58.8	5.9	75
76	66 53.0	−59.3	3.7	67 52.9	−59.3	3.9	68 52.7	−59.2	4.0	69 52.6	−59.2	4.2	70 52.4	−59.1	4.4	71 52.2	−59.1	4.7	72 52.0	−59.0	4.9	73 51.8	−59.0	5.2	76
77	65 53.7	−59.3	3.3	66 53.6	−59.2	3.4	67 53.5	−59.2	3.6	68 53.4	−59.2	3.7	69 53.3	−59.2	3.9	70 53.1	−59.2	4.1	71 53.0	−59.2	4.3	72 52.8	−59.1	4.6	77
78	64 54.4	−59.4	2.9	65 54.4	−59.4	3.1	66 54.3	−59.4	3.2	67 54.2	−59.3	3.3	68 54.1	−59.3	3.5	69 53.9	−59.2	3.6	70 53.8	−59.2	3.8	71 53.7	−59.2	4.0	78
79	63 55.1	−59.4	2.6	64 55.0	−59.4	2.7	65 54.9	−59.3	2.8	66 54.9	−59.4	2.9	67 54.8	−59.3	3.0	68 54.7	−59.3	3.2	69 54.6	−59.3	3.3	70 54.5	−59.3	3.5	79
80	62 55.7	−59.5	2.3	63 55.6	−59.4	2.4	64 55.6	−59.5	2.5	65 55.5	−59.4	2.6	66 55.4	−59.3	2.7	67 55.4	−59.4	2.8	68 55.3	−59.3	2.9	69 55.2	−59.3	3.0	80
81	61 56.2	−59.5	2.0	62 56.2	−59.5	2.1	63 56.1	−59.4	2.2	64 56.1	−59.5	2.2	65 56.1	−59.5	2.3	66 56.0	−59.4	2.4	67 55.9	−59.4	2.5	68 55.9	−59.4	2.6	81
82	60 56.7	−59.5	1.7	61 56.7	−59.5	1.8	62 56.7	−59.5	1.8	63 56.7	−59.5	1.9	64 56.6	−59.5	2.0	65 56.6	−59.5	2.0	66 56.5	−59.4	2.1	67 56.5	−59.4	2.2	82
83	59 57.2	−59.5	1.5	60 57.2	−59.5	1.5	61 57.2	−59.5	1.6	62 57.2	−59.5	1.6	63 57.2	−59.6	1.7	64 57.1	−59.5	1.7	65 57.1	−59.5	1.8	66 57.1	−59.5	1.9	83
84	58 57.7	−59.6	1.2	59 57.7	−59.6	1.3	60 57.7	−59.6	1.3	61 57.7	−59.6	1.3	62 57.6	−59.5	1.4	63 57.6	−59.6	1.5	64 57.6	−59.5	1.5	65 57.6	−59.5	1.5	84
85	57 58.1	−59.6	1.0	58 58.1	−59.6	1.0	59 58.1	−59.6	1.0	60 58.1	−59.6	1.1	61 58.1	−59.6	1.1	62 58.1	−59.6	1.1	63 58.1	−59.6	1.2	64 58.1	−59.6	1.2	85
86	56 58.5	−59.6	0.8	57 58.5	−59.6	0.8	58 58.5	−59.6	0.8	59 58.5	−59.6	0.8	60 58.5	−59.6	0.9	61 58.5	−59.6	0.9	62 58.5	−59.6	0.9	63 58.5	−59.6	1.0	86
87	55 58.9	−59.6	0.6	56 58.9	−59.6	0.6	57 58.9	−59.6	0.6	58 58.9	−59.6	0.6	59 58.9	−59.6	0.6	60 58.9	−59.6	0.6	61 58.9	−59.6	0.7	62 58.9	−59.6	0.7	87
88	54 59.3	−59.6	0.4	55 59.3	−59.6	0.4	56 59.3	−59.6	0.4	57 59.3	−59.6	0.4	58 59.3	−59.6	0.4	59 59.3	−59.6	0.4	60 59.3	−59.6	0.4	61 59.3	−59.6	0.4	88
89	53 59.7	−59.7	0.2	54 59.7	−59.7	0.2	55 59.7	−59.7	0.2	56 59.7	−59.7	0.2	57 59.7	−59.7	0.2	58 59.7	−59.7	0.2	59 59.7	−59.7	0.2	60 59.7	−59.7	0.2	89
90	53 00.0	−59.7	0.0	54 00.0	−59.7	0.0	55 00.0	−59.7	0.0	56 00.0	−59.7	0.0	57 00.0	−59.7	0.0	58 00.0	−59.7	0.0	59 00.0	−59.7	0.0	60 00.0	−59.7	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

6°, 354° L.H.A.   LATITUDE SAME NAME AS DECLINATION

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 45.8	−59.8	172.5	35 46.3	−59.8	172.6	34 46.8	−59.8	172.7	33 47.3	−59.8	172.8	32 47.8	−59.8	172.9	31 48.2	−59.8	172.9	30 48.7	−59.9	173.0	29 49.1	−59.9	173.1	0
1	35 46.0	−59.8	172.6	34 46.5	−59.8	172.7	33 47.0	−59.8	172.8	32 47.5	−59.9	172.9	31 47.9	−59.9	172.9	30 48.4	−59.8	173.0	29 48.9	−59.9	173.1	28 49.2	−59.9	173.1	1
2	34 46.2	−59.8	172.7	33 46.7	−59.8	172.8	32 47.1	−59.9	172.9	31 47.6	−59.9	172.9	30 48.1	−59.8	173.0	29 48.5	−59.9	173.1	28 48.9	−59.9	173.2	27 49.4	−59.9	173.2	2
3	33 46.4	−59.9	172.8	32 46.8	−59.8	172.9	31 47.3	−59.9	172.9	30 47.7	−59.8	173.0	29 48.2	−59.9	173.1	28 48.6	−59.9	173.2	27 49.0	−59.9	173.2	26 49.5	−59.9	173.3	3
4	32 46.5	−59.8	172.9	31 47.0	−59.9	173.0	30 47.4	−59.8	173.0	29 47.9	−59.8	173.1	28 48.3	−59.9	173.2	27 48.7	−59.8	173.2	26 49.1	−59.9	173.2	25 49.6	−59.9	173.3	4
5	31 46.7	−59.8	173.0	30 47.1	−59.8	173.0	29 47.6	−59.9	173.1	28 48.0	−59.8	173.2	27 48.4	−59.8	173.2	26 48.9	−59.9	173.3	25 49.3	−59.9	173.4	24 49.7	−59.9	173.4	5
6	30 46.9	−59.8	173.1	29 47.3	−59.8	173.1	28 47.7	−59.8	173.2	27 48.1	−59.8	173.3	26 48.6	−59.9	173.3	25 49.0	−59.9	173.4	24 49.4	−59.9	173.4	23 49.8	−60.0	173.5	6
7	29 47.0	−59.8	173.1	28 47.5	−59.9	173.2	27 47.9	−59.9	173.3	26 48.3	−59.9	173.4	25 48.7	−59.9	173.4	24 49.1	−59.9	173.4	23 49.5	−59.9	173.5	22 49.9	−60.0	173.5	7
8	28 47.2	−59.8	173.2	27 47.6	−59.8	173.3	26 48.0	−59.8	173.3	25 48.4	−59.9	173.4	24 48.8	−59.9	173.5	23 49.2	−59.9	173.5	22 49.6	−59.9	173.6	21 49.9	−59.9	173.6	8
9	27 47.3	−59.8	173.3	26 47.7	−59.8	173.4	25 48.1	−59.8	173.4	24 48.5	−59.8	173.5	23 48.9	−59.9	173.5	22 49.3	−59.9	173.6	21 49.7	−59.9	173.6	20 50.0	−59.9	173.7	9
10	26 47.5	−59.9	173.4	25 47.9	−59.9	173.4	24 48.3	−59.9	173.5	23 48.7	−59.9	173.6	22 49.0	−59.8	173.6	21 49.4	−59.9	173.6	20 49.8	−59.9	173.7	19 50.1	−59.9	173.7	10
11	25 47.6	−59.8	173.5	24 48.0	−59.8	173.5	23 48.4	−59.9	173.6	22 48.8	−59.9	173.6	21 49.1	−59.8	173.7	20 49.5	−59.9	173.7	19 49.9	−59.9	173.7	18 50.2	−59.9	173.8	11
12	24 47.8	−59.9	173.5	23 48.2	−59.9	173.6	22 48.5	−59.8	173.6	21 48.9	−59.9	173.7	20 49.3	−59.9	173.7	19 49.6	−59.9	173.8	18 50.0	−59.9	173.8	17 50.3	−59.9	173.8	12
13	23 47.9	−59.8	173.6	22 48.3	−59.9	173.7	21 48.7	−59.9	173.7	20 49.0	−59.8	173.7	19 49.4	−59.9	173.8	18 49.7	−59.8	173.8	17 50.1	−59.9	173.9	16 50.4	−59.9	173.9	13
14	22 48.1	−59.9	173.7	21 48.4	−59.8	173.7	20 48.8	−59.9	173.8	19 49.1	−59.8	173.8	18 49.5	−59.9	173.8	17 49.8	−59.8	173.9	16 50.2	−59.9	173.9	15 50.5	−59.9	173.9	14
15	21 48.2	−59.8	173.8	20 48.6	−59.8	173.8	19 48.9	−59.8	173.8	18 49.2	−59.8	173.9	17 49.6	−59.9	173.9	16 49.9	−59.9	173.9	15 50.3	−59.9	174.0	14 50.6	−59.9	174.0	15
16	20 48.3	−59.8	173.8	19 48.7	−59.9	173.9	18 49.0	−59.9	173.9	17 49.4	−59.9	173.9	16 49.7	−59.9	174.0	15 50.0	−59.9	174.0	14 50.4	−60.0	174.0	13 50.7	−59.9	174.1	16
17	19 48.5	−59.8	173.9	18 48.8	−59.8	173.9	17 49.1	−59.8	174.0	16 49.5	−59.9	174.0	15 49.8	−59.9	174.1	14 50.1	−59.9	174.1	13 50.4	−59.9	174.1	12 50.8	−60.0	174.1	17
18	18 48.6	−59.9	174.0	17 48.9	−59.8	174.0	16 49.3	−59.9	174.0	15 49.6	−59.9	174.1	14 49.9	−59.9	174.1	13 50.2	−59.9	174.1	12 50.5	−59.9	174.1	11 50.8	−59.9	174.2	18
19	17 48.7	−59.8	174.0	16 49.1	−59.9	174.1	15 49.4	−59.9	174.1	14 49.7	−59.9	174.1	13 50.0	−59.9	174.2	12 50.3	−59.9	174.2	11 50.6	−59.9	174.2	10 50.9	−59.9	174.2	19
20	16 48.9	−59.9	174.1	15 49.2	−59.9	174.1	14 49.5	−59.9	174.2	13 49.8	−59.9	174.2	12 50.1	−59.9	174.2	11 50.4	−59.9	174.2	10 50.7	−59.9	174.3	9 51.0	−59.9	174.3	20
21	15 49.0	−59.9	174.2	14 49.3	−59.9	174.2	13 49.6	−59.9	174.2	12 49.9	−59.9	174.3	11 50.2	−59.9	174.3	10 50.5	−59.9	174.3	9 50.8	−59.9	174.3	8 51.1	−59.9	174.3	21
22	14 49.1	−59.8	174.2	13 49.4	−59.9	174.3	12 49.7	−59.9	174.3	11 50.0	−59.9	174.4	10 50.3	−59.9	174.4	9 50.6	−59.9	174.4	8 50.9	−59.9	174.4	7 51.2	−59.9	174.4	22
23	13 49.3	−59.9	174.3	12 49.5	−59.8	174.3	11 49.8	−59.9	174.4	10 50.1	−59.9	174.4	9 50.4	−59.9	174.4	8 50.7	−59.9	174.4	7 51.0	−59.9	174.4	6 51.3	−59.9	174.4	23
24	12 49.4	−59.9	174.4	11 49.7	−59.9	174.4	10 50.0	−59.9	174.4	9 50.2	−59.9	174.4	8 50.5	−59.9	174.5	7 50.8	−59.9	174.5	6 51.1	−59.9	174.5	5 51.4	−60.0	174.5	24
25	11 49.5	−59.9	174.4	10 49.8	−59.9	174.5	9 50.1	−59.9	174.5	8 50.3	−59.9	174.5	7 50.6	−59.9	174.5	6 50.9	−59.9	174.5	5 51.2	−60.0	174.5	4 51.4	−59.9	174.6	25
26	10 49.6	−59.9	174.5	9 49.9	−59.9	174.5	8 50.2	−59.9	174.5	7 50.4	−59.9	174.6	6 50.7	−59.9	174.6	5 51.0	−59.9	174.6	4 51.2	−59.9	174.6	3 51.5	−59.9	174.6	26
27	9 49.7	−59.8	174.6	8 50.0	−59.9	174.6	7 50.3	−59.9	174.6	6 50.5	−59.8	174.6	5 50.8	−59.9	174.6	4 51.1	−59.9	174.6	3 51.3	−59.9	174.6	2 51.6	−59.9	174.6	27
28	8 49.9	−59.9	174.6	7 50.1	−59.8	174.7	6 50.4	−59.9	174.7	5 50.6	−59.9	174.7	4 50.9	−59.9	174.7	3 51.2	−59.9	174.7	2 51.4	−59.9	174.7	1 51.7	−59.9	174.7	28
29	7 50.0	−59.9	174.7	6 50.2	−59.8	174.7	5 50.5	−59.9	174.7	4 50.8	−59.9	174.7	3 51.0	−59.9	174.7	2 51.3	−59.9	174.7	1 51.5	−59.9	174.8	0 51.8	−60.0	174.8	29
30	6 50.1	−59.8	174.8	5 50.4	−59.9	174.8	4 50.6	−59.9	174.8	3 50.9	−59.9	174.8	2 51.1	−59.9	174.8	1 51.4	−60.0	174.8	0 51.6	−59.9	174.8	0 08.2	+59.9	5.2	30
31	5 50.2	−59.8	174.8	4 50.5	−59.9	174.8	3 50.7	−59.9	174.8	2 51.0	−59.9	174.9	1 51.2	−59.9	174.9	0 51.4	−59.9	174.9	0 08.3	+59.9	5.1	1 08.1	+59.9	5.1	31
32	4 50.4	−59.9	174.9	3 50.6	−59.9	174.9	2 50.8	−59.9	174.9	1 51.1	−59.9	174.9	0 51.3	−59.9	174.9	0 08.5	+59.9	5.1	1 08.2	+59.9	5.1	2 08.0	+59.9	5.1	32
33	3 50.5	−59.9	175.0	2 50.7	−59.9	175.0	1 50.9	−59.9	175.0	0 51.2	−59.9	175.0	0 08.6	+59.9	5.0	1 08.4	+59.9	5.0	2 08.1	+60.0	5.0	3 07.9	+59.9	5.0	33
34	2 50.6	−59.9	175.0	1 50.8	−59.9	175.0	0 51.0	−59.9	175.0	0 08.7	+59.9	5.0	1 08.6	+59.9	5.0	2 08.3	+59.9	5.0	3 08.1	+59.9	5.0	4 07.8	+59.9	5.0	34
35	1 50.7	−59.9	175.1	0 50.9	−59.9	175.1	0 08.8	+59.9	4.9	1 08.6	+59.9	4.9	2 08.4	+59.9	4.9	3 08.2	+59.9	4.9	4 08.0	+59.9	4.9	5 07.7	+60.0	4.9	35
36	0 50.8	−59.9	175.1	0 09.0	+59.8	4.9	1 08.7	+59.9	4.9	2 08.5	+59.9	4.9	3 08.3	+59.9	4.9	4 08.1	+59.9	4.9	5 07.9	+59.9	4.9	6 07.7	+59.9	4.9	36
37	0 09.1	+59.8	4.8	1 08.9	+59.9	4.8	2 08.6	+59.9	4.8	3 08.4	+59.9	4.8	4 08.3	+59.9	4.7	5 08.1	+59.9	4.7	6 07.9	+59.9	4.8	7 07.6	+59.9	4.8	37
38	1 08.9	+59.9	4.7	2 08.7	+59.9	4.7	3 08.5	+59.9	4.7	4 08.3	+59.9	4.7	5 08.2	+59.9	4.7	6 08.0	+59.9	4.7	7 07.7	+59.9	4.7	8 07.5	+59.9	4.8	38
39	2 08.8	+59.9	4.7	3 08.6	+59.9	4.7	4 08.4	+59.9	4.7	5 08.2	+59.9	4.7	6 08.0	+59.9	4.7	7 07.8	+59.9	4.7	8 07.6	+59.9	4.7	9 07.4	+59.9	4.7	39
40	3 08.7	+59.9	4.6	4 08.5	+59.9	4.6	5 08.3	+59.9	4.6	6 08.1	+59.9	4.6	7 07.9	+59.9	4.6	8 07.7	+59.9	4.6	9 07.5	+59.9	4.7	10 07.3	+59.9	4.7	40
41	4 08.6	+59.9	4.5	5 08.4	+59.9	4.5	6 08.2	+59.9	4.6	7 08.0	+59.9	4.6	8 07.8	+59.9	4.6	9 07.6	+59.9	4.6	10 07.4	+59.9	4.6	11 07.2	+60.0	4.6	41
42	5 08.5	+59.9	4.5	6 08.3	+59.9	4.5	7 08.1	+59.9	4.5	8 07.9	+59.9	4.5	9 07.7	+59.9	4.5	10 07.5	+59.9	4.5	11 07.3	+60.0	4.5	12 07.2	+59.9	4.6	42
43	6 08.3	+59.9	4.4	7 08.2	+59.9	4.4	8 08.0	+59.9	4.4	9 07.8	+59.9	4.4	10 07.6	+59.9	4.5	11 07.4	+59.9	4.5	12 07.3	+59.9	4.5	13 07.1	+59.9	4.5	43
44	7 08.2	+59.9	4.3	8 08.0	+59.9	4.4	9 07.9	+59.9	4.4	10 07.7	+59.9	4.4	11 07.5	+59.9	4.4	12 07.3	+59.9	4.4	13 07.2	+59.9	4.4	14 07.0	+59.9	4.4	44
45	8 08.1	+59.9	4.3	9 07.9	+59.9	4.3	10 07.8	+59.8	4.3	11 07.6	+59.9	4.3	12 07.4	+59.9	4.3	13 07.2	+59.9	4.4	14 07.1	+59.9	4.4	15 06.9	+59.9	4.4	45
46	9 08.0	+59.9	4.2	10 07.8	+59.9	4.2	11 07.6	+59.9	4.2	12 07.5	+59.9	4.3	13 07.3	+59.9	4.3	14 07.1	+59.9	4.3	15 07.0	+59.9	4.3	16 06.8	+59.9	4.3	46
47	10 07.9	+59.9	4.2	11 07.7	+59.9	4.2	12 07.5	+59.9	4.2	13 07.4	+59.9	4.2	14 07.2	+59.9	4.2	15 07.0	+59.9	4.2	16 06.9	+59.9	4.3	17 06.7	+59.9	4.3	47
48	11 07.7	+59.9	4.1	12 07.6	+59.9	4.1	13 07.4	+59.9	4.1	14 07.3	+59.9	4.1	15 07.1	+59.9	4.2	16 06.9	+59.9	4.2	17 06.8	+59.9	4.2	18 06.6	+59.9	4.2	48
49	12 07.6	+59.9	4.0	13 07.5	+59.8	4.0	14 07.3	+59.9	4.1	15 07.2	+59.8	4.1	16 07.0	+59.9	4.1	17 06.8	+59.9	4.1	18 06.7	+59.9	4.1	19 06.5	+59.9	4.2	49
50	13 07.5	+59.9	4.0	14 07.3	+59.9	4.0	15 07.2	+59.9	4.0	16 07.0	+59.9	4.0	17 06.9	+59.9	4.0	18 06.7	+59.9	4.1	19 06.6	+59.9	4.1	20 06.4	+59.9	4.1	50
51	14 07.4	+59.8	3.9	15 07.2	+59.9	3.9	16 07.1	+59.9	3.9	17 06.9	+59.9	3.9	18 06.8	+59.9	4.0	19 06.6	+59.9	4.0	20 06.5	+59.9	4.0	21 06.3	+60.0	4.0	51
52	15 07.2	+59.9	3.8	16 07.1	+59.9	3.8	17 07.0	+59.8	3.9	18 06.8	+59.9	3.9	19 06.7	+59.9	3.9	20 06.5	+59.9	3.9	21 06.4	+59.9	4.0	22 06.3	+59.9	4.0	52
53	16 07.1	+59.9	3.8	17 07.0	+59.9	3.8	18 06.8	+59.9	3.8	19 06.7	+59.9	3.8	20 06.6	+59.9	3.8	21 06.4	+59.9	3.9	22 06.3	+59.9	3.9	23 06.2	+59.9	3.9	53
54	17 07.0	+59.8	3.7	18 06.8	+59.9	3.7	19 06.7	+59.9	3.7	20 06.6	+59.9	3.8	21 06.5	+59.8	3.8	22 06.3	+59.9	3.8	23 06.2	+59.9	3.8	24 06.1	+59.9	3.9	54
55	18 06.8	+59.9	3.6	19 06.7	+59.9	3.6	20 06.6	+59.9	3.7	21 06.5	+59.9	3.7	22 06.3	+59.9	3.7	23 06.2	+59.9	3.7	24 06.1	+59.9	3.8	25 06.0	+59.9	3.8	55
56	19 06.7	+59.9	3.5	20 06.6	+59.9	3.6	21 06.5	+59.8	3.6	22 06.4	+59.9	3.6	23 06.2	+59.8	3.6	24 06.1	+59.9	3.7	25 06.0	+59.9	3.7	26 05.9	+59.9	3.7	56
57	20 06.6	+59.8	3.5	21 06.5	+59.9	3.5	22 06.3	+59.8	3.5	23 06.2	+59.9	3.5	24 06.1	+59.9	3.6	25 06.0	+59.9	3.6	26 05.9	+59.9	3.6	27 05.8	+59.9	3.7	57
58	21 06.4	+59.9	3.4	22 06.3	+59.8	3.4	23 06.2	+59.9	3.5	24 06.1	+59.9	3.5	25 06.0	+59.9	3.5	26 05.9	+59.9	3.5	27 05.8	+59.9	3.6	28 05.7	+59.9	3.6	58
59	22 06.3	+59.9	3.3	23 06.2	+59.8	3.4	24 06.1	+59.9	3.4	25 06.0	+59.9	3.4	26 05.9	+59.9	3.4	27 05.8	+59.9	3.5	28 05.7	+59.9	3.5	29 05.5	+59.9	3.5	59
60	23 06.2	+59.8	3.3	24 06.1	+59.8	3.3	25 06.0	+59.8	3.3	26 05.9	+59.8	3.3	27 05.8	+59.9	3.4	28 05.7	+59.9	3.4	29 05.5	+59.8	3.4	30 05.4	+59.9	3.5	60
61	24 06.0	+59.9	3.2	25 05.9	+59.9	3.2	26 05.8	+59.9	3.2	27 05.7	+59.9	3.3	28 05.6	+59.9	3.3	29 05.5	+59.9	3.3	30 05.4	+59.9	3.4	31 05.3	+59.9	3.4	61
62	25 05.9	+59.8	3.1	26 05.8	+59.8	3.1	27 05.7	+59.9	3.2	28 05.6	+59.9	3.2	29 05.5	+59.9	3.2	30 05.4	+59.9	3.3	31 05.3	+59.9	3.3	32 05.2	+59.9	3.3	62
63	26 05.7	+59.9	3.0	27 05.6	+59.9	3.1	28 05.6	+59.9	3.1	29 05.5	+59.9	3.1	30 05.4	+59.9	3.1	31 05.3	+59.9	3.2	32 05.2	+59.9	3.2	33 05.1	+59.9	3.2	63
64	27 05.6	+59.9	3.0	28 05.5	+59.9	3.0	29 05.4	+59.8	3.0	30 05.3	+59.9	3.0	31 05.2	+59.9	3.1	32 05.2	+59.9	3.1	33 05.1	+59.8	3.1	34 05.0	+59.9	3.2	64
65	28 05.4	+59.9	2.9	29 05.4	+59.9	2.9	30 05.3	+59.8	2.9	31 05.2	+59.9	3.0	32 05.1	+59.9	3.0	33 05.0	+59.9	3.0	34 04.9	+59.9	3.0	35 04.9	+59.8	3.1	65
66	29 05.3	+59.8	2.8	30 05.2	+59.8	2.8	31 05.1	+59.9	2.8	32 05.1	+59.8	2.9	33 05.0	+59.9	2.9	34 04.9	+59.9	2.9	35 04.8	+59.9	3.0	36 04.7	+59.9	3.0	66
67	30 05.1	+59.9	2.7	31 05.0	+59.9	2.7	32 05.0	+59.8	2.8	33 04.9	+59.9	2.8	34 04.8	+59.9	2.8	35 04.8	+59.9	2.9	36 04.7	+59.9	2.9	37 04.6	+59.9	2.9	67
68	31 05.0	+59.8	2.6	32 04.9	+59.9	2.6	33 04.8	+59.8	2.7	34 04.8	+59.9	2.7	35 04.7	+59.9	2.7	36 04.6	+59.9	2.8	37 04.6	+59.9	2.8	38 04.5	+59.9	2.9	68
69	32 04.8	+59.8	2.5	33 04.7	+59.9	2.6	34 04.7	+59.8	2.6	35 04.6	+59.9	2.6	36 04.5	+59.9	2.7	37 04.5	+59.9	2.7	38 04.4	+59.9	2.7	39 04.3	+59.9	2.8	69
70	33 04.6	+59.8	2.4	34 04.6	+59.8	2.5	35 04.5	+59.8	2.5	36 04.5	+59.9	2.5	37 04.4	+59.9	2.6	38 04.3	+59.9	2.6	39 04.3	+59.9	2.6	40 04.2	+59.9	2.7	70
71	34 04.5	+59.8	2.4	35 04.4	+59.9	2.4	36 04.3	+59.8	2.4	37 04.3	+59.8	2.4	38 04.2	+59.9	2.5	39 04.2	+59.9	2.5	40 04.1	+59.9	2.5	41 04.1	+59.8	2.6	71
72	35 04.3	+59.8	2.3	36 04.2	+59.9	2.3	37 04.2	+59.8	2.3	38 04.1	+59.9	2.4	39 04.1	+59.8	2.4	40 04.0	+59.9	2.4	41 04.0	+59.9	2.4	42 03.9	+59.9	2.5	72
73	36 04.1	+59.8	2.2	37 04.1	+59.8	2.2	38 04.0	+59.8	2.2	39 04.0	+59.8	2.3	40 03.9	+59.9	2.3	41 03.9	+59.9	2.3	42 03.8	+59.9	2.4	43 03.8	+59.9	2.4	73
74	37 03.9	+59.8	2.1	38 03.9	+59.8	2.1	39 03.8	+59.9	2.1	40 03.8	+59.8	2.2	41 03.7	+59.9	2.2	42 03.7	+59.8	2.2	43 03.7	+59.9	2.3	44 03.6	+59.9	2.3	74
75	38 03.7	+59.8	2.0	39 03.7	+59.8	2.0	40 03.7	+59.8	2.0	41 03.6	+59.8	2.1	42 03.6	+59.8	2.1	43 03.5	+59.8	2.1	44 03.5	+59.8	2.2	45 03.4	+59.8	2.2	75
76	39 03.5	+59.8	1.9	40 03.5	+59.8	1.9	41 03.5	+59.8	1.9	42 03.4	+59.8	2.0	43 03.4	+59.8	2.0	44 03.4	+59.8	2.0	45 03.3	+59.8	2.1	46 03.3	+59.8	2.1	76
77	40 03.3	+59.8	1.8	41 03.3	+59.8	1.8	42 03.3	+59.8	1.8	43 03.2	+59.8	1.8	44 03.2	+59.8	1.9	45 03.2	+59.8	1.9	46 03.1	+59.9	1.9	47 03.1	+59.8	2.0	77
78	41 03.1	+59.8	1.7	42 03.1	+59.8	1.7	43 03.1	+59.8	1.7	44 03.0	+59.8	1.7	45 03.0	+59.8	1.8	46 03.0	+59.8	1.8	47 03.0	+59.8	1.8	48 02.9	+59.8	1.9	78
79	42 02.9	+59.8	1.5	43 02.9	+59.8	1.6	44 02.9	+59.8	1.6	45 02.8	+59.8	1.6	46 02.8	+59.8	1.6	47 02.8	+59.8	1.7	48 02.8	+59.8	1.7	49 02.7	+59.8	1.7	79
80	43 02.7	+59.8	1.4	44 02.7	+59.8	1.4	45 02.7	+59.7	1.5	46 02.6	+59.8	1.5	47 02.6	+59.8	1.5	48 02.6	+59.8	1.6	49 02.6	+59.8	1.6	50 02.5	+59.8	1.6	80
81	44 02.5	+59.7	1.3	45 02.4	+59.8	1.3	46 02.4	+59.8	1.3	47 02.4	+59.8	1.4	48 02.4	+59.7	1.4	49 02.4	+59.7	1.4	50 02.4	+59.7	1.5	51 02.3	+59.8	1.5	81
82	45 02.2	+59.8	1.2	46 02.2	+59.8	1.2	47 02.2	+59.8	1.2	48 02.2	+59.7	1.2	49 02.2	+59.7	1.3	50 02.2	+59.7	1.3	51 02.1	+59.8	1.3	52 02.1	+59.7	1.4	82
83	46 02.0	+59.7	1.1	47 02.0	+59.7	1.1	48 02.0	+59.7	1.1	49 02.0	+59.7	1.1	50 01.9	+59.8	1.1	51 01.9	+59.8	1.2	52 01.9	+59.8	1.2	53 01.9	+59.7	1.2	83
84	47 01.7	+59.8	0.9	48 01.7	+59.8	0.9	49 01.7	+59.7	1.0	50 01.7	+59.7	1.0	51 01.7	+59.7	1.0	52 01.7	+59.7	1.0	53 01.7	+59.7	1.0	54 01.7	+59.7	1.1	84
85	48 01.5	+59.7	0.8	49 01.5	+59.7	0.8	50 01.5	+59.7	0.8	51 01.5	+59.7	0.8	52 01.5	+59.7	0.8	53 01.4	+59.8	0.9	54 01.4	+59.8	0.9	55 01.4	+59.7	0.9	85
86	49 01.2	+59.7	0.6	50 01.2	+59.7	0.7	51 01.2	+59.7	0.7	52 01.2	+59.7	0.7	53 01.2	+59.7	0.7	54 01.2	+59.7	0.7	55 01.2	+59.7	0.7	56 01.2	+59.7	0.7	86
87	50 00.9	+59.7	0.5	51 00.9	+59.7	0.5	52 00.9	+59.7	0.5	53 00.9	+59.7	0.5	54 00.9	+59.7	0.5	55 00.9	+59.7	0.5	56 00.9	+59.7	0.6	57 00.9	+59.7	0.6	87
88	51 00.6	+59.7	0.3	52 00.6	+59.7	0.3	53 00.6	+59.7	0.3	54 00.6	+59.7	0.4	55 00.6	+59.7	0.4	56 00.6	+59.7	0.4	57 00.6	+59.7	0.4	58 00.6	+59.7	0.4	88
89	52 00.3	+59.7	0.2	53 00.3	+59.7	0.2	54 00.3	+59.7	0.2	55 00.3	+59.7	0.2	56 00.3	+59.7	0.2	57 00.3	+59.7	0.2	58 00.3	+59.7	0.2	59 00.3	+59.7	0.2	89
90	53 00.0	+59.7	0.0	54 00.0	+59.7	0.0	55 00.0	+59.7	0.0	56 00.0	+59.7	0.0	57 00.0	+59.7	0.0	58 00.0	+59.7	0.0	59 00.0	+59.7	0.0	60 00.0	+59.7	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION · **L.H.A. 174°, 186°**

7°, 353° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 40.7	+59.8	171.3	35 41.4	+59.8	171.4	34 42.1	+59.8	171.5	33 42.7	+59.8	171.6	32 43.4	+59.8	171.7	31 44.0	+59.8	171.8	30 44.6	+59.9	171.8	29 45.2	+59.9	171.9	0
1	37 40.5	+59.7	171.1	36 41.2	+59.7	171.3	35 41.9	+59.7	171.4	34 42.5	+59.8	171.5	33 43.2	+59.8	171.6	32 43.8	+59.9	171.7	31 44.5	+59.8	171.8	30 45.1	+59.8	171.8	1
2	38 40.2	+59.7	171.0	37 40.9	+59.8	171.1	36 41.6	+59.8	171.3	35 42.3	+59.8	171.4	34 43.0	+59.8	171.5	33 43.7	+59.8	171.6	32 44.3	+59.8	171.7	31 44.9	+59.9	171.8	2
3	39 39.9	+59.8	170.9	38 40.7	+59.7	171.0	37 41.4	+59.7	171.2	36 42.1	+59.8	171.3	35 42.8	+59.8	171.4	34 43.5	+59.8	171.4	33 44.1	+59.9	171.5	32 44.8	+59.8	171.7	3
4	40 39.7	+59.7	170.8	39 40.4	+59.7	170.9	38 41.2	+59.7	171.0	37 41.9	+59.8	171.2	36 42.6	+59.8	171.3	35 43.3	+59.8	171.4	34 44.0	+59.8	171.5	33 44.6	+59.8	171.7	4
5	41 39.4	+59.7	170.6	40 40.2	+59.7	170.8	39 40.9	+59.8	170.9	38 41.7	+59.7	171.1	37 42.4	+59.8	171.2	36 43.1	+59.8	171.3	35 43.8	+59.8	171.4	34 44.4	+59.9	171.5	5
6	42 39.1	+59.7	170.5	41 39.9	+59.7	170.7	40 40.7	+59.7	170.8	39 41.4	+59.8	170.9	38 42.2	+59.8	171.1	37 42.9	+59.8	171.2	36 43.6	+59.8	171.3	35 44.3	+59.8	171.4	6
7	43 38.8	+59.6	170.4	42 39.6	+59.7	170.5	41 40.4	+59.8	170.7	40 41.2	+59.8	170.8	39 42.0	+59.7	171.0	38 42.7	+59.8	171.1	37 43.4	+59.8	171.2	36 44.1	+59.8	171.3	7
8	44 38.5	+59.6	170.2	43 39.3	+59.7	170.4	42 40.2	+59.7	170.6	41 41.0	+59.7	170.7	40 41.7	+59.8	170.8	39 42.5	+59.8	171.0	38 43.2	+59.8	171.1	37 43.9	+59.8	171.2	8
9	45 38.1	+59.7	170.1	44 39.0	+59.7	170.3	43 39.9	+59.7	170.4	42 40.7	+59.7	170.6	41 41.5	+59.8	170.7	40 42.3	+59.7	170.9	39 43.0	+59.8	171.0	38 43.7	+59.9	171.1	9
10	46 37.8	+59.6	169.9	45 38.7	+59.7	170.1	44 39.6	+59.7	170.3	43 40.4	+59.8	170.4	42 41.3	+59.7	170.6	41 42.0	+59.8	170.7	40 42.8	+59.8	170.9	39 43.6	+59.8	171.0	10
11	47 37.5	+59.5	169.8	46 38.4	+59.7	170.0	45 39.3	+59.7	170.1	44 40.2	+59.8	170.3	43 41.0	+59.7	170.5	42 41.8	+59.8	170.7	41 42.6	+59.8	170.8	40 43.4	+59.8	170.9	11
12	48 37.1	+59.6	169.6	47 38.1	+59.6	169.8	46 39.0	+59.7	170.0	45 39.9	+59.7	170.2	44 40.7	+59.8	170.3	43 41.6	+59.7	170.5	42 42.4	+59.8	170.7	41 43.2	+59.8	170.8	12
13	49 36.7	+59.6	169.4	48 37.7	+59.7	169.6	47 38.7	+59.6	169.8	46 39.6	+59.7	170.0	45 40.5	+59.7	170.2	44 41.3	+59.8	170.3	43 42.2	+59.7	170.5	42 43.0	+59.8	170.7	13
14	50 36.3	+59.6	169.3	49 37.4	+59.6	169.5	48 38.3	+59.7	169.7	47 39.3	+59.7	169.9	46 40.2	+59.7	170.1	45 41.1	+59.7	170.3	44 41.9	+59.8	170.5	43 42.8	+59.7	170.6	14
15	51 35.9	+59.6	169.1	50 37.0	+59.6	169.3	49 38.0	+59.6	169.5	48 39.0	+59.7	169.7	47 39.9	+59.7	169.9	46 40.8	+59.8	170.1	45 41.7	+59.8	170.3	44 42.5	+59.8	170.5	15
16	52 35.5	+59.5	168.9	51 36.6	+59.6	169.1	50 37.6	+59.7	169.4	49 38.7	+59.6	169.6	48 39.6	+59.7	169.8	47 40.6	+59.7	170.0	46 41.5	+59.7	170.2	45 42.3	+59.8	170.3	16
17	53 35.0	+59.6	168.7	52 36.2	+59.5	168.9	51 37.3	+59.6	169.2	50 38.3	+59.6	169.4	49 39.3	+59.6	169.6	48 40.3	+59.8	169.8	47 41.2	+59.7	170.0	46 42.1	+59.7	170.2	17
18	54 34.6	+59.5	168.5	53 35.7	+59.6	168.7	52 36.9	+59.6	169.0	51 38.0	+59.6	169.2	50 39.0	+59.7	169.5	49 40.0	+59.7	169.7	48 40.9	+59.8	169.9	47 41.8	+59.8	170.1	18
19	55 34.1	+59.4	168.2	54 35.3	+59.5	168.5	53 36.5	+59.5	168.8	52 37.6	+59.6	169.1	51 38.7	+59.6	169.3	50 39.7	+59.7	169.5	49 40.7	+59.7	169.7	48 41.6	+59.7	170.0	19
20	56 33.5	+59.5	168.0	55 34.8	+59.5	168.3	54 36.0	+59.4	168.6	53 37.2	+59.6	168.9	52 38.3	+59.6	169.1	51 39.4	+59.6	169.4	50 40.4	+59.7	169.6	49 41.3	+59.8	169.8	20
21	57 33.0	+59.4	167.8	56 34.3	+59.5	168.1	55 35.6	+59.5	168.4	54 36.8	+59.6	168.7	53 37.9	+59.6	168.9	52 39.0	+59.7	169.2	51 40.1	+59.6	169.4	50 41.1	+59.7	169.7	21
22	58 32.4	+59.4	167.5	57 33.8	+59.5	167.8	56 35.1	+59.5	168.2	55 36.4	+59.5	168.5	54 37.5	+59.6	168.7	53 38.7	+59.6	169.0	52 39.7	+59.7	169.3	51 40.8	+59.7	169.5	22
23	59 31.8	+59.3	167.2	58 33.3	+59.4	167.6	57 34.6	+59.5	167.9	56 35.9	+59.5	168.2	55 37.1	+59.6	168.5	54 38.3	+59.6	168.8	53 39.4	+59.7	169.1	52 40.5	+59.7	169.3	23
24	60 31.2	+59.3	166.9	59 32.7	+59.3	167.3	58 34.1	+59.4	167.7	57 35.4	+59.5	168.0	56 36.7	+59.6	168.3	55 37.9	+59.6	168.6	54 39.1	+59.6	168.9	53 40.2	+59.6	169.2	24
25	61 30.5	+59.2	166.6	60 32.0	+59.4	167.0	59 33.5	+59.4	167.4	58 34.9	+59.5	167.8	57 36.3	+59.5	168.1	56 37.5	+59.6	168.4	55 38.7	+59.6	168.8	54 39.8	+59.7	169.0	25
26	62 29.7	+59.2	166.3	61 31.4	+59.3	166.7	60 32.9	+59.4	167.1	59 34.4	+59.4	167.5	58 35.8	+59.4	167.9	57 37.1	+59.6	168.2	56 38.3	+59.6	168.5	55 39.5	+59.6	168.8	26
27	63 28.9	+59.2	165.9	62 30.7	+59.2	166.4	61 32.3	+59.3	166.8	60 33.8	+59.4	167.2	59 35.3	+59.5	167.6	58 36.6	+59.6	168.0	57 37.9	+59.6	168.3	56 39.1	+59.7	168.6	27
28	64 28.1	+59.1	165.5	63 29.9	+59.2	166.0	62 31.6	+59.3	166.5	61 33.2	+59.4	166.9	60 34.8	+59.4	167.3	59 36.2	+59.5	167.7	58 37.5	+59.5	168.1	57 38.8	+59.6	168.4	28
29	65 27.2	+59.0	165.1	64 29.1	+59.2	165.7	63 30.9	+59.3	166.2	62 32.6	+59.3	166.6	61 34.2	+59.4	167.1	60 35.7	+59.4	167.5	59 37.0	+59.6	167.8	58 38.4	+59.5	168.2	29
30	66 26.2	+59.0	164.7	65 28.3	+59.0	165.3	64 30.2	+59.1	165.8	63 31.9	+59.3	166.3	62 33.6	+59.3	166.8	61 35.1	+59.4	167.2	60 36.6	+59.5	167.6	59 37.9	+59.6	167.9	30
31	67 25.2	+58.8	164.2	66 27.3	+59.0	164.8	65 29.3	+59.1	165.4	64 31.2	+59.2	165.9	63 32.9	+59.3	166.4	62 34.5	+59.4	166.9	61 36.1	+59.4	167.3	60 37.5	+59.5	167.7	31
32	68 24.0	+58.7	163.7	67 26.3	+58.9	164.4	66 28.4	+59.1	165.0	65 30.4	+59.2	165.6	64 32.2	+59.3	166.1	63 33.9	+59.4	166.6	62 35.5	+59.4	167.0	61 37.0	+59.5	167.4	32
33	69 22.7	+58.7	163.1	68 25.2	+58.8	163.9	67 27.5	+58.9	164.5	66 29.6	+59.0	165.2	65 31.5	+59.2	165.7	64 33.3	+59.3	166.2	63 34.9	+59.4	166.7	62 36.5	+59.4	167.2	33
34	70 21.4	+58.4	162.5	69 24.0	+58.7	163.3	68 26.4	+58.9	164.0	67 28.6	+59.0	164.7	66 30.7	+59.1	165.3	65 32.6	+59.2	165.9	64 34.3	+59.3	166.4	63 36.0	+59.4	166.9	34
35	71 19.8	+58.4	161.8	70 22.7	+58.5	162.7	69 25.3	+58.7	163.5	68 27.6	+59.0	164.2	67 29.8	+59.0	164.9	66 31.8	+59.2	165.5	65 33.6	+59.3	166.0	64 35.4	+59.3	166.5	35
36	72 18.2	+58.1	161.1	71 21.2	+58.4	162.0	70 24.0	+58.6	162.9	69 26.6	+58.8	163.7	68 28.9	+58.9	164.4	67 31.0	+59.1	165.1	66 32.9	+59.2	165.7	65 34.7	+59.3	166.2	36
37	73 16.3	+57.9	160.2	72 19.6	+58.2	161.3	71 22.6	+58.5	162.3	70 25.4	+58.6	163.1	69 27.8	+58.9	163.9	68 30.1	+59.0	164.6	67 32.1	+59.2	165.2	66 34.0	+59.3	165.8	37
38	74 14.2	+57.6	159.3	73 17.8	+58.0	160.5	72 21.1	+58.3	161.5	71 24.0	+58.6	162.5	70 26.7	+58.7	163.3	69 29.1	+58.9	164.1	68 31.3	+59.1	164.8	67 33.3	+59.2	165.4	38
39	75 11.8	+57.3	158.2	74 15.8	+57.8	159.6	73 19.4	+58.1	160.7	72 22.6	+58.3	161.8	71 25.4	+58.6	162.7	70 28.0	+58.8	163.5	69 30.4	+58.9	164.3	68 32.5	+59.1	165.0	39
40	76 09.1	+56.9	157.0	75 13.6	+57.4	158.5	74 17.5	+57.8	159.8	73 20.9	+58.2	161.0	72 24.0	+58.5	162.0	71 26.8	+58.7	162.9	70 29.3	+58.9	163.8	69 31.6	+59.1	164.5	40
41	77 06.0	+56.4	155.7	76 11.0	+57.0	157.3	75 15.3	+57.5	158.8	74 19.1	+58.0	160.1	73 22.5	+58.3	161.2	72 25.5	+58.5	162.3	71 28.2	+58.8	163.2	70 30.7	+58.9	164.0	41
42	78 02.4	+55.8	154.1	77 08.0	+56.6	156.0	76 12.8	+57.2	157.7	75 17.1	+57.6	159.1	74 20.8	+58.0	160.4	73 24.0	+58.2	161.5	72 27.0	+58.6	162.5	71 29.6	+58.8	163.4	42
43	78 58.2	+55.0	152.2	78 04.6	+55.9	154.4	77 10.0	+56.7	156.3	76 14.7	+57.3	158.0	75 18.8	+57.8	159.4	74 22.4	+58.1	160.7	73 25.6	+58.4	161.8	72 28.4	+58.7	162.8	43
44	79 53.2	+53.9	150.1	79 00.5	+55.2	152.6	78 06.7	+56.1	154.8	77 12.0	+56.9	156.7	76 16.6	+57.4	158.3	75 20.5	+57.9	159.7	74 24.0	+58.3	161.0	73 27.1	+58.5	162.1	44
45	80 47.1	+52.6	147.4	79 55.7	+54.2	150.5	79 02.8	+55.4	153.0	78 08.9	+56.3	155.2	77 14.0	+57.0	157.0	76 18.4	+57.6	158.7	75 22.3	+57.9	160.0	74 25.6	+58.4	161.3	45
46	81 39.7	+50.8•	144.3	80 49.9	+52.9	147.9	79 58.2	+54.5	150.9	79 05.2	+55.6	153.4	78 11.0	+56.5	155.6	77 16.0	+57.1	157.4	76 20.2	+57.7	159.0	75 24.0	+58.1	160.4	46
47	82 30.5	+48.2•	140.4	81 42.8	+51.0•	144.8	80 52.7	+53.1	148.4	80 00.8	+54.5	151.4	79 07.5	+55.8	153.9	78 13.1	+56.7	156.0	77 17.9	+57.3	157.8	76 22.1	+57.8	159.4	47
48	83 18.7	+44.6•	135.6	82 33.8	+48.6•	140.9	81 45.8	+51.4•	145.3	80 55.4	+53.5	148.9	80 03.3	+54.9	151.8	79 09.8	+56.0	154.3	78 15.2	+56.8	156.4	77 19.9	+57.4	158.2	48
49	84 03.3	+39.5•	129.5	83 22.4	+45.1•	136.1	82 37.2	+49.0•	141.5	81 48.9	+51.7•	145.8	80 58.2	+53.7	149.4	80 05.8	+55.1	152.3	79 12.0	+56.2	154.7	78 17.3	+57.0	156.8	49
50	84 42.8	+32.3•	121.8	84 07.5	+40.0•	130.1	83 26.2	+45.6•	136.7	82 40.6	+49.4•	142.1	81 51.9	+52.1	146.4	81 00.9	+54.0	149.9	80 08.2	+55.4	152.8	79 14.3	+56.4	155.2	50
51	85 15.1	+22.4•	112.1	84 47.5	+32.9•	122.3	84 11.8	+40.5•	130.7	83 30.0	+46.0•	137.4	82 44.0	+49.8•	142.7	81 54.9	+52.4	147.0	81 03.6	+54.3	150.4	80 10.7	+55.6	153.3	51
52	85 37.5	+9.8•	100.4	85 20.4	+22.8•	112.6	84 52.3	+33.4•	122.9	84 16.0	+41.1•	131.3	83 33.8	+46.5•	138.0	82 47.3	+50.2•	143.3	81 57.9	+52.8	147.5	81 06.3	+54.6	151.0	52
53	85 47.3	− 4.1•	87.2	85 43.2	+10.0•	100.7	85 25.7	+23.7•	113.1	84 57.1	+33.9•	123.5	84 20.3	+41.6•	131.8	83 37.5	+47.0•	138.7	82 50.7	+50.6•	143.9	81 59.9	+53.1	148.1	53
54	85 43.2	−17.5•	73.7	85 53.2	− 4.2•	87.2	85 49.0	+10.2•	101.0	85 31.0	+23.8•	113.6	85 01.9	+34.5•	124.2	84 24.5	+42.3•	132.7	83 41.3	+47.5•	139.3	82 54.0	+51.0•	144.6	54
55	85 25.7	−28.6•	61.3	85 49.0	−18.0•	73.3	85 59.2	− 4.4•	87.1	85 54.8	+10.4•	101.3	85 36.4	+24.3•	114.1	85 06.8	+35.1•	124.9	84 28.8	+42.8•	133.4	83 45.0	+48.0•	140.1	55
56	84 57.1	−36.8•	50.8	85 31.0	−29.1•	60.7	85 54.8	−18.8•	73.0	86 05.2	− 4.5•	87.1	86 00.7	+10.7•	101.6	85 41.9	+24.7•	114.7	85 11.6	+35.7•	125.6	84 33.0	+43.4•	134.1	56
57	84 20.3	−42.8•	42.3	85 01.9	−37.4•	50.0	85 36.4	−29.6•	60.1	86 00.7	−18.9•	72.6	86 11.4	− 4.8•	87.1	86 06.6	+10.9•	101.9	85 47.3	+25.3•	115.3	85 16.4	+36.4•	126.3	57
58	83 37.5	−46.8•	35.6	84 24.5	−43.2•	41.5	85 06.8	−38.0•	49.3	85 41.9	−30.3•	59.4	86 06.6	−19.3•	72.2	86 17.5	− 4.9•	87.0	86 12.6	+11.2•	102.3	85 52.8	+25.9•	116.0	58
59	82 50.7	−49.8•	30.3	83 41.3	−47.3•	34.8	84 28.8	−43.8•	40.7	85 11.6	−38.4•	48.5	85 47.3	−30.9•	58.7	86 12.6	−19.8•	71.7	86 23.8	− 5.1•	87.0	86 18.7	+11.4•	102.7	59
60	82 00.9	−51.9	26.0	82 54.0	−50.2	29.5	83 45.0	−47.7•	34.0	84 33.0	−44.3•	39.9	85 16.4	−39.2•	47.7	85 52.8	−31.5•	58.0	86 18.7	−20.4•	71.3	86 30.1	− 5.3•	87.0	60
61	81 09.0	−53.5	22.6	82 03.8	−52.2	25.3	82 57.3	−50.6•	28.8	83 48.7	−48.2•	33.2	84 37.2	−44.8•	39.1	85 21.3	−39.9•	46.8	85 58.3	−32.2•	57.3	86 24.8	−21.0•	70.8	61
62	80 15.5	−54.6	19.8	81 11.6	−53.7	21.9	82 06.7	−52.5	24.6	83 00.5	−50.9•	28.0	83 52.4	−48.3•	32.4	84 41.4	−45.3•	38.2	85 26.1	−40.5•	46.0	86 03.8	−32.9•	56.5	62
63	79 20.9	−55.4	17.4	80 17.9	−54.8	19.2	81 14.2	−53.9	21.3	82 09.6	−52.8	23.9	83 03.8	−51.3•	27.3	83 56.1	−49.2•	31.6	84 45.6	−45.9•	37.3	85 30.9	−41.2•	45.0	63
64	78 25.5	−56.2	15.4	79 23.1	−55.7	16.9	80 20.3	−55.1	18.6	81 16.8	−54.2	20.6	82 12.5	−53.2	23.2	83 06.9	−51.6•	26.5	83 59.7	−49.6•	30.7	84 49.7	−46.5•	36.4	64
65	77 29.3	−57.0	13.8	78 27.4	−56.3	14.9	79 25.2	−55.8	16.3	80 22.6	−55.3	17.9	81 19.3	−54.5	20.0	82 15.3	−53.5	22.5	83 10.1	−52.1•	25.7	84 03.2	−50.0•	29.8	65
66	76 32.6	−57.2	12.3	77 31.1	−56.8	13.3	78 29.4	−56.5	14.4	79 27.3	−56.0	15.7	80 24.8	−55.4	17.3	81 21.8	−54.7	19.3	82 18.0	−53.7	21.7	83 13.2	−52.5•	24.8	66
67	75 35.4	−57.5	11.0	76 34.3	−57.3	11.8	77 32.9	−57.0	12.8	78 31.3	−56.7	13.8	79 29.4	−56.3	15.1	80 27.1	−55.7	16.7	81 24.3	−55.0	18.6	82 20.7	−54.0	20.9	67
68	74 37.9	−57.8	9.9	75 37.0	−57.6	10.6	76 35.9	−57.5	11.4	77 34.6	−57.1	12.3	78 33.1	−56.8	13.3	79 31.4	−56.4	14.5	80 29.3	−56.0	16.0	81 26.7	−55.3	17.9	68
69	73 40.1	−58.0	8.9	74 39.4	−57.9	9.5	75 38.5	−57.7	10.1	76 37.5	−57.5	10.9	77 36.3	−57.2	11.7	78 35.0	−57.0	12.7	79 33.3	−56.6	13.9	80 31.4	−56.1	15.4	69
70	72 42.1	−58.2	8.1	73 41.5	−58.1	8.5	74 40.8	−58.0	9.1	75 40.0	−57.9	9.7	76 39.1	−57.7	10.4	77 38.0	−57.4	11.2	78 36.7	−57.1	12.2	79 35.3	−56.8	13.3	70
71	71 43.9	−58.4	7.3	72 43.4	−58.4	7.7	73 42.8	−58.2	8.1	74 42.1	−58.0	8.6	75 41.4	−57.9	9.2	76 40.6	−57.8	9.9	77 39.6	−57.5	10.7	78 38.5	−57.3	11.6	71
72	70 45.5	−58.6	6.6	71 45.0	−58.4	6.9	72 44.6	−58.4	7.3	73 44.1	−58.3	7.7	74 43.5	−58.2	8.2	75 42.8	−58.0	8.8	76 42.1	−57.9	9.4	77 41.2	−57.7	10.2	72
73	69 46.9	−58.7	5.9	70 46.6	−58.7	6.2	71 46.2	−58.6	6.5	72 45.8	−58.5	6.9	73 45.3	−58.4	7.3	74 44.8	−58.3	7.8	75 44.2	−58.1	8.3	76 43.5	−58.0	8.9	73
74	68 48.2	−58.8	5.3	69 47.9	−58.7	5.6	70 47.6	−58.7	5.9	71 47.3	−58.6	6.2	72 46.9	−58.5	6.5	73 46.5	−58.5	6.9	74 46.1	−58.4	7.3	75 45.5	−58.2	7.8	74
75	67 49.4	−58.9	4.8	68 49.2	−58.9	5.0	69 48.9	−58.8	5.2	70 48.7	−58.8	5.5	71 48.4	−58.7	5.8	72 48.0	−58.6	6.1	73 47.7	−58.6	6.5	74 47.3	−58.5	6.9	75
76	66 50.5	−59.0	4.3	67 50.3	−58.9	4.5	68 50.1	−58.9	4.7	69 49.9	−58.9	4.9	70 49.7	−58.8	5.2	71 49.4	−58.7	5.4	72 49.1	−58.7	5.7	73 48.8	−58.6	6.1	76
77	65 51.5	−59.1	3.8	66 51.4	−59.1	4.0	67 51.2	−59.0	4.2	68 51.0	−59.0	4.4	69 50.9	−58.9	4.6	70 50.7	−58.9	4.8	71 50.4	−58.8	5.0	72 50.2	−58.8	5.3	77
78	64 52.4	−59.1	3.4	65 52.3	−59.1	3.6	66 52.2	−59.1	3.7	67 52.0	−59.0	3.9	68 51.9	−59.0	4.1	69 51.8	−59.0	4.2	70 51.6	−58.9	4.4	71 51.4	−59.0	4.7	78
79	63 53.3	−59.2	3.0	64 53.2	−59.2	3.1	65 53.1	−59.1	3.3	66 53.0	−59.1	3.4	67 52.9	−59.1	3.5	68 52.8	−59.1	3.7	69 52.7	−59.1	3.9	70 52.5	−59.0	4.1	79
80	62 54.1	−59.2	2.7	63 54.0	−59.2	2.8	64 54.0	−59.2	2.9	65 53.9	−59.2	3.0	66 53.8	−59.2	3.1	67 53.7	−59.1	3.2	68 53.6	−59.1	3.4	69 53.5	−59.1	3.5	80
81	61 54.9	−59.3	2.3	62 54.8	−59.3	2.4	63 54.8	−59.3	2.5	64 54.7	−59.2	2.6	65 54.6	−59.2	2.7	66 54.6	−59.2	2.8	67 54.5	−59.2	2.9	68 54.4	−59.2	3.0	81
82	60 55.6	−59.4	2.0	61 55.5	−59.3	2.1	62 55.5	−59.3	2.1	63 55.5	−59.3	2.2	64 55.4	−59.3	2.3	65 55.4	−59.2	2.4	66 55.3	−59.3	2.5	67 55.2	−59.2	2.6	82
83	59 56.2	−59.3	1.7	60 56.2	−59.3	1.8	61 56.2	−59.4	1.8	62 56.2	−59.4	1.9	63 56.1	−59.3	1.9	64 56.1	−59.3	2.0	65 56.1	−59.4	2.1	66 56.0	−59.3	2.2	83
84	58 56.9	−59.5	1.4	59 56.9	−59.5	1.5	60 56.8	−59.4	1.5	61 56.8	−59.4	1.6	62 56.8	−59.4	1.6	63 56.8	−59.4	1.7	64 56.7	−59.4	1.7	65 56.7	−59.4	1.8	84
85	57 57.5	−59.5	1.1	58 57.5	−59.5	1.2	59 57.4	−59.4	1.2	60 57.4	−59.4	1.3	61 57.4	−59.4	1.3	62 57.4	−59.4	1.3	63 57.4	−59.4	1.4	64 57.4	−59.4	1.4	85
86	56 58.0	−59.4	0.9	57 58.0	−59.4	0.9	58 58.0	−59.5	0.9	59 58.0	−59.5	1.0	60 58.0	−59.5	1.0	61 58.0	−59.5	1.0	62 58.0	−59.5	1.1	63 58.0	−59.5	1.1	86
87	55 58.6	−59.5	0.7	56 58.6	−59.6	0.7	57 58.5	−59.5	0.7	58 58.5	−59.5	0.7	59 58.5	−59.5	0.8	60 58.5	−59.5	0.8	61 58.5	−59.6	0.8	62 58.5	−59.5	0.8	87
88	54 59.1	−59.6	0.4	55 59.1	−59.6	0.4	56 59.1	−59.6	0.4	57 59.1	−59.6	0.5	58 59.1	−59.6	0.5	59 59.1	−59.6	0.5	60 59.1	−59.6	0.5	61 59.0	−59.6	0.5	88
89	53 59.5	−59.5	0.2	54 59.5	−59.5	0.2	55 59.5	−59.5	0.2	56 59.5	−59.5	0.2	57 59.5	−59.5	0.2	58 59.5	−59.5	0.2	59 59.5	−59.5	0.2	60 59.5	−59.5	0.3	89
90	53 00.0	−59.6	0.0	54 00.0	−59.6	0.0	55 00.0	−59.6	0.0	56 00.0	−59.6	0.0	57 00.0	−59.6	0.0	58 00.0	−59.6	0.0	59 00.0	−59.6	0.0	60 00.0	−59.6	0.0	90

7°, 353° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 7°, 353°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 40.7	−59.7	171.3	35 41.4	−59.7	171.4	34 42.1	−59.8	171.5	33 42.7	−59.8	171.6	32 43.4	−59.8	171.7	31 44.0	−59.8	171.8	30 44.6	−59.8	171.8	29 45.2	−59.8	171.9	0
1	35 41.0	−59.8	171.4	34 41.7	−59.8	171.5	33 42.3	−59.8	171.6	32 42.9	−59.8	171.7	31 43.6	−59.8	171.8	30 44.2	−59.9	171.9	29 44.8	−59.9	171.9	28 45.4	−59.9	172.0	1
2	34 41.2	−59.7	171.5	33 41.9	−59.8	171.6	32 42.5	−59.8	171.7	31 43.1	−59.8	171.8	30 43.8	−59.9	171.9	29 44.4	−59.9	171.9	28 44.9	−59.8	172.0	27 45.5	−59.8	172.1	2
3	33 41.5	−59.8	171.6	32 42.1	−59.8	171.7	31 42.7	−59.8	171.8	30 43.3	−59.8	171.9	29 43.9	−59.8	171.9	28 44.5	−59.8	172.0	27 45.1	−59.9	172.1	26 45.7	−59.9	172.2	3
4	32 41.7	−59.7	171.7	31 42.3	−59.8	171.8	30 42.9	−59.8	171.9	29 43.5	−59.8	172.0	28 44.1	−59.8	172.0	27 44.7	−59.8	172.1	26 45.2	−59.8	172.2	25 45.8	−59.9	172.2	4
5	31 41.9	−59.7	171.8	30 42.5	−59.8	171.9	29 43.1	−59.8	172.0	28 43.7	−59.8	172.0	27 44.3	−59.8	172.1	26 44.8	−59.8	172.2	25 45.4	−59.9	172.3	24 45.9	−59.8	172.3	5
6	30 42.1	−59.7	171.9	29 42.7	−59.8	172.0	28 43.3	−59.8	172.1	27 43.9	−59.8	172.1	26 44.4	−59.8	172.2	25 45.0	−59.9	172.3	24 45.5	−59.8	172.3	23 46.1	−59.9	172.4	6
7	29 42.4	−59.8	172.0	28 42.9	−59.8	172.1	27 43.5	−59.8	172.2	26 44.1	−59.9	172.2	25 44.6	−59.8	172.3	24 45.2	−59.9	172.4	23 45.7	−59.9	172.4	22 46.2	−59.9	172.5	7
8	28 42.6	−59.8	172.1	27 43.1	−59.8	172.2	26 43.7	−59.8	172.2	25 44.2	−59.8	172.3	24 44.8	−59.9	172.4	23 45.3	−59.8	172.4	22 45.8	−59.8	172.5	21 46.3	−59.8	172.5	8
9	27 42.8	−59.8	172.2	26 43.3	−59.8	172.3	25 43.9	−59.8	172.3	24 44.4	−59.8	172.4	23 44.9	−59.8	172.4	22 45.4	−59.9	172.5	21 46.0	−59.9	172.6	20 46.5	−59.9	172.6	9
10	26 43.0	−59.8	172.3	25 43.5	−59.8	172.3	24 44.0	−59.8	172.4	23 44.6	−59.9	172.5	22 45.1	−59.9	172.5	21 45.6	−59.8	172.6	20 46.1	−59.9	172.6	19 46.6	−59.9	172.7	10
11	25 43.2	−59.8	172.4	24 43.7	−59.8	172.4	23 44.2	−59.8	172.5	22 44.7	−59.9	172.5	21 45.2	−59.8	172.6	20 45.7	−59.9	172.6	19 46.2	−59.8	172.7	18 46.7	−59.9	172.7	11
12	24 43.4	−59.8	172.5	23 43.9	−59.8	172.5	22 44.4	−59.8	172.6	21 44.9	−59.9	172.6	20 45.4	−59.9	172.7	19 45.9	−59.9	172.7	18 46.4	−59.8	172.8	17 46.8	−59.8	172.8	12
13	23 43.6	−59.8	172.5	22 44.1	−59.8	172.6	21 44.6	−59.8	172.7	20 45.1	−59.9	172.7	19 45.5	−59.8	172.8	18 46.0	−59.8	172.8	17 46.5	−59.9	172.8	16 47.0	−59.9	172.9	13
14	22 43.8	−59.8	172.6	21 44.3	−59.8	172.7	20 44.7	−59.8	172.7	19 45.2	−59.8	172.8	18 45.7	−59.9	172.8	17 46.2	−59.9	172.9	16 46.6	−59.8	172.9	15 47.1	−59.9	172.9	14
15	21 43.9	−59.8	172.7	20 44.4	−59.8	172.8	19 44.9	−59.8	172.8	18 45.4	−59.9	172.9	17 45.8	−59.8	172.9	16 46.3	−59.9	172.9	15 46.7	−59.8	173.0	14 47.2	−59.9	173.0	15
16	20 44.1	−59.8	172.8	19 44.6	−59.8	172.9	18 45.1	−59.9	172.9	17 45.5	−59.8	173.0	16 46.0	−59.9	173.0	15 46.4	−59.8	173.0	14 46.9	−59.9	173.0	13 47.3	−59.8	173.1	16
17	19 44.3	−59.8	172.9	18 44.8	−59.8	172.9	17 45.2	−59.8	173.0	16 45.7	−59.9	173.0	15 46.1	−59.8	173.0	14 46.6	−59.9	173.1	13 47.0	−59.9	173.1	12 47.4	−59.9	173.1	17
18	18 44.5	−59.8	173.0	17 44.9	−59.8	173.0	16 45.4	−59.8	173.0	15 45.8	−59.8	173.1	14 46.3	−59.9	173.1	13 46.7	−59.9	173.1	12 47.1	−59.8	173.2	11 47.5	−59.8	173.2	18
19	17 44.7	−59.8	173.1	16 45.1	−59.8	173.1	15 45.6	−59.9	173.1	14 46.0	−59.8	173.2	13 46.4	−59.8	173.2	12 46.8	−59.8	173.2	11 47.2	−59.8	173.2	10 47.7	−59.9	173.2	19
20	16 44.9	−59.9	173.1	15 45.3	−59.8	173.2	14 45.7	−59.8	173.2	13 46.1	−59.8	173.2	12 46.5	−59.8	173.3	11 47.0	−59.9	173.3	10 47.4	−59.9	173.3	9 47.8	−59.9	173.3	20
21	15 45.0	−59.8	173.2	14 45.5	−59.9	173.2	13 45.9	−59.8	173.3	12 46.3	−59.8	173.3	11 46.7	−59.8	173.3	10 47.1	−59.8	173.3	9 47.5	−59.9	173.4	8 47.9	−59.9	173.4	21
22	14 45.2	−59.8	173.3	13 45.6	−59.8	173.3	12 46.0	−59.8	173.3	11 46.4	−59.8	173.4	10 46.8	−59.9	173.4	9 47.2	−59.9	173.4	8 47.6	−59.9	173.4	7 48.0	−59.9	173.5	22
23	13 45.4	−59.8	173.4	12 45.8	−59.8	173.4	11 46.2	−59.8	173.4	10 46.6	−59.9	173.4	9 47.0	−59.9	173.5	8 47.3	−59.8	173.5	7 47.7	−59.9	173.5	6 48.1	−59.9	173.5	23
24	12 45.5	−59.8	173.4	11 45.9	−59.8	173.5	10 46.3	−59.8	173.5	9 46.7	−59.8	173.5	8 47.1	−59.9	173.5	7 47.5	−59.9	173.5	6 47.9	−59.9	173.6	5 48.2	−59.9	173.6	24
25	11 45.7	−59.8	173.5	10 46.1	−59.8	173.5	9 46.5	−59.9	173.5	8 46.9	−59.9	173.6	7 47.2	−59.8	173.6	6 47.6	−59.9	173.6	5 48.0	−59.9	173.6	4 48.3	−59.8	173.6	25
26	10 45.9	−59.8	173.6	9 46.3	−59.8	173.6	8 46.6	−59.8	173.6	7 47.0	−59.9	173.7	6 47.4	−59.9	173.7	5 47.7	−59.8	173.7	4 48.1	−59.9	173.7	3 48.5	−59.9	173.7	26
27	9 46.1	−59.8	173.7	8 46.4	−59.8	173.7	7 46.8	−59.9	173.7	6 47.1	−59.8	173.7	5 47.5	−59.9	173.7	4 47.9	−59.9	173.7	3 48.2	−59.9	173.8	2 48.6	−59.9	173.8	27
28	8 46.2	−59.8	173.7	7 46.6	−59.8	173.8	6 46.9	−59.8	173.8	5 47.3	−59.9	173.8	4 47.7	−59.9	173.8	3 48.0	−59.8	173.8	2 48.3	−59.8	173.8	1 48.7	−59.9	173.8	28
29	7 46.4	−59.8	173.8	6 46.7	−59.8	173.8	5 47.1	−59.9	173.8	4 47.4	−59.8	173.9	3 47.8	−59.9	173.9	2 48.1	−59.9	173.9	1 48.5	−59.9	173.9	0 48.8	−59.9	173.9	29
30	6 46.5	−59.8	173.9	5 46.9	−59.8	173.9	4 47.2	−59.8	173.9	3 47.6	−59.9	173.9	2 47.9	−59.9	173.9	1 48.2	−59.8	173.9	0 48.6	−59.9	173.9	0 11.1	+59.9	6.1	30
31	5 46.7	−59.8	174.0	4 47.0	−59.8	174.0	3 47.4	−59.9	174.0	2 47.7	−59.8	174.0	1 48.0	−59.8	174.0	0 48.4	−59.9	174.0	0 11.3	+59.9	6.0	1 11.0	+59.9	6.0	31
32	4 46.9	−59.8	174.0	3 47.2	−59.8	174.1	2 47.5	−59.9	174.1	1 47.8	−59.8	174.1	0 48.2	−59.9	174.1	0 11.5	+59.9	5.9	1 11.2	+59.9	5.9	2 10.9	+59.9	5.9	32
33	3 47.0	−59.8	174.1	2 47.4	−59.9	174.1	1 47.7	−59.9	174.1	0 48.0	−59.9	174.1	0 11.7	+59.7	5.9	1 11.4	+59.9	5.9	2 11.1	+59.9	5.9	3 10.8	+59.8	5.9	33
34	2 47.2	−59.8	174.2	1 47.5	−59.8	174.2	0 47.8	−59.8	174.2	0 11.9	+59.8	5.8	1 11.7	+59.8	5.8	2 11.3	+59.8	5.8	3 11.0	+59.8	5.8	4 10.6	+59.8	5.8	34
35	1 47.4	−59.9	174.3	0 47.7	−59.9	174.3	0 12.0	+59.9	5.7	1 11.7	+59.9	5.7	2 11.4	+59.9	5.7	3 11.1	+59.9	5.7	4 10.8	+59.9	5.7	5 10.5	+59.9	5.8	35
36	0 47.5	−59.8	174.3	0 12.2	+59.8	5.7	1 11.9	+59.8	5.7	2 11.6	+59.9	5.6	3 11.3	+59.9	5.7	4 11.0	+59.9	5.7	5 10.7	+59.9	5.7	6 10.4	+59.9	5.7	36
37	0 12.3	+59.7	5.6	1 12.0	+59.9	5.6	2 11.7	+59.9	5.6	3 11.5	+59.8	5.6	4 11.2	+59.8	5.6	5 10.9	+59.9	5.6	6 10.6	+59.9	5.6	7 10.3	+59.9	5.6	37
38	1 12.2	+59.7	5.5	2 11.9	+59.8	5.5	3 11.6	+59.8	5.5	4 11.3	+59.8	5.5	5 11.0	+59.8	5.5	6 10.8	+59.8	5.5	7 10.5	+59.9	5.5	8 10.2	+59.9	5.6	38
39	2 12.0	+59.7	5.4	3 11.7	+59.9	5.4	4 11.5	+59.8	5.4	5 11.2	+59.8	5.5	6 10.9	+59.9	5.5	7 10.6	+59.9	5.5	8 10.4	+59.8	5.5	9 10.1	+59.9	5.5	39
40	3 11.8	+59.9	5.4	4 11.6	+59.8	5.4	5 11.3	+59.9	5.4	6 11.0	+59.9	5.4	7 10.8	+59.9	5.4	8 10.5	+59.9	5.4	9 10.2	+59.9	5.4	10 10.0	+59.9	5.4	40
41	4 11.7	+59.8	5.3	5 11.4	+59.9	5.3	6 11.2	+59.8	5.3	7 10.9	+59.9	5.3	8 10.6	+59.9	5.3	9 10.4	+59.8	5.3	10 10.1	+59.9	5.4	11 09.9	+59.8	5.4	41
42	5 11.5	+59.9	5.2	6 11.3	+59.8	5.2	7 11.0	+59.9	5.2	8 10.8	+59.8	5.2	9 10.5	+59.9	5.3	10 10.2	+59.9	5.3	11 10.0	+59.9	5.3	12 09.7	+59.9	5.3	42
43	6 11.3	+59.9	5.1	7 11.1	+59.8	5.2	8 10.9	+59.9	5.2	9 10.6	+59.9	5.2	10 10.4	+59.8	5.2	11 10.1	+59.9	5.2	12 09.9	+59.8	5.2	13 09.6	+59.9	5.3	43
44	7 11.2	+59.8	5.1	8 10.9	+59.9	5.1	9 10.7	+59.9	5.1	10 10.5	+59.9	5.1	11 10.2	+59.9	5.1	12 10.0	+59.9	5.1	13 09.7	+59.9	5.2	14 09.5	+59.9	5.2	44
45	8 11.0	+59.9	5.0	9 10.8	+59.9	5.0	10 10.6	+59.8	5.0	11 10.3	+59.9	5.0	12 10.1	+59.9	5.1	13 09.9	+59.8	5.1	14 09.6	+59.9	5.1	15 09.4	+59.9	5.1	45
46	9 10.8	+59.9	4.9	10 10.6	+59.9	4.9	11 10.4	+59.9	5.0	12 10.2	+59.9	5.0	13 10.0	+59.8	5.0	14 09.7	+59.9	5.0	15 09.5	+59.8	5.0	16 09.3	+59.8	5.1	46
47	10 10.7	+59.8	4.8	11 10.5	+59.9	4.9	12 10.3	+59.8	4.9	13 10.1	+59.9	4.9	14 09.8	+59.9	4.9	15 09.6	+59.9	4.9	16 09.4	+59.9	5.0	17 09.1	+59.9	5.0	47
48	11 10.5	+59.9	4.8	12 10.3	+59.8	4.8	13 10.1	+59.8	4.8	14 09.9	+59.8	4.8	15 09.7	+59.8	4.8	16 09.5	+59.8	4.9	17 09.2	+59.9	4.9	18 09.0	+59.9	4.9	48
49	12 10.3	+59.9	4.7	13 10.1	+59.9	4.7	14 09.9	+59.9	4.7	15 09.7	+59.9	4.8	16 09.5	+59.9	4.8	17 09.3	+59.9	4.8	18 09.1	+59.9	4.8	19 08.9	+59.9	4.9	49
50	13 10.2	+59.8	4.6	14 10.0	+59.9	4.6	15 09.8	+59.9	4.7	16 09.6	+59.9	4.7	17 09.4	+59.9	4.7	18 09.2	+59.8	4.7	19 09.0	+59.9	4.8	20 08.8	+59.8	4.8	50
51	14 10.0	+59.9	4.5	15 09.8	+59.9	4.6	16 09.6	+59.9	4.6	17 09.4	+59.9	4.6	18 09.2	+59.8	4.6	19 09.0	+59.9	4.7	20 08.8	+59.9	4.7	21 08.6	+59.8	4.7	51
52	15 09.8	+59.9	4.5	16 09.7	+59.8	4.5	17 09.5	+59.8	4.5	18 09.3	+59.8	4.5	19 09.1	+59.9	4.6	20 08.9	+59.9	4.6	21 08.7	+59.9	4.6	22 08.5	+59.9	4.6	52
53	16 09.7	+59.8	4.4	17 09.5	+59.9	4.4	18 09.3	+59.9	4.4	19 09.1	+59.9	4.5	20 09.0	+59.8	4.5	21 08.8	+59.8	4.5	22 08.6	+59.8	4.5	23 08.4	+59.9	4.6	53
54	17 09.5	+59.8	4.3	18 09.3	+59.8	4.3	19 09.1	+59.9	4.4	20 09.0	+59.8	4.4	21 08.8	+59.9	4.4	22 08.6	+59.9	4.4	23 08.4	+59.9	4.5	24 08.2	+59.9	4.5	54
55	18 09.3	+59.8	4.2	19 09.1	+59.9	4.2	20 09.0	+59.8	4.3	21 08.8	+59.8	4.3	22 08.6	+59.9	4.3	23 08.5	+59.8	4.4	24 08.3	+59.8	4.4	25 08.1	+59.9	4.4	55
56	19 09.1	+59.8	4.1	20 09.0	+59.8	4.2	21 08.8	+59.9	4.2	22 08.6	+59.9	4.2	23 08.5	+59.8	4.3	24 08.3	+59.9	4.3	25 08.1	+59.9	4.3	26 08.0	+59.8	4.4	56
57	20 08.9	+59.9	4.1	21 08.8	+59.8	4.1	22 08.6	+59.9	4.1	23 08.5	+59.8	4.1	24 08.3	+59.9	4.2	25 08.2	+59.8	4.2	26 08.0	+59.9	4.2	27 07.8	+59.9	4.3	57
58	21 08.8	+59.8	4.0	22 08.6	+59.8	4.0	23 08.5	+59.8	4.0	24 08.3	+59.8	4.1	25 08.2	+59.8	4.1	26 08.0	+59.8	4.1	27 07.9	+59.8	4.2	28 07.7	+59.8	4.2	58
59	22 08.6	+59.8	3.9	23 08.4	+59.9	3.9	24 08.3	+59.8	3.9	25 08.1	+59.9	4.0	26 08.0	+59.8	4.0	27 07.8	+59.9	4.0	28 07.7	+59.8	4.1	29 07.5	+59.8	4.1	59
60	23 08.4	+59.8	3.8	24 08.2	+59.9	3.8	25 08.1	+59.8	3.9	26 08.0	+59.8	3.9	27 07.8	+59.9	3.9	28 07.7	+59.8	4.0	29 07.5	+59.9	4.0	30 07.4	+59.8	4.0	60
61	24 08.2	+59.8	3.7	25 08.1	+59.8	3.7	26 07.9	+59.8	3.8	27 07.8	+59.9	3.8	28 07.7	+59.8	3.8	29 07.5	+59.9	3.9	30 07.4	+59.8	3.9	31 07.3	+59.8	4.0	61
62	25 08.0	+59.8	3.6	26 07.9	+59.8	3.7	27 07.7	+59.9	3.7	28 07.6	+59.8	3.7	29 07.5	+59.8	3.8	30 07.3	+59.9	3.8	31 07.2	+59.8	3.8	32 07.1	+59.8	3.9	62
63	26 07.8	+59.8	3.5	27 07.7	+59.8	3.6	28 07.6	+59.8	3.6	29 07.4	+59.9	3.6	30 07.3	+59.8	3.7	31 07.2	+59.8	3.7	32 07.1	+59.8	3.7	33 06.9	+59.9	3.8	63
64	27 07.6	+59.8	3.4	28 07.5	+59.8	3.5	29 07.4	+59.8	3.5	30 07.3	+59.8	3.5	31 07.1	+59.9	3.6	32 07.0	+59.8	3.6	33 06.9	+59.8	3.7	34 06.8	+59.8	3.7	64
65	28 07.4	+59.8	3.3	29 07.3	+59.8	3.4	30 07.2	+59.8	3.4	31 07.0	+59.8	3.4	32 06.9	+59.9	3.5	33 06.8	+59.8	3.5	34 06.7	+59.8	3.6	35 06.6	+59.8	3.6	65
66	29 07.2	+59.8	3.3	30 07.1	+59.8	3.3	31 07.0	+59.8	3.3	32 06.9	+59.8	3.4	33 06.8	+59.8	3.4	34 06.7	+59.8	3.4	35 06.6	+59.8	3.5	36 06.4	+59.9	3.5	66
67	30 07.0	+59.7	3.2	31 06.9	+59.8	3.2	32 06.8	+59.8	3.2	33 06.7	+59.8	3.3	34 06.6	+59.8	3.3	35 06.5	+59.8	3.3	36 06.4	+59.8	3.4	37 06.3	+59.8	3.4	67
68	31 06.7	+59.8	3.1	32 06.7	+59.7	3.1	33 06.6	+59.8	3.1	34 06.5	+59.8	3.2	35 06.4	+59.8	3.2	36 06.3	+59.8	3.2	37 06.2	+59.8	3.3	38 06.1	+59.8	3.3	68
69	32 06.5	+59.8	3.0	33 06.4	+59.8	3.0	34 06.4	+59.7	3.0	35 06.3	+59.8	3.1	36 06.2	+59.8	3.1	37 06.1	+59.8	3.1	38 06.0	+59.8	3.2	39 05.9	+59.8	3.2	69
70	33 06.3	+59.8	2.9	34 06.2	+59.8	2.9	35 06.1	+59.8	2.9	36 06.1	+59.7	3.0	37 06.0	+59.8	3.0	38 05.9	+59.8	3.0	39 05.8	+59.8	3.1	40 05.7	+59.8	3.1	70
71	34 06.1	+59.7	2.7	35 06.0	+59.8	2.8	36 05.9	+59.8	2.8	37 05.8	+59.8	2.9	38 05.8	+59.7	2.9	39 05.7	+59.8	2.9	40 05.6	+59.8	3.0	41 05.5	+59.8	3.0	71
72	35 05.8	+59.8	2.6	36 05.8	+59.7	2.7	37 05.7	+59.8	2.7	38 05.6	+59.8	2.7	39 05.6	+59.7	2.8	40 05.5	+59.8	2.8	41 05.4	+59.8	2.9	42 05.3	+59.8	2.9	72
73	36 05.6	+59.7	2.5	37 05.5	+59.8	2.6	38 05.5	+59.7	2.6	39 05.4	+59.8	2.6	40 05.3	+59.8	2.7	41 05.3	+59.7	2.7	42 05.2	+59.8	2.8	43 05.1	+59.8	2.8	73
74	37 05.3	+59.8	2.4	38 05.3	+59.7	2.4	39 05.2	+59.8	2.5	40 05.2	+59.7	2.5	41 05.1	+59.8	2.6	42 05.0	+59.8	2.6	43 05.0	+59.7	2.6	44 04.9	+59.8	2.7	74
75	38 05.1	+59.7	2.3	39 05.0	+59.8	2.3	40 05.0	+59.7	2.4	41 04.9	+59.8	2.4	42 04.9	+59.7	2.4	43 04.8	+59.8	2.5	44 04.8	+59.7	2.5	45 04.7	+59.8	2.6	75
76	39 04.8	+59.7	2.2	40 04.8	+59.7	2.2	41 04.7	+59.7	2.2	42 04.7	+59.7	2.3	43 04.6	+59.8	2.3	44 04.6	+59.7	2.4	45 04.5	+59.8	2.4	46 04.5	+59.7	2.4	76
77	40 04.5	+59.8	2.1	41 04.5	+59.7	2.1	42 04.5	+59.7	2.1	43 04.4	+59.7	2.2	44 04.4	+59.7	2.2	45 04.3	+59.8	2.2	46 04.3	+59.7	2.3	47 04.2	+59.8	2.3	77
78	41 04.3	+59.7	1.9	42 04.2	+59.7	2.0	43 04.2	+59.7	2.0	44 04.1	+59.8	2.0	45 04.1	+59.7	2.1	46 04.1	+59.7	2.1	47 04.0	+59.8	2.2	48 04.0	+59.7	2.2	78
79	42 04.0	+59.7	1.8	43 03.9	+59.7	1.8	44 03.9	+59.7	1.9	45 03.9	+59.7	1.9	46 03.8	+59.8	1.9	47 03.8	+59.7	2.0	48 03.8	+59.7	2.0	49 03.7	+59.8	2.0	79
80	43 03.7	+59.7	1.7	44 03.6	+59.7	1.7	45 03.6	+59.7	1.7	46 03.6	+59.7	1.7	47 03.6	+59.7	1.8	48 03.5	+59.7	1.8	49 03.5	+59.7	1.9	50 03.5	+59.7	1.9	80
81	44 03.4	+59.6	1.5	45 03.3	+59.7	1.5	46 03.3	+59.7	1.6	47 03.3	+59.7	1.6	48 03.3	+59.6	1.6	49 03.2	+59.7	1.7	50 03.2	+59.7	1.7	51 03.2	+59.7	1.7	81
82	45 03.0	+59.7	1.4	46 03.0	+59.7	1.4	47 03.0	+59.7	1.4	48 03.0	+59.7	1.5	49 03.0	+59.6	1.5	50 02.9	+59.7	1.5	51 02.9	+59.7	1.5	52 02.9	+59.7	1.6	82
83	46 02.7	+59.7	1.2	47 02.7	+59.7	1.2	48 02.7	+59.6	1.3	49 02.7	+59.6	1.3	50 02.6	+59.7	1.3	51 02.6	+59.7	1.4	52 02.6	+59.7	1.4	53 02.6	+59.7	1.4	83
84	47 02.4	+59.6	1.1	48 02.4	+59.6	1.1	49 02.3	+59.7	1.1	50 02.3	+59.7	1.1	51 02.3	+59.6	1.2	52 02.3	+59.6	1.2	53 02.3	+59.7	1.2	54 02.3	+59.7	1.2	84
85	48 02.0	+59.7	0.9	49 02.0	+59.6	0.9	50 02.0	+59.6	0.9	51 02.0	+59.6	1.0	52 02.0	+59.6	1.0	53 02.0	+59.6	1.0	54 02.0	+59.6	1.0	55 01.9	+59.7	1.1	85
86	49 01.6	+59.7	0.7	50 01.6	+59.7	0.8	51 01.6	+59.6	0.8	52 01.6	+59.6	0.8	53 01.6	+59.6	0.8	54 01.6	+59.6	0.8	55 01.6	+59.6	0.8	56 01.6	+59.6	0.9	86
87	50 01.3	+59.6	0.6	51 01.3	+59.6	0.6	52 01.2	+59.7	0.6	53 01.2	+59.6	0.6	54 01.2	+59.6	0.6	55 01.2	+59.6	0.6	56 01.2	+59.6	0.7	57 01.2	+59.7	0.7	87
88	51 00.9	+59.5	0.4	52 00.9	+59.5	0.4	53 00.9	+59.5	0.4	54 00.9	+59.5	0.4	55 00.8	+59.6	0.4	56 00.8	+59.6	0.4	57 00.8	+59.6	0.4	58 00.8	+59.6	0.5	88
89	52 00.4	+59.6	0.2	53 00.4	+59.6	0.2	54 00.4	+59.6	0.2	55 00.4	+59.6	0.2	56 00.4	+59.6	0.2	57 00.4	+59.6	0.2	58 00.4	+59.6	0.2	59 00.4	+59.6	0.2	89
90	53 00.0	+59.5	0.0	54 00.0	+59.5	0.0	55 00.0	+59.5	0.0	56 00.0	+59.5	0.0	57 00.0	+59.5	0.0	58 00.0	+59.5	0.0	59 00.0	+59.5	0.0	60 00.0	+59.5	0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 173°, 187°

Dec.	53° (Hc / d / Z)	54° (Hc / d / Z)	55° (Hc / d / Z)	56° (Hc / d / Z)	57° (Hc / d / Z)	58° (Hc / d / Z)	59° (Hc / d / Z)	60° (Hc / d / Z)	Dec.
0	36 34.9 +59.6 170.0	35 35.8 +59.6 170.1	34 36.6 +59.7 170.3	33 37.5 +59.7 170.4	32 38.3 +59.8 170.5	31 39.1 +59.8 170.6	30 39.9 +59.8 170.7	29 40.7 +59.8 170.8	0
1	37 34.5 +59.7 169.9	36 35.4 +59.7 170.0	35 36.3 +59.7 170.1	34 37.2 +59.7 170.3	33 38.1 +59.7 170.4	32 38.9 +59.8 170.5	31 39.7 +59.8 170.6	30 40.5 +59.8 170.7	1
2	38 34.2 +59.6 169.8	37 35.1 +59.7 169.9	36 36.0 +59.7 170.0	35 36.9 +59.8 170.1	34 37.8 +59.7 170.3	33 38.7 +59.7 170.4	32 39.5 +59.8 170.5	31 40.3 +59.8 170.6	2
3	39 33.8 +59.7 169.6	38 34.8 +59.7 169.8	37 35.7 +59.7 169.9	36 36.7 +59.7 170.0	35 37.6 +59.7 170.2	34 38.4 +59.8 170.3	33 39.3 +59.8 170.4	32 40.1 +59.8 170.5	3
4	40 33.5 +59.6 169.5	39 34.5 +59.6 169.6	38 35.4 +59.8 169.8	37 36.4 +59.7 169.9	36 37.3 +59.7 170.0	35 38.2 +59.7 170.2	34 39.1 +59.7 170.3	33 39.9 +59.8 170.4	4
5	41 33.1 +59.6 169.3	40 34.1 +59.7 169.5	39 35.1 +59.7 169.6	38 36.1 +59.7 169.9	37 37.0 +59.7 169.9	36 37.9 +59.7 170.1	35 38.8 +59.7 170.2	34 39.7 +59.8 170.3	5
6	42 32.7 +59.6 169.2	41 33.8 +59.6 169.3	40 34.8 +59.7 169.5	39 35.8 +59.7 169.7	38 36.7 +59.8 169.8	37 37.7 +59.7 169.9	36 38.6 +59.7 170.1	35 39.5 +59.8 170.2	6
7	43 32.3 +59.6 169.0	42 33.4 +59.6 169.1	41 34.5 +59.6 169.4	40 35.5 +59.7 169.5	39 36.5 +59.7 169.7	38 37.4 +59.7 169.8	37 38.3 +59.8 170.0	36 39.3 +59.7 170.1	7
8	44 31.9 +59.6 168.9	43 33.0 +59.6 169.0	42 34.1 +59.6 169.2	41 35.2 +59.6 169.4	40 36.2 +59.7 169.5	39 37.1 +59.7 169.7	38 38.1 +59.7 169.8	37 39.0 +59.8 170.0	8
9	45 31.5 +59.6 168.7	44 32.6 +59.6 168.9	43 33.7 +59.7 169.1	42 34.8 +59.6 169.2	41 35.9 +59.6 169.4	40 36.9 +59.7 169.6	39 37.8 +59.7 169.7	38 38.8 +59.8 169.9	9
10	46 31.1 +59.5 168.5	45 32.2 +59.6 168.7	44 33.4 +59.6 168.9	43 34.5 +59.6 169.1	42 35.5 +59.7 169.3	41 36.6 +59.7 169.4	40 37.6 +59.7 169.6	39 38.6 +59.7 169.7	10
11	47 30.6 +59.5 168.3	46 31.8 +59.6 168.5	45 33.0 +59.6 168.8	44 34.1 +59.6 168.9	43 35.2 +59.6 169.1	42 36.3 +59.6 169.3	41 37.3 +59.7 169.5	40 38.3 +59.7 169.6	11
12	48 30.1 +59.5 168.1	47 31.4 +59.5 168.4	46 32.6 +59.6 168.6	45 33.8 +59.6 168.8	44 34.9 +59.6 169.0	43 36.0 +59.7 169.2	42 37.0 +59.7 169.3	41 38.0 +59.8 169.5	12
13	49 29.6 +59.5 167.9	48 30.9 +59.6 168.2	47 32.2 +59.6 168.4	46 33.4 +59.6 168.6	45 34.5 +59.7 168.8	44 35.7 +59.6 169.0	43 36.7 +59.7 169.2	42 37.8 +59.7 169.4	13
14	50 29.1 +59.5 167.7	49 30.5 +59.5 168.0	48 31.8 +59.5 168.2	47 33.0 +59.6 168.5	46 34.2 +59.6 168.7	45 35.3 +59.7 168.9	44 36.4 +59.7 169.1	43 37.5 +59.7 169.2	14
15	51 28.6 +59.4 167.5	50 30.0 +59.5 167.8	49 31.3 +59.5 168.0	48 32.6 +59.6 168.3	47 33.8 +59.6 168.5	46 35.0 +59.6 168.7	45 36.1 +59.7 168.9	44 37.2 +59.7 169.1	15
16	52 28.0 +59.3 167.3	51 29.5 +59.4 167.6	50 30.8 +59.6 167.9	49 32.2 +59.5 168.1	48 33.4 +59.6 168.3	47 34.6 +59.6 168.6	46 35.8 +59.7 168.6	45 36.9 +59.7 169.0	16
17	53 27.5 +59.3 167.1	52 28.9 +59.5 167.4	51 30.4 +59.4 167.7	50 31.7 +59.5 167.9	49 33.0 +59.6 168.2	48 34.3 +59.6 168.4	47 35.5 +59.6 168.6	46 36.6 +59.7 168.8	17
18	54 26.8 +59.4 166.8	53 28.4 +59.4 167.2	52 29.8 +59.5 167.4	51 31.3 +59.5 167.7	50 32.6 +59.5 168.0	49 33.9 +59.6 168.2	48 35.1 +59.6 168.5	47 36.3 +59.7 168.7	18
19	55 26.2 +59.3 166.6	54 27.8 +59.4 166.9	53 29.3 +59.5 167.2	52 30.8 +59.5 167.5	51 32.2 +59.5 167.8	50 33.5 +59.6 168.0	49 34.8 +59.6 168.3	48 36.0 +59.6 168.5	19
20	56 25.5 +59.3 166.3	55 27.2 +59.3 166.7	54 28.8 +59.4 167.0	53 30.3 +59.4 167.3	52 31.7 +59.5 167.6	51 33.1 +59.5 167.9	50 34.4 +59.6 168.1	49 35.6 +59.5 168.4	20
21	57 24.8 +59.3 166.0	56 26.5 +59.4 166.4	55 28.2 +59.4 166.7	54 29.7 +59.5 167.1	53 31.2 +59.5 167.4	52 32.6 +59.6 167.7	51 34.0 +59.6 167.9	50 35.3 +59.6 168.2	21
22	58 24.1 +59.2 165.7	57 25.9 +59.2 166.1	56 27.6 +59.3 166.5	55 29.2 +59.4 166.8	54 30.7 +59.5 167.2	53 32.2 +59.5 167.5	52 33.6 +59.6 167.5	51 34.9 +59.6 168.0	22
23	59 23.3 +59.1 165.4	58 25.1 +59.3 165.8	57 26.9 +59.3 166.2	56 28.6 +59.4 166.6	55 30.2 +59.4 166.9	54 31.7 +59.5 167.2	53 33.2 +59.5 167.5	52 34.5 +59.6 167.8	23
24	60 22.4 +59.1 165.1	59 24.4 +59.2 165.5	58 26.2 +59.3 165.9	57 28.0 +59.3 166.3	56 29.6 +59.5 166.7	55 31.2 +59.5 167.0	54 32.7 +59.5 167.3	53 34.1 +59.6 167.6	24
25	61 21.5 +59.1 164.7	60 23.6 +59.1 165.2	59 25.5 +59.2 165.6	58 27.3 +59.3 166.0	57 29.1 +59.3 166.4	56 30.7 +59.4 166.8	55 32.2 +59.5 167.1	54 33.7 +59.6 167.4	25
26	62 20.6 +59.0 164.4	61 22.7 +59.1 164.9	60 24.7 +59.2 165.3	59 26.6 +59.3 165.8	58 28.4 +59.4 166.2	57 30.1 +59.5 166.5	56 31.7 +59.5 166.9	55 33.3 +59.5 167.2	26
27	63 19.6 +58.9 164.0	62 21.8 +59.0 164.5	61 23.9 +59.2 165.0	60 25.9 +59.2 165.4	59 27.8 +59.3 165.9	58 29.6 +59.3 166.3	57 31.2 +59.4 166.6	56 32.8 +59.5 167.0	27
28	64 18.5 +58.9 163.6	63 20.8 +59.0 164.1	62 23.1 +59.0 164.6	61 25.1 +59.2 165.1	60 27.1 +59.3 165.6	59 28.9 +59.4 166.0	58 30.7 +59.4 166.4	57 32.3 +59.5 166.8	28
29	65 17.3 +58.7 163.1	64 19.8 +58.9 163.7	63 22.1 +59.0 164.2	62 24.3 +59.1 164.8	61 26.4 +59.1 165.2	60 28.3 +59.3 165.7	59 30.1 +59.4 166.1	58 31.8 +59.4 166.5	29
30	66 16.0 +58.7 162.6	65 18.7 +58.8 163.2	64 21.1 +59.0 163.8	63 23.4 +59.1 164.4	62 25.6 +59.1 164.9	61 27.6 +59.2 165.4	60 29.5 +59.3 165.8	59 31.2 +59.4 166.3	30
31	67 14.7 +58.5 162.0	66 17.5 +58.7 162.7	65 20.1 +58.8 163.4	64 22.5 +59.0 164.0	63 24.7 +59.1 164.5	62 26.8 +59.2 165.0	61 28.8 +59.3 165.5	60 30.6 +59.4 166.0	31
32	68 13.2 +58.4 161.5	67 16.2 +58.6 162.2	66 18.9 +58.8 162.9	65 21.5 +58.9 163.6	64 23.8 +59.1 164.1	63 26.0 +59.1 164.7	62 28.1 +59.3 165.2	61 30.0 +59.4 165.7	32
33	69 11.6 +58.2 160.8	68 14.8 +58.4 161.6	67 17.7 +58.6 162.4	66 20.4 +58.8 163.1	65 22.9 +58.9 163.7	64 25.2 +59.1 164.3	63 27.4 +59.1 164.9	62 29.4 +59.3 165.4	33
34	70 09.8 +58.0 160.1	69 13.2 +58.3 161.0	68 16.3 +58.6 161.8	67 19.2 +58.7 162.6	66 21.8 +58.9 163.3	65 24.3 +59.0 163.9	64 26.5 +59.2 164.5	63 28.7 +59.2 165.0	34
35	71 07.8 +57.9 159.4	70 11.5 +58.1 160.3	69 14.9 +58.3 161.2	68 17.9 +58.6 162.0	67 20.7 +58.8 162.8	66 23.3 +58.9 163.5	65 25.7 +59.0 164.1	64 27.9 +59.2 164.7	35
36	72 05.7 +57.6 158.5	71 09.6 +58.0 159.6	70 13.2 +58.3 160.6	69 16.5 +58.5 161.4	68 19.5 +58.7 162.3	67 22.2 +58.9 163.0	66 24.7 +59.0 163.7	65 27.1 +59.1 164.3	36
37	73 03.3 +57.3 157.6	72 07.6 +57.7 158.8	71 11.5 +58.0 159.8	70 15.0 +58.3 160.8	69 18.2 +58.5 161.7	68 21.1 +58.7 162.5	67 23.7 +58.9 163.2	66 26.2 +59.0 163.9	37
38	74 00.6 +57.0 156.5	73 05.3 +57.4 157.9	72 09.5 +57.8 159.0	71 13.3 +58.1 160.1	70 16.7 +58.4 161.0	69 19.8 +58.6 161.9	68 22.6 +58.8 162.7	67 25.2 +59.0 163.4	38
39	74 57.6 +56.6 155.4	74 02.7 +57.1 156.8	73 07.3 +57.6 158.1	72 11.4 +57.9 159.3	71 15.1 +58.2 160.3	70 18.4 +58.5 161.3	69 21.4 +58.7 162.1	68 24.2 +58.9 162.9	39
40	75 54.2 +56.0 154.0	74 59.8 +56.8 155.7	74 04.9 +57.2 157.1	73 09.3 +57.7 158.4	72 13.3 +58.0 159.6	71 16.9 +58.3 160.6	70 20.1 +58.6 161.5	69 23.1 +58.7 162.4	40
41	76 50.2 +55.5 152.5	75 56.6 +56.2 154.4	75 02.1 +56.9 156.0	74 07.0 +57.3 157.4	73 11.3 +57.8 158.7	72 15.2 +58.1 159.8	71 18.7 +58.4 160.8	70 21.8 +58.7 161.6	41
42	77 45.7 +54.7 150.8	76 52.8 +55.7 152.9	75 59.0 +56.4 154.7	75 04.3 +57.0 156.3	74 09.1 +57.5 157.7	73 13.3 +57.9 159.0	72 17.1 +58.2 160.1	71 20.5 +58.5 161.1	42
43	78 40.4 +53.8 148.8	77 48.5 +54.9 151.2	76 55.4 +55.8 153.3	76 01.3 +56.6 155.1	75 06.6 +57.1 156.7	74 11.2 +57.6 158.1	73 15.3 +58.0 159.3	72 19.0 +58.3 160.4	43
44	79 34.2 +52.5 146.4	78 43.4 +54.0 149.2	77 51.2 +55.1 151.6	76 57.9 +56.0 153.6	76 03.7 +56.8 155.4	75 08.8 +57.3 157.0	74 13.3 +57.7 158.3	73 17.3 +58.1 159.6	44
45	80 26.7 +50.9 143.6	79 37.4 +52.8 146.9	78 46.3 +54.3 149.6	77 53.9 +55.4 152.0	77 00.5 +56.2 154.0	76 06.1 +56.9 155.8	75 11.0 +57.5 157.4	74 15.4 +57.8 158.7	45
46	81 17.6 +48.9•140.3	80 30.2 +51.2 144.1	79 40.6 +53.1 147.4	78 49.3 +54.5 150.1	77 56.7 +55.5 152.4	77 03.0 +56.4 154.4	76 08.5 +57.0 156.2	75 13.2 +57.6 157.7	46
47	82 06.5 +45.9•136.3	81 21.4 +49.2•140.8	80 33.7 +51.6 144.6	79 43.8 +53.3 147.8	78 52.2 +54.8 150.5	77 59.4 +55.7 152.9	77 05.5 +56.6 154.5	76 10.8 +57.2 156.3	47
48	82 52.4 +42.2•131.3	82 10.6 +46.5•136.8	81 25.3 +49.5•141.4	80 37.1 +52.0 145.2	79 47.0 +53.6 148.3	78 55.1 +55.0 151.0	78 02.1 +56.0 153.3	77 08.0 +56.8 155.3	48
49	83 34.6 +36.9•125.3	82 57.1 +42.6•131.9	82 14.8 +46.9•137.4	81 29.1 +49.9•141.9	80 40.6 +52.3 145.7	79 50.1 +54.0 148.8	78 58.1 +55.2 151.5	78 04.8 +56.2 153.8	49
50	84 11.5 +29.8•117.9	83 39.7 +37.4•125.5	83 01.7 +43.1•132.5	82 19.0 +47.4•138.0	81 32.9 +50.3•142.5	80 44.1 +52.6 146.2	79 53.3 +54.2 149.4	79 01.0 +55.4 152.0	50
51	84 41.3 +20.6•108.9	84 17.1 +30.3•118.4	83 44.8 +38.0•126.5	83 06.4 +43.6•133.1	82 23.2 +47.8•138.6	81 36.7 +50.7•143.1	80 47.5 +52.9 146.8	79 56.4 +54.5 149.9	51
52	85 01.9 +9.4 98.4	84 47.4 +21.0•109.3	84 22.8 +30.8•119.0	83 50.0 +38.5•127.1	83 11.0 +44.2•133.8	82 27.4 +48.3•139.3	81 40.4 +51.2•143.7	80 50.9 +53.3 147.4	52
53	85 11.3 −2.9 86.8	85 08.4 +9.6 98.6	84 53.6 +21.6 109.8	84 28.5 +31.4•119.5	83 55.2 +39.1•127.7	83 15.7 +44.7•134.5	82 31.6 +48.7•139.9	81 44.2 +51.5•144.4	53
54	85 08.4 −14.8 74.9	85 18.0 −3.0 86.8	85 15.0 +9.8 98.9	84 59.9 +21.9 110.2	84 34.3 +31.9•120.2	84 00.4 +39.6•128.4	83 20.3 +45.2•135.2	82 35.7 +49.2•140.6	54
55	84 53.6 −25.1 63.8	85 15.0 −15.1 74.6	85 24.8 −3.0 86.7	85 21.8 +9.9 99.1	85 06.2 +22.3•110.7	84 40.0 +32.6•120.8	84 05.5 +40.3•129.1	83 24.9 +45.8•135.9	55
56	84 28.5 −33.5 53.2	84 59.9 −25.6 63.2	85 21.8 −15.6 74.3	85 31.7 −3.2 86.7	85 28.5 +10.2•99.4	85 12.6 +22.8•111.3	84 45.8 +33.2•121.5	84 10.7 +40.9•129.9	56
57	83 55.2 −39.5 45.7	84 34.3 −33.9 53.2	85 06.2 −26.2 62.6	85 28.5 −15.9 73.9	85 38.7 −3.3 86.6	85 35.4 +10.4 99.7	85 19.0 +23.3•111.8	84 51.6 +33.8•122.2	57
58	83 15.7 −44.1 38.9	84 00.4 −40.1 44.9	84 40.0 −34.5 52.5	85 12.6 −26.8 62.0	85 35.4 −16.4 73.5	85 45.8 −3.5 86.6	85 42.3 +10.6•100.0	85 25.4 +23.9•112.4	58
59	82 31.6 −47.4 33.4	83 20.3 −44.6 38.2	84 05.5 −40.6 44.1	84 45.8 −35.1 51.8	85 19.0 −27.4 61.4	85 42.3 −16.9 73.2	85 52.9 −3.6 86.6	85 49.3 +10.8•100.4	59
60	81 44.2 −49.9 29.0	82 35.7 −47.8 32.7	83 24.9 −45.0 37.4	84 10.7 −41.2 43.3	84 51.6 −35.7 51.0	85 25.4 −28.0 60.7	85 49.3 −17.4 72.7	86 00.1 −3.8 86.5	60
61	80 54.3 −51.7 25.3	81 47.9 −50.2•28.2	82 39.9 −48.3•31.9	83 29.5 −45.5•36.5	84 15.9 −41.8 42.5	84 57.4 −36.4 50.1	85 31.9 −28.7 60.0	85 56.3 −17.9 72.3	61
62	80 02.6 −53.1 22.2	80 57.7 −52.1 24.6	81 51.6 −50.6 27.5	82 44.0 −48.7•31.1	83 34.1 −46.1•35.7	84 21.0 −42.4•41.6	85 03.2 −37.0•49.3	85 38.4 −29.4 59.3	62
63	79 09.5 −54.3 19.6	80 05.6 −53.4 21.5	81 01.0 −52.4 23.9	81 55.3 −51.0•26.7	82 48.0 −49.1•30.3	83 38.6 −46.6•34.8	84 26.2 −43.1•40.7	85 09.0 −37.8•48.4	63
64	78 15.2 −55.0 17.4	79 12.2 −54.4 19.0	80 08.6 −53.6 20.9	81 04.3 −52.7 23.1	81 58.9 −51.4 25.9	82 52.0 −49.6•29.4	83 43.1 −47.1•33.9	84 31.2 −43.6•39.7	64
65	77 20.2 −55.8 15.6	78 17.8 −55.3 16.9	79 15.0 −54.7 18.4	80 11.6 −53.9 20.2	81 07.5 −53.0 22.4	82 02.4 −51.7 25.1	82 56.0 −50.0•28.6	83 47.6 −47.7•33.0	65
66	76 24.4 −56.3 13.9	77 22.5 −56.0 15.0	78 20.3 −55.5 16.3	79 17.7 −55.0 17.7	80 14.5 −54.2 19.5	81 10.7 −53.3 21.7	82 06.0 −52.2 24.3	82 59.9 −50.5•27.7	66
67	75 28.1 −56.8 12.5	76 26.5 −56.4 13.4	77 24.8 −56.1 14.5	78 22.7 −55.7 15.7	79 20.3 −55.2 17.1	80 17.4 −54.5 18.8	81 13.8 −53.6 20.9	82 09.4 −52.5 23.5	67
68	74 31.3 −57.1 11.3	75 30.1 −56.9 12.0	76 28.7 −56.7 12.9	77 27.0 −56.3 13.9	78 25.1 −55.9 15.1	79 22.9 −55.4 16.4	80 20.2 −54.8 18.1	81 16.9 −54.0 20.1	68
69	73 34.2 −57.5 10.2	74 33.2 −57.3 10.8	75 32.0 −57.0 11.5	76 30.7 −56.8 12.3	77 29.2 −56.4 13.3	78 27.5 −56.1 14.4	79 25.4 −55.6 15.8	80 22.9 −55.0 17.4	69
70	72 36.7 −57.7 9.2	73 35.9 −57.6 9.7	74 35.0 −57.4 10.3	75 33.9 −57.1 11.0	76 32.8 −57.0 11.8	77 31.4 −56.7 12.7	78 29.8 −56.3 13.8	79 27.9 −55.9 15.1	70
71	71 39.0 −58.0 8.3	72 38.3 −57.8 8.7	73 37.6 −57.7 9.2	74 36.8 −57.6 9.8	75 35.8 −57.3 10.5	76 34.7 −57.1 11.3	77 33.5 −56.8 12.1	78 32.0 −56.5 13.2	71
72	70 41.0 −58.1 7.5	71 40.5 −58.2 7.9	72 39.9 −57.9 8.3	73 39.2 −57.7 8.8	74 38.5 −57.6 9.3	75 37.6 −57.4 10.0	76 36.7 −57.3 10.7	77 35.5 −57.0 11.5	72
73	69 42.9 −58.3 6.7	70 42.5 −58.2 7.1	71 42.0 −58.1 7.4	72 41.5 −58.1 7.9	73 40.9 −57.9 8.3	74 40.2 −57.8 8.9	75 39.4 −57.6 9.5	76 38.5 −57.4 10.1	73
74	68 44.6 −58.4 6.1	69 44.3 −58.4 6.4	70 43.9 −58.3 6.7	71 43.4 −58.2 7.0	72 43.0 −58.2 7.4	73 42.4 −58.0 7.9	74 41.8 −57.8 8.4	75 41.1 −57.7 8.9	74
75	67 46.2 −58.6 5.5	68 45.9 −58.5 5.7	69 45.6 −58.5 6.0	70 45.2 −58.4 6.3	71 44.8 −58.3 6.6	72 44.4 −58.2 7.0	73 44.0 −58.2 7.4	74 43.4 −58.0 7.9	75
76	66 47.6 −58.7 4.9	67 47.4 −58.7 5.1	68 47.1 −58.6 5.3	69 46.8 −58.5 5.6	70 46.5 −58.4 5.9	71 46.2 −58.4 6.2	72 45.8 −58.3 6.5	73 45.4 −58.2 6.9	76
77	65 48.9 −58.8 4.4	66 48.7 −58.7 4.6	67 48.5 −58.7 4.8	68 48.3 −58.6 5.0	69 48.1 −58.6 5.2	70 47.8 −58.5 5.5	71 47.5 −58.5 5.8	72 47.2 −58.4 6.1	77
78	64 50.1 −58.8 3.9	65 50.0 −58.9 4.1	66 49.8 −58.8 4.2	67 49.7 −58.8 4.4	68 49.5 −58.8 4.6	69 49.3 −58.7 4.8	70 49.0 −58.7 5.1	71 48.8 −58.6 5.3	78
79	63 51.3 −59.0 3.5	64 51.1 −58.9 3.6	65 51.0 −58.9 3.7	66 50.9 −58.9 3.9	67 50.7 −58.8 4.0	68 50.6 −58.7 4.2	69 50.4 −58.7 4.4	70 50.2 −58.7 4.6	79
80	62 52.3 −59.0 3.0	63 52.2 −59.0 3.1	64 52.1 −58.9 3.3	65 52.0 −58.9 3.4	66 51.9 −58.9 3.5	67 51.8 −58.9 3.7	68 51.7 −58.9 3.8	69 51.5 −58.8 4.0	80
81	61 53.3 −59.1 2.6	62 53.2 −59.0 2.7	63 53.2 −59.1 2.8	64 53.1 −59.0 2.9	65 53.0 −59.0 3.1	66 53.9 −59.0 3.2	67 53.8 −59.0 3.3	68 53.7 −59.0 3.5	81
82	60 54.2 −59.1 2.3	61 54.2 −59.1 2.4	62 54.1 −59.1 2.4	63 54.1 −59.1 2.5	64 54.0 −59.1 2.6	65 53.9 −59.0 2.7	66 53.9 −59.0 2.8	67 53.8 −59.0 3.0	82
83	59 55.1 −59.2 1.9	60 55.1 −59.2 2.0	61 55.0 −59.1 2.1	62 55.0 −59.2 2.1	63 54.9 −59.1 2.2	64 54.9 −59.1 2.3	65 54.8 −59.1 2.4	66 54.8 −59.1 2.5	83
84	58 55.9 −59.3 1.6	59 55.9 −59.2 1.7	60 55.9 −59.3 1.7	61 55.8 −59.2 1.8	62 55.8 −59.2 1.8	63 55.8 −59.2 1.9	64 55.7 −59.1 2.0	65 55.7 −59.2 2.0	84
85	57 56.7 −59.3 1.3	58 56.7 −59.3 1.3	59 56.7 −59.3 1.4	60 56.6 −59.2 1.4	61 56.6 −59.2 1.5	62 56.6 −59.2 1.5	63 56.6 −59.2 1.6	64 56.6 −59.3 1.6	85
86	56 57.4 −59.3 1.0	57 57.4 −59.3 1.0	58 57.4 −59.3 1.1	59 57.4 −59.3 1.1	60 57.4 −59.3 1.1	61 57.4 −59.3 1.2	62 57.4 −59.3 1.2	63 57.3 −59.2 1.3	86
87	55 58.1 −59.3 0.7	56 58.1 −59.3 0.8	57 58.1 −59.4 0.8	58 58.1 −59.3 0.8	59 58.1 −59.3 0.8	60 58.1 −59.3 0.9	61 58.1 −59.3 0.9	62 58.1 −59.3 0.9	87
88	54 58.8 −59.4 0.5	55 58.8 −59.4 0.5	56 58.8 −59.4 0.5	57 58.8 −59.4 0.5	58 58.8 −59.4 0.5	59 58.8 −59.4 0.6	60 58.8 −59.4 0.6	61 58.8 −59.4 0.6	88
89	53 59.4 −59.4 0.2	54 59.4 −59.4 0.2	55 59.4 −59.4 0.2	56 59.4 −59.4 0.3	57 59.4 −59.4 0.3	58 59.4 −59.4 0.3	59 59.4 −59.4 0.3	60 59.4 −59.4 0.3	89
90	53 00.0 −59.4 0.0	54 00.0 −59.4 0.0	55 00.0 −59.4 0.0	56 00.0 −59.4 0.0	57 00.0 −59.4 0.0	58 00.0 −59.4 0.0	59 00.0 −59.4 0.0	60 00.0 −59.4 0.0	90
	53°	**54°**	**55°**	**56°**	**57°**	**58°**	**59°**	**60°**	

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 34.9	−59.7	170.0	35 35.8	−59.7	170.1	34 36.6	−59.7	170.3	33 37.5	−59.8	170.4	32 38.3	−59.7	170.5	31 39.1	−59.8	170.6	30 39.9	−59.8	170.7	29 40.7	−59.8	170.8	0
1	35 35.2	−59.7	170.1	34 36.1	−59.8	170.3	33 36.9	−59.7	170.4	32 37.7	−59.7	170.5	31 38.6	−59.8	170.6	30 39.4	−59.8	170.7	29 40.1	−59.8	170.8	28 40.9	−59.8	170.9	1
2	34 35.5	−59.7	170.3	33 36.3	−59.7	170.4	32 37.2	−59.8	170.5	31 38.0	−59.7	170.6	30 38.8	−59.8	170.7	29 39.6	−59.8	170.8	28 40.3	−59.8	170.9	27 41.1	−59.8	171.0	2
3	33 35.8	−59.7	170.4	32 36.6	−59.7	170.5	31 37.4	−59.7	170.7	30 38.2	−59.7	170.7	29 39.0	−59.7	170.8	28 39.8	−59.8	170.9	27 40.5	−59.8	171.0	26 41.3	−59.8	171.1	3
4	32 36.1	−59.7	170.5	31 36.9	−59.7	170.6	30 37.7	−59.7	170.7	29 38.5	−59.8	170.7	28 39.3	−59.8	170.9	27 40.0	−59.7	171.0	26 40.7	−59.7	171.1	25 41.5	−59.9	171.1	4
5	31 36.4	−59.7	170.6	30 37.2	−59.7	170.7	29 38.0	−59.8	170.8	28 38.7	−59.7	170.9	27 39.5	−59.8	171.0	26 40.2	−59.8	171.1	25 40.9	−59.8	171.2	24 41.6	−59.8	171.2	5
6	30 36.7	−59.7	170.7	29 37.5	−59.8	170.8	28 38.2	−59.7	170.9	27 39.0	−59.8	171.0	26 39.7	−59.8	171.1	25 40.4	−59.8	171.2	24 41.1	−59.8	171.2	23 41.8	−59.8	171.3	6
7	29 37.0	−59.8	170.9	28 37.7	−59.7	170.9	27 38.5	−59.8	171.1	26 39.2	−59.8	171.1	25 39.9	−59.8	171.2	24 40.6	−59.8	171.3	23 41.3	−59.8	171.3	22 42.0	−59.8	171.4	7
8	28 37.2	−59.7	171.0	27 38.0	−59.8	171.1	26 38.7	−59.8	171.1	25 39.4	−59.8	171.2	24 40.1	−59.8	171.3	23 40.8	−59.8	171.3	22 41.5	−59.9	171.4	21 42.2	−59.9	171.5	8
9	27 37.5	−59.7	171.1	26 38.2	−59.7	171.2	25 38.9	−59.7	171.2	24 39.6	−59.7	171.3	23 40.3	−59.8	171.4	22 41.0	−59.8	171.4	21 41.7	−59.9	171.5	20 42.3	−59.8	171.5	9
10	26 37.8	−59.8	171.2	25 38.5	−59.8	171.3	24 39.2	−59.8	171.3	23 39.9	−59.8	171.4	22 40.5	−59.7	171.5	21 41.2	−59.8	171.5	20 41.8	−59.8	171.6	19 42.5	−59.9	171.7	10
11	25 38.0	−59.7	171.3	24 38.7	−59.8	171.4	23 39.4	−59.8	171.4	22 40.1	−59.8	171.5	21 40.7	−59.8	171.5	20 41.4	−59.9	171.6	19 42.0	−59.8	171.7	18 42.6	−59.9	171.7	11
12	24 38.3	−59.7	171.4	23 39.0	−59.8	171.5	22 39.6	−59.7	171.5	21 40.3	−59.8	171.6	20 40.9	−59.8	171.6	19 41.6	−59.9	171.7	18 42.2	−59.8	171.7	17 42.8	−59.8	171.8	12
13	23 38.6	−59.7	171.5	22 39.2	−59.8	171.6	21 39.9	−59.8	171.6	20 40.5	−59.8	171.7	19 41.1	−59.8	171.7	18 41.7	−59.8	171.8	17 42.4	−59.9	171.8	16 43.0	−59.9	171.9	13
14	22 38.8	−59.7	171.6	21 39.4	−59.7	171.6	20 40.1	−59.8	171.7	19 40.7	−59.8	171.7	18 41.3	−59.8	171.8	17 41.9	−59.8	171.9	16 42.5	−59.8	171.9	15 43.1	−59.8	171.9	14
15	21 39.1	−59.8	171.7	20 39.7	−59.8	171.7	19 40.3	−59.8	171.8	18 40.9	−59.8	171.8	17 41.5	−59.8	171.9	16 42.1	−59.8	171.9	15 42.7	−59.8	172.0	14 43.3	−59.9	172.0	15
16	20 39.3	−59.7	171.8	19 39.9	−59.8	171.8	18 40.5	−59.8	171.9	17 41.1	−59.8	171.9	16 41.7	−59.8	172.0	15 42.3	−59.8	172.0	14 42.9	−59.9	172.0	13 43.4	−59.8	172.1	16
17	19 39.5	−59.7	171.9	18 40.1	−59.7	171.9	17 40.7	−59.8	172.0	16 41.3	−59.8	172.0	15 41.9	−59.8	172.1	14 42.5	−59.9	172.1	13 43.0	−59.8	172.1	12 43.6	−59.8	172.2	17
18	18 39.8	−59.8	172.0	17 40.4	−59.8	172.0	16 40.9	−59.8	172.1	15 41.5	−59.8	172.1	14 42.1	−59.8	172.1	13 42.6	−59.8	172.2	12 43.2	−59.8	172.2	11 43.7	−59.8	172.2	18
19	17 40.0	−59.8	172.1	16 40.6	−59.8	172.1	15 41.1	−59.8	172.1	14 41.7	−59.8	172.2	13 42.3	−59.9	172.2	12 42.8	−59.8	172.2	11 43.4	−59.9	172.3	10 43.9	−59.9	172.3	19
20	16 40.2	−59.7	172.2	15 40.8	−59.8	172.2	14 41.3	−59.8	172.2	13 41.9	−59.8	172.3	12 42.4	−59.8	172.3	11 43.0	−59.9	172.3	10 43.5	−59.9	172.4	9 44.0	−59.8	172.4	20
21	15 40.5	−59.8	172.2	14 41.0	−59.8	172.3	13 41.5	−59.7	172.3	12 42.1	−59.8	172.3	11 42.6	−59.8	172.4	10 43.1	−59.8	172.4	9 43.7	−59.9	172.4	8 44.2	−59.9	172.4	21
22	14 40.7	−59.8	172.3	13 41.2	−59.8	172.4	12 41.8	−59.8	172.4	11 42.3	−59.8	172.4	10 42.8	−59.8	172.5	9 43.3	−59.8	172.5	8 43.8	−59.8	172.5	7 44.3	−59.8	172.5	22
23	13 40.9	−59.8	172.4	12 41.4	−59.8	172.5	11 42.0	−59.8	172.5	10 42.5	−59.8	172.5	9 43.0	−59.8	172.5	8 43.5	−59.8	172.6	7 44.0	−59.8	172.6	6 44.5	−59.9	172.6	23
24	12 41.1	−59.7	172.5	11 41.6	−59.7	172.5	10 42.2	−59.9	172.6	9 42.7	−59.9	172.6	8 43.2	−59.9	172.6	7 43.7	−59.9	172.6	6 44.1	−59.8	172.6	5 44.6	−59.8	172.7	24
25	11 41.4	−59.8	172.6	10 41.9	−59.8	172.6	9 42.3	−59.8	172.7	8 42.8	−59.8	172.7	7 43.3	−59.8	172.7	6 43.8	−59.8	172.7	5 44.3	−59.8	172.7	4 44.8	−59.9	172.7	25
26	10 41.6	−59.8	172.7	9 42.1	−59.8	172.7	8 42.5	−59.8	172.7	7 43.0	−59.8	172.7	6 43.5	−59.8	172.8	5 44.0	−59.9	172.8	4 44.5	−59.9	172.8	3 44.9	−59.8	172.8	26
27	9 41.8	−59.8	172.8	8 42.3	−59.8	172.8	7 42.7	−59.8	172.8	6 43.2	−59.8	172.8	5 43.7	−59.8	172.8	4 44.1	−59.8	172.9	3 44.6	−59.9	172.9	2 45.1	−59.9	172.9	27
28	8 42.0	−59.8	172.9	7 42.5	−59.8	172.9	6 42.9	−59.8	172.9	5 43.4	−59.8	172.9	4 43.9	−59.9	172.9	3 44.3	−59.8	172.9	2 44.8	−59.9	172.9	1 45.2	−59.8	172.9	28
29	7 42.2	−59.8	172.9	6 42.7	−59.8	173.0	5 43.1	−59.8	173.0	4 43.6	−59.8	173.0	3 44.0	−59.8	173.0	3 44.0	−59.8	173.0	1 44.9	−59.9	173.0	0 45.4	−59.9	173.0	29
30	6 42.4	−59.7	173.0	5 42.9	−59.8	173.0	4 43.3	−59.8	173.1	3 43.8	−59.9	173.1	2 44.2	−59.8	173.1	1 44.6	−59.8	173.1	0 45.1	−59.9	173.1	0 14.5	+59.8	6.9	30
31	5 42.7	−59.8	173.1	4 43.1	−59.8	173.1	3 43.5	−59.8	173.1	2 43.9	−59.7	173.1	1 44.4	−59.9	173.1	0 44.8	−59.8	173.1	0 14.8	+59.8	6.9	1 14.3	+59.9	6.9	31
32	4 42.9	−59.8	173.2	3 43.3	−59.8	173.2	2 43.7	−59.8	173.2	1 44.1	−59.8	173.2	0 44.5	−59.8	173.2	0 15.0	+59.9	6.8	1 14.6	+59.9	6.8	2 14.2	+59.9	6.8	32
33	3 43.1	−59.8	173.3	2 43.5	−59.8	173.3	1 43.9	−59.8	173.3	0 44.3	−59.8	173.3	0 15.3	+59.8	6.7	1 14.9	+59.8	6.7	2 14.5	+59.8	6.7	3 14.1	+59.8	6.7	33
34	2 43.3	−59.8	173.4	1 43.7	−59.8	173.4	0 44.1	−59.8	173.4	0 15.5	+59.8	6.6	1 15.1	+59.8	6.6	2 14.7	+59.8	6.6	3 14.3	+59.9	6.6	4 13.9	+59.9	6.6	34
35	1 43.5	−59.8	173.5	0 43.9	−59.8	173.5	0 15.7	+59.8	6.5	1 15.3	+59.9	6.5	2 14.9	+59.8	6.6	3 14.5	+59.8	6.6	4 14.2	+59.8	6.6	5 13.8	+59.9	6.6	35
36	0 43.7	−59.8	173.5	0 15.9	+59.8	6.5	1 15.5	+59.8	6.5	2 15.1	+59.9	6.5	3 14.8	+59.8	6.5	4 14.4	+59.8	6.5	5 14.0	+59.8	6.5	6 13.6	+59.9	6.5	36
37	0 16.1	+59.8	6.4	1 15.7	+59.8	6.4	2 15.3	+59.8	6.4	3 15.0	+59.8	6.4	4 14.6	+59.8	6.4	5 14.2	+59.8	6.4	6 13.8	+59.9	6.4	7 13.5	+59.8	6.4	37
38	1 15.9	+59.7	6.3	2 15.5	+59.8	6.3	3 15.1	+59.9	6.3	4 14.8	+59.9	6.3	5 14.4	+59.8	6.3	6 14.1	+59.8	6.3	7 13.7	+59.8	6.3	8 13.3	+59.9	6.4	38
39	2 15.7	+59.7	6.2	3 15.3	+59.8	6.2	4 15.0	+59.8	6.2	5 14.6	+59.8	6.2	6 14.2	+59.9	6.2	7 13.9	+59.8	6.3	8 13.5	+59.9	6.3	9 13.2	+59.8	6.3	39
40	3 15.4	+59.8	6.1	4 15.1	+59.8	6.1	5 14.8	+59.8	6.1	6 14.4	+59.8	6.2	7 14.1	+59.8	6.2	8 13.7	+59.9	6.2	9 13.4	+59.8	6.2	10 13.0	+59.9	6.2	40
41	4 15.2	+59.8	6.0	5 14.9	+59.8	6.1	6 14.6	+59.8	6.1	7 14.2	+59.8	6.1	8 13.9	+59.8	6.1	9 13.6	+59.8	6.1	10 13.2	+59.8	6.1	11 12.9	+59.9	6.1	41
42	5 15.0	+59.8	6.0	6 14.7	+59.8	6.0	7 14.4	+59.8	6.0	8 14.0	+59.9	6.0	9 13.7	+59.8	6.0	10 13.4	+59.8	6.0	11 13.0	+59.9	6.1	12 12.7	+59.9	6.1	42
43	6 14.8	+59.8	5.9	7 14.5	+59.8	5.9	8 14.2	+59.8	5.9	9 13.9	+59.8	5.9	10 13.5	+59.9	5.9	11 13.2	+59.8	6.0	12 12.9	+59.8	6.0	13 12.6	+59.8	6.0	43
44	7 14.6	+59.8	5.8	8 14.3	+59.8	5.8	9 14.0	+59.8	5.8	10 13.7	+59.8	5.8	11 13.4	+59.8	5.9	12 13.0	+59.9	5.9	13 12.7	+59.9	5.9	14 12.4	+59.9	5.9	44
45	8 14.4	+59.8	5.7	9 14.1	+59.8	5.7	10 13.8	+59.8	5.7	11 13.5	+59.8	5.8	12 13.2	+59.8	5.8	13 12.9	+59.8	5.8	14 12.6	+59.8	5.8	15 12.3	+59.9	5.9	45
46	9 14.2	+59.7	5.6	10 13.9	+59.8	5.6	11 13.6	+59.8	5.7	12 13.3	+59.8	5.7	13 13.0	+59.8	5.7	14 12.7	+59.8	5.7	15 12.4	+59.8	5.7	16 12.1	+59.8	5.8	46
47	10 13.9	+59.8	5.5	11 13.7	+59.8	5.6	12 13.4	+59.8	5.6	13 13.1	+59.8	5.6	14 12.8	+59.8	5.6	15 12.6	+59.8	5.6	16 12.2	+59.9	5.7	17 11.9	+59.9	5.7	47
48	11 13.7	+59.8	5.4	12 13.5	+59.7	5.5	13 13.2	+59.8	5.5	14 12.9	+59.8	5.5	15 12.6	+59.8	5.5	16 12.3	+59.8	5.6	17 12.1	+59.8	5.6	18 11.8	+59.8	5.6	48
49	12 13.5	+59.8	5.4	13 13.2	+59.8	5.4	14 13.0	+59.8	5.4	15 12.7	+59.8	5.4	16 12.4	+59.9	5.5	17 12.2	+59.8	5.5	18 11.9	+59.8	5.5	19 11.6	+59.8	5.5	49
50	13 13.3	+59.8	5.3	14 13.0	+59.8	5.3	15 12.8	+59.8	5.3	16 12.5	+59.8	5.3	17 12.3	+59.8	5.4	18 12.0	+59.8	5.4	19 11.7	+59.8	5.4	20 11.4	+59.9	5.5	50
51	14 13.1	+59.7	5.2	15 12.8	+59.8	5.2	16 12.6	+59.8	5.2	17 12.3	+59.9	5.3	18 12.1	+59.8	5.3	19 11.8	+59.8	5.3	20 11.5	+59.9	5.4	21 11.3	+59.8	5.4	51
52	15 12.8	+59.8	5.1	16 12.6	+59.8	5.1	17 12.4	+59.7	5.1	18 12.1	+59.8	5.2	19 11.9	+59.8	5.2	20 11.6	+59.8	5.2	21 11.4	+59.9	5.3	22 11.1	+59.8	5.3	52
53	16 12.6	+59.8	5.0	17 12.4	+59.8	5.0	18 12.1	+59.8	5.1	19 11.9	+59.8	5.1	20 11.7	+59.8	5.1	21 11.4	+59.8	5.1	22 11.2	+59.8	5.2	23 10.9	+59.9	5.2	53
54	17 12.4	+59.7	4.9	18 12.2	+59.7	4.9	19 11.9	+59.8	5.0	20 11.7	+59.8	5.0	21 11.5	+59.8	5.0	22 11.2	+59.9	5.1	23 11.0	+59.8	5.1	24 10.8	+59.8	5.1	54
55	18 12.1	+59.8	4.8	19 11.9	+59.8	4.8	20 11.7	+59.8	4.9	21 11.5	+59.8	4.9	22 11.3	+59.8	4.9	23 11.1	+59.8	5.0	24 10.8	+59.8	5.0	25 10.6	+59.8	5.1	55
56	19 11.9	+59.8	4.7	20 11.7	+59.8	4.8	21 11.5	+59.8	4.8	22 11.3	+59.8	4.8	23 11.1	+59.8	4.9	24 10.9	+59.8	4.9	25 10.6	+59.8	4.9	26 10.4	+59.8	5.0	56
57	20 11.7	+59.7	4.6	21 11.5	+59.7	4.7	22 11.3	+59.8	4.7	23 11.1	+59.8	4.7	24 10.9	+59.8	4.8	25 10.7	+59.8	4.8	26 10.4	+59.8	4.8	27 10.2	+59.8	4.9	57
58	21 11.4	+59.8	4.5	22 11.2	+59.8	4.6	23 11.1	+59.7	4.6	24 10.9	+59.7	4.6	25 10.7	+59.7	4.7	26 10.5	+59.8	4.7	27 10.3	+59.8	4.8	28 10.0	+59.8	4.8	58
59	22 11.2	+59.7	4.4	23 11.0	+59.8	4.5	24 10.8	+59.8	4.5	25 10.6	+59.8	4.5	26 10.4	+59.8	4.6	27 10.3	+59.7	4.6	28 10.1	+59.7	4.7	29 09.9	+59.8	4.7	59
60	23 10.9	+59.7	4.3	24 10.8	+59.7	4.4	25 10.6	+59.8	4.4	26 10.4	+59.8	4.4	27 10.2	+59.8	4.5	28 10.0	+59.8	4.5	29 09.9	+59.8	4.6	30 09.7	+59.8	4.6	60
61	24 10.7	+59.7	4.2	25 10.5	+59.7	4.3	26 10.4	+59.7	4.3	27 10.2	+59.7	4.3	28 10.0	+59.8	4.4	29 09.8	+59.8	4.4	30 09.7	+59.7	4.5	31 09.5	+59.8	4.5	61
62	25 10.4	+59.8	4.1	26 10.3	+59.7	4.2	27 10.1	+59.8	4.2	28 09.9	+59.8	4.3	29 09.7	+59.8	4.3	30 09.6	+59.7	4.2	31 09.4	+59.8	4.3	32 09.3	+59.8	4.4	62
63	26 10.2	+59.7	4.0	27 10.0	+59.7	4.1	28 09.9	+59.7	4.1	29 09.7	+59.8	4.1	30 09.6	+59.7	4.2	31 09.4	+59.8	4.2	32 09.2	+59.7	4.3	33 09.1	+59.7	4.3	63
64	27 09.9	+59.7	3.9	28 09.8	+59.7	4.0	29 09.6	+59.8	4.0	30 09.5	+59.7	4.0	31 09.3	+59.8	4.1	32 09.2	+59.7	4.1	33 09.0	+59.7	4.2	34 08.9	+59.7	4.2	64
65	28 09.6	+59.8	3.8	29 09.5	+59.7	3.9	30 09.4	+59.7	3.9	31 09.2	+59.7	3.9	32 09.1	+59.7	4.0	33 08.9	+59.8	4.0	34 08.8	+59.6	4.1	35 08.6	+59.8	4.1	65
66	29 09.4	+59.7	3.7	30 09.2	+59.8	3.8	31 09.1	+59.7	3.8	32 09.0	+59.7	3.8	33 08.8	+59.7	3.9	34 08.7	+59.6	3.9	35 08.6	+59.7	4.0	36 08.4	+59.7	4.0	66
67	30 09.1	+59.7	3.6	31 09.0	+59.7	3.6	32 08.8	+59.8	3.7	33 08.7	+59.7	3.7	34 08.6	+59.7	3.8	35 08.5	+59.6	3.8	36 08.3	+59.7	3.9	37 08.2	+59.7	3.9	67
68	31 08.8	+59.7	3.5	32 08.7	+59.7	3.5	33 08.6	+59.7	3.6	34 08.4	+59.7	3.6	35 08.3	+59.7	3.7	36 08.2	+59.7	3.7	37 08.1	+59.7	3.7	38 08.0	+59.7	3.8	68
69	32 08.5	+59.7	3.4	33 08.4	+59.7	3.4	34 08.3	+59.7	3.5	35 08.2	+59.7	3.5	36 08.1	+59.7	3.5	37 08.0	+59.7	3.6	38 07.8	+59.8	3.6	39 07.7	+59.8	3.7	69
70	33 08.2	+59.7	3.3	34 08.1	+59.7	3.3	35 08.0	+59.7	3.3	36 07.9	+59.7	3.4	37 07.8	+59.7	3.4	38 07.7	+59.7	3.5	39 07.6	+59.7	3.5	40 07.5	+59.7	3.6	70
71	34 07.9	+59.7	3.1	35 07.8	+59.7	3.2	36 07.7	+59.7	3.2	37 07.6	+59.7	3.3	38 07.5	+59.8	3.3	39 07.4	+59.8	3.3	40 07.3	+59.8	3.4	41 07.2	+59.7	3.4	71
72	35 07.6	+59.7	3.0	36 07.5	+59.7	3.1	37 07.4	+59.7	3.1	38 07.3	+59.7	3.1	39 07.3	+59.7	3.2	40 07.2	+59.7	3.2	41 07.1	+59.7	3.3	42 07.0	+59.7	3.3	72
73	36 07.3	+59.7	2.9	37 07.2	+59.7	2.9	38 07.1	+59.7	3.0	39 07.0	+59.7	3.0	40 07.0	+59.7	3.1	41 06.9	+59.7	3.1	42 06.8	+59.7	3.1	43 06.7	+59.7	3.2	73
74	37 07.0	+59.6	2.8	38 06.9	+59.7	2.8	39 06.8	+59.7	2.8	40 06.8	+59.7	2.9	41 06.7	+59.7	2.9	42 06.6	+59.7	3.0	43 06.5	+59.7	3.0	44 06.4	+59.7	3.1	74
75	38 06.6	+59.7	2.6	39 06.6	+59.7	2.7	40 06.5	+59.7	2.7	41 06.4	+59.7	2.7	42 06.4	+59.7	2.8	43 06.3	+59.7	2.8	44 06.2	+59.7	2.9	45 06.1	+59.7	2.9	75
76	39 06.3	+59.6	2.5	40 06.2	+59.7	2.5	41 06.2	+59.6	2.6	42 06.1	+59.7	2.6	43 06.0	+59.6	2.6	44 06.0	+59.7	2.7	45 05.9	+59.7	2.7	46 05.8	+59.7	2.8	76
77	40 05.9	+59.7	2.3	41 05.9	+59.6	2.4	42 05.8	+59.7	2.4	43 05.8	+59.6	2.5	44 05.7	+59.7	2.5	45 05.6	+59.7	2.5	46 05.6	+59.7	2.6	47 05.5	+59.7	2.6	77
78	41 05.6	+59.6	2.2	42 05.5	+59.6	2.3	43 05.5	+59.6	2.3	44 05.4	+59.7	2.3	45 05.4	+59.7	2.3	46 05.3	+59.7	2.4	47 05.3	+59.6	2.4	48 05.2	+59.7	2.5	78
79	42 05.2	+59.6	2.1	43 05.1	+59.7	2.1	44 05.1	+59.6	2.1	45 05.1	+59.6	2.2	46 05.0	+59.6	2.2	47 05.0	+59.6	2.2	48 04.9	+59.7	2.3	49 04.9	+59.6	2.3	79
80	43 04.8	+59.6	1.9	44 04.8	+59.6	1.9	45 04.7	+59.6	2.0	46 04.7	+59.6	2.0	47 04.6	+59.7	2.0	48 04.6	+59.6	2.1	49 04.6	+59.6	2.1	50 04.5	+59.7	2.2	80
81	44 04.4	+59.6	1.7	45 04.4	+59.5	1.8	46 04.3	+59.6	1.8	47 04.3	+59.6	1.8	48 04.3	+59.6	1.9	49 04.2	+59.6	1.9	50 04.2	+59.6	1.9	51 04.2	+59.6	2.0	81
82	45 04.0	+59.5	1.6	46 03.9	+59.6	1.6	47 03.9	+59.6	1.6	48 03.9	+59.6	1.7	49 03.9	+59.6	1.7	50 03.8	+59.6	1.7	51 03.8	+59.6	1.8	52 03.8	+59.6	1.8	82
83	46 03.5	+59.6	1.4	47 03.5	+59.6	1.4	48 03.5	+59.6	1.5	49 03.5	+59.5	1.5	50 03.5	+59.5	1.5	51 03.4	+59.6	1.5	52 03.4	+59.6	1.6	53 03.4	+59.6	1.6	83
84	47 03.1	+59.5	1.2	48 03.1	+59.4	1.3	49 03.1	+59.5	1.3	50 03.0	+59.6	1.3	51 03.0	+59.6	1.3	52 03.0	+59.6	1.4	53 03.0	+59.6	1.4	54 03.0	+59.7	1.4	84
85	48 02.6	+59.5	1.0	49 02.6	+59.5	1.1	50 02.6	+59.5	1.1	51 02.6	+59.5	1.1	52 02.6	+59.5	1.1	53 02.6	+59.5	1.2	54 02.6	+59.5	1.2	55 02.5	+59.6	1.2	85
86	49 02.1	+59.5	0.8	50 02.1	+59.5	0.9	51 02.1	+59.5	0.9	52 02.1	+59.5	0.9	53 02.1	+59.5	0.9	54 02.1	+59.5	0.9	55 02.1	+59.5	1.0	56 02.1	+59.5	1.0	86
87	50 01.6	+59.5	0.6	51 01.6	+59.5	0.7	52 01.6	+59.5	0.7	53 01.6	+59.5	0.7	54 01.6	+59.5	0.7	55 01.6	+59.5	0.7	56 01.6	+59.5	0.8	57 01.6	+59.5	0.8	87
88	51 01.1	+59.5	0.4	52 01.1	+59.5	0.5	53 01.1	+59.5	0.5	54 01.1	+59.5	0.5	55 01.1	+59.5	0.5	56 01.1	+59.5	0.5	57 01.1	+59.5	0.5	58 01.1	+59.5	0.5	88
89	52 00.6	+59.4	0.2	53 00.6	+59.4	0.2	54 00.6	+59.4	0.2	55 00.6	+59.4	0.2	56 00.6	+59.4	0.2	57 00.6	+59.4	0.3	58 00.6	+59.4	0.3	59 00.6	+59.4	0.3	89
90	53 00.0	+59.4	0.0	54 00.0	+59.4	0.0	55 00.0	+59.4	0.0	56 00.0	+59.4	0.0	57 00.0	+59.4	0.0	58 00.0	+59.4	0.0	59 00.0	+59.4	0.0	60 00.0	+59.4	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 172°, 188°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 28.2	+59.6	168.8	35 29.3	+59.7	168.9	34 30.5	+59.6	169.1	33 31.5	+59.7	169.2	32 32.6	+59.7	169.3	31 33.6	+59.7	169.4	30 34.6	+59.8	169.5	29 35.6	+59.8	169.6	0
1	37 27.8	+59.6	168.6	36 29.0	+59.6	168.8	35 30.1	+59.6	168.9	34 31.2	+59.7	169.1	33 32.3	+59.7	169.2	32 33.3	+59.7	169.3	31 34.4	+59.7	169.4	30 35.4	+59.7	169.5	1
2	38 27.4	+59.5	168.5	37 28.6	+59.6	168.6	36 29.7	+59.6	168.8	35 30.9	+59.6	168.9	34 32.0	+59.6	169.1	33 33.0	+59.7	169.2	32 34.1	+59.7	169.3	31 35.1	+59.8	169.4	2
3	39 26.9	+59.5	168.3	38 28.2	+59.5	168.5	37 29.3	+59.7	168.6	36 30.5	+59.6	168.8	35 31.6	+59.7	168.9	34 32.7	+59.7	169.1	33 33.8	+59.7	169.2	32 34.9	+59.7	169.3	3
4	40 26.5	+59.5	168.2	39 27.7	+59.6	168.3	38 29.0	+59.6	168.5	37 30.1	+59.7	168.7	36 31.3	+59.7	168.8	35 32.4	+59.7	168.9	34 33.5	+59.7	169.1	33 34.6	+59.7	169.2	4
5	41 26.0	+59.5	168.0	40 27.3	+59.6	168.2	39 28.6	+59.5	168.4	38 29.8	+59.6	168.5	37 31.0	+59.6	168.7	36 32.1	+59.7	168.8	35 33.2	+59.7	169.0	34 34.3	+59.8	169.1	5
6	42 25.5	+59.5	167.8	41 26.9	+59.5	168.0	40 28.1	+59.6	168.2	39 29.4	+59.6	168.4	38 30.6	+59.6	168.5	37 31.8	+59.7	168.7	36 32.9	+59.6	168.8	35 34.1	+59.7	169.0	6
7	43 25.0	+59.4	167.7	42 26.4	+59.5	167.9	41 27.7	+59.6	168.0	40 29.0	+59.6	168.2	39 30.2	+59.7	168.4	38 31.5	+59.6	168.6	37 32.6	+59.7	168.7	36 33.8	+59.7	168.9	7
8	44 24.5	+59.4	167.5	43 25.9	+59.5	167.7	42 27.3	+59.5	167.9	41 28.6	+59.6	168.1	40 29.9	+59.6	168.2	39 31.1	+59.6	168.4	38 32.3	+59.7	168.6	37 33.5	+59.7	168.7	8
9	45 24.0	+59.4	167.3	44 25.4	+59.5	167.5	43 26.8	+59.6	167.7	42 28.2	+59.5	167.9	41 29.5	+59.6	168.1	40 30.8	+59.6	168.3	39 32.0	+59.7	168.4	38 33.2	+59.7	168.6	9
10	46 23.4	+59.5	167.1	45 24.9	+59.5	167.3	44 26.4	+59.5	167.5	43 27.7	+59.6	167.7	42 29.1	+59.6	167.9	41 30.4	+59.6	168.1	40 31.7	+59.6	168.3	39 32.9	+59.7	168.5	10
11	47 22.9	+59.4	166.9	46 24.4	+59.4	167.1	45 25.9	+59.5	167.4	44 27.3	+59.6	167.6	43 28.7	+59.5	167.8	42 30.0	+59.6	168.0	41 31.3	+59.7	168.2	40 32.6	+59.6	168.3	11
12	48 22.3	+59.3	166.7	47 23.8	+59.5	166.9	46 25.4	+59.4	167.2	45 26.8	+59.6	167.4	44 28.3	+59.5	167.6	43 29.6	+59.6	167.8	42 31.0	+59.6	168.0	41 32.2	+59.7	168.2	12
13	49 21.6	+59.4	166.5	48 23.3	+59.4	166.6	47 24.8	+59.5	166.9	46 26.4	+59.5	167.2	45 27.8	+59.6	167.4	44 29.2	+59.6	167.7	43 30.6	+59.6	167.9	42 31.9	+59.7	168.1	13
14	50 21.0	+59.3	166.2	49 22.7	+59.4	166.5	48 24.3	+59.4	166.8	47 25.9	+59.5	167.0	46 27.4	+59.5	167.3	45 28.8	+59.5	167.5	44 30.2	+59.6	167.7	43 31.6	+59.6	167.9	14
15	51 20.3	+59.3	166.0	50 22.1	+59.3	166.3	49 23.7	+59.5	166.6	48 25.4	+59.4	166.8	47 26.9	+59.5	167.1	46 28.4	+59.5	167.3	45 29.8	+59.6	167.6	44 31.2	+59.6	167.8	15
16	52 19.6	+59.3	165.8	51 21.4	+59.4	166.1	50 23.2	+59.4	166.3	49 24.8	+59.5	166.6	48 26.4	+59.5	166.9	47 27.9	+59.6	167.1	46 29.4	+59.6	167.4	45 30.8	+59.7	167.6	16
17	53 18.9	+59.2	165.5	52 20.8	+59.3	165.8	51 22.6	+59.3	166.1	50 24.3	+59.4	166.4	49 25.9	+59.5	166.7	48 27.5	+59.5	167.0	47 29.0	+59.6	167.2	46 30.5	+59.6	167.4	17
18	54 18.1	+59.2	165.2	53 20.1	+59.2	165.6	52 21.9	+59.3	165.9	51 23.7	+59.4	166.2	50 25.4	+59.4	166.5	49 27.0	+59.5	166.8	48 28.6	+59.5	167.0	47 30.1	+59.6	167.3	18
19	55 17.3	+59.2	164.9	54 19.3	+59.3	165.3	53 21.2	+59.4	165.7	52 23.1	+59.3	166.0	51 24.8	+59.5	166.3	50 26.5	+59.5	166.6	49 28.1	+59.5	166.8	48 29.7	+59.5	167.1	19
20	56 16.5	+59.1	164.6	55 18.6	+59.2	165.0	54 20.6	+59.2	165.4	53 22.4	+59.3	165.7	52 24.3	+59.4	166.1	51 26.0	+59.4	166.4	50 27.6	+59.5	166.6	49 29.2	+59.6	166.9	20
21	57 15.6	+59.0	164.3	56 17.8	+59.1	164.7	55 19.8	+59.2	165.1	54 21.8	+59.3	165.5	53 23.7	+59.3	165.8	52 25.4	+59.5	166.1	51 27.1	+59.5	166.4	50 28.8	+59.5	166.7	21
22	58 14.6	+59.0	164.0	57 16.9	+59.1	164.4	56 19.0	+59.2	164.8	55 21.1	+59.3	165.2	54 23.0	+59.3	165.6	53 24.9	+59.5	165.9	52 26.6	+59.5	166.2	51 28.3	+59.5	166.5	22
23	59 13.6	+59.0	163.7	58 16.0	+59.1	164.1	57 18.2	+59.2	164.5	56 20.4	+59.2	164.9	55 22.4	+59.3	165.3	54 24.3	+59.3	165.7	53 26.1	+59.4	166.0	52 27.8	+59.5	166.3	23
24	60 12.6	+58.9	163.3	59 15.1	+58.9	163.8	58 17.4	+59.1	164.2	57 19.6	+59.2	164.6	56 21.7	+59.2	165.0	55 23.6	+59.4	165.4	54 25.5	+59.4	165.8	53 27.3	+59.5	166.1	24
25	61 11.5	+58.8	162.9	60 14.0	+59.0	163.4	59 16.5	+59.0	163.9	58 18.8	+59.1	164.3	57 20.9	+59.3	164.8	56 23.0	+59.3	165.2	55 24.9	+59.4	165.5	54 26.8	+59.4	165.9	25
26	62 10.3	+58.7	162.5	61 13.0	+58.8	163.0	60 15.5	+59.0	163.5	59 17.9	+59.1	164.0	58 20.2	+59.1	164.5	57 22.3	+59.3	164.9	56 24.3	+59.4	165.3	55 26.2	+59.4	165.7	26
27	63 09.0	+58.6	162.0	62 11.8	+58.8	162.6	61 14.5	+58.9	163.2	60 17.0	+59.0	163.7	59 19.3	+59.2	164.1	58 21.6	+59.2	164.6	57 23.7	+59.3	165.0	56 25.6	+59.4	165.4	27
28	64 07.6	+58.6	161.5	63 10.6	+58.7	162.2	62 13.4	+58.8	162.8	61 16.0	+59.0	163.3	60 18.3	+59.0	163.8	59 20.8	+59.1	164.3	58 23.0	+59.2	164.7	57 25.0	+59.3	165.1	28
29	65 06.2	+58.4	161.0	64 09.3	+58.6	161.7	63 12.2	+58.8	162.3	62 15.0	+58.9	162.9	61 17.5	+59.0	163.5	60 20.0	+59.1	164.0	59 22.2	+59.2	164.4	58 24.4	+59.3	164.9	29
30	66 04.6	+58.3	160.5	65 07.9	+58.5	161.2	64 11.0	+58.7	161.9	63 13.9	+58.8	162.5	62 16.6	+58.9	163.1	61 19.1	+59.1	163.6	60 21.4	+59.2	164.1	59 23.7	+59.2	164.6	30
31	67 02.9	+58.1	159.9	66 06.4	+58.4	160.7	65 09.7	+58.5	161.4	64 12.7	+58.7	162.0	63 15.5	+58.9	162.7	62 18.2	+59.0	163.2	61 20.6	+59.1	163.8	60 22.9	+59.3	164.3	31
32	68 01.0	+58.0	159.2	67 04.8	+58.2	160.1	66 08.2	+58.5	160.9	65 11.4	+58.7	161.6	64 14.4	+58.8	162.2	63 17.2	+58.9	162.8	62 19.7	+59.1	163.4	61 22.2	+59.1	163.9	32
33	68 59.0	+57.8	158.5	68 03.0	+58.1	159.5	67 06.7	+58.3	160.3	66 10.1	+58.5	161.1	65 13.2	+58.7	161.8	64 16.1	+58.8	162.4	63 18.8	+59.0	163.0	62 21.3	+59.1	163.6	33
34	69 56.8	+57.6	157.8	69 01.1	+57.9	158.8	68 05.0	+58.1	159.7	67 08.6	+58.3	160.5	66 11.9	+58.6	161.3	65 14.9	+58.8	162.0	64 17.8	+58.9	162.6	63 20.4	+59.1	163.2	34
35	70 54.4	+57.3	156.9	69 59.0	+57.7	158.0	69 03.1	+58.0	159.0	68 07.0	+58.2	159.9	67 10.5	+58.4	160.7	66 13.7	+58.7	161.5	65 16.7	+58.8	162.2	64 19.5	+59.0	162.8	35
36	71 51.7	+57.1	156.0	70 56.7	+57.4	157.2	70 01.1	+57.8	158.3	69 05.2	+58.1	159.2	68 08.9	+58.4	160.1	67 12.4	+58.5	160.9	66 15.5	+58.8	161.7	65 18.5	+58.9	162.4	36
37	72 48.8	+56.7	155.0	71 54.1	+57.2	156.3	70 58.9	+57.6	157.5	70 03.3	+57.9	158.5	69 07.3	+58.2	159.5	68 10.9	+58.4	160.4	67 14.3	+58.6	161.2	66 17.4	+58.8	161.9	37
38	73 45.5	+56.2	153.8	72 51.3	+56.8	155.3	71 56.5	+57.3	156.6	71 01.2	+57.7	157.7	70 05.5	+58.0	158.8	69 09.3	+58.3	159.7	68 12.9	+58.5	160.6	67 16.2	+58.7	161.4	38
39	74 41.7	+55.8	152.6	73 48.1	+56.4	154.2	72 53.8	+56.9	155.6	71 58.9	+57.4	156.9	71 03.5	+57.7	158.0	70 07.6	+58.1	159.0	69 11.4	+58.4	160.0	68 14.9	+58.6	160.8	39
40	75 37.5	+55.2	151.1	74 44.5	+56.0	152.9	73 50.7	+56.6	154.5	72 56.3	+57.1	155.9	72 01.2	+57.6	157.2	71 05.7	+57.9	158.3	70 09.8	+58.2	159.3	69 13.5	+58.4	160.3	40
41	76 32.7	+54.5	149.5	75 40.5	+55.4	151.4	74 47.3	+56.2	153.2	73 53.4	+56.7	154.8	72 58.8	+57.2	156.2	72 03.6	+57.7	157.5	71 08.0	+58.0	158.6	70 11.9	+58.3	159.6	41
42	77 27.2	+53.6	147.6	76 35.9	+54.7	149.9	75 43.5	+55.6	151.9	74 50.1	+56.4	153.6	73 56.0	+56.9	155.2	73 01.3	+57.4	156.5	72 06.0	+57.8	157.8	71 10.2	+58.1	158.9	42
43	78 20.8	+52.5	145.5	77 30.6	+53.9	148.1	76 39.1	+54.9	150.3	75 46.5	+55.7	152.3	74 52.9	+56.5	154.0	73 58.7	+57.0	155.5	73 03.8	+57.5	156.9	72 08.3	+57.9	158.1	43
44	79 13.3	+51.1	143.0	78 24.5	+52.7	145.9	77 34.0	+54.1	148.5	76 42.2	+55.2	150.7	75 49.4	+56.0	152.6	74 55.7	+56.7	154.4	74 01.3	+57.2	155.9	73 06.2	+57.7	157.2	44
45	80 04.4	+49.3•	140.1	79 17.2	+51.4	143.5	78 28.1	+53.1	146.4	77 37.4	+54.3	148.9	76 45.4	+55.4	151.1	75 52.4	+56.2	153.1	74 58.5	+56.8	154.7	74 03.9	+57.3	156.2	45
46	80 53.7	+46.9•	136.6	80 08.6	+49.7•	140.6	79 21.2	+51.7	144.0	78 31.7	+53.4	146.9	77 40.8	+54.6	149.4	76 48.6	+55.5	151.6	75 55.3	+56.4	153.5	75 01.2	+57.0	155.1	46
47	81 40.6	+44.0•	132.5	80 58.3	+47.4•	137.2	80 12.9	+50.1	141.1	79 25.1	+52.0	144.5	78 35.4	+53.6	147.4	77 44.1	+54.9	149.9	76 51.7	+55.8	152.0	75 58.2	+56.6	153.9	47
48	82 24.6	+39.9•	127.5	81 45.7	+44.4•	133.1	81 02.9	+47.8•	137.7	80 17.1	+50.4	141.7	79 29.0	+52.4	145.0	78 39.0	+53.9	147.9	77 47.5	+55.1	150.3	76 54.8	+55.9	152.5	48
49	83 04.5	+34.6•	121.7	82 30.1	+40.4•	128.2	81 50.7	+44.9•	133.7	81 07.5	+48.3•	138.3	80 21.4	+50.8	142.2	79 32.9	+52.7	145.5	78 42.6	+54.2	148.4	77 50.8	+55.4	150.8	49
50	83 39.1	+27.7•	114.6	83 10.5	+35.1•	122.2	82 35.6	+40.9•	128.7	81 55.8	+45.3•	134.3	81 12.2	+48.6•	138.9	80 25.6	+51.2	142.8	79 36.8	+53.0	146.1	78 46.2	+54.4	148.9	50
51	84 06.8	+19.3•	106.3	83 45.6	+28.3•	115.1	83 16.5	+35.7•	122.8	82 41.1	+41.5•	129.4	82 00.8	+45.9•	134.9	81 16.8	+49.1•	139.5	80 29.8	+51.6	143.4	79 40.6	+53.4	146.7	51
52	84 26.1	+9.1•	96.7	84 13.9	+19.6•	106.6	83 52.2	+28.8•	115.6	83 22.6	+36.2•	123.4	82 46.7	+42.0•	130.0	82 05.9	+46.3•	135.5	81 21.4	+49.5•	140.1	80 34.0	+52.0	144.0	52
53	84 35.2	−1.7•	86.4	84 33.5	+9.3•	96.9	84 21.0	+20.0•	107.0	83 58.8	+29.3•	116.1	83 28.7	+36.8•	124.0	82 52.2	+42.0•	130.7	82 10.9	+46.9•	136.2	81 26.0	+50.0•	140.8	53
54	84 33.5	−12.5•	75.8	84 42.8	−1.8•	86.4	84 41.0	+9.5•	97.1	84 28.1	+20.4•	107.4	84 05.5	+29.9•	116.7	83 34.8	+37.4•	124.7	82 57.8	+43.1•	131.4	82 16.0	+47.3•	136.9	54
55	84 21.0	−22.2•	65.7	84 41.0	−12.9•	75.5	84 50.5	−2.0•	86.3	84 48.5	+9.7•	97.4	84 35.4	+20.8•	107.9	84 12.2	+30.5•	117.3	83 40.9	+38.1•	125.4	83 03.3	+43.8•	132.1	55
56	83 58.8	−30.1•	56.5	84 28.1	−22.6•	65.2	84 35.4	−13.1•	75.2	84 58.2	−2.0•	86.3	84 56.2	+9.9•	97.6	84 42.4	+21.3•	108.4	84 19.0	+31.0•	118.0	83 47.1	+38.6•	126.5	56
57	83 28.7	−36.5•	48.6	84 05.5	−30.7•	55.9	84 22.3	−23.2•	64.6	84 56.2	−13.5•	74.9	85 06.1	−2.1•	86.2	85 04.0	+10.1•	97.9	84 50.0	+21.8•	108.9	84 25.7	+31.7•	118.6	57
58	82 52.2	−41.3•	41.9	83 34.8	−37.0•	47.9	84 12.2	−31.3•	55.2	84 42.7	−23.7•	64.1	85 04.0	−14.0•	74.5	85 14.1	−2.3•	86.2	85 11.8	+10.3•	98.1	84 57.4	+22.3•	109.4	58
59	82 10.9	−44.9•	36.3	82 57.8	−41.8•	41.1	83 40.9	−37.6•	47.1	84 19.0	−31.9•	54.4	84 50.0	−24.3•	63.5	85 11.8	−14.4•	74.2	85 22.1	−2.4•	86.1	85 19.7	+10.5•	98.4	59
60	81 26.0	−47.8•	31.7	82 16.0	−45.5•	35.5	83 03.3	−42.3•	40.3	83 47.1	−38.2•	46.3	84 25.7	−32.5•	53.7	84 57.4	−24.9•	62.8	85 19.7	−14.9•	73.8	85 30.2	−2.6•	86.1	60
61	80 38.2	−49.9	27.8	81 30.5	−48.2•	30.9	82 21.0	−46.0•	34.7	83 08.9	−43.0•	39.5	83 53.2	−38.8•	45.4	84 32.5	−33.2•	52.9	85 04.8	−25.5•	62.2	85 27.6	−15.3•	73.4	61
62	79 48.3	−51.6	24.5	80 42.3	−50.3	27.0	81 35.0	−48.6•	30.1	82 25.9	−46.4•	33.9	83 14.4	−43.5•	38.4	83 59.3	−39.5•	44.5	84 39.3	−33.9•	52.0	85 12.3	−26.2•	61.5	62
63	78 56.7	−52.9	21.7	79 52.0	−51.9	23.8	80 46.4	−50.6	26.3	81 39.5	−49.0•	29.3	82 30.9	−47.0•	33.0	83 19.8	−44.0•	37.7	84 05.4	−40.1•	43.6	84 46.1	−34.6•	51.2	63
64	78 03.8	−53.9	19.4	79 00.1	−53.1	21.1	79 55.8	−52.3	23.1	80 50.5	−51.1	25.5	81 43.9	−49.5•	28.5	82 35.8	−47.5•	32.2	83 25.3	−44.7•	36.8	84 11.5	−40.9•	42.7	64
65	77 09.9	−54.7	17.3	78 07.0	−54.1	18.7	79 03.5	−53.4	20.4	79 59.4	−52.5	22.4	80 54.4	−51.4	24.7	81 48.3	−49.9•	27.6	82 40.6	−48.0•	31.2	83 30.6	−45.2•	35.8	65
66	76 15.2	−55.4	15.5	77 12.9	−55.0	16.7	78 10.1	−54.4	18.1	79 06.9	−53.7	19.7	80 03.0	−52.8	21.6	80 58.4	−51.8	23.9	81 52.6	−50.4•	26.8	82 45.4	−48.5•	30.3	66
67	75 19.8	−56.0	14.0	76 17.9	−55.6	15.0	77 15.7	−55.1	16.1	78 13.2	−54.7	17.4	79 10.2	−54.0	19.0	80 06.6	−53.2	20.8	81 02.2	−52.1	23.1	81 56.9	−50.9•	25.9	67
68	74 23.8	−56.4	12.6	75 22.3	−56.1	13.4	76 20.6	−55.8	14.4	77 18.5	−55.3	15.5	78 16.2	−54.9	16.8	79 13.4	−54.3	18.3	80 10.1	−53.5	20.1	81 06.0	−52.5	22.3	68
69	73 27.4	−56.8	11.4	74 26.2	−56.6	12.1	75 24.8	−56.3	12.9	76 23.2	−56.0	13.8	77 21.3	−55.6	14.8	78 19.1	−55.1	16.1	79 16.6	−54.6	17.5	80 13.5	−53.8	19.3	69
70	72 30.6	−57.1	10.3	73 29.6	−56.9	10.9	74 28.5	−56.8	11.5	75 27.2	−56.5	12.3	76 25.7	−56.2	13.2	77 24.0	−55.8	14.2	78 22.0	−55.4	15.4	79 19.7	−54.9	16.8	70
71	71 33.5	−57.4	9.3	72 32.7	−57.3	9.8	73 31.7	−57.1	10.3	74 30.7	−56.9	11.0	75 29.5	−56.6	11.7	76 28.2	−56.4	12.6	77 26.6	−56.0	13.5	78 24.8	−55.6	14.7	71
72	70 36.1	−57.7	8.4	71 35.4	−57.6	8.8	72 34.6	−57.3	9.3	73 33.8	−57.2	9.8	74 32.9	−57.1	10.5	75 31.8	−56.8	11.2	76 30.6	−56.6	12.0	77 29.2	−56.2	12.9	72
73	69 38.4	−57.8	7.6	70 37.9	−57.8	7.9	71 37.3	−57.7	8.3	72 36.6	−57.5	8.8	73 35.8	−57.3	9.3	74 35.0	−57.2	9.9	75 34.0	−56.9	10.6	76 33.0	−56.8	11.3	73
74	68 40.6	−58.1	6.8	69 40.1	−57.9	7.1	70 39.6	−57.8	7.5	71 39.1	−57.8	7.9	72 38.5	−57.6	8.3	73 37.8	−57.5	8.8	74 37.1	−57.4	9.4	75 36.2	−57.1	10.0	74
75	67 42.5	−58.2	6.1	68 42.2	−58.2	6.4	69 41.8	−58.1	6.7	70 41.3	−57.9	7.0	71 40.9	−57.9	7.4	72 40.3	−57.7	7.8	73 39.7	−57.6	8.3	74 39.1	−57.5	8.8	75
76	66 44.3	−58.3	5.5	67 44.0	−58.3	5.7	68 43.7	−58.2	6.0	69 43.4	−58.2	6.3	70 43.0	−58.1	6.6	71 42.6	−57.9	6.9	72 42.1	−57.9	7.3	73 41.6	−57.9	7.7	76
77	65 46.0	−58.5	4.9	66 45.7	−58.4	5.1	67 45.5	−58.4	5.3	68 45.2	−58.3	5.6	69 44.9	−58.2	5.8	70 44.6	−58.2	6.1	71 44.2	−58.0	6.4	72 43.8	−57.9	6.8	77
78	64 47.5	−58.6	4.4	65 47.3	−58.5	4.5	66 47.1	−58.4	4.7	67 46.9	−58.4	4.9	68 46.7	−58.4	5.2	69 46.4	−58.3	5.4	70 46.2	−58.3	5.7	71 45.9	−58.2	6.0	78
79	63 48.9	−58.6	3.9	64 48.8	−58.6	4.0	65 48.7	−58.6	4.2	66 48.5	−58.6	4.3	67 48.3	−58.5	4.5	68 48.1	−58.5	4.7	69 47.9	−58.4	5.0	70 47.7	−58.4	5.2	79
80	62 50.3	−58.8	3.4	63 50.2	−58.8	3.5	64 50.1	−58.7	3.7	65 49.9	−58.6	3.8	66 49.8	−58.6	4.0	67 49.6	−58.6	4.1	68 49.5	−58.6	4.3	69 49.3	−58.5	4.5	80
81	61 51.5	−58.8	3.0	62 51.4	−58.8	3.1	63 51.4	−58.8	3.2	64 51.3	−58.8	3.3	65 51.2	−58.8	3.4	66 51.0	−58.7	3.6	67 50.9	−58.8	3.7	68 50.8	−58.6	3.9	81
82	60 52.7	−58.9	2.6	61 52.6	−58.8	2.6	62 52.6	−58.9	2.7	63 52.5	−58.8	2.8	64 52.4	−58.8	2.9	65 52.3	−58.8	3.1	66 52.3	−58.8	3.2	67 52.2	−58.8	3.3	82
83	59 53.8	−59.0	2.2	60 53.8	−59.0	2.2	61 53.7	−58.9	2.3	62 53.7	−59.0	2.4	63 53.6	−58.9	2.5	64 53.5	−58.8	2.6	65 53.5	−59.0	2.7	66 53.4	−58.9	2.8	83
84	58 54.8	−59.0	1.8	59 54.8	−59.0	1.9	60 54.8	−59.1	1.9	61 54.7	−58.9	2.0	62 54.7	−59.0	2.1	63 54.7	−59.0	2.1	64 54.6	−58.9	2.2	65 54.6	−59.0	2.3	84
85	57 55.8	−59.1	1.5	58 55.8	−59.1	1.5	59 55.8	−59.1	1.6	60 55.8	−59.1	1.6	61 55.7	−59.0	1.7	62 55.7	−59.0	1.7	63 55.7	−59.0	1.8	64 55.6	−59.0	1.8	85
86	56 56.7	−59.1	1.1	57 56.7	−59.1	1.2	58 56.7	−59.1	1.2	59 56.7	−59.1	1.2	60 56.7	−59.1	1.3	61 56.7	−59.1	1.3	62 56.7	−59.1	1.4	63 56.6	−59.0	1.4	86
87	55 57.6	−59.2	0.8	56 57.6	−59.2	0.9	57 57.6	−59.2	0.9	58 57.6	−59.2	0.9	59 57.6	−59.2	0.9	60 57.6	−59.2	1.0	61 57.6	−59.2	1.0	62 57.6	−59.2	1.0	87
88	54 58.5	−59.3	0.5	55 58.4	−59.2	0.6	56 58.4	−59.2	0.6	57 58.4	−59.2	0.6	58 58.4	−59.2	0.6	59 58.4	−59.2	0.6	60 58.4	−59.2	0.6	61 58.4	−59.2	0.7	88
89	53 59.2	−59.2	0.3	54 59.2	−59.2	0.3	55 59.2	−59.2	0.3	56 59.2	−59.2	0.3	57 59.2	−59.2	0.3	58 59.2	−59.2	0.3	59 59.2	−59.2	0.3	60 59.2	−59.2	0.3	89
90	53 00.0	−59.3	0.0	54 00.0	−59.3	0.0	55 00.0	−59.3	0.0	56 00.0	−59.3	0.0	57 00.0	−59.3	0.0	58 00.0	−59.3	0.0	59 00.0	−59.3	0.0	60 00.0	−59.3	0.0	90

53°	54°	55°	56°	57°	58°	59°	60°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 28.2	−59.6	168.8	35 29.3	−59.6	168.9	34 30.5	−59.7	169.1	33 31.5	−59.6	169.2	32 32.6	−59.7	169.3	31 33.6	−59.7	169.4	30 34.6	−59.7	169.5	29 35.6	−59.7	169.6	0
1	35 28.6	−59.6	168.9	34 29.7	−59.6	169.1	33 30.8	−59.6	169.2	32 31.9	−59.7	169.3	31 32.9	−59.7	169.4	30 33.9	−59.7	169.5	29 34.9	−59.8	169.6	28 35.9	−59.8	169.7	1
2	34 29.0	−59.6	169.1	33 30.1	−59.6	169.2	32 31.1	−59.6	169.3	31 32.2	−59.7	169.4	30 33.2	−59.7	169.5	29 34.2	−59.8	169.6	28 35.1	−59.7	169.7	27 36.1	−59.8	169.8	2
3	33 29.4	−59.6	169.2	32 30.5	−59.7	169.3	31 31.5	−59.6	169.4	30 32.5	−59.7	169.5	29 33.5	−59.7	169.7	28 34.4	−59.7	169.8	27 35.4	−59.8	169.8	26 36.3	−59.7	169.9	3
4	32 29.8	−59.6	169.3	31 30.8	−59.6	169.5	30 31.8	−59.7	169.6	29 32.8	−59.7	169.7	28 33.8	−59.8	169.8	27 34.7	−59.7	169.9	26 35.6	−59.8	170.0	25 36.6	−59.8	170.0	4
5	31 30.2	−59.7	169.5	30 31.2	−59.6	169.6	29 32.1	−59.6	169.7	28 33.1	−59.7	169.8	27 34.0	−59.7	169.9	26 35.0	−59.7	170.0	25 35.9	−59.7	170.0	24 36.8	−59.8	170.1	5
6	30 30.5	−59.6	169.6	29 31.5	−59.7	169.7	28 32.5	−59.7	169.8	27 33.4	−59.7	169.9	26 34.3	−59.7	170.0	25 35.2	−59.7	170.1	24 36.1	−59.7	170.1	23 37.0	−59.8	170.2	6
7	29 30.9	−59.7	169.7	28 31.8	−59.6	169.8	27 32.8	−59.7	169.9	26 33.7	−59.7	170.0	25 34.6	−59.7	170.1	24 35.5	−59.8	170.2	23 36.4	−59.8	170.2	22 37.2	−59.7	170.3	7
8	28 31.2	−59.6	169.8	27 32.2	−59.7	169.9	26 33.1	−59.7	170.0	25 34.0	−59.7	170.1	24 34.9	−59.8	170.2	23 35.7	−59.7	170.3	22 36.6	−59.8	170.3	21 37.4	−59.7	170.4	8
9	27 31.6	−59.7	170.0	26 32.5	−59.7	170.1	25 33.4	−59.7	170.1	24 34.3	−59.8	170.2	23 35.1	−59.7	170.3	22 36.0	−59.8	170.4	21 36.8	−59.8	170.4	20 37.6	−59.8	170.5	9
10	26 31.9	−59.6	170.1	25 32.8	−59.7	170.2	24 33.7	−59.7	170.2	23 34.5	−59.7	170.3	22 35.4	−59.8	170.4	21 36.2	−59.7	170.5	20 37.0	−59.7	170.5	19 37.8	−59.7	170.6	10
11	25 32.2	−59.6	170.2	24 33.1	−59.7	170.3	23 34.0	−59.8	170.4	22 34.8	−59.7	170.4	21 35.6	−59.7	170.5	20 36.4	−59.7	170.6	19 37.3	−59.8	170.6	18 38.1	−59.8	170.7	11
12	24 32.6	−59.7	170.3	23 33.4	−59.7	170.4	22 34.2	−59.7	170.5	21 35.1	−59.8	170.5	20 35.9	−59.8	170.6	19 36.7	−59.8	170.7	18 37.5	−59.8	170.7	17 38.3	−59.8	170.8	12
13	23 32.9	−59.7	170.4	22 33.7	−59.7	170.5	21 34.5	−59.7	170.6	20 35.3	−59.7	170.6	19 36.1	−59.7	170.7	18 36.9	−59.7	170.8	17 37.7	−59.8	170.8	16 38.5	−59.8	170.8	13
14	22 33.2	−59.7	170.5	21 34.0	−59.7	170.6	20 34.8	−59.7	170.7	19 35.6	−59.7	170.7	18 36.4	−59.8	170.8	17 37.1	−59.7	170.8	16 37.9	−59.8	170.9	15 38.7	−59.8	170.9	14
15	21 33.5	−59.7	170.6	20 34.3	−59.7	170.7	19 35.1	−59.8	170.8	18 35.9	−59.8	170.8	17 36.6	−59.7	170.9	16 37.4	−59.8	170.9	15 38.1	−59.8	171.0	14 38.9	−59.8	171.0	15
16	20 33.8	−59.7	170.8	19 34.6	−59.7	170.8	18 35.3	−59.7	170.9	17 36.1	−59.7	170.9	16 36.9	−59.8	171.0	15 37.6	−59.8	171.0	14 38.3	−59.8	171.1	13 39.1	−59.9	171.1	16
17	19 34.1	−59.7	170.9	18 34.9	−59.8	170.9	17 35.6	−59.8	171.0	16 36.4	−59.8	171.0	15 37.1	−59.8	171.1	14 37.8	−59.8	171.1	13 38.5	−59.8	171.1	12 39.2	−59.8	171.2	17
18	18 34.4	−59.7	171.0	17 35.2	−59.8	171.0	16 35.9	−59.8	171.1	15 36.6	−59.7	171.1	14 37.3	−59.7	171.2	13 38.0	−59.7	171.2	12 38.7	−59.8	171.2	11 39.4	−59.8	171.3	18
19	17 34.7	−59.7	171.1	16 35.4	−59.7	171.1	15 36.1	−59.7	171.2	14 36.9	−59.8	171.2	13 37.6	−59.8	171.2	12 38.3	−59.8	171.3	11 38.9	−59.8	171.3	10 39.6	−59.8	171.4	19
20	16 35.0	−59.7	171.2	15 35.7	−59.8	171.2	14 36.4	−59.7	171.3	13 37.1	−59.8	171.3	12 37.8	−59.8	171.3	11 38.5	−59.9	171.4	10 39.1	−59.8	171.4	9 39.8	−59.8	171.4	20
21	15 35.3	−59.7	171.3	14 36.0	−59.8	171.3	13 36.7	−59.8	171.4	12 37.3	−59.7	171.4	11 38.0	−59.8	171.4	10 38.7	−59.9	171.5	9 39.3	−59.8	171.5	8 40.0	−59.9	171.5	21
22	14 35.6	−59.7	171.4	13 36.2	−59.7	171.4	12 36.9	−59.7	171.5	11 37.6	−59.8	171.5	10 38.2	−59.7	171.5	9 38.9	−59.8	171.5	8 39.5	−59.8	171.6	7 40.2	−59.8	171.6	22
23	13 35.9	−59.8	171.5	12 36.5	−59.7	171.5	11 37.2	−59.8	171.5	10 37.8	−59.7	171.6	9 38.5	−59.8	171.6	8 39.1	−59.8	171.6	7 39.7	−59.8	171.6	6 40.4	−59.9	171.7	23
24	12 36.1	−59.7	171.6	11 36.8	−59.8	171.6	10 37.4	−59.7	171.6	9 38.1	−59.8	171.7	8 38.7	−59.8	171.7	7 39.3	−59.8	171.7	6 39.9	−59.8	171.7	5 40.6	−59.9	171.7	24
25	11 36.4	−59.7	171.7	10 37.0	−59.7	171.7	9 37.7	−59.8	171.7	8 38.3	−59.8	171.8	7 38.9	−59.8	171.8	6 39.5	−59.8	171.8	5 40.1	−59.8	171.8	4 40.8	−59.9	171.8	25
26	10 36.7	−59.8	171.8	9 37.3	−59.7	171.8	8 37.9	−59.7	171.8	7 38.5	−59.7	171.8	6 39.1	−59.7	171.9	5 39.7	−59.8	171.9	4 40.3	−59.8	171.9	3 40.9	−59.8	171.9	26
27	9 37.0	−59.7	171.9	8 37.6	−59.8	171.9	7 38.2	−59.8	171.9	6 38.8	−59.8	171.9	5 39.4	−59.8	171.9	4 39.9	−59.7	172.0	3 40.5	−59.8	172.0	2 41.1	−59.8	172.0	27
28	8 37.2	−59.7	172.0	7 37.8	−59.7	172.0	6 38.4	−59.7	172.0	5 38.9	−59.7	172.0	4 39.6	−59.8	172.0	3 40.2	−59.7	172.0	2 40.7	−59.7	172.1	1 41.3	−59.8	172.1	28
29	7 37.5	−59.7	172.1	6 38.1	−59.8	172.1	5 38.7	−59.8	172.1	4 39.2	−59.7	172.1	3 39.8	−59.8	172.1	2 40.4	−59.8	172.1	1 40.9	−59.8	172.1	0 41.5	−59.8	172.1	29
30	6 37.8	−59.7	172.2	5 38.3	−59.7	172.2	4 38.9	−59.8	172.2	3 39.5	−59.8	172.2	2 40.0	−59.8	172.2	1 40.6	−59.8	172.2	0 41.1	−59.8	172.2	0 18.3	+59.8	7.8	30
31	5 38.1	−59.8	172.3	4 38.6	−59.7	172.3	3 39.1	−59.7	172.3	2 39.7	−59.8	172.3	1 40.2	−59.8	172.3	0 40.8	−59.8	172.3	0 18.7	+59.8	7.7	1 18.1	+59.9	7.7	31
32	4 38.3	−59.7	172.4	3 38.9	−59.8	172.4	2 39.4	−59.8	172.4	1 39.9	−59.8	172.4	0 40.4	−59.7	172.4	0 19.0	+59.8	7.6	1 18.5	+59.8	7.6	2 18.0	+59.8	7.6	32
33	3 38.6	−59.7	172.4	2 39.1	−59.8	172.5	1 39.6	−59.7	172.5	0 40.1	−59.7	172.5	0 19.3	+59.8	7.5	1 18.8	+59.8	7.5	2 18.3	+59.8	7.5	3 17.8	+59.8	7.6	33
34	2 38.9	−59.8	172.5	1 39.4	−59.8	172.6	0 39.9	−59.8	172.5	0 19.6	+59.8	7.5	1 19.1	+59.8	7.5	2 18.6	+59.8	7.5	3 18.1	+59.8	7.5	4 17.6	+59.8	7.5	34
35	1 39.1	−59.7	172.6	0 39.6	−59.7	172.6	0 19.9	+59.7	7.4	1 19.4	+59.8	7.4	2 18.9	+59.8	7.4	3 18.4	+59.8	7.4	4 17.9	+59.8	7.4	5 17.4	+59.8	7.4	35
36	0 39.4	−59.7	172.7	0 20.1	+59.8	7.3	1 19.6	+59.8	7.3	2 19.1	+59.7	7.3	3 18.7	+59.8	7.3	4 18.2	+59.8	7.3	5 17.7	+59.8	7.3	6 17.2	+59.8	7.3	36
37	0 20.3	+59.8	7.2	1 19.9	+59.7	7.2	2 19.4	+59.7	7.2	3 18.9	+59.8	7.2	4 18.5	+59.7	7.2	5 18.0	+59.8	7.2	6 17.5	+59.8	7.2	7 17.0	+59.9	7.2	37
38	1 20.1	+59.7	7.1	2 19.6	+59.7	7.1	3 19.2	+59.7	7.1	4 18.7	+59.7	7.1	5 18.2	+59.7	7.1	6 17.8	+59.8	7.1	7 17.3	+59.8	7.1	8 16.8	+59.9	7.2	38
39	2 19.8	+59.7	7.0	3 19.4	+59.7	7.0	4 18.9	+59.7	7.0	5 18.5	+59.7	7.0	6 18.0	+59.8	7.0	7 17.6	+59.8	7.0	8 17.1	+59.8	7.1	9 16.7	+59.9	7.1	39
40	3 19.5	+59.8	6.9	4 19.1	+59.8	6.9	5 18.7	+59.7	6.9	6 18.2	+59.7	6.9	7 17.8	+59.8	6.9	8 17.4	+59.7	7.0	9 16.9	+59.8	7.0	10 16.5	+59.8	7.0	40
41	4 19.3	+59.7	6.8	5 18.9	+59.7	6.8	6 18.4	+59.8	6.8	7 18.0	+59.8	6.8	8 17.6	+59.8	6.9	9 17.1	+59.8	6.9	10 16.7	+59.8	6.9	11 16.3	+59.8	6.9	41
42	5 19.0	+59.7	6.7	6 18.6	+59.7	6.7	7 18.2	+59.7	6.7	8 17.8	+59.7	6.7	9 17.4	+59.7	6.8	10 16.9	+59.8	6.8	11 16.5	+59.8	6.8	12 16.1	+59.8	6.8	42
43	6 18.7	+59.8	6.6	7 18.3	+59.7	6.6	8 17.9	+59.8	6.6	9 17.5	+59.8	6.7	10 17.1	+59.8	6.7	11 16.7	+59.8	6.7	12 16.3	+59.8	6.7	13 15.9	+59.8	6.8	43
44	7 18.5	+59.7	6.5	8 18.1	+59.7	6.5	9 17.7	+59.7	6.5	10 17.3	+59.8	6.6	11 16.9	+59.7	6.6	12 16.5	+59.8	6.6	13 16.1	+59.8	6.6	14 15.7	+59.8	6.7	44
45	8 18.2	+59.7	6.4	9 17.8	+59.8	6.4	10 17.4	+59.8	6.5	11 17.1	+59.7	6.5	12 16.7	+59.8	6.5	13 16.3	+59.8	6.5	14 15.9	+59.8	6.6	15 15.5	+59.8	6.6	45
46	9 17.9	+59.7	6.3	10 17.6	+59.7	6.3	11 17.2	+59.7	6.4	12 16.8	+59.8	6.4	13 16.4	+59.8	6.4	14 16.1	+59.7	6.4	15 15.7	+59.8	6.5	16 15.3	+59.8	6.5	46
47	10 17.6	+59.8	6.2	11 17.3	+59.7	6.2	12 16.9	+59.8	6.3	13 16.6	+59.7	6.3	14 16.2	+59.8	6.3	15 15.8	+59.8	6.3	16 15.5	+59.8	6.4	17 15.1	+59.8	6.4	47
48	11 17.4	+59.7	6.1	12 17.0	+59.8	6.1	13 16.7	+59.7	6.2	14 16.3	+59.7	6.2	15 16.0	+59.7	6.2	16 15.6	+59.8	6.3	17 15.3	+59.7	6.3	18 14.9	+59.8	6.3	48
49	12 17.1	+59.7	6.0	13 16.8	+59.7	6.1	14 16.4	+59.8	6.1	15 16.1	+59.7	6.1	16 15.7	+59.8	6.1	17 15.4	+59.8	6.2	18 15.0	+59.8	6.2	19 14.7	+59.8	6.2	49
50	13 16.8	+59.7	5.9	14 16.5	+59.7	6.0	15 16.2	+59.7	6.0	16 15.8	+59.7	6.0	17 15.5	+59.7	6.0	18 15.2	+59.7	6.1	19 14.8	+59.8	6.1	20 14.5	+59.8	6.2	50
51	14 16.5	+59.7	5.8	15 16.2	+59.8	5.9	16 15.9	+59.7	5.9	17 15.6	+59.7	5.9	18 15.3	+59.7	5.9	19 14.9	+59.7	6.0	20 14.6	+59.8	6.0	21 14.3	+59.8	6.1	51
52	15 16.2	+59.8	5.7	16 15.9	+59.8	5.8	17 15.6	+59.7	5.8	18 15.3	+59.8	5.8	19 15.0	+59.8	5.9	20 14.7	+59.8	5.9	21 14.4	+59.8	5.9	22 14.1	+59.7	6.0	52
53	16 16.0	+59.8	5.6	17 15.7	+59.7	5.7	18 15.4	+59.7	5.7	19 15.1	+59.7	5.7	20 14.8	+59.7	5.8	21 14.5	+59.8	5.8	22 14.2	+59.7	5.8	23 13.8	+59.8	5.9	53
54	17 15.7	+59.7	5.5	18 15.4	+59.7	5.6	19 15.1	+59.7	5.6	20 14.8	+59.8	5.6	21 14.5	+59.8	5.7	22 14.2	+59.7	5.7	23 13.9	+59.8	5.7	24 13.6	+59.8	5.8	54
55	18 15.4	+59.7	5.4	19 15.1	+59.7	5.5	20 14.8	+59.8	5.5	21 14.6	+59.7	5.5	22 14.3	+59.7	5.6	23 14.0	+59.7	5.6	24 13.7	+59.8	5.6	25 13.4	+59.7	5.7	55
56	19 15.1	+59.7	5.3	20 14.8	+59.7	5.3	21 14.6	+59.7	5.4	22 14.3	+59.7	5.4	23 14.0	+59.7	5.4	24 13.7	+59.8	5.5	25 13.5	+59.7	5.5	26 13.2	+59.7	5.6	56
57	20 14.8	+59.7	5.2	21 14.5	+59.7	5.2	22 14.3	+59.7	5.3	23 14.0	+59.7	5.3	24 13.8	+59.7	5.4	25 13.5	+59.7	5.4	26 13.2	+59.8	5.4	27 12.9	+59.8	5.5	57
58	21 14.5	+59.7	5.1	22 14.2	+59.7	5.1	23 14.0	+59.7	5.2	24 13.7	+59.8	5.2	25 13.5	+59.7	5.3	26 13.2	+59.8	5.3	27 13.0	+59.7	5.3	28 12.7	+59.8	5.4	58
59	22 14.2	+59.6	5.0	23 13.9	+59.7	5.0	24 13.7	+59.7	5.1	25 13.5	+59.7	5.1	26 13.2	+59.7	5.2	27 13.0	+59.7	5.2	28 12.7	+59.7	5.3	29 12.5	+59.7	5.3	59
60	23 13.8	+59.7	4.9	24 13.6	+59.7	4.9	25 13.4	+59.7	5.0	26 13.2	+59.7	5.0	27 12.9	+59.7	5.0	28 12.7	+59.7	5.1	29 12.5	+59.8	5.1	30 12.2	+59.8	5.2	60
61	24 13.5	+59.7	4.8	25 13.3	+59.7	4.8	26 13.1	+59.7	4.8	27 12.9	+59.7	4.9	28 12.7	+59.7	4.9	29 12.4	+59.8	5.0	30 12.2	+59.7	5.0	31 12.0	+59.8	5.1	61
62	25 13.2	+59.7	4.7	26 13.0	+59.7	4.7	27 12.8	+59.7	4.7	28 12.6	+59.7	4.8	29 12.3	+59.7	4.8	30 12.2	+59.7	4.9	31 12.0	+59.7	4.9	32 11.7	+59.8	5.0	62
63	26 12.9	+59.6	4.5	27 12.7	+59.7	4.6	28 12.5	+59.7	4.6	29 12.3	+59.7	4.7	30 12.1	+59.7	4.7	31 11.9	+59.7	4.8	32 11.7	+59.8	4.8	33 11.5	+59.8	4.9	63
64	27 12.5	+59.7	4.4	28 12.4	+59.6	4.5	29 12.2	+59.7	4.5	30 12.0	+59.7	4.6	31 11.8	+59.7	4.6	32 11.6	+59.7	4.6	33 11.4	+59.7	4.7	34 11.2	+59.7	4.8	64
65	28 12.2	+59.7	4.3	29 12.0	+59.7	4.3	30 11.9	+59.6	4.4	31 11.7	+59.7	4.4	32 11.5	+59.7	4.5	33 11.3	+59.7	4.5	34 11.1	+59.7	4.6	35 10.9	+59.8	4.6	65
66	29 11.9	+59.7	4.2	30 11.7	+59.7	4.2	31 11.5	+59.7	4.3	32 11.4	+59.6	4.3	33 11.2	+59.7	4.4	34 11.0	+59.7	4.4	35 10.8	+59.7	4.5	36 10.7	+59.7	4.5	66
67	30 11.5	+59.6	4.1	31 11.4	+59.7	4.1	32 11.2	+59.7	4.1	33 11.0	+59.7	4.2	34 10.9	+59.7	4.2	35 10.7	+59.7	4.3	36 10.5	+59.7	4.3	37 10.4	+59.7	4.4	67
68	31 11.1	+59.6	3.9	32 11.0	+59.6	4.0	33 10.9	+59.6	4.0	34 10.7	+59.7	4.1	35 10.6	+59.6	4.1	36 10.4	+59.7	4.2	37 10.2	+59.7	4.2	38 10.1	+59.7	4.3	68
69	32 10.8	+59.6	3.8	33 10.6	+59.7	3.8	34 10.5	+59.6	3.9	35 10.4	+59.6	3.9	36 10.2	+59.7	4.0	37 10.1	+59.6	4.0	38 09.9	+59.7	4.1	39 09.8	+59.7	4.1	69
70	33 10.4	+59.6	3.7	34 10.3	+59.6	3.7	35 10.1	+59.7	3.8	36 10.0	+59.6	3.8	37 09.9	+59.6	3.8	38 09.7	+59.7	3.9	39 09.6	+59.7	4.0	40 09.5	+59.6	4.0	70
71	34 10.0	+59.6	3.5	35 09.9	+59.6	3.6	36 09.8	+59.6	3.6	37 09.7	+59.6	3.7	38 09.5	+59.7	3.7	39 09.4	+59.7	3.8	40 09.3	+59.6	3.8	41 09.1	+59.7	3.9	71
72	35 09.6	+59.6	3.4	36 09.5	+59.6	3.5	37 09.4	+59.6	3.5	38 09.3	+59.6	3.6	39 09.2	+59.6	3.6	40 09.1	+59.6	3.6	41 08.9	+59.7	3.7	42 08.8	+59.7	3.7	72
73	36 09.2	+59.6	3.2	37 09.1	+59.6	3.3	38 09.0	+59.6	3.3	39 08.9	+59.6	3.4	40 08.8	+59.6	3.4	41 08.7	+59.6	3.5	42 08.6	+59.6	3.5	43 08.5	+59.6	3.6	73
74	37 08.8	+59.6	3.1	38 08.7	+59.6	3.1	39 08.6	+59.6	3.2	40 08.5	+59.6	3.2	41 08.4	+59.6	3.3	42 08.3	+59.6	3.3	43 08.2	+59.7	3.4	44 08.1	+59.7	3.4	74
75	38 08.4	+59.5	3.0	39 08.3	+59.6	3.0	40 08.2	+59.6	3.1	41 08.1	+59.6	3.1	42 08.1	+59.6	3.1	43 07.9	+59.6	3.2	44 07.9	+59.6	3.2	45 07.8	+59.6	3.3	75
76	39 07.9	+59.6	2.8	40 07.9	+59.5	2.8	41 07.8	+59.6	2.9	42 07.7	+59.6	2.9	43 07.6	+59.6	3.0	44 07.6	+59.5	3.0	45 07.5	+59.6	3.1	46 07.4	+59.6	3.1	76
77	40 07.5	+59.5	2.6	41 07.4	+59.5	2.7	42 07.4	+59.5	2.7	43 07.3	+59.5	2.8	44 07.2	+59.6	2.8	45 07.1	+59.6	2.9	46 07.1	+59.6	2.9	47 07.0	+59.6	3.0	77
78	41 07.0	+59.6	2.5	42 07.0	+59.5	2.5	43 06.9	+59.6	2.6	44 06.8	+59.6	2.6	45 06.8	+59.5	2.6	46 06.7	+59.6	2.7	47 06.7	+59.5	2.7	48 06.6	+59.6	2.8	78
79	42 06.5	+59.6	2.3	43 06.5	+59.5	2.3	44 06.4	+59.6	2.4	45 06.4	+59.5	2.4	46 06.3	+59.6	2.5	47 06.3	+59.5	2.5	48 06.2	+59.6	2.6	49 06.2	+59.5	2.6	79
80	43 06.1	+59.4	2.1	44 06.0	+59.5	2.2	45 06.0	+59.5	2.2	46 05.9	+59.5	2.2	47 05.9	+59.5	2.3	48 05.8	+59.6	2.3	49 05.8	+59.5	2.4	50 05.7	+59.6	2.4	80
81	44 05.5	+59.5	2.0	45 05.5	+59.5	2.0	46 05.5	+59.5	2.0	47 05.4	+59.5	2.1	48 05.4	+59.5	2.1	49 05.4	+59.5	2.1	50 05.3	+59.5	2.2	51 05.3	+59.5	2.2	81
82	45 05.0	+59.5	1.8	46 05.0	+59.4	1.8	47 05.0	+59.4	1.8	48 04.9	+59.5	1.9	49 04.9	+59.5	1.9	50 04.9	+59.5	1.9	51 04.8	+59.5	2.0	52 04.8	+59.5	2.0	82
83	46 04.5	+59.4	1.6	47 04.4	+59.5	1.6	48 04.4	+59.5	1.6	49 04.4	+59.4	1.7	50 04.4	+59.4	1.7	51 04.3	+59.5	1.7	52 04.3	+59.5	1.8	53 04.3	+59.5	1.8	83
84	47 03.9	+59.4	1.4	48 03.9	+59.4	1.4	49 03.9	+59.4	1.4	50 03.9	+59.4	1.5	51 03.8	+59.5	1.5	52 03.8	+59.5	1.5	53 03.8	+59.4	1.6	54 03.8	+59.4	1.6	84
85	48 03.3	+59.4	1.2	49 03.3	+59.4	1.2	50 03.3	+59.4	1.2	51 03.3	+59.4	1.2	52 03.3	+59.4	1.3	53 03.3	+59.3	1.3	54 03.2	+59.5	1.3	55 03.2	+59.4	1.4	85
86	49 02.7	+59.4	1.0	50 02.7	+59.4	1.0	51 02.7	+59.4	1.0	52 02.7	+59.4	1.0	53 02.7	+59.4	1.0	54 02.7	+59.4	1.1	55 02.7	+59.3	1.1	56 02.6	+59.4	1.1	86
87	50 02.1	+59.3	0.7	51 02.1	+59.3	0.7	52 02.1	+59.3	0.8	53 02.1	+59.3	0.8	54 02.1	+59.3	0.8	55 02.0	+59.4	0.8	56 02.0	+59.3	0.9	57 02.0	+59.3	0.9	87
88	51 01.4	+59.3	0.5	52 01.4	+59.3	0.5	53 01.4	+59.3	0.5	54 01.4	+59.3	0.5	55 01.4	+59.3	0.5	56 01.4	+59.3	0.6	57 01.4	+59.3	0.6	58 01.4	+59.3	0.6	88
89	52 00.7	+59.3	0.3	53 00.7	+59.3	0.3	54 00.7	+59.3	0.3	55 00.7	+59.3	0.3	56 00.7	+59.3	0.3	57 00.7	+59.3	0.3	58 00.7	+59.3	0.3	59 00.7	+59.3	0.3	89
90	53 00.0	+59.2	0.0	54 00.0	+59.2	0.0	55 00.0	+59.2	0.0	56 00.0	+59.2	0.0	57 00.0	+59.2	0.0	58 00.0	+59.2	0.0	59 00.0	+59.2	0.0	60 00.0	+59.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 171°, 189°**

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°–Z

Dec.	Hc 53°	d	Z	Hc 54°	d	Z	Hc 55°	d	Z	Hc 56°	d	Z	Hc 57°	d	Z	Hc 58°	d	Z	Hc 59°	d	Z	Hc 60°	d	Z	Dec.
0	36 20.8	+59.5	167.5	35 22.2	+59.5	167.7	34 23.6	+59.5	167.9	33 24.9	+59.6	168.0	32 26.2	+59.6	168.1	31 27.5	+59.6	168.3	30 28.7	+59.7	168.4	29 29.9	+59.7	168.5	0
1	37 20.3	+59.5	167.4	36 21.7	+59.5	167.5	35 23.1	+59.6	167.7	34 24.5	+59.6	167.9	33 25.8	+59.6	168.0	32 27.1	+59.6	168.1	31 28.4	+59.7	168.3	30 29.6	+59.7	168.4	1
2	38 19.8	+59.4	167.2	37 21.2	+59.5	167.4	36 22.7	+59.5	167.6	35 24.1	+59.5	167.7	34 25.4	+59.6	167.9	33 26.7	+59.7	168.0	32 28.0	+59.7	168.1	31 29.3	+59.7	168.3	2
3	39 19.2	+59.5	167.0	38 20.7	+59.5	167.2	37 22.2	+59.5	167.4	36 23.6	+59.6	167.6	35 25.0	+59.6	167.7	34 26.4	+59.6	167.9	33 27.7	+59.6	168.0	32 29.0	+59.7	168.1	3
4	40 18.7	+59.4	166.9	39 20.2	+59.5	167.1	38 21.7	+59.5	167.2	37 23.2	+59.5	167.4	36 24.6	+59.6	167.6	35 26.0	+59.6	167.7	34 27.4	+59.6	167.9	33 28.7	+59.6	168.0	4
5	41 18.1	+59.4	166.7	40 19.7	+59.4	166.9	39 21.2	+59.5	167.1	38 22.7	+59.6	167.3	37 24.2	+59.6	167.4	36 25.6	+59.6	167.6	35 27.0	+59.6	167.7	34 28.3	+59.7	167.9	5
6	42 17.5	+59.4	166.5	41 19.1	+59.5	166.7	40 20.7	+59.5	166.9	39 22.3	+59.5	167.1	38 23.8	+59.5	167.3	37 25.2	+59.6	167.4	36 26.6	+59.7	167.6	35 28.0	+59.6	167.8	6
7	43 16.9	+59.4	166.3	42 18.6	+59.4	166.5	41 20.2	+59.5	166.7	40 21.8	+59.5	166.9	39 23.3	+59.6	167.1	38 24.8	+59.6	167.3	37 26.2	+59.7	167.5	36 27.7	+59.6	167.6	7
8	44 16.3	+59.3	166.1	43 18.0	+59.4	166.3	42 19.7	+59.4	166.6	41 21.3	+59.5	166.8	40 22.9	+59.4	167.0	39 24.4	+59.5	167.1	38 25.9	+59.6	167.3	37 27.3	+59.6	167.5	8
9	45 15.6	+59.3	165.9	44 17.4	+59.4	166.1	43 19.1	+59.4	166.4	42 20.8	+59.4	166.6	41 22.4	+59.5	166.8	40 23.9	+59.6	167.0	39 25.5	+59.7	167.2	38 26.9	+59.7	167.3	9
10	46 14.9	+59.3	165.7	45 16.8	+59.3	165.9	44 18.5	+59.4	166.2	43 20.2	+59.5	166.4	42 21.9	+59.5	166.6	41 23.5	+59.5	166.8	40 25.1	+59.5	167.0	39 26.6	+59.6	167.1	10
11	47 14.2	+59.3	165.5	46 16.1	+59.3	165.7	45 17.9	+59.4	166.0	44 19.7	+59.4	166.2	43 21.4	+59.5	166.4	42 23.0	+59.6	166.7	41 24.6	+59.6	166.9	40 26.2	+59.6	167.1	11
12	48 13.5	+59.2	165.2	47 15.4	+59.3	165.5	46 17.3	+59.4	165.8	45 19.1	+59.4	166.0	44 20.9	+59.4	166.3	43 22.6	+59.5	166.5	42 24.2	+59.5	166.7	41 25.8	+59.6	166.9	12
13	49 12.7	+59.3	165.0	48 14.7	+59.3	165.3	47 16.7	+59.3	165.6	46 18.5	+59.4	165.8	45 20.3	+59.5	166.1	44 22.1	+59.5	166.3	43 23.7	+59.6	166.5	42 25.4	+59.5	166.7	13
14	50 12.0	+59.1	164.7	49 14.0	+59.3	165.0	48 16.0	+59.3	165.3	47 17.9	+59.4	165.6	46 19.8	+59.4	165.9	45 21.6	+59.4	166.1	44 23.3	+59.5	166.4	43 24.9	+59.6	166.6	14
15	51 11.1	+59.2	164.5	50 13.3	+59.2	164.8	49 15.3	+59.3	165.1	48 17.3	+59.3	165.4	47 19.2	+59.4	165.7	46 21.0	+59.5	165.9	45 22.8	+59.5	166.2	44 24.5	+59.6	166.4	15
16	52 10.3	+59.1	164.2	51 12.5	+59.2	164.5	50 14.6	+59.3	164.9	49 16.6	+59.4	165.2	48 18.6	+59.4	165.5	47 20.5	+59.4	165.7	46 22.3	+59.5	166.0	45 24.1	+59.5	166.2	16
17	53 09.4	+59.0	163.9	52 11.7	+59.1	164.3	51 13.9	+59.2	164.6	50 16.0	+59.3	164.9	49 18.0	+59.3	165.2	48 19.9	+59.4	165.5	47 21.8	+59.5	165.8	46 23.6	+59.5	166.1	17
18	54 08.4	+59.0	163.6	53 10.8	+59.1	164.0	52 13.1	+59.2	164.4	51 15.3	+59.2	164.7	50 17.3	+59.4	165.0	49 19.3	+59.3	165.3	48 21.3	+59.4	165.6	47 23.1	+59.5	165.9	18
19	55 07.4	+59.0	163.3	54 09.9	+59.1	163.7	53 12.3	+59.1	164.1	52 14.5	+59.2	164.4	51 16.7	+59.3	164.8	50 18.7	+59.4	165.1	49 20.7	+59.4	165.4	48 22.6	+59.5	165.7	19
20	56 06.4	+58.9	163.0	55 09.0	+59.0	163.4	54 11.4	+59.1	163.8	53 13.7	+59.2	164.2	52 16.0	+59.2	164.5	51 18.1	+59.3	164.9	50 20.1	+59.4	165.2	49 22.1	+59.4	165.5	20
21	57 05.3	+58.9	162.6	56 08.0	+58.9	163.1	55 10.5	+59.1	163.5	54 12.9	+59.2	163.9	53 15.2	+59.2	164.3	52 17.4	+59.3	164.6	51 19.5	+59.4	165.0	50 21.5	+59.5	165.3	21
22	58 04.2	+58.8	162.3	57 06.9	+58.9	162.8	56 09.6	+59.0	163.2	55 12.1	+59.1	163.6	54 14.4	+59.2	164.0	53 16.7	+59.3	164.4	52 18.9	+59.3	164.7	51 21.0	+59.4	165.1	22
23	59 03.0	+58.7	161.9	58 05.8	+58.9	162.4	57 08.6	+58.9	162.9	56 11.2	+59.0	163.3	55 13.6	+59.2	163.7	54 16.0	+59.2	164.1	53 18.2	+59.3	164.5	52 20.4	+59.3	164.8	23
24	60 01.7	+58.6	161.5	59 04.7	+58.7	162.0	58 07.5	+58.9	162.5	57 10.2	+59.0	163.0	56 12.8	+59.1	163.4	55 15.2	+59.2	163.8	54 17.5	+59.3	164.2	53 19.7	+59.4	164.6	24
25	61 00.3	+58.5	161.1	60 03.4	+58.7	161.6	59 06.4	+58.8	162.2	58 09.2	+59.0	162.6	57 11.9	+59.0	163.1	56 14.4	+59.2	163.5	55 16.8	+59.2	163.9	54 19.1	+59.3	164.3	25
26	61 58.8	+58.5	160.6	61 02.1	+58.7	161.2	60 05.2	+58.8	161.8	59 08.2	+58.9	162.3	58 10.9	+59.0	162.8	57 13.6	+59.1	163.2	56 16.0	+59.2	163.7	55 18.4	+59.5	164.1	26
27	62 57.3	+58.3	160.1	62 00.8	+58.5	160.7	61 04.0	+58.7	161.3	60 07.1	+58.8	161.9	59 09.9	+59.0	162.4	58 12.7	+59.0	162.9	57 15.2	+59.2	163.4	56 17.7	+59.2	163.8	27
28	63 55.6	+58.2	159.6	62 59.3	+58.4	160.3	62 02.7	+58.6	160.9	61 05.9	+58.7	161.5	60 08.9	+58.9	162.1	59 11.7	+59.0	162.6	58 14.4	+59.1	163.1	57 16.9	+59.2	163.5	28
29	64 53.8	+58.1	159.0	63 57.7	+58.3	159.8	63 01.3	+58.4	160.4	62 04.6	+58.7	161.1	61 07.8	+58.8	161.7	60 10.7	+58.9	162.2	59 13.5	+59.0	162.7	58 16.1	+59.2	163.2	29
30	65 51.9	+57.9	158.4	64 56.0	+58.1	159.2	63 59.7	+58.4	159.9	63 03.3	+58.5	160.6	62 06.6	+58.7	161.2	61 09.6	+58.9	161.8	60 12.5	+59.0	162.4	59 15.3	+59.1	162.9	30
31	66 49.8	+57.8	157.8	65 54.1	+58.1	158.6	64 58.1	+58.3	159.4	64 01.8	+58.5	160.1	63 05.3	+58.6	160.8	62 08.5	+58.8	161.4	61 11.5	+59.0	162.0	60 14.4	+59.0	162.6	31
32	67 47.6	+57.6	157.1	66 52.2	+57.8	158.0	65 56.4	+58.1	158.8	65 00.3	+58.3	159.6	64 03.9	+58.5	160.3	63 07.3	+58.7	161.0	62 10.5	+58.8	161.6	61 13.4	+59.0	162.2	32
33	68 45.2	+57.3	156.3	67 50.0	+57.7	157.3	66 54.5	+57.9	158.2	65 58.6	+58.2	159.0	65 02.4	+58.4	159.8	64 06.0	+58.6	160.5	63 09.3	+58.8	161.2	62 12.4	+58.9	161.8	33
34	69 42.5	+57.1	155.5	68 47.7	+57.4	156.5	67 52.4	+57.8	157.5	66 56.8	+58.0	158.4	66 00.8	+58.3	159.3	65 04.6	+58.5	160.0	64 08.1	+58.7	160.7	63 11.3	+58.9	161.4	34
35	70 39.6	+56.7	154.6	69 45.1	+57.2	155.7	68 50.2	+57.6	156.8	67 54.8	+57.9	157.8	66 59.1	+58.2	158.7	66 03.1	+58.4	159.5	65 06.8	+58.5	160.2	64 10.2	+58.7	160.9	35
36	71 36.3	+56.5	153.6	70 42.3	+56.9	154.8	69 47.8	+57.3	156.0	68 52.7	+57.7	157.1	67 57.3	+58.0	158.0	67 01.5	+58.2	158.9	66 05.3	+58.5	159.7	65 08.9	+58.7	160.5	36
37	72 32.8	+56.0	152.5	71 39.2	+56.6	153.9	70 45.1	+57.0	155.1	69 50.4	+57.5	156.3	68 55.3	+57.7	157.3	67 59.7	+58.1	158.3	67 03.8	+58.3	159.2	66 07.6	+58.5	160.0	37
38	73 28.8	+55.6	151.2	72 35.8	+56.2	152.7	71 42.1	+56.8	154.2	70 47.9	+57.1	155.4	69 53.0	+57.6	156.6	68 57.8	+57.9	157.6	68 02.1	+58.2	158.6	67 06.1	+58.4	159.4	38
39	74 24.4	+54.9	149.9	73 32.0	+55.7	151.6	72 38.9	+56.3	153.1	71 45.0	+56.9	154.5	70 50.6	+57.3	155.7	69 55.7	+57.7	156.8	69 00.3	+58.0	157.9	68 04.5	+58.3	158.8	39
40	75 19.3	+54.3	148.3	74 27.7	+55.2	150.2	73 35.2	+55.9	151.9	72 41.9	+56.5	153.4	71 47.9	+57.1	154.8	70 53.4	+57.4	156.0	69 58.3	+57.8	157.1	69 02.8	+58.1	158.2	40
41	76 13.6	+53.5	146.6	75 22.9	+54.6	148.7	74 31.1	+55.4	150.6	73 38.4	+56.1	152.3	72 45.0	+56.7	153.8	71 50.8	+57.2	155.1	70 56.1	+57.6	156.3	70 00.9	+58.0	157.5	41
42	77 07.1	+52.5	144.6	76 17.5	+53.7	147.0	75 26.5	+54.8	149.1	74 34.5	+55.6	151.0	73 41.7	+56.3	152.6	72 48.0	+56.9	154.1	71 53.7	+57.3	155.5	70 58.9	+57.7	156.7	42
43	77 59.6	+51.2	142.4	77 11.2	+52.7	145.1	76 21.3	+54.0	147.4	75 30.1	+55.0	149.5	74 37.9	+55.8	151.4	73 44.9	+56.4	152.9	72 51.0	+57.0	154.5	71 56.6	+57.5	155.8	43
44	78 50.8	+49.6	139.8	78 03.9	+51.6	142.8	77 15.3	+53.0	145.5	76 25.1	+54.2	147.9	75 33.7	+55.2	149.9	74 41.3	+56.0	151.8	73 48.0	+56.7	153.4	72 54.1	+57.1	154.9	44
45	79 40.4	+47.7•	136.8	78 55.5	+50.0•	140.3	78 08.3	+51.8•	143.3	77 19.3	+53.4•	146.0	76 28.9	+54.5•	148.3	75 37.3	+55.4•	150.4	74 44.7	+56.2•	152.2	73 51.2	+56.8•	153.8	45
46	80 28.1	+45.2•	133.2	79 45.5	+48.1•	137.3	79 00.1	+50.4•	140.8	78 12.7	+52.1•	143.8	77 23.4	+53.6•	146.5	76 32.7	+54.8•	148.8	75 40.9	+55.6•	150.8	74 48.0	+56.4•	152.6	46
47	81 13.3	+42.0•	129.1	80 33.6	+45.6•	133.8	79 50.5	+48.5•	137.8	79 04.8	+50.7•	141.3	78 17.0	+52.5•	144.1	77 27.5	+53.9•	147.0	76 36.5	+55.0•	149.3	75 44.4	+55.9•	151.3	47
48	81 55.3	+37.9•	124.2	81 19.2	+42.5•	129.7	80 39.0	+46.1•	134.3	79 55.6	+48.9•	138.4	79 09.5	+51.1•	141.8	78 21.4	+52.8•	144.9	77 31.5	+54.2•	147.5	76 40.3	+55.2•	149.7	48
49	82 33.2	+32.7•	118.5	82 01.7	+38.4•	124.8	81 25.1	+43.0•	130.2	80 44.5	+46.6•	134.9	80 00.6	+49.4•	138.9	79 14.2	+51.5•	142.4	78 25.7	+53.2•	145.4	77 35.5	+54.5•	148.0	49
50	83 05.9	+26.1•	111.8	82 40.1	+33.2•	119.0	82 08.1	+39.0•	125.3	81 31.1	+43.5•	130.8	80 50.0	+47.0•	135.5	80 05.7	+49.7•	139.5	79 18.9	+51.8•	143.0	78 30.0	+53.5•	146.0	50
51	83 32.0	+18.2•	104.0	83 13.3	+26.6•	112.2	82 47.1	+33.7•	119.5	82 14.6	+39.5•	125.9	81 37.0	+44.0•	131.4	80 55.4	+47.5•	136.2	80 10.7	+50.2•	140.2	79 23.5	+52.2•	143.6	51
52	83 50.2	+9.0•	95.3	83 39.9	+18.5•	104.3	83 20.8	+27.1•	112.7	82 54.1	+34.2•	120.1	82 21.0	+40.1•	126.6	81 42.9	+44.6•	132.1	81 00.9	+48.0•	136.8	80 15.7	+50.6•	140.8	52
53	83 59.2	–0.8•	86.0	83 58.4	+9.2•	95.5	83 48.0	+18.5•	104.7	83 28.3	+27.6•	113.2	83 01.1	+34.8•	120.7	82 27.5	+40.6•	127.2	81 48.9	+45.1•	132.8	81 06.3	+48.5•	137.5	53
54	83 58.4	–10.5•	76.5	84 07.6	–0.8•	86.0	84 06.8	+9.3•	95.7	83 55.9	+19.3•	105.1	83 35.9	+28.2•	113.7	83 08.1	+35.5•	121.4	82 34.0	+41.2•	127.7	81 54.8	+45.7•	133.5	54
55	83 47.9	–19.6•	67.2	84 06.8	–10.9•	76.2	84 16.1	–0.9•	85.9	84 15.2	+9.6•	95.9	84 04.1	+19.7•	105.5	83 43.6	+28.7•	114.3	83 15.2	+36.1•	122.0	82 40.5	+41.8•	128.6	55
56	83 28.3	–27.2•	58.7	83 55.9	–20.0•	66.7	84 15.2	–11.1•	75.9	84 24.8	–1.0•	85.9	84 23.8	+9.7•	96.1	84 12.3	+20.1•	105.9	83 51.3	+29.3•	114.9	83 22.3	+36.7•	122.7	56
57	83 01.1	–33.6•	51.1	83 35.9	–27.8•	58.0	84 04.1	–20.5•	66.2	84 23.8	–11.5•	75.6	84 33.5	–1.1•	85.8	84 32.4	+9.9•	96.3	84 20.6	+20.5•	106.4	83 59.0	+29.9•	115.5	57
58	82 27.5	–38.6•	44.5	83 08.1	–34.1•	50.3	83 43.6	–28.4•	57.4	84 12.3	–21.0•	65.7	84 32.4	–11.8•	75.3	84 42.3	–1.2•	85.8	84 41.1	+10.2•	96.5	84 28.9	+21.0•	106.9	58
59	81 48.9	–42.6•	38.9	82 34.0	–39.2•	43.7	83 15.2	–34.7•	49.6	83 51.3	–28.6•	56.8	84 20.6	–21.3•	65.7	84 41.1	–12.2•	74.9	84 49.9	–1.4•	85.7	84 49.9	+10.4•	96.8	59
60	81 06.3	–45.6•	34.2	81 54.8	–43.1•	38.1	82 40.5	–39.8•	42.9	83 22.3	–35.4•	48.8	83 59.0	–29.6•	55.9	84 28.9	–22.1•	64.5	84 49.9	–12.6•	74.6	85 00.3	–1.5•	85.7	60
61	80 20.7	–48.0•	30.1	81 11.7	–46.1•	33.4	82 00.7	–43.6•	37.3	82 46.9	–40.3•	42.1	83 29.4	–36.0•	48.0	84 06.8	–30.3•	55.2	84 37.3	–22.7•	63.9	84 58.8	–13.1•	74.2	61
62	79 32.7	–50.0•	26.7	80 25.6	–48.4•	29.4	81 17.1	–46.4•	32.6	82 06.6	–44.1•	36.4	82 53.4	–41.0•	41.2	83 36.7	–37.1•	47.1	84 14.6	–31.0•	54.4	84 45.7	–23.3•	63.3	62
63	78 42.7	–51.4	23.8	79 37.2	–50.3	25.9	80 30.6	–48.9	28.6	81 22.5	–47.1	31.7	82 12.4	–44.6	35.6	82 59.8	–41.6	40.3	83 43.6	–37.4	46.2	84 22.4	–31.7	53.5	63
64	77 51.3	–52.6	21.2	78 46.9	–51.7	23.0	79 41.7	–50.7	25.2	80 35.4	–49.3	27.7	81 27.8	–47.6	30.8	82 18.2	–45.2	34.6	83 06.2	–42.2	39.3	83 50.7	–38.1	45.2	64
65	76 58.7	–53.6	19.0	77 55.2	–53.0	20.5	78 51.0	–52.1	22.3	79 46.1	–51.0	24.4	80 40.2	–49.7	26.9	81 33.0	–48.1	30.0	82 23.0	–45.8	33.7	83 12.6	–42.9	38.4	65
66	76 05.1	–54.4	17.1	77 02.2	–53.8	18.4	77 58.9	–53.2	19.8	78 55.1	–52.4	21.6	79 50.5	–51.4	23.6	80 44.9	–50.1	26.1	81 38.2	–48.6	29.0	82 29.7	–46.5	32.7	66
67	75 10.7	–55.1	15.4	76 08.4	–54.7	16.5	77 05.7	–54.1	17.7	78 02.7	–53.6	19.1	78 59.1	–52.8	20.8	79 54.8	–51.8	22.8	80 49.6	–50.6	25.2	81 43.2	–49.0	28.1	67
68	74 15.6	–55.7	13.9	75 13.7	–55.3	14.8	76 11.6	–54.9	15.8	77 09.1	–54.3	17.0	78 06.3	–53.8	18.4	79 03.0	–53.1	20.0	79 59.0	–52.2	22.0	80 54.2	–51.1	24.3	68
69	73 19.9	–56.0	12.5	74 18.4	–55.8	13.3	75 16.7	–55.5	14.2	76 14.8	–55.1	15.2	77 12.5	–54.6	16.3	78 09.9	–54.1	17.7	79 06.8	–53.4	19.2	80 03.1	–52.5	21.1	69
70	72 23.9	–56.5	11.3	73 22.6	–56.2	12.0	74 21.2	–56.0	12.7	75 19.7	–55.7	13.6	76 17.9	–55.4	14.5	77 15.8	–54.9	15.6	78 13.4	–54.4	16.9	79 10.6	–53.8	18.4	70
71	71 27.4	–56.9	10.2	72 26.4	–56.7	10.8	73 25.2	–56.4	11.4	74 24.0	–56.2	12.1	75 22.5	–55.9	12.9	76 20.9	–55.6	13.9	77 19.0	–55.1	14.9	78 16.8	–54.6	16.2	71
72	70 30.5	–57.1	9.3	71 29.7	–57.0	9.7	72 28.8	–56.8	10.3	73 27.8	–56.6	10.9	74 26.6	–56.3	11.5	75 25.3	–56.1	12.3	76 23.9	–55.8	13.2	77 22.2	–55.4	14.2	72
73	69 33.4	–57.4	8.4	70 32.7	–57.2	8.8	71 32.0	–57.1	9.2	72 31.2	–57.0	9.7	73 30.3	–56.8	10.3	74 29.2	–56.5	10.9	75 28.1	–56.3	11.7	76 26.8	–56.1	12.5	73
74	68 36.0	–57.5	7.5	69 35.5	–57.5	7.9	70 34.9	–57.4	8.3	71 34.2	–57.2	8.7	72 33.5	–57.1	9.2	73 32.7	–56.9	9.7	74 31.8	–56.7	10.3	75 30.7	–56.5	11.0	74
75	67 38.5	–57.8	6.8	68 38.0	–57.7	7.1	69 37.5	–57.8	7.4	70 37.0	–57.5	7.8	71 36.4	–57.4	8.2	72 35.8	–57.3	8.6	73 35.1	–57.1	9.2	74 34.2	–56.9	9.7	75
76	66 40.7	–58.0	6.1	67 40.3	–57.9	6.3	68 39.9	–57.8	6.6	69 39.5	–57.7	6.9	70 39.0	–57.7	7.3	71 38.5	–57.5	7.7	72 38.0	–57.4	8.1	73 37.3	–57.2	8.6	76
77	65 42.7	–58.1	5.4	66 42.4	–58.0	5.7	67 42.1	–58.0	5.9	68 41.8	–57.9	6.2	69 41.4	–57.8	6.5	70 41.0	–57.7	6.8	71 40.6	–57.7	7.1	72 40.1	–57.5	7.5	77
78	64 44.6	–58.4	4.9	65 44.4	–58.3	5.0	66 44.1	–58.3	5.2	67 43.9	–58.2	5.5	68 43.6	–58.0	5.7	69 43.3	–58.0	6.0	70 42.9	–57.8	6.3	71 42.6	–57.8	6.6	78
79	63 46.4	–58.4	4.3	64 46.2	–58.3	4.5	65 46.0	–58.3	4.6	66 45.8	–58.2	4.8	67 45.6	–58.2	5.0	68 45.3	–58.1	5.2	69 45.1	–58.1	5.5	70 44.8	–58.0	5.8	79
80	62 48.0	–58.4	3.8	63 47.9	–58.4	3.9	64 47.7	–58.4	4.1	65 47.6	–58.4	4.2	66 47.4	–58.3	4.4	67 47.2	–58.2	4.6	68 47.0	–58.2	4.8	69 46.8	–58.2	5.0	80
81	61 49.6	–58.6	3.3	62 49.5	–58.6	3.4	63 49.3	–58.5	3.5	64 49.2	–58.4	3.7	65 49.1	–58.4	3.7	66 49.0	–58.4	4.0	67 48.8	–58.3	4.1	68 48.6	–58.3	4.3	81
82	60 51.0	–58.6	2.8	61 50.9	–58.6	2.9	62 50.8	–58.6	3.0	63 50.8	–58.6	3.1	64 50.7	–58.5	3.3	65 50.6	–58.5	3.4	66 50.5	–58.5	3.5	67 50.3	–58.4	3.7	82
83	59 52.4	–58.8	2.4	60 52.3	–58.7	2.5	61 52.2	–58.6	2.6	62 52.2	–58.7	2.7	63 52.1	–58.6	2.8	64 52.0	–58.6	2.9	65 52.0	–58.6	3.0	66 51.9	–58.6	3.1	83
84	58 53.6	–58.8	2.0	59 53.6	–58.8	2.1	60 53.6	–58.9	2.1	61 53.5	–58.7	2.2	62 53.5	–58.8	2.2	63 53.4	–58.7	2.4	64 53.4	–58.7	2.5	65 53.4	–58.7	2.5	84
85	57 54.8	–58.8	1.6	58 54.8	–58.8	1.7	59 54.8	–58.9	1.7	60 54.8	–58.9	1.8	61 54.7	–58.8	1.8	62 54.7	–58.9	1.9	63 54.7	–58.7	2.0	64 54.6	–58.8	2.0	85
86	56 56.0	–58.9	1.3	57 56.0	–58.9	1.3	58 55.9	–58.9	1.3	59 55.9	–58.9	1.4	60 55.9	–58.9	1.4	61 55.9	–58.9	1.5	62 55.9	–58.9	1.5	63 55.8	–58.8	1.6	86
87	55 57.1	–59.0	0.9	56 57.1	–59.0	1.0	57 57.0	–58.9	1.0	58 57.0	–59.0	1.0	59 57.0	–59.0	1.0	60 57.0	–59.0	1.1	61 57.0	–59.0	1.1	62 57.0	–59.0	1.1	87
88	54 58.1	–59.0	0.6	55 58.1	–59.0	0.6	56 58.1	–59.0	0.6	57 58.1	–59.0	0.7	58 58.1	–59.0	0.7	59 58.1	–59.0	0.7	60 58.1	–59.0	0.7	61 58.1	–59.0	0.7	88
89	53 59.1	–59.1	0.3	54 59.1	–59.1	0.3	55 59.1	–59.1	0.3	56 59.1	–59.1	0.3	57 59.1	–59.1	0.3	58 59.1	–59.1	0.3	59 59.1	–59.1	0.3	60 59.1	–59.1	0.4	89
90	53 00.0	–59.1	0.0	54 00.0	–59.1	0.0	55 00.0	–59.1	0.0	56 00.0	–59.1	0.0	57 00.0	–59.1	0.0	58 00.0	–59.1	0.0	59 00.0	–59.1	0.0	60 00.0	–59.1	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 20.8	−59.5	167.5	35 22.2	−59.5	167.7	34 23.6	−59.6	167.9	33 24.9	−59.6	168.0	32 26.2	−59.6	168.1	31 27.5	−59.7	168.3	30 28.7	−59.7	168.4	29 29.9	−59.7	168.5	0
1	35 21.3	−59.5	167.7	34 22.7	−59.5	167.9	33 24.0	−59.5	168.0	32 25.3	−59.6	168.1	31 26.6	−59.7	168.3	30 27.8	−59.7	168.4	29 29.0	−59.7	168.5	28 30.2	−59.7	168.6	1
2	34 21.8	−59.5	167.9	33 23.1	−59.5	168.0	32 24.4	−59.6	168.1	31 25.7	−59.6	168.3	30 26.9	−59.6	168.4	29 28.1	−59.7	168.5	28 29.3	−59.7	168.6	27 30.5	−59.7	168.7	2
3	33 22.3	−59.6	168.0	32 23.6	−59.6	168.1	31 24.8	−59.6	168.3	30 26.1	−59.6	168.4	29 27.3	−59.7	168.5	28 28.5	−59.7	168.6	27 29.6	−59.6	168.7	26 30.8	−59.7	168.8	3
4	32 22.7	−59.6	168.2	31 24.0	−59.6	168.3	30 25.2	−59.6	168.4	29 26.5	−59.7	168.5	28 27.6	−59.6	168.6	27 28.8	−59.7	168.7	26 30.0	−59.6	168.8	25 31.1	−59.7	168.9	4
5	31 23.2	−59.6	168.3	30 24.4	−59.6	168.4	29 25.6	−59.6	168.5	28 26.8	−59.6	168.7	27 28.0	−59.7	168.8	26 29.1	−59.6	168.9	25 30.2	−59.6	169.0	24 31.4	−59.8	169.0	5
6	30 23.6	−59.5	168.5	29 24.8	−59.6	168.6	28 26.0	−59.6	168.7	27 27.2	−59.7	168.8	26 28.3	−59.6	168.9	25 29.4	−59.6	169.0	24 30.5	−59.7	169.1	23 31.6	−59.7	169.1	6
7	29 24.1	−59.6	168.6	28 25.3	−59.6	168.7	27 26.4	−59.6	168.8	26 27.5	−59.6	168.9	25 28.7	−59.7	169.0	24 29.8	−59.7	169.1	23 30.8	−59.7	169.2	22 31.9	−59.7	169.2	7
8	28 24.5	−59.6	168.7	27 25.7	−59.6	168.8	26 26.8	−59.6	168.9	25 27.9	−59.7	169.0	24 29.0	−59.7	169.1	23 30.1	−59.7	169.2	22 31.1	−59.7	169.3	21 32.2	−59.8	169.3	8
9	27 24.9	−59.6	168.9	26 26.1	−59.7	169.0	25 27.2	−59.7	169.1	24 28.2	−59.6	169.1	23 29.3	−59.7	169.2	22 30.4	−59.7	169.3	21 31.4	−59.7	169.4	20 32.4	−59.7	169.4	9
10	26 25.3	−59.6	169.0	25 26.4	−59.6	169.1	24 27.5	−59.6	169.2	23 28.6	−59.7	169.3	22 29.6	−59.7	169.4	21 30.7	−59.8	169.4	20 31.7	−59.8	169.5	19 32.7	−59.8	169.5	10
11	25 25.8	−59.6	169.1	24 26.8	−59.6	169.2	23 27.9	−59.7	169.3	22 28.9	−59.7	169.4	21 29.9	−59.7	169.4	20 30.9	−59.7	169.5	19 31.9	−59.7	169.6	18 32.9	−59.8	169.6	11
12	24 26.2	−59.7	169.2	23 27.2	−59.6	169.3	22 28.2	−59.6	169.4	21 29.2	−59.6	169.5	20 30.2	−59.6	169.6	19 31.2	−59.7	169.6	18 32.2	−59.7	169.7	17 33.2	−59.8	169.7	12
13	23 26.5	−59.6	169.4	22 27.6	−59.7	169.5	21 28.6	−59.7	169.5	20 29.6	−59.7	169.6	19 30.6	−59.7	169.7	18 31.5	−59.7	169.7	17 32.5	−59.8	169.8	16 33.4	−59.7	169.8	13
14	22 26.9	−59.6	169.5	21 27.9	−59.6	169.6	20 28.9	−59.6	169.6	19 29.9	−59.7	169.7	18 30.9	−59.8	169.8	17 31.8	−59.7	169.8	16 32.7	−59.7	169.9	15 33.7	−59.8	169.9	14
15	21 27.3	−59.6	169.6	20 28.3	−59.7	169.7	19 29.3	−59.7	169.8	18 30.2	−59.7	169.8	17 31.1	−59.7	169.9	16 32.1	−59.8	169.9	15 33.0	−59.7	170.0	14 33.9	−59.7	170.0	15
16	20 27.7	−59.6	169.7	19 28.6	−59.6	169.8	18 29.6	−59.7	169.9	17 30.5	−59.7	169.9	16 31.4	−59.7	170.0	15 32.4	−59.8	170.0	14 33.3	−59.8	170.1	13 34.2	−59.8	170.1	16
17	19 28.1	−59.7	169.9	18 29.0	−59.7	169.9	17 29.9	−59.7	170.0	16 30.8	−59.7	170.0	15 31.7	−59.7	170.1	14 32.6	−59.7	170.1	13 33.5	−59.7	170.2	12 34.4	−59.8	170.2	17
18	18 28.4	−59.6	170.0	17 29.3	−59.6	170.0	16 30.2	−59.6	170.1	15 31.1	−59.7	170.1	14 32.0	−59.7	170.2	13 32.9	−59.7	170.2	12 33.8	−59.8	170.3	11 34.6	−59.7	170.3	18
19	17 28.8	−59.6	170.1	16 29.7	−59.7	170.1	15 30.6	−59.7	170.2	14 31.4	−59.7	170.2	13 32.3	−59.7	170.3	12 33.2	−59.8	170.3	11 34.0	−59.7	170.4	10 34.9	−59.8	170.4	19
20	16 29.2	−59.7	170.2	15 30.0	−59.6	170.3	14 30.9	−59.7	170.3	13 31.7	−59.7	170.4	12 32.6	−59.7	170.4	11 33.4	−59.7	170.4	10 34.3	−59.8	170.4	9 35.1	−59.8	170.5	20
21	15 29.5	−59.6	170.3	14 30.4	−59.7	170.4	13 31.2	−59.7	170.4	12 32.0	−59.7	170.4	11 32.9	−59.7	170.5	10 33.7	−59.8	170.5	9 34.5	−59.7	170.5	8 35.3	−59.7	170.6	21
22	14 29.9	−59.7	170.4	13 30.7	−59.7	170.5	12 31.5	−59.7	170.5	11 32.3	−59.7	170.5	10 33.2	−59.8	170.6	9 34.0	−59.8	170.6	8 34.8	−59.8	170.6	7 35.6	−59.8	170.7	22
23	13 30.2	−59.7	170.5	12 31.0	−59.6	170.6	11 31.8	−59.7	170.6	10 32.6	−59.7	170.6	9 33.4	−59.7	170.7	8 34.2	−59.8	170.7	7 35.0	−59.7	170.7	6 35.8	−59.8	170.7	23
24	12 30.6	−59.7	170.6	11 31.4	−59.7	170.7	10 32.1	−59.6	170.7	9 32.9	−59.7	170.7	8 33.7	−59.7	170.8	7 34.5	−59.8	170.8	6 35.3	−59.8	170.8	5 36.0	−59.8	170.8	24
25	11 30.9	−59.7	170.8	10 31.7	−59.7	170.8	9 32.5	−59.7	170.8	8 33.2	−59.7	170.9	7 34.0	−59.7	170.9	6 34.7	−59.7	170.9	5 35.5	−59.8	170.9	4 36.2	−59.7	170.9	25
26	10 31.2	−59.6	170.9	9 32.0	−59.7	170.9	8 32.8	−59.7	170.9	7 33.5	−59.7	170.9	6 34.3	−59.8	171.0	5 35.0	−59.7	171.0	4 35.7	−59.7	171.0	3 36.5	−59.8	171.0	26
27	9 31.6	−59.7	171.1	8 32.3	−59.7	171.0	7 33.1	−59.7	171.0	6 33.8	−59.7	171.0	5 34.5	−59.7	171.1	4 35.3	−59.8	171.1	3 36.0	−59.8	171.1	2 36.7	−59.8	171.1	27
28	8 31.9	−59.7	171.1	7 32.6	−59.7	171.1	6 33.4	−59.7	171.1	5 34.1	−59.7	171.1	4 34.8	−59.7	171.2	3 35.5	−59.7	171.2	2 36.2	−59.7	171.2	1 36.9	−59.7	171.2	28
29	7 32.3	−59.7	171.2	6 33.0	−59.7	171.2	5 33.7	−59.7	171.2	4 34.4	−59.7	171.2	3 35.1	−59.8	171.2	2 35.8	−59.8	171.3	1 36.5	−59.8	171.3	0 37.2	−59.8	171.3	29
30	6 32.6	−59.6	171.3	5 33.3	−59.7	171.3	4 34.0	−59.7	171.3	3 34.7	−59.8	171.3	2 35.3	−59.7	171.3	1 36.0	−59.7	171.3	0 36.7	−59.8	171.4	0 22.6	+59.8	8.6	30
31	5 32.9	−59.6	171.4	4 33.6	−59.7	171.4	3 34.3	−59.7	171.4	2 34.9	−59.7	171.4	1 35.6	−59.7	171.4	0 36.3	−59.8	171.4	0 23.1	+59.7	8.6	1 22.4	+59.8	8.6	31
32	4 33.3	−59.7	171.5	3 33.9	−59.7	171.5	2 34.6	−59.7	171.5	1 35.2	−59.7	171.5	0 35.9	−59.8	171.5	0 23.5	+59.7	8.5	1 22.8	+59.8	8.5	2 22.2	+59.7	8.5	32
33	3 33.6	−59.7	171.6	2 34.2	−59.7	171.6	1 34.9	−59.7	171.6	0 35.5	−59.7	171.6	0 23.9	+59.7	8.4	1 23.2	+59.8	8.4	2 22.6	+59.7	8.4	3 21.9	+59.8	8.4	33
34	2 33.9	−59.7	171.7	1 34.5	−59.6	171.7	0 35.2	−59.7	171.7	0 24.2	+59.7	8.3	1 23.6	+59.7	8.3	2 23.0	+59.7	8.3	3 22.3	+59.8	8.3	4 21.7	+59.7	8.3	34
35	1 34.2	−59.6	171.8	0 34.9	−59.7	171.8	0 24.5	+59.7	8.2	1 23.9	+59.7	8.2	2 23.3	+59.7	8.2	3 22.7	+59.8	8.2	4 22.1	+59.7	8.2	5 21.5	+59.7	8.2	35
36	0 34.6	−59.7	171.9	0 24.8	+59.7	8.1	1 24.2	+59.7	8.1	2 23.6	+59.8	8.1	3 23.0	+59.8	8.1	4 22.5	+59.7	8.1	5 21.9	+59.7	8.1	6 21.2	+59.8	8.1	36
37	0 25.1	+59.7	8.0	1 24.5	+59.7	8.0	2 23.9	+59.7	8.0	3 23.4	+59.7	8.0	4 22.8	+59.7	8.0	5 22.2	+59.7	8.0	6 21.6	+59.8	8.0	7 21.0	+59.8	8.0	37
38	1 24.8	+59.7	7.9	2 24.2	+59.7	7.9	3 23.6	+59.7	7.9	4 23.1	+59.7	7.9	5 22.5	+59.7	7.9	6 21.9	+59.8	7.9	7 21.4	+59.7	7.9	8 20.8	+59.8	7.9	38
39	2 24.4	+59.7	7.8	3 23.9	+59.7	7.8	4 23.3	+59.7	7.8	5 22.8	+59.7	7.8	6 22.2	+59.8	7.8	7 21.7	+59.7	7.8	8 21.1	+59.7	7.8	9 20.6	+59.7	7.9	39
40	3 24.1	+59.7	7.7	4 23.6	+59.7	7.6	5 23.0	+59.7	7.7	6 22.5	+59.7	7.7	7 22.0	+59.7	7.7	8 21.4	+59.8	7.7	9 20.9	+59.7	7.7	10 20.3	+59.8	7.8	40
41	4 23.8	+59.7	7.6	5 23.3	+59.6	7.6	6 22.7	+59.7	7.6	7 22.2	+59.7	7.6	8 21.7	+59.7	7.6	9 21.2	+59.7	7.6	10 20.6	+59.8	7.7	11 20.1	+59.8	7.7	41
42	5 23.5	+59.6	7.4	6 22.9	+59.7	7.5	7 22.4	+59.7	7.5	8 21.9	+59.7	7.5	9 21.4	+59.7	7.5	10 20.9	+59.7	7.5	11 20.4	+59.7	7.6	12 19.9	+59.8	7.6	42
43	6 23.1	+59.7	7.3	7 22.6	+59.7	7.4	8 22.1	+59.7	7.4	9 21.6	+59.7	7.4	10 21.1	+59.8	7.4	11 20.6	+59.8	7.4	12 20.1	+59.7	7.5	13 19.6	+59.8	7.5	43
44	7 22.8	+59.7	7.2	8 22.3	+59.7	7.3	9 21.8	+59.7	7.3	10 21.3	+59.8	7.3	11 20.9	+59.7	7.3	12 20.4	+59.7	7.3	13 19.9	+59.7	7.4	14 19.4	+59.7	7.4	44
45	8 22.5	+59.6	7.1	9 22.0	+59.7	7.1	10 21.5	+59.7	7.2	11 21.1	+59.7	7.2	12 20.6	+59.7	7.2	13 20.1	+59.7	7.2	14 19.6	+59.8	7.3	15 19.1	+59.8	7.3	45
46	9 22.1	+59.7	7.0	10 21.7	+59.6	7.0	11 21.2	+59.7	7.1	12 20.8	+59.7	7.1	13 20.3	+59.7	7.1	14 19.8	+59.7	7.2	15 19.4	+59.7	7.2	16 18.9	+59.7	7.2	46
47	10 21.8	+59.6	6.9	11 21.3	+59.7	6.9	12 20.9	+59.7	7.0	13 20.5	+59.7	7.0	14 20.0	+59.7	7.0	15 19.6	+59.7	7.1	16 19.1	+59.7	7.1	17 18.6	+59.8	7.1	47
48	11 21.4	+59.7	6.8	12 21.0	+59.6	6.8	13 20.6	+59.7	6.9	14 20.2	+59.7	6.9	15 19.7	+59.7	6.9	16 19.3	+59.7	7.0	17 18.8	+59.7	7.0	18 18.4	+59.7	7.0	48
49	12 21.1	+59.6	6.7	13 20.7	+59.7	6.7	14 20.3	+59.7	6.8	15 19.9	+59.6	6.8	16 19.4	+59.7	6.8	17 19.0	+59.7	6.9	18 18.6	+59.7	6.9	19 18.1	+59.8	6.9	49
50	13 20.7	+59.7	6.6	14 20.4	+59.6	6.6	15 20.0	+59.6	6.6	16 19.5	+59.7	6.7	17 19.1	+59.7	6.7	18 18.7	+59.7	6.8	19 18.3	+59.7	6.8	20 17.9	+59.7	6.8	50
51	14 20.4	+59.6	6.5	15 20.0	+59.6	6.5	16 19.6	+59.6	6.5	17 19.2	+59.7	6.6	18 18.8	+59.7	6.6	19 18.4	+59.8	6.6	20 18.0	+59.8	6.7	21 17.6	+59.8	6.7	51
52	15 20.0	+59.7	6.4	16 19.7	+59.6	6.4	17 19.3	+59.7	6.4	18 18.9	+59.7	6.5	19 18.5	+59.7	6.5	20 18.2	+59.7	6.5	21 17.8	+59.7	6.6	22 17.4	+59.6	6.6	52
53	16 19.7	+59.6	6.3	17 19.3	+59.6	6.3	18 19.0	+59.6	6.3	19 18.6	+59.7	6.4	20 18.2	+59.7	6.4	21 17.9	+59.7	6.4	22 17.5	+59.7	6.5	23 17.1	+59.6	6.5	53
54	17 19.3	+59.7	6.1	18 19.0	+59.7	6.2	19 18.6	+59.7	6.2	20 18.3	+59.7	6.2	21 17.9	+59.7	6.3	22 17.6	+59.7	6.3	23 17.2	+59.7	6.4	24 16.8	+59.7	6.4	54
55	18 19.0	+59.6	6.0	19 18.6	+59.7	6.1	20 18.3	+59.7	6.1	21 18.0	+59.6	6.1	22 17.6	+59.7	6.2	23 17.3	+59.7	6.2	24 16.9	+59.7	6.3	25 16.5	+59.8	6.3	55
56	19 18.6	+59.6	5.9	20 18.3	+59.6	5.9	21 18.0	+59.6	6.0	22 17.6	+59.7	6.0	23 17.3	+59.7	6.1	24 17.0	+59.7	6.1	25 16.6	+59.7	6.2	26 16.3	+59.7	6.2	56
57	20 18.2	+59.7	5.8	21 17.9	+59.7	5.8	22 17.6	+59.7	5.9	23 17.3	+59.7	5.9	24 17.0	+59.7	6.0	25 16.7	+59.6	6.0	26 16.3	+59.7	6.1	27 16.0	+59.7	6.1	57
58	21 17.9	+59.6	5.7	22 17.6	+59.7	5.7	23 17.3	+59.6	5.7	24 17.0	+59.6	5.8	25 16.7	+59.7	5.8	26 16.3	+59.7	5.9	27 16.0	+59.7	5.9	28 15.7	+59.7	6.0	58
59	22 17.5	+59.6	5.5	23 17.2	+59.6	5.6	24 16.9	+59.6	5.6	25 16.6	+59.7	5.7	26 16.3	+59.7	5.7	27 16.0	+59.7	5.8	28 15.7	+59.7	5.9	29 15.4	+59.7	5.9	59
60	23 17.1	+59.6	5.4	24 16.8	+59.6	5.5	25 16.5	+59.7	5.5	26 16.3	+59.6	5.6	27 16.0	+59.6	5.6	28 15.7	+59.7	5.6	29 15.4	+59.7	5.7	30 15.1	+59.7	5.8	60
61	24 16.7	+59.6	5.3	25 16.4	+59.7	5.3	26 16.2	+59.6	5.4	27 15.9	+59.6	5.4	28 15.6	+59.7	5.5	29 15.4	+59.7	5.5	30 15.1	+59.7	5.6	31 14.8	+59.7	5.7	61
62	25 16.3	+59.6	5.2	26 16.1	+59.6	5.2	27 15.8	+59.6	5.3	28 15.5	+59.7	5.3	29 15.3	+59.7	5.4	30 15.0	+59.7	5.4	31 14.8	+59.6	5.5	32 14.5	+59.7	5.5	62
63	26 15.9	+59.6	5.0	27 15.7	+59.6	5.1	28 15.4	+59.6	5.1	29 15.2	+59.6	5.2	30 14.9	+59.6	5.2	31 14.7	+59.6	5.3	32 14.4	+59.7	5.3	33 14.2	+59.6	5.4	63
64	27 15.5	+59.6	4.9	28 15.3	+59.6	5.0	29 15.0	+59.6	5.0	30 14.8	+59.6	5.1	31 14.6	+59.6	5.1	32 14.3	+59.7	5.2	33 14.1	+59.6	5.2	34 13.8	+59.7	5.3	64
65	28 15.1	+59.5	4.8	29 14.9	+59.6	4.8	30 14.6	+59.6	4.9	31 14.4	+59.6	4.9	32 14.2	+59.6	5.0	33 14.0	+59.6	5.0	34 13.7	+59.6	5.1	35 13.5	+59.6	5.2	65
66	29 14.6	+59.6	4.6	30 14.4	+59.6	4.7	31 14.2	+59.6	4.7	32 14.0	+59.6	4.8	33 13.8	+59.6	4.8	34 13.6	+59.6	4.9	35 13.4	+59.6	5.0	36 13.1	+59.6	5.0	66
67	30 14.2	+59.6	4.5	31 14.0	+59.6	4.6	32 13.8	+59.6	4.6	33 13.6	+59.6	4.7	34 13.4	+59.6	4.7	35 13.2	+59.6	4.8	36 13.0	+59.6	4.8	37 12.8	+59.6	4.9	67
68	31 13.8	+59.5	4.4	32 13.6	+59.6	4.4	33 13.4	+59.6	4.5	34 13.2	+59.6	4.5	35 13.0	+59.6	4.6	36 12.8	+59.6	4.6	37 12.6	+59.7	4.7	38 12.4	+59.7	4.7	68
69	32 13.3	+59.5	4.2	33 13.1	+59.6	4.3	34 13.0	+59.6	4.3	35 12.8	+59.6	4.4	36 12.6	+59.6	4.4	37 12.4	+59.7	4.5	38 12.3	+59.6	4.5	39 12.1	+59.6	4.6	69
70	33 12.8	+59.5	4.1	34 12.7	+59.5	4.1	35 12.5	+59.6	4.2	36 12.4	+59.5	4.2	37 12.2	+59.6	4.3	38 12.0	+59.6	4.3	39 11.9	+59.5	4.4	40 11.7	+59.6	4.5	70
71	34 12.4	+59.5	3.9	35 12.2	+59.5	4.0	36 12.1	+59.5	4.0	37 11.9	+59.6	4.1	38 11.8	+59.5	4.1	39 11.6	+59.6	4.2	40 11.4	+59.6	4.2	41 11.3	+59.5	4.3	71
72	35 11.9	+59.5	3.8	36 11.7	+59.6	3.8	37 11.6	+59.5	3.9	38 11.5	+59.5	3.9	39 11.3	+59.6	4.0	40 11.2	+59.5	4.0	41 11.0	+59.6	4.1	42 10.9	+59.6	4.2	72
73	36 11.4	+59.5	3.6	37 11.3	+59.5	3.7	38 11.1	+59.5	3.7	39 11.0	+59.5	3.8	40 10.9	+59.5	3.8	41 10.7	+59.6	3.9	42 10.6	+59.6	3.9	43 10.5	+59.5	4.0	73
74	37 10.9	+59.4	3.4	38 10.8	+59.4	3.5	39 10.6	+59.5	3.5	40 10.5	+59.5	3.6	41 10.4	+59.5	3.6	42 10.3	+59.5	3.7	43 10.2	+59.5	3.8	44 10.0	+59.6	3.8	74
75	38 10.3	+59.5	3.3	39 10.2	+59.4	3.3	40 10.1	+59.5	3.4	41 10.0	+59.4	3.4	42 09.9	+59.5	3.5	43 09.8	+59.5	3.5	44 09.7	+59.5	3.6	45 09.6	+59.5	3.7	75
76	39 09.8	+59.5	3.1	40 09.7	+59.4	3.2	41 09.6	+59.4	3.2	42 09.5	+59.4	3.2	43 09.4	+59.5	3.3	44 09.3	+59.4	3.4	45 09.2	+59.5	3.4	46 09.1	+59.5	3.5	76
77	40 09.2	+59.5	2.9	41 09.2	+59.4	3.0	42 09.1	+59.4	3.0	43 09.0	+59.4	3.1	44 08.9	+59.5	3.1	45 08.8	+59.5	3.2	46 08.7	+59.5	3.2	47 08.6	+59.5	3.3	77
78	41 08.7	+59.4	2.7	42 08.6	+59.4	2.8	43 08.5	+59.4	2.8	44 08.5	+59.4	2.9	45 08.4	+59.5	2.9	46 08.3	+59.5	3.0	47 08.2	+59.5	3.1	48 08.1	+59.5	3.1	78
79	42 08.1	+59.4	2.6	43 08.0	+59.4	2.6	44 08.0	+59.4	2.6	45 07.9	+59.4	2.7	46 07.8	+59.5	2.7	47 07.8	+59.4	2.8	48 07.7	+59.4	2.8	49 07.6	+59.5	2.9	79
80	43 07.5	+59.3	2.4	44 07.4	+59.4	2.4	45 07.4	+59.4	2.4	46 07.3	+59.4	2.5	47 07.3	+59.4	2.5	48 07.2	+59.4	2.6	49 07.1	+59.5	2.6	50 07.1	+59.4	2.7	80
81	44 06.8	+59.4	2.2	45 06.8	+59.3	2.2	46 06.8	+59.4	2.2	47 06.7	+59.3	2.3	48 06.7	+59.3	2.3	49 06.6	+59.4	2.4	50 06.6	+59.3	2.4	51 06.5	+59.4	2.5	81
82	45 06.2	+59.3	2.0	46 06.2	+59.3	2.0	47 06.1	+59.4	2.0	48 06.1	+59.3	2.1	49 06.0	+59.4	2.1	50 06.0	+59.3	2.2	51 06.0	+59.3	2.2	52 05.9	+59.4	2.3	82
83	46 05.5	+59.3	1.7	47 05.5	+59.3	1.8	48 05.5	+59.3	1.8	49 05.4	+59.4	1.9	50 05.4	+59.3	1.9	51 05.4	+59.3	1.9	52 05.3	+59.4	2.0	53 05.3	+59.3	2.0	83
84	47 04.8	+59.3	1.5	48 04.8	+59.3	1.6	49 04.8	+59.3	1.6	50 04.8	+59.3	1.6	51 04.7	+59.3	1.7	52 04.7	+59.3	1.7	53 04.7	+59.3	1.7	54 04.6	+59.4	1.8	84
85	48 04.1	+59.2	1.3	49 04.1	+59.2	1.3	50 04.1	+59.2	1.4	51 04.0	+59.3	1.4	52 04.0	+59.3	1.4	53 04.0	+59.2	1.4	54 04.0	+59.2	1.5	55 04.0	+59.2	1.5	85
86	49 03.3	+59.3	1.1	50 03.3	+59.2	1.1	51 03.3	+59.2	1.1	52 03.3	+59.2	1.1	53 03.3	+59.2	1.2	54 03.3	+59.2	1.2	55 03.3	+59.2	1.2	56 03.3	+59.2	1.2	86
87	50 02.6	+59.1	0.8	51 02.6	+59.1	0.8	52 02.5	+59.2	0.8	53 02.5	+59.2	0.8	54 02.5	+59.2	0.9	55 02.5	+59.2	0.9	56 02.5	+59.2	0.9	57 02.5	+59.2	1.0	87
88	51 01.7	+59.2	0.6	52 01.7	+59.2	0.6	53 01.7	+59.2	0.6	54 01.7	+59.2	0.6	55 01.7	+59.2	0.6	56 01.7	+59.2	0.6	57 01.7	+59.2	0.6	58 01.7	+59.2	0.7	88
89	52 00.9	+59.1	0.3	53 00.9	+59.1	0.3	54 00.9	+59.1	0.3	55 00.9	+59.1	0.3	56 00.9	+59.1	0.3	57 00.9	+59.1	0.3	58 00.9	+59.1	0.3	59 00.9	+59.1	0.3	89
90	53 00.0	+59.1	0.0	54 00.0	+59.1	0.0	55 00.0	+59.1	0.0	56 00.0	+59.1	0.0	57 00.0	+59.1	0.0	58 00.0	+59.1	0.0	59 00.0	+59.1	0.0	60 00.0	+59.1	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
        { L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 170°, 190°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	36 12.6	+59.4	166.3	35 14.3	+59.5	166.5	34 16.0	+59.4	166.7	33 17.6	+59.5	166.8	32 19.1	+59.6	167.0	31 20.7	+59.5	167.1	30 22.2	+59.6	167.2	29 23.6	+59.7	167.3	0
1	37 12.0	+59.4	166.1	36 13.8	+59.4	166.3	35 15.4	+59.5	166.5	34 17.1	+59.5	166.7	33 18.7	+59.5	166.8	32 20.2	+59.6	167.0	31 21.8	+59.6	167.1	30 23.3	+59.6	167.2	1
2	38 11.4	+59.3	166.0	37 13.2	+59.4	166.1	36 14.9	+59.4	166.3	35 16.6	+59.4	166.5	34 18.2	+59.5	166.7	33 19.8	+59.6	166.8	32 21.4	+59.6	167.0	31 22.9	+59.6	167.1	2
3	39 10.7	+59.3	165.8	38 12.6	+59.3	166.0	37 14.3	+59.4	166.2	36 16.0	+59.5	166.3	35 17.7	+59.5	166.5	34 19.4	+59.5	166.7	33 21.0	+59.5	166.8	33 22.5	+59.6	167.0	3
4	40 10.1	+59.3	165.6	39 11.9	+59.3	165.8	38 13.7	+59.5	166.0	37 15.5	+59.5	166.2	36 17.2	+59.5	166.3	35 18.9	+59.5	166.5	34 20.5	+59.6	166.7	33 22.1	+59.6	166.8	4
5	41 09.4	+59.3	165.4	40 11.3	+59.3	165.6	39 13.2	+59.3	165.8	38 15.0	+59.4	166.0	37 16.7	+59.5	166.2	36 18.4	+59.6	166.4	35 20.1	+59.6	166.5	34 21.7	+59.6	166.7	5
6	42 08.7	+59.2	165.2	41 10.6	+59.4	165.4	40 12.5	+59.4	165.6	39 14.4	+59.4	165.8	38 16.2	+59.5	166.0	37 18.0	+59.5	166.2	36 19.7	+59.6	166.4	35 21.3	+59.6	166.5	6
7	43 07.9	+59.2	165.0	42 10.0	+59.3	165.2	41 11.9	+59.4	165.4	40 13.8	+59.4	165.6	39 15.7	+59.4	165.8	38 17.5	+59.5	166.0	37 19.2	+59.5	166.3	36 20.9	+59.6	166.3	7
8	44 07.2	+59.2	164.7	43 09.3	+59.2	165.0	42 11.3	+59.3	165.2	41 13.2	+59.4	165.5	40 15.1	+59.4	165.7	39 17.0	+59.4	165.9	38 18.7	+59.6	166.1	37 20.5	+59.6	166.3	8
9	45 06.4	+59.2	164.5	44 08.5	+59.3	164.8	43 10.6	+59.3	165.0	42 12.6	+59.4	165.3	41 14.5	+59.5	165.5	40 16.4	+59.5	165.7	39 18.3	+59.5	165.9	38 20.1	+59.5	166.1	9
10	46 05.6	+59.1	164.3	45 07.8	+59.2	164.6	44 09.9	+59.3	164.8	43 12.0	+59.3	165.1	42 14.0	+59.4	165.3	41 15.9	+59.4	165.5	40 17.8	+59.5	165.7	39 19.6	+59.5	165.9	10
11	47 04.7	+59.1	164.0	46 07.0	+59.2	164.3	45 09.2	+59.3	164.6	44 11.3	+59.3	164.9	43 13.4	+59.3	165.1	42 15.3	+59.5	165.3	41 17.3	+59.4	165.6	40 19.1	+59.6	165.8	11
12	48 03.9	+59.0	163.8	47 06.2	+59.2	164.1	46 08.5	+59.2	164.4	45 10.6	+59.3	164.6	44 12.7	+59.4	164.9	43 14.8	+59.4	165.2	42 16.7	+59.5	165.4	41 18.7	+59.5	165.6	12
13	49 02.9	+59.1	163.5	48 05.4	+59.1	163.8	47 07.7	+59.2	164.1	46 09.9	+59.3	164.4	45 12.1	+59.3	164.7	44 14.2	+59.4	165.0	43 16.2	+59.4	165.2	42 18.2	+59.5	165.4	13
14	50 02.0	+59.0	163.2	49 04.5	+59.1	163.6	48 06.9	+59.2	163.9	47 09.2	+59.2	164.2	46 11.4	+59.3	164.5	45 13.6	+59.3	164.8	44 15.6	+59.3	165.0	43 17.7	+59.4	165.3	14
15	51 01.0	+59.0	163.0	50 03.6	+59.0	163.3	49 06.1	+59.1	163.7	48 08.4	+59.3	164.0	47 10.7	+59.3	164.3	46 12.9	+59.4	164.6	45 15.1	+59.4	164.8	44 17.1	+59.5	165.1	15
16	52 00.0	+58.9	162.7	51 02.6	+59.1	163.1	50 05.2	+59.1	163.4	49 07.7	+59.1	163.7	48 10.0	+59.3	164.0	47 12.3	+59.3	164.3	46 14.5	+59.4	164.6	45 16.6	+59.4	164.9	16
17	52 58.9	+58.9	162.4	52 01.7	+58.9	162.7	51 04.3	+59.1	163.1	50 06.8	+59.2	163.5	49 09.3	+59.2	163.8	48 11.6	+59.3	164.1	47 13.9	+59.3	164.4	46 16.0	+59.4	164.7	17
18	53 57.8	+58.8	162.0	53 00.6	+59.0	162.4	52 03.4	+59.0	162.8	51 06.0	+59.1	163.2	50 08.5	+59.2	163.6	49 10.9	+59.3	163.9	48 13.2	+59.3	164.2	47 15.4	+59.4	164.5	18
19	54 56.6	+58.7	161.7	53 59.6	+58.8	162.1	53 02.4	+59.0	162.5	52 05.1	+59.1	162.9	51 07.7	+59.1	163.3	50 10.2	+59.2	163.6	49 12.5	+59.3	164.0	48 14.8	+59.4	164.3	19
20	55 55.3	+58.7	161.3	54 58.4	+58.8	161.8	54 01.4	+58.9	162.2	53 04.2	+59.0	162.6	52 06.8	+59.1	163.0	51 09.4	+59.2	163.4	50 11.8	+59.3	163.7	49 14.2	+59.3	164.1	20
21	56 54.0	+58.7	161.0	55 57.2	+58.8	161.4	55 00.3	+58.9	161.9	54 03.2	+59.0	162.3	53 05.9	+59.1	162.7	52 08.6	+59.1	163.1	51 11.1	+59.3	163.5	50 13.5	+59.4	163.8	21
22	57 52.7	+58.5	160.6	56 56.0	+58.7	161.1	55 59.2	+58.8	161.6	55 02.2	+58.9	162.0	54 05.0	+59.0	162.4	53 07.7	+59.2	162.8	52 10.4	+59.2	163.2	51 12.9	+59.2	163.6	22
23	58 51.2	+58.5	160.1	57 54.7	+58.6	160.7	56 58.0	+58.7	161.2	56 01.1	+58.8	161.7	55 04.0	+59.0	162.1	54 06.9	+59.0	162.6	53 09.6	+59.1	163.0	52 12.1	+59.3	163.3	23
24	59 49.7	+58.3	159.7	58 53.3	+58.5	160.3	57 56.7	+58.7	160.8	56 59.9	+58.9	161.3	56 03.0	+58.9	161.8	55 05.9	+59.1	162.3	54 08.7	+59.2	162.7	53 11.4	+59.2	163.1	24
25	60 48.0	+58.3	159.2	59 51.8	+58.5	159.9	58 55.4	+58.6	160.4	57 58.8	+58.7	161.0	57 01.9	+58.9	161.5	56 05.0	+59.0	161.9	55 07.9	+59.0	162.4	54 10.6	+59.2	162.8	25
26	61 46.3	+58.1	158.7	60 50.3	+58.3	159.4	59 54.0	+58.5	160.0	58 57.5	+58.7	160.6	58 00.8	+58.8	161.1	57 04.0	+58.9	161.6	56 06.9	+59.1	162.1	55 09.8	+59.1	162.5	26
27	62 44.4	+58.1	158.2	61 48.6	+58.2	158.9	60 52.5	+58.4	159.6	59 56.2	+58.5	160.2	58 59.6	+58.7	160.7	58 02.9	+58.8	161.3	57 06.0	+59.0	161.8	56 08.9	+59.1	162.2	27
28	63 42.5	+57.8	157.6	62 46.8	+58.1	158.4	61 50.9	+58.3	159.1	60 54.7	+58.5	159.7	59 58.3	+58.7	160.3	59 01.7	+58.8	160.9	58 05.0	+58.9	161.4	57 08.0	+59.0	161.9	28
29	64 40.3	+57.7	157.0	63 44.9	+58.0	157.8	62 49.2	+58.2	158.6	61 53.2	+58.4	159.3	60 57.0	+58.6	159.9	60 00.5	+58.8	160.5	59 03.9	+58.8	161.1	58 07.0	+59.0	161.6	29
30	65 38.0	+57.6	156.4	64 42.9	+57.8	157.2	63 47.4	+58.1	158.0	62 51.6	+58.3	158.8	61 55.6	+58.4	159.4	60 59.3	+58.6	160.1	60 02.7	+58.8	160.7	59 06.0	+59.0	161.2	30
31	66 35.6	+57.3	155.7	65 40.7	+57.5	156.6	64 45.5	+57.7	157.4	63 49.9	+58.1	158.2	62 54.0	+58.4	159.0	61 57.9	+58.6	159.6	61 01.5	+58.7	160.3	60 05.0	+58.8	160.9	31
32	67 32.9	+57.1	154.9	66 38.3	+57.5	155.9	65 43.4	+57.7	156.8	64 48.0	+58.1	157.7	63 52.4	+58.2	158.4	62 56.5	+58.4	159.2	62 00.2	+58.7	159.8	61 03.8	+58.8	160.5	32
33	68 30.0	+56.9	154.1	67 35.8	+57.2	155.2	66 41.1	+57.6	156.2	65 46.1	+57.8	157.1	64 50.6	+58.1	157.9	63 54.9	+58.3	158.7	62 58.9	+58.5	159.4	62 02.6	+58.7	160.0	33
34	69 26.9	+56.5	153.2	68 33.0	+57.0	154.4	67 38.7	+57.3	155.4	66 43.9	+57.7	156.4	65 48.7	+58.0	157.3	64 53.2	+58.2	158.1	63 57.4	+58.4	158.9	63 01.3	+58.6	159.6	34
35	70 23.4	+56.2	152.2	69 30.0	+56.7	153.5	68 36.0	+57.2	154.6	67 41.6	+57.5	155.7	66 46.7	+57.8	156.6	65 51.4	+58.1	157.5	64 55.8	+58.3	158.4	63 59.9	+58.5	159.1	35
36	71 19.6	+55.8	151.2	70 26.7	+56.3	152.5	69 33.2	+56.8	153.8	68 39.1	+57.2	154.9	67 44.5	+57.6	155.9	66 49.5	+57.9	156.9	65 54.1	+58.2	157.8	64 58.4	+58.4	158.6	36
37	72 15.4	+55.3	150.0	71 23.0	+56.0	151.5	70 30.0	+56.5	152.8	69 36.3	+57.0	154.1	68 42.1	+57.4	155.2	67 47.4	+57.7	156.2	66 52.3	+58.0	157.2	65 56.8	+58.3	158.0	37
38	73 10.7	+54.8	148.7	72 19.0	+55.5	150.3	71 26.5	+56.2	151.8	70 33.3	+56.7	153.1	69 39.5	+57.1	154.4	68 45.1	+57.5	155.5	67 50.3	+57.8	156.5	66 55.1	+58.1	157.4	38
39	74 05.5	+54.2	147.2	73 14.5	+55.0	149.0	72 22.7	+55.7	150.7	71 30.0	+56.3	152.1	70 36.6	+56.8	153.5	69 42.6	+57.3	154.7	68 48.1	+57.7	155.8	67 53.2	+58.0	156.8	39
40	74 59.7	+53.3	145.6	74 09.5	+54.4	147.6	73 18.4	+55.2	149.4	72 26.3	+55.9	151.0	71 33.4	+56.5	152.5	70 39.9	+57.0	153.8	69 45.8	+57.4	155.0	68 51.2	+57.7	156.1	40
41	75 53.0	+52.5	143.8	75 03.9	+53.6	146.0	74 13.6	+54.8	148.0	73 22.2	+55.4	149.8	72 29.9	+56.1	151.4	71 36.9	+56.6	152.8	70 43.2	+57.1	154.1	69 48.9	+57.6	155.3	41
42	76 45.5	+51.3	141.8	75 57.5	+52.8	144.2	75 08.2	+53.9	146.4	74 17.6	+54.8	148.4	73 26.0	+55.6	150.2	72 33.5	+56.3	151.8	71 40.3	+56.9	153.2	70 46.5	+57.3	154.5	42
43	77 36.8	+49.9	139.4	76 50.3	+51.5	142.1	76 02.1	+53.0	144.7	75 12.4	+54.2	146.9	74 21.6	+55.1	148.8	73 29.8	+55.9	150.5	72 37.2	+56.6	152.2	71 43.8	+57.0	153.6	43
44	78 26.7	+48.3	136.7	77 41.9	+50.3	139.9	76 55.1	+51.9	142.7	76 06.6	+53.3	145.1	75 16.7	+54.4	147.3	74 25.7	+55.3	149.3	73 33.6	+56.1	151.0	72 40.8	+56.6	152.5	44
45	79 15.0	+46.1•	133.7	78 32.2	+48.6	137.2	77 47.0	+50.7	140.4	76 59.9	+52.3	143.2	76 11.1	+53.6	145.6	75 21.0	+54.6	147.8	74 29.7	+55.5	149.7	73 37.4	+56.3	151.4	45
46	80 01.1	+43.6•	130.1	79 20.8	+46.6•	134.2	78 37.7	+49.0	137.8	77 52.2	+51.0	140.9	77 04.7	+52.6	143.6	76 15.6	+53.9	146.1	75 25.2	+54.9	148.2	74 33.7	+55.7	150.1	46
47	80 44.7	+40.2•	126.0	80 07.4	+44.0•	130.6	79 26.7	+47.1•	134.7	78 43.2	+49.4	138.3	77 57.3	+51.1	141.4	77 09.5	+52.9	144.2	76 20.1	+54.2	146.6	75 29.4	+55.2	148.7	47
48	81 24.9	+36.1•	121.2	80 51.4	+40.8•	126.5	80 13.8	+44.4•	131.2	79 32.6	+47.5•	135.3	78 48.7	+49.8	138.9	78 02.4	+51.7	142.0	77 14.3	+53.2	144.7	76 24.6	+54.4	147.1	48
49	82 01.0	+31.0•	115.7	81 32.2	+36.6•	121.7	80 58.2	+41.3•	127.1	80 20.1	+45.0•	131.8	79 38.5	+47.9•	135.9	78 54.1	+50.3	139.4	78 07.5	+52.1	142.5	77 19.0	+53.6	145.2	49
50	82 32.0	+24.8•	109.3	82 08.8	+31.5•	116.1	81 39.5	+37.2•	122.3	81 05.1	+41.8•	127.7	80 26.4	+45.5•	132.4	79 44.4	+48.4•	136.5	78 59.6	+50.7	140.0	78 12.6	+52.5	143.1	50
51	82 56.8	+17.4•	102.1	82 40.3	+25.3•	109.7	82 16.7	+32.0•	116.7	81 46.9	+37.7•	122.9	81 11.9	+42.4•	128.3	80 32.8	+46.0•	133.0	79 50.3	+48.8•	137.1	79 05.1	+51.0	140.6	51
52	83 14.2	+9.0•	94.1	83 05.6	+17.7•	102.4	82 48.7	+25.7•	110.1	82 24.6	+32.6•	117.2	81 54.3	+38.3•	123.5	81 18.8	+42.9•	128.9	80 39.1	+46.5•	133.7	79 56.1	+49.4•	137.8	52
53	83 23.2	+0.1•	85.6	83 23.3	+9.2•	94.2	83 14.4	+18.1•	102.7	82 57.2	+26.2•	110.6	82 32.6	+33.1•	117.8	82 01.7	+38.9•	124.1	81 25.6	+43.5•	129.6	80 45.5	+47.0•	134.4	53
54	83 23.3	−8.9•	76.9	83 32.5	0.0•	85.5	83 32.5	+9.3•	94.4	83 23.4	+18.4•	103.0	83 05.7	+26.7•	111.1	82 40.6	+33.7•	118.4	82 09.1	+39.5•	124.8	81 32.5	+44.0•	130.3	54
55	83 14.4	−17.2•	68.4	83 32.5	−9.1•	76.6	83 41.8	0.0•	85.5	83 41.8	+9.5•	94.6	83 32.4	+18.8•	103.4	83 14.3	+27.2•	111.6	82 48.6	+34.4•	119.0	82 16.5	+40.2•	125.5	55
56	82 57.2	−24.6•	60.4	83 23.4	−17.7•	68.0	83 41.8	−9.4•	76.4	83 51.3	−0.1•	85.4	83 51.2	+9.7•	94.7	83 41.5	+19.3•	103.8	83 23.0	+27.8•	112.2	82 56.7	+35.0•	119.7	56
57	82 32.6	−30.9•	53.2	83 05.7	−25.1•	59.8	83 32.4	−18.1•	67.5	83 51.2	−9.7•	76.1	84 00.9	−0.1•	85.4	84 00.8	+9.8•	94.9	83 50.8	+19.6•	104.2	83 31.7	+28.3•	112.8	57
58	82 01.7	−36.1•	46.8	82 40.6	−31.5•	52.5	83 14.3	−25.7•	59.2	83 41.5	−18.5•	67.0	84 00.8	−10.0•	75.8	84 10.6	−0.2•	85.3	84 10.4	+10.1•	95.1	84 00.0	+20.1•	104.7	58
59	81 25.6	−40.1•	41.2	82 09.1	−36.6•	46.0	82 48.6	−32.1•	51.7	83 23.0	−26.3•	58.5	83 50.8	−19.1•	66.4	84 10.4	−10.4•	75.5	84 20.5	−0.4•	85.3	84 20.1	+10.3•	95.4	59
60	80 45.5	−43.5•	36.4	81 32.5	−40.7•	40.4	82 16.5	−37.2•	45.2	82 56.7	−32.7•	51.0	83 31.7	−27.0•	57.8	84 00.0	−19.6•	65.9	84 20.1	−10.7•	75.1	84 30.4	−0.5•	85.2	60
61	80 02.0	−46.1•	32.3	80 51.8	−44.0•	35.6	81 39.3	−41.3•	39.6	82 24.0	−37.9•	44.4	83 04.7	−33.3•	50.1	83 40.4	−27.6•	57.1	84 09.4	−20.2•	65.3	84 29.9	−11.1•	74.8	61
62	79 15.9	−48.3	28.7	80 07.8	−46.6•	31.5	80 58.0	−44.5•	34.8	81 46.1	−41.8•	38.7	82 31.4	−38.5•	43.5	83 12.8	−34.0•	49.3	83 49.2	−28.3•	56.3	84 18.8	−20.9•	64.7	62
63	78 27.6	−49.9	25.7	79 21.2	−48.6	28.0	80 13.5	−47.0•	30.7	81 04.3	−45.1•	33.9	81 52.9	−42.4•	37.8	82 38.8	−39.2•	42.6	83 20.9	−34.8•	48.4	83 57.9	−29.0•	55.5	63
64	77 37.7	−51.3	23.0	78 32.6	−50.3	24.9	79 26.5	−49.1	27.2	80 19.2	−47.5•	29.8	81 10.5	−45.6•	33.0	81 59.6	−43.0•	36.9	82 46.1	−39.8•	41.6	83 28.9	−35.4•	47.5	64
65	76 46.4	−52.4	20.6	77 42.3	−51.6	22.3	78 37.4	−50.6	24.1	79 31.7	−49.4	26.3	80 24.9	−48.0•	29.0	81 16.6	−46.1•	32.1	82 06.3	−43.7•	36.0	82 53.5	−40.5•	40.7	65
66	75 54.0	−53.3	18.6	76 50.7	−52.8	19.9	77 46.8	−52.0	21.5	78 42.3	−51.1	23.3	79 36.9	−49.9	25.5	80 30.5	−48.5•	28.1	81 22.6	−46.6•	31.2	82 13.0	−44.4•	35.0	66
67	75 00.7	−54.2	16.8	75 57.9	−53.6	17.9	76 54.8	−53.0	19.2	77 51.2	−52.3	20.8	78 47.0	−51.4	22.5	79 42.0	−50.4	24.6	80 36.0	−49.0•	27.2	81 28.6	−47.2•	30.2	67
68	74 06.5	−54.7	15.1	75 04.3	−54.3	16.1	76 01.8	−53.9	17.2	76 58.9	−53.3	18.5	77 55.6	−52.7	20.0	78 51.6	−51.8	21.7	79 47.0	−50.8	23.8	80 41.4	−49.5•	26.2	68
69	73 11.8	−55.4	13.7	74 10.0	−55.0	14.5	75 07.9	−54.6	15.5	76 05.6	−54.2	16.5	77 02.9	−53.6	17.8	77 59.8	−52.9	19.2	78 56.2	−52.2	20.9	79 51.9	−51.2	22.9	69
70	72 16.4	−55.8	12.4	73 15.0	−55.6	13.1	74 13.3	−55.2	13.9	75 11.4	−54.8	14.8	76 09.3	−54.4	15.8	77 06.9	−53.9	17.0	78 04.0	−53.3	18.4	79 00.7	−52.6	20.0	70
71	71 20.6	−56.1	11.2	72 19.4	−55.9	11.8	73 18.1	−55.7	12.5	74 16.6	−55.4	13.3	75 14.9	−55.1	14.1	76 13.0	−54.7	15.1	77 10.7	−54.2	16.3	78 08.1	−53.6	17.6	71
72	70 24.5	−56.4	10.1	71 23.5	−56.4	10.6	72 22.4	−56.2	11.2	73 21.2	−55.9	11.9	74 19.8	−55.6	12.6	75 18.3	−55.4	13.4	76 16.5	−55.0	14.4	77 14.5	−54.5	15.5	72
73	69 27.9	−56.8	9.2	70 27.1	−56.7	9.6	71 26.2	−56.5	10.1	72 25.3	−56.4	10.6	73 24.2	−56.1	11.3	74 22.9	−55.8	12.0	75 21.5	−55.5	12.8	76 20.0	−55.3	13.7	73
74	68 31.1	−57.1	8.3	69 30.4	−56.9	8.6	70 29.7	−56.8	9.1	71 28.9	−56.7	9.5	72 28.1	−56.5	10.1	73 27.1	−56.3	10.6	74 26.0	−56.1	11.3	75 24.7	−55.8	12.1	74
75	67 34.0	−57.3	7.4	68 33.5	−57.4	7.8	69 32.9	−57.1	8.1	70 32.2	−56.9	8.5	71 31.6	−56.9	9.0	72 30.8	−56.7	9.5	73 29.9	−56.5	10.0	74 28.9	−56.2	10.6	75
76	66 36.7	−57.6	6.7	67 36.2	−57.4	7.0	68 35.8	−57.4	7.3	69 35.3	−57.3	7.6	70 34.7	−57.1	8.0	71 34.1	−57.0	8.4	72 33.4	−56.8	8.9	73 32.7	−56.7	9.4	76
77	65 39.1	−57.7	6.0	66 38.8	−57.7	6.2	67 38.4	−57.6	6.5	68 38.0	−57.5	6.8	69 37.6	−57.4	7.1	70 37.1	−57.3	7.4	71 36.6	−57.2	7.8	72 36.0	−57.0	8.3	77
78	64 41.4	−57.9	5.3	65 41.1	−57.8	5.5	66 40.8	−57.8	5.8	67 40.5	−57.6	6.0	68 40.2	−57.6	6.3	69 39.8	−57.5	6.6	70 39.4	−57.4	6.9	71 39.0	−57.2	7.2	78
79	63 43.5	−58.0	4.7	64 43.3	−57.9	4.9	65 43.1	−57.9	5.1	66 42.9	−57.9	5.3	67 42.6	−57.7	5.5	68 42.3	−57.7	5.8	69 42.0	−57.7	6.0	70 41.6	−57.5	6.3	79
80	62 45.5	−58.1	4.2	63 45.4	−58.1	4.3	64 45.2	−58.1	4.5	65 45.0	−58.0	4.6	66 44.8	−58.0	4.8	67 44.6	−57.9	5.0	68 44.3	−57.8	5.2	69 44.1	−57.8	5.5	80
81	61 47.4	−58.3	3.6	62 47.3	−58.3	3.7	63 47.1	−58.2	3.9	64 47.0	−58.2	4.0	65 46.8	−58.1	4.1	66 46.7	−58.1	4.3	67 46.5	−58.0	4.5	68 46.3	−58.0	4.7	81
82	60 49.1	−58.3	3.1	61 49.0	−58.3	3.2	62 48.9	−58.3	3.3	63 48.8	−58.3	3.4	64 48.7	−58.3	3.6	65 48.6	−58.2	3.7	66 48.5	−58.2	3.9	67 48.3	−58.1	4.0	82
83	59 50.8	−58.5	2.7	60 50.7	−58.4	2.7	61 50.6	−58.4	2.8	62 50.5	−58.3	2.9	63 50.5	−58.4	3.0	64 50.4	−58.4	3.1	65 50.3	−58.3	3.3	66 50.2	−58.3	3.4	83
84	58 52.3	−58.5	2.2	59 52.3	−58.6	2.3	60 52.2	−58.5	2.3	61 52.2	−58.5	2.4	62 52.1	−58.5	2.5	63 52.0	−58.4	2.6	64 52.0	−58.5	2.7	65 51.9	−58.4	2.8	84
85	57 53.8	−58.7	1.8	58 53.7	−58.6	1.8	59 53.7	−58.6	1.9	60 53.7	−58.6	2.0	61 53.6	−58.6	2.0	62 53.6	−58.6	2.1	63 53.5	−58.5	2.2	64 53.5	−58.5	2.2	85
86	56 55.1	−58.7	1.4	57 55.1	−58.7	1.4	58 55.1	−58.7	1.5	59 55.1	−58.7	1.5	60 55.0	−58.6	1.6	61 55.0	−58.6	1.6	62 55.0	−58.6	1.7	63 55.0	−58.6	1.7	86
87	55 56.4	−58.7	1.0	56 56.4	−58.7	1.0	57 56.4	−58.7	1.1	58 56.4	−58.7	1.1	59 56.4	−58.7	1.1	60 56.4	−58.7	1.2	61 56.4	−58.7	1.2	62 56.4	−58.7	1.3	87
88	54 57.7	−58.8	0.7	55 57.7	−58.8	0.7	56 57.7	−58.8	0.7	57 57.7	−58.8	0.7	58 57.7	−58.8	0.7	59 57.7	−58.8	0.8	60 57.7	−58.8	0.8	61 57.7	−58.8	0.8	88
89	53 58.9	−58.9	0.3	54 58.9	−58.9	0.3	55 58.9	−58.9	0.3	56 58.9	−58.9	0.4	57 58.9	−58.9	0.4	58 58.9	−58.9	0.4	59 58.9	−58.9	0.4	60 58.9	−58.9	0.4	89
90	53 00.0	−58.9	0.0	54 00.0	−58.9	0.0	55 00.0	−58.9	0.0	56 00.0	−58.9	0.0	57 00.0	−58.9	0.0	58 00.0	−58.9	0.0	59 00.0	−58.9	0.0	60 00.0	−58.9	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 12.6	−59.3	166.3	35 14.3	−59.4	166.5	34 16.0	−59.5	166.7	33 17.6	−59.5	166.8	32 19.1	−59.5	167.0	31 20.7	−59.6	167.1	30 22.2	−59.6	167.2	29 23.6	−59.6	167.3	0
1	35 13.3	−59.5	166.5	34 14.9	−59.5	166.6	33 16.5	−59.5	166.8	32 18.1	−59.6	167.0	31 19.6	−59.6	167.1	30 21.1	−59.6	167.2	29 22.6	−59.7	167.4	28 24.0	−59.6	167.5	1
2	34 13.8	−59.4	166.7	33 15.4	−59.4	166.8	32 17.0	−59.5	167.0	31 18.5	−59.5	167.1	30 20.0	−59.5	167.2	29 21.5	−59.6	167.4	28 22.9	−59.7	167.5	27 24.4	−59.7	167.6	2
3	33 14.4	−59.4	166.8	32 16.0	−59.5	167.0	31 17.5	−59.5	167.1	30 19.0	−59.5	167.2	29 20.5	−59.6	167.4	28 21.9	−59.6	167.5	27 23.3	−59.6	167.6	26 24.7	−59.7	167.7	3
4	32 15.0	−59.5	167.0	31 16.5	−59.5	167.1	30 18.0	−59.5	167.3	29 19.5	−59.5	167.4	28 20.9	−59.6	167.5	27 22.3	−59.6	167.6	26 23.7	−59.7	167.7	25 25.0	−59.6	167.8	4
5	31 15.5	−59.4	167.2	30 17.0	−59.5	167.3	29 18.5	−59.6	167.4	28 19.9	−59.5	167.5	27 21.3	−59.6	167.6	26 22.7	−59.6	167.8	25 24.0	−59.6	167.9	24 25.4	−59.7	168.0	5
6	30 16.1	−59.5	167.3	29 17.5	−59.5	167.4	28 18.9	−59.5	167.6	27 20.3	−59.5	167.7	26 21.7	−59.6	167.8	25 23.1	−59.7	167.9	24 24.4	−59.7	168.0	23 25.7	−59.7	168.1	6
7	29 16.6	−59.5	167.5	28 18.0	−59.5	167.6	27 19.4	−59.5	167.7	26 20.8	−59.6	167.9	25 21.2	−59.6	167.9	24 23.4	−59.6	168.0	23 24.7	−59.6	168.1	22 26.0	−59.7	168.2	7
8	28 17.1	−59.5	167.6	27 18.5	−59.5	167.7	26 19.9	−59.5	167.8	25 21.2	−59.6	167.9	24 22.5	−59.6	168.0	23 23.8	−59.6	168.1	22 25.1	−59.7	168.2	21 26.3	−59.6	168.3	8
9	27 17.6	−59.5	167.8	26 19.0	−59.6	167.9	25 20.3	−59.5	168.0	24 21.6	−59.6	168.1	23 22.9	−59.6	168.2	22 24.2	−59.7	168.2	21 25.4	−59.7	168.3	20 26.7	−59.7	168.4	9
10	26 18.1	−59.5	167.9	25 19.4	−59.5	168.0	24 20.7	−59.5	168.1	23 22.0	−59.6	168.2	22 23.3	−59.6	168.3	21 24.5	−59.6	168.4	20 25.7	−59.6	168.4	19 27.0	−59.7	168.5	10
11	25 18.6	−59.5	168.0	24 19.9	−59.5	168.1	23 21.2	−59.6	168.2	22 22.4	−59.6	168.3	21 23.7	−59.7	168.4	20 24.9	−59.7	168.5	19 26.1	−59.7	168.5	18 27.3	−59.7	168.6	11
12	24 19.1	−59.5	168.2	23 20.4	−59.6	168.3	22 21.6	−59.6	168.4	21 22.8	−59.6	168.4	20 24.0	−59.6	168.5	19 25.2	−59.6	168.6	18 26.4	−59.7	168.7	17 27.6	−59.7	168.7	12
13	23 19.6	−59.5	168.3	22 20.8	−59.5	168.4	21 22.0	−59.5	168.5	20 23.2	−59.6	168.6	19 24.4	−59.6	168.6	18 25.6	−59.7	168.7	17 26.7	−59.7	168.8	16 27.9	−59.7	168.8	13
14	22 20.0	−59.5	168.5	21 21.2	−59.6	168.5	20 22.4	−59.6	168.6	19 23.6	−59.6	168.7	18 24.8	−59.7	168.7	17 25.9	−59.6	168.8	16 27.0	−59.6	168.9	15 28.2	−59.7	168.9	14
15	21 20.5	−59.5	168.6	20 21.7	−59.6	168.7	19 22.8	−59.5	168.7	18 24.0	−59.6	168.8	17 25.1	−59.6	168.9	16 26.2	−59.6	168.9	15 27.4	−59.7	169.0	14 28.5	−59.8	169.0	15
16	20 20.9	−59.5	168.7	19 22.1	−59.6	168.8	18 23.2	−59.6	168.9	17 24.4	−59.7	168.9	16 25.5	−59.7	169.0	15 26.6	−59.7	169.0	14 27.7	−59.7	169.1	13 28.7	−59.7	169.1	16
17	19 21.4	−59.5	168.8	18 22.5	−59.5	168.9	17 23.6	−59.6	169.0	16 24.7	−59.6	169.0	15 25.8	−59.6	169.1	14 26.9	−59.7	169.1	13 28.0	−59.7	169.2	12 29.0	−59.7	169.2	17
18	18 21.8	−59.5	169.0	17 22.9	−59.5	169.0	16 24.0	−59.6	169.1	15 25.1	−59.6	169.1	14 26.2	−59.7	169.2	13 27.2	−59.6	169.2	12 28.3	−59.7	169.3	11 29.3	−59.7	169.3	18
19	17 22.3	−59.5	169.1	16 23.4	−59.6	169.2	15 24.4	−59.6	169.2	14 25.5	−59.7	169.3	13 26.5	−59.7	169.3	12 27.6	−59.7	169.4	11 28.6	−59.7	169.4	10 29.6	−59.7	169.4	19
20	16 22.7	−59.5	169.2	15 23.8	−59.6	169.3	14 24.8	−59.6	169.3	13 25.8	−59.6	169.4	12 26.9	−59.7	169.4	11 27.9	−59.7	169.5	10 28.9	−59.7	169.5	9 29.9	−59.7	169.5	20
21	15 23.1	−59.5	169.4	14 24.2	−59.6	169.4	13 25.2	−59.6	169.4	12 26.2	−59.6	169.5	11 27.2	−59.7	169.5	10 28.2	−59.7	169.6	9 29.2	−59.7	169.6	8 30.2	−59.8	169.6	21
22	14 23.6	−59.6	169.5	13 24.6	−59.6	169.5	12 25.6	−59.7	169.6	11 26.6	−59.7	169.6	10 27.5	−59.6	169.6	9 28.5	−59.7	169.7	8 29.5	−59.7	169.7	7 30.4	−59.7	169.7	22
23	13 24.0	−59.5	169.6	12 25.0	−59.6	169.6	11 25.9	−59.6	169.7	10 26.9	−59.6	169.7	9 27.9	−59.7	169.7	8 28.8	−59.7	169.8	7 29.8	−59.7	169.8	6 30.7	−59.7	169.8	23
24	12 24.4	−59.6	169.7	11 25.4	−59.6	169.8	10 26.3	−59.6	169.8	9 27.3	−59.7	169.8	8 28.2	−59.7	169.8	7 29.1	−59.6	169.9	6 30.1	−59.7	169.9	5 31.0	−59.7	169.9	24
25	11 24.8	−59.6	169.8	10 25.8	−59.7	169.9	9 26.7	−59.6	169.9	8 27.6	−59.6	169.9	7 28.5	−59.6	170.0	6 29.5	−59.7	170.0	5 30.4	−59.7	170.0	4 31.3	−59.7	170.0	25
26	10 25.2	−59.6	170.0	9 26.1	−59.6	170.0	8 27.1	−59.7	170.0	7 28.0	−59.7	170.0	6 28.9	−59.7	170.1	5 29.8	−59.7	170.1	4 30.7	−59.7	170.1	3 31.6	−59.8	170.1	26
27	9 25.6	−59.6	170.1	8 26.5	−59.6	170.1	7 27.4	−59.6	170.1	6 28.3	−59.6	170.1	5 29.2	−59.7	170.2	4 30.1	−59.7	170.2	3 31.0	−59.8	170.2	2 31.8	−59.7	170.2	27
28	8 26.0	−59.5	170.2	7 26.9	−59.6	170.2	6 27.8	−59.6	170.2	5 28.7	−59.7	170.2	4 29.5	−59.6	170.3	3 30.4	−59.7	170.3	2 31.2	−59.7	170.3	1 32.1	−59.7	170.3	28
29	7 26.5	−59.6	170.3	6 27.3	−59.6	170.3	5 28.2	−59.7	170.3	4 29.0	−59.7	170.4	3 29.8	−59.6	170.4	2 30.7	−59.7	170.4	1 31.5	−59.7	170.4	0 32.4	−59.7	170.4	29
30	6 26.9	−59.6	170.4	5 27.7	−59.6	170.4	4 28.5	−59.6	170.5	3 29.3	−59.6	170.5	2 30.2	−59.7	170.5	1 31.0	−59.7	170.5	0 31.8	−59.7	170.5	0 27.3	+59.8	9.5	30
31	5 27.3	−59.6	170.5	4 28.1	−59.7	170.6	3 28.9	−59.7	170.6	2 29.7	−59.7	170.6	1 30.5	−59.7	170.6	0 31.3	−59.7	170.6	0 27.9	+59.7	9.4	1 27.1	+59.7	9.4	31
32	4 27.7	−59.6	170.7	3 28.4	−59.6	170.7	2 29.2	−59.6	170.7	1 30.0	−59.6	170.7	0 30.8	−59.7	170.7	0 28.4	+59.7	9.3	1 27.6	+59.7	9.3	2 26.8	+59.7	9.3	32
33	3 28.1	−59.6	170.8	2 28.8	−59.6	170.8	1 29.6	−59.6	170.8	0 30.4	−59.7	170.8	0 28.9	+59.6	9.2	1 28.1	+59.7	9.2	2 27.3	+59.7	9.2	3 26.5	+59.8	9.2	33
34	2 28.5	−59.7	170.9	1 29.2	−59.6	170.9	0 30.0	−59.7	170.9	0 29.3	+59.6	9.1	1 28.5	+59.7	9.1	2 27.8	+59.7	9.1	3 27.0	+59.7	9.1	4 26.3	+59.7	9.1	34
35	1 28.8	−59.6	171.0	0 29.6	−59.6	171.0	0 29.7	+59.6	9.0	1 28.9	+59.7	9.0	2 28.2	+59.7	9.0	3 27.5	+59.7	9.0	4 26.7	+59.7	9.0	5 26.0	+59.7	9.0	35
36	0 29.2	−59.6	171.1	0 30.0	+59.7	8.9	1 29.3	+59.7	8.9	2 28.6	+59.7	8.9	3 27.9	+59.6	8.9	4 27.2	+59.7	8.9	5 26.4	+59.7	8.9	6 25.7	+59.7	8.9	36
37	0 30.4	+59.6	8.8	1 29.7	+59.6	8.8	2 29.0	+59.6	8.8	3 28.3	+59.6	8.8	4 27.5	+59.7	8.8	5 26.8	+59.7	8.8	6 26.1	+59.7	8.8	7 25.4	+59.7	8.8	37
38	1 30.0	+59.6	8.7	2 29.3	+59.7	8.7	3 28.6	+59.6	8.7	4 27.9	+59.7	8.7	5 27.2	+59.7	8.7	6 26.5	+59.7	8.7	7 25.8	+59.7	8.7	8 25.1	+59.8	8.7	38
39	2 29.6	+59.6	8.5	3 28.9	+59.6	8.5	4 28.2	+59.7	8.6	5 27.6	+59.6	8.6	6 26.9	+59.7	8.6	7 26.2	+59.7	8.6	8 25.5	+59.7	8.6	9 24.9	+59.7	8.6	39
40	3 29.2	+59.6	8.4	4 28.5	+59.6	8.4	5 27.9	+59.6	8.4	6 27.2	+59.7	8.5	7 26.6	+59.6	8.5	8 25.9	+59.7	8.5	9 25.2	+59.7	8.5	10 24.6	+59.7	8.5	40
41	4 28.8	+59.6	8.3	5 28.1	+59.7	8.3	6 27.5	+59.6	8.3	7 26.9	+59.6	8.4	8 26.2	+59.7	8.4	9 25.6	+59.7	8.4	10 24.9	+59.7	8.4	11 24.3	+59.7	8.4	41
42	5 28.4	+59.6	8.2	6 27.8	+59.6	8.2	7 27.1	+59.7	8.2	8 26.5	+59.7	8.2	9 25.9	+59.7	8.3	10 25.3	+59.7	8.3	11 24.6	+59.6	8.3	12 24.0	+59.7	8.3	42
43	6 28.0	+59.6	8.1	7 27.4	+59.6	8.1	8 26.8	+59.6	8.1	9 26.2	+59.6	8.1	10 25.6	+59.6	8.2	11 25.0	+59.6	8.2	12 24.3	+59.7	8.2	13 23.7	+59.7	8.2	43
44	7 27.6	+59.6	8.0	8 27.0	+59.6	8.0	9 26.4	+59.6	8.0	10 25.8	+59.7	8.0	11 25.2	+59.7	8.0	12 24.6	+59.7	8.1	13 24.0	+59.7	8.1	14 23.4	+59.7	8.1	44
45	8 27.2	+59.6	7.8	9 26.6	+59.6	7.9	10 26.0	+59.7	7.9	11 25.5	+59.6	7.9	12 24.9	+59.6	7.9	13 24.3	+59.7	8.0	14 23.7	+59.7	8.0	15 23.1	+59.7	8.0	45
46	9 26.8	+59.5	7.7	10 26.2	+59.6	7.7	11 25.7	+59.6	7.8	12 25.1	+59.6	7.8	13 24.5	+59.7	7.8	14 24.0	+59.7	7.9	15 23.4	+59.7	7.9	16 22.8	+59.7	7.9	46
47	10 26.3	+59.6	7.6	11 25.8	+59.6	7.6	12 25.3	+59.6	7.7	13 24.7	+59.7	7.7	14 24.2	+59.7	7.7	15 23.7	+59.6	7.8	16 23.1	+59.7	7.8	17 22.5	+59.7	7.8	47
48	11 25.9	+59.6	7.5	12 25.4	+59.6	7.5	13 24.9	+59.6	7.5	14 24.4	+59.6	7.6	15 23.9	+59.6	7.6	16 23.3	+59.7	7.6	17 22.8	+59.7	7.7	18 22.2	+59.7	7.7	48
49	12 25.5	+59.6	7.4	13 25.0	+59.6	7.4	14 24.5	+59.6	7.4	15 24.0	+59.6	7.5	16 23.5	+59.6	7.5	17 23.0	+59.6	7.5	18 22.5	+59.6	7.6	19 21.9	+59.7	7.6	49
50	13 25.1	+59.6	7.2	14 24.6	+59.6	7.3	15 24.1	+59.6	7.3	16 23.6	+59.7	7.3	17 23.1	+59.7	7.4	18 22.6	+59.7	7.4	19 22.1	+59.7	7.5	20 21.6	+59.7	7.5	50
51	14 24.7	+59.5	7.1	15 24.2	+59.6	7.2	16 23.7	+59.6	7.2	17 23.3	+59.6	7.2	18 22.8	+59.6	7.3	19 22.3	+59.7	7.3	20 21.8	+59.7	7.4	21 21.3	+59.7	7.4	51
52	15 24.3	+59.6	7.0	16 23.8	+59.6	7.0	17 23.3	+59.6	7.1	18 22.9	+59.6	7.1	19 22.4	+59.7	7.2	20 22.0	+59.6	7.2	21 21.5	+59.6	7.2	22 21.0	+59.7	7.3	52
53	16 23.8	+59.6	6.9	17 23.4	+59.5	6.9	18 22.9	+59.6	7.0	19 22.5	+59.6	7.0	20 22.1	+59.6	7.0	21 21.6	+59.6	7.1	22 21.1	+59.7	7.1	23 20.7	+59.6	7.2	53
54	17 23.4	+59.5	6.7	18 23.0	+59.5	6.8	19 22.5	+59.6	6.8	20 22.1	+59.6	6.9	21 21.7	+59.6	6.9	22 21.2	+59.7	7.0	23 20.8	+59.7	7.0	24 20.3	+59.7	7.1	54
55	18 22.9	+59.6	6.6	19 22.5	+59.6	6.7	20 22.1	+59.6	6.7	21 21.7	+59.6	6.7	22 21.3	+59.6	6.8	23 20.9	+59.6	6.8	24 20.5	+59.6	6.9	25 20.0	+59.7	7.0	55
56	19 22.5	+59.5	6.5	20 22.1	+59.6	6.6	21 21.7	+59.6	6.6	22 21.3	+59.6	6.6	23 20.9	+59.6	6.7	24 20.5	+59.6	6.7	25 20.1	+59.7	6.7	26 19.7	+59.6	6.8	56
57	20 22.1	+59.5	6.4	21 21.7	+59.5	6.4	22 21.3	+59.6	6.5	23 20.9	+59.6	6.5	24 20.5	+59.6	6.5	25 20.1	+59.7	6.6	26 19.7	+59.7	6.7	27 19.3	+59.7	6.7	57
58	21 21.6	+59.5	6.2	22 21.2	+59.6	6.3	23 20.9	+59.6	6.3	24 20.5	+59.6	6.4	25 20.1	+59.6	6.4	26 19.8	+59.6	6.5	27 19.4	+59.6	6.5	28 19.0	+59.6	6.6	58
59	22 21.1	+59.6	6.1	23 20.8	+59.5	6.1	24 20.5	+59.5	6.2	25 20.1	+59.6	6.2	26 19.7	+59.6	6.3	27 19.4	+59.6	6.4	28 19.0	+59.6	6.4	29 18.6	+59.7	6.5	59
60	23 20.7	+59.5	6.0	24 20.3	+59.6	6.0	25 20.0	+59.6	6.1	26 19.7	+59.5	6.1	27 19.3	+59.6	6.2	28 19.0	+59.6	6.2	29 18.6	+59.6	6.3	30 18.3	+59.6	6.3	60
61	24 20.2	+59.5	5.8	25 19.9	+59.5	5.9	26 19.6	+59.5	5.9	27 19.2	+59.6	6.0	28 18.9	+59.6	6.0	29 18.6	+59.6	6.1	30 18.2	+59.6	6.2	31 17.9	+59.6	6.2	61
62	25 19.7	+59.5	5.7	26 19.4	+59.5	5.7	27 19.1	+59.6	5.8	28 18.8	+59.6	5.8	29 18.4	+59.5	5.9	30 18.1	+59.5	5.9	31 17.8	+59.6	6.0	32 17.5	+59.6	6.1	62
63	26 19.2	+59.5	5.5	27 18.9	+59.6	5.6	28 18.7	+59.5	5.6	29 18.4	+59.5	5.7	30 18.1	+59.5	5.8	31 17.8	+59.6	5.8	32 17.4	+59.6	5.9	33 17.1	+59.6	5.9	63
64	27 18.7	+59.5	5.4	28 18.5	+59.5	5.5	29 18.2	+59.5	5.5	30 17.9	+59.5	5.6	31 17.6	+59.6	5.6	32 17.3	+59.6	5.7	33 17.0	+59.6	5.7	34 16.7	+59.6	5.8	64
65	28 18.2	+59.4	5.3	29 18.0	+59.5	5.3	30 17.7	+59.5	5.4	31 17.4	+59.6	5.4	32 17.2	+59.5	5.5	33 16.9	+59.5	5.5	34 16.6	+59.6	5.6	35 16.3	+59.6	5.7	65
66	29 17.7	+59.5	5.1	30 17.5	+59.4	5.2	31 17.2	+59.5	5.2	32 17.0	+59.5	5.3	33 16.7	+59.5	5.3	34 16.4	+59.5	5.4	35 16.2	+59.5	5.5	36 15.9	+59.6	5.5	66
67	30 17.2	+59.4	5.0	31 16.9	+59.5	5.0	32 16.7	+59.5	5.1	33 16.5	+59.5	5.1	34 16.2	+59.6	5.2	35 16.0	+59.5	5.2	36 15.7	+59.5	5.3	37 15.5	+59.5	5.4	67
68	31 16.6	+59.5	4.8	32 16.4	+59.4	4.8	33 16.2	+59.5	4.9	34 16.0	+59.5	5.0	35 15.8	+59.5	5.0	36 15.5	+59.5	5.1	37 15.3	+59.5	5.2	38 15.0	+59.4	5.2	68
69	32 16.1	+59.4	4.6	33 15.9	+59.4	4.7	34 15.7	+59.4	4.7	35 15.5	+59.5	4.8	36 15.3	+59.5	4.9	37 15.0	+59.4	4.9	38 14.8	+59.5	5.0	39 14.6	+59.5	5.1	69
70	33 15.5	+59.4	4.5	34 15.3	+59.5	4.5	35 15.1	+59.5	4.6	36 15.0	+59.4	4.6	37 14.8	+59.4	4.7	38 14.6	+59.4	4.8	39 14.3	+59.5	4.8	40 14.1	+59.5	4.9	70
71	34 14.9	+59.5	4.3	35 14.8	+59.4	4.4	36 14.6	+59.4	4.4	37 14.4	+59.5	4.5	38 14.2	+59.5	4.5	39 14.0	+59.5	4.6	40 13.8	+59.4	4.7	41 13.6	+59.4	4.7	71
72	35 14.4	+59.4	4.1	36 14.2	+59.4	4.2	37 14.0	+59.4	4.2	38 13.9	+59.4	4.3	39 13.7	+59.4	4.3	40 13.5	+59.4	4.4	41 13.3	+59.5	4.5	42 13.2	+59.4	4.6	72
73	36 13.8	+59.3	4.0	37 13.6	+59.4	4.0	38 13.5	+59.4	4.1	39 13.3	+59.4	4.1	40 13.2	+59.4	4.2	41 13.0	+59.4	4.3	42 12.8	+59.5	4.3	43 12.6	+59.4	4.4	73
74	37 13.1	+59.4	3.8	38 13.0	+59.4	3.8	39 12.9	+59.4	3.9	40 12.7	+59.4	3.9	41 12.6	+59.4	4.0	42 12.4	+59.5	4.1	43 12.3	+59.4	4.1	44 12.1	+59.5	4.2	74
75	38 12.5	+59.3	3.6	39 12.4	+59.3	3.7	40 12.3	+59.4	3.7	41 12.1	+59.4	3.8	42 12.0	+59.4	3.8	43 11.9	+59.4	3.9	44 11.7	+59.4	4.0	45 11.6	+59.4	4.0	75
76	39 11.8	+59.3	3.4	40 11.7	+59.4	3.5	41 11.6	+59.4	3.5	42 11.5	+59.4	3.6	43 11.4	+59.4	3.6	44 11.3	+59.4	3.7	45 11.1	+59.4	3.8	46 11.0	+59.4	3.8	76
77	40 11.2	+59.3	3.2	41 11.1	+59.3	3.3	42 11.0	+59.3	3.3	43 10.9	+59.4	3.4	44 10.8	+59.3	3.4	45 10.7	+59.4	3.5	46 10.6	+59.4	3.6	47 10.4	+59.4	3.6	77
78	41 10.5	+59.3	3.0	42 10.4	+59.3	3.1	43 10.3	+59.3	3.1	44 10.2	+59.3	3.2	45 10.1	+59.4	3.2	46 10.0	+59.3	3.3	47 09.9	+59.4	3.3	48 09.8	+59.4	3.4	78
79	42 09.8	+59.2	2.8	43 09.7	+59.3	2.9	44 09.6	+59.3	2.9	45 09.5	+59.3	3.0	46 09.5	+59.3	3.0	47 09.4	+59.3	3.1	48 09.3	+59.3	3.1	49 09.2	+59.3	3.2	79
80	43 09.0	+59.3	2.6	44 09.0	+59.2	2.6	45 08.9	+59.3	2.7	46 08.8	+59.3	2.7	47 08.8	+59.3	2.8	48 08.7	+59.3	2.8	49 08.6	+59.3	2.9	50 08.5	+59.4	3.0	80
81	44 08.3	+59.2	2.4	45 08.2	+59.2	2.4	46 08.2	+59.2	2.5	47 08.1	+59.3	2.5	48 08.1	+59.2	2.6	49 08.0	+59.3	2.6	50 07.9	+59.3	2.7	51 07.9	+59.2	2.7	81
82	45 07.5	+59.2	2.2	46 07.4	+59.2	2.2	47 07.4	+59.2	2.2	48 07.4	+59.2	2.3	49 07.3	+59.2	2.3	50 07.3	+59.2	2.4	51 07.2	+59.2	2.4	52 07.1	+59.3	2.5	82
83	46 06.7	+59.1	1.9	47 06.6	+59.2	2.0	48 06.6	+59.2	2.0	49 06.6	+59.1	2.0	50 06.5	+59.2	2.1	51 06.5	+59.2	2.1	52 06.4	+59.2	2.2	53 06.4	+59.2	2.2	83
84	47 05.8	+59.2	1.7	48 05.8	+59.1	1.7	49 05.8	+59.1	1.7	50 05.7	+59.2	1.8	51 05.7	+59.2	1.8	52 05.7	+59.2	1.8	53 05.7	+59.1	1.9	54 05.6	+59.2	1.9	84
85	48 05.0	+59.1	1.4	49 04.9	+59.1	1.5	50 04.9	+59.1	1.5	51 04.9	+59.1	1.5	52 04.9	+59.1	1.6	53 04.9	+59.1	1.6	54 04.8	+59.1	1.6	55 04.8	+59.1	1.7	85
86	49 04.0	+59.1	1.2	50 04.0	+59.1	1.2	51 04.0	+59.1	1.2	52 04.0	+59.1	1.2	53 04.0	+59.1	1.3	54 04.0	+59.1	1.3	55 04.0	+59.0	1.3	56 03.9	+59.1	1.4	86
87	50 03.1	+59.0	0.9	51 03.1	+59.0	0.9	52 03.1	+59.0	0.9	53 03.1	+59.0	1.0	54 03.1	+59.0	1.0	55 03.1	+59.0	1.0	56 03.0	+59.1	1.0	57 03.0	+59.1	1.1	87
88	51 02.1	+59.0	0.6	52 02.1	+59.0	0.6	53 02.1	+59.0	0.6	54 02.1	+59.0	0.6	55 02.1	+59.0	0.7	56 02.1	+59.0	0.7	57 02.1	+59.0	0.7	58 02.1	+59.0	0.7	88
89	52 01.1	+58.9	0.3	53 01.1	+58.9	0.3	54 01.1	+58.9	0.3	55 01.1	+58.9	0.3	56 01.1	+58.9	0.3	57 01.1	+58.9	0.4	58 01.1	+58.9	0.4	59 01.1	+58.9	0.4	89
90	53 00.0	+58.9	0.0	54 00.0	+58.9	0.0	55 00.0	+58.9	0.0	56 00.0	+58.9	0.0	57 00.0	+58.9	0.0	58 00.0	+58.9	0.0	59 00.0	+58.9	0.0	60 00.0	+58.9	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 169°, 191°

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 03.7	+59.3	165.1	35 05.7	+59.3	165.3	34 07.7	+59.3	165.5	33 09.6	+59.4	165.6	32 11.4	+59.5	165.8	31 13.3	+59.4	165.9	30 15.0	+59.6	166.1	29 16.8	+59.6	166.2	0
1	37 03.0	+59.3	164.9	36 05.0	+59.3	165.1	35 07.0	+59.4	165.3	34 09.0	+59.4	165.5	33 10.9	+59.4	165.6	32 12.7	+59.5	165.8	31 14.6	+59.5	165.9	30 16.4	+59.5	166.1	1
2	38 02.3	+59.2	164.7	37 04.3	+59.3	164.9	36 06.4	+59.3	165.1	35 08.4	+59.4	165.3	34 10.3	+59.4	165.5	33 12.2	+59.5	165.6	32 14.1	+59.5	165.8	31 15.9	+59.6	165.9	2
3	39 01.5	+59.2	164.5	38 03.6	+59.3	164.7	37 05.7	+59.3	164.9	36 07.8	+59.3	165.1	35 09.8	+59.4	165.3	34 11.7	+59.5	165.5	33 13.6	+59.5	165.6	32 15.5	+59.5	165.8	3
4	40 00.7	+59.2	164.3	39 02.9	+59.2	164.5	38 05.0	+59.3	164.7	37 07.1	+59.4	164.9	36 09.2	+59.4	165.1	35 11.2	+59.4	165.3	34 13.1	+59.5	165.5	33 15.0	+59.5	165.6	4
5	40 59.9	+59.1	164.1	40 02.1	+59.3	164.3	39 04.3	+59.3	164.5	38 06.5	+59.3	164.7	37 08.6	+59.3	164.9	36 10.6	+59.4	165.1	35 12.6	+59.4	165.3	34 14.5	+59.5	165.5	5
6	41 59.0	+59.2	163.8	41 01.4	+59.2	164.1	40 03.6	+59.3	164.3	39 05.8	+59.3	164.5	38 08.0	+59.3	164.8	37 10.0	+59.5	165.0	36 12.1	+59.4	165.2	35 14.0	+59.6	165.3	6
7	42 58.2	+59.1	163.6	42 00.6	+59.1	163.9	41 02.9	+59.2	164.1	40 05.1	+59.3	164.4	39 07.3	+59.4	164.6	38 09.5	+59.4	164.8	37 11.5	+59.5	165.0	36 13.6	+59.4	165.2	7
8	43 57.3	+59.0	163.4	42 59.7	+59.2	163.7	42 02.1	+59.2	163.9	41 04.4	+59.3	164.2	40 06.7	+59.3	164.4	39 08.9	+59.3	164.6	38 11.0	+59.4	164.8	37 13.0	+59.5	165.0	8
9	44 56.3	+59.1	163.1	43 58.9	+59.1	163.4	43 01.3	+59.2	163.7	42 03.7	+59.2	163.9	41 06.0	+59.3	164.2	40 08.2	+59.4	164.4	39 10.4	+59.4	164.6	38 12.5	+59.5	164.9	9
10	45 55.4	+59.0	162.9	44 58.0	+59.1	163.2	44 00.5	+59.2	163.5	43 02.9	+59.3	163.7	42 05.3	+59.3	164.0	41 07.6	+59.3	164.2	40 09.8	+59.4	164.5	39 12.0	+59.4	164.7	10
11	46 54.4	+58.9	162.6	45 57.1	+59.0	162.9	44 59.7	+59.1	163.2	44 02.2	+59.2	163.5	43 04.6	+59.3	163.8	42 06.9	+59.4	164.0	41 09.2	+59.3	164.3	40 11.4	+59.5	164.5	11
12	47 53.3	+59.0	162.3	46 56.1	+59.0	162.7	45 58.8	+59.1	163.0	45 01.4	+59.1	163.3	44 03.9	+59.2	163.6	43 06.3	+59.3	163.8	42 08.6	+59.4	164.1	41 10.9	+59.4	164.3	12
13	48 52.3	+58.8	162.1	47 55.1	+59.0	162.4	46 57.9	+59.0	162.7	46 00.5	+59.2	163.0	45 03.1	+59.2	163.3	44 05.6	+59.3	163.6	43 08.0	+59.3	163.8	42 10.3	+59.4	164.1	13
14	49 51.1	+58.9	161.8	48 54.1	+58.9	162.1	47 56.9	+59.1	162.5	46 59.7	+59.1	162.8	46 02.3	+59.2	163.1	45 04.9	+59.2	163.4	44 07.3	+59.3	163.7	43 09.7	+59.4	163.9	14
15	50 50.0	+58.8	161.5	49 53.0	+58.9	161.8	48 56.0	+58.9	162.2	47 58.8	+59.0	162.5	47 01.5	+59.1	162.9	46 04.1	+59.2	163.2	45 06.6	+59.3	163.5	44 09.1	+59.3	163.7	15
16	51 48.8	+58.7	161.1	50 51.9	+58.9	161.5	49 54.9	+59.0	161.9	48 57.8	+59.1	162.3	48 00.6	+59.2	162.6	47 03.3	+59.2	163.0	46 05.9	+59.3	163.3	45 08.4	+59.4	163.5	16
17	52 47.5	+58.7	160.8	51 50.8	+58.7	161.2	50 53.9	+58.9	161.6	49 56.9	+59.0	162.0	48 59.8	+59.0	162.4	48 02.5	+59.2	162.7	47 05.2	+59.2	163.0	46 07.8	+59.3	163.3	17
18	53 46.2	+58.6	160.5	52 49.5	+58.8	160.9	51 52.8	+58.8	161.3	50 55.9	+58.9	161.7	49 58.8	+59.1	162.1	49 01.7	+59.1	162.4	48 04.4	+59.2	162.8	47 07.1	+59.2	163.1	18
19	54 44.8	+58.5	160.1	53 48.3	+58.6	160.5	52 51.6	+58.8	161.0	51 54.8	+58.9	161.4	50 57.9	+59.0	161.8	50 00.8	+59.1	162.2	49 03.6	+59.2	162.5	48 06.3	+59.3	162.9	19
20	55 43.3	+58.5	159.7	54 46.9	+58.6	160.2	53 50.4	+58.7	160.7	52 53.7	+58.9	161.1	51 56.9	+58.9	161.5	50 59.9	+59.0	161.9	50 02.8	+59.2	162.3	49 05.6	+59.2	162.6	20
21	56 41.8	+58.3	159.3	55 45.5	+58.6	159.8	54 49.1	+58.7	160.3	53 52.6	+58.8	160.8	52 55.8	+58.9	161.2	51 59.0	+59.0	161.6	51 02.0	+59.1	162.0	50 04.8	+59.2	162.4	21
22	57 40.1	+58.3	158.9	56 44.1	+58.4	159.4	55 47.8	+58.6	159.9	54 51.4	+58.7	160.4	53 54.7	+58.9	160.9	52 58.0	+58.9	161.3	52 01.1	+59.0	161.7	51 04.0	+59.2	162.1	22
23	58 38.4	+58.2	158.4	57 42.5	+58.4	159.0	56 46.4	+58.5	159.6	55 50.1	+58.7	160.1	54 53.6	+58.8	160.6	53 56.9	+58.9	161.0	53 00.1	+59.0	161.5	52 03.2	+59.1	161.9	23
24	59 36.6	+58.1	157.9	58 40.9	+58.3	158.6	57 44.9	+58.5	159.1	56 48.8	+58.6	159.7	55 52.4	+58.7	160.2	54 55.8	+58.9	160.7	53 59.1	+59.0	161.2	53 02.3	+59.1	161.6	24
25	60 34.7	+58.0	157.4	59 39.2	+58.1	158.1	58 43.4	+58.3	158.7	57 47.4	+58.5	159.3	56 51.1	+58.7	159.8	55 54.7	+58.8	160.4	54 58.1	+59.0	160.8	54 01.4	+59.0	161.3	25
26	61 32.7	+57.8	156.9	60 37.3	+58.1	157.6	59 41.7	+58.3	158.3	58 45.9	+58.4	158.9	57 49.8	+58.6	159.5	56 53.5	+58.7	160.0	55 57.0	+58.9	160.5	55 00.4	+59.0	161.0	26
27	62 30.5	+57.7	156.3	61 35.4	+57.9	157.1	60 40.0	+58.1	157.8	59 44.3	+58.3	158.4	58 48.4	+58.5	159.0	57 52.2	+58.7	159.6	56 55.9	+58.8	160.2	55 59.4	+58.9	160.7	27
28	63 28.2	+57.5	155.7	62 33.3	+57.8	156.5	61 38.1	+58.0	157.3	60 42.6	+58.3	158.0	59 46.9	+58.4	158.6	58 50.9	+58.6	159.2	57 54.7	+58.7	159.8	56 58.3	+58.9	160.3	28
29	64 25.7	+57.3	155.1	63 31.1	+57.6	155.9	62 36.1	+57.9	156.7	61 40.9	+58.1	157.5	60 45.3	+58.3	158.1	59 49.5	+58.5	158.8	58 53.4	+58.7	159.4	57 57.2	+58.8	160.0	29
30	65 23.0	+57.1	154.4	64 28.7	+57.4	155.3	63 34.0	+57.7	156.1	62 39.0	+57.9	156.9	61 43.6	+58.2	157.7	60 48.0	+58.4	158.3	59 52.1	+58.6	159.0	58 56.0	+58.7	159.6	30
31	66 20.1	+56.9	153.6	65 26.1	+57.3	154.6	64 31.7	+57.5	155.5	63 36.9	+57.9	156.4	62 41.8	+58.1	157.1	61 46.4	+58.3	157.9	60 50.7	+58.5	158.5	59 54.7	+58.7	159.2	31
32	67 17.0	+56.6	152.8	66 23.4	+57.0	153.9	65 29.3	+57.4	154.9	64 34.8	+57.6	155.7	63 39.9	+57.9	156.6	62 44.7	+58.2	157.4	61 49.2	+58.3	158.1	60 53.4	+58.5	158.8	32
33	68 13.6	+56.4	152.0	67 20.4	+56.8	153.1	66 26.7	+57.1	154.1	65 32.4	+57.5	155.1	64 37.8	+57.8	156.0	63 42.9	+58.0	156.8	62 47.5	+58.3	157.6	61 51.9	+58.5	158.3	33
34	69 10.0	+56.0	151.0	68 17.2	+56.5	152.2	67 23.8	+56.9	153.4	66 29.9	+57.3	154.3	65 35.6	+57.6	155.3	64 40.9	+57.9	156.2	63 45.8	+58.2	157.1	62 50.4	+58.4	157.8	34
35	70 06.0	+55.6	150.0	69 13.7	+56.1	151.3	68 20.7	+56.7	152.5	67 27.2	+57.1	153.6	66 33.2	+57.4	154.7	65 38.8	+57.7	155.6	64 44.0	+58.0	156.5	63 48.8	+58.2	157.3	35
36	71 01.6	+55.1	148.8	70 09.8	+55.8	150.3	69 17.4	+56.3	151.6	68 24.3	+56.8	152.8	67 30.6	+57.2	153.9	66 36.5	+57.6	154.9	65 42.0	+57.8	155.9	64 47.0	+58.1	156.7	36
37	71 56.7	+54.6	147.6	71 05.6	+55.3	149.2	70 13.7	+55.9	150.6	69 21.1	+56.5	151.9	68 27.8	+57.0	153.1	67 34.1	+57.3	154.2	66 39.8	+57.7	155.2	65 45.1	+58.0	156.2	37
38	72 51.3	+54.0	146.2	72 00.9	+54.9	148.0	71 09.6	+55.6	149.5	70 17.6	+56.1	150.9	69 24.8	+56.6	152.2	68 31.4	+57.1	153.4	67 37.5	+57.5	154.5	66 43.1	+57.8	155.5	38
39	73 45.3	+53.3	144.7	72 55.8	+54.2	146.6	72 05.2	+55.0	148.3	71 13.7	+55.7	149.9	70 21.4	+56.4	151.3	69 28.5	+56.8	152.6	68 35.0	+57.2	153.7	67 40.9	+57.6	154.8	39
40	74 38.6	+52.4	143.0	73 50.0	+53.5	145.1	73 00.2	+54.5	147.0	72 09.4	+55.3	148.7	71 17.8	+55.9	150.2	70 25.3	+56.5	151.6	69 32.2	+57.0	152.9	68 38.5	+57.4	154.1	40
41	75 31.0	+51.4	141.1	74 43.5	+52.8	143.4	73 54.7	+53.9	145.5	73 04.7	+54.7	147.4	72 13.7	+55.5	149.1	71 21.8	+56.1	150.6	70 29.2	+56.7	152.0	69 35.9	+57.1	153.2	41
42	76 22.4	+50.2	139.0	75 36.3	+51.7	141.6	74 48.5	+53.0	143.9	73 59.4	+54.1	145.9	73 09.2	+54.9	147.8	72 17.9	+55.7	149.5	71 25.9	+56.3	151.0	70 33.0	+56.9	152.4	42
43	77 12.6	+48.7	136.6	76 28.0	+50.5	139.5	75 41.5	+52.1	142.0	74 53.5	+53.3	144.3	74 04.1	+54.3	146.4	73 13.6	+55.2	148.2	72 22.2	+55.9	149.9	71 29.9	+56.5	151.4	43
44	78 01.3	+46.9	133.9	77 18.5	+49.1	137.1	76 33.6	+50.8	140.0	75 46.8	+52.3	142.5	74 58.4	+53.6	144.8	74 08.8	+54.6	146.8	73 18.1	+55.4	148.6	72 26.4	+56.1	150.3	44
45	78 48.2	+44.7	130.8	78 07.6	+47.3	134.4	77 24.4	+49.5	137.6	76 39.1	+51.3	140.4	75 52.0	+52.7	143.0	75 03.4	+53.9	145.2	74 13.5	+54.9	147.3	73 22.5	+55.7	149.1	45
46	79 32.9	+42.0	127.2	78 54.9	+45.2	131.3	78 13.9	+47.8	134.9	77 30.4	+49.8	138.1	76 44.7	+51.6	141.0	75 57.3	+53.0	143.5	75 08.4	+54.1	145.7	74 18.2	+55.1	147.7	46
47	80 14.9	+38.7	123.2	79 40.1	+42.5	127.8	79 01.7	+45.6	131.8	78 20.2	+48.2	135.5	77 36.3	+50.3	138.7	76 50.3	+51.9	141.5	76 02.5	+53.3	144.0	75 13.3	+54.4	146.2	47
48	80 53.6	+34.5	118.5	80 22.6	+39.2	123.7	79 47.3	+43.0	128.3	79 08.4	+46.1	132.4	78 26.6	+48.6	136.0	77 42.2	+50.7	139.2	76 55.8	+52.3	142.0	76 07.7	+53.7	144.5	48
49	81 28.1	+29.6	113.1	81 01.8	+35.0	119.0	80 30.3	+39.7	124.2	79 54.5	+43.5	128.9	79 15.2	+46.5	133.0	78 32.9	+49.0	136.6	77 48.1	+51.1	139.8	77 01.4	+52.6	142.6	49
50	81 57.7	+23.7	107.1	81 36.8	+30.1	113.6	81 10.0	+35.6	119.5	80 38.0	+40.2	124.8	80 01.7	+44.1	129.5	79 21.9	+47.1	133.6	78 39.2	+49.5	137.2	77 54.0	+51.5	140.4	50
51	82 21.4	+16.7	100.4	82 06.9	+24.1	107.5	81 45.6	+30.6	114.1	81 18.2	+36.2	120.1	80 45.8	+40.8	125.4	80 09.0	+44.5	130.1	79 28.7	+47.5	134.2	78 45.5	+49.9	137.8	51
52	82 38.1	+9.1	93.0	82 31.0	+17.1	100.6	82 16.2	+24.5	107.9	81 54.4	+31.2	114.6	81 26.6	+36.7	120.7	80 53.5	+41.4	126.0	80 16.2	+45.1	130.8	79 35.4	+48.1	134.9	52
53	82 47.2	+0.9	85.2	82 48.1	+9.2	93.1	82 40.7	+17.4	100.9	82 25.6	+25.0	108.3	82 03.3	+31.7	115.1	81 34.9	+37.3	121.3	81 01.3	+42.0	126.7	80 23.5	+45.6	131.4	53
54	82 48.1	−7.4	77.2	82 57.3	+0.8	85.1	82 58.1	+9.4	93.2	82 50.6	+17.7	101.2	82 35.0	+25.5	108.8	82 12.2	+32.3	115.7	81 43.3	+37.9	121.9	81 09.1	+42.6	127.4	54
55	82 40.7	−15.1	69.4	82 58.1	−7.5	77.0	83 07.5	+0.8	85.1	83 08.3	+9.6	93.4	83 00.5	+18.1	101.6	82 44.5	+26.0	109.3	82 21.2	+32.9	116.3	81 51.7	+38.5	122.6	55
56	82 25.6	−22.3	61.9	82 50.6	−15.6	68.9	83 08.3	−7.8	76.7	83 17.9	+0.7	85.0	83 18.6	+9.8	93.5	83 10.5	+18.6	101.9	82 54.1	+26.6	109.8	82 30.2	+33.6	117.0	56
57	82 03.3	−28.4	55.0	82 35.0	−22.8	61.3	83 00.5	−16.0	68.5	83 18.6	−8.1	76.4	83 28.4	+0.7	85.0	83 29.1	+9.9	93.7	83 20.7	+18.9	102.3	83 03.8	+27.1	110.4	57
58	81 34.9	−33.6	48.8	82 12.2	−28.9	54.3	82 44.5	−23.3	60.7	83 10.5	−16.4	68.0	83 29.1	−8.4	76.1	83 39.0	+0.6	84.9	83 39.6	+10.1	93.9	83 30.9	+19.3	102.7	58
59	81 01.3	−37.8	43.3	81 43.3	−34.2	48.0	82 21.2	−29.5	53.6	82 54.1	−23.9	60.1	83 20.7	−16.9	67.5	83 39.6	−8.7	75.8	83 49.7	+0.5	84.9	83 50.2	+10.3	94.1	59
60	80 23.5	−41.4	38.5	81 09.1	−38.4	42.5	81 51.7	−34.8	47.2	82 30.2	−30.1	52.8	83 03.8	−24.5	59.4	83 30.9	−17.4	67.0	83 50.2	−9.0	75.5	84 00.5	+0.4	84.8	60
61	79 42.1	−44.1	34.3	80 30.7	−41.9	37.7	81 16.9	−39.0	41.7	82 00.1	−35.4	46.4	82 39.3	−30.8	52.0	83 13.5	−25.1	58.7	83 41.2	−18.0	66.4	84 00.9	−9.4	75.2	61
62	78 58.0	−46.5	30.7	79 48.8	−44.6	33.5	80 37.9	−42.4	36.8	81 24.7	−39.7	40.8	82 08.5	−36.1	45.5	82 48.4	−31.6	51.2	83 23.2	−25.8	57.9	83 51.5	−18.5	65.8	62
63	78 11.5	−48.4	27.5	79 04.2	−47.0	29.9	79 55.5	−45.2	32.7	80 45.0	−42.9	36.0	81 32.4	−40.2	39.9	82 16.8	−36.7	44.6	82 57.4	−32.2	50.3	83 33.0	−26.5	57.2	63
64	77 23.1	−49.9	24.7	78 17.2	−48.7	26.7	79 10.3	−47.4	29.0	80 02.1	−45.7	31.8	80 52.2	−43.6	35.1	81 40.1	−40.9	39.0	82 25.2	−37.5	43.7	83 06.5	−33.0	49.4	64
65	76 33.2	−51.1	22.2	77 28.5	−50.3	23.9	78 22.9	−49.2	25.9	79 16.4	−47.9	28.2	80 08.6	−46.2	30.9	80 59.2	−44.2	34.1	81 47.7	−41.5	38.0	83 33.5	−38.2	42.7	65
66	75 42.1	−52.3	20.0	76 38.2	−51.5	21.5	77 33.7	−50.6	23.1	78 28.5	−49.6	25.0	79 22.4	−48.4	27.3	80 15.0	−46.7	30.0	81 06.2	−44.8	33.1	81 55.3	−42.2	37.0	66
67	74 49.8	−53.1	18.1	75 46.7	−52.5	19.3	76 43.1	−51.9	20.7	77 38.9	−51.0	22.3	78 34.0	−50.0	24.2	79 28.3	−48.8	26.4	80 21.4	−47.3	29.0	81 13.1	−45.4	32.1	67
68	73 56.7	−53.8	16.4	74 54.2	−53.4	17.4	75 51.2	−52.8	18.6	76 47.9	−52.2	19.9	77 44.0	−51.4	21.5	78 39.5	−50.5	23.3	79 34.1	−49.3	25.5	80 27.7	−47.9	28.0	68
69	73 02.9	−54.5	14.8	74 00.8	−54.1	15.7	74 58.4	−53.7	16.7	75 55.7	−53.2	17.8	76 52.6	−52.5	19.2	77 49.0	−51.8	20.7	78 44.8	−50.9	22.4	79 39.8	−49.8	24.5	69
70	72 08.4	−55.1	13.4	73 06.7	−54.8	14.2	74 04.7	−54.3	15.0	75 02.5	−53.9	16.0	76 00.1	−53.5	17.1	76 57.2	−52.9	18.4	77 53.9	−52.2	19.8	78 50.0	−51.3	21.5	70
71	71 13.3	−55.5	12.1	72 11.9	−55.2	12.8	73 10.4	−55.0	13.5	74 08.6	−54.6	14.3	75 06.6	−54.2	15.3	76 04.3	−53.7	16.3	77 01.7	−53.2	17.6	77 58.7	−52.5	19.0	71
72	70 17.8	−55.9	11.0	71 16.7	−55.7	11.5	72 15.4	−55.5	12.2	73 14.0	−55.2	12.9	74 12.4	−54.9	13.7	75 10.6	−54.5	14.5	76 08.5	−54.1	15.6	77 06.2	−53.6	16.7	72
73	69 21.9	−56.2	9.9	70 21.0	−56.1	10.4	71 19.9	−55.8	10.9	72 18.8	−55.7	11.5	73 17.5	−55.4	12.2	74 16.1	−55.1	13.0	75 14.4	−54.7	13.8	76 12.6	−54.4	14.8	73
74	68 25.7	−56.6	9.0	69 24.9	−56.4	9.4	70 24.1	−56.3	9.8	71 23.1	−56.0	10.3	72 22.1	−55.9	10.9	73 21.0	−55.7	11.5	74 19.7	−55.4	12.2	75 18.2	−55.0	13.1	74
75	67 29.1	−56.8	8.1	68 28.5	−56.7	8.4	69 27.8	−56.6	8.8	70 27.1	−56.5	9.3	71 26.2	−56.2	9.7	72 25.3	−56.0	10.3	73 24.3	−55.8	10.9	74 23.2	−55.5	11.5	75
76	66 32.3	−57.1	7.3	67 31.8	−57.0	7.6	68 31.2	−56.8	7.9	69 30.6	−56.7	8.3	70 30.0	−56.6	8.7	71 29.3	−56.5	9.1	72 28.5	−56.3	9.6	73 27.6	−56.1	10.2	76
77	65 35.2	−57.3	6.5	66 34.8	−57.2	6.8	67 34.4	−57.2	7.0	68 33.9	−57.0	7.4	69 33.4	−56.9	7.7	70 32.8	−56.8	8.1	71 32.2	−56.7	8.5	72 31.5	−56.5	9.0	77
78	64 37.9	−57.5	5.8	65 37.6	−57.4	6.0	66 37.2	−57.3	6.3	67 36.9	−57.3	6.5	68 36.5	−57.2	6.8	69 36.0	−57.0	7.1	70 35.5	−56.9	7.5	71 35.0	−56.8	7.9	78
79	63 40.4	−57.6	5.1	64 40.2	−57.6	5.3	65 39.9	−57.5	5.5	66 39.6	−57.4	5.7	67 39.3	−57.4	6.0	68 39.0	−57.3	6.2	69 38.6	−57.2	6.5	70 38.2	−57.1	6.9	79
80	62 42.8	−57.8	4.5	63 42.6	−57.7	4.7	64 42.4	−57.7	4.8	65 42.2	−57.7	5.0	66 41.9	−57.6	5.2	67 41.7	−57.6	5.5	68 41.4	−57.5	5.7	69 41.1	−57.4	6.0	80
81	61 45.0	−57.9	3.9	62 44.9	−57.9	4.1	63 44.7	−57.9	4.2	64 44.5	−57.7	4.4	65 44.3	−57.7	4.5	66 44.1	−57.7	4.7	67 43.9	−57.6	4.9	68 43.7	−57.6	5.1	81
82	60 47.1	−58.1	3.4	61 47.0	−58.1	3.5	62 46.8	−58.0	3.6	63 46.7	−57.9	3.8	64 46.6	−57.9	3.9	65 46.4	−57.8	4.0	66 46.3	−57.8	4.2	67 46.1	−57.8	4.4	82
83	59 49.0	−58.2	2.9	60 48.9	−58.1	3.0	61 48.8	−58.1	3.1	62 48.8	−58.1	3.2	63 48.7	−58.1	3.3	64 48.6	−58.1	3.4	65 48.5	−58.0	3.5	66 48.3	−57.9	3.7	83
84	58 50.8	−58.2	2.4	59 50.8	−58.3	2.5	60 50.7	−58.2	2.6	61 50.7	−58.2	2.6	62 50.6	−58.2	2.7	63 50.5	−58.1	2.8	64 50.5	−58.2	2.9	65 50.4	−58.1	3.0	84
85	57 52.6	−58.4	2.0	58 52.5	−58.3	2.0	59 52.5	−58.3	2.1	60 52.5	−58.4	2.1	61 52.4	−58.3	2.2	62 52.4	−58.3	2.3	63 52.3	−58.2	2.4	64 52.3	−58.3	2.4	85
86	56 54.2	−58.4	1.5	57 54.2	−58.4	1.6	58 54.2	−58.5	1.6	59 54.1	−58.4	1.7	60 54.1	−58.4	1.7	61 54.1	−58.4	1.8	62 54.1	−58.4	1.8	63 54.0	−58.3	1.9	86
87	55 55.8	−58.5	1.1	56 55.8	−58.5	1.1	57 55.7	−58.5	1.2	58 55.7	−58.5	1.2	59 55.7	−58.5	1.2	60 55.7	−58.5	1.3	61 55.7	−58.5	1.3	62 55.7	−58.6	1.4	87
88	54 57.3	−58.6	0.7	55 57.2	−58.5	0.7	56 57.2	−58.5	0.8	57 57.2	−58.5	0.8	58 57.2	−58.5	0.8	59 57.2	−58.6	0.9	60 57.2	−58.6	0.9	61 57.2	−58.6	0.9	88
89	53 58.7	−58.7	0.4	54 58.7	−58.7	0.4	55 58.7	−58.7	0.4	56 58.7	−58.7	0.4	57 58.7	−58.7	0.4	58 58.7	−58.7	0.4	59 58.6	−58.6	0.4	60 58.6	−58.6	0.4	89
90	53 00.0	−58.7	0.0	54 00.0	−58.7	0.0	55 00.0	−58.7	0.0	56 00.0	−58.7	0.0	57 00.0	−58.7	0.0	58 00.0	−58.7	0.0	59 00.0	−58.7	0.0	60 00.0	−58.7	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 12°, 348°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	36 03.7	−59.3	165.1	35 05.7	−59.3	165.3	34 07.7	−59.4	165.5	33 09.6	−59.4	165.6	32 11.4	−59.4	165.8	31 13.3	−59.5	165.9	30 15.0	−59.5	166.1	29 16.8	−59.6	166.2	0
1	35 04.4	−59.3	165.3	34 06.4	−59.3	165.5	33 08.3	−59.4	165.6	32 10.2	−59.5	165.8	31 12.0	−59.5	165.9	30 13.8	−59.6	166.1	29 15.5	−59.6	166.2	28 17.2	−59.6	166.3	1
2	34 05.1	−59.3	165.5	33 07.0	−59.3	165.6	32 08.9	−59.4	165.8	31 10.7	−59.5	165.9	30 12.5	−59.5	166.1	29 14.2	−59.5	166.2	28 15.9	−59.6	166.4	27 17.6	−59.6	166.5	2
3	33 05.8	−59.3	165.7	32 07.7	−59.4	165.8	31 09.5	−59.4	166.0	30 11.3	−59.5	166.1	29 13.0	−59.5	166.2	28 14.7	−59.5	166.4	27 16.4	−59.6	166.5	26 18.0	−59.6	166.6	3
4	32 06.5	−59.3	165.8	31 08.3	−59.4	166.0	30 10.1	−59.5	166.1	29 11.8	−59.5	166.3	28 13.5	−59.5	166.4	27 15.2	−59.6	166.5	26 16.8	−59.6	166.6	25 18.4	−59.6	166.7	4
5	31 07.1	−59.3	166.0	30 08.9	−59.4	166.1	29 10.6	−59.4	166.3	28 12.3	−59.4	166.4	27 14.0	−59.5	166.5	26 15.6	−59.6	166.6	25 17.2	−59.6	166.8	24 18.8	−59.6	166.9	5
6	30 07.8	−59.4	166.2	29 09.5	−59.4	166.3	28 11.2	−59.5	166.4	27 12.9	−59.5	166.6	26 14.5	−59.5	166.7	25 16.1	−59.6	166.8	24 17.7	−59.6	166.9	23 19.2	−59.6	167.0	6
7	29 08.4	−59.4	166.3	28 10.1	−59.4	166.5	27 11.7	−59.4	166.6	26 13.4	−59.5	166.7	25 15.0	−59.6	166.8	24 16.5	−59.5	166.9	23 18.1	−59.6	167.0	22 19.6	−59.6	167.1	7
8	28 09.0	−59.4	166.5	27 10.7	−59.5	166.6	26 12.3	−59.5	166.7	25 13.9	−59.5	166.8	24 15.4	−59.5	166.9	23 17.0	−59.6	167.0	22 18.5	−59.6	167.1	21 20.0	−59.7	167.2	8
9	27 09.6	−59.4	166.7	26 11.2	−59.4	166.8	25 12.8	−59.5	166.9	24 14.4	−59.6	167.0	23 15.9	−59.6	167.1	22 17.4	−59.6	167.2	21 18.9	−59.6	167.3	20 20.3	−59.6	167.3	9
10	26 10.2	−59.4	166.8	25 11.8	−59.5	166.9	24 13.3	−59.5	167.0	23 14.8	−59.5	167.1	22 16.3	−59.5	167.2	21 17.8	−59.6	167.3	20 19.3	−59.6	167.4	19 20.7	−59.6	167.5	10
11	25 10.8	−59.4	167.0	24 12.3	−59.4	167.1	23 13.8	−59.5	167.2	22 15.3	−59.5	167.3	21 16.8	−59.5	167.3	20 18.2	−59.5	167.4	19 19.7	−59.6	167.5	18 21.1	−59.7	167.6	11
12	24 11.4	−59.5	167.1	23 12.9	−59.5	167.2	22 14.3	−59.5	167.3	21 15.8	−59.5	167.4	20 17.2	−59.5	167.5	19 18.7	−59.6	167.6	18 20.1	−59.7	167.6	17 21.4	−59.6	167.7	12
13	23 11.9	−59.5	167.3	22 13.4	−59.5	167.4	21 14.8	−59.5	167.4	20 16.3	−59.6	167.5	19 17.7	−59.6	167.6	18 19.1	−59.6	167.7	17 20.4	−59.6	167.7	16 21.8	−59.7	167.8	13
14	22 12.5	−59.5	167.4	21 13.9	−59.5	167.5	20 15.3	−59.5	167.6	19 16.7	−59.5	167.7	18 18.1	−59.6	167.7	17 19.5	−59.6	167.8	16 20.8	−59.6	167.9	15 22.1	−59.6	167.9	14
15	21 13.0	−59.4	167.6	20 14.4	−59.5	167.6	19 15.8	−59.5	167.7	18 17.2	−59.6	167.8	17 18.5	−59.6	167.9	16 19.9	−59.6	167.9	15 21.2	−59.6	168.0	14 22.5	−59.7	168.0	15
16	20 13.6	−59.5	167.7	19 14.9	−59.5	167.8	18 16.3	−59.5	167.9	17 17.6	−59.5	167.9	16 18.9	−59.5	168.0	15 20.3	−59.7	168.0	14 21.6	−59.5	168.1	13 22.8	−59.6	168.1	16
17	19 14.1	−59.5	167.8	18 15.4	−59.5	167.9	17 16.8	−59.6	168.0	16 18.1	−59.6	168.0	15 19.4	−59.6	168.1	14 20.6	−59.6	168.2	13 21.9	−59.6	168.2	12 23.2	−59.7	168.3	17
18	18 14.6	−59.5	168.0	17 15.9	−59.5	168.0	16 17.2	−59.5	168.1	15 18.5	−59.6	168.2	14 19.8	−59.6	168.2	13 21.0	−59.6	168.3	12 22.3	−59.7	168.3	11 23.5	−59.6	168.4	18
19	17 15.1	−59.4	168.1	16 16.4	−59.5	168.2	15 17.7	−59.6	168.2	14 18.9	−59.5	168.3	13 20.2	−59.6	168.3	12 21.4	−59.6	168.4	11 22.6	−59.6	168.4	10 23.9	−59.7	168.5	19
20	16 15.7	−59.5	168.3	15 16.9	−59.5	168.3	14 18.1	−59.5	168.4	13 19.4	−59.6	168.4	12 20.6	−59.6	168.5	11 21.8	−59.6	168.5	10 23.0	−59.6	168.5	9 24.2	−59.7	168.6	20
21	15 16.2	−59.5	168.4	14 17.4	−59.5	168.4	13 18.6	−59.5	168.5	12 19.8	−59.6	168.5	11 21.0	−59.6	168.6	10 22.2	−59.7	168.6	9 23.4	−59.6	168.7	8 24.5	−59.6	168.7	21
22	14 16.7	−59.5	168.5	13 17.9	−59.6	168.6	12 19.1	−59.6	168.6	11 20.2	−59.5	168.7	10 21.4	−59.6	168.7	9 22.6	−59.7	168.7	8 23.7	−59.6	168.8	7 24.9	−59.7	168.8	22
23	13 17.2	−59.5	168.7	12 18.3	−59.5	168.7	11 19.5	−59.6	168.7	10 20.7	−59.6	168.8	9 21.8	−59.6	168.8	8 22.9	−59.6	168.8	7 24.1	−59.7	168.9	6 25.2	−59.7	168.9	23
24	12 17.7	−59.5	168.8	11 18.8	−59.5	168.8	10 19.9	−59.5	168.9	9 21.1	−59.6	168.9	8 22.2	−59.6	168.9	7 23.3	−59.6	169.0	6 24.4	−59.6	169.0	5 25.5	−59.7	169.0	24
25	11 18.2	−59.5	168.9	10 19.3	−59.6	169.0	9 20.4	−59.6	169.0	8 21.5	−59.6	169.0	7 22.6	−59.6	169.0	6 23.7	−59.7	169.1	5 24.8	−59.7	169.1	4 25.8	−59.6	169.1	25
26	10 18.7	−59.6	169.1	9 19.7	−59.5	169.1	8 20.8	−59.5	169.1	7 21.9	−59.6	169.1	6 23.0	−59.6	169.2	5 24.0	−59.6	169.2	4 25.1	−59.6	169.2	3 26.2	−59.7	169.2	26
27	9 19.1	−59.5	169.2	8 20.2	−59.5	169.2	7 21.3	−59.6	169.2	6 22.3	−59.6	169.3	5 23.4	−59.6	169.3	4 24.4	−59.6	169.3	3 25.5	−59.7	169.3	2 26.5	−59.7	169.3	27
28	8 19.6	−59.5	169.3	7 20.7	−59.6	169.3	6 21.7	−59.6	169.3	5 22.7	−59.6	169.4	4 23.8	−59.7	169.4	3 24.8	−59.7	169.4	2 25.8	−59.7	169.4	1 26.8	−59.7	169.4	28
29	7 20.1	−59.4	169.4	6 21.1	−59.5	169.5	5 22.1	−59.5	169.5	4 23.1	−59.6	169.5	3 24.1	−59.6	169.5	2 25.1	−59.6	169.5	1 26.1	−59.6	169.5	0 27.1	−59.6	169.5	29
30	6 20.6	−59.5	169.6	5 21.6	−59.6	169.6	4 22.6	−59.6	169.6	3 23.5	−59.5	169.6	2 24.5	−59.6	169.6	1 25.5	−59.6	169.6	0 26.5	−59.7	169.6	0 32.5	+59.7	10.4	30
31	5 21.1	−59.6	169.7	4 22.0	−59.5	169.7	3 23.0	−59.6	169.7	2 24.0	−59.6	169.7	1 24.9	−59.6	169.7	0 25.9	−59.7	169.7	0 33.2	+59.6	10.3	1 32.2	+59.7	10.3	31
32	4 21.5	−59.5	169.8	3 22.5	−59.5	169.8	2 23.4	−59.6	169.8	1 24.4	−59.6	169.8	0 25.3	−59.6	169.8	0 33.8	+59.6	10.2	1 32.8	+59.7	10.2	2 31.9	+59.7	10.2	32
33	3 22.0	−59.5	169.9	2 22.9	−59.5	169.9	1 23.8	−59.5	170.0	0 24.8	−59.6	170.0	0 34.3	+59.6	10.0	1 33.4	+59.6	10.0	2 32.5	+59.6	10.1	3 31.6	+59.6	10.1	33
34	2 22.5	−59.5	170.1	1 23.4	−59.6	170.1	0 24.3	−59.6	170.1	0 34.8	+59.6	9.9	1 33.9	+59.6	9.9	2 33.0	+59.7	9.9	3 32.1	+59.7	10.0	4 31.2	+59.7	10.0	34
35	1 22.9	−59.5	170.2	0 23.8	−59.5	170.2	0 35.3	+59.6	9.8	1 34.4	+59.6	9.8	2 33.5	+59.7	9.8	3 32.7	+59.6	9.8	4 31.8	+59.7	9.9	5 30.9	+59.7	9.9	35
36	0 23.4	−59.5	170.3	0 35.7	+59.6	9.7	1 34.9	+59.5	9.7	2 34.0	+59.6	9.7	3 33.2	+59.6	9.7	4 32.3	+59.6	9.7	5 31.4	+59.7	9.7	6 30.6	+59.6	9.7	36
37	0 36.1	+59.5	9.6	1 35.3	+59.5	9.6	2 34.4	+59.6	9.6	3 33.6	+59.6	9.6	4 32.8	+59.6	9.6	5 31.9	+59.7	9.6	6 31.1	+59.6	9.6	7 30.2	+59.7	9.6	37
38	1 35.6	+59.5	9.4	2 34.8	+59.5	9.4	3 34.0	+59.5	9.4	4 33.2	+59.6	9.5	5 32.4	+59.6	9.5	6 31.6	+59.6	9.5	7 30.7	+59.7	9.5	8 29.9	+59.6	9.5	38
39	2 35.2	+59.5	9.3	3 34.4	+59.5	9.3	4 33.6	+59.5	9.3	5 32.8	+59.6	9.3	6 32.0	+59.6	9.4	7 31.2	+59.6	9.4	8 30.4	+59.6	9.4	9 29.6	+59.6	9.4	39
40	3 34.7	+59.5	9.2	4 33.9	+59.6	9.2	5 33.1	+59.6	9.2	6 32.4	+59.6	9.2	7 31.6	+59.6	9.2	8 30.8	+59.6	9.3	9 30.0	+59.7	9.3	10 29.2	+59.7	9.3	40
41	4 34.2	+59.5	9.1	5 33.5	+59.5	9.1	6 32.7	+59.6	9.1	7 32.0	+59.6	9.1	8 31.2	+59.6	9.1	9 30.4	+59.7	9.2	10 29.7	+59.6	9.2	11 28.9	+59.6	9.2	41
42	5 33.7	+59.6	8.9	6 33.0	+59.6	8.9	7 32.3	+59.6	9.0	8 31.5	+59.6	9.0	9 30.8	+59.6	9.0	10 30.1	+59.6	9.0	11 29.3	+59.7	9.1	12 28.6	+59.6	9.1	42
43	6 33.3	+59.5	8.8	7 32.6	+59.5	8.8	8 31.8	+59.6	8.8	9 31.1	+59.6	8.9	10 30.4	+59.6	8.9	11 29.7	+59.6	8.9	12 29.0	+59.7	9.0	13 28.2	+59.7	9.0	43
44	7 32.8	+59.5	8.7	8 32.1	+59.5	8.7	9 31.4	+59.6	8.7	10 30.7	+59.6	8.7	11 30.0	+59.6	8.8	12 29.3	+59.6	8.8	13 28.6	+59.6	8.9	14 27.9	+59.6	8.9	44
45	8 32.3	+59.5	8.5	9 31.6	+59.6	8.6	10 31.0	+59.5	8.6	11 30.3	+59.6	8.6	12 29.6	+59.6	8.7	13 28.9	+59.6	8.7	14 28.2	+59.7	8.7	15 27.5	+59.7	8.8	45
46	9 31.8	+59.5	8.4	10 31.2	+59.5	8.4	11 30.5	+59.6	8.5	12 29.9	+59.5	8.5	13 29.2	+59.6	8.5	14 28.5	+59.6	8.6	15 27.9	+59.6	8.6	16 27.2	+59.6	8.7	46
47	10 31.3	+59.5	8.3	11 30.7	+59.5	8.3	12 30.1	+59.5	8.4	13 29.4	+59.6	8.4	14 28.8	+59.6	8.4	15 28.1	+59.6	8.5	16 27.5	+59.7	8.5	17 26.8	+59.7	8.5	47
48	11 30.8	+59.6	8.2	12 30.2	+59.6	8.2	13 29.6	+59.6	8.2	14 29.0	+59.6	8.3	15 28.4	+59.6	8.3	16 27.7	+59.6	8.3	17 27.1	+59.6	8.4	18 26.5	+59.6	8.4	48
49	12 30.4	+59.5	8.0	13 29.8	+59.5	8.1	14 29.2	+59.5	8.1	15 28.6	+59.5	8.1	16 28.0	+59.5	8.1	17 27.3	+59.6	8.2	18 26.7	+59.6	8.3	19 26.1	+59.6	8.3	49
50	13 29.9	+59.5	7.9	14 29.3	+59.5	7.9	15 28.7	+59.5	8.0	16 28.1	+59.6	8.0	17 27.5	+59.6	8.1	18 26.9	+59.6	8.1	19 26.3	+59.6	8.1	20 25.7	+59.7	8.2	50
51	14 29.4	+59.4	7.8	15 28.8	+59.5	7.8	16 28.2	+59.5	7.8	17 27.7	+59.5	7.9	18 27.1	+59.6	7.9	19 26.5	+59.6	8.0	20 25.9	+59.7	8.0	21 25.4	+59.6	8.1	51
52	15 28.8	+59.5	7.6	16 28.3	+59.5	7.7	17 27.8	+59.5	7.7	18 27.2	+59.5	7.8	19 26.7	+59.6	7.8	20 26.1	+59.6	7.9	21 25.6	+59.6	7.9	22 25.0	+59.6	8.0	52
53	16 28.3	+59.5	7.5	17 27.8	+59.5	7.5	18 27.3	+59.5	7.6	19 26.8	+59.5	7.6	20 26.2	+59.6	7.7	21 25.7	+59.5	7.7	22 25.2	+59.5	7.8	23 24.6	+59.6	7.8	53
54	17 27.8	+59.5	7.4	18 27.3	+59.5	7.4	19 26.8	+59.5	7.4	20 26.3	+59.5	7.5	21 25.8	+59.5	7.5	22 25.3	+59.5	7.6	23 24.7	+59.6	7.7	24 24.2	+59.6	7.7	54
55	18 27.3	+59.5	7.2	19 26.8	+59.5	7.3	20 26.3	+59.5	7.3	21 25.8	+59.6	7.4	22 25.3	+59.6	7.4	23 24.8	+59.6	7.5	24 24.3	+59.6	7.5	25 23.8	+59.6	7.6	55
56	19 26.8	+59.4	7.1	20 26.3	+59.5	7.1	21 25.8	+59.5	7.2	22 25.4	+59.5	7.2	23 24.9	+59.5	7.3	24 24.4	+59.6	7.3	25 23.9	+59.5	7.4	26 23.4	+59.6	7.5	56
57	20 26.2	+59.5	6.9	21 25.8	+59.5	7.0	22 25.3	+59.5	7.1	23 24.9	+59.5	7.1	24 24.4	+59.5	7.1	25 24.0	+59.5	7.2	26 23.5	+59.6	7.3	27 23.0	+59.6	7.3	57
58	21 25.7	+59.5	6.8	22 25.3	+59.4	6.8	23 24.8	+59.5	6.9	24 24.4	+59.5	6.9	25 24.0	+59.5	7.0	26 23.5	+59.6	7.1	27 23.1	+59.5	7.1	28 22.6	+59.6	7.2	58
59	22 25.2	+59.4	6.7	23 24.7	+59.4	6.8	24 24.3	+59.5	6.8	25 23.9	+59.5	6.9	26 23.5	+59.5	6.9	27 23.1	+59.5	6.9	28 22.6	+59.6	7.0	29 22.2	+59.6	7.1	59
60	23 24.6	+59.5	6.5	24 24.2	+59.5	6.6	25 23.8	+59.5	6.6	26 23.4	+59.5	6.7	27 23.0	+59.5	6.7	28 22.6	+59.5	6.8	29 22.2	+59.5	6.9	30 21.7	+59.6	6.9	60
61	24 24.0	+59.5	6.4	25 23.7	+59.4	6.4	26 23.3	+59.4	6.5	27 22.9	+59.5	6.5	28 22.5	+59.5	6.6	29 22.1	+59.5	6.6	30 21.7	+59.6	6.7	31 21.3	+59.5	6.8	61
62	25 23.5	+59.4	6.2	26 23.1	+59.4	6.3	27 22.7	+59.5	6.3	28 22.4	+59.4	6.4	29 22.0	+59.5	6.4	30 21.6	+59.5	6.5	31 21.2	+59.6	6.5	32 20.8	+59.6	6.6	62
63	26 22.9	+59.4	6.0	27 22.5	+59.4	6.1	28 22.2	+59.4	6.2	29 21.8	+59.5	6.2	30 21.5	+59.4	6.3	31 21.1	+59.5	6.3	32 20.8	+59.5	6.4	33 20.4	+59.5	6.5	63
64	27 22.3	+59.4	5.9	28 22.0	+59.4	5.9	29 21.6	+59.5	6.0	30 21.3	+59.4	6.1	31 21.0	+59.4	6.1	32 20.6	+59.5	6.2	33 20.3	+59.5	6.3	34 19.9	+59.5	6.3	64
65	28 21.7	+59.4	5.7	29 21.4	+59.4	5.8	30 21.1	+59.4	5.8	31 20.7	+59.5	5.9	32 20.4	+59.5	6.0	33 20.1	+59.5	6.0	34 19.8	+59.4	6.1	35 19.4	+59.5	6.2	65
66	29 21.1	+59.4	5.6	30 20.8	+59.4	5.6	31 20.5	+59.4	5.7	32 20.2	+59.4	5.7	33 19.9	+59.4	5.8	34 19.6	+59.4	5.9	35 19.2	+59.5	6.0	36 18.9	+59.4	6.0	66
67	30 20.4	+59.4	5.4	31 20.2	+59.3	5.5	32 19.9	+59.4	5.5	33 19.6	+59.4	5.6	34 19.3	+59.4	5.6	35 19.0	+59.5	5.7	36 18.7	+59.5	5.8	37 18.4	+59.5	5.9	67
68	31 19.8	+59.3	5.2	32 19.5	+59.3	5.3	33 19.3	+59.4	5.3	34 19.0	+59.4	5.4	35 18.7	+59.4	5.5	36 18.5	+59.4	5.5	37 18.2	+59.5	5.7	38 17.9	+59.5	5.7	68
69	32 19.1	+59.4	5.1	33 18.9	+59.3	5.1	34 18.7	+59.3	5.2	35 18.4	+59.4	5.2	36 18.2	+59.4	5.3	37 17.9	+59.4	5.4	38 17.6	+59.5	5.4	39 17.4	+59.4	5.5	69
70	33 18.5	+59.3	4.9	34 18.2	+59.4	4.9	35 18.0	+59.4	5.0	36 17.8	+59.4	5.1	37 17.6	+59.3	5.1	38 17.3	+59.4	5.2	39 17.1	+59.4	5.3	40 16.8	+59.4	5.3	70
71	34 17.8	+59.3	4.7	35 17.6	+59.3	4.8	36 17.4	+59.3	4.8	37 17.2	+59.4	4.9	38 16.9	+59.4	4.9	39 16.7	+59.4	5.0	40 16.5	+59.5	5.1	41 16.2	+59.5	5.2	71
72	35 17.1	+59.2	4.5	36 16.9	+59.3	4.6	37 16.7	+59.3	4.6	38 16.5	+59.4	4.7	39 16.3	+59.4	4.8	40 16.1	+59.4	4.8	41 15.9	+59.4	5.0	42 15.7	+59.4	5.0	72
73	36 16.4	+59.3	4.3	37 16.2	+59.3	4.4	38 16.0	+59.3	4.4	39 15.8	+59.3	4.5	40 15.6	+59.4	4.6	41 15.5	+59.3	4.6	42 15.3	+59.3	4.7	43 15.0	+59.4	4.8	73
74	37 15.6	+59.3	4.1	38 15.5	+59.2	4.2	39 15.3	+59.3	4.2	40 15.1	+59.3	4.3	41 15.0	+59.3	4.4	42 14.8	+59.3	4.4	43 14.6	+59.3	4.5	44 14.4	+59.4	4.6	74
75	38 14.9	+59.2	3.9	39 14.7	+59.2	4.0	40 14.6	+59.3	4.0	41 14.4	+59.3	4.1	42 14.3	+59.2	4.2	43 14.1	+59.3	4.2	44 13.9	+59.3	4.4	45 13.8	+59.3	4.4	75
76	39 14.1	+59.2	3.7	40 14.0	+59.2	3.8	41 13.8	+59.3	3.8	42 13.7	+59.2	3.9	43 13.5	+59.3	3.9	44 13.4	+59.2	4.0	45 13.3	+59.3	4.1	46 13.1	+59.2	4.2	76
77	40 13.3	+59.3	3.5	41 13.2	+59.2	3.6	42 13.1	+59.2	3.6	43 12.9	+59.3	3.7	44 12.8	+59.3	3.7	45 12.7	+59.2	3.8	46 12.6	+59.2	3.9	47 12.4	+59.3	3.9	77
78	41 12.5	+59.1	3.3	42 12.4	+59.1	3.4	43 12.3	+59.2	3.4	44 12.2	+59.2	3.5	45 12.1	+59.2	3.5	46 12.0	+59.1	3.6	47 11.8	+59.3	3.6	48 11.7	+59.2	3.7	78
79	42 11.6	+59.2	3.1	43 11.5	+59.2	3.1	44 11.4	+59.2	3.2	45 11.4	+59.1	3.2	46 11.3	+59.1	3.3	47 11.2	+59.2	3.3	48 11.1	+59.2	3.4	49 10.9	+59.2	3.5	79
80	43 10.8	+59.1	2.8	44 10.7	+59.1	2.9	45 10.6	+59.1	2.9	46 10.5	+59.2	3.0	47 10.4	+59.2	3.0	48 10.3	+59.2	3.1	49 10.3	+59.1	3.2	50 10.2	+59.2	3.2	80
81	44 09.8	+59.1	2.6	45 09.8	+59.1	2.6	46 09.7	+59.1	2.7	47 09.7	+59.0	2.7	48 09.6	+59.1	2.8	49 09.5	+59.1	2.8	50 09.4	+59.2	2.9	51 09.4	+59.1	3.0	81
82	45 08.9	+59.0	2.4	46 08.9	+59.0	2.4	47 08.8	+59.1	2.4	48 08.7	+59.1	2.5	49 08.7	+59.1	2.5	50 08.6	+59.1	2.6	51 08.6	+59.1	2.6	52 08.5	+59.1	2.7	82
83	46 07.9	+59.0	2.1	47 07.9	+59.0	2.1	48 07.9	+59.0	2.2	49 07.8	+59.0	2.2	50 07.8	+59.0	2.3	51 07.7	+59.1	2.3	52 07.7	+59.0	2.4	53 07.6	+59.1	2.4	83
84	47 06.9	+59.0	1.8	48 06.9	+59.0	1.9	49 06.9	+58.9	1.9	50 06.8	+59.0	1.9	51 06.8	+59.0	2.0	52 06.8	+59.0	2.0	53 06.8	+59.0	2.1	54 06.7	+59.0	2.1	84
85	48 05.9	+58.9	1.6	49 05.9	+58.9	1.6	50 05.8	+59.0	1.6	51 05.8	+59.0	1.7	52 05.8	+58.9	1.7	53 05.8	+58.9	1.7	54 05.7	+58.9	1.8	55 05.7	+59.0	1.8	85
86	49 04.8	+58.9	1.3	50 04.8	+58.9	1.3	51 04.8	+58.9	1.3	52 04.8	+58.9	1.4	53 04.7	+58.9	1.4	54 04.7	+58.9	1.4	55 04.7	+58.9	1.5	56 04.7	+58.9	1.5	86
87	50 03.7	+58.8	1.0	51 03.7	+58.8	1.0	52 03.7	+58.8	1.0	53 03.7	+58.8	1.0	54 03.7	+58.8	1.1	55 03.6	+58.9	1.1	56 03.6	+58.9	1.1	57 03.6	+58.9	1.1	87
88	51 02.5	+58.8	0.7	52 02.5	+58.8	0.7	53 02.5	+58.8	0.7	54 02.5	+58.8	0.7	55 02.5	+58.8	0.7	56 02.5	+58.8	0.7	57 02.5	+58.8	0.8	58 02.5	+58.8	0.8	88
89	52 01.3	+58.7	0.3	53 01.3	+58.7	0.3	54 01.3	+58.7	0.4	55 01.3	+58.7	0.4	56 01.3	+58.7	0.4	57 01.3	+58.7	0.4	58 01.3	+58.7	0.4	59 01.3	+58.7	0.4	89
90	53 00.0	+58.7	0.0	54 00.0	+58.7	0.0	55 00.0	+58.7	0.0	56 00.0	+58.7	0.0	57 00.0	+58.7	0.0	58 00.0	+58.7	0.0	59 00.0	+58.6	0.0	60 00.0	+58.6	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 168°, 192°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 54.1	+59.1	163.9	34 56.4	+59.2	164.1	33 58.7	+59.2	164.3	33 00.9	+59.3	164.4	32 03.1	+59.3	164.6	31 05.2	+59.4	164.8	30 07.3	+59.5	164.9	29 09.3	+59.5	165.1	0
1	36 53.2	+59.1	163.7	35 55.6	+59.2	163.9	34 57.9	+59.3	164.1	34 00.2	+59.3	164.3	33 02.4	+59.4	164.4	32 04.6	+59.4	164.6	31 06.8	+59.5	164.8	30 08.8	+59.5	164.9	1
2	37 52.3	+59.1	163.5	36 54.8	+59.2	163.7	35 57.2	+59.2	163.9	34 59.5	+59.3	164.1	34 01.8	+59.3	164.3	33 04.0	+59.4	164.4	32 06.2	+59.4	164.6	31 08.3	+59.5	164.8	2
3	38 51.4	+59.1	163.2	37 54.0	+59.1	163.5	36 56.4	+59.2	163.7	35 58.8	+59.3	163.9	35 01.1	+59.3	164.1	34 03.4	+59.4	164.3	33 05.6	+59.4	164.6	32 07.8	+59.5	164.6	3
4	39 50.5	+59.1	163.0	38 53.1	+59.1	163.2	37 55.6	+59.2	163.5	36 58.1	+59.2	163.7	36 00.4	+59.3	163.9	35 02.8	+59.3	164.1	34 05.0	+59.4	164.3	33 07.3	+59.4	164.5	4
5	40 49.6	+59.0	162.8	39 52.2	+59.1	163.0	38 54.8	+59.2	163.3	37 57.3	+59.2	163.5	36 59.7	+59.3	163.7	36 02.1	+59.4	163.9	35 04.4	+59.4	164.1	34 06.7	+59.4	164.3	5
6	41 48.6	+59.0	162.5	40 51.3	+59.1	162.8	39 54.0	+59.1	163.0	38 56.5	+59.2	163.3	37 59.0	+59.3	163.5	37 01.5	+59.3	163.7	36 03.8	+59.4	163.9	35 06.1	+59.5	164.1	6
7	42 47.6	+58.9	162.3	41 50.4	+59.0	162.6	40 53.1	+59.1	162.8	39 55.7	+59.2	163.1	38 58.3	+59.2	163.3	38 00.8	+59.3	163.5	37 03.2	+59.4	163.8	36 05.6	+59.4	164.0	7
8	43 46.5	+58.9	162.0	42 49.4	+59.0	162.3	41 52.2	+59.1	162.6	40 54.9	+59.1	162.9	39 57.5	+59.2	163.1	39 00.1	+59.3	163.3	38 02.6	+59.3	163.6	37 05.0	+59.4	163.8	8
9	44 45.4	+58.9	161.8	43 48.4	+59.0	162.1	42 51.3	+59.0	162.4	41 54.0	+59.2	162.6	40 56.7	+59.2	162.9	39 59.4	+59.2	163.1	39 01.9	+59.3	163.4	38 04.4	+59.3	163.6	9
10	45 44.3	+58.9	161.5	44 47.4	+58.9	161.8	43 50.3	+59.0	162.1	42 53.2	+59.1	162.4	41 55.9	+59.2	162.7	40 58.6	+59.3	162.9	40 01.2	+59.3	163.2	39 03.7	+59.4	163.4	10
11	46 43.2	+58.8	161.2	45 46.3	+58.9	161.5	44 49.3	+59.0	161.9	43 52.3	+59.0	162.2	42 55.1	+59.1	162.5	41 57.9	+59.2	162.7	41 00.5	+59.3	163.0	40 03.1	+59.3	163.2	11
12	47 42.0	+58.7	160.9	46 45.2	+58.8	161.3	45 48.3	+59.0	161.6	44 51.3	+59.1	161.9	43 54.2	+59.2	162.2	42 57.1	+59.1	162.5	41 59.8	+59.3	162.8	41 02.4	+59.4	163.0	12
13	48 40.7	+58.7	160.6	47 44.0	+58.8	161.0	46 47.3	+58.9	161.3	45 50.4	+59.0	161.7	44 53.4	+59.0	162.0	43 56.2	+59.2	162.2	42 59.1	+59.2	162.6	42 01.8	+59.3	162.8	13
14	49 39.4	+58.6	160.3	48 42.8	+58.8	160.7	47 46.2	+58.8	161.0	46 49.4	+58.9	161.4	45 52.4	+59.1	161.7	44 55.4	+59.1	162.0	43 58.3	+59.2	162.3	43 01.1	+59.2	162.6	14
15	50 38.0	+58.6	160.0	49 41.6	+58.7	160.4	48 45.0	+58.8	160.8	47 48.3	+58.9	161.1	46 51.5	+59.0	161.5	45 54.5	+59.1	161.8	44 57.5	+59.2	162.1	44 00.3	+59.3	162.4	15
16	51 36.6	+58.5	159.6	50 40.3	+58.7	160.1	49 43.8	+58.8	160.5	48 47.2	+58.9	160.8	47 50.5	+59.0	161.2	46 53.6	+59.1	161.5	45 56.7	+59.1	161.9	44 59.6	+59.2	162.2	16
17	52 35.2	+58.4	159.3	51 39.0	+58.6	159.7	50 42.6	+58.7	160.1	49 46.1	+58.9	160.5	48 49.5	+58.9	160.9	47 52.7	+59.0	161.3	46 55.8	+59.1	161.6	45 58.8	+59.2	162.0	17
18	53 33.6	+58.4	158.9	52 37.6	+58.5	159.4	51 41.3	+58.7	159.8	50 44.9	+58.8	160.2	49 48.4	+58.9	160.6	48 51.7	+59.0	161.0	47 54.9	+59.1	161.4	46 58.0	+59.2	161.7	18
19	54 32.0	+58.3	158.5	53 36.1	+58.4	159.0	52 40.0	+58.6	159.5	51 43.7	+58.7	159.9	50 47.3	+58.8	160.3	49 50.7	+59.0	160.7	48 54.0	+59.0	161.1	47 57.2	+59.1	161.5	19
20	55 30.3	+58.2	158.1	54 34.5	+58.4	158.6	53 38.6	+58.5	159.1	52 42.4	+58.7	159.6	51 46.1	+58.8	160.0	50 49.7	+58.9	160.4	49 53.0	+59.0	160.8	48 56.3	+59.1	161.2	20
21	56 28.5	+58.1	157.7	55 32.9	+58.3	158.2	54 37.1	+58.5	158.7	53 41.1	+58.6	159.2	52 44.9	+58.7	159.7	51 48.6	+58.8	160.1	50 52.0	+59.0	160.6	49 55.4	+59.0	161.0	21
22	57 26.6	+58.1	157.2	56 31.2	+58.2	157.8	55 35.6	+58.3	158.3	54 39.7	+58.5	158.9	53 43.6	+58.7	159.4	52 47.4	+58.8	159.9	51 51.0	+58.9	160.3	50 54.4	+59.1	160.7	22
23	58 24.7	+57.9	156.7	57 29.4	+58.1	157.3	56 33.9	+58.3	157.9	55 38.2	+58.5	158.5	54 42.3	+58.6	159.0	53 46.2	+58.7	159.5	52 49.9	+58.9	160.0	51 53.5	+58.9	160.4	23
24	59 22.6	+57.7	156.2	58 27.5	+58.0	156.9	57 32.2	+58.2	157.5	56 36.7	+58.3	158.1	55 40.9	+58.5	158.6	54 44.9	+58.7	159.1	53 48.8	+58.8	159.6	52 52.4	+59.0	160.1	24
25	60 20.3	+57.7	155.7	59 25.5	+57.9	156.4	58 30.4	+58.1	157.0	57 35.0	+58.3	157.6	56 39.4	+58.5	158.2	55 43.6	+58.6	158.8	54 47.6	+58.7	159.3	53 51.4	+58.8	159.8	25
26	61 18.0	+57.5	155.1	60 23.4	+57.7	155.8	59 28.5	+58.0	156.5	58 33.3	+58.2	157.2	57 37.9	+58.3	157.8	56 42.2	+58.5	158.4	55 46.3	+58.7	158.9	54 50.2	+58.9	159.4	26
27	62 15.5	+57.3	154.5	61 21.1	+57.6	155.3	60 26.5	+57.8	156.0	59 31.5	+58.1	156.7	58 36.2	+58.3	157.4	57 40.7	+58.5	158.0	56 45.0	+58.6	158.6	55 49.1	+58.7	159.1	27
28	63 12.8	+57.1	153.9	62 18.7	+57.5	154.7	61 24.3	+57.7	155.5	60 29.6	+57.9	156.2	59 34.5	+58.2	156.9	58 39.2	+58.3	157.6	57 43.6	+58.5	158.2	56 47.8	+58.7	158.7	28
29	64 09.9	+56.9	153.2	63 16.2	+57.2	154.1	62 22.0	+57.4	154.9	61 27.5	+57.8	155.7	60 32.7	+58.0	156.4	59 37.5	+58.3	157.1	58 42.1	+58.5	157.7	57 46.5	+58.6	158.3	29
30	65 06.8	+56.7	152.4	64 13.4	+57.1	153.4	63 19.6	+57.3	154.3	62 25.3	+57.7	155.1	61 30.7	+57.9	155.9	60 35.8	+58.1	156.6	59 40.6	+58.3	157.3	58 45.1	+58.5	157.9	30
31	66 03.5	+56.5	151.6	65 10.5	+56.8	152.7	64 16.9	+57.2	153.6	63 23.0	+57.5	154.5	62 28.6	+57.8	155.3	61 33.9	+58.1	156.1	60 38.9	+58.3	156.8	59 43.6	+58.5	157.5	31
32	67 00.0	+56.1	150.8	66 07.3	+56.6	151.9	65 14.1	+57.0	152.9	64 20.5	+57.3	153.9	63 26.4	+57.6	154.7	62 32.0	+57.9	155.6	61 37.2	+58.1	156.3	60 42.1	+58.3	157.1	32
33	67 56.1	+55.8	149.9	67 03.9	+56.3	151.0	66 11.1	+56.7	152.1	65 17.8	+57.1	153.2	64 24.0	+57.5	154.1	63 29.9	+57.7	155.0	62 35.3	+58.0	155.8	61 40.4	+58.3	156.6	33
34	68 51.9	+55.4	148.9	68 00.2	+55.9	150.1	67 07.8	+56.5	151.3	66 14.9	+56.9	152.4	65 21.5	+57.2	153.4	64 27.6	+57.6	154.4	63 33.3	+57.9	155.2	62 38.7	+58.1	156.1	34
35	69 47.3	+55.0	147.8	68 56.1	+55.6	149.2	68 04.3	+56.1	150.4	67 11.8	+56.6	151.6	66 18.7	+57.1	152.7	65 25.2	+57.4	153.7	64 31.2	+57.7	154.6	63 36.8	+57.9	155.5	35
36	70 42.3	+54.4	146.6	69 51.7	+55.2	148.1	69 00.4	+55.8	149.5	68 08.4	+56.3	150.7	67 15.8	+56.7	151.9	66 22.6	+57.1	153.0	65 28.9	+57.5	154.0	64 34.7	+57.9	154.9	36
37	71 36.7	+53.9	145.3	70 46.9	+54.7	146.9	69 56.2	+55.3	148.4	69 04.7	+56.0	149.8	68 12.5	+56.5	151.1	67 19.7	+57.0	152.2	66 26.4	+57.3	153.3	65 32.6	+57.6	154.3	37
38	72 30.6	+53.2	143.9	71 41.6	+54.1	145.6	70 51.6	+54.9	147.3	70 00.7	+55.6	148.8	69 09.0	+56.2	150.1	68 16.7	+56.6	151.4	67 23.7	+57.1	152.5	66 30.2	+57.5	153.6	38
39	73 23.8	+52.5	142.3	72 35.7	+53.5	144.2	71 46.5	+54.4	146.0	70 56.3	+55.1	147.6	70 05.2	+55.8	149.1	69 13.3	+56.4	150.5	68 20.8	+56.8	151.7	67 27.7	+57.2	152.9	39
40	74 16.3	+51.4	140.5	73 29.2	+52.7	142.7	72 40.9	+53.7	144.6	71 51.4	+54.6	146.4	71 01.0	+55.3	148.0	70 09.7	+56.0	149.5	69 17.6	+56.6	150.8	68 24.9	+57.0	152.1	40
41	75 07.7	+50.4	138.6	74 21.9	+51.8	141.0	73 34.6	+53.0	143.1	72 46.0	+54.0	145.0	71 56.3	+54.9	146.8	71 05.7	+55.5	148.4	70 14.2	+56.2	149.9	69 21.9	+56.7	151.2	41
42	75 58.1	+49.1	136.4	75 13.7	+50.8	139.0	74 27.6	+52.1	141.4	73 40.0	+53.3	143.5	72 51.2	+54.3	145.5	72 01.2	+55.1	147.2	71 10.4	+55.7	148.8	70 18.6	+56.4	150.3	42
43	76 47.2	+47.5	134.0	76 04.5	+49.4	136.9	75 19.7	+51.1	139.5	74 33.3	+52.5	141.8	73 45.5	+53.5	144.0	72 56.3	+54.6	145.9	72 06.1	+55.4	147.6	71 15.0	+56.0	149.2	43
44	77 34.7	+45.7•	131.2	76 53.9	+47.9	134.4	76 10.8	+49.9	137.4	75 25.8	+51.4	140.0	74 39.0	+52.8	142.3	73 50.9	+53.8	144.4	73 01.5	+54.8	146.3	72 11.0	+55.6	148.1	44
45	78 20.4	+43.3•	128.1	77 41.8	+46.1•	131.7	77 00.7	+48.3	135.0	76 17.2	+50.2	137.9	75 31.8	+51.8	140.5	74 44.7	+53.1	142.8	73 56.3	+54.1	144.9	73 06.6	+55.0	146.8	45
46	79 03.7	+40.6•	124.6	78 27.9	+43.8•	128.6	77 49.0	+46.5•	132.2	77 07.4	+48.7	135.5	76 23.6	+50.5	138.4	75 37.8	+52.1	141.0	74 50.4	+53.4	143.3	74 01.6	+54.5	145.4	46
47	79 44.3	+37.2•	120.6	79 11.7	+41.1•	125.1	78 35.5	+44.3•	129.1	77 56.1	+47.0	132.8	77 14.1	+49.2	136.0	76 29.9	+51.0	138.9	75 43.8	+52.5	141.5	74 56.1	+53.7	143.8	47
48	80 21.5	+33.2•	116.0	79 52.8	+37.7•	121.1	79 19.8	+41.6•	125.6	78 43.1	+44.8•	129.7	78 03.3	+47.4	133.3	77 20.9	+49.6	136.6	76 36.3	+51.3	139.5	75 49.8	+52.8	142.1	48
49	80 54.7	+28.3•	110.9	80 30.5	+33.7•	116.5	80 01.4	+38.3•	121.6	79 27.9	+42.1•	126.2	78 50.7	+45.3•	130.3	78 10.5	+47.9	133.9	77 27.6	+50.1	137.2	76 42.6	+51.8	140.1	49
50	81 23.0	+22.8•	105.2	81 04.2	+28.9•	111.3	80 39.7	+34.2•	117.0	80 10.0	+38.8•	122.1	79 36.0	+42.7•	126.8	78 58.4	+45.8•	130.9	78 17.7	+48.3	134.5	77 34.4	+50.4	137.8	50
51	81 45.8	+16.3•	98.8	81 33.1	+23.2•	105.5	81 13.9	+29.4•	111.8	80 48.8	+34.8•	117.5	80 18.7	+39.4•	122.7	79 44.2	+43.2•	127.4	79 06.0	+46.4•	131.5	78 24.8	+48.9	135.2	51
52	82 02.1	+9.1•	92.0	81 56.3	+16.6•	99.1	81 43.3	+23.6•	105.9	81 23.6	+29.9•	112.3	80 58.1	+35.3•	118.1	80 27.4	+40.0•	123.4	79 52.4	+43.7•	128.0	79 13.7	+46.8•	132.2	52
53	82 11.2	+1.7•	84.8	82 12.9	+9.3•	92.1	82 06.9	+16.9•	99.6	81 53.5	+24.1•	106.3	81 33.4	+30.5•	113.3	81 07.4	+35.9•	119.3	80 36.1	+40.6•	124.7	80 00.5	+44.4•	128.7	53
54	82 12.9	−6.0•	77.4	82 22.2	+1.6•	84.7	82 23.8	+9.5•	92.2	82 17.6	+17.2•	99.6	82 03.9	+24.5•	106.3	81 43.3	+31.0•	113.3	81 16.7	+36.5•	119.3	80 44.9	+41.1•	124.7	54
55	82 06.9	−13.4•	70.1	82 23.8	−6.2•	77.2	82 33.3	+1.5•	84.7	82 34.8	+9.7•	92.3	82 28.4	+17.6•	99.9	82 14.3	+25.0•	107.2	81 53.2	+31.6•	113.9	81 26.0	+37.2•	120.0	55
56	81 53.5	−20.1•	63.1	82 17.6	−13.7•	69.7	82 34.8	−6.4•	76.9	82 44.5	+1.5•	84.6	82 46.0	+9.8•	92.5	82 39.3	+18.0•	100.2	82 24.8	+25.6•	107.7	82 03.2	+32.2•	114.5	56
57	81 33.4	−26.0•	56.6	82 03.9	−20.6•	62.6	82 28.4	−14.1•	69.3	82 46.0	−6.7•	76.7	82 55.8	+1.5•	84.5	82 57.3	+10.0•	92.6	82 50.4	+18.3•	100.6	82 35.4	+26.1•	108.2	57
58	81 07.4	−31.3•	50.6	81 43.3	−26.6•	55.9	82 14.3	−21.1•	62.0	82 39.3	−14.5•	68.8	82 57.3	−6.9•	76.4	83 07.3	+1.4•	84.5	83 08.7	+10.2•	92.8	83 01.5	+18.8•	101.0	58
59	80 36.1	−35.6•	45.2	81 16.7	−31.8•	49.8	81 53.2	−27.2•	55.2	82 24.8	−21.6•	61.4	82 50.4	−15.0•	68.3	83 08.7	−7.2•	76.1	83 18.9	+1.4•	84.4	83 20.3	+10.3•	93.0	59
60	80 00.5	−39.2•	40.4	80 44.9	−36.2•	44.4	81 26.0	−32.4•	49.0	82 03.2	−27.8•	54.4	82 35.4	−22.2•	60.7	83 01.5	−15.4•	67.9	83 20.3	−7.6•	75.8	83 30.6	+1.3•	84.4	60
61	79 21.3	−42.2•	36.2	80 08.7	−39.8•	39.6	80 53.6	−36.8•	43.6	81 35.4	−33.1•	48.2	82 13.2	−28.4•	53.7	82 46.1	−22.8•	60.0	83 12.7	−15.9•	67.3	83 31.9	−7.8•	75.5	61
62	78 39.1	−44.7•	32.5	79 28.9	−42.8•	35.3	80 16.8	−40.4•	38.7	81 02.3	−37.4•	42.7	81 44.8	−33.8•	47.4	82 23.3	−29.2•	52.9	82 56.8	−23.5•	59.3	83 24.1	−16.6•	66.8	62
63	77 54.4	−46.8•	29.2	78 46.1	−45.2•	31.6	79 36.4	−43.3•	34.5	80 24.9	−41.0•	37.8	81 11.0	−38.0•	41.8	81 54.1	−34.4•	46.5	82 33.3	−29.8•	52.0	83 07.6	−24.2•	58.6	63
64	77 07.6	−48.4	26.3	78 00.9	−47.2	28.4	78 53.1	−45.7•	30.8	79 43.9	−43.8•	33.6	80 33.0	−41.6•	36.9	81 19.7	−38.8•	40.8	82 03.5	−35.2•	45.5	82 43.4	−30.6•	51.1	64
65	76 19.2	−49.9	23.7	77 13.7	−48.8	25.5	78 07.4	−47.6	27.5	79 00.1	−46.2•	29.9	79 51.4	−44.5•	32.7	80 40.9	−42.2•	36.0	81 28.7	−39.4•	39.9	82 12.8	−35.9•	44.6	65
66	75 29.3	−51.1	21.4	76 24.9	−50.3	22.9	77 19.8	−49.3	24.7	78 13.9	−48.2	26.7	79 06.9	−46.7•	29.0	79 58.7	−45.0•	31.7	80 48.9	−42.9•	35.0	81 36.9	−40.2•	38.9	66
67	74 38.2	−52.0	19.4	75 34.6	−51.4	20.7	76 30.5	−50.6	22.1	77 25.7	−49.7	23.8	78 20.2	−48.6	25.8	79 13.7	−47.2•	28.1	80 06.0	−45.6•	30.7	80 56.7	−43.5•	34.0	67
68	73 46.2	−52.9	17.5	74 43.2	−52.3	18.6	75 39.9	−51.8	19.9	76 36.0	−51.0	21.3	77 31.6	−50.1	23.0	78 26.5	−49.1	24.9	79 20.4	−47.8•	27.1	80 13.2	−46.2•	29.7	68
69	72 53.3	−53.6	15.9	73 50.9	−53.2	16.8	74 48.1	−52.6	17.9	75 45.0	−52.0	19.1	76 41.5	−51.4	20.5	77 37.4	−50.6	22.1	78 32.6	−49.5	23.9	79 27.0	−48.3	26.1	69
70	71 59.7	−54.2	14.4	72 57.7	−53.9	15.2	73 55.5	−53.5	16.1	74 53.0	−53.0	17.2	75 50.1	−52.4	18.3	76 46.8	−51.7	19.7	77 43.1	−51.0	21.2	78 38.7	−50.1	23.0	70
71	71 05.5	−54.8	13.1	72 03.8	−54.4	13.8	73 02.0	−54.1	14.5	74 00.0	−53.8	15.4	74 57.7	−53.3	16.4	75 55.1	−52.8	17.5	76 52.1	−52.2	18.8	77 48.6	−51.4	20.3	71
72	70 10.7	−55.2	11.8	71 09.4	−55.0	12.4	72 07.9	−54.7	13.1	73 06.2	−54.4	13.8	74 04.4	−54.1	14.7	75 02.3	−53.6	15.6	75 59.9	−53.1	16.7	76 57.2	−52.5	17.9	72
73	69 15.5	−55.7	10.7	70 14.4	−55.5	11.2	71 13.2	−55.2	11.8	72 11.8	−54.9	12.4	73 10.3	−54.6	13.1	74 08.7	−54.3	13.9	75 06.8	−53.9	14.8	76 04.7	−53.5	15.9	73
74	68 19.8	−56.0	9.7	69 18.9	−55.8	10.1	70 18.0	−55.7	10.6	71 16.9	−55.4	11.1	72 15.7	−55.2	11.7	73 14.4	−55.0	12.4	74 12.9	−54.6	13.2	75 11.2	−54.2	14.0	74
75	67 23.8	−56.3	8.7	68 23.1	−56.2	9.1	69 22.3	−56.0	9.5	70 21.5	−55.9	10.0	71 20.5	−55.6	10.5	72 19.4	−55.4	11.1	73 18.3	−55.2	11.7	74 17.0	−54.9	12.4	75
76	66 27.5	−56.6	7.8	67 26.9	−56.4	8.2	68 26.3	−56.3	8.5	69 25.6	−56.2	8.9	70 24.9	−56.1	9.3	71 24.0	−55.8	9.8	72 23.1	−55.7	10.4	73 22.1	−55.5	11.0	76
77	65 30.9	−56.8	7.0	66 30.5	−56.7	7.3	67 30.0	−56.6	7.6	68 29.4	−56.5	7.9	69 28.8	−56.4	8.3	70 28.2	−56.3	8.7	71 27.4	−56.0	9.2	72 26.6	−55.9	9.7	77
78	64 34.1	−57.0	6.3	65 33.8	−57.0	6.5	66 33.4	−56.9	6.8	67 33.0	−56.8	7.0	68 32.4	−56.6	7.3	69 31.9	−56.5	7.7	70 31.4	−56.5	8.1	71 30.7	−56.2	8.5	78
79	63 37.1	−57.3	5.5	64 36.8	−57.2	5.7	65 36.5	−57.1	6.0	66 36.1	−57.0	6.2	67 35.8	−57.0	6.5	68 35.4	−56.9	6.8	69 34.9	−56.7	7.1	70 34.5	−56.7	7.4	79
80	62 39.8	−57.4	4.9	63 39.6	−57.4	5.1	64 39.4	−57.3	5.2	65 39.1	−57.2	5.4	66 38.8	−57.1	5.7	67 38.5	−57.1	5.9	68 38.2	−57.0	6.2	69 37.8	−56.9	6.4	80
81	61 42.4	−57.6	4.3	62 42.2	−57.5	4.4	63 42.1	−57.5	4.6	64 41.9	−57.5	4.7	65 41.7	−57.4	4.9	66 41.4	−57.3	5.1	67 41.2	−57.3	5.3	68 40.9	−57.2	5.6	81
82	60 44.8	−57.7	3.7	61 44.7	−57.7	3.8	62 44.6	−57.7	3.9	63 44.4	−57.6	4.1	64 44.3	−57.6	4.2	65 44.1	−57.5	4.4	66 43.9	−57.4	4.5	67 43.7	−57.4	4.7	82
83	59 47.1	−57.8	3.1	60 47.0	−57.8	3.2	61 46.9	−57.8	3.3	62 46.8	−57.7	3.4	63 46.7	−57.7	3.6	64 46.6	−57.7	3.7	65 46.5	−57.7	3.8	66 46.3	−57.6	4.0	83
84	58 49.3	−58.0	2.6	59 49.2	−57.9	2.7	60 49.1	−58.0	2.8	61 49.1	−57.9	2.9	62 49.0	−57.9	3.0	63 48.9	−57.8	3.1	64 48.8	−57.8	3.2	65 48.7	−57.8	3.3	84
85	57 51.3	−58.1	2.1	58 51.3	−58.1	2.2	59 51.2	−58.0	2.2	60 51.2	−58.1	2.3	61 51.1	−58.0	2.4	62 51.1	−58.0	2.5	63 51.0	−57.9	2.5	64 50.9	−57.9	2.6	85
86	56 53.2	−58.2	1.6	57 53.2	−58.2	1.7	58 53.2	−58.2	1.7	59 53.1	−58.1	1.8	60 53.1	−58.1	1.8	61 53.1	−58.1	1.9	62 53.0	−58.1	2.0	63 53.0	−58.1	2.0	86
87	55 55.0	−58.2	1.2	56 55.0	−58.4	1.2	57 55.0	−58.2	1.3	58 55.0	−58.2	1.3	59 55.0	−58.2	1.3	60 55.0	−58.3	1.4	61 54.9	−58.2	1.4	62 54.9	−58.2	1.5	87
88	54 56.8	−58.4	0.8	55 56.8	−58.4	0.8	56 56.8	−58.4	0.8	57 56.8	−58.4	0.8	58 56.8	−58.4	0.9	59 56.7	−58.3	0.9	60 56.7	−58.3	0.9	61 56.7	−58.3	1.0	88
89	53 58.4	−58.4	0.4	54 58.4	−58.4	0.4	55 58.4	−58.4	0.4	56 58.4	−58.4	0.4	57 58.4	−58.4	0.4	58 58.4	−58.4	0.4	59 58.4	−58.4	0.4	60 58.4	−58.4	0.5	89
90	53 00.0	−58.5	0.0	54 00.0	−58.5	0.0	55 00.0	−58.5	0.0	56 00.0	−58.5	0.0	57 00.0	−58.5	0.0	58 00.0	−58.5	0.0	59 00.0	−58.5	0.0	60 00.0	−58.5	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 54.1	−59.2	163.9	34 56.4	−59.2	164.1	33 58.7	−59.3	164.3	33 00.9	−59.3	164.4	32 03.1	−59.4	164.6	31 05.2	−59.4	164.8	30 07.3	−59.5	164.9	29 09.3	−59.5	165.1	0
1	34 54.9	−59.2	164.1	33 57.2	−59.3	164.3	32 59.4	−59.3	164.4	32 01.6	−59.4	164.6	31 03.7	−59.4	164.8	30 05.8	−59.4	164.9	29 07.8	−59.4	165.1	28 09.8	−59.5	165.2	1
2	33 55.7	−59.2	164.3	32 57.9	−59.2	164.5	32 00.1	−59.3	164.6	31 02.2	−59.3	164.8	30 04.3	−59.4	164.9	29 06.4	−59.5	165.1	28 08.4	−59.5	165.2	27 10.3	−59.5	165.4	2
3	32 56.5	−59.2	164.5	31 58.7	−59.3	164.6	31 00.8	−59.3	164.8	30 02.9	−59.4	165.0	29 04.9	−59.4	165.1	28 06.9	−59.4	165.2	27 08.9	−59.5	165.4	26 10.8	−59.5	165.5	3
4	31 57.3	−59.2	164.7	30 59.4	−59.3	164.8	30 01.5	−59.4	165.0	29 03.5	−59.4	165.1	28 05.5	−59.4	165.3	27 07.5	−59.5	165.4	26 09.4	−59.5	165.5	25 11.3	−59.6	165.6	4
5	30 58.1	−59.3	164.8	30 00.1	−59.3	165.0	29 02.1	−59.3	165.1	28 04.1	−59.4	165.3	27 06.1	−59.5	165.4	26 08.0	−59.5	165.5	25 09.9	−59.5	165.7	24 11.7	−59.5	165.8	5
6	29 58.8	−59.3	165.0	29 00.8	−59.3	165.2	28 02.8	−59.4	165.3	27 04.7	−59.4	165.4	26 06.6	−59.4	165.6	25 08.5	−59.5	165.7	24 10.4	−59.5	165.8	23 12.2	−59.6	165.9	6
7	28 59.5	−59.3	165.2	28 01.5	−59.3	165.3	27 03.4	−59.3	165.5	26 05.3	−59.4	165.6	25 07.2	−59.5	165.7	24 09.0	−59.4	165.8	23 10.9	−59.6	165.9	22 12.6	−59.5	166.1	7
8	28 00.2	−59.2	165.4	27 02.2	−59.3	165.5	26 04.1	−59.4	165.6	25 05.9	−59.4	165.8	24 07.7	−59.4	165.9	23 09.6	−59.5	166.0	22 11.3	−59.5	166.1	21 13.1	−59.6	166.2	8
9	27 01.0	−59.4	165.6	26 02.8	−59.3	165.7	25 04.7	−59.4	165.8	24 06.5	−59.4	165.9	23 08.3	−59.5	166.0	22 10.1	−59.6	166.1	21 11.8	−59.5	166.2	20 13.5	−59.6	166.3	9
10	26 01.6	−59.3	165.7	25 03.5	−59.4	165.8	24 05.3	−59.4	166.0	23 07.1	−59.5	166.1	22 08.8	−59.5	166.2	21 10.5	−59.5	166.3	20 12.3	−59.6	166.3	19 13.9	−59.5	166.5	10
11	25 02.3	−59.3	165.9	24 04.1	−59.4	166.0	23 05.9	−59.4	166.1	22 07.6	−59.4	166.2	21 09.3	−59.5	166.3	20 11.0	−59.5	166.4	19 12.7	−59.5	166.5	18 14.4	−59.6	166.6	11
12	24 03.0	−59.4	166.1	23 04.7	−59.3	166.2	22 06.5	−59.4	166.3	21 08.2	−59.5	166.4	20 09.9	−59.5	166.4	19 11.5	−59.5	166.5	18 13.2	−59.6	166.6	17 14.8	−59.6	166.7	12
13	23 03.6	−59.3	166.2	22 05.4	−59.4	166.3	21 07.1	−59.5	166.4	20 08.7	−59.4	166.5	19 10.4	−59.5	166.6	18 12.0	−59.5	166.7	17 13.6	−59.6	166.7	16 15.2	−59.6	166.8	13
14	22 04.3	−59.4	166.4	21 06.0	−59.4	166.5	20 07.6	−59.4	166.6	19 09.3	−59.5	166.6	18 10.9	−59.5	166.7	17 12.5	−59.5	166.8	16 14.0	−59.6	166.9	15 15.6	−59.6	166.9	14
15	21 04.9	−59.3	166.5	20 06.6	−59.4	166.6	19 08.2	−59.4	166.7	18 09.8	−59.5	166.8	17 11.4	−59.5	166.9	16 12.9	−59.5	166.9	15 14.5	−59.6	167.0	14 16.0	−59.6	167.0	15
16	20 05.6	−59.4	166.7	19 07.2	−59.4	166.8	18 08.8	−59.5	166.8	17 10.3	−59.5	166.9	16 11.9	−59.5	167.0	15 13.4	−59.5	167.1	14 14.9	−59.6	167.1	13 16.4	−59.6	167.2	16
17	19 06.2	−59.4	166.8	18 07.8	−59.5	166.9	17 09.3	−59.4	167.0	16 10.8	−59.4	167.1	15 12.4	−59.5	167.1	14 13.9	−59.6	167.2	13 15.3	−59.5	167.2	12 16.8	−59.6	167.3	17
18	18 06.8	−59.4	167.0	17 08.3	−59.4	167.1	16 09.9	−59.5	167.1	15 11.4	−59.5	167.2	14 12.8	−59.5	167.2	13 14.3	−59.5	167.3	12 15.8	−59.6	167.4	11 17.2	−59.6	167.4	18
19	17 07.4	−59.4	167.1	16 08.9	−59.4	167.2	15 10.4	−59.5	167.3	14 11.9	−59.5	167.3	13 13.3	−59.5	167.4	12 14.8	−59.6	167.4	11 16.2	−59.6	167.5	10 17.6	−59.6	167.5	19
20	16 08.0	−59.4	167.3	15 09.5	−59.4	167.3	14 10.9	−59.4	167.4	13 12.4	−59.5	167.5	12 13.8	−59.5	167.5	11 15.2	−59.6	167.6	10 16.6	−59.6	167.6	9 18.0	−59.6	167.6	20
21	15 08.6	−59.4	167.4	14 10.0	−59.4	167.5	13 11.5	−59.5	167.5	12 12.9	−59.5	167.6	11 14.3	−59.6	167.6	10 15.6	−59.5	167.7	9 17.0	−59.6	167.7	8 18.4	−59.6	167.7	21
22	14 09.2	−59.4	167.6	13 10.6	−59.4	167.6	12 12.0	−59.5	167.7	11 13.4	−59.5	167.7	10 14.7	−59.5	167.8	9 16.1	−59.6	167.8	8 17.4	−59.6	167.8	7 18.8	−59.6	167.9	22
23	13 09.8	−59.4	167.7	12 11.2	−59.5	167.8	11 12.5	−59.5	167.8	10 13.9	−59.6	167.9	9 15.2	−59.5	167.9	8 16.5	−59.5	167.9	7 17.9	−59.6	168.0	6 19.2	−59.6	168.0	23
24	12 10.4	−59.5	167.9	11 11.7	−59.5	167.9	10 13.0	−59.5	167.9	9 14.3	−59.5	168.0	8 15.7	−59.6	168.0	7 17.0	−59.6	168.0	6 18.3	−59.6	168.1	5 19.6	−59.7	168.1	24
25	11 10.9	−59.4	168.0	10 12.2	−59.4	168.0	9 13.5	−59.4	168.1	8 14.8	−59.5	168.1	7 16.1	−59.5	168.1	6 17.4	−59.6	168.2	5 18.7	−59.6	168.2	4 19.9	−59.6	168.2	25
26	10 11.5	−59.4	168.2	9 12.8	−59.5	168.2	8 14.1	−59.5	168.2	7 15.3	−59.5	168.2	6 16.6	−59.6	168.3	5 17.8	−59.5	168.3	4 19.1	−59.6	168.3	3 20.3	−59.6	168.3	26
27	9 12.1	−59.4	168.3	8 13.3	−59.4	168.3	7 14.6	−59.5	168.3	6 15.8	−59.5	168.4	5 17.0	−59.5	168.4	4 18.3	−59.6	168.4	3 19.5	−59.6	168.4	2 20.7	−59.6	168.4	27
28	8 12.6	−59.4	168.4	7 13.9	−59.5	168.5	6 15.1	−59.5	168.5	5 16.3	−59.5	168.5	4 17.5	−59.6	168.5	3 18.7	−59.6	168.5	2 19.9	−59.6	168.5	1 21.1	−59.6	168.5	28
29	7 13.2	−59.4	168.6	6 14.4	−59.5	168.6	5 15.6	−59.5	168.6	4 16.8	−59.6	168.6	3 17.9	−59.5	168.6	2 19.1	−59.6	168.6	1 20.3	−59.6	168.7	0 21.5	−59.7	168.7	29
30	6 13.8	−59.5	168.7	5 14.9	−59.4	168.7	4 16.1	−59.5	168.7	3 17.2	−59.5	168.7	2 18.4	−59.6	168.8	1 19.5	−59.5	168.8	0 20.7	−59.6	168.8	0 38.2	+59.6	11.2	30
31	5 14.3	−59.4	168.8	4 15.5	−59.5	168.9	3 16.6	−59.5	168.9	2 17.7	−59.5	168.9	1 18.8	−59.5	168.9	0 20.0	−59.6	168.9	0 38.9	+59.6	11.1	1 37.8	+59.6	11.1	31
32	4 14.9	−59.4	169.0	3 16.0	−59.4	169.0	2 17.1	−59.5	169.0	1 18.2	−59.5	169.0	0 19.3	−59.5	169.0	0 39.6	+59.6	11.0	1 38.5	+59.6	11.0	2 37.4	+59.6	11.0	32
33	3 15.4	−59.4	169.1	2 16.5	−59.5	169.1	1 17.6	−59.5	169.1	0 18.7	−59.5	169.1	0 40.2	+59.6	10.9	1 39.2	+59.5	10.9	2 38.1	+59.6	10.9	3 37.0	+59.6	10.9	33
34	2 16.0	−59.5	169.2	1 17.0	−59.4	169.2	0 18.1	−59.5	169.3	0 40.8	+59.6	10.7	1 39.8	+59.5	10.8	2 38.7	+59.6	10.8	3 37.7	+59.6	10.8	4 36.6	+59.6	10.8	34
35	1 16.5	−59.4	169.4	0 17.6	−59.5	169.4	0 41.4	+59.5	10.6	1 40.4	+59.5	10.6	2 39.3	+59.6	10.6	3 38.3	+59.6	10.6	4 37.3	+59.6	10.7	5 36.2	+59.7	10.7	35
36	0 17.1	−59.4	169.5	0 41.9	+59.5	10.5	1 40.9	+59.5	10.5	2 39.9	+59.5	10.5	3 38.9	+59.5	10.5	4 37.9	+59.6	10.5	5 36.9	+59.6	10.5	6 35.9	+59.6	10.6	36
37	0 42.3	+59.5	10.4	1 41.4	+59.4	10.4	2 40.4	+59.5	10.4	3 39.4	+59.4	10.4	4 38.4	+59.6	10.4	5 37.4	+59.6	10.4	6 36.5	+59.6	10.4	7 35.5	+59.6	10.4	37
38	1 41.8	+59.4	10.2	2 40.8	+59.5	10.2	3 39.9	+59.5	10.2	4 38.9	+59.6	10.2	5 38.0	+59.5	10.3	6 37.0	+59.6	10.3	7 36.1	+59.6	10.3	8 35.1	+59.6	10.3	38
39	2 41.2	+59.5	10.1	3 40.3	+59.5	10.1	4 39.4	+59.5	10.1	5 38.5	+59.5	10.1	6 37.5	+59.6	10.1	7 36.6	+59.6	10.2	8 35.6	+59.6	10.2	9 34.7	+59.6	10.2	39
40	3 40.7	+59.4	9.9	4 39.8	+59.5	10.0	5 38.9	+59.5	10.0	6 38.0	+59.5	10.0	7 37.1	+59.5	10.0	8 36.1	+59.6	10.0	9 35.2	+59.6	10.1	10 34.3	+59.6	10.1	40
41	4 40.1	+59.5	9.8	5 39.3	+59.4	9.8	6 38.4	+59.5	9.8	7 37.5	+59.5	9.9	8 36.6	+59.5	9.9	9 35.7	+59.6	9.9	10 34.8	+59.6	9.9	11 33.9	+59.6	10.0	41
42	5 39.6	+59.4	9.7	6 38.7	+59.5	9.7	7 37.9	+59.4	9.7	8 37.0	+59.5	9.7	9 36.1	+59.6	9.8	10 35.3	+59.5	9.8	11 34.4	+59.6	9.8	12 33.5	+59.6	9.9	42
43	6 39.0	+59.5	9.5	7 38.2	+59.4	9.6	8 37.4	+59.4	9.6	9 36.5	+59.5	9.6	10 35.7	+59.5	9.6	11 34.8	+59.6	9.7	12 34.0	+59.5	9.7	13 33.1	+59.6	9.7	43
44	7 38.5	+59.4	9.4	8 37.6	+59.5	9.4	9 36.8	+59.5	9.4	10 36.0	+59.5	9.5	11 35.2	+59.5	9.5	12 34.4	+59.5	9.5	13 33.5	+59.6	9.6	14 32.7	+59.6	9.6	44
45	8 37.9	+59.5	9.3	9 37.1	+59.5	9.3	10 36.3	+59.5	9.3	11 35.5	+59.5	9.3	12 34.7	+59.6	9.4	13 33.9	+59.6	9.4	14 33.1	+59.6	9.5	15 32.3	+59.6	9.5	45
46	9 37.3	+59.5	9.1	10 36.6	+59.4	9.1	11 35.8	+59.5	9.2	12 35.0	+59.5	9.2	13 34.3	+59.5	9.3	14 33.5	+59.5	9.3	15 32.7	+59.6	9.3	16 31.9	+59.6	9.4	46
47	10 36.8	+59.4	9.0	11 36.0	+59.5	9.0	12 35.3	+59.4	9.0	13 34.5	+59.5	9.1	14 33.8	+59.5	9.1	15 33.0	+59.5	9.2	16 32.2	+59.6	9.2	17 31.5	+59.5	9.3	47
48	11 36.2	+59.4	8.8	12 35.5	+59.4	8.9	13 34.7	+59.5	8.9	14 34.0	+59.5	8.9	15 33.3	+59.5	9.0	16 32.5	+59.6	9.0	17 31.8	+59.6	9.1	18 31.0	+59.6	9.1	48
49	12 35.6	+59.4	8.7	13 34.9	+59.5	8.7	14 34.2	+59.5	8.8	15 33.5	+59.5	8.8	16 32.8	+59.5	8.9	17 32.1	+59.5	8.9	18 31.4	+59.5	9.0	19 30.6	+59.6	9.0	49
50	13 35.0	+59.4	8.6	14 34.4	+59.4	8.6	15 33.7	+59.4	8.6	16 33.0	+59.5	8.7	17 32.3	+59.5	8.7	18 31.6	+59.5	8.8	19 30.9	+59.6	8.8	20 30.2	+59.6	8.9	50
51	14 34.4	+59.4	8.4	15 33.8	+59.4	8.5	16 33.1	+59.5	8.5	17 32.5	+59.4	8.5	18 31.8	+59.5	8.6	19 31.1	+59.5	8.6	20 30.4	+59.6	8.7	21 29.7	+59.6	8.8	51
52	15 33.8	+59.4	8.3	16 33.2	+59.4	8.3	17 32.6	+59.4	8.4	18 31.9	+59.5	8.4	19 31.3	+59.5	8.4	20 30.6	+59.5	8.5	21 30.0	+59.5	8.6	22 29.3	+59.6	8.6	52
53	16 33.2	+59.4	8.1	17 32.6	+59.5	8.2	18 32.0	+59.5	8.2	19 31.4	+59.5	8.3	20 30.8	+59.4	8.3	21 30.1	+59.5	8.4	22 29.5	+59.5	8.4	23 28.9	+59.5	8.5	53
54	17 32.6	+59.4	8.0	18 32.1	+59.4	8.0	19 31.5	+59.4	8.1	20 30.9	+59.4	8.1	21 30.3	+59.4	8.2	22 29.7	+59.4	8.2	23 29.0	+59.6	8.3	24 28.4	+59.5	8.4	54
55	18 32.0	+59.4	7.8	19 31.5	+59.4	7.9	20 30.9	+59.4	7.9	21 30.3	+59.5	8.0	22 29.7	+59.5	8.0	23 29.1	+59.4	8.1	24 28.5	+59.6	8.2	25 27.9	+59.6	8.2	55
56	19 31.4	+59.4	7.7	20 30.9	+59.4	7.7	21 30.3	+59.4	7.8	22 29.8	+59.4	7.8	23 29.2	+59.5	7.9	24 28.6	+59.5	7.9	25 28.1	+59.5	8.0	26 27.5	+59.5	8.1	56
57	20 30.8	+59.3	7.5	21 30.3	+59.4	7.6	22 29.7	+59.4	7.6	23 29.2	+59.4	7.7	24 28.7	+59.4	7.7	25 28.1	+59.5	7.8	26 27.6	+59.4	7.9	27 27.0	+59.5	7.9	57
58	21 30.1	+59.4	7.4	22 29.7	+59.3	7.4	23 29.1	+59.4	7.5	24 28.6	+59.5	7.5	25 28.1	+59.5	7.6	26 27.6	+59.4	7.7	27 27.0	+59.5	7.7	28 26.5	+59.5	7.8	58
59	22 29.5	+59.4	7.2	23 29.0	+59.4	7.3	24 28.5	+59.4	7.3	25 28.1	+59.3	7.4	26 27.6	+59.4	7.4	27 27.0	+59.5	7.5	28 26.5	+59.5	7.6	29 26.0	+59.5	7.6	59
60	23 28.9	+59.3	7.0	24 28.4	+59.4	7.1	25 27.9	+59.4	7.2	26 27.5	+59.4	7.2	27 27.0	+59.4	7.3	28 26.5	+59.4	7.3	29 26.0	+59.5	7.4	30 25.5	+59.5	7.5	60
61	24 28.2	+59.3	6.9	25 27.8	+59.3	6.9	26 27.3	+59.4	7.0	27 26.9	+59.4	7.1	28 26.4	+59.4	7.1	29 25.9	+59.4	7.2	30 25.5	+59.4	7.3	31 25.0	+59.4	7.3	61
62	25 27.5	+59.3	6.7	26 27.1	+59.3	6.8	27 26.7	+59.3	6.8	28 26.3	+59.3	6.9	29 25.8	+59.4	7.0	30 25.3	+59.5	7.0	31 24.9	+59.4	7.1	32 24.4	+59.5	7.2	62
63	26 26.8	+59.3	6.5	27 26.4	+59.4	6.6	28 26.0	+59.4	6.7	29 25.6	+59.4	6.7	30 25.2	+59.4	6.8	31 24.8	+59.4	6.9	32 24.3	+59.5	6.9	33 23.9	+59.4	7.0	63
64	27 26.1	+59.3	6.4	28 25.8	+59.3	6.4	29 25.4	+59.3	6.5	30 25.0	+59.3	6.6	31 24.6	+59.4	6.6	32 24.2	+59.4	6.7	33 23.8	+59.4	6.8	34 23.3	+59.5	6.9	64
65	28 25.4	+59.3	6.2	29 25.1	+59.3	6.3	30 24.7	+59.3	6.3	31 24.3	+59.4	6.4	32 24.0	+59.3	6.5	33 23.6	+59.4	6.5	34 23.2	+59.4	6.6	35 22.8	+59.4	6.7	65
66	29 24.7	+59.3	6.0	30 24.4	+59.3	6.1	31 24.0	+59.3	6.2	32 23.7	+59.3	6.2	33 23.3	+59.4	6.3	34 23.0	+59.3	6.4	35 22.6	+59.4	6.5	36 22.2	+59.4	6.5	66
67	30 24.0	+59.2	5.8	31 23.7	+59.2	5.9	32 23.3	+59.3	6.0	33 23.0	+59.3	6.0	34 22.7	+59.3	6.1	35 22.3	+59.4	6.2	36 22.0	+59.3	6.3	37 21.6	+59.4	6.3	67
68	31 23.2	+59.3	5.7	32 22.9	+59.3	5.7	33 22.6	+59.3	5.8	34 22.3	+59.3	5.9	35 21.9	+59.3	6.0	36 21.7	+59.3	6.0	37 21.3	+59.4	6.1	38 21.0	+59.4	6.2	68
69	32 22.5	+59.2	5.5	33 22.2	+59.2	5.5	34 21.9	+59.2	5.6	35 21.6	+59.3	5.7	36 21.3	+59.3	5.7	37 21.0	+59.3	5.8	38 20.7	+59.3	5.9	39 20.4	+59.3	6.0	69
70	33 21.7	+59.2	5.3	34 21.4	+59.2	5.3	35 21.1	+59.3	5.4	36 20.9	+59.2	5.5	37 20.6	+59.3	5.6	38 20.3	+59.3	5.6	39 20.0	+59.3	5.7	40 19.7	+59.4	5.8	70
71	34 20.9	+59.1	5.1	35 20.6	+59.2	5.2	36 20.4	+59.2	5.2	37 20.1	+59.3	5.3	38 19.9	+59.2	5.4	39 19.6	+59.3	5.5	40 19.3	+59.3	5.5	41 19.1	+59.3	5.6	71
72	35 20.0	+59.2	4.9	36 19.8	+59.2	5.0	37 19.6	+59.2	5.0	38 19.4	+59.2	5.1	39 19.1	+59.2	5.2	40 18.9	+59.2	5.2	41 18.6	+59.3	5.3	42 18.4	+59.3	5.4	72
73	36 19.2	+59.1	4.7	37 19.0	+59.2	4.7	38 18.8	+59.2	4.8	39 18.6	+59.2	4.9	40 18.4	+59.2	4.9	41 18.1	+59.3	5.0	42 17.9	+59.2	5.1	43 17.7	+59.2	5.2	73
74	37 18.3	+59.2	4.5	38 18.2	+59.1	4.5	39 18.0	+59.1	4.6	40 17.8	+59.1	4.7	41 17.6	+59.1	4.7	42 17.4	+59.2	4.8	43 17.1	+59.3	4.9	44 16.9	+59.3	5.0	74
75	38 17.5	+59.0	4.3	39 17.3	+59.1	4.3	40 17.1	+59.1	4.4	41 16.9	+59.1	4.4	42 16.7	+59.2	4.5	43 16.6	+59.1	4.5	44 16.4	+59.2	4.7	45 16.2	+59.2	4.7	75
76	39 16.5	+59.1	4.0	40 16.4	+59.1	4.1	41 16.2	+59.1	4.2	42 16.1	+59.1	4.2	43 15.9	+59.1	4.3	44 15.7	+59.2	4.4	45 15.6	+59.1	4.4	46 15.4	+59.2	4.5	76
77	40 15.6	+59.0	3.8	41 15.5	+59.0	3.9	42 15.3	+59.1	3.9	43 15.2	+59.1	4.0	44 15.0	+59.1	4.1	45 14.9	+59.1	4.1	46 14.7	+59.2	4.2	47 14.6	+59.1	4.3	77
78	41 14.6	+59.0	3.6	42 14.5	+59.0	3.6	43 14.4	+59.0	3.7	44 14.3	+59.0	3.7	45 14.1	+59.1	3.8	46 14.0	+59.1	3.9	47 13.9	+59.1	3.9	48 13.7	+59.1	4.0	78
79	42 13.6	+59.0	3.3	43 13.5	+59.0	3.4	44 13.4	+59.0	3.4	45 13.3	+59.0	3.5	46 13.2	+59.0	3.6	47 13.1	+59.0	3.6	48 13.0	+59.0	3.7	49 12.8	+59.1	3.8	79
80	43 12.6	+59.0	3.1	44 12.5	+59.0	3.1	45 12.4	+59.0	3.2	46 12.3	+59.0	3.2	47 12.2	+59.0	3.3	48 12.1	+59.1	3.4	49 12.0	+59.1	3.4	50 11.9	+59.1	3.5	80
81	44 11.6	+58.9	2.8	45 11.5	+58.9	2.9	46 11.4	+58.9	2.9	47 11.3	+59.0	3.0	48 11.2	+59.0	3.0	49 11.2	+58.9	3.1	50 11.1	+59.0	3.1	51 11.0	+59.0	3.2	81
82	45 10.5	+58.8	2.5	46 10.4	+58.9	2.6	47 10.3	+58.9	2.6	48 10.3	+58.9	2.7	49 10.2	+58.9	2.7	50 10.1	+59.0	2.8	51 10.1	+58.9	2.9	52 10.0	+58.9	2.9	82
83	46 09.3	+58.8	2.3	47 09.3	+58.8	2.3	48 09.2	+58.9	2.4	49 09.2	+58.8	2.4	50 09.1	+58.9	2.5	51 09.1	+58.8	2.5	52 09.0	+58.9	2.6	53 08.9	+58.9	2.6	83
84	47 08.1	+58.8	2.0	48 08.1	+58.8	2.0	49 08.1	+58.8	2.1	50 08.0	+58.8	2.1	51 08.0	+58.8	2.1	52 07.9	+58.9	2.2	53 07.9	+58.8	2.2	54 07.8	+58.9	2.3	84
85	48 06.9	+58.7	1.7	49 06.9	+58.7	1.7	50 06.9	+58.7	1.8	51 06.8	+58.8	1.8	52 06.8	+58.8	1.8	53 06.8	+58.7	1.9	54 06.7	+58.8	1.9	55 06.7	+58.8	2.0	85
86	49 05.6	+58.7	1.4	50 05.6	+58.7	1.4	51 05.6	+58.7	1.4	52 05.6	+58.7	1.5	53 05.6	+58.7	1.5	54 05.5	+58.8	1.5	55 05.5	+58.8	1.6	56 05.5	+58.7	1.6	86
87	50 04.3	+58.6	1.1	51 04.3	+58.6	1.1	52 04.3	+58.6	1.1	53 04.3	+58.6	1.1	54 04.3	+58.6	1.1	55 04.3	+58.6	1.1	56 04.3	+58.6	1.2	57 04.2	+58.7	1.2	87
88	51 02.9	+58.6	0.7	52 02.9	+58.6	0.7	53 02.9	+58.6	0.7	54 02.9	+58.6	0.8	55 02.9	+58.6	0.8	56 02.9	+58.6	0.8	57 02.9	+58.6	0.8	58 02.9	+58.6	0.9	88
89	52 01.5	+58.5	0.4	53 01.5	+58.5	0.4	54 01.5	+58.5	0.4	55 01.5	+58.5	0.4	56 01.5	+58.5	0.4	57 01.5	+58.5	0.4	58 01.5	+58.5	0.4	59 01.5	+58.5	0.4	89
90	53 00.0	+58.4	0.0	54 00.0	+58.4	0.0	55 00.0	+58.4	0.0	56 00.0	+58.4	0.0	57 00.0	+58.4	0.0	58 00.0	+58.4	0.0	59 00.0	+58.4	0.0	60 00.0	+58.4	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 167°, 193°**

Dec.	53°			54°			55°			56°			57°			58°			59°			60°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	35 43.7	+59.0	162.7	34 46.4	+59.1	162.9	33 49.0	+59.2	163.1	32 51.6	+59.2	163.3	31 54.1	+59.3	163.4	30 56.6	+59.3	163.6	29 59.0	+59.3	163.8	29 01.3	+59.4	163.9	0
1	36 42.7	+59.0	162.4	35 45.5	+59.0	162.7	34 48.2	+59.1	162.9	33 50.8	+59.2	163.1	32 53.4	+59.2	163.3	31 55.9	+59.3	163.3	30 58.3	+59.4	163.5	30 00.7	+59.5	163.7	1
2	37 41.7	+58.9	162.2	36 44.5	+59.1	162.4	35 47.3	+59.1	162.7	34 50.0	+59.1	162.9	33 52.6	+59.3	163.1	32 55.2	+59.3	163.3	31 57.7	+59.3	163.4	31 00.2	+59.3	163.6	2
3	38 40.6	+59.0	162.0	37 43.6	+59.0	162.2	36 46.4	+59.1	162.4	35 49.1	+59.2	162.7	34 51.8	+59.2	162.9	33 54.5	+59.2	163.1	32 57.0	+59.3	163.3	31 59.5	+59.4	163.4	3
4	39 39.6	+58.9	161.7	38 42.6	+59.0	162.0	37 45.5	+59.0	162.2	36 48.3	+59.1	162.5	35 51.0	+59.2	162.7	34 53.7	+59.3	162.9	33 56.4	+59.3	163.1	32 58.9	+59.4	163.3	4
5	40 38.5	+58.9	161.5	39 41.5	+59.0	161.7	38 44.5	+59.1	162.0	37 47.4	+59.1	162.2	36 50.2	+59.2	162.5	35 53.0	+59.2	162.7	34 55.7	+59.3	162.9	33 58.3	+59.3	163.1	5
6	41 37.4	+58.8	161.2	40 40.5	+58.9	161.5	39 43.6	+59.0	161.8	38 46.5	+59.1	162.0	37 49.4	+59.1	162.3	36 52.2	+59.2	162.5	35 55.0	+59.2	162.7	34 57.6	+59.4	162.9	6
7	42 36.2	+58.8	161.0	41 39.4	+58.9	161.3	40 42.6	+58.9	161.5	39 45.6	+59.0	161.8	38 48.6	+59.1	162.1	37 51.4	+59.2	162.3	36 54.2	+59.3	162.5	35 57.0	+59.3	162.7	7
8	43 35.0	+58.7	160.7	42 38.3	+58.8	161.0	41 41.5	+59.0	161.3	40 44.6	+59.1	161.6	39 47.7	+59.1	161.8	38 50.6	+59.2	162.1	37 53.5	+59.2	162.3	36 56.3	+59.3	162.6	8
9	44 33.7	+58.7	160.4	43 37.2	+58.8	160.7	42 40.5	+58.9	161.0	41 43.7	+59.0	161.3	40 46.8	+59.0	161.6	39 49.8	+59.1	161.9	38 52.7	+59.2	162.1	37 55.6	+59.3	162.4	9
10	45 32.4	+58.7	160.1	44 36.0	+58.7	160.5	43 39.4	+58.8	160.8	42 42.7	+58.9	161.1	41 45.8	+59.0	161.4	40 48.9	+59.1	161.6	39 52.0	+59.1	161.9	38 54.9	+59.2	162.2	10
11	46 31.1	+58.6	159.8	45 34.7	+58.8	160.2	44 38.2	+58.8	160.5	43 41.6	+59.0	160.8	42 44.9	+59.0	161.1	41 48.1	+59.1	161.4	40 51.1	+59.2	161.7	39 54.1	+59.3	162.0	11
12	47 29.7	+58.6	159.5	46 33.5	+58.6	159.9	45 37.1	+58.7	160.2	44 40.5	+58.9	160.6	43 43.9	+59.0	160.9	42 47.2	+59.0	161.2	41 50.3	+59.2	161.5	40 53.4	+59.2	161.8	12
13	48 28.3	+58.5	159.2	47 32.1	+58.7	159.6	46 35.8	+58.8	159.9	45 39.4	+58.9	160.3	44 42.9	+58.9	160.6	43 46.2	+59.1	160.9	42 49.5	+59.1	161.2	41 52.6	+59.2	161.5	13
14	49 26.8	+58.4	158.8	48 30.8	+58.5	159.2	47 34.6	+58.7	159.6	46 38.3	+58.8	160.0	45 41.8	+58.9	160.4	44 45.3	+58.9	160.7	43 48.6	+59.1	161.0	42 51.8	+59.1	161.3	14
15	50 25.2	+58.4	158.5	49 29.3	+58.6	158.9	48 33.3	+58.6	159.3	47 37.1	+58.7	159.7	46 40.7	+58.8	160.1	45 44.2	+59.0	160.4	44 47.7	+59.0	160.8	43 50.9	+59.2	161.1	15
16	51 23.6	+58.3	158.1	50 27.9	+58.4	158.5	49 31.9	+58.6	159.0	48 35.8	+58.7	159.4	47 39.6	+58.8	159.8	46 43.2	+58.9	160.2	45 46.7	+59.0	160.5	44 50.1	+59.1	160.9	16
17	52 21.9	+58.3	157.7	51 26.3	+58.4	158.2	50 30.5	+58.5	158.7	49 34.5	+58.7	159.1	48 38.4	+58.8	159.5	47 42.1	+58.9	159.9	46 45.7	+59.0	160.3	45 49.2	+59.1	160.6	17
18	53 20.2	+58.1	157.3	52 24.7	+58.3	157.8	51 29.0	+58.5	158.3	50 33.2	+58.6	158.8	49 37.2	+58.7	159.2	48 41.0	+58.8	159.6	47 44.7	+58.9	160.0	46 48.3	+59.0	160.4	18
19	54 18.3	+58.1	156.9	53 23.0	+58.2	157.4	52 27.5	+58.4	157.9	51 31.8	+58.5	158.4	50 35.9	+58.7	158.9	49 39.8	+58.8	159.3	48 43.6	+58.9	159.7	47 47.3	+59.0	160.1	19
20	55 16.4	+57.9	156.5	54 21.2	+58.2	157.0	53 25.9	+58.3	157.6	52 30.3	+58.5	158.1	51 34.6	+58.5	158.5	50 38.6	+58.8	159.0	49 42.5	+58.9	159.4	48 46.3	+59.0	159.8	20
21	56 14.3	+57.9	156.0	55 19.4	+58.0	156.6	54 24.2	+58.2	157.2	53 28.8	+58.4	157.7	52 33.2	+58.5	158.2	51 37.4	+58.6	158.7	50 41.4	+58.8	159.1	49 45.3	+58.9	159.5	21
22	57 12.2	+57.7	155.5	56 17.4	+58.0	156.2	55 22.4	+58.1	156.7	54 27.2	+58.3	157.3	53 31.7	+58.5	157.8	52 36.0	+58.7	158.3	51 40.2	+58.7	158.8	50 44.2	+58.8	159.2	22
23	58 09.9	+57.6	155.0	57 15.4	+57.8	155.7	56 20.5	+58.1	156.3	55 25.5	+58.2	156.9	54 30.2	+58.4	157.4	53 34.7	+58.5	158.0	52 38.9	+58.7	158.5	51 43.0	+58.9	158.9	23
24	59 07.5	+57.5	154.5	58 13.2	+57.7	155.2	57 18.6	+57.9	155.8	56 23.7	+58.1	156.5	55 28.6	+58.3	157.0	54 33.2	+58.5	157.6	53 37.6	+58.7	158.1	52 41.9	+58.7	158.6	24
25	60 05.0	+57.3	153.9	59 10.9	+57.6	154.7	58 16.5	+57.8	155.4	57 21.8	+58.1	156.0	56 26.9	+58.2	156.6	55 31.7	+58.4	157.2	54 36.3	+58.5	157.8	53 40.6	+58.7	158.3	25
26	61 02.3	+57.1	153.3	60 08.5	+57.4	154.1	59 14.3	+57.7	154.8	58 19.9	+57.9	155.5	57 25.1	+58.1	156.2	56 30.1	+58.3	156.8	55 34.8	+58.5	157.4	54 39.3	+58.7	157.9	26
27	61 59.4	+56.9	152.7	61 05.9	+57.3	153.5	60 12.0	+57.6	154.3	59 17.8	+57.8	155.0	58 23.2	+58.1	155.7	57 28.4	+58.2	156.4	56 33.3	+58.4	157.0	55 38.0	+58.5	157.6	27
28	62 56.3	+56.8	152.0	62 03.2	+57.0	152.9	61 09.6	+57.3	153.7	60 15.6	+57.6	154.5	59 21.3	+57.9	155.2	58 26.6	+58.1	155.9	57 31.7	+58.3	156.6	56 36.5	+58.5	157.2	28
29	63 53.1	+56.5	151.3	63 00.2	+56.9	152.2	62 06.9	+57.2	153.1	61 13.2	+57.5	153.9	60 19.2	+57.8	154.7	59 24.7	+58.1	155.4	58 30.0	+58.2	156.1	57 35.0	+58.4	156.8	29
30	64 49.6	+56.2	150.5	63 57.1	+56.7	151.5	63 04.1	+57.1	152.4	62 10.7	+57.4	153.3	61 16.9	+57.7	154.1	60 22.8	+57.8	154.9	59 28.2	+58.2	155.6	58 33.4	+58.4	156.3	30
31	65 45.8	+56.0	149.7	64 53.8	+56.4	150.7	64 01.2	+56.8	151.7	63 08.1	+57.1	152.7	62 14.6	+57.4	153.5	61 20.6	+57.8	154.4	60 26.4	+58.0	155.1	59 31.8	+58.2	155.9	31
32	66 41.8	+55.6	148.8	65 50.2	+56.1	149.9	64 58.0	+56.5	151.0	64 05.2	+57.0	152.0	63 12.0	+57.3	152.9	62 18.4	+57.6	153.8	61 24.4	+57.8	154.6	60 30.0	+58.1	155.4	32
33	67 37.4	+55.2	147.8	66 46.3	+55.8	149.0	65 54.5	+56.3	150.2	65 02.2	+56.7	151.3	64 09.3	+57.1	152.3	63 16.0	+57.4	153.2	62 22.2	+57.7	154.1	61 28.1	+58.0	154.9	33
34	68 32.6	+54.7	146.7	67 42.1	+55.4	148.1	66 50.8	+56.0	149.3	65 58.9	+56.4	150.5	65 06.4	+56.9	151.5	64 13.4	+57.2	152.5	63 19.9	+57.6	153.5	62 26.1	+57.8	154.3	34
35	69 27.5	+54.3	145.6	68 37.5	+55.0	147.1	67 46.8	+55.6	148.4	66 55.3	+56.2	149.6	66 03.3	+56.6	150.8	65 10.6	+57.1	151.8	64 17.5	+57.4	152.8	63 23.9	+57.7	153.7	35
36	70 21.8	+53.8	144.4	69 32.5	+54.6	145.9	68 42.4	+55.3	147.4	67 51.5	+55.8	148.7	66 59.9	+56.3	149.9	66 07.7	+56.7	151.1	65 14.9	+57.2	152.1	64 21.6	+57.5	153.1	36
37	71 15.6	+53.1	143.0	70 27.1	+54.0	144.7	69 37.7	+54.7	146.3	68 47.3	+55.5	147.7	67 55.6	+56.0	149.0	67 04.4	+56.6	150.3	66 12.1	+56.9	151.4	65 19.1	+57.3	152.4	37
38	72 08.7	+52.5	141.6	71 21.1	+53.5	143.4	70 32.4	+54.3	145.1	69 42.8	+54.9	146.6	68 52.2	+55.3	148.1	68 01.0	+56.2	149.4	67 09.0	+56.7	150.6	66 16.4	+57.2	151.7	38
39	73 01.2	+51.5	139.9	72 14.6	+52.7	141.9	71 26.7	+53.7	143.8	70 37.8	+54.5	145.5	69 47.9	+55.3	147.0	68 57.2	+55.8	148.4	68 05.7	+56.4	149.7	67 13.6	+56.8	150.9	39
40	73 52.7	+50.6	138.1	73 07.3	+51.8	140.3	72 20.4	+53.0	142.3	71 32.3	+54.0	144.2	70 43.2	+54.7	145.9	69 53.0	+55.5	147.4	69 02.1	+56.1	148.8	68 10.4	+56.6	150.1	40
41	74 43.3	+49.4	136.1	73 59.1	+50.9	138.5	73 13.4	+52.2	140.6	72 26.3	+53.2	142.8	71 37.9	+54.2	144.6	70 48.5	+55.0	146.3	69 58.2	+55.7	147.8	69 07.0	+56.3	149.2	41
42	75 32.7	+48.0	133.9	74 50.0	+49.8	136.6	74 05.6	+51.2	139.0	73 19.5	+52.6	141.2	72 32.1	+53.6	143.2	71 43.5	+54.5	145.0	70 53.9	+55.2	146.7	70 03.3	+55.9	148.2	42
43	76 20.7	+46.3	131.5	75 39.8	+48.4	134.4	74 56.8	+50.2	137.1	74 12.1	+51.5	139.5	73 25.7	+52.8	141.7	72 38.0	+53.9	143.8	71 49.1	+54.8	145.5	70 59.2	+55.5	147.1	43
44	77 07.0	+44.5•	128.7	76 28.2	+46.8	131.9	75 47.0	+48.8	134.9	75 03.6	+50.5	137.5	74 18.5	+51.9	140.0	73 31.9	+53.1	142.1	72 43.9	+54.1	144.1	71 54.7	+55.0	145.9	44
45	77 51.5	+42.0•	125.6	77 15.0	+44.9•	129.2	76 35.8	+47.2	132.4	75 54.1	+49.3	135.4	75 10.4	+50.9	138.0	74 25.0	+52.3	140.4	73 38.0	+53.4	142.6	72 49.7	+54.4	144.6	45
46	78 33.5	+39.3•	122.1	77 59.9	+42.5•	126.1	77 23.0	+45.3•	129.7	76 43.4	+47.6	133.0	76 01.3	+49.6	135.9	75 17.3	+51.2	138.6	74 31.4	+52.7	141.0	73 44.1	+53.8	143.1	46
47	79 12.8	+35.9•	118.2	78 42.4	+39.8•	122.6	78 08.3	+43.1•	126.6	77 31.0	+45.8•	130.2	76 50.9	+48.2	133.5	76 08.5	+50.0	136.5	75 24.1	+51.6	139.1	74 37.9	+53.0	141.3	47
48	79 48.7	+32.0•	113.8	79 22.2	+36.5•	118.7	78 51.4	+40.3•	123.1	78 16.8	+43.6•	127.2	77 39.1	+46.3•	130.8	76 58.5	+48.6	134.1	76 15.7	+50.4	137.0	75 30.9	+52.0	139.7	48
49	80 20.7	+27.4•	108.9	79 58.7	+32.5•	114.2	79 31.7	+37.0•	119.2	79 00.4	+40.8•	123.7	78 25.4	+44.0•	127.7	77 47.1	+46.8•	131.4	77 06.1	+49.1	134.7	76 22.9	+50.8	137.6	49
50	80 48.1	+21.9•	103.4	80 31.2	+27.8•	109.3	80 08.7	+33.0•	114.7	79 41.2	+37.6•	119.7	79 09.4	+41.4•	124.2	78 33.9	+44.6•	128.3	77 55.2	+47.2	132.0	77 13.7	+49.5	135.3	50
51	81 10.0	+16.0•	97.5	80 59.0	+22.4•	103.7	80 41.7	+28.3•	109.7	80 18.8	+33.5•	115.2	79 50.8	+38.1•	120.3	79 18.5	+42.0•	124.9	78 42.4	+45.2•	129.0	78 03.2	+47.8	132.7	51
52	81 26.0	+9.3•	91.1	81 21.4	+16.2•	97.7	81 10.0	+22.8•	104.1	80 52.3	+28.9•	110.1	80 28.9	+34.2•	115.7	80 00.5	+38.7•	120.9	79 27.6	+42.5•	125.5	78 51.0	+45.7•	129.6	52
53	81 35.3	+2.3•	84.4	81 37.6	+9.5•	91.2	81 32.8	+16.6•	97.9	81 21.2	+23.2•	104.4	81 03.1	+29.3•	110.6	80 39.2	+34.7•	116.3	80 10.1	+39.3•	121.5	79 36.7	+43.1•	126.2	53
54	81 37.6	−4.8•	77.5	81 47.1	+2.3•	84.3	81 49.4	+9.6•	91.3	81 44.4	+16.9•	98.2	81 32.4	+23.7•	104.8	81 13.9	+29.9•	111.1	80 49.4	+35.4•	116.9	80 19.8	+39.9•	122.2	54
55	81 32.8	−11.6•	70.7	81 49.4	−5.0•	77.3	81 59.0	+2.3•	84.3	82 01.3	+9.8•	91.4	81 56.1	+17.2•	98.4	81 43.8	+24.2•	105.3	81 24.8	+30.4•	111.7	80 59.7	+36.0•	117.6	55
56	81 21.2	−18.1•	64.1	81 44.4	−12.0•	70.3	82 01.3	−5.2•	77.1	82 11.1	+2.2•	84.2	82 13.3	+10.0•	91.5	82 08.0	+17.5•	98.7	81 55.2	+24.7•	105.3	81 35.7	+31.1•	112.3	56
57	81 03.1	−23.9•	57.9	81 32.4	−18.5•	63.6	81 56.1	−12.3•	69.9	82 13.3	−5.3•	76.8	82 23.3	+2.2•	84.1	82 25.5	+10.2•	91.6	82 19.9	+18.0•	99.1	82 06.8	+25.2•	106.2	57
58	80 39.2	−29.1•	52.1	81 13.9	−24.5•	57.2	81 43.8	−19.0•	63.0	82 08.0	−12.8•	69.5	82 25.5	−5.6•	76.6	82 35.7	+2.2•	84.1	82 37.9	+10.3•	91.8	82 32.0	+18.3•	99.4	58
59	80 10.1	−34.1•	46.9	80 49.4	−29.6•	51.8	81 24.8	−25.1•	56.6	81 55.2	−19.7•	62.7	82 19.9	−13.1•	69.0	82 37.9	−5.9•	76.3	82 48.2	+2.1•	84.0	82 50.3	+10.5•	91.9	59
60	79 36.7	−37.2•	42.1	80 19.8	−34.0•	46.1	80 59.7	−30.2•	50.6	81 35.7	−25.6•	55.8	82 06.8	−20.1•	61.8	82 32.0	−13.6•	68.6	82 50.3	−6.1•	76.0	83 00.8	+2.1•	83.9	60
61	78 59.5	−40.3•	37.9	79 45.8	−37.8•	41.3	80 29.5	−34.6•	45.2	81 10.1	−30.9•	49.8	81 46.7	−26.3•	55.1	82 18.4	−20.7•	61.2	82 44.2	−14.1•	68.1	83 02.9	−6.5•	75.7	61
62	78 19.2	−42.9•	34.1	79 08.0	−40.8•	37.0	79 54.9	−38.4•	40.4	80 39.2	−35.4•	44.4	81 20.4	−31.5•	49.8	81 57.7	−26.9•	54.3	82 30.1	−21.4•	60.5	82 56.4	−14.6•	67.5	62
63	77 36.3	−45.1•	30.8	78 27.2	−43.4•	33.3	79 16.5	−41.4•	36.2	80 03.9	−38.9•	39.5	80 48.9	−36.0•	43.5	81 30.8	−32.3•	48.1	82 08.7	−27.6•	53.5	82 41.8	−22.0•	59.8	63
64	76 51.2	−47.0	27.8	77 43.8	−45.7•	29.9	78 35.1	−44.0•	32.4	79 25.0	−42.1•	35.3	80 12.9	−39.6•	38.6	80 58.5	−36.6•	42.5	81 41.1	−33.0•	47.2	82 19.8	−28.4•	52.6	64
65	76 04.2	−48.5	25.1	76 58.1	−47.4	27.0	77 51.1	−46.1	29.1	78 42.9	−44.5•	31.5	79 33.3	−42.6•	34.3	80 21.9	−40.3•	37.7	81 08.1	−37.3•	41.6	81 51.4	−33.7•	46.2	65
66	75 15.7	−49.8	22.8	76 10.7	−48.9	24.3	77 05.0	−47.9	26.1	77 58.4	−46.6	28.2	78 50.7	−45.1•	30.6	79 41.6	−43.2•	33.4	80 30.8	−41.0•	36.7	81 17.7	−38.1•	40.6	66
67	74 25.9	−50.9	20.6	75 21.8	−50.2	22.0	76 17.1	−49.3	23.5	77 11.8	−48.3	25.2	78 05.6	−47.1	27.3	78 58.4	−45.7•	29.6	79 49.8	−43.8•	32.4	80 39.6	−41.6•	35.6	67
68	73 35.0	−51.9	18.7	74 31.6	−51.3	19.9	75 27.8	−50.6	21.2	76 23.5	−49.8	22.7	77 18.5	−48.8	24.4	78 12.7	−47.6	26.3	79 06.0	−46.3•	28.6	79 58.0	−44.7•	31.3	68
69	72 43.1	−52.7	17.0	73 40.3	−52.2	18.0	74 37.2	−51.6	19.1	75 33.7	−51.0	20.3	76 29.7	−50.2	21.8	77 25.1	−49.3	23.5	78 19.7	−48.1	25.4	79 13.4	−46.8•	27.6	69
70	71 50.4	−53.4	15.4	72 48.1	−52.9	16.3	73 45.6	−52.5	17.2	74 42.7	−51.9	18.3	75 39.5	−51.3	19.5	76 35.8	−50.6	20.9	77 31.6	−49.8	22.5	78 26.6	−48.7	24.4	70
71	70 57.0	−54.0	14.0	71 55.2	−53.7	14.7	72 53.1	−53.3	15.5	73 50.8	−52.9	16.4	74 48.2	−52.4	17.5	75 45.2	−51.7	18.7	76 41.8	−51.0	20.0	77 37.9	−50.2	21.6	71
72	70 03.0	−54.5	12.7	71 01.5	−54.2	13.3	71 59.8	−53.9	14.0	72 57.9	−53.5	14.8	73 55.8	−53.1	15.7	74 53.5	−52.7	16.7	75 50.8	−52.2	17.8	76 47.7	−51.5	19.1	72
73	69 08.5	−55.0	11.5	70 07.3	−54.8	12.0	71 05.9	−54.5	12.6	72 04.4	−54.2	13.3	73 02.7	−53.9	14.0	74 00.8	−53.5	14.9	74 58.6	−53.0	15.8	75 56.2	−52.5	16.9	73
74	68 13.5	−55.3	10.4	69 12.5	−55.2	10.8	70 11.4	−54.8	11.3	71 10.2	−54.8	11.9	72 08.8	−54.5	12.8	73 07.3	−54.2	13.3	74 05.6	−53.8	14.1	75 03.7	−53.4	15.0	74
75	67 18.2	−55.8	9.3	68 17.3	−55.6	9.7	69 16.4	−55.4	10.2	70 15.4	−55.2	10.7	71 14.3	−54.9	11.2	72 13.1	−54.7	11.8	73 11.8	−54.3	12.5	74 10.3	−54.1	13.3	75
76	66 22.4	−56.0	8.4	67 21.8	−56.0	8.7	68 21.0	−55.7	9.1	69 20.2	−55.6	9.5	70 19.4	−55.5	10.0	71 18.4	−55.2	10.5	72 17.3	−55.0	11.1	73 16.2	−54.8	11.7	76
77	65 26.4	−56.4	7.5	66 25.8	−56.2	7.8	67 25.3	−56.1	8.1	68 24.6	−55.9	8.5	69 23.9	−55.8	8.9	70 23.2	−55.7	9.3	71 22.3	−55.4	9.8	72 21.4	−55.2	10.3	77
78	64 30.0	−56.5	6.6	65 29.6	−56.5	7.0	66 29.2	−56.4	7.2	67 28.7	−56.3	7.5	68 28.1	−56.1	7.9	69 27.5	−56.0	8.3	70 26.9	−55.9	8.6	71 26.5	−55.7	9.1	78
79	63 33.5	−56.9	6.0	64 33.1	−56.7	6.2	65 32.8	−56.7	6.4	66 32.4	−56.6	6.7	67 32.0	−56.6	6.9	68 31.5	−56.4	7.2	69 31.0	−56.2	7.6	70 30.4	−56.1	8.0	79
80	62 36.6	−57.0	5.2	63 36.4	−57.0	5.4	64 36.1	−56.9	5.6	65 35.8	−56.8	5.8	66 35.5	−56.7	6.1	67 35.1	−56.6	6.3	68 34.8	−56.6	6.6	69 34.3	−56.4	6.9	80
81	61 39.6	−57.2	4.6	62 39.4	−57.1	4.7	63 39.0	−57.1	4.9	64 38.8	−57.0	5.1	65 38.8	−57.0	5.3	66 38.5	−56.9	5.5	67 38.2	−56.8	5.7	68 37.9	−56.7	6.0	81
82	60 42.4	−57.3	3.9	61 42.3	−57.3	4.1	62 42.1	−57.2	4.2	63 42.0	−57.3	4.4	64 41.8	−57.2	4.5	65 41.6	−57.1	4.7	66 41.4	−57.1	4.9	67 41.2	−57.0	5.1	82
83	59 45.1	−57.5	3.4	60 45.0	−57.5	3.5	61 44.9	−57.5	3.6	62 44.7	−57.4	3.7	63 44.6	−57.4	3.8	64 44.5	−57.4	4.0	65 44.3	−57.3	4.1	66 44.2	−57.3	4.3	83
84	58 47.6	−57.7	2.8	59 47.5	−57.6	2.9	60 47.4	−57.5	3.0	61 47.3	−57.5	3.1	62 47.2	−57.5	3.1	63 47.1	−57.5	3.3	64 47.0	−57.4	3.4	65 46.9	−57.4	3.5	84
85	57 49.9	−57.8	2.3	58 49.9	−57.8	2.3	59 49.8	−57.7	2.4	60 49.8	−57.7	2.5	61 49.7	−57.7	2.6	62 49.6	−57.6	2.6	63 49.6	−57.7	2.7	64 49.5	−57.6	2.8	85
86	56 52.1	−57.8	1.8	57 52.1	−57.9	1.8	58 52.1	−57.9	1.9	59 52.0	−57.8	1.9	60 52.0	−57.8	2.0	61 52.0	−57.8	2.1	62 51.9	−57.8	2.1	63 51.9	−57.8	2.2	86
87	55 54.3	−58.0	1.3	56 54.2	−57.9	1.3	57 54.2	−58.0	1.4	58 54.2	−58.0	1.4	59 54.2	−58.0	1.4	60 54.2	−58.0	1.4	61 54.1	−57.9	1.5	62 54.1	−57.9	1.6	87
88	54 56.3	−58.1	0.8	55 56.3	−58.1	0.9	56 56.2	−58.0	0.9	57 56.2	−58.0	0.9	58 56.2	−58.0	0.9	59 56.2	−58.0	1.0	60 56.2	−58.0	1.0	61 56.2	−58.0	1.0	88
89	53 58.2	−58.2	0.4	54 58.2	−58.2	0.4	55 58.2	−58.2	0.4	56 58.2	−58.2	0.4	57 58.2	−58.2	0.5	58 58.2	−58.2	0.5	59 58.2	−58.2	0.5	60 58.2	−58.2	0.5	89
90	53 00.0	−58.3	0.0	54 00.0	−58.3	0.0	55 00.0	−58.3	0.0	56 00.0	−58.3	0.0	57 00.0	−58.3	0.0	58 00.0	−58.3	0.0	59 00.0	−58.3	0.0	60 00.0	−58.3	0.0	90

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	35 43.7 −59.1 162.7	34 46.4 −59.1 162.9	33 49.0 −59.2 163.1	32 51.6 −59.2 163.3	31 54.1 −59.3 163.4	30 56.6 −59.4 163.6	29 59.0 −59.4 163.8	29 01.3 −59.4 163.9	0
1	34 44.6 −59.0 162.9	33 47.3 −59.2 163.1	32 49.8 −59.2 163.3	31 52.4 −59.3 163.5	30 54.8 −59.3 163.6	29 57.2 −59.3 163.8	28 59.6 −59.4 163.9	28 01.9 −59.5 164.1	1
2	33 45.6 −59.1 163.1	32 48.1 −59.1 163.3	31 50.7 −59.2 163.5	30 53.1 −59.2 163.6	29 55.5 −59.3 163.8	28 57.9 −59.4 164.0	28 00.2 −59.4 164.1	27 02.5 −59.5 164.2	2
3	32 46.5 −59.1 163.3	31 49.0 −59.2 163.5	30 51.5 −59.3 163.7	29 53.9 −59.3 163.8	28 56.2 −59.3 164.0	27 58.5 −59.4 164.1	27 00.8 −59.4 164.3	26 03.0 −59.4 164.4	3
4	31 47.4 −59.1 163.5	30 49.8 −59.1 163.7	29 52.2 −59.3 163.8	28 54.6 −59.3 164.0	27 56.9 −59.4 164.1	26 59.1 −59.4 164.3	26 01.4 −59.5 164.4	25 03.6 −59.5 164.5	4
5	30 48.3 −59.2 163.7	29 50.7 −59.2 163.9	28 53.0 −59.3 164.0	27 55.3 −59.3 164.2	26 57.5 −59.3 164.3	25 59.8 −59.4 164.4	25 01.9 −59.4 164.6	24 04.1 −59.5 164.7	5
6	29 49.1 −59.1 163.9	28 51.5 −59.2 164.1	27 53.7 −59.2 164.2	26 56.0 −59.3 164.3	25 58.2 −59.4 164.5	25 00.4 −59.4 164.6	24 02.5 −59.4 164.7	23 04.6 −59.5 164.8	6
7	28 50.0 −59.2 164.1	27 52.3 −59.3 164.2	26 54.5 −59.3 164.4	25 56.7 −59.3 164.5	24 58.8 −59.3 164.6	24 01.0 −59.4 164.8	23 03.1 −59.5 164.9	22 05.1 −59.5 165.0	7
8	27 50.8 −59.2 164.3	26 53.0 −59.2 164.4	25 55.2 −59.3 164.6	24 57.4 −59.4 164.7	23 59.5 −59.4 164.8	23 01.6 −59.5 164.9	22 03.6 −59.5 165.0	21 05.6 −59.5 165.1	8
9	26 51.6 −59.2 164.5	25 53.8 −59.3 164.6	24 55.9 −59.3 164.7	23 58.0 −59.3 164.8	23 00.1 −59.4 165.0	22 02.1 −59.4 165.1	21 04.2 −59.5 165.2	20 06.1 −59.5 165.3	9
10	25 52.4 −59.2 164.6	24 54.5 −59.2 164.8	23 56.6 −59.3 164.9	22 58.7 −59.4 165.0	22 00.7 −59.4 165.1	21 02.7 −59.5 165.2	20 04.7 −59.5 165.3	19 06.6 −59.5 165.4	10
11	24 53.2 −59.2 164.8	23 55.3 −59.3 164.9	22 57.3 −59.3 165.1	21 59.3 −59.3 165.2	21 01.3 −59.4 165.3	20 03.3 −59.5 165.4	19 05.2 −59.5 165.4	18 07.1 −59.5 165.5	11
12	23 54.0 −59.3 165.0	22 56.0 −59.3 165.1	21 58.0 −59.3 165.2	21 00.0 −59.4 165.3	20 01.9 −59.4 165.4	19 03.8 −59.4 165.5	18 05.7 −59.4 165.6	17 07.6 −59.5 165.7	12
13	22 54.7 −59.2 165.2	21 56.7 −59.3 165.3	20 58.7 −59.4 165.4	20 00.6 −59.4 165.5	19 02.5 −59.4 165.6	18 04.4 −59.5 165.6	17 06.3 −59.5 165.7	16 08.1 −59.5 165.8	13
14	21 55.5 −59.3 165.3	20 57.4 −59.3 165.4	19 59.3 −59.3 165.5	19 01.2 −59.4 165.6	18 03.1 −59.4 165.7	17 04.9 −59.4 165.8	16 06.8 −59.5 165.9	15 08.6 −59.6 165.9	14
15	20 56.2 −59.3 165.5	19 58.1 −59.3 165.6	19 00.0 −59.4 165.7	18 01.8 −59.4 165.8	17 03.7 −59.5 165.9	16 05.5 −59.5 165.9	15 07.3 −59.5 166.0	14 09.0 −59.5 166.1	15
16	19 56.9 −59.2 165.7	18 58.8 −59.3 165.8	18 00.6 −59.3 165.8	17 02.4 −59.4 165.9	16 04.2 −59.4 166.0	15 06.0 −59.5 166.1	14 07.8 −59.5 166.1	13 09.5 −59.5 166.2	16
17	18 57.7 −59.3 165.8	17 59.5 −59.4 165.9	17 01.3 −59.4 166.0	16 03.0 −59.4 166.1	15 04.8 −59.4 166.1	14 06.5 −59.4 166.2	13 08.3 −59.5 166.3	12 10.0 −59.6 166.3	17
18	17 58.4 −59.3 166.0	17 00.1 −59.3 166.1	16 01.9 −59.4 166.1	15 03.6 −59.4 166.2	14 05.4 −59.5 166.3	13 07.1 −59.5 166.3	12 08.8 −59.6 166.4	11 10.4 −59.5 166.4	18
19	16 59.1 −59.3 166.2	16 00.8 −59.3 166.2	15 02.5 −59.4 166.3	14 04.2 −59.4 166.4	13 05.9 −59.4 166.4	12 07.6 −59.5 166.5	11 09.2 −59.5 166.5	10 10.9 −59.6 166.6	19
20	15 59.8 −59.3 166.3	15 01.5 −59.3 166.4	14 03.1 −59.3 166.4	13 04.8 −59.4 166.5	12 06.5 −59.5 166.6	11 08.1 −59.5 166.6	10 09.7 −59.5 166.6	9 11.3 −59.5 166.7	20
21	15 00.5 −59.4 166.5	14 02.1 −59.3 166.5	13 03.8 −59.4 166.6	12 05.4 −59.4 166.6	11 07.0 −59.5 166.7	10 08.6 −59.5 166.7	9 10.2 −59.5 166.8	8 11.8 −59.6 166.8	21
22	14 01.1 −59.3 166.6	13 02.8 −59.4 166.7	12 04.4 −59.4 166.7	11 06.0 −59.5 166.8	10 07.5 −59.4 166.8	9 09.1 −59.5 166.9	8 10.7 −59.5 166.9	7 12.2 −59.5 166.9	22
23	13 01.8 −59.3 166.8	12 03.4 −59.4 166.8	11 05.0 −59.4 166.9	10 06.5 −59.4 166.9	9 08.1 −59.5 167.0	8 09.6 −59.5 167.0	7 11.2 −59.6 167.0	6 12.7 −59.6 167.1	23
24	12 02.5 −59.3 166.9	11 04.0 −59.3 167.0	10 05.6 −59.4 167.0	9 07.1 −59.4 167.1	8 08.6 −59.4 167.1	7 10.1 −59.5 167.1	6 11.6 −59.5 167.2	5 13.1 −59.5 167.2	24
25	11 03.2 −59.4 167.1	10 04.7 −59.4 167.1	9 06.2 −59.4 167.2	8 07.7 −59.5 167.2	7 09.2 −59.5 167.2	6 10.6 −59.5 167.3	5 12.1 −59.6 167.3	4 13.6 −59.6 167.3	25
26	10 03.8 −59.4 167.2	9 05.3 −59.4 167.3	8 06.8 −59.4 167.3	7 08.2 −59.4 167.3	6 09.7 −59.5 167.4	5 11.1 −59.5 167.4	4 12.6 −59.6 167.4	3 14.0 −59.6 167.4	26
27	9 04.5 −59.4 167.4	8 05.9 −59.4 167.4	7 07.4 −59.5 167.5	6 08.8 −59.5 167.5	5 10.2 −59.5 167.5	4 11.6 −59.5 167.5	3 13.0 −59.5 167.5	2 14.5 −59.6 167.5	27
28	8 05.1 −59.4 167.5	7 06.5 −59.3 167.6	6 07.9 −59.4 167.6	5 09.3 −59.4 167.6	4 10.7 −59.4 167.6	3 12.1 −59.5 167.6	2 13.5 −59.5 167.7	1 14.9 −59.6 167.7	28
29	7 05.8 −59.4 167.7	6 07.2 −59.4 167.7	5 08.5 −59.4 167.7	4 09.9 −59.4 167.8	3 11.3 −59.5 167.8	2 12.6 −59.5 167.8	1 14.0 −59.6 167.8	0 15.3 −59.5 167.8	29
30	6 06.4 −59.3 167.8	5 07.8 −59.4 167.9	4 09.1 −59.4 167.9	3 10.5 −59.5 167.9	2 11.8 −59.5 167.9	1 13.1 −59.5 167.9	0 14.4 −59.5 167.9	0 44.2 +59.6 12.1	30
31	5 07.1 −59.4 168.0	4 08.4 −59.4 168.0	3 09.7 −59.4 168.0	2 11.0 −59.4 168.0	1 12.3 −59.5 168.0	0 13.6 −59.5 168.0	0 45.1 +59.5 12.0	1 43.8 +59.5 12.0	31
32	4 07.7 −59.3 168.1	3 09.0 −59.3 168.1	2 10.3 −59.3 168.2	1 11.6 −59.5 168.2	0 12.8 −59.4 168.2	0 45.9 +59.5 11.8	1 44.6 +59.5 11.8	2 43.3 +59.6 11.9	32
33	3 08.4 −59.4 168.3	2 09.6 −59.3 168.3	1 10.9 −59.5 168.3	0 12.1 −59.4 168.3	0 46.6 +59.5 11.7	1 45.4 +59.5 11.7	2 44.1 +59.6 11.7	3 42.9 +59.6 11.7	33
34	2 09.0 −59.4 168.4	1 10.2 −59.4 168.4	0 11.4 −59.4 168.4	0 47.3 +59.5 11.6	1 46.1 +59.5 11.6	2 44.9 +59.5 11.6	3 43.7 +59.5 11.6	4 42.5 +59.5 11.6	34
35	1 09.6 −59.3 168.6	0 10.8 −59.4 168.6	0 48.0 +59.4 11.4	1 46.8 +59.4 11.4	2 45.6 +59.5 11.4	3 44.4 +59.5 11.5	4 43.2 +59.5 11.5	5 42.0 +59.6 11.5	35
36	0 10.3 −59.4 168.7	0 48.6 +59.4 11.3	1 47.4 +59.4 11.3	2 46.2 +59.5 11.3	3 45.1 +59.4 11.3	4 43.9 +59.5 11.3	5 42.7 +59.5 11.3	6 41.6 +59.5 11.4	36
37	0 49.1 +59.3 11.1	1 48.0 +59.3 11.1	2 46.8 +59.4 11.2	3 45.7 +59.4 11.2	4 44.5 +59.5 11.2	5 43.4 +59.5 11.2	6 42.3 +59.6 11.2	7 41.1 +59.6 11.2	37
38	1 48.4 +59.4 11.0	2 47.3 +59.4 11.0	3 46.2 +59.5 11.0	4 45.1 +59.5 11.0	5 44.0 +59.5 11.0	6 42.9 +59.5 11.1	7 41.8 +59.5 11.1	8 40.7 +59.5 11.1	38
39	2 47.8 +59.4 10.8	3 46.7 +59.4 10.9	4 45.7 +59.4 10.9	5 44.6 +59.4 10.9	6 43.5 +59.5 10.9	7 42.4 +59.5 10.9	8 41.3 +59.5 11.0	9 40.2 +59.6 11.0	39
40	3 47.2 +59.3 10.7	4 46.1 +59.4 10.7	5 45.1 +59.4 10.7	6 44.0 +59.5 10.8	7 43.0 +59.5 10.8	8 41.9 +59.5 10.8	9 40.8 +59.5 10.8	10 39.8 +59.5 10.9	40
41	4 46.5 +59.4 10.6	5 45.5 +59.4 10.6	6 44.5 +59.4 10.6	7 43.5 +59.4 10.6	8 42.4 +59.5 10.6	9 41.4 +59.5 10.7	10 40.3 +59.6 10.7	11 39.3 +59.5 10.7	41
42	5 45.9 +59.4 10.4	6 44.9 +59.4 10.4	7 43.9 +59.4 10.5	8 42.9 +59.4 10.5	9 41.9 +59.4 10.5	10 40.9 +59.5 10.5	11 39.9 +59.6 10.6	12 38.8 +59.6 10.6	42
43	6 45.2 +59.4 10.3	7 44.3 +59.3 10.3	8 43.3 +59.4 10.3	9 42.3 +59.5 10.3	10 41.3 +59.4 10.4	11 40.4 +59.4 10.4	12 39.4 +59.5 10.4	13 38.4 +59.5 10.5	43
44	7 44.6 +59.3 10.1	8 43.6 +59.4 10.1	9 42.7 +59.4 10.2	10 41.8 +59.4 10.2	11 40.7 +59.5 10.2	12 39.8 +59.5 10.3	13 38.9 +59.5 10.3	14 37.9 +59.6 10.4	44
45	8 43.9 +59.4 10.0	9 43.0 +59.4 10.0	10 42.1 +59.4 10.0	11 41.2 +59.4 10.1	12 40.3 +59.4 10.1	13 39.3 +59.5 10.1	14 38.4 +59.5 10.2	15 37.4 +59.6 10.2	45
46	9 43.3 +59.3 9.8	10 42.4 +59.4 9.8	11 41.5 +59.4 9.9	12 40.6 +59.4 9.9	13 39.7 +59.4 10.0	14 38.8 +59.5 10.0	15 37.9 +59.5 10.0	16 37.0 +59.5 10.1	46
47	10 42.6 +59.3 9.7	11 41.8 +59.3 9.7	12 40.9 +59.4 9.7	13 40.0 +59.4 9.8	14 39.1 +59.5 9.8	15 38.3 +59.4 9.9	16 37.4 +59.5 9.9	17 36.5 +59.5 10.0	47
48	11 41.9 +59.3 9.5	12 41.1 +59.4 9.6	13 40.3 +59.4 9.6	14 39.4 +59.4 9.6	15 38.6 +59.4 9.7	16 37.7 +59.5 9.7	17 36.9 +59.4 9.8	18 36.0 +59.5 9.8	48
49	12 41.3 +59.3 9.4	13 40.5 +59.3 9.4	14 39.7 +59.3 9.4	15 38.8 +59.4 9.5	16 38.0 +59.4 9.5	17 37.2 +59.4 9.6	18 36.3 +59.5 9.6	19 35.5 +59.5 9.7	49
50	13 40.6 +59.3 9.2	14 39.8 +59.4 9.2	15 39.0 +59.4 9.3	16 38.2 +59.4 9.3	17 37.4 +59.5 9.4	18 36.6 +59.5 9.4	19 35.8 +59.5 9.5	20 35.0 +59.5 9.6	50
51	14 39.9 +59.3 9.1	15 39.2 +59.3 9.1	16 38.4 +59.4 9.1	17 37.6 +59.4 9.2	18 36.9 +59.4 9.2	19 36.1 +59.4 9.3	20 35.3 +59.4 9.4	21 34.5 +59.5 9.4	51
52	15 39.2 +59.3 8.9	16 38.5 +59.3 8.9	17 37.8 +59.4 9.0	18 37.0 +59.4 9.0	19 36.3 +59.4 9.1	20 35.5 +59.4 9.2	21 34.8 +59.4 9.2	22 34.0 +59.5 9.3	52
53	16 38.5 +59.3 8.7	17 37.8 +59.4 8.8	18 37.1 +59.4 8.8	19 36.4 +59.4 8.9	20 35.7 +59.4 8.9	21 35.0 +59.4 9.0	22 34.2 +59.5 9.1	23 33.5 +59.4 9.1	53
54	17 37.8 +59.3 8.6	18 37.2 +59.3 8.6	19 36.5 +59.3 8.7	20 35.8 +59.4 8.7	21 35.1 +59.4 8.8	22 34.4 +59.4 8.9	23 33.7 +59.4 8.9	24 32.9 +59.4 9.0	54
55	18 37.1 +59.3 8.4	19 36.5 +59.3 8.5	20 35.8 +59.4 8.5	21 35.2 +59.3 8.6	22 34.5 +59.4 8.6	23 33.8 +59.4 8.7	24 33.1 +59.4 8.8	25 32.4 +59.4 8.8	55
56	19 36.4 +59.3 8.3	20 35.8 +59.3 8.3	21 35.2 +59.3 8.4	22 34.5 +59.4 8.4	23 33.9 +59.3 8.5	24 33.2 +59.4 8.6	25 32.5 +59.4 8.6	26 31.8 +59.5 8.7	56
57	20 35.7 +59.3 8.1	21 35.1 +59.3 8.1	22 34.5 +59.3 8.2	23 33.9 +59.3 8.3	24 33.2 +59.4 8.3	25 32.6 +59.4 8.4	26 31.9 +59.4 8.5	27 31.3 +59.4 8.5	57
58	21 35.0 +59.2 7.9	22 34.4 +59.3 8.0	23 33.8 +59.3 8.0	24 33.2 +59.3 8.1	25 32.6 +59.3 8.2	26 32.0 +59.4 8.2	27 31.4 +59.4 8.3	28 30.7 +59.4 8.4	58
59	22 34.2 +59.2 7.8	23 33.7 +59.3 7.8	24 33.1 +59.3 7.9	25 32.5 +59.3 7.9	26 31.9 +59.3 8.0	27 31.4 +59.3 8.1	28 30.8 +59.3 8.2	29 30.1 +59.4 8.2	59
60	23 33.5 +59.2 7.6	24 32.9 +59.3 7.6	25 32.4 +59.3 7.7	26 31.8 +59.3 7.8	27 31.3 +59.3 7.8	28 30.7 +59.3 7.9	29 30.1 +59.4 8.0	30 29.6 +59.4 8.1	60
61	24 32.7 +59.2 7.4	25 32.2 +59.2 7.5	26 31.7 +59.2 7.5	27 31.1 +59.3 7.6	28 30.6 +59.3 7.7	29 30.1 +59.3 7.7	30 29.5 +59.3 7.8	31 29.0 +59.3 7.9	61
62	25 31.9 +59.2 7.2	26 31.4 +59.3 7.3	27 30.9 +59.3 7.4	28 30.4 +59.3 7.4	29 29.9 +59.3 7.5	30 29.4 +59.3 7.6	31 28.9 +59.3 7.7	32 28.3 +59.4 7.7	62
63	26 31.1 +59.2 7.1	27 30.7 +59.2 7.1	28 30.2 +59.2 7.2	29 29.7 +59.3 7.2	30 29.2 +59.3 7.3	31 28.7 +59.3 7.4	32 28.2 +59.4 7.5	33 27.7 +59.4 7.6	63
64	27 30.3 +59.2 6.9	28 29.9 +59.2 6.9	29 29.4 +59.3 7.0	30 29.0 +59.2 7.1	31 28.5 +59.3 7.1	32 28.0 +59.3 7.2	33 27.6 +59.3 7.3	34 27.1 +59.3 7.4	64
65	28 29.5 +59.1 6.7	29 29.1 +59.2 6.7	30 28.7 +59.3 6.8	31 28.2 +59.3 6.9	32 27.8 +59.2 7.0	33 27.3 +59.3 7.0	34 26.9 +59.3 7.1	35 26.4 +59.3 7.2	65
66	29 28.6 +59.2 6.5	30 28.3 +59.1 6.6	31 27.9 +59.2 6.6	32 27.5 +59.2 6.7	33 27.0 +59.3 6.8	34 26.6 +59.3 6.9	35 26.2 +59.2 6.9	36 25.7 +59.3 7.0	66
67	30 27.8 +59.1 6.3	31 27.4 +59.2 6.4	32 27.1 +59.1 6.4	33 26.7 +59.2 6.5	34 26.3 +59.2 6.6	35 25.9 +59.2 6.7	36 25.5 +59.2 6.7	37 25.0 +59.3 6.8	67
68	31 26.9 +59.1 6.1	32 26.6 +59.1 6.2	33 26.2 +59.2 6.2	34 25.9 +59.1 6.3	35 25.5 +59.2 6.4	36 25.1 +59.2 6.4	37 24.7 +59.3 6.6	38 24.3 +59.3 6.6	68
69	32 26.0 +59.1 5.9	33 25.7 +59.1 6.0	34 25.4 +59.1 6.0	35 25.0 +59.2 6.1	36 24.7 +59.2 6.2	37 24.3 +59.3 6.3	38 24.0 +59.2 6.3	39 23.6 +59.3 6.4	69
70	33 25.1 +59.1 5.7	34 24.8 +59.1 5.8	35 24.5 +59.1 5.8	36 24.2 +59.1 5.9	37 23.9 +59.1 6.0	38 23.6 +59.1 6.1	39 23.2 +59.2 6.1	40 22.9 +59.2 6.2	70
71	34 24.2 +59.0 5.5	35 23.9 +59.1 5.5	36 23.6 +59.1 5.6	37 23.3 +59.2 5.7	38 23.0 +59.2 5.8	39 22.7 +59.2 5.8	40 22.4 +59.2 5.9	41 22.1 +59.2 6.0	71
72	35 23.2 +59.0 5.3	36 23.0 +59.0 5.4	37 22.7 +59.1 5.4	38 22.5 +59.1 5.5	39 22.2 +59.1 5.5	40 21.9 +59.1 5.6	41 21.6 +59.1 5.7	42 21.3 +59.2 5.8	72
73	36 22.3 +59.0 5.0	37 22.0 +59.0 5.1	38 21.8 +59.0 5.2	39 21.5 +59.1 5.2	40 21.3 +59.1 5.3	41 21.0 +59.1 5.4	42 20.7 +59.2 5.5	43 20.5 +59.1 5.6	73
74	37 21.3 +58.9 4.8	38 21.0 +59.0 4.9	39 20.8 +59.0 4.9	40 20.6 +59.0 5.0	41 20.4 +59.0 5.1	42 20.1 +59.1 5.2	43 19.9 +59.1 5.3	44 19.6 +59.1 5.3	74
75	38 20.2 +59.0 4.6	39 20.0 +59.0 4.6	40 19.8 +59.0 4.7	41 19.6 +59.0 4.8	42 19.4 +59.0 4.9	43 19.2 +59.0 4.9	44 19.0 +59.0 5.0	45 18.7 +59.1 5.1	75
76	39 19.2 +58.9 4.3	40 19.0 +59.0 4.4	41 18.8 +59.0 4.5	42 18.6 +59.0 4.5	43 18.4 +59.0 4.6	44 18.2 +59.0 4.7	45 18.0 +59.0 4.8	46 17.8 +59.1 4.9	76
77	40 18.1 +58.9 4.1	41 17.9 +58.9 4.2	42 17.8 +58.9 4.2	43 17.6 +58.9 4.3	44 17.4 +59.0 4.4	45 17.3 +58.9 4.4	46 17.1 +59.0 4.5	47 16.9 +59.0 4.6	77
78	41 17.0 +58.8 3.8	42 16.8 +58.9 3.9	43 16.7 +58.9 4.0	44 16.5 +58.9 4.0	45 16.4 +58.9 4.1	46 16.2 +59.0 4.1	47 16.1 +58.9 4.3	48 15.9 +59.0 4.3	78
79	42 15.8 +58.8 3.6	43 15.7 +58.8 3.6	44 15.6 +58.9 3.7	45 15.4 +58.9 3.8	46 15.3 +58.9 3.8	47 15.2 +58.9 3.9	48 15.0 +58.9 4.0	49 14.9 +58.9 4.1	79
80	43 14.6 +58.8 3.3	44 14.5 +58.8 3.4	45 14.4 +58.8 3.4	46 14.3 +58.8 3.5	47 14.2 +58.8 3.5	48 14.1 +58.8 3.6	49 14.0 +58.8 3.7	50 13.8 +58.9 3.8	80
81	44 13.4 +58.7 3.0	45 13.3 +58.7 3.1	46 13.2 +58.8 3.1	47 13.1 +58.8 3.2	48 13.0 +58.8 3.3	49 12.9 +58.8 3.3	50 12.8 +58.9 3.3	51 12.7 +58.9 3.5	81
82	45 12.1 +58.7 2.7	46 12.0 +58.7 2.8	47 12.0 +58.7 2.8	48 11.9 +58.7 2.9	49 11.8 +58.8 3.0	50 11.7 +58.8 3.0	51 11.7 +58.7 3.1	52 11.6 +58.8 3.1	82
83	46 10.8 +58.6 2.4	47 10.7 +58.7 2.5	48 10.7 +58.6 2.5	49 10.6 +58.7 2.6	50 10.6 +58.7 2.6	51 10.5 +58.7 2.7	52 10.4 +58.7 2.8	53 10.4 +58.7 2.8	83
84	47 09.4 +58.6 2.1	48 09.4 +58.6 2.2	49 09.3 +58.6 2.2	50 09.3 +58.6 2.3	51 09.3 +58.6 2.3	52 09.2 +58.6 2.4	53 09.2 +58.6 2.4	54 09.1 +58.7 2.5	84
85	48 08.0 +58.5 1.8	49 08.0 +58.5 1.8	50 08.0 +58.5 1.9	51 07.9 +58.6 1.9	52 07.9 +58.6 2.0	53 07.8 +58.6 2.0	54 07.8 +58.6 2.1	55 07.8 +58.6 2.1	85
86	49 06.5 +58.5 1.5	50 06.5 +58.5 1.5	51 06.5 +58.5 1.5	52 06.5 +58.5 1.6	53 06.5 +58.5 1.6	54 06.4 +58.5 1.6	55 06.4 +58.5 1.7	56 06.4 +58.5 1.7	86
87	50 05.0 +58.4 1.1	51 05.0 +58.4 1.2	52 05.0 +58.4 1.2	53 05.0 +58.4 1.2	54 05.0 +58.4 1.2	55 04.9 +58.4 1.2	56 04.9 +58.5 1.3	57 04.9 +58.5 1.3	87
88	51 03.4 +58.3 0.8	52 03.4 +58.3 0.8	53 03.4 +58.3 0.8	54 03.4 +58.3 0.8	55 03.4 +58.3 0.8	56 03.4 +58.3 0.8	57 03.4 +58.3 0.9	58 03.4 +58.3 0.9	88
89	52 01.7 +58.3 0.4	53 01.7 +58.3 0.4	54 01.7 +58.3 0.4	55 01.7 +58.3 0.4	56 01.7 +58.3 0.4	57 01.7 +58.3 0.4	58 01.7 +58.3 0.5	59 01.7 +58.3 0.5	89
90	53 00.0 +58.2 0.0	54 00.0 +58.2 0.0	55 00.0 +58.2 0.0	56 00.0 +58.2 0.0	57 00.0 +58.2 0.0	58 00.0 +58.2 0.0	59 00.0 +58.2 0.0	60 00.0 +58.2 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 166°, 194°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 32.6	+58.8	161.5	34 35.6	+59.0	161.7	33 38.6	+59.1	161.9	32 41.6	+59.1	162.1	31 44.5	+59.1	162.3	30 47.3	+59.2	162.5	29 50.0	+59.3	162.6	28 52.7	+59.4	162.8	0
1	36 31.4	+58.9	161.2	35 34.6	+58.9	161.4	34 37.7	+59.0	161.7	33 40.7	+59.1	161.9	32 43.6	+59.2	162.1	31 46.5	+59.2	162.3	30 49.3	+59.3	162.5	29 52.1	+59.3	162.6	1
2	37 30.3	+58.8	161.0	36 33.5	+58.9	161.2	35 36.7	+59.0	161.4	34 39.8	+59.0	161.7	33 42.8	+59.1	161.9	32 45.7	+59.2	162.1	31 48.6	+59.2	162.3	30 51.4	+59.3	162.5	2
3	38 29.1	+58.8	160.7	37 32.4	+58.9	161.0	36 35.7	+58.9	161.2	35 38.8	+59.0	161.5	34 41.9	+59.1	161.7	33 44.9	+59.2	161.9	32 47.8	+59.3	162.1	31 50.7	+59.3	162.3	3
4	39 27.9	+58.7	160.5	38 31.3	+58.8	160.7	37 34.6	+58.9	161.0	36 37.8	+59.0	161.2	35 41.0	+59.1	161.5	34 44.1	+59.1	161.7	33 47.1	+59.2	161.9	32 50.0	+59.3	162.1	4
5	40 26.6	+58.7	160.2	39 30.1	+58.8	160.5	38 33.5	+58.9	160.7	37 36.8	+59.0	161.0	36 40.1	+59.0	161.2	35 43.2	+59.1	161.5	34 46.3	+59.2	161.7	33 49.3	+59.2	161.9	5
6	41 25.3	+58.7	159.9	40 28.9	+58.8	160.2	39 32.4	+58.9	160.5	38 35.8	+59.0	160.8	37 39.1	+59.0	161.0	36 42.3	+59.1	161.3	35 45.5	+59.1	161.5	34 48.5	+59.3	161.7	6
7	42 24.0	+58.6	159.6	41 27.7	+58.7	160.0	40 31.3	+58.8	160.2	39 34.8	+58.9	160.5	38 38.1	+59.0	160.8	37 41.4	+59.1	161.0	36 44.6	+59.2	161.3	35 47.8	+59.2	161.5	7
8	43 22.6	+58.6	159.4	42 26.4	+58.7	159.7	41 30.1	+58.8	160.0	40 33.7	+58.9	160.3	39 37.1	+59.0	160.6	38 40.5	+59.1	160.8	37 43.8	+59.1	161.1	36 47.0	+59.2	161.3	8
9	44 21.2	+58.6	159.1	43 25.1	+58.7	159.4	42 28.9	+58.8	159.7	41 32.6	+58.8	160.0	40 36.1	+59.0	160.3	39 39.6	+59.0	160.6	38 42.9	+59.1	160.9	37 46.2	+59.2	161.1	9
10	45 19.8	+58.4	158.9	44 23.8	+58.6	159.1	43 27.7	+58.7	159.4	42 31.4	+58.8	159.8	41 35.1	+58.9	160.1	40 38.6	+59.0	160.4	39 42.0	+59.1	160.7	38 45.4	+59.1	160.9	10
11	46 18.2	+58.5	158.4	45 22.4	+58.5	158.8	44 26.4	+58.6	159.2	43 30.2	+58.8	159.5	42 34.0	+58.8	159.8	41 37.6	+59.0	160.1	40 41.1	+59.1	160.4	39 44.5	+59.2	160.7	11
12	47 16.7	+58.3	158.1	46 20.9	+58.5	158.5	45 25.0	+58.6	158.9	44 29.0	+58.7	159.2	43 32.8	+58.9	159.6	42 36.6	+58.9	159.9	41 40.2	+59.0	160.2	40 43.7	+59.1	160.5	12
13	48 15.0	+58.3	157.7	47 19.4	+58.5	158.2	46 23.6	+58.6	158.6	45 27.7	+58.7	158.9	44 31.7	+58.8	159.3	43 35.5	+58.9	159.6	42 39.2	+59.0	159.9	41 42.8	+59.0	160.3	13
14	49 13.3	+58.3	157.4	48 17.9	+58.3	157.8	47 22.2	+58.5	158.2	46 26.4	+58.7	158.6	45 30.5	+58.7	159.0	44 34.4	+58.8	159.4	43 38.2	+58.9	159.7	42 41.8	+59.1	160.0	14
15	50 11.6	+58.1	157.0	49 16.2	+58.4	157.5	48 20.7	+58.5	157.9	47 25.1	+58.5	158.3	46 29.2	+58.7	158.7	45 33.2	+58.9	159.1	44 37.1	+59.0	159.4	43 40.9	+59.0	159.8	15
16	51 09.7	+58.1	156.6	50 14.6	+58.2	157.1	49 19.2	+58.4	157.6	48 23.6	+58.6	158.0	47 27.9	+58.7	158.4	46 32.1	+58.7	158.8	45 36.1	+58.8	159.2	44 39.9	+59.0	159.5	16
17	52 07.8	+58.0	156.2	51 12.8	+58.2	156.7	50 17.6	+58.3	157.2	49 22.2	+58.4	157.7	48 26.6	+58.6	158.1	47 30.8	+58.8	158.5	46 34.9	+58.9	158.9	45 38.9	+58.9	159.3	17
18	53 05.8	+57.9	155.8	52 11.0	+58.0	156.3	51 15.9	+58.2	156.8	50 20.6	+58.4	157.3	49 25.2	+58.5	157.8	48 29.6	+58.6	158.2	47 33.8	+58.8	158.6	46 37.8	+58.9	159.0	18
19	54 03.7	+57.8	155.4	53 09.0	+58.0	155.9	52 14.1	+58.2	156.4	51 19.0	+58.4	156.9	50 23.7	+58.5	157.4	49 28.2	+58.7	157.9	48 32.6	+58.7	158.3	47 36.7	+58.9	158.7	19
20	55 01.5	+57.7	154.9	54 07.0	+57.9	155.5	53 12.3	+58.1	156.0	52 17.4	+58.2	156.6	51 22.2	+58.4	157.1	50 26.9	+58.5	157.5	49 31.3	+58.7	158.0	48 35.6	+58.8	158.4	20
21	55 59.2	+57.5	154.4	55 04.9	+57.8	155.0	54 10.4	+58.0	155.6	53 15.6	+58.2	156.2	52 20.6	+58.4	156.7	51 25.4	+58.5	157.2	50 30.0	+58.7	157.7	49 34.4	+58.8	158.1	21
22	56 56.7	+57.5	153.9	56 02.7	+57.7	154.6	55 08.4	+57.9	155.2	54 13.8	+58.1	155.8	53 19.0	+58.2	156.3	52 23.9	+58.4	156.8	51 28.7	+58.5	157.3	50 33.2	+58.7	157.8	22
23	57 54.2	+57.3	153.4	57 00.4	+57.5	154.1	56 06.3	+57.8	154.7	55 11.9	+58.0	155.3	54 17.2	+58.2	155.9	53 22.3	+58.4	156.5	52 27.2	+58.5	157.0	51 31.9	+58.7	157.5	23
24	58 51.5	+57.1	152.8	57 57.9	+57.4	153.5	57 04.1	+57.6	154.2	56 09.9	+57.9	154.9	55 15.4	+58.1	155.5	54 20.7	+58.3	156.1	53 25.7	+58.5	156.6	52 30.6	+58.6	157.1	24
25	59 48.6	+57.0	152.2	58 55.3	+57.3	153.0	58 01.7	+57.5	153.7	57 07.8	+57.7	154.4	56 13.5	+58.0	155.0	55 19.0	+58.2	155.6	54 24.2	+58.4	156.2	53 29.2	+58.5	156.8	25
26	60 45.6	+56.7	151.6	59 52.6	+57.1	152.4	58 59.2	+57.4	153.2	58 05.5	+57.7	153.9	57 11.5	+57.9	154.6	56 17.2	+58.1	155.2	55 22.6	+58.2	155.8	54 27.7	+58.4	156.4	26
27	61 42.3	+56.6	150.9	60 49.7	+56.9	151.8	59 56.6	+57.2	152.6	59 03.2	+57.5	153.4	58 09.4	+57.7	154.1	57 15.3	+57.9	154.8	56 20.8	+58.2	155.4	55 26.1	+58.4	156.0	27
28	62 38.9	+56.3	150.2	61 46.6	+56.7	151.1	60 53.8	+57.1	152.0	60 00.7	+57.3	152.8	59 07.1	+57.7	153.6	58 13.2	+57.9	154.3	57 19.0	+58.1	155.0	56 24.5	+58.3	155.6	28
29	63 35.2	+56.1	149.4	62 43.3	+56.5	150.4	61 50.9	+56.8	151.3	60 58.0	+57.2	152.2	60 04.8	+57.4	153.0	59 11.1	+57.8	153.8	58 17.1	+58.0	154.5	57 22.8	+58.2	155.2	29
30	64 31.3	+55.8	148.6	63 39.8	+56.2	149.7	62 47.7	+56.7	150.6	61 55.2	+57.0	151.6	61 02.2	+57.4	152.4	60 08.9	+57.6	153.2	59 15.1	+57.9	154.0	58 21.0	+58.1	154.7	30
31	65 27.1	+55.4	147.7	64 36.0	+56.0	148.9	63 44.4	+56.4	149.9	62 52.2	+56.8	150.9	61 59.6	+57.1	151.8	61 06.5	+57.4	152.7	60 13.0	+57.7	153.5	59 19.1	+58.0	154.2	31
32	66 22.5	+55.1	146.8	65 32.0	+55.6	148.0	64 40.8	+56.1	149.1	63 49.0	+56.6	150.2	62 56.7	+56.9	151.1	62 03.9	+57.3	152.1	61 10.7	+57.6	152.9	60 17.1	+57.8	153.7	32
33	67 17.6	+54.7	145.8	66 27.6	+55.3	147.1	65 36.9	+55.8	148.3	64 45.6	+56.3	149.4	63 53.6	+56.8	150.4	63 01.2	+57.1	151.4	62 08.3	+57.4	152.3	61 14.9	+57.8	153.2	33
34	68 12.3	+54.2	144.7	67 22.9	+54.9	146.1	66 32.7	+55.5	147.4	65 41.9	+56.0	148.6	64 50.4	+56.4	149.7	63 58.3	+56.9	150.7	63 05.7	+57.2	151.7	62 12.7	+57.5	152.6	34
35	69 06.5	+53.7	143.5	68 17.8	+54.5	145.0	67 28.2	+55.2	146.4	66 37.9	+55.7	147.7	65 46.8	+56.2	148.9	64 55.2	+56.6	150.0	64 02.9	+57.1	151.0	63 10.2	+57.4	152.0	35
36	70 00.2	+53.1	142.2	69 12.3	+53.9	143.9	68 23.4	+54.6	145.4	67 33.6	+55.3	146.7	66 43.0	+55.9	148.0	65 51.8	+56.4	149.2	65 00.0	+56.8	150.3	64 07.6	+57.2	151.3	36
37	70 53.3	+52.4	140.9	70 06.2	+53.4	142.6	69 18.0	+54.2	144.2	68 28.9	+54.9	145.7	67 38.9	+55.6	147.1	66 48.2	+56.1	148.3	65 56.8	+56.6	149.5	65 04.8	+57.0	150.6	37
38	71 45.7	+51.7	139.3	70 59.6	+52.7	141.2	70 12.2	+53.7	143.0	69 23.8	+54.5	144.6	68 34.5	+55.1	146.1	67 44.3	+55.8	147.4	66 53.4	+56.3	148.7	66 01.8	+56.8	149.9	38
39	72 37.4	+50.7	137.7	71 52.3	+51.9	139.7	71 05.9	+53.0	141.6	70 18.3	+53.9	143.4	69 29.6	+54.7	145.0	68 40.1	+55.3	146.4	67 49.7	+55.9	147.8	66 58.6	+56.4	149.1	39
40	73 28.1	+49.6	135.8	72 44.2	+51.1	138.1	71 58.9	+52.2	140.1	71 12.2	+53.3	142.0	70 24.3	+54.2	143.8	69 35.4	+55.0	145.4	68 45.6	+55.6	146.8	67 55.0	+56.2	148.2	40
41	74 17.7	+48.5	133.8	73 35.3	+50.0	136.3	72 51.1	+51.4	138.5	72 05.5	+52.5	140.6	71 18.5	+53.6	142.4	70 30.4	+54.4	144.2	69 41.2	+55.2	145.8	68 51.2	+55.8	147.2	41
42	75 06.2	+46.9	131.6	74 25.3	+48.8	134.3	73 42.5	+50.4	136.7	72 58.0	+51.7	139.0	72 12.1	+52.8	141.0	71 24.8	+53.9	142.9	70 36.4	+54.7	144.6	69 47.0	+55.5	146.2	42
43	75 53.1	+45.3	129.1	75 14.1	+47.4	132.0	74 32.9	+49.2	134.7	73 49.7	+50.8	137.2	73 04.9	+52.1	139.4	72 18.7	+53.2	141.5	71 31.1	+54.2	143.3	70 42.5	+54.9	145.0	43
44	76 38.4	+43.3	•126.3	76 01.5	+45.7	129.6	75 22.1	+47.8	132.5	74 40.5	+49.6	135.2	73 57.0	+51.1	137.7	73 11.9	+52.4	139.9	72 25.3	+53.5	141.9	71 37.4	+54.5	143.8	44
45	77 21.7	+40.8	•123.2	76 47.2	+43.7	•126.8	76 09.9	+46.2	130.1	75 30.1	+48.2	133.0	74 48.1	+50.0	135.7	74 04.3	+51.4	138.2	73 18.8	+52.7	140.4	72 31.9	+53.8	142.4	45
46	78 02.5	+38.1	•119.8	77 30.9	+41.4	•123.7	76 56.1	+44.2	•127.3	76 18.3	+46.7	130.6	75 38.1	+48.7	133.6	74 55.7	+50.4	136.3	74 11.5	+51.9	138.7	73 25.7	+53.1	140.9	46
47	78 40.6	+34.8	•116.0	78 12.3	+38.6	•120.3	77 40.3	+41.9	•124.2	77 05.0	+44.7	•127.9	76 26.8	+47.1	131.1	75 46.1	+49.2	134.1	75 03.4	+50.8	136.8	74 18.8	+52.2	139.2	47
48	79 15.4	+31.0	•111.7	78 50.9	+35.3	•116.4	78 22.2	+39.1	•120.8	77 49.7	+42.4	•124.8	77 13.9	+45.2	•128.4	76 35.3	+47.5	131.7	75 54.2	+49.5	134.7	75 11.0	+51.2	137.4	48
49	79 46.4	+26.4	•107.0	79 26.2	+31.5	•112.1	79 01.3	+35.9	•116.9	78 32.1	+39.7	•121.3	77 59.1	+42.9	•125.3	77 22.8	+45.7	•129.0	76 43.7	+48.1	132.3	76 02.2	+50.0	135.3	49
50	80 12.8	+21.4	•101.8	79 57.7	+26.9	•107.4	79 37.2	+31.9	•112.6	79 11.8	+36.4	•117.4	78 42.0	+40.3	•121.9	78 08.5	+43.5	•125.9	77 31.8	+46.2	•129.6	76 52.2	+48.5	132.9	50
51	80 34.2	+15.7	• 96.2	80 24.6	+21.8	•102.1	80 09.1	+27.4	•107.8	79 48.2	+32.5	•113.1	79 22.3	+36.9	•118.0	78 52.0	+40.8	•122.5	78 18.0	+44.1	•126.6	77 40.7	+46.8	130.2	51
52	80 49.9	+9.5	• 90.3	80 46.4	+15.9	• 96.4	80 36.5	+22.2	•102.4	80 20.7	+27.9	•108.2	79 59.2	+33.1	•113.6	79 32.8	+37.6	•118.6	79 02.1	+41.3	•123.1	78 27.5	+44.6	•127.2	52
53	80 59.4	+2.9	• 84.0	81 02.3	+9.7	• 90.3	80 58.7	+16.3	• 96.6	80 48.6	+22.6	•102.8	80 32.3	+28.4	•108.8	80 10.4	+33.6	•114.1	79 43.4	+38.2	•119.2	79 12.1	+42.0	•123.8	53
54	81 02.3	−3.6	• 77.6	81 12.0	+3.0	• 83.9	81 15.0	+9.8	• 90.4	81 11.2	+16.5	• 96.9	80 57.7	+23.1	•103.1	80 44.0	+29.0	•109.1	80 21.6	+34.2	•114.7	79 54.1	+38.8	•119.8	54
55	80 58.7	−10.1	• 71.2	81 15.0	−3.8	• 77.4	81 24.8	+2.9	• 83.8	81 27.7	+10.0	• 90.5	81 23.8	+16.9	• 97.1	81 13.0	+23.5	•103.5	80 55.8	+29.6	•109.6	80 32.9	+34.8	•115.3	55
56	80 48.6	−16.3	• 65.0	81 11.2	−10.5	• 70.8	81 27.7	−3.9	• 77.1	81 37.7	+3.0	• 83.8	81 40.7	+10.1	• 90.6	81 36.5	+17.2	• 97.4	81 25.4	+24.0	•104.0	81 07.7	+30.1	•110.2	56
57	80 32.3	−21.9	• 59.0	81 00.7	−16.7	• 64.5	81 23.8	−10.8	• 70.4	81 40.7	−4.2	• 76.9	81 50.8	+2.9	• 83.7	81 53.7	+10.4	• 90.7	81 49.4	+17.6	• 97.7	81 37.8	+24.5	•104.4	57
58	80 10.4	−27.0	• 53.5	80 44.0	−22.4	• 58.4	81 13.0	−17.2	• 63.9	81 36.5	−11.1	• 70.0	81 53.7	−4.3	• 76.6	82 04.1	+2.9	• 83.6	82 07.0	+10.4	• 90.8	82 02.3	+18.0	• 98.0	58
59	79 43.4	−31.3	• 48.4	80 21.6	−27.5	• 52.8	80 55.8	−22.4	• 57.7	81 25.4	−17.7	• 63.4	81 49.4	−11.6	• 69.6	82 07.0	−4.7	• 76.4	82 17.4	+2.9	• 83.5	82 20.3	+10.7	• 91.0	59
60	79 12.1	−35.1	• 43.7	79 54.1	−31.9	• 47.6	80 32.9	−28.2	• 52.0	81 07.7	−23.5	• 57.0	81 37.8	−18.1	• 62.8	82 02.3	−11.9	• 69.1	82 20.3	−4.9	• 76.1	82 31.0	+2.8	• 83.5	60
61	78 37.0	−38.4	39.5	79 22.2	−35.8	• 42.9	80 04.7	−32.5	46.7	80 44.2	−28.8	51.2	81 19.7	−24.2	56.3	81 50.4	−18.7	62.1	82 15.4	−12.4	68.6	82 33.8	−5.2	75.8	61
62	77 58.6	−41.2	35.7	78 46.4	−39.0	38.6	79 32.2	−36.4	42.0	80 15.4	−33.2	45.9	80 55.5	−29.4	50.8	81 31.7	−24.9	55.6	82 03.0	−19.3	61.5	82 28.6	−13.2	68.1	62
63	77 17.4	−43.4	32.3	78 07.4	−41.6	34.8	78 55.8	−39.5	37.7	79 42.2	−37.0	41.1	80 26.1	−33.9	45.0	81 06.8	−30.1	49.5	81 43.7	−25.5	54.8	82 15.7	−19.9	60.8	63
64	76 34.0	−45.5	29.2	77 25.8	−44.0	31.4	78 16.3	−42.3	33.9	79 05.2	−40.2	36.8	79 52.2	−37.7	40.2	80 36.7	−34.6	44.1	81 18.2	−30.9	48.6	81 55.8	−26.3	53.9	64
65	75 48.5	−47.1	26.5	76 41.8	−46.0	28.4	77 34.0	−44.5	• 30.5	78 25.0	−42.8	• 33.0	79 14.5	−40.8	35.9	80 02.1	−38.3	39.2	80 47.3	−35.3	• 43.1	81 29.5	−31.6	47.7	65
66	75 01.4	−48.6	24.0	75 55.8	−47.5	25.7	76 49.5	−46.4	27.5	77 42.2	−45.1	29.6	78 33.7	−43.4	32.1	79 23.8	−41.5	34.9	80 12.0	−39.0	38.2	80 57.9	−36.1	42.1	66
67	74 12.8	−49.7	21.8	75 08.3	−49.0	23.2	76 03.1	−48.1	24.8	76 57.1	−46.9	26.6	77 50.3	−45.6	28.7	78 42.3	−44.0	31.1	79 33.0	−42.2	33.9	80 21.8	−39.8	37.2	67
68	73 23.1	−50.9	19.8	74 19.3	−50.2	21.0	75 15.0	−49.3	22.4	76 10.2	−48.5	23.9	77 04.7	−47.5	25.7	77 58.3	−46.2	27.7	78 50.8	−44.6	• 30.1	79 42.0	−42.8	32.8	68
69	72 32.2	−51.7	18.0	73 29.1	−51.1	19.0	74 25.7	−50.6	20.2	75 21.7	−49.8	21.5	76 17.2	−48.9	23.0	77 12.1	−47.9	24.8	78 06.2	−46.8	26.7	78 59.2	−45.3	• 29.0	69
70	71 40.5	−52.5	16.4	72 38.0	−52.1	17.3	73 35.1	−51.5	18.3	74 31.9	−50.9	19.4	75 28.3	−50.2	20.7	76 24.2	−49.5	22.1	77 19.4	−48.5	23.8	78 13.9	−47.3	25.7	70
71	70 48.0	−53.1	14.8	71 45.9	−52.8	15.6	72 43.6	−52.4	16.5	73 41.0	−51.9	17.5	74 38.1	−51.4	18.5	75 34.7	−50.6	19.8	76 30.9	−49.9	21.2	77 26.6	−49.0	22.8	71
72	69 54.9	−53.8	13.5	70 53.1	−53.4	14.1	71 51.2	−53.1	14.9	72 49.1	−52.7	15.7	73 46.7	−52.2	16.6	74 44.1	−51.7	17.7	75 41.0	−51.1	18.9	76 37.6	−50.4	20.2	72
73	69 01.1	−54.3	12.2	69 59.7	−54.0	12.8	70 58.1	−53.7	13.4	71 56.4	−53.4	14.1	72 54.5	−53.0	14.9	73 52.4	−52.6	15.8	74 49.9	−52.1	16.8	75 47.2	−51.5	18.0	73
74	68 06.8	−54.7	11.0	69 05.7	−54.5	11.5	70 04.4	−54.3	12.1	71 03.0	−54.0	12.7	72 01.5	−53.7	13.4	72 59.8	−53.4	14.1	73 57.8	−52.9	15.0	74 55.7	−52.5	15.9	74
75	67 12.1	−55.0	10.0	68 11.2	−55.0	10.4	69 10.1	−54.7	10.9	70 09.0	−54.5	11.4	71 07.8	−54.3	12.0	72 06.4	−54.0	12.6	73 04.9	−53.7	13.3	74 03.2	−53.4	14.1	75
76	66 17.0	−55.5	9.0	67 16.2	−55.3	9.3	68 15.4	−55.2	9.7	69 14.5	−55.0	10.2	70 13.5	−54.8	10.7	71 12.4	−54.5	11.2	72 11.2	−54.3	11.8	73 09.8	−54.0	12.5	76
77	65 21.5	−55.8	8.0	66 20.9	−55.7	8.3	67 20.2	−55.5	8.7	68 19.5	−55.4	9.1	69 18.7	−55.2	9.5	70 17.9	−55.1	9.9	71 16.9	−54.8	10.5	72 15.9	−54.6	11.0	77
78	64 25.7	−56.1	7.2	65 25.2	−56.0	7.4	66 24.7	−55.9	7.7	67 24.1	−55.7	8.0	68 23.5	−55.6	8.4	69 22.8	−55.4	8.8	70 22.1	−55.3	9.2	71 21.3	−55.1	9.7	78
79	63 29.6	−56.4	6.4	64 29.2	−56.3	6.6	65 28.8	−56.2	6.8	66 28.4	−56.1	7.1	67 27.9	−56.0	7.4	68 27.4	−55.9	7.7	69 26.8	−55.7	8.1	70 26.2	−55.6	8.5	79
80	62 33.2	−56.5	5.6	63 32.9	−56.5	5.8	64 32.6	−56.4	6.0	65 32.3	−56.4	6.2	66 31.9	−56.2	6.5	67 31.5	−56.1	6.8	68 31.1	−56.1	7.0	69 30.6	−55.9	7.4	80
81	61 36.7	−56.8	4.9	62 36.4	−56.7	5.0	63 36.2	−56.7	5.2	64 35.9	−56.6	5.4	65 35.7	−56.6	5.5	66 35.4	−56.5	5.8	67 35.0	−56.3	6.1	68 34.7	−56.3	6.4	81
82	60 39.9	−57.0	4.2	61 39.7	−56.9	4.4	62 39.5	−56.9	4.5	63 39.3	−56.8	4.7	64 39.1	−56.7	4.8	65 38.9	−56.7	5.0	66 38.7	−56.7	5.2	67 38.4	−56.6	5.4	82
83	59 42.9	−57.2	3.6	60 42.8	−57.1	3.7	61 42.6	−57.0	3.8	62 42.5	−57.0	3.9	63 42.4	−57.0	4.1	64 42.2	−56.9	4.2	65 42.0	−56.9	4.4	66 41.8	−56.8	4.6	83
84	58 45.7	−57.3	3.0	59 45.7	−57.3	3.1	60 45.6	−57.3	3.2	61 45.5	−57.2	3.3	62 45.4	−57.2	3.4	63 45.3	−57.2	3.5	64 45.1	−57.1	3.6	65 45.0	−57.0	3.8	84
85	57 48.4	−57.4	2.4	58 48.4	−57.4	2.5	59 48.3	−57.4	2.6	60 48.3	−57.4	2.7	61 48.2	−57.4	2.7	62 48.1	−57.3	2.8	63 48.0	−57.2	2.9	64 48.0	−57.2	3.0	85
86	56 51.0	−57.6	1.9	57 51.0	−57.6	1.9	58 50.9	−57.5	2.0	59 50.9	−57.5	2.1	60 50.8	−57.5	2.1	61 50.8	−57.5	2.2	62 50.8	−57.5	2.3	63 50.7	−57.4	2.3	86
87	55 53.4	−57.7	1.4	56 53.4	−57.7	1.4	57 53.4	−57.7	1.5	58 53.4	−57.7	1.5	59 53.3	−57.6	1.5	60 53.3	−57.6	1.6	61 53.3	−57.6	1.6	62 53.3	−57.6	1.7	87
88	54 55.7	−57.8	0.9	55 55.7	−57.8	0.9	56 55.7	−57.8	0.9	57 55.7	−57.8	1.0	58 55.7	−57.8	1.0	59 55.7	−57.8	1.0	60 55.7	−57.8	1.1	61 55.7	−57.8	1.1	88
89	53 57.9	−57.9	0.4	54 57.9	−57.9	0.5	55 57.9	−57.9	0.5	56 57.9	−57.9	0.5	57 57.9	−57.9	0.5	58 57.9	−57.9	0.5	59 57.9	−57.9	0.5	60 57.9	−57.9	0.5	89
90	53 00.0	−58.0	0.0	54 00.0	−58.0	0.0	55 00.0	−58.0	0.0	56 00.0	−58.0	0.0	57 00.0	−58.0	0.0	58 00.0	−58.0	0.0	59 00.0	−58.0	0.0	60 00.0	−58.0	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 32.6	−58.9	161.5	34 35.6	−58.9	161.7	33 38.6	−59.0	161.9	32 41.6	−59.1	162.1	31 44.5	−59.2	162.3	30 47.3	−59.3	162.5	29 50.0	−59.3	162.6	28 52.7	−59.3	162.8	0
1	34 33.7	−59.0	161.7	33 36.7	−59.0	161.9	32 39.6	−59.1	162.1	31 42.5	−59.1	162.3	30 45.3	−59.2	162.5	28 48.0	−59.2	162.6	28 50.7	−59.3	162.8	27 53.4	−59.4	163.0	1
2	33 34.7	−58.9	161.9	32 37.7	−59.1	162.1	31 40.5	−59.1	162.3	30 43.3	−59.1	162.5	29 46.1	−59.2	162.7	28 48.8	−59.3	162.8	27 51.4	−59.3	163.0	26 54.0	−59.3	163.1	2
3	32 35.8	−59.0	162.1	31 38.6	−59.0	162.3	30 41.4	−59.1	162.5	29 44.2	−59.2	162.7	28 46.9	−59.2	162.8	27 49.5	−59.3	163.0	26 52.1	−59.3	163.2	25 54.7	−59.4	163.3	3
4	31 36.8	−59.0	162.4	30 39.6	−59.1	162.5	29 42.3	−59.1	162.7	28 45.0	−59.2	162.9	27 47.7	−59.3	163.0	26 50.2	−59.3	163.2	25 52.8	−59.4	163.3	24 55.3	−59.4	163.5	4
5	30 37.8	−59.0	162.6	29 40.5	−59.1	162.7	28 43.2	−59.1	162.9	27 45.8	−59.2	163.1	26 48.4	−59.2	163.2	25 50.9	−59.3	163.4	24 53.4	−59.3	163.5	23 55.9	−59.4	163.6	5
6	29 38.8	−59.1	162.8	28 41.4	−59.1	162.9	27 44.1	−59.2	163.1	26 46.6	−59.2	163.2	25 49.2	−59.3	163.4	24 51.6	−59.3	163.5	23 54.1	−59.4	163.6	22 56.5	−59.4	163.8	6
7	28 39.7	−59.1	163.0	27 42.3	−59.1	163.1	26 44.9	−59.2	163.3	25 47.4	−59.2	163.4	24 49.9	−59.3	163.6	23 52.3	−59.3	163.7	22 54.7	−59.3	163.8	21 57.1	−59.4	163.9	7
8	27 40.7	−59.1	163.2	26 43.2	−59.1	163.3	25 45.7	−59.2	163.5	24 48.2	−59.2	163.6	23 50.6	−59.3	163.7	22 53.0	−59.3	163.8	21 55.4	−59.4	164.0	20 57.7	−59.5	164.1	8
9	26 41.6	−59.1	163.4	25 44.1	−59.1	163.5	24 46.5	−59.2	163.6	23 49.0	−59.3	163.8	22 51.3	−59.3	163.9	21 53.7	−59.3	164.0	20 56.0	−59.4	164.1	19 58.2	−59.4	164.2	9
10	25 42.5	−59.1	163.6	24 45.0	−59.2	163.7	23 47.3	−59.2	163.8	22 49.7	−59.3	164.0	21 52.0	−59.3	164.1	20 54.3	−59.3	164.2	19 56.6	−59.4	164.3	18 58.8	−59.4	164.4	10
11	24 43.4	−59.1	163.8	23 45.8	−59.2	163.9	22 48.1	−59.2	164.0	21 50.4	−59.2	164.1	20 52.7	−59.3	164.2	19 55.0	−59.4	164.3	18 57.2	−59.4	164.4	17 59.4	−59.5	164.5	11
12	23 44.3	−59.1	163.9	22 46.6	−59.2	164.1	21 48.9	−59.2	164.2	20 51.2	−59.3	164.3	19 53.4	−59.3	164.4	18 55.6	−59.4	164.5	17 57.8	−59.4	164.6	16 59.9	−59.4	164.6	12
13	22 45.2	−59.1	164.1	21 47.4	−59.2	164.2	20 49.7	−59.3	164.3	19 51.9	−59.3	164.4	18 54.1	−59.3	164.5	17 56.2	−59.3	164.6	16 58.4	−59.5	164.7	16 00.5	−59.5	164.8	13
14	21 46.0	−59.1	164.3	20 48.2	−59.3	164.4	19 50.4	−59.3	164.5	18 52.6	−59.3	164.6	17 54.7	−59.3	164.7	16 56.9	−59.4	164.8	15 58.9	−59.4	164.9	15 01.0	−59.4	164.9	14
15	20 46.9	−59.2	164.5	19 49.0	−59.2	164.6	18 51.2	−59.3	164.7	17 53.3	−59.3	164.8	16 55.4	−59.4	164.9	15 57.5	−59.4	164.9	14 59.5	−59.4	165.0	14 01.6	−59.5	165.1	15
16	19 47.7	−59.2	164.7	18 49.8	−59.2	164.8	17 51.9	−59.2	164.8	16 54.0	−59.3	165.0	15 56.0	−59.3	165.0	14 58.1	−59.4	165.1	14 00.1	−59.4	165.1	13 02.1	−59.5	165.2	16
17	18 48.5	−59.2	164.8	17 50.6	−59.3	164.9	16 52.7	−59.3	165.0	15 54.7	−59.3	165.1	14 56.7	−59.3	165.2	13 58.7	−59.4	165.2	13 00.7	−59.4	165.3	12 02.6	−59.5	165.3	17
18	17 49.3	−59.2	165.0	16 51.4	−59.3	165.1	15 53.4	−59.3	165.2	14 55.4	−59.4	165.2	13 57.3	−59.3	165.3	12 59.3	−59.4	165.4	12 01.2	−59.4	165.4	11 03.2	−59.5	165.5	18
19	16 50.1	−59.2	165.2	15 52.1	−59.3	165.3	14 54.1	−59.3	165.3	13 56.0	−59.3	165.4	12 58.0	−59.4	165.5	11 59.9	−59.4	165.5	11 01.8	−59.5	165.6	10 03.7	−59.5	165.6	19
20	15 50.9	−59.2	165.4	14 52.9	−59.2	165.4	13 54.8	−59.3	165.5	12 56.7	−59.3	165.5	11 58.6	−59.4	165.6	11 00.5	−59.4	165.7	10 02.3	−59.4	165.7	9 04.2	−59.5	165.7	20
21	14 51.7	−59.2	165.5	13 53.6	−59.2	165.6	12 55.5	−59.3	165.6	11 57.4	−59.4	165.7	10 59.2	−59.4	165.8	10 01.1	−59.5	165.8	9 02.9	−59.5	165.8	8 04.7	−59.5	165.9	21
22	13 52.5	−59.2	165.7	12 54.4	−59.3	165.7	11 56.2	−59.3	165.8	10 58.0	−59.3	165.9	9 59.8	−59.3	165.9	9 01.6	−59.5	165.9	8 03.4	−59.4	166.0	7 05.2	−59.5	166.0	22
23	12 53.3	−59.3	165.9	11 55.1	−59.3	165.9	10 56.9	−59.3	166.0	9 58.7	−59.4	166.0	9 00.5	−59.4	166.0	8 02.2	−59.4	166.1	7 04.0	−59.5	166.1	6 05.7	−59.5	166.1	23
24	11 54.0	−59.2	166.0	10 55.8	−59.3	166.1	9 57.6	−59.3	166.1	8 59.3	−59.3	166.1	8 01.1	−59.4	166.2	7 02.8	−59.4	166.2	6 04.5	−59.4	166.2	5 06.2	−59.5	166.3	24
25	10 54.8	−59.2	166.2	9 56.5	−59.2	166.2	8 58.3	−59.4	166.3	8 00.0	−59.3	166.4	7 01.7	−59.4	166.3	6 03.4	−59.5	166.4	5 05.1	−59.6	166.4	4 06.7	−59.4	166.4	25
26	9 55.6	−59.3	166.3	8 57.3	−59.3	166.4	7 58.9	−59.3	166.4	7 00.6	−59.3	166.4	6 02.3	−59.4	166.5	5 03.9	−59.4	166.5	4 05.6	−59.5	166.5	3 07.3	−59.5	166.5	26
27	8 56.3	−59.2	166.5	7 58.0	−59.3	166.5	6 59.6	−59.3	166.6	6 01.3	−59.4	166.6	5 02.9	−59.4	166.6	4 04.5	−59.4	166.6	3 06.1	−59.4	166.6	2 07.8	−59.5	166.7	27
28	7 57.1	−59.3	166.7	6 58.7	−59.3	166.6	6 00.3	−59.3	166.7	5 02.0	−59.4	166.7	4 03.9	−59.4	166.7	3 05.1	−59.4	166.8	2 06.7	−59.5	166.8	1 08.3	−59.5	166.8	28
29	6 57.8	−59.2	166.8	5 59.4	−59.3	166.8	5 01.0	−59.4	166.9	4 02.6	−59.4	166.9	3 04.1	−59.4	166.9	2 05.7	−59.5	166.9	1 07.2	−59.5	166.9	0 08.8	−59.5	166.9	29
30	5 58.6	−59.3	167.0	5 00.1	−59.3	167.0	4 01.6	−59.3	167.0	3 03.2	−59.4	167.0	2 04.7	−59.4	167.0	1 06.2	−59.4	167.0	0 07.7	−59.4	167.0	0 50.7	+59.5	13.0	30
31	4 59.3	−59.3	167.1	4 00.8	−59.3	167.2	3 02.3	−59.3	167.2	2 03.8	−59.4	167.2	1 05.3	−59.3	167.2	0 06.8	−59.2	167.2	0 51.7	+59.5	12.8	1 50.2	+59.5	12.8	31
32	4 00.0	−59.2	167.3	3 01.5	−59.3	167.3	2 03.0	−59.4	167.3	1 04.4	−59.3	167.3	0 05.9	−59.4	167.3	0 52.6	+59.5	12.7	1 51.2	+59.5	12.7	2 49.7	+59.5	12.7	32
33	3 00.8	−59.3	167.4	2 02.2	−59.3	167.5	1 03.6	−59.3	167.5	0 05.1	−59.4	167.5	0 53.5	+59.4	12.5	1 52.1	+59.4	12.5	2 50.6	+59.5	12.6	3 49.2	+59.5	12.6	33
34	2 01.5	−59.3	167.6	1 02.9	−59.3	167.6	0 04.3	−59.3	167.6	0 54.3	+59.4	12.4	1 52.9	+59.4	12.4	2 51.5	+59.4	12.4	3 50.1	+59.5	12.4	4 48.7	+59.5	12.4	34
35	1 02.2	−59.2	167.8	0 03.6	−59.3	167.8	0 55.0	+59.4	12.2	1 53.7	+59.4	12.2	2 52.3	+59.4	12.3	3 50.9	+59.5	12.3	4 49.6	+59.5	12.3	5 48.2	+59.5	12.3	35
36	0 03.0	−59.3	167.9	0 55.7	+59.3	12.1	1 54.4	+59.3	12.1	2 53.0	+59.4	12.1	3 51.7	+59.4	12.1	4 50.4	+59.4	12.1	5 49.0	+59.5	12.2	6 47.7	+59.5	12.2	36
37	0 56.3	+59.3	11.9	1 55.0	+59.3	11.9	2 53.7	+59.3	11.9	3 52.4	+59.3	12.0	4 51.1	+59.4	12.0	5 49.8	+59.4	12.0	6 48.5	+59.4	12.0	7 47.2	+59.5	12.0	37
38	1 55.6	+59.3	11.8	2 54.3	+59.3	11.8	3 53.0	+59.4	11.8	4 51.8	+59.3	11.8	5 50.5	+59.4	11.8	6 49.2	+59.4	11.9	7 47.9	+59.5	11.9	8 46.7	+59.4	11.9	38
39	2 54.8	+59.3	11.6	3 53.6	+59.3	11.6	4 52.4	+59.3	11.6	5 51.1	+59.4	11.7	6 49.9	+59.4	11.7	7 48.6	+59.5	11.7	8 47.4	+59.4	11.7	9 46.1	+59.5	11.8	39
40	3 54.1	+59.3	11.5	4 52.9	+59.3	11.5	5 51.7	+59.3	11.5	6 50.5	+59.4	11.5	7 49.3	+59.4	11.5	8 48.1	+59.4	11.6	9 46.8	+59.5	11.6	10 45.6	+59.5	11.6	40
41	4 53.4	+59.2	11.3	5 52.2	+59.3	11.3	6 51.0	+59.4	11.3	7 49.9	+59.3	11.4	8 48.7	+59.4	11.4	9 47.5	+59.4	11.4	10 46.3	+59.4	11.5	11 45.1	+59.5	11.5	41
42	5 52.6	+59.3	11.1	6 51.5	+59.3	11.2	7 50.4	+59.3	11.2	8 49.2	+59.4	11.2	9 48.1	+59.3	11.3	10 46.9	+59.4	11.3	11 45.7	+59.5	11.3	12 44.6	+59.4	11.4	42
43	6 51.9	+59.2	11.0	7 50.8	+59.3	11.0	8 49.7	+59.3	11.0	9 48.6	+59.3	11.1	10 47.4	+59.4	11.1	11 46.3	+59.4	11.1	12 45.2	+59.4	11.2	13 44.0	+59.5	11.2	43
44	7 51.1	+59.3	10.8	8 50.1	+59.3	10.9	9 49.0	+59.3	10.9	10 47.9	+59.3	10.9	11 46.8	+59.4	11.0	12 45.7	+59.4	11.0	13 44.6	+59.4	11.1	14 43.5	+59.4	11.1	44
45	8 50.4	+59.2	10.7	9 49.4	+59.2	10.7	10 48.3	+59.3	10.7	11 47.2	+59.4	10.8	12 46.2	+59.3	10.8	13 45.1	+59.4	10.9	14 44.0	+59.4	10.9	15 42.9	+59.5	11.0	45
46	9 49.6	+59.3	10.5	10 48.6	+59.3	10.5	11 47.6	+59.3	10.6	12 46.6	+59.3	10.6	13 45.6	+59.3	10.7	14 44.5	+59.4	10.7	15 43.5	+59.4	10.8	16 42.4	+59.4	10.8	46
47	10 48.9	+59.2	10.4	11 47.9	+59.3	10.4	12 46.9	+59.3	10.4	13 45.9	+59.3	10.5	14 44.9	+59.4	10.5	15 43.9	+59.4	10.6	16 42.9	+59.4	10.6	17 41.8	+59.5	10.7	47
48	11 48.1	+59.2	10.2	12 47.2	+59.2	10.2	13 46.2	+59.3	10.3	14 45.2	+59.4	10.3	15 44.3	+59.3	10.4	16 43.3	+59.4	10.4	17 42.3	+59.4	10.5	18 41.3	+59.4	10.5	48
49	12 47.4	+59.2	10.0	13 46.4	+59.3	10.1	14 45.5	+59.3	10.1	15 44.6	+59.3	10.2	16 43.6	+59.4	10.2	17 42.7	+59.3	10.3	18 41.7	+59.4	10.3	19 40.7	+59.4	10.4	49
50	13 46.6	+59.2	9.9	14 45.7	+59.3	9.9	15 44.8	+59.3	10.0	16 43.9	+59.3	10.0	17 43.0	+59.3	10.1	18 42.0	+59.4	10.1	19 41.1	+59.4	10.2	20 40.1	+59.5	10.2	50
51	14 45.8	+59.3	9.7	15 44.9	+59.3	9.8	16 44.1	+59.2	9.8	17 43.2	+59.3	9.8	18 42.3	+59.3	9.9	19 41.4	+59.4	10.0	20 40.5	+59.4	10.0	21 39.6	+59.4	10.1	51
52	15 45.0	+59.2	9.5	16 44.2	+59.2	9.6	17 43.3	+59.3	9.6	18 42.5	+59.3	9.7	19 41.6	+59.3	9.7	20 40.8	+59.3	9.8	21 39.9	+59.4	9.9	22 39.0	+59.4	9.9	52
53	16 44.2	+59.2	9.4	17 43.4	+59.2	9.4	18 42.6	+59.3	9.5	19 41.8	+59.3	9.5	20 40.9	+59.3	9.6	21 40.1	+59.3	9.6	22 39.3	+59.3	9.7	23 38.4	+59.4	9.8	53
54	17 43.4	+59.2	9.2	18 42.6	+59.3	9.2	19 41.9	+59.2	9.3	20 41.1	+59.2	9.4	21 40.3	+59.3	9.4	22 39.4	+59.4	9.5	23 38.6	+59.3	9.6	24 37.8	+59.4	9.6	54
55	18 42.6	+59.2	9.0	19 41.9	+59.2	9.1	20 41.1	+59.2	9.1	21 40.3	+59.3	9.2	22 39.6	+59.3	9.3	23 38.8	+59.3	9.3	24 38.0	+59.3	9.4	25 37.2	+59.3	9.5	55
56	19 41.8	+59.1	8.8	20 41.1	+59.1	9.0	21 40.3	+59.2	9.0	22 39.6	+59.3	9.0	23 38.9	+59.2	9.1	24 38.1	+59.3	9.1	25 37.3	+59.4	9.2	26 36.5	+59.3	9.3	56
57	20 40.9	+59.1	8.7	21 40.3	+59.1	8.7	22 39.6	+59.2	8.8	23 38.9	+59.2	8.9	24 38.1	+59.3	8.9	25 37.4	+59.3	9.0	26 36.7	+59.3	9.1	27 35.9	+59.3	9.2	57
58	21 40.1	+59.2	8.5	22 39.4	+59.2	8.5	23 38.8	+59.2	8.6	24 38.1	+59.2	8.7	25 37.4	+59.3	8.7	26 36.7	+59.2	8.8	27 36.0	+59.3	8.9	28 35.2	+59.4	9.0	58
59	22 39.3	+59.1	8.3	23 38.6	+59.2	8.4	24 38.0	+59.2	8.4	25 37.3	+59.2	8.5	26 36.7	+59.2	8.6	27 36.0	+59.2	8.7	28 35.3	+59.3	8.7	29 34.6	+59.3	8.8	59
60	23 38.4	+59.1	8.1	24 37.8	+59.1	8.3	25 37.2	+59.1	8.3	26 36.5	+59.2	8.3	27 35.9	+59.2	8.4	28 35.2	+59.3	8.5	29 34.6	+59.3	8.6	30 33.9	+59.3	8.6	60
61	24 37.5	+59.1	7.9	25 36.9	+59.2	8.0	26 36.3	+59.2	8.1	27 35.7	+59.2	8.1	28 35.1	+59.2	8.2	29 34.5	+59.2	8.3	30 33.9	+59.2	8.4	31 33.2	+59.3	8.5	61
62	25 36.6	+59.1	7.7	26 36.1	+59.1	7.8	27 35.5	+59.1	7.9	28 34.9	+59.2	8.0	29 34.3	+59.2	8.0	30 33.7	+59.3	8.1	31 33.1	+59.3	8.2	32 32.5	+59.3	8.3	62
63	26 35.7	+59.1	7.6	27 35.2	+59.1	7.6	28 34.6	+59.2	7.7	29 34.1	+59.2	7.8	30 33.5	+59.2	7.8	31 33.0	+59.2	7.9	32 32.4	+59.3	8.0	33 31.8	+59.3	8.1	63
64	27 34.8	+59.0	7.4	28 34.3	+59.1	7.4	29 33.8	+59.1	7.5	30 33.3	+59.1	7.6	31 32.7	+59.2	7.7	32 32.2	+59.2	7.7	33 31.6	+59.3	7.8	34 31.1	+59.2	7.9	64
65	28 33.8	+59.1	7.2	29 33.4	+59.1	7.2	30 32.9	+59.1	7.3	31 32.4	+59.1	7.4	32 31.9	+59.1	7.5	33 31.4	+59.1	7.5	34 30.8	+59.2	7.6	35 30.3	+59.2	7.7	65
66	29 32.9	+59.0	7.0	30 32.4	+59.1	7.1	31 32.0	+59.0	7.1	32 31.5	+59.1	7.2	33 31.0	+59.1	7.3	34 30.5	+59.2	7.3	35 30.0	+59.2	7.5	36 29.5	+59.2	7.5	66
67	30 31.9	+59.0	6.7	31 31.5	+59.0	6.8	32 31.0	+59.1	6.9	33 30.6	+59.1	7.0	34 30.2	+59.1	7.0	35 29.7	+59.1	7.1	36 29.2	+59.2	7.2	37 28.7	+59.2	7.3	67
68	31 30.9	+59.0	6.5	32 30.5	+59.0	6.7	33 30.1	+59.0	6.7	34 29.7	+59.0	6.8	35 29.3	+59.1	6.9	36 28.8	+59.1	7.0	37 28.4	+59.1	7.1	38 27.9	+59.2	7.1	68
69	32 29.9	+58.9	6.3	33 29.5	+59.0	6.4	34 29.1	+59.0	6.5	35 28.7	+59.0	6.5	36 28.3	+59.1	6.6	37 27.9	+59.1	6.7	38 27.5	+59.1	6.8	39 27.1	+59.1	6.9	69
70	33 28.8	+59.0	6.1	34 28.5	+58.9	6.2	35 28.1	+59.0	6.2	36 27.8	+59.0	6.3	37 27.4	+59.0	6.4	38 27.0	+59.1	6.5	39 26.6	+59.1	6.6	40 26.2	+59.1	6.7	70
71	34 27.8	+58.9	5.9	35 27.4	+59.0	5.9	36 27.1	+59.0	6.0	37 26.8	+59.0	6.1	38 26.4	+59.0	6.2	39 26.1	+59.0	6.2	40 25.7	+59.1	6.4	41 25.3	+59.1	6.5	71
72	35 26.7	+58.9	5.6	36 26.4	+58.9	5.8	37 26.1	+58.9	5.8	38 25.8	+58.9	5.9	39 25.4	+59.0	5.9	40 25.1	+59.0	6.0	41 24.8	+59.0	6.1	42 24.4	+59.1	6.2	72
73	36 25.5	+58.9	5.4	37 25.3	+58.9	5.5	38 25.0	+58.9	5.5	39 24.7	+58.9	5.6	40 24.4	+59.0	5.7	41 24.1	+59.0	5.8	42 23.8	+59.0	5.9	43 23.5	+59.0	6.0	73
74	37 24.4	+58.8	5.2	38 24.2	+58.8	5.2	39 23.9	+58.9	5.3	40 23.6	+58.9	5.4	41 23.4	+58.9	5.5	42 23.1	+58.9	5.5	43 22.8	+59.0	5.6	44 22.5	+59.0	5.7	74
75	38 23.2	+58.8	4.9	39 23.0	+58.8	5.0	40 22.8	+58.8	5.0	41 22.5	+58.9	5.1	42 22.3	+58.8	5.2	43 22.0	+58.9	5.2	44 21.8	+58.9	5.3	45 21.5	+59.0	5.5	75
76	39 22.0	+58.8	4.6	40 21.8	+58.8	4.7	41 21.6	+58.8	4.8	42 21.4	+58.8	4.9	43 21.2	+58.9	4.9	44 20.9	+58.9	5.0	45 20.7	+58.9	5.1	46 20.5	+58.9	5.2	76
77	40 20.8	+58.7	4.4	41 20.6	+58.7	4.4	42 20.4	+58.8	4.5	43 20.2	+58.8	4.6	44 20.0	+58.8	4.7	45 19.8	+58.8	4.8	46 19.6	+58.9	4.8	47 19.4	+58.9	4.9	77
78	41 19.5	+58.6	4.1	42 19.3	+58.7	4.2	43 19.2	+58.7	4.2	44 19.0	+58.7	4.3	45 18.8	+58.8	4.4	46 18.6	+58.8	4.5	47 18.4	+58.9	4.6	48 18.3	+58.8	4.6	78
79	42 18.1	+58.6	3.8	43 18.0	+58.7	3.9	44 17.9	+58.6	4.0	45 17.7	+58.7	4.0	46 17.6	+58.7	4.1	47 17.4	+58.8	4.2	48 17.3	+58.7	4.3	49 17.1	+58.8	4.3	79
80	43 16.8	+58.6	3.5	44 16.7	+58.6	3.6	45 16.5	+58.7	3.7	46 16.4	+58.7	3.7	47 16.3	+58.7	3.8	48 16.2	+58.6	3.9	49 16.0	+58.7	3.9	50 15.9	+58.7	4.0	80
81	44 15.4	+58.5	3.2	45 15.3	+58.5	3.3	46 15.2	+58.5	3.4	47 15.1	+58.6	3.4	48 15.0	+58.6	3.5	49 14.8	+58.7	3.6	50 14.7	+58.7	3.6	51 14.6	+58.7	3.7	81
82	45 13.9	+58.5	2.9	46 13.8	+58.5	3.0	47 13.7	+58.6	3.0	48 13.7	+58.5	3.1	49 13.6	+58.5	3.2	50 13.5	+58.6	3.2	51 13.4	+58.6	3.3	52 13.3	+58.6	3.4	82
83	46 12.4	+58.4	2.6	47 12.3	+58.5	2.7	48 12.3	+58.4	2.7	49 12.2	+58.5	2.8	50 12.1	+58.5	2.8	51 12.0	+58.6	2.9	52 12.0	+58.5	2.9	53 11.9	+58.5	3.0	83
84	47 10.8	+58.4	2.3	48 10.8	+58.4	2.4	49 10.7	+58.4	2.4	50 10.7	+58.4	2.4	51 10.6	+58.4	2.5	52 10.6	+58.4	2.5	53 10.5	+58.5	2.6	54 10.4	+58.4	2.6	84
85	48 09.2	+58.3	1.9	49 09.2	+58.3	2.0	50 09.1	+58.4	2.0	51 09.1	+58.3	2.1	52 09.0	+58.4	2.1	53 09.0	+58.3	2.2	54 09.0	+58.3	2.2	55 08.9	+58.4	2.3	85
86	49 07.5	+58.2	1.6	50 07.5	+58.2	1.6	51 07.5	+58.2	1.6	52 07.4	+58.3	1.7	53 07.4	+58.3	1.7	54 07.4	+58.3	1.8	55 07.3	+58.4	1.8	56 07.3	+58.3	1.9	86
87	50 05.7	+58.1	1.2	51 05.7	+58.2	1.3	52 05.7	+58.2	1.3	53 05.7	+58.2	1.3	54 05.7	+58.2	1.3	55 05.7	+58.1	1.3	56 05.7	+58.2	1.4	57 05.6	+58.3	1.4	87
88	51 03.9	+58.1	0.8	52 03.9	+58.1	0.8	53 03.9	+58.1	0.9	54 03.9	+58.1	0.9	55 03.9	+58.1	0.9	56 03.9	+58.1	0.9	57 03.9	+58.1	1.0	58 03.9	+58.1	1.0	88
89	52 02.0	+58.0	0.4	53 02.0	+58.0	0.4	54 02.0	+58.0	0.4	55 02.0	+58.0	0.5	56 02.0	+58.0	0.5	57 02.0	+58.0	0.5	58 02.0	+58.0	0.5	59 02.0	+58.0	0.5	89
90	53 00.0	+57.9	0.0	54 00.0	+57.9	0.0	55 00.0	+57.9	0.0	56 00.0	+57.9	0.0	57 00.0	+57.9	0.0	58 00.0	+57.9	0.0	59 00.0	+57.9	0.0	60 00.0	+57.9	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
        { L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 165°, 195°**

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 20.7	+58.7	160.2	34 24.2	+58.8	160.5	33 27.6	+58.9	160.7	32 30.9	+59.0	160.9	31 34.2	+59.1	161.1	30 37.4	+59.1	161.3	29 40.5	+59.2	161.5	28 43.6	+59.2	161.7	0
1	36 19.4	+58.7	160.0	35 23.0	+58.8	160.2	34 26.5	+58.9	160.5	33 29.9	+59.0	160.7	32 33.3	+59.0	160.9	31 36.5	+59.1	161.1	30 39.7	+59.2	161.3	29 42.8	+59.3	161.5	1
2	37 18.1	+58.7	159.7	36 21.8	+58.8	160.0	35 25.4	+58.8	160.2	34 28.9	+58.9	160.5	33 32.3	+59.0	160.7	32 35.6	+59.1	160.9	31 38.9	+59.1	161.1	30 42.1	+59.2	161.3	2
3	38 16.8	+58.6	159.5	37 20.6	+58.7	159.7	36 24.2	+58.8	160.0	35 27.8	+58.9	160.2	34 31.3	+59.0	160.5	33 34.7	+59.1	160.7	32 38.0	+59.1	160.9	31 41.3	+59.1	161.1	3
4	39 15.4	+58.6	159.2	38 19.3	+58.7	159.5	37 23.0	+58.8	159.8	36 26.7	+58.9	160.0	35 30.3	+59.0	160.3	34 33.8	+59.0	160.5	33 37.2	+59.1	160.7	32 40.5	+59.2	160.9	4
5	40 14.0	+58.6	158.9	39 18.0	+58.6	159.2	38 21.8	+58.8	159.5	37 25.6	+58.8	159.8	36 29.2	+59.0	160.0	35 32.8	+59.0	160.3	34 36.3	+59.1	160.5	33 39.7	+59.1	160.7	5
6	41 12.6	+58.5	158.6	40 16.6	+58.6	158.9	39 20.6	+58.7	159.2	38 24.4	+58.8	159.5	37 28.2	+58.9	159.8	36 31.8	+59.0	160.1	35 35.4	+59.0	160.3	34 38.8	+59.2	160.5	6
7	42 11.1	+58.4	158.3	41 15.2	+58.6	158.7	40 19.3	+58.7	159.0	39 23.2	+58.8	159.3	38 27.1	+58.8	159.6	37 30.8	+59.0	159.8	36 34.4	+59.1	160.1	35 38.0	+59.1	160.3	7
8	43 09.5	+58.4	158.0	42 13.8	+58.5	158.4	41 18.0	+58.6	158.7	40 22.0	+58.8	159.0	39 25.9	+58.9	159.3	38 29.8	+58.9	159.6	37 33.5	+59.0	159.9	36 37.1	+59.1	160.1	8
9	44 07.9	+58.4	157.7	43 12.3	+58.5	158.1	42 16.6	+58.6	158.4	41 20.8	+58.7	158.7	40 24.8	+58.8	159.0	39 28.7	+58.9	159.3	38 32.5	+59.0	159.6	37 36.2	+59.1	159.9	9
10	45 06.3	+58.3	157.4	44 10.8	+58.4	157.8	43 15.2	+58.5	158.1	42 19.5	+58.6	158.5	41 23.6	+58.7	158.8	40 27.6	+58.9	159.1	39 31.5	+58.9	159.4	38 35.3	+59.0	159.7	10
11	46 04.6	+58.2	157.0	45 09.2	+58.4	157.4	44 13.7	+58.5	157.8	43 18.1	+58.6	158.2	42 22.3	+58.8	158.5	41 26.5	+58.8	158.8	40 30.4	+59.0	159.2	39 34.3	+59.0	159.5	11
12	47 02.8	+58.1	156.7	46 07.6	+58.3	157.1	45 12.2	+58.5	157.5	44 16.7	+58.6	157.9	43 21.1	+58.7	158.2	42 25.3	+58.8	158.6	41 29.4	+58.9	158.9	40 33.3	+59.0	159.2	12
13	48 00.9	+58.1	156.3	47 05.9	+58.2	156.8	46 10.7	+58.4	157.2	45 15.3	+58.5	157.6	44 19.8	+58.6	157.9	43 24.1	+58.7	158.3	42 28.3	+58.8	158.6	41 32.3	+59.0	159.0	13
14	48 59.0	+58.0	156.0	48 04.1	+58.2	156.4	47 09.1	+58.3	156.8	46 13.8	+58.5	157.3	45 18.4	+58.6	157.6	44 22.8	+58.7	158.0	43 27.1	+58.8	158.4	42 31.3	+58.9	158.7	14
15	49 57.0	+58.0	155.6	49 02.3	+58.1	156.0	48 07.4	+58.3	156.5	47 12.3	+58.4	156.9	46 17.0	+58.5	157.3	45 21.5	+58.7	157.7	44 25.9	+58.8	158.1	43 30.2	+58.9	158.5	15
16	50 55.0	+57.8	155.1	50 00.4	+58.0	155.7	49 05.7	+58.1	156.1	48 10.7	+58.3	156.6	47 15.5	+58.5	157.0	46 20.2	+58.6	157.4	45 24.7	+58.7	157.8	44 29.1	+58.8	158.2	16
17	51 52.8	+57.7	154.7	50 58.4	+58.0	155.3	50 03.8	+58.2	155.8	49 09.0	+58.4	156.2	48 14.0	+58.4	156.7	47 18.8	+58.6	157.1	46 23.5	+58.7	157.5	45 27.9	+58.9	157.9	17
18	52 50.6	+57.6	154.3	51 56.4	+57.8	154.8	51 02.0	+58.0	155.4	50 07.3	+58.2	155.9	49 12.4	+58.4	156.3	48 17.4	+58.5	156.8	47 22.2	+58.6	157.2	46 26.8	+58.7	157.6	18
19	53 48.2	+57.5	153.8	52 54.2	+57.8	154.4	52 00.0	+57.9	155.0	51 05.5	+58.1	155.5	50 10.8	+58.3	156.0	49 15.9	+58.4	156.5	48 20.8	+58.6	156.9	47 25.5	+58.7	157.3	19
20	54 45.7	+57.4	153.3	53 52.0	+57.6	153.9	52 57.9	+57.9	154.5	52 03.6	+58.1	155.1	51 09.1	+58.2	155.6	50 14.3	+58.4	156.1	49 19.4	+58.5	156.6	48 24.2	+58.7	157.0	20
21	55 43.1	+57.3	152.8	54 49.6	+57.5	153.5	53 55.8	+57.7	154.1	53 01.7	+57.9	154.7	52 07.3	+58.2	155.2	51 12.7	+58.3	155.7	50 17.9	+58.5	156.2	49 22.9	+58.6	156.7	21
22	56 40.4	+57.1	152.3	55 47.1	+57.4	153.0	54 53.5	+57.6	153.6	53 59.6	+57.9	154.2	53 05.5	+58.0	154.8	52 11.0	+58.3	155.3	51 16.4	+58.4	155.9	50 21.5	+58.6	156.4	22
23	57 37.5	+57.0	151.7	56 44.5	+57.3	152.4	55 51.1	+57.6	153.1	54 57.5	+57.7	153.8	54 03.5	+58.0	154.4	53 09.3	+58.1	155.0	52 14.8	+58.3	155.5	51 20.1	+58.5	156.0	23
24	58 34.5	+56.8	151.1	57 41.8	+57.1	151.9	56 48.7	+57.3	152.6	55 55.2	+57.6	153.3	55 01.5	+57.8	153.9	54 07.4	+58.1	154.6	53 13.1	+58.3	155.1	52 18.6	+58.4	155.7	24
25	59 31.3	+56.6	150.5	58 38.9	+56.9	151.3	57 46.0	+57.2	152.1	56 52.8	+57.5	152.8	55 59.3	+57.8	153.5	55 05.5	+57.9	154.1	54 11.4	+58.1	154.7	53 17.0	+58.3	155.3	25
26	60 27.9	+56.4	149.8	59 35.8	+56.7	150.7	58 43.3	+57.0	151.5	57 50.3	+57.4	152.3	56 57.1	+57.6	153.0	56 03.4	+57.9	153.7	55 09.5	+58.1	154.3	54 15.3	+58.3	154.9	26
27	61 24.3	+56.1	149.1	60 32.5	+56.6	150.0	59 40.3	+56.9	150.9	58 47.7	+57.2	151.7	57 54.7	+57.5	152.5	57 01.3	+57.7	153.2	56 07.6	+58.0	153.9	55 13.6	+58.2	154.5	27
28	62 20.4	+55.9	148.4	61 29.1	+56.3	149.3	60 37.2	+56.7	150.1	59 44.9	+57.0	151.1	58 52.2	+57.3	151.9	57 59.0	+57.7	152.7	57 05.6	+57.8	153.4	56 11.8	+58.0	154.1	28
29	63 16.3	+55.7	147.6	62 25.4	+56.1	148.6	61 33.9	+56.5	149.6	60 41.9	+56.9	150.5	59 49.5	+57.2	151.3	58 56.7	+57.4	152.1	58 03.4	+57.8	152.9	57 09.8	+58.0	153.6	29
30	64 12.0	+55.3	146.7	63 21.5	+55.8	147.8	62 30.4	+56.3	148.9	61 38.8	+56.6	149.8	60 46.7	+57.0	150.7	59 54.1	+57.3	151.6	59 01.2	+57.6	152.4	58 07.8	+57.9	153.1	30
31	65 07.3	+54.9	145.8	64 17.3	+55.5	147.0	63 26.7	+55.9	148.1	62 35.4	+56.5	149.1	61 43.7	+56.8	150.1	60 51.4	+57.2	150.9	59 58.8	+57.4	151.8	59 05.7	+57.7	152.6	31
32	66 02.2	+54.6	144.9	65 12.8	+55.2	146.1	64 22.6	+55.7	147.3	63 31.9	+56.1	148.4	62 40.5	+56.6	149.4	61 48.6	+57.0	150.3	60 56.2	+57.3	151.2	60 03.4	+57.6	152.1	32
33	66 56.8	+54.1	143.8	66 08.0	+54.7	145.2	65 18.3	+55.4	146.4	64 28.0	+55.9	147.6	63 37.1	+56.3	148.7	62 45.6	+56.7	149.7	61 53.5	+57.1	150.6	61 01.0	+57.5	151.5	33
34	67 50.9	+53.6	142.7	67 02.7	+54.4	144.1	66 13.7	+55.0	145.4	65 23.9	+55.6	146.7	64 33.4	+56.1	147.9	63 42.3	+56.5	148.9	62 50.6	+56.9	149.9	61 58.5	+57.3	150.8	34
35	68 44.5	+53.1	141.5	67 57.1	+53.9	143.0	67 08.7	+54.6	144.5	66 19.5	+55.2	145.8	65 29.5	+55.8	147.0	64 38.8	+56.3	148.2	63 47.6	+56.7	149.3	62 55.7	+57.1	150.3	35
36	69 37.6	+52.4	140.2	68 51.0	+53.3	141.8	68 03.3	+54.1	143.4	67 14.7	+54.8	144.8	66 25.3	+55.4	146.1	65 35.1	+56.0	147.4	64 44.3	+56.4	148.5	63 52.8	+56.9	149.6	36
37	70 30.0	+51.7	138.7	69 44.3	+52.7	140.5	68 57.4	+53.6	142.2	68 09.5	+54.4	143.7	67 20.7	+55.1	145.1	66 31.1	+55.6	146.5	65 40.7	+56.2	147.7	64 49.7	+56.6	148.8	37
38	71 21.7	+50.8	137.2	70 37.0	+52.0	139.1	69 51.0	+53.0	140.9	69 03.9	+53.9	142.6	68 15.8	+54.6	144.1	67 26.7	+55.3	145.5	66 36.9	+55.9	146.8	65 46.3	+56.4	148.0	38
39	72 12.5	+49.9	135.5	71 29.0	+51.2	137.6	70 44.0	+52.3	139.5	69 57.8	+53.2	141.3	69 10.4	+54.1	143.0	68 22.0	+54.9	144.5	67 32.8	+55.5	145.9	66 42.7	+56.1	147.2	39
40	73 02.4	+48.8	133.6	72 20.2	+50.2	135.9	71 36.3	+51.5	138.0	70 51.0	+52.7	139.9	70 04.5	+53.6	141.7	69 16.9	+54.4	143.4	68 28.3	+55.1	144.9	67 38.8	+55.7	146.3	40
41	73 51.2	+47.5	131.6	73 10.4	+49.2	134.1	72 27.8	+50.6	136.3	71 43.7	+51.8	138.4	70 58.1	+52.9	140.4	70 11.3	+53.9	142.1	69 23.4	+54.7	143.8	68 34.5	+55.4	145.3	41
42	74 38.7	+46.0	129.3	73 59.6	+47.8	132.0	73 18.4	+49.6	134.5	72 35.5	+51.0	136.8	71 51.0	+52.2	138.9	71 05.2	+53.2	140.8	70 18.1	+54.1	142.6	69 29.9	+54.9	144.2	42
43	75 24.7	+44.2	126.8	74 47.4	+46.5	129.8	74 08.0	+48.3	132.5	73 26.5	+49.9	135.0	72 43.2	+51.3	137.3	71 58.4	+52.5	139.3	71 12.2	+53.6	141.3	70 24.8	+54.5	143.0	43
44	76 08.9	+42.2•	124.1	75 33.9	+44.7	127.3	74 56.3	+46.8	130.3	74 16.4	+48.7	133.0	73 34.5	+50.3	135.5	72 50.9	+51.7	137.8	72 05.8	+52.8	139.8	71 19.3	+53.8	141.7	44
45	76 51.1	+39.8•	121.0	76 18.6	+42.6•	124.6	75 43.1	+45.2	127.8	75 05.1	+47.3	130.8	74 24.8	+49.2	133.5	73 42.6	+50.7	136.0	72 58.6	+52.1	138.3	72 13.1	+53.2	140.3	45
46	77 30.9	+37.0•	117.7	77 01.2	+40.3•	121.5	76 28.3	+43.2•	125.1	75 52.4	+45.7	128.3	75 14.0	+47.7	131.3	74 33.3	+49.6	134.0	73 50.7	+51.1	136.5	73 06.3	+52.4	138.8	46
47	78 07.9	+33.8•	113.9	77 41.5	+37.6•	118.1	77 11.5	+40.3•	122.0	76 38.1	+43.6•	125.6	76 01.7	+46.2	128.8	75 22.9	+48.2	131.9	74 41.4	+50.0	134.6	73 58.7	+51.5	137.1	47
48	78 41.7	+30.0•	109.8	78 19.1	+34.3•	114.4	77 52.3	+38.0•	118.6	77 21.7	+41.4•	122.5	76 47.9	+44.2•	126.1	76 11.1	+46.6	129.4	75 31.8	+48.7	132.4	74 50.2	+50.5	135.2	48
49	79 11.7	+25.7•	105.3	78 53.4	+30.5•	110.2	78 30.3	+34.9•	114.8	78 03.1	+38.6•	119.1	77 32.1	+41.9•	123.1	76 57.7	+44.7•	126.7	76 20.5	+47.1	130.0	75 40.7	+49.1	133.0	49
50	79 37.4	+20.9•	100.4	79 23.9	+26.1•	105.6	79 05.2	+31.0•	110.6	78 41.7	+35.4•	115.3	78 14.0	+39.1•	119.7	77 42.4	+42.5•	123.7	77 07.6	+45.2•	127.3	76 29.8	+47.6	130.6	50
51	79 58.3	+15.5•	95.1	79 50.0	+21.3•	100.6	79 36.2	+26.6•	106.0	79 17.1	+31.5•	111.1	78 53.1	+36.0•	115.9	78 24.9	+39.7•	120.3	77 52.8	+43.1•	124.3	77 17.4	+45.8•	128.0	51
52	80 13.8	+9.7•	89.5	80 11.3	+15.8•	95.3	80 02.8	+21.7•	100.9	79 48.6	+27.1•	106.4	79 29.1	+32.1•	111.6	79 04.6	+36.5•	116.4	78 35.9	+40.3•	120.9	78 03.2	+43.6•	124.9	52
53	80 23.5	+3.6•	83.6	80 27.1	+9.8•	89.5	80 24.5	+16.1•	95.4	80 15.7	+22.1•	101.3	80 01.2	+27.6•	106.8	79 41.1	+32.7•	112.1	79 16.2	+37.1•	117.0	78 46.8	+41.0•	121.5	53
54	80 27.1	−2.6•	77.6	80 36.9	+3.7•	83.5	80 40.6	+10.0•	89.6	80 37.8	+16.4•	95.6	80 28.8	+22.5•	101.6	80 13.8	+28.2•	107.3	79 53.3	+33.3•	112.7	79 27.8	+37.7•	117.6	54
55	80 24.5	−8.8•	71.6	80 40.6	−2.8•	77.4	80 50.6	+3.6•	83.4	80 54.2	+10.2•	89.6	80 51.3	+16.7•	95.9	80 42.0	+22.9•	102.0	80 26.6	+28.7•	107.8	80 05.5	+33.9•	113.2	55
56	80 15.7	−14.5•	65.7	80 37.8	−9.0•	71.2	80 54.2	−2.9•	77.1	81 04.4	+3.6•	83.4	81 08.0	+10.8•	89.9	81 04.9	+17.1•	96.1	80 55.3	+23.4•	102.4	80 39.4	+29.3•	108.3	56
57	80 01.2	−20.1•	60.0	80 28.8	−15.0•	65.2	80 51.3	−9.3•	70.8	81 08.0	−3.1•	76.9	81 18.3	+3.7•	83.3	81 22.0	+10.5•	89.8	81 18.7	+17.4•	96.4	81 08.7	+23.9•	102.8	57
58	79 41.1	−24.9•	54.7	80 13.8	−20.5•	59.4	80 42.0	−15.4•	64.7	81 04.9	−9.6•	70.4	81 22.0	−3.3•	76.6	81 32.5	+3.6•	83.2	81 36.1	+10.6•	89.9	81 32.6	+17.7•	96.7	58
59	79 16.2	−29.4•	49.7	79 53.3	−25.5•	54.0	80 26.6	−21.1•	58.8	80 55.3	−15.9•	64.1	81 18.7	−9.6•	70.4	81 36.1	−3.5•	76.4	81 46.7	+3.6•	83.1	81 50.3	+10.9•	90.1	59
60	78 46.8	−33.1•	45.1	79 27.8	−30.0•	48.9	80 05.5	−26.1•	53.2	80 39.4	−21.6•	58.1	81 08.7	−16.4•	63.5	81 32.6	−10.4•	69.6	81 50.3	−3.7•	76.1	82 01.2	+3.5•	83.1	60
61	78 13.7	−36.6•	40.9	78 57.8	−33.7•	44.3	79 39.4	−30.6•	48.1	80 17.8	−26.8•	52.4	80 52.3	−22.2•	57.4	81 22.2	−16.9•	62.9	81 46.6	−10.8•	69.1	82 04.7	−4.0•	75.8	61
62	77 37.1	−39.3•	37.1	78 24.1	−37.2•	40.1	79 08.8	−34.4•	43.4	79 51.0	−31.4•	47.3	80 30.1	−27.4•	51.6	81 05.3	−22.9•	56.6	81 35.8	−17.5•	62.3	82 00.7	−11.3•	68.6	62
63	76 57.8	−41.9•	33.7	77 46.9	−39.9•	36.3	78 34.4	−37.7•	39.2	79 19.6	−35.0•	42.5	80 02.7	−31.9•	46.4	80 42.4	−28.1•	50.8	81 18.3	−23.5•	55.9	81 49.4	−18.1•	61.6	63
64	76 15.9	−43.9	30.6	77 07.0	−42.4•	32.8	77 56.7	−40.5•	35.3	78 44.6	−38.4•	38.3	79 30.8	−35.7•	41.6	80 14.3	−32.6•	45.5	80 54.8	−28.9•	49.9	81 31.3	−24.2•	55.0	64
65	75 32.0	−45.7	27.8	76 24.6	−44.4	29.7	77 16.2	−43.0•	31.9	78 06.2	−41.1•	34.4	78 55.1	−39.1•	37.3	79 41.7	−36.4•	40.6	80 25.9	−33.3•	44.5	81 07.1	−29.6•	49.0	65
66	74 46.3	−47.2	25.3	75 40.2	−46.2	26.9	76 33.2	−44.9	28.8	77 25.1	−43.5•	31.0	78 16.0	−41.7•	33.5	79 05.3	−39.7•	36.3	79 52.6	−37.2•	39.6	80 37.5	−34.1•	43.5	66
67	73 59.1	−48.6	23.0	74 54.0	−47.7	24.4	75 48.3	−46.7	26.1	76 41.6	−45.5	27.9	77 34.3	−44.1•	30.0	78 25.6	−42.4•	32.5	79 15.4	−40.4•	35.3	80 03.4	−38.0•	38.6	67
68	73 10.5	−49.7	20.9	74 06.3	−49.0	22.1	75 01.6	−48.1	23.6	75 56.1	−47.2	25.1	76 50.2	−46.1•	27.0	77 43.2	−44.7•	29.0	78 35.0	−43.1•	31.4	79 25.4	−41.1•	34.2	68
69	72 20.8	−50.7	19.0	73 17.3	−50.1	20.1	74 13.5	−49.5	21.3	75 09.2	−48.6	22.7	76 04.1	−47.6	24.2	76 58.5	−46.6	26.0	77 51.9	−45.3•	28.0	78 44.3	−43.7•	30.4	69
70	71 30.1	−51.6	17.3	72 27.2	−51.0	18.2	73 24.0	−50.4	19.3	74 20.3	−49.9	20.4	75 16.5	−49.1	21.8	76 11.9	−48.2	23.3	77 06.6	−47.1	25.0	78 00.6	−45.9•	27.0	70
71	70 38.5	−52.3	15.7	71 36.2	−51.9	16.5	72 33.6	−51.5	17.4	73 30.4	−50.8	18.4	74 27.4	−50.3	19.6	75 23.7	−49.6	20.8	76 19.5	−48.7	22.3	77 14.7	−47.8	24.0	71
72	69 46.2	−52.9	14.3	70 44.3	−52.6	15.0	71 42.1	−52.2	15.7	72 39.6	−51.8	16.6	73 37.1	−51.3	17.6	74 34.1	−50.6	18.7	75 30.8	−50.0	19.9	76 26.9	−49.2	21.3	72
73	68 53.3	−53.6	12.9	69 51.7	−53.3	13.5	70 49.9	−52.9	14.2	71 47.8	−52.6	15.0	72 45.8	−52.1	15.8	73 43.5	−51.7	16.7	74 40.8	−51.2	17.8	75 37.7	−50.5	18.9	73
74	67 59.7	−54.0	11.7	68 58.4	−53.8	12.2	69 57.0	−53.3	12.8	70 55.2	−53.2	13.4	71 53.7	−52.9	14.2	72 51.8	−52.5	14.9	73 49.6	−52.0	15.8	74 47.2	−51.5	16.8	74
75	67 05.7	−54.5	10.6	68 04.6	−54.3	11.0	69 03.5	−54.1	11.5	70 02.0	−53.9	12.1	71 00.8	−53.5	12.7	71 59.3	−53.2	13.4	72 57.6	−52.9	14.1	73 55.7	−52.5	14.9	75
76	66 11.2	−54.9	9.5	67 10.3	−54.7	9.9	68 09.4	−54.5	10.3	69 08.1	−54.3	10.8	70 07.3	−54.1	11.3	71 06.1	−53.9	11.9	72 04.7	−53.6	12.5	73 03.2	−53.2	13.2	76
77	65 16.3	−55.3	8.5	66 15.6	−55.1	8.9	67 14.9	−55.0	9.2	68 14.1	−54.8	9.6	69 13.2	−54.6	10.1	70 12.2	−54.4	10.5	71 11.1	−54.1	11.1	72 10.0	−53.9	11.7	77
78	64 21.0	−55.5	7.6	65 20.5	−55.5	7.9	66 19.9	−55.3	8.2	67 19.3	−55.2	8.5	68 18.6	−55.1	8.9	69 17.8	−54.9	9.3	70 17.0	−54.7	9.8	71 16.1	−54.5	10.3	78
79	63 25.5	−55.9	6.8	64 25.0	−55.7	7.0	65 24.6	−55.7	7.3	66 24.1	−55.6	7.5	67 23.5	−55.4	7.9	68 22.9	−55.2	8.2	69 22.3	−55.1	8.6	70 21.6	−54.9	9.0	79
80	62 29.6	−56.1	5.9	63 29.3	−56.1	6.2	64 28.9	−55.9	6.4	65 28.5	−55.8	6.6	66 28.1	−55.7	6.9	67 27.7	−55.7	7.2	68 27.2	−55.6	7.5	69 26.7	−55.4	7.8	80
81	61 33.5	−56.5	5.2	62 33.2	−56.3	5.4	63 33.0	−56.3	5.6	64 32.4	−56.1	5.6	65 32.4	−56.1	6.0	66 32.0	−56.0	6.2	67 31.6	−55.8	6.5	68 31.3	−55.7	6.8	81
82	60 37.1	−56.5	4.5	61 36.9	−56.5	4.6	62 36.7	−56.4	4.8	63 36.5	−56.4	5.0	64 36.3	−56.3	5.1	65 36.0	−56.2	5.3	66 35.8	−56.2	5.5	67 35.5	−56.1	5.8	82
83	59 40.6	−56.8	3.8	60 40.4	−56.7	3.9	61 40.3	−56.7	4.1	62 40.1	−56.6	4.2	63 40.0	−56.6	4.3	64 39.8	−56.5	4.5	65 39.6	−56.5	4.7	66 39.4	−56.4	4.9	83
84	58 43.8	−56.9	3.2	59 43.7	−56.9	3.3	60 43.6	−56.8	3.4	61 43.5	−56.8	3.5	62 43.4	−56.8	3.6	63 43.3	−56.8	3.7	64 43.1	−56.7	3.9	65 43.0	−56.6	4.0	84
85	57 46.9	−57.1	2.6	58 46.8	−57.1	2.7	59 46.7	−57.0	2.7	60 46.7	−57.1	2.8	61 46.6	−57.1	2.9	62 46.5	−57.0	3.0	63 46.4	−56.9	3.1	64 46.3	−56.9	3.2	85
86	56 49.8	−57.3	2.0	57 49.7	−57.2	2.1	58 49.7	−57.2	2.1	59 49.6	−57.2	2.2	60 49.6	−57.2	2.3	61 49.5	−57.1	2.3	62 49.5	−57.1	2.4	63 49.4	−57.1	2.5	86
87	55 52.5	−57.4	1.5	56 52.5	−57.5	1.5	57 52.5	−57.5	1.6	58 52.4	−57.3	1.6	59 52.4	−57.3	1.6	60 52.4	−57.3	1.7	61 52.4	−57.2	1.8	62 52.3	−57.2	1.8	87
88	54 55.1	−57.5	1.0	55 55.1	−57.5	1.0	56 55.1	−57.5	1.0	57 55.1	−57.5	1.0	58 55.1	−57.5	1.1	59 55.1	−57.5	1.1	60 55.1	−57.5	1.1	61 55.1	−57.5	1.2	88
89	53 57.6	−57.6	0.5	54 57.6	−57.6	0.5	55 57.6	−57.6	0.5	56 57.6	−57.6	0.5	57 57.6	−57.6	0.5	58 57.6	−57.6	0.5	59 57.6	−57.6	0.6	60 57.6	−57.6	0.6	89
90	53 00.0	−57.7	0.0	54 00.0	−57.7	0.0	55 00.0	−57.7	0.0	56 00.0	−57.7	0.0	57 00.0	−57.7	0.0	58 00.0	−57.7	0.0	59 00.0	−57.7	0.0	60 00.0	−57.7	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 20.7	−58.7	160.2	34 24.2	−58.8	160.5	33 27.6	−58.9	160.7	32 30.9	−59.0	160.9	31 34.2	−59.1	161.1	30 37.4	−59.1	161.3	29 40.5	−59.2	161.5	28 43.6	−59.3	161.7	0
1	34 22.0	−58.8	160.5	33 25.4	−58.9	160.7	32 28.7	−59.0	160.9	31 31.9	−59.0	161.1	30 35.1	−59.1	161.3	29 38.3	−59.2	161.5	28 41.3	−59.2	161.7	27 44.3	−59.2	161.9	1
2	33 23.2	−58.9	160.7	32 26.5	−58.9	160.9	31 29.7	−58.9	161.2	30 32.9	−59.0	161.3	29 36.0	−59.1	161.5	28 39.1	−59.2	161.7	27 42.1	−59.2	161.9	26 45.1	−59.3	162.0	2
3	32 24.3	−58.8	161.0	31 27.6	−58.9	161.2	30 30.8	−59.0	161.4	29 33.9	−59.1	161.6	28 37.0	−59.1	161.7	27 39.9	−59.2	161.9	26 42.9	−59.3	162.1	25 45.8	−59.3	162.2	3
4	31 25.5	−58.9	161.2	30 28.7	−59.0	161.4	29 31.8	−59.0	161.6	28 34.8	−59.0	161.8	27 37.9	−59.1	161.9	26 40.7	−59.2	162.1	25 43.6	−59.2	162.2	24 46.5	−59.3	162.4	4
5	30 26.6	−58.9	161.4	29 29.7	−58.9	161.6	28 32.8	−59.1	161.8	27 35.7	−59.1	162.0	26 38.7	−59.2	162.1	25 41.5	−59.2	162.3	24 44.4	−59.2	162.4	23 47.2	−59.4	162.5	5
6	29 27.7	−58.9	161.6	28 30.8	−59.0	161.8	27 33.7	−59.0	162.0	26 36.6	−59.1	162.1	25 39.5	−59.2	162.3	24 42.3	−59.2	162.4	23 45.1	−59.3	162.6	22 47.8	−59.3	162.7	6
7	28 28.8	−58.9	161.9	27 31.8	−59.0	162.0	26 34.7	−59.1	162.2	25 37.5	−59.1	162.3	24 40.3	−59.1	162.5	23 43.1	−59.2	162.6	22 45.8	−59.3	162.7	21 48.5	−59.3	162.9	7
8	27 29.9	−58.9	162.1	26 32.8	−59.0	162.2	25 35.6	−59.1	162.4	24 38.4	−59.1	162.5	23 41.2	−59.2	162.7	22 43.9	−59.2	162.8	21 46.5	−59.3	162.9	20 49.2	−59.4	163.0	8
9	26 31.0	−59.0	162.3	25 33.8	−59.1	162.4	24 36.5	−59.0	162.6	23 39.3	−59.2	162.7	22 42.0	−59.2	162.8	21 44.6	−59.2	163.0	20 47.2	−59.3	163.1	19 49.8	−59.3	163.2	9
10	25 32.0	−59.0	162.5	24 34.7	−59.0	162.6	23 37.5	−59.2	162.8	22 40.1	−59.1	162.9	21 42.8	−59.2	163.0	20 45.4	−59.3	163.1	19 47.9	−59.3	163.2	18 50.5	−59.4	163.3	10
11	24 33.0	−59.0	162.7	23 35.7	−59.0	162.8	22 38.3	−59.1	163.0	21 41.0	−59.2	163.1	20 43.5	−59.3	163.2	19 46.1	−59.3	163.3	18 48.6	−59.3	163.4	17 51.1	−59.3	163.5	11
12	23 34.0	−59.0	162.9	22 36.6	−59.0	163.0	21 39.2	−59.1	163.1	20 41.8	−59.2	163.2	19 44.3	−59.2	163.4	18 46.8	−59.3	163.5	17 49.3	−59.3	163.5	16 51.7	−59.3	163.6	12
13	22 35.0	−59.1	163.1	21 37.6	−59.1	163.2	20 40.1	−59.1	163.3	19 42.6	−59.2	163.4	18 45.1	−59.3	163.5	17 47.5	−59.3	163.6	16 50.0	−59.4	163.7	15 52.4	−59.4	163.8	13
14	21 35.9	−59.1	163.3	20 38.5	−59.1	163.4	19 41.0	−59.2	163.5	18 43.4	−59.2	163.6	17 45.8	−59.3	163.7	16 48.2	−59.3	163.8	15 50.6	−59.3	163.9	14 53.0	−59.4	163.9	14
15	20 36.9	−59.1	163.5	19 39.4	−59.1	163.6	18 41.8	−59.2	163.7	17 44.2	−59.2	163.8	16 46.6	−59.3	163.9	15 48.9	−59.3	163.9	14 51.3	−59.4	164.0	13 53.6	−59.4	164.1	15
16	19 37.8	−59.0	163.7	18 40.3	−59.1	163.8	17 42.6	−59.1	163.9	16 45.0	−59.2	164.0	15 47.3	−59.3	164.0	14 49.6	−59.3	164.1	13 51.9	−59.4	164.2	12 54.2	−59.4	164.2	16
17	18 38.8	−59.1	163.8	17 41.1	−59.1	163.9	16 43.5	−59.3	164.0	15 45.8	−59.3	164.1	14 48.1	−59.3	164.2	13 50.3	−59.3	164.2	12 52.6	−59.3	164.3	11 54.8	−59.4	164.4	17
18	17 39.7	−59.1	164.0	16 42.0	−59.1	164.1	15 44.3	−59.2	164.2	14 46.5	−59.2	164.3	13 48.8	−59.3	164.3	12 51.0	−59.3	164.4	11 53.2	−59.4	164.5	10 55.4	−59.4	164.5	18
19	16 40.6	−59.1	164.2	15 42.9	−59.2	164.3	14 45.1	−59.2	164.4	13 47.3	−59.2	164.4	12 49.5	−59.3	164.5	11 51.7	−59.4	164.6	10 53.8	−59.3	164.6	9 56.0	−59.4	164.7	19
20	15 41.5	−59.1	164.4	14 43.7	−59.1	164.5	13 45.9	−59.2	164.5	12 48.1	−59.3	164.6	11 50.2	−59.3	164.7	10 52.3	−59.3	164.7	9 54.5	−59.4	164.8	8 56.6	−59.5	164.8	20
21	14 42.4	−59.1	164.6	13 44.6	−59.2	164.6	12 46.7	−59.2	164.7	11 48.8	−59.2	164.8	10 50.9	−59.3	164.8	9 53.0	−59.3	164.9	8 55.1	−59.4	164.9	7 57.1	−59.4	164.9	21
22	13 43.3	−59.1	164.7	12 45.4	−59.2	164.8	11 47.5	−59.2	164.9	10 49.6	−59.3	164.9	9 51.6	−59.3	165.0	8 53.7	−59.4	165.0	7 55.7	−59.4	165.0	6 57.7	−59.4	165.1	22
23	12 44.2	−59.2	164.9	11 46.2	−59.1	165.0	10 48.3	−59.3	165.0	9 50.3	−59.3	165.1	8 52.3	−59.3	165.1	7 54.3	−59.3	165.2	6 56.3	−59.4	165.2	5 58.3	−59.4	165.2	23
24	11 45.0	−59.1	165.1	10 47.1	−59.2	165.1	9 49.1	−59.3	165.2	8 51.0	−59.2	165.2	7 53.0	−59.3	165.3	6 55.0	−59.4	165.3	5 56.9	−59.3	165.3	4 58.9	−59.4	165.4	24
25	10 45.9	−59.2	165.3	9 47.9	−59.3	165.3	8 49.8	−59.2	165.4	7 51.8	−59.3	165.4	6 53.7	−59.3	165.4	5 55.6	−59.3	165.5	4 57.6	−59.4	165.5	3 59.5	−59.5	165.5	25
26	9 46.8	−59.2	165.4	8 48.7	−59.2	165.5	7 50.6	−59.2	165.5	6 52.5	−59.3	165.5	5 54.4	−59.3	165.6	4 56.3	−59.4	165.6	3 58.2	−59.4	165.6	3 00.0	−59.4	165.6	26
27	8 47.6	−59.1	165.6	7 49.5	−59.2	165.6	6 51.4	−59.3	165.7	5 53.2	−59.3	165.7	4 55.1	−59.3	165.7	3 56.9	−59.3	165.7	2 58.8	−59.4	165.8	2 00.6	−59.4	165.8	27
28	7 48.5	−59.1	165.8	6 50.3	−59.2	165.7	5 52.1	−59.2	165.8	4 54.0	−59.3	165.8	3 55.8	−59.4	165.9	2 57.6	−59.4	165.9	1 59.4	−59.4	165.9	1 01.2	−59.4	165.9	28
29	6 49.3	−59.1	165.9	5 51.1	−59.2	166.0	4 52.9	−59.3	166.0	3 54.7	−59.3	166.0	2 56.4	−59.3	166.0	1 58.2	−59.3	166.0	1 00.0	−59.4	166.0	0 01.8	−59.5	166.0	29
30	5 50.2	−59.2	166.1	4 51.9	−59.2	166.1	3 53.6	−59.2	166.2	2 55.4	−59.3	166.2	1 57.1	−59.3	166.2	0 58.9	−59.4	166.2	0 00.6	−59.4	166.2	0 57.7	+59.4	13.8	30
31	4 51.0	−59.2	166.3	3 52.7	−59.2	166.3	2 54.4	−59.2	166.3	1 56.1	−59.3	166.3	0 57.8	−59.3	166.3	0 00.5	+59.4	13.7	0 58.8	+59.4	13.7	1 57.1	+59.4	13.7	31
32	3 51.8	−59.3	166.5	2 53.5	−59.2	166.5	1 55.2	−59.3	166.5	0 56.8	−59.3	166.5	0 01.5	+59.3	13.5	0 59.9	+59.3	13.5	1 58.2	+59.3	13.5	2 56.5	+59.4	13.5	32
33	2 52.7	−59.2	166.6	1 54.3	−59.2	166.6	0 55.9	−59.2	166.6	0 02.5	+59.2	13.4	1 00.8	+59.4	13.4	1 59.2	+59.3	13.4	2 57.6	+59.3	13.4	3 55.9	+59.5	13.4	33
34	1 53.5	−59.2	166.8	0 55.1	−59.2	166.8	0 03.3	+59.3	13.2	1 01.7	+59.3	13.2	2 00.2	+59.3	13.2	2 58.6	+59.3	13.2	3 57.0	+59.4	13.2	4 55.4	+59.4	13.3	34
35	0 54.3	−59.1	166.9	0 04.1	+59.2	13.0	1 02.6	+59.3	13.1	2 01.0	+59.3	13.1	2 59.5	+59.3	13.1	3 57.9	+59.4	13.1	4 56.4	+59.3	13.1	5 54.8	+59.4	13.1	35
36	0 04.8	+59.2	12.9	1 03.3	+59.2	12.9	2 01.8	+59.3	12.9	3 00.3	+59.3	12.9	3 58.8	+59.3	12.9	4 57.3	+59.4	12.9	5 55.7	+59.4	13.0	6 54.2	+59.4	13.0	36
37	1 04.0	+59.2	12.7	2 02.5	+59.2	12.7	3 01.1	+59.2	12.7	3 59.6	+59.3	12.7	4 58.1	+59.3	12.8	5 56.6	+59.4	12.8	6 55.1	+59.4	12.8	7 53.6	+59.4	12.8	37
38	2 03.2	+59.1	12.6	3 01.7	+59.2	12.6	4 00.3	+59.2	12.6	4 58.9	+59.3	12.6	5 57.4	+59.3	12.6	6 56.0	+59.3	12.6	7 54.5	+59.4	12.7	8 53.0	+59.5	12.7	38
39	3 02.3	+59.2	12.4	4 00.9	+59.2	12.4	4 59.5	+59.3	12.4	5 58.1	+59.3	12.4	6 56.7	+59.3	12.5	7 55.3	+59.4	12.5	8 53.9	+59.4	12.5	9 52.5	+59.4	12.6	39
40	4 01.5	+59.2	12.2	5 00.1	+59.2	12.2	5 58.8	+59.2	12.3	6 57.4	+59.3	12.3	7 56.0	+59.3	12.3	8 54.7	+59.3	12.3	9 53.3	+59.3	12.4	10 51.9	+59.4	12.4	40
41	5 00.7	+59.1	12.1	5 59.3	+59.2	12.1	6 58.0	+59.3	12.1	7 56.7	+59.3	12.1	8 55.3	+59.3	12.2	9 54.0	+59.3	12.2	10 52.6	+59.4	12.2	11 51.3	+59.4	12.3	41
42	5 59.8	+59.1	11.9	6 58.5	+59.2	11.9	7 57.3	+59.2	11.9	8 56.0	+59.2	12.0	9 54.6	+59.3	12.0	10 53.3	+59.4	12.0	11 52.0	+59.4	12.1	12 50.7	+59.4	12.1	42
43	6 59.0	+59.1	11.7	7 57.7	+59.2	11.7	8 56.5	+59.2	11.8	9 55.2	+59.3	11.8	10 53.9	+59.3	11.8	11 52.7	+59.3	11.9	12 51.4	+59.3	11.9	13 50.1	+59.4	12.0	43
44	7 58.1	+59.2	11.5	8 56.9	+59.2	11.6	9 55.7	+59.2	11.6	10 54.5	+59.2	11.6	11 53.2	+59.3	11.7	12 52.0	+59.3	11.7	13 50.7	+59.4	11.8	14 49.5	+59.3	11.8	44
45	8 57.3	+59.1	11.4	9 56.1	+59.2	11.4	10 54.9	+59.2	11.4	11 53.7	+59.3	11.5	12 52.5	+59.3	11.5	13 51.3	+59.3	11.6	14 50.1	+59.3	11.6	15 48.8	+59.4	11.7	45
46	9 56.4	+59.2	11.2	10 55.3	+59.2	11.2	11 54.1	+59.2	11.3	12 53.0	+59.2	11.3	13 51.8	+59.3	11.4	14 50.6	+59.3	11.4	15 49.4	+59.4	11.5	16 48.2	+59.4	11.5	46
47	10 55.6	+59.1	11.0	11 54.5	+59.1	11.1	12 53.3	+59.3	11.1	13 52.2	+59.3	11.2	14 51.1	+59.2	11.2	15 49.9	+59.3	11.3	16 48.8	+59.3	11.3	17 47.6	+59.4	11.4	47
48	11 54.7	+59.1	10.9	12 53.6	+59.2	10.9	13 52.6	+59.1	11.0	14 51.5	+59.2	11.0	15 50.3	+59.3	11.1	16 49.2	+59.3	11.1	17 48.1	+59.3	11.2	18 47.0	+59.3	11.2	48
49	12 53.8	+59.2	10.7	13 52.8	+59.2	10.7	14 51.7	+59.2	10.8	15 50.7	+59.2	10.8	16 49.6	+59.3	10.9	17 48.5	+59.3	10.9	18 47.4	+59.3	11.0	19 46.3	+59.4	11.1	49
50	13 53.0	+59.1	10.5	14 52.0	+59.1	10.6	15 50.9	+59.2	10.6	16 49.9	+59.2	10.7	17 48.9	+59.2	10.7	18 47.8	+59.3	10.8	19 46.7	+59.3	10.8	20 45.7	+59.3	10.9	50
51	14 52.1	+59.1	10.3	15 51.1	+59.1	10.4	16 50.1	+59.2	10.4	17 49.1	+59.2	10.5	18 48.1	+59.2	10.6	19 47.1	+59.3	10.6	20 46.0	+59.3	10.7	21 45.0	+59.3	10.8	51
52	15 51.2	+59.1	10.2	16 50.2	+59.1	10.2	17 49.3	+59.1	10.3	18 48.3	+59.2	10.3	19 47.3	+59.3	10.4	20 46.4	+59.2	10.5	21 45.3	+59.3	10.5	22 44.3	+59.4	10.6	52
53	16 50.3	+59.1	10.0	17 49.4	+59.1	10.1	18 48.4	+59.2	10.1	19 47.5	+59.2	10.2	20 46.6	+59.2	10.2	21 45.6	+59.3	10.3	22 44.6	+59.3	10.4	23 43.7	+59.3	10.4	53
54	17 49.4	+59.0	9.8	18 48.5	+59.1	9.9	19 47.6	+59.1	9.9	20 46.7	+59.2	10.0	21 45.8	+59.2	10.0	22 44.9	+59.2	10.1	23 43.9	+59.3	10.2	24 43.0	+59.3	10.3	54
55	18 48.4	+59.1	9.6	19 47.6	+59.1	9.7	20 46.7	+59.2	9.7	21 45.9	+59.1	9.8	22 45.0	+59.2	9.9	23 44.1	+59.2	9.9	24 43.2	+59.2	10.0	25 42.3	+59.3	10.1	55
56	19 47.5	+59.1	9.4	20 46.7	+59.1	9.6	21 45.9	+59.1	9.6	22 45.0	+59.2	9.6	23 44.2	+59.1	9.7	24 43.3	+59.2	9.8	25 42.4	+59.3	9.9	26 41.6	+59.2	9.9	56
57	20 46.6	+59.1	9.2	21 45.8	+59.1	9.3	22 45.0	+59.1	9.4	23 44.2	+59.1	9.4	24 43.4	+59.1	9.5	25 42.5	+59.2	9.6	26 41.7	+59.2	9.7	27 40.8	+59.3	9.8	57
58	21 45.6	+59.0	9.0	22 44.9	+59.0	9.1	23 44.1	+59.1	9.2	24 43.3	+59.1	9.3	25 42.5	+59.2	9.3	26 41.7	+59.1	9.4	27 40.9	+59.2	9.5	28 40.1	+59.2	9.6	58
59	22 44.6	+59.1	8.9	23 43.9	+59.1	9.0	24 43.2	+59.1	9.0	25 42.4	+59.2	9.1	26 41.7	+59.1	9.1	27 40.9	+59.1	9.2	28 40.1	+59.2	9.3	29 39.3	+59.2	9.4	59
60	23 43.7	+59.0	8.7	24 43.0	+59.0	8.7	25 42.3	+59.0	8.7	26 41.6	+59.0	8.9	27 40.8	+59.1	9.0	28 40.0	+59.1	9.0	29 39.3	+59.2	9.1	30 38.6	+59.2	9.2	60
61	24 42.7	+58.9	8.5	25 42.0	+59.0	8.5	26 41.3	+59.1	8.6	27 40.6	+59.1	8.7	28 39.9	+59.2	8.8	29 39.2	+59.1	8.8	30 38.5	+59.2	8.9	31 37.8	+59.2	9.0	61
62	25 41.6	+59.0	8.3	26 41.0	+59.0	8.3	27 40.4	+59.0	8.4	28 39.7	+59.1	8.5	29 39.0	+59.1	8.6	30 38.4	+59.1	8.7	31 37.7	+59.1	8.7	32 37.0	+59.2	8.8	62
63	26 40.6	+58.9	8.1	27 40.0	+58.9	8.1	28 39.4	+59.0	8.2	29 38.8	+59.0	8.3	30 38.1	+59.1	8.4	31 37.5	+59.1	8.5	32 36.8	+59.2	8.5	33 36.2	+59.1	8.6	63
64	27 39.5	+59.0	7.8	28 39.0	+58.9	7.9	29 38.4	+59.0	8.0	30 37.8	+59.0	8.1	31 37.2	+59.1	8.2	32 36.6	+59.1	8.2	33 36.0	+59.1	8.3	34 35.3	+59.2	8.4	64
65	28 38.5	+58.9	7.6	29 37.9	+58.9	7.7	30 37.4	+58.9	7.8	31 36.8	+59.0	7.9	32 36.3	+59.0	7.9	33 35.7	+59.0	8.0	34 35.1	+59.1	8.1	35 34.5	+59.1	8.2	65
66	29 37.4	+58.9	7.4	30 36.9	+58.9	7.5	31 36.4	+58.9	7.6	32 35.8	+59.0	7.6	33 35.3	+59.0	7.7	34 34.7	+59.1	7.8	35 34.2	+59.0	7.9	36 33.6	+59.1	8.0	66
67	30 36.3	+58.8	7.2	31 35.8	+58.9	7.3	32 35.3	+58.9	7.3	33 34.8	+59.0	7.4	34 34.3	+59.0	7.5	35 33.8	+59.0	7.6	36 33.2	+59.1	7.7	37 32.7	+59.1	7.8	67
68	31 35.1	+58.9	7.0	32 34.7	+58.9	7.1	33 34.2	+58.9	7.1	34 33.8	+58.9	7.2	35 33.3	+59.0	7.3	36 32.8	+59.0	7.4	37 32.3	+59.0	7.5	38 31.8	+59.0	7.6	68
69	32 34.0	+58.8	6.7	33 33.6	+58.8	6.8	34 33.1	+58.9	6.9	35 32.7	+58.9	7.0	36 32.2	+59.0	7.1	37 31.8	+58.9	7.2	38 31.3	+59.0	7.3	39 30.8	+59.0	7.4	69
70	33 32.8	+58.8	6.5	34 32.4	+58.8	6.6	35 32.0	+58.8	6.7	36 31.6	+58.9	6.7	37 31.2	+58.9	6.8	38 30.7	+59.0	6.9	39 30.3	+59.0	7.0	40 29.8	+59.0	7.1	70
71	34 31.6	+58.7	6.3	35 31.2	+58.8	6.4	36 30.8	+58.9	6.4	37 30.5	+58.8	6.5	38 30.1	+58.8	6.6	39 29.7	+58.9	6.7	40 29.3	+58.9	6.8	41 28.8	+59.0	6.9	71
72	35 30.3	+58.8	6.0	36 30.0	+58.7	6.1	37 29.7	+58.7	6.2	38 29.3	+58.8	6.2	39 28.9	+58.9	6.3	40 28.6	+58.8	6.4	41 28.2	+58.9	6.5	42 27.8	+58.9	6.6	72
73	36 29.1	+58.6	5.8	37 28.7	+58.8	5.8	38 28.4	+58.8	5.9	39 28.1	+58.8	6.0	40 27.8	+58.8	6.1	41 27.4	+58.8	6.2	42 27.1	+58.8	6.3	43 26.7	+58.9	6.4	73
74	37 27.7	+58.7	5.5	38 27.5	+58.6	5.6	39 27.2	+58.7	5.6	40 26.9	+58.7	5.7	41 26.6	+58.7	5.8	42 26.3	+58.8	5.9	43 25.9	+58.9	6.0	44 25.6	+58.9	6.1	74
75	38 26.4	+58.6	5.3	39 26.1	+58.7	5.4	40 25.9	+58.7	5.4	41 25.6	+58.7	5.5	42 25.3	+58.7	5.5	43 25.1	+58.7	5.5	44 24.8	+58.7	5.7	45 24.5	+58.8	5.8	75
76	39 25.0	+58.6	5.0	40 24.8	+58.6	5.0	41 24.6	+58.6	5.1	42 24.3	+58.7	5.2	43 24.1	+58.7	5.3	44 23.8	+58.7	5.4	45 23.5	+58.7	5.4	46 23.3	+58.7	5.5	76
77	40 23.6	+58.5	4.7	41 23.4	+58.6	4.7	42 23.2	+58.6	4.8	43 23.0	+58.6	4.9	44 22.8	+58.6	5.0	45 22.5	+58.7	5.1	46 22.3	+58.7	5.2	47 22.0	+58.8	5.3	77
78	41 22.1	+58.5	4.4	42 22.0	+58.5	4.5	43 21.8	+58.5	4.5	44 21.6	+58.5	4.6	45 21.4	+58.6	4.7	46 21.2	+58.6	4.8	47 21.0	+58.6	4.8	48 20.8	+58.6	4.9	78
79	42 20.6	+58.5	4.1	43 20.5	+58.4	4.1	44 20.3	+58.5	4.2	45 20.2	+58.5	4.3	46 20.0	+58.5	4.4	47 19.8	+58.6	4.5	48 19.6	+58.6	4.5	49 19.4	+58.6	4.6	79
80	43 19.1	+58.4	3.8	44 18.9	+58.5	3.8	45 18.8	+58.4	3.9	46 18.7	+58.4	4.0	47 18.5	+58.5	4.0	48 18.4	+58.5	4.1	49 18.2	+58.5	4.2	50 18.0	+58.6	4.3	80
81	44 17.5	+58.3	3.5	45 17.4	+58.3	3.6	46 17.2	+58.4	3.6	47 17.1	+58.4	3.6	48 17.0	+58.4	3.7	49 16.9	+58.4	3.8	50 16.7	+58.5	3.8	51 16.6	+58.5	4.0	81
82	45 15.8	+58.3	3.1	46 15.7	+58.3	3.2	47 15.6	+58.3	3.2	48 15.5	+58.4	3.3	49 15.4	+58.4	3.4	50 15.3	+58.4	3.4	51 15.2	+58.4	3.5	52 15.1	+58.4	3.6	82
83	46 14.1	+58.2	2.8	47 14.0	+58.3	2.8	48 13.9	+58.3	2.9	49 13.9	+58.2	2.9	50 13.8	+58.3	3.0	51 13.7	+58.3	3.1	52 13.6	+58.3	3.1	53 13.5	+58.4	3.2	83
84	47 12.3	+58.2	2.4	48 12.3	+58.1	2.4	49 12.2	+58.2	2.5	50 12.1	+58.2	2.6	51 12.1	+58.1	2.6	52 12.0	+58.2	2.6	53 11.9	+58.3	2.8	54 11.9	+58.2	2.8	84
85	48 10.5	+58.0	2.1	49 10.4	+58.1	2.1	50 10.4	+58.1	2.1	51 10.3	+58.2	2.2	52 10.3	+58.1	2.2	53 10.2	+58.2	2.3	54 10.2	+58.1	2.4	55 10.1	+58.2	2.4	85
86	49 08.5	+58.0	1.7	50 08.5	+58.0	1.7	51 08.5	+58.0	1.8	52 08.5	+58.0	1.8	53 08.4	+58.1	1.8	54 08.4	+58.0	1.9	55 08.4	+58.0	1.9	56 08.3	+58.1	2.0	86
87	50 06.5	+57.9	1.3	51 06.5	+57.9	1.3	52 06.5	+57.9	1.3	53 06.5	+57.9	1.4	54 06.5	+57.9	1.4	55 06.4	+57.9	1.4	56 06.4	+57.9	1.5	57 06.4	+57.9	1.5	87
88	51 04.4	+57.9	0.9	52 04.4	+57.9	0.9	53 04.4	+57.9	0.9	54 04.4	+57.9	0.9	55 04.4	+57.9	1.0	56 04.4	+57.9	1.0	57 04.4	+57.9	1.0	58 04.4	+57.9	1.0	88
89	52 02.3	+57.7	0.4	53 02.3	+57.7	0.5	54 02.3	+57.7	0.5	55 02.3	+57.7	0.5	56 02.3	+57.7	0.5	57 02.3	+57.7	0.5	58 02.3	+57.7	0.5	59 02.3	+57.7	0.5	89
90	53 00.0	+57.6	0.0	54 00.0	+57.6	0.0	55 00.0	+57.6	0.0	56 00.0	+57.6	0.0	57 00.0	+57.6	0.0	58 00.0	+57.6	0.0	59 00.0	+57.6	0.0	60 00.0	+57.6	0.0	90

| | **53°** | | | **54°** | | | **55°** | | | **56°** | | | **57°** | | | **58°** | | | **59°** | | | **60°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 164°, 196°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	35 08.2 +58.5 159.1	34 12.1 +58.7 159.3	33 15.9 +58.8 159.5	32 19.7 +58.8 159.8	31 23.3 +59.0 160.0	30 26.9 +59.0 160.2	29 30.4 +59.1 160.4	28 33.9 +59.1 160.6	0
1	36 06.7 +58.6 158.8	35 10.8 +58.6 159.0	34 14.7 +58.7 159.3	33 18.5 +58.8 159.5	32 22.3 +58.9 159.8	31 25.9 +59.0 160.0	30 29.5 +59.0 160.2	29 33.0 +59.2 160.4	1
2	37 05.3 +58.5 158.5	36 09.4 +58.6 158.8	35 13.4 +58.7 159.0	34 17.3 +58.8 159.3	33 21.2 +58.9 159.5	32 24.9 +59.0 159.7	31 28.6 +59.0 160.0	30 32.2 +59.1 160.2	2
3	38 03.8 +58.4 158.2	37 08.0 +58.5 158.5	36 12.1 +58.7 158.8	35 16.1 +58.8 159.0	34 20.1 +58.8 159.3	33 23.9 +58.9 159.5	32 27.6 +59.1 159.8	31 31.3 +59.1 160.0	3
4	39 02.2 +58.5 157.9	38 06.6 +58.5 158.2	37 10.8 +58.6 158.5	36 14.9 +58.7 158.8	35 18.9 +58.8 159.1	34 22.8 +59.0 159.3	33 26.7 +59.0 159.5	32 30.4 +59.1 159.8	4
5	40 00.7 +58.3 157.6	39 05.1 +58.5 158.0	38 09.4 +58.6 158.3	37 13.6 +58.7 158.5	36 17.7 +58.8 158.8	35 21.8 +58.8 159.1	34 25.7 +58.9 159.3	33 29.5 +59.0 159.6	5
6	40 59.0 +58.4 157.3	40 03.6 +58.4 157.7	39 08.0 +58.6 158.0	38 12.3 +58.7 158.3	37 16.5 +58.7 158.6	36 20.6 +58.9 158.8	35 24.6 +59.1 159.1	34 28.5 +59.1 159.3	6
7	41 57.4 +58.2 157.0	41 02.0 +58.4 157.4	40 06.6 +58.5 157.7	39 11.0 +58.6 158.0	38 15.3 +58.8 158.3	37 19.5 +58.8 158.6	36 23.6 +58.9 158.9	35 27.6 +59.0 159.1	7
8	42 55.6 +58.2 156.7	42 00.4 +58.4 157.1	41 05.1 +58.5 157.4	40 09.6 +58.6 157.7	39 14.1 +58.7 158.1	38 18.3 +58.8 158.3	37 22.5 +58.9 158.6	36 26.6 +59.0 158.9	8
9	43 53.8 +58.2 156.4	42 58.8 +58.3 156.8	42 03.6 +58.4 157.1	41 08.2 +58.6 157.5	40 12.8 +58.6 157.8	39 17.1 +58.8 158.1	38 21.4 +58.9 158.4	37 25.6 +58.9 158.7	9
10	44 52.0 +58.1 156.0	43 57.1 +58.2 156.4	43 02.0 +58.4 156.8	42 06.8 +58.5 157.2	41 11.4 +58.6 157.5	40 15.9 +58.7 157.8	39 20.3 +58.8 158.1	38 24.5 +59.0 158.4	10
11	45 50.1 +58.0 155.7	44 55.3 +58.2 156.1	44 00.4 +58.3 156.5	43 05.3 +58.4 156.9	42 10.0 +58.6 157.2	41 14.6 +58.7 157.6	40 19.1 +58.8 157.9	39 23.5 +58.9 158.2	11
12	46 48.1 +57.9 155.3	45 53.5 +58.1 155.7	44 58.7 +58.3 156.2	44 03.7 +58.4 156.5	43 08.6 +58.5 156.9	42 13.3 +58.7 157.3	41 17.9 +58.8 157.6	40 22.4 +58.8 158.0	12
13	47 46.0 +57.9 154.9	46 51.6 +58.0 155.4	45 57.0 +58.2 155.8	45 02.1 +58.4 156.2	44 07.1 +58.5 156.6	43 12.0 +58.6 157.0	42 16.7 +58.7 157.4	41 21.2 +58.9 157.7	13
14	48 43.9 +57.8 154.5	47 49.6 +58.0 155.0	46 55.2 +58.1 155.5	46 00.5 +58.3 155.9	45 05.6 +58.4 156.3	44 10.6 +58.6 156.7	43 15.4 +58.7 157.1	42 20.1 +58.8 157.4	14
15	49 41.7 +57.7 154.1	48 47.6 +57.9 154.6	47 53.3 +58.0 155.1	46 58.8 +58.2 155.5	46 04.0 +58.4 156.0	45 09.2 +58.5 156.4	44 14.1 +58.6 156.8	43 18.9 +58.7 157.2	15
16	50 39.4 +57.6 153.7	49 45.5 +57.8 154.2	48 51.3 +58.0 154.7	47 57.0 +58.1 155.2	47 02.4 +58.3 155.6	46 07.7 +58.4 156.1	45 12.7 +58.6 156.5	44 17.6 +58.7 156.9	16
17	51 37.0 +57.5 153.2	50 43.3 +57.7 153.8	49 49.3 +57.9 154.3	48 55.1 +58.1 154.8	48 00.7 +58.3 155.3	47 06.1 +58.4 155.8	46 11.3 +58.6 156.2	45 16.3 +58.7 156.6	17
18	52 34.5 +57.3 152.8	51 41.0 +57.6 153.4	50 47.2 +57.8 153.9	49 53.2 +58.0 154.4	48 59.0 +58.1 154.9	48 04.5 +58.3 155.4	47 09.9 +58.4 155.9	46 15.0 +58.6 156.3	18
19	53 31.8 +57.3 152.3	52 38.6 +57.5 152.9	51 45.0 +57.7 153.5	50 51.2 +57.9 154.0	49 57.1 +58.1 154.6	49 02.8 +58.3 155.1	48 08.3 +58.4 155.5	47 13.6 +58.6 156.0	19
20	54 29.1 +57.1 151.8	53 36.1 +57.3 152.4	52 42.7 +57.6 153.0	51 49.1 +57.8 153.6	50 55.2 +58.0 154.2	50 01.1 +58.2 154.7	49 06.8 +58.3 155.2	48 12.2 +58.5 155.7	20
21	55 26.2 +57.0 151.2	54 33.4 +57.3 151.9	53 40.3 +57.5 152.6	52 46.9 +57.7 153.2	51 53.2 +58.0 153.8	50 59.3 +58.1 154.3	50 05.1 +58.3 154.8	49 10.7 +58.5 155.3	21
22	56 23.2 +56.8 150.7	55 30.7 +57.1 151.4	54 37.8 +57.4 152.1	53 44.6 +57.6 152.7	52 51.2 +57.8 153.3	51 57.4 +58.0 153.9	51 03.4 +58.2 154.5	50 09.2 +58.3 155.0	22
23	57 20.0 +56.6 150.1	56 27.8 +56.9 150.8	55 35.2 +57.2 151.6	54 42.2 +57.5 152.2	53 49.0 +57.7 152.9	52 55.4 +58.0 153.5	52 01.6 +58.2 154.1	51 07.5 +58.4 154.6	23
24	58 16.6 +56.4 149.5	57 24.7 +56.8 150.3	56 32.4 +57.1 151.0	55 39.7 +57.4 151.7	54 46.7 +57.6 152.4	53 53.4 +57.8 153.1	52 59.8 +58.0 153.7	52 05.9 +58.2 154.2	24
25	59 13.0 +56.3 148.8	58 21.5 +56.6 149.6	57 29.5 +56.9 150.5	56 37.1 +57.2 151.2	55 44.3 +57.5 151.9	54 51.2 +57.8 152.6	53 57.8 +58.0 153.2	53 04.1 +58.1 153.8	25
26	60 09.3 +56.0 148.1	59 18.1 +56.4 149.0	58 26.4 +56.8 149.9	57 34.3 +57.1 150.7	56 41.8 +57.4 151.4	55 49.0 +57.6 152.1	54 55.8 +57.8 152.8	54 02.2 +58.1 153.4	26
27	61 05.3 +55.7 147.4	60 14.5 +56.1 148.3	59 23.2 +56.5 149.2	58 31.4 +56.9 150.1	57 39.2 +57.2 150.9	56 46.6 +57.5 151.6	55 53.6 +57.7 152.3	55 00.3 +58.0 153.0	27
28	62 01.0 +55.5 146.6	61 10.6 +56.0 147.6	60 19.7 +56.4 148.5	59 28.3 +56.7 149.5	58 36.4 +57.0 150.3	57 44.1 +57.3 151.1	56 51.3 +57.5 151.8	55 58.1 +57.8 152.5	28
29	62 56.5 +55.2 145.8	62 06.6 +55.6 146.9	61 16.1 +56.1 147.9	60 25.0 +56.5 148.8	59 33.4 +56.9 149.7	58 41.4 +57.2 150.5	57 49.0 +57.4 151.3	56 56.1 +57.8 152.0	29
30	63 51.7 +54.8 144.9	63 02.2 +55.4 146.1	62 12.2 +55.8 147.1	61 21.5 +56.3 148.1	60 30.3 +56.7 149.1	59 38.6 +57.0 149.9	58 46.4 +57.4 150.8	57 53.9 +57.6 151.5	30
31	64 46.5 +54.5 144.0	63 57.6 +55.1 145.2	63 08.0 +55.6 146.3	62 17.8 +56.0 147.4	61 27.0 +56.4 148.4	60 35.6 +56.9 149.3	59 43.8 +57.2 150.2	58 51.5 +57.5 151.0	31
32	65 41.0 +54.0 143.0	64 52.7 +54.6 144.3	64 03.6 +55.2 145.5	63 13.8 +55.8 146.6	62 23.4 +56.2 147.7	61 32.5 +56.6 148.6	60 41.0 +57.0 149.6	59 49.0 +57.3 150.5	32
33	66 35.0 +53.5 141.9	65 47.3 +54.3 143.3	64 58.8 +54.9 144.6	64 09.6 +55.4 145.8	63 19.6 +56.0 146.9	62 29.1 +56.4 147.9	61 38.0 +56.8 148.9	60 46.3 +57.2 149.9	33
34	67 28.5 +53.1 140.7	66 41.6 +53.8 142.2	65 53.7 +54.5 143.6	65 05.0 +55.2 144.9	64 15.6 +55.7 146.1	63 25.5 +56.2 147.2	62 34.8 +56.6 148.2	61 43.5 +57.0 149.2	34
35	68 21.6 +52.4 139.5	67 35.4 +53.3 141.1	66 48.2 +54.1 142.6	66 00.2 +54.7 143.9	65 11.3 +55.3 145.2	64 21.7 +55.8 146.4	63 31.4 +56.3 147.5	62 40.5 +56.7 148.6	35
36	69 14.0 +51.7 138.2	68 28.7 +52.7 139.9	67 42.3 +53.6 141.4	66 54.9 +54.3 142.9	66 06.6 +55.0 144.3	65 17.5 +55.6 145.5	64 27.7 +56.1 146.7	63 37.2 +56.6 147.8	36
37	70 05.7 +51.0 136.7	69 21.4 +52.0 138.5	68 35.9 +53.0 140.2	67 49.2 +53.9 141.8	67 01.6 +54.6 143.3	66 13.1 +55.2 144.6	65 23.8 +55.8 145.7	64 33.8 +56.3 147.1	37
38	70 56.7 +50.1 135.1	70 13.4 +51.3 137.1	69 28.9 +52.3 138.9	68 43.1 +53.2 140.6	67 56.2 +54.1 142.2	67 08.3 +54.8 143.6	66 19.6 +55.4 145.0	65 30.1 +56.0 146.2	38
39	71 46.8 +49.0 133.4	71 04.7 +50.5 135.5	70 21.2 +51.6 137.5	69 36.3 +52.7 139.3	68 50.3 +53.5 141.0	68 03.1 +54.4 142.6	67 15.0 +55.1 144.0	66 26.1 +55.6 145.4	39
40	72 35.8 +47.9 131.5	71 55.2 +49.4 133.8	71 12.8 +50.8 135.9	70 29.0 +52.0 137.9	69 43.8 +53.0 139.7	68 57.5 +53.9 141.4	68 10.1 +54.6 143.0	67 21.7 +55.3 144.4	40
41	73 23.7 +46.6 129.5	72 44.6 +48.3 131.9	72 03.6 +49.8 134.2	71 21.0 +51.1 136.4	70 36.8 +52.3 138.3	69 51.4 +53.2 140.3	69 04.7 +54.2 141.8	68 17.0 +55.0 143.4	41
42	74 10.3 +45.1 127.2	73 32.9 +47.0 129.9	72 53.4 +48.8 132.4	72 12.1 +50.2 134.7	71 29.1 +51.5 136.8	70 44.6 +52.7 138.8	69 58.9 +53.6 140.6	69 12.0 +54.4 142.3	42
43	74 55.4 +43.2 124.7	74 19.9 +45.5 127.6	73 42.2 +47.4 130.4	73 02.3 +49.1 132.9	72 20.6 +50.6 135.2	71 37.3 +51.8 137.3	70 52.5 +52.9 139.3	70 06.4 +53.9 141.1	43
44	75 38.6 +41.2•122.0	75 05.4 +43.8 125.2	74 29.6 +45.9 128.1	73 51.4 +47.9 130.8	73 11.2 +49.5 133.4	72 29.1 +51.0 135.7	71 45.4 +52.2 137.8	71 00.3 +53.3 139.7	44
45	76 19.8 +38.8•119.0	75 49.2 +41.6•122.4	75 15.5 +44.3 125.7	74 39.3 +46.4 128.6	74 00.7 +48.3 131.4	73 20.1 +49.9 133.9	72 37.6 +51.4 136.2	71 53.6 +52.6 138.3	45
46	76 58.6 +36.0•115.7	76 30.8 +39.4•119.4	75 59.8 +42.1•122.9	75 25.7 +44.7 126.2	74 49.0 +46.9 129.2	74 10.0 +48.8 131.9	73 29.0 +50.4 134.4	72 46.2 +51.7 136.7	46
47	77 34.6 +32.9•112.0	77 10.2 +36.5•116.1	76 41.9 +39.9•119.9	76 10.4 +42.7•123.5	75 35.9 +45.2 126.7	74 58.8 +47.4 129.7	74 19.4 +49.2 132.4	73 37.9 +50.8 135.0	47
48	78 07.5 +29.2•108.1	77 46.7 +33.4•112.5	77 21.8 +37.1•116.6	76 53.1 +40.4•120.4	76 21.1 +43.3•124.0	75 46.2 +45.7 127.3	75 08.6 +47.8 130.3	74 28.7 +49.7 133.0	48
49	78 36.7 +25.1•103.7	78 20.1 +29.7•108.4	77 58.9 +33.9•112.9	77 33.5 +37.6•117.1	77 04.4 +40.9•121.0	76 31.9 +43.8•124.6	75 56.4 +46.3 127.7	75 18.4 +48.3 130.9	49
50	79 01.8 +20.5• 99.0	78 49.8 +25.5•104.1	78 32.8 +30.2•108.8	78 11.1 +34.5•113.4	77 45.3 +38.2•117.6	77 15.7 +41.4•121.5	76 42.7 +44.3•125.2	76 06.7 +46.7 128.5	50
51	79 22.3 +15.3• 94.0	79 15.3 +20.8• 99.3	79 03.0 +26.0•104.4	78 45.6 +30.7•109.3	78 23.5 +35.0•113.9	77 57.1 +38.8•118.2	77 27.0 +42.0•122.1	76 53.4 +44.9•125.8	51
52	79 37.6 +10.0• 88.7	79 36.1 +15.7• 94.2	79 29.0 +21.2• 99.6	79 16.3 +26.5•104.8	78 58.5 +31.3•109.7	78 35.9 +35.6•114.4	78 09.0 +39.4•118.8	77 38.3 +42.7•122.8	52
53	79 47.6 +4.2• 83.2	79 51.8 +10.1• 88.8	79 50.2 +15.7• 94.3	79 42.8 +22.1•100.2	79 29.8 +26.9•105.6	79 11.5 +31.8•110.2	78 48.4 +36.2•115.0	78 21.0 +40.0•119.4	53
54	79 51.8 −1.6• 77.5	80 01.9 +4.2• 83.1	80 06.1 +10.3• 88.8	80 04.9 +15.7• 94.5	79 56.7 +22.1•100.2	79 43.3 +27.5•105.6	79 24.6 +32.4•110.8	79 01.0 +36.8•115.6	54
55	79 50.2 −7.4• 71.9	80 06.1 −1.7• 77.3	80 16.4 +4.2• 83.0	80 20.6 +10.5• 88.9	80 18.8 +16.5• 94.7	80 10.8 +22.5•100.5	79 57.0 +28.0•106.1	79 37.8 +33.0•111.3	55
56	79 42.8 −13.0• 66.3	80 04.4 −7.7• 71.5	80 20.6 −1.8• 77.1	80 31.1 +4.2• 82.9	80 35.3 +10.7• 89.0	80 33.3 +16.9• 95.0	80 25.0 +22.9•100.9	80 10.8 +28.5•106.6	56
57	79 29.8 −18.3• 60.9	79 56.7 −13.4• 65.8	80 18.8 −8.0• 71.1	80 35.3 −2.0• 76.9	80 45.9 +4.3• 82.9	80 50.2 +10.7• 89.0	80 47.9 +17.3• 95.2	80 39.3 +23.5•101.3	57
58	79 11.5 −23.1• 55.7	79 43.3 −18.7• 60.3	80 10.8 −13.8• 65.3	80 33.3 −8.3• 70.8	80 50.2 −2.3• 76.6	81 00.9 +4.3• 82.8	81 05.2 +10.9• 89.1	81 02.8 +17.5• 95.5	58
59	78 48.4 −27.4• 50.9	79 24.6 −23.6• 55.0	79 57.0 −19.2• 59.6	80 25.0 −14.2• 64.8	80 47.9 −8.6• 70.3	81 05.2 −2.4• 76.4	81 16.1 +4.2• 82.7	81 20.3 +11.1• 89.2	59
60	78 21.0 −31.3• 46.4	79 01.0 −28.1• 50.1	79 37.8 −24.3• 54.3	80 10.8 −19.8• 59.0	80 39.3 −14.7• 64.2	81 02.8 −9.0• 69.9	81 20.3 −2.6• 76.1	81 31.4 +4.2• 82.6	60
61	77 49.7 −34.7• 42.2	78 32.9 −31.9• 45.6	79 13.5 −28.6• 49.3	79 51.0 −24.8• 53.5	80 24.6 −20.3• 58.3	80 53.8 −15.2• 63.6	81 17.7 −9.4• 69.5	81 35.6 −2.8• 75.8	61
62	77 15.0 −37.6• 38.5	78 01.0 −35.2• 41.4	78 44.9 −32.5• 44.7	79 26.2 −29.4• 48.5	80 04.0 −25.5• 52.7	80 38.6 −21.0• 57.6	81 08.3 −15.7• 63.0	81 32.8 −9.8• 69.0	62
63	76 37.4 −40.2• 35.0	77 25.8 −38.3• 37.6	78 12.4 −35.9• 40.5	78 56.9 −33.2• 43.8	79 38.8 −30.0• 47.6	80 17.6 −26.2• 51.9	80 52.6 −21.7• 56.8	81 23.0 −16.4• 62.4	63
64	75 57.2 −42.4• 31.9	76 47.5 −40.7• 34.1	77 36.5 −38.9• 36.7	78 23.7 −36.6• 39.6	79 08.8 −33.9• 42.9	79 51.4 −30.7• 46.7	80 30.9 −26.9• 51.1	81 06.6 −22.3• 56.0	64
65	75 14.8 −44.2• 29.0	76 06.8 −42.9• 31.0	76 57.6 −41.3• 33.2	77 47.1 −39.4• 35.7	78 34.9 −37.2• 38.6	79 20.7 −34.6• 41.9	80 04.0 −31.4• 45.8	80 44.3 −27.7• 50.1	65
66	74 30.6 −46.0• 26.4	75 23.9 −44.8• 28.1	76 16.3 −43.5• 30.1	77 07.7 −42.0• 32.3	77 57.7 −40.1• 34.8	78 46.1 −37.9• 37.6	79 32.6 −35.3• 40.9	80 16.6 −32.2• 44.8	66
67	73 44.6 −47.3• 24.1	74 39.1 −46.4• 25.6	75 32.8 −45.3• 27.2	76 25.7 −44.0• 29.1	77 17.6 −42.5• 31.3	78 08.2 −40.8• 33.8	78 57.3 −38.7• 36.6	79 44.4 −36.1• 39.9	67
68	72 57.3 −48.6• 21.9	73 52.7 −47.8• 23.2	74 47.5 −46.8• 24.7	75 41.7 −45.8• 26.3	76 35.1 −44.7• 28.2	77 27.4 −43.2• 30.3	78 18.6 −41.5• 32.7	79 08.3 −39.4• 35.5	68
69	72 08.7 −49.6• 20.0	73 04.9 −49.0• 21.1	74 00.7 −48.3• 22.4	74 55.9 −47.4• 23.8	75 50.4 −46.3• 25.4	76 44.2 −45.2• 27.2	77 37.1 −43.8• 29.3	78 28.9 −42.2• 31.6	69
70	71 19.1 −50.6• 18.2	72 15.9 −50.0• 19.2	73 12.4 −49.4• 20.2	74 08.5 −48.7• 21.5	75 04.1 −47.9• 22.8	75 59.0 −46.9• 24.4	76 53.3 −45.8• 26.2	77 46.7 −44.5• 28.2	70
71	70 28.5 −51.4• 16.5	71 25.9 −51.0• 17.4	72 23.0 −50.4• 18.3	73 19.8 −49.9• 19.4	74 16.2 −49.2• 20.6	75 12.1 −48.4• 21.9	76 07.5 −47.5• 23.4	77 02.2 −46.4• 25.1	71
72	69 37.1 −52.1• 15.0	70 34.9 −51.7• 15.8	71 32.6 −51.3• 16.6	72 29.9 −50.8• 17.5	73 27.0 −50.3• 18.5	74 23.7 −49.6• 19.6	75 20.0 −48.9• 20.9	76 15.8 −48.1• 22.4	72
73	68 45.0 −52.8• 13.6	69 43.2 −52.4• 14.3	70 41.3 −52.1• 15.0	71 39.1 −51.7• 15.8	72 36.7 −51.2• 16.6	73 34.1 −50.7• 17.6	74 31.1 −50.1• 18.7	75 27.7 −49.4• 19.9	73
74	67 52.2 −53.3• 12.4	68 50.8 −53.1• 12.9	69 49.2 −52.8• 13.5	70 47.4 −52.4• 14.2	71 45.5 −52.0• 14.9	72 43.4 −51.7• 15.7	73 41.0 −51.2• 16.7	74 38.3 −50.6• 17.7	74
75	66 58.9 −54.0 11.2	67 57.7 −53.6• 11.6	68 56.4 −53.4• 12.2	69 55.0 −53.1• 12.7	70 53.5 −52.8• 13.4	71 51.7 −52.4• 14.1	72 49.8 −52.0• 14.9	73 47.7 −51.6• 15.7	75
76	66 05.1 −54.3 10.0	67 04.1 −54.1• 10.5	68 03.1 −53.9• 10.9	69 01.9 −53.6• 11.4	70 00.7 −53.4• 11.9	70 59.3 −53.1• 12.5	71 57.8 −52.8• 13.2	72 56.1 −52.4• 13.9	76
77	65 10.8 −54.7 9.0	66 10.0 −54.5 9.4	67 09.2 −54.3 9.8	68 08.3 −54.2 10.2	69 07.3 −53.9• 10.6	70 06.2 −53.7• 11.1	71 05.0 −53.4• 11.7	72 03.7 −53.1• 12.3	77
78	64 16.1 −55.0 8.0	65 15.5 −54.9 8.4	66 14.9 −54.8 8.7	67 14.1 −54.6 9.0	68 13.4 −54.5 9.4	69 12.5 −54.2• 9.9	70 11.6 −54.0• 10.3	71 10.6 −53.8• 10.9	78
79	63 21.1 −55.3 7.1	64 20.6 −55.2 7.4	65 20.1 −55.1 7.7	66 19.5 −55.0 8.0	67 18.9 −54.8 8.3	68 18.3 −54.7 8.7	69 17.6 −54.6 9.1	70 16.8 −54.4 9.5	79
80	62 25.8 −55.7 6.3	63 25.4 −55.6 6.5	64 25.0 −55.5 6.8	65 24.5 −55.3 7.0	66 24.1 −55.2 7.3	67 23.6 −55.1 7.6	68 23.0 −54.9 7.9	69 22.4 −54.8 8.3	80
81	61 30.1 −55.9 5.5	62 29.8 −55.8 5.7	63 29.5 −55.7 5.9	64 29.2 −55.7 6.1	65 28.9 −55.5 6.1	66 28.5 −55.5 6.6	67 28.1 −55.4 6.9	68 27.6 −55.2 7.2	81
82	60 34.2 −56.1 4.8	61 34.0 −56.1 4.9	62 33.8 −56.0 5.1	63 33.5 −55.9 5.2	64 33.3 −55.9 5.4	65 33.0 −55.8 5.6	66 32.7 −55.7 5.9	67 32.4 −55.6 6.1	82
83	59 38.1 −56.4 4.0	60 37.9 −56.3 4.2	61 37.8 −56.3 4.3	62 37.6 −56.2 4.4	63 37.4 −56.1 4.6	64 37.2 −56.1 4.8	65 37.0 −56.0 5.0	66 36.8 −56.0 5.1	83
84	58 41.7 −56.5 3.4	59 41.6 −56.5 3.5	60 41.5 −56.5 3.6	61 41.4 −56.4 3.7	62 41.3 −56.4 3.8	63 41.1 −56.3 4.0	64 41.0 −56.2 4.1	65 40.8 −56.2 4.3	84
85	57 45.2 −56.7 2.7	58 45.1 −56.7 2.8	59 45.0 −56.6 2.9	60 45.0 −56.7 3.0	61 44.9 −56.6 3.1	62 44.8 −56.6 3.2	63 44.7 −56.5 3.3	64 44.6 −56.5 3.4	85
86	56 48.5 −56.9 2.1	57 48.4 −56.9 2.2	58 48.4 −56.9 2.3	59 48.3 −56.8 2.3	60 48.3 −56.8 2.4	61 48.2 −56.8 2.5	62 48.2 −56.8 2.6	63 48.1 −56.7 2.6	86
87	55 51.6 −57.1 1.6	56 51.5 −57.0 1.6	57 51.5 −57.0 1.6	58 51.5 −57.0 1.7	59 51.5 −57.0 1.7	60 51.4 −56.9 1.8	61 51.4 −57.0 1.9	62 51.4 −57.0 1.9	87
88	54 54.5 −57.2 1.0	55 54.5 −57.2 1.0	56 54.5 −57.2 1.1	57 54.5 −57.2 1.1	58 54.5 −57.2 1.1	59 54.5 −57.2 1.2	60 54.4 −57.1 1.2	61 54.4 −57.1 1.2	88
89	53 57.3 −57.3 0.5	54 57.3 −57.3 0.5	55 57.3 −57.3 0.5	56 57.3 −57.3 0.5	57 57.3 −57.3 0.6	58 57.3 −57.3 0.6	59 57.3 −57.3 0.6	60 57.3 −57.3 0.6	89
90	53 00.0 −57.4 0.0	54 00.0 −57.4 0.0	55 00.0 −57.4 0.0	56 00.0 −57.4 0.0	57 00.0 −57.4 0.0	58 00.0 −57.4 0.0	59 00.0 −57.5 0.0	60 00.0 −57.5 0.0	90

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 17°, 343°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	35 08.2	−58.7	159.1	34 12.1	−58.7	159.3	33 15.9	−58.8	159.5	32 19.7	−58.9	159.8	31 23.3	−58.9	160.0	30 26.9	−59.0	160.2	29 30.4	−59.1	160.4	28 33.9	−59.2	160.6	0
1	34 09.5	−58.6	159.3	33 13.4	−58.8	159.5	32 17.1	−58.8	159.8	31 20.8	−58.9	160.0	30 24.4	−59.0	160.2	29 27.9	−59.1	160.4	28 31.3	−59.1	160.6	27 34.7	−59.2	160.7	1
2	33 10.9	−58.7	159.6	32 14.6	−58.7	159.8	31 18.3	−58.9	160.0	30 21.9	−58.9	160.2	29 25.4	−59.0	160.4	28 28.8	−59.1	160.6	27 32.2	−59.1	160.8	26 35.5	−59.2	160.9	2
3	32 12.2	−58.7	159.8	31 15.9	−58.8	160.0	30 19.4	−58.8	160.2	29 22.9	−58.9	160.4	28 26.4	−59.0	160.6	27 29.8	−59.1	160.8	26 33.1	−59.2	160.9	25 36.3	−59.2	161.1	3
4	31 13.5	−58.7	160.1	30 17.1	−58.8	160.3	29 20.6	−58.8	160.5	28 24.0	−59.0	160.6	27 27.4	−59.1	160.8	26 30.7	−59.1	161.0	25 33.9	−59.1	161.1	24 37.1	−59.2	161.3	4
5	30 14.8	−58.8	160.3	29 18.3	−58.9	160.5	28 21.7	−58.9	160.7	27 25.0	−59.0	160.8	26 28.3	−59.0	161.0	25 31.6	−59.1	161.2	24 34.8	−59.2	161.3	23 37.9	−59.2	161.5	5
6	29 16.0	−58.7	160.5	28 19.4	−58.8	160.7	27 22.8	−59.0	160.9	26 26.1	−59.0	161.1	25 29.3	−59.1	161.2	24 32.5	−59.1	161.4	23 35.6	−59.2	161.5	22 38.7	−59.3	161.6	6
7	28 17.3	−58.8	160.8	27 20.6	−58.9	160.9	26 23.8	−58.9	161.1	25 27.1	−59.1	161.3	24 30.2	−59.1	161.4	23 33.3	−59.1	161.5	22 36.4	−59.2	161.7	21 39.4	−59.2	161.8	7
8	27 18.5	−58.9	161.0	26 21.7	−58.9	161.1	25 24.9	−58.9	161.3	24 28.0	−59.0	161.5	23 31.1	−59.1	161.6	22 34.2	−59.2	161.7	21 37.2	−59.2	161.9	20 40.2	−59.3	162.0	8
9	26 19.6	−58.8	161.2	25 22.8	−58.9	161.4	24 25.9	−58.9	161.5	23 29.0	−59.0	161.6	22 32.0	−59.1	161.8	21 35.0	−59.1	161.9	20 38.0	−59.2	162.0	19 40.9	−59.3	162.1	9
10	25 20.8	−58.9	161.4	24 23.9	−58.9	161.6	23 27.0	−59.0	161.8	22 30.0	−59.1	161.8	21 32.9	−59.1	162.0	20 35.9	−59.2	162.1	19 38.8	−59.3	162.2	18 41.6	−59.3	162.4	10
11	24 21.9	−58.8	161.6	23 25.0	−59.0	161.8	22 28.0	−59.0	161.9	21 30.9	−59.1	162.0	20 33.8	−59.1	162.1	19 36.7	−59.2	162.3	18 39.5	−59.3	162.4	17 42.3	−59.3	162.5	11
12	23 23.1	−58.9	161.8	22 26.0	−58.9	162.0	21 28.9	−59.0	162.1	20 31.8	−59.1	162.2	19 34.7	−59.2	162.3	18 37.5	−59.2	162.4	17 40.3	−59.3	162.5	16 43.0	−59.3	162.6	12
13	22 24.2	−58.9	162.1	21 27.1	−59.0	162.2	20 29.9	−59.0	162.3	19 32.7	−59.0	162.4	18 35.5	−59.1	162.5	17 38.3	−59.2	162.6	16 41.0	−59.2	162.7	15 43.7	−59.3	162.8	13
14	21 25.3	−59.0	162.3	20 28.1	−59.0	162.4	19 30.9	−59.1	162.5	18 33.7	−59.2	162.6	17 36.4	−59.2	162.7	16 39.1	−59.2	162.8	15 41.8	−59.3	162.9	14 44.4	−59.3	162.9	14
15	20 26.3	−58.9	162.5	19 29.1	−59.0	162.6	18 31.8	−59.0	162.7	17 34.5	−59.1	162.8	16 37.2	−59.1	162.9	15 39.9	−59.2	162.9	14 42.5	−59.3	163.0	13 45.1	−59.3	163.1	15
16	19 27.4	−59.0	162.7	18 30.1	−59.0	162.8	17 32.8	−59.1	162.9	16 35.4	−59.1	163.0	15 38.1	−59.2	163.0	14 40.7	−59.3	163.1	13 43.2	−59.2	163.2	12 45.8	−59.3	163.3	16
17	18 28.4	−59.0	162.9	17 31.1	−59.0	163.0	16 33.7	−59.1	163.0	15 36.3	−59.1	163.1	14 38.9	−59.2	163.2	13 41.4	−59.2	163.3	12 44.0	−59.3	163.3	11 46.5	−59.4	163.4	17
18	17 29.5	−59.0	163.0	16 32.1	−59.1	163.1	15 34.6	−59.1	163.2	14 37.2	−59.2	163.3	13 39.7	−59.2	163.4	12 42.2	−59.3	163.4	11 44.7	−59.3	163.5	10 47.1	−59.3	163.6	18
19	16 30.5	−59.0	163.2	15 33.0	−59.1	163.3	14 35.5	−59.1	163.4	13 38.0	−59.1	163.5	12 40.5	−59.2	163.5	11 42.9	−59.2	163.6	10 45.4	−59.3	163.7	9 47.8	−59.3	163.7	19
20	15 31.5	−59.0	163.4	14 34.0	−59.1	163.5	13 36.4	−59.1	163.6	12 38.9	−59.2	163.6	11 41.3	−59.2	163.7	10 43.7	−59.2	163.8	9 46.1	−59.3	163.8	8 48.5	−59.4	163.9	20
21	14 32.5	−59.0	163.6	13 34.9	−59.0	163.7	12 37.3	−59.1	163.8	11 39.7	−59.1	163.8	10 42.1	−59.2	163.9	9 44.5	−59.3	163.9	8 46.8	−59.3	164.0	7 49.1	−59.3	164.0	21
22	13 33.5	−59.0	163.8	12 35.9	−59.1	163.9	11 38.2	−59.1	163.9	10 40.6	−59.2	164.0	9 42.9	−59.2	164.0	8 45.2	−59.3	164.1	7 47.5	−59.3	164.1	6 49.8	−59.4	164.2	22
23	12 34.5	−59.0	164.0	11 36.8	−59.1	164.1	10 39.1	−59.1	164.1	9 41.4	−59.2	164.2	8 43.7	−59.2	164.2	7 45.9	−59.2	164.2	6 48.2	−59.3	164.3	5 50.4	−59.3	164.3	23
24	11 35.5	−59.1	164.2	10 37.7	−59.0	164.2	9 40.0	−59.1	164.3	8 42.2	−59.1	164.3	7 44.5	−59.3	164.4	6 46.7	−59.3	164.4	5 48.9	−59.3	164.4	4 51.1	−59.4	164.5	24
25	10 36.4	−59.0	164.4	9 38.7	−59.1	164.4	8 40.9	−59.2	164.5	7 43.1	−59.2	164.5	6 45.2	−59.2	164.5	5 47.4	−59.3	164.6	4 49.6	−59.3	164.6	3 51.7	−59.3	164.6	25
26	9 37.4	−59.0	164.5	8 39.6	−59.1	164.6	7 41.7	−59.1	164.6	6 43.9	−59.2	164.7	5 46.0	−59.2	164.7	4 48.1	−59.3	164.7	3 50.3	−59.4	164.7	2 52.4	−59.4	164.7	26
27	8 38.4	−59.1	164.7	7 40.5	−59.1	164.8	6 42.6	−59.1	164.8	5 44.7	−59.2	164.8	4 46.8	−59.3	164.8	3 48.9	−59.3	164.9	2 50.9	−59.3	164.9	1 53.0	−59.3	164.9	27
28	7 39.3	−59.0	164.9	6 41.4	−59.1	164.9	5 43.5	−59.2	164.9	4 45.5	−59.2	165.0	3 47.5	−59.2	165.0	2 49.6	−59.3	165.0	1 51.6	−59.3	165.0	0 53.7	−59.4	165.0	28
29	6 40.3	−59.1	165.1	5 42.3	−59.1	165.1	4 44.3	−59.1	165.1	3 46.3	−59.2	165.2	2 48.3	−59.2	165.2	1 50.3	−59.3	165.2	0 52.3	−59.3	165.2	0 05.7	+59.3	14.8	29
30	5 41.2	−59.0	165.3	4 43.2	−59.1	165.3	3 45.2	−59.2	165.3	2 47.1	−59.2	165.3	1 49.1	−59.2	165.3	0 51.0	−59.2	165.3	0 07.0	+59.3	14.7	1 05.0	+59.4	14.7	30
31	4 42.2	−59.0	165.4	3 44.1	−59.1	165.5	2 46.0	−59.1	165.5	1 47.9	−59.2	165.5	0 49.9	−59.3	165.5	0 08.2	+59.3	14.5	1 06.3	+59.3	14.5	2 04.4	+59.4	14.5	31
32	3 43.1	−59.0	165.6	2 45.0	−59.1	165.6	1 46.9	−59.2	165.6	0 48.7	−59.1	165.6	0 09.4	+59.2	14.4	1 07.5	+59.3	14.4	2 05.6	+59.3	14.4	3 03.8	+59.3	14.4	32
33	2 44.1	−59.1	165.8	1 45.9	−59.1	165.8	0 47.7	−59.1	165.8	0 10.4	+59.2	14.2	1 08.6	+59.3	14.2	2 06.8	+59.3	14.2	3 04.9	+59.4	14.2	4 03.1	+59.4	14.2	33
34	1 45.0	−59.0	166.0	0 46.8	−59.1	166.0	0 11.4	+59.2	14.0	1 09.6	+59.2	14.0	2 07.9	+59.2	14.0	3 06.1	+59.2	14.0	4 04.3	+59.3	14.1	5 02.5	+59.3	14.1	34
35	0 45.9	−59.0	166.1	0 12.3	+59.1	13.9	1 10.6	+59.1	13.9	2 08.8	+59.2	13.9	3 07.1	+59.2	13.9	4 05.3	+59.3	13.9	5 03.6	+59.3	13.9	6 01.8	+59.4	13.9	35
36	0 13.1	+59.1	13.7	1 11.4	+59.1	13.7	2 09.7	+59.2	13.7	3 08.0	+59.2	13.7	4 06.3	+59.2	13.7	5 04.6	+59.3	13.7	6 02.9	+59.3	13.8	7 01.2	+59.3	13.8	36
37	1 12.2	+59.1	13.5	2 10.5	+59.1	13.5	3 08.9	+59.1	13.5	4 07.2	+59.2	13.5	5 05.5	+59.3	13.6	6 03.9	+59.2	13.6	7 02.2	+59.3	13.6	8 00.5	+59.3	13.6	37
38	2 11.3	+59.1	13.3	3 09.6	+59.2	13.3	4 08.0	+59.1	13.4	5 06.4	+59.2	13.4	6 04.8	+59.2	13.4	7 03.1	+59.3	13.4	8 01.5	+59.3	13.5	8 59.8	+59.4	13.5	38
39	3 10.3	+59.1	13.2	4 08.8	+59.1	13.2	5 07.2	+59.1	13.2	6 05.6	+59.2	13.2	7 04.0	+59.2	13.2	8 02.4	+59.3	13.3	9 00.8	+59.3	13.3	9 59.2	+59.3	13.3	39
40	4 09.4	+59.0	13.0	5 07.9	+59.1	13.0	6 06.3	+59.2	13.0	7 04.8	+59.1	13.0	8 03.2	+59.2	13.1	9 01.7	+59.2	13.1	10 00.1	+59.3	13.1	10 58.5	+59.3	13.2	40
41	5 08.4	+59.1	12.8	6 07.0	+59.0	12.8	7 05.5	+59.1	12.8	8 03.9	+59.2	12.9	9 02.4	+59.2	12.9	10 00.9	+59.2	12.9	10 59.4	+59.3	13.0	11 57.8	+59.4	13.0	41
42	6 07.5	+59.1	12.6	7 06.0	+59.1	12.6	8 04.6	+59.1	12.7	9 03.1	+59.2	12.7	10 01.6	+59.3	12.7	11 00.2	+59.2	12.8	11 58.7	+59.2	12.8	12 57.2	+59.3	12.9	42
43	7 06.6	+59.0	12.4	8 05.1	+59.1	12.5	9 03.7	+59.1	12.5	10 02.3	+59.2	12.5	11 00.9	+59.2	12.6	11 59.4	+59.2	12.6	12 58.0	+59.2	12.7	13 56.5	+59.3	12.7	43
44	8 05.6	+59.0	12.3	9 04.2	+59.1	12.3	10 02.8	+59.2	12.3	11 01.5	+59.1	12.4	12 00.1	+59.2	12.4	12 58.6	+59.2	12.5	13 57.2	+59.3	12.5	14 55.8	+59.3	12.6	44
45	9 04.6	+59.1	12.1	10 03.3	+59.1	12.1	11 02.0	+59.1	12.2	12 00.6	+59.2	12.2	12 59.3	+59.1	12.2	13 57.9	+59.2	12.3	14 56.5	+59.2	12.4	15 55.1	+59.3	12.4	45
46	10 03.7	+59.0	11.9	11 02.4	+59.1	11.9	12 01.1	+59.1	12.0	12 59.8	+59.1	12.0	13 58.4	+59.2	12.1	14 57.1	+59.2	12.1	15 55.8	+59.2	12.2	16 54.4	+59.3	12.3	46
47	11 02.7	+59.0	11.7	12 01.5	+59.0	11.8	13 00.2	+59.1	11.8	13 58.9	+59.1	11.9	14 57.6	+59.2	11.9	15 56.3	+59.2	12.0	16 55.0	+59.2	12.0	17 53.7	+59.3	12.1	47
48	12 01.7	+59.1	11.5	13 00.5	+59.1	11.6	13 59.3	+59.1	11.6	14 58.1	+59.1	11.7	15 56.8	+59.2	11.7	16 55.5	+59.1	11.8	17 54.3	+59.2	11.9	18 53.0	+59.3	11.9	48
49	13 00.8	+59.0	11.4	13 59.6	+59.0	11.4	14 58.4	+59.1	11.5	15 57.2	+59.1	11.5	16 56.0	+59.1	11.6	17 54.7	+59.2	11.6	18 53.5	+59.2	11.7	19 52.3	+59.2	11.8	49
50	13 59.8	+59.0	11.2	14 58.6	+59.1	11.2	15 57.5	+59.0	11.3	16 56.3	+59.1	11.3	17 55.1	+59.1	11.4	18 53.9	+59.2	11.5	19 52.7	+59.1	11.5	20 51.5	+59.3	11.6	50
51	14 58.8	+59.0	11.0	15 57.7	+59.0	11.0	16 56.5	+59.1	11.1	17 55.4	+59.1	11.2	18 54.3	+59.1	11.2	19 53.1	+59.2	11.3	20 52.0	+59.2	11.4	21 50.8	+59.2	11.4	51
52	15 57.8	+58.9	10.8	16 56.7	+59.0	10.8	17 55.6	+59.1	10.9	18 54.5	+59.1	11.0	19 53.4	+59.1	11.0	20 52.3	+59.2	11.1	21 51.2	+59.1	11.2	22 50.0	+59.3	11.3	52
53	16 56.7	+59.0	10.6	17 55.7	+59.0	10.7	18 54.7	+59.0	10.7	19 53.6	+59.1	10.8	20 52.5	+59.2	10.9	21 51.5	+59.1	10.9	22 50.4	+59.2	11.1	23 49.3	+59.2	11.1	53
54	17 55.7	+59.0	10.4	18 54.7	+59.0	10.5	19 53.7	+59.0	10.6	20 52.7	+59.1	10.6	21 51.7	+59.1	10.7	22 50.6	+59.1	10.7	23 49.6	+59.1	10.8	24 48.5	+59.2	10.9	54
55	18 54.7	+58.9	10.2	19 53.7	+59.0	10.3	20 52.7	+59.1	10.3	21 51.8	+59.0	10.4	22 50.8	+59.1	10.5	23 49.8	+59.1	10.6	24 48.7	+59.2	10.6	25 47.7	+59.2	10.7	55
56	19 53.6	+59.0	10.0	20 52.7	+59.0	10.1	21 51.8	+59.0	10.1	22 50.8	+59.1	10.2	23 49.9	+59.0	10.3	24 48.9	+59.1	10.4	25 47.9	+59.1	10.5	26 46.9	+59.2	10.6	56
57	20 52.5	+59.0	9.8	21 51.7	+58.9	9.9	22 50.8	+59.1	10.0	23 49.9	+59.0	10.0	24 48.9	+59.1	10.1	25 48.0	+59.0	10.2	26 47.0	+59.1	10.3	27 46.1	+59.1	10.4	57
58	21 51.5	+58.9	9.6	22 50.6	+59.0	9.7	23 49.8	+58.9	9.8	24 48.9	+59.0	9.8	25 48.0	+59.0	9.9	26 47.1	+59.0	10.0	27 46.2	+59.0	10.1	28 45.2	+59.2	10.2	58
59	22 50.4	+58.9	9.4	23 49.6	+58.9	9.5	24 48.7	+59.0	9.5	25 47.9	+59.0	9.6	26 47.0	+58.9	9.7	27 46.2	+59.0	9.8	28 45.3	+59.1	9.9	29 44.4	+59.1	10.0	59
60	23 49.3	+58.9	9.2	24 48.5	+58.9	9.3	25 47.7	+58.9	9.3	26 46.9	+59.0	9.4	27 46.1	+59.0	9.5	28 45.2	+59.0	9.6	29 44.4	+59.1	9.7	30 43.5	+59.1	9.8	60
61	24 48.1	+58.9	9.0	25 47.4	+58.9	9.1	26 46.6	+59.0	9.1	27 45.9	+58.9	9.2	28 45.1	+59.0	9.3	29 44.3	+59.0	9.4	30 43.5	+59.0	9.5	31 42.6	+59.1	9.6	61
62	25 47.0	+58.8	8.8	26 46.3	+58.8	8.8	27 45.6	+58.9	8.9	28 44.8	+59.0	9.0	29 44.1	+58.9	9.1	30 43.3	+59.0	9.2	31 42.5	+59.0	9.3	32 41.7	+59.1	9.4	62
63	26 45.8	+58.8	8.5	27 45.1	+58.9	8.6	28 44.5	+58.8	8.7	29 43.8	+58.9	8.8	30 43.0	+59.0	8.9	31 42.3	+59.0	9.0	32 41.6	+59.0	9.1	33 40.8	+59.1	9.2	63
64	27 44.6	+58.8	8.3	28 44.0	+58.8	8.4	29 43.3	+58.9	8.5	30 42.7	+58.9	8.6	31 42.0	+58.9	8.7	32 41.3	+59.0	8.8	33 40.6	+59.0	8.9	34 39.9	+59.0	9.0	64
65	28 43.4	+58.7	8.1	29 42.8	+58.8	8.2	30 42.2	+58.8	8.3	31 41.6	+58.8	8.3	32 40.9	+58.9	8.4	33 40.3	+58.9	8.5	34 39.6	+59.0	8.6	35 38.9	+59.0	8.7	65
66	29 42.2	+58.7	7.9	30 41.6	+58.8	7.9	31 41.0	+58.8	8.0	32 40.4	+58.9	8.1	33 39.8	+58.9	8.2	34 39.2	+58.9	8.3	35 38.6	+58.9	8.4	36 37.9	+59.0	8.5	66
67	30 40.9	+58.7	7.6	31 40.4	+58.7	7.7	32 39.8	+58.8	7.8	33 39.3	+58.8	7.9	34 38.7	+58.9	8.0	35 38.1	+58.9	8.1	36 37.5	+58.9	8.2	37 36.9	+59.0	8.3	67
68	31 39.6	+58.7	7.4	32 39.1	+58.8	7.5	33 38.6	+58.8	7.6	34 38.1	+58.8	7.6	35 37.6	+58.8	7.7	36 37.0	+58.9	7.8	37 36.4	+58.9	7.9	38 35.9	+58.9	8.1	68
69	32 38.3	+58.7	7.1	33 37.9	+58.7	7.2	34 37.4	+58.7	7.3	35 36.9	+58.7	7.4	36 36.4	+58.8	7.5	37 35.9	+58.9	7.6	38 35.3	+58.9	7.7	39 34.8	+58.9	7.8	69
70	33 37.0	+58.6	6.9	34 36.6	+58.6	7.0	35 36.1	+58.7	7.1	36 35.6	+58.7	7.2	37 35.2	+58.7	7.2	38 34.7	+58.8	7.3	39 34.2	+58.8	7.5	40 33.7	+58.8	7.6	70
71	34 35.6	+58.6	6.6	35 35.2	+58.6	6.7	36 34.8	+58.7	6.8	37 34.4	+58.7	6.9	38 33.9	+58.8	7.0	39 33.5	+58.7	7.1	40 33.0	+58.8	7.2	41 32.5	+58.9	7.3	71
72	35 34.2	+58.6	6.4	36 33.8	+58.6	6.5	37 33.5	+58.6	6.5	38 33.1	+58.6	6.6	39 32.7	+58.6	6.7	40 32.2	+58.8	6.8	41 31.8	+58.8	6.9	42 31.4	+58.7	7.0	72
73	36 32.8	+58.5	6.1	37 32.4	+58.6	6.2	38 32.1	+58.6	6.3	39 31.7	+58.6	6.4	40 31.3	+58.7	6.5	41 31.0	+58.6	6.6	42 30.6	+58.7	6.7	43 30.1	+58.8	6.8	73
74	37 31.3	+58.5	5.9	38 31.0	+58.5	5.9	39 30.7	+58.6	6.0	40 30.3	+58.6	6.1	41 30.0	+58.6	6.2	42 29.6	+58.7	6.3	43 29.3	+58.6	6.4	44 28.9	+58.7	6.5	74
75	38 29.8	+58.4	5.5	39 29.5	+58.5	5.7	40 29.2	+58.5	5.7	41 28.9	+58.5	5.8	42 28.6	+58.6	5.9	43 28.3	+58.6	6.0	44 27.9	+58.7	6.2	45 27.6	+58.7	6.2	75
76	39 28.2	+58.4	5.3	40 28.0	+58.4	5.3	41 27.7	+58.5	5.4	42 27.4	+58.5	5.5	43 27.2	+58.5	5.6	44 26.9	+58.5	5.7	45 26.6	+58.6	5.8	46 26.3	+58.6	5.9	76
77	40 26.6	+58.4	5.0	41 26.4	+58.4	5.0	42 26.2	+58.4	5.1	43 25.9	+58.5	5.2	44 25.7	+58.4	5.3	45 25.4	+58.5	5.4	46 25.1	+58.6	5.5	47 24.9	+58.5	5.6	77
78	41 25.0	+58.3	4.8	42 24.8	+58.3	4.8	43 24.6	+58.3	4.8	44 24.4	+58.4	4.9	45 24.1	+58.4	5.0	46 23.9	+58.4	5.1	47 23.7	+58.4	5.1	48 23.4	+58.5	5.3	78
79	42 23.3	+58.2	4.3	43 23.1	+58.3	4.4	44 22.9	+58.3	4.5	45 22.7	+58.4	4.6	46 22.5	+58.4	4.6	47 22.3	+58.4	4.7	48 22.1	+58.4	4.8	49 21.9	+58.5	4.9	79
80	43 21.5	+58.2	4.0	44 21.4	+58.2	4.1	45 21.2	+58.3	4.1	46 21.1	+58.2	4.2	47 20.9	+58.3	4.3	48 20.7	+58.3	4.4	49 20.5	+58.4	4.5	50 20.4	+58.3	4.6	80
81	44 19.7	+58.1	3.7	45 19.6	+58.1	3.7	46 19.5	+58.1	3.8	47 19.3	+58.2	3.9	48 19.2	+58.2	3.9	49 19.0	+58.3	4.0	50 18.9	+58.3	4.1	51 18.7	+58.3	4.2	81
82	45 17.8	+58.1	3.3	46 17.7	+58.1	3.4	47 17.6	+58.1	3.4	48 17.5	+58.1	3.5	49 17.4	+58.2	3.6	50 17.3	+58.2	3.7	51 17.2	+58.2	3.7	52 17.0	+58.3	3.8	82
83	46 15.9	+58.0	3.0	47 15.8	+58.0	3.0	48 15.7	+58.1	3.1	49 15.6	+58.1	3.1	50 15.6	+58.0	3.2	51 15.5	+58.0	3.3	52 15.4	+58.1	3.3	53 15.3	+58.1	3.4	83
84	47 13.9	+57.9	2.6	48 13.8	+58.0	2.6	49 13.8	+57.9	2.7	50 13.7	+58.0	2.7	51 13.6	+58.0	2.8	52 13.5	+58.0	2.8	53 13.5	+58.0	2.9	54 13.4	+58.0	3.0	84
85	48 11.8	+57.7	2.2	49 11.8	+57.8	2.2	50 11.7	+57.9	2.3	51 11.7	+57.8	2.3	52 11.6	+57.9	2.4	53 11.6	+57.9	2.4	54 11.5	+57.9	2.5	55 11.4	+58.0	2.6	85
86	49 09.6	+57.8	1.8	50 09.6	+57.8	1.8	51 09.6	+57.7	1.9	52 09.5	+57.8	1.9	53 09.5	+57.8	1.9	54 09.5	+57.7	2.0	55 09.4	+57.9	2.0	56 09.4	+57.8	2.1	86
87	50 07.4	+57.6	1.4	51 07.4	+57.6	1.4	52 07.3	+57.7	1.4	53 07.3	+57.7	1.5	54 07.3	+57.6	1.5	55 07.3	+57.6	1.5	56 07.3	+57.7	1.5	57 07.2	+57.8	1.6	87
88	51 05.0	+57.6	0.9	52 05.0	+57.6	1.0	53 05.0	+57.6	1.0	54 05.0	+57.6	1.0	55 05.0	+57.6	1.0	56 05.0	+57.6	1.0	57 05.0	+57.6	1.1	58 05.0	+57.5	1.1	88
89	52 02.6	+57.4	0.5	53 02.6	+57.4	0.5	54 02.6	+57.4	0.5	55 02.6	+57.4	0.5	56 02.6	+57.4	0.5	57 02.6	+57.4	0.5	58 02.5	+57.5	0.6	59 02.5	+57.5	0.6	89
90	53 00.0	+57.3	0.0	54 00.0	+57.3	0.0	55 00.0	+57.3	0.0	56 00.0	+57.3	0.0	57 00.0	+57.3	0.0	58 00.0	+57.3	0.0	59 00.0	+57.3	0.0	60 00.0	+57.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 163°, 197°

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	34 54.9	+58.4	157.9	33 59.3	+58.5	158.1	33 03.5	+58.7	158.4	32 07.7	+58.8	158.6	31 11.8	+58.8	158.8	30 15.8	+58.9	159.0	29 19.8	+58.9	159.2	28 23.6	+59.1	159.4	0
1	35 53.3	+58.4	157.6	34 57.8	+58.5	157.9	34 02.2	+58.6	158.1	33 06.5	+58.6	158.4	32 10.6	+58.8	158.6	31 14.7	+58.9	158.8	30 18.7	+59.0	159.0	29 22.7	+59.0	159.2	1
2	36 51.7	+58.3	157.3	35 56.3	+58.4	157.6	35 00.8	+58.5	157.8	34 05.1	+58.7	158.1	33 09.4	+58.6	158.4	32 13.6	+58.9	158.6	31 17.7	+58.9	158.8	30 21.7	+59.0	159.0	2
3	37 50.0	+58.3	157.0	36 54.7	+58.4	157.3	35 59.3	+58.6	157.6	35 03.8	+58.6	157.9	34 08.2	+58.7	158.1	33 12.5	+58.8	158.4	32 16.6	+59.0	158.6	31 20.7	+59.0	158.8	3
4	38 48.3	+58.3	156.7	37 53.1	+58.4	157.0	36 57.9	+58.4	157.3	36 02.4	+58.6	157.6	35 06.9	+58.7	157.9	34 11.3	+58.8	158.1	33 15.6	+58.9	158.4	32 19.7	+59.0	158.6	4
5	39 46.6	+58.2	156.4	38 51.5	+58.3	156.7	37 56.3	+58.5	157.0	37 01.0	+58.6	157.3	36 05.6	+58.7	157.6	35 10.1	+58.8	157.9	34 14.5	+58.8	158.1	33 18.7	+59.0	158.4	5
6	40 44.8	+58.1	156.1	39 49.8	+58.3	156.4	38 54.8	+58.4	156.7	37 59.6	+58.5	157.0	37 04.3	+58.6	157.3	36 08.9	+58.7	157.6	35 13.3	+58.9	157.9	34 17.7	+58.9	158.2	6
7	41 42.9	+58.1	155.7	40 48.1	+58.2	156.1	39 53.2	+58.3	156.4	38 58.1	+58.5	156.8	38 02.9	+58.6	157.1	37 07.6	+58.7	157.4	36 12.2	+58.8	157.7	35 16.6	+58.9	157.9	7
8	42 41.0	+58.0	155.4	41 46.3	+58.2	155.8	40 51.5	+58.3	156.1	39 56.6	+58.4	156.5	39 01.5	+58.5	156.8	38 06.3	+58.7	157.1	37 11.0	+58.7	157.4	36 15.5	+58.9	157.7	8
9	43 39.0	+57.9	155.1	42 44.5	+58.1	155.4	41 49.8	+58.3	155.8	40 55.0	+58.4	156.2	40 00.1	+58.5	156.5	39 05.0	+58.6	156.8	38 09.7	+58.8	157.2	37 14.4	+58.8	157.5	9
10	44 36.9	+57.9	154.7	43 42.6	+58.0	155.1	42 48.1	+58.2	155.5	41 53.4	+58.3	155.9	40 58.6	+58.4	156.2	40 03.6	+58.5	156.6	39 08.5	+58.7	156.9	38 13.2	+58.8	157.2	10
11	45 34.8	+57.8	154.3	44 40.6	+58.0	154.7	43 46.3	+58.1	155.2	42 51.7	+58.3	155.6	41 57.0	+58.5	155.9	41 02.2	+58.5	156.3	40 07.2	+58.6	156.6	39 12.0	+58.8	157.0	11
12	46 32.6	+57.7	153.9	45 38.6	+57.9	154.4	44 44.4	+58.1	154.8	43 50.0	+58.3	155.2	42 55.5	+58.3	155.6	42 00.7	+58.5	156.0	41 05.8	+58.7	156.4	40 10.8	+58.8	156.7	12
13	47 30.3	+57.5	153.5	46 36.5	+57.8	154.0	45 42.5	+58.0	154.5	44 48.3	+58.1	154.9	43 53.8	+58.3	155.3	42 59.2	+58.5	155.7	42 04.5	+58.6	156.1	41 09.6	+58.7	156.4	13
14	48 28.0	+57.5	153.1	47 34.3	+57.8	153.6	46 40.5	+57.9	154.1	45 46.4	+58.1	154.5	44 52.1	+58.3	155.0	43 57.7	+58.4	155.3	43 03.1	+58.5	155.8	42 08.3	+58.6	156.1	14
15	49 25.5	+57.5	152.7	48 32.1	+57.6	153.2	47 38.4	+57.9	153.7	46 44.5	+58.0	154.2	45 50.4	+58.2	154.6	44 56.1	+58.3	155.1	44 01.6	+58.5	155.5	43 06.9	+58.6	155.9	15
16	50 23.0	+57.3	152.2	49 29.7	+57.5	152.7	48 36.3	+57.7	153.3	47 42.5	+58.0	153.8	46 48.6	+58.1	154.3	45 54.4	+58.3	154.7	45 00.1	+58.4	155.2	44 05.5	+58.6	155.6	16
17	51 20.3	+57.2	151.8	50 27.3	+57.5	152.3	49 34.0	+57.7	152.9	48 40.5	+57.9	153.4	47 46.7	+58.1	153.9	46 52.7	+58.2	154.4	45 58.5	+58.4	154.8	45 04.1	+58.5	155.3	17
18	52 17.5	+57.1	151.3	51 24.8	+57.3	151.9	50 31.7	+57.6	152.5	49 38.4	+57.7	153.0	48 44.8	+57.9	153.5	47 50.9	+58.2	154.0	46 56.9	+58.3	154.5	46 02.6	+58.5	154.9	18
19	53 14.6	+57.0	150.8	52 22.1	+57.2	151.4	51 29.3	+57.4	152.0	50 36.1	+57.7	152.6	49 42.7	+57.9	153.1	48 49.1	+58.1	153.7	47 55.2	+58.3	154.2	47 01.1	+58.4	154.6	19
20	54 11.6	+56.8	150.2	53 19.3	+57.1	150.9	52 26.7	+57.4	151.5	51 33.8	+57.6	152.2	50 40.6	+57.8	152.7	49 47.2	+58.0	153.3	48 53.5	+58.1	153.8	47 59.5	+58.4	154.3	20
21	55 08.4	+56.6	149.7	54 16.4	+57.0	150.4	53 24.1	+57.2	151.1	52 31.4	+57.5	151.7	51 38.4	+57.7	152.3	50 45.2	+57.9	152.9	49 51.6	+58.1	153.4	48 57.9	+58.2	153.9	21
22	56 05.0	+56.5	149.1	55 13.4	+56.8	149.8	54 21.3	+57.1	150.6	53 28.9	+57.3	151.2	52 36.1	+57.6	151.9	51 43.1	+57.8	152.5	50 49.7	+58.1	153.0	49 56.1	+58.2	153.6	22
23	57 01.5	+56.3	148.5	56 10.2	+56.6	149.3	55 18.4	+56.9	150.0	54 26.2	+57.2	150.7	53 33.7	+57.5	151.4	52 40.9	+57.7	152.0	51 47.8	+57.9	152.6	50 54.3	+58.2	153.2	23
24	57 57.8	+56.1	147.8	57 06.8	+56.4	148.7	56 15.3	+56.8	149.5	55 23.4	+57.1	150.2	54 31.2	+57.4	150.9	53 38.6	+57.6	151.6	52 45.7	+57.8	152.2	51 52.5	+58.0	152.8	24
25	58 53.9	+55.9	147.2	58 03.2	+56.3	148.0	57 12.1	+56.6	148.9	56 20.5	+57.0	149.6	55 28.6	+57.2	150.4	54 36.2	+57.5	151.1	53 43.5	+57.8	151.7	52 50.5	+58.0	152.4	25
26	59 49.8	+55.6	146.5	58 59.5	+56.0	147.4	58 08.7	+56.4	148.2	57 17.5	+56.7	149.1	56 25.8	+57.1	149.8	55 33.7	+57.4	150.6	54 41.3	+57.6	151.3	53 48.5	+57.8	151.9	26
27	60 45.4	+55.3	145.7	59 55.5	+55.8	146.7	59 05.1	+56.2	147.6	58 14.2	+56.6	148.5	57 22.9	+56.9	149.3	56 31.1	+57.2	150.1	55 38.9	+57.5	150.8	54 46.3	+57.8	151.5	27
28	61 40.7	+54.9	144.9	60 51.3	+55.6	145.9	60 01.3	+56.0	146.9	59 10.8	+56.4	147.8	58 19.8	+56.7	148.7	57 28.3	+57.1	149.5	56 36.4	+57.4	150.3	55 44.1	+57.6	151.0	28
29	62 35.8	+54.7	144.0	61 46.9	+55.2	145.1	60 57.3	+55.7	146.2	60 07.2	+56.2	147.1	59 16.5	+56.6	148.1	58 25.4	+56.9	148.9	57 33.8	+57.2	149.7	56 41.7	+57.5	150.5	29
30	63 30.5	+54.3	143.1	62 42.1	+54.9	144.3	61 53.0	+55.5	145.4	61 03.4	+55.9	146.4	60 13.1	+56.3	147.4	59 22.3	+56.7	148.3	58 31.0	+57.0	149.2	57 39.2	+57.4	150.0	30
31	64 24.8	+54.0	142.2	63 37.0	+54.6	143.4	62 48.5	+55.1	144.6	61 59.3	+55.6	145.7	61 09.4	+56.1	146.7	60 19.0	+56.5	147.7	59 28.0	+56.9	148.6	58 36.6	+57.2	149.4	31
32	65 18.8	+53.5	141.1	64 31.6	+54.2	142.5	63 43.6	+54.8	143.7	62 54.9	+55.4	144.9	62 05.5	+55.9	146.0	61 15.5	+56.3	147.0	60 24.9	+56.7	147.9	59 33.8	+57.1	148.8	32
33	66 12.3	+52.9	140.0	65 25.8	+53.7	141.4	64 38.4	+54.5	142.8	63 50.3	+55.0	144.0	63 01.4	+55.6	145.2	62 11.8	+56.1	146.2	61 21.6	+56.5	147.3	60 30.9	+56.9	148.2	33
34	67 05.2	+52.5	138.9	66 19.5	+53.3	140.4	65 32.9	+54.0	141.8	64 45.3	+54.7	143.1	63 57.0	+55.2	144.3	63 07.9	+55.8	145.5	62 18.1	+56.3	146.6	61 27.8	+56.6	147.6	34
35	67 57.7	+51.7	137.6	67 12.8	+52.7	139.2	66 26.9	+53.5	140.7	65 40.0	+54.2	142.1	64 52.2	+54.9	143.4	64 03.7	+55.4	144.6	63 14.4	+56.0	145.8	62 24.4	+56.5	146.9	35
36	68 49.4	+51.1	136.2	68 05.5	+52.1	137.9	67 20.4	+53.0	139.5	66 34.2	+53.8	141.0	65 47.1	+54.5	142.4	64 59.1	+55.2	143.8	64 10.4	+55.7	145.0	63 20.9	+56.2	146.1	36
37	69 40.5	+50.3	134.7	68 57.6	+51.4	136.6	68 13.4	+52.4	138.3	67 28.0	+53.3	139.9	66 41.6	+54.1	141.4	65 54.3	+54.7	142.8	65 06.1	+55.3	144.1	64 17.1	+55.9	145.3	37
38	70 30.8	+49.3	133.1	69 49.0	+50.6	135.1	69 05.8	+51.7	137.0	68 21.3	+52.7	138.7	67 35.7	+53.6	140.3	66 49.0	+54.4	141.8	66 01.4	+55.1	143.2	65 13.0	+55.6	144.5	38
39	71 20.1	+48.3	131.4	70 39.6	+49.7	133.5	69 57.5	+51.0	135.5	69 14.0	+52.1	137.4	68 29.3	+53.0	139.1	67 43.4	+53.8	140.7	66 56.5	+54.6	142.2	66 08.6	+55.3	143.6	39
40	72 08.4	+47.1	129.5	71 29.3	+48.7	131.8	70 48.5	+50.0	133.9	70 06.1	+51.3	135.9	69 22.3	+52.4	137.8	68 37.2	+53.4	139.5	67 51.1	+54.1	141.1	67 03.9	+54.9	142.6	40
41	72 55.5	+45.7	127.4	72 18.0	+47.5	129.9	71 38.5	+49.1	132.2	70 57.4	+50.4	134.4	70 14.7	+51.6	136.4	69 30.6	+52.7	138.2	68 45.2	+53.7	139.9	67 58.8	+54.4	141.5	41
42	73 41.2	+44.1	125.2	73 05.5	+46.1	127.9	72 27.6	+47.9	130.4	71 47.8	+49.5	132.7	71 06.3	+50.9	134.8	70 23.3	+52.0	136.8	69 38.9	+53.0	138.7	68 53.2	+53.9	140.4	42
43	74 25.3	+42.4	122.7	73 51.6	+44.6	125.6	73 15.5	+46.6	128.3	72 37.3	+48.4	130.8	71 57.2	+49.8	133.2	71 15.3	+51.2	135.3	70 31.9	+52.4	137.3	69 47.1	+53.4	139.2	43
44	75 07.7	+40.2•	120.0	74 36.2	+42.9	123.1	74 02.1	+45.1	126.1	73 25.7	+47.0	128.8	72 47.0	+48.8	131.3	72 06.5	+50.3	133.7	71 24.3	+51.5	135.8	70 40.5	+52.7	137.8	44
45	75 47.9	+37.9•	117.0	75 19.1	+40.7•	120.4	74 47.2	+43.3	123.6	74 12.7	+45.6	126.6	73 35.8	+47.5	129.3	72 56.8	+49.2	131.8	72 15.8	+50.7	134.2	71 33.2	+52.0	136.3	45
46	76 25.8	+35.2•	113.8	75 59.8	+38.4•	117.5	75 30.5	+41.3•	120.9	74 58.3	+43.8	124.1	74 23.3	+46.1	127.1	73 46.0	+48.0	129.8	73 06.5	+49.7	132.4	72 25.2	+51.1	134.7	46
47	77 01.0	+32.0•	110.3	76 38.2	+35.7•	114.2	76 11.8	+39.0•	118.0	75 42.1	+41.8•	121.4	75 09.4	+44.3•	124.4	74 34.0	+46.5	127.5	73 56.2	+48.4	130.4	73 16.3	+50.1	132.9	47
48	77 33.0	+28.5•	106.4	77 13.9	+32.6•	110.7	76 50.8	+36.2•	114.7	76 23.9	+39.5•	118.4	75 53.7	+42.4•	122.0	75 20.5	+44.9	125.2	74 44.6	+47.1	128.2	74 06.4	+48.9	131.0	48
49	78 01.5	+24.6•	102.3	77 46.5	+29.0•	106.8	77 27.0	+33.0•	111.1	77 03.4	+36.7•	115.2	76 36.1	+40.0•	119.0	76 05.4	+42.9•	122.5	75 31.7	+45.4	125.8	74 55.3	+47.6	128.8	49
50	78 26.1	+20.1•	97.8	78 15.5	+24.9•	102.6	78 00.0	+29.5•	107.2	77 40.1	+33.6•	111.6	77 16.1	+37.3•	115.7	76 48.3	+40.6•	119.5	76 17.1	+43.4•	123.1	75 42.9	+45.9	126.4	50
51	78 46.2	+15.4•	93.0	78 40.4	+20.5•	98.0	78 29.5	+25.5•	102.9	78 13.7	+30.0•	107.6	77 53.4	+34.2•	112.0	77 28.9	+37.9•	116.2	77 00.5	+41.2•	120.1	76 28.8	+44.0•	123.7	51
52	79 01.6	+10.1•	88.0	79 00.9	+15.7•	93.2	78 55.0	+20.8•	98.3	78 43.7	+25.9•	103.2	78 27.6	+30.5•	108.0	78 06.8	+34.7•	112.5	77 41.7	+38.5•	116.8	77 12.8	+41.8•	120.7	52
53	79 11.7	+4.9•	82.8	79 16.6	+10.3•	88.0	79 15.8	+15.9•	93.3	79 09.6	+21.3•	98.5	78 58.1	+26.4•	103.6	78 41.5	+31.1•	108.5	78 20.2	+35.3•	113.1	77 54.6	+39.1•	117.4	53
54	79 16.6	−0.8•	77.5	79 26.9	+4.8•	82.7	79 31.7	+10.6•	88.1	79 30.9	+16.2•	93.5	79 24.5	+21.7•	98.8	79 12.6	+26.9•	104.0	78 55.5	+31.7•	109.0	78 33.7	+35.9•	113.7	54
55	79 15.8	−6.2•	72.1	79 31.7	−0.8•	77.2	79 42.3	+4.8•	82.6	79 47.1	+10.7•	88.1	79 46.2	+16.5•	93.7	79 39.5	+22.1•	99.1	79 27.2	+27.4•	104.5	79 09.6	+32.3•	109.5	55
56	79 09.6	−11.5•	66.8	79 30.9	−6.4•	71.7	79 47.1	−0.9•	77.0	79 57.8	+4.9•	82.5	80 02.7	+10.8•	88.2	80 01.6	+16.8•	93.9	79 54.6	+22.5•	99.5	79 41.9	+28.0•	104.9	56
57	78 58.1	−16.6•	61.6	79 24.5	−11.9•	66.3	79 46.2	−6.7•	71.4	80 02.7	−1.1•	76.8	80 13.5	+4.9•	82.4	80 18.4	+11.0•	88.2	80 17.1	+17.2•	94.1	80 09.9	+23.0•	99.9	57
58	78 41.5	−21.3•	56.6	79 12.6	−17.1•	61.0	79 39.5	−12.3•	65.8	80 01.6	−7.0•	71.0	80 18.4	−1.3•	76.5	80 29.4	+4.9•	82.3	80 34.3	+11.1•	88.3	80 32.9	+17.4•	94.3	58
59	78 20.2	−26.1•	51.9	78 55.5	−21.8•	56.0	79 27.2	−17.6•	60.4	79 54.6	−12.7•	65.3	80 17.1	−7.2•	70.6	80 34.3	−1.4•	76.3	80 50.3	+4.5•	82.3	80 50.3	+11.4•	88.4	59
60	77 54.6	−29.5•	47.5	78 33.7	−26.2•	51.2	79 09.6	−22.4•	55.2	79 41.9	−18.1•	59.8	80 09.9	−13.2•	64.8	80 32.9	−7.7•	70.2	80 50.3	−1.6•	76.0	81 01.7	+4.8•	82.2	60
61	77 25.1	−32.9•	43.5	78 07.5	−30.1•	46.7	78 47.2	−26.8•	50.4	79 23.8	−23.0•	54.5	79 56.7	−18.6•	59.1	80 25.2	−13.6•	64.2	80 48.7	−8.0•	69.8	81 06.5	−1.8•	75.8	61
62	76 52.2	−35.8•	39.7	77 37.4	−33.5•	42.6	78 20.4	−30.7•	45.9	79 00.8	−27.4•	49.6	79 38.1	−23.7•	53.7	80 11.6	−19.2•	58.4	80 40.7	−14.1•	63.6	81 04.7	−8.4•	69.3	62
63	76 16.4	−38.6•	36.2	77 03.9	−36.4•	38.8	77 49.7	−34.1•	41.7	78 33.4	−31.4•	45.0	79 14.4	−28.1•	48.7	79 52.4	−24.3•	52.9	80 26.6	−19.9•	57.7	80 56.3	−14.7•	63.0	63
64	75 37.8	−40.7•	33.1	76 27.5	−39.2•	35.3	77 15.6	−37.1•	37.9	78 02.0	−34.8•	40.8	78 46.3	−32.0•	44.1	79 28.1	−28.9•	47.8	80 06.7	−25.0•	52.1	80 41.6	−20.6•	56.9	64
65	74 57.0	−42.8	30.2	75 48.3	−41.4•	32.2	76 38.5	−39.7•	34.4	77 27.2	−37.7•	37.0	78 14.3	−35.5•	39.8	78 59.2	−32.7•	43.1	79 41.7	−29.6•	46.9	80 21.0	−25.7•	51.2	65
66	74 14.2	−44.6	27.6	75 06.9	−43.3	29.3	75 58.8	−42.0•	31.3	76 49.5	−40.4•	33.5	77 38.8	−38.5•	36.0	78 26.5	−36.2•	38.8	79 12.1	−33.5•	42.1	79 55.3	−30.4•	45.9	66
67	73 29.6	−46.1	25.1	74 23.6	−45.1	26.7	75 16.8	−43.9	28.4	76 09.1	−42.6•	30.3	77 00.3	−41.0•	32.5	77 50.3	−39.2•	35.0	78 38.6	−37.0•	37.8	79 24.9	−34.3•	41.1	67
68	72 43.5	−47.4	22.9	73 38.5	−46.6	24.3	74 32.9	−45.6	25.8	75 26.5	−44.4	27.4	76 19.3	−43.1•	29.2	77 11.1	−41.7•	31.5	78 01.6	−39.8•	33.9	78 50.6	−37.7•	36.7	68
69	71 56.1	−48.6	20.9	72 51.9	−47.8	22.1	73 47.3	−47.1	23.4	74 42.1	−46.2	24.8	75 36.2	−45.1	26.4	76 29.4	−43.8	28.3	77 21.8	−42.4•	30.4	78 12.9	−40.6•	32.8	69
70	71 07.5	−49.5	19.1	72 04.1	−49.0	20.1	73 00.2	−48.3	21.2	73 55.9	−47.5	22.4	74 51.1	−46.7	23.9	75 45.6	−45.6	25.4	76 39.4	−44.4	27.3	77 32.3	−43.1•	29.3	70
71	70 18.0	−50.5	17.4	71 15.1	−50.0	18.2	72 11.9	−49.4	19.2	73 08.4	−48.8	20.3	74 04.4	−48.0	21.5	75 00.0	−47.2	22.9	75 55.0	−46.3	24.4	76 49.2	−45.1	26.2	71
72	69 27.5	−51.3	15.8	70 25.1	−50.8	16.6	71 22.5	−50.4	17.4	72 19.6	−49.8	18.3	73 16.4	−49.2	19.4	74 12.8	−48.6	20.5	75 08.7	−47.7	21.9	76 04.1	−46.8	23.4	72
73	68 36.2	−51.9	14.3	69 34.3	−51.6	15.0	70 32.1	−51.2	15.7	71 29.8	−50.8	16.5	72 27.2	−50.3	17.4	73 24.2	−49.7	18.4	74 21.0	−49.1	19.6	75 17.3	−48.3	20.8	73
74	67 44.3	−52.6	13.0	68 42.7	−52.3	13.6	69 40.9	−51.9	14.2	70 39.0	−51.6	14.9	71 36.9	−51.2	15.7	72 34.5	−50.7	16.5	73 31.9	−50.2	17.5	74 29.0	−49.6	18.6	74
75	66 51.7	−53.1	11.7	67 50.4	−52.9	12.2	68 49.0	−52.6	12.8	69 47.4	−52.3	13.4	70 45.7	−51.9	14.0	71 43.8	−51.6	14.7	72 41.7	−51.1	15.6	73 39.4	−50.6	16.5	75
76	65 58.6	−53.6	10.6	66 57.5	−53.4	11.0	67 56.4	−53.2	11.5	68 55.1	−52.9	12.0	69 53.8	−52.7	12.6	70 52.2	−52.3	13.2	71 50.6	−52.0	13.9	72 48.7	−51.6	14.7	76
77	65 05.0	−54.1	9.5	66 04.1	−53.8	9.9	67 03.2	−53.7	10.3	68 02.2	−53.5	10.7	69 01.1	−53.2	11.2	69 59.9	−53.0	11.7	70 58.6	−52.7	12.3	71 57.1	−52.3	13.0	77
78	64 10.9	−54.4	8.5	65 10.3	−54.3	8.8	66 09.5	−54.1	9.1	67 08.7	−53.9	9.5	68 07.9	−53.8	9.9	69 06.9	−53.6	10.4	70 05.9	−53.3	10.9	71 04.8	−53.1	11.4	78
79	63 16.5	−54.8	7.5	64 16.0	−54.7	7.8	65 15.4	−54.6	8.1	66 14.8	−54.5	8.4	67 14.1	−54.3	8.8	68 13.3	−54.0	9.1	69 12.6	−53.9	9.6	70 11.7	−53.7	10.0	79
80	62 21.7	−55.1	6.6	63 21.3	−55.1	6.9	64 20.8	−54.9	7.1	65 20.3	−54.8	7.4	66 19.8	−54.6	7.7	67 19.3	−54.6	8.0	68 18.7	−54.4	8.3	69 18.0	−54.2	8.7	80
81	61 26.6	−55.5	5.8	62 26.2	−55.3	6.0	63 25.9	−55.2	6.2	64 25.5	−55.1	6.4	65 25.2	−55.1	6.6	66 24.7	−54.9	6.9	67 24.3	−54.8	7.2	68 23.8	−54.7	7.5	81
82	60 31.1	−55.6	5.2	61 30.9	−55.6	5.3	62 30.7	−55.6	5.5	63 30.4	−55.5	5.7	64 30.1	−55.4	5.9	65 29.8	−55.3	6.1	66 29.5	−55.2	6.2	67 29.1	−55.1	6.4	82
83	59 35.5	−55.9	4.3	60 35.3	−55.9	4.4	61 35.1	−55.8	4.5	62 34.9	−55.7	4.7	63 34.7	−55.7	4.9	64 34.5	−55.6	5.0	65 34.3	−55.5	5.2	66 34.0	−55.5	5.4	83
84	58 39.6	−56.2	3.6	59 39.4	−56.1	3.7	60 39.3	−56.1	3.8	61 39.2	−56.0	3.9	62 39.0	−56.0	4.0	63 38.9	−55.9	4.2	64 38.7	−55.8	4.3	65 38.5	−55.8	4.5	84
85	57 43.4	−56.3	2.9	58 43.3	−56.3	3.0	59 43.2	−56.2	3.1	60 43.2	−56.3	3.2	61 43.1	−56.2	3.3	62 43.0	−56.2	3.4	63 42.9	−56.2	3.5	64 42.7	−56.0	3.6	85
86	56 47.1	−56.6	2.3	57 47.0	−56.5	2.3	58 47.0	−56.5	2.4	59 46.9	−56.4	2.5	60 46.9	−56.5	2.5	61 46.8	−56.4	2.6	62 46.7	−56.3	2.7	63 46.7	−56.4	2.8	86
87	55 50.5	−56.7	1.7	56 50.5	−56.7	1.7	57 50.5	−56.7	1.7	58 50.5	−56.7	1.8	59 50.4	−56.6	1.8	60 50.4	−56.6	1.9	61 50.4	−56.7	2.0	62 50.3	−56.6	2.0	87
88	54 53.8	−56.8	1.1	55 53.8	−56.8	1.1	56 53.8	−56.8	1.1	57 53.8	−56.8	1.2	58 53.8	−56.8	1.2	59 53.8	−56.8	1.2	60 53.8	−56.8	1.3	61 53.8	−56.8	1.3	88
89	53 57.0	−57.0	0.5	54 57.0	−57.0	0.5	55 57.0	−57.0	0.6	56 57.0	−57.0	0.6	57 57.0	−57.0	0.6	58 57.0	−57.0	0.6	59 57.0	−57.0	0.6	60 57.0	−57.0	0.6	89
90	53 00.0	−57.1	0.0	54 00.0	−57.1	0.0	55 00.0	−57.1	0.0	56 00.0	−57.1	0.0	57 00.0	−57.1	0.0	58 00.0	−57.1	0.0	59 00.0	−57.1	0.0	60 00.0	−57.1	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	34 54.9	−58.5	157.9	33 59.3	−58.6	158.1	33 03.5	−58.6	158.4	32 07.7	−58.7	158.6	31 11.8	−58.8	158.8	30 15.8	−58.9	159.0	29 19.8	−59.0	159.2	28 23.6	−59.1	159.4	0
1	33 56.4	−58.4	158.1	33 00.7	−58.6	158.4	32 04.9	−58.7	158.6	31 09.0	−58.7	158.8	30 13.0	−58.9	159.1	29 16.9	−58.9	159.3	28 20.8	−59.1	159.4	27 24.5	−59.0	159.6	1
2	32 58.0	−58.6	158.4	32 02.1	−58.6	158.6	31 06.2	−58.7	158.9	30 10.2	−58.8	159.1	29 14.1	−58.9	159.3	28 18.0	−59.0	159.5	27 21.7	−59.0	159.7	26 25.5	−59.2	159.8	2
3	31 59.4	−58.5	158.7	31 03.5	−58.7	158.9	30 07.5	−58.8	159.1	29 11.4	−58.8	159.3	28 15.2	−58.9	159.5	27 19.0	−59.0	159.7	26 22.7	−59.0	159.9	25 26.3	−59.1	160.0	3
4	31 00.9	−58.5	158.9	30 04.8	−58.6	159.1	29 08.7	−58.7	159.3	28 12.6	−58.9	159.5	27 16.3	−58.9	159.7	26 20.0	−59.0	159.9	25 23.7	−59.1	160.0	24 27.2	−59.1	160.2	4
5	30 02.3	−58.6	159.2	29 06.2	−58.7	159.4	28 10.0	−58.8	159.6	27 13.7	−58.9	159.7	26 17.4	−58.9	159.9	25 21.0	−59.0	160.1	24 24.6	−59.1	160.2	23 28.1	−59.2	160.4	5
6	29 03.7	−58.7	159.4	28 07.5	−58.8	159.6	27 11.2	−58.8	159.8	26 14.9	−58.9	160.0	25 18.5	−59.0	160.1	24 22.0	−59.0	160.3	23 25.5	−59.1	160.4	22 28.9	−59.1	160.6	6
7	28 05.0	−58.7	159.7	27 08.7	−58.7	159.8	26 12.4	−58.8	160.0	25 16.0	−58.9	160.2	24 19.5	−59.0	160.3	23 23.0	−59.1	160.5	22 26.4	−59.1	160.6	21 29.8	−59.2	160.7	7
8	27 06.4	−58.7	159.9	26 10.0	−58.8	160.1	25 13.6	−58.9	160.2	24 17.1	−58.9	160.4	23 20.5	−59.0	160.5	22 23.9	−59.0	160.7	21 27.3	−59.1	160.8	20 30.6	−59.2	160.9	8
9	26 07.7	−58.7	160.1	25 11.2	−58.8	160.3	24 14.7	−58.8	160.4	23 18.2	−59.0	160.6	22 21.5	−59.0	160.7	21 24.9	−59.1	160.9	20 28.2	−59.2	161.0	19 31.4	−59.2	161.1	9
10	25 09.0	−58.7	160.4	24 12.4	−58.8	160.5	23 15.9	−58.9	160.7	22 19.2	−58.9	160.8	21 22.5	−59.0	161.0	20 25.8	−59.1	161.0	19 29.0	−59.1	161.2	18 32.2	−59.2	161.3	10
11	24 10.2	−58.8	160.6	23 13.6	−58.8	160.7	22 17.0	−58.9	160.9	21 20.3	−59.0	161.0	20 23.5	−59.0	161.1	19 26.7	−59.1	161.2	18 29.9	−59.1	161.3	17 33.0	−59.2	161.4	11
12	23 11.5	−58.8	160.8	22 14.8	−58.8	160.9	21 18.1	−58.9	161.1	20 21.3	−59.0	161.2	19 24.5	−59.1	161.3	18 27.6	−59.1	161.4	17 30.7	−59.1	161.5	16 33.8	−59.2	161.6	12
13	22 12.7	−58.8	161.0	21 16.0	−58.9	161.1	20 19.2	−58.9	161.3	19 22.3	−59.0	161.4	18 25.4	−59.0	161.5	17 28.5	−59.1	161.6	16 31.6	−59.2	161.7	15 34.6	−59.2	161.8	13
14	21 13.9	−58.8	161.2	20 17.1	−58.9	161.4	19 20.2	−58.9	161.5	18 23.3	−59.0	161.6	17 26.4	−59.1	161.7	16 29.4	−59.1	161.8	15 32.4	−59.2	161.9	14 35.4	−59.3	162.0	14
15	20 15.1	−58.8	161.4	19 18.2	−58.8	161.6	18 21.3	−58.9	161.7	17 24.3	−59.0	161.8	16 27.3	−59.1	161.9	15 30.3	−59.1	162.0	14 33.2	−59.2	162.1	13 36.1	−59.2	162.1	15
16	19 16.3	−58.8	161.7	18 19.4	−58.9	161.8	17 22.4	−59.0	161.9	16 25.3	−59.0	162.0	15 28.2	−59.0	162.0	14 31.2	−59.2	162.1	13 34.0	−59.2	162.2	12 36.9	−59.2	162.3	16
17	18 17.5	−58.9	161.9	17 20.5	−58.9	162.0	16 23.4	−59.0	162.1	15 26.3	−59.0	162.1	14 29.2	−59.1	162.2	13 32.0	−59.1	162.3	12 34.8	−59.2	162.4	11 37.7	−59.3	162.4	17
18	17 18.6	−58.8	162.1	16 21.5	−58.9	162.2	15 24.4	−59.0	162.3	14 27.3	−59.1	162.3	13 30.1	−59.1	162.4	12 32.9	−59.2	162.5	11 35.6	−59.2	162.5	10 38.4	−59.3	162.6	18
19	16 19.8	−58.9	162.3	15 22.6	−58.9	162.4	14 25.4	−59.0	162.4	13 28.2	−59.0	162.5	12 31.0	−59.1	162.6	11 33.7	−59.1	162.6	10 36.4	−59.2	162.7	9 39.1	−59.2	162.8	19
20	15 20.9	−58.9	162.5	14 23.7	−58.9	162.6	13 26.4	−59.0	162.6	12 29.2	−59.1	162.7	11 31.9	−59.1	162.8	10 34.6	−59.2	162.8	9 37.2	−59.2	162.9	8 39.9	−59.3	162.9	20
21	14 22.0	−58.8	162.7	13 24.8	−59.0	162.7	12 27.4	−59.0	162.8	11 30.1	−59.1	162.9	10 32.8	−59.2	162.9	9 35.4	−59.2	163.0	8 38.0	−59.2	163.0	7 40.6	−59.2	163.1	21
22	13 23.2	−58.9	162.9	12 25.8	−59.0	162.9	11 28.4	−59.0	163.0	10 31.0	−59.0	163.1	9 33.6	−59.1	163.1	8 36.2	−59.2	163.2	7 38.8	−59.2	163.2	6 41.4	−59.3	163.2	22
23	12 24.3	−58.9	163.1	11 26.8	−59.0	163.1	10 29.4	−59.0	163.2	9 32.0	−59.1	163.2	8 34.5	−59.1	163.3	7 37.1	−59.2	163.3	6 39.6	−59.3	163.4	5 42.1	−59.3	163.4	23
24	11 25.4	−59.0	163.3	10 27.9	−59.0	163.3	9 30.4	−59.0	163.4	8 32.9	−59.1	163.4	7 35.4	−59.1	163.5	6 37.9	−59.2	163.5	5 40.3	−59.2	163.5	4 42.8	−59.3	163.5	24
25	10 26.4	−58.9	163.5	9 28.9	−59.0	163.5	8 31.4	−59.1	163.6	7 33.8	−59.1	163.6	6 36.3	−59.2	163.6	5 38.7	−59.2	163.7	4 41.1	−59.2	163.7	3 43.5	−59.3	163.7	25
26	9 27.5	−58.9	163.6	8 29.9	−59.0	163.7	7 32.3	−59.0	163.7	6 34.7	−59.0	163.8	5 37.1	−59.1	163.8	4 39.5	−59.2	163.8	3 41.9	−59.2	163.8	2 44.3	−59.3	163.9	26
27	8 28.6	−58.9	163.8	7 31.0	−59.0	163.9	6 33.3	−59.0	163.9	5 35.7	−59.1	163.9	4 38.0	−59.1	164.0	3 40.3	−59.2	164.0	2 42.7	−59.3	164.0	1 45.0	−59.3	164.0	27
28	7 29.7	−58.9	164.0	6 32.0	−59.0	164.1	5 34.3	−59.1	164.1	4 36.6	−59.1	164.1	3 38.9	−59.1	164.1	2 41.1	−59.1	164.1	1 43.4	−59.2	164.2	0 45.7	−59.3	164.2	28
29	6 30.7	−58.9	164.2	5 33.0	−59.0	164.2	4 35.2	−59.0	164.3	3 37.5	−59.1	164.3	2 39.7	−59.1	164.3	1 42.0	−59.2	164.3	0 44.2	−59.3	164.3	0 13.6	+59.3	15.7	29
30	5 31.8	−59.0	164.4	4 34.0	−59.0	164.4	3 36.2	−59.1	164.4	2 38.4	−59.1	164.5	1 40.6	−59.2	164.5	0 42.8	−59.2	164.5	0 15.1	+59.2	15.5	1 12.9	+59.2	15.5	30
31	4 32.8	−58.9	164.6	3 35.0	−59.0	164.6	2 37.1	−59.0	164.6	1 39.3	−59.1	164.6	0 41.4	−59.2	164.6	0 16.4	+59.2	15.4	1 14.3	+59.2	15.4	2 12.1	+59.3	15.4	31
32	3 33.9	−59.0	164.8	2 36.0	−59.0	164.8	1 38.1	−59.1	164.8	0 40.2	−59.1	164.8	0 17.7	+59.2	15.2	1 15.6	+59.2	15.2	2 13.5	+59.2	15.2	3 11.4	+59.3	15.2	32
33	2 34.9	−58.9	165.0	1 37.0	−59.0	165.0	0 39.0	−59.0	165.0	0 18.9	+59.1	15.0	1 16.9	+59.1	15.0	2 14.8	+59.1	15.0	3 12.8	+59.2	15.0	4 10.7	+59.3	15.1	33
34	1 36.0	−59.0	165.2	0 38.0	−59.0	165.2	0 20.0	+59.1	14.8	1 18.0	+59.1	14.8	2 16.0	+59.1	14.9	3 14.0	+59.2	14.9	4 12.0	+59.2	14.9	5 10.0	+59.2	14.9	34
35	0 37.0	−58.9	165.3	0 21.0	+59.0	14.7	1 19.1	+59.0	14.7	2 17.1	+59.1	14.7	3 15.1	+59.2	14.7	4 13.2	+59.2	14.7	5 11.2	+59.2	14.7	6 09.2	+59.3	14.7	35
36	0 21.9	+59.0	14.5	1 20.0	+59.0	14.5	2 18.1	+59.0	14.5	3 16.2	+59.1	14.5	4 14.3	+59.1	14.5	5 12.4	+59.2	14.5	6 10.4	+59.3	14.6	7 08.5	+59.2	14.6	36
37	1 20.9	+58.9	14.3	2 19.0	+59.0	14.3	3 17.2	+59.0	14.3	4 15.3	+59.1	14.3	5 13.4	+59.2	14.3	6 11.6	+59.1	14.4	7 09.7	+59.2	14.4	8 07.8	+59.2	14.4	37
38	2 19.8	+58.9	14.1	3 18.0	+59.0	14.1	4 16.2	+59.0	14.1	5 14.4	+59.1	14.2	6 12.6	+59.1	14.2	7 10.7	+59.2	14.2	8 08.9	+59.2	14.2	9 07.0	+59.3	14.3	38
39	3 18.8	+58.9	13.9	4 17.0	+59.0	13.9	5 15.2	+59.1	14.0	6 13.5	+59.1	14.0	7 11.7	+59.1	14.0	8 09.9	+59.2	14.0	9 08.1	+59.2	14.1	10 06.3	+59.3	14.1	39
40	4 17.7	+59.0	13.7	5 16.0	+59.0	13.8	6 14.3	+59.0	13.8	7 12.6	+59.0	13.8	8 10.8	+59.1	13.8	9 09.1	+59.1	13.9	10 07.3	+59.2	13.9	11 05.6	+59.2	14.0	40
41	5 16.7	+58.9	13.5	6 15.0	+59.0	13.6	7 13.3	+59.1	13.6	8 11.6	+59.1	13.6	9 09.9	+59.2	13.7	10 08.2	+59.2	13.7	11 06.5	+59.3	13.7	12 04.8	+59.3	13.8	41
42	6 15.6	+59.0	13.4	7 14.0	+59.0	13.4	8 12.4	+59.0	13.4	9 10.7	+59.1	13.5	10 09.1	+59.1	13.5	11 07.4	+59.2	13.5	12 05.7	+59.2	13.6	13 04.0	+59.3	13.6	42
43	7 14.6	+58.9	13.2	8 13.0	+59.0	13.2	9 11.4	+59.0	13.2	10 09.8	+59.1	13.3	11 08.2	+59.1	13.3	12 06.6	+59.1	13.4	13 04.9	+59.2	13.4	14 03.3	+59.2	13.5	43
44	8 13.5	+58.9	13.0	9 12.0	+58.9	13.0	10 10.4	+59.0	13.1	11 08.9	+59.0	13.1	12 07.3	+59.1	13.1	13 05.7	+59.2	13.2	14 04.1	+59.2	13.3	15 02.5	+59.2	13.3	44
45	9 12.4	+58.9	12.8	10 10.9	+58.9	12.8	11 09.4	+59.0	12.9	12 07.9	+59.1	12.9	13 06.4	+59.1	13.0	14 04.9	+59.1	13.0	15 03.3	+59.2	13.1	16 01.7	+59.3	13.1	45
46	10 11.3	+59.0	12.6	11 09.9	+58.9	12.6	12 08.4	+59.0	12.7	13 07.0	+59.0	12.7	14 05.5	+59.1	12.8	15 04.0	+59.1	12.8	16 02.5	+59.1	12.9	17 01.0	+59.2	13.0	46
47	11 10.3	+58.9	12.4	12 08.8	+58.9	12.4	13 07.4	+59.0	12.5	14 06.0	+59.0	12.6	15 04.6	+59.0	12.6	16 03.1	+59.1	12.7	17 01.6	+59.2	12.7	18 00.2	+59.2	12.8	47
48	12 09.2	+58.9	12.2	13 07.8	+58.9	12.3	14 06.4	+59.0	12.3	15 05.0	+59.1	12.4	16 03.6	+59.1	12.4	17 02.2	+59.1	12.5	18 00.8	+59.2	12.6	18 59.4	+59.1	12.6	48
49	13 08.1	+58.9	12.0	14 06.7	+59.0	12.1	15 05.4	+59.0	12.1	16 04.1	+59.0	12.2	17 02.7	+59.1	12.2	18 01.3	+59.1	12.3	19 00.0	+59.1	12.4	19 58.5	+59.2	12.5	49
50	14 07.0	+58.8	11.8	15 05.7	+58.9	11.9	16 04.4	+59.0	11.9	17 03.1	+59.0	12.0	18 01.8	+59.0	12.1	19 00.4	+59.1	12.1	19 59.1	+59.1	12.2	20 57.7	+59.2	12.3	50
51	15 05.8	+58.9	11.6	16 04.6	+58.9	11.7	17 03.4	+58.9	11.7	18 02.1	+59.0	11.8	19 00.8	+59.1	11.9	19 59.5	+59.0	11.9	20 58.2	+59.1	12.0	21 56.9	+59.1	12.1	51
52	16 04.7	+58.9	11.4	17 03.5	+58.9	11.5	18 02.3	+58.9	11.5	19 01.1	+59.0	11.6	19 59.9	+59.0	11.7	20 58.6	+59.1	11.8	21 57.3	+59.1	11.8	22 56.0	+59.2	11.9	52
53	17 03.6	+58.8	11.2	18 02.4	+58.9	11.3	19 01.2	+58.9	11.4	20 00.1	+58.9	11.4	20 58.9	+59.0	11.5	21 57.7	+59.0	11.6	22 56.4	+59.1	11.7	23 55.2	+59.1	11.7	53
54	18 02.4	+58.8	11.0	19 01.3	+58.9	11.1	20 00.2	+58.9	11.1	20 59.0	+58.9	11.2	21 57.9	+59.0	11.3	22 56.7	+59.1	11.4	23 55.5	+59.1	11.5	24 54.3	+59.1	11.6	54
55	19 01.2	+58.9	10.8	20 00.2	+58.8	10.9	20 59.1	+58.9	10.9	21 58.0	+58.9	11.0	22 56.9	+59.0	11.1	23 55.8	+59.0	11.2	24 54.6	+59.1	11.3	25 53.4	+59.1	11.4	55
56	20 00.1	+58.8	10.6	20 59.0	+58.9	10.7	21 58.0	+58.9	10.7	22 56.9	+58.9	10.8	23 55.9	+59.0	10.9	24 54.8	+59.0	11.0	25 53.7	+59.0	11.1	26 52.5	+59.1	11.2	56
57	20 58.9	+58.8	10.4	21 57.9	+58.8	10.5	22 56.9	+58.8	10.6	23 55.9	+58.9	10.6	24 54.8	+59.0	10.7	25 53.8	+58.9	10.8	26 52.7	+59.0	10.9	27 51.6	+59.1	11.0	57
58	21 57.7	+58.7	10.2	22 56.7	+58.8	10.2	23 55.8	+58.8	10.3	24 54.8	+58.9	10.4	25 53.8	+58.9	10.5	26 52.8	+58.9	10.6	27 51.7	+59.0	10.7	28 50.7	+59.0	10.8	58
59	22 56.4	+58.8	10.0	23 55.5	+58.8	10.1	24 54.6	+58.8	10.1	25 53.7	+58.9	10.2	26 52.7	+58.9	10.3	27 51.7	+58.9	10.4	28 50.7	+58.9	10.5	29 49.7	+59.0	10.6	59
60	23 55.2	+58.7	9.7	24 54.3	+58.8	9.8	25 53.4	+58.9	9.9	26 52.5	+58.9	10.0	27 51.6	+58.9	10.1	28 50.7	+59.0	10.2	29 49.7	+59.0	10.3	30 48.8	+59.0	10.4	60
61	24 53.9	+58.7	9.5	25 53.1	+58.8	9.6	26 52.3	+58.7	9.7	27 51.4	+58.8	9.8	28 50.5	+58.9	9.8	29 49.6	+58.9	9.9	30 48.7	+59.0	10.0	31 47.8	+59.0	10.2	61
62	25 52.6	+58.7	9.3	26 51.9	+58.7	9.4	27 51.0	+58.8	9.4	28 50.2	+58.8	9.5	29 49.4	+58.8	9.6	30 48.5	+58.9	9.7	31 47.7	+58.9	9.8	32 46.8	+58.9	9.9	62
63	26 51.3	+58.7	9.0	27 50.6	+58.7	9.1	28 49.8	+58.8	9.2	29 49.0	+58.8	9.3	30 48.2	+58.9	9.4	31 47.4	+58.9	9.5	32 46.6	+58.9	9.6	33 45.7	+59.0	9.7	63
64	27 50.0	+58.7	8.8	28 49.3	+58.7	8.9	29 48.6	+58.7	9.0	30 47.8	+58.8	9.1	31 47.1	+58.8	9.2	32 46.3	+58.8	9.3	33 45.5	+58.9	9.4	34 44.7	+58.9	9.5	64
65	28 48.7	+58.6	8.5	29 48.0	+58.6	8.7	30 47.3	+58.7	8.7	31 46.6	+58.7	8.8	32 45.9	+58.7	8.9	33 45.1	+58.8	9.0	34 44.4	+58.9	9.1	35 43.6	+58.9	9.3	65
66	29 47.3	+58.6	8.3	30 46.6	+58.7	8.4	31 46.0	+58.6	8.5	32 45.3	+58.7	8.6	33 44.6	+58.8	8.7	34 43.9	+58.8	8.8	35 43.2	+58.8	9.0	36 42.5	+58.9	9.0	66
67	30 45.9	+58.5	8.1	31 45.3	+58.6	8.2	32 44.6	+58.7	8.3	33 44.0	+58.7	8.3	34 43.4	+58.7	8.4	35 42.7	+58.8	8.6	36 42.0	+58.8	8.7	37 41.3	+58.9	8.8	67
68	31 44.4	+58.6	7.8	32 43.9	+58.5	7.9	33 43.3	+58.6	8.0	34 42.7	+58.6	8.1	35 42.1	+58.7	8.2	36 41.5	+58.7	8.3	37 40.8	+58.8	8.5	38 40.2	+58.8	8.5	68
69	32 43.0	+58.5	7.6	33 42.4	+58.6	7.7	34 41.9	+58.6	7.7	35 41.3	+58.6	7.8	36 40.8	+58.6	7.9	37 40.2	+58.7	8.0	38 39.6	+58.7	8.2	39 39.0	+58.7	8.3	69
70	33 41.5	+58.4	7.3	34 41.0	+58.5	7.4	35 40.5	+58.5	7.5	36 39.9	+58.6	7.6	37 39.4	+58.6	7.7	38 38.9	+58.6	7.8	39 38.3	+58.7	7.9	40 37.7	+58.8	8.0	70
71	34 39.9	+58.4	7.0	35 39.5	+58.4	7.1	36 39.0	+58.5	7.2	37 38.5	+58.5	7.3	38 38.0	+58.6	7.4	39 37.5	+58.6	7.5	40 37.0	+58.6	7.6	41 36.5	+58.6	7.7	71
72	35 38.3	+58.4	6.7	36 37.9	+58.4	6.8	37 37.5	+58.5	6.9	38 37.1	+58.4	7.0	39 36.6	+58.5	7.1	40 36.1	+58.6	7.2	41 35.6	+58.6	7.3	42 35.1	+58.7	7.5	72
73	36 36.7	+58.4	6.5	37 36.4	+58.3	6.5	38 36.0	+58.4	6.6	39 35.5	+58.5	6.7	40 35.1	+58.5	6.8	41 34.7	+58.5	6.9	42 34.2	+58.6	7.0	43 33.8	+58.6	7.2	73
74	37 35.1	+58.3	6.2	38 34.7	+58.4	6.3	39 34.4	+58.3	6.3	40 34.0	+58.4	6.4	41 33.6	+58.5	6.5	42 33.2	+58.5	6.6	43 32.8	+58.5	6.7	44 32.4	+58.5	6.9	74
75	38 33.4	+58.2	5.9	39 33.1	+58.2	6.0	40 32.7	+58.4	6.0	41 32.4	+58.4	6.1	42 32.1	+58.4	6.2	43 31.7	+58.4	6.3	44 31.3	+58.5	6.4	45 30.9	+58.5	6.6	75
76	39 31.6	+58.2	5.6	40 31.4	+58.2	5.6	41 31.1	+58.2	5.7	42 30.8	+58.3	5.8	43 30.4	+58.3	5.9	44 30.1	+58.4	6.0	45 29.8	+58.4	6.1	46 29.4	+58.5	6.2	76
77	40 29.8	+58.2	5.2	41 29.6	+58.2	5.3	42 29.3	+58.2	5.4	43 29.1	+58.2	5.5	44 28.8	+58.3	5.6	45 28.5	+58.3	5.7	46 28.2	+58.3	5.8	47 27.9	+58.4	5.9	77
78	41 28.0	+58.1	4.9	42 27.8	+58.1	5.0	43 27.5	+58.2	5.1	44 27.3	+58.2	5.2	45 27.1	+58.1	5.3	46 26.8	+58.2	5.3	47 26.5	+58.3	5.6	48 26.3	+58.3	5.6	78
79	42 26.1	+58.0	4.6	43 25.9	+58.1	4.7	44 25.7	+58.1	4.7	45 25.5	+58.1	4.8	46 25.3	+58.1	4.9	47 25.0	+58.2	5.0	48 24.8	+58.2	5.1	49 24.6	+58.2	5.2	79
80	43 24.1	+58.0	4.2	44 24.0	+57.9	4.3	45 23.8	+58.0	4.4	46 23.6	+58.1	4.5	47 23.4	+58.1	4.5	48 23.2	+58.1	4.6	49 23.0	+58.2	4.7	50 22.8	+58.2	4.8	80
81	44 22.1	+57.9	3.9	45 21.9	+58.0	3.9	46 21.8	+58.0	4.0	47 21.7	+57.9	4.1	48 21.5	+58.0	4.2	49 21.3	+58.1	4.2	50 21.2	+58.0	4.3	51 21.0	+58.1	4.4	81
82	45 20.0	+57.8	3.5	46 19.9	+57.9	3.6	47 19.8	+57.8	3.6	48 19.6	+57.9	3.7	49 19.5	+57.9	3.8	50 19.4	+57.9	3.9	51 19.2	+58.0	3.9	52 19.1	+58.0	4.0	82
83	46 17.8	+57.8	3.1	47 17.7	+57.8	3.2	48 17.6	+57.8	3.2	49 17.5	+57.8	3.3	50 17.4	+57.9	3.4	51 17.3	+57.9	3.5	52 17.2	+57.9	3.5	53 17.1	+57.9	3.6	83
84	47 15.6	+57.6	2.7	48 15.5	+57.7	2.8	49 15.4	+57.7	2.8	50 15.3	+57.7	2.9	51 15.3	+57.6	3.0	52 15.2	+57.7	3.0	53 15.1	+57.8	3.1	54 15.0	+57.8	3.2	84
85	48 13.2	+57.6	2.3	49 13.2	+57.6	2.4	50 13.1	+57.6	2.4	51 13.1	+57.6	2.5	52 13.0	+57.6	2.5	53 12.9	+57.7	2.6	54 12.9	+57.7	2.6	55 12.8	+57.7	2.7	85
86	49 10.8	+57.5	1.9	50 10.8	+57.4	1.9	51 10.7	+57.5	2.0	52 10.7	+57.5	2.0	53 10.6	+57.6	2.1	54 10.6	+57.5	2.1	55 10.6	+57.5	2.2	56 10.5	+57.6	2.2	86
87	50 08.3	+57.3	1.4	51 08.2	+57.4	1.5	52 08.2	+57.4	1.5	53 08.2	+57.3	1.5	54 08.2	+57.4	1.6	55 08.1	+57.4	1.6	56 08.1	+57.4	1.7	57 08.1	+57.4	1.7	87
88	51 05.6	+57.3	1.0	52 05.6	+57.3	1.0	53 05.6	+57.3	1.0	54 05.6	+57.3	1.1	55 05.6	+57.3	1.1	56 05.6	+57.3	1.1	57 05.6	+57.3	1.1	58 05.5	+57.4	1.2	88
89	52 02.9	+57.1	0.5	53 02.9	+57.1	0.5	54 02.9	+57.1	0.5	55 02.9	+57.1	0.5	56 02.9	+57.1	0.6	57 02.9	+57.1	0.6	58 02.9	+57.1	0.6	59 02.9	+57.1	0.6	89
90	53 00.0	+57.0	0.0	54 00.0	+57.0	0.0	55 00.0	+57.0	0.0	56 00.0	+57.0	0.0	57 00.0	+57.0	0.0	58 00.0	+57.0	0.0	59 00.0	+57.0	0.0	60 00.0	+57.0	0.0	90

53°   54°   55°   56°   57°   58°   59°   60°

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 162°, 198°

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	34 40.9 +58.3 156.7	33 45.8 +58.4 156.9	32 50.5 +58.5 157.2	31 55.2 +58.6 157.4	30 59.7 +58.7 157.7	30 04.2 +58.7 157.9	29 08.5 +58.9 158.1	28 12.8 +59.0 158.3	0
1	35 39.2 +58.2 156.4	34 44.2 +58.3 156.7	33 49.0 +58.5 156.9	32 53.8 +58.5 157.2	31 58.4 +58.7 157.4	31 02.9 +58.8 157.7	30 07.4 +58.9 157.9	29 11.8 +58.9 158.1	1
2	36 37.4 +58.2 156.1	35 42.5 +58.3 156.4	34 47.5 +58.4 156.7	33 52.3 +58.5 156.9	32 57.1 +58.6 157.2	32 01.7 +58.7 157.4	31 06.3 +58.8 157.7	30 10.7 +58.9 157.9	2
3	37 35.6 +58.1 155.8	36 40.8 +58.2 156.1	35 45.9 +58.4 156.4	34 50.8 +58.5 156.7	33 55.7 +58.6 156.9	33 00.4 +58.7 157.2	32 05.1 +58.8 157.4	31 09.6 +58.9 157.7	3
4	38 33.7 +58.0 155.5	37 39.0 +58.2 155.8	36 44.2 +58.4 156.1	35 49.3 +58.5 156.4	34 54.3 +58.6 156.7	33 59.1 +58.7 156.9	33 03.9 +58.8 157.2	32 08.5 +58.9 157.4	4
5	39 31.7 +58.0 155.1	38 37.2 +58.2 155.5	37 42.6 +58.2 155.8	36 47.8 +58.4 156.1	35 52.9 +58.5 156.4	34 57.8 +58.6 156.7	34 02.7 +58.7 157.0	33 07.4 +58.8 157.2	5
6	40 29.7 +58.0 154.8	39 35.4 +58.1 155.2	38 40.8 +58.3 155.5	37 46.2 +58.3 155.8	36 51.4 +58.5 156.1	35 56.4 +58.7 156.4	35 01.4 +58.7 156.7	34 06.2 +58.8 157.0	6
7	41 27.7 +57.9 154.5	40 33.5 +58.0 154.8	39 39.1 +58.2 155.2	38 44.5 +58.4 155.5	37 49.9 +58.4 155.8	36 55.1 +58.5 156.2	36 00.1 +58.7 156.5	35 05.0 +58.8 156.7	7
8	42 25.6 +57.8 154.1	41 31.5 +58.0 154.5	40 37.3 +58.1 154.9	39 42.9 +58.2 155.2	38 48.3 +58.4 155.6	37 53.6 +58.5 155.9	36 58.8 +58.6 156.2	36 03.8 +58.8 156.5	8
9	43 23.4 +57.7 153.7	42 29.5 +57.9 154.1	41 35.4 +58.1 154.5	40 41.1 +58.3 154.9	39 46.7 +58.4 155.3	38 52.1 +58.5 155.6	37 57.4 +58.6 155.9	37 02.6 +58.7 156.2	9
10	44 21.1 +57.7 153.4	43 27.4 +57.8 153.8	42 33.5 +58.0 154.2	41 39.4 +58.1 154.6	40 45.1 +58.3 155.0	39 50.6 +58.5 155.3	38 56.0 +58.6 155.7	38 01.3 +58.7 156.0	10
11	45 18.8 +57.6 153.0	44 25.2 +57.8 153.4	43 31.5 +57.9 153.8	42 37.5 +58.1 154.3	41 43.4 +58.2 154.6	40 49.1 +58.4 155.0	39 54.6 +58.5 155.4	39 00.0 +58.6 155.7	11
12	46 16.4 +57.5 152.6	45 23.0 +57.7 153.0	44 29.4 +57.9 153.5	43 35.6 +58.1 153.9	42 41.6 +58.2 154.3	41 47.5 +58.3 154.7	40 53.1 +58.5 155.1	39 58.6 +58.7 155.4	12
13	47 13.9 +57.4 152.1	46 20.7 +57.6 152.6	45 27.3 +57.8 153.1	44 33.7 +57.9 153.6	43 39.8 +58.2 154.0	42 45.8 +58.3 154.4	41 51.6 +58.5 154.8	40 57.3 +58.5 155.2	13
14	48 11.3 +57.3 151.7	47 18.3 +57.5 152.2	46 25.1 +57.7 152.7	45 31.6 +57.9 153.2	44 38.0 +58.1 153.6	43 44.1 +58.2 154.1	42 50.1 +58.3 154.5	41 55.8 +58.5 154.9	14
15	49 08.6 +57.1 151.3	48 15.8 +57.4 151.8	47 22.8 +57.6 152.3	46 29.5 +57.9 152.8	45 36.1 +58.0 153.3	44 42.3 +58.2 153.7	43 48.4 +58.4 154.2	42 54.3 +58.5 154.6	15
16	50 05.7 +57.1 150.8	49 13.2 +57.3 151.4	48 20.4 +57.6 151.9	47 27.4 +57.7 152.4	46 34.1 +57.9 152.9	45 40.5 +58.1 153.4	44 46.8 +58.2 153.8	43 52.8 +58.4 154.3	16
17	51 02.8 +57.0 150.3	50 10.5 +57.2 150.9	49 18.0 +57.4 151.5	48 25.1 +57.7 152.0	47 32.0 +57.8 152.5	46 38.6 +58.1 153.0	45 45.0 +58.3 153.5	44 51.2 +58.4 153.9	17
18	51 59.8 +56.8 149.8	51 07.7 +57.1 150.4	50 15.4 +57.3 151.0	49 22.8 +57.5 151.6	48 29.8 +57.8 152.1	47 36.7 +57.9 152.7	46 43.3 +58.1 153.2	45 49.6 +58.3 153.6	18
19	52 56.6 +56.6 149.3	52 04.8 +57.0 149.9	51 12.7 +57.2 150.6	50 20.3 +57.5 151.2	49 27.6 +57.7 151.7	48 34.6 +57.9 152.3	47 41.4 +58.1 152.9	46 47.9 +58.3 153.3	19
20	53 53.2 +56.5 148.7	53 01.8 +56.8 149.4	52 09.9 +57.1 150.1	51 17.8 +57.3 150.7	50 25.3 +57.6 151.3	49 32.5 +57.8 151.9	48 39.5 +58.0 152.4	47 46.2 +58.1 152.9	20
21	54 49.7 +56.4 148.2	53 58.6 +56.6 148.9	53 07.0 +57.0 149.6	52 15.1 +57.2 150.2	51 22.9 +57.4 150.9	50 30.3 +57.7 151.5	49 37.5 +57.9 152.0	48 44.3 +58.2 152.6	21
22	55 46.1 +56.1 147.5	54 55.2 +56.5 148.3	54 04.0 +56.8 149.0	53 12.3 +57.1 149.7	52 20.3 +57.4 150.4	51 28.0 +57.6 151.0	50 35.4 +57.8 151.6	49 42.5 +58.0 152.2	22
23	56 42.2 +56.0 146.9	55 51.7 +56.3 147.7	55 00.8 +56.6 148.5	54 09.4 +57.0 149.2	53 17.7 +57.2 149.9	52 25.6 +57.5 150.6	51 33.2 +57.7 151.2	50 40.5 +57.9 151.8	23
24	57 38.2 +55.7 146.2	56 48.0 +56.2 147.1	55 57.4 +56.5 147.9	55 06.4 +56.8 148.7	54 14.9 +57.1 149.4	53 23.1 +57.4 150.1	52 30.9 +57.7 150.7	51 38.4 +57.9 151.4	24
25	58 33.9 +55.5 145.5	57 44.2 +55.9 146.4	56 53.9 +56.3 147.3	56 03.2 +56.6 148.1	55 12.0 +57.0 148.9	54 20.5 +57.2 149.6	53 28.6 +57.5 150.3	52 36.3 +57.7 150.9	25
26	59 29.4 +55.2 144.8	58 40.1 +55.6 145.8	57 50.2 +56.1 146.7	56 59.8 +56.5 147.5	56 09.0 +56.8 148.3	55 17.7 +57.1 149.1	54 26.1 +57.4 149.8	53 34.0 +57.6 150.5	26
27	60 24.6 +54.9 144.0	59 35.7 +55.4 145.0	58 46.3 +55.8 146.0	57 56.3 +56.2 146.9	57 05.8 +56.6 147.7	56 14.8 +57.0 148.5	55 23.5 +57.2 149.3	54 31.7 +57.5 150.0	27
28	61 19.5 +54.6 143.2	60 31.1 +55.2 144.3	59 42.1 +55.6 145.3	58 52.5 +56.1 146.2	58 02.4 +56.5 147.1	57 11.8 +56.8 147.9	56 20.7 +57.1 148.8	55 29.2 +57.4 149.5	28
29	62 14.1 +54.3 142.3	61 26.3 +54.8 143.4	60 37.7 +55.4 144.5	59 48.6 +55.8 145.5	58 58.9 +56.2 146.5	58 08.6 +56.6 147.4	57 17.8 +57.0 148.2	56 26.6 +57.3 149.0	29
30	63 08.4 +53.8 141.4	62 21.1 +54.5 142.6	61 33.1 +55.0 143.7	60 44.4 +55.5 144.8	59 55.1 +56.0 145.8	59 05.2 +56.4 146.7	58 14.8 +56.8 147.6	57 23.9 +57.1 148.4	30
31	64 02.2 +53.5 140.4	63 15.6 +54.1 141.7	62 28.1 +54.7 142.9	61 39.9 +55.3 144.0	60 51.1 +55.7 145.0	60 01.6 +56.2 146.0	59 11.6 +56.7 147.0	58 21.0 +57.0 147.9	31
32	64 55.7 +52.9 139.3	64 09.7 +53.7 140.7	63 22.8 +54.4 142.0	62 35.2 +55.0 143.2	61 46.8 +55.5 144.3	60 57.8 +56.0 145.3	60 08.2 +56.4 146.3	59 18.0 +56.7 147.3	32
33	65 48.6 +52.4 138.2	65 03.4 +53.2 139.7	64 17.2 +53.9 141.0	63 30.2 +54.5 142.3	62 42.3 +55.1 143.5	61 53.8 +55.7 144.6	61 04.6 +56.1 145.6	60 14.7 +56.6 146.6	33
34	66 41.0 +51.7 137.0	65 56.6 +52.7 138.5	65 11.1 +53.5 140.0	64 24.7 +54.3 141.3	63 37.5 +54.8 142.6	62 49.5 +55.4 143.7	62 00.7 +55.9 144.9	61 13.6 +56.4 145.9	34
35	67 32.9 +51.1 135.7	66 49.3 +52.2 137.3	66 04.6 +53.0 138.9	65 19.0 +53.7 140.3	64 32.3 +54.5 141.7	63 44.9 +55.0 142.9	62 56.6 +55.7 144.1	62 07.7 +56.1 145.2	35
36	68 24.0 +50.4 134.3	67 41.5 +51.4 136.1	66 57.6 +52.5 137.7	66 12.7 +53.3 139.2	65 26.8 +54.0 140.7	64 39.9 +54.8 142.0	63 52.3 +55.3 143.3	63 03.8 +55.9 144.4	36
37	69 14.4 +49.6 132.8	68 32.9 +50.8 134.7	67 50.1 +51.8 136.4	67 06.0 +52.8 138.1	66 20.8 +53.6 139.6	65 34.7 +54.3 141.0	64 47.6 +54.9 142.4	63 59.7 +55.5 143.6	37
38	70 04.0 +48.6 131.2	69 23.7 +49.9 133.2	68 41.9 +51.1 135.1	67 58.8 +52.1 136.8	67 14.4 +53.1 138.5	66 29.0 +53.9 140.0	65 42.5 +54.6 141.4	64 55.2 +55.2 142.8	38
39	70 52.6 +47.5 129.4	70 13.6 +49.0 131.6	69 33.0 +50.3 133.6	68 50.9 +51.4 135.5	68 07.5 +52.4 137.2	67 22.9 +53.3 138.9	66 37.1 +54.2 140.4	65 50.4 +54.9 141.8	39
40	71 40.1 +46.3 127.5	71 02.6 +47.9 129.8	70 23.3 +49.4 132.0	69 42.3 +50.7 134.0	68 59.9 +51.8 135.9	68 16.2 +52.8 137.7	67 31.3 +53.7 139.3	66 45.3 +54.4 140.8	40
41	72 26.4 +44.9 125.5	71 50.5 +46.8 128.0	71 12.7 +48.3 130.3	70 33.0 +49.8 132.4	69 51.7 +51.1 134.5	69 09.0 +52.1 136.3	68 25.0 +53.1 138.1	67 39.7 +54.0 139.7	41
42	73 11.3 +43.3 123.2	72 37.3 +45.3 125.9	72 01.0 +47.2 128.4	71 22.8 +48.7 130.7	70 42.8 +50.1 132.9	70 01.1 +51.5 134.9	69 18.1 +52.5 136.8	68 33.7 +53.5 138.6	42
43	73 54.6 +41.5 120.8	73 22.6 +43.8 123.7	72 48.2 +45.8 126.4	72 11.5 +47.7 128.9	71 32.9 +49.2 131.2	70 52.6 +50.5 133.4	70 10.6 +51.8 135.4	69 27.2 +52.8 137.3	43
44	74 36.1 +39.4• 118.1	74 06.4 +42.0 121.2	73 34.0 +44.2 124.1	72 59.2 +46.2 126.8	72 22.1 +48.1 129.4	71 43.1 +49.6 131.7	71 02.4 +50.9 133.9	70 20.0 +52.2 135.9	44
45	75 15.5 +37.1• 115.2	74 48.4 +39.9• 118.6	74 18.2 +42.5 121.7	73 45.4 +44.8 124.6	73 10.2 +46.7 127.3	72 32.7 +48.5 129.9	71 53.3 +50.1 132.2	71 12.2 +51.3 134.4	45
46	75 52.6 +34.3• 112.1	75 28.3 +37.6• 115.6	75 00.7 +40.5• 119.0	74 30.2 +43.0 122.2	73 56.9 +45.3 125.1	73 21.2 +47.3 127.9	72 43.4 +48.9 130.4	72 03.5 +50.5 132.8	46
47	76 26.9 +31.3• 108.6	76 05.9 +34.8• 112.5	75 41.2 +38.1• 116.1	75 13.2 +40.9• 119.5	74 42.2 +43.3 122.7	74 08.5 +45.7 125.7	73 32.3 +47.7 128.4	72 54.0 +49.4 131.0	47
48	76 58.2 +28.0• 104.9	76 40.7 +31.9• 109.0	76 19.3 +35.4• 112.9	75 54.1 +38.7• 116.6	75 25.7 +41.5• 120.0	74 54.2 +44.1 123.2	74 20.0 +46.3 126.2	73 43.4 +48.2 129.0	48
49	77 26.2 +24.0• 100.9	77 12.6 +28.3• 105.3	76 54.7 +32.3• 109.4	76 32.8 +35.9• 113.4	76 07.2 +39.2• 117.1	75 38.3 +42.0• 120.6	75 06.3 +44.6 123.8	74 31.6 +46.8 126.8	49
50	77 50.2 +19.9• 96.6	77 40.9 +24.6• 101.2	77 27.0 +28.9• 105.6	77 08.7 +32.9• 109.8	76 46.4 +36.5• 113.8	76 20.3 +39.8• 117.6	75 50.9 +42.6• 121.1	75 18.4 +45.2 124.4	50
51	78 10.1 +15.4• 92.1	78 05.5 +20.2• 96.8	77 55.9 +24.9• 101.5	77 41.6 +29.4• 106.0	77 22.9 +33.5• 110.3	77 00.1 +37.1• 114.4	76 33.5 +40.4• 118.2	76 03.6 +43.2• 121.7	51
52	78 25.5 +10.4• 87.3	78 25.7 +15.6• 92.2	78 20.8 +20.7• 97.1	78 11.0 +25.4• 101.8	77 56.4 +29.8• 106.4	77 37.2 +34.0• 110.8	77 13.9 +37.7• 114.9	76 46.8 +40.9• 118.8	52
53	78 35.9 +4.5• 82.4	78 41.3 +10.6• 87.3	78 41.5 +15.9• 92.4	78 36.4 +21.0• 97.3	78 26.2 +25.9• 102.2	78 11.2 +30.4• 106.9	77 51.6 +34.6• 111.3	77 27.7 +38.3• 115.5	53
54	78 41.3 +0.2• 77.3	78 51.9 +5.5• 82.3	78 57.4 +10.7• 87.4	78 57.4 +16.2• 92.5	78 52.1 +21.4• 97.6	78 41.6 +26.4• 102.5	78 26.2 +31.0• 107.3	78 06.0 +35.2• 111.9	54
55	78 41.5 −5.1• 72.2	78 57.4 0.0• 77.1	79 08.1 +5.5• 82.2	79 13.6 +10.9• 87.4	79 13.5 +16.5• 92.7	79 08.0 +21.8• 97.9	78 57.2 +26.9• 103.0	78 41.2 +31.6• 107.8	55
56	78 36.4 −10.2• 67.2	78 57.4 −5.3• 71.9	79 13.6 −5.5• 76.9	79 24.5 +5.5• 82.1	79 30.0 +11.1• 87.5	79 29.8 +16.8• 92.8	79 24.1 +22.2• 98.2	79 12.8 +27.4• 103.4	56
57	78 26.2 −15.0• 62.2	78 52.1 −10.5• 66.7	79 13.5 −5.5• 71.5	79 30.0 −0.2• 76.7	79 41.1 +5.5• 82.0	79 46.6 +11.3• 87.5	79 46.3 +17.1• 93.1	79 40.2 +22.7• 98.5	57
58	78 11.2 −19.6• 57.4	78 41.6 −15.4• 61.6	79 08.0 −10.8• 66.2	79 29.8 −5.7• 71.2	79 46.6 −0.3• 76.4	79 57.9 +5.5• 81.9	80 03.4 +11.4• 87.6	80 02.9 +17.4• 93.3	58
59	77 51.6 −23.9• 52.9	78 26.2 −20.2• 56.8	78 57.2 −16.0• 61.1	79 24.1 −11.3• 65.7	79 46.3 −6.4• 70.4	80 03.4 −0.5• 76.2	80 14.8 +5.5• 81.8	80 20.3 +11.7• 87.7	59
60	77 27.7 −27.7• 48.6	78 06.0 −24.4• 52.1	78 41.2 −20.7• 56.1	79 12.8 −16.4• 60.4	79 40.2 −11.6• 65.2	80 02.9 −6.4• 70.4	80 20.3 −0.6• 75.9	80 32.0 +5.5• 81.8	60
61	77 00.0 −31.1• 44.6	77 41.6 −28.3• 47.8	78 20.5 −25.0• 51.4	78 56.4 −21.3• 55.4	79 28.6 −17.0• 59.8	79 56.5 −12.1• 64.7	80 19.7 −6.7• 70.0	80 37.5 −0.9• 75.7	61
62	76 28.9 −34.2• 40.8	77 13.3 −31.7• 43.7	77 55.5 −28.9• 46.9	78 35.1 −25.7• 50.6	79 11.6 −21.9• 54.6	79 44.4 −17.5• 59.1	80 13.0 −12.7• 64.1	80 36.6 −7.1• 69.5	62
63	75 54.7 −36.9• 37.4	76 41.6 −34.8• 40.0	77 26.6 −32.4• 42.8	78 09.4 −29.5• 46.1	78 49.7 −26.3• 49.7	79 26.9 −22.6• 53.8	80 00.3 −18.1• 58.4	80 29.5 −13.1• 63.5	63
64	75 17.8 −39.3• 34.2	76 06.8 −37.5• 36.5	76 54.2 −35.4• 39.0	77 39.9 −33.1• 41.9	78 23.4 −30.3• 45.2	79 04.3 −27.0• 48.8	79 42.2 −23.3• 53.0	80 16.4 −18.9• 57.6	64
65	74 38.5 −41.3 31.3	75 29.3 −39.9• 33.3	76 18.8 −38.2• 35.6	77 06.8 −36.1• 38.1	77 53.1 −33.8• 41.0	78 37.3 −31.0• 44.2	79 18.9 −27.7• 47.9	79 57.5 −24.0• 52.1	65
66	73 57.2 −43.2 28.6	74 49.4 −41.9 30.4	75 40.6 −40.4• 32.4	76 30.7 −38.9• 34.6	77 19.3 −36.8• 37.1	78 06.3 −34.5• 40.0	78 51.2 −31.8• 43.2	79 33.5 −28.5• 46.9	66
67	73 14.0 −44.8 26.2	74 07.5 −43.8 27.7	75 00.2 −42.6 29.4	75 51.9 −41.1• 31.4	76 42.5 −39.4• 33.6	77 31.8 −37.5• 36.1	78 19.4 −35.3• 38.9	79 05.0 −32.6• 42.2	67
68	72 29.2 −46.3 23.9	73 23.7 −45.3 25.3	74 17.6 −44.2 26.8	75 10.8 −43.1 28.5	76 03.1 −41.8• 30.4	76 54.3 −40.2• 32.6	77 44.1 −38.2• 35.0	78 32.4 −36.1• 37.9	68
69	71 42.9 −47.4 21.8	72 38.4 −46.7 23.0	73 33.4 −45.9 24.3	74 27.7 −44.8 25.8	75 21.3 −43.7 27.5	76 14.1 −42.4• 29.4	77 05.9 −40.9• 31.5	77 56.3 −39.0• 33.9	69
70	70 55.5 −48.6 19.9	71 51.7 −47.9 21.0	72 47.5 −47.2 22.1	73 42.9 −46.4 23.4	74 37.6 −45.4 24.8	75 31.7 −44.3 26.5	76 25.0 −43.0• 28.3	77 17.3 −41.6• 30.4	70
71	70 06.9 −49.5 18.2	71 03.8 −49.0 19.1	72 00.3 −48.3 20.1	72 56.5 −47.7 21.2	73 52.2 −46.9 22.4	74 47.4 −46.0 23.8	75 42.0 −45.0 25.4	76 35.7 −43.7• 27.2	71
72	69 17.4 −50.3 16.5	70 14.8 −49.9 17.3	71 12.0 −49.4 18.2	72 08.8 −48.8 19.2	73 05.3 −48.2 20.2	74 01.4 −47.4 21.4	74 57.0 −46.6 22.8	75 52.0 −45.6 24.3	72
73	68 27.1 −51.1 15.0	69 24.9 −50.7 15.7	70 22.6 −50.3 16.5	71 20.0 −49.8 17.3	72 17.1 −49.2 18.2	73 14.0 −48.7 19.3	74 10.4 −48.0 20.4	75 06.4 −47.2 21.7	73
74	67 36.0 −51.8 13.6	68 34.2 −51.5 14.2	69 32.3 −51.1 14.9	70 30.2 −50.7 15.6	71 27.9 −50.3 16.4	72 25.3 −49.8 17.3	73 22.4 −49.2 18.3	74 19.2 −48.5 19.4	74
75	66 44.2 −52.4 12.3	67 42.7 −52.1 12.9	68 41.2 −51.8 13.4	69 39.5 −51.4 14.0	70 37.6 −51.1 14.7	71 35.5 −50.7 15.5	72 33.2 −50.2 16.3	73 30.7 −49.7 17.3	75
76	65 51.8 −52.9 11.1	66 50.6 −52.7 11.6	67 49.4 −52.5 12.0	68 48.0 −52.2 12.6	69 46.5 −51.9 13.2	70 44.8 −51.5 13.8	71 43.0 −51.1 14.5	72 41.0 −50.7 15.3	76
77	64 58.9 −53.4 10.0	65 57.9 −53.2 10.4	66 56.9 −53.0 10.8	67 55.8 −52.8 11.2	68 54.6 −52.5 11.7	69 53.3 −52.2 12.3	70 51.9 −52.0 12.9	71 50.3 −51.6 13.6	77
78	64 05.5 −53.9 8.9	65 04.7 −53.7 9.2	66 03.9 −53.5 9.6	67 03.0 −53.3 10.0	68 02.1 −53.1 10.4	69 01.1 −52.9 10.9	70 00.0 −52.6 11.4	70 58.7 −52.4 12.0	78
79	63 11.6 −54.2 7.9	64 11.0 −54.1 8.2	65 10.4 −53.9 8.5	66 09.7 −53.8 8.8	67 09.0 −53.7 9.2	68 08.2 −53.5 9.6	69 07.3 −53.2 10.0	70 06.3 −53.0 10.5	79
80	62 17.4 −54.6 7.0	63 16.9 −54.4 7.2	64 16.5 −54.4 7.5	65 15.9 −54.2 7.8	66 15.3 −54.0 8.1	67 14.7 −53.9 8.4	68 14.1 −53.8 8.8	69 13.3 −53.6 9.2	80
81	61 22.8 −54.9 6.1	62 22.5 −54.8 6.3	63 22.1 −54.7 6.5	64 21.7 −54.6 6.7	65 21.3 −54.5 6.9	66 20.8 −54.4 7.3	67 20.3 −54.3 7.6	68 19.7 −54.1 7.9	81
82	60 27.9 −55.2 5.3	61 27.7 −55.2 5.4	62 27.4 −55.1 5.6	63 27.1 −55.0 5.8	64 26.8 −54.9 6.0	65 26.4 −54.8 6.3	66 26.0 −54.6 6.5	67 25.6 −54.5 6.8	82
83	59 32.7 −55.5 4.5	60 32.5 −55.4 4.6	61 32.3 −55.3 4.8	62 32.1 −55.3 4.9	63 31.9 −55.2 5.1	64 31.6 −55.1 5.3	65 31.4 −55.1 5.5	66 31.1 −55.0 5.7	83
84	58 37.2 −55.7 3.7	59 37.1 −55.6 3.9	60 37.0 −55.6 4.0	61 36.8 −55.5 4.1	62 36.7 −55.5 4.2	63 36.5 −55.5 4.4	64 36.3 −55.4 4.6	65 36.1 −55.4 4.7	84
85	57 41.5 −55.9 3.0	58 41.5 −55.9 3.1	59 41.4 −55.9 3.2	60 41.3 −55.9 3.3	61 41.2 −55.8 3.4	62 41.0 −55.7 3.5	63 40.9 −55.7 3.7	64 40.8 −55.6 3.8	85
86	56 45.6 −56.1 2.4	57 45.6 −56.2 2.4	58 45.5 −56.1 2.5	59 45.4 −56.0 2.6	60 45.4 −56.0 2.7	61 45.3 −56.0 2.8	62 45.2 −55.9 2.8	63 45.2 −56.0 2.9	86
87	55 49.5 −56.3 1.7	56 49.4 −56.3 1.8	57 49.4 −56.5 1.8	58 49.4 −56.3 1.9	59 49.4 −56.3 1.9	60 49.3 −56.2 2.0	61 49.3 −56.2 2.1	62 49.2 −56.2 2.1	87
88	54 53.2 −56.5 1.1	55 53.1 −56.4 1.2	56 53.1 −56.5 1.2	57 53.1 −56.5 1.2	58 53.1 −56.5 1.3	59 53.1 −56.5 1.3	60 53.1 −56.5 1.3	61 53.1 −56.5 1.4	88
89	53 56.7 −56.7 0.6	54 56.7 −56.7 0.6	55 56.6 −56.6 0.6	56 56.6 −56.6 0.6	57 56.6 −56.6 0.6	58 56.6 −56.6 0.6	59 56.6 −56.6 0.7	60 56.6 −56.6 0.7	89
90	53 00.0 −56.8 0.0	54 00.0 −56.8 0.0	55 00.0 −56.8 0.0	56 00.0 −56.8 0.0	57 00.0 −56.8 0.0	58 00.0 −56.8 0.0	59 00.0 −56.8 0.0	60 00.0 −56.8 0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	34 40.9	−58.2	156.7	33 45.8	−58.4	156.9	32 50.5	−58.5	157.2	31 55.2	−58.6	157.4	30 59.7	−58.7	157.7	30 04.2	−58.8	157.9	29 08.5	−58.9	158.1	28 12.8	−59.0	158.3	0
1	33 42.7	−58.4	157.0	32 47.4	−58.5	157.2	31 52.0	−58.6	157.5	30 56.6	−58.7	157.7	30 01.0	−58.7	157.9	29 05.4	−58.9	158.1	28 09.6	−58.9	158.3	27 13.8	−59.0	158.5	1
2	32 44.3	−58.3	157.2	31 48.9	−58.5	157.5	30 53.5	−58.6	157.7	29 57.9	−58.7	157.9	29 02.3	−58.8	158.2	28 06.5	−58.8	158.4	27 10.7	−59.0	158.5	26 14.8	−59.0	158.7	2
3	31 46.0	−58.4	157.5	30 50.5	−58.5	157.7	29 54.9	−58.6	158.0	28 59.2	−58.7	158.2	28 03.5	−58.8	158.4	27 07.7	−58.9	158.6	26 11.8	−59.0	158.8	25 15.8	−59.0	158.9	3
4	30 47.6	−58.5	157.8	29 52.0	−58.6	158.0	28 56.3	−58.6	158.2	28 00.5	−58.7	158.4	27 04.7	−58.8	158.6	26 08.8	−58.9	158.8	25 12.8	−59.0	159.0	24 16.8	−59.0	159.1	4
5	29 49.1	−58.4	158.0	28 53.4	−58.5	158.3	27 57.7	−58.7	158.5	27 01.8	−58.7	158.6	26 05.9	−58.8	158.8	25 09.9	−58.9	159.0	24 13.9	−58.9	159.2	23 17.8	−59.1	159.3	5
6	28 50.7	−58.5	158.3	27 54.9	−58.6	158.5	26 59.0	−58.7	158.7	26 03.1	−58.8	158.9	25 07.1	−58.9	159.0	24 11.0	−58.9	159.2	23 14.9	−59.0	159.4	22 18.7	−59.1	159.5	6
7	27 52.2	−58.5	158.6	26 56.3	−58.6	158.8	26 00.3	−58.7	158.9	25 04.3	−58.8	159.1	24 08.2	−58.9	159.3	23 12.1	−59.0	159.4	22 15.9	−59.0	159.6	21 19.6	−59.1	159.7	7
8	26 53.6	−58.5	158.8	25 57.7	−58.7	159.0	25 01.6	−58.7	159.2	24 05.5	−58.8	159.3	23 09.4	−58.9	159.5	22 13.1	−58.9	159.6	21 16.9	−59.1	159.8	20 20.5	−59.0	159.9	8
9	25 55.1	−58.6	159.1	24 59.0	−58.6	159.2	24 02.9	−58.7	159.4	23 06.7	−58.8	159.5	22 10.5	−58.9	159.7	21 14.2	−59.0	159.8	20 17.8	−59.0	159.9	19 21.5	−59.2	160.1	9
10	24 56.5	−58.6	159.3	24 00.4	−58.7	159.5	23 04.2	−58.8	159.6	22 07.9	−58.8	159.7	21 11.6	−58.9	159.9	20 15.2	−59.0	160.0	19 18.8	−59.1	160.1	18 22.3	−59.1	160.3	10
11	23 57.9	−58.6	159.5	23 01.7	−58.7	159.7	22 05.4	−58.8	159.8	21 09.1	−58.9	160.0	20 12.7	−59.0	160.1	19 16.2	−59.0	160.2	18 19.7	−59.0	160.3	17 23.2	−59.1	160.4	11
12	22 59.3	−58.6	159.8	22 03.0	−58.7	159.9	21 06.6	−58.8	160.0	20 10.2	−58.9	160.2	19 13.7	−58.9	160.3	18 17.2	−59.0	160.4	17 20.7	−59.1	160.5	16 24.1	−59.1	160.6	12
13	22 00.7	−58.7	160.0	21 04.3	−58.8	160.1	20 07.8	−58.8	160.3	19 11.3	−58.8	160.4	18 14.8	−59.0	160.5	17 18.2	−59.0	160.6	16 21.6	−59.1	160.7	15 25.0	−59.2	160.8	13
14	21 02.0	−58.6	160.2	20 05.5	−58.7	160.3	19 09.0	−58.8	160.5	18 12.5	−58.9	160.6	17 15.8	−58.9	160.7	16 19.2	−59.0	160.8	15 22.5	−59.1	160.9	14 25.8	−59.1	161.0	14
15	20 03.4	−58.7	160.4	19 06.8	−58.8	160.6	18 10.2	−58.8	160.7	17 13.6	−58.9	160.8	16 16.9	−59.0	160.9	15 20.2	−59.1	161.0	14 23.4	−59.1	161.1	13 26.7	−59.2	161.1	15
16	19 04.7	−58.7	160.7	18 08.0	−58.7	160.8	17 11.4	−58.9	160.9	16 14.7	−59.0	161.0	15 17.9	−59.0	161.1	14 21.1	−59.0	161.2	13 24.3	−59.1	161.2	12 27.5	−59.1	161.3	16
17	18 06.0	−58.8	160.9	17 09.3	−58.8	161.0	16 12.5	−58.8	161.1	15 15.7	−58.9	161.2	14 18.9	−59.0	161.3	13 22.1	−59.0	161.3	12 25.2	−59.1	161.4	11 28.4	−59.2	161.5	17
18	17 07.2	−58.7	161.1	16 10.5	−58.8	161.2	15 13.6	−58.8	161.3	14 16.8	−58.9	161.4	13 19.9	−59.0	161.4	12 23.0	−59.0	161.5	11 26.1	−59.1	161.6	10 29.2	−59.2	161.6	18
19	16 08.5	−58.7	161.3	15 11.7	−58.9	161.4	14 14.8	−58.9	161.5	13 17.9	−59.0	161.5	12 20.9	−59.0	161.6	11 24.0	−59.1	161.7	10 27.0	−59.1	161.8	9 30.0	−59.2	161.8	19
20	15 09.8	−58.8	161.5	14 12.8	−58.8	161.6	13 15.9	−58.9	161.7	12 18.9	−58.9	161.8	11 21.9	−59.0	161.8	10 24.9	−59.1	161.9	9 27.9	−59.1	161.9	8 30.8	−59.1	162.0	20
21	14 11.0	−58.8	161.7	13 14.0	−58.8	161.8	12 17.0	−58.9	161.9	11 20.0	−59.0	161.9	10 22.9	−59.0	162.0	9 25.8	−59.0	162.1	8 28.8	−59.2	162.1	7 31.7	−59.2	162.1	21
22	13 12.2	−58.7	161.9	12 15.2	−58.9	162.0	11 18.1	−58.9	162.1	10 21.0	−59.0	162.1	9 23.9	−59.0	162.2	8 26.8	−59.1	162.2	7 29.6	−59.1	162.3	6 32.5	−59.2	162.3	22
23	12 13.5	−58.8	162.1	11 16.3	−58.8	162.2	10 19.2	−58.9	162.3	9 22.0	−58.9	162.3	8 24.9	−59.1	162.4	7 27.7	−59.1	162.4	6 30.5	−59.2	162.4	5 33.3	−59.2	162.5	23
24	11 14.7	−58.8	162.3	10 17.5	−58.9	162.4	9 20.3	−58.9	162.5	8 23.1	−59.0	162.5	7 25.8	−59.0	162.5	6 28.6	−59.1	162.6	5 31.3	−59.1	162.6	4 34.1	−59.2	162.6	24
25	10 15.9	−58.8	162.6	9 18.6	−58.8	162.6	8 21.4	−59.0	162.6	7 24.1	−59.0	162.7	6 26.8	−59.0	162.7	5 29.5	−59.1	162.8	4 32.2	−59.1	162.8	3 34.9	−59.2	162.8	25
26	9 17.1	−58.8	162.8	8 19.8	−58.9	162.8	7 22.4	−58.9	162.8	6 25.1	−59.0	162.9	5 27.8	−59.1	162.9	4 30.4	−59.1	162.9	3 33.1	−59.2	163.0	2 35.7	−59.2	163.0	26
27	8 18.3	−58.8	163.0	7 20.9	−58.9	163.0	6 23.5	−58.9	163.0	5 26.1	−59.0	163.1	4 28.7	−59.0	163.1	3 31.3	−59.1	163.1	2 33.9	−59.2	163.1	1 36.5	−59.2	163.1	27
28	7 19.5	−58.8	163.2	6 22.0	−58.9	163.2	5 24.6	−59.0	163.2	4 27.1	−59.0	163.3	3 29.7	−59.1	163.3	2 32.2	−59.1	163.3	1 34.8	−59.2	163.3	0 37.3	−59.2	163.3	28
29	6 20.6	−58.8	163.4	5 23.1	−58.8	163.4	4 25.6	−58.9	163.4	3 28.1	−58.9	163.4	2 30.6	−59.0	163.4	1 33.1	−59.1	163.4	0 35.6	−59.1	163.5	0 21.9	+59.2	16.5	29
30	5 21.8	−58.8	163.5	4 24.3	−58.9	163.6	3 26.7	−58.9	163.6	2 29.2	−59.0	163.6	1 31.6	−59.1	163.6	0 34.0	−59.1	163.6	0 23.5	+59.2	16.4	1 21.1	+59.2	16.4	30
31	4 23.0	−58.8	163.7	3 25.4	−58.9	163.8	2 27.8	−59.0	163.8	1 30.2	−59.0	163.8	0 32.5	−59.1	163.8	0 25.1	+59.1	16.2	1 22.7	+59.1	16.2	2 20.3	+59.2	16.2	31
32	3 24.2	−58.9	163.9	2 26.5	−58.9	164.0	1 28.8	−58.9	164.0	0 31.2	−59.0	164.0	0 26.5	+59.1	16.0	1 24.2	+59.1	16.0	2 21.8	+59.1	16.0	3 19.5	+59.2	16.1	32
33	2 25.3	−58.8	164.1	1 27.6	−58.9	164.1	0 29.9	−59.0	164.2	0 27.8	+59.0	15.8	1 25.6	+59.0	15.9	2 23.3	+59.1	15.9	3 21.0	+59.1	15.9	4 18.7	+59.2	15.9	33
34	1 26.5	−58.8	164.3	0 28.7	−58.9	164.3	0 29.1	+58.9	15.7	1 26.8	+59.0	15.7	2 24.6	+59.1	15.7	3 22.4	+59.1	15.7	4 20.1	+59.2	15.7	5 17.9	+59.2	15.7	34
35	0 27.6	−58.8	164.5	0 30.2	+58.9	15.5	1 28.0	+59.0	15.5	2 25.8	+59.0	15.5	3 23.7	+59.0	15.5	4 21.5	+59.1	15.5	5 19.3	+59.1	15.5	6 17.1	+59.2	15.6	35
36	0 31.2	+58.8	15.3	1 29.1	+58.9	15.3	2 27.0	+58.9	15.3	3 24.8	+59.0	15.3	4 22.7	+59.0	15.3	5 20.6	+59.1	15.3	6 18.4	+59.2	15.4	7 16.3	+59.2	15.4	36
37	1 30.0	+58.9	15.1	2 28.0	+58.9	15.1	3 25.9	+58.9	15.1	4 23.8	+59.0	15.1	5 21.7	+59.1	15.1	6 19.7	+59.0	15.2	7 17.6	+59.1	15.2	8 15.5	+59.1	15.2	37
38	2 28.9	+58.8	14.9	3 26.9	+58.8	14.9	4 24.8	+58.9	14.9	5 22.8	+59.0	14.9	6 20.8	+59.0	15.0	7 18.7	+59.0	15.0	8 16.7	+59.1	15.1	9 14.6	+59.2	15.1	38
39	3 27.7	+58.8	14.7	4 25.7	+58.9	14.7	5 23.8	+58.9	14.7	6 21.8	+59.0	14.7	7 19.8	+59.0	14.8	8 17.8	+59.1	14.8	9 15.8	+59.2	14.9	10 13.8	+59.2	14.9	39
40	4 26.5	+58.9	14.5	5 24.6	+58.9	14.5	6 22.7	+58.9	14.5	7 20.8	+59.0	14.6	8 18.8	+59.1	14.6	9 16.9	+59.1	14.6	10 15.0	+59.1	14.7	11 13.0	+59.2	14.7	40
41	5 25.4	+58.8	14.3	6 23.5	+58.9	14.3	7 21.6	+59.0	14.4	8 19.8	+58.9	14.4	9 17.9	+59.0	14.4	10 16.0	+59.0	14.5	11 14.1	+59.1	14.5	12 12.2	+59.1	14.6	41
42	6 24.2	+58.8	14.1	7 22.4	+58.8	14.1	8 20.6	+58.9	14.2	9 18.7	+59.0	14.2	10 16.9	+59.0	14.2	11 15.0	+59.1	14.3	12 13.2	+59.1	14.3	13 11.3	+59.2	14.4	42
43	7 23.0	+58.8	13.9	8 21.2	+58.8	13.9	9 19.5	+58.9	14.0	10 17.7	+59.0	14.0	11 15.9	+59.0	14.1	12 14.1	+59.1	14.1	13 12.3	+59.1	14.2	14 10.5	+59.1	14.2	43
44	8 21.8	+58.8	13.7	9 20.1	+58.9	13.7	10 18.4	+58.9	13.8	11 16.7	+58.9	13.8	12 14.9	+59.0	13.9	13 13.2	+59.0	13.9	14 11.4	+59.1	14.0	15 09.6	+59.1	14.0	44
45	9 20.6	+58.8	13.5	10 19.0	+58.8	13.5	11 17.3	+58.9	13.6	12 15.6	+58.9	13.6	13 13.9	+59.0	13.7	14 12.2	+59.0	13.7	15 10.5	+59.1	13.8	16 08.7	+59.2	13.9	45
46	10 19.4	+58.8	13.3	11 17.8	+58.9	13.3	12 16.2	+58.9	13.4	13 14.6	+58.9	13.4	14 12.9	+59.0	13.5	15 11.2	+59.1	13.6	16 09.6	+59.0	13.6	17 07.9	+59.1	13.7	46
47	11 18.2	+58.8	13.1	12 16.7	+58.8	13.1	13 15.1	+58.9	13.2	14 13.5	+58.9	13.2	15 11.9	+59.0	13.3	16 10.3	+59.0	13.4	17 08.6	+59.1	13.4	18 07.0	+59.1	13.5	47
48	12 17.0	+58.8	12.9	13 15.5	+58.8	12.9	14 14.0	+58.9	13.0	15 12.4	+58.9	13.0	16 10.9	+58.9	13.1	17 09.3	+59.0	13.2	18 07.7	+59.1	13.3	19 06.1	+59.1	13.3	48
49	13 15.8	+58.8	12.7	14 14.3	+58.8	12.7	15 12.8	+58.9	12.8	16 11.3	+58.9	12.9	17 09.8	+59.0	12.9	18 08.3	+59.0	13.0	19 06.8	+59.0	13.1	20 05.2	+59.1	13.1	49
50	14 14.6	+58.7	12.5	15 13.1	+58.8	12.5	16 11.7	+58.8	12.6	17 10.2	+58.9	12.7	18 08.8	+58.9	12.7	19 07.3	+59.0	12.8	20 05.8	+59.0	12.9	21 04.3	+59.1	13.0	50
51	15 13.3	+58.8	12.3	16 11.9	+58.8	12.3	17 10.5	+58.9	12.4	18 09.1	+58.9	12.5	19 07.7	+58.9	12.5	20 06.3	+59.0	12.6	21 04.8	+59.0	12.7	22 03.4	+59.0	12.8	51
52	16 12.1	+58.7	12.0	17 10.7	+58.8	12.1	18 09.4	+58.8	12.2	19 08.0	+58.9	12.2	20 06.6	+59.0	12.3	21 05.3	+58.9	12.4	22 03.8	+59.0	12.5	23 02.4	+59.1	12.6	52
53	17 10.8	+58.7	11.8	18 09.5	+58.7	11.7	19 08.2	+58.8	11.9	20 06.9	+58.8	11.8	21 05.7	+58.9	11.8	22 04.5	+58.8	11.9	23 03.2	+58.9	12.0	24 01.8	+59.0	12.1	53
54	18 09.5	+58.7	11.6	19 08.3	+58.7	11.7	20 07.0	+58.8	11.8	21 05.7	+58.8	11.8	22 04.5	+58.8	11.9	23 03.2	+59.0	12.0	24 01.8	+59.0	12.1	25 00.5	+59.0	12.2	54
55	19 08.2	+58.7	11.4	20 07.0	+58.7	11.5	21 05.8	+58.8	11.5	22 04.6	+58.8	11.6	23 03.3	+58.9	11.7	24 02.1	+58.9	11.8	25 00.8	+59.0	11.9	25 59.5	+59.0	12.0	55
56	20 06.9	+58.7	11.2	21 05.7	+58.8	11.3	22 04.6	+58.7	11.3	23 03.4	+58.8	11.4	24 02.2	+58.9	11.5	25 01.0	+58.9	11.6	25 59.8	+58.9	11.7	26 58.5	+59.0	11.8	56
57	21 05.6	+58.6	11.0	22 04.5	+58.7	11.0	23 03.3	+58.8	11.1	24 02.2	+58.8	11.2	25 01.1	+58.8	11.3	25 59.9	+58.9	11.4	26 58.7	+58.9	11.5	27 57.5	+59.0	11.6	57
58	22 04.2	+58.6	10.7	23 03.2	+58.6	10.8	24 02.1	+58.7	10.9	25 01.0	+58.7	11.0	25 59.9	+58.8	11.1	26 58.8	+58.8	11.2	27 57.6	+58.9	11.3	28 56.5	+58.9	11.4	58
59	23 02.8	+58.6	10.5	24 01.8	+58.7	10.7	25 00.8	+58.7	10.7	25 59.8	+58.7	10.8	26 58.7	+58.8	10.8	27 57.6	+58.9	10.9	28 56.5	+58.9	11.2	29 55.4	+58.9	11.2	59
60	24 01.5	+58.6	10.3	25 00.5	+58.6	10.3	25 59.5	+58.7	10.4	26 58.5	+58.7	10.5	27 57.5	+58.8	10.6	28 56.5	+58.7	10.7	29 55.4	+58.8	10.8	30 54.3	+58.9	10.9	60
61	25 00.1	+58.5	10.0	25 59.1	+58.6	10.1	26 58.2	+58.6	10.2	27 57.2	+58.7	10.3	28 56.3	+58.7	10.4	29 55.3	+58.8	10.5	30 54.3	+58.8	10.6	31 53.2	+58.9	10.7	61
62	25 58.6	+58.5	9.8	26 57.7	+58.6	9.9	27 56.8	+58.6	10.0	28 55.9	+58.7	10.1	29 55.0	+58.7	10.2	30 54.1	+58.7	10.3	31 53.1	+58.8	10.4	32 52.1	+58.8	10.5	62
63	26 57.2	+58.5	9.5	27 56.3	+58.6	9.6	28 55.5	+58.6	9.7	29 54.6	+58.7	9.8	30 53.7	+58.7	9.9	31 52.8	+58.7	10.0	32 51.9	+58.8	10.1	33 50.9	+58.8	10.3	63
64	27 55.7	+58.5	9.3	28 54.9	+58.5	9.4	29 54.1	+58.6	9.5	30 53.3	+58.6	9.6	31 52.4	+58.7	9.7	32 51.5	+58.8	9.8	33 50.7	+58.7	9.9	34 49.8	+58.8	10.0	64
65	28 54.2	+58.4	9.0	29 53.4	+58.5	9.1	30 52.7	+58.5	9.2	31 51.9	+58.6	9.3	32 51.1	+58.6	9.4	33 50.3	+58.6	9.4	34 49.4	+58.7	9.6	35 48.6	+58.7	9.8	65
66	29 52.6	+58.4	8.8	30 51.9	+58.5	8.8	31 51.2	+58.5	9.0	32 50.5	+58.5	9.1	33 49.7	+58.6	9.2	34 48.9	+58.7	9.3	35 48.1	+58.7	9.4	36 47.3	+58.8	9.5	66
67	30 51.1	+58.4	8.5	31 50.4	+58.4	8.6	32 49.7	+58.5	8.7	33 49.0	+58.5	8.8	34 48.3	+58.6	8.9	35 47.6	+58.6	9.0	36 46.8	+58.7	9.1	37 46.1	+58.6	9.3	67
68	31 49.5	+58.3	8.3	32 48.8	+58.5	8.4	33 48.2	+58.5	8.4	34 47.5	+58.5	8.5	35 46.9	+58.5	8.6	36 46.2	+58.6	8.6	37 45.5	+58.6	8.9	38 44.7	+58.7	9.0	68
69	32 47.8	+58.4	8.0	33 47.3	+58.3	8.1	34 46.7	+58.4	8.2	35 46.0	+58.5	8.3	36 45.4	+58.5	8.4	37 44.8	+58.5	8.5	38 44.1	+58.6	8.6	39 43.4	+58.6	8.7	69
70	33 46.2	+58.3	7.7	34 45.6	+58.4	7.8	35 45.1	+58.3	7.9	36 44.5	+58.4	8.0	37 43.9	+58.4	8.1	38 43.3	+58.5	8.2	39 42.7	+58.5	8.3	40 42.0	+58.6	8.4	70
71	34 44.5	+58.2	7.4	35 44.0	+58.2	7.5	36 43.4	+58.4	7.6	37 42.9	+58.4	7.7	38 42.3	+58.5	7.8	39 41.8	+58.4	7.9	40 41.2	+58.5	8.0	41 40.6	+58.5	8.2	71
72	35 42.7	+58.2	7.1	36 42.2	+58.3	7.2	37 41.8	+58.2	7.3	38 41.3	+58.3	7.4	39 40.8	+58.3	7.5	40 40.2	+58.4	7.6	41 39.7	+58.4	7.7	42 39.1	+58.5	7.9	72
73	36 40.9	+58.2	6.8	37 40.5	+58.2	6.9	38 40.0	+58.3	7.0	39 39.6	+58.3	7.1	40 39.1	+58.3	7.2	41 38.6	+58.4	7.3	42 38.1	+58.4	7.4	43 37.6	+58.5	7.6	73
74	37 39.1	+58.1	6.5	38 38.7	+58.1	6.6	39 38.3	+58.2	6.7	40 37.9	+58.2	6.8	41 37.4	+58.3	6.9	42 37.0	+58.3	7.0	43 36.5	+58.4	7.1	44 36.1	+58.4	7.2	74
75	38 37.2	+58.0	6.2	39 36.8	+58.1	6.4	40 36.5	+58.1	6.4	41 36.1	+58.1	6.5	42 35.7	+58.2	6.6	43 35.3	+58.2	6.7	44 34.9	+58.3	6.8	45 34.5	+58.3	6.9	75
76	39 35.2	+58.0	5.9	40 34.9	+58.1	6.0	41 34.6	+58.1	6.0	42 34.2	+58.2	6.1	43 33.9	+58.1	6.2	44 33.5	+58.2	6.3	45 33.2	+58.2	6.5	46 32.8	+58.3	6.6	76
77	40 33.2	+58.0	5.5	41 33.0	+57.9	5.6	42 32.7	+58.0	5.7	43 32.4	+58.0	5.8	44 32.0	+58.1	5.9	45 31.7	+58.1	6.0	46 31.4	+58.1	6.1	47 31.0	+58.2	6.2	77
78	41 31.2	+57.9	5.2	42 30.9	+57.9	5.3	43 30.7	+57.9	5.4	44 30.4	+58.0	5.4	45 30.1	+58.0	5.5	46 29.8	+58.1	5.6	47 29.5	+58.1	5.7	48 29.2	+58.2	5.9	78
79	42 29.1	+57.8	4.8	43 28.8	+57.9	4.9	44 28.6	+57.9	5.0	45 28.4	+57.9	5.1	46 28.1	+58.0	5.2	47 27.9	+58.0	5.3	48 27.6	+58.0	5.4	49 27.4	+58.0	5.5	79
80	43 26.9	+57.7	4.5	44 26.7	+57.7	4.5	45 26.5	+57.8	4.6	46 26.3	+57.8	4.7	47 26.1	+57.9	4.8	48 25.9	+57.9	4.9	49 25.6	+58.0	5.0	50 25.4	+58.0	5.1	80
81	44 24.6	+57.7	4.2	45 24.4	+57.7	4.2	46 24.3	+57.7	4.3	47 24.1	+57.7	4.4	48 23.9	+57.7	4.4	49 23.8	+57.8	4.4	50 23.6	+57.8	4.6	51 23.4	+57.9	4.7	81
82	45 22.3	+57.5	3.7	46 22.1	+57.6	3.8	47 22.0	+57.6	3.8	48 21.9	+57.6	3.9	49 21.7	+57.7	4.0	50 21.6	+57.7	4.1	51 21.4	+57.7	4.2	52 21.3	+57.7	4.3	82
83	46 19.8	+57.5	3.3	47 19.7	+57.5	3.4	48 19.6	+57.6	3.4	49 19.5	+57.6	3.5	50 19.4	+57.6	3.6	51 19.3	+57.6	3.6	52 19.2	+57.6	3.7	53 19.0	+57.7	3.8	83
84	47 17.3	+57.4	2.9	48 17.2	+57.5	3.0	49 17.2	+57.4	3.0	50 17.1	+57.4	3.1	51 17.0	+57.5	3.1	52 16.9	+57.5	3.2	53 16.8	+57.5	3.3	54 16.7	+57.6	3.3	84
85	48 14.7	+57.3	2.4	49 14.7	+57.3	2.5	50 14.6	+57.3	2.5	51 14.5	+57.4	2.6	52 14.5	+57.4	2.7	53 14.4	+57.4	2.7	54 14.3	+57.4	2.8	55 14.3	+57.4	2.9	85
86	49 12.0	+57.2	2.0	50 12.0	+57.2	2.0	51 11.9	+57.2	2.1	52 11.9	+57.2	2.1	53 11.9	+57.2	2.2	54 11.8	+57.3	2.2	55 11.8	+57.2	2.3	56 11.7	+57.3	2.3	86
87	50 09.2	+57.1	1.5	51 09.2	+57.1	1.5	52 09.1	+57.1	1.6	53 09.1	+57.1	1.6	54 09.1	+57.1	1.6	55 09.1	+57.1	1.7	56 09.0	+57.2	1.7	57 09.0	+57.1	1.8	87
88	51 06.3	+56.9	1.0	52 06.2	+57.0	1.1	53 06.2	+57.0	1.1	54 06.2	+57.0	1.1	55 06.2	+57.0	1.1	56 06.2	+57.0	1.2	57 06.2	+57.0	1.2	58 06.2	+57.0	1.2	88
89	52 03.2	+56.8	0.5	53 03.2	+56.8	0.5	54 03.2	+56.8	0.6	55 03.2	+56.8	0.6	56 03.2	+56.8	0.6	57 03.2	+56.8	0.6	58 03.2	+56.8	0.6	59 03.2	+56.8	0.6	89
90	53 00.0	+56.7	0.0	54 00.0	+56.7	0.0	55 00.0	+56.6	0.0	56 00.0	+56.6	0.0	57 00.0	+56.6	0.0	58 00.0	+56.6	0.0	59 00.0	+56.6	0.0	60 00.0	+56.6	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z LATITUDE **SAME** NAME AS DECLINATION L.H.A. **161°, 199°**

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LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	34 26.3	+58.1	155.5	33 31.7	+58.2	155.8	32 36.9	+58.3	156.0	31 42.0	+58.4	156.3	30 47.0	+58.6	156.5	29 51.9	+58.7	156.8	28 56.7	+58.8	157.0	28 01.5	+58.8	157.2	0
1	35 24.4	+58.0	155.2	34 29.9	+58.1	155.5	33 35.2	+58.3	155.8	32 40.4	+58.5	156.0	31 45.6	+58.5	156.3	30 50.6	+58.6	156.5	29 55.5	+58.7	156.8	29 00.3	+58.8	157.0	1
2	36 22.4	+58.0	154.9	35 28.0	+58.1	155.2	34 33.5	+58.3	155.5	33 38.9	+58.3	155.8	32 44.1	+58.5	156.0	31 49.2	+58.6	156.3	30 54.2	+58.7	156.5	29 59.1	+58.8	156.8	2
3	37 20.4	+57.9	154.6	36 26.1	+58.1	154.9	35 31.8	+58.2	155.2	34 37.2	+58.4	155.5	33 42.6	+58.4	155.8	32 47.8	+58.6	156.0	31 52.9	+58.7	156.3	30 57.9	+58.8	156.5	3
4	38 18.3	+57.9	154.2	37 24.2	+58.0	154.6	36 30.0	+58.1	154.9	35 35.6	+58.3	155.2	34 41.0	+58.5	155.5	33 46.4	+58.5	155.8	32 51.6	+58.7	156.0	31 56.7	+58.8	156.3	4
5	39 16.2	+57.8	153.9	38 22.2	+58.0	154.2	37 28.1	+58.1	154.6	36 33.9	+58.2	154.9	35 39.5	+58.3	155.2	34 44.9	+58.5	155.5	33 50.3	+58.6	155.8	32 55.5	+58.7	156.1	5
6	40 14.0	+57.8	153.5	39 20.2	+57.9	153.9	38 26.2	+58.1	154.3	37 32.1	+58.2	154.6	36 37.8	+58.4	154.9	35 43.4	+58.5	155.2	34 48.9	+58.6	155.5	33 54.2	+58.7	155.8	6
7	41 11.8	+57.6	153.2	40 18.1	+57.9	153.6	39 24.3	+58.0	153.9	38 30.3	+58.2	154.3	37 36.2	+58.3	154.6	36 41.9	+58.4	155.0	35 47.5	+58.5	155.3	34 52.9	+58.7	155.6	7
8	42 09.4	+57.6	152.8	41 16.0	+57.7	153.2	40 22.3	+58.0	153.6	39 28.5	+58.1	154.0	38 34.5	+58.2	154.3	37 40.3	+58.4	154.7	36 46.0	+58.5	155.0	35 51.6	+58.6	155.3	8
9	43 07.0	+57.6	152.4	42 13.7	+57.8	152.9	41 20.3	+57.8	153.3	40 26.6	+58.0	153.6	39 32.7	+58.2	154.0	38 38.7	+58.3	154.4	37 44.5	+58.5	154.7	36 50.2	+58.6	155.0	9
10	44 04.6	+57.4	152.0	43 11.5	+57.6	152.5	42 18.1	+57.9	152.9	41 24.6	+58.0	153.3	40 30.9	+58.2	153.7	39 37.0	+58.3	154.1	38 43.0	+58.4	154.4	37 48.8	+58.6	154.8	10
11	45 02.0	+57.4	151.6	44 09.1	+57.5	152.1	43 16.0	+57.7	152.5	42 22.6	+57.9	153.0	41 29.1	+58.1	153.4	40 35.3	+58.3	153.8	39 41.4	+58.4	154.1	38 47.4	+58.5	154.5	11
12	45 59.4	+57.2	151.2	45 06.6	+57.5	151.7	44 13.7	+57.7	152.2	43 20.5	+57.9	152.6	42 27.2	+58.0	153.0	41 33.6	+58.2	153.4	40 39.8	+58.4	153.8	39 45.9	+58.5	154.2	12
13	46 56.6	+57.2	150.8	46 04.1	+57.4	151.3	45 11.4	+57.6	151.8	44 18.4	+57.8	152.2	43 25.2	+57.9	152.7	42 31.8	+58.1	153.1	41 38.2	+58.2	153.5	40 44.4	+58.4	153.9	13
14	47 53.8	+57.0	150.3	47 01.5	+57.3	150.9	46 09.0	+57.5	151.4	45 16.2	+57.7	151.9	44 23.1	+57.9	152.3	43 29.9	+58.1	152.8	42 36.4	+58.3	153.2	41 42.8	+58.4	153.6	14
15	48 50.8	+56.9	149.9	47 58.8	+57.1	150.4	47 06.5	+57.4	151.0	46 13.9	+57.6	151.5	45 21.0	+57.8	152.0	44 28.0	+58.0	152.4	43 34.7	+58.1	152.9	42 41.2	+58.3	153.3	15
16	49 47.7	+56.8	149.4	48 55.9	+57.1	150.0	48 03.9	+57.3	150.5	47 11.5	+57.5	151.1	46 18.8	+57.8	151.6	45 26.0	+57.9	152.1	44 32.8	+58.1	152.5	43 39.5	+58.3	153.0	16
17	50 44.5	+56.7	148.9	49 53.0	+57.0	149.5	49 01.2	+57.2	150.1	48 09.0	+57.4	150.6	47 16.6	+57.6	151.2	46 23.9	+57.8	151.7	45 30.9	+58.1	152.2	44 37.8	+58.2	152.6	17
18	51 41.2	+56.5	148.4	50 50.0	+56.8	149.0	49 58.4	+57.0	149.6	49 06.4	+57.4	150.2	48 14.2	+57.6	150.8	47 21.7	+57.8	151.3	46 29.0	+57.9	151.8	45 36.0	+58.1	152.3	18
19	52 37.7	+56.4	147.8	51 46.8	+56.6	148.5	50 55.4	+57.0	149.1	50 03.8	+57.2	149.8	49 11.8	+57.4	150.3	48 19.5	+57.7	150.9	47 26.9	+57.9	151.4	46 34.1	+58.1	151.9	19
20	53 34.1	+56.2	147.2	52 43.4	+56.6	148.0	51 52.4	+56.8	148.6	51 01.0	+57.1	149.3	50 09.2	+57.4	149.9	49 17.2	+57.6	150.5	48 24.8	+57.8	151.0	47 32.2	+58.0	151.6	20
21	54 30.3	+56.0	146.6	53 40.0	+56.3	147.4	52 49.2	+56.7	148.1	51 58.1	+57.0	148.8	51 06.6	+57.2	149.4	50 14.8	+57.5	150.0	49 22.6	+57.8	150.6	48 30.2	+57.9	151.2	21
22	55 26.3	+55.8	146.0	54 36.3	+56.2	146.8	53 45.9	+56.5	147.6	52 55.1	+56.8	148.3	52 03.8	+57.2	148.9	51 12.3	+57.3	149.6	50 20.4	+57.6	150.2	49 28.1	+57.9	150.8	22
23	56 22.1	+55.6	145.4	55 32.5	+56.0	146.2	54 42.4	+56.4	147.0	53 51.9	+56.7	147.7	53 01.0	+56.9	148.4	52 09.6	+57.3	149.1	51 18.0	+57.5	149.8	50 26.0	+57.7	150.4	23
24	57 17.7	+55.4	144.7	56 28.5	+55.8	145.5	55 38.8	+56.1	146.4	54 48.6	+56.5	147.2	53 57.9	+56.9	147.9	53 06.9	+57.1	148.6	52 15.5	+57.4	149.3	51 23.7	+57.7	149.9	24
25	58 13.1	+55.0	143.9	57 24.3	+55.6	144.8	56 34.9	+56.0	145.7	55 45.1	+56.3	146.6	54 54.8	+56.7	147.4	54 04.0	+57.0	148.1	53 12.9	+57.3	148.8	52 21.4	+57.5	149.5	25
26	59 08.1	+54.9	143.2	58 19.8	+55.3	144.2	57 30.9	+55.7	145.1	56 41.4	+56.2	146.0	55 51.5	+56.5	146.8	55 01.0	+56.9	147.6	54 10.2	+57.1	148.3	53 18.9	+57.4	149.0	26
27	60 03.0	+54.5	142.4	59 15.1	+55.0	143.4	58 26.6	+55.5	144.4	57 37.6	+55.9	145.3	56 48.0	+56.3	146.2	55 57.9	+56.7	147.0	55 07.3	+57.0	147.8	54 16.4	+57.3	148.5	27
28	60 57.5	+54.1	141.5	60 10.1	+54.8	142.6	59 22.1	+55.3	143.7	58 33.5	+55.7	144.6	57 44.3	+56.1	145.5	56 54.6	+56.5	146.4	56 04.3	+56.9	147.2	55 13.7	+57.1	148.0	28
29	61 51.6	+53.8	140.6	61 04.9	+54.4	141.8	60 17.4	+54.9	142.9	59 29.2	+55.5	143.9	58 40.4	+55.9	144.9	57 51.1	+56.3	145.8	57 01.2	+56.7	146.7	56 10.8	+57.0	147.5	29
30	62 45.4	+53.4	139.7	61 59.3	+54.0	140.9	61 12.3	+54.7	142.1	60 24.7	+55.1	143.1	59 36.3	+55.7	144.2	58 47.4	+56.1	145.1	57 57.9	+56.5	146.1	57 07.8	+56.9	146.9	30
31	63 38.8	+52.9	138.7	62 53.3	+53.6	140.0	62 07.0	+54.2	141.2	61 19.8	+54.9	142.3	60 32.0	+55.4	143.4	59 43.5	+55.9	144.3	58 54.4	+56.3	145.3	58 04.7	+56.7	146.3	31
32	64 31.7	+52.4	137.6	63 46.9	+53.2	139.0	63 01.2	+53.9	140.3	62 14.7	+54.5	141.5	61 27.4	+55.1	142.6	60 39.4	+55.6	143.7	59 50.7	+56.1	144.7	59 01.4	+56.5	145.7	32
33	65 24.1	+51.9	136.4	64 40.1	+52.8	137.9	63 55.1	+53.5	139.3	63 09.2	+54.2	140.6	62 22.5	+54.8	141.8	61 35.0	+55.3	142.9	60 46.7	+55.9	144.0	59 57.9	+56.3	145.0	33
34	66 16.0	+51.3	135.2	65 32.9	+52.1	136.6	64 48.6	+53.0	138.2	64 03.4	+53.7	139.6	63 17.3	+54.4	140.9	62 30.3	+55.0	142.1	61 42.6	+55.5	143.3	60 54.2	+56.0	144.3	34
35	67 07.2	+50.6	133.9	66 25.0	+51.6	135.6	65 41.6	+52.5	137.1	64 57.1	+53.3	138.6	64 11.7	+54.0	139.9	63 25.3	+54.7	141.2	62 38.1	+55.3	142.4	61 50.2	+55.8	143.6	35
36	67 57.8	+49.7	132.5	67 16.6	+50.9	134.2	66 34.1	+51.9	135.9	65 50.4	+52.8	137.5	65 05.7	+53.6	138.9	64 20.0	+54.3	140.3	63 33.4	+54.9	141.6	62 46.0	+55.5	142.8	36
37	68 47.5	+48.9	131.0	68 07.5	+50.1	132.9	67 26.0	+51.2	134.6	66 43.2	+52.2	136.3	65 59.3	+53.1	137.8	65 14.3	+53.9	139.3	64 28.3	+54.6	140.7	63 41.5	+55.2	142.0	37
38	69 36.4	+47.9	129.3	68 57.6	+49.3	131.3	68 17.2	+50.5	133.2	67 35.4	+51.6	135.0	66 52.4	+52.5	136.7	66 08.2	+53.4	138.2	65 22.9	+54.2	139.7	64 36.7	+54.8	141.1	38
39	70 24.3	+46.8	127.6	69 46.9	+48.3	129.7	69 07.7	+49.6	131.8	68 27.0	+50.8	133.6	67 44.9	+51.9	135.4	67 01.6	+52.8	137.1	66 17.1	+53.7	138.6	65 31.5	+54.5	140.1	39
40	71 11.1	+45.6	125.7	70 35.2	+47.2	128.0	69 57.3	+48.7	130.1	69 17.8	+50.1	132.2	68 36.8	+51.2	134.1	67 54.4	+52.3	135.8	67 10.8	+53.2	137.5	66 26.0	+54.0	139.1	40
41	71 56.7	+44.1	123.6	71 22.4	+46.0	126.1	70 46.0	+47.7	128.4	70 07.9	+49.1	130.6	69 28.0	+50.5	132.6	68 46.7	+51.6	134.5	68 04.0	+52.6	136.3	67 20.0	+53.5	137.9	41
42	72 40.8	+42.5	121.4	72 08.4	+44.5	124.0	71 33.7	+46.4	126.5	70 57.0	+48.1	128.9	70 18.5	+49.5	131.0	69 38.3	+50.8	133.1	68 56.6	+51.9	135.0	68 13.5	+53.0	136.8	42
43	73 23.3	+40.7	119.0	72 52.9	+43.0	121.8	72 20.1	+45.1	124.5	71 45.1	+46.9	127.0	71 08.0	+48.5	129.3	70 29.1	+49.9	131.5	69 48.5	+51.2	133.6	69 06.5	+52.3	135.5	43
44	74 04.0	+38.6•	116.3	73 35.9	+41.2	119.4	73 05.2	+43.5	122.3	72 32.0	+45.5	124.9	71 56.5	+47.4	127.5	71 19.0	+49.0	129.8	70 39.7	+50.4	132.0	69 58.8	+51.6	134.1	44
45	74 42.6	+36.3•	113.5	74 17.1	+39.2•	116.8	73 48.7	+41.7	119.8	73 17.5	+44.0	122.7	72 43.9	+46.0	125.4	72 08.0	+47.8	128.0	71 30.1	+49.4	130.3	70 50.4	+50.8	132.5	45
46	75 18.9	+33.7•	110.4	74 56.3	+36.8•	113.9	74 30.4	+39.6•	117.2	74 01.5	+42.2	120.3	73 29.9	+44.5	123.2	72 55.8	+46.5	126.0	72 19.5	+48.3	128.5	71 41.2	+49.8	130.9	46
47	75 52.6	+30.6•	107.1	75 33.1	+34.1•	110.8	75 10.0	+37.4•	114.3	74 43.7	+40.2•	117.4	74 14.4	+42.7	120.1	73 42.3	+45.0	123.8	73 07.8	+47.0	126.5	72 31.0	+48.8	129.1	47
48	76 23.2	+27.4•	103.5	76 07.2	+31.2•	107.4	75 47.4	+34.7•	111.2	75 23.9	+37.9•	114.8	74 57.1	+40.8•	118.2	74 27.3	+43.3	121.4	73 54.8	+45.5	124.3	73 19.8	+47.5	127.1	48
49	76 50.6	+23.7•	99.7	76 38.4	+27.9•	103.8	76 22.1	+31.7•	107.8	76 01.8	+35.2•	111.7	75 37.9	+38.4•	115.3	75 10.6	+41.3•	118.7	74 40.3	+43.9	121.9	74 07.3	+46.1	124.9	49
50	77 14.3	+19.8•	95.6	77 06.3	+24.1•	99.9	76 53.8	+28.3•	104.1	76 37.0	+32.3•	108.2	76 16.3	+35.8•	112.1	75 51.9	+39.0•	115.8	75 24.2	+41.9•	119.3	74 53.4	+44.2	122.5	50
51	77 34.1	+15.3•	91.2	77 30.4	+20.1•	95.7	77 22.1	+24.6•	100.2	77 09.3	+28.8•	104.5	76 52.1	+32.8•	108.7	76 30.9	+36.4•	112.6	76 06.1	+39.6•	116.4	75 37.8	+42.4•	119.9	51
52	77 49.4	+10.8•	86.7	77 50.5	+15.6•	91.3	77 46.7	+20.4•	95.9	77 38.1	+25.0•	100.5	77 24.9	+29.3•	104.9	77 07.3	+33.4•	109.1	76 45.7	+36.9•	113.2	76 20.2	+40.2•	116.9	52
53	78 00.2	+5.9•	82.0	78 06.1	+10.9•	86.7	78 07.1	+15.9•	91.4	78 03.1	+20.8•	96.2	77 54.2	+25.5•	100.8	77 40.7	+29.8•	105.3	77 22.6	+33.9•	109.6	77 00.4	+37.6•	113.7	53
54	78 06.1	+1.0•	77.2	78 17.0	+6.0•	81.9	78 23.0	+11.1•	86.7	78 23.9	+16.2•	91.6	78 19.7	+21.2•	96.4	78 10.5	+26.0•	101.2	77 56.5	+30.5•	105.8	77 38.0	+34.5•	110.2	54
55	78 07.1	−4.0•	72.3	78 23.0	+0.9•	77.0	78 34.1	+6.0•	81.8	78 40.1	+11.2•	86.7	78 40.9	+16.5•	91.7	78 36.5	+21.6•	96.7	78 27.0	+26.4•	101.6	78 12.5	+31.0•	106.3	55
56	78 03.1	−8.9•	67.5	78 23.9	−4.2•	72.0	78 40.1	+0.8•	76.7	78 51.3	+6.1•	81.7	78 57.4	+11.4•	86.8	78 58.1	+16.7•	91.9	78 53.4	+22.0•	97.0	78 43.5	+27.0•	102.0	56
57	77 54.2	−13.5•	62.7	78 19.7	−9.2•	67.0	78 40.9	−4.4•	71.6	78 57.4	+0.7•	76.5	79 08.8	+6.0•	81.6	79 14.8	+11.6•	86.8	79 15.4	+17.1•	92.1	79 10.5	+22.5•	97.3	57
58	77 40.7	−18.1•	58.1	78 10.5	−14.0•	62.2	78 36.5	−9.5•	66.6	78 58.1	−4.7•	71.3	79 14.8	+0.6•	76.3	79 26.4	+6.1•	81.5	79 32.5	+11.8•	86.9	79 33.0	+17.4•	92.3	58
59	77 22.6	−22.2•	53.7	77 56.5	−18.5•	57.5	78 27.0	−14.5•	61.6	78 53.4	−9.9•	66.1	79 15.4	−4.9•	70.9	79 32.5	+0.5•	76.0	79 44.3	+6.1•	81.4	79 50.4	+11.9•	86.9	59
60	77 00.4	−25.9•	49.5	77 38.0	−22.7•	53.0	78 12.5	−19.0•	56.8	78 43.5	−14.9•	61.0	79 10.5	−10.3•	65.6	79 33.0	−5.2•	70.5	79 50.4	+0.3•	75.8	80 02.3	+6.1•	81.3	60
61	76 34.5	−29.5•	45.6	77 15.3	−26.6•	48.7	77 53.5	−23.3•	52.2	78 28.6	−19.6•	56.1	79 00.2	−15.4•	60.4	79 27.8	−10.8•	65.1	79 50.7	−5.6•	70.1	80 08.4	+0.1•	75.5	61
62	76 05.0	−32.5•	41.9	76 48.7	−30.0•	44.7	77 30.2	−27.2•	47.9	78 09.0	−23.9•	51.4	78 44.8	−20.2•	55.4	79 17.0	−15.9•	59.7	79 45.1	−11.2•	64.5	80 08.5	−5.9•	69.7	62
63	75 32.5	−35.3•	38.5	76 18.7	−33.2•	41.0	77 03.0	−30.7•	43.9	77 45.1	−27.9•	47.0	78 24.6	−24.6•	50.6	79 01.1	−20.9•	54.6	79 33.9	−16.5•	59.0	80 02.6	−11.7•	63.9	63
64	74 57.2	−37.7•	35.3	75 45.5	−35.9•	37.6	76 32.3	−33.8•	40.1	77 17.2	−31.3•	42.9	78 00.0	−28.6•	46.1	78 40.2	−25.3•	49.7	79 17.4	−21.6•	53.8	79 50.9	−17.2•	58.3	64
65	74 19.5	−39.9•	32.3	75 09.6	−38.3•	34.4	75 58.5	−36.6•	36.6	76 45.9	−34.5•	39.1	77 31.4	−32.0•	42.0	78 14.9	−29.3•	45.2	78 55.8	−26.0•	48.8	79 33.7	−22.2•	52.9	65
66	73 39.6	−41.8	29.6	74 31.3	−40.5•	31.4	75 21.9	−38.9•	33.4	76 11.4	−37.2•	35.6	76 59.4	−35.2•	38.2	77 45.6	−32.8•	41.0	78 29.8	−30.1•	44.2	79 11.5	−26.9•	47.9	66
67	72 57.8	−43.5	27.1	73 50.8	−42.4	28.7	74 43.0	−41.1•	30.5	75 34.2	−39.6•	32.4	76 24.2	−37.9•	34.6	77 12.8	−35.9•	37.1	77 59.7	−33.6•	40.0	78 44.6	−30.8•	43.2	67
68	72 14.3	−45.0	24.8	73 08.4	−44.0	26.2	74 01.9	−43.0	27.8	74 54.6	−41.8	29.5	75 46.3	−40.3	31.4	76 36.9	−38.6•	33.6	77 26.1	−36.6•	36.1	78 13.8	−34.4•	38.9	68
69	71 29.3	−46.4	22.7	72 24.4	−45.5	23.9	73 18.9	−44.6	25.3	74 12.8	−43.5	26.8	75 06.0	−42.3	28.5	75 58.3	−41.0•	30.4	76 49.5	−39.4•	32.5	77 39.4	−37.5•	35.0	69
70	70 42.9	−47.4	20.7	71 38.9	−46.8	21.8	72 34.3	−46.0	23.0	73 29.3	−45.2	24.3	74 23.7	−44.2	25.8	75 17.3	−43.0	27.4	76 10.1	−41.6•	29.3	77 01.9	−40.1•	31.4	70
71	69 55.5	−48.5	18.9	70 52.1	−48.0	19.9	71 48.3	−47.3	20.9	72 44.1	−46.5	22.0	73 39.5	−45.7	23.3	74 34.3	−44.7	24.7	75 28.5	−43.7	26.4	76 21.8	−42.4•	28.2	71
72	69 07.0	−49.1	17.2	70 04.1	−48.9	18.1	71 01.0	−48.4	19.0	71 57.6	−47.8	20.0	72 53.8	−47.1	21.1	73 49.6	−46.3	22.3	74 44.8	−45.4	23.7	75 39.4	−44.3	25.3	72
73	68 17.5	−50.2	15.7	69 15.2	−49.8	16.4	70 12.6	−49.3	17.2	71 09.8	−48.8	18.0	72 06.7	−48.3	19.0	73 03.3	−47.7	20.1	73 59.4	−46.9	21.3	74 55.1	−46.0	22.6	73
74	67 27.3	−51.0	14.2	68 25.4	−50.7	14.9	69 23.3	−50.3	15.5	70 21.0	−49.8	16.3	71 18.4	−49.3	17.1	72 15.6	−48.7	18.0	73 12.5	−48.1	19.0	74 09.1	−47.5	20.2	74
75	66 36.3	−51.6	12.9	67 34.7	−51.3	13.4	68 33.0	−51.0	14.0	69 31.2	−50.7	14.7	70 29.1	−50.2	15.4	71 26.9	−49.8	16.2	72 24.4	−49.3	17.0	73 21.6	−48.7	18.0	75
76	65 44.7	−52.2	11.6	66 43.4	−52.0	12.1	67 42.0	−51.7	12.6	68 40.5	−51.4	13.2	69 38.9	−51.1	13.8	70 37.1	−50.7	14.4	71 35.1	−50.3	15.2	72 32.9	−49.8	16.0	76
77	64 52.5	−52.8	10.4	65 51.4	−52.5	10.8	66 50.3	−52.3	11.3	67 49.1	−52.0	11.8	68 47.8	−51.8	12.3	69 46.4	−51.5	12.9	70 44.8	−51.1	13.5	71 43.1	−50.8	14.2	77
78	63 59.7	−53.2	9.3	64 58.9	−53.0	9.7	65 58.0	−52.8	10.1	66 57.1	−52.6	10.5	67 56.0	−52.4	10.9	68 54.9	−52.2	11.4	69 53.7	−51.9	11.9	70 52.3	−51.6	12.5	78
79	63 06.5	−53.6	8.3	64 05.9	−53.5	8.6	65 05.2	−53.3	8.9	66 04.5	−53.1	9.3	67 03.6	−52.9	9.6	68 02.7	−52.7	10.1	69 01.8	−52.6	10.5	70 00.7	−52.3	11.0	79
80	62 12.9	−54.0	7.3	63 12.4	−53.9	7.6	64 11.9	−53.8	7.8	65 11.3	−53.7	8.1	66 10.7	−53.5	8.5	67 10.0	−53.3	8.8	68 09.2	−53.1	9.2	69 08.4	−52.9	9.6	80
81	61 18.9	−54.4	6.4	62 18.5	−54.3	6.6	63 18.1	−54.2	6.8	64 17.6	−54.0	7.1	65 17.2	−54.0	7.3	66 16.7	−53.8	7.6	67 16.1	−53.7	8.0	68 15.5	−53.5	8.3	81
82	60 24.5	−54.7	5.5	61 24.2	−54.6	5.7	62 23.9	−54.5	5.9	63 23.6	−54.4	6.1	64 23.2	−54.3	6.3	65 22.9	−54.3	6.5	66 22.4	−54.1	6.8	67 22.0	−54.0	7.1	82
83	59 29.8	−55.0	4.7	60 29.6	−54.9	4.9	61 29.4	−54.9	5.0	62 29.2	−54.8	5.2	63 28.9	−54.7	5.4	64 28.6	−54.6	5.6	65 28.3	−54.5	5.8	66 28.0	−54.4	6.0	83
84	58 34.8	−55.2	3.9	59 34.7	−55.2	4.0	60 34.5	−55.1	4.2	61 34.4	−55.1	4.3	62 34.2	−55.0	4.5	63 34.0	−55.0	4.6	64 33.8	−54.9	4.8	65 33.6	−54.8	5.0	84
85	57 39.6	−55.5	3.2	58 39.5	−55.5	3.3	59 39.4	−55.4	3.4	60 39.3	−55.4	3.5	61 39.2	−55.4	3.6	62 39.0	−55.3	3.7	63 38.9	−55.2	3.9	64 38.8	−55.2	4.0	85
86	56 44.1	−55.7	2.5	57 44.0	−55.7	2.6	58 44.0	−55.7	2.6	59 43.9	−55.6	2.7	60 43.8	−55.6	2.8	61 43.7	−55.5	2.9	62 43.7	−55.6	3.0	63 43.6	−55.5	3.1	86
87	55 48.4	−56.0	1.8	56 48.3	−55.9	1.9	57 48.3	−55.9	1.9	58 48.3	−55.9	2.0	59 48.2	−55.9	2.0	60 48.2	−55.9	2.1	61 48.1	−55.8	2.2	62 48.1	−55.8	2.2	87
88	54 52.4	−56.1	1.2	55 52.4	−56.1	1.2	56 52.4	−56.1	1.3	57 52.4	−56.1	1.3	58 52.3	−56.0	1.3	59 52.3	−56.0	1.4	60 52.3	−56.0	1.4	61 52.3	−56.0	1.5	88
89	53 56.3	−56.3	0.6	54 56.3	−56.3	0.6	55 56.3	−56.3	0.6	56 56.3	−56.3	0.6	57 56.3	−56.3	0.6	58 56.3	−56.3	0.7	59 56.3	−56.3	0.7	60 56.3	−56.3	0.7	89
90	53 00.0	−56.5	0.0	54 00.0	−56.5	0.0	55 00.0	−56.5	0.0	56 00.0	−56.5	0.0	57 00.0	−56.5	0.0	58 00.0	−56.5	0.0	59 00.0	−56.5	0.0	60 00.0	−56.5	0.0	90

53°	54°	55°	56°	57°	58°	59°	60°

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	34 26.3	−58.1	155.5	33 31.7	−58.3	155.8	32 36.9	−58.4	156.0	31 42.0	−58.5	156.3	30 47.0	−58.6	156.5	29 51.9	−58.7	156.8	28 56.7	−58.8	157.0	28 01.5	−58.9	157.2	0
1	33 28.2	−58.2	155.8	32 33.4	−58.3	156.1	31 38.5	−58.4	156.3	30 43.5	−58.5	156.6	29 48.4	−58.6	156.8	28 53.2	−58.7	157.0	27 57.9	−58.8	157.2	27 02.6	−58.9	157.4	1
2	32 30.0	−58.2	156.1	31 35.1	−58.3	156.3	30 40.1	−58.4	156.6	29 45.0	−58.5	156.8	28 49.8	−58.6	157.0	27 54.5	−58.7	157.2	26 59.1	−58.8	157.4	26 03.7	−58.9	157.6	2
3	31 31.8	−58.2	156.4	30 36.8	−58.4	156.6	29 41.7	−58.5	156.8	28 46.5	−58.6	157.1	27 51.2	−58.7	157.3	26 55.8	−58.8	157.5	26 00.3	−58.8	157.7	25 04.8	−58.9	157.8	3
4	30 33.6	−58.3	156.7	29 38.4	−58.4	156.9	28 43.2	−58.5	157.1	27 47.9	−58.6	157.3	26 52.5	−58.7	157.5	25 57.0	−58.8	157.7	25 01.5	−58.9	157.9	24 05.9	−59.0	158.1	4
5	29 35.3	−58.3	156.9	28 40.0	−58.4	157.2	27 44.7	−58.5	157.4	26 49.3	−58.6	157.6	25 53.8	−58.7	157.7	24 58.2	−58.8	157.9	24 02.6	−58.8	158.1	23 06.9	−59.0	158.3	5
6	28 37.0	−58.4	157.2	27 41.6	−58.4	157.4	26 46.2	−58.6	157.6	25 50.7	−58.7	157.8	24 55.1	−58.7	158.0	23 59.4	−58.8	158.1	23 03.7	−58.9	158.3	22 07.9	−59.0	158.5	6
7	27 38.6	−58.4	157.5	26 43.2	−58.5	157.7	25 47.6	−58.5	157.9	24 52.0	−58.6	158.0	23 56.4	−58.8	158.2	23 00.6	−58.8	158.4	22 04.8	−58.9	158.5	21 09.0	−59.0	158.7	7
8	26 40.3	−58.4	157.7	25 44.7	−58.5	157.9	24 49.1	−58.6	158.1	23 53.4	−58.7	158.1	22 57.6	−58.8	158.4	22 01.8	−58.9	158.6	21 05.9	−58.9	158.7	20 10.0	−59.0	158.8	8
9	25 41.9	−58.5	158.0	24 46.2	−58.5	158.2	23 50.5	−58.6	158.3	22 54.7	−58.7	158.5	21 58.8	−58.7	158.6	21 02.9	−58.8	158.8	20 07.0	−59.0	158.9	19 11.0	−59.0	159.0	9
10	24 43.4	−58.5	158.2	23 47.7	−58.5	158.4	22 51.9	−58.7	158.7	21 56.0	−58.7	158.7	21 00.1	−58.8	158.9	20 04.1	−58.9	159.0	19 08.0	−58.9	159.1	18 12.0	−59.1	159.2	10
11	23 45.0	−58.5	158.5	22 49.1	−58.5	158.6	21 53.2	−58.6	158.8	20 57.3	−58.8	158.9	20 01.3	−58.9	159.1	19 05.2	−58.9	159.2	18 09.1	−59.0	159.3	17 12.9	−59.0	159.4	11
12	22 46.5	−58.5	158.7	21 50.6	−58.6	158.9	20 54.6	−58.7	159.0	19 58.5	−58.7	159.1	19 02.4	−58.8	159.3	18 06.3	−58.9	159.4	17 10.1	−59.0	159.5	16 13.9	−59.0	159.6	12
13	21 48.0	−58.5	159.0	20 52.0	−58.6	159.1	19 55.9	−58.7	159.2	18 59.8	−58.8	159.4	18 03.6	−58.8	159.5	17 07.4	−58.9	159.6	16 11.1	−58.9	159.7	15 14.9	−59.1	159.8	13
14	20 49.5	−58.5	159.2	19 53.4	−58.6	159.3	18 57.2	−58.7	159.5	18 01.0	−58.8	159.6	17 04.8	−58.9	159.7	16 08.5	−58.9	159.8	15 12.2	−59.0	159.9	14 15.8	−59.1	160.0	14
15	19 51.0	−58.6	159.4	18 54.8	−58.7	159.6	17 58.5	−58.7	159.7	17 02.2	−58.8	159.8	16 05.9	−58.9	159.9	15 09.6	−59.0	160.0	14 13.2	−59.0	160.1	13 16.7	−59.0	160.2	15
16	18 52.4	−58.6	159.7	17 56.1	−58.6	159.8	16 59.8	−58.7	159.9	16 03.4	−58.8	160.0	15 07.0	−58.8	160.1	14 10.6	−58.9	160.2	13 14.2	−59.1	160.3	12 17.7	−59.1	160.3	16
17	17 53.8	−58.5	159.9	16 57.5	−58.7	160.0	16 01.1	−58.8	160.1	15 04.6	−58.8	160.2	14 08.2	−58.9	160.3	13 11.7	−59.0	160.4	12 15.1	−59.0	160.4	11 18.6	−59.1	160.5	17
18	16 55.3	−58.7	160.1	15 58.8	−58.7	160.2	15 02.3	−58.7	160.3	14 05.8	−58.8	160.4	13 09.3	−58.9	160.5	12 12.7	−58.9	160.6	11 16.1	−59.0	160.6	10 19.5	−59.1	160.7	18
19	15 56.6	−58.6	160.3	15 00.1	−58.7	160.4	14 03.6	−58.8	160.5	13 07.0	−58.8	160.6	12 10.4	−58.9	160.7	11 13.8	−59.0	160.7	10 17.1	−59.0	160.8	9 20.4	−59.1	160.9	19
20	14 58.0	−58.6	160.6	14 01.4	−58.7	160.7	13 04.8	−58.7	160.7	12 08.2	−58.9	160.8	11 11.5	−58.9	160.9	10 14.8	−59.0	160.9	9 18.1	−59.1	161.0	8 21.3	−59.1	161.0	20
21	13 59.4	−58.6	160.8	13 02.7	−58.7	160.9	12 06.0	−58.7	160.9	11 09.3	−58.8	161.0	10 12.6	−59.0	161.1	9 15.8	−59.0	161.1	8 19.0	−59.0	161.2	7 22.2	−59.1	161.2	21
22	13 00.8	−58.7	161.0	12 04.0	−58.7	161.1	11 07.3	−58.8	161.1	10 10.5	−58.9	161.2	9 13.6	−58.9	161.3	8 16.8	−59.0	161.3	7 20.0	−59.1	161.4	6 23.1	−59.1	161.4	22
23	12 02.1	−58.7	161.2	11 05.3	−58.7	161.3	10 08.5	−58.8	161.3	9 11.6	−58.9	161.4	8 14.7	−58.9	161.5	7 17.8	−59.0	161.5	6 20.9	−59.0	161.5	5 24.0	−59.1	161.6	23
24	11 03.5	−58.7	161.4	10 06.6	−58.8	161.5	9 09.7	−58.8	161.5	8 12.7	−58.8	161.6	7 15.8	−58.9	161.6	6 18.8	−59.0	161.7	5 21.9	−59.1	161.7	4 24.9	−59.1	161.7	24
25	10 04.8	−58.7	161.6	9 07.8	−58.7	161.7	8 10.9	−58.9	161.8	7 13.9	−58.9	161.8	6 16.9	−59.0	161.8	5 19.8	−59.0	161.9	4 22.8	−59.0	161.9	3 25.8	−59.1	162.0	25
26	9 06.1	−58.7	161.9	8 09.1	−58.8	161.9	7 12.0	−58.8	161.9	6 15.0	−58.8	162.0	5 17.9	−58.9	162.0	4 20.8	−59.0	162.0	3 23.8	−59.1	162.1	2 26.7	−59.1	162.1	26
27	8 07.4	−58.7	162.1	7 10.3	−58.7	162.1	6 13.2	−58.8	162.1	5 16.1	−58.9	162.2	4 19.0	−59.0	162.2	3 21.8	−59.0	162.2	2 24.7	−59.1	162.2	1 27.6	−59.2	162.3	27
28	7 08.7	−58.7	162.3	6 11.6	−58.8	162.3	5 14.4	−58.8	162.3	4 17.2	−58.9	162.4	3 20.0	−59.0	162.4	2 22.8	−59.0	162.4	1 25.6	−59.0	162.4	0 28.4	−59.1	162.4	28
29	6 10.0	−58.7	162.5	5 12.8	−58.7	162.5	4 15.6	−58.9	162.5	3 18.3	−58.9	162.6	2 21.1	−59.0	162.6	1 23.8	−59.0	162.6	0 26.6	−59.1	162.6	0 30.7	+59.1	17.4	29
30	5 11.3	−58.7	162.7	4 14.0	−58.7	162.7	3 16.7	−58.8	162.7	2 19.4	−58.8	162.8	1 22.1	−58.9	162.8	0 24.8	−59.0	162.8	0 32.5	+59.0	17.2	1 29.8	+59.1	17.2	30
31	4 12.6	−58.7	162.9	3 15.3	−58.8	162.9	2 17.9	−58.8	162.9	1 20.6	−58.9	162.9	0 23.2	−59.0	163.0	0 34.2	+59.0	17.0	1 31.5	+59.1	17.1	2 28.9	+59.1	17.1	31
32	3 13.9	−58.7	163.1	2 16.5	−58.8	163.1	1 19.1	−58.9	163.1	0 21.7	−58.9	163.1	0 35.8	+58.9	16.9	1 33.2	+59.0	16.9	2 30.6	+59.1	16.9	3 28.0	+59.1	16.9	32
33	2 15.2	−58.7	163.3	1 17.7	−58.8	163.3	0 20.2	−58.8	163.3	0 37.2	+58.9	16.7	1 34.7	+59.0	16.7	2 32.2	+59.0	16.7	3 29.7	+59.0	16.7	4 27.1	+59.1	16.7	33
34	1 16.5	−58.7	163.5	0 18.9	−58.7	163.5	0 38.6	+58.8	16.5	1 36.1	+58.9	16.5	2 33.7	+58.9	16.5	3 31.2	+59.0	16.5	4 28.7	+59.1	16.5	5 26.2	+59.1	16.5	34
35	0 17.8	−58.7	163.7	0 39.8	+58.8	16.3	1 37.4	+58.9	16.3	2 35.0	+58.9	16.3	3 32.6	+59.0	16.3	4 30.2	+59.0	16.3	5 27.8	+59.0	16.3	6 25.3	+59.1	16.4	35
36	0 40.9	+58.8	16.1	1 38.6	+58.8	16.1	2 36.3	+58.9	16.1	3 33.9	+58.9	16.1	4 31.6	+58.9	16.1	5 29.2	+59.0	16.1	6 26.8	+59.1	16.2	7 24.4	+59.1	16.2	36
37	1 39.7	+58.7	15.9	2 37.4	+58.7	15.9	3 35.1	+58.8	15.9	4 32.8	+58.9	15.9	5 30.5	+58.9	15.9	6 28.2	+59.0	16.0	7 25.9	+59.0	16.0	8 23.5	+59.1	16.0	37
38	2 38.4	+58.7	15.7	3 36.1	+58.8	15.7	4 33.9	+58.8	15.7	5 31.7	+58.9	15.7	6 29.4	+59.0	15.7	7 27.2	+59.0	15.8	8 24.9	+59.1	15.8	9 22.6	+59.1	15.9	38
39	3 37.1	+58.7	15.4	4 34.9	+58.8	15.5	5 32.7	+58.9	15.5	6 30.6	+58.8	15.5	7 28.4	+58.9	15.5	8 26.2	+58.9	15.6	9 24.0	+59.0	15.6	10 21.7	+59.1	15.7	39
40	4 35.8	+58.7	15.2	5 33.7	+58.7	15.3	6 31.6	+58.8	15.3	7 29.4	+58.9	15.3	8 27.3	+58.9	15.4	9 25.1	+59.0	15.4	10 23.0	+59.0	15.4	11 20.8	+59.1	15.5	40
41	5 34.5	+58.7	15.0	6 32.4	+58.7	15.0	7 30.4	+58.8	15.1	8 28.3	+58.9	15.1	9 26.2	+58.9	15.2	10 24.1	+59.0	15.2	11 22.0	+59.0	15.3	12 19.9	+59.1	15.3	41
42	6 33.2	+58.7	14.8	7 31.2	+58.7	14.9	8 29.2	+58.8	14.9	9 27.2	+58.8	14.9	10 25.1	+58.9	15.0	11 23.1	+59.0	15.0	12 21.0	+59.0	15.1	13 19.0	+59.0	15.1	42
43	7 31.9	+58.7	14.6	8 29.9	+58.8	14.7	9 28.0	+58.8	14.7	10 26.0	+58.9	14.7	11 24.0	+58.9	14.8	12 22.1	+58.9	14.8	13 20.0	+59.0	14.9	14 18.0	+59.1	15.0	43
44	8 30.6	+58.7	14.4	9 28.7	+58.7	14.4	10 26.8	+58.7	14.5	11 24.9	+58.8	14.5	12 22.9	+58.9	14.6	13 21.0	+59.0	14.6	14 19.0	+59.0	14.7	15 17.1	+59.0	14.8	44
45	9 29.3	+58.6	14.2	10 27.4	+58.8	14.2	11 25.6	+58.8	14.3	12 23.7	+58.9	14.3	13 21.8	+58.9	14.4	14 20.0	+58.9	14.5	15 18.0	+59.0	14.5	16 16.1	+59.1	14.6	45
46	10 27.9	+58.7	14.0	11 26.2	+58.7	14.0	12 24.4	+58.7	14.1	13 22.6	+58.8	14.1	14 20.7	+58.9	14.2	15 18.9	+58.9	14.3	16 17.0	+59.0	14.3	17 15.2	+59.0	14.4	46
47	11 26.6	+58.7	13.8	12 24.9	+58.7	13.8	13 23.1	+58.8	13.9	14 21.4	+58.8	13.9	15 19.6	+58.9	14.0	16 17.8	+58.9	14.1	17 16.0	+59.0	14.1	18 14.2	+59.0	14.2	47
48	12 25.3	+58.6	13.6	13 23.6	+58.7	13.6	14 21.9	+58.7	13.7	15 20.2	+58.8	13.7	16 18.5	+58.8	13.8	17 16.7	+59.0	13.9	18 15.0	+58.9	13.9	19 13.2	+59.0	14.0	48
49	13 23.9	+58.6	13.3	14 22.3	+58.7	13.4	15 20.6	+58.8	13.5	16 19.0	+58.8	13.5	17 17.3	+58.9	13.6	18 15.6	+58.9	13.7	19 13.9	+59.0	13.7	20 12.2	+59.0	13.8	49
50	14 22.5	+58.7	13.1	15 21.0	+58.6	13.2	16 19.4	+58.7	13.2	17 17.8	+58.8	13.3	18 16.2	+58.8	13.4	19 14.5	+58.9	13.5	20 12.9	+58.9	13.5	21 11.2	+59.0	13.6	50
51	15 21.2	+58.6	12.9	16 19.6	+58.7	13.0	17 18.1	+58.7	13.0	18 16.6	+58.7	13.1	19 15.0	+58.8	13.2	20 13.4	+58.9	13.3	21 11.8	+58.9	13.3	22 10.2	+58.9	13.4	51
52	16 19.8	+58.6	12.7	17 18.3	+58.7	12.7	18 16.8	+58.7	12.8	19 15.3	+58.8	12.9	20 13.8	+58.8	13.0	21 12.3	+58.8	13.1	22 10.7	+58.9	13.1	23 09.1	+59.0	13.2	52
53	17 18.4	+58.5	12.5	18 17.0	+58.6	12.6	19 15.5	+58.7	12.6	20 14.1	+58.7	12.7	21 12.6	+58.8	12.8	22 11.1	+58.8	12.8	23 09.6	+58.9	12.9	24 08.1	+58.9	13.0	53
54	18 17.0	+58.5	12.2	19 15.6	+58.6	12.3	20 14.2	+58.7	12.4	21 12.8	+58.7	12.5	22 11.4	+58.7	12.5	23 09.9	+58.8	12.6	24 08.5	+58.8	12.7	25 07.0	+58.9	12.8	54
55	19 15.5	+58.6	12.0	20 14.2	+58.6	12.1	21 12.9	+58.6	12.1	22 11.5	+58.7	12.2	23 10.1	+58.8	12.3	24 08.8	+58.7	12.4	25 07.3	+58.9	12.5	26 05.9	+58.9	12.6	55
56	20 14.1	+58.5	11.8	21 12.8	+58.6	11.9	22 11.5	+58.6	11.9	23 10.2	+58.7	12.0	24 08.9	+58.7	12.1	25 07.5	+58.8	12.2	26 06.2	+58.8	12.3	27 04.8	+58.9	12.4	56
57	21 12.6	+58.5	11.5	22 11.4	+58.5	11.6	23 10.1	+58.6	11.7	24 08.9	+58.6	11.8	25 07.6	+58.7	11.9	26 06.3	+58.8	12.0	27 05.0	+58.8	12.1	28 03.7	+58.8	12.2	57
58	22 11.1	+58.5	11.3	23 09.9	+58.6	11.4	24 08.8	+58.5	11.5	25 07.5	+58.7	11.5	26 06.3	+58.7	11.6	27 05.1	+58.7	11.7	28 03.8	+58.8	11.9	29 02.5	+58.8	12.0	58
59	23 09.6	+58.5	11.0	24 08.5	+58.5	11.1	25 07.3	+58.6	11.3	26 06.2	+58.6	11.3	27 05.0	+58.7	11.4	28 03.8	+58.7	11.5	29 02.6	+58.7	11.6	30 01.3	+58.8	11.7	59
60	24 08.1	+58.4	10.8	25 07.0	+58.5	10.9	26 05.9	+58.5	11.0	27 04.8	+58.6	11.1	28 03.7	+58.6	11.2	29 02.5	+58.6	11.3	30 01.3	+58.7	11.4	31 00.2	+58.7	11.5	60
61	25 06.5	+58.4	10.6	26 05.5	+58.4	10.6	27 04.4	+58.6	10.7	28 03.4	+58.5	10.8	29 02.3	+58.6	10.9	30 01.2	+58.7	11.0	31 00.1	+58.7	11.2	31 58.9	+58.8	11.3	61
62	26 04.9	+58.4	10.3	27 03.9	+58.5	10.4	28 03.0	+58.4	10.5	29 01.9	+58.6	10.6	30 00.9	+58.5	10.7	30 59.9	+58.6	10.8	31 58.8	+58.7	10.9	32 57.7	+58.7	11.0	62
63	27 03.3	+58.4	10.0	28 02.4	+58.4	10.1	29 01.4	+58.5	10.2	30 00.5	+58.5	10.3	30 59.5	+58.5	10.4	31 58.5	+58.6	10.5	32 57.5	+58.6	10.7	33 56.4	+58.7	10.8	63
64	28 01.7	+58.3	9.8	29 00.8	+58.4	9.9	29 59.9	+58.4	10.0	30 59.0	+58.5	10.1	31 58.0	+58.6	10.2	32 57.1	+58.6	10.3	33 56.1	+58.6	10.4	34 55.1	+58.7	10.5	64
65	29 00.0	+58.3	9.5	29 59.2	+58.3	9.6	30 58.3	+58.4	9.7	31 57.5	+58.4	9.8	32 56.6	+58.5	9.9	33 55.7	+58.5	10.0	34 54.7	+58.6	10.2	35 53.8	+58.6	10.3	65
66	29 58.3	+58.3	9.2	30 57.5	+58.3	9.3	31 56.7	+58.4	9.4	32 55.9	+58.4	9.5	33 55.1	+58.4	9.7	34 54.2	+58.5	9.8	35 53.3	+58.6	9.9	36 52.4	+58.6	10.0	66
67	30 56.6	+58.2	9.0	31 55.8	+58.3	9.1	32 55.1	+58.3	9.2	33 54.3	+58.4	9.3	34 53.5	+58.4	9.4	35 52.7	+58.4	9.5	36 51.9	+58.5	9.6	37 51.0	+58.6	9.7	67
68	31 54.8	+58.2	8.7	32 54.1	+58.2	8.8	33 53.4	+58.3	8.9	34 52.7	+58.3	9.0	35 51.9	+58.4	9.1	36 51.1	+58.5	9.2	37 50.4	+58.4	9.3	38 49.6	+58.5	9.5	68
69	32 53.0	+58.1	8.4	33 52.3	+58.2	8.5	34 51.7	+58.2	8.6	35 51.0	+58.3	8.7	36 50.3	+58.3	8.8	37 49.6	+58.3	8.9	38 48.8	+58.5	9.1	39 48.1	+58.4	9.2	69
70	33 51.1	+58.1	8.1	34 50.5	+58.2	8.2	35 49.9	+58.2	8.3	36 49.3	+58.2	8.4	37 48.6	+58.3	8.5	38 47.9	+58.4	8.6	39 47.3	+58.3	8.8	40 46.5	+58.5	8.9	70
71	34 49.2	+58.1	7.8	35 48.7	+58.1	7.9	36 48.1	+58.1	8.0	37 47.5	+58.2	8.1	38 46.9	+58.2	8.2	39 46.3	+58.3	8.3	40 45.6	+58.4	8.5	41 45.0	+58.4	8.6	71
72	35 47.3	+58.0	7.5	36 46.8	+58.0	7.6	37 46.2	+58.1	7.7	38 45.7	+58.1	7.8	39 45.1	+58.2	7.9	40 44.6	+58.2	8.0	41 44.0	+58.2	8.1	42 43.4	+58.3	8.3	72
73	36 45.3	+58.0	7.2	37 44.8	+58.0	7.3	38 44.3	+58.1	7.4	39 43.8	+58.1	7.5	40 43.3	+58.2	7.6	41 42.8	+58.2	7.7	42 42.2	+58.1	7.8	43 41.7	+58.2	7.9	73
74	37 43.3	+57.9	6.8	38 42.8	+58.0	6.9	39 42.4	+58.0	7.0	40 41.9	+58.1	7.1	41 41.5	+58.0	7.3	42 41.0	+58.1	7.4	43 40.5	+58.1	7.5	44 39.9	+58.3	7.6	74
75	38 41.2	+57.8	6.6	39 40.8	+57.9	6.6	40 40.4	+57.9	6.7	41 40.0	+57.9	6.8	42 39.5	+58.0	6.9	43 39.1	+58.0	7.0	44 38.6	+58.1	7.1	45 38.2	+58.1	7.3	75
76	39 39.0	+57.8	6.2	40 38.7	+57.8	6.3	41 38.3	+57.9	6.4	42 37.9	+57.9	6.5	43 37.5	+58.0	6.6	44 37.1	+58.0	6.7	45 36.7	+58.1	6.8	46 36.3	+58.1	6.9	76
77	40 36.8	+57.7	5.8	41 36.5	+57.7	5.9	42 36.2	+57.8	6.0	43 35.8	+57.9	6.1	44 35.5	+57.9	6.2	45 35.1	+57.9	6.3	46 34.8	+57.9	6.4	47 34.4	+58.0	6.5	77
78	41 34.5	+57.7	5.5	42 34.2	+57.7	5.6	43 34.0	+57.7	5.6	44 33.7	+57.7	5.7	45 33.4	+57.8	5.8	46 33.0	+57.8	5.9	47 32.7	+57.9	6.0	48 32.4	+57.9	6.2	78
79	42 32.2	+57.6	5.1	43 31.9	+57.6	5.2	44 31.7	+57.6	5.3	45 31.4	+57.7	5.3	46 31.2	+57.7	5.4	47 30.9	+57.7	5.5	48 30.6	+57.8	5.7	49 30.3	+57.8	5.8	79
80	43 29.7	+57.5	4.7	44 29.5	+57.6	4.8	45 29.3	+57.6	4.9	46 29.1	+57.6	4.9	47 28.9	+57.6	5.0	48 28.6	+57.7	5.1	49 28.4	+57.7	5.2	50 28.1	+57.8	5.4	80
81	44 27.2	+57.4	4.3	45 27.1	+57.4	4.5	46 26.9	+57.5	4.5	47 26.7	+57.5	4.5	48 26.5	+57.6	4.6	49 26.3	+57.6	4.7	50 26.1	+57.6	4.9	51 25.9	+57.6	4.9	81
82	45 24.6	+57.4	3.9	46 24.5	+57.4	4.0	47 24.4	+57.3	4.1	48 24.2	+57.4	4.1	49 24.1	+57.4	4.2	50 23.9	+57.5	4.3	51 23.7	+57.5	4.4	52 23.5	+57.6	4.5	82
83	46 22.0	+57.2	3.5	47 21.9	+57.2	3.5	48 21.7	+57.3	3.6	49 21.6	+57.3	3.7	50 21.5	+57.3	3.7	51 21.4	+57.3	3.8	52 21.2	+57.4	3.9	53 21.1	+57.4	4.0	83
84	47 19.2	+57.1	3.0	48 19.1	+57.1	3.1	49 19.0	+57.2	3.1	50 18.9	+57.2	3.2	51 18.8	+57.2	3.2	52 18.7	+57.3	3.3	53 18.6	+57.3	3.4	54 18.5	+57.3	3.5	84
85	48 16.3	+57.0	2.6	49 16.2	+57.1	2.6	50 16.2	+57.0	2.7	51 16.1	+57.1	2.7	52 16.0	+57.1	2.8	53 16.0	+57.1	2.9	54 15.9	+57.1	2.9	55 15.8	+57.2	3.0	85
86	49 13.3	+56.9	2.1	50 13.3	+56.9	2.1	51 13.2	+56.9	2.2	52 13.2	+56.9	2.2	53 13.1	+57.0	2.3	54 13.1	+56.9	2.3	55 13.0	+57.0	2.4	56 13.0	+57.0	2.5	86
87	50 10.2	+56.7	1.6	51 10.2	+56.7	1.6	52 10.1	+56.8	1.7	53 10.1	+56.7	1.7	54 10.1	+56.8	1.8	55 10.0	+56.9	1.8	56 10.0	+56.8	1.9	57 10.0	+56.8	1.9	87
88	51 06.9	+56.6	1.1	52 06.9	+56.6	1.1	53 06.9	+56.6	1.1	54 06.9	+56.6	1.2	55 06.9	+56.6	1.2	56 06.9	+56.6	1.2	57 06.9	+56.6	1.3	58 06.8	+56.7	1.3	88
89	52 03.5	+56.5	0.6	53 03.5	+56.5	0.6	54 03.5	+56.5	0.6	55 03.5	+56.5	0.6	56 03.5	+56.5	0.6	57 03.5	+56.5	0.6	58 03.5	+56.5	0.6	59 03.5	+56.5	0.7	89
90	53 00.0	+56.3	0.0	54 00.0	+56.3	0.0	55 00.0	+56.3	0.0	56 00.0	+56.3	0.0	57 00.0	+56.3	0.0	58 00.0	+56.3	0.0	59 00.0	+56.3	0.0	60 00.0	+56.3	0.0	90

LATITUDE SAME NAME AS DECLINATION — N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	34 11.0	+57.9	154.3	33 16.9	+58.0	154.6	32 22.6	+58.2	154.9	31 28.2	+58.3	155.2	30 33.7	+58.4	155.4	29 39.1	+58.5	155.6	28 44.4	+58.6	155.9	27 49.6	+58.7	156.1	0
1	35 08.9	+57.8	154.0	34 14.9	+58.0	154.3	33 20.8	+58.1	154.6	32 26.5	+58.3	154.9	31 32.1	+58.4	155.1	30 37.6	+58.5	155.4	29 43.0	+58.6	155.6	28 48.3	+58.7	155.9	1
2	36 06.7	+57.8	153.7	35 12.9	+57.9	154.0	34 18.9	+58.1	154.3	33 24.8	+58.2	154.6	32 30.5	+58.3	154.9	31 36.1	+58.5	155.1	30 41.6	+58.6	155.4	29 47.0	+58.7	155.6	2
3	37 04.5	+57.8	153.3	36 10.8	+57.9	153.7	35 17.0	+58.0	154.0	34 23.0	+58.2	154.3	33 28.9	+58.3	154.6	32 34.6	+58.4	154.9	31 40.2	+58.6	155.1	30 45.7	+58.7	155.4	3
4	38 02.3	+57.7	153.0	37 08.7	+57.9	153.4	36 15.0	+58.0	153.7	35 21.2	+58.1	154.0	34 27.2	+58.2	154.3	33 33.0	+58.4	154.6	32 38.8	+58.5	154.9	31 44.4	+58.6	155.1	4
5	39 00.0	+57.6	152.7	38 06.6	+57.8	153.0	37 13.0	+58.0	153.4	36 19.3	+58.1	153.7	35 25.4	+58.3	154.0	34 31.4	+58.4	154.3	33 37.3	+58.5	154.6	32 43.0	+58.6	154.9	5
6	39 57.6	+57.5	152.3	39 04.4	+57.7	152.7	38 11.0	+57.8	153.0	37 17.4	+58.0	153.4	36 23.7	+58.2	153.7	35 29.8	+58.3	154.0	34 35.8	+58.4	154.3	33 41.6	+58.6	154.6	6
7	40 55.1	+57.5	151.9	40 02.1	+57.6	152.3	39 08.8	+57.9	152.7	38 15.4	+58.0	153.1	37 21.9	+58.1	153.4	36 28.1	+58.3	153.7	35 34.2	+58.5	154.1	34 40.2	+58.6	154.4	7
8	41 52.6	+57.3	151.5	40 59.7	+57.6	152.0	40 06.7	+57.7	152.4	39 13.4	+58.0	152.7	38 20.0	+58.1	153.1	37 26.4	+58.2	153.5	36 32.7	+58.3	153.8	35 38.8	+58.5	154.1	8
9	42 50.0	+57.3	151.1	41 57.3	+57.5	151.6	41 04.4	+57.7	152.0	40 11.4	+57.8	152.4	39 18.1	+58.0	152.8	38 24.6	+58.2	153.1	37 31.0	+58.4	153.5	36 37.3	+58.4	153.8	9
10	43 47.3	+57.1	150.7	42 54.8	+57.4	151.2	42 02.1	+57.6	151.6	41 09.2	+57.8	152.0	40 16.1	+58.0	152.4	39 22.8	+58.2	152.8	38 29.4	+58.3	153.2	37 35.7	+58.5	153.5	10
11	44 44.5	+57.1	150.3	43 52.2	+57.4	150.8	42 59.7	+57.5	151.3	42 07.0	+57.8	151.7	41 14.1	+57.9	152.1	40 21.0	+58.0	152.5	39 27.6	+58.3	152.9	38 34.2	+58.3	153.3	11
12	45 41.6	+57.0	149.9	44 49.6	+57.2	150.4	43 57.3	+57.4	150.9	43 04.8	+57.6	151.3	42 12.0	+57.9	151.8	41 19.0	+58.1	152.2	40 25.9	+58.2	152.6	39 32.5	+58.4	153.0	12
13	46 38.6	+56.9	149.4	45 46.8	+57.2	150.0	44 54.7	+57.4	150.5	44 02.4	+57.5	150.9	43 09.9	+57.7	151.4	42 17.1	+57.9	151.8	41 24.1	+58.1	152.3	40 30.9	+58.3	152.7	13
14	47 35.5	+56.8	149.0	46 44.0	+57.0	149.5	45 52.1	+57.3	150.0	45 00.0	+57.5	150.5	44 07.6	+57.7	151.0	43 15.0	+57.9	151.5	42 22.2	+58.1	151.9	41 29.2	+58.2	152.3	14
15	48 32.3	+56.7	148.5	47 41.0	+56.9	149.1	46 49.4	+57.2	149.6	45 57.5	+57.4	150.1	45 05.3	+57.7	150.6	44 12.9	+57.8	151.1	43 20.3	+58.0	151.6	42 27.4	+58.2	152.0	15
16	49 29.0	+56.5	148.0	48 37.9	+56.8	148.6	47 46.6	+57.0	149.2	46 54.9	+57.3	149.7	46 03.0	+57.5	150.2	45 10.7	+57.7	150.7	44 18.3	+57.9	151.2	43 25.6	+58.1	151.7	16
17	50 25.5	+56.4	147.5	49 34.7	+56.7	148.1	48 43.6	+57.0	148.7	47 52.2	+57.2	149.3	47 00.5	+57.4	149.8	46 08.5	+57.6	150.4	45 16.2	+57.9	150.9	44 23.7	+58.0	151.3	17
18	51 21.9	+56.2	146.9	50 31.4	+56.6	147.6	49 40.6	+56.8	148.2	48 49.4	+57.1	148.8	47 57.9	+57.4	149.4	47 06.1	+57.6	150.0	46 14.1	+57.7	150.5	45 21.7	+58.0	151.0	18
19	52 18.1	+56.1	146.4	51 28.0	+56.3	147.0	50 37.4	+56.7	147.7	49 46.5	+57.0	148.4	48 55.3	+57.2	149.0	48 03.7	+57.5	149.6	47 11.8	+57.7	150.1	46 19.7	+57.9	150.6	19
20	53 14.2	+55.8	145.8	52 24.3	+56.3	146.5	51 34.1	+56.6	147.2	50 43.5	+56.8	147.9	49 52.5	+57.1	148.5	49 01.2	+57.4	149.1	48 09.5	+57.7	149.7	47 17.6	+57.8	150.2	20
21	54 10.0	+55.7	145.1	53 20.6	+56.0	145.9	52 30.7	+56.4	146.7	51 40.3	+56.8	147.4	50 49.6	+57.0	148.0	49 58.6	+57.2	148.7	49 07.2	+57.5	149.3	48 15.4	+57.8	149.8	21
22	55 05.7	+55.5	144.5	54 16.6	+55.9	145.3	53 27.1	+56.2	146.1	52 37.1	+56.5	146.8	51 46.6	+56.9	147.5	50 55.8	+57.2	148.2	50 04.7	+57.4	148.8	49 13.2	+57.6	149.4	22
23	56 01.2	+55.2	143.8	55 12.5	+55.6	144.7	54 23.3	+56.0	145.5	53 33.6	+56.4	146.3	52 43.5	+56.7	147.0	51 53.0	+57.0	147.7	51 02.1	+57.3	148.4	50 10.8	+57.6	149.0	23
24	56 56.4	+55.0	143.1	56 08.1	+55.5	144.0	55 19.3	+55.9	144.9	54 30.0	+56.2	145.7	53 40.2	+56.6	146.5	52 50.0	+56.9	147.2	51 59.4	+57.2	147.9	51 08.4	+57.4	148.5	24
25	57 51.4	+54.7	142.4	57 03.6	+55.2	143.3	56 15.2	+55.6	144.2	55 26.2	+56.1	145.1	54 36.8	+56.4	145.9	53 46.9	+56.7	146.7	52 56.6	+57.0	147.4	52 05.8	+57.4	148.1	25
26	58 46.1	+54.4	141.6	57 58.8	+54.9	142.6	57 10.8	+55.4	143.5	56 22.3	+55.8	144.4	55 33.2	+56.2	145.3	54 43.6	+56.6	146.1	53 53.6	+56.9	146.9	53 03.2	+57.2	147.6	26
27	59 40.5	+54.1	140.8	58 53.7	+54.6	141.8	58 06.2	+55.1	142.8	57 18.1	+55.6	143.8	56 29.4	+56.0	144.7	55 40.2	+56.4	145.5	54 50.5	+56.8	146.3	54 00.4	+57.0	147.1	27
28	60 34.6	+53.7	139.9	59 48.3	+54.4	141.0	59 01.3	+54.9	142.1	58 13.7	+55.4	143.1	57 25.4	+55.9	144.0	56 36.6	+56.2	144.9	55 47.3	+56.6	145.8	54 57.4	+57.0	146.6	28
29	61 28.3	+53.4	139.0	60 42.7	+53.9	140.2	59 56.2	+54.6	141.3	59 09.1	+55.1	142.3	58 21.3	+55.5	143.3	57 32.8	+56.1	144.3	56 43.9	+56.4	145.2	55 54.4	+56.7	146.0	29
30	62 21.7	+52.9	138.0	61 36.6	+53.6	139.3	60 50.8	+54.2	140.4	60 04.2	+54.7	141.5	59 16.8	+55.3	142.6	58 28.9	+55.7	143.6	57 40.3	+56.2	144.5	56 51.1	+56.6	145.4	30
31	63 14.6	+52.4	137.0	62 30.2	+53.2	138.3	61 45.0	+53.9	139.5	60 58.9	+54.5	140.7	60 12.1	+55.1	141.8	59 24.6	+55.6	142.9	58 36.5	+56.0	143.9	57 47.7	+56.5	144.8	31
32	64 07.0	+51.9	135.9	63 23.4	+52.7	137.3	62 38.9	+53.4	138.6	61 53.4	+54.1	139.8	61 07.2	+54.7	141.0	60 20.2	+55.2	142.1	59 32.5	+55.7	143.2	58 44.2	+56.2	144.2	32
33	64 58.9	+51.3	134.7	64 16.1	+52.2	136.2	63 32.3	+53.0	137.6	62 47.5	+53.8	138.9	62 01.9	+54.4	140.1	61 15.4	+55.0	141.3	60 28.2	+55.5	142.4	59 40.4	+55.9	143.5	33
34	65 50.2	+50.8	133.5	65 08.3	+51.6	135.0	64 25.3	+52.5	136.5	63 41.3	+53.3	137.9	62 56.3	+54.0	139.2	62 10.4	+54.7	140.4	61 23.7	+55.3	141.6	60 36.3	+55.8	142.7	34
35	66 40.8	+50.0	132.1	65 59.9	+51.0	133.8	65 17.8	+52.0	135.4	64 34.6	+52.8	136.9	63 50.3	+53.6	138.3	63 05.1	+54.2	139.6	62 19.0	+54.9	140.8	61 32.1	+55.4	142.0	35
36	67 30.8	+49.1	130.7	66 50.9	+50.3	132.5	66 09.8	+51.3	134.2	65 27.4	+52.3	135.7	64 43.9	+53.1	137.2	63 59.3	+53.9	138.6	63 13.9	+54.5	139.9	62 27.5	+55.2	141.2	36
37	68 19.9	+48.2	129.2	67 41.2	+49.5	131.1	67 01.1	+50.7	132.9	66 19.7	+51.6	134.5	65 37.0	+52.6	136.1	64 53.2	+53.4	137.5	64 08.4	+54.2	139.0	63 22.7	+54.8	140.3	37
38	69 08.1	+47.3	127.5	68 30.7	+48.7	129.6	67 51.8	+49.9	131.5	67 11.3	+51.1	133.2	66 29.6	+52.0	134.9	65 46.6	+53.0	136.5	65 02.6	+53.7	138.0	64 17.5	+54.5	139.4	38
39	69 55.4	+46.1	125.8	69 19.4	+47.6	127.9	68 41.7	+49.0	130.0	68 02.4	+50.2	131.9	67 21.6	+51.4	133.7	66 39.6	+52.3	135.3	65 56.3	+53.3	136.9	65 12.0	+54.0	138.4	39
40	70 41.5	+44.8	123.9	70 07.0	+46.5	126.2	69 30.7	+48.0	128.3	68 52.6	+49.5	130.4	68 13.0	+50.6	132.3	67 31.9	+51.8	134.1	66 49.6	+52.7	135.8	66 06.0	+53.6	137.3	40
41	71 26.3	+43.4	121.8	70 53.5	+45.3	124.3	70 18.7	+47.0	126.6	69 42.1	+48.4	128.8	69 03.6	+49.9	130.8	68 23.7	+51.0	132.7	67 42.3	+52.1	134.5	66 59.6	+53.0	136.2	41
42	72 09.7	+41.7	119.6	71 38.8	+43.9	122.2	71 05.7	+45.8	124.7	70 30.5	+47.5	127.0	69 53.5	+48.9	129.2	69 14.7	+50.3	131.3	68 34.4	+51.4	133.2	67 52.6	+52.5	135.0	42
43	72 51.4	+40.0	117.2	72 22.7	+42.2	120.0	71 51.5	+44.3	122.7	71 18.0	+46.2	125.2	70 42.4	+47.9	127.5	70 05.0	+49.3	129.7	69 25.8	+50.6	131.8	68 45.1	+51.8	133.7	43
44	73 31.4	+37.9•	114.6	73 04.9	+40.5	117.6	72 35.8	+42.8	120.5	72 04.2	+44.8	123.1	71 30.3	+46.6	125.6	70 54.3	+48.3	128.0	70 16.4	+49.8	130.2	69 36.9	+51.1	132.3	44
45	74 09.3	+35.6•	111.9	73 45.4	+38.4•	115.1	73 18.6	+40.9	118.1	72 49.0	+43.3	120.9	72 16.9	+45.4	123.6	71 42.6	+47.2	126.1	71 06.2	+48.8	128.5	70 28.0	+50.2	130.7	45
46	74 44.9	+33.0•	108.9	74 23.8	+36.1•	112.3	73 59.5	+39.0•	115.5	73 32.3	+41.5	118.5	73 02.3	+43.8	121.4	72 29.8	+45.8	124.1	71 55.0	+47.7	126.7	71 18.2	+49.2	129.1	46
47	75 17.9	+30.1•	105.6	74 59.9	+33.6•	109.2	74 38.5	+36.6•	112.7	74 13.8	+39.4•	115.9	73 46.1	+42.0	119.0	73 15.6	+44.3	121.9	72 42.7	+46.3	124.7	72 07.4	+48.2	127.2	47
48	75 48.0	+27.0•	102.2	75 33.5	+30.6•	106.0	75 15.1	+34.1•	109.6	74 53.2	+37.2•	113.1	74 28.1	+40.0•	116.4	73 59.9	+42.6	119.6	73 29.0	+44.9	122.5	72 55.6	+46.8	125.2	48
49	76 15.0	+23.4•	98.5	76 04.1	+27.4•	102.4	75 49.2	+31.1•	106.3	75 30.4	+34.6•	110.0	75 08.1	+37.8•	113.6	74 42.5	+40.6•	116.9	74 13.9	+43.1	120.1	73 42.4	+45.4	123.1	49
50	76 38.4	+19.5•	94.5	76 31.5	+23.8•	98.7	76 20.3	+27.9•	102.8	76 05.0	+31.7•	106.7	75 45.9	+35.1•	110.5	75 23.1	+38.3•	114.1	74 57.0	+41.2•	117.5	74 27.8	+43.7	120.7	50
51	76 57.9	+15.5•	90.4	76 55.3	+19.9•	94.7	76 48.2	+24.2•	98.9	76 36.7	+28.3•	103.1	76 21.0	+32.2•	107.1	76 01.4	+35.7•	111.0	75 38.2	+38.9•	114.6	75 11.5	+41.8•	118.1	51
52	77 13.4	+11.0•	86.1	77 15.2	+15.7•	90.5	77 12.4	+20.3•	94.9	77 05.0	+24.7•	99.2	76 53.2	+28.9•	103.5	76 37.1	+32.8•	107.6	76 17.1	+36.3•	111.5	75 53.3	+39.5•	115.2	52
53	77 24.4	+6.5•	81.6	77 30.9	+11.2•	86.1	77 32.7	+15.9•	90.6	77 29.7	+20.6•	95.1	77 22.1	+25.1•	99.5	77 09.9	+29.4•	103.9	76 53.4	+33.3•	108.0	76 32.8	+36.9•	112.0	53
54	77 30.9	+1.8•	77.0	77 42.1	+6.5•	81.5	77 48.6	+11.4•	86.1	77 50.3	+16.3•	90.7	77 47.2	+21.0•	95.3	77 39.3	+25.6•	99.9	77 26.7	+29.9•	104.3	77 09.7	+33.9•	108.6	54
55	77 32.7	–3.0•	72.4	77 48.6	+1.7•	76.8	78 00.0	+6.6•	81.4	78 06.6	+11.5•	86.1	78 08.2	+16.5•	90.8	78 04.9	+21.4•	95.6	77 56.6	+26.1•	100.2	77 43.6	+30.5•	104.8	55
56	77 29.7	–7.6•	67.7	77 50.3	–3.1•	72.0	78 06.6	+1.6•	76.6	78 18.1	+6.6•	81.3	78 24.7	+11.8•	86.1	78 26.3	+16.8•	91.0	78 22.7	+21.8•	95.8	78 14.1	+26.6•	100.6	56
57	77 22.1	–12.2•	63.2	77 47.2	–7.9•	67.3	78 08.2	–3.3•	71.7	78 24.7	+1.6•	76.3	78 36.5	+6.6•	81.2	78 43.1	+11.9•	86.1	78 44.5	+17.2•	91.1	78 40.7	+22.3•	96.1	57
58	77 09.9	–16.5•	58.7	77 39.3	–12.6•	62.6	78 04.9	–8.3•	66.9	78 26.3	–3.6•	71.4	78 43.1	+1.4•	76.1	78 55.0	+6.7•	81.1	79 01.7	+12.0•	86.2	79 03.0	+17.4•	91.3	58
59	76 53.4	–20.9•	54.3	77 26.7	–17.0•	58.1	77 56.6	–13.0•	62.1	78 22.7	–8.6•	66.4	78 44.5	–3.8•	71.0	79 01.7	+1.3•	75.9	79 13.7	+6.7•	81.0	79 20.4	+12.3•	86.2	59
60	76 32.8	–24.3•	50.4	77 09.7	–21.1•	53.7	77 43.6	–17.5•	57.5	78 14.1	–13.4•	61.5	78 40.7	–8.9•	65.9	79 03.0	–4.1•	70.6	79 20.4	+1.2•	75.6	79 32.7	+6.7•	80.9	60
61	76 08.5	–27.8•	46.5	76 48.6	–24.9•	49.6	77 26.1	–21.6•	53.0	78 00.7	–18.1•	56.8	78 31.8	–14.0•	60.9	78 58.9	–9.4•	65.4	79 21.6	–4.4•	70.2	79 39.4	+1.0•	75.4	61
62	75 40.7	–30.9•	42.9	76 23.7	–28.4•	45.7	77 04.5	–25.6•	48.8	77 42.6	–22.3•	52.2	78 17.8	–18.6•	56.0	78 49.5	–14.5•	60.2	79 17.2	–9.8•	64.8	79 40.4	–4.4•	69.8	62
63	75 09.8	–33.7•	39.4	75 55.3	–31.5•	42.0	76 38.9	–29.0•	44.8	77 20.3	–26.1•	47.9	77 59.2	–22.9•	51.4	78 35.0	–19.2•	55.3	79 07.4	–15.1•	59.6	79 35.6	–10.3•	64.3	63
64	74 36.1	–36.2•	36.3	75 23.8	–34.3•	38.5	76 09.9	–32.2•	41.1	76 54.2	–29.8•	43.9	77 36.3	–26.9•	47.0	78 15.8	–23.6•	50.6	78 52.3	–19.9•	54.5	79 25.3	–15.6•	58.8	64
65	73 59.9	–38.4•	33.3	74 49.5	–36.9•	35.3	75 37.7	–35.0•	37.6	76 24.4	–32.8•	40.1	77 09.4	–30.4•	42.9	77 52.2	–27.6•	46.1	78 32.4	–24.3•	49.7	79 09.7	–20.7•	53.6	65
66	73 21.5	–40.5	30.6	74 12.6	–39.0•	32.4	75 02.7	–37.4•	34.4	75 51.6	–35.7•	36.6	76 39.0	–33.6•	39.1	77 24.6	–31.2•	42.0	78 08.1	–28.4•	45.1	78 49.0	–25.1•	48.7	66
67	72 41.0	–42.2	28.1	73 33.6	–41.0	29.7	74 25.3	–39.7•	31.4	75 15.9	–38.1•	33.4	76 05.4	–36.4•	35.6	76 53.4	–34.3•	38.1	77 39.7	–32.0•	40.9	78 23.9	–29.2•	44.1	67
68	71 58.8	–43.7	25.7	72 52.6	–42.8	27.1	73 45.6	–41.6	28.7	74 37.8	–40.3•	30.4	75 29.0	–38.8•	32.4	76 19.1	–37.1•	34.6	77 07.7	–35.1•	37.1	77 54.7	–32.7•	39.9	68
69	71 15.1	–45.2	23.6	72 09.8	–44.3	24.8	73 04.0	–43.3	26.2	73 57.5	–42.2	27.7	74 50.2	–41.0•	29.4	75 42.0	–39.6•	31.3	76 32.6	–37.8•	33.5	77 22.0	–35.9•	36.0	69
70	70 29.9	–46.4	21.5	71 25.5	–45.6	22.6	72 20.7	–44.9	23.8	73 15.3	–44.0	25.2	74 09.2	–42.8	26.7	75 02.4	–41.6	28.3	75 54.8	–40.3•	30.2	76 46.1	–38.7•	32.4	70
71	69 43.5	–47.5	19.7	70 39.9	–46.9	20.6	71 35.8	–46.2	21.7	72 31.3	–45.4	22.9	73 26.4	–44.6	24.2	74 20.8	–43.5	25.8	75 14.5	–42.3	27.3	76 07.4	–41.0•	29.1	71
72	68 56.0	–48.4	17.9	69 53.0	–48.0	18.8	70 49.6	–47.3	19.7	71 45.9	–46.7	20.7	72 41.8	–45.9	21.9	73 37.3	–45.1	23.1	74 32.2	–44.2	24.5	75 26.4	–43.1	26.1	72
73	68 07.6	–49.4	16.3	69 05.0	–48.9	17.1	70 02.3	–48.4	17.9	70 59.2	–47.8	18.8	71 55.9	–47.2	19.7	72 52.2	–46.6	20.8	73 48.0	–45.7	22.1	74 43.3	–44.8	23.4	73
74	67 18.2	–50.1	14.8	68 16.1	–49.7	15.5	69 13.9	–49.4	16.2	70 11.4	–48.9	16.9	71 08.6	–48.3	17.8	72 05.6	–47.8	18.7	73 02.3	–47.2	19.8	73 58.5	–46.4	21.0	74
75	66 28.1	–50.8	13.4	67 26.4	–50.5	14.0	68 24.5	–50.1	14.6	69 22.5	–49.6	15.3	70 20.3	–49.4	16.0	71 17.8	–48.8	16.8	72 15.1	–48.3	17.7	73 12.1	–47.4	18.7	75
76	65 37.3	–51.5	12.1	66 35.9	–51.2	12.6	67 34.4	–50.9	13.1	68 32.7	–50.6	13.7	69 30.9	–50.2	14.3	70 29.0	–49.9	15.0	71 26.8	–49.4	15.8	72 24.4	–48.9	16.7	76
77	64 45.8	–52.0	10.9	65 44.7	–51.8	11.3	66 43.5	–51.6	11.8	67 42.1	–51.2	12.3	68 40.7	–51.0	12.8	69 39.1	–50.6	13.4	70 37.4	–50.3	14.1	71 35.5	–49.8	14.8	77
78	63 53.8	–52.6	9.7	64 52.9	–52.4	10.1	65 51.9	–52.2	10.5	66 50.9	–52.0	10.9	67 49.7	–51.7	11.4	68 48.5	–51.4	11.9	69 47.1	–51.1	12.5	70 45.7	–50.8	13.1	78
79	63 01.2	–53.0	8.7	64 00.5	–52.8	9.0	64 59.7	–52.6	9.3	65 58.9	–52.5	9.7	66 58.0	–52.3	10.1	67 57.1	–52.1	10.5	68 56.0	–51.8	11.0	69 54.9	–51.6	11.5	79
80	62 08.2	–53.4	7.7	63 07.7	–53.4	7.9	64 07.1	–53.2	8.2	65 06.4	–53.0	8.5	66 05.7	–52.8	8.8	67 05.0	–52.7	9.2	68 04.2	–52.5	9.6	69 03.3	–52.2	10.0	80
81	61 14.8	–53.8	6.7	62 14.3	–53.7	6.9	63 13.9	–53.5	7.2	64 13.4	–53.5	7.4	65 12.9	–53.3	7.7	66 12.3	–53.2	8.0	67 11.7	–53.0	8.3	68 11.1	–52.9	8.7	81
82	60 21.0	–54.2	5.8	61 20.6	–54.0	6.0	62 20.3	–54.0	6.2	63 19.9	–53.9	6.4	64 19.6	–53.8	6.6	65 19.1	–53.6	6.9	66 18.7	–53.5	7.1	67 18.2	–53.4	7.4	82
83	59 26.8	–54.5	4.9	60 26.6	–54.5	5.1	61 26.3	–54.3	5.2	62 26.1	–54.3	5.4	63 25.8	–54.2	5.6	64 25.5	–54.1	5.8	65 25.2	–54.0	6.0	66 24.8	–53.9	6.3	83
84	58 32.3	–54.8	4.1	59 32.1	–54.7	4.2	60 32.0	–54.7	4.4	61 31.8	–54.6	4.5	62 31.6	–54.5	4.7	63 31.4	–54.5	4.8	64 31.2	–54.4	5.0	65 30.9	–54.3	5.2	84
85	57 37.5	–55.0	3.3	58 37.4	–55.0	3.4	59 37.3	–55.0	3.5	60 37.2	–54.9	3.7	61 37.1	–54.9	3.8	62 36.9	–54.8	3.9	63 36.8	–54.8	4.0	64 36.6	–54.7	4.2	85
86	56 42.5	–55.3	2.6	57 42.4	–55.3	2.7	58 42.3	–55.2	2.8	59 42.3	–55.2	2.8	60 42.2	–55.2	2.9	61 42.1	–55.1	3.0	62 42.0	–55.1	3.1	63 41.9	–55.0	3.2	86
87	55 47.2	–55.5	1.9	56 47.1	–55.5	2.0	57 47.1	–55.5	2.0	58 47.1	–55.5	2.1	59 47.0	–55.4	2.1	60 47.0	–55.4	2.2	61 46.9	–55.3	2.3	62 46.9	–55.4	2.4	87
88	54 51.7	–55.8	1.2	55 51.6	–55.7	1.3	56 51.6	–55.7	1.3	57 51.6	–55.7	1.3	58 51.6	–55.7	1.4	59 51.6	–55.7	1.4	60 51.6	–55.7	1.5	61 51.5	–55.6	1.5	88
89	53 55.9	–55.9	0.6	54 55.9	–55.9	0.6	55 55.9	–55.9	0.6	56 55.9	–55.9	0.7	57 55.9	–55.9	0.7	58 55.9	–55.9	0.7	59 55.9	–55.9	0.7	60 55.9	–55.9	0.7	89
90	53 00.0	–56.1	0.0	54 00.0	–56.1	0.0	55 00.0	–56.1	0.0	56 00.0	–56.1	0.0	57 00.0	–56.1	0.0	58 00.0	–56.1	0.0	59 00.0	–56.1	0.0	60 00.0	–56.1	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	34 11.0	−57.9	154.3	33 16.9	−58.1	154.6	32 22.6	−58.2	154.9	31 28.2	−58.3	155.2	30 33.7	−58.5	155.4	29 39.1	−58.6	155.6	28 44.4	−58.7	155.9	27 49.6	−58.8	156.1	0
1	33 13.1	−58.0	154.6	32 18.8	−58.2	154.9	31 24.4	−58.3	155.2	30 29.9	−58.4	155.4	29 35.2	−58.4	155.7	28 40.5	−58.6	155.9	27 45.7	−58.7	156.1	26 50.8	−58.8	156.3	1
2	32 15.1	−58.1	154.9	31 20.6	−58.1	155.2	30 26.1	−58.3	155.5	29 31.5	−58.4	155.7	28 36.8	−58.6	155.9	27 41.9	−58.6	156.1	26 47.0	−58.7	156.3	25 52.0	−58.8	156.5	2
3	31 17.0	−58.1	155.2	30 22.5	−58.2	155.5	29 27.8	−58.3	155.7	28 33.1	−58.4	156.0	27 38.2	−58.5	156.2	26 43.3	−58.6	156.4	25 48.3	−58.7	156.6	24 53.2	−58.8	156.8	3
4	30 18.9	−58.1	155.5	29 24.3	−58.3	155.8	28 29.5	−58.3	156.0	27 34.7	−58.5	156.2	26 39.7	−58.6	156.4	25 44.7	−58.6	156.6	24 49.6	−58.8	156.8	23 54.4	−58.9	157.0	4
5	29 20.8	−58.1	155.8	28 26.0	−58.2	156.0	27 31.2	−58.4	156.3	26 36.2	−58.5	156.5	25 41.1	−58.5	156.7	24 46.0	−58.7	156.8	23 50.8	−58.8	157.0	22 55.5	−58.8	157.2	5
6	28 22.7	−58.2	156.1	27 27.8	−58.3	156.3	26 32.8	−58.4	156.5	25 37.7	−58.5	156.7	24 42.6	−58.7	156.9	23 47.3	−58.7	157.1	22 52.0	−58.8	157.2	21 56.7	−58.9	157.4	6
7	27 24.5	−58.2	156.4	26 29.5	−58.3	156.6	25 34.4	−58.5	156.8	24 39.2	−58.5	157.0	23 43.9	−58.7	157.1	22 48.6	−58.7	157.3	21 53.2	−58.8	157.5	20 57.8	−58.9	157.6	7
8	26 26.3	−58.3	156.7	25 31.1	−58.3	156.8	24 35.9	−58.4	157.0	23 40.7	−58.6	157.2	22 45.3	−58.6	157.4	21 49.9	−58.7	157.5	20 54.4	−58.8	157.7	19 58.9	−58.9	157.8	8
9	25 28.0	−58.3	156.9	24 32.8	−58.4	157.1	23 37.5	−58.5	157.3	22 42.1	−58.6	157.4	21 46.7	−58.7	157.6	20 51.2	−58.8	157.7	19 55.6	−58.8	157.9	19 00.0	−58.9	158.0	9
10	24 29.7	−58.3	157.2	23 34.4	−58.4	157.4	22 39.0	−58.5	157.5	21 43.5	−58.6	157.7	20 48.0	−58.7	157.8	19 52.4	−58.7	158.0	18 56.8	−58.9	158.1	18 01.1	−59.0	158.2	10
11	23 31.4	−58.3	157.4	22 36.0	−58.4	157.6	21 40.5	−58.5	157.8	20 44.9	−58.6	157.9	19 49.3	−58.7	158.0	18 53.6	−58.7	158.2	17 57.9	−58.8	158.3	17 02.1	−58.9	158.4	11
12	22 33.1	−58.3	157.7	21 37.6	−58.5	157.8	20 42.0	−58.6	158.0	19 46.3	−58.6	158.1	18 50.6	−58.7	158.3	17 54.9	−58.8	158.4	16 59.0	−58.8	158.5	16 03.2	−58.9	158.6	12
13	21 34.8	−58.4	157.9	20 39.1	−58.4	158.1	19 43.4	−58.5	158.2	18 47.7	−58.7	158.4	17 51.9	−58.7	158.5	16 56.1	−58.7	158.6	16 00.2	−58.9	158.7	15 04.3	−59.0	158.8	13
14	20 36.4	−58.4	158.2	19 40.7	−58.5	158.3	18 44.9	−58.6	158.5	17 49.0	−58.6	158.6	16 53.2	−58.8	158.7	15 57.2	−58.8	158.8	15 01.3	−58.9	158.9	14 05.3	−59.0	159.0	14
15	19 38.0	−58.4	158.4	18 42.2	−58.5	158.6	17 46.3	−58.6	158.7	16 50.4	−58.7	158.8	15 54.4	−58.7	158.9	14 58.4	−58.8	159.0	14 02.4	−58.9	159.1	13 06.3	−59.0	159.2	15
16	18 39.6	−58.5	158.7	17 43.7	−58.6	158.8	16 47.7	−58.6	158.9	15 51.7	−58.7	159.0	14 55.7	−58.8	159.1	13 59.6	−58.9	159.2	13 03.5	−58.9	159.3	12 07.3	−59.0	159.4	16
17	17 41.1	−58.5	158.9	16 45.1	−58.6	159.0	15 49.1	−58.6	159.1	14 53.0	−58.7	159.2	13 56.9	−58.8	159.3	13 00.7	−58.8	159.4	12 04.6	−58.9	159.5	11 08.3	−59.0	159.6	17
18	16 42.7	−58.5	159.2	15 46.6	−58.6	159.3	14 50.5	−58.7	159.4	13 54.3	−58.7	159.4	12 58.1	−58.8	159.5	12 01.9	−58.9	159.6	11 05.6	−58.9	159.7	10 09.4	−59.0	159.7	18
19	15 44.2	−58.5	159.4	14 48.0	−58.6	159.5	13 51.8	−58.6	159.6	12 55.6	−58.7	159.7	11 59.3	−58.8	159.7	11 03.0	−58.8	159.8	10 06.7	−58.9	159.9	9 10.4	−59.1	159.9	19
20	14 45.7	−58.5	159.6	13 49.5	−58.6	159.7	12 53.2	−58.7	159.8	11 56.9	−58.8	159.9	11 00.5	−58.8	159.9	10 04.2	−58.9	160.0	9 07.8	−59.0	160.1	8 11.3	−59.0	160.1	20
21	13 47.2	−58.5	159.8	12 50.9	−58.6	159.9	11 54.5	−58.6	160.0	10 58.1	−58.7	160.1	10 01.7	−58.8	160.1	9 05.3	−58.9	160.2	8 08.8	−59.0	160.2	7 12.3	−59.0	160.3	21
22	12 48.7	−58.5	160.1	11 52.3	−58.6	160.2	10 55.9	−58.7	160.2	9 59.4	−58.8	160.3	9 02.9	−58.8	160.3	8 06.4	−58.9	160.4	7 09.9	−59.0	160.4	6 13.3	−59.0	160.5	22
23	11 50.2	−58.5	160.3	10 53.7	−58.6	160.4	9 57.2	−58.7	160.4	9 00.6	−58.7	160.5	8 04.1	−58.8	160.5	7 07.5	−58.9	160.6	6 10.9	−58.9	160.6	5 14.3	−59.0	160.7	23
24	10 51.7	−58.6	160.5	9 55.1	−58.6	160.6	8 58.5	−58.7	160.6	8 01.9	−58.8	160.7	7 05.3	−58.9	160.7	6 08.6	−58.9	160.8	5 12.0	−59.0	160.8	4 15.3	−59.0	160.8	24
25	9 53.1	−58.5	160.8	8 56.5	−58.6	161.0	7 59.8	−58.7	160.9	7 03.1	−58.7	160.9	6 06.4	−58.8	160.9	5 09.7	−58.9	161.0	4 13.0	−59.0	161.0	3 16.3	−59.1	161.0	25
26	8 54.6	−58.6	161.0	7 57.9	−58.7	161.0	7 01.1	−58.7	161.1	6 04.4	−58.8	161.1	5 07.6	−58.8	161.1	4 10.8	−58.9	161.2	3 14.0	−59.0	161.2	2 17.2	−59.0	161.2	26
27	7 56.0	−58.5	161.2	6 59.2	−58.6	161.2	6 02.4	−58.7	161.3	5 05.6	−58.8	161.3	4 08.8	−58.9	161.3	3 11.9	−58.9	161.3	2 15.1	−59.0	161.4	1 18.2	−59.0	161.4	27
28	6 57.5	−58.6	161.4	6 00.6	−58.7	161.4	5 03.7	−58.7	161.5	4 06.8	−58.7	161.5	3 10.0	−58.7	161.5	2 13.0	−58.9	161.5	1 16.1	−59.0	161.5	0 19.2	−59.1	161.6	28
29	5 58.9	−58.6	161.6	5 02.0	−58.7	161.7	4 05.0	−58.7	161.7	3 08.0	−58.7	161.7	2 11.1	−58.9	161.7	1 14.1	−58.9	161.7	0 17.1	−58.9	161.7	0 39.9	+59.0	18.3	29
30	5 00.3	−58.5	161.8	4 03.3	−58.6	161.9	3 06.3	−58.7	161.9	2 09.3	−58.8	161.9	1 12.2	−58.8	161.9	0 15.2	−58.8	161.9	0 41.8	+59.0	18.1	1 38.9	+59.0	18.1	30
31	4 01.8	−58.6	162.1	3 04.7	−58.7	162.1	2 07.6	−58.7	162.1	1 10.5	−58.8	162.1	0 13.4	−58.8	162.1	0 43.7	+58.9	17.9	1 40.8	+59.0	17.9	2 37.9	+59.0	17.9	31
32	3 03.2	−58.6	162.3	2 06.0	−58.6	162.3	1 08.9	−58.7	162.3	0 11.7	−58.8	162.3	0 45.5	+58.8	17.7	1 42.6	+58.9	17.7	2 39.8	+58.9	17.7	3 36.9	+59.1	17.7	32
33	2 04.6	−58.6	162.5	1 07.4	−58.7	162.5	0 10.1	−58.7	162.5	0 47.1	+58.8	17.5	1 44.3	+58.9	17.5	2 41.5	+58.9	17.5	3 38.8	+58.9	17.5	4 36.0	+59.0	17.5	33
34	1 06.0	−58.6	162.7	0 08.7	−58.6	162.7	0 48.6	+58.7	17.3	1 45.9	+58.7	17.3	2 43.2	+58.7	17.3	3 40.4	+58.9	17.3	4 37.7	+59.0	17.3	5 35.0	+59.0	17.4	34
35	0 07.4	−58.6	162.9	0 49.9	+58.7	17.1	1 47.3	+58.7	17.1	2 44.7	+58.7	17.1	3 42.0	+58.8	17.1	4 39.3	+58.9	17.1	5 36.7	+59.0	17.2	6 34.0	+59.0	17.2	35
36	0 51.2	+58.6	16.9	1 48.6	+58.6	16.9	2 46.0	+58.7	16.9	3 43.4	+58.7	16.9	4 40.8	+58.9	16.9	5 38.2	+58.9	16.9	6 35.6	+59.0	17.0	7 33.0	+59.0	17.0	36
37	1 49.8	+58.5	16.6	2 47.2	+58.7	16.7	3 44.7	+58.7	16.7	4 42.2	+58.6	16.7	5 39.7	+58.8	16.7	6 37.1	+58.9	16.7	7 34.6	+58.9	16.7	8 32.0	+59.0	16.8	37
38	2 48.3	+58.6	16.4	3 45.9	+58.6	16.4	4 43.4	+58.8	16.5	5 41.0	+58.7	16.5	6 38.5	+58.8	16.5	7 36.0	+58.9	16.6	8 33.5	+59.0	16.6	9 31.0	+59.0	16.6	38
39	3 46.9	+58.6	16.2	4 44.5	+58.7	16.2	5 42.2	+58.7	16.3	6 39.7	+58.8	16.3	7 37.3	+58.9	16.3	8 34.9	+58.9	16.4	9 32.5	+59.0	16.4	10 30.0	+59.0	16.5	39
40	4 45.5	+58.6	16.0	5 43.2	+58.6	16.0	6 40.9	+58.7	16.0	7 38.5	+58.8	16.1	8 36.2	+58.8	16.1	9 33.8	+58.9	16.2	10 31.4	+58.9	16.2	11 29.0	+59.0	16.3	40
41	5 44.1	+58.5	15.8	6 41.8	+58.7	15.8	7 39.6	+58.6	15.8	8 37.3	+58.7	15.9	9 35.0	+58.8	15.9	10 32.7	+58.8	16.0	11 30.3	+59.0	16.0	12 28.0	+59.0	16.1	41
42	6 42.7	+58.5	15.6	7 40.5	+58.6	15.6	8 38.2	+58.7	15.6	9 36.0	+58.7	15.7	10 33.8	+58.8	15.7	11 31.5	+58.9	15.8	12 29.3	+58.9	15.8	13 27.0	+58.9	15.9	42
43	7 41.2	+58.6	15.3	8 39.1	+58.6	15.4	9 36.9	+58.7	15.4	10 34.8	+58.7	15.5	11 32.6	+58.8	15.5	12 30.4	+58.8	15.6	13 28.2	+58.9	15.6	14 25.9	+59.0	15.7	43
44	8 39.8	+58.5	15.1	9 37.7	+58.6	15.2	10 35.6	+58.7	15.2	11 33.5	+58.7	15.3	12 31.4	+58.8	15.3	13 29.2	+58.9	15.4	14 27.1	+58.9	15.4	15 24.9	+59.0	15.5	44
45	9 38.3	+58.6	14.9	10 36.3	+58.6	14.9	11 34.3	+58.6	15.0	12 32.2	+58.7	15.0	13 30.2	+58.7	15.1	14 28.1	+58.8	15.2	15 26.0	+58.8	15.2	16 23.9	+58.9	15.3	45
46	10 36.9	+58.5	14.7	11 34.9	+58.6	14.7	12 32.9	+58.7	14.8	13 30.9	+58.7	14.8	14 28.9	+58.8	14.9	15 26.9	+58.8	15.0	16 24.9	+58.8	15.0	17 22.8	+58.9	15.1	46
47	11 35.4	+58.5	14.4	12 33.5	+58.6	14.6	13 31.6	+58.6	14.6	14 29.6	+58.7	14.6	15 27.7	+58.7	14.7	16 25.7	+58.8	14.8	17 23.7	+58.9	14.8	18 21.7	+58.9	14.9	47
48	12 33.9	+58.5	14.2	13 32.1	+58.6	14.3	14 30.2	+58.6	14.3	15 28.3	+58.7	14.4	16 26.4	+58.8	14.5	17 24.5	+58.8	14.6	18 22.6	+58.8	14.6	19 20.6	+58.9	14.7	48
49	13 32.4	+58.5	14.0	14 30.7	+58.5	14.1	15 28.8	+58.7	14.1	16 27.0	+58.7	14.2	17 25.2	+58.7	14.3	18 23.3	+58.8	14.3	19 21.4	+58.9	14.4	20 19.5	+58.9	14.5	49
50	14 30.9	+58.5	13.8	15 29.2	+58.6	13.8	16 27.5	+58.6	13.9	17 25.7	+58.6	14.0	18 23.9	+58.7	14.0	19 22.1	+58.8	14.1	20 20.3	+58.8	14.2	21 18.4	+58.9	14.3	50
51	15 29.4	+58.5	13.5	16 27.8	+58.5	13.6	17 26.1	+58.6	13.7	18 24.3	+58.7	13.8	19 22.6	+58.7	13.8	20 20.9	+58.7	13.9	21 19.1	+58.8	14.0	22 17.3	+58.9	14.1	51
52	16 27.9	+58.5	13.3	17 26.3	+58.5	13.4	18 24.6	+58.6	13.4	19 23.0	+58.6	13.5	20 21.3	+58.7	13.6	21 19.6	+58.7	13.7	22 17.9	+58.8	13.8	23 16.2	+58.8	13.9	52
53	17 26.4	+58.4	13.1	18 24.8	+58.5	13.1	19 23.2	+58.5	13.2	20 21.6	+58.5	13.3	21 20.0	+58.6	13.4	22 18.3	+58.7	13.5	23 16.7	+58.8	13.6	24 15.0	+58.8	13.7	53
54	18 24.8	+58.4	12.8	19 23.3	+58.5	12.9	20 21.8	+58.5	13.0	21 20.2	+58.6	13.1	22 18.6	+58.6	13.2	23 17.1	+58.7	13.3	24 15.5	+58.7	13.4	25 13.8	+58.8	13.5	54
55	19 23.2	+58.4	12.6	20 21.8	+58.4	12.7	21 20.3	+58.5	12.7	22 18.8	+58.6	12.8	23 17.3	+58.6	12.9	24 15.8	+58.6	13.0	25 14.2	+58.7	13.1	26 12.6	+58.8	13.2	55
56	20 21.6	+58.4	12.3	21 20.2	+58.4	12.5	22 18.8	+58.5	12.5	23 17.4	+58.5	12.6	24 15.9	+58.6	12.7	25 14.4	+58.7	12.8	26 12.9	+58.7	12.9	27 11.4	+58.8	13.0	56
57	21 20.0	+58.3	12.1	22 18.6	+58.5	12.2	23 17.3	+58.5	12.3	24 15.9	+58.4	12.4	25 14.5	+58.6	12.5	26 13.1	+58.6	12.6	27 11.6	+58.7	12.7	28 10.2	+58.7	12.8	57
58	22 18.3	+58.4	11.8	23 17.1	+58.4	11.9	24 15.8	+58.4	12.0	25 14.4	+58.5	12.1	26 13.1	+58.5	12.2	27 11.7	+58.6	12.3	28 10.3	+58.7	12.4	29 08.9	+58.7	12.6	58
59	23 16.7	+58.3	11.6	24 15.5	+58.3	11.8	25 14.2	+58.4	11.8	26 12.9	+58.5	11.9	27 11.6	+58.5	12.0	28 10.3	+58.5	12.1	29 09.0	+58.6	12.2	30 07.6	+58.7	12.3	59
60	24 15.0	+58.3	11.3	25 13.8	+58.4	11.4	26 12.6	+58.4	11.5	27 11.4	+58.4	11.6	28 10.2	+58.5	11.7	29 08.9	+58.5	11.8	30 07.6	+58.6	12.0	31 06.3	+58.6	12.1	60
61	25 13.3	+58.2	11.1	26 12.2	+58.3	11.2	27 11.0	+58.4	11.3	28 09.8	+58.5	11.4	29 08.7	+58.4	11.5	30 07.4	+58.6	11.6	31 06.2	+58.6	11.7	32 04.9	+58.7	11.8	61
62	26 11.5	+58.3	10.8	27 10.5	+58.3	10.9	28 09.4	+58.4	11.0	29 08.3	+58.4	11.1	30 07.1	+58.5	11.2	31 06.0	+58.5	11.3	32 04.8	+58.5	11.5	33 03.6	+58.6	11.6	62
63	27 09.8	+58.2	10.5	28 08.7	+58.3	10.6	29 07.7	+58.3	10.7	30 06.6	+58.4	10.8	31 05.6	+58.4	11.0	32 04.5	+58.4	11.1	33 03.3	+58.5	11.2	34 02.2	+58.6	11.3	63
64	28 08.0	+58.1	10.3	29 07.0	+58.2	10.4	30 06.0	+58.3	10.5	31 05.0	+58.3	10.6	32 04.0	+58.3	10.7	33 02.9	+58.4	10.8	34 01.8	+58.5	10.9	35 00.7	+58.6	11.1	64
65	29 06.1	+58.1	10.0	30 05.2	+58.2	10.2	31 04.3	+58.2	10.2	32 03.3	+58.3	10.3	33 02.3	+58.4	10.4	34 01.3	+58.4	10.5	35 00.3	+58.4	10.7	35 59.3	+58.5	10.8	65
66	30 04.2	+58.1	9.7	31 03.4	+58.1	9.8	32 02.5	+58.2	9.9	33 01.6	+58.2	10.0	34 00.7	+58.3	10.1	34 59.7	+58.4	10.2	35 58.7	+58.4	10.4	36 57.8	+58.4	10.5	66
67	31 02.3	+58.1	9.4	32 01.5	+58.1	9.5	33 00.7	+58.1	9.6	33 59.8	+58.2	9.7	34 59.0	+58.2	9.8	35 58.1	+58.3	10.0	36 57.1	+58.4	10.1	37 56.2	+58.4	10.2	67
68	32 00.4	+58.0	9.1	32 59.6	+58.1	9.3	33 58.8	+58.1	9.3	34 58.0	+58.2	9.4	35 57.2	+58.2	9.5	36 56.4	+58.2	9.7	37 55.5	+58.3	9.8	38 54.6	+58.4	9.9	68
69	32 58.4	+57.9	8.8	33 57.7	+58.0	8.9	34 56.9	+58.1	9.1	35 56.2	+58.1	9.1	36 55.4	+58.2	9.2	37 54.6	+58.2	9.4	38 53.8	+58.3	9.5	39 53.0	+58.3	9.6	69
70	33 56.3	+58.0	8.5	34 55.7	+57.9	8.6	35 55.0	+58.0	8.7	36 54.3	+58.1	8.8	37 53.6	+58.1	8.9	38 52.8	+58.2	9.1	39 52.1	+58.2	9.2	40 51.3	+58.3	9.3	70
71	34 54.3	+57.8	8.2	35 53.6	+57.9	8.3	36 53.0	+58.0	8.4	37 52.4	+58.0	8.5	38 51.7	+58.0	8.6	39 51.0	+58.1	8.7	40 50.3	+58.2	8.9	41 49.6	+58.2	9.0	71
72	35 52.1	+57.8	7.9	36 51.5	+57.9	8.0	37 51.0	+57.9	8.1	38 50.4	+57.9	8.2	39 49.7	+58.0	8.3	40 49.1	+58.1	8.4	41 48.5	+58.1	8.5	42 47.8	+58.1	8.7	72
73	36 49.9	+57.8	7.5	37 49.4	+57.8	7.6	38 48.9	+57.8	7.7	39 48.3	+57.9	7.8	40 47.7	+58.0	8.0	41 47.2	+57.9	8.1	42 46.6	+58.0	8.2	43 45.9	+58.1	8.3	73
74	37 47.7	+57.7	7.2	38 47.2	+57.7	7.3	39 46.7	+57.8	7.4	40 46.2	+57.8	7.5	41 45.7	+57.9	7.6	42 45.1	+58.0	7.7	43 44.6	+58.0	7.9	44 44.0	+58.0	8.0	74
75	38 45.4	+57.6	6.8	39 44.9	+57.7	6.9	40 44.5	+57.7	7.0	41 44.0	+57.8	7.1	42 43.6	+57.8	7.3	43 43.1	+57.8	7.3	44 42.6	+57.9	7.5	45 42.0	+57.9	7.6	75
76	39 43.0	+57.6	6.5	40 42.6	+57.6	6.6	41 42.2	+57.7	6.7	42 41.8	+57.7	6.8	43 41.4	+57.7	6.9	44 40.9	+57.8	7.0	45 40.5	+57.8	7.1	46 40.0	+57.9	7.3	76
77	40 40.6	+57.4	6.1	41 40.2	+57.5	6.2	42 39.9	+57.5	6.3	43 39.5	+57.6	6.4	44 39.1	+57.7	6.5	45 38.7	+57.7	6.6	46 38.3	+57.8	6.7	47 37.9	+57.8	6.9	77
78	41 38.0	+57.4	5.7	42 37.7	+57.5	5.9	43 37.4	+57.5	5.9	44 37.1	+57.5	6.0	45 36.8	+57.5	6.1	46 36.4	+57.6	6.1	47 36.1	+57.6	6.3	48 35.7	+57.6	6.5	78
79	42 35.4	+57.4	5.3	43 35.2	+57.3	5.4	44 34.9	+57.4	5.5	45 34.6	+57.5	5.6	46 34.3	+57.5	5.7	47 34.0	+57.6	5.8	48 33.7	+57.6	5.9	49 33.4	+57.6	6.1	79
80	43 32.8	+57.2	4.9	44 32.5	+57.3	5.0	45 32.3	+57.3	5.1	46 32.1	+57.3	5.2	47 31.8	+57.4	5.3	48 31.6	+57.4	5.4	49 31.3	+57.5	5.5	50 31.0	+57.5	5.6	80
81	44 30.0	+57.2	4.5	45 29.8	+57.2	4.6	46 29.6	+57.2	4.7	47 29.4	+57.3	4.8	48 29.2	+57.3	4.9	49 29.0	+57.3	4.9	50 28.8	+57.3	5.1	51 28.5	+57.4	5.2	81
82	45 27.2	+57.0	4.1	46 27.0	+57.1	4.2	47 26.8	+57.1	4.2	48 26.7	+57.1	4.3	49 26.5	+57.2	4.4	50 26.3	+57.2	4.5	51 26.1	+57.2	4.6	52 25.9	+57.3	4.7	82
83	46 24.2	+56.9	3.6	47 24.1	+56.9	3.7	48 23.9	+57.0	3.8	49 23.8	+57.0	3.8	50 23.7	+57.0	3.9	51 23.5	+57.1	4.0	52 23.4	+57.1	4.1	53 23.2	+57.2	4.2	83
84	47 21.1	+56.9	3.2	48 21.0	+56.9	3.3	49 20.9	+56.9	3.3	50 20.8	+56.9	3.4	51 20.7	+57.0	3.4	52 20.6	+57.0	3.5	53 20.5	+57.0	3.6	54 20.4	+57.0	3.7	84
85	48 18.0	+56.6	2.7	49 17.9	+56.7	2.7	50 17.8	+56.8	2.8	51 17.7	+56.8	2.9	52 17.7	+56.8	2.9	53 17.6	+56.8	3.0	54 17.5	+56.8	3.1	55 17.4	+56.9	3.1	85
86	49 14.6	+56.6	2.2	50 14.6	+56.6	2.2	51 14.6	+56.6	2.3	52 14.5	+56.6	2.3	53 14.5	+56.6	2.4	54 14.4	+56.7	2.5	55 14.3	+56.7	2.5	56 14.3	+56.7	2.6	86
87	50 11.2	+56.4	1.7	51 11.2	+56.4	1.7	52 11.2	+56.4	1.8	53 11.1	+56.5	1.8	54 11.1	+56.5	1.8	55 11.1	+56.5	1.8	56 11.0	+56.5	1.9	57 11.0	+56.5	2.0	87
88	51 07.6	+56.3	1.1	52 07.6	+56.3	1.2	53 07.6	+56.3	1.2	54 07.6	+56.3	1.2	55 07.6	+56.3	1.3	56 07.6	+56.3	1.3	57 07.5	+56.4	1.3	58 07.5	+56.4	1.4	88
89	52 03.9	+56.1	0.6	53 03.9	+56.1	0.6	54 03.9	+56.1	0.6	55 03.9	+56.1	0.6	56 03.9	+56.1	0.6	57 03.9	+56.1	0.6	58 03.9	+56.1	0.7	59 03.9	+56.1	0.7	89
90	53 00.0	+55.9	0.0	54 00.0	+55.9	0.0	55 00.0	+55.9	0.0	56 00.0	+55.9	0.0	57 00.0	+55.9	0.0	58 00.0	+55.9	0.0	59 00.0	+55.9	0.0	60 00.0	+55.9	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 159°, 201°**

Dec.	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec.
0	33 55.0 +57.7 153.2	33 01.4 +57.9 153.5	32 07.7 +58.0 153.7	31 13.8 +58.2 154.0	30 19.8 +58.3 154.3	29 25.7 +58.4 154.5	28 31.5 +58.5 154.8	27 37.1 +58.7 155.0	0
1	34 52.7 +57.7 152.8	33 59.3 +57.8 153.1	33 05.7 +58.0 153.4	32 12.0 +58.1 153.7	31 18.1 +58.2 154.0	30 24.1 +58.4 154.3	29 30.0 +58.5 154.5	28 35.8 +58.6 154.8	1
2	35 50.4 +57.6 152.5	34 57.1 +57.8 152.8	34 03.7 +57.9 153.1	33 10.1 +58.0 153.4	32 16.3 +58.2 153.7	31 22.5 +58.3 154.0	30 28.5 +58.4 154.3	29 34.4 +58.6 154.5	2
3	36 48.0 +57.6 152.1	35 54.9 +57.7 152.5	35 01.6 +57.9 152.8	34 08.1 +58.1 153.1	33 14.5 +58.2 153.4	32 20.8 +58.3 153.7	31 26.9 +58.5 154.0	30 33.0 +58.5 154.3	3
4	37 45.6 +57.4 151.8	36 52.6 +57.6 152.2	35 59.5 +57.8 152.5	35 06.2 +57.9 152.8	34 12.7 +58.1 153.1	33 19.1 +58.3 153.4	32 25.4 +58.4 153.7	31 31.5 +58.5 154.0	4
5	38 43.0 +57.4 151.4	37 50.2 +57.6 151.8	36 57.3 +57.7 152.2	36 04.1 +58.0 152.5	35 10.8 +58.1 152.8	34 17.4 +58.2 153.1	33 23.8 +58.3 153.4	32 30.0 +58.5 153.7	5
6	39 40.4 +57.4 151.1	38 47.8 +57.5 151.4	37 55.0 +57.7 151.8	37 02.1 +57.8 152.2	36 08.9 +58.0 152.5	35 15.6 +58.2 152.9	34 22.1 +58.3 153.2	33 28.5 +58.5 153.5	6
7	40 37.8 +57.2 150.7	39 45.3 +57.5 151.1	38 52.7 +57.7 151.5	37 59.9 +57.8 151.8	37 06.9 +58.0 152.2	36 13.8 +58.1 152.6	35 20.4 +58.3 152.9	34 27.0 +58.4 153.2	7
8	41 35.0 +57.2 150.3	40 42.8 +57.4 150.7	39 50.4 +57.5 151.1	38 57.7 +57.8 151.5	38 04.9 +57.9 151.9	37 11.9 +58.1 152.2	36 18.7 +58.3 152.6	35 25.4 +58.4 152.9	8
9	42 32.2 +57.1 149.9	41 40.2 +57.3 150.3	40 47.9 +57.5 150.7	39 55.5 +57.7 151.2	39 02.8 +57.9 151.5	38 10.0 +58.0 151.9	37 17.0 +58.1 152.3	36 23.8 +58.3 152.6	9
10	43 29.3 +56.9 149.4	42 37.5 +57.2 149.9	41 45.4 +57.5 150.4	40 53.2 +57.6 150.8	40 00.7 +57.8 151.2	39 08.0 +58.0 151.5	38 15.1 +58.2 152.0	37 22.1 +58.3 152.3	10
11	44 26.2 +56.9 149.0	43 34.7 +57.1 149.5	42 42.9 +57.3 150.0	41 50.8 +57.5 150.4	40 58.5 +57.7 150.9	40 06.0 +57.9 151.3	39 13.3 +58.1 151.7	38 20.4 +58.2 152.0	11
12	45 23.1 +56.8 148.6	44 31.8 +57.0 149.1	43 40.2 +57.2 149.6	42 48.3 +57.5 150.0	41 56.2 +57.7 150.5	41 03.9 +57.9 150.9	40 11.4 +58.0 151.3	39 18.6 +58.2 151.7	12
13	46 19.9 +56.6 148.1	45 28.8 +56.9 148.6	44 37.4 +57.2 149.1	43 45.8 +57.4 149.6	42 53.9 +57.6 150.1	42 01.8 +57.7 150.6	41 09.4 +57.9 151.0	40 16.8 +58.1 151.4	13
14	47 16.5 +56.6 147.6	46 25.7 +56.8 148.2	45 34.6 +57.0 148.7	44 43.2 +57.3 149.2	43 51.5 +57.5 149.7	42 59.5 +57.7 150.2	42 07.3 +58.0 150.7	41 14.9 +58.1 151.1	14
15	48 13.1 +56.4 147.1	47 22.5 +56.7 147.7	46 31.6 +57.0 148.3	45 40.5 +57.1 148.8	44 49.0 +57.4 149.3	43 57.2 +57.7 149.8	43 05.3 +57.8 150.3	42 13.0 +58.0 150.8	15
16	49 09.5 +56.2 146.6	48 19.2 +56.5 147.2	47 28.6 +56.8 147.8	46 37.6 +57.1 148.4	45 46.4 +57.3 148.9	44 54.9 +57.5 149.4	44 03.1 +57.7 149.9	43 11.0 +58.0 150.4	16
17	50 05.7 +56.1 146.1	49 15.7 +56.5 146.7	48 25.4 +56.7 147.3	47 34.7 +57.0 147.9	46 43.7 +57.3 148.5	45 52.4 +57.5 149.0	45 00.8 +57.7 149.6	44 09.0 +57.9 150.0	17
18	51 01.8 +55.9 145.5	50 12.2 +56.2 146.2	49 22.1 +56.6 146.8	48 31.7 +56.9 147.5	47 41.0 +57.1 148.0	46 49.9 +57.4 148.6	45 58.5 +57.6 149.2	45 06.9 +57.8 149.7	18
19	51 57.7 +55.8 144.9	51 08.4 +56.1 145.6	50 18.7 +56.4 146.3	49 28.6 +56.7 147.0	48 38.1 +57.0 147.6	47 47.3 +57.2 148.2	46 56.1 +57.5 148.8	46 04.7 +57.7 149.3	19
20	52 53.5 +55.5 144.3	52 04.5 +55.9 145.1	51 15.1 +56.3 145.8	50 25.3 +56.6 146.5	49 35.1 +56.9 147.1	48 44.5 +57.2 147.7	47 53.6 +57.4 148.3	47 02.4 +57.7 148.9	20
21	53 49.0 +55.4 143.7	53 00.4 +55.8 144.5	52 11.4 +56.1 145.2	51 21.9 +56.4 145.9	50 32.0 +56.7 146.6	49 41.7 +57.0 147.3	48 51.0 +57.4 147.9	48 00.1 +57.5 148.5	21
22	54 44.4 +55.1 143.0	53 56.2 +55.5 143.8	53 07.5 +55.9 144.6	52 18.3 +56.3 145.4	51 28.7 +56.7 146.1	50 38.7 +57.0 146.8	49 48.4 +57.2 147.4	48 57.6 +57.5 148.1	22
23	55 39.5 +54.9 142.3	54 51.7 +55.4 143.2	54 03.4 +55.8 144.0	53 14.6 +56.1 144.8	52 25.4 +56.4 145.6	51 35.7 +56.7 146.3	50 45.6 +57.0 147.0	49 55.1 +57.3 147.6	23
24	56 34.4 +54.6 141.6	55 47.1 +55.0 142.5	54 59.2 +55.5 143.4	54 10.7 +56.0 144.2	53 21.8 +56.3 145.0	52 32.4 +56.7 145.8	51 42.6 +57.0 146.5	50 52.4 +57.3 147.2	24
25	57 29.0 +54.3 140.8	56 42.1 +54.9 141.8	55 54.7 +55.3 142.7	55 06.7 +55.7 143.6	54 18.1 +56.1 144.4	53 29.1 +56.5 145.2	52 39.6 +56.8 146.0	51 49.7 +57.1 146.7	25
26	58 23.3 +54.0 140.0	57 37.0 +54.5 141.0	56 50.0 +55.0 142.0	56 02.4 +55.5 142.9	55 14.2 +56.0 143.8	54 25.6 +56.3 144.6	53 36.4 +56.7 145.4	52 46.8 +57.0 146.2	26
27	59 17.3 +53.7 139.2	58 31.5 +54.3 140.3	57 45.0 +54.8 141.3	56 57.9 +55.3 142.2	56 10.2 +55.7 143.2	55 21.9 +56.1 144.0	54 33.1 +56.5 144.9	53 43.8 +56.8 145.7	27
28	60 11.0 +53.2 138.3	59 25.8 +53.9 139.4	58 39.8 +54.5 140.5	57 53.2 +55.0 141.5	57 05.9 +55.5 142.5	56 18.0 +55.9 143.4	55 29.6 +56.3 144.3	54 40.6 +56.7 145.1	28
29	61 04.2 +52.9 137.4	60 19.7 +53.5 138.6	59 34.3 +54.2 139.7	58 48.2 +54.7 140.8	58 01.4 +55.1 141.8	57 13.9 +55.7 142.7	56 25.9 +56.1 143.7	55 37.3 +56.5 144.5	29
30	61 57.1 +52.4 136.4	61 13.2 +53.2 137.6	60 28.5 +53.8 138.8	59 42.9 +54.4 140.0	58 56.6 +55.0 141.0	58 09.6 +55.5 142.1	57 22.0 +55.9 143.0	56 33.8 +56.3 143.9	30
31	62 49.5 +52.0 135.3	62 06.4 +52.7 136.7	61 22.3 +53.4 137.9	60 37.3 +54.1 139.1	59 51.6 +54.7 140.2	59 05.1 +55.2 141.3	58 17.9 +55.7 142.3	57 30.1 +56.2 143.3	31
32	63 41.5 +51.3 134.2	62 59.1 +52.2 135.6	62 15.7 +53.0 137.0	61 31.4 +53.7 138.2	60 46.3 +54.3 139.4	60 00.3 +54.9 140.5	59 13.6 +55.5 141.6	58 26.3 +55.9 142.6	32
33	64 32.8 +50.8 133.0	63 51.3 +51.7 134.5	63 08.7 +52.6 135.9	62 25.1 +53.3 137.3	61 40.6 +54.0 138.5	60 55.2 +54.6 139.7	60 09.1 +55.1 140.9	59 22.2 +55.7 141.9	33
34	65 23.6 +50.1 131.8	64 43.0 +51.1 133.3	64 01.3 +52.0 134.8	63 18.4 +52.9 136.3	62 34.6 +53.6 137.6	61 49.8 +54.3 138.8	61 04.2 +54.9 140.1	60 17.9 +55.4 141.2	34
35	66 13.7 +49.4 130.4	65 34.1 +50.5 132.1	64 53.3 +51.4 133.7	64 11.3 +52.3 135.2	63 28.2 +53.1 136.6	62 44.1 +53.9 137.9	61 59.1 +54.5 139.2	61 13.3 +55.1 140.4	35
36	67 03.1 +48.5 129.0	66 24.6 +49.7 130.8	65 44.7 +50.8 132.5	65 03.6 +51.8 134.1	64 21.3 +52.7 135.6	63 38.0 +53.4 137.0	62 53.6 +54.2 138.3	62 08.4 +54.8 139.6	36
37	67 51.6 +47.6 127.5	67 14.3 +48.9 129.4	66 35.5 +50.1 131.1	65 55.4 +51.2 132.8	65 14.0 +52.1 134.3	64 31.4 +53.0 135.8	63 47.8 +53.8 137.1	63 03.2 +54.4 138.7	37
38	68 39.2 +46.6 125.8	68 03.2 +48.0 127.8	67 25.6 +49.3 129.7	66 46.6 +50.4 131.5	66 06.1 +51.5 133.2	65 24.4 +52.5 134.8	64 41.6 +53.3 136.3	63 57.6 +54.1 137.7	38
39	69 25.8 +45.4 124.0	68 51.2 +47.0 126.2	68 14.9 +48.5 128.2	67 37.0 +49.7 130.1	66 57.6 +50.9 131.9	66 16.9 +51.9 133.6	65 34.9 +52.8 135.2	64 51.7 +53.6 136.7	39
40	70 11.2 +44.1 122.2	69 38.2 +45.9 124.4	69 03.4 +47.4 126.6	68 26.7 +48.9 128.6	67 48.5 +50.1 130.6	67 08.8 +51.2 132.4	66 27.7 +52.2 134.1	65 45.3 +53.2 135.7	40
41	70 55.3 +42.7 120.1	70 24.1 +44.6 122.6	69 50.8 +46.3 124.9	69 15.6 +47.9 127.0	68 38.6 +49.3 129.1	68 00.0 +50.5 131.0	67 19.9 +51.6 132.8	66 38.5 +52.6 134.5	41
42	71 38.0 +41.1 117.9	71 08.7 +43.2 120.5	70 37.1 +45.1 123.0	70 03.5 +46.7 125.3	69 27.9 +48.3 127.5	68 50.5 +49.7 129.5	68 11.5 +50.9 131.5	67 31.1 +52.0 133.3	42
43	72 19.1 +39.3 115.3	71 51.9 +41.6 118.3	71 22.2 +43.7 120.9	70 50.2 +45.6 123.4	70 16.2 +47.2 125.8	69 40.2 +48.7 127.9	69 02.4 +50.1 130.0	68 23.1 +51.3 132.0	43
44	72 58.4 +37.2• 113.0	72 33.5 +39.7 116.0	72 05.9 +42.1 118.8	71 35.8 +44.2 121.4	71 03.4 +46.1 123.9	70 28.9 +47.8 126.2	69 52.5 +49.3 128.4	69 14.4 +50.5 130.5	44
45	73 35.6 +35.0• 110.3	73 13.2 +37.8• 113.4	72 48.0 +40.3 116.4	72 20.0 +42.6 119.2	71 49.5 +44.6 121.9	71 16.7 +46.5 124.4	70 41.8 +48.1 126.7	70 04.9 +49.7 129.0	45
46	74 10.6 +32.4• 107.4	73 51.0 +35.5• 110.7	73 28.3 +38.2• 113.8	73 02.6 +40.8 116.8	72 34.1 +43.2 119.7	72 03.2 +45.2 122.4	71 29.9 +47.1 124.9	70 54.6 +48.7 127.3	46
47	74 43.0 +29.7• 104.2	74 26.5 +32.9• 107.7	74 06.5 +36.0• 111.1	73 43.4 +38.8• 114.3	73 17.3 +41.3 117.3	72 48.4 +43.6 120.2	72 17.0 +45.7 122.9	71 43.3 +47.5 125.5	47
48	75 12.7 +26.5• 100.9	74 59.4 +30.2• 104.6	74 42.5 +33.5• 108.1	74 22.2 +36.6• 111.5	73 58.6 +39.4• 114.8	73 32.0 +42.0 117.8	73 02.7 +44.2 120.7	72 30.8 +46.2 123.5	48
49	75 39.2 +23.2• 97.3	75 29.6 +27.0• 101.2	75 16.0 +30.6• 104.9	74 58.8 +34.0• 108.5	74 38.0 +37.1• 112.0	74 14.0 +39.9• 115.3	73 46.9 +42.5 118.4	73 17.0 +44.8 121.3	49
50	76 02.4 +19.4• 93.6	75 56.6 +23.5• 97.5	75 46.6 +27.5• 101.5	75 32.8 +31.1• 105.3	75 15.1 +34.6• 108.9	74 53.9 +37.7• 112.4	74 29.4 +40.5• 115.8	74 01.8 +43.1 118.9	50
51	76 21.8 +15.6• 89.6	76 20.1 +19.8• 93.7	76 14.1 +24.0• 97.8	76 03.9 +27.9• 101.8	75 49.7 +31.6• 105.7	75 31.6 +35.1• 109.4	75 09.9 +38.3• 113.0	74 44.9 +41.1• 116.3	51
52	76 37.4 +11.3• 85.5	76 39.9 +15.8• 89.7	76 38.1 +20.2• 93.9	76 31.8 +24.5• 98.0	76 21.3 +28.5• 102.1	76 06.7 +32.2• 106.1	75 48.2 +35.7• 109.9	75 26.0 +38.8• 113.5	52
53	76 48.7 +7.0• 81.2	76 55.7 +11.6• 85.4	76 58.3 +16.0• 89.7	76 56.3 +20.5• 94.1	76 49.8 +24.8• 98.3	76 38.9 +29.0• 102.5	76 23.9 +32.8• 106.5	76 04.8 +36.3• 110.4	53
54	76 55.7 +2.6• 76.8	77 07.3 +7.0• 81.1	77 14.3 +11.7• 85.4	77 16.8 +16.3• 89.8	77 14.6 +20.9• 94.3	77 07.9 +25.3• 98.6	76 56.7 +29.5• 102.9	76 41.1 +33.4• 107.0	54
55	76 58.3 −2.0• 72.4	77 14.3 +2.5• 76.6	77 26.0 +7.1• 81.0	77 33.1 +11.9• 85.4	77 35.5 +16.7• 90.0	77 33.2 +21.3• 94.5	77 26.2 +25.8• 99.0	77 14.5 +30.1• 103.3	55
56	76 56.3 −6.8• 67.9	77 16.8 −2.2• 72.1	77 33.1 +2.4• 76.4	77 45.0 +7.2• 80.8	77 52.2 +12.0• 85.4	77 54.5 +16.9• 90.1	77 52.0 +21.6• 94.8	77 44.6 +26.3• 99.4	56
57	76 49.8 −10.9• 63.6	77 14.6 −6.7• 67.5	77 35.5 −2.3• 71.7	77 52.2 +2.3• 76.1	78 04.2 +7.2• 80.7	78 11.4 +12.2• 85.5	78 13.6 +17.3• 90.3	78 10.9 +22.1• 95.0	57
58	76 38.9 −15.0• 59.3	77 07.9 −11.2• 63.0	77 33.2 −7.0• 67.1	77 54.5 −2.5• 71.4	78 11.4 +2.2• 75.9	78 23.6 +7.3• 80.6	78 30.9 +12.3• 85.5	78 33.0 +17.5• 90.4	58
59	76 23.9 −19.1• 55.1	76 56.7 −15.6• 58.7	77 26.2 −11.7• 62.5	77 52.0 −7.4• 66.6	78 13.6 −2.7• 71.0	78 30.9 +2.1• 75.7	78 43.2 +7.3• 80.5	78 50.5 +12.5• 85.5	59
60	76 04.8 −22.7• 51.1	76 41.1 −19.5• 54.4	77 14.5 −16.0• 58.0	77 44.6 −12.1• 61.9	78 10.9 −7.8• 66.1	78 33.0 −3.0• 70.7	78 50.5 +2.0• 75.4	79 03.0 +7.3• 80.4	60
61	75 42.1 −26.2• 47.3	76 21.6 −23.3• 50.4	76 58.5 −20.1• 53.7	77 32.5 −16.5• 57.3	78 03.1 −12.5• 61.3	78 30.0 −8.2• 65.6	78 52.5 −3.3• 70.3	79 10.3 +1.9• 75.2	61
62	75 15.9 −29.3• 43.7	75 58.3 −26.8• 46.5	76 38.4 −23.9• 49.6	77 16.0 −20.7• 52.9	77 50.6 −17.1• 56.6	78 21.8 −13.0• 60.7	78 49.2 −8.5• 65.1	79 12.2 −3.6• 69.9	62
63	74 46.6 −32.1• 40.4	75 31.5 −29.9• 42.9	76 14.5 −27.4• 45.6	76 55.3 −24.6• 48.7	77 33.5 −21.3• 52.1	78 08.8 −17.7• 55.9	78 40.7 −13.6• 60.0	79 08.6 −9.0• 64.5	63
64	74 14.5 −34.7• 37.2	75 01.6 −32.8• 39.5	75 47.1 −30.6• 42.0	76 30.7 −28.1• 44.8	77 12.2 −25.3• 47.9	77 51.1 −22.0• 51.3	78 27.1 −18.4• 55.1	78 59.6 −14.2• 59.3	64
65	73 39.8 −37.0• 34.3	74 28.8 −35.3• 36.3	75 16.5 −33.4• 38.5	76 02.6 −31.2• 41.0	76 46.9 −28.8• 43.8	77 29.1 −26.0• 46.9	78 08.7 −22.7• 50.4	78 45.4 −19.0• 54.3	65
66	73 02.8 −39.0 31.5	73 53.5 −37.6• 33.3	74 43.1 −36.0• 35.3	75 31.4 −34.2• 37.6	76 18.1 −32.0• 40.0	77 03.1 −29.5• 42.8	77 46.0 −26.7• 46.0	78 26.4 −23.5• 49.5	66
67	72 23.8 −40.9 28.9	73 15.9 −39.6 30.6	74 07.1 −38.3• 32.3	74 57.2 −36.6• 34.3	75 46.1 −34.8• 36.5	76 33.6 −32.8• 39.0	77 19.3 −30.4• 41.8	78 02.9 −27.6• 45.0	67
68	71 42.9 −42.5 26.6	72 36.3 −41.5 28.0	73 28.8 −40.2 29.6	74 20.6 −38.9• 31.3	75 11.3 −37.4 33.5	76 00.8 −35.6• 35.5	76 48.9 −33.5• 38.0	77 35.3 −31.2• 40.8	68
69	71 00.4 −44.0 24.4	71 54.8 −43.1 25.6	72 48.6 −42.1 27.0	73 41.7 −40.9 28.6	74 33.9 −39.6• 30.3	75 25.2 −38.1• 32.2	76 15.4 −36.4• 34.4	77 04.1 −34.3• 36.9	69
70	70 16.4 −45.2 22.3	71 11.7 −44.5 23.4	72 06.5 −43.6 24.6	73 00.8 −42.7 26.0	73 54.3 −41.5 27.5	74 47.1 −40.3• 29.2	75 39.0 −38.8• 31.1	76 29.8 −37.2• 33.3	70
71	69 31.2 −46.5 20.4	70 27.2 −45.8 21.4	71 22.9 −45.1 22.5	72 18.1 −44.2 23.7	73 12.8 −43.3 25.0	74 06.8 −42.2 26.5	75 00.2 −41.1• 28.1	75 52.6 −39.9• 30.0	71
72	68 44.7 −47.5 18.6	69 41.4 −46.9 19.5	70 37.8 −46.3 20.4	71 33.9 −45.7 21.5	72 29.5 −44.9 22.6	73 24.6 −43.9 23.9	74 19.1 −42.9 25.4	75 13.0 −41.8• 27.0	72
73	67 57.2 −48.7 17.0	68 54.5 −48.0 17.7	69 51.5 −47.4 18.5	70 48.2 −46.8 19.5	71 44.6 −46.1 20.5	72 40.7 −45.5 21.6	73 36.2 −44.6 22.8	74 31.2 −43.6 24.2	73
74	67 08.8 −49.3 15.4	68 06.5 −48.8 16.1	69 04.1 −48.4 16.8	70 01.4 −47.9 17.6	70 58.5 −47.4 18.5	71 55.2 −46.7 19.4	72 51.6 −46.0 20.5	73 47.6 −45.3 21.7	74
75	66 19.5 −50.0 14.0	67 17.7 −49.7 14.5	68 15.7 −49.3 15.2	69 13.5 −48.7 15.9	70 11.1 −48.4 16.6	71 08.5 −47.7 17.5	72 05.6 −47.4 18.4	73 02.3 −46.6 19.4	75
76	65 29.5 −50.7 12.6	66 28.0 −50.4 13.1	67 26.4 −50.1 13.7	68 24.8 −49.7 14.3	69 22.7 −49.4 14.9	70 20.6 −49.0 15.6	71 18.2 −48.4 16.4	72 15.7 −48.0 17.3	76
77	64 38.8 −51.3 11.3	65 37.6 −51.1 11.8	66 36.3 −50.8 12.3	67 34.9 −50.5 12.8	68 33.3 −50.2 13.3	69 31.6 −49.8 13.9	70 29.8 −49.5 14.6	71 27.7 −49.0 15.4	77
78	63 47.5 −51.8 10.2	64 46.5 −51.6 10.5	65 45.5 −51.4 10.9	66 44.4 −51.2 11.4	67 43.1 −50.9 11.9	68 41.8 −50.6 12.4	69 40.3 −50.3 13.0	70 38.7 −49.9 13.6	78
79	62 55.7 −52.4 9.4	63 54.9 −52.2 9.7	64 54.1 −52.1 10.1	65 53.2 −51.8 10.5	66 52.2 −51.6 10.9	67 51.2 −51.4 11.4	68 50.0 −51.1 11.4	69 48.8 −50.8 12.0	79
80	62 03.3 −52.8 8.0	63 02.7 −52.7 8.3	64 02.0 −52.5 8.5	65 01.4 −52.4 8.9	66 00.6 −52.2 9.2	66 59.8 −52.0 9.6	67 58.9 −51.7 10.0	68 58.0 −51.6 10.4	80
81	61 10.5 −53.3 7.0	62 10.0 −53.1 7.2	63 09.5 −53.0 7.5	64 09.0 −52.9 7.7	65 08.4 −52.7 8.0	66 07.8 −52.6 8.3	67 07.2 −52.4 8.7	68 06.4 −52.1 9.0	81
82	60 17.2 −53.6 6.0	61 16.9 −53.5 6.2	62 16.5 −53.4 6.4	63 16.1 −53.3 6.7	64 15.7 −53.2 6.9	65 15.3 −53.1 7.2	66 14.8 −53.0 7.4	67 14.3 −52.8 7.7	82
83	59 23.6 −54.0 5.1	60 23.4 −53.9 5.3	61 23.1 −53.8 5.5	62 22.8 −53.7 5.7	63 22.5 −53.6 5.8	64 22.2 −53.4 6.1	65 21.8 −53.4 6.3	66 21.5 −53.3 6.5	83
84	58 29.6 −54.2 4.3	59 29.5 −54.3 4.4	60 29.3 −54.2 4.6	61 29.1 −54.1 4.7	62 28.9 −54.0 4.9	63 28.7 −54.0 5.0	64 28.4 −53.8 5.2	65 28.2 −53.8 5.4	84
85	57 35.4 −54.6 3.5	58 35.2 −54.5 3.6	59 35.1 −54.5 3.7	60 35.0 −54.4 3.8	61 34.9 −54.4 3.9	62 34.7 −54.3 4.1	63 34.6 −54.3 4.2	64 34.4 −54.2 4.4	85
86	56 40.8 −54.9 2.7	57 40.7 −54.8 2.8	58 40.6 −54.7 2.9	59 40.6 −54.8 3.0	60 40.5 −54.7 3.1	61 40.4 −54.7 3.2	62 40.3 −54.6 3.3	63 40.2 −54.6 3.4	86
87	55 45.9 −55.0 2.0	56 45.9 −55.1 2.0	57 45.9 −55.1 2.1	58 45.8 −55.0 2.2	59 45.8 −55.0 2.3	60 45.7 −54.9 2.3	61 45.7 −55.0 2.4	62 45.6 −54.9 2.5	87
88	54 50.9 −55.4 1.3	55 50.8 −55.3 1.3	56 50.8 −55.3 1.4	57 50.8 −55.3 1.4	58 50.8 −55.3 1.4	59 50.8 −55.3 1.5	60 50.7 −55.2 1.5	61 50.7 −55.2 1.6	88
89	53 55.5 −55.5 0.6	54 55.5 −55.5 0.7	55 55.5 −55.5 0.7	56 55.5 −55.5 0.7	57 55.5 −55.5 0.7	58 55.5 −55.5 0.7	59 55.5 −55.5 0.7	60 55.5 −55.5 0.8	89
90	53 00.0 −55.7 0.0	54 00.0 −55.7 0.0	55 00.0 −55.7 0.0	56 00.0 −55.7 0.0	57 00.0 −55.7 0.0	58 00.0 −55.7 0.0	59 00.0 −55.7 0.0	60 00.0 −55.8 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	33 55.0	−57.7	153.2	33 01.4	−57.9	153.5	32 07.7	−58.1	153.7	31 13.8	−58.2	154.0	30 19.8	−58.3	154.3	29 25.7	−58.4	154.5	28 31.5	−58.6	154.8	27 37.1	−58.6	155.0	0
1	32 57.3	−57.9	153.5	32 03.5	−58.0	153.8	31 09.6	−58.1	154.0	30 15.6	−58.2	154.3	29 21.5	−58.4	154.5	28 27.3	−58.5	154.8	27 32.9	−58.6	155.0	26 38.5	−58.7	155.2	1
2	31 59.4	−57.8	153.8	31 05.5	−58.0	154.1	30 11.5	−58.1	154.3	29 17.4	−58.3	154.6	28 23.1	−58.3	154.8	27 28.8	−58.5	155.0	26 34.3	−58.5	155.3	25 39.8	−58.7	155.5	2
3	31 01.6	−57.9	154.1	30 07.5	−58.0	154.4	29 13.4	−58.2	154.6	28 19.1	−58.3	154.9	27 20.8	−58.3	155.1	26 30.3	−58.5	155.3	25 35.7	−58.6	155.5	24 41.1	−58.7	155.7	3
4	30 03.7	−58.0	154.4	29 09.5	−58.1	154.7	28 15.2	−58.2	154.9	27 20.8	−58.3	155.1	26 26.4	−58.5	155.3	25 31.8	−58.5	155.5	24 37.1	−58.6	155.7	23 42.4	−58.7	155.9	4
5	29 05.7	−58.0	154.7	28 11.4	−58.1	155.0	27 17.0	−58.2	155.2	26 22.5	−58.3	155.4	25 27.9	−58.4	155.6	24 33.2	−58.5	155.8	23 38.5	−58.7	156.0	22 43.6	−58.7	156.1	5
6	28 07.7	−58.0	155.0	27 13.3	−58.1	155.2	26 18.8	−58.3	155.4	25 24.2	−58.4	155.6	24 29.5	−58.5	155.8	23 34.7	−58.6	156.0	22 39.8	−58.7	156.2	21 44.9	−58.8	156.4	6
7	27 09.7	−58.1	155.3	26 15.2	−58.2	155.5	25 20.5	−58.3	155.7	24 25.8	−58.4	155.9	23 31.0	−58.5	156.1	22 36.1	−58.6	156.3	21 41.1	−58.7	156.4	20 46.1	−58.8	156.6	7
8	26 11.6	−58.1	155.6	25 17.0	−58.2	155.8	24 22.2	−58.3	156.0	23 27.4	−58.4	156.1	22 32.5	−58.5	156.3	21 37.5	−58.6	156.5	20 42.4	−58.7	156.6	19 47.3	−58.8	156.8	8
9	25 13.6	−58.2	155.9	24 18.8	−58.3	156.0	23 23.9	−58.4	156.2	22 29.0	−58.5	156.4	21 33.9	−58.5	156.6	20 38.9	−58.7	156.7	19 43.7	−58.7	156.9	18 48.5	−58.9	157.0	9
10	24 15.4	−58.1	156.1	23 20.5	−58.3	156.3	22 25.5	−58.3	156.5	21 30.5	−58.5	156.6	20 35.4	−58.6	156.8	19 40.2	−58.6	156.9	18 45.0	−58.8	157.1	17 49.7	−58.8	157.2	10
11	23 17.3	−58.2	156.4	22 22.3	−58.3	156.6	21 27.2	−58.4	156.7	20 32.0	−58.5	156.9	19 36.8	−58.6	157.0	18 41.6	−58.7	157.2	17 46.2	−58.7	157.3	16 50.9	−58.9	157.4	11
12	22 19.1	−58.2	156.7	21 24.0	−58.3	156.8	20 28.8	−58.4	157.0	19 33.5	−58.5	157.1	18 38.2	−58.6	157.3	17 42.9	−58.7	157.4	16 47.5	−58.8	157.5	15 52.0	−58.8	157.6	12
13	21 20.9	−58.2	156.9	20 25.7	−58.4	157.1	19 30.4	−58.4	157.2	18 35.0	−58.5	157.4	17 39.6	−58.6	157.5	16 44.2	−58.7	157.6	15 48.7	−58.8	157.7	14 53.2	−58.9	157.8	13
14	20 22.7	−58.3	157.2	19 27.3	−58.3	157.3	18 32.0	−58.5	157.5	17 36.5	−58.5	157.6	16 41.0	−58.6	157.7	15 45.5	−58.7	157.8	14 49.9	−58.8	157.9	13 54.3	−58.9	158.0	14
15	19 24.4	−58.2	157.4	18 29.0	−58.4	157.6	17 33.5	−58.5	157.7	16 38.0	−58.6	157.8	15 42.4	−58.7	157.9	14 46.8	−58.8	158.0	13 51.1	−58.8	158.1	12 55.4	−58.9	158.2	15
16	18 26.2	−58.3	157.7	17 30.6	−58.4	157.8	16 35.0	−58.5	157.9	15 39.4	−58.6	158.0	14 43.7	−58.6	158.1	13 48.0	−58.7	158.2	12 52.3	−58.8	158.3	11 56.5	−58.9	158.4	16
17	17 27.9	−58.3	157.9	16 32.2	−58.4	158.1	15 36.6	−58.5	158.2	14 40.8	−58.6	158.3	13 45.1	−58.6	158.4	12 49.3	−58.7	158.4	11 53.5	−58.8	158.5	10 57.6	−58.9	158.6	17
18	16 29.6	−58.4	158.2	15 33.8	−58.4	158.3	14 38.1	−58.5	158.4	13 42.3	−58.6	158.5	12 46.4	−58.7	158.6	11 50.6	−58.8	158.7	10 54.7	−58.9	158.7	9 58.7	−58.9	158.8	18
19	15 31.2	−58.3	158.4	14 35.4	−58.5	158.5	13 39.6	−58.6	158.6	12 43.7	−58.6	158.7	11 47.7	−58.6	158.8	10 54.8	−58.8	158.9	9 55.8	−58.8	158.9	8 59.8	−58.9	159.0	19
20	14 32.9	−58.4	158.7	13 37.0	−58.5	158.8	12 41.0	−58.5	158.8	11 45.1	−58.7	158.9	10 49.1	−58.7	159.0	9 53.0	−58.7	159.1	8 57.0	−58.9	159.1	8 00.9	−58.9	159.2	20
21	13 34.5	−58.3	158.9	12 38.5	−58.4	159.0	11 42.5	−58.5	159.1	10 46.4	−58.6	159.1	9 50.4	−58.7	159.2	8 54.3	−58.8	159.3	7 58.1	−58.8	159.3	7 02.0	−58.9	159.4	21
22	12 36.2	−58.4	159.2	11 40.1	−58.5	159.2	10 44.0	−58.6	159.3	9 47.8	−58.6	159.3	8 51.7	−58.7	159.4	7 55.5	−58.8	159.5	6 59.3	−58.9	159.5	6 03.1	−59.0	159.6	22
23	11 37.8	−58.4	159.4	10 41.6	−58.5	159.5	9 45.4	−58.6	159.5	8 49.2	−58.7	159.6	7 53.0	−58.8	159.6	6 56.7	−58.8	159.7	6 00.4	−58.9	159.7	5 04.1	−59.0	159.7	23
24	10 39.4	−58.4	159.6	9 43.1	−58.5	159.7	8 46.8	−58.5	159.7	7 50.5	−58.6	159.8	6 54.2	−58.7	159.8	5 57.9	−58.8	159.9	5 01.6	−58.9	159.9	4 05.2	−58.9	159.9	24
25	9 41.0	−58.4	159.9	8 44.6	−58.5	159.9	7 48.3	−58.6	160.0	6 51.9	−58.6	160.0	5 55.5	−58.7	160.0	4 59.1	−58.8	160.1	4 02.7	−58.9	160.1	3 06.3	−59.0	160.1	25
26	8 42.6	−58.5	160.1	7 46.1	−58.5	160.1	6 49.7	−58.6	160.2	5 53.3	−58.7	160.2	4 56.8	−58.7	160.2	4 00.3	−58.8	160.3	3 03.8	−58.9	160.3	2 07.3	−59.0	160.3	26
27	7 44.1	−58.4	160.3	6 47.6	−58.5	160.4	5 51.1	−58.6	160.4	4 54.6	−58.7	160.4	3 58.1	−58.8	160.5	3 01.5	−58.8	160.5	2 05.0	−58.9	160.5	1 08.4	−58.9	160.5	27
28	6 45.7	−58.4	160.5	5 49.1	−58.5	160.6	4 52.5	−58.6	160.6	3 55.9	−58.6	160.6	2 59.3	−58.7	160.7	2 02.7	−58.8	160.7	1 06.1	−58.9	160.7	0 09.5	−59.0	160.7	28
29	5 47.3	−58.5	160.8	4 50.6	−58.5	160.8	3 53.9	−58.5	160.8	2 57.3	−58.7	160.8	2 00.6	−58.7	160.9	1 03.9	−58.8	160.9	0 07.2	−58.9	160.9	0 49.5	+58.9	19.1	29
30	4 48.8	−58.4	161.0	3 52.1	−58.5	161.0	2 55.4	−58.6	161.0	1 58.6	−58.7	161.1	1 01.9	−58.8	161.1	0 05.1	−58.8	161.1	0 51.7	+58.8	18.9	1 48.4	+58.9	18.9	30
31	3 50.4	−58.5	161.2	2 53.6	−58.6	161.2	1 56.8	−58.6	161.3	0 59.9	−58.6	161.3	0 03.1	−58.7	161.3	0 53.7	+58.8	18.7	1 50.5	+58.9	18.7	2 47.3	+59.0	18.8	31
32	2 51.9	−58.5	161.5	1 55.0	−58.5	161.5	0 58.2	−58.6	161.5	0 01.3	−58.7	161.5	0 55.6	+58.7	18.5	1 52.5	+58.8	18.5	2 49.4	+58.9	18.5	3 46.3	+58.9	18.6	32
33	1 53.5	−58.5	161.7	0 56.5	−58.5	161.7	0 00.4	+58.6	18.3	0 57.4	+58.7	18.3	1 54.4	+58.7	18.3	2 51.3	+58.8	18.3	3 48.3	+58.8	18.4	4 45.2	+58.9	18.4	33
34	0 55.0	−58.5	161.9	0 02.0	+58.5	18.1	0 59.0	+58.6	18.1	1 56.1	+58.6	18.1	2 53.1	+58.7	18.1	3 50.1	+58.8	18.1	4 47.1	+58.9	18.2	5 44.1	+59.0	18.2	34
35	0 03.4	+58.5	17.9	1 00.5	+58.6	17.9	1 57.6	+58.6	17.9	2 54.7	+58.7	17.9	3 51.8	+58.8	17.9	4 48.9	+58.8	17.9	5 46.0	+58.8	18.0	6 43.1	+58.9	18.0	35
36	1 01.9	+58.5	17.6	1 59.1	+58.5	17.7	2 56.2	+58.6	17.7	3 53.4	+58.7	17.7	4 50.6	+58.7	17.7	5 47.7	+58.8	17.7	6 44.9	+58.8	17.8	7 42.0	+58.9	17.8	36
37	2 00.3	+58.5	17.4	2 57.6	+58.5	17.5	3 54.8	+58.6	17.5	4 52.1	+58.6	17.5	5 49.3	+58.7	17.5	6 46.5	+58.8	17.5	7 43.7	+58.9	17.6	8 40.9	+58.9	17.6	37
38	2 58.8	+58.4	17.2	3 56.1	+58.5	17.2	4 53.4	+58.6	17.2	5 50.7	+58.7	17.3	6 48.0	+58.7	17.3	7 45.3	+58.8	17.3	8 42.6	+58.8	17.4	9 39.8	+58.9	17.4	38
39	3 57.2	+58.5	17.0	4 54.6	+58.5	17.0	5 52.0	+58.6	17.0	6 49.4	+58.6	17.0	7 46.7	+58.7	17.1	8 44.1	+58.7	17.1	9 41.4	+58.8	17.2	10 38.7	+58.9	17.2	39
40	4 55.7	+58.4	16.7	5 53.1	+58.5	16.8	6 50.6	+58.6	16.8	7 48.0	+58.7	16.8	8 45.4	+58.7	16.9	9 42.8	+58.8	16.9	10 40.2	+58.9	17.0	11 37.6	+58.9	17.0	40
41	5 54.1	+58.5	16.5	6 51.6	+58.6	16.5	7 49.2	+58.5	16.6	8 46.7	+58.6	16.6	9 44.1	+58.7	16.7	10 41.6	+58.8	16.7	11 39.1	+58.8	16.8	12 36.5	+58.9	16.8	41
42	6 52.6	+58.4	16.3	7 50.2	+58.4	16.3	8 47.7	+58.6	16.4	9 45.3	+58.6	16.4	10 42.8	+58.7	16.5	11 40.4	+58.7	16.5	12 37.9	+58.8	16.6	13 35.4	+58.9	16.6	42
43	7 51.0	+58.4	16.1	8 48.6	+58.5	16.1	9 46.3	+58.5	16.1	10 43.9	+58.6	16.2	11 41.5	+58.7	16.2	12 39.1	+58.8	16.3	13 36.7	+58.8	16.4	14 34.3	+58.8	16.4	43
44	8 49.4	+58.4	15.8	9 47.1	+58.5	15.9	10 44.8	+58.6	15.9	11 42.5	+58.6	16.0	12 40.2	+58.7	16.0	13 37.9	+58.7	16.1	14 35.5	+58.8	16.2	15 33.1	+58.9	16.2	44
45	9 47.8	+58.4	15.6	10 45.6	+58.5	15.6	11 43.4	+58.5	15.7	12 41.1	+58.6	15.8	13 38.9	+58.6	15.8	14 36.6	+58.7	15.9	15 34.3	+58.8	16.0	16 32.0	+58.8	16.0	45
46	10 46.2	+58.4	15.4	11 44.1	+58.4	15.4	12 41.9	+58.5	15.5	13 39.7	+58.6	15.5	14 37.5	+58.7	15.6	15 35.3	+58.7	15.7	16 33.1	+58.7	15.8	17 30.8	+58.8	15.8	46
47	11 44.6	+58.4	15.1	12 42.5	+58.5	15.2	13 40.4	+58.5	15.2	14 38.3	+58.6	15.3	15 36.2	+58.6	15.4	16 34.0	+58.7	15.5	17 31.8	+58.8	15.5	18 29.6	+58.8	15.6	47
48	12 43.0	+58.4	14.9	13 41.0	+58.4	15.0	14 38.9	+58.5	15.1	15 36.9	+58.5	15.1	16 34.8	+58.6	15.2	17 32.7	+58.7	15.2	18 30.6	+58.7	15.3	19 28.4	+58.8	15.4	48
49	13 41.4	+58.3	14.7	14 39.4	+58.4	14.7	15 37.4	+58.5	14.8	16 35.4	+58.6	14.9	17 33.4	+58.6	14.9	18 31.4	+58.6	15.0	19 29.3	+58.7	15.1	20 27.2	+58.8	15.2	49
50	14 39.7	+58.4	14.4	15 37.8	+58.4	14.5	16 35.9	+58.5	14.6	17 34.0	+58.5	14.6	18 32.0	+58.6	14.7	19 30.0	+58.7	14.8	20 28.0	+58.8	14.9	21 26.0	+58.8	15.0	50
51	15 38.1	+58.3	14.2	16 36.2	+58.4	14.2	17 34.4	+58.4	14.3	18 32.5	+58.5	14.4	19 30.6	+58.6	14.5	20 28.7	+58.6	14.6	21 26.8	+58.6	14.7	22 24.8	+58.7	14.8	51
52	16 36.4	+58.3	13.9	17 34.6	+58.4	14.0	18 32.8	+58.5	14.1	19 31.0	+58.5	14.2	20 29.2	+58.5	14.3	21 27.3	+58.6	14.3	22 25.4	+58.7	14.4	23 23.5	+58.8	14.6	52
53	17 34.7	+58.3	13.7	18 33.0	+58.3	13.8	19 31.3	+58.4	13.8	20 29.5	+58.5	13.9	21 27.7	+58.6	14.0	22 25.9	+58.6	14.1	23 24.1	+58.7	14.2	24 22.3	+58.7	14.3	53
54	18 33.0	+58.3	13.4	19 31.3	+58.4	13.5	20 29.7	+58.4	13.6	21 28.0	+58.4	13.7	22 26.3	+58.5	13.8	23 24.5	+58.6	13.9	24 22.8	+58.6	14.0	25 21.0	+58.6	14.1	54
55	19 31.3	+58.2	13.2	20 29.7	+58.3	13.3	21 28.1	+58.3	13.3	22 26.4	+58.5	13.4	23 24.8	+58.5	13.5	24 23.1	+58.5	13.6	25 21.4	+58.6	13.8	26 19.6	+58.7	13.9	55
56	20 29.5	+58.2	12.9	21 28.0	+58.3	13.1	22 26.4	+58.4	13.1	23 24.9	+58.4	13.2	24 23.3	+58.3	13.3	25 21.6	+58.4	13.4	26 20.0	+58.6	13.5	27 18.3	+58.7	13.6	56
57	21 27.7	+58.2	12.7	22 26.3	+58.2	12.8	23 24.8	+58.3	12.8	24 23.3	+58.3	12.9	25 21.7	+58.5	13.0	26 20.2	+58.5	13.2	27 18.6	+58.5	13.3	28 17.0	+58.6	13.4	57
58	22 25.9	+58.2	12.4	23 24.5	+58.3	12.5	24 23.1	+58.3	12.6	25 21.6	+58.4	12.7	26 20.2	+58.4	12.8	27 18.7	+58.4	12.9	28 17.1	+58.6	13.0	29 15.6	+58.6	13.2	58
59	23 24.1	+58.2	12.1	24 22.8	+58.2	12.2	25 21.4	+58.2	12.4	26 20.0	+58.3	12.4	27 18.6	+58.4	12.5	28 17.1	+58.5	12.7	29 15.7	+58.5	12.8	30 14.2	+58.6	12.9	59
60	24 22.3	+58.1	11.9	25 21.0	+58.1	12.0	26 19.6	+58.3	12.1	27 18.3	+58.3	12.2	28 17.0	+58.3	12.3	29 15.6	+58.3	12.4	30 14.2	+58.4	12.5	31 12.7	+58.5	12.7	60
61	25 20.4	+58.1	11.6	26 19.1	+58.2	11.7	27 17.9	+58.2	11.8	28 16.6	+58.3	11.9	29 15.3	+58.3	12.0	30 14.0	+58.4	12.1	31 12.6	+58.5	12.3	32 11.2	+58.5	12.4	61
62	26 18.5	+58.0	11.3	27 17.3	+58.1	11.4	28 16.1	+58.2	11.5	29 14.9	+58.2	11.6	30 13.6	+58.3	11.7	31 12.4	+58.3	11.9	32 11.1	+58.4	12.0	33 09.7	+58.5	12.1	62
63	27 16.5	+58.0	11.0	28 15.4	+58.1	11.1	29 14.3	+58.1	11.2	30 13.1	+58.2	11.4	31 11.9	+58.3	11.5	32 10.7	+58.3	11.6	33 09.5	+58.3	11.7	34 08.2	+58.4	11.9	63
64	28 14.5	+58.0	10.7	29 13.5	+58.0	10.8	30 12.4	+58.1	11.0	31 11.3	+58.1	11.1	32 10.2	+58.2	11.2	33 09.0	+58.3	11.3	34 07.8	+58.4	11.4	35 06.6	+58.4	11.6	64
65	29 12.5	+58.0	10.6	30 11.5	+58.0	10.6	31 10.5	+58.0	10.7	32 09.4	+58.1	10.8	33 08.4	+58.1	10.9	34 07.3	+58.2	11.0	35 06.2	+58.2	11.2	36 05.0	+58.4	11.3	65
66	30 10.5	+57.9	10.2	31 09.5	+58.0	10.3	32 08.5	+58.1	10.4	33 07.6	+58.0	10.5	34 06.5	+58.2	10.6	35 05.5	+58.2	10.7	36 04.4	+58.3	10.9	37 03.4	+58.3	11.0	66
67	31 08.4	+57.8	9.8	32 07.5	+57.9	10.0	33 06.6	+57.9	10.1	34 05.6	+58.1	10.2	35 04.7	+58.1	10.3	36 03.7	+58.1	10.4	37 02.7	+58.2	10.6	38 01.7	+58.2	10.7	67
68	32 06.2	+57.8	9.5	33 05.4	+57.9	9.6	34 04.5	+58.0	9.8	35 03.7	+57.9	9.9	36 02.8	+58.0	10.0	37 01.8	+58.1	10.1	38 00.9	+58.1	10.2	38 59.9	+58.2	10.4	68
69	33 04.0	+57.8	9.2	34 03.3	+57.8	9.3	35 02.5	+57.8	9.4	36 01.6	+58.0	9.6	37 00.8	+58.0	9.7	37 59.9	+58.1	9.8	38 59.0	+58.1	9.9	39 58.1	+58.2	10.1	69
70	34 01.8	+57.7	8.9	35 01.1	+57.7	9.0	36 00.3	+57.8	9.1	36 59.6	+57.8	9.2	37 58.8	+57.9	9.4	38 58.0	+57.9	9.5	39 57.1	+58.1	9.6	40 56.3	+58.1	9.8	70
71	34 59.5	+57.7	8.6	35 58.8	+57.7	8.7	36 58.1	+57.8	8.8	37 57.4	+57.8	8.9	38 56.7	+57.9	9.0	39 55.9	+58.0	9.2	40 55.2	+57.9	9.3	41 54.4	+58.0	9.4	71
72	35 57.2	+57.6	8.2	36 56.5	+57.7	8.4	37 55.9	+57.7	8.5	38 55.2	+57.8	8.6	39 54.6	+57.8	8.7	40 53.9	+57.8	8.8	41 53.1	+58.0	9.0	42 52.4	+58.0	9.1	72
73	36 54.8	+57.5	7.9	37 54.2	+57.6	8.0	38 53.6	+57.6	8.1	39 53.0	+57.7	8.2	40 52.4	+57.7	8.3	41 51.7	+57.8	8.5	42 51.1	+57.8	8.6	43 50.4	+57.9	8.7	73
74	37 52.3	+57.5	7.5	38 51.8	+57.5	7.6	39 51.2	+57.6	7.7	40 50.7	+57.6	7.8	41 50.1	+57.7	8.0	42 49.5	+57.7	8.1	43 48.9	+57.8	8.2	44 48.3	+57.8	8.4	74
75	38 49.8	+57.4	7.1	39 49.3	+57.4	7.3	40 48.8	+57.5	7.4	41 48.3	+57.5	7.5	42 47.8	+57.5	7.6	43 47.2	+57.7	7.7	44 46.7	+57.7	7.9	45 46.1	+57.8	8.0	75
76	39 47.2	+57.3	6.8	40 46.7	+57.4	6.9	41 46.3	+57.4	7.0	42 45.8	+57.5	7.1	43 45.4	+57.5	7.2	44 44.9	+57.6	7.3	45 44.4	+57.6	7.5	46 43.9	+57.7	7.6	76
77	40 44.5	+57.2	6.4	41 44.1	+57.3	6.5	42 43.7	+57.3	6.6	43 43.3	+57.4	6.7	44 42.9	+57.4	6.8	45 42.5	+57.4	6.9	46 42.0	+57.5	7.1	47 41.6	+57.5	7.2	77
78	41 41.7	+57.2	6.0	42 41.4	+57.2	6.1	43 41.0	+57.3	6.2	44 40.7	+57.3	6.3	45 40.3	+57.4	6.4	46 39.9	+57.4	6.6	47 39.5	+57.5	6.8	48 39.1	+57.5	6.8	78
79	42 38.9	+57.0	5.6	43 38.6	+57.1	5.7	44 38.3	+57.1	5.8	45 38.0	+57.2	5.9	46 37.7	+57.2	6.0	47 37.3	+57.3	6.1	48 37.0	+57.3	6.2	49 36.6	+57.4	6.3	79
80	43 35.9	+57.0	5.2	44 35.7	+57.0	5.2	45 35.4	+57.1	5.3	46 35.2	+57.1	5.4	47 34.9	+57.1	5.5	48 34.6	+57.2	5.6	49 34.3	+57.2	5.8	50 34.0	+57.3	5.9	80
81	44 32.9	+56.8	4.7	45 32.7	+56.9	4.8	46 32.5	+56.9	4.9	47 32.3	+57.0	5.0	48 32.0	+57.1	5.1	49 31.8	+57.1	5.1	50 31.5	+57.2	5.2	51 31.3	+57.1	5.4	81
82	45 29.8	+56.7	4.3	46 29.6	+56.8	4.3	47 29.4	+56.9	4.4	48 29.3	+56.8	4.5	49 29.1	+56.9	4.6	50 28.9	+56.9	4.7	51 28.7	+56.9	4.8	52 28.4	+57.1	4.9	82
83	46 26.5	+56.7	3.8	47 26.4	+56.7	3.9	48 26.3	+56.7	3.9	49 26.1	+56.8	4.0	50 26.0	+56.7	4.1	51 25.8	+56.8	4.2	52 25.6	+56.9	4.3	53 25.5	+56.9	4.4	83
84	47 23.2	+56.5	3.3	48 23.1	+56.5	3.4	49 23.0	+56.5	3.4	50 22.9	+56.6	3.5	51 22.7	+56.7	3.6	52 22.6	+56.7	3.6	53 22.5	+56.7	3.7	54 22.4	+56.7	3.9	84
85	48 19.7	+56.4	2.8	49 19.6	+56.4	2.9	50 19.5	+56.5	2.9	51 19.5	+56.4	3.0	52 19.4	+56.5	3.1	53 19.3	+56.5	3.1	54 19.2	+56.5	3.2	55 19.1	+56.6	3.3	85
86	49 16.1	+56.2	2.3	50 16.0	+56.3	2.3	51 16.0	+56.2	2.4	52 15.9	+56.3	2.4	53 15.9	+56.3	2.5	54 15.8	+56.3	2.6	55 15.7	+56.4	2.6	56 15.7	+56.4	2.7	86
87	50 12.3	+56.1	1.8	51 12.3	+56.1	1.8	52 12.2	+56.1	1.8	53 12.2	+56.1	1.9	54 12.2	+56.1	1.9	55 12.1	+56.2	1.9	56 12.1	+56.2	2.0	57 12.1	+56.2	2.1	87
88	51 08.4	+55.9	1.2	52 08.4	+55.9	1.2	53 08.3	+56.0	1.2	54 08.3	+56.0	1.3	55 08.3	+56.0	1.3	56 08.3	+56.0	1.3	57 08.3	+56.0	1.4	58 08.3	+55.9	1.4	88
89	52 04.3	+55.7	0.6	53 04.3	+55.7	0.6	54 04.3	+55.7	0.6	55 04.3	+55.7	0.7	56 04.3	+55.7	0.7	57 04.3	+55.7	0.7	58 04.3	+55.7	0.7	59 04.2	+55.8	0.7	89
90	53 00.0	+55.5	0.0	54 00.0	+55.5	0.0	55 00.0	+55.5	0.0	56 00.0	+55.5	0.0	57 00.0	+55.5	0.0	58 00.0	+55.5	0.0	59 00.0	+55.5	0.0	60 00.0	+55.5	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 158°, 202°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	33 38.4	+57.5	152.0	32 45.3	+57.7	152.3	31 52.1	+57.9	152.6	30 58.8	+58.0	152.9	30 05.3	+58.2	153.2	29 11.7	+58.3	153.4	28 18.0	+58.4	153.7	27 24.2	+58.5	153.9	0
1	34 35.9	+57.5	151.7	33 43.0	+57.7	152.0	32 50.0	+57.8	152.3	31 56.8	+58.0	152.6	31 03.5	+58.1	152.9	30 10.0	+58.2	153.1	29 16.4	+58.4	153.4	28 22.7	+58.5	153.6	1
2	35 33.4	+57.4	151.3	34 40.7	+57.6	151.7	33 47.8	+57.7	152.0	32 54.8	+57.9	152.3	32 01.6	+58.1	152.6	31 08.2	+58.2	152.9	30 14.8	+58.3	153.1	29 21.2	+58.5	153.4	2
3	36 30.8	+57.3	151.0	35 38.3	+57.5	151.3	34 45.5	+57.7	151.6	33 52.7	+57.8	152.0	32 59.6	+58.0	152.3	32 06.4	+58.1	152.6	31 13.1	+58.3	152.9	30 19.7	+58.4	153.1	3
4	37 28.1	+57.3	150.6	36 35.8	+57.4	151.0	35 43.2	+57.7	151.3	34 50.5	+57.8	151.6	33 57.6	+58.0	152.0	33 04.6	+58.1	152.3	32 11.4	+58.3	152.6	31 18.1	+58.4	152.9	4
5	38 25.4	+57.2	150.2	37 33.2	+57.4	150.6	36 40.9	+57.6	151.0	35 48.3	+57.8	151.3	34 55.6	+57.9	151.7	34 02.7	+58.1	152.0	33 09.7	+58.2	152.3	32 16.5	+58.3	152.6	5
6	39 22.6	+57.1	149.8	38 30.6	+57.4	150.2	37 38.5	+57.5	150.6	36 46.1	+57.7	151.0	35 53.5	+57.9	151.3	35 00.8	+58.0	151.7	34 07.9	+58.2	152.0	33 14.8	+58.4	152.3	6
7	40 19.7	+57.1	149.4	39 28.0	+57.2	149.8	38 36.0	+57.4	150.2	37 43.8	+57.6	150.6	36 51.4	+57.8	151.0	35 58.8	+58.0	151.4	35 06.1	+58.1	151.7	34 13.2	+58.2	152.0	7
8	41 16.8	+56.9	149.0	40 25.2	+57.2	149.5	39 33.4	+57.4	149.9	38 41.4	+57.6	150.3	37 49.2	+57.8	150.7	36 56.8	+57.9	151.0	36 04.2	+58.1	151.4	35 11.4	+58.3	151.7	8
9	42 13.7	+56.8	148.6	41 22.4	+57.0	149.1	40 30.8	+57.3	149.5	39 39.0	+57.5	149.9	38 47.0	+57.6	150.3	37 54.7	+57.9	150.7	37 02.3	+58.0	151.1	36 09.7	+58.2	151.4	9
10	43 10.5	+56.8	148.2	42 19.4	+57.0	148.6	41 28.1	+57.2	149.1	40 36.5	+57.4	149.5	39 44.6	+57.7	150.0	38 52.6	+57.8	150.4	38 00.3	+58.0	150.8	37 07.9	+58.1	151.1	10
11	44 07.3	+56.6	147.7	43 16.4	+56.9	148.2	42 25.3	+57.1	148.7	41 33.9	+57.3	149.2	40 42.3	+57.5	149.6	39 50.4	+57.7	150.0	38 58.3	+57.9	150.4	38 06.0	+58.1	150.8	11
12	45 03.9	+56.5	147.2	44 13.3	+56.8	147.8	43 22.4	+57.0	148.3	42 31.2	+57.3	148.8	41 39.8	+57.5	149.2	40 48.1	+57.7	149.7	39 56.2	+57.9	150.1	39 04.1	+58.1	150.5	12
13	46 00.4	+56.4	146.8	45 10.1	+56.7	147.3	44 19.4	+57.0	147.8	43 28.5	+57.2	148.4	42 37.3	+57.4	148.8	41 45.8	+57.6	149.3	40 54.1	+57.8	149.7	40 02.2	+57.9	150.2	13
14	46 56.8	+56.3	146.3	46 06.8	+56.5	146.8	45 16.4	+56.8	147.4	44 25.7	+57.1	147.9	43 34.7	+57.3	148.4	42 43.4	+57.6	148.9	41 51.9	+57.7	149.4	41 00.1	+58.0	149.8	14
15	47 53.1	+56.1	145.8	47 03.3	+56.4	146.4	46 13.2	+56.7	146.9	45 22.8	+56.9	147.5	44 32.0	+57.2	148.0	43 41.0	+57.4	148.5	42 49.6	+57.7	149.0	41 58.1	+57.8	149.5	15
16	48 49.2	+56.0	145.2	47 59.7	+56.3	145.9	47 09.9	+56.6	146.5	46 19.7	+56.9	147.0	45 29.2	+57.1	147.6	44 38.4	+57.4	148.1	43 47.3	+57.6	148.6	42 55.9	+57.8	149.1	16
17	49 45.2	+55.8	144.7	48 56.0	+56.2	145.3	48 06.5	+56.4	146.0	47 16.6	+56.7	146.6	46 26.3	+57.0	147.2	45 35.8	+57.2	147.7	44 44.9	+57.5	148.3	43 53.7	+57.7	148.8	17
18	50 41.0	+55.6	144.1	49 52.2	+55.9	144.8	49 02.9	+56.4	145.5	48 13.3	+56.6	146.1	47 23.3	+57.0	146.7	46 33.0	+57.2	147.3	45 42.4	+57.4	147.9	44 51.4	+57.7	148.4	18
19	51 36.6	+55.4	143.5	50 48.1	+55.9	144.2	49 59.3	+56.1	144.9	49 09.9	+56.5	145.6	48 20.3	+56.7	146.2	47 30.2	+57.0	146.8	46 39.8	+57.3	147.4	45 49.1	+57.5	148.0	19
20	52 32.0	+55.3	142.9	51 44.0	+55.6	143.6	50 55.4	+56.0	144.4	50 06.4	+56.4	145.1	49 17.0	+56.7	145.7	48 27.2	+57.0	146.4	47 37.1	+57.2	147.0	46 46.6	+57.5	147.6	20
21	53 27.3	+55.0	142.2	52 39.6	+55.4	143.0	51 51.4	+55.8	143.8	51 02.8	+56.1	144.5	50 13.7	+56.5	145.2	49 24.2	+56.8	145.9	48 34.3	+57.1	146.5	47 44.1	+57.3	147.2	21
22	54 22.3	+54.8	141.5	53 35.0	+55.2	142.4	52 47.2	+55.7	143.2	51 58.9	+56.1	144.0	51 10.2	+56.4	144.7	50 21.0	+56.7	145.4	49 31.4	+57.0	146.1	48 41.4	+57.3	146.7	22
23	55 17.1	+54.5	140.8	54 30.2	+55.0	141.7	53 42.9	+55.4	142.6	52 55.0	+55.8	143.4	52 06.6	+56.2	144.2	51 17.7	+56.5	144.9	50 28.4	+56.9	145.6	49 38.7	+57.1	146.3	23
24	56 11.6	+54.2	140.1	55 25.2	+54.8	141.0	54 38.3	+55.2	141.9	53 50.8	+55.6	142.8	53 02.8	+56.0	143.6	52 14.2	+56.4	144.3	51 25.3	+56.7	145.1	50 35.8	+57.1	145.8	24
25	57 05.8	+53.9	139.3	56 20.0	+54.4	140.3	55 33.5	+55.0	141.2	54 46.4	+55.4	142.1	53 58.8	+55.8	143.0	53 10.6	+56.2	143.8	52 22.0	+56.5	144.6	51 32.9	+56.9	145.3	25
26	57 59.7	+53.6	138.5	57 14.4	+54.2	139.5	56 28.5	+54.7	140.5	55 41.8	+55.2	141.5	54 54.6	+55.6	142.3	54 06.8	+56.1	143.2	53 18.5	+56.5	144.0	52 29.8	+56.7	144.8	26
27	58 53.3	+53.3	137.6	58 08.6	+53.9	138.7	57 23.2	+54.4	139.8	56 37.0	+55.0	140.7	55 50.2	+55.5	141.7	55 02.9	+55.8	142.6	54 15.0	+56.2	143.4	53 26.5	+56.6	144.2	27
28	59 46.6	+52.8	136.7	59 02.5	+53.5	137.9	58 17.6	+54.1	139.0	57 32.0	+54.6	140.0	56 45.7	+55.1	141.0	55 58.7	+55.7	141.9	55 11.2	+56.1	142.8	54 23.1	+56.5	143.7	28
29	60 39.4	+52.4	135.8	59 56.0	+53.1	137.0	59 11.7	+53.8	138.1	58 26.6	+54.4	139.2	57 40.8	+54.9	140.3	56 54.4	+55.4	141.3	56 07.3	+55.8	142.2	55 19.6	+56.2	143.1	29
30	61 31.8	+52.0	134.8	60 49.1	+52.7	136.1	60 05.5	+53.4	137.3	59 21.0	+54.0	138.4	58 35.7	+54.7	139.5	57 49.8	+55.1	140.5	57 03.1	+55.6	141.5	56 15.8	+56.1	142.5	30
31	62 23.8	+51.4	133.7	61 41.8	+52.3	135.1	60 58.9	+53.0	136.3	60 15.0	+53.7	137.5	59 30.4	+54.3	138.7	58 44.9	+54.9	139.8	57 58.7	+55.4	140.8	57 11.9	+55.8	141.8	31
32	63 15.2	+50.9	132.6	62 34.1	+51.7	134.0	61 51.9	+52.5	135.4	61 08.7	+53.3	136.6	60 24.7	+53.9	137.8	59 39.8	+54.5	139.0	58 54.1	+55.1	140.1	58 07.7	+55.7	141.1	32
33	64 06.1	+50.2	131.4	63 25.8	+51.2	132.9	62 44.4	+52.1	134.3	62 02.0	+52.9	135.7	61 18.6	+53.6	137.0	60 34.3	+54.3	138.2	59 49.2	+54.9	139.3	59 03.4	+55.3	140.4	33
34	64 56.3	+49.6	130.1	64 17.0	+50.6	131.7	63 36.5	+51.5	133.2	62 54.9	+52.4	134.6	62 12.2	+53.2	136.0	61 28.6	+53.9	137.3	60 44.1	+54.5	138.5	59 58.7	+55.1	139.7	34
35	65 45.9	+48.8	128.8	65 07.6	+49.9	130.5	64 28.1	+50.9	132.0	63 47.3	+51.9	133.6	63 05.4	+52.7	135.0	62 22.5	+53.4	136.3	61 38.6	+54.2	137.6	60 53.8	+54.8	138.8	35
36	66 34.7	+47.9	127.3	65 57.5	+49.2	129.1	65 19.0	+50.3	130.8	64 39.2	+51.3	132.4	63 58.1	+52.2	133.9	63 15.9	+53.1	135.4	62 32.8	+53.7	136.7	61 48.6	+54.5	138.0	36
37	67 22.6	+47.0	125.8	66 46.7	+48.4	127.7	66 09.3	+49.6	129.5	65 30.5	+50.6	131.2	64 50.3	+51.7	132.8	64 09.0	+52.5	134.3	63 26.5	+53.4	135.7	62 43.1	+54.1	137.1	37
38	68 09.6	+46.0	124.1	67 35.1	+47.4	126.2	66 58.9	+48.7	128.1	66 21.1	+50.0	129.9	65 42.0	+51.0	131.6	65 01.5	+52.0	133.2	64 19.9	+52.9	134.7	63 37.2	+53.6	136.1	38
39	68 55.6	+44.7	122.4	68 22.5	+46.4	124.5	67 47.6	+47.8	126.5	67 11.1	+49.1	128.5	66 33.0	+50.4	130.3	65 53.5	+51.5	132.0	65 12.8	+52.4	133.6	64 30.8	+53.3	135.1	39
40	69 40.3	+43.5	120.5	69 08.9	+45.2	122.8	68 35.4	+46.9	124.9	68 00.2	+48.3	127.0	67 23.4	+49.5	128.9	66 45.0	+50.7	130.7	66 05.2	+51.7	132.4	65 24.1	+52.7	134.0	40
41	70 23.8	+42.1	118.5	69 54.1	+44.0	120.9	69 22.3	+45.7	123.2	68 48.5	+47.3	125.3	68 12.9	+48.7	127.4	67 35.7	+50.0	129.3	66 56.9	+51.2	131.1	66 16.8	+52.1	132.9	41
42	71 05.9	+40.4	116.3	70 38.1	+42.5	118.9	70 08.0	+44.4	121.3	69 35.8	+46.2	123.6	69 01.6	+47.8	125.8	68 25.7	+49.1	127.8	67 48.1	+50.4	129.8	67 08.9	+51.6	131.6	42
43	71 46.3	+38.6	114.0	71 20.6	+41.0	116.7	70 52.4	+43.1	119.3	70 22.0	+44.9	121.7	69 49.4	+46.6	124.1	69 14.8	+48.2	126.2	68 38.5	+49.6	128.3	68 00.5	+50.8	130.3	43
44	72 24.9	+36.7•	111.5	72 01.6	+39.1	114.4	71 35.5	+41.4	117.1	71 06.9	+43.5	119.7	70 36.0	+45.5	122.2	70 03.0	+47.2	124.5	69 28.1	+48.6	126.7	68 51.3	+50.0	128.8	44
45	73 01.6	+34.4•	108.8	72 40.7	+37.1•	111.9	72 16.9	+39.7	114.8	71 50.4	+42.0	117.6	71 21.5	+44.0	120.2	70 50.2	+45.9	122.7	70 16.7	+47.6	125.0	69 41.3	+49.1	127.3	45
46	73 36.0	+31.9•	106.0	73 17.8	+35.0•	109.2	72 56.6	+37.7•	112.3	72 32.4	+40.2	115.2	72 05.5	+42.5	118.0	71 36.1	+44.6	120.7	71 04.3	+46.5	123.2	70 30.4	+48.2	125.6	46
47	74 07.9	+29.2•	102.9	73 52.8	+32.4•	106.3	73 34.3	+35.4•	109.6	73 12.6	+38.2•	112.7	72 48.0	+40.8	115.7	72 20.7	+43.0	118.5	71 50.8	+45.1	121.2	71 18.6	+46.9	123.7	47
48	74 37.1	+26.2•	99.7	74 25.2	+29.7•	103.2	74 09.7	+33.0•	106.7	73 50.8	+36.0•	110.0	73 28.8	+38.7•	113.2	73 03.7	+41.3	116.2	72 35.9	+43.6	119.0	72 05.5	+45.7	121.8	48
49	75 03.3	+23.0•	96.3	74 54.9	+26.6•	99.9	74 42.7	+30.1•	103.6	74 26.8	+33.5•	107.1	74 07.5	+36.6•	110.4	73 45.0	+39.4•	113.6	73 19.5	+41.9	116.7	72 51.2	+44.1	119.6	49
50	75 26.3	+19.4•	92.6	75 21.5	+23.4•	96.5	75 12.8	+27.2•	100.2	75 00.3	+30.7•	103.9	74 44.1	+34.0•	107.5	74 24.4	+37.1•	110.9	74 01.4	+39.9•	114.2	73 35.3	+42.5	117.3	50
51	75 45.7	+15.7•	88.8	75 44.9	+19.8•	92.8	75 40.0	+23.7•	96.7	75 31.0	+27.6•	100.5	75 18.1	+31.2•	104.3	75 01.5	+34.5•	107.9	74 41.3	+37.7•	111.4	74 17.8	+40.5•	114.7	51
52	76 01.4	+11.7•	84.9	76 04.7	+15.9•	88.9	76 03.7	+20.1•	92.9	75 58.6	+24.2•	96.9	75 49.3	+28.1•	100.9	75 36.0	+31.8•	104.7	75 19.0	+35.1•	108.4	74 58.3	+38.3•	111.9	52
53	76 13.1	+7.5•	80.8	76 20.6	+11.8•	84.8	76 23.8	+16.2•	89.0	76 22.8	+20.4•	93.1	76 17.4	+24.6•	97.2	76 07.8	+28.6•	101.2	75 54.1	+32.4•	105.1	75 36.6	+35.8•	108.9	53
54	76 20.6	+3.2•	76.6	76 32.4	+7.6•	80.7	76 40.0	+12.0•	84.8	76 43.2	+16.5•	89.0	76 42.0	+20.9•	93.3	76 36.4	+25.1•	97.5	76 26.5	+29.1•	101.6	76 12.4	+32.9•	105.6	54
55	76 23.8	–1.0•	72.3	76 40.0	+3.2•	76.4	76 52.0	+7.7•	80.5	76 59.7	+12.2•	84.8	77 02.9	+16.7•	89.1	77 01.5	+21.2•	93.5	76 55.6	+25.5•	97.8	76 45.3	+29.6•	102.0	55
56	76 22.8	–5.4•	68.1	76 43.2	–1.2•	72.0	76 59.7	+3.2•	76.2	77 11.9	+7.7•	80.4	77 19.6	+12.4•	84.8	77 22.7	+17.0•	89.3	77 21.1	+21.6•	93.7	77 14.9	+26.1•	98.1	56
57	76 17.4	–9.6•	63.9	76 42.0	–5.6•	67.7	77 02.9	–1.4•	71.7	77 19.6	+3.1•	75.9	77 32.0	+7.7•	80.3	77 39.7	+12.6•	84.8	77 42.7	+17.4•	89.4	77 41.0	+22.0•	94.0	57
58	76 07.8	–13.7•	59.7	76 36.4	–9.9•	63.4	77 01.5	–5.9•	67.2	77 22.7	–1.6•	71.4	77 39.7	+3.0•	75.7	77 52.3	+7.8•	80.2	78 00.1	+12.7•	84.9	78 03.0	+17.6•	89.6	58
59	75 54.1	–17.5•	55.7	76 26.5	–14.1•	59.1	76 56.3	–10.2•	62.8	77 21.1	–6.2•	66.8	77 42.7	–1.7•	71.0	78 00.1	+2.9•	75.5	78 12.8	+7.8•	80.1	78 20.6	+12.9•	84.9	59
60	75 36.6	–21.2•	51.8	76 12.4	–18.1•	55.0	76 45.3	–14.6•	58.5	77 14.9	–10.7•	62.3	77 41.0	–6.6•	66.3	78 03.0	–2.0•	70.7	78 20.6	+2.8•	75.2	78 33.5	+7.9•	80.0	60
61	75 15.4	–24.6•	48.1	75 54.3	–21.8•	51.1	76 30.7	–18.6•	54.3	77 04.2	–15.1•	57.8	77 34.4	–11.2•	61.7	78 01.0	–6.9•	65.8	78 23.4	–2.3•	70.3	78 41.4	+2.6•	75.0	61
62	74 50.8	–27.7•	44.6	75 32.5	–25.2•	47.3	76 12.1	–22.4•	50.3	76 49.1	–19.2•	53.6	77 23.2	–15.6•	57.1	77 54.1	–11.7•	61.3	78 21.1	–7.3•	65.3	78 44.0	–2.5•	69.9	62
63	74 23.1	–30.6•	41.2	75 07.3	–28.3•	43.7	75 49.7	–25.8•	46.4	76 29.9	–23.0•	49.4	77 07.6	–19.8•	52.8	77 42.4	–16.2•	56.4	78 13.8	–12.2•	60.4	78 41.5	–7.8•	64.8	63
64	73 52.5	–33.2•	38.1	74 39.0	–31.3•	40.3	75 23.9	–29.0•	42.8	76 06.9	–26.5•	45.5	76 47.8	–23.7•	48.6	77 26.2	–20.5•	51.9	78 01.6	–16.8•	55.7	78 33.7	–12.7•	59.7	64
65	73 19.3	–35.6•	35.1	74 07.7	–33.8•	37.1	74 54.9	–31.9•	39.4	75 40.4	–29.7•	41.9	76 24.1	–27.2•	44.6	77 05.7	–24.4•	47.7	77 42.8	–21.2•	51.1	78 15.9	–17.6•	55.0	65
66	72 43.7	–37.6•	32.4	73 33.9	–36.2•	34.2	74 23.0	–34.5•	36.2	75 10.7	–32.6•	38.4	75 56.9	–30.4•	40.9	76 41.3	–27.9•	43.7	77 23.6	–25.1•	46.7	78 03.4	–21.9•	50.2	66
67	72 06.1	–39.6	29.8	72 57.7	–38.2•	31.4	73 48.5	–36.9•	33.2	74 38.1	–35.2•	35.2	75 26.5	–33.4•	37.4	76 13.4	–31.2•	39.9	76 58.5	–28.8•	42.6	77 41.5	–25.9•	45.7	67
68	71 26.5	–41.2	27.4	72 19.5	–40.2	28.8	73 11.6	–38.9	30.4	74 02.9	–37.5•	32.2	74 53.1	–35.9•	34.1	75 42.2	–34.1•	36.3	76 29.7	–32.0•	38.8	77 15.6	–29.6•	41.6	68
69	70 45.3	–42.8	25.1	71 39.3	–41.8	26.4	72 32.7	–40.7	27.8	73 25.4	–39.6	29.4	74 17.2	–38.2•	31.1	75 08.1	–36.7•	33.1	75 57.7	–34.9•	35.3	76 46.0	–32.9•	37.7	69
70	70 02.5	–44.1	23.0	70 57.5	–43.4	24.2	71 52.0	–42.5	25.4	72 45.8	–41.4	26.8	73 39.0	–40.2	28.3	74 31.4	–38.9•	30.1	75 22.8	–37.4•	32.0	76 13.1	–35.7•	34.1	70
71	69 18.4	–45.4	21.1	70 14.1	–44.6	22.1	71 09.5	–43.9	23.2	72 04.4	–43.0	24.4	72 58.8	–42.1	25.8	73 52.5	–41.0	27.3	74 45.4	–39.7•	28.9	75 37.4	–38.2•	30.8	71
72	68 33.0	–46.5	19.3	69 29.5	–45.9	20.2	70 25.6	–45.2	21.1	71 21.4	–44.5	22.2	72 16.7	–43.7	23.4	73 11.5	–42.7	24.7	74 05.7	–41.7	26.1	74 59.2	–40.5•	27.8	72
73	67 46.5	–47.5	17.6	68 43.6	–47.0	18.4	69 40.4	–46.4	19.2	70 36.9	–45.8	20.1	71 33.0	–45.1	21.2	72 28.8	–44.3	22.3	73 24.0	–43.4	23.6	74 18.7	–42.4	25.0	73
74	66 59.0	–48.3	16.0	67 56.6	–47.9	16.7	68 54.0	–47.5	17.4	69 51.1	–46.9	18.2	70 47.9	–46.3	19.1	71 44.5	–45.7	20.1	72 40.6	–44.9	21.2	73 36.3	–44.1	22.4	74
75	66 10.7	–49.2	14.5	67 08.7	–48.8	15.1	68 06.5	–48.4	15.7	69 04.2	–48.0	16.4	70 01.6	–47.5	17.2	70 58.8	–47.0	18.1	71 55.7	–46.4	19.0	72 52.2	–45.6	20.1	75
76	65 21.5	–49.9	13.1	66 19.9	–49.6	13.6	67 18.1	–49.2	14.2	68 16.2	–48.9	14.8	69 14.1	–48.4	15.5	70 11.8	–48.0	16.2	71 09.3	–47.5	17.0	72 06.6	–47.0	17.9	76
77	64 31.6	–50.6	11.8	65 30.3	–50.3	12.2	66 28.9	–50.1	12.7	67 27.3	–49.7	13.3	68 25.7	–49.4	13.8	69 23.8	–48.9	14.5	70 21.8	–48.5	15.2	71 19.6	–48.0	15.9	77
78	63 41.0	–51.1	10.6	64 40.0	–51.0	10.9	65 38.8	–50.7	11.4	66 37.6	–50.4	11.8	67 36.3	–50.2	12.3	68 34.9	–49.9	12.9	69 33.3	–49.5	13.4	70 31.6	–49.1	14.1	78
79	62 49.9	–51.7	9.4	63 49.0	–51.5	9.7	64 48.1	–51.3	10.1	65 47.2	–51.1	10.5	66 46.1	–50.8	10.9	67 45.0	–50.6	11.4	68 43.8	–50.3	11.9	69 42.5	–50.1	12.4	79
80	61 58.2	–52.2	8.3	62 57.5	–52.0	8.6	63 56.8	–51.8	8.9	64 56.1	–51.7	9.2	65 55.3	–51.5	9.6	66 54.4	–51.3	10.0	67 53.5	–51.1	10.4	68 52.4	–50.8	10.9	80
81	61 06.0	–52.7	7.3	62 05.5	–52.5	7.5	63 05.0	–52.4	7.8	64 04.4	–52.2	8.0	65 03.8	–52.1	8.3	66 03.1	–51.9	8.7	67 02.4	–51.7	9.0	68 01.6	–51.5	9.4	81
82	60 13.4	–53.1	6.3	61 13.0	–53.0	6.5	62 12.6	–52.8	6.7	63 12.2	–52.6	6.9	64 11.7	–52.6	7.2	65 11.2	–52.4	7.4	66 10.7	–52.3	7.7	67 10.1	–52.1	8.1	82
83	59 20.3	–53.4	5.4	60 20.0	–53.3	5.5	61 19.8	–53.3	5.7	62 19.4	–53.1	5.9	63 19.1	–53.0	6.1	64 18.8	–53.0	6.3	65 18.4	–52.8	6.5	66 18.0	–52.7	6.8	83
84	58 26.9	–53.8	4.5	59 26.7	–53.7	4.6	60 26.5	–53.6	4.7	61 26.3	–53.5	4.9	62 26.1	–53.5	5.1	63 25.8	–53.4	5.2	64 25.6	–53.3	5.4	65 25.3	–53.2	5.6	84
85	57 33.1	–54.1	3.6	58 33.0	–54.0	3.7	59 32.9	–54.0	3.9	60 32.7	–53.9	4.0	61 32.6	–53.9	4.1	62 32.4	–53.8	4.2	63 32.2	–53.7	4.4	64 32.1	–53.7	4.5	85
86	56 39.0	–54.3	2.8	57 39.0	–54.4	2.9	58 38.9	–54.3	3.0	59 38.8	–54.3	3.1	60 38.7	–54.2	3.2	61 38.6	–54.2	3.3	62 38.5	–54.1	3.4	63 38.4	–54.1	3.5	86
87	55 44.7	–54.7	2.1	56 44.6	–54.6	2.1	57 44.6	–54.6	2.2	58 44.5	–54.5	2.3	59 44.5	–54.6	2.3	60 44.4	–54.5	2.4	61 44.4	–54.5	2.5	62 44.3	–54.4	2.6	87
88	54 50.0	–54.9	1.4	55 50.0	–54.9	1.4	56 50.0	–54.9	1.4	57 50.0	–54.9	1.5	58 49.9	–54.8	1.5	59 49.9	–54.8	1.6	60 49.9	–54.8	1.6	61 49.9	–54.8	1.7	88
89	53 55.1	–55.1	0.7	54 55.1	–55.1	0.7	55 55.1	–55.1	0.7	56 55.1	–55.1	0.7	57 55.1	–55.1	0.7	58 55.1	–55.1	0.8	59 55.1	–55.1	0.8	60 55.1	–55.1	0.8	89
90	53 00.0	–55.3	0.0	54 00.0	–55.3	0.0	55 00.0	–55.3	0.0	56 00.0	–55.3	0.0	57 00.0	–55.4	0.0	58 00.0	–55.4	0.0	59 00.0	–55.4	0.0	60 00.0	–55.4	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 23°, 337°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	33 38.4	−57.6	152.0	32 45.3	−57.7	152.3	31 52.1	−57.9	152.6	30 58.8	−58.0	152.9	30 05.3	−58.1	153.2	29 11.7	−58.3	153.4	28 18.0	−58.4	153.7	27 24.2	−58.5	153.9	0
1	32 40.8	−57.6	152.3	31 47.6	−57.8	152.6	30 54.2	−57.9	152.9	30 00.8	−58.1	153.2	29 07.2	−58.3	153.4	28 13.4	−58.3	153.7	27 19.6	−58.5	153.9	26 25.7	−58.6	154.1	1
2	31 43.2	−57.7	152.7	30 49.8	−57.8	153.0	29 56.3	−58.0	153.2	29 02.7	−58.1	153.5	28 08.9	−58.2	153.7	27 15.1	−58.4	153.9	26 21.1	−58.4	154.2	25 27.1	−58.6	154.4	2
3	30 45.5	−57.7	153.0	29 52.0	−57.9	153.3	28 58.3	−58.0	153.5	28 04.6	−58.2	153.8	27 10.7	−58.3	154.0	26 16.7	−58.4	154.2	25 22.7	−58.5	154.4	24 28.5	−58.6	154.6	3
4	29 47.8	−57.8	153.3	28 54.1	−57.9	153.6	28 00.3	−58.0	153.8	27 06.4	−58.2	154.0	26 12.4	−58.3	154.3	25 18.3	−58.4	154.5	24 24.2	−58.6	154.7	23 29.9	−58.6	154.8	4
5	28 50.0	−57.8	153.6	27 56.2	−58.0	153.9	27 02.3	−58.1	154.1	26 08.2	−58.2	154.3	25 14.1	−58.3	154.5	24 19.9	−58.4	154.7	23 25.6	−58.5	154.9	22 31.3	−58.7	155.1	5
6	27 52.2	−57.9	153.9	26 58.2	−58.0	154.2	26 04.2	−58.1	154.4	25 10.0	−58.2	154.6	24 15.8	−58.4	154.8	23 21.5	−58.5	155.0	22 27.1	−58.6	155.1	21 32.6	−58.7	155.3	6
7	26 54.3	−57.9	154.2	26 00.2	−58.0	154.4	25 06.1	−58.2	154.6	24 11.8	−58.3	154.8	23 17.4	−58.3	155.0	22 23.0	−58.5	155.2	21 28.5	−58.6	155.4	20 33.9	−58.7	155.5	7
8	25 56.4	−57.9	154.5	25 02.2	−58.0	154.7	24 07.9	−58.2	154.9	23 13.5	−58.3	155.1	22 19.1	−58.4	155.3	21 24.5	−58.5	155.4	20 29.9	−58.6	155.6	19 35.2	−58.7	155.8	8
9	24 58.5	−58.0	154.8	24 04.2	−58.1	155.0	23 09.7	−58.2	155.2	22 15.2	−58.3	155.4	21 20.7	−58.5	155.5	20 26.0	−58.5	155.7	19 31.3	−58.6	155.8	18 36.5	−58.7	156.0	9
10	24 00.5	−58.0	155.1	23 06.1	−58.1	155.3	22 11.5	−58.2	155.5	21 16.9	−58.3	155.7	20 22.2	−58.4	155.8	19 27.5	−58.5	155.9	18 32.7	−58.6	156.1	17 37.8	−58.7	156.2	10
11	23 02.5	−58.0	155.4	22 08.0	−58.2	155.5	21 13.3	−58.2	155.7	20 18.6	−58.4	155.9	19 23.8	−58.5	156.0	18 29.0	−58.6	156.1	17 34.1	−58.7	156.3	16 39.1	−58.8	156.4	11
12	22 04.5	−58.0	155.6	21 09.8	−58.2	155.8	20 15.1	−58.3	156.0	19 20.2	−58.4	156.1	18 25.3	−58.4	156.2	17 30.4	−58.6	156.4	16 35.4	−58.7	156.5	15 40.3	−58.7	156.6	12
13	21 06.5	−58.1	155.9	20 11.6	−58.1	156.1	19 16.8	−58.3	156.2	18 21.8	−58.4	156.4	17 26.9	−58.5	156.5	16 31.8	−58.6	156.6	15 36.7	−58.7	156.7	14 41.6	−58.8	156.8	13
14	20 08.4	−58.1	156.2	19 13.5	−58.2	156.3	18 18.5	−58.3	156.5	17 23.4	−58.4	156.6	16 28.4	−58.6	156.7	15 33.2	−58.6	156.8	14 38.0	−58.7	156.9	13 42.8	−58.8	157.0	14
15	19 10.3	−58.1	156.4	18 15.3	−58.3	156.6	17 20.2	−58.4	156.7	16 25.0	−58.4	156.8	15 29.8	−58.5	156.9	14 34.6	−58.6	157.0	13 39.4	−58.8	157.1	12 44.0	−58.7	157.2	15
16	18 12.2	−58.2	156.7	17 17.0	−58.2	156.8	16 21.8	−58.3	157.0	15 26.6	−58.5	157.1	14 31.3	−58.5	157.2	13 36.0	−58.5	157.3	12 40.6	−58.7	157.4	11 45.3	−58.7	157.4	16
17	17 14.0	−58.1	157.0	16 18.8	−58.3	157.1	15 23.5	−58.4	157.2	14 28.2	−58.5	157.3	13 32.8	−58.6	157.4	12 37.4	−58.7	157.5	11 41.9	−58.7	157.6	10 46.5	−58.8	157.6	17
18	16 15.9	−58.2	157.2	15 20.5	−58.3	157.3	14 25.1	−58.4	157.4	13 29.7	−58.5	157.5	12 34.2	−58.5	157.6	11 38.7	−58.6	157.7	10 43.2	−58.7	157.8	9 47.7	−58.9	157.8	18
19	15 17.7	−58.2	157.5	14 22.2	−58.3	157.6	13 26.7	−58.3	157.7	12 31.2	−58.5	157.7	11 35.7	−58.6	157.8	11 35.7	−58.6	157.9	9 44.5	−58.8	158.0	8 48.8	−58.8	158.0	19
20	14 19.5	−58.2	157.7	13 23.9	−58.3	157.8	12 28.4	−58.4	157.9	11 32.7	−58.5	158.0	10 37.1	−58.6	158.1	9 41.4	−58.6	158.1	8 45.7	−58.7	158.2	7 50.0	−58.8	158.2	20
21	13 21.3	−58.3	158.0	12 25.6	−58.3	158.1	11 30.0	−58.5	158.1	10 34.2	−58.5	158.2	9 38.5	−58.6	158.3	8 42.8	−58.7	158.3	7 47.0	−58.8	158.4	6 51.2	−58.8	158.4	21
22	12 23.0	−58.2	158.2	11 27.3	−58.3	158.3	10 31.5	−58.4	158.4	9 35.7	−58.5	158.4	8 39.9	−58.6	158.5	7 44.1	−58.7	158.6	6 48.2	−58.7	158.6	5 52.4	−58.9	158.6	22
23	11 24.8	−58.3	158.5	10 29.0	−58.3	158.5	9 33.1	−58.4	158.6	8 37.2	−58.5	158.7	7 41.3	−58.6	158.7	6 45.4	−58.7	158.8	5 49.5	−58.8	158.8	4 53.5	−58.8	158.8	23
24	10 26.5	−58.2	158.7	9 30.6	−58.3	158.8	8 34.7	−58.5	158.8	7 38.7	−58.5	158.9	6 42.7	−58.6	158.9	5 46.7	−58.7	159.0	4 50.7	−58.7	159.0	3 54.7	−58.8	159.0	24
25	9 28.3	−58.3	159.0	8 32.3	−58.4	159.0	7 36.2	−58.4	159.1	6 40.2	−58.5	159.1	5 44.1	−58.6	159.2	4 48.0	−58.6	159.2	3 52.0	−58.8	159.2	2 55.9	−58.9	159.2	25
26	8 30.0	−58.3	159.2	7 33.9	−58.3	159.3	6 37.8	−58.5	159.3	5 41.7	−58.5	159.3	4 45.5	−58.6	159.4	3 49.4	−58.7	159.4	2 53.2	−58.8	159.4	1 57.0	−58.8	159.4	26
27	7 31.7	−58.3	159.4	6 35.5	−58.3	159.5	5 39.3	−58.4	159.5	4 43.1	−58.5	159.6	3 46.9	−58.6	159.6	2 50.7	−58.7	159.6	1 54.4	−58.8	159.6	0 58.2	−58.9	159.6	27
28	6 33.4	−58.3	159.7	5 37.2	−58.4	159.7	4 40.9	−58.5	159.7	3 44.6	−58.5	159.8	2 48.3	−58.7	159.8	1 52.0	−58.7	159.8	0 55.6	−58.7	159.8	0 00.7	+58.8	20.2	28
29	5 35.1	−58.3	159.9	4 38.8	−58.3	159.9	3 42.4	−58.5	160.0	2 46.0	−58.5	160.0	1 49.6	−58.6	160.0	0 53.3	−58.7	160.0	0 03.1	+58.8	20.0	0 59.5	+58.9	20.0	29
30	4 36.8	−58.3	160.2	3 40.4	−58.4	160.2	2 43.9	−58.4	160.2	1 47.5	−58.6	160.2	0 51.0	−58.6	160.2	0 05.4	+58.7	19.8	1 01.9	+58.8	19.8	1 58.4	+58.8	19.8	30
31	3 38.5	−58.3	160.4	2 42.0	−58.4	160.4	1 45.5	−58.5	160.4	0 48.9	−58.5	160.4	0 07.6	+58.7	19.6	1 04.1	+58.7	19.6	2 00.7	+58.7	19.6	2 57.2	+58.9	19.6	31
32	2 40.2	−58.3	160.6	1 43.6	−58.4	160.6	0 47.0	−58.5	160.6	0 09.6	+58.6	19.4	1 06.2	+58.7	19.4	2 02.8	+58.7	19.4	2 59.4	+58.8	19.4	3 56.0	+58.9	19.4	32
33	1 41.9	−58.3	160.9	0 45.2	−58.4	160.9	0 11.5	+58.5	19.1	1 08.2	+58.5	19.1	2 04.9	+58.6	19.1	3 01.5	+58.7	19.2	3 58.2	+58.8	19.2	4 54.9	+58.8	19.2	33
34	0 43.6	−58.3	161.1	0 13.2	+58.4	18.9	1 10.0	+58.4	18.9	2 06.7	+58.6	18.9	3 03.5	+58.6	18.9	4 00.2	+58.7	18.9	4 57.0	+58.7	19.0	5 53.7	+58.8	19.0	34
35	0 14.7	+58.4	18.7	1 11.6	+58.4	18.7	2 08.4	+58.5	18.7	3 05.3	+58.5	18.7	4 02.1	+58.6	18.7	4 58.9	+58.7	18.7	5 55.7	+58.8	18.8	6 52.5	+58.9	18.8	35
36	1 13.1	+58.3	18.4	2 10.0	+58.4	18.4	3 06.9	+58.4	18.5	4 03.8	+58.6	18.5	5 00.7	+58.6	18.5	5 57.6	+58.7	18.5	6 54.5	+58.7	18.6	7 51.4	+58.8	18.6	36
37	2 11.4	+58.3	18.2	3 08.4	+58.4	18.2	4 05.4	+58.4	18.2	5 02.4	+58.5	18.3	5 59.3	+58.6	18.3	6 56.3	+58.7	18.3	7 53.2	+58.8	18.4	8 50.2	+58.8	18.4	37
38	3 09.7	+58.3	18.0	4 06.8	+58.4	18.0	5 03.8	+58.5	18.0	6 00.9	+58.5	18.0	6 57.9	+58.6	18.1	7 55.0	+58.6	18.1	8 52.0	+58.7	18.2	9 49.0	+58.8	18.2	38
39	4 08.0	+58.3	17.7	5 05.2	+58.3	17.7	6 02.3	+58.4	17.8	6 59.4	+58.5	17.8	7 56.5	+58.6	17.9	8 53.6	+58.7	17.9	9 50.7	+58.8	18.0	10 47.8	+58.8	18.0	39
40	5 06.3	+58.3	17.5	6 03.5	+58.4	17.5	7 00.7	+58.5	17.6	7 57.9	+58.6	17.6	8 55.1	+58.6	17.6	9 52.3	+58.7	17.7	10 49.5	+58.7	17.7	11 46.6	+58.8	17.8	40
41	6 04.6	+58.3	17.3	7 01.9	+58.4	17.3	7 59.2	+58.4	17.3	8 56.5	+58.5	17.4	9 53.7	+58.6	17.4	10 51.0	+58.6	17.5	11 48.2	+58.7	17.5	12 45.4	+58.8	17.6	41
42	7 02.9	+58.3	17.0	8 00.3	+58.3	17.1	8 57.6	+58.5	17.1	9 55.0	+58.5	17.1	10 52.3	+58.6	17.2	11 49.6	+58.6	17.3	12 46.9	+58.7	17.3	13 44.2	+58.7	17.4	42
43	8 01.2	+58.3	16.8	8 58.6	+58.4	16.8	9 56.1	+58.4	16.9	10 53.5	+58.5	16.9	11 52.0	+58.4	17.0	12 48.2	+58.7	17.0	13 45.6	+58.7	17.1	14 42.9	+58.8	17.2	43
44	8 59.5	+58.2	16.5	9 57.0	+58.3	16.6	10 54.5	+58.4	16.6	11 52.0	+58.4	16.7	12 49.4	+58.6	16.8	13 46.9	+58.6	16.8	14 44.3	+58.7	16.9	15 41.7	+58.7	17.0	44
45	9 57.7	+58.3	16.3	10 55.3	+58.3	16.3	11 52.9	+58.4	16.4	12 50.4	+58.5	16.5	13 48.0	+58.5	16.5	14 45.5	+58.6	16.6	15 43.0	+58.6	16.7	16 40.4	+58.8	16.8	45
46	10 56.0	+58.3	16.0	11 53.7	+58.3	16.1	12 51.3	+58.4	16.2	13 48.9	+58.5	16.2	14 46.5	+58.5	16.3	15 44.1	+58.6	16.4	16 41.6	+58.7	16.5	17 39.2	+58.7	16.5	46
47	11 54.3	+58.2	15.8	12 52.0	+58.3	15.9	13 49.7	+58.4	15.9	14 47.4	+58.4	16.0	15 45.0	+58.5	16.1	16 42.7	+58.5	16.2	17 40.3	+58.6	16.2	18 37.9	+58.7	16.3	47
48	12 52.5	+58.2	15.6	13 50.3	+58.3	15.6	14 48.1	+58.3	15.7	15 45.8	+58.4	15.8	16 43.5	+58.5	15.8	17 41.2	+58.6	15.9	18 38.9	+58.7	16.0	19 36.6	+58.7	16.1	48
49	13 50.7	+58.2	15.3	14 48.6	+58.2	15.4	15 46.4	+58.4	15.4	16 44.2	+58.4	15.5	17 42.0	+58.4	15.6	18 39.8	+58.5	15.7	19 37.6	+58.6	15.8	20 35.3	+58.6	15.9	49
50	14 48.9	+58.2	15.1	15 46.8	+58.3	15.1	16 44.8	+58.3	15.2	17 42.6	+58.4	15.3	18 40.5	+58.5	15.4	19 38.3	+58.6	15.5	20 36.2	+58.6	15.6	21 33.9	+58.7	15.7	50
51	15 47.1	+58.2	14.8	16 45.1	+58.2	14.9	17 43.1	+58.3	15.0	18 41.0	+58.4	15.0	19 39.0	+58.4	15.1	20 36.9	+58.5	15.2	21 34.7	+58.6	15.3	22 32.6	+58.6	15.4	51
52	16 45.3	+58.1	14.5	17 43.3	+58.3	14.6	18 41.4	+58.3	14.7	19 39.4	+58.4	14.8	20 37.4	+58.4	14.9	21 35.4	+58.5	15.0	22 33.3	+58.6	15.1	23 31.2	+58.6	15.2	52
53	17 43.4	+58.2	14.3	18 41.6	+58.2	14.4	19 39.7	+58.2	14.6	20 37.8	+58.3	14.6	21 36.1	+58.4	14.6	22 34.2	+58.4	14.8	23 31.9	+58.5	14.9	24 29.8	+58.6	15.0	53
54	18 41.6	+58.1	14.0	19 43.8	+58.1	14.1	20 37.9	+58.3	14.2	21 36.1	+58.3	14.3	22 34.2	+58.4	14.4	23 32.3	+58.4	14.5	24 30.4	+58.5	14.6	25 28.4	+58.6	14.7	54
55	19 39.7	+58.1	13.8	20 37.9	+58.2	13.9	21 36.2	+58.2	13.9	22 34.4	+58.3	14.0	23 32.6	+58.3	14.2	24 30.8	+58.4	14.3	25 28.9	+58.5	14.4	26 27.0	+58.5	14.5	55
56	20 37.8	+58.0	13.5	21 36.1	+58.1	13.6	22 34.4	+58.2	13.7	23 32.7	+58.2	13.8	24 30.9	+58.4	13.9	25 29.2	+58.4	14.0	26 27.4	+58.4	14.1	27 25.5	+58.6	14.3	56
57	21 35.8	+58.1	13.2	22 34.2	+58.1	13.3	23 32.6	+58.2	13.4	24 30.9	+58.3	13.5	25 29.3	+58.3	13.6	26 27.6	+58.3	13.8	27 25.8	+58.4	13.9	28 24.1	+58.4	14.0	57
58	22 33.9	+58.0	13.0	23 32.3	+58.1	13.1	24 30.8	+58.1	13.2	25 29.2	+58.2	13.3	26 27.6	+58.2	13.4	27 25.9	+58.3	13.5	28 24.2	+58.3	13.6	29 22.5	+58.5	13.7	58
59	23 31.9	+57.9	12.7	24 30.4	+58.0	12.8	25 28.9	+58.1	12.9	26 27.4	+58.1	13.0	27 25.8	+58.3	13.1	28 24.2	+58.3	13.2	29 22.6	+58.4	13.4	30 21.0	+58.4	13.5	59
60	24 29.8	+57.9	12.4	25 28.4	+58.0	12.5	26 27.0	+58.1	12.6	27 25.5	+58.2	12.7	28 24.1	+58.2	12.8	29 22.5	+58.3	13.0	30 21.0	+58.3	13.1	31 19.4	+58.4	13.2	60
61	25 27.8	+57.9	12.1	26 26.4	+58.0	12.2	27 25.1	+58.0	12.3	28 23.7	+58.1	12.4	29 22.3	+58.1	12.6	30 20.8	+58.2	12.7	31 19.3	+58.3	12.8	32 17.8	+58.4	13.0	61
62	26 25.7	+57.8	11.8	27 24.4	+58.0	11.9	28 23.1	+58.0	12.0	29 21.8	+58.0	12.2	30 20.4	+58.2	12.3	31 19.0	+58.2	12.4	32 17.6	+58.3	12.5	33 16.2	+58.3	12.7	62
63	27 23.6	+57.8	11.5	28 22.4	+57.9	11.6	29 21.1	+58.0	11.7	30 19.8	+58.1	11.9	31 18.6	+58.0	12.0	32 17.2	+58.2	12.1	33 15.9	+58.2	12.2	34 14.5	+58.3	12.4	63
64	28 21.4	+57.8	11.2	29 20.3	+57.8	11.3	30 19.1	+57.9	11.4	31 17.9	+58.0	11.6	32 16.6	+58.1	11.7	33 15.4	+58.1	11.8	34 14.1	+58.2	12.0	35 12.8	+58.2	12.1	64
65	29 19.2	+57.8	10.9	30 18.1	+57.8	11.0	31 17.0	+57.9	11.1	32 15.9	+57.9	11.3	33 14.7	+58.0	11.4	34 13.5	+58.1	11.5	35 12.3	+58.1	11.7	36 11.0	+58.2	11.8	65
66	30 17.0	+57.7	10.6	31 15.9	+57.8	10.7	32 14.9	+57.8	10.8	33 13.8	+57.9	11.0	34 12.7	+57.9	11.1	35 11.6	+58.0	11.2	36 10.4	+58.1	11.4	37 09.2	+58.1	11.5	66
67	31 14.7	+57.6	10.3	32 13.7	+57.7	10.4	33 12.7	+57.8	10.5	34 11.7	+57.8	10.6	35 10.6	+57.9	10.8	36 09.6	+57.9	10.9	37 08.5	+58.0	11.0	38 07.4	+58.0	11.2	67
68	32 12.3	+57.6	10.0	33 11.4	+57.7	10.1	34 10.5	+57.7	10.2	35 09.5	+57.8	10.3	36 08.5	+57.9	10.4	37 07.5	+58.0	10.6	38 06.5	+58.0	10.7	39 05.4	+58.1	10.9	68
69	33 09.9	+57.6	9.6	34 09.1	+57.6	9.7	35 08.2	+57.7	9.9	36 07.3	+57.8	10.0	37 06.4	+57.8	10.1	38 05.5	+57.8	10.2	39 04.5	+57.9	10.4	40 03.5	+58.0	10.5	69
70	34 07.5	+57.5	9.3	35 06.7	+57.6	9.4	36 05.9	+57.6	9.5	37 05.1	+57.6	9.6	38 04.2	+57.7	9.8	39 03.3	+57.8	9.9	40 02.4	+57.9	10.1	41 01.5	+57.9	10.2	70
71	35 05.0	+57.4	8.9	36 04.3	+57.5	9.1	37 03.5	+57.6	9.2	38 02.7	+57.6	9.3	39 01.9	+57.7	9.4	40 01.1	+57.7	9.6	41 00.3	+57.8	9.7	41 59.4	+57.9	9.9	71
72	36 02.4	+57.4	8.6	37 01.8	+57.4	8.7	38 01.1	+57.5	8.8	39 00.3	+57.6	8.9	39 59.6	+57.6	9.1	40 58.8	+57.7	9.2	41 58.1	+57.7	9.3	42 57.3	+57.7	9.5	72
73	36 59.8	+57.3	8.2	37 59.2	+57.4	8.3	38 58.6	+57.4	8.5	39 57.9	+57.5	8.6	40 57.2	+57.5	8.7	41 56.5	+57.6	8.8	42 55.8	+57.7	9.0	43 55.0	+57.8	9.1	73
74	37 57.1	+57.3	7.9	38 56.6	+57.2	8.0	39 56.0	+57.3	8.1	40 55.4	+57.4	8.2	41 54.7	+57.5	8.3	42 54.1	+57.5	8.5	43 53.4	+57.6	8.6	44 52.8	+57.6	8.7	74
75	38 54.4	+57.1	7.5	39 53.8	+57.2	7.7	40 53.3	+57.3	7.7	41 52.8	+57.3	7.8	42 52.2	+57.4	7.9	43 51.6	+57.4	8.1	44 51.0	+57.5	8.3	45 50.4	+57.5	8.3	75
76	39 51.5	+57.1	7.1	40 51.0	+57.2	7.2	41 50.6	+57.1	7.3	42 50.1	+57.2	7.4	43 49.6	+57.3	7.5	44 49.0	+57.4	7.7	45 48.5	+57.4	7.8	46 47.9	+57.5	7.9	76
77	40 48.6	+57.0	6.7	41 48.2	+57.0	6.8	42 47.7	+57.1	6.9	43 47.3	+57.1	7.0	44 46.9	+57.1	7.1	45 46.4	+57.2	7.2	46 45.9	+57.3	7.4	47 45.4	+57.4	7.5	77
78	41 45.6	+56.9	6.3	42 45.2	+57.0	6.4	43 44.8	+57.0	6.5	44 44.4	+57.1	6.6	45 44.0	+57.1	6.7	46 43.6	+57.2	6.8	47 43.2	+57.2	7.0	48 42.8	+57.2	7.1	78
79	42 42.5	+56.8	5.8	43 42.2	+56.8	5.9	44 41.8	+56.9	6.0	45 41.5	+56.9	6.1	46 41.1	+57.0	6.2	47 40.8	+57.0	6.4	48 40.4	+57.1	6.5	49 40.0	+57.2	6.6	79
80	43 39.3	+56.6	5.4	44 39.0	+56.7	5.5	45 38.7	+56.8	5.6	46 38.4	+56.8	5.7	47 38.1	+56.9	5.8	48 37.8	+56.9	5.9	49 37.5	+57.0	6.0	50 37.2	+57.0	6.1	80
81	44 35.9	+56.6	4.9	45 35.7	+56.6	5.0	46 35.5	+56.6	5.1	47 35.2	+56.6	5.2	48 35.0	+56.7	5.3	49 34.7	+56.8	5.3	50 34.5	+56.8	5.6	51 34.2	+56.9	5.6	81
82	45 32.5	+56.5	4.5	46 32.3	+56.5	4.5	47 32.1	+56.6	4.6	48 32.0	+56.5	4.7	49 31.7	+56.7	4.8	50 31.5	+56.7	4.9	51 31.3	+56.7	5.0	52 31.1	+56.7	5.1	82
83	46 29.0	+56.3	4.0	47 28.8	+56.4	4.0	48 28.7	+56.4	4.1	49 28.5	+56.5	4.2	50 28.4	+56.4	4.3	51 28.2	+56.5	4.4	52 28.0	+56.6	4.5	53 27.8	+56.6	4.6	83
84	47 25.3	+56.2	3.5	48 25.2	+56.2	3.6	49 25.1	+56.2	3.6	50 25.0	+56.2	3.7	51 24.8	+56.4	3.8	52 24.7	+56.4	3.8	53 24.6	+56.4	3.9	54 24.4	+56.5	4.0	84
85	48 21.5	+56.0	2.9	49 21.4	+56.1	3.0	50 21.3	+56.1	3.1	51 21.2	+56.2	3.1	52 21.2	+56.1	3.2	53 21.1	+56.1	3.3	54 21.0	+56.2	3.3	55 20.9	+56.2	3.4	85
86	49 17.5	+55.9	2.4	50 17.5	+55.9	2.4	51 17.4	+56.0	2.5	52 17.4	+55.9	2.6	53 17.3	+56.0	2.6	54 17.2	+56.1	2.7	55 17.2	+56.0	2.7	56 17.1	+56.1	2.8	86
87	50 13.4	+55.7	1.8	51 13.4	+55.7	1.9	52 13.4	+55.7	1.9	53 13.3	+55.8	2.0	54 13.3	+55.8	2.0	55 13.3	+55.8	2.1	56 13.2	+55.8	2.1	57 13.2	+55.8	2.2	87
88	51 09.1	+55.6	1.2	52 09.1	+55.6	1.3	53 09.1	+55.6	1.3	54 09.1	+55.6	1.3	55 09.1	+55.5	1.4	56 09.1	+55.5	1.4	57 09.0	+55.6	1.4	58 09.0	+55.6	1.5	88
89	52 04.7	+55.3	0.6	53 04.7	+55.3	0.7	54 04.7	+55.3	0.7	55 04.7	+55.3	0.7	56 04.6	+55.4	0.7	57 04.6	+55.4	0.7	58 04.6	+55.4	0.7	59 04.6	+55.4	0.8	89
90	53 00.0	+55.1	0.0	54 00.0	+55.1	0.0	55 00.0	+55.1	0.0	56 00.0	+55.1	0.0	57 00.0	+55.1	0.0	58 00.0	+55.1	0.0	59 00.0	+55.1	0.0	60 00.0	+55.1	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
         { L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 157°, 203°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	33 21.1	+57.4	150.9	32 28.7	+57.5	151.2	31 36.0	+57.7	151.5	30 43.2	+57.9	151.8	29 50.3	+58.0	152.0	28 57.2	+58.2	152.3	28 04.0	+58.3	152.6	27 10.7	+58.4	152.8	0
1	34 18.5	+57.2	150.5	33 26.2	+57.4	150.8	32 33.7	+57.6	151.1	31 41.1	+57.8	151.5	30 48.3	+57.9	151.7	29 55.4	+58.1	152.0	29 02.3	+58.3	152.3	28 09.1	+58.4	152.5	1
2	35 15.7	+57.3	150.1	34 23.6	+57.4	150.5	33 31.3	+57.6	150.8	32 38.9	+57.7	151.1	31 46.2	+57.9	151.4	30 53.5	+58.0	151.7	30 00.6	+58.2	152.0	29 07.5	+58.3	152.3	2
3	36 13.0	+57.1	149.8	35 21.0	+57.3	150.1	34 28.9	+57.5	150.5	33 36.6	+57.7	150.8	32 44.1	+57.9	151.1	31 51.5	+58.0	151.4	30 58.8	+58.1	151.7	30 05.8	+58.3	152.0	3
4	37 10.1	+57.0	149.4	36 18.3	+57.3	149.8	35 26.4	+57.5	150.1	34 34.3	+57.6	150.5	33 42.0	+57.8	150.8	32 49.5	+58.0	151.1	31 56.9	+58.1	151.4	31 04.1	+58.3	151.7	4
5	38 07.1	+57.0	149.0	37 15.6	+57.2	149.4	36 23.9	+57.4	149.8	35 31.9	+57.6	150.1	34 39.8	+57.8	150.5	33 47.5	+57.9	150.8	32 55.0	+58.1	151.1	32 02.4	+58.2	151.4	5
6	39 04.1	+56.9	148.6	38 12.8	+57.1	149.0	37 21.3	+57.3	149.4	36 29.5	+57.5	149.8	35 37.6	+57.7	150.2	34 45.4	+57.9	150.5	33 53.1	+58.1	150.8	33 00.6	+58.2	151.2	6
7	40 01.0	+56.8	148.2	39 09.9	+57.1	148.6	38 18.6	+57.2	149.0	37 27.0	+57.5	149.4	36 35.3	+57.6	149.8	35 43.3	+57.8	150.2	34 51.2	+57.9	150.5	33 58.8	+58.2	150.9	7
8	40 57.8	+56.7	147.8	40 07.0	+56.9	148.2	39 15.8	+57.2	148.7	38 24.5	+57.4	149.1	37 32.9	+57.6	149.5	36 41.1	+57.8	149.9	35 49.1	+58.0	150.2	34 57.0	+58.1	150.6	8
9	41 54.5	+56.7	147.3	41 03.9	+56.9	147.8	40 13.0	+57.1	148.3	39 21.9	+57.3	148.7	38 30.5	+57.5	149.1	37 38.9	+57.7	149.5	36 47.1	+57.9	149.9	35 55.1	+58.0	150.3	9
10	42 51.2	+56.5	146.9	42 00.8	+56.7	147.4	41 10.1	+57.0	147.9	40 19.2	+57.2	148.3	39 28.0	+57.4	148.7	38 36.6	+57.6	149.2	37 45.0	+57.8	149.6	36 53.1	+58.0	149.9	10
11	43 47.7	+56.3	146.4	42 57.5	+56.7	146.9	42 07.1	+56.9	147.4	41 16.4	+57.1	147.9	40 25.4	+57.4	148.4	39 34.2	+57.6	148.8	38 42.8	+57.8	149.2	37 51.1	+58.0	149.6	11
12	44 44.0	+56.3	145.9	43 54.2	+56.5	146.5	43 04.0	+56.8	147.0	42 13.5	+57.1	147.5	41 22.8	+57.3	148.0	40 31.8	+57.5	148.4	39 40.6	+57.7	148.9	38 49.1	+57.9	149.3	12
13	45 40.3	+56.1	145.4	44 50.7	+56.4	146.0	44 00.8	+56.7	146.6	43 10.6	+56.9	147.1	42 20.1	+57.2	147.6	41 29.3	+57.4	148.1	40 38.3	+57.6	148.5	39 47.0	+57.8	149.0	13
14	46 36.4	+56.0	144.9	45 47.1	+56.3	145.5	44 57.5	+56.6	146.1	44 07.5	+56.9	146.6	43 17.3	+57.1	147.2	42 26.7	+57.4	147.7	41 35.9	+57.5	148.1	40 44.8	+57.8	148.6	14
15	47 32.4	+55.9	144.4	46 43.4	+56.2	145.0	45 54.1	+56.5	145.6	45 04.4	+56.8	146.2	44 14.4	+57.0	146.7	43 24.1	+57.2	147.3	42 33.4	+57.5	147.8	41 42.6	+57.7	148.2	15
16	48 28.3	+55.6	143.9	47 39.6	+56.0	144.5	46 50.6	+56.3	145.1	46 01.2	+56.6	145.7	45 11.4	+56.9	146.3	44 21.3	+57.2	146.9	43 30.9	+57.4	147.4	42 40.3	+57.6	147.9	16
17	49 23.9	+55.6	143.3	48 35.6	+55.9	144.0	47 46.9	+56.2	144.6	46 57.8	+56.5	145.3	46 08.3	+56.8	145.9	45 18.5	+57.0	146.4	44 28.3	+57.3	147.0	43 37.9	+57.5	147.5	17
18	50 19.5	+55.3	142.7	49 31.5	+55.7	143.4	48 43.1	+56.0	144.1	47 54.3	+56.4	144.8	47 05.1	+56.7	145.4	46 15.5	+57.0	146.0	45 25.6	+57.3	146.6	44 35.4	+57.5	147.1	18
19	51 14.8	+55.1	142.1	50 27.2	+55.5	142.8	49 39.1	+55.9	143.6	48 50.7	+56.2	144.2	48 01.8	+56.5	144.9	47 12.5	+56.8	145.5	46 22.9	+57.1	146.1	45 32.9	+57.3	146.7	19
20	52 09.9	+54.9	141.5	51 22.7	+55.3	142.2	50 35.0	+55.7	143.0	49 46.9	+56.1	143.7	48 58.3	+56.4	144.4	48 09.3	+56.8	145.0	47 20.0	+57.0	145.7	46 30.2	+57.3	146.3	20
21	53 04.8	+54.7	140.8	52 18.0	+55.1	141.6	51 30.7	+55.6	142.4	50 43.0	+55.9	143.2	49 54.7	+56.3	143.9	49 06.1	+56.5	144.6	48 17.0	+56.9	145.2	47 27.5	+57.2	145.8	21
22	53 59.5	+54.4	140.1	53 13.1	+54.9	141.0	52 26.3	+55.3	141.8	51 38.9	+55.7	142.6	50 51.0	+56.1	143.3	50 02.6	+56.5	144.0	49 13.9	+56.7	144.7	48 24.7	+57.0	145.4	22
23	54 53.9	+54.1	139.4	54 08.0	+54.7	140.3	53 21.6	+55.1	141.1	52 34.6	+55.6	142.0	51 47.1	+55.9	142.8	50 59.1	+56.3	143.5	50 10.6	+56.7	144.2	49 21.7	+57.0	144.9	23
24	55 48.0	+53.9	138.6	55 02.7	+54.4	139.6	54 16.7	+54.9	140.5	53 30.2	+55.3	141.3	52 43.0	+55.8	142.2	51 55.4	+56.1	143.0	51 07.3	+56.5	143.7	50 18.7	+56.8	144.4	24
25	56 41.9	+53.6	137.8	55 57.1	+54.1	138.8	55 11.6	+54.6	139.8	54 25.5	+55.1	140.7	53 38.8	+55.5	141.5	52 51.5	+56.0	142.4	52 03.8	+56.3	143.1	51 15.5	+56.7	143.9	25
26	57 35.5	+53.2	137.0	56 51.2	+53.8	138.0	56 06.2	+54.4	139.0	55 20.6	+54.9	140.0	54 34.3	+55.4	140.9	53 47.5	+55.7	141.8	53 00.1	+56.1	142.6	52 12.2	+56.5	143.4	26
27	58 28.7	+52.8	136.1	57 45.0	+53.5	137.2	57 00.6	+54.1	138.3	56 15.5	+54.6	139.3	55 29.7	+55.1	140.2	54 43.2	+55.6	141.1	53 56.2	+56.0	142.0	53 08.7	+56.4	142.8	27
28	59 21.5	+52.4	135.2	58 38.5	+53.1	136.4	57 54.7	+53.7	137.5	57 10.1	+54.3	138.5	56 24.8	+54.8	139.5	55 38.8	+55.3	140.5	54 52.2	+55.8	141.4	54 05.1	+56.1	142.2	28
29	60 13.9	+52.0	134.2	59 31.6	+52.7	135.5	58 48.4	+53.4	136.6	58 04.4	+54.0	137.7	57 19.6	+54.6	138.8	56 34.1	+55.1	139.8	55 48.0	+55.6	140.7	55 01.2	+56.0	141.6	29
30	61 05.9	+51.5	133.2	60 24.3	+52.3	134.5	59 41.8	+53.0	135.7	58 58.4	+53.7	136.9	58 14.2	+54.3	138.0	57 29.2	+54.9	139.1	56 43.6	+55.3	140.1	55 57.2	+55.8	141.0	30
31	61 57.4	+50.9	132.1	61 16.6	+51.8	133.5	60 34.8	+52.6	134.8	59 52.1	+53.3	136.0	59 08.5	+53.9	137.2	58 24.1	+54.5	138.3	57 38.9	+55.1	139.3	56 53.0	+55.6	140.3	31
32	62 48.3	+50.4	131.0	62 08.4	+51.3	132.4	61 27.4	+52.1	133.8	60 45.4	+52.9	135.1	60 02.4	+53.6	136.3	59 18.6	+54.2	137.5	58 34.0	+54.8	138.6	57 48.6	+55.3	139.6	32
33	63 38.7	+49.7	129.8	62 59.7	+50.7	131.3	62 19.5	+51.6	132.7	61 38.2	+52.5	134.1	60 56.0	+53.2	135.4	60 12.8	+53.9	136.6	59 28.8	+54.5	137.8	58 43.9	+55.1	138.9	33
34	64 28.4	+49.0	128.5	63 50.4	+50.1	130.1	63 11.1	+51.1	131.6	62 30.7	+52.0	133.1	61 49.2	+52.8	134.4	61 06.7	+53.5	135.7	60 23.3	+54.2	137.0	59 39.0	+54.8	138.1	34
35	65 17.4	+48.2	127.2	64 40.5	+49.4	128.8	64 02.2	+50.4	130.4	63 22.7	+51.4	132.0	62 42.0	+52.3	133.4	62 00.2	+53.1	134.8	61 17.5	+53.8	136.1	60 33.8	+54.4	137.3	35
36	66 05.6	+47.4	125.7	65 29.9	+48.6	127.5	64 52.6	+49.8	129.2	64 14.1	+50.8	130.8	63 34.3	+51.7	132.3	62 53.3	+52.6	133.8	62 11.3	+53.4	135.1	61 28.2	+54.2	136.5	36
37	66 53.0	+46.4	124.2	66 18.5	+47.8	126.1	65 42.4	+49.1	127.9	65 04.9	+50.2	129.6	64 26.0	+51.2	131.2	63 45.9	+52.1	132.7	63 04.7	+52.9	134.2	62 22.4	+53.7	135.5	37
38	67 39.4	+45.4	122.5	67 06.3	+46.8	124.5	66 31.5	+48.2	126.4	65 55.1	+49.4	128.2	65 17.2	+50.6	129.9	64 38.0	+51.6	131.6	63 57.6	+52.5	133.1	63 16.1	+53.3	134.6	38
39	68 24.8	+44.2	120.8	67 53.1	+45.8	122.9	67 19.7	+47.2	124.9	66 44.5	+48.6	126.8	66 07.8	+49.8	128.6	65 29.6	+51.0	130.4	64 50.1	+51.9	132.0	64 09.4	+52.8	133.5	39
40	69 09.0	+42.9	118.9	68 38.9	+44.7	121.2	68 06.9	+46.3	123.3	67 33.1	+47.8	125.3	66 57.6	+49.1	127.2	66 20.6	+50.2	129.1	65 42.0	+51.4	130.8	65 02.2	+52.3	132.4	40
41	69 51.9	+41.4	116.9	69 23.6	+43.4	119.3	68 53.2	+45.1	121.5	68 20.9	+46.7	123.7	67 46.7	+48.2	125.7	67 10.8	+49.5	127.7	66 33.4	+50.5	129.5	65 54.5	+51.7	131.2	41
42	70 33.3	+39.8	114.8	70 07.0	+41.9	117.3	69 38.3	+43.9	119.7	69 07.6	+45.6	122.0	68 34.9	+47.1	124.1	68 00.3	+48.6	126.2	67 24.0	+50.0	128.1	66 46.2	+51.1	130.0	42
43	71 13.1	+38.1	112.5	70 48.9	+40.3	115.1	70 22.2	+42.4	117.7	69 53.2	+44.3	120.1	69 22.0	+46.1	122.4	68 48.9	+47.7	124.6	68 14.0	+49.0	126.7	67 37.3	+50.3	128.6	43
44	71 51.2	+36.1•	110.0	71 29.2	+38.6	112.9	71 04.6	+40.9	115.5	70 37.5	+43.1	118.1	70 08.1	+44.9	120.6	69 36.6	+46.6	122.9	69 03.0	+48.2	125.1	68 27.6	+49.6	127.2	44
45	72 27.3	+33.9•	107.4	72 07.8	+36.6•	110.4	71 45.5	+39.1	113.3	71 20.5	+41.4	116.0	70 53.0	+43.5	118.6	70 23.2	+45.3	121.0	69 51.2	+47.0	123.4	69 17.2	+48.6	125.6	45
46	73 01.2	+31.4•	104.7	72 44.4	+34.4•	107.8	72 24.6	+37.1•	110.8	72 01.9	+39.6	113.7	71 36.5	+41.9	116.4	71 08.5	+44.0	119.1	70 38.2	+45.9	121.5	70 05.8	+47.6	123.9	46
47	73 32.6	+28.9•	101.7	73 18.8	+32.0•	105.0	73 01.7	+34.9•	108.1	72 41.5	+37.7•	111.2	72 18.4	+40.1	114.1	71 52.5	+42.5	116.9	71 24.1	+44.6	119.6	70 53.4	+46.4	122.1	47
48	74 01.5	+25.9•	98.6	73 50.8	+29.3•	102.0	73 36.6	+32.5•	105.3	73 19.2	+35.4•	108.5	72 58.5	+38.3•	111.6	72 35.0	+40.7	114.6	72 08.7	+43.0	117.4	71 39.8	+45.1	120.1	48
49	74 27.4	+22.8•	95.2	74 20.1	+26.4•	98.8	74 09.1	+29.8•	102.3	73 54.6	+33.0•	105.7	73 36.8	+36.0•	108.9	73 15.7	+38.8•	112.1	72 51.7	+41.3	115.1	72 24.9	+43.6	118.0	49
50	74 50.2	+19.4•	91.7	74 46.5	+23.2•	95.4	74 38.9	+26.8•	99.0	74 27.6	+30.3•	102.6	74 12.8	+33.5•	106.1	73 54.5	+36.6•	109.4	73 33.0	+39.4•	112.6	73 08.5	+41.9	115.6	50
51	75 09.6	+15.8•	88.1	75 09.7	+19.7•	91.9	75 05.7	+23.6•	95.6	74 57.9	+27.3•	99.3	74 46.3	+30.9•	103.0	74 31.1	+34.1•	106.5	74 12.4	+37.1•	109.9	73 50.4	+39.9•	113.1	51
52	75 25.4	+12.0•	84.3	75 29.4	+16.1•	88.1	75 29.3	+20.1•	92.0	75 25.2	+24.1•	95.8	75 17.2	+27.7•	99.6	75 05.2	+31.4•	103.3	74 49.5	+34.7•	106.9	74 30.3	+37.8•	110.4	52
53	75 37.4	+8.1•	80.4	75 45.5	+12.2•	84.3	75 49.4	+16.4•	88.2	75 49.3	+20.4•	92.2	75 44.9	+24.5•	96.1	75 36.6	+28.2•	100.0	75 24.2	+31.9•	103.8	75 08.1	+35.3•	107.4	53
54	75 45.5	+3.9•	76.4	75 57.7	+8.1•	80.2	76 05.8	+12.3•	84.2	76 09.7	+16.6•	88.3	76 09.4	+20.8•	92.3	76 04.8	+24.9•	96.4	75 56.1	+28.8•	100.3	75 43.4	+32.4•	104.2	54
55	75 49.4	−0.1•	72.3	76 05.8	+3.9•	76.1	76 18.1	+8.2•	80.1	76 26.3	+12.5•	84.2	76 30.2	+16.9•	88.4	76 29.7	+21.2•	92.5	76 24.9	+25.4•	96.7	76 15.8	+29.4•	100.7	55
56	75 49.3	−4.4•	68.2	76 09.7	−0.3•	72.0	76 26.3	+3.9•	75.9	76 38.8	+8.3•	80.0	76 47.1	+12.7•	84.2	76 50.9	+17.2•	88.5	76 50.3	+21.5•	92.7	76 45.2	+25.8•	97.0	56
57	75 44.9	−8.3•	64.1	76 09.4	−4.6•	67.8	76 30.2	−0.5•	71.7	76 47.1	+3.8•	75.7	76 59.8	+8.3•	79.9	77 08.1	+12.8•	84.2	77 11.8	+17.5•	88.6	77 11.0	+22.0•	93.0	57
58	75 36.6	−12.4•	60.1	76 04.8	−8.7•	63.6	76 29.7	−4.8•	67.4	76 50.9	−0.6•	71.3	77 08.1	+3.7•	75.5	77 20.9	+8.4•	79.8	77 29.3	+13.0•	84.2	77 33.0	+17.7•	88.7	58
59	75 24.2	−16.1•	56.2	75 56.1	−12.7•	59.5	76 24.9	−9.1•	63.1	76 50.3	−5.1•	66.9	77 11.8	−0.8•	71.0	77 29.3	+3.7•	75.2	77 42.3	+8.4•	79.7	77 50.7	+13.3•	84.2	59
60	75 08.1	−19.7•	52.4	75 43.4	−16.7•	55.6	76 15.8	−13.2•	58.9	76 45.2	−9.5•	62.6	77 11.0	−5.4•	66.5	77 33.0	−1.1•	70.6	77 50.7	+3.6•	75.0	78 04.0	+8.4•	79.6	60
61	74 48.4	−23.1•	48.8	75 26.7	−20.2•	51.7	76 02.6	−17.1•	54.8	76 35.7	−13.7•	58.3	77 05.6	−9.9•	62.0	77 31.9	−5.7•	66.0	77 54.3	−1.3•	70.2	78 12.4	+3.5•	74.8	61
62	74 25.3	−26.2•	45.3	75 06.5	−23.7•	48.0	75 45.5	−20.9•	50.9	76 22.0	−17.7•	54.1	76 55.7	−14.2•	57.6	77 26.2	−10.4•	61.4	77 53.0	−6.1•	65.5	78 15.9	−1.6•	69.9	62
63	73 59.1	−29.1•	42.0	74 42.8	−26.8•	44.5	75 24.6	−24.3•	47.1	76 04.3	−21.5•	50.1	76 41.5	−18.3•	53.3	77 15.8	−14.8•	56.9	77 46.9	−10.9•	60.8	78 14.3	−6.5•	64.9	63
64	73 30.0	−31.7•	38.9	74 16.0	−29.8•	41.1	75 00.3	−27.5•	43.6	75 42.8	−24.9•	46.3	76 23.2	−22.2•	49.2	77 01.0	−18.9•	52.5	77 36.0	−15.3•	56.1	78 07.8	−11.5•	60.1	64
65	72 58.3	−34.1•	35.9	73 46.2	−32.3•	38.0	74 32.8	−30.4•	40.2	75 17.9	−28.2•	42.8	76 01.0	−25.6•	45.3	76 42.1	−22.9•	48.8	77 20.7	−19.7•	51.7	77 56.3	−16.0•	55.4	65
66	72 24.2	−36.3•	33.2	73 13.9	−34.7•	35.0	74 02.4	−33.0•	37.0	74 49.7	−31.1•	39.2	75 35.4	−29.0•	41.7	76 19.2	−26.4•	44.4	77 01.0	−23.6•	47.4	77 40.3	−20.4•	50.8	66
67	71 47.9	−38.2	30.6	72 39.2	−36.9•	32.2	73 29.4	−35.4•	34.0	74 18.6	−33.8•	36.0	75 06.4	−31.8•	38.2	75 52.8	−29.7•	40.7	76 37.4	−27.2•	43.4	77 19.9	−24.4•	46.4	67
68	71 09.7	−40.0	28.2	72 02.3	−38.9	29.6	72 54.0	−37.5•	31.2	73 44.8	−36.1•	33.0	74 34.6	−34.5•	35.0	75 23.1	−32.6•	37.1	76 10.2	−30.5•	39.6	76 55.5	−28.0•	42.3	68
69	70 29.7	−41.5	25.9	71 23.4	−40.6	27.2	72 16.5	−39.5	28.6	73 08.7	−38.2•	30.2	74 00.1	−36.8•	31.9	74 50.5	−35.2•	33.9	75 39.7	−33.4•	36.1	76 27.5	−31.4•	38.5	69
70	69 48.2	−43.0	23.8	70 42.8	−42.1	24.9	71 37.0	−41.2	26.2	72 30.5	−40.1	27.6	73 23.3	−38.9•	29.1	74 15.3	−37.6•	30.8	75 06.3	−36.0•	32.8	75 56.1	−34.2•	34.9	70
71	69 05.2	−44.3	21.8	70 00.7	−43.6	22.8	70 55.8	−42.8	23.9	71 50.4	−41.9	25.1	72 44.4	−40.8	26.5	73 37.7	−39.7	28.0	74 30.3	−38.4•	29.7	75 21.9	−36.9•	31.6	71
72	68 20.9	−45.5	19.9	69 17.1	−44.8	20.8	70 13.0	−44.1	21.8	71 08.5	−43.3	22.9	72 03.6	−42.5	24.1	72 58.0	−41.3	25.4	73 51.9	−40.4	26.9	74 45.0	−39.1•	28.5	72
73	67 35.4	−46.5	18.2	68 32.3	−46.0	19.0	69 28.9	−45.4	19.8	70 25.2	−44.8	20.8	71 21.1	−44.0	21.8	72 16.5	−43.1	23.0	73 11.5	−42.2	24.3	74 05.9	−41.2	25.7	73
74	66 48.9	−47.4	16.5	67 46.3	−47.0	17.2	68 43.5	−46.5	18.0	69 40.4	−45.9	18.8	70 37.1	−45.3	19.7	71 33.4	−44.7	20.8	72 29.3	−43.9	21.9	73 24.7	−43.0	23.1	74
75	66 01.5	−48.3	15.0	66 59.3	−47.9	15.6	67 57.0	−47.5	16.3	68 54.5	−47.0	17.0	69 51.8	−46.5	17.8	70 48.7	−45.9	18.7	71 45.4	−45.3	19.7	72 41.7	−44.5	20.7	75
76	65 13.2	−49.1	13.6	66 11.4	−48.7	14.1	67 09.5	−48.4	14.7	68 07.5	−48.0	15.3	69 05.3	−47.6	16.0	70 02.8	−47.0	16.8	71 00.1	−46.5	17.6	71 57.2	−45.9	18.5	76
77	64 24.1	−49.8	12.2	65 22.7	−49.5	12.7	66 21.1	−49.2	13.2	67 19.5	−48.9	13.7	68 17.7	−48.5	14.3	69 15.8	−48.1	15.0	70 13.6	−47.6	15.7	71 11.3	−47.2	16.5	77
78	63 34.3	−50.4	11.0	64 33.2	−50.2	11.4	65 31.9	−49.9	11.8	66 30.6	−49.6	12.2	67 29.2	−49.3	12.8	68 27.7	−49.1	13.3	69 26.0	−48.7	13.9	70 24.1	−48.2	14.6	78
79	62 43.9	−51.0	9.8	63 43.0	−50.8	10.1	64 42.0	−50.6	10.5	65 41.0	−50.4	10.9	66 39.9	−50.2	11.3	67 38.6	−49.8	11.8	68 37.3	−49.5	12.3	69 35.9	−49.2	12.9	79
80	61 52.9	−51.6	8.6	62 52.2	−51.4	8.9	63 51.4	−51.2	9.2	64 50.6	−51.0	9.6	65 49.7	−50.7	9.9	66 48.8	−50.6	10.3	67 47.8	−50.3	10.8	68 46.7	−50.1	11.3	80
81	61 01.3	−52.0	7.5	62 00.8	−51.9	7.8	63 00.2	−51.7	8.1	63 59.6	−51.6	8.3	64 59.0	−51.5	8.7	65 58.2	−51.2	9.0	66 57.5	−51.0	9.4	67 56.6	−50.9	9.8	81
82	60 09.3	−52.4	6.5	61 08.9	−52.3	6.7	62 08.5	−52.2	7.0	63 08.0	−52.1	7.2	64 07.5	−51.9	7.5	65 07.0	−51.8	7.7	66 06.5	−51.7	8.0	67 05.8	−51.4	8.4	82
83	59 16.9	−52.9	5.6	60 16.6	−52.8	5.7	61 16.3	−52.7	5.9	62 15.9	−52.5	6.1	63 15.6	−52.5	6.3	64 15.2	−52.3	6.6	65 14.8	−52.2	6.8	66 14.4	−52.1	7.1	83
84	58 24.0	−53.2	4.7	59 23.8	−53.2	4.8	60 23.6	−53.1	4.9	61 23.4	−53.0	5.1	62 23.1	−52.9	5.2	63 22.9	−52.9	5.4	64 22.6	−52.8	5.6	65 22.3	−52.7	5.9	84
85	57 30.8	−53.6	3.8	58 30.6	−53.5	3.9	59 30.5	−53.5	4.0	60 30.4	−53.5	4.1	61 30.2	−53.4	4.3	62 30.0	−53.3	4.4	63 29.8	−53.2	4.6	64 29.6	−53.1	4.7	85
86	56 37.2	−53.9	3.0	57 37.1	−53.8	3.0	58 37.0	−53.8	3.1	59 36.9	−53.7	3.2	60 36.8	−53.7	3.3	61 36.7	−53.6	3.4	62 36.6	−53.6	3.5	63 36.5	−53.5	3.7	86
87	55 43.3	−54.2	2.2	56 43.3	−54.2	2.2	57 43.2	−54.1	2.3	58 43.2	−54.1	2.3	59 43.1	−54.0	2.4	60 43.1	−54.1	2.5	61 43.0	−54.0	2.6	62 43.0	−54.0	2.7	87
88	54 49.1	−54.4	1.4	55 49.1	−54.4	1.4	56 49.1	−54.4	1.5	57 49.1	−54.4	1.5	58 49.1	−54.4	1.6	59 49.0	−54.3	1.6	60 49.0	−54.3	1.7	61 49.0	−54.3	1.7	88
89	53 54.7	−54.7	0.7	54 54.7	−54.7	0.7	55 54.7	−54.7	0.7	56 54.7	−54.7	0.7	57 54.7	−54.7	0.8	58 54.7	−54.7	0.8	59 54.7	−54.7	0.8	60 54.7	−54.7	0.8	89
90	53 00.0	−54.9	0.0	54 00.0	−54.9	0.0	55 00.0	−54.9	0.0	56 00.0	−54.9	0.0	57 00.0	−54.9	0.0	58 00.0	−54.9	0.0	59 00.0	−55.0	0.0	60 00.0	−55.0	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	33 21.1 −57.4 150.9	32 28.7 −57.6 151.2	31 36.0 −57.7 151.5	30 43.2 −57.9 151.8	29 50.3 −58.0 152.0	28 57.2 −58.1 152.3	28 04.0 −58.3 152.6	27 10.7 −58.4 152.8	0
1	32 23.7 −57.4 151.2	31 31.1 −57.6 151.5	30 38.3 −57.8 151.8	29 45.3 −57.9 152.1	28 52.3 −58.1 152.3	27 59.1 −58.2 152.6	27 05.7 −58.3 152.8	26 12.3 −58.4 153.1	1
2	31 26.3 −57.5 151.5	30 33.5 −57.7 151.8	29 40.5 −57.8 152.1	28 47.4 −58.0 152.4	27 54.2 −58.1 152.6	27 00.9 −58.2 152.9	26 07.4 −58.4 153.1	25 13.9 −58.5 153.3	2
3	30 28.8 −57.6 151.9	29 35.8 −57.7 152.2	28 42.7 −57.9 152.4	27 49.4 −58.0 152.7	26 56.1 −58.1 152.9	26 02.6 −58.2 153.1	25 09.1 −58.4 153.3	24 15.4 −58.5 153.5	3
4	29 31.2 −57.6 152.2	28 38.1 −57.8 152.5	27 44.8 −57.9 152.7	26 51.4 −58.0 152.9	25 58.0 −58.2 153.2	25 04.4 −58.3 153.4	24 10.7 −58.4 153.6	23 16.9 −58.5 153.8	4
5	28 33.6 −57.6 152.5	27 40.3 −57.8 152.8	26 46.9 −57.9 153.0	25 53.4 −58.1 153.2	24 59.8 −58.2 153.4	24 06.1 −58.3 153.6	23 12.3 −58.5 153.8	22 18.4 −58.6 154.0	5
6	27 36.0 −57.7 152.8	26 42.5 −57.8 153.1	25 49.0 −58.0 153.3	24 55.3 −58.1 153.5	24 01.6 −58.2 153.7	23 07.8 −58.4 153.9	22 13.8 −58.4 154.1	21 19.8 −58.5 154.3	6
7	26 38.3 −57.7 153.2	25 44.7 −57.9 153.4	24 51.0 −58.0 153.6	23 57.3 −58.2 153.7	23 03.4 −58.3 154.0	22 09.4 −58.3 154.2	21 15.4 −58.5 154.3	20 21.3 −58.6 154.5	7
8	25 40.6 −57.8 153.5	24 46.9 −57.9 153.7	23 53.0 −58.0 153.9	22 59.1 −58.1 154.1	22 05.1 −58.3 154.2	21 11.1 −58.4 154.4	20 16.9 −58.5 154.6	19 22.7 −58.6 154.7	8
9	24 42.8 −57.8 153.8	23 49.0 −58.0 154.0	22 55.0 −58.1 154.1	22 01.0 −58.2 154.3	21 06.9 −58.3 154.5	20 12.7 −58.4 154.7	19 18.4 −58.5 154.8	18 24.1 −58.6 155.0	9
10	23 45.0 −57.8 154.0	22 51.0 −57.9 154.2	21 56.9 −58.0 154.4	21 02.8 −58.2 154.6	20 08.6 −58.4 154.7	19 14.3 −58.5 154.9	18 19.9 −58.5 155.0	17 25.5 −58.7 155.2	10
11	22 47.2 −57.9 154.3	21 53.1 −58.0 154.5	20 58.9 −58.1 154.7	20 04.6 −58.2 154.8	19 10.2 −58.3 155.0	18 15.8 −58.5 155.1	17 21.4 −58.5 155.3	16 26.8 −58.6 155.4	11
12	21 49.3 −57.9 154.6	20 55.1 −58.0 154.8	20 00.8 −58.2 154.9	19 06.4 −58.3 155.1	18 11.9 −58.3 155.2	17 17.4 −58.5 155.4	16 22.8 −58.5 155.5	15 28.2 −58.7 155.6	12
13	20 51.4 −57.9 154.9	19 57.1 −58.1 155.1	19 02.6 −58.1 155.2	18 08.1 −58.2 155.3	17 13.6 −58.4 155.5	16 18.9 −58.4 155.6	15 24.3 −58.6 155.7	14 29.5 −58.6 155.8	13
14	19 53.5 −57.9 155.2	18 59.0 −58.0 155.3	18 04.5 −58.2 155.5	17 09.9 −58.3 155.6	16 15.2 −58.4 155.7	15 20.5 −58.5 155.8	14 25.7 −58.6 156.0	13 30.9 −58.7 156.1	14
15	18 55.6 −58.0 155.5	18 01.0 −58.1 155.6	17 06.3 −58.2 155.7	16 11.6 −58.3 155.9	15 16.8 −58.4 156.0	14 22.0 −58.5 156.1	13 27.1 −58.6 156.2	12 32.2 −58.7 156.3	15
16	17 57.6 −58.0 155.7	17 02.9 −58.1 155.9	16 08.1 −58.2 156.0	15 13.3 −58.4 156.1	14 18.4 −58.4 156.2	13 23.5 −58.5 156.3	12 28.5 −58.6 156.4	11 33.5 −58.7 156.5	16
17	16 59.6 −58.0 156.0	16 04.8 −58.1 156.1	15 09.9 −58.2 156.2	14 15.0 −58.4 156.3	13 20.0 −58.5 156.4	12 25.0 −58.6 156.5	11 29.9 −58.6 156.6	10 34.8 −58.7 156.7	17
18	16 01.6 −58.0 156.3	15 06.7 −58.2 156.4	14 11.7 −58.3 156.5	13 16.6 −58.3 156.6	12 21.5 −58.4 156.7	11 26.4 −58.5 156.8	10 31.3 −58.6 156.8	9 36.1 −58.7 156.9	18
19	15 03.6 −58.1 156.5	14 08.5 −58.1 156.6	13 13.4 −58.2 156.7	12 18.3 −58.4 156.8	11 23.1 −58.5 156.9	10 27.9 −58.5 157.0	9 32.7 −58.7 157.0	8 37.4 −58.7 157.1	19
20	14 05.5 −58.0 156.8	13 10.4 −58.2 156.9	12 15.2 −58.3 157.0	11 19.9 −58.4 157.1	10 24.6 −58.4 157.1	9 29.3 −58.5 157.2	8 34.0 −58.6 157.3	7 38.7 −58.7 157.3	20
21	13 07.5 −58.1 157.1	12 12.2 −58.2 157.1	11 16.9 −58.3 157.2	10 21.5 −58.3 157.3	9 26.2 −58.5 157.4	8 30.8 −58.6 157.4	7 35.4 −58.7 157.5	6 39.9 −58.7 157.5	21
22	12 09.4 −58.1 157.3	11 14.0 −58.2 157.4	10 18.6 −58.3 157.5	9 23.2 −58.4 157.5	8 27.7 −58.5 157.6	7 32.2 −58.5 157.6	6 36.7 −58.6 157.7	5 41.2 −58.7 157.7	22
23	11 11.3 −58.1 157.6	10 15.8 −58.2 157.6	9 20.3 −58.3 157.7	8 24.8 −58.4 157.8	7 29.2 −58.5 157.8	6 33.7 −58.6 157.9	5 38.1 −58.7 157.9	4 42.5 −58.7 157.9	23
24	10 13.2 −58.2 157.8	9 17.6 −58.2 157.9	8 22.0 −58.3 157.9	7 26.4 −58.4 158.0	6 30.7 −58.4 158.0	5 35.1 −58.6 158.1	4 39.4 −58.6 158.1	3 43.7 −58.7 158.1	24
25	9 15.0 −58.1 158.1	8 19.4 −58.2 158.1	7 23.7 −58.3 158.3	6 28.0 −58.4 158.2	5 32.3 −58.5 158.3	4 36.5 −58.6 158.3	3 40.8 −58.7 158.3	2 45.0 −58.7 158.3	25
26	8 16.9 −58.1 158.3	7 21.2 −58.3 158.4	6 25.4 −58.4 158.4	5 29.6 −58.3 158.5	4 33.8 −58.5 158.5	3 37.9 −58.6 158.5	2 42.1 −58.7 158.5	1 46.3 −58.8 158.5	26
27	7 18.8 −58.2 158.6	6 22.9 −58.2 158.6	5 27.0 −58.3 158.7	4 31.2 −58.5 158.7	3 35.3 −58.6 158.7	2 39.3 −58.5 158.7	1 43.4 −58.7 158.7	0 47.5 −58.7 158.7	27
28	6 20.6 −58.1 158.8	5 24.7 −58.3 158.9	4 28.7 −58.3 158.9	3 32.7 −58.4 158.9	2 36.7 −58.5 158.9	1 40.8 −58.4 159.0	0 44.8 −58.7 159.0	0 11.2 +58.8 21.0	28
29	5 22.5 −58.2 159.1	4 26.4 −58.2 159.1	3 30.4 −58.4 159.1	2 34.3 −58.4 159.1	1 38.2 −58.5 159.2	0 42.2 −58.6 159.2	0 13.9 +58.7 20.8	1 10.0 +58.7 20.8	29
30	4 24.3 −58.2 159.3	3 28.2 −58.3 159.3	2 32.0 −58.3 159.4	1 35.9 −58.4 159.4	0 39.7 −58.5 159.4	0 16.4 +58.6 20.6	1 12.6 +58.6 20.6	2 08.7 +58.8 20.6	30
31	3 26.1 −58.1 159.6	2 29.9 −58.3 159.6	1 33.7 −58.4 159.7	0 37.5 −58.5 159.6	0 18.8 +58.5 20.4	1 15.0 +58.6 20.4	2 11.2 +58.7 20.4	3 07.5 +58.7 20.4	31
32	2 28.0 −58.2 159.8	1 31.7 −58.3 159.8	0 35.3 −58.3 159.8	0 21.0 +58.4 20.2	1 17.3 +58.5 20.2	2 13.6 +58.6 20.2	3 09.9 +58.7 20.2	4 06.2 +58.7 20.2	32
33	1 29.8 −58.2 160.0	0 33.4 −58.3 160.1	0 23.0 +58.3 19.9	1 19.4 +58.4 20.0	2 15.8 +58.5 20.0	3 12.2 +58.6 20.0	4 08.6 +58.6 20.0	5 04.9 +58.8 20.0	33
34	0 31.6 −58.1 160.3	0 24.9 +58.2 19.7	1 21.3 +58.4 19.7	2 17.8 +58.4 19.7	3 14.3 +58.5 19.7	4 10.8 +58.5 19.8	5 07.2 +58.7 19.8	6 03.7 +58.7 19.8	34
35	0 26.5 +58.2 19.5	1 23.1 +58.3 19.5	2 19.7 +58.3 19.5	3 16.2 +58.5 19.5	4 12.8 +58.5 19.5	5 09.3 +58.6 19.5	6 05.9 +58.6 19.6	7 02.4 +58.7 19.6	35
36	1 24.7 +58.2 19.2	2 21.4 +58.2 19.2	3 18.0 +58.3 19.2	4 14.7 +58.4 19.3	5 11.3 +58.5 19.3	6 07.9 +58.6 19.3	7 04.5 +58.7 19.4	8 01.1 +58.8 19.4	36
37	2 22.9 +58.2 19.0	3 19.6 +58.3 19.0	4 16.4 +58.3 19.0	5 13.1 +58.4 19.0	6 09.8 +58.5 19.1	7 06.5 +58.6 19.1	8 03.2 +58.6 19.2	8 59.9 +58.7 19.2	37
38	3 21.1 +58.2 18.7	4 17.9 +58.2 18.7	5 14.7 +58.3 18.8	6 11.5 +58.4 18.8	7 08.3 +58.5 18.8	8 05.1 +58.5 18.9	9 01.8 +58.7 18.9	9 58.6 +58.7 19.0	38
39	4 19.2 +58.2 18.5	5 16.1 +58.3 18.5	6 13.0 +58.3 18.5	7 09.9 +58.4 18.6	8 06.8 +58.4 18.6	9 03.6 +58.6 18.7	10 00.5 +58.6 18.7	10 57.3 +58.7 18.8	39
40	5 17.4 +58.1 18.2	6 14.4 +58.2 18.3	7 11.3 +58.4 18.3	8 08.3 +58.4 18.3	9 05.2 +58.5 18.4	10 02.2 +58.5 18.4	10 59.1 +58.6 18.5	11 56.0 +58.6 18.6	40
41	6 15.5 +58.2 18.0	7 12.6 +58.2 18.0	8 09.7 +58.3 18.1	9 06.7 +58.4 18.1	10 03.7 +58.5 18.2	11 00.7 +58.5 18.2	11 57.7 +58.6 18.3	12 54.6 +58.7 18.4	41
42	7 13.7 +58.1 17.7	8 10.8 +58.3 17.8	9 08.0 +58.3 17.8	10 05.1 +58.3 17.9	11 02.2 +58.4 17.9	11 59.2 +58.6 18.0	12 56.3 +58.6 18.1	13 53.3 +58.7 18.1	42
43	8 11.8 +58.2 17.5	9 09.1 +58.2 17.5	10 06.3 +58.2 17.6	11 03.4 +58.4 17.6	12 00.6 +58.4 17.7	12 57.8 +58.5 17.8	13 54.9 +58.6 17.8	14 52.0 +58.6 17.9	43
44	9 10.0 +58.1 17.2	10 07.3 +58.2 17.3	11 04.5 +58.3 17.3	12 01.8 +58.4 17.4	12 59.0 +58.5 17.5	13 56.3 +58.5 17.5	14 53.5 +58.5 17.6	15 50.6 +58.7 17.7	44
45	10 08.1 +58.1 17.0	11 05.5 +58.1 17.0	12 02.8 +58.3 17.1	13 00.2 +58.3 17.2	13 57.5 +58.4 17.2	14 54.8 +58.4 17.3	15 52.0 +58.6 17.4	16 49.3 +58.6 17.5	45
46	11 06.2 +58.1 16.7	12 03.6 +58.2 16.8	13 01.1 +58.2 16.9	13 58.5 +58.3 16.9	14 55.9 +58.4 17.0	15 53.2 +58.5 17.1	16 50.6 +58.5 17.2	17 47.9 +58.6 17.3	46
47	12 04.3 +58.1 16.5	13 01.8 +58.2 16.5	13 59.3 +58.3 16.6	14 56.8 +58.3 16.7	15 54.3 +58.3 16.8	16 51.7 +58.5 16.8	17 49.1 +58.5 16.9	18 46.5 +58.6 17.0	47
48	13 02.4 +58.0 16.2	14 00.0 +58.1 16.3	14 57.6 +58.2 16.4	15 55.1 +58.3 16.4	16 52.6 +58.4 16.5	17 50.2 +58.4 16.6	18 47.6 +58.5 16.7	19 45.1 +58.6 16.8	48
49	14 00.4 +58.1 16.0	14 58.1 +58.1 16.0	15 55.8 +58.2 16.1	16 53.4 +58.3 16.2	17 51.0 +58.4 16.3	18 48.6 +58.4 16.4	19 46.1 +58.5 16.5	20 43.7 +58.5 16.6	49
50	14 58.5 +58.0 15.7	15 56.2 +58.1 15.7	16 54.0 +58.1 15.9	17 51.7 +58.2 15.9	18 49.4 +58.3 16.0	19 47.0 +58.4 16.1	20 44.6 +58.5 16.2	21 42.2 +58.6 16.3	50
51	15 56.5 +58.0 15.4	16 54.3 +58.1 15.5	17 52.1 +58.2 15.6	18 49.9 +58.3 15.7	19 47.7 +58.3 15.8	20 45.4 +58.4 15.9	21 43.1 +58.4 16.0	22 40.8 +58.5 16.1	51
52	16 54.5 +58.0 15.2	17 52.4 +58.1 15.3	18 50.3 +58.1 15.3	19 48.2 +58.2 15.4	20 46.0 +58.3 15.5	21 43.8 +58.3 15.6	22 41.5 +58.5 15.7	23 39.3 +58.5 15.9	52
53	17 52.5 +58.0 14.9	18 50.5 +58.0 15.0	19 48.4 +58.2 15.1	20 46.4 +58.2 15.2	21 44.3 +58.2 15.3	22 42.1 +58.4 15.4	23 40.0 +58.4 15.4	24 37.8 +58.4 15.6	53
54	18 50.5 +57.9 14.6	19 48.5 +58.1 14.7	20 46.6 +58.0 14.8	21 44.6 +58.1 14.9	22 42.5 +58.2 15.0	23 40.5 +58.3 15.1	24 38.4 +58.3 15.2	25 36.2 +58.5 15.4	54
55	19 48.4 +58.0 14.4	20 46.6 +58.0 14.4	21 44.6 +58.1 14.5	22 42.7 +58.1 14.6	23 40.7 +58.3 14.8	24 38.8 +58.2 14.9	25 36.7 +58.4 15.0	26 34.7 +58.4 15.1	55
56	20 46.4 +57.9 14.1	21 44.6 +57.9 14.1	22 42.5 +58.0 14.2	23 40.8 +58.0 14.4	24 39.0 +58.2 14.5	25 37.0 +58.1 14.6	26 35.1 +58.3 14.7	27 33.1 +58.4 14.9	56
57	21 44.3 +57.8 13.8	22 42.5 +57.9 13.9	23 40.7 +58.1 14.0	24 39.0 +58.0 14.1	25 37.1 +58.1 14.2	26 35.3 +58.2 14.3	27 33.4 +58.2 14.5	28 31.5 +58.3 14.6	57
58	22 42.1 +57.9 13.5	23 40.5 +57.9 13.6	24 38.8 +57.9 13.7	25 37.0 +58.1 13.8	26 35.3 +58.1 13.9	27 33.5 +58.2 14.1	28 31.7 +58.2 14.2	29 29.8 +58.3 14.3	58
59	23 40.0 +57.8 13.2	24 38.4 +57.9 13.4	25 36.7 +58.0 13.4	26 35.1 +58.0 13.5	27 33.4 +58.1 13.7	28 31.7 +58.1 13.8	29 29.9 +58.3 13.9	30 28.1 +58.3 14.1	59
60	24 37.8 +57.7 12.9	25 36.2 +57.9 13.0	26 34.7 +57.9 13.1	27 33.1 +58.0 13.3	28 31.5 +58.0 13.4	29 29.8 +58.1 13.5	30 28.1 +58.1 13.6	31 26.4 +58.3 13.8	60
61	25 35.5 +57.8 12.6	26 34.1 +57.8 12.7	27 32.6 +57.8 12.8	28 31.1 +57.9 13.0	29 29.5 +58.0 13.1	30 27.9 +58.1 13.2	31 26.3 +58.2 13.4	32 24.7 +58.2 13.5	61
62	26 33.3 +57.6 12.3	27 31.9 +57.7 12.4	28 30.4 +57.9 12.6	29 29.0 +57.9 12.7	30 27.5 +58.0 12.8	31 26.0 +58.0 12.9	32 24.5 +58.1 13.1	33 22.9 +58.2 13.2	62
63	27 30.9 +57.7 12.0	28 29.6 +57.7 12.1	29 28.3 +57.7 12.2	30 26.9 +57.8 12.4	31 25.5 +57.9 12.5	32 24.0 +58.0 12.6	33 22.6 +58.0 12.8	34 21.1 +58.1 12.9	63
64	28 28.6 +57.6 11.7	29 27.3 +57.7 11.8	30 26.0 +57.8 11.9	31 24.7 +57.8 12.1	32 23.4 +57.9 12.2	33 22.0 +58.0 12.3	34 20.6 +58.0 12.5	35 19.2 +58.1 12.6	64
65	29 26.2 +57.6 11.4	30 25.0 +57.6 11.5	31 23.8 +57.7 11.6	32 22.5 +57.8 11.7	33 21.3 +57.8 11.9	34 20.0 +57.9 12.0	35 18.6 +58.0 12.1	36 17.3 +58.0 12.2	65
66	30 23.8 +57.5 11.1	31 22.6 +57.6 11.2	32 21.5 +57.6 11.3	33 20.3 +57.7 11.4	34 19.1 +57.8 11.6	35 17.9 +57.8 11.7	36 16.6 +57.9 11.8	37 15.3 +58.0 12.0	66
67	31 21.3 +57.4 10.7	32 20.2 +57.5 10.8	33 19.1 +57.6 11.0	34 18.0 +57.7 11.1	35 16.9 +57.7 11.2	36 15.7 +57.8 11.4	37 14.5 +57.9 11.5	38 13.3 +57.9 11.7	67
68	32 18.7 +57.4 10.4	33 17.7 +57.5 10.5	34 16.7 +57.5 10.6	35 15.7 +57.6 10.8	36 14.6 +57.7 10.9	37 13.5 +57.7 11.0	38 12.4 +57.8 11.2	39 11.2 +57.9 11.3	68
69	33 16.1 +57.4 10.0	34 15.2 +57.4 10.2	35 14.2 +57.5 10.3	36 13.3 +57.5 10.4	37 12.3 +57.6 10.5	38 11.2 +57.7 10.7	39 10.2 +57.7 10.8	40 09.1 +57.8 11.0	69
70	34 13.5 +57.2 9.7	35 12.6 +57.3 9.8	36 11.7 +57.4 9.9	37 10.8 +57.5 10.1	38 09.9 +57.5 10.2	39 08.9 +57.6 10.3	40 07.9 +57.7 10.5	41 06.9 +57.7 10.6	70
71	35 10.7 +57.2 9.3	36 09.9 +57.3 9.4	37 09.1 +57.3 9.6	38 08.3 +57.4 9.7	39 07.4 +57.5 9.8	40 06.5 +57.5 10.0	41 05.6 +57.6 10.1	42 04.6 +57.7 10.3	71
72	36 07.9 +57.2 9.0	37 07.2 +57.2 9.1	38 06.4 +57.3 9.2	39 05.7 +57.3 9.3	40 04.9 +57.4 9.5	41 04.0 +57.5 9.6	42 03.2 +57.5 9.7	43 02.3 +57.6 9.9	72
73	37 05.1 +57.1 8.6	38 04.4 +57.1 8.7	39 03.7 +57.2 8.8	40 03.0 +57.2 8.9	41 02.3 +57.3 9.1	42 01.5 +57.4 9.2	43 00.7 +57.5 9.4	43 59.9 +57.5 9.5	73
74	38 02.2 +56.9 8.2	39 01.5 +57.1 8.3	40 00.9 +57.1 8.4	41 00.2 +57.2 8.5	41 59.6 +57.2 8.7	42 58.9 +57.3 8.8	43 58.2 +57.3 9.0	44 57.4 +57.4 9.1	74
75	38 59.1 +57.0 7.8	39 58.6 +56.9 7.9	40 58.0 +57.0 8.0	41 57.4 +57.1 8.1	42 56.8 +57.1 8.3	43 56.2 +57.2 8.3	44 55.5 +57.3 8.5	45 54.8 +57.4 8.7	75
76	39 56.1 +56.8 7.4	40 55.5 +56.9 7.5	41 55.0 +57.0 7.6	42 54.5 +57.0 7.7	43 53.9 +57.1 7.8	44 53.4 +57.1 8.0	45 52.8 +57.1 8.1	46 52.2 +57.2 8.3	76
77	40 52.9 +56.7 7.0	41 52.4 +56.8 7.1	42 52.0 +56.8 7.2	43 51.5 +56.9 7.3	44 51.0 +56.9 7.4	45 50.5 +57.0 7.5	46 49.9 +57.1 7.7	47 49.4 +57.1 7.8	77
78	41 49.6 +56.5 6.5	42 49.2 +56.7 6.6	43 48.8 +56.7 6.7	44 48.4 +56.7 6.8	45 47.9 +56.9 7.0	46 47.5 +56.9 7.1	47 47.0 +57.0 7.2	48 46.5 +57.0 7.4	78
79	42 46.2 +56.5 6.1	43 45.9 +56.5 6.2	44 45.5 +56.6 6.3	45 45.1 +56.7 6.4	46 44.8 +56.7 6.5	47 44.4 +56.7 6.6	48 44.0 +56.8 6.8	49 43.5 +56.9 6.9	79
80	43 42.7 +56.4 5.6	44 42.4 +56.5 5.7	45 42.1 +56.5 5.8	46 41.8 +56.6 5.9	47 41.5 +56.6 6.0	48 41.1 +56.7 6.1	49 40.8 +56.7 6.3	50 40.4 +56.8 6.4	80
81	44 39.1 +56.3 5.1	45 38.9 +56.3 5.2	46 38.6 +56.4 5.3	47 38.4 +56.4 5.4	48 38.1 +56.4 5.5	49 37.8 +56.5 5.6	50 37.5 +56.6 5.7	51 37.2 +56.6 5.9	81
82	45 35.4 +56.1 4.6	46 35.2 +56.2 4.7	47 35.0 +56.2 4.8	48 34.8 +56.2 4.9	49 34.5 +56.4 5.0	50 34.3 +56.4 5.1	51 34.1 +56.4 5.2	52 33.8 +56.5 5.3	82
83	46 31.5 +56.0 4.1	47 31.4 +56.0 4.2	48 31.2 +56.1 4.3	49 31.0 +56.2 4.4	50 30.9 +56.1 4.5	51 30.7 +56.2 4.6	52 30.5 +56.2 4.7	53 30.3 +56.3 4.8	83
84	47 27.5 +55.9 3.6	48 27.4 +55.9 3.7	49 27.3 +55.9 3.8	50 27.2 +55.9 3.8	51 27.0 +56.0 3.9	52 26.9 +56.0 3.9	53 26.7 +56.1 4.0	54 26.6 +56.1 4.2	84
85	48 23.4 +55.7 3.1	49 23.3 +55.7 3.1	50 23.2 +55.8 3.2	51 23.1 +55.8 3.3	52 23.0 +55.8 3.3	53 22.9 +55.9 3.4	54 22.8 +55.9 3.5	55 22.7 +55.9 3.6	85
86	49 19.1 +55.5 2.5	50 19.0 +55.6 2.5	51 19.0 +55.5 2.6	52 18.9 +55.6 2.7	53 18.8 +55.7 2.7	54 18.8 +55.6 2.8	55 18.7 +55.7 2.9	56 18.6 +55.7 2.9	86
87	50 14.6 +55.3 1.9	51 14.6 +55.3 1.9	52 14.5 +55.4 2.0	53 14.5 +55.4 2.0	54 14.5 +55.4 2.1	55 14.4 +55.5 2.1	56 14.4 +55.4 2.2	57 14.3 +55.5 2.3	87
88	51 09.9 +55.2 1.3	52 09.9 +55.2 1.3	53 09.9 +55.2 1.4	54 09.9 +55.2 1.4	55 09.9 +55.2 1.4	56 09.9 +55.2 1.5	57 09.8 +55.2 1.5	58 09.8 +55.2 1.5	88
89	52 05.1 +54.9 0.7	53 05.1 +54.9 0.7	54 05.1 +54.9 0.7	55 05.1 +54.9 0.7	56 05.1 +54.9 0.7	57 05.1 +54.9 0.7	58 05.0 +55.0 0.8	59 05.0 +55.0 0.8	89
90	53 00.0 +54.7 0.0	54 00.0 +54.7 0.0	55 00.0 +54.7 0.0	56 00.0 +54.7 0.0	57 00.0 +54.7 0.0	58 00.0 +54.7 0.0	59 00.0 +54.7 0.0	60 00.0 +54.7 0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 156°, 204°**

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Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	33 03.2	+57.2	149.7	32 11.3	+57.4	150.0	31 19.3	+57.5	150.3	30 27.1	+57.6	150.6	29 34.7	+57.8	150.9	28 42.2	+58.0	151.2	27 49.5	+58.2	151.5	26 56.8	+58.2	151.7	0
1	34 00.4	+57.1	149.4	33 08.7	+57.2	149.7	32 16.8	+57.4	150.0	31 24.7	+57.5	150.3	30 32.5	+57.8	150.6	29 40.2	+57.9	150.9	28 47.7	+58.1	151.2	27 55.0	+58.3	151.4	1
2	34 57.5	+57.0	149.0	34 05.9	+57.2	149.3	33 14.2	+57.4	149.7	32 22.4	+57.5	150.0	31 30.3	+57.5	150.3	30 38.1	+57.9	150.6	29 45.8	+58.0	150.9	28 53.3	+58.2	151.2	2
3	35 54.5	+56.9	148.6	35 03.1	+57.2	149.0	34 11.6	+57.4	149.3	33 19.9	+57.6	149.7	32 28.1	+57.7	150.0	31 36.0	+57.9	150.3	30 43.8	+58.1	150.6	29 51.5	+58.2	150.9	3
4	36 51.4	+56.8	148.2	36 00.3	+57.0	148.6	35 09.0	+57.2	149.0	34 17.5	+57.4	149.3	33 25.8	+57.6	149.7	32 33.9	+57.8	150.0	31 41.9	+57.9	150.3	30 49.7	+58.1	150.6	4
5	37 48.2	+56.8	147.8	36 57.3	+57.0	148.2	36 06.2	+57.2	148.6	35 14.9	+57.4	149.0	34 23.4	+57.6	149.3	33 31.7	+57.8	149.7	32 39.8	+58.0	150.0	31 47.8	+58.1	150.3	5
6	38 45.0	+56.7	147.4	37 54.3	+56.9	147.8	37 03.4	+57.2	148.2	36 12.3	+57.4	148.6	35 21.0	+57.5	149.0	34 29.5	+57.7	149.3	33 37.8	+57.9	149.7	32 45.9	+58.1	150.0	6
7	39 41.7	+56.5	147.0	38 51.2	+56.9	147.4	38 00.6	+57.0	147.8	37 09.7	+57.2	148.2	36 18.5	+57.5	148.6	35 27.2	+57.7	149.0	34 35.7	+57.8	149.4	33 44.0	+58.0	149.7	7
8	40 38.2	+56.5	146.5	39 48.1	+56.7	147.0	38 57.6	+57.0	147.4	38 06.9	+57.2	147.9	37 16.0	+57.4	148.3	36 24.9	+57.6	148.7	35 33.5	+57.8	149.0	34 42.0	+57.9	149.4	8
9	41 34.7	+56.4	146.1	40 44.8	+56.6	146.6	39 54.6	+56.9	147.0	39 04.1	+57.1	147.5	38 13.4	+57.3	147.9	37 22.5	+57.5	148.3	36 31.3	+57.7	148.7	35 39.9	+57.9	149.1	9
10	42 31.1	+56.3	145.6	41 41.4	+56.6	146.1	40 51.5	+56.8	146.6	40 01.2	+57.1	147.1	39 10.7	+57.3	147.5	38 20.0	+57.5	148.0	37 29.0	+57.7	148.4	36 37.8	+57.9	148.8	10
11	43 27.4	+56.1	145.1	42 38.0	+56.4	145.7	41 48.3	+56.6	146.2	40 58.3	+56.9	146.7	40 08.0	+57.2	147.1	39 17.5	+57.4	147.6	38 26.7	+57.6	148.0	37 35.7	+57.8	148.4	11
12	44 23.5	+56.0	144.7	43 34.4	+56.3	145.2	42 44.9	+56.6	145.7	41 55.2	+56.8	146.3	41 05.2	+57.1	146.7	40 14.9	+57.3	147.2	39 24.3	+57.5	147.7	38 33.5	+57.7	148.1	12
13	45 19.5	+55.9	144.1	44 30.7	+56.2	144.7	43 41.5	+56.5	145.3	42 52.0	+56.8	145.8	42 02.3	+57.0	146.3	41 12.2	+57.2	146.8	40 21.8	+57.5	147.3	39 31.2	+57.7	147.7	13
14	46 15.4	+55.7	143.6	45 26.9	+56.0	144.2	44 38.0	+56.3	144.8	43 48.8	+56.6	145.4	42 59.3	+56.9	145.9	42 09.4	+57.2	146.4	41 19.3	+57.4	146.9	40 28.9	+57.6	147.4	14
15	47 11.1	+55.5	143.1	46 22.9	+55.9	143.7	45 34.3	+56.3	144.3	44 45.4	+56.5	144.9	43 56.2	+56.8	145.5	43 06.6	+57.0	146.0	42 16.7	+57.3	146.5	41 26.5	+57.5	147.0	15
16	48 06.6	+55.4	142.5	47 18.8	+55.8	143.2	46 30.6	+56.1	143.8	45 41.9	+56.4	144.4	44 53.0	+56.7	145.0	44 03.6	+57.0	145.6	43 14.0	+57.2	146.1	42 24.0	+57.5	146.6	16
17	49 02.0	+55.2	141.9	48 14.6	+55.5	142.6	47 26.7	+55.9	143.3	46 38.3	+56.3	143.9	45 49.7	+56.5	144.5	45 00.6	+56.9	145.1	44 11.2	+57.1	145.7	43 21.5	+57.3	146.2	17
18	49 57.2	+55.0	141.3	49 10.1	+55.5	142.1	48 22.6	+55.8	142.8	47 34.6	+56.1	143.4	46 46.2	+56.5	144.1	45 57.5	+56.7	144.7	45 08.3	+57.0	145.3	44 18.8	+57.3	145.8	18
19	50 52.2	+54.8	140.7	50 05.6	+55.2	141.5	49 18.4	+55.6	142.2	48 30.7	+56.0	142.9	47 42.7	+56.3	143.6	46 54.2	+56.6	144.2	46 05.3	+57.0	144.8	45 16.1	+57.2	145.4	19
20	51 47.0	+54.6	140.1	51 00.8	+55.0	140.9	50 14.0	+55.4	141.6	49 26.7	+55.8	142.4	48 39.0	+56.1	143.1	47 50.8	+56.5	143.7	47 02.3	+56.8	144.4	46 13.3	+57.1	145.0	20
21	52 41.6	+54.4	139.4	51 55.8	+54.8	140.2	51 09.4	+55.3	141.0	50 22.5	+55.7	141.8	49 35.1	+56.1	142.5	48 47.3	+56.4	143.2	47 59.1	+56.6	143.9	47 10.4	+57.0	144.5	21
22	53 36.0	+54.0	138.7	52 50.6	+54.6	139.6	52 04.7	+55.0	140.4	51 18.2	+55.4	141.2	50 31.2	+55.8	142.0	49 43.7	+56.2	142.7	48 55.7	+56.6	143.4	48 07.4	+56.9	144.1	22
23	54 30.0	+53.8	137.9	53 45.2	+54.3	138.9	52 59.7	+54.8	139.7	52 13.6	+55.3	140.6	51 27.0	+55.7	141.4	50 39.9	+56.0	142.1	49 52.3	+56.4	142.9	49 04.2	+56.7	143.6	23
24	55 23.8	+53.5	137.2	54 39.5	+54.0	138.1	53 54.5	+54.5	139.1	53 08.9	+55.0	139.9	52 22.7	+55.4	140.8	51 35.9	+55.9	141.6	50 48.7	+56.2	142.3	50 00.9	+56.6	143.1	24
25	56 17.3	+53.2	136.4	55 33.5	+53.8	137.4	54 49.0	+54.3	138.3	54 03.9	+54.8	139.3	53 18.1	+55.3	140.1	52 31.8	+55.7	141.0	51 44.9	+56.1	141.8	50 57.5	+56.5	142.5	25
26	57 10.5	+52.8	135.5	56 27.3	+53.4	136.6	55 43.3	+54.1	137.6	54 58.7	+54.6	138.6	54 13.4	+55.0	139.5	53 27.5	+55.5	140.4	52 41.0	+55.9	141.2	51 54.0	+56.3	142.0	26
27	58 03.3	+52.4	134.6	57 20.7	+53.1	135.7	56 37.4	+53.7	136.8	55 53.3	+54.2	137.8	55 08.4	+54.8	138.8	54 23.0	+55.3	139.7	53 36.9	+55.7	140.6	52 50.3	+56.1	141.4	27
28	58 55.7	+52.0	133.7	58 13.8	+52.7	134.9	57 31.1	+53.3	136.0	56 47.5	+54.0	137.1	56 03.2	+54.6	138.1	55 18.3	+55.0	139.0	54 32.6	+55.5	140.0	53 46.4	+55.9	140.8	28
29	59 47.7	+51.5	132.7	59 06.5	+52.3	133.9	58 24.4	+53.0	135.1	57 41.5	+53.6	136.2	56 57.8	+54.2	137.3	56 13.3	+54.8	138.3	55 28.1	+55.3	139.3	54 42.3	+55.8	140.2	29
30	60 39.2	+51.1	131.7	59 58.8	+51.9	133.0	59 17.4	+52.6	134.2	58 35.1	+53.3	135.4	57 52.0	+53.9	136.5	57 08.1	+54.5	137.6	56 23.4	+55.1	138.6	55 38.1	+55.5	139.6	30
31	61 30.3	+50.4	130.6	60 50.7	+51.3	132.0	60 10.0	+52.2	133.3	59 28.4	+53.0	134.5	58 45.9	+53.6	135.7	58 02.6	+54.2	136.8	57 18.5	+54.7	137.9	56 33.6	+55.3	138.9	31
32	62 20.7	+49.9	129.4	61 42.0	+50.9	130.9	61 02.2	+51.7	132.3	60 21.4	+52.4	133.6	59 39.5	+53.3	134.8	58 56.8	+53.9	136.0	58 13.2	+54.5	137.1	57 28.9	+55.0	138.2	32
33	63 10.6	+49.2	128.2	62 32.9	+50.2	129.8	61 53.9	+51.2	131.2	61 13.8	+52.1	132.6	60 32.8	+52.8	133.9	59 50.7	+53.5	135.1	59 07.7	+54.2	136.3	58 23.9	+54.8	137.4	33
34	63 59.8	+48.5	126.9	63 23.1	+49.6	128.5	62 45.1	+50.6	130.1	62 05.9	+51.5	131.5	61 24.6	+52.3	132.9	60 44.2	+53.1	134.2	60 01.9	+53.8	135.5	59 18.7	+54.5	136.6	34
35	64 48.3	+47.7	125.6	64 12.7	+48.9	127.3	63 35.7	+50.0	128.9	62 57.4	+51.0	130.4	62 17.9	+51.9	131.9	61 37.3	+52.7	133.2	60 55.7	+53.5	134.6	60 13.2	+54.1	135.8	35
36	65 36.0	+46.9	124.1	65 01.6	+48.1	125.9	64 25.7	+49.3	127.6	63 48.4	+50.3	129.2	63 09.8	+51.3	130.8	62 30.0	+52.3	132.2	61 49.2	+53.0	133.6	61 07.3	+53.8	134.9	36
37	66 22.9	+45.8	122.6	65 49.7	+47.3	124.5	65 15.0	+48.5	126.3	64 38.7	+49.7	128.0	64 01.1	+50.8	129.6	63 23.3	+51.7	131.1	62 42.2	+52.6	132.6	62 01.1	+53.3	134.0	37
38	67 08.7	+44.8	121.0	66 37.0	+46.3	123.0	66 03.5	+47.7	124.9	65 28.4	+49.0	126.7	64 51.9	+50.1	128.4	64 14.0	+51.1	130.0	63 34.8	+52.1	131.5	62 54.4	+52.9	133.0	38
39	67 53.5	+43.6	119.2	67 23.3	+45.2	121.3	66 51.2	+46.7	123.3	66 17.4	+48.1	125.2	65 42.0	+49.3	127.1	65 05.1	+50.5	128.8	64 26.9	+51.5	130.4	63 47.3	+52.5	132.0	39
40	68 37.1	+42.3	117.4	68 08.5	+44.1	119.6	67 37.9	+45.7	121.7	67 05.5	+47.2	123.7	66 31.3	+48.6	125.6	65 55.6	+49.8	127.5	65 18.4	+50.9	129.2	64 39.8	+51.9	130.8	40
41	69 19.4	+40.9	115.4	68 52.6	+42.8	117.7	68 23.6	+44.6	120.0	67 52.7	+46.2	122.1	67 19.9	+47.6	124.1	66 45.4	+49.0	126.1	66 09.3	+50.2	127.9	65 31.7	+51.3	129.7	41
42	70 00.3	+39.3	113.3	69 35.4	+41.4	115.8	69 08.2	+43.3	118.1	68 38.9	+45.0	120.4	68 07.5	+46.7	122.5	67 34.4	+48.1	124.6	66 59.5	+49.4	126.5	66 23.0	+50.6	128.4	42
43	70 39.6	+37.5	111.0	70 16.8	+39.8	113.7	69 51.5	+41.9	116.2	69 23.9	+43.8	118.5	68 54.2	+45.6	120.8	68 22.5	+47.1	123.0	67 48.9	+48.6	125.1	67 13.6	+49.9	127.0	43
44	71 17.1	+35.6•	108.7	70 56.6	+38.0	111.4	70 33.4	+40.3	114.0	70 07.7	+42.4	116.6	69 39.8	+44.3	119.0	69 09.6	+46.1	121.3	68 37.5	+47.6	123.5	68 03.5	+49.0	125.6	44
45	71 52.7	+33.4•	106.1	71 34.6	+36.1•	109.0	71 13.7	+38.6	111.8	70 50.1	+40.9	114.5	70 24.1	+42.9	117.0	69 55.7	+44.8	119.5	69 25.1	+46.6	121.8	68 52.5	+48.2	124.0	45
46	72 26.1	+31.1•	103.4	72 10.7	+33.9•	106.4	71 52.3	+36.6•	109.4	71 31.0	+39.1	112.2	71 07.0	+41.4	114.9	70 40.5	+43.5	117.5	70 11.7	+45.3	120.0	69 40.7	+47.0	122.3	46
47	72 57.2	+28.5•	100.5	72 44.6	+31.6•	103.7	72 28.9	+34.4•	106.8	72 10.1	+37.1•	109.7	71 48.4	+39.6	112.6	71 24.0	+41.9	115.4	70 57.0	+44.0	118.0	70 27.7	+45.9	120.5	47
48	73 25.7	+25.7•	97.5	73 16.2	+29.0•	100.8	73 03.3	+32.1•	104.0	72 47.2	+35.0•	107.1	72 28.0	+37.7•	110.2	72 05.9	+40.2	113.1	71 41.0	+42.5	115.9	71 13.6	+44.6	118.5	48
49	73 51.4	+22.7•	94.3	73 45.2	+26.1•	97.7	73 35.4	+29.5•	101.1	73 22.2	+32.6•	104.3	73 05.7	+35.6•	107.5	72 46.1	+38.3•	110.6	72 23.5	+40.8	113.6	71 58.2	+43.0	116.4	49
50	74 14.1	+19.5•	90.9	74 11.3	+23.1•	94.4	74 04.9	+26.6•	97.9	73 54.8	+30.0•	101.4	73 41.3	+33.1•	104.7	73 24.4	+36.1•	108.0	73 04.3	+38.9•	111.1	72 41.2	+41.4	114.1	50
51	74 33.6	+15.9•	87.4	74 34.4	+19.8•	91.0	74 31.5	+23.4•	94.6	74 24.8	+27.0•	98.2	74 14.4	+30.5•	101.7	74 00.5	+33.7•	105.1	73 43.2	+36.7•	108.4	73 22.6	+39.5•	111.6	51
52	74 49.5	+12.4•	83.7	74 54.2	+16.2•	87.4	74 54.9	+20.1•	91.1	74 51.8	+23.9•	94.8	74 44.9	+27.5•	98.5	74 34.2	+31.0•	102.1	74 19.9	+34.2•	105.6	74 02.1	+37.2•	108.9	52
53	75 01.9	+8.5•	80.0	75 10.4	+12.5•	83.7	75 15.0	+16.5•	87.5	75 15.7	+20.5•	91.3	75 12.4	+24.3•	95.0	75 05.2	+28.0•	98.8	74 54.1	+31.6•	102.5	74 39.3	+34.9•	106.0	53
54	75 10.4	+4.6•	76.1	75 22.9	+8.6•	79.8	75 31.5	+12.7•	83.6	75 36.2	+16.7•	87.5	75 36.7	+20.8•	91.4	75 33.2	+24.8•	95.3	75 25.7	+28.5•	99.1	75 14.2	+32.1•	102.9	54
55	75 15.0	+0.7•	72.2	75 31.5	+4.7•	75.9	75 44.2	+8.7•	79.7	75 52.9	+12.9•	83.6	75 57.5	+17.1•	87.6	75 58.0	+21.1•	91.6	75 54.2	+25.2•	95.6	75 46.3	+29.1•	99.5	55
56	75 15.7	–3.3•	68.3	75 36.2	+0.5•	71.9	75 52.9	+4.6•	75.7	76 05.8	+8.8•	79.6	76 14.6	+13.0•	83.6	76 19.1	+17.4•	87.7	76 19.4	+21.6•	91.8	76 15.4	+25.7•	95.9	56
57	75 12.4	–7.2•	64.4	75 36.7	–3.5•	67.9	75 57.5	+0.5•	71.6	76 14.6	+4.5•	75.4	76 27.6	+8.9•	79.5	76 36.5	+13.2•	83.6	76 41.0	+17.6•	87.8	76 41.1	+21.9•	92.0	57
58	75 05.2	–11.1•	60.5	75 33.2	–7.5•	63.9	75 58.0	–3.8•	67.4	76 19.1	+0.3•	71.2	76 36.5	+4.5•	75.2	76 49.7	+8.9•	79.4	76 58.6	+13.4•	83.6	77 03.0	+17.9•	87.9	58
59	74 54.1	–14.8•	56.7	75 25.7	–11.5•	59.9	75 54.2	–7.9•	63.3	76 19.4	–4.0•	67.0	76 41.0	+0.1•	70.9	76 58.6	+4.4•	75.0	77 12.0	+8.9•	79.2	77 20.9	+13.6•	83.6	59
60	74 39.3	–18.2•	53.0	75 14.2	–15.2•	56.0	75 46.3	–11.9•	59.3	76 15.4	–8.3•	62.8	76 41.1	–4.4•	66.6	77 03.0	–0.1•	70.5	77 20.9	+4.4•	74.8	77 34.5	+9.0•	79.1	60
61	74 21.1	–21.7•	49.4	74 59.0	–18.9•	52.3	75 34.4	–15.7•	55.3	76 07.1	–12.3•	58.7	76 36.7	–8.6•	62.2	77 02.9	–4.7•	66.1	77 25.3	–0.4•	70.2	77 43.5	+4.2•	74.5	61
62	73 59.4	–24.7•	46.0	74 40.1	–22.2•	48.6	75 18.7	–19.4•	51.5	75 54.8	–16.3•	54.6	76 28.1	–12.9•	58.0	76 58.2	–9.1•	61.8	77 24.9	–5.0•	65.8	77 47.7	–0.6•	69.8	62
63	73 34.7	–27.6•	42.7	74 17.9	–25.3•	45.2	74 59.3	–22.8•	47.8	75 38.5	–20.1•	50.7	76 15.2	–16.9•	53.8	76 49.1	–13.4•	57.3	77 19.9	–9.6•	61.0	77 47.1	–5.4•	65.1	63
64	73 07.1	–30.2•	39.6	73 52.6	–28.2•	41.8	74 36.5	–26.0•	44.3	75 18.4	–23.4•	46.9	75 58.3	–20.6•	49.8	76 35.7	–17.5•	53.0	77 10.3	–14.0•	56.6	77 41.7	–10.1•	60.4	64
65	72 36.9	–32.7•	36.7	73 24.4	–30.9•	38.7	74 10.5	–28.9•	40.9	74 55.0	–26.7•	43.3	75 37.7	–24.2•	46.0	76 18.2	–21.3•	49.0	76 56.3	–18.2•	52.2	77 31.6	–14.6•	55.8	65
66	72 04.2	–34.8•	33.9	72 53.5	–33.3•	35.8	73 41.6	–31.6•	37.7	74 28.3	–29.6•	39.9	75 13.5	–27.4•	42.4	75 56.9	–25.0•	45.1	76 38.1	–22.1•	48.0	77 17.0	–19.0•	51.3	66
67	71 29.4	–36.9•	31.3	72 20.2	–35.6•	33.0	73 10.0	–34.0•	34.8	73 58.7	–32.3•	36.7	74 46.1	–30.4•	38.9	75 31.9	–28.1•	41.4	76 16.0	–25.7•	44.1	76 58.0	–22.8•	47.1	67
68	70 52.5	–38.7•	28.9	71 44.6	–37.5•	30.4	72 36.0	–36.2•	32.0	73 26.4	–34.7•	33.7	74 15.7	–33.0•	35.7	75 03.8	–31.2•	37.9	75 50.3	–28.9•	40.3	76 35.2	–26.6•	43.0	68
69	70 13.8	–40.4•	26.6	71 07.1	–39.3•	27.9	71 59.8	–38.2•	29.3	72 51.7	–36.9•	30.9	73 42.7	–35.5•	32.7	74 32.6	–33.8•	34.6	75 21.4	–32.0•	36.8	76 08.6	–29.8•	39.2	69
70	69 33.4	–41.8	24.4	70 27.8	–41.0	25.6	71 21.6	–40.0	26.9	72 14.8	–38.9	28.3	73 07.2	–37.6•	29.9	73 58.8	–36.2•	31.6	74 49.4	–34.6•	33.5	75 38.8	–32.8•	35.7	70
71	68 51.6	–43.2	22.4	69 46.8	–42.4	23.5	70 41.6	–41.5	24.6	71 35.9	–40.6	25.8	72 29.6	–39.6	27.2	73 22.6	–38.4•	28.7	74 14.8	–37.0•	30.4	75 06.0	–35.5•	32.4	71
72	68 08.4	–44.4	20.5	69 04.4	–43.7	21.4	70 00.1	–43.1	22.4	70 55.3	–42.2	23.5	71 50.0	–41.3	24.8	72 44.2	–40.3	26.1	73 37.8	–39.2•	27.6	74 30.5	–37.8•	29.3	72
73	67 24.0	–45.5	18.8	68 20.7	–45.0	19.6	69 17.0	–44.3	20.4	70 13.1	–43.7	21.4	71 08.7	–42.8	22.5	72 03.9	–42.0	23.7	72 58.6	–41.0	25.0	73 52.7	–39.9•	26.4	73
74	66 38.5	–46.6	17.1	67 35.7	–46.0	17.8	68 32.7	–45.5	18.6	69 29.4	–44.9	19.4	70 25.9	–44.3	20.4	71 21.9	–43.5	21.4	72 17.6	–42.7	22.5	73 12.8	–41.8	23.8	74
75	65 51.9	–47.4	15.5	66 49.7	–47.0	16.1	67 47.2	–46.5	16.8	68 44.5	–46.1	17.6	69 41.6	–45.5	18.4	70 38.4	–44.9	19.3	71 34.9	–44.2	20.3	72 31.0	–43.5	21.4	75
76	65 04.5	–48.2	14.0	66 02.7	–47.9	14.6	67 00.7	–47.5	15.2	67 58.5	–47.1	15.8	68 56.1	–46.6	16.5	69 53.5	–46.1	17.3	70 50.7	–45.6	18.2	71 47.5	–44.9	19.1	76
77	64 16.3	–49.0	12.7	65 14.8	–48.7	13.1	66 13.2	–48.4	13.6	67 11.4	–48.0	14.2	68 09.5	–47.6	14.8	69 07.4	–47.2	15.5	70 05.1	–46.7	16.2	71 02.6	–46.2	17.0	77
78	63 27.3	–49.7	11.3	64 26.1	–49.4	11.7	65 24.8	–49.2	12.2	66 23.4	–48.9	12.7	67 21.9	–48.6	13.2	68 20.2	–48.2	13.8	69 18.4	–47.8	14.4	70 16.4	–47.3	15.1	78
79	62 37.6	–50.2	10.1	63 36.7	–50.1	10.5	64 35.6	–49.8	10.8	65 34.5	–49.6	11.2	66 33.3	–49.3	11.7	67 32.0	–49.0	12.2	68 30.6	–48.7	12.7	69 29.1	–48.4	13.3	79
80	61 47.4	–50.9	8.9	62 46.6	–50.7	9.2	63 45.8	–50.5	9.6	64 44.9	–50.2	9.9	65 44.0	–50.0	10.3	66 43.0	–49.8	10.7	67 41.9	–49.5	11.2	68 40.7	–49.2	11.6	80
81	60 56.5	–51.4	7.8	61 55.9	–51.3	8.1	62 55.3	–51.0	8.4	63 54.7	–50.9	8.6	64 54.0	–50.8	9.0	65 53.2	–50.5	9.3	66 52.4	–50.3	9.7	67 51.5	–50.1	10.1	81
82	60 05.1	–51.8	6.8	61 04.7	–51.7	7.0	62 04.3	–51.6	7.2	63 03.8	–51.5	7.5	64 03.2	–51.3	7.7	65 02.7	–51.2	8.0	66 02.1	–51.0	8.3	67 01.4	–50.8	8.7	82
83	59 13.3	–52.3	5.8	60 13.0	–52.2	6.0	61 12.7	–52.1	6.1	62 12.3	–52.0	6.3	63 11.9	–51.8	6.6	64 11.5	–51.7	6.8	65 11.1	–51.6	7.0	66 10.6	–51.4	7.3	83
84	58 21.0	–52.6	4.8	59 20.8	–52.6	5.0	60 20.6	–52.5	5.1	61 20.3	–52.4	5.3	62 20.1	–52.4	5.5	63 19.8	–52.3	5.6	64 19.5	–52.2	5.9	65 19.2	–52.1	6.1	84
85	57 28.4	–53.1	3.9	58 28.2	–53.0	4.0	59 28.1	–53.0	4.2	60 27.9	–52.9	4.3	61 27.7	–52.8	4.4	62 27.5	–52.7	4.6	63 27.3	–52.6	4.7	64 27.1	–52.5	4.9	85
86	56 35.3	–53.4	3.1	57 35.2	–53.3	3.2	58 35.1	–53.3	3.2	59 35.0	–53.2	3.3	60 34.9	–53.2	3.4	61 34.8	–53.1	3.6	62 34.7	–53.1	3.7	63 34.6	–53.1	3.8	86
87	55 41.9	–53.7	2.2	56 41.9	–53.7	2.3	57 41.8	–53.6	2.4	58 41.8	–53.6	2.4	59 41.7	–53.6	2.4	60 41.7	–53.6	2.6	61 41.6	–53.5	2.7	62 41.5	–53.5	2.8	87
88	54 48.2	–53.9	1.5	55 48.2	–54.0	1.5	56 48.2	–54.0	1.5	57 48.2	–54.0	1.6	58 48.1	–53.9	1.6	59 48.1	–53.9	1.7	60 48.1	–53.9	1.7	61 48.1	–53.9	1.8	88
89	53 54.3	–54.3	0.7	54 54.2	–54.2	0.7	55 54.2	–54.2	0.8	56 54.2	–54.2	0.8	57 54.2	–54.2	0.8	58 54.2	–54.2	0.8	59 54.2	–54.2	0.8	60 54.2	–54.2	0.9	89
90	53 00.0	–54.5	0.0	54 00.0	–54.5	0.0	55 00.0	–54.5	0.0	56 00.0	–54.5	0.0	57 00.0	–54.5	0.0	58 00.0	–54.5	0.0	59 00.0	–54.5	0.0	60 00.0	–54.5	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	33 03.2	−57.2	149.7	32 11.3	−57.3	150.0	31 19.3	−57.6	150.3	30 27.1	−57.8	150.6	29 34.7	−57.9	150.9	28 42.2	−58.0	151.2	27 49.5	−58.1	151.5	26 56.8	−58.3	151.7	0
1	32 06.0	−57.2	150.1	31 14.0	−57.5	150.4	30 21.7	−57.6	150.7	29 29.3	−57.7	151.0	28 36.8	−57.9	151.2	27 44.2	−58.1	151.5	26 51.4	−58.2	151.7	25 58.5	−58.4	152.0	1
2	31 08.8	−57.3	150.4	30 16.5	−57.5	150.7	29 24.1	−57.6	151.0	28 31.6	−57.7	151.3	27 38.9	−58.0	151.5	26 46.1	−58.1	151.8	25 53.2	−58.3	152.0	25 00.1	−58.3	152.2	2
3	30 11.5	−57.4	150.8	29 19.0	−57.5	151.1	28 26.5	−57.7	151.3	27 33.8	−57.9	151.6	26 40.9	−58.0	151.8	25 48.0	−58.1	152.0	24 54.9	−58.2	152.3	24 01.8	−58.4	152.5	3
4	29 14.1	−57.4	151.1	28 21.5	−57.5	151.4	27 28.8	−57.7	151.6	26 35.9	−57.9	151.9	25 42.9	−58.0	152.1	24 49.9	−58.2	152.3	23 56.7	−58.3	152.5	23 03.4	−58.4	152.7	4
5	28 16.7	−57.5	151.4	27 23.9	−57.6	151.7	26 31.0	−57.7	151.9	25 38.0	−57.9	152.2	24 44.9	−58.0	152.4	23 51.7	−58.2	152.6	22 58.4	−58.3	152.8	22 05.0	−58.4	153.0	5
6	27 19.2	−57.5	151.8	26 26.3	−57.7	152.0	25 33.3	−57.9	152.2	24 40.1	−57.9	152.5	23 46.9	−58.1	152.7	22 53.5	−58.2	152.9	22 00.1	−58.4	153.0	21 06.6	−58.5	153.2	6
7	26 21.7	−57.6	152.1	25 28.6	−57.7	152.3	24 35.4	−57.8	152.5	23 42.2	−58.0	152.7	22 48.8	−58.1	152.9	21 55.3	−58.2	153.1	21 01.7	−58.3	153.3	20 08.1	−58.5	153.5	7
8	25 24.1	−57.6	152.4	24 30.9	−57.7	152.6	23 37.6	−57.9	152.8	22 44.2	−58.0	153.0	21 50.7	−58.2	153.2	20 57.1	−58.3	153.4	20 03.4	−58.4	153.5	19 09.6	−58.5	153.7	8
9	24 26.6	−57.7	152.7	23 33.2	−57.8	152.9	22 39.7	−57.9	153.1	21 46.2	−58.1	153.3	20 52.5	−58.1	153.5	19 58.8	−58.3	153.6	19 05.0	−58.4	153.8	18 11.1	−58.5	153.9	9
10	23 28.9	−57.6	153.0	22 35.4	−57.8	153.2	21 41.8	−57.9	153.4	20 48.1	−58.0	153.6	19 54.4	−58.2	153.7	19 00.5	−58.3	153.9	18 06.6	−58.4	154.0	17 12.6	−58.5	154.2	10
11	22 31.3	−57.7	153.3	21 37.6	−57.8	153.5	20 43.9	−58.0	153.7	19 50.1	−58.1	153.8	18 56.2	−58.2	154.0	18 02.2	−58.3	154.1	17 08.2	−58.4	154.3	16 14.1	−58.5	154.4	11
12	21 33.6	−57.8	153.6	20 39.8	−57.9	153.8	19 45.9	−58.0	153.9	18 52.0	−58.1	154.1	17 58.0	−58.3	154.2	17 03.9	−58.3	154.4	16 09.8	−58.5	154.5	15 15.6	−58.6	154.6	12
13	20 35.8	−57.7	153.9	19 41.9	−57.9	154.1	18 47.9	−58.0	154.2	17 53.9	−58.2	154.4	16 59.7	−58.2	154.5	16 05.6	−58.4	154.6	15 11.3	−58.4	154.7	14 17.0	−58.5	154.9	13
14	19 38.1	−57.8	154.2	18 44.0	−58.0	154.3	17 49.9	−58.1	154.5	16 55.7	−58.1	154.6	16 01.5	−58.3	154.7	15 07.2	−58.4	154.9	14 12.9	−58.5	155.0	13 18.5	−58.6	155.1	14
15	18 40.3	−57.8	154.5	17 46.1	−57.9	154.6	16 51.9	−58.1	154.8	15 57.6	−58.2	154.9	15 03.2	−58.2	155.0	14 08.8	−58.4	155.1	13 14.4	−58.5	155.2	12 19.9	−58.6	155.3	15
16	17 42.5	−57.9	154.8	16 48.2	−58.0	154.9	15 53.8	−58.0	155.0	14 59.4	−58.2	155.1	14 05.0	−58.3	155.2	13 10.4	−58.3	155.3	12 15.9	−58.5	155.4	11 21.3	−58.6	155.5	16
17	16 44.6	−57.9	155.0	15 50.2	−57.9	155.2	14 55.8	−58.1	155.3	14 01.2	−58.2	155.5	13 06.7	−58.3	155.5	12 12.1	−58.5	155.6	11 17.4	−58.5	155.7	10 22.7	−58.6	155.7	17
18	15 46.8	−57.9	155.3	14 52.3	−58.0	155.4	13 57.7	−58.1	155.5	13 03.0	−58.2	155.6	12 08.4	−58.4	155.7	11 13.6	−58.4	155.8	10 18.9	−58.5	155.9	9 24.1	−58.6	156.0	18
19	14 48.9	−57.9	155.6	13 54.3	−58.1	155.7	12 59.6	−58.2	155.8	12 04.8	−58.3	155.9	11 10.0	−58.3	156.0	10 15.2	−58.4	156.0	9 20.4	−58.6	156.1	8 25.5	−58.6	156.2	19
20	13 51.0	−57.9	155.9	12 56.2	−58.0	156.0	12 01.4	−58.1	156.0	11 06.6	−58.3	156.1	10 11.7	−58.3	156.2	9 16.8	−58.4	156.3	8 21.8	−58.5	156.3	7 26.9	−58.6	156.4	20
21	12 53.1	−57.9	156.1	11 58.2	−58.0	156.2	11 03.3	−58.1	156.3	10 08.3	−58.2	156.4	9 13.4	−58.4	156.4	8 18.4	−58.5	156.5	7 23.3	−58.5	156.6	6 28.3	−58.7	156.6	21
22	11 55.2	−58.0	156.4	11 00.2	−58.1	156.5	10 05.2	−58.2	156.5	9 10.1	−58.3	156.6	8 15.0	−58.3	156.7	7 19.9	−58.4	156.7	6 24.8	−58.6	156.8	5 29.6	−58.6	156.8	22
23	10 57.2	−57.9	156.7	10 02.1	−58.0	156.7	9 07.0	−58.2	156.8	8 11.8	−58.2	156.9	7 16.7	−58.4	156.9	6 21.5	−58.5	157.0	5 26.2	−58.5	157.0	4 31.0	−58.6	157.0	23
24	9 59.3	−58.0	156.9	9 04.1	−58.1	157.0	8 08.8	−58.2	157.0	7 13.6	−58.3	157.1	6 18.3	−58.4	157.1	5 23.0	−58.5	157.2	4 27.7	−58.6	157.2	3 32.4	−58.7	157.2	24
25	9 01.3	−58.0	157.2	8 06.0	−58.1	157.2	7 10.6	−58.1	157.3	6 15.3	−58.3	157.3	5 19.9	−58.4	157.4	4 24.5	−58.5	157.4	3 29.1	−58.6	157.4	2 33.7	−58.6	157.5	25
26	8 03.3	−58.0	157.4	7 07.9	−58.1	157.5	6 12.5	−58.2	157.5	5 17.0	−58.3	157.6	4 21.5	−58.3	157.6	3 26.1	−58.5	157.6	2 30.6	−58.6	157.7	1 35.1	−58.7	157.7	26
27	7 05.3	−58.0	157.7	6 09.8	−58.1	157.7	5 14.3	−58.2	157.8	4 18.7	−58.3	157.8	3 23.2	−58.4	157.8	2 27.6	−58.5	157.9	1 32.0	−58.6	157.9	0 36.4	−58.6	157.9	27
28	6 07.3	−58.0	158.0	5 11.7	−58.1	158.0	4 16.1	−58.2	158.0	3 20.4	−58.3	158.1	2 24.8	−58.4	158.1	1 29.1	−58.5	158.1	0 33.4	−58.5	158.1	0 22.2	+58.7	21.9	28
29	5 09.3	−58.0	158.2	4 13.6	−58.1	158.2	3 17.9	−58.2	158.3	2 22.1	−58.3	158.3	1 26.4	−58.4	158.3	0 30.6	−58.4	158.3	0 25.1	+58.6	21.7	1 20.9	+58.6	21.7	29
30	4 11.3	−58.0	158.5	3 15.5	−58.1	158.5	2 19.7	−58.2	158.5	1 23.8	−58.3	158.5	0 28.0	−58.4	158.5	0 27.8	+58.5	21.5	1 23.7	+58.5	21.5	2 19.5	+58.6	21.5	30
31	3 13.3	−58.0	158.7	2 17.4	−58.1	158.7	1 21.5	−58.3	158.8	0 25.5	−58.3	158.8	0 30.4	+58.4	21.2	1 26.3	+58.5	21.2	2 22.2	+58.6	21.3	3 18.1	+58.7	21.3	31
32	2 15.3	−58.1	159.0	1 19.3	−58.2	159.0	0 23.2	−58.2	159.0	0 32.8	+58.3	21.0	1 28.8	+58.4	21.0	2 24.8	+58.5	21.0	3 20.8	+58.5	21.0	4 16.8	+58.6	21.1	32
33	1 17.2	−58.0	159.2	0 21.1	−58.1	159.2	0 35.0	+58.2	20.8	1 31.1	+58.3	20.8	2 27.2	+58.4	20.8	3 23.3	+58.4	20.8	4 19.3	+58.6	20.8	5 15.4	+58.7	20.9	33
34	0 19.2	−58.1	159.5	0 37.0	+58.1	20.5	1 33.2	+58.2	20.5	2 29.4	+58.3	20.5	3 25.6	+58.3	20.5	4 21.7	+58.5	20.6	5 17.9	+58.5	20.6	6 14.1	+58.6	20.6	34
35	0 38.8	+58.0	20.3	1 35.1	+58.1	20.3	2 31.4	+58.2	20.3	3 27.7	+58.3	20.3	4 23.9	+58.4	20.3	5 20.2	+58.5	20.3	6 16.4	+58.6	20.4	7 12.7	+58.6	20.4	35
36	1 36.8	+58.1	20.0	2 33.2	+58.1	20.0	3 29.6	+58.2	20.0	4 26.0	+58.2	20.1	5 22.3	+58.4	20.1	6 18.7	+58.5	20.1	7 15.0	+58.5	20.2	8 11.3	+58.6	20.2	36
37	2 34.9	+58.0	19.7	3 31.3	+58.1	19.7	4 27.8	+58.2	19.8	5 24.2	+58.3	19.8	6 20.7	+58.3	19.9	7 17.1	+58.5	19.9	8 13.5	+58.5	19.9	9 09.9	+58.6	20.0	37
38	3 32.9	+58.0	19.5	4 29.4	+58.1	19.5	5 26.0	+58.2	19.5	6 22.5	+58.3	19.6	7 19.0	+58.4	19.6	8 15.6	+58.4	19.7	9 12.0	+58.6	19.7	10 08.5	+58.6	19.8	38
39	4 30.9	+58.0	19.2	5 27.5	+58.1	19.3	6 24.2	+58.2	19.3	7 20.8	+58.3	19.3	8 17.4	+58.4	19.4	9 14.0	+58.4	19.4	10 10.6	+58.5	19.5	11 07.1	+58.6	19.6	39
40	5 28.9	+58.0	19.0	6 25.6	+58.1	19.0	7 22.4	+58.1	19.1	8 19.1	+58.2	19.1	9 15.8	+58.3	19.1	10 12.4	+58.4	19.2	11 09.1	+58.5	19.3	12 05.7	+58.6	19.3	40
41	6 26.9	+58.0	18.7	7 23.7	+58.1	18.8	8 20.5	+58.2	18.8	9 17.3	+58.3	18.9	10 14.1	+58.3	18.9	11 10.8	+58.5	19.0	12 07.6	+58.5	19.0	13 04.3	+58.5	19.1	41
42	7 24.9	+58.0	18.5	8 21.8	+58.1	18.5	9 18.7	+58.2	18.6	10 15.6	+58.3	18.6	11 12.4	+58.3	18.7	12 09.3	+58.4	18.7	13 06.1	+58.4	18.8	14 02.8	+58.6	18.9	42
43	8 22.9	+58.0	18.2	9 19.9	+58.0	18.3	10 16.9	+58.1	18.3	11 13.8	+58.2	18.4	12 10.7	+58.4	18.4	13 07.7	+58.3	18.5	14 04.5	+58.5	18.6	15 01.4	+58.5	18.7	43
44	9 20.9	+57.9	17.9	10 17.9	+58.0	18.0	11 15.0	+58.1	18.1	12 12.0	+58.3	18.1	13 09.1	+58.2	18.2	14 06.0	+58.4	18.3	15 03.0	+58.5	18.3	15 59.9	+58.6	18.4	44
45	10 18.8	+57.8	17.7	11 16.0	+58.0	17.7	12 13.1	+58.2	17.8	13 10.3	+58.2	17.9	14 07.3	+58.3	17.9	15 04.4	+58.4	18.0	16 01.5	+58.4	18.1	16 58.5	+58.6	18.2	45
46	11 16.8	+57.9	17.4	12 14.0	+58.1	17.5	13 11.3	+58.1	17.5	14 08.5	+58.1	17.6	15 05.6	+58.3	17.7	16 02.8	+58.3	17.8	16 59.9	+58.4	17.9	17 57.0	+58.5	18.0	46
47	12 14.7	+57.9	17.2	13 12.1	+58.0	17.2	14 09.4	+58.0	17.3	15 06.6	+58.2	17.4	16 03.9	+58.2	17.5	17 01.1	+58.3	17.5	17 58.3	+58.4	17.6	18 55.5	+58.4	17.7	47
48	13 12.7	+57.9	16.9	14 10.1	+57.9	17.0	15 07.4	+58.1	17.0	16 04.8	+58.1	17.1	17 02.1	+58.3	17.2	17 59.4	+58.3	17.3	18 56.7	+58.4	17.4	19 53.9	+58.5	17.5	48
49	14 10.6	+57.9	16.6	15 08.1	+57.9	16.7	16 05.5	+58.1	16.8	17 02.9	+58.2	16.9	18 00.4	+58.2	17.0	18 57.7	+58.3	17.0	19 55.1	+58.3	17.2	20 52.4	+58.4	17.3	49
50	15 08.5	+57.8	16.3	16 06.0	+58.0	16.4	17 03.6	+58.0	16.5	18 01.1	+58.1	16.6	18 58.6	+58.1	16.7	19 56.0	+58.3	16.8	20 53.4	+58.4	16.9	21 50.8	+58.4	17.0	50
51	16 06.3	+57.9	16.1	17 04.0	+57.9	16.2	18 01.6	+58.0	16.2	18 59.2	+58.1	16.3	19 56.7	+58.2	16.4	20 54.3	+58.2	16.5	21 51.8	+58.3	16.7	22 49.2	+58.4	16.8	51
52	17 04.2	+57.8	15.8	18 01.9	+57.9	15.9	18 59.6	+58.0	16.0	19 57.3	+58.0	16.1	20 54.9	+58.1	16.2	21 52.5	+58.2	16.3	22 50.1	+58.3	16.4	23 47.6	+58.4	16.5	52
53	18 02.0	+57.8	15.5	18 59.8	+57.9	15.6	19 57.6	+57.9	15.7	20 55.3	+58.1	15.8	21 53.0	+58.1	15.9	22 50.7	+58.2	16.0	23 48.4	+58.2	16.1	24 46.0	+58.3	16.3	53
54	18 59.8	+57.8	15.2	19 57.7	+57.9	15.3	20 55.5	+58.0	15.4	21 53.4	+58.0	15.5	22 51.2	+58.0	15.6	23 48.9	+58.2	15.8	24 46.6	+58.3	15.9	25 44.3	+58.4	16.0	54
55	19 57.6	+57.7	14.9	20 55.5	+57.9	15.0	21 53.5	+57.9	15.1	22 51.4	+57.9	15.3	23 49.2	+58.1	15.4	24 47.1	+58.1	15.5	25 44.9	+58.2	15.6	26 42.7	+58.2	15.7	55
56	20 55.3	+57.7	14.7	21 53.4	+57.8	14.9	22 51.4	+57.8	15.0	23 49.3	+58.0	15.0	24 47.3	+58.0	15.1	25 45.2	+58.1	15.2	26 43.1	+58.2	15.3	27 40.9	+58.3	15.5	56
57	21 53.0	+57.7	14.4	22 51.2	+57.7	14.5	23 49.2	+57.9	14.6	24 47.3	+57.9	14.7	25 45.3	+58.0	14.8	26 43.3	+58.1	14.9	27 41.3	+58.1	15.1	28 39.2	+58.2	15.2	57
58	22 50.7	+57.7	14.1	23 48.9	+57.7	14.2	24 47.1	+57.8	14.3	25 45.2	+57.9	14.4	26 43.3	+58.0	14.5	27 41.4	+58.0	14.7	28 39.4	+58.1	14.8	29 37.4	+58.2	14.9	58
59	23 48.4	+57.6	13.8	24 46.6	+57.7	13.9	25 44.9	+57.8	14.0	26 43.1	+57.8	14.1	27 41.3	+57.9	14.2	28 39.4	+58.0	14.4	29 37.5	+58.1	14.5	30 35.6	+58.1	14.6	59
60	24 46.0	+57.6	13.5	25 44.3	+57.7	13.6	26 42.7	+57.7	13.7	27 40.9	+57.8	13.8	28 39.2	+57.9	13.9	29 37.4	+58.0	14.1	30 35.6	+58.0	14.2	31 33.7	+58.1	14.4	60
61	25 43.6	+57.5	13.1	26 42.0	+57.6	13.3	27 40.4	+57.7	13.4	28 38.7	+57.8	13.5	29 37.1	+57.8	13.6	30 35.4	+57.9	13.8	31 33.6	+58.0	13.9	32 31.8	+58.1	14.1	61
62	26 41.1	+57.5	12.8	27 39.6	+57.6	12.9	28 38.1	+57.6	13.1	29 36.5	+57.7	13.2	30 34.9	+57.7	13.3	31 33.3	+57.8	13.5	32 31.6	+57.9	13.6	33 29.9	+58.0	13.8	62
63	27 38.6	+57.5	12.5	28 37.2	+57.5	12.6	29 35.7	+57.6	12.7	30 34.2	+57.7	12.9	31 32.7	+57.7	13.0	32 31.1	+57.9	13.2	33 29.5	+57.9	13.3	34 27.9	+58.0	13.5	63
64	28 36.1	+57.4	12.2	29 34.7	+57.5	12.3	30 33.3	+57.6	12.4	31 31.9	+57.6	12.6	32 30.4	+57.7	12.7	33 29.0	+57.7	12.8	34 27.4	+57.9	13.0	35 25.9	+57.9	13.1	64
65	29 33.5	+57.3	11.8	30 32.2	+57.4	12.0	31 30.9	+57.5	12.1	32 29.5	+57.6	12.2	33 28.1	+57.7	12.4	34 26.7	+57.7	12.5	35 25.3	+57.8	12.7	36 23.8	+57.9	12.8	65
66	30 30.8	+57.3	11.5	31 29.6	+57.4	11.6	32 28.4	+57.4	11.8	33 27.1	+57.5	11.9	34 25.8	+57.6	12.0	35 24.4	+57.7	12.2	36 23.1	+57.7	12.3	37 21.7	+57.8	12.5	66
67	31 28.1	+57.3	11.2	32 27.0	+57.3	11.3	33 25.8	+57.4	11.4	34 24.6	+57.5	11.5	35 23.4	+57.5	11.7	36 22.1	+57.6	11.8	37 20.8	+57.7	12.0	38 19.5	+57.7	12.2	67
68	32 25.4	+57.1	10.8	33 24.3	+57.2	11.0	34 23.2	+57.3	11.1	35 22.1	+57.3	11.2	36 20.9	+57.5	11.3	37 19.7	+57.5	11.5	38 18.5	+57.6	11.6	39 17.2	+57.7	11.8	68
69	33 22.5	+57.2	10.4	34 21.5	+57.2	10.6	35 20.5	+57.3	10.7	36 19.4	+57.4	10.8	37 18.4	+57.4	11.0	38 17.2	+57.5	11.1	39 16.1	+57.6	11.3	40 14.9	+57.7	11.4	69
70	34 19.7	+57.0	10.1	35 18.7	+57.1	10.2	36 17.8	+57.1	10.3	37 16.8	+57.2	10.5	38 15.8	+57.3	10.6	39 14.7	+57.4	10.8	40 13.7	+57.4	10.9	41 12.6	+57.5	11.1	70
71	35 16.7	+57.0	9.7	36 15.8	+57.1	9.8	37 14.9	+57.2	10.0	38 14.0	+57.2	10.1	39 13.1	+57.2	10.2	40 12.1	+57.3	10.4	41 11.1	+57.4	10.5	42 10.1	+57.5	10.7	71
72	36 13.7	+56.9	9.3	37 12.9	+56.9	9.4	38 12.1	+57.0	9.6	39 11.2	+57.1	9.7	40 10.3	+57.2	9.8	41 09.4	+57.3	10.0	42 08.5	+57.3	10.1	43 07.6	+57.4	10.3	72
73	37 10.6	+56.8	8.9	38 09.8	+56.9	9.0	39 09.1	+56.9	9.2	40 08.3	+57.0	9.3	41 07.5	+57.1	9.4	42 06.7	+57.1	9.6	43 05.8	+57.3	9.7	44 05.0	+57.3	9.9	73
74	38 07.4	+56.7	8.5	39 06.7	+56.8	8.6	40 06.0	+56.9	8.8	41 05.3	+57.0	8.9	42 04.6	+57.0	9.0	43 03.8	+57.1	9.2	44 03.1	+57.1	9.3	45 02.3	+57.2	9.5	74
75	39 04.1	+56.7	8.1	40 03.5	+56.7	8.2	41 02.9	+56.8	8.3	42 02.3	+56.8	8.5	43 01.6	+56.9	8.6	44 00.9	+57.0	8.7	45 00.2	+57.0	8.8	45 59.5	+57.1	9.1	75
76	40 00.8	+56.5	7.7	41 00.2	+56.6	7.8	41 59.7	+56.6	7.9	42 59.1	+56.7	8.0	43 58.5	+56.8	8.2	44 57.9	+56.8	8.3	45 57.2	+57.0	8.5	46 56.6	+57.0	8.6	76
77	40 57.3	+56.5	7.2	41 56.8	+56.5	7.3	42 56.3	+56.6	7.5	43 55.8	+56.6	7.6	44 55.3	+56.7	7.7	45 54.7	+56.8	7.9	46 54.2	+56.8	8.0	47 53.6	+56.9	8.2	77
78	41 53.8	+56.3	6.8	42 53.3	+56.4	7.0	43 52.9	+56.4	7.0	44 52.4	+56.5	7.1	45 51.9	+56.6	7.2	46 51.5	+56.6	7.4	47 51.0	+56.7	7.5	48 50.5	+56.7	7.7	78
79	42 50.1	+56.2	6.3	43 49.7	+56.3	6.4	44 49.3	+56.4	6.5	45 49.0	+56.3	6.6	46 48.5	+56.5	6.8	47 48.1	+56.5	6.9	48 47.7	+56.5	7.0	49 47.2	+56.6	7.2	79
80	43 46.3	+56.1	5.8	44 46.0	+56.1	5.9	45 45.7	+56.2	6.0	46 45.3	+56.3	6.1	47 45.0	+56.3	6.3	48 44.6	+56.4	6.4	49 44.2	+56.5	6.5	50 43.8	+56.5	6.7	80
81	44 42.4	+56.0	5.3	45 42.1	+56.0	5.4	46 41.9	+56.0	5.5	47 41.6	+56.1	5.6	48 41.3	+56.1	5.7	49 41.0	+56.2	5.9	50 40.7	+56.2	6.0	51 40.3	+56.4	6.1	81
82	45 38.4	+55.8	4.8	46 38.1	+55.9	4.9	47 37.9	+55.9	5.1	48 37.7	+55.9	5.1	49 37.4	+56.1	5.2	50 37.2	+56.1	5.3	51 36.9	+56.1	5.4	52 36.7	+56.1	5.6	82
83	46 34.2	+55.6	4.3	47 34.0	+55.7	4.4	48 33.8	+55.8	4.5	49 33.6	+55.8	4.6	50 33.5	+55.8	4.7	51 33.3	+55.8	4.8	52 33.0	+56.0	4.9	53 32.8	+56.0	5.0	83
84	47 29.8	+55.5	3.7	48 29.7	+55.6	3.8	49 29.6	+55.6	3.9	50 29.4	+55.7	4.0	51 29.3	+55.6	4.1	52 29.1	+55.7	4.2	53 29.0	+55.7	4.3	54 28.8	+55.8	4.4	84
85	48 25.4	+55.4	3.2	49 25.3	+55.3	3.2	50 25.2	+55.4	3.3	51 25.1	+55.4	3.4	52 24.9	+55.5	3.5	53 24.8	+55.5	3.5	54 24.7	+55.6	3.6	55 24.6	+55.6	3.7	85
86	49 20.7	+55.1	2.6	50 20.6	+55.2	2.6	51 20.6	+55.2	2.7	52 20.5	+55.2	2.8	53 20.4	+55.3	2.8	54 20.3	+55.3	2.9	55 20.3	+55.3	3.0	56 20.2	+55.3	3.0	86
87	50 15.8	+55.0	2.0	51 15.8	+55.0	2.0	52 15.8	+54.9	2.1	53 15.7	+55.0	2.1	54 15.7	+55.0	2.1	55 15.6	+55.1	2.2	56 15.6	+55.1	2.3	57 15.5	+55.1	2.3	87
88	51 10.8	+54.7	1.3	52 10.8	+54.7	1.4	53 10.7	+54.8	1.4	54 10.7	+54.8	1.4	55 10.7	+54.8	1.5	56 10.7	+54.8	1.5	57 10.7	+54.8	1.6	58 10.6	+54.9	1.6	88
89	52 05.5	+54.5	0.7	53 05.5	+54.5	0.7	54 05.5	+54.5	0.7	55 05.5	+54.5	0.7	56 05.5	+54.5	0.8	57 05.5	+54.5	0.8	58 05.5	+54.5	0.8	59 05.5	+54.5	0.8	89
90	53 00.0	+54.3	0.0	54 00.0	+54.2	0.0	55 00.0	+54.2	0.0	56 00.0	+54.2	0.0	57 00.0	+54.2	0.0	58 00.0	+54.2	0.0	59 00.0	+54.2	0.0	60 00.0	+54.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 155°, 205°**

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	32 44.7	+57.0	148.6	31 53.4	+57.2	148.9	31 02.0	+57.3	149.2	30 10.3	+57.5	149.5	29 18.5	+57.7	149.8	28 26.6	+57.8	150.1	27 34.5	+58.0	150.4	26 42.3	+58.2	150.6	0
1	33 41.7	+56.8	148.2	32 50.6	+57.0	148.6	31 59.3	+57.3	148.9	31 07.8	+57.5	149.2	30 16.2	+57.7	149.5	29 24.4	+57.8	149.8	28 32.5	+58.0	150.1	27 40.5	+58.1	150.3	1
2	34 38.5	+56.8	147.8	33 47.6	+57.1	148.2	32 56.6	+57.2	148.5	32 05.3	+57.4	148.9	31 13.9	+57.5	149.2	30 22.2	+57.8	149.5	29 30.5	+57.9	149.8	28 38.6	+58.0	150.1	2
3	35 35.3	+56.7	147.4	34 44.7	+56.9	147.8	33 53.8	+57.1	148.2	33 02.7	+57.4	148.5	32 11.4	+57.6	148.8	31 20.0	+57.7	149.2	30 28.4	+57.9	149.5	29 36.6	+58.1	149.8	3
4	36 32.0	+56.7	147.0	35 41.6	+56.9	147.4	34 50.9	+57.1	147.8	34 00.1	+57.2	148.2	33 09.0	+57.5	148.5	32 17.7	+57.7	148.8	31 26.3	+57.8	149.2	30 34.7	+58.0	149.5	4
5	37 28.7	+56.5	146.6	36 38.5	+56.7	147.0	35 48.0	+57.0	147.4	34 57.3	+57.3	147.8	34 06.5	+57.4	148.2	33 15.4	+57.6	148.5	32 24.1	+57.8	148.9	31 32.7	+58.0	149.2	5
6	38 25.2	+56.5	146.2	37 35.2	+56.7	146.6	36 45.0	+56.9	147.0	35 54.6	+57.1	147.4	35 03.9	+57.3	147.8	34 13.0	+57.6	148.2	33 21.9	+57.8	148.5	32 30.7	+57.9	148.9	6
7	39 21.7	+56.3	145.8	38 31.9	+56.6	146.2	37 41.9	+56.8	146.6	36 51.7	+57.1	147.1	36 01.2	+57.3	147.5	35 10.6	+57.5	147.8	34 19.7	+57.6	148.2	33 28.6	+57.8	148.5	7
8	40 18.0	+56.3	145.3	39 28.5	+56.5	145.8	38 38.8	+56.8	146.2	37 48.8	+57.0	146.7	36 58.5	+57.1	147.1	36 08.1	+57.3	147.5	35 17.3	+57.7	147.9	34 26.4	+57.8	148.2	8
9	41 14.3	+56.1	144.8	40 25.0	+56.5	145.3	39 35.6	+56.6	145.8	38 45.8	+56.9	146.3	37 55.8	+57.1	146.7	37 05.5	+57.3	147.1	36 15.0	+57.5	147.5	35 24.2	+57.8	147.9	9
10	42 10.4	+56.0	144.2	41 21.5	+56.3	144.8	40 32.2	+56.6	145.4	39 42.7	+56.8	145.9	38 52.9	+57.1	146.3	38 02.8	+57.3	146.8	37 12.5	+57.6	147.2	36 22.0	+57.7	147.6	10
11	43 06.4	+55.9	143.9	42 17.8	+56.1	144.4	41 28.8	+56.5	144.9	40 39.5	+56.8	145.4	39 50.0	+57.0	145.9	39 00.1	+57.3	146.4	38 10.1	+57.4	146.8	37 19.7	+57.7	147.2	11
12	44 02.3	+55.7	143.4	43 13.9	+56.1	143.9	42 25.3	+56.3	144.5	41 36.3	+56.6	145.0	40 47.0	+56.8	145.5	39 57.4	+57.1	146.0	39 07.5	+57.4	146.4	38 17.4	+57.5	146.9	12
13	44 58.0	+55.5	142.9	44 10.0	+55.9	143.5	43 21.6	+56.1	144.0	42 32.9	+56.5	144.6	41 43.8	+56.8	145.1	40 54.5	+57.0	145.6	40 04.9	+57.2	146.1	39 14.9	+57.6	146.5	13
14	45 53.6	+55.5	142.3	45 05.9	+55.8	142.9	44 17.9	+56.1	143.5	43 29.4	+56.4	144.1	42 40.6	+56.7	144.7	41 51.5	+57.0	145.2	41 02.1	+57.3	145.7	40 12.5	+57.6	146.2	14
15	46 49.1	+55.2	141.8	46 01.7	+55.7	142.4	45 14.0	+55.9	143.0	44 25.8	+56.3	143.6	43 37.3	+56.6	144.2	42 48.5	+56.9	144.7	41 59.4	+57.1	145.3	41 09.9	+57.4	145.8	15
16	47 44.3	+55.1	141.2	46 57.4	+55.4	141.9	46 09.9	+55.9	142.5	45 22.1	+56.2	143.1	44 33.9	+56.5	143.7	43 45.4	+56.7	144.3	42 56.5	+57.0	144.9	42 07.3	+57.2	145.4	16
17	48 39.4	+54.9	140.6	47 52.8	+55.3	141.3	47 05.8	+55.7	142.0	46 18.3	+56.0	142.6	45 30.4	+56.3	143.3	44 42.1	+56.7	143.9	43 53.5	+56.9	144.4	43 04.5	+57.1	145.0	17
18	49 34.3	+54.7	140.0	48 48.1	+55.2	140.7	48 01.5	+55.5	141.4	47 14.3	+55.9	142.1	46 26.7	+56.3	142.8	45 38.8	+56.5	143.4	44 50.4	+56.9	144.0	44 01.7	+57.1	144.6	18
19	50 29.0	+54.5	139.4	49 43.3	+54.9	140.1	48 57.0	+55.3	140.9	48 10.2	+55.7	141.6	47 23.0	+56.0	142.3	46 35.3	+56.4	142.9	45 47.3	+56.7	143.5	44 58.8	+57.0	144.1	19
20	51 23.5	+54.3	138.7	50 38.2	+54.7	139.5	49 52.3	+55.2	140.3	49 05.9	+55.6	141.0	48 19.0	+56.0	141.7	47 31.7	+56.3	142.4	46 44.0	+56.6	143.1	45 55.8	+56.9	143.7	20
21	52 17.8	+54.0	138.0	51 32.9	+54.5	138.8	50 47.5	+54.9	139.7	50 01.5	+55.3	140.4	49 15.0	+55.7	141.2	48 28.0	+56.1	141.9	47 40.6	+56.4	142.6	46 52.7	+56.8	143.2	21
22	53 11.8	+53.7	137.3	52 27.4	+54.2	138.1	51 42.4	+54.7	139.0	50 56.8	+55.2	139.8	50 10.7	+55.6	140.6	49 24.1	+56.0	141.3	48 37.0	+56.3	142.1	47 49.5	+56.6	142.7	22
23	54 05.5	+53.5	136.5	53 21.6	+54.0	137.5	52 37.1	+54.5	138.3	51 52.0	+55.0	139.2	51 06.3	+55.4	140.0	50 20.1	+55.8	140.8	49 33.3	+56.2	141.5	48 46.1	+56.5	142.2	23
24	54 59.0	+53.1	135.7	54 15.6	+53.7	136.7	53 31.6	+54.3	137.6	52 47.0	+54.7	138.5	52 01.7	+55.2	139.4	51 15.9	+55.6	140.2	50 29.5	+56.0	141.0	49 42.6	+56.4	141.7	24
25	55 52.1	+52.8	134.9	55 09.3	+53.4	135.9	54 25.9	+53.9	136.9	53 41.7	+54.5	137.9	52 56.9	+55.0	138.7	52 11.5	+55.4	139.6	51 25.5	+55.9	140.4	50 39.0	+56.2	141.2	25
26	56 44.9	+52.4	134.1	56 02.7	+53.1	135.1	55 19.8	+53.7	136.2	54 36.2	+54.2	137.1	53 51.9	+54.7	138.1	53 06.9	+55.2	139.0	52 21.4	+55.6	139.8	51 35.2	+56.1	140.6	26
27	57 37.3	+52.0	133.2	56 55.8	+52.7	134.3	56 13.5	+53.3	135.4	55 30.4	+54.0	136.4	54 46.6	+54.5	137.4	54 02.1	+55.0	138.3	53 17.0	+55.5	139.2	52 31.3	+55.9	140.1	27
28	58 29.3	+51.5	132.2	57 48.5	+52.3	133.4	57 06.8	+53.0	134.5	56 24.4	+53.6	135.6	55 41.1	+54.2	136.6	54 57.1	+54.8	137.6	54 12.5	+55.2	138.6	53 27.2	+55.7	139.5	28
29	59 20.8	+51.1	131.2	58 40.8	+51.9	132.5	57 59.8	+52.7	133.7	57 18.0	+53.3	134.8	56 35.3	+53.9	135.9	55 51.9	+54.5	136.9	55 07.7	+55.0	137.9	54 22.9	+55.4	138.8	29
30	60 11.9	+50.6	130.2	59 32.7	+51.4	131.5	58 52.5	+52.2	132.7	58 11.3	+52.9	133.9	57 29.2	+53.6	135.1	56 46.4	+54.1	136.1	56 02.7	+54.8	137.2	55 18.3	+55.3	138.2	30
31	61 02.5	+50.1	129.1	60 24.1	+51.0	130.5	59 44.7	+51.7	131.8	59 04.2	+52.5	133.0	58 22.8	+53.3	134.2	57 40.5	+53.9	135.4	56 57.5	+54.4	136.4	56 13.6	+55.0	137.5	31
32	61 52.6	+49.4	127.9	61 15.1	+50.3	129.4	60 36.4	+51.3	130.8	59 56.7	+52.1	132.1	59 16.1	+52.8	133.3	58 34.4	+53.6	134.5	57 51.9	+54.2	135.7	57 08.6	+54.8	136.7	32
33	62 42.0	+48.7	126.7	62 05.4	+49.8	128.2	61 27.7	+50.8	129.7	60 48.8	+51.7	131.1	60 08.9	+52.4	132.4	59 28.0	+53.1	133.6	58 46.1	+53.8	134.8	58 03.4	+54.4	136.0	33
34	63 30.7	+48.0	125.4	62 55.2	+49.2	127.0	62 18.5	+50.1	128.6	61 40.5	+51.1	130.0	61 01.3	+52.0	131.4	60 21.1	+52.8	132.7	59 39.9	+53.5	133.9	58 57.8	+54.2	135.2	34
35	64 18.7	+47.2	124.1	63 44.4	+48.4	125.7	63 08.6	+49.5	127.4	62 31.6	+50.5	128.9	61 53.3	+51.5	130.4	61 13.9	+52.3	131.7	60 33.4	+53.1	133.1	59 52.0	+53.8	134.3	35
36	65 05.9	+46.3	122.6	64 32.8	+47.6	124.4	63 58.1	+48.8	126.1	63 22.1	+49.9	127.7	62 44.8	+50.9	129.2	62 06.2	+51.8	130.7	61 26.5	+52.7	132.1	60 45.8	+53.4	133.4	36
37	65 52.2	+45.3	121.1	65 20.4	+46.7	123.0	64 46.9	+48.1	124.7	64 12.0	+49.2	126.4	63 35.7	+50.3	128.1	62 58.0	+51.3	129.6	62 19.2	+52.2	131.1	61 39.2	+53.0	132.5	37
38	66 37.5	+44.3	119.5	66 07.1	+45.8	121.4	65 35.0	+47.2	123.3	65 01.2	+48.5	125.1	64 26.0	+49.6	126.8	63 49.3	+50.7	128.5	63 11.4	+51.7	130.0	62 32.2	+52.6	131.5	38
39	67 21.8	+43.1	117.7	66 52.9	+44.7	119.8	66 22.2	+46.2	121.8	65 49.7	+47.6	123.7	65 15.6	+48.9	125.5	64 40.0	+50.1	127.2	64 03.1	+51.1	128.9	63 24.8	+52.0	130.4	39
40	68 04.9	+41.7	115.9	67 37.6	+43.6	118.1	67 08.4	+45.2	120.2	66 37.3	+46.7	122.2	66 04.5	+48.1	124.1	65 30.1	+49.3	125.9	64 54.2	+50.4	127.7	64 16.8	+51.5	129.3	40
41	68 46.6	+40.4	113.9	68 21.2	+42.3	116.1	67 53.6	+44.1	118.5	67 24.0	+45.7	120.6	66 52.6	+47.2	122.6	66 19.4	+48.6	124.5	65 44.6	+49.8	126.4	65 08.3	+50.9	128.1	41
42	69 27.0	+38.7	111.9	69 03.5	+40.8	114.3	68 37.7	+42.7	116.6	68 09.7	+44.6	118.9	67 39.8	+46.1	121.0	67 08.0	+47.6	123.0	66 34.4	+49.0	125.0	65 59.2	+50.2	126.8	42
43	70 05.7	+37.1	109.7	69 44.3	+39.3	112.2	69 20.4	+41.4	114.7	68 54.3	+43.2	117.0	68 25.9	+45.1	119.3	67 55.6	+46.6	121.4	67 23.4	+48.1	123.5	66 49.4	+49.4	125.5	43
44	70 42.8	+35.1•	107.3	70 23.6	+37.5	110.0	70 01.8	+39.8	112.6	69 37.5	+41.9	115.1	69 11.0	+43.8	117.5	68 42.2	+45.6	119.7	68 11.5	+47.1	121.9	67 38.8	+48.6	124.0	44
45	71 17.9	+33.0•	104.8	71 01.1	+35.6	107.6	70 41.6	+38.0	110.4	70 19.4	+40.3	113.0	69 54.8	+42.4	115.5	69 27.8	+44.3	117.9	68 58.6	+46.1	120.2	68 27.4	+47.7	122.4	45
46	71 50.9	+30.7•	102.2	71 36.7	+33.6•	105.1	71 19.6	+36.2•	108.0	70 59.7	+38.7	110.7	70 37.2	+40.9	113.4	70 12.1	+43.0	116.0	69 44.7	+44.9	118.4	69 15.1	+46.6	120.7	46
47	72 21.6	+28.3•	99.4	72 10.3	+31.2•	102.5	71 55.8	+34.0•	105.5	71 38.4	+36.6•	108.4	71 18.1	+39.1	111.2	70 55.1	+41.4	113.9	70 29.6	+43.5	116.5	70 01.7	+45.4	118.9	47
48	72 49.9	+25.5•	96.4	72 41.5	+28.7•	99.6	72 29.8	+31.8•	102.8	72 15.0	+34.6•	105.8	71 57.2	+37.3•	108.8	71 36.5	+39.7	111.6	71 13.1	+42.0	114.4	70 47.1	+44.0	117.0	48
49	73 15.4	+22.6•	93.3	73 10.2	+26.0•	96.6	73 01.6	+29.1•	99.9	72 49.6	+32.3•	103.1	72 34.5	+35.1•	106.2	72 16.2	+37.8•	109.2	71 55.1	+40.2	112.1	71 31.1	+42.6	114.9	49
50	73 38.0	+19.5•	90.1	73 36.2	+22.9•	93.5	73 30.7	+26.4•	96.9	73 21.9	+29.6•	100.2	73 09.6	+32.7•	103.4	72 54.0	+35.7•	106.6	72 35.3	+38.4	109.7	72 13.7	+40.9	112.6	50
51	73 57.5	+16.2•	86.7	73 59.1	+19.9•	90.2	73 57.1	+23.4•	93.6	73 51.5	+26.9•	97.1	73 42.3	+30.2•	100.5	73 29.7	+33.3•	103.9	73 13.7	+36.3•	107.0	72 54.6	+39.0•	110.2	51
52	74 13.7	+12.6•	83.2	74 19.0	+16.4•	86.7	74 20.5	+20.2•	90.3	74 18.4	+23.8•	93.8	74 12.5	+27.3•	97.4	74 03.0	+30.7•	100.8	73 50.0	+33.9•	104.2	73 33.6	+36.8•	107.5	52
53	74 26.3	+9.1•	79.6	74 35.4	+12.8•	83.1	74 40.7	+16.7•	86.7	74 42.2	+20.5•	90.4	74 39.8	+24.3•	94.0	74 33.7	+27.8•	97.7	74 23.9	+31.2•	101.2	74 10.4	+34.5•	104.7	53
54	74 35.4	+5.3•	75.8	74 48.2	+9.2•	79.4	74 57.4	+13.0•	83.0	75 02.7	+16.9•	86.8	75 04.1	+20.8•	90.5	75 01.5	+24.7•	94.3	74 55.1	+28.3•	98.0	74 44.9	+31.8•	101.6	54
55	74 40.7	+1.5•	72.1	74 57.4	+5.3•	75.6	75 10.4	+9.2•	79.3	75 19.6	+13.2•	83.0	75 24.9	+17.2•	86.9	75 26.2	+21.2•	90.7	75 23.4	+25.1•	94.5	75 16.7	+28.8•	98.3	55
56	74 42.2	−2.4•	68.3	75 02.7	+1.4•	71.8	75 19.6	+5.3•	75.4	75 32.8	+9.3•	79.2	75 42.1	+13.4•	83.0	75 47.4	+17.5•	86.5	75 48.5	+21.6•	90.9	75 45.5	+25.6•	94.8	56
57	74 39.8	−6.1•	64.5	75 04.1	−2.6•	67.9	75 24.9	+1.3•	71.5	75 42.1	+5.3•	75.2	75 55.5	+9.4•	79.0	76 04.9	+13.5•	83.0	76 10.1	+17.8•	87.0	76 11.1	+21.9•	91.1	57
58	74 33.7	−9.8•	60.8	75 01.5	−6.4•	64.0	75 26.2	−2.8•	67.5	75 47.4	+1.1•	71.1	76 04.9	+5.2•	75.0	76 18.4	+9.5•	78.9	76 27.9	+13.7•	83.0	76 33.0	+18.1•	87.2	58
59	74 23.9	−13.5•	57.1	74 55.1	−10.2•	60.2	75 23.4	−6.7•	63.5	75 48.5	−3.0•	67.1	76 10.1	+1.0•	70.8	76 27.9	+5.1•	74.7	76 41.6	+9.5•	78.8	76 51.1	+13.9•	83.0	59
60	74 10.4	−16.9•	53.5	74 44.9	−13.9•	56.4	75 16.7	−10.7•	59.6	75 45.5	−7.1•	63.0	76 11.1	−3.3•	66.6	76 33.0	+0.8•	70.5	76 51.1	+5.1•	74.5	77 05.0	+9.6•	78.7	60
61	73 53.5	−20.2•	50.0	74 31.0	−17.5•	52.8	75 06.0	−14.4•	55.7	75 38.4	−11.1•	59.0	76 07.8	−7.5•	62.4	76 33.8	−3.6•	66.2	76 56.2	+0.6•	70.1	77 14.6	+5.0•	74.2	61
62	73 33.3	−23.2•	46.6	74 13.5	−20.7•	49.2	74 51.6	−17.9•	52.0	75 27.3	−14.9•	55.0	76 00.3	−11.6•	58.3	76 30.2	−7.9•	61.9	76 56.8	−4.0•	65.7	77 19.6	+0.3•	69.7	62
63	73 10.1	−26.2•	43.4	73 52.8	−23.9•	45.8	74 33.7	−21.4•	48.4	75 12.4	−18.6•	51.2	75 48.7	−15.5•	54.3	76 22.3	−12.1•	57.6	76 52.8	−8.3•	61.3	77 19.9	−4.3•	65.2	63
64	72 43.9	−28.8•	40.3	73 28.9	−26.8•	42.5	74 12.3	−24.5•	44.9	74 53.8	−22.0•	47.5	75 33.2	−19.2•	50.4	76 10.2	−16.1•	53.5	76 44.5	−12.7•	56.9	77 15.6	−8.9•	60.6	64
65	72 15.1	−31.2•	37.4	73 02.1	−29.4•	39.4	73 47.8	−27.5•	41.6	74 31.8	−25.2•	44.0	75 14.0	−22.7•	46.8	75 54.1	−19.9•	49.5	76 31.8	−16.8•	52.7	77 06.7	−13.2•	56.2	65
66	71 43.9	−33.5•	34.7	72 32.7	−31.9•	36.5	73 20.3	−30.1•	38.5	74 06.6	−28.2•	40.6	74 51.3	−25.9•	43.0	75 34.2	−23.4•	45.7	76 15.0	−20.6•	48.6	76 53.5	−17.5•	51.8	66
67	71 10.4	−35.6•	32.1	72 00.8	−34.2•	33.7	72 50.2	−32.6•	35.5	73 38.4	−30.8•	37.5	74 25.4	−28.9•	39.6	75 10.8	−26.7•	42.0	75 54.4	−24.2•	44.7	76 36.0	−21.4•	47.7	67
68	70 34.8	−37.4•	29.6	71 26.6	−36.2•	31.1	72 17.6	−34.9•	32.7	73 07.6	−33.3•	34.5	73 56.5	−31.6•	36.4	74 44.1	−29.7•	38.5	75 30.2	−27.5•	41.0	76 14.6	−25.1•	43.7	68
69	69 57.4	−39.1•	27.3	70 50.4	−38.0•	28.6	71 42.7	−36.8•	30.0	72 34.3	−35.6•	31.6	73 24.9	−34.1•	33.4	74 14.4	−32.4•	35.3	75 02.7	−30.5•	37.5	75 49.5	−28.3•	39.9	69
70	69 18.3	−40.7•	25.1	70 12.4	−39.8•	26.3	71 05.9	−38.8•	27.6	71 58.7	−37.6•	29.0	72 50.8	−36.3•	30.6	73 42.0	−34.9•	32.3	74 32.2	−33.3•	34.2	75 21.2	−31.4•	36.4	70
71	68 37.6	−42.1•	23.1	69 32.6	−41.3•	24.1	70 27.1	−40.4•	25.2	71 21.1	−39.4•	26.5	72 14.5	−38.3•	27.9	73 07.1	−37.0•	29.2	73 58.9	−35.6•	31.1	74 49.8	−34.1•	33.1	71
72	67 55.5	−43.3•	21.1	68 51.3	−42.6•	22.1	69 46.7	−41.9•	23.1	70 41.7	−41.0•	24.2	71 36.2	−40.1•	25.4	72 30.1	−39.1•	26.8	73 23.3	−37.9•	28.3	74 15.7	−36.5•	30.0	72
73	67 12.2	−44.5•	19.3	68 08.7	−43.9•	20.1	69 04.8	−43.2•	21.0	70 00.7	−42.6•	22.0	70 56.1	−41.8•	23.1	71 51.0	−40.8•	24.3	72 45.4	−39.8•	25.6	73 39.2	−38.7•	27.1	73
74	66 27.7	−45.6•	17.6	67 24.8	−45.1•	18.3	68 21.6	−44.5•	19.1	69 18.1	−43.8•	20.0	70 14.3	−43.1•	20.9	71 10.2	−42.4•	22.0	72 05.6	−41.6•	23.1	73 00.5	−40.6•	24.4	74
75	65 42.1	−46.5•	16.0	66 39.7	−46.1•	16.6	67 37.1	−45.6•	17.3	68 34.3	−45.1•	18.1	69 31.2	−44.5•	18.9	70 27.8	−43.9•	19.8	71 24.0	−43.1•	20.8	72 19.9	−42.3•	21.8	75
76	64 55.6	−47.3•	14.5	65 53.6	−47.0•	15.0	66 51.5	−46.6•	15.7	67 49.2	−46.2•	16.3	68 46.7	−45.7•	17.0	69 43.9	−45.1•	17.8	70 40.9	−44.5•	18.7	71 37.6	−43.9•	19.7	76
77	64 08.3	−48.2•	13.1	65 06.6	−47.8•	13.6	66 04.9	−47.5•	14.1	67 03.0	−47.1•	14.6	68 01.0	−46.7•	15.3	68 58.8	−46.3•	16.0	69 56.4	−45.8•	16.7	70 53.7	−45.2•	17.5	77
78	63 20.1	−48.9•	11.7	64 18.8	−48.6•	12.1	65 17.4	−48.3•	12.6	66 15.9	−48.0•	13.1	67 14.3	−47.7•	13.6	68 12.5	−47.3•	14.2	69 10.6	−46.9•	14.9	70 08.5	−46.4•	15.6	78
79	62 31.2	−49.5•	10.4	63 30.2	−49.3•	10.8	64 29.1	−49.1•	11.2	65 27.9	−48.8•	11.6	66 26.6	−48.5•	12.1	67 25.2	−48.2•	12.6	68 23.7	−47.9•	13.1	69 22.1	−47.5•	13.7	79
80	61 41.7	−50.2	9.2	62 40.9	−50.0	9.5	63 40.0	−49.8	9.9	64 39.1	−49.6	10.2	65 38.1	−49.3	10.6	66 37.0	−49.0	11.1	67 35.8	−48.7	11.5	68 34.6	−48.5	12.0	80
81	60 51.5	−50.7	8.1	61 50.9	−50.6	8.4	62 50.2	−50.3	8.6	63 49.5	−50.2	8.9	64 48.8	−50.0	9.3	65 48.0	−49.8	9.6	66 47.1	−49.6	10.0	67 46.1	−49.4	10.4	81
82	60 00.8	−51.2	7.0	61 00.3	−51.0	7.2	61 59.9	−51.0	7.5	62 59.3	−50.8	7.7	63 58.8	−50.7	8.0	64 58.2	−50.5	8.3	65 57.5	−50.3	8.6	66 56.8	−50.1	9.0	82
83	59 09.6	−51.7	6.0	60 09.3	−51.6	6.2	61 08.9	−51.5	6.4	62 08.5	−51.3	6.6	63 08.1	−51.2	6.8	64 07.7	−51.1	7.0	65 07.2	−50.9	7.3	66 06.7	−50.8	7.6	83
84	58 17.9	−52.1	5.1	59 17.7	−52.0	5.1	60 17.4	−51.9	5.3	61 17.2	−51.8	5.5	62 16.9	−51.7	5.6	63 16.6	−51.6	5.8	64 16.3	−51.5	6.1	65 15.9	−51.4	6.3	84
85	57 25.8	−52.5	4.1	58 25.7	−52.5	4.2	59 25.5	−52.4	4.3	60 25.3	−52.3	4.4	61 25.2	−52.3	4.6	62 25.0	−52.2	4.7	63 24.7	−52.0	4.9	64 24.5	−52.0	5.1	85
86	56 33.3	−52.8	3.2	57 33.2	−52.8	3.3	58 33.1	−52.7	3.4	59 33.0	−52.7	3.5	60 32.9	−52.6	3.6	61 32.8	−52.6	3.7	62 32.7	−52.6	3.8	63 32.5	−52.4	3.9	86
87	55 40.5	−53.2	2.3	56 40.4	−53.1	2.4	57 40.4	−53.1	2.5	58 40.3	−53.1	2.5	59 40.3	−53.1	2.7	60 40.2	−53.0	2.7	61 40.1	−53.0	2.8	62 40.1	−53.0	2.9	87
88	54 47.3	−53.5	1.5	55 47.3	−53.5	1.6	56 47.2	−53.4	1.6	57 47.2	−53.4	1.6	58 47.2	−53.4	1.7	59 47.2	−53.4	1.7	60 47.1	−53.3	1.8	61 47.1	−53.4	1.9	88
89	53 53.8	−53.8	0.7	54 53.8	−53.8	0.8	55 53.8	−53.8	0.8	56 53.8	−53.8	0.8	57 53.8	−53.8	0.8	58 53.8	−53.8	0.8	59 53.8	−53.8	0.9	60 53.7	−53.7	0.9	89
90	53 00.0	−54.1	0.0	54 00.0	−54.1	0.0	55 00.0	−54.1	0.0	56 00.0	−54.1	0.0	57 00.0	−54.1	0.0	58 00.0	−54.1	0.0	59 00.0	−54.1	0.0	60 00.0	−54.1	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 26°, 334°

Dec.	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec.
0	32 44.7 −57.0 148.6	31 53.4 −57.2 148.9	31 02.0 −57.4 149.2	30 10.3 −57.5 149.5	29 18.5 −57.7 149.8	28 26.6 −57.9 150.1	27 34.5 −58.0 150.4	26 42.3 −58.2 150.6	0
1	31 47.7 −57.0 149.0	30 56.2 −57.2 149.3	30 04.6 −57.5 149.6	29 12.8 −57.6 149.9	28 20.8 −57.8 150.1	27 28.7 −57.9 150.4	26 36.5 −58.1 150.6	25 44.1 −58.2 151.0	1
2	30 50.7 −57.2 149.3	29 59.0 −57.3 149.6	29 07.1 −57.4 149.9	28 15.2 −57.7 150.2	27 23.0 −57.8 150.4	26 30.8 −58.0 150.7	25 38.4 −58.1 150.9	24 45.9 −58.2 151.2	2
3	29 53.5 −57.2 149.7	29 01.7 −57.4 149.8	28 09.7 −57.6 150.2	27 17.5 −57.7 150.5	26 25.2 −57.8 150.7	25 32.8 −58.0 151.0	24 40.3 −58.1 151.2	23 47.7 −58.3 151.4	3
4	28 56.3 −57.2 150.0	28 04.3 −57.4 150.3	27 12.1 −57.5 150.5	26 19.8 −57.7 150.8	25 27.4 −57.9 151.0	24 34.8 −58.0 151.3	23 42.2 −58.2 151.5	22 49.4 −58.3 151.7	4
5	27 59.1 −57.3 150.4	27 06.9 −57.5 150.6	26 14.6 −57.7 150.9	25 22.1 −57.8 151.1	24 29.5 −57.9 151.3	23 36.8 −58.0 151.5	22 44.0 −58.2 151.7	21 51.1 −58.3 151.9	5
6	27 01.8 −57.3 150.7	26 09.4 −57.5 150.9	25 16.9 −57.6 151.2	24 24.3 −57.8 151.4	23 31.6 −58.0 151.6	22 38.8 −58.1 151.8	21 45.8 −58.2 152.0	20 52.8 −58.3 152.2	6
7	26 04.5 −57.4 151.0	25 11.9 −57.5 151.3	24 19.3 −57.7 151.5	23 26.5 −57.8 151.7	22 33.6 −57.9 151.9	21 40.7 −58.1 152.1	20 47.6 −58.2 152.3	19 54.5 −58.4 152.4	7
8	25 07.1 −57.4 151.4	24 14.4 −57.6 151.6	23 21.6 −57.7 151.8	22 28.7 −57.9 152.0	21 35.7 −58.0 152.2	20 42.6 −58.2 152.3	19 49.4 −58.3 152.5	18 56.1 −58.4 152.7	8
9	24 09.7 −57.5 151.7	23 16.8 −57.6 151.9	22 23.9 −57.8 152.1	21 30.8 −57.9 152.3	20 37.7 −58.1 152.4	19 44.4 −58.1 152.6	18 51.1 −58.3 152.8	17 57.7 −58.4 152.9	9
10	23 12.2 −57.4 152.0	22 19.2 −57.6 152.3	21 26.1 −57.8 152.4	20 32.9 −57.9 152.5	19 39.6 −58.0 152.7	18 46.3 −58.2 152.9	17 52.8 −58.3 153.0	16 59.3 −58.4 153.2	10
11	22 14.8 −57.5 152.3	21 21.6 −57.7 152.5	20 28.3 −57.8 152.7	19 35.0 −57.9 152.8	18 41.6 −58.1 153.0	17 48.1 −58.2 153.1	16 54.5 −58.3 153.3	16 00.9 −58.4 153.4	11
12	21 17.2 −57.5 152.6	20 23.9 −57.7 152.8	19 30.5 −57.8 152.9	18 37.1 −58.0 153.1	17 43.5 −58.1 153.2	16 49.9 −58.2 153.4	15 56.2 −58.3 153.5	15 02.5 −58.4 153.6	12
13	20 19.7 −57.5 152.9	19 26.2 −57.7 153.1	18 32.7 −57.9 153.2	17 39.1 −58.0 153.4	16 45.4 −58.1 153.5	15 51.7 −58.3 153.6	14 57.9 −58.3 153.8	14 04.1 −58.5 153.9	13
14	19 22.1 −57.6 153.2	18 28.5 −57.8 153.4	17 34.8 −57.9 153.5	16 41.1 −58.0 153.6	15 47.3 −58.1 153.8	14 53.5 −58.3 153.9	13 59.6 −58.4 154.0	13 05.6 −58.5 154.1	14
15	18 24.5 −57.7 153.5	17 30.7 −57.8 153.6	16 36.9 −57.9 153.8	15 43.1 −58.1 153.9	14 49.2 −58.2 154.0	13 55.2 −58.3 154.1	13 01.2 −58.4 154.2	12 07.1 −58.4 154.3	15
16	17 26.8 −57.7 153.8	16 32.9 −57.8 153.9	15 39.0 −57.9 154.0	14 45.0 −58.0 154.2	13 51.0 −58.1 154.3	12 56.9 −58.2 154.4	12 02.8 −58.4 154.5	11 08.7 −58.5 154.6	16
17	16 29.1 −57.7 154.1	15 35.1 −57.8 154.2	14 41.1 −57.9 154.3	13 47.0 −58.1 154.4	12 52.9 −58.2 154.5	11 58.7 −58.3 154.6	11 04.4 −58.4 154.7	10 10.2 −58.5 154.8	17
18	15 31.4 −57.7 154.4	14 37.3 −57.8 154.5	13 43.2 −58.0 154.6	12 48.9 −58.0 154.7	11 54.7 −58.2 154.8	11 00.4 −58.3 154.9	10 06.0 −58.4 154.9	9 11.7 −58.5 155.0	18
19	14 33.7 −57.8 154.6	13 39.5 −57.9 154.8	12 45.2 −58.0 154.9	11 50.9 −58.1 154.9	10 56.5 −58.2 155.0	10 02.1 −58.3 155.1	9 07.6 −58.4 155.2	8 13.2 −58.6 155.2	19
20	13 36.0 −57.8 154.9	12 41.6 −57.9 155.0	11 47.2 −58.0 155.1	10 52.8 −58.1 155.2	9 58.3 −58.2 155.3	9 03.8 −58.4 155.3	8 09.2 −58.4 155.4	7 14.6 −58.5 155.5	20
21	12 38.2 −57.7 155.2	11 43.7 −57.9 155.3	10 49.2 −58.0 155.4	9 54.7 −58.2 155.5	9 00.1 −58.3 155.5	8 05.4 −58.3 155.6	7 10.8 −58.4 155.6	6 16.1 −58.5 155.7	21
22	11 40.5 −57.8 155.5	10 45.8 −57.9 155.6	9 51.2 −58.0 155.7	8 56.5 −58.1 155.7	8 01.8 −58.2 155.8	7 07.1 −58.3 155.8	6 12.4 −58.5 155.9	5 17.6 −58.5 155.9	22
23	10 42.7 −57.8 155.8	9 47.9 −57.9 155.8	8 53.2 −58.1 155.9	7 58.4 −58.1 156.0	7 03.6 −58.2 156.0	6 08.8 −58.4 156.1	5 13.9 −58.4 156.1	4 19.1 −58.6 156.1	23
24	9 44.9 −57.9 156.0	8 50.0 −57.9 156.1	7 55.2 −58.1 156.2	7 00.3 −58.2 156.2	6 05.4 −58.3 156.3	5 10.4 −58.3 156.3	4 15.5 −58.5 156.3	3 20.5 −58.5 156.3	24
25	8 47.0 −57.8 156.3	7 52.1 −57.9 156.4	6 57.1 −58.0 156.4	6 02.1 −58.1 156.5	5 07.1 −58.2 156.5	4 12.1 −58.4 156.5	3 17.0 −58.4 156.5	2 22.0 −58.6 156.6	25
26	7 49.2 −57.9 156.6	6 54.2 −58.0 156.6	5 59.1 −58.1 156.7	5 04.0 −58.2 156.7	4 08.9 −58.3 156.7	3 13.7 −58.3 156.8	2 18.6 −58.4 156.8	1 23.5 −58.6 156.8	26
27	6 51.4 −57.9 156.8	5 56.2 −57.9 156.9	5 01.0 −58.0 156.9	4 05.8 −58.1 156.9	3 10.6 −58.3 157.0	2 15.4 −58.4 157.0	1 20.2 −58.5 157.0	0 24.9 −58.5 157.0	27
28	5 53.5 −57.9 157.1	4 58.3 −58.0 157.1	4 03.0 −58.1 157.2	3 07.7 −58.2 157.2	2 12.3 −58.2 157.2	1 17.0 −58.3 157.2	0 21.7 −58.5 157.2	0 33.6 +58.6 22.8	28
29	4 55.7 −57.9 157.4	4 00.3 −58.0 157.4	3 04.9 −58.1 157.4	2 09.5 −58.2 157.4	1 14.1 −58.3 157.4	0 18.7 −58.4 157.5	0 36.8 +58.4 22.5	1 32.2 +58.5 22.6	29
30	3 57.8 −57.9 157.6	3 02.3 −57.9 157.7	2 06.8 −58.0 157.7	1 11.3 −58.1 157.7	0 15.8 −58.3 157.7	0 39.7 +58.4 22.3	1 35.2 +58.4 22.3	2 30.7 +58.5 22.3	30
31	2 59.9 −57.9 157.9	2 04.4 −58.0 157.9	1 08.8 −58.1 157.9	0 13.2 −58.2 157.9	0 42.5 +58.2 22.1	1 38.1 +58.3 22.1	2 33.6 +58.5 22.1	3 29.2 +58.6 22.1	31
32	2 02.1 −57.9 158.2	1 06.4 −58.0 158.2	0 10.7 −58.1 158.2	0 45.0 +58.2 21.8	1 40.7 +58.3 21.8	2 36.4 +58.4 21.8	3 32.1 +58.4 21.9	4 27.8 +58.5 21.9	32
33	1 04.2 −57.9 158.4	0 08.4 −58.0 158.4	0 47.4 +58.1 21.6	1 43.2 +58.2 21.6	2 39.0 +58.2 21.6	3 34.8 +58.3 21.6	4 30.5 +58.5 21.6	5 26.3 +58.5 21.7	33
34	0 06.3 −57.8 158.7	0 49.6 +57.9 21.3	1 45.5 +58.0 21.3	2 41.4 +58.1 21.3	3 37.2 +58.3 21.4	4 33.1 +58.4 21.4	5 29.0 +58.4 21.4	6 24.8 +58.5 21.5	34
35	0 51.5 +57.9 21.0	1 47.5 +58.0 21.1	2 43.5 +58.1 21.1	3 39.5 +58.2 21.1	4 35.5 +58.2 21.1	5 31.5 +58.3 21.1	6 27.4 +58.4 21.2	7 23.3 +58.6 21.2	35
36	1 49.4 +57.9 20.8	2 45.5 +58.0 20.8	3 41.6 +58.1 20.8	4 37.7 +58.1 20.8	5 33.7 +58.3 20.9	6 29.8 +58.3 20.9	7 25.8 +58.5 21.0	8 21.9 +58.5 21.0	36
37	2 47.3 +57.9 20.5	3 43.5 +57.9 20.5	4 39.7 +58.0 20.6	5 35.8 +58.2 20.6	6 32.0 +58.2 20.6	7 28.1 +58.4 20.7	8 24.3 +58.4 20.7	9 20.4 +58.5 20.8	37
38	3 45.2 +57.8 20.3	4 41.4 +58.0 20.3	5 37.7 +58.1 20.3	6 34.0 +58.1 20.3	7 30.2 +58.3 20.4	8 26.5 +58.3 20.4	9 22.7 +58.4 20.5	10 18.9 +58.4 20.6	38
39	4 43.0 +57.9 20.0	5 39.4 +57.9 20.0	6 35.8 +58.0 20.1	7 32.1 +58.2 20.1	8 28.5 +58.2 20.1	9 24.8 +58.3 20.2	10 21.1 +58.4 20.3	11 17.3 +58.5 20.3	39
40	5 40.9 +57.8 19.7	6 37.3 +58.0 19.8	7 33.8 +58.0 19.8	8 30.3 +58.1 19.8	9 26.7 +58.2 19.9	10 23.1 +58.3 20.0	11 19.5 +58.3 20.0	12 15.8 +58.5 20.1	40
41	6 38.7 +57.9 19.5	7 35.3 +57.9 19.5	8 31.8 +58.1 19.5	9 28.4 +58.1 19.6	10 24.9 +58.2 19.7	11 21.4 +58.3 19.7	12 17.8 +58.4 19.8	13 14.3 +58.4 19.9	41
42	7 36.6 +57.8 19.2	8 33.2 +57.9 19.2	9 29.9 +58.0 19.3	10 26.5 +58.1 19.3	11 23.1 +58.2 19.4	12 19.7 +58.2 19.5	13 16.2 +58.4 19.6	14 12.7 +58.4 19.6	42
43	8 34.4 +57.8 18.9	9 31.1 +58.0 19.0	10 27.9 +58.0 19.0	11 24.6 +58.1 19.1	12 21.3 +58.1 19.2	13 17.9 +58.3 19.2	14 14.6 +58.3 19.3	15 11.2 +58.4 19.4	43
44	9 32.2 +57.8 18.6	10 29.1 +57.8 18.7	11 25.9 +58.0 18.8	12 22.7 +58.0 18.8	13 19.4 +58.2 18.9	14 16.2 +58.2 19.0	15 12.9 +58.3 19.1	16 09.6 +58.4 19.2	44
45	10 30.0 +57.8 18.4	11 26.9 +57.9 18.4	12 23.9 +57.9 18.5	13 20.7 +58.1 18.6	14 17.6 +58.1 18.7	15 14.4 +58.2 18.7	16 11.2 +58.4 18.8	17 08.0 +58.4 18.9	45
46	11 27.8 +57.8 18.1	12 24.8 +57.9 18.2	13 21.8 +58.0 18.2	14 18.8 +58.0 18.3	15 15.7 +58.2 18.4	16 12.7 +58.2 18.5	17 09.6 +58.2 18.6	18 06.4 +58.4 18.7	46
47	12 25.6 +57.7 17.8	13 22.7 +57.8 17.9	14 19.8 +57.9 18.0	15 16.8 +58.1 18.1	16 13.9 +58.1 18.1	17 10.9 +58.2 18.3	18 07.8 +58.3 18.3	19 04.8 +58.3 18.4	47
48	13 23.3 +57.7 17.5	14 20.5 +57.9 17.6	15 17.7 +57.9 17.7	16 14.9 +58.0 17.8	17 12.0 +58.1 17.9	18 09.1 +58.1 18.0	19 06.1 +58.3 18.1	20 03.1 +58.4 18.2	48
49	14 21.1 +57.7 17.3	15 18.4 +57.8 17.3	16 15.6 +57.9 17.4	17 12.9 +57.9 17.5	18 10.1 +58.0 17.6	19 07.2 +58.2 17.7	20 04.4 +58.2 17.8	21 01.5 +58.3 17.9	49
50	15 18.8 +57.7 17.0	16 16.2 +57.8 17.1	17 13.5 +57.9 17.2	18 10.8 +58.0 17.3	19 08.1 +58.1 17.4	20 05.4 +58.1 17.5	21 02.6 +58.2 17.6	21 59.8 +58.3 17.7	50
51	16 16.5 +57.7 16.7	17 14.0 +57.7 16.8	18 11.4 +57.8 16.9	19 08.8 +57.9 17.0	20 06.2 +58.0 17.1	21 03.5 +58.1 17.2	22 00.8 +58.2 17.3	22 58.1 +58.2 17.4	51
52	17 14.2 +57.6 16.4	18 11.7 +57.8 16.5	19 09.2 +57.9 16.6	20 06.7 +57.9 16.7	21 04.2 +58.0 16.8	22 01.6 +58.1 16.9	22 59.0 +58.1 17.0	23 56.3 +58.3 17.2	52
53	18 11.8 +57.7 16.1	19 09.5 +57.7 16.2	20 07.1 +57.8 16.3	21 04.6 +57.9 16.4	22 02.2 +57.9 16.5	22 59.7 +58.0 16.7	23 57.1 +58.2 16.8	24 54.6 +58.2 16.9	53
54	19 09.5 +57.6 15.8	20 07.2 +57.7 15.9	21 04.9 +57.7 16.0	22 02.5 +57.9 16.1	23 00.1 +58.0 16.3	23 57.7 +58.0 16.4	24 55.3 +58.1 16.5	25 52.8 +58.1 16.6	54
55	20 07.1 +57.5 15.5	21 04.9 +57.6 15.6	22 02.6 +57.8 15.7	23 00.4 +57.8 15.9	23 58.1 +57.9 16.0	24 55.7 +58.0 16.1	25 53.4 +58.0 16.2	26 50.9 +58.2 16.4	55
56	21 04.6 +57.6 15.2	22 02.5 +57.6 15.3	23 00.4 +57.6 15.4	23 58.2 +57.8 15.6	24 56.0 +57.7 15.7	25 53.7 +58.0 15.8	26 51.4 +58.1 15.9	27 49.1 +58.1 16.1	56
57	22 02.2 +57.5 14.9	23 00.1 +57.6 15.0	23 58.1 +57.6 15.1	24 56.0 +57.7 15.3	25 53.8 +57.9 15.4	26 51.7 +57.9 15.5	27 49.5 +57.9 15.7	28 47.2 +58.1 15.8	57
58	22 59.7 +57.4 14.6	23 57.7 +57.6 14.7	24 55.7 +57.7 14.8	25 53.7 +57.7 15.0	26 51.7 +57.8 15.1	27 49.6 +57.8 15.2	28 47.4 +58.0 15.4	29 45.3 +58.0 15.5	58
59	23 57.1 +57.5 14.4	24 55.3 +57.4 14.5	25 53.4 +57.5 14.5	26 51.4 +57.7 14.7	27 49.5 +57.7 14.8	28 47.4 +57.9 14.9	29 45.4 +57.9 15.1	30 43.3 +58.1 15.3	59
60	24 54.6 +57.3 14.0	25 52.8 +57.4 14.1	26 50.9 +57.6 14.3	27 49.1 +57.6 14.3	28 47.2 +57.7 14.5	29 45.3 +57.7 14.6	30 43.3 +57.9 14.8	31 41.3 +58.0 14.9	60
61	25 51.9 +57.4 13.7	26 50.2 +57.5 13.8	27 48.5 +57.5 13.9	28 46.7 +57.5 14.0	29 44.9 +57.6 14.2	30 43.1 +57.7 14.3	31 41.2 +57.8 14.5	32 39.3 +57.9 14.6	61
62	26 49.3 +57.3 13.3	27 47.7 +57.3 13.5	28 46.0 +57.5 13.6	29 44.3 +57.5 13.7	30 42.6 +57.6 13.8	31 40.8 +57.7 14.0	32 39.0 +57.8 14.1	33 37.2 +57.8 14.3	62
63	27 46.6 +57.2 13.0	28 45.0 +57.4 13.1	29 43.5 +57.4 13.2	30 41.8 +57.5 13.4	31 40.2 +57.5 13.5	32 38.5 +57.5 13.7	33 36.8 +57.7 13.8	34 35.0 +57.8 14.0	63
64	28 43.8 +57.2 12.7	29 42.4 +57.2 12.8	30 40.9 +57.3 12.9	31 39.3 +57.5 13.0	32 37.8 +57.5 13.2	33 36.2 +57.5 13.3	34 34.5 +57.7 13.5	35 32.8 +57.8 13.7	64
65	29 41.0 +57.0 12.3	30 39.6 +57.2 12.4	31 38.2 +57.3 12.6	32 36.8 +57.3 12.7	33 35.3 +57.4 12.8	34 33.7 +57.6 13.0	35 32.2 +57.6 13.2	36 30.6 +57.7 13.3	65
66	30 38.2 +57.0 12.0	31 36.8 +57.2 12.1	32 35.5 +57.2 12.2	33 34.1 +57.3 12.4	34 32.7 +57.4 12.5	35 31.3 +57.5 12.7	36 29.8 +57.6 12.8	37 28.3 +57.6 13.0	66
67	31 35.2 +57.1 11.6	32 34.0 +57.1 11.7	33 32.7 +57.2 11.9	34 31.4 +57.3 12.0	35 30.1 +57.3 12.1	36 28.8 +57.4 12.3	37 27.4 +57.4 12.5	38 25.9 +57.6 12.6	67
68	32 32.3 +56.9 11.2	33 31.1 +57.0 11.4	34 29.9 +57.1 11.5	35 28.7 +57.2 11.6	36 27.4 +57.2 11.8	37 26.2 +57.3 11.9	38 24.8 +57.5 12.1	39 23.5 +57.5 12.2	68
69	33 29.2 +56.9 10.9	34 28.1 +57.0 11.0	35 27.0 +57.0 11.1	36 25.9 +57.1 11.3	37 24.7 +57.2 11.4	38 23.5 +57.3 11.6	39 22.3 +57.3 11.7	40 21.0 +57.4 11.9	69
70	34 26.1 +56.8 10.5	35 25.1 +56.9 10.6	36 24.0 +57.0 10.7	37 23.0 +57.0 10.9	38 21.9 +57.1 11.0	39 20.8 +57.2 11.2	40 19.6 +57.3 11.3	41 18.4 +57.4 11.5	70
71	35 22.9 +56.7 10.1	36 22.0 +56.8 10.2	37 21.0 +56.9 10.3	38 20.0 +57.0 10.5	39 19.0 +57.0 10.6	40 18.0 +57.1 10.8	41 16.9 +57.2 10.9	42 15.8 +57.2 11.1	71
72	36 19.6 +56.7 9.7	37 18.8 +56.7 9.9	38 17.9 +56.8 9.9	39 17.0 +56.8 10.1	40 16.0 +57.0 10.2	41 15.1 +57.0 10.4	42 14.1 +57.1 10.5	43 13.0 +57.2 10.7	72
73	37 16.3 +56.6 9.3	38 15.5 +56.6 9.4	39 14.7 +56.7 9.5	40 13.8 +56.8 9.7	41 13.0 +56.8 9.8	42 12.1 +56.9 10.0	43 11.2 +57.0 10.1	44 10.2 +57.1 10.3	73
74	38 12.9 +56.4 8.8	39 12.1 +56.6 9.0	40 11.4 +56.6 9.1	41 10.6 +56.7 9.2	42 09.8 +56.8 9.4	43 09.0 +56.8 9.5	44 08.2 +56.9 9.7	45 07.3 +57.0 9.9	74
75	39 09.3 +56.4 8.4	40 08.7 +56.4 8.5	41 08.0 +56.5 8.7	42 07.3 +56.6 8.8	43 06.6 +56.6 8.9	44 05.8 +56.8 9.1	45 05.1 +56.8 9.2	46 04.3 +56.8 9.4	75
76	40 05.7 +56.3 8.0	41 05.1 +56.3 8.1	42 04.5 +56.4 8.2	43 03.9 +56.4 8.3	44 03.2 +56.6 8.5	45 02.6 +56.6 8.6	46 01.9 +56.6 8.8	47 01.1 +56.8 8.9	76
77	41 02.0 +56.1 7.5	42 01.4 +56.3 7.6	43 00.9 +56.3 7.8	44 00.3 +56.4 7.9	44 59.8 +56.4 8.0	45 59.2 +56.5 8.2	46 58.5 +56.6 8.3	47 57.9 +56.6 8.5	77
78	41 58.1 +56.0 7.0	42 57.7 +56.0 7.2	43 57.2 +56.1 7.3	44 56.7 +56.2 7.4	45 56.2 +56.3 7.5	46 55.7 +56.3 7.7	47 55.1 +56.4 7.8	48 54.5 +56.5 8.0	78
79	42 54.1 +56.0 6.6	43 53.7 +56.0 6.7	44 53.3 +56.1 6.8	45 52.9 +56.1 6.9	46 52.5 +56.1 7.0	47 52.0 +56.2 7.2	48 51.5 +56.3 7.3	49 51.0 +56.4 7.5	79
80	43 50.1 +55.7 6.1	44 49.7 +55.8 6.2	45 49.4 +55.8 6.3	46 49.0 +55.9 6.4	47 48.6 +56.0 6.5	48 48.2 +56.1 6.6	49 47.8 +56.1 6.8	50 47.4 +56.2 6.9	80
81	44 45.8 +55.7 5.6	45 45.5 +55.7 5.6	46 45.2 +55.6 5.7	47 44.9 +55.7 5.9	48 44.6 +55.7 6.0	49 44.3 +55.9 6.1	50 43.9 +55.8 6.4	51 43.6 +55.9 6.4	81
82	45 41.5 +55.4 5.0	46 41.2 +55.6 5.1	47 41.0 +55.6 5.2	48 40.7 +55.7 5.3	49 40.5 +55.7 5.4	50 40.2 +55.7 5.5	51 39.9 +55.8 5.6	52 39.6 +55.9 5.8	82
83	46 36.9 +55.4 4.5	47 36.8 +55.3 4.5	48 36.6 +55.4 4.6	49 36.4 +55.4 4.7	50 36.2 +55.5 4.8	51 35.9 +55.6 4.9	52 35.7 +55.6 5.0	53 35.5 +55.6 5.2	83
84	47 32.3 +55.1 4.0	48 32.1 +55.2 4.0	49 32.0 +55.2 4.1	50 31.8 +55.3 4.1	51 31.7 +55.3 4.2	52 31.5 +55.3 4.3	53 31.3 +55.4 4.3	54 31.1 +55.4 4.5	84
85	48 27.4 +54.9 3.3	49 27.3 +55.0 3.4	50 27.2 +55.0 3.4	51 27.1 +55.0 3.5	52 27.0 +55.1 3.6	53 26.8 +55.2 3.7	54 26.7 +55.2 3.8	55 26.6 +55.2 3.9	85
86	49 22.3 +54.8 2.7	50 22.3 +54.8 2.7	51 22.2 +54.8 2.8	52 22.1 +54.9 2.9	53 22.1 +54.8 2.9	54 22.0 +54.9 3.0	55 21.9 +54.9 3.1	56 21.8 +55.0 3.2	86
87	50 17.1 +54.5 2.1	51 17.1 +54.6 2.1	52 17.0 +54.6 2.1	53 16.9 +54.7 2.2	54 16.9 +54.7 2.3	55 16.9 +54.6 2.3	56 16.8 +54.7 2.4	57 16.8 +54.7 2.4	87
88	51 11.6 +54.3 1.4	52 11.6 +54.3 1.4	53 11.6 +54.3 1.5	54 11.6 +54.3 1.5	55 11.6 +54.3 1.5	56 11.5 +54.4 1.6	57 11.5 +54.4 1.6	58 11.5 +54.4 1.7	88
89	52 05.9 +54.1 0.7	53 05.9 +54.1 0.7	54 05.9 +54.1 0.7	55 05.9 +54.1 0.8	56 05.9 +54.1 0.8	57 05.9 +54.1 0.8	58 05.9 +54.1 0.8	59 05.9 +54.1 0.9	89
90	53 00.0 +53.8 0.0	54 00.0 +53.8 0.0	55 00.0 +53.8 0.0	56 00.0 +53.8 0.0	57 00.0 +53.8 0.0	58 00.0 +53.8 0.0	59 00.0 +53.8 0.0	60 00.0 +53.7 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION   L.H.A. 154°, 206°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	32 25.6	+56.7	147.5	31 34.9	+57.0	147.8	30 44.1	+57.1	148.1	29 53.0	+57.4	148.4	29 01.8	+57.6	148.7	28 10.5	+57.7	149.0	27 19.0	+57.8	149.3	26 27.3	+58.1	149.5	0
1	33 22.3	+56.7	147.1	32 31.9	+56.9	147.4	31 41.2	+57.1	147.8	30 50.4	+57.3	148.1	29 59.4	+57.4	148.4	29 08.2	+57.6	148.7	28 16.8	+57.9	149.0	27 25.4	+57.9	149.2	1
2	34 19.0	+56.6	146.7	33 28.8	+56.8	147.0	32 38.3	+57.0	147.4	31 47.7	+57.2	147.7	30 56.8	+57.5	148.1	30 05.8	+57.6	148.4	29 14.7	+57.8	148.7	28 23.3	+58.0	149.0	2
3	35 15.6	+56.5	146.3	34 25.6	+56.7	146.7	33 35.3	+57.0	147.0	32 44.9	+57.2	147.4	31 54.3	+57.3	147.7	31 03.4	+57.5	148.0	30 12.5	+57.7	148.4	29 21.3	+57.9	148.7	3
4	36 12.1	+56.4	145.9	35 22.3	+56.7	146.3	34 32.3	+56.9	146.6	33 42.1	+57.1	147.0	32 51.6	+57.4	147.4	32 01.0	+57.5	147.7	31 10.2	+57.7	148.0	30 19.2	+57.9	148.4	4
5	37 08.5	+56.3	145.4	36 19.0	+56.5	145.9	35 29.2	+56.8	146.3	34 39.2	+57.0	146.6	33 49.0	+57.2	147.0	32 58.5	+57.5	147.4	32 07.9	+57.6	147.7	31 17.1	+57.8	148.0	5
6	38 04.8	+56.2	145.0	37 15.5	+56.5	145.4	36 26.0	+56.7	145.9	35 36.2	+57.0	146.3	34 46.2	+57.2	146.7	33 56.0	+57.4	147.0	33 05.5	+57.6	147.4	32 14.9	+57.8	147.7	6
7	39 01.0	+56.1	144.6	38 12.0	+56.4	145.0	37 22.7	+56.7	145.5	36 33.2	+56.9	145.9	35 43.4	+57.1	146.3	34 53.4	+57.3	146.7	34 03.1	+57.5	147.1	33 12.7	+57.7	147.4	7
8	39 57.1	+56.0	144.1	39 08.4	+56.3	144.6	38 19.4	+56.5	145.0	37 30.1	+56.8	145.5	36 40.5	+57.0	145.9	35 50.7	+57.3	146.3	35 00.6	+57.5	146.7	34 10.4	+57.7	147.1	8
9	40 53.1	+55.9	143.6	40 04.7	+56.2	144.1	39 15.9	+56.5	144.6	38 26.9	+56.7	145.1	37 37.5	+57.0	145.5	36 48.0	+57.1	145.9	35 58.1	+57.4	146.4	35 08.1	+57.6	146.7	9
10	41 49.0	+55.8	143.1	41 00.9	+56.0	143.6	40 12.4	+56.3	144.2	39 23.6	+56.6	144.7	38 34.5	+56.9	145.1	37 45.1	+57.2	145.6	36 55.5	+57.4	146.0	36 05.7	+57.5	146.4	10
11	42 44.8	+55.6	142.6	41 56.9	+56.0	143.2	41 08.7	+56.3	143.7	40 20.2	+56.5	144.2	39 31.4	+56.8	144.7	38 42.3	+57.0	145.2	37 52.9	+57.2	145.6	37 03.2	+57.4	146.1	11
12	43 40.4	+55.5	142.1	42 52.9	+55.8	142.7	42 05.0	+56.1	143.2	41 16.7	+56.4	143.8	40 28.2	+56.7	144.3	39 39.3	+56.9	144.8	38 50.1	+57.2	145.2	38 00.7	+57.4	145.7	12
13	44 35.9	+55.3	141.6	43 48.7	+55.7	142.2	43 01.1	+56.0	142.8	42 13.1	+56.4	143.3	41 24.9	+56.6	143.9	40 36.2	+56.9	144.4	39 47.3	+57.1	144.9	38 58.1	+57.4	145.3	13
14	45 31.2	+55.2	141.0	44 44.4	+55.5	141.7	43 57.1	+55.9	142.3	43 09.5	+56.1	142.9	42 21.5	+56.4	143.4	41 33.1	+56.8	143.9	40 44.4	+57.1	144.5	39 55.5	+57.3	144.9	14
15	46 26.4	+55.0	140.5	45 39.9	+55.4	141.1	44 53.0	+55.7	141.8	44 05.6	+56.1	142.4	43 17.9	+56.4	142.9	42 29.9	+56.6	143.5	41 41.5	+56.9	144.0	40 52.8	+57.1	144.6	15
16	47 21.4	+54.8	139.9	46 35.3	+55.2	140.6	45 48.7	+55.6	141.3	45 01.7	+55.9	141.9	44 14.3	+56.3	142.5	43 26.5	+56.6	143.1	42 38.4	+56.9	143.6	41 49.9	+57.1	144.1	16
17	48 16.2	+54.6	139.3	47 30.5	+55.0	140.0	46 44.3	+55.4	140.7	45 57.6	+55.8	141.4	45 10.6	+56.1	142.0	44 23.1	+56.4	142.6	43 35.3	+56.7	143.2	42 47.0	+57.1	143.7	17
18	49 10.8	+54.4	138.7	48 25.5	+54.8	139.4	47 39.7	+55.2	140.1	46 53.4	+55.6	140.8	46 06.7	+56.0	141.5	45 19.5	+56.4	142.1	44 32.0	+56.6	142.7	43 44.1	+56.9	143.3	18
19	50 05.2	+54.2	138.0	49 20.3	+54.7	138.8	48 34.9	+55.1	139.5	47 49.0	+55.5	140.3	47 02.7	+55.8	141.0	46 15.9	+56.1	141.6	45 28.6	+56.5	142.3	44 41.0	+56.8	142.9	19
20	50 59.4	+53.9	137.3	50 15.0	+54.4	138.2	49 30.0	+54.9	138.9	48 44.5	+55.3	139.7	47 58.5	+55.7	140.4	47 12.0	+56.1	141.1	46 25.1	+56.4	141.8	45 37.8	+56.7	142.4	20
21	51 53.3	+53.7	136.6	51 09.4	+54.2	137.5	50 24.9	+54.6	138.3	49 39.8	+55.1	139.1	48 54.2	+55.5	139.9	48 08.1	+55.9	140.6	47 21.5	+56.2	141.3	46 34.5	+56.5	141.9	21
22	52 47.0	+53.4	135.9	52 03.6	+53.9	136.8	51 19.5	+54.4	137.7	50 34.9	+54.9	138.5	49 49.7	+55.3	139.3	49 04.0	+55.7	140.0	48 17.7	+56.1	140.7	47 31.0	+56.5	141.4	22
23	53 40.4	+53.0	135.1	52 57.5	+53.6	136.1	52 13.9	+54.2	137.0	51 29.8	+54.6	137.8	50 45.0	+55.1	138.7	49 59.7	+55.5	139.5	49 13.8	+56.0	140.2	48 27.5	+56.3	140.9	23
24	54 33.4	+52.8	134.3	53 51.1	+53.4	135.3	53 08.1	+53.9	136.3	52 24.4	+54.5	137.2	51 40.1	+55.0	138.0	50 55.2	+55.4	138.9	50 09.8	+55.8	139.7	49 23.8	+56.1	140.4	24
25	55 26.2	+52.4	133.5	54 44.5	+53.0	134.5	54 02.0	+53.7	135.5	53 18.9	+54.2	136.5	52 35.1	+54.6	137.4	51 50.6	+55.2	138.2	51 05.6	+55.5	139.1	50 19.9	+56.0	139.9	25
26	56 18.6	+52.0	132.6	55 37.5	+52.7	133.7	54 55.7	+53.3	134.8	54 13.1	+53.9	135.7	53 29.7	+54.5	136.7	52 45.8	+54.9	137.6	52 01.1	+55.4	138.5	51 15.9	+55.9	139.3	26
27	57 10.6	+51.6	131.7	56 30.2	+52.4	132.9	55 49.0	+53.0	133.9	55 07.0	+53.6	135.0	54 24.2	+54.2	136.0	53 40.7	+54.7	136.9	52 56.5	+55.2	137.8	52 11.8	+55.6	138.7	27
28	58 02.2	+51.2	130.8	57 22.6	+51.9	132.0	56 42.0	+52.5	133.1	56 00.6	+53.3	134.2	55 18.4	+53.9	135.2	54 35.4	+54.5	136.2	53 51.7	+55.0	137.2	53 07.4	+55.4	138.1	28
29	58 53.4	+50.7	129.8	58 14.5	+51.5	131.0	57 34.6	+52.3	132.2	56 53.9	+52.9	133.4	56 12.3	+53.6	134.5	55 29.9	+54.1	135.5	54 46.7	+54.7	136.5	54 02.8	+55.3	137.4	29
30	59 44.1	+50.1	128.7	59 06.0	+51.0	130.0	58 26.9	+51.8	131.3	57 46.8	+52.6	132.5	57 05.9	+53.2	133.6	56 24.0	+53.9	134.7	55 41.4	+54.5	135.8	54 58.1	+55.0	136.8	30
31	60 34.2	+49.6	127.6	59 57.0	+50.5	129.0	59 18.7	+51.4	130.3	58 39.4	+52.2	131.6	57 59.1	+52.9	132.8	57 17.9	+53.6	133.9	56 35.9	+54.2	135.0	55 53.1	+54.7	136.1	31
32	61 23.8	+48.9	126.5	60 47.5	+50.0	127.9	60 10.1	+50.8	129.3	59 31.6	+51.7	130.6	58 52.0	+52.5	131.9	58 11.5	+53.2	133.1	57 30.1	+53.8	134.2	56 47.8	+54.5	135.3	32
33	62 12.7	+48.3	125.2	61 37.5	+49.3	126.8	61 00.9	+50.4	128.2	60 23.3	+51.2	129.6	59 44.5	+52.0	130.9	59 04.7	+52.8	132.2	58 23.9	+53.5	133.4	57 42.3	+54.1	134.6	33
34	63 01.0	+47.5	124.0	62 26.8	+48.7	125.5	61 51.3	+49.7	127.1	61 14.5	+50.7	128.5	60 36.5	+51.6	129.9	59 57.5	+52.4	131.3	59 17.4	+53.2	132.5	58 36.4	+53.9	133.7	34
35	63 48.5	+46.7	122.6	63 15.5	+47.9	124.3	62 41.0	+49.1	125.9	62 05.2	+50.1	127.4	61 28.1	+51.1	128.9	60 49.9	+52.0	130.3	60 10.6	+52.7	131.6	59 30.3	+53.4	132.9	35
36	64 35.2	+45.8	121.1	64 03.4	+47.1	122.9	63 30.1	+48.3	124.6	62 55.3	+49.5	126.2	62 19.2	+50.5	127.8	61 41.9	+51.4	129.2	61 03.3	+52.3	130.6	60 23.7	+53.1	132.0	36
37	65 21.0	+44.9	119.6	64 50.5	+46.3	121.5	64 18.4	+47.6	123.2	63 44.8	+48.7	124.9	63 09.7	+49.9	126.6	62 33.3	+50.9	128.1	61 55.6	+51.9	129.6	61 16.8	+52.7	131.0	37
38	66 05.9	+43.7	118.0	65 36.8	+45.3	120.0	65 06.0	+46.7	121.8	64 33.5	+48.0	123.6	63 59.6	+49.2	125.3	63 24.2	+50.3	127.0	62 47.5	+51.2	128.5	62 09.5	+52.2	130.0	38
39	66 49.6	+42.6	116.3	66 22.1	+44.2	118.3	65 52.7	+45.7	120.3	65 21.5	+47.2	122.2	64 48.8	+48.4	124.0	64 14.5	+49.6	125.7	63 38.7	+50.7	127.4	63 01.7	+51.7	128.9	39
40	67 32.2	+41.3	114.5	67 06.3	+43.1	116.6	66 38.4	+44.7	118.7	66 08.7	+46.2	120.7	65 37.2	+47.6	122.6	65 04.1	+48.9	124.4	64 29.4	+50.1	126.1	63 53.4	+51.1	127.8	40
41	68 13.5	+39.8	112.5	67 49.4	+41.7	114.8	67 23.1	+43.6	117.0	66 54.9	+45.3	119.1	66 24.8	+46.7	121.1	65 53.0	+48.1	123.0	65 19.5	+49.3	124.8	64 44.5	+50.5	126.6	41
42	68 53.3	+38.3	110.5	68 31.1	+40.4	112.9	68 06.7	+42.3	115.2	67 40.1	+44.1	117.4	67 11.5	+45.7	119.5	66 41.1	+47.1	121.5	66 08.8	+48.6	123.5	65 35.0	+49.7	125.3	42
43	69 31.6	+36.6	108.3	69 11.5	+38.8	110.8	68 49.0	+40.8	113.2	68 24.2	+42.8	115.6	67 57.2	+44.6	117.8	67 28.2	+46.2	119.9	66 57.4	+47.6	122.0	66 24.7	+49.0	123.9	43
44	70 08.2	+34.7•	106.0	69 50.3	+37.1	108.6	69 29.8	+39.4	111.2	69 07.0	+41.4	113.6	68 41.8	+43.3	116.0	68 14.4	+45.1	118.2	67 45.0	+46.7	120.4	67 13.7	+48.2	122.5	44
45	70 42.9	+32.6•	103.6	70 27.4	+35.2	106.3	70 09.2	+37.6	109.0	69 48.4	+39.8	111.6	69 25.1	+41.9	114.1	68 59.5	+43.9	116.4	68 31.7	+45.6	118.7	68 01.9	+47.2	120.9	45
46	71 15.5	+30.5•	101.0	71 02.6	+33.2•	103.9	70 46.8	+35.7	106.7	70 28.2	+38.2	109.4	70 07.0	+40.4	112.0	69 43.4	+42.4	114.5	69 17.3	+44.4	116.9	68 49.1	+46.1	119.2	46
47	71 46.0	+28.0•	98.3	71 35.8	+30.9•	101.3	71 22.5	+33.7•	104.2	71 06.4	+36.3•	107.0	70 47.4	+38.7	109.8	70 25.8	+41.0	112.4	70 01.7	+43.0	115.0	69 35.2	+45.0	117.4	47
48	72 14.0	+25.3•	95.4	72 06.7	+28.4•	98.5	71 56.2	+31.4•	101.6	71 42.7	+34.2•	104.5	71 26.1	+36.9•	107.4	71 06.8	+39.3	110.2	70 44.7	+41.6	112.9	70 20.2	+43.6	115.5	48
49	72 39.3	+22.6•	92.4	72 35.1	+25.8•	95.6	72 27.6	+28.9•	98.8	72 16.9	+31.9•	101.9	72 03.0	+34.7•	104.9	71 46.1	+37.3•	107.8	71 26.3	+39.8	110.7	71 03.8	+42.1	113.4	49
50	73 01.9	+19.6•	89.3	73 00.9	+23.0•	92.6	72 56.5	+26.3•	95.8	72 48.8	+29.4•	99.0	72 37.7	+32.5•	102.2	72 23.4	+35.3•	105.3	72 06.1	+38.0	108.3	71 45.9	+40.4	111.2	50
51	73 21.5	+16.3•	86.0	73 23.9	+19.9•	89.4	73 22.8	+23.3•	92.7	73 18.2	+26.7•	96.1	73 10.2	+29.9•	99.3	72 58.7	+33.0•	102.6	72 44.1	+35.9•	105.7	72 26.3	+38.6•	108.8	51
52	73 37.8	+13.0•	82.6	73 43.8	+16.6•	86.0	73 46.1	+20.2•	89.5	73 44.9	+23.7•	92.9	73 40.1	+27.1•	96.3	73 31.7	+30.5•	99.7	73 20.0	+33.5•	103.0	73 04.9	+36.4•	106.2	52
53	73 50.8	+9.6•	79.1	74 00.4	+13.2•	82.6	74 06.3	+16.9•	86.1	74 08.6	+20.6•	89.6	74 07.2	+24.2•	93.1	74 02.2	+27.6•	96.6	73 53.5	+31.0•	100.0	73 41.3	+34.1•	103.4	53
54	74 00.4	+5.9•	75.6	74 13.6	+9.6•	79.0	74 23.2	+13.4•	82.5	74 29.2	+17.1•	86.1	74 31.4	+20.9•	89.7	74 29.8	+24.6•	93.3	74 24.5	+28.1•	96.9	74 15.4	+31.6•	100.4	54
55	74 06.3	+2.3•	72.0	74 23.2	+6.0•	75.4	74 36.6	+9.7•	78.9	74 46.3	+13.6•	82.5	74 52.3	+17.4•	86.1	74 54.4	+21.2•	89.9	74 52.6	+25.0•	93.6	74 47.0	+28.6•	97.2	55
56	74 08.6	–1.4•	68.3	74 29.2	+2.2•	71.6	74 46.3	+6.0•	75.1	74 59.9	+9.8•	78.7	75 09.7	+13.8•	82.4	75 15.6	+17.7•	86.3	75 17.6	+21.6•	90.0	75 15.6	+25.5•	93.8	56
57	74 07.2	–5.0•	64.6	74 31.4	–1.6•	67.9	74 52.3	+2.1•	71.3	75 09.7	+5.9•	74.9	75 23.5	+9.8•	78.6	75 33.3	+14.0•	82.4	75 39.2	+18.0•	86.3	75 41.1	+22.0•	90.2	57
58	74 02.2	–8.7•	61.0	74 29.8	–5.3•	64.2	74 54.4	–1.8•	67.5	75 15.6	+2.0•	71.0	75 33.3	+5.9•	74.7	75 47.3	+9.9•	78.5	75 57.2	+14.1•	82.4	76 03.1	+18.3•	86.4	58
59	73 53.5	–12.2•	57.4	74 24.5	–9.1•	60.4	74 52.6	–5.6•	63.7	75 17.6	–2.0•	67.1	75 39.2	+1.9•	70.7	75 57.2	+5.9•	74.5	76 11.3	+10.1•	78.4	76 21.4	+14.2•	82.4	59
60	73 41.3	–15.6•	53.9	74 15.4	–12.6•	56.8	74 47.0	–9.5•	59.9	75 15.6	–6.0•	63.1	75 41.1	–2.3•	66.6	76 03.1	+1.6•	70.3	76 21.4	+5.7•	74.2	76 35.6	+10.1•	78.3	60
61	73 25.7	–18.8•	50.5	74 02.8	–16.1•	53.2	74 37.5	–13.1•	56.1	75 09.6	–9.8•	59.2	75 38.8	–6.3•	62.6	76 04.7	–2.5•	66.2	76 27.1	+1.5•	70.0	76 45.7	+5.7•	74.0	61
62	73 06.9	–21.8•	47.2	73 46.7	–19.3•	49.7	74 24.4	–16.6•	52.5	74 59.8	–13.6•	55.4	75 32.5	–10.6•	58.5	76 02.2	–6.8•	62.0	76 28.6	–2.9•	65.7	76 51.4	+1.3•	69.6	62
63	72 45.1	–24.7•	44.0	73 27.4	–22.5•	46.4	74 07.8	–19.9•	48.9	74 46.2	–17.2•	51.7	75 22.1	–14.1•	54.7	75 55.4	–10.8•	57.9	76 25.7	–7.2•	61.4	76 52.7	–3.3•	65.2	63
64	72 20.4	–27.4•	41.0	73 04.9	–25.3•	43.1	73 47.9	–23.1•	45.5	74 29.0	–20.6•	48.1	75 08.0	–17.8•	50.9	75 44.6	–14.8•	53.9	76 18.5	–11.3•	57.2	76 49.4	–7.6•	60.8	64
65	71 53.0	–29.8•	38.1	72 39.6	–28.0•	40.1	73 24.8	–26.0•	42.2	74 08.4	–23.8•	44.6	74 50.2	–21.3•	47.2	75 29.8	–18.4•	50.0	76 07.2	–15.4•	53.1	76 41.8	–12.0•	56.5	65
66	71 23.2	–32.2•	35.3	72 11.6	–30.6•	37.1	72 58.8	–28.8•	39.1	73 44.6	–26.7•	41.3	74 28.9	–24.5•	43.6	75 11.4	–22.0•	46.2	75 51.8	–19.2•	49.1	76 29.8	–16.1•	52.3	66
67	70 51.0	–34.2	32.7	71 41.0	–32.8•	34.4	72 30.0	–31.2•	36.2	73 17.9	–29.5•	38.1	74 04.4	–27.5•	40.3	74 49.4	–25.3•	42.7	75 32.6	–22.8•	45.3	76 13.7	–20.0•	48.2	67
68	70 16.8	–36.1	30.3	71 08.2	–34.8•	31.7	71 58.8	–33.5•	33.4	72 48.4	–31.9•	35.1	73 36.9	–30.2•	37.1	74 24.1	–28.2•	39.2	75 09.8	–26.1•	41.6	75 53.7	–23.6•	44.3	68
69	69 40.7	–37.9	27.9	70 33.4	–36.8	29.3	71 25.3	–35.5•	30.7	72 16.5	–34.2•	32.3	73 06.7	–32.7•	34.1	73 55.9	–31.0•	36.0	74 43.7	–29.0•	38.1	75 30.1	–26.9•	40.5	69
70	69 02.8	–39.5	25.7	69 56.6	–38.6	26.9	70 49.8	–37.5	28.2	71 42.3	–36.3	29.6	72 34.0	–35.0•	31.2	73 24.9	–33.6•	33.0	74 14.7	–31.9•	34.9	75 03.2	–29.9•	37.0	70
71	68 23.3	–40.9	23.7	69 18.0	–40.1	24.7	70 12.3	–39.2	25.9	71 06.0	–38.2	27.1	71 59.0	–37.0	28.5	72 51.3	–35.7•	30.1	73 42.8	–34.3•	31.8	74 33.3	–32.7•	33.7	71
72	67 42.4	–42.3	21.7	68 37.9	–41.5	22.6	69 33.1	–40.8	23.7	70 27.8	–39.9	24.8	71 22.0	–39.0	26.0	72 15.6	–37.8•	27.4	73 08.5	–36.6•	28.9	74 00.6	–35.2•	30.6	72
73	67 00.1	–43.5	19.9	67 56.4	–42.9	20.7	68 52.3	–42.1	21.6	69 47.9	–41.4	22.6	70 43.1	–40.6	23.7	71 37.8	–39.7	24.9	72 31.9	–38.6	26.2	73 25.4	–37.4•	27.7	73
74	66 16.6	–44.6	18.1	67 13.5	–44.0	18.9	68 10.2	–43.5	19.7	69 06.5	–42.8	20.5	70 02.5	–42.1	21.5	70 58.1	–41.3	22.6	71 53.3	–40.4	23.7	72 48.0	–39.5	25.0	74
75	65 32.0	–45.5	16.5	66 29.5	–45.1	17.1	67 26.7	–44.6	17.8	68 23.7	–44.1	18.6	69 20.4	–43.4	19.5	70 16.8	–42.8	20.4	71 12.9	–42.0	21.4	72 08.5	–41.2	22.5	75
76	64 46.5	–46.5	14.9	65 44.4	–46.1	15.5	66 42.1	–45.7	16.1	67 39.6	–45.2	16.8	68 37.0	–44.7	17.5	69 34.0	–44.1	18.3	70 30.9	–43.5	19.2	71 27.3	–42.8	20.2	76
77	64 00.0	–47.4	13.5	64 58.3	–47.0	14.0	65 56.4	–46.6	14.5	66 54.4	–46.2	15.1	67 52.3	–45.8	15.7	68 49.9	–45.3	16.4	69 47.4	–44.8	17.2	70 44.5	–44.2	18.0	77
78	63 12.6	–48.0	12.1	64 11.3	–47.8	12.5	65 09.8	–47.5	13.0	66 08.2	–47.1	13.5	67 06.5	–46.6	14.0	68 04.6	–46.4	14.6	69 02.6	–46.0	15.3	70 00.3	–45.4	16.0	78
79	62 24.6	–48.8	10.8	63 23.5	–48.6	11.2	64 22.3	–48.3	11.6	65 21.0	–48.0	12.0	66 19.7	–47.7	12.5	67 18.2	–47.4	13.0	68 16.6	–47.0	13.5	69 14.9	–46.7	14.2	79
80	61 35.8	–49.5	9.5	62 34.9	–49.2	9.9	63 34.0	–49.0	10.2	64 33.0	–48.8	10.6	65 32.0	–48.6	11.0	66 30.8	–48.2	11.4	67 29.6	–48.0	11.9	68 28.2	–47.6	12.4	80
81	60 46.3	–50.0	8.4	61 45.7	–49.9	8.6	62 45.0	–49.7	8.9	63 44.2	–49.5	9.2	64 43.4	–49.3	9.6	65 42.6	–49.1	9.9	66 41.6	–48.8	10.3	67 40.6	–48.5	10.8	81
82	59 56.3	–50.5	7.2	60 55.8	–50.4	7.5	61 55.3	–50.3	7.7	62 54.7	–50.1	8.0	63 54.1	–49.9	8.3	64 53.5	–49.8	8.6	65 52.8	–49.6	8.9	66 52.1	–49.4	9.3	82
83	59 05.8	–51.1	6.2	60 05.4	–50.9	6.4	61 05.0	–50.8	6.6	62 04.6	–50.7	6.8	63 04.2	–50.6	7.0	64 03.7	–50.4	7.3	65 03.2	–50.2	7.5	66 02.7	–50.1	7.8	83
84	58 14.7	–51.5	5.2	59 14.5	–51.4	5.3	60 14.2	–51.3	5.5	61 13.9	–51.2	5.7	62 13.6	–51.1	5.8	63 13.3	–51.0	6.0	64 13.0	–50.9	6.3	65 12.6	–50.8	6.5	84
85	57 23.2	–51.9	4.2	58 23.1	–51.9	4.3	59 22.9	–51.8	4.5	60 22.7	–51.7	4.6	61 22.5	–51.6	4.7	62 22.3	–51.6	4.9	63 22.1	–51.5	5.1	64 21.8	–51.4	5.2	85
86	56 31.3	–52.3	3.3	57 31.2	–52.3	3.4	58 31.1	–52.2	3.5	59 31.0	–52.2	3.6	60 30.9	–52.1	3.7	61 30.7	–52.0	3.8	62 30.6	–52.0	3.9	63 30.4	–51.9	4.1	86
87	55 39.0	–52.7	2.4	56 38.9	–52.6	2.5	57 38.9	–52.6	2.5	58 38.8	–52.6	2.6	59 38.8	–52.5	2.7	60 38.7	–52.5	2.8	61 38.6	–52.4	2.9	62 38.5	–52.4	3.0	87
88	54 46.3	–53.0	1.6	55 46.3	–53.0	1.6	56 46.3	–53.0	1.7	57 46.2	–52.9	1.7	58 46.2	–52.9	1.8	59 46.2	–52.9	1.8	60 46.2	–52.9	1.9	61 46.1	–52.8	1.9	88
89	53 53.3	–53.3	0.8	54 53.3	–53.3	0.8	55 53.3	–53.3	0.8	56 53.3	–53.3	0.8	57 53.3	–53.3	0.9	58 53.3	–53.3	0.9	59 53.3	–53.3	0.9	60 53.3	–53.3	0.9	89
90	53 00.0	–53.6	0.0	54 00.0	–53.6	0.0	55 00.0	–53.6	0.0	56 00.0	–53.6	0.0	57 00.0	–53.6	0.0	58 00.0	–53.6	0.0	59 00.0	–53.6	0.0	60 00.0	–53.6	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 27°, 333°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	32 25.6	−56.8	147.5	31 34.9	−57.0	147.8	30 44.1	−57.2	148.1	29 53.0	−57.4	148.4	29 01.8	−57.5	148.7	28 10.5	−57.8	149.0	27 19.0	−57.9	149.3	26 27.3	−58.0	149.5	0
1	31 28.8	−56.9	147.8	30 37.9	−57.1	148.2	29 46.9	−57.3	148.5	28 55.6	−57.4	148.8	28 04.3	−57.7	149.0	27 12.7	−57.7	149.3	26 21.1	−58.0	149.6	25 29.3	−58.1	149.8	1
2	30 31.9	−56.9	148.2	29 40.8	−57.1	148.5	28 49.6	−57.3	148.8	27 58.2	−57.5	149.1	27 06.6	−57.6	149.4	26 15.0	−57.9	149.6	25 23.1	−57.9	149.9	24 31.2	−58.1	150.1	2
3	29 35.0	−57.0	148.6	28 43.7	−57.2	148.9	27 52.3	−57.4	149.1	27 00.7	−57.5	149.4	26 09.0	−57.7	149.7	25 17.1	−57.8	149.9	24 25.2	−58.0	150.1	23 33.1	−58.2	150.4	3
4	28 38.0	−57.0	148.9	27 46.5	−57.2	149.2	26 54.9	−57.4	149.5	26 03.2	−57.6	149.7	25 11.3	−57.7	150.0	24 19.3	−57.9	150.2	23 27.2	−58.1	150.4	22 34.9	−58.1	150.6	4
5	27 41.0	−57.1	149.3	26 49.3	−57.3	149.6	25 57.5	−57.4	149.8	25 05.6	−57.6	150.0	24 13.6	−57.8	150.3	23 21.4	−57.9	150.5	22 29.1	−58.0	150.7	21 36.8	−58.2	150.9	5
6	26 43.9	−57.2	149.6	25 52.0	−57.3	149.9	25 00.1	−57.5	150.1	24 08.0	−57.7	150.3	23 15.8	−57.8	150.6	22 23.5	−58.0	150.8	21 31.1	−58.1	151.0	20 38.6	−58.3	151.2	6
7	25 46.7	−57.2	150.0	24 54.7	−57.4	150.2	24 02.6	−57.6	150.4	23 10.3	−57.6	150.6	22 18.0	−57.8	150.9	21 25.5	−57.9	151.0	20 33.0	−58.1	151.2	19 40.3	−58.2	151.4	7
8	24 49.5	−57.2	150.3	23 57.3	−57.3	150.5	23 05.0	−57.5	150.7	22 12.7	−57.7	150.9	21 20.2	−57.9	151.1	20 27.6	−58.0	151.3	19 34.9	−58.2	151.5	18 42.1	−58.3	151.7	8
9	23 52.3	−57.3	150.6	22 59.9	−57.4	150.8	22 07.5	−57.6	151.1	21 14.9	−57.7	151.2	20 22.3	−57.9	151.4	19 29.6	−58.1	151.6	18 36.7	−58.1	151.8	17 43.8	−58.2	151.9	9
10	22 55.0	−57.3	151.0	22 02.5	−57.5	151.2	21 09.9	−57.6	151.4	20 17.2	−57.8	151.5	19 24.4	−57.9	151.7	18 31.5	−58.0	151.9	17 38.6	−58.2	152.0	16 45.6	−58.3	152.2	10
11	21 57.7	−57.4	151.3	21 05.0	−57.5	151.5	20 12.3	−57.7	151.6	19 19.4	−57.8	151.8	18 26.5	−58.0	152.0	17 33.5	−58.1	152.1	16 40.4	−58.2	152.3	15 47.3	−58.4	152.4	11
12	21 00.3	−57.4	151.6	20 07.5	−57.5	151.8	19 14.6	−57.7	151.9	18 21.6	−57.8	152.1	17 28.5	−57.9	152.3	16 35.4	−58.1	152.4	15 42.2	−58.2	152.5	14 48.9	−58.3	152.7	12
13	20 02.9	−57.4	151.9	19 10.0	−57.6	152.1	18 16.9	−57.7	152.2	17 23.8	−57.9	152.4	16 30.6	−58.0	152.5	15 37.3	−58.1	152.7	14 44.0	−58.2	152.8	13 50.6	−58.3	152.9	13
14	19 05.5	−57.4	152.2	18 12.4	−57.6	152.4	17 19.2	−57.7	152.5	16 25.9	−57.8	152.7	15 32.6	−58.0	152.8	14 39.2	−58.1	152.9	13 45.8	−58.3	153.0	12 52.3	−58.3	153.1	14
15	18 08.1	−57.5	152.5	17 14.8	−57.6	152.7	16 21.5	−57.8	152.8	15 28.1	−57.9	152.9	14 34.6	−58.0	153.1	13 41.1	−58.1	153.2	12 47.5	−58.2	153.3	11 53.9	−58.4	153.4	15
16	17 10.6	−57.5	152.8	16 17.2	−57.7	153.0	15 23.7	−57.8	153.1	14 30.2	−57.9	153.2	13 36.6	−58.0	153.3	12 43.0	−58.2	153.4	11 49.3	−58.3	153.5	10 55.5	−58.3	153.6	16
17	16 13.1	−57.6	153.1	15 19.5	−57.7	153.2	14 25.9	−57.8	153.4	13 32.3	−58.0	153.5	12 38.6	−58.1	153.6	11 44.8	−58.2	153.7	10 51.0	−58.3	153.8	9 57.2	−58.4	153.8	17
18	15 15.5	−57.5	153.4	14 21.9	−57.7	153.5	13 28.1	−57.8	153.6	12 34.3	−57.9	153.7	11 40.5	−58.1	153.8	10 46.6	−58.1	153.9	9 52.7	−58.3	154.0	8 58.8	−58.4	154.1	18
19	14 18.0	−57.6	153.7	13 24.2	−57.7	153.8	12 30.3	−57.8	153.9	11 36.4	−58.0	154.0	10 42.4	−58.1	154.1	9 48.5	−58.2	154.2	8 54.4	−58.3	154.2	8 00.4	−58.4	154.3	19
20	13 20.4	−57.6	154.0	12 26.5	−57.8	154.1	11 32.5	−57.9	154.2	10 38.4	−57.9	154.3	9 44.4	−58.1	154.4	8 50.3	−58.2	154.4	7 56.1	−58.3	154.5	7 02.0	−58.4	154.5	20
21	12 22.8	−57.6	154.3	11 28.7	−57.7	154.4	10 34.6	−57.8	154.5	9 40.5	−58.0	154.5	8 46.3	−58.1	154.6	7 52.1	−58.2	154.7	6 57.8	−58.3	154.7	6 03.6	−58.5	154.8	21
22	11 25.2	−57.6	154.6	10 31.0	−57.8	154.7	9 36.8	−57.9	154.7	8 42.5	−58.0	154.8	7 48.2	−58.1	154.9	6 53.9	−58.3	154.9	5 59.5	−58.3	155.0	5 05.1	−58.4	155.0	22
23	10 27.6	−57.7	154.9	9 33.2	−57.7	154.9	8 38.9	−57.9	155.0	7 44.5	−58.0	155.1	6 50.1	−58.1	155.1	5 55.6	−58.2	155.2	5 01.2	−58.3	155.2	4 06.7	−58.4	155.2	23
24	9 29.9	−57.6	155.1	8 35.5	−57.8	155.2	7 41.0	−57.9	155.3	6 46.5	−58.0	155.3	5 52.0	−58.2	155.4	4 57.4	−58.2	155.4	4 02.9	−58.4	155.4	3 08.3	−58.4	155.5	24
25	8 32.3	−57.7	155.4	7 37.7	−57.8	155.5	6 43.1	−57.9	155.5	5 48.5	−58.0	155.6	4 53.8	−58.1	155.6	3 59.2	−58.2	155.6	3 04.5	−58.3	155.7	2 09.9	−58.5	155.7	25
26	7 34.6	−57.7	155.7	6 39.9	−57.8	155.7	5 45.2	−57.9	155.8	4 50.5	−58.1	155.8	3 55.7	−58.1	155.9	3 01.0	−58.3	155.9	2 06.2	−58.3	155.9	1 11.4	−58.4	155.9	26
27	6 36.9	−57.7	156.0	5 42.1	−57.8	156.0	4 47.3	−57.9	156.1	3 52.4	−58.0	156.1	2 57.6	−58.1	156.1	2 02.7	−58.2	156.1	1 07.9	−58.4	156.1	0 13.0	−58.4	156.1	27
28	5 39.2	−57.7	156.2	4 44.3	−57.8	156.3	3 49.4	−58.0	156.3	2 54.4	−58.0	156.3	1 59.5	−58.2	156.4	1 04.5	−58.2	156.4	0 09.5	−58.3	156.4	0 45.4	+58.5	23.6	28
29	4 41.5	−57.7	156.5	3 46.5	−57.8	156.6	2 51.4	−57.9	156.6	1 56.4	−58.0	156.6	1 01.3	−58.1	156.6	0 06.3	−58.3	156.6	0 48.8	+58.3	23.4	1 43.9	+58.4	23.4	29
30	3 43.8	−57.7	156.8	2 48.7	−57.8	156.8	1 53.5	−57.9	156.8	0 58.4	−58.1	156.8	0 03.2	−58.2	156.8	0 52.0	+58.2	23.2	1 47.1	+58.4	23.2	2 42.3	+58.4	23.2	30
31	2 46.1	−57.7	157.1	1 50.9	−57.9	157.1	0 55.6	−57.9	157.1	0 00.3	−58.0	157.1	0 55.0	+58.1	22.9	1 50.2	+58.3	22.9	2 45.5	+58.3	22.9	3 40.7	+58.5	23.0	31
32	1 48.4	−57.7	157.3	0 53.0	−57.8	157.4	0 02.3	+58.0	22.6	0 57.7	+58.0	22.6	1 53.1	+58.2	22.7	2 48.5	+58.2	22.7	3 43.8	+58.4	22.7	4 39.2	+58.4	22.7	32
33	0 50.7	−57.7	157.6	0 04.8	+57.8	22.4	1 00.3	+57.9	22.4	1 55.7	+58.1	22.4	2 51.2	+58.2	22.4	3 46.7	+58.2	22.4	4 42.1	+58.4	22.5	5 37.6	+58.4	22.5	33
34	0 07.0	+57.7	22.1	1 02.6	+57.9	22.1	1 58.2	+57.9	22.1	2 53.8	+58.0	22.1	3 49.4	+58.1	22.2	4 44.9	+58.2	22.2	5 40.5	+58.3	22.2	6 36.0	+58.4	22.3	34
35	1 04.7	+57.8	21.8	2 00.4	+57.9	21.8	2 56.1	+57.9	21.9	3 51.8	+58.0	21.9	4 47.5	+58.1	21.9	5 43.1	+58.3	21.9	6 38.8	+58.3	22.0	7 34.4	+58.4	22.0	35
36	2 02.5	+57.7	21.6	2 58.3	+57.8	21.6	3 54.0	+58.0	21.6	4 49.8	+58.0	21.6	5 45.6	+58.1	21.7	6 41.4	+58.2	21.7	7 37.1	+58.3	21.7	8 32.8	+58.4	21.8	36
37	3 00.2	+57.7	21.3	3 56.1	+57.8	21.3	4 52.0	+57.9	21.3	5 47.8	+58.1	21.4	6 43.7	+58.1	21.4	7 39.6	+58.2	21.5	8 35.4	+58.3	21.5	9 31.2	+58.4	21.6	37
38	3 57.9	+57.7	21.0	4 53.9	+57.8	21.0	5 49.9	+57.9	21.1	6 45.9	+58.0	21.1	7 41.8	+58.1	21.2	8 37.8	+58.2	21.2	9 33.7	+58.3	21.3	10 29.6	+58.4	21.3	38
39	4 55.6	+57.7	20.7	5 51.7	+57.8	20.8	6 47.8	+57.9	20.8	7 43.9	+57.9	20.9	8 39.9	+58.1	20.9	9 36.0	+58.1	21.0	10 32.0	+58.2	21.0	11 28.0	+58.3	21.1	39
40	5 53.3	+57.7	20.5	6 49.5	+57.8	20.5	7 45.7	+57.9	20.5	8 41.8	+58.0	20.6	9 38.0	+58.1	20.7	10 34.1	+58.2	20.7	11 30.2	+58.3	20.8	12 26.3	+58.4	20.9	40
41	6 51.0	+57.6	20.2	7 47.3	+57.8	20.2	8 43.6	+57.8	20.3	9 39.8	+58.0	20.3	10 36.1	+58.0	20.4	11 32.3	+58.2	20.5	12 28.5	+58.3	20.5	13 24.7	+58.3	20.6	41
42	7 48.6	+57.7	19.9	8 45.1	+57.7	20.0	9 41.4	+57.9	20.0	10 37.8	+58.0	20.1	11 34.1	+58.1	20.1	12 30.5	+58.1	20.2	13 26.8	+58.2	20.3	14 23.0	+58.3	20.4	42
43	8 46.3	+57.7	19.6	9 42.8	+57.7	19.7	10 39.3	+57.8	19.7	11 35.8	+57.9	19.8	12 32.2	+58.0	19.9	13 28.6	+58.1	20.0	14 25.0	+58.2	20.0	15 21.3	+58.3	20.1	43
44	9 44.0	+57.6	19.4	10 40.6	+57.7	19.4	11 37.1	+57.9	19.5	12 33.7	+57.9	19.5	13 30.2	+58.0	19.6	14 26.7	+58.1	19.7	15 23.2	+58.2	19.8	16 19.6	+58.3	19.9	44
45	10 41.6	+57.6	19.1	11 38.3	+57.7	19.1	12 35.0	+57.8	19.2	13 31.6	+57.9	19.3	14 28.2	+58.1	19.4	15 24.8	+58.1	19.5	16 21.4	+58.2	19.5	17 17.9	+58.3	19.6	45
46	11 39.2	+57.6	18.8	12 36.0	+57.7	18.9	13 32.8	+57.8	18.9	14 29.5	+57.9	19.0	15 26.3	+57.9	19.1	16 22.9	+58.1	19.2	17 19.6	+58.1	19.3	18 16.2	+58.2	19.4	46
47	12 36.8	+57.6	18.5	13 33.7	+57.7	18.6	14 30.6	+57.8	18.7	15 27.4	+57.9	18.7	16 24.2	+58.0	18.8	17 21.0	+58.1	18.9	18 17.7	+58.2	18.9	19 14.4	+58.3	19.1	47
48	13 34.4	+57.6	18.2	14 31.4	+57.7	18.3	15 28.4	+57.7	18.4	16 25.3	+57.8	18.5	17 22.2	+57.9	18.6	18 19.1	+58.0	18.7	19 15.9	+58.1	18.8	20 12.7	+58.2	18.9	48
49	14 32.0	+57.6	17.9	15 29.1	+57.6	18.0	16 26.1	+57.8	18.1	17 23.1	+57.9	18.2	18 20.1	+58.0	18.3	19 17.1	+58.0	18.4	20 14.0	+58.1	18.5	21 10.9	+58.2	18.6	49
50	15 29.6	+57.5	17.6	16 26.7	+57.6	17.7	17 23.9	+57.7	17.8	18 21.0	+57.8	17.9	19 18.1	+57.9	18.0	20 15.1	+58.0	18.1	21 12.1	+58.1	18.2	22 09.1	+58.1	18.4	50
51	16 27.1	+57.5	17.3	17 24.3	+57.6	17.4	18 21.6	+57.7	17.5	19 18.8	+57.8	17.6	20 15.9	+57.9	17.7	21 13.1	+57.9	17.8	22 10.2	+58.0	18.0	23 07.2	+58.1	18.1	51
52	17 24.6	+57.4	17.0	18 21.9	+57.6	17.1	19 19.3	+57.6	17.2	20 16.6	+57.7	17.3	21 13.8	+57.8	17.4	22 11.0	+58.0	17.6	23 08.2	+58.0	17.7	24 05.4	+58.1	17.8	52
53	18 22.1	+57.4	16.7	19 19.5	+57.5	16.8	20 16.9	+57.6	16.9	21 14.3	+57.7	17.0	22 11.6	+57.9	17.2	23 09.0	+57.9	17.3	24 06.2	+57.9	17.4	25 03.5	+58.0	17.5	53
54	19 19.5	+57.4	16.4	20 17.0	+57.5	16.5	21 14.5	+57.6	16.6	22 12.0	+57.7	16.8	23 09.5	+57.7	16.9	24 06.8	+57.9	17.0	25 04.2	+58.0	17.1	26 01.5	+58.1	17.3	54
55	20 16.9	+57.4	16.1	21 14.5	+57.5	16.2	22 12.1	+57.6	16.3	23 09.7	+57.6	16.5	24 07.2	+57.8	16.6	25 04.7	+57.8	16.7	26 02.2	+57.9	16.8	26 59.6	+58.0	17.0	55
56	21 14.3	+57.3	15.8	22 12.0	+57.5	16.0	23 09.7	+57.5	16.1	24 07.3	+57.7	16.2	25 05.0	+57.5	16.3	26 02.5	+57.6	16.4	27 00.1	+57.8	16.6	27 57.6	+57.9	16.6	56
57	22 11.6	+57.3	15.5	23 09.5	+57.3	15.6	24 07.2	+57.5	15.7	25 05.0	+57.5	15.8	26 02.7	+57.6	16.0	27 00.3	+57.8	16.1	27 57.9	+57.9	16.3	28 55.5	+58.0	16.4	57
58	23 09.0	+57.2	15.2	24 06.8	+57.4	15.3	25 04.7	+57.5	15.4	26 02.5	+57.6	15.5	27 00.1	+57.6	15.7	27 58.1	+57.7	15.8	28 55.8	+57.8	16.0	29 53.5	+57.8	16.1	58
59	24 06.2	+57.3	14.8	25 04.2	+57.3	15.0	26 02.2	+57.4	15.1	27 00.1	+57.5	15.2	27 57.9	+57.6	15.4	28 55.8	+57.7	15.5	29 53.6	+57.7	15.6	30 51.3	+57.9	15.9	59
60	25 03.5	+57.1	14.5	26 01.5	+57.3	14.6	26 59.6	+57.3	14.8	27 57.6	+57.4	14.9	28 55.5	+57.6	15.0	29 53.5	+57.6	15.2	30 51.3	+57.7	15.3	31 49.2	+57.8	15.5	60
61	26 00.6	+57.2	14.2	26 58.8	+57.2	14.3	27 56.9	+57.3	14.4	28 55.0	+57.4	14.6	29 53.1	+57.4	14.7	30 51.1	+57.5	14.9	31 49.0	+57.7	15.0	32 47.0	+57.7	15.2	61
62	26 57.8	+57.1	13.8	27 56.0	+57.2	14.0	28 54.2	+57.3	14.1	29 52.4	+57.3	14.2	30 50.5	+57.5	14.4	31 48.6	+57.6	14.5	32 46.7	+57.6	14.7	33 44.7	+57.7	14.9	62
63	27 54.9	+57.0	13.5	28 53.2	+57.1	13.6	29 51.5	+57.2	13.7	30 49.7	+57.3	13.9	31 48.0	+57.4	14.0	32 46.2	+57.4	14.2	33 44.3	+57.6	14.4	34 42.4	+57.7	14.5	63
64	28 51.9	+57.0	13.1	29 50.3	+57.1	13.3	30 48.7	+57.1	13.4	31 47.0	+57.3	13.5	32 45.4	+57.3	13.7	33 43.6	+57.4	13.8	34 41.9	+57.5	14.0	35 40.1	+57.5	14.2	64
65	29 48.9	+56.9	12.8	30 47.4	+57.0	12.9	31 45.8	+57.1	13.0	32 44.3	+57.1	13.2	33 42.7	+57.2	13.3	34 41.0	+57.3	13.5	35 39.4	+57.4	13.7	36 37.6	+57.6	13.8	65
66	30 45.8	+56.8	12.4	31 44.4	+56.9	12.5	32 42.9	+57.0	12.7	33 41.4	+57.1	12.8	34 39.9	+57.2	13.0	35 38.4	+57.3	13.1	36 36.8	+57.4	13.3	37 35.2	+57.4	13.5	66
67	31 42.6	+56.8	12.0	32 41.3	+56.9	12.2	33 39.9	+57.0	12.3	34 38.5	+57.1	12.5	35 37.1	+57.1	12.6	36 35.7	+57.2	12.8	37 34.2	+57.2	12.9	38 32.6	+57.4	13.1	67
68	32 39.4	+56.7	11.7	33 38.2	+56.8	11.9	34 36.9	+56.9	11.9	35 35.6	+56.9	12.1	36 34.2	+57.1	12.2	37 32.9	+57.1	12.4	38 31.4	+57.3	12.6	39 30.0	+57.2	12.7	68
69	33 36.1	+56.6	11.3	34 35.0	+56.7	11.4	35 33.8	+56.8	11.5	36 32.5	+56.9	11.7	37 31.3	+57.0	11.8	38 30.0	+57.0	12.0	39 28.7	+57.1	12.2	40 27.3	+57.2	12.3	69
70	34 32.8	+56.5	10.9	35 31.7	+56.6	11.0	36 30.6	+56.7	11.1	37 29.4	+56.8	11.3	38 28.3	+56.8	11.4	39 27.0	+57.0	11.6	40 25.8	+57.1	11.8	41 24.5	+57.2	11.9	70
71	35 29.3	+56.5	10.5	36 28.3	+56.6	10.7	37 27.3	+56.6	10.7	38 26.2	+56.8	10.9	39 25.1	+56.8	11.0	40 24.0	+56.9	11.2	41 22.9	+56.9	11.4	42 21.7	+57.0	11.5	71
72	36 25.8	+56.4	10.0	37 24.9	+56.5	10.2	38 23.9	+56.6	10.3	39 23.0	+56.5	10.5	40 21.9	+56.7	10.6	41 20.9	+56.8	10.8	42 19.8	+56.9	10.9	43 18.7	+57.0	11.1	72
73	37 22.2	+56.3	9.6	38 21.4	+56.3	9.7	39 20.5	+56.4	9.9	40 19.6	+56.5	10.0	41 18.6	+56.7	10.2	42 17.7	+56.7	10.3	43 16.7	+56.8	10.5	44 15.7	+56.8	10.7	73
74	38 18.5	+56.2	9.2	39 17.7	+56.3	9.3	40 16.9	+56.4	9.4	41 16.1	+56.4	9.6	42 15.3	+56.5	9.7	43 14.4	+56.6	9.9	44 13.5	+56.6	10.1	45 12.5	+56.8	10.2	74
75	39 14.7	+56.1	8.7	40 14.0	+56.2	8.9	41 13.3	+56.2	9.0	42 12.5	+56.3	9.1	43 11.8	+56.3	9.3	44 11.0	+56.4	9.4	45 10.1	+56.6	9.6	46 09.3	+56.6	9.8	75
76	40 10.8	+56.0	8.3	41 10.2	+56.0	8.4	42 09.5	+56.1	8.5	43 08.8	+56.2	8.7	44 08.1	+56.3	8.8	45 07.4	+56.4	9.0	46 06.7	+56.4	9.1	47 05.9	+56.5	9.3	76
77	41 06.8	+55.8	7.8	42 06.2	+55.9	7.9	43 05.6	+56.0	8.0	44 05.0	+56.1	8.2	45 04.4	+56.1	8.3	46 03.8	+56.2	8.5	47 03.1	+56.3	8.6	48 02.4	+56.4	8.8	77
78	42 02.6	+55.7	7.3	43 02.1	+55.8	7.4	44 01.6	+55.9	7.5	45 01.1	+55.9	7.7	46 00.5	+56.0	7.8	47 00.0	+56.0	8.0	47 59.4	+56.1	8.1	48 58.8	+56.2	8.3	78
79	42 58.3	+55.6	6.8	43 57.9	+55.7	6.9	44 57.5	+55.7	7.0	45 57.0	+55.7	7.2	46 56.5	+55.9	7.3	47 56.0	+56.0	7.4	48 55.5	+56.0	7.6	49 55.0	+56.1	7.7	79
80	43 53.9	+55.5	6.3	44 53.6	+55.5	6.4	45 53.2	+55.6	6.5	46 52.8	+55.6	6.6	47 52.4	+55.7	6.7	48 52.0	+55.7	6.9	49 51.5	+55.9	7.0	50 51.1	+55.9	7.2	80
81	44 49.4	+55.3	5.8	45 49.1	+55.3	5.8	46 48.8	+55.4	6.0	47 48.4	+55.5	6.1	48 48.1	+55.6	6.2	49 47.7	+55.6	6.3	50 47.4	+55.6	6.5	51 47.0	+55.7	6.6	81
82	45 44.7	+55.1	5.2	46 44.4	+55.2	5.3	47 44.2	+55.2	5.4	48 43.9	+55.3	5.5	49 43.6	+55.4	5.6	50 43.3	+55.4	5.7	51 43.0	+55.5	5.9	52 42.7	+55.5	6.0	82
83	46 39.8	+55.0	4.6	47 39.6	+55.0	4.7	48 39.4	+55.0	4.8	49 39.2	+55.1	4.9	50 39.0	+55.1	5.0	51 38.7	+55.2	5.1	52 38.5	+55.2	5.2	53 38.2	+55.3	5.4	83
84	47 34.8	+54.7	4.1	48 34.6	+54.8	4.1	49 34.4	+54.9	4.2	50 34.3	+54.9	4.3	51 34.1	+54.9	4.4	52 33.9	+55.0	4.5	53 33.7	+55.1	4.6	54 33.5	+55.1	4.7	84
85	48 29.5	+54.6	3.4	49 29.4	+54.6	3.5	50 29.3	+54.6	3.6	51 29.2	+54.6	3.6	52 29.0	+54.8	3.7	53 28.9	+54.8	3.8	54 28.8	+54.8	3.9	55 28.6	+54.9	4.0	85
86	49 24.1	+54.3	2.8	50 24.0	+54.4	2.8	51 23.9	+54.4	2.9	52 23.8	+54.5	3.0	53 23.8	+54.4	3.0	54 23.7	+54.5	3.1	55 23.6	+54.5	3.2	56 23.5	+54.6	3.3	86
87	50 18.4	+54.1	2.1	51 18.4	+54.1	2.2	52 18.3	+54.2	2.2	53 18.3	+54.2	2.3	54 18.2	+54.2	2.3	55 18.2	+54.2	2.4	56 18.1	+54.3	2.5	57 18.1	+54.3	2.5	87
88	51 12.5	+53.9	1.4	52 12.5	+53.9	1.5	53 12.5	+53.9	1.5	54 12.5	+53.9	1.6	55 12.4	+54.0	1.6	56 12.4	+54.0	1.6	57 12.4	+54.0	1.7	58 12.4	+54.0	1.7	88
89	52 06.4	+53.6	0.7	53 06.4	+53.6	0.8	54 06.4	+53.6	0.8	55 06.4	+53.6	0.8	56 06.4	+53.6	0.8	57 06.4	+53.6	0.8	58 06.4	+53.6	0.9	59 06.4	+53.6	0.9	89
90	53 00.0	+53.3	0.0	54 00.0	+53.3	0.0	55 00.0	+53.3	0.0	56 00.0	+53.3	0.0	57 00.0	+53.3	0.0	58 00.0	+53.3	0.0	59 00.0	+53.3	0.0	60 00.0	+53.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 153°, 207°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	32 05.9	+56.5	146.3	31 15.8	+56.8	146.7	30 25.6	+57.0	147.0	29 35.2	+57.2	147.3	28 44.6	+57.4	147.6	27 53.8	+57.6	147.9	27 02.9	+57.8	148.2	26 11.9	+57.9	148.5	0
1	33 02.4	+56.5	145.9	32 12.6	+56.7	146.3	31 22.6	+56.9	146.6	30 32.4	+57.1	147.0	29 42.0	+57.3	147.3	28 51.4	+57.5	147.6	28 00.7	+57.6	147.9	27 09.8	+57.8	148.2	1
2	33 58.9	+56.3	145.5	33 09.3	+56.6	145.9	32 19.5	+56.8	146.3	31 29.5	+57.0	146.6	30 39.3	+57.2	146.9	29 48.9	+57.5	147.3	28 58.3	+57.7	147.6	28 07.6	+57.8	147.9	2
3	34 55.2	+56.3	145.1	34 05.9	+56.5	145.5	33 16.3	+56.8	145.9	32 26.5	+57.0	146.3	31 36.5	+57.2	146.6	30 46.4	+57.4	146.9	29 56.0	+57.6	147.2	29 05.4	+57.7	147.6	3
4	35 51.5	+56.2	144.7	35 02.4	+56.5	145.1	34 13.1	+56.7	145.5	33 23.5	+56.9	145.9	32 33.7	+57.2	146.2	31 43.8	+57.3	146.6	30 53.6	+57.6	146.9	30 03.2	+57.7	147.2	4
5	36 47.7	+56.1	144.3	35 58.9	+56.3	144.7	35 09.8	+56.6	145.1	34 20.4	+56.9	145.5	33 30.9	+57.1	145.9	32 41.1	+57.3	146.2	31 51.1	+57.5	146.6	31 00.9	+57.7	146.9	5
6	37 43.8	+56.0	143.8	36 55.2	+56.3	144.3	36 06.4	+56.5	144.7	35 17.3	+56.8	145.1	34 28.0	+57.0	145.5	33 38.4	+57.2	145.9	32 48.6	+57.5	146.3	31 58.6	+57.7	146.6	6
7	38 39.8	+55.9	143.4	37 51.5	+56.2	143.8	37 02.9	+56.5	144.3	36 14.1	+56.7	144.7	35 25.0	+56.9	145.1	34 35.6	+57.2	145.5	33 46.1	+57.3	145.9	32 56.3	+57.5	146.3	7
8	39 35.7	+55.7	142.9	38 47.7	+56.0	143.4	37 59.4	+56.3	143.9	37 10.8	+56.6	144.3	36 21.9	+56.9	144.7	35 32.8	+57.1	145.2	34 43.4	+57.3	145.6	33 53.8	+57.6	145.9	8
9	40 31.4	+55.7	142.4	39 43.7	+56.0	142.9	38 55.7	+56.2	143.4	38 07.4	+56.5	143.9	37 18.8	+56.7	144.3	36 29.9	+57.0	144.8	35 40.7	+57.3	145.2	34 51.4	+57.4	145.6	9
10	41 27.1	+55.5	141.9	40 39.7	+55.8	142.4	39 51.9	+56.1	142.9	39 03.9	+56.4	143.5	38 15.5	+56.7	143.9	37 26.9	+56.9	144.4	36 38.0	+57.2	144.8	35 48.8	+57.4	145.2	10
11	42 22.6	+55.3	141.4	41 35.5	+55.7	142.0	40 48.1	+56.0	142.5	40 00.3	+56.3	143.0	39 12.2	+56.6	143.5	38 23.8	+56.9	144.0	37 35.2	+57.1	144.4	36 46.2	+57.3	144.9	11
12	43 17.9	+55.3	140.9	42 31.2	+55.6	141.5	41 44.1	+55.9	142.0	40 56.6	+56.2	142.6	40 08.8	+56.5	143.1	39 20.7	+56.8	143.6	38 32.3	+57.0	144.0	37 43.5	+57.3	144.5	12
13	44 13.2	+55.0	140.3	43 26.8	+55.4	140.9	42 40.0	+55.7	141.5	41 52.8	+56.1	142.1	41 05.3	+56.4	142.6	40 17.5	+56.6	143.2	39 29.3	+56.9	143.6	38 40.8	+57.2	144.1	13
14	45 08.2	+54.9	139.8	44 22.2	+55.3	140.4	43 35.7	+55.7	141.0	42 48.9	+56.0	141.6	42 01.7	+56.3	142.2	41 14.1	+56.6	142.7	40 26.2	+56.9	143.2	39 38.0	+57.1	143.7	14
15	46 03.1	+54.7	139.2	45 17.5	+55.1	139.9	44 31.4	+55.5	140.5	43 44.9	+55.8	141.1	42 58.0	+56.1	141.7	42 10.7	+56.5	142.3	41 23.1	+56.7	142.8	40 35.1	+57.0	143.3	15
16	46 57.8	+54.5	138.6	46 12.6	+54.9	139.3	45 26.9	+55.3	140.0	44 40.7	+55.7	140.6	43 54.1	+56.1	141.2	43 07.2	+56.3	141.8	42 19.8	+56.7	142.4	41 32.1	+56.9	142.9	16
17	47 52.3	+54.3	138.0	47 07.5	+54.8	138.7	46 22.2	+55.1	139.4	45 36.4	+55.5	140.1	44 50.2	+55.8	140.7	44 03.5	+56.2	141.3	43 16.5	+56.5	141.9	42 29.0	+56.8	142.5	17
18	48 46.6	+54.1	137.3	48 02.3	+54.5	138.1	47 17.3	+55.0	138.8	46 31.9	+55.4	139.5	45 46.0	+55.8	140.2	44 59.7	+56.1	140.8	44 13.0	+56.4	141.5	43 25.9	+56.7	142.1	18
19	49 40.7	+53.9	136.7	48 56.8	+54.3	137.5	48 12.3	+54.8	138.2	47 27.3	+55.2	139.0	46 41.8	+55.6	139.7	45 55.8	+56.0	140.3	45 09.4	+56.3	141.0	44 22.6	+56.6	141.6	19
20	50 34.6	+53.6	136.0	49 51.1	+54.2	136.8	49 07.1	+54.6	137.6	48 22.5	+55.0	138.4	47 37.4	+55.4	139.1	46 51.8	+55.8	139.8	46 05.7	+56.2	140.5	45 19.2	+56.5	141.1	20
21	51 28.2	+53.3	135.3	50 45.3	+53.8	136.1	50 01.7	+54.3	137.0	49 17.5	+54.9	137.8	48 32.8	+55.3	138.5	47 47.6	+55.7	139.3	47 01.9	+56.0	140.0	46 15.7	+56.4	140.7	21
22	52 21.5	+53.1	134.5	51 39.1	+53.6	135.4	50 56.0	+54.2	136.3	50 12.4	+54.6	137.1	49 28.1	+55.0	137.9	48 43.3	+55.4	138.7	47 57.9	+55.9	139.5	47 12.1	+56.2	140.2	22
23	53 14.6	+52.7	133.8	52 32.7	+53.3	134.7	51 50.2	+53.8	135.6	51 07.0	+54.3	136.5	50 23.1	+54.8	137.3	49 38.7	+55.3	138.1	48 53.8	+55.7	138.9	48 08.3	+56.1	139.6	23
24	54 07.3	+52.4	133.0	53 26.0	+53.1	134.0	52 44.0	+53.6	134.9	52 01.3	+54.2	135.8	51 18.0	+54.6	136.7	50 34.0	+55.1	137.5	49 49.5	+55.5	138.3	49 04.4	+55.9	139.1	24
25	54 59.7	+52.0	132.1	54 19.1	+52.7	133.2	53 37.6	+53.4	134.2	52 55.5	+53.9	135.1	52 12.6	+54.5	136.0	51 29.1	+54.9	136.9	50 45.0	+55.4	137.7	50 00.3	+55.8	138.5	25
26	55 51.7	+51.7	131.2	55 11.8	+52.3	132.3	54 31.0	+52.9	133.4	53 49.4	+53.6	134.4	53 07.1	+54.1	135.3	52 24.0	+54.7	136.2	51 40.4	+55.1	137.1	50 56.1	+55.6	138.0	26
27	56 43.4	+51.2	130.3	56 04.1	+52.0	131.5	55 23.9	+52.7	132.6	54 43.0	+53.2	133.6	54 01.2	+53.9	134.6	53 18.7	+54.4	135.6	52 35.5	+55.0	136.5	51 51.7	+55.4	137.4	27
28	57 34.6	+50.8	129.4	56 56.1	+51.5	130.6	56 16.6	+52.3	131.7	55 36.2	+53.0	132.8	54 55.1	+53.6	133.8	54 13.1	+54.2	134.8	53 30.5	+54.7	135.8	52 47.1	+55.2	136.7	28
29	58 25.4	+50.2	128.4	57 47.6	+51.1	129.6	57 08.9	+51.9	130.8	56 29.2	+52.6	132.0	55 48.7	+53.3	133.1	55 07.3	+53.9	134.1	54 25.2	+54.4	135.1	53 42.3	+55.0	136.1	29
30	59 15.6	+49.7	127.3	58 38.7	+50.6	128.6	58 00.8	+51.4	129.9	57 21.8	+52.2	131.1	56 41.9	+52.9	132.2	56 01.2	+53.6	133.3	55 19.6	+54.2	134.4	54 37.3	+54.7	135.4	30
31	60 05.3	+49.2	126.2	59 29.3	+50.1	127.5	58 52.2	+51.0	128.9	58 14.0	+51.8	130.1	57 34.8	+52.6	131.4	56 54.8	+53.2	132.5	56 13.8	+53.8	133.6	55 32.0	+54.4	134.7	31
32	60 54.5	+48.5	125.0	60 19.4	+49.5	126.5	59 43.2	+50.4	127.9	59 05.8	+51.3	129.2	58 27.4	+52.1	130.4	57 48.0	+52.9	131.7	57 07.7	+53.5	132.8	56 26.4	+54.2	133.9	32
33	61 43.0	+47.8	123.8	61 08.9	+48.9	125.3	60 33.6	+49.9	126.8	59 57.1	+50.9	128.2	59 19.5	+51.7	129.5	58 40.9	+52.4	130.8	58 01.2	+53.2	132.0	57 20.6	+53.9	133.1	33
34	62 30.8	+47.1	122.5	61 57.8	+48.1	124.1	61 23.5	+49.3	125.6	60 48.0	+50.3	127.1	60 11.2	+51.2	128.5	59 33.3	+52.1	129.8	58 54.4	+52.8	131.1	58 14.5	+53.5	132.3	34
35	63 17.9	+46.2	121.1	62 46.1	+47.5	122.8	62 12.8	+48.7	124.4	61 38.3	+49.7	125.9	61 02.4	+50.7	127.4	60 25.4	+51.6	128.8	59 47.2	+52.4	130.2	59 08.0	+53.2	131.4	35
36	64 04.1	+45.3	119.7	63 33.6	+46.6	121.5	63 01.5	+47.9	123.1	62 28.0	+49.0	124.8	61 53.1	+50.1	126.3	61 17.0	+51.0	127.8	60 39.6	+52.0	129.2	60 01.2	+52.7	130.5	36
37	64 49.4	+44.4	118.2	64 20.2	+45.8	120.0	63 49.4	+47.1	121.8	63 17.0	+48.4	123.5	62 43.2	+49.5	125.1	62 08.0	+50.5	126.7	61 31.6	+51.4	128.1	60 53.9	+52.4	129.6	37
38	65 33.8	+43.2	116.6	65 06.0	+44.8	118.5	64 36.5	+46.3	120.4	64 05.4	+47.5	122.2	63 32.7	+48.8	123.9	62 58.5	+49.9	125.5	62 23.0	+50.9	127.1	61 46.3	+51.8	128.5	38
39	66 17.0	+42.1	114.9	65 50.8	+43.8	116.9	65 22.8	+45.2	118.9	64 52.9	+46.7	120.7	64 21.5	+48.0	122.5	63 48.4	+49.2	124.3	63 13.9	+50.4	125.9	62 38.1	+51.3	127.5	39
40	66 59.1	+40.8	113.1	66 34.6	+42.6	115.2	66 08.0	+44.3	117.3	65 39.6	+45.8	119.2	65 09.5	+47.1	121.1	64 37.6	+48.5	122.9	64 04.3	+49.6	124.7	63 29.4	+50.8	126.3	40
41	67 39.9	+39.4	111.2	67 17.2	+41.3	113.4	66 52.3	+43.1	115.6	66 25.4	+44.7	117.6	65 56.6	+46.3	119.6	65 26.1	+47.7	121.5	64 53.9	+48.9	123.4	64 20.2	+50.0	125.1	41
42	68 19.3	+37.9	109.2	67 58.5	+39.9	111.5	67 35.4	+41.8	113.8	67 10.1	+43.6	116.0	66 42.9	+45.2	118.0	66 13.8	+46.7	120.1	65 42.8	+48.2	122.0	65 10.2	+49.4	123.8	42
43	68 57.2	+36.2	107.0	68 38.4	+38.4	109.5	68 17.2	+40.4	111.9	67 53.7	+42.4	114.2	67 28.1	+44.1	116.4	67 00.5	+45.7	118.5	66 31.0	+47.2	120.5	65 59.6	+48.6	122.4	43
44	69 33.4	+34.3	104.8	69 16.8	+36.6	107.4	68 57.6	+38.9	109.8	68 36.1	+40.9	112.2	68 12.2	+42.9	114.6	67 46.2	+44.7	116.8	67 18.2	+46.2	118.9	66 48.2	+47.8	121.0	44
45	70 07.7	+32.3•	102.4	69 53.4	+34.9	105.1	69 36.5	+37.2	107.7	69 17.0	+39.5	110.2	68 55.1	+41.5	112.6	68 30.9	+43.4	115.0	68 04.4	+45.2	117.3	67 36.0	+46.7	119.4	45
46	70 40.0	+30.2•	99.9	70 28.3	+32.8•	102.7	70 13.7	+35.4	105.4	69 56.5	+37.7	108.0	69 36.6	+40.0	110.6	69 14.3	+42.0	113.1	68 49.6	+43.9	115.5	68 22.7	+45.7	117.7	46
47	71 10.2	+27.8•	97.3	71 01.1	+30.9•	100.1	70 49.1	+33.3•	103.0	70 34.2	+35.9	105.7	70 16.6	+38.3	108.4	69 56.3	+40.5	111.0	69 33.5	+42.6	113.5	69 08.4	+44.5	116.0	47
48	71 38.0	+25.3•	94.5	71 31.7	+28.3•	97.5	71 22.4	+31.2•	100.4	71 10.1	+33.9•	103.3	70 54.9	+36.4	106.1	70 36.8	+38.9	108.8	70 16.1	+41.1	111.5	69 52.9	+43.2	114.0	48
49	72 03.3	+22.5•	91.6	72 00.0	+25.7•	94.6	71 53.6	+28.7•	97.7	71 44.0	+31.6•	100.7	71 31.3	+34.4•	103.6	71 15.7	+37.0•	106.5	70 57.2	+39.5	109.3	70 36.1	+41.7	112.0	49
50	72 25.8	+19.7•	88.5	72 25.7	+22.9•	91.7	72 22.3	+26.1•	94.8	72 15.6	+29.2•	98.0	72 05.7	+32.2•	101.0	71 52.7	+34.9•	104.0	71 36.7	+37.5	106.9	71 17.8	+40.0	109.8	50
51	72 45.5	+16.5•	85.4	72 48.6	+20.0•	88.6	72 48.4	+23.3•	91.8	72 44.8	+26.6•	95.0	72 37.9	+29.7•	98.2	72 27.6	+32.7•	101.4	72 14.2	+35.6•	104.9	71 57.8	+38.1	107.4	51
52	73 02.0	+13.4•	82.1	73 08.6	+16.8•	85.4	73 11.7	+20.3•	88.7	73 11.4	+23.7•	92.0	73 07.6	+27.0•	95.3	73 00.3	+30.2•	98.5	72 49.8	+33.2•	101.7	72 35.9	+36.2•	104.9	52
53	73 15.4	+10.0•	78.7	73 25.4	+13.6•	82.0	73 31.5	+17.2•	85.4	73 35.1	+20.6•	88.8	73 34.6	+24.1•	92.2	73 30.5	+27.5•	95.5	73 23.0	+30.8•	98.9	73 11.9	+34.0•	102.2	53
54	73 25.4	+6.6•	75.3	73 39.0	+10.1•	78.6	73 49.1	+13.8•	82.0	73 55.7	+17.4•	85.4	73 58.7	+21.0•	88.9	73 58.0	+24.6•	92.4	73 53.8	+27.9•	95.8	73 45.9	+31.3•	99.3	54
55	73 32.0	+3.1•	71.8	73 49.1	+6.6•	75.1	74 02.9	+10.2•	78.5	74 13.1	+13.9•	81.9	74 19.7	+17.6•	85.5	74 22.6	+21.3•	89.0	74 21.7	+25.0•	92.6	74 17.2	+28.4•	96.1	55
56	73 35.1	−0.5•	68.3	73 55.7	+3.0•	71.5	74 13.1	+6.6•	74.9	74 27.0	+10.3•	78.3	74 37.3	+14.1•	81.9	74 43.9	+17.9•	85.5	74 46.7	+21.7•	89.2	74 45.6	+25.5•	92.9	56
57	73 34.6	−4.1•	64.7	73 58.7	−0.7•	67.9	74 19.7	+2.9•	71.2	74 37.3	+6.6•	74.6	74 51.4	+10.4•	78.2	75 01.8	+14.3•	81.9	75 08.4	+18.2•	85.6	75 11.1	+22.0•	89.4	57
58	73 30.5	−7.5•	61.2	73 58.0	−4.2•	64.3	74 22.6	−0.9•	67.5	74 43.9	+2.8•	70.9	75 01.8	+6.6•	74.4	75 16.1	+10.5•	78.1	75 26.6	+14.5•	81.8	75 33.1	+18.5•	85.7	58
59	73 23.0	−10.9•	57.7	73 53.8	−7.9•	60.7	74 21.7	−4.5•	63.8	74 46.7	−1.1•	67.1	75 08.4	+2.7•	70.5	75 26.6	+6.5•	74.2	75 41.1	+10.5•	77.9	75 51.6	+14.7•	81.8	59
60	73 12.1	−14.3•	54.3	73 45.9	−11.4•	57.1	74 17.2	−8.3•	60.1	74 45.6	−4.8•	63.3	75 11.1	−1.3•	66.6	75 33.1	+2.5•	70.2	75 51.6	+6.5•	73.9	76 06.3	+10.6•	77.8	60
61	72 57.8	−17.5•	51.0	73 34.5	−14.8•	53.6	74 08.9	−11.8•	56.4	74 40.8	−8.7•	59.5	75 09.8	−5.3•	62.7	75 35.6	−1.5•	66.2	75 58.1	+2.3•	69.8	76 16.9	+6.4•	73.7	61
62	72 40.3	−20.4•	47.7	73 19.7	−18.0•	50.2	73 57.1	−15.3•	52.9	74 32.1	−12.3•	55.7	75 04.5	−9.1•	58.8	75 34.1	−5.7•	62.2	76 00.4	−1.8•	65.7	76 23.3	+2.1•	69.5	62
63	72 19.9	−23.3•	44.6	73 01.7	−21.0•	46.9	73 41.8	−18.6•	49.4	74 19.8	−15.9•	52.1	74 55.4	−12.9•	55.0	75 28.4	−9.5•	58.2	75 58.6	−6.1•	61.6	76 25.4	−2.2•	65.2	63
64	71 56.6	−26.0•	41.6	72 40.7	−24.0•	43.7	73 23.2	−21.7•	46.0	74 03.9	−19.2•	48.6	74 42.5	−16.4•	51.3	75 18.9	−13.5•	54.3	75 52.5	−10.1•	57.5	76 23.2	−6.5•	61.0	64
65	71 30.6	−28.5•	38.7	72 16.7	−26.6•	40.7	73 01.5	−24.6•	42.8	73 44.7	−22.4•	45.1	74 26.1	−19.9•	47.7	75 05.4	−17.1•	50.5	75 42.4	−14.1•	53.5	76 16.7	−10.7•	56.8	65
66	71 02.1	−30.8•	36.0	71 50.1	−29.1•	37.8	72 36.9	−27.3•	39.7	73 22.3	−25.3•	41.9	74 06.2	−23.1•	44.2	74 48.3	−20.6•	46.8	75 28.3	−17.8•	49.6	76 06.0	−14.7•	52.6	66
67	70 31.3	−32.9•	33.4	71 21.0	−31.5•	35.0	72 09.6	−29.9•	36.8	72 57.0	−28.0•	38.7	73 43.1	−26.0•	40.9	74 27.7	−23.8•	43.2	75 10.5	−21.3•	45.8	75 51.3	−18.6•	48.6	67
68	69 58.4	−34.8	30.9	70 49.5	−33.5•	32.4	71 39.7	−32.1•	34.0	72 29.0	−30.6•	35.8	73 17.1	−28.8•	37.8	74 03.9	−26.9•	39.8	74 49.2	−24.7•	42.2	75 32.7	−22.2•	44.8	68
69	69 23.6	−36.7	28.6	70 16.0	−35.6	29.9	71 07.6	−34.3•	31.3	71 58.4	−32.9•	32.9	72 48.3	−31.4•	34.7	73 37.0	−29.6•	36.6	74 24.5	−27.7•	38.8	75 10.5	−25.5•	41.1	69
70	68 46.9	−38.3	26.3	69 40.4	−37.3	27.5	70 33.3	−36.2	28.8	71 25.5	−35.0•	30.3	72 16.9	−33.6•	31.8	73 07.4	−32.1•	33.6	73 56.8	−30.4•	35.5	74 45.0	−28.5•	37.6	70
71	68 08.6	−39.8	24.2	69 03.1	−38.9	25.3	69 57.1	−38.0	26.5	70 50.5	−36.9	27.8	71 43.3	−35.8•	29.2	72 35.3	−34.5•	30.7	73 26.4	−33.0•	32.4	74 16.5	−31.4•	34.3	71
72	67 28.8	−41.1	22.3	68 24.2	−40.4	23.2	69 19.1	−39.6	24.3	70 13.6	−38.7	25.4	71 07.5	−37.7	26.6	72 00.8	−36.6	28.0	72 53.4	−35.3•	29.5	73 45.1	−33.8•	31.2	72
73	66 47.7	−42.5	20.4	67 43.8	−41.8	21.2	68 39.5	−41.1	22.2	69 34.9	−40.3	23.2	70 29.8	−39.4	24.3	71 24.2	−38.4	25.5	72 18.1	−37.4	26.8	73 11.3	−36.2•	28.3	73
74	66 05.2	−43.5	18.6	67 02.0	−43.1	19.4	67 58.4	−42.4	20.2	68 54.6	−41.8	21.1	69 50.4	−41.0	22.1	70 45.8	−40.2	23.1	71 40.7	−39.2	24.3	72 35.1	−38.2	25.6	74
75	65 21.7	−44.7	16.9	66 18.9	−44.1	17.6	67 16.0	−43.6	18.3	68 12.8	−43.0	19.1	69 09.4	−42.4	20.0	70 05.6	−41.7	20.9	71 01.5	−41.0	21.9	71 56.9	−40.1	23.1	75
76	64 37.0	−45.6	15.4	65 34.8	−45.2	15.9	66 32.4	−44.7	16.6	67 29.8	−44.2	17.3	68 27.0	−43.7	18.0	69 23.9	−43.1	18.8	70 20.5	−42.4	19.7	71 16.8	−41.7	20.7	76
77	63 51.4	−46.4	13.9	64 49.6	−46.1	14.4	65 47.7	−45.8	14.9	66 45.6	−45.4	15.5	67 43.3	−44.9	16.2	68 40.8	−44.4	16.9	69 38.1	−43.8	17.7	70 35.1	−43.2	18.5	77
78	63 05.0	−47.3	12.5	64 03.5	−47.0	12.9	65 01.9	−46.5	13.4	66 00.2	−46.3	13.9	66 58.4	−45.9	14.5	67 56.4	−45.4	15.1	68 54.3	−45.0	15.7	69 51.9	−44.5	16.5	78
79	62 17.7	−48.0	11.1	63 16.5	−47.7	11.5	64 15.4	−47.5	11.9	65 14.0	−47.2	12.3	66 12.5	−46.9	12.8	67 11.0	−46.6	13.4	68 09.3	−46.2	13.9	69 07.4	−45.7	14.6	79
80	61 29.7	−48.7	9.8	62 28.8	−48.5	10.2	63 27.8	−48.2	10.5	64 26.8	−48.0	10.9	65 25.6	−47.7	11.3	66 24.4	−47.4	11.8	67 23.1	−47.1	12.2	68 21.7	−46.8	12.8	80
81	60 41.0	−49.3	8.6	61 40.3	−49.1	8.9	62 39.6	−49.0	9.2	63 38.8	−48.7	9.5	64 37.9	−48.5	9.8	65 37.0	−48.3	10.2	66 36.0	−48.0	10.7	67 34.9	−47.7	11.1	81
82	59 51.7	−49.9	7.5	60 51.2	−49.8	7.7	61 50.6	−49.6	8.0	62 50.0	−49.4	8.2	63 49.4	−49.3	8.5	64 48.7	−49.1	8.8	65 48.0	−48.9	9.2	66 47.2	−48.7	9.5	82
83	59 01.8	−50.4	6.4	60 01.4	−50.2	6.6	61 01.0	−50.1	6.8	62 00.6	−50.0	7.0	63 00.1	−49.9	7.2	63 59.6	−49.7	7.5	64 59.1	−49.6	7.8	65 58.5	−49.4	8.1	83
84	58 11.4	−50.9	5.3	59 11.2	−50.8	5.5	60 10.9	−50.7	5.7	61 10.6	−50.6	5.8	62 10.2	−50.4	6.0	63 09.9	−50.4	6.2	64 09.5	−50.2	6.5	65 09.1	−50.1	6.7	84
85	57 20.5	−51.3	4.3	58 20.4	−51.3	4.5	59 20.2	−51.2	4.6	60 20.0	−51.1	4.7	61 19.8	−51.1	4.9	62 19.5	−50.9	5.1	63 19.3	−50.9	5.2	64 19.0	−50.7	5.4	85
86	56 29.2	−51.8	3.4	57 29.1	−51.7	3.5	58 29.0	−51.7	3.6	59 28.9	−51.6	3.7	60 28.7	−51.5	3.8	61 28.6	−51.5	3.9	62 28.4	−51.4	4.1	63 28.3	−51.3	4.2	86
87	55 37.4	−52.1	2.5	56 37.4	−52.1	2.6	57 37.3	−52.0	2.6	58 37.3	−52.0	2.7	59 37.2	−52.0	2.8	60 37.1	−51.9	2.9	61 37.0	−51.9	3.0	62 37.0	−51.9	3.1	87
88	54 45.3	−52.5	1.6	55 45.3	−52.5	1.7	56 45.3	−52.5	1.7	57 45.2	−52.4	1.8	58 45.2	−52.4	1.8	59 45.2	−52.4	1.9	60 45.1	−52.3	1.9	61 45.1	−52.3	2.0	88
89	53 52.8	−52.8	0.8	54 52.8	−52.8	0.8	55 52.8	−52.8	0.8	56 52.8	−52.8	0.9	57 52.8	−52.8	0.9	58 52.8	−52.9	0.9	59 52.8	−52.9	0.9	60 52.8	−52.8	1.0	89
90	53 00.0	−53.1	0.0	54 00.0	−53.1	0.0	55 00.0	−53.1	0.0	56 00.0	−53.1	0.0	57 00.0	−53.1	0.0	58 00.0	−53.2	0.0	59 00.0	−53.2	0.0	60 00.0	−53.2	0.0	90

LATITUDE **CONTRARY** NAME TO DECLINATION — L.H.A. 28°, 332°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	32 05.9	-56.6	146.3	31 15.8	-56.8	146.7	30 25.6	-57.0	147.0	29 35.2	-57.2	147.3	28 44.6	-57.4	147.6	27 53.8	-57.5	147.9	27 02.9	-57.7	148.2	26 11.9	-58.0	148.5	0
1	31 09.3	-56.7	146.7	30 19.0	-56.9	147.1	29 28.6	-57.1	147.4	28 38.0	-57.3	147.7	27 47.2	-57.5	148.0	26 56.3	-57.7	148.2	26 05.2	-57.8	148.5	25 13.9	-57.9	148.7	1
2	30 12.6	-56.7	147.1	29 22.1	-56.9	147.4	28 31.5	-57.1	147.7	27 40.7	-57.3	148.0	26 49.7	-57.5	148.3	25 58.6	-57.7	148.5	25 07.4	-57.9	148.8	24 16.0	-58.0	149.0	2
3	29 15.9	-56.8	147.5	28 25.2	-57.0	147.8	27 34.4	-57.2	148.1	26 43.4	-57.4	148.3	25 52.2	-57.5	148.6	25 00.9	-57.7	148.8	24 09.5	-57.8	149.1	23 18.0	-58.0	149.3	3
4	28 19.1	-56.9	147.9	27 28.2	-57.0	148.1	26 37.2	-57.3	148.4	25 46.0	-57.4	148.7	24 54.7	-57.6	148.9	24 03.2	-57.9	149.1	23 11.7	-57.9	149.4	22 20.0	-58.1	149.6	4
5	27 22.2	-56.9	148.2	26 31.2	-57.1	148.5	25 39.9	-57.2	148.7	24 48.6	-57.5	149.0	23 57.1	-57.6	149.2	23 05.5	-57.8	149.4	22 13.8	-58.0	149.7	21 21.9	-58.1	149.9	5
6	26 25.3	-56.9	148.6	25 34.1	-57.2	148.8	24 42.7	-57.4	149.1	23 51.1	-57.5	149.3	22 59.5	-57.7	149.5	22 07.7	-57.8	149.7	21 15.8	-57.9	149.9	20 23.8	-58.1	150.1	6
7	25 28.4	-57.0	148.9	24 36.9	-57.2	149.2	23 45.3	-57.3	149.4	22 53.6	-57.5	149.6	22 01.8	-57.7	149.8	21 09.9	-57.8	150.0	20 17.9	-58.0	150.2	19 25.7	-58.1	150.4	7
8	24 31.4	-57.1	149.3	23 39.7	-57.2	149.5	22 48.0	-57.4	149.7	21 56.1	-57.6	149.9	21 04.1	-57.7	150.1	20 12.1	-57.9	150.3	19 19.9	-58.0	150.5	18 27.6	-58.1	150.7	8
9	23 34.3	-57.1	149.6	22 42.5	-57.3	149.8	21 50.6	-57.5	150.0	20 58.5	-57.6	150.2	20 06.4	-57.7	150.4	19 14.2	-57.9	150.6	18 21.9	-58.1	150.8	17 29.5	-58.2	150.9	9
10	22 37.2	-57.1	149.9	21 45.2	-57.3	150.1	20 53.1	-57.4	150.3	20 00.9	-57.6	150.5	19 08.7	-57.8	150.7	18 16.3	-57.9	150.9	17 23.8	-58.0	151.0	16 31.3	-58.2	151.2	10
11	21 40.1	-57.2	150.3	20 47.9	-57.4	150.5	19 55.7	-57.5	150.6	19 03.3	-57.6	150.8	18 10.9	-57.8	151.0	17 18.4	-58.0	151.1	16 25.8	-58.1	151.3	15 33.1	-58.2	151.4	11
12	20 42.9	-57.2	150.6	19 50.6	-57.4	150.8	18 58.2	-57.6	150.9	18 05.7	-57.7	151.1	17 13.1	-57.8	151.3	16 20.4	-57.9	151.4	15 27.7	-58.1	151.5	14 34.9	-58.2	151.7	12
13	19 45.7	-57.3	150.9	18 53.2	-57.4	151.1	18 00.6	-57.5	151.2	17 08.0	-57.7	151.4	16 15.3	-57.9	151.5	15 22.5	-58.0	151.7	14 29.6	-58.1	151.8	13 36.7	-58.2	151.9	13
14	18 48.4	-57.3	151.2	17 55.8	-57.5	151.4	17 03.1	-57.6	151.5	16 10.3	-57.7	151.7	15 17.4	-57.8	151.8	14 24.5	-58.0	151.9	13 31.5	-58.1	152.1	12 38.5	-58.3	152.2	14
15	17 51.1	-57.3	151.5	16 58.3	-57.4	151.7	16 05.5	-57.6	151.8	15 12.6	-57.8	152.0	14 19.6	-57.9	152.1	13 26.5	-58.0	152.2	12 33.4	-58.1	152.3	11 40.2	-58.2	152.4	15
16	16 53.8	-57.3	151.9	16 00.9	-57.5	152.0	15 07.9	-57.7	152.1	14 14.8	-57.8	152.3	13 21.7	-57.9	152.4	12 28.5	-58.0	152.5	11 35.3	-58.2	152.6	10 42.0	-58.3	152.7	16
17	15 56.5	-57.4	152.2	15 03.4	-57.5	152.3	14 10.2	-57.6	152.4	13 17.0	-57.7	152.5	12 23.8	-57.9	152.6	11 30.5	-58.1	152.7	10 37.1	-58.1	152.8	9 43.7	-58.3	152.9	17
18	14 59.1	-57.4	152.5	14 05.9	-57.5	152.6	13 12.6	-57.7	152.7	12 19.3	-57.8	152.8	11 25.9	-58.0	152.9	10 32.4	-58.0	153.0	9 39.0	-58.2	153.1	8 45.4	-58.2	153.1	18
19	14 01.7	-57.4	152.8	13 08.4	-57.6	152.9	12 14.9	-57.7	153.0	11 21.5	-57.9	153.1	10 27.9	-57.9	153.2	9 34.4	-58.1	153.2	8 40.8	-58.2	153.3	7 47.2	-58.3	153.4	19
20	13 04.3	-57.4	153.1	12 10.8	-57.6	153.2	11 17.2	-57.7	153.3	10 23.6	-57.8	153.4	9 30.0	-58.0	153.4	8 36.3	-58.1	153.5	7 42.6	-58.2	153.6	6 48.9	-58.3	153.6	20
21	12 06.9	-57.5	153.4	11 13.2	-57.5	153.5	10 19.5	-57.7	153.5	9 25.8	-57.8	153.6	8 32.0	-57.9	153.7	7 38.2	-58.0	153.8	6 44.4	-58.2	153.8	5 50.6	-58.4	153.9	21
22	11 09.4	-57.4	153.7	10 15.7	-57.6	153.7	9 21.8	-57.7	153.8	8 28.0	-57.9	153.9	7 34.1	-58.0	154.0	6 40.2	-58.1	154.0	5 46.2	-58.2	154.1	4 52.2	-58.3	154.1	22
23	10 12.0	-57.5	154.0	9 18.1	-57.7	154.0	8 24.1	-57.7	154.1	7 30.1	-57.9	154.2	6 36.1	-58.0	154.2	5 42.1	-58.1	154.3	4 48.0	-58.2	154.3	3 53.9	-58.3	154.3	23
24	9 14.5	-57.5	154.2	8 20.4	-57.6	154.3	7 26.4	-57.8	154.4	6 32.2	-57.8	154.4	5 38.1	-58.0	154.5	4 44.0	-58.1	154.5	3 49.8	-58.2	154.5	2 55.6	-58.3	154.6	24
25	8 17.0	-57.5	154.5	7 22.8	-57.6	154.6	6 28.6	-57.8	154.7	5 34.4	-57.9	154.7	4 40.1	-58.0	154.7	3 45.9	-58.1	154.8	2 51.6	-58.2	154.8	1 57.3	-58.3	154.8	25
26	7 19.5	-57.5	154.8	6 25.2	-57.7	154.9	5 30.8	-57.7	154.9	4 36.5	-57.9	155.0	3 42.1	-58.0	155.0	2 47.8	-58.2	155.0	1 53.4	-58.3	155.0	0 59.0	-58.4	155.0	26
27	6 22.0	-57.6	155.1	5 27.5	-57.6	155.2	4 33.1	-57.8	155.2	3 38.6	-57.9	155.2	2 44.1	-58.0	155.2	1 49.6	-58.1	155.3	0 55.1	-58.2	155.3	0 00.6	-58.3	155.3	27
28	5 24.4	-57.5	155.4	4 29.9	-57.7	155.5	3 35.3	-57.8	155.5	2 40.7	-57.9	155.5	1 46.1	-58.0	155.5	0 51.5	-58.1	155.5	0 03.1	+58.2	24.5	0 57.7	+58.3	24.5	28
29	4 26.9	-57.5	155.7	3 32.2	-57.6	155.7	2 37.5	-57.7	155.7	1 42.8	-57.9	155.7	0 48.1	-58.0	155.8	0 06.6	+58.1	24.2	1 01.3	+58.2	24.2	1 56.0	+58.3	24.3	29
30	3 29.4	-57.6	156.0	2 34.6	-57.7	156.0	1 39.8	-57.8	156.0	0 44.9	-57.9	156.0	0 09.9	+58.0	24.0	1 04.7	+58.1	24.0	1 59.5	+58.2	24.0	2 54.3	+58.3	24.0	30
31	2 31.8	-57.5	156.2	1 36.9	-57.7	156.3	0 42.0	-57.8	156.3	0 13.0	+57.9	23.7	1 07.9	+58.0	23.7	2 02.8	+58.1	23.7	2 57.7	+58.2	23.8	3 52.6	+58.3	23.8	31
32	1 34.3	-57.6	156.5	0 39.2	-57.6	156.5	0 15.8	+57.8	23.5	1 10.9	+57.8	23.5	2 05.9	+58.0	23.5	3 00.9	+58.1	23.5	3 55.9	+58.2	23.5	4 50.9	+58.4	23.6	32
33	0 36.7	-57.5	156.8	0 18.4	+57.7	23.2	1 13.6	+57.8	23.2	2 08.7	+57.9	23.2	3 03.9	+58.0	23.2	3 59.0	+58.1	23.2	4 54.1	+58.3	23.3	5 49.3	+58.3	23.3	33
34	0 20.8	+57.6	22.9	1 16.1	+57.7	22.9	2 11.4	+57.8	22.9	3 06.6	+57.9	22.9	4 01.9	+58.0	23.0	4 57.1	+58.1	23.0	5 52.4	+58.1	23.0	6 47.6	+58.3	23.1	34
35	1 18.4	+57.6	22.6	2 13.8	+57.6	22.6	3 09.2	+57.7	22.7	4 04.5	+57.9	22.7	4 59.9	+58.0	22.7	5 55.2	+58.1	22.7	6 50.5	+58.2	22.8	7 45.9	+58.2	22.8	35
36	2 16.0	+57.5	22.3	3 11.4	+57.7	22.4	4 06.9	+57.8	22.4	5 02.4	+57.9	22.4	5 57.9	+57.9	22.5	6 53.3	+58.1	22.5	7 48.7	+58.2	22.5	8 44.1	+58.2	22.6	36
37	3 13.5	+57.6	22.1	4 09.1	+57.7	22.1	5 04.7	+57.8	22.1	6 00.3	+57.9	22.1	6 55.8	+58.0	22.2	7 51.4	+58.1	22.2	8 46.9	+58.2	22.3	9 42.4	+58.3	22.4	37
38	4 11.1	+57.5	21.8	5 06.8	+57.6	21.8	6 02.5	+57.7	21.8	6 58.2	+57.8	21.9	7 53.8	+58.0	21.9	8 49.5	+58.0	22.0	9 45.1	+58.2	22.0	10 40.7	+58.2	22.1	38
39	5 08.6	+57.5	21.5	6 04.4	+57.7	21.5	7 00.2	+57.8	21.6	7 56.0	+57.9	21.6	8 51.8	+57.9	21.7	9 47.5	+58.1	21.7	10 43.3	+58.1	21.8	11 38.9	+58.3	21.9	39
40	6 06.1	+57.5	21.2	7 02.1	+57.6	21.2	7 58.0	+57.7	21.3	8 53.9	+57.8	21.3	9 49.7	+58.0	21.4	10 45.6	+58.0	21.5	11 41.4	+58.1	21.5	12 37.2	+58.2	21.6	40
41	7 03.6	+57.5	20.9	7 59.7	+57.6	21.0	8 55.7	+57.7	21.0	9 51.7	+57.8	21.1	10 47.7	+57.9	21.1	11 43.6	+58.0	21.2	12 39.5	+58.2	21.3	13 35.4	+58.2	21.4	41
42	8 01.2	+57.5	20.6	8 57.3	+57.6	20.7	9 53.4	+57.7	20.7	10 49.5	+57.8	20.8	11 45.6	+57.9	20.9	12 41.6	+58.0	21.0	13 37.7	+58.1	21.0	14 33.6	+58.2	21.1	42
43	8 58.7	+57.4	20.3	9 54.9	+57.6	20.4	10 51.1	+57.7	20.5	11 47.3	+57.8	20.5	12 43.5	+57.9	20.6	13 39.6	+58.0	20.7	14 35.8	+58.1	20.8	15 31.8	+58.2	20.9	43
44	9 56.1	+57.5	20.1	10 52.5	+57.6	20.1	11 48.8	+57.7	20.2	12 45.1	+57.8	20.3	13 41.4	+57.9	20.3	14 37.6	+58.0	20.4	15 33.9	+58.0	20.5	16 30.0	+58.2	20.6	44
45	10 53.6	+57.5	19.8	11 50.1	+57.5	19.8	12 46.5	+57.7	19.9	13 42.9	+57.8	20.0	14 39.3	+57.8	20.1	15 35.6	+58.0	20.2	16 31.9	+58.1	20.3	17 28.2	+58.1	20.4	45
46	11 51.1	+57.4	19.5	12 47.6	+57.6	19.5	13 44.2	+57.6	19.6	14 40.7	+57.7	19.7	15 37.1	+57.9	19.8	16 33.6	+57.9	19.9	17 30.0	+58.0	20.0	18 26.3	+58.2	20.1	46
47	12 48.5	+57.4	19.2	13 45.2	+57.5	19.2	14 41.8	+57.6	19.3	15 38.4	+57.7	19.4	16 35.0	+57.8	19.5	17 31.5	+57.9	19.6	18 28.0	+58.0	19.7	19 24.5	+58.1	19.8	47
48	13 45.9	+57.4	18.9	14 42.7	+57.5	19.0	15 39.4	+57.6	19.1	16 36.1	+57.7	19.1	17 32.8	+57.8	19.2	18 29.4	+57.9	19.3	19 26.0	+58.0	19.5	20 22.6	+58.0	19.6	48
49	14 43.3	+57.4	18.6	15 40.2	+57.4	18.7	16 37.0	+57.6	18.7	17 33.8	+57.7	18.8	18 30.6	+57.7	19.0	19 27.3	+57.9	19.1	20 24.0	+57.9	19.2	21 20.6	+58.1	19.3	49
50	15 40.7	+57.3	18.3	16 37.6	+57.5	18.4	17 34.6	+57.5	18.5	18 31.5	+57.6	18.6	19 28.3	+57.8	18.7	20 25.2	+57.8	18.8	21 21.9	+58.0	19.0	22 18.7	+58.0	19.0	50
51	16 38.0	+57.3	18.0	17 35.1	+57.4	18.1	18 32.1	+57.5	18.2	19 29.1	+57.6	18.3	20 26.1	+57.7	18.4	21 23.0	+57.8	18.5	22 19.9	+57.9	18.6	23 16.7	+58.0	18.8	51
52	17 35.3	+57.3	17.7	18 32.5	+57.4	17.7	19 29.6	+57.5	17.9	20 26.7	+57.6	18.0	21 23.8	+57.7	18.1	22 20.8	+57.8	18.2	23 17.8	+57.8	18.3	24 14.7	+58.0	18.5	52
53	18 32.6	+57.3	17.3	19 29.9	+57.3	17.4	20 27.1	+57.5	17.6	21 24.3	+57.6	17.7	22 21.5	+57.6	17.8	23 18.6	+57.7	17.9	24 15.6	+57.9	18.1	25 12.7	+57.9	18.2	53
54	19 29.9	+57.2	17.0	20 27.2	+57.4	17.1	21 24.6	+57.4	17.3	22 21.9	+57.5	17.4	23 19.1	+57.6	17.5	24 16.3	+57.7	17.6	25 13.5	+57.8	17.8	26 10.6	+57.9	17.9	54
55	20 27.1	+57.2	16.7	21 24.6	+57.3	16.8	22 22.0	+57.4	16.9	23 19.4	+57.4	17.1	24 16.7	+57.6	17.2	25 14.0	+57.7	17.3	26 11.3	+57.7	17.5	27 08.5	+57.8	17.6	55
56	21 24.3	+57.2	16.4	22 21.9	+57.2	16.5	23 19.4	+57.3	16.6	24 16.8	+57.5	16.7	25 14.3	+57.5	16.9	26 11.7	+57.6	17.0	27 09.0	+57.7	17.2	28 06.3	+57.7	17.3	56
57	22 21.5	+57.1	16.0	23 19.1	+57.2	16.2	24 16.7	+57.3	16.3	25 14.3	+57.4	16.4	26 11.8	+57.5	16.6	27 09.3	+57.5	16.7	28 06.8	+57.6	16.9	29 04.2	+57.7	17.0	57
58	23 18.6	+57.0	15.7	24 16.3	+57.2	15.8	25 14.0	+57.3	16.0	26 11.7	+57.3	16.1	27 09.3	+57.5	16.2	28 06.9	+57.5	16.4	29 04.4	+57.7	16.5	30 01.9	+57.8	16.7	58
59	24 15.6	+57.1	15.5	25 13.5	+57.1	15.6	26 11.3	+57.2	15.6	27 09.0	+57.3	15.8	28 06.8	+57.4	15.9	29 04.4	+57.5	16.1	30 02.1	+57.6	16.2	30 59.7	+57.6	16.4	59
60	25 12.7	+56.9	15.0	26 10.6	+57.1	15.2	27 08.5	+57.1	15.3	28 06.3	+57.3	15.4	29 04.2	+57.3	15.6	30 01.9	+57.5	15.7	30 59.7	+57.5	15.9	31 57.3	+57.7	16.1	60
61	26 09.6	+57.0	14.7	27 07.7	+57.0	14.8	28 05.6	+57.2	15.0	29 03.6	+57.2	15.1	30 01.5	+57.3	15.2	30 59.4	+57.4	15.4	31 57.2	+57.5	15.6	32 55.0	+57.6	15.7	61
62	27 06.6	+56.8	14.3	28 04.7	+56.9	14.5	29 02.8	+57.0	14.6	30 00.8	+57.1	14.7	30 58.8	+57.2	14.9	31 56.8	+57.3	15.1	32 54.7	+57.4	15.2	33 52.6	+57.5	15.4	62
63	28 03.4	+56.8	14.0	29 01.6	+56.9	14.1	29 59.8	+57.0	14.3	30 57.9	+57.1	14.4	31 56.0	+57.2	14.5	32 54.1	+57.3	14.7	33 52.1	+57.4	14.9	34 50.1	+57.4	15.1	63
64	29 00.2	+56.8	13.6	29 58.5	+56.9	13.7	30 56.8	+56.9	13.9	31 55.0	+57.1	14.0	32 53.2	+57.1	14.2	33 51.4	+57.2	14.3	34 49.5	+57.3	14.5	35 47.5	+57.4	14.7	64
65	29 57.0	+56.7	13.2	30 55.4	+56.8	13.4	31 53.7	+56.9	13.5	32 52.1	+56.9	13.7	33 50.3	+57.1	13.8	34 48.6	+57.1	14.0	35 46.8	+57.2	14.2	36 44.9	+57.4	14.3	65
66	30 53.7	+56.6	12.9	31 52.2	+56.7	13.0	32 50.6	+56.8	13.1	33 49.0	+56.9	13.3	34 47.4	+57.0	13.4	35 45.7	+57.1	13.6	36 44.0	+57.2	13.8	37 42.3	+57.2	14.0	66
67	31 50.3	+56.5	12.5	32 48.9	+56.6	12.6	33 47.4	+56.7	12.8	34 45.9	+56.8	12.9	35 44.4	+56.9	13.1	36 42.8	+57.0	13.2	37 41.2	+57.1	13.4	38 39.5	+57.2	13.6	67
68	32 46.8	+56.5	12.1	33 45.5	+56.6	12.2	34 44.1	+56.7	12.4	35 42.7	+56.8	12.5	36 41.3	+56.8	12.7	37 39.8	+56.9	12.9	38 38.3	+57.0	13.0	39 36.7	+57.1	13.2	68
69	33 43.3	+56.4	11.7	34 42.1	+56.4	11.8	35 40.8	+56.5	12.0	36 39.5	+56.6	12.1	37 38.1	+56.8	12.3	38 36.7	+56.9	12.4	39 35.3	+56.9	12.6	40 33.8	+57.0	12.8	69
70	34 39.7	+56.3	11.3	35 38.5	+56.4	11.4	36 37.3	+56.5	11.5	37 36.1	+56.6	11.7	38 34.9	+56.6	11.9	39 33.6	+56.7	12.0	40 32.2	+56.9	12.2	41 30.8	+57.0	12.4	70
71	35 36.0	+56.2	10.8	36 34.9	+56.3	11.0	37 33.8	+56.4	11.1	38 32.7	+56.5	11.3	39 31.5	+56.6	11.4	40 30.3	+56.7	11.6	41 29.1	+56.7	11.8	42 27.8	+56.8	12.0	71
72	36 32.2	+56.2	10.4	37 31.2	+56.2	10.5	38 30.2	+56.3	10.7	39 29.2	+56.3	10.8	40 28.1	+56.4	11.0	41 27.0	+56.5	11.2	42 25.8	+56.6	11.3	43 24.6	+56.7	11.5	72
73	37 28.4	+56.0	10.0	38 27.4	+56.1	10.1	39 26.5	+56.2	10.2	40 25.5	+56.3	10.4	41 24.5	+56.4	10.5	42 23.5	+56.4	10.7	43 22.4	+56.6	10.9	44 21.3	+56.7	11.1	73
74	38 24.4	+55.9	9.5	39 23.5	+56.0	9.6	40 22.7	+56.0	9.8	41 21.8	+56.1	9.9	42 20.9	+56.2	10.1	43 19.9	+56.4	10.2	44 19.0	+56.4	10.4	45 18.0	+56.5	10.6	74
75	39 20.3	+55.8	9.1	40 19.5	+55.9	9.2	41 18.7	+56.0	9.3	42 17.9	+56.1	9.5	43 17.1	+56.1	9.6	44 16.3	+56.2	9.8	45 15.4	+56.3	10.1	46 14.5	+56.3	10.1	75
76	40 16.1	+55.6	8.6	41 15.4	+55.7	8.7	42 14.7	+55.8	8.8	43 14.0	+55.9	9.0	44 13.2	+56.0	9.1	45 12.5	+56.0	9.3	46 11.7	+56.1	9.4	47 10.8	+56.3	9.6	76
77	41 11.7	+55.6	8.1	42 11.1	+55.7	8.2	43 10.5	+55.7	8.3	44 09.9	+55.7	8.5	45 09.2	+55.9	8.6	46 08.5	+56.0	8.8	47 07.8	+56.0	8.9	48 07.1	+56.1	9.1	77
78	42 07.3	+55.4	7.6	43 06.8	+55.4	7.7	44 06.2	+55.4	7.8	45 05.6	+55.7	7.9	46 05.1	+55.7	8.1	47 04.5	+55.7	8.2	48 03.8	+55.9	8.2	49 03.2	+55.9	8.6	78
79	43 02.7	+55.3	7.0	44 02.0	+55.4	7.2	45 01.8	+55.4	7.3	46 01.3	+55.4	7.4	47 00.8	+55.5	7.5	48 00.2	+55.6	7.7	48 59.7	+55.7	7.8	49 59.1	+55.8	8.0	79
80	43 58.0	+55.1	6.5	44 57.6	+55.1	6.6	45 57.2	+55.2	6.7	46 56.7	+55.3	6.9	47 56.3	+55.4	7.0	48 55.8	+55.5	7.1	49 55.4	+55.5	7.3	50 54.9	+55.6	7.4	80
81	44 53.1	+54.9	5.9	45 52.7	+55.0	6.1	46 52.4	+55.1	6.2	47 52.0	+55.2	6.3	48 51.7	+55.2	6.4	49 51.3	+55.2	6.5	50 50.9	+55.3	6.6	51 50.5	+55.4	6.8	81
82	45 48.0	+54.8	5.4	46 47.7	+54.8	5.5	47 47.5	+54.8	5.6	48 47.2	+54.9	5.7	49 46.9	+55.0	5.8	50 46.5	+55.1	5.9	51 46.2	+55.1	6.1	52 45.9	+55.2	6.2	82
83	46 42.8	+54.5	4.8	47 42.5	+54.7	4.9	48 42.3	+54.7	5.0	49 42.1	+54.7	5.1	50 41.9	+54.7	5.2	51 41.6	+54.9	5.3	52 41.3	+55.0	5.4	53 41.1	+54.9	5.5	83
84	47 37.3	+54.4	4.2	48 37.2	+54.4	4.3	49 37.0	+54.5	4.3	50 36.8	+54.5	4.4	51 36.6	+54.6	4.5	52 36.5	+54.6	4.6	53 36.3	+54.6	4.7	54 36.0	+54.8	4.9	84
85	48 31.7	+54.2	3.5	49 31.6	+54.2	3.6	50 31.5	+54.2	3.7	51 31.3	+54.3	3.8	52 31.2	+54.3	3.9	53 31.1	+54.3	3.9	54 30.9	+54.4	4.0	55 30.8	+54.4	4.1	85
86	49 25.9	+53.9	2.9	50 25.8	+53.9	2.9	51 25.7	+54.0	3.0	52 25.6	+54.0	3.1	53 25.5	+54.1	3.2	54 25.4	+54.1	3.2	55 25.3	+54.2	3.3	56 25.2	+54.2	3.4	86
87	50 19.8	+53.7	2.2	51 19.7	+53.7	2.3	52 19.7	+53.7	2.3	53 19.6	+53.8	2.4	54 19.6	+53.8	2.4	55 19.5	+53.8	2.4	56 19.5	+53.8	2.5	57 19.4	+53.9	2.6	87
88	51 13.5	+53.4	1.5	52 13.4	+53.5	1.5	53 13.4	+53.5	1.6	54 13.4	+53.5	1.6	55 13.4	+53.5	1.6	56 13.3	+53.5	1.7	57 13.3	+53.5	1.7	58 13.3	+53.5	1.8	88
89	52 06.9	+53.1	0.8	53 06.9	+53.1	0.8	54 06.9	+53.1	0.8	55 06.9	+53.1	0.8	56 06.9	+53.1	0.8	57 06.8	+53.2	0.8	58 06.8	+53.2	0.9	59 06.8	+53.2	0.9	89
90	53 00.0	+52.8	0.0	54 00.0	+52.8	0.0	55 00.0	+52.8	0.0	56 00.0	+52.8	0.0	57 00.0	+52.8	0.0	58 00.0	+52.8	0.0	59 00.0	+52.8	0.0	60 00.0	+52.8	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION — L.H.A. 152°, 208°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	31 45.6	+56.3	145.2	30 56.2	+56.5	145.6	30 06.6	+56.8	145.9	29 16.8	+57.0	146.2	28 26.8	+57.2	146.5	27 36.7	+57.4	146.8	26 46.4	+57.6	147.1	25 55.9	+57.8	147.4	0
1	32 41.9	+56.2	144.8	31 52.7	+56.5	145.2	31 03.4	+56.7	145.5	30 13.8	+57.0	145.9	29 24.0	+57.2	146.2	28 34.1	+57.4	146.5	27 44.0	+57.5	146.8	26 53.7	+57.7	147.1	1
2	33 38.1	+56.2	144.4	32 49.2	+56.4	144.8	32 00.1	+56.6	145.2	31 10.8	+56.8	145.5	30 21.2	+57.1	145.8	29 31.5	+57.3	146.2	28 41.5	+57.5	146.5	27 51.4	+57.7	146.8	2
3	34 34.3	+56.1	144.0	33 45.6	+56.4	144.4	32 56.7	+56.6	144.8	32 07.6	+56.8	145.1	31 18.3	+57.0	145.5	30 28.8	+57.2	145.8	29 39.0	+57.5	146.1	28 49.1	+57.6	146.5	3
4	35 30.4	+55.9	143.6	34 42.0	+56.2	144.0	33 53.3	+56.5	144.4	33 04.4	+56.6	144.8	32 15.3	+57.0	145.1	31 26.0	+57.2	145.5	30 36.5	+57.4	145.8	29 46.7	+57.6	146.1	4
5	36 26.3	+55.9	143.1	35 38.2	+56.1	143.5	34 49.8	+56.4	144.0	34 01.2	+56.6	144.4	33 12.3	+56.9	144.7	32 23.2	+57.1	145.1	31 33.9	+57.3	145.5	30 44.3	+57.6	145.8	5
6	37 22.2	+55.7	142.6	36 34.3	+56.1	143.1	35 46.2	+56.3	143.5	34 57.8	+56.6	144.0	34 09.2	+56.8	144.4	33 20.3	+57.1	144.8	32 31.2	+57.3	145.1	31 41.9	+57.5	145.5	6
7	38 17.9	+55.7	142.2	37 30.4	+55.9	142.7	36 42.5	+56.3	143.1	35 54.4	+56.5	143.6	35 06.0	+56.8	144.0	34 17.4	+57.0	144.4	33 28.5	+57.2	144.8	32 39.4	+57.4	145.1	7
8	39 13.6	+55.5	141.7	38 26.3	+55.9	142.2	37 38.8	+56.1	142.7	36 50.9	+56.4	143.1	36 02.8	+56.6	143.6	35 14.4	+56.9	144.0	34 25.7	+57.1	144.4	33 36.8	+57.4	144.8	8
9	40 09.1	+55.4	141.2	39 22.2	+55.7	141.7	38 34.9	+56.0	142.2	37 47.3	+56.3	142.7	36 59.4	+56.6	143.2	36 11.3	+56.8	143.6	35 22.8	+57.1	144.0	34 34.2	+57.3	144.4	9
10	41 04.5	+55.2	140.7	40 17.9	+55.6	141.2	39 30.9	+55.9	141.8	38 43.6	+56.2	142.3	37 56.0	+56.5	142.7	37 08.1	+56.8	143.2	36 19.9	+57.0	143.7	35 31.5	+57.2	144.1	10
11	41 59.7	+55.2	140.2	41 13.5	+55.4	140.7	40 26.8	+55.8	141.3	39 39.8	+56.1	141.8	38 52.5	+56.4	142.3	38 04.9	+56.6	142.8	37 16.9	+57.0	143.3	36 28.7	+57.2	143.7	11
12	42 54.9	+54.9	139.6	42 08.9	+55.3	140.2	41 22.6	+55.7	140.8	40 35.9	+56.0	141.4	39 48.9	+56.3	141.9	39 01.5	+56.6	142.4	38 13.9	+56.8	142.9	37 25.9	+57.1	143.3	12
13	43 49.8	+54.8	139.1	43 04.2	+55.2	139.7	42 18.3	+55.5	140.3	41 31.9	+55.9	140.9	40 45.2	+56.2	141.4	39 58.1	+56.5	141.9	39 10.7	+56.8	142.5	38 23.0	+57.0	142.9	13
14	44 44.6	+54.6	138.5	43 59.4	+55.0	139.2	43 13.8	+55.4	139.8	42 27.8	+55.7	140.4	41 41.4	+56.1	141.0	40 54.6	+56.4	141.5	40 07.5	+56.6	142.0	39 20.0	+56.9	142.5	14
15	45 39.2	+54.4	137.9	44 54.4	+54.9	138.6	44 09.2	+55.2	139.3	43 23.5	+55.6	139.9	42 37.4	+56.0	140.5	41 51.0	+56.2	141.0	41 04.1	+56.6	141.6	40 16.9	+56.9	142.1	15
16	46 33.6	+54.3	137.3	45 49.3	+54.6	138.1	45 04.4	+55.1	138.7	44 19.1	+55.5	139.4	43 33.4	+55.8	140.0	42 47.2	+56.2	140.6	42 00.7	+56.4	141.2	41 13.8	+56.7	141.7	16
17	47 27.9	+54.0	136.7	46 43.9	+54.5	137.4	45 59.5	+54.9	138.1	45 14.6	+55.3	138.8	44 29.2	+55.7	139.5	43 43.4	+56.0	140.1	42 57.1	+56.4	140.7	42 10.5	+56.7	141.3	17
18	48 21.9	+53.8	136.1	47 38.4	+54.3	136.8	46 54.4	+54.7	137.6	46 09.9	+55.1	138.3	45 24.9	+55.5	138.9	44 39.4	+55.9	139.6	43 53.5	+56.2	140.2	43 07.2	+56.5	140.8	18
19	49 15.7	+53.5	135.4	48 32.7	+54.0	136.2	47 49.1	+54.5	136.9	47 05.0	+54.9	137.7	46 20.4	+55.3	138.4	45 35.3	+55.7	139.1	44 49.7	+56.1	139.7	44 03.7	+56.4	140.4	19
20	50 09.2	+53.3	134.7	49 26.7	+53.8	135.5	48 43.6	+54.3	136.3	47 59.9	+54.8	137.1	47 15.7	+55.2	137.8	46 31.0	+55.6	138.5	45 45.8	+56.0	139.2	45 00.1	+56.3	139.9	20
21	51 02.5	+53.0	134.0	50 20.5	+53.6	134.8	49 37.9	+54.1	135.7	48 54.7	+54.6	136.5	48 10.9	+55.0	137.2	47 26.6	+55.4	138.0	46 41.8	+55.8	138.7	45 56.4	+56.2	139.4	21
22	51 55.5	+52.7	133.2	51 14.1	+53.3	134.1	50 32.0	+53.8	135.0	49 49.3	+54.3	135.8	49 05.9	+54.8	136.6	48 22.0	+55.3	137.4	47 37.6	+55.6	138.2	46 52.6	+56.0	138.9	22
23	52 48.2	+52.4	132.4	52 07.4	+53.0	133.4	51 25.8	+53.6	134.3	50 43.6	+54.1	135.2	50 00.7	+54.6	136.0	49 17.3	+55.0	136.8	48 33.2	+55.5	137.6	47 48.6	+55.9	138.4	23
24	53 40.6	+52.0	131.6	53 00.4	+52.7	132.6	52 19.4	+53.3	133.6	51 37.7	+53.8	134.5	50 55.3	+54.4	135.4	50 12.3	+54.9	136.2	49 28.7	+55.3	137.0	48 44.5	+55.7	137.8	24
25	54 32.6	+51.7	130.8	53 53.1	+52.3	131.8	53 12.7	+53.0	132.8	52 31.5	+53.6	133.8	51 49.7	+54.1	134.7	51 07.2	+54.6	135.6	50 24.0	+55.1	136.4	49 40.2	+55.6	137.2	25
26	55 24.3	+51.3	129.9	54 45.4	+52.0	131.0	54 05.7	+52.6	132.0	53 25.1	+53.3	133.0	52 43.8	+53.9	134.0	52 01.8	+54.4	134.9	51 19.1	+54.9	135.8	50 35.8	+55.3	136.7	26
27	56 15.6	+50.8	128.9	55 37.4	+51.6	130.1	54 58.3	+52.3	131.2	54 18.4	+53.0	132.2	53 37.7	+53.5	133.2	52 56.2	+54.1	134.2	52 14.0	+54.7	135.1	51 31.1	+55.2	136.0	27
28	57 06.4	+50.4	128.0	56 29.0	+51.2	129.2	55 50.6	+52.0	130.3	55 11.4	+52.6	131.4	54 31.2	+53.3	132.5	53 50.3	+53.9	133.5	53 08.7	+54.4	134.5	52 26.3	+54.9	135.4	28
29	57 56.8	+49.8	127.0	57 20.2	+50.7	128.2	56 42.6	+51.5	129.4	56 04.0	+52.2	130.6	55 24.5	+53.0	131.7	54 44.2	+53.6	132.7	54 03.1	+54.2	133.8	53 21.2	+54.7	134.7	29
30	58 46.6	+49.3	125.9	58 10.9	+50.2	127.2	57 34.1	+51.0	128.5	56 56.2	+51.9	129.7	56 17.5	+52.6	130.8	55 37.8	+53.3	132.0	54 57.3	+53.9	133.0	54 15.9	+54.5	134.0	30
31	59 35.9	+48.8	124.8	59 01.1	+49.7	126.2	58 25.1	+50.6	127.5	57 48.1	+51.4	128.7	57 10.1	+52.2	130.0	56 31.1	+52.9	131.1	55 51.2	+53.5	132.2	55 10.4	+54.2	133.3	31
32	60 24.7	+48.0	123.6	59 50.8	+49.1	125.1	59 15.7	+50.1	126.4	58 39.5	+50.9	127.8	58 02.3	+51.8	129.0	57 24.0	+52.5	130.3	56 44.7	+53.3	131.4	56 04.6	+53.9	132.5	32
33	61 12.7	+47.4	122.4	60 39.9	+48.5	123.9	60 05.8	+49.5	125.4	59 30.5	+50.5	126.7	58 54.1	+51.3	128.1	58 16.5	+52.2	129.4	57 38.0	+52.9	130.6	56 58.5	+53.6	131.8	33
34	62 00.1	+46.6	121.1	61 28.4	+47.8	122.7	60 55.3	+48.9	124.2	60 21.0	+49.9	125.7	59 45.4	+50.8	127.1	59 08.7	+51.7	128.4	58 30.9	+52.5	129.7	57 52.1	+53.2	130.9	34
35	62 46.7	+45.8	119.8	62 16.2	+47.0	121.4	61 44.2	+48.2	123.0	61 10.9	+49.3	124.5	60 36.2	+50.3	126.0	60 00.4	+51.2	127.4	59 23.4	+52.0	128.7	58 45.3	+52.8	130.0	35
36	63 32.5	+44.9	118.3	63 03.2	+46.3	120.1	62 32.4	+47.5	121.7	62 00.2	+48.6	123.3	61 26.5	+49.7	124.9	60 51.6	+50.7	126.3	60 15.4	+51.6	127.8	59 38.1	+52.5	129.1	36
37	64 17.4	+43.9	116.8	63 49.5	+45.3	118.7	63 19.9	+46.7	120.4	62 48.8	+47.9	122.1	62 16.2	+49.1	123.7	61 42.3	+50.1	125.2	61 07.0	+51.1	126.7	60 30.6	+52.0	128.1	37
38	65 01.3	+42.8	115.2	64 34.8	+44.4	117.1	64 06.6	+45.8	119.0	63 36.7	+47.2	120.7	63 05.3	+48.4	122.4	62 32.4	+49.5	124.1	61 58.1	+50.6	125.6	61 22.6	+51.5	127.1	38
39	65 44.1	+41.7	113.5	65 19.2	+43.3	115.5	64 52.4	+44.9	117.5	64 23.9	+46.3	119.3	63 53.7	+47.6	121.1	63 21.9	+48.8	122.8	62 48.7	+49.9	124.5	62 14.1	+50.9	126.0	39
40	66 25.8	+40.3	111.8	66 02.5	+42.1	113.9	65 37.3	+43.8	115.9	65 10.2	+45.3	117.8	64 41.3	+46.7	119.7	64 10.7	+48.1	121.5	63 38.6	+49.3	123.2	63 05.0	+50.4	124.9	40
41	67 06.1	+39.0	109.9	66 44.6	+40.9	112.1	66 21.1	+42.6	114.2	65 55.5	+44.3	116.2	65 28.0	+45.9	118.2	64 58.8	+47.2	120.1	64 27.9	+48.5	121.9	63 55.4	+49.7	123.7	41
42	67 45.1	+37.5	107.9	67 25.5	+39.5	110.2	67 03.7	+41.4	112.4	66 39.8	+43.2	114.6	66 13.9	+44.8	116.6	65 46.0	+46.4	118.6	65 16.4	+47.7	120.5	64 45.1	+49.0	122.4	42
43	68 22.6	+35.8	105.8	68 05.0	+38.0	108.2	67 45.1	+40.0	110.5	67 23.0	+41.9	112.8	66 58.7	+43.7	115.0	66 32.4	+45.3	117.1	66 04.1	+46.9	119.1	65 34.1	+48.2	121.0	43
44	68 58.4	+34.0	103.6	68 43.0	+36.3	106.1	68 25.1	+38.5	108.5	68 04.9	+40.5	110.9	67 42.4	+42.4	113.2	67 17.7	+44.2	115.4	66 51.0	+45.8	117.5	66 22.3	+47.3	119.5	44
45	69 32.4	+32.0•	101.3	69 19.3	+34.5	103.9	69 03.6	+36.8	106.4	68 45.4	+39.0	108.9	68 24.8	+41.1	111.3	68 01.9	+43.0	113.6	67 36.8	+44.7	115.8	67 09.6	+46.4	118.0	45
46	70 04.4	+29.9•	98.8	69 53.8	+32.5•	101.5	69 40.4	+35.1	104.2	69 24.4	+37.4	106.8	69 05.9	+39.5	109.3	68 44.9	+41.6	111.7	68 21.5	+43.6	114.0	67 56.0	+45.3	116.3	46
47	70 34.3	+27.7•	96.3	70 26.3	+30.4•	99.1	70 15.5	+33.0•	101.8	70 01.8	+35.6	104.5	69 45.4	+38.0	107.1	69 26.5	+40.1	109.7	69 05.1	+42.1	112.2	68 41.3	+44.1	114.5	47
48	71 02.0	+25.2•	93.6	70 56.7	+28.1•	96.4	70 48.5	+30.9•	99.3	70 37.4	+33.5•	102.1	70 23.4	+36.1	104.9	70 06.6	+38.5	107.5	69 47.2	+40.8	110.1	69 25.4	+42.7	112.6	48
49	71 27.2	+22.5•	90.7	71 24.8	+25.6•	93.7	71 19.4	+28.6•	96.7	71 10.9	+31.4•	99.6	70 59.5	+34.1•	102.4	70 45.1	+36.7	105.2	70 28.0	+39.0	108.0	70 08.1	+41.3	110.6	49
50	71 49.7	+19.8•	87.8	71 50.4	+23.0•	90.8	71 48.0	+26.0•	93.9	71 42.3	+29.1•	96.9	71 33.6	+31.9•	99.9	71 21.8	+34.6•	102.8	71 07.0	+37.2	105.7	70 49.4	+39.7	108.4	50
51	72 09.5	+16.8•	84.7	72 13.4	+20.1•	87.8	72 14.0	+23.3•	91.0	72 11.4	+26.4•	94.1	72 05.5	+29.5•	97.2	71 56.4	+32.5•	100.2	71 44.2	+35.2•	103.2	71 29.1	+37.8	106.1	51
52	72 26.3	+13.7•	81.6	72 33.5	+17.0•	84.7	72 37.3	+20.4•	87.9	72 37.8	+23.7•	91.1	72 35.0	+26.9•	94.3	72 28.9	+30.0•	97.5	72 19.4	+33.0•	100.6	72 06.9	+35.8•	103.6	52
53	72 40.0	+10.5•	78.3	72 50.5	+13.9•	81.5	72 57.7	+17.4•	84.7	73 01.5	+20.8•	88.0	73 01.9	+24.1•	91.3	72 58.9	+27.4•	94.5	72 52.4	+30.6•	97.8	72 42.7	+33.5•	101.0	53
54	72 50.5	+7.2•	75.0	73 04.4	+10.7•	78.2	73 15.1	+14.1•	81.4	73 22.3	+17.6•	84.7	73 26.0	+21.1•	88.1	73 26.3	+24.5•	91.5	73 23.0	+27.9•	94.8	73 16.2	+31.1•	98.1	54
55	72 57.7	+3.8•	71.6	73 15.1	+7.2•	74.8	73 29.2	+10.7•	78.0	73 39.9	+14.3•	81.4	73 47.1	+17.9•	84.8	73 50.8	+21.4•	88.2	73 50.9	+24.9•	91.7	73 47.3	+28.4•	95.1	55
56	73 01.5	+0.5•	68.2	73 22.3	+3.7•	71.3	73 39.9	+7.2•	74.6	73 54.2	+10.8	77.9	74 05.0	+14.5	81.3	74 12.2	+18.2•	84.8	74 15.8	+21.8•	88.4	74 15.7	+25.4•	91.9	56
57	73 01.9	–3.0•	64.8	73 26.0	+0.3•	67.8	73 47.1	+3.7•	71.0	74 05.0	+7.2•	74.3	74 19.5	+10.9•	77.8	74 30.4	+14.7•	81.3	74 37.6	+18.5•	84.9	74 41.1	+22.2•	88.5	57
58	72 58.9	–6.5•	61.4	73 26.3	–3.3•	64.3	73 50.8	+0.1•	67.4	74 12.2	+3.6•	70.7	74 30.4	+7.2•	74.1	74 45.1	+11.0•	77.6	74 56.1	+14.8•	81.3	75 03.3	+18.7•	85.0	58
59	72 52.4	–9.7•	58.0	73 23.0	–6.8•	60.8	73 50.9	–3.6•	63.8	74 15.8	–0.1•	67.0	74 37.6	+3.5•	70.4	74 56.1	+7.2•	73.9	75 10.9	+11.1•	77.5	75 22.0	+15.0•	81.2	59
60	72 42.7	–13.0•	54.7	73 16.2	–10.2•	57.4	73 47.3	–7.1•	60.3	74 15.7	–3.9•	63.3	74 41.1	–0.4•	66.6	75 03.3	+3.3•	70.0	75 22.0	+7.1•	73.6	75 37.0	+11.1•	77.4	60
61	72 29.7	–16.2•	51.4	73 06.0	–13.4•	54.0	73 40.2	–10.6•	56.7	74 11.8	–7.5•	59.7	74 40.7	–4.2•	62.8	75 06.6	–0.7•	66.2	75 29.1	+3.2•	69.7	75 48.1	+7.1•	73.4	61
62	72 13.5	–19.1•	48.2	72 52.6	–16.7•	50.6	73 29.6	–13.9•	53.2	74 03.2	–11.1•	56.0	74 36.5	–7.9•	59.0	75 05.9	–4.5•	62.3	75 32.3	–0.9•	65.7	75 55.2	+3.0•	69.3	62
63	71 54.4	–21.9•	45.1	72 35.9	–19.7•	47.4	73 15.6	–17.3•	49.8	73 53.2	–14.5•	52.5	74 28.6	–11.6•	55.3	75 01.4	–8.4•	58.4	75 31.4	–5.0•	61.7	75 58.2	–1.2•	65.2	63
64	71 32.5	–24.7•	42.2	72 16.2	–22.6•	44.3	72 58.3	–20.3•	46.5	73 38.7	–17.9•	49.0	74 17.0	–15.2•	51.7	74 53.0	–12.2•	54.6	75 26.4	–8.9•	57.7	75 57.0	–5.4•	61.1	64
65	71 07.8	–27.1•	39.3	71 53.6	–25.2•	41.2	72 38.0	–23.2•	43.3	73 20.8	–21.0•	45.6	74 01.8	–18.5•	48.1	74 40.8	–15.8•	50.9	75 17.5	–12.8•	53.8	75 51.6	–9.5•	57.0	65
66	70 40.7	–29.4•	36.6	71 28.4	–27.8•	38.4	72 14.8	–26.0•	40.3	72 59.8	–23.9•	42.4	73 43.3	–21.7•	44.7	74 25.0	–19.2•	47.2	75 04.7	–16.4•	50.0	75 42.1	–13.4•	53.0	66
67	70 11.3	–31.6•	34.0	71 00.6	–30.1•	35.6	71 48.8	–28.4•	37.4	72 35.9	–26.7•	39.3	73 21.6	–24.6•	41.4	74 05.8	–22.4•	43.7	74 48.3	–20.0•	46.3	75 28.7	–17.2•	49.1	67
68	69 39.7	–33.5•	31.5	70 30.5	–32.3•	33.0	71 20.4	–30.9•	34.6	72 09.2	–29.2•	36.3	72 57.0	–27.3•	38.3	73 43.4	–25.5•	40.4	74 28.3	–23.2•	42.7	75 11.5	–20.8•	45.3	68
69	69 06.2	–35.5	29.1	69 58.2	–34.2	30.5	70 49.5	–32.9•	31.9	71 40.0	–31.5•	33.5	72 29.5	–30.0•	35.3	73 17.9	–28.2•	37.2	74 05.1	–26.3•	39.3	74 50.7	–24.1•	41.6	69
70	68 30.7	–37.0	26.9	69 24.0	–36.1	28.1	70 16.6	–35.0	29.4	71 08.5	–33.8•	30.9	71 59.5	–32.3•	32.4	72 49.7	–30.8•	34.2	73 38.8	–29.1•	36.1	74 26.6	–27.2•	38.2	70
71	67 53.7	–38.7	24.8	68 47.9	–37.8	25.9	69 41.6	–36.8	27.1	70 34.7	–35.7	28.3	71 27.2	–34.5•	29.8	72 18.9	–33.2•	31.3	73 09.7	–31.7•	33.0	73 59.4	–29.9•	34.9	71
72	67 15.0	–40.1	22.8	68 10.1	–39.3	23.8	69 04.8	–38.4	24.8	69 59.0	–37.5	26.0	70 52.7	–36.5	27.2	71 45.7	–35.3•	28.6	72 38.0	–34.0•	30.1	73 29.5	–32.6•	31.8	72
73	66 34.9	–41.3	20.9	67 30.8	–40.7	21.8	68 26.4	–40.0	22.7	69 21.5	–39.1	23.7	70 16.2	–38.2	24.8	71 10.4	–37.2	26.1	72 04.0	–36.1•	27.4	72 56.9	–34.9•	28.9	73
74	65 53.6	–42.6	19.1	66 50.1	–42.0	19.9	67 46.4	–41.3	20.7	68 42.4	–40.7	21.6	69 38.0	–39.9	22.6	70 33.2	–39.1	23.7	71 27.9	–38.1	24.9	72 22.0	–37.0•	26.2	74
75	65 11.0	–43.7	17.4	66 08.1	–43.1	18.1	67 05.1	–42.6	18.8	68 01.7	–42.0	19.6	68 58.1	–41.3	20.5	69 54.1	–40.6	21.4	70 49.8	–39.8	22.5	71 45.0	–38.9	23.6	75
76	64 27.3	–44.6	15.8	65 25.0	–44.3	16.4	66 22.5	–43.8	17.0	67 19.7	–43.2	17.7	68 16.8	–42.7	18.5	69 13.5	–42.0	19.3	70 10.0	–41.4	20.2	71 06.1	–40.6	21.2	76
77	63 42.7	–45.6	14.3	64 40.7	–45.2	14.8	65 38.7	–44.8	15.3	66 36.5	–44.4	15.9	67 34.1	–43.9	16.6	68 31.5	–43.4	17.3	69 28.6	–42.8	18.1	70 25.5	–42.2	19.0	77
78	62 57.1	–46.5	12.8	63 55.5	–46.1	13.3	64 53.9	–45.8	13.7	65 52.1	–45.4	14.3	66 50.2	–45.0	14.8	67 48.1	–44.6	15.5	68 45.8	–44.1	16.2	69 43.3	–43.5	16.9	78
79	62 10.6	–47.2	11.4	63 09.4	–46.9	11.8	64 08.1	–46.7	12.2	65 06.7	–46.4	12.7	66 05.2	–46.1	13.2	67 03.5	–45.6	13.7	68 01.7	–45.2	14.3	68 59.8	–44.8	15.0	79
80	61 23.4	–47.9	10.1	62 22.5	–47.7	10.5	63 21.4	–47.4	10.8	64 20.3	–47.2	11.2	65 19.1	–46.9	11.6	66 17.9	–46.7	12.1	67 16.5	–46.3	12.6	68 15.0	–46.0	13.1	80
81	60 35.5	–48.6	8.9	61 34.8	–48.4	9.2	62 34.0	–48.3	9.5	63 33.1	–48.0	9.8	64 32.2	–47.7	10.2	65 31.2	–47.5	10.5	66 30.2	–47.2	11.0	67 29.0	–46.9	11.4	81
82	59 46.9	–49.2	7.7	60 46.4	–49.1	7.9	61 45.8	–48.9	8.2	62 45.1	–48.7	8.5	63 44.5	–48.5	8.8	64 43.7	–48.3	9.1	65 43.0	–48.1	9.4	66 42.1	–47.8	9.8	82
83	58 57.7	–49.7	6.6	59 57.3	–49.6	6.8	60 56.9	–49.5	7.0	61 56.4	–49.3	7.2	62 56.0	–49.2	7.5	63 55.4	–49.0	7.7	64 54.9	–48.8	8.0	65 54.3	–48.7	8.3	83
84	58 08.0	–50.2	5.5	59 07.7	–50.1	5.7	60 07.4	–50.0	5.8	61 07.1	–49.9	6.0	62 06.8	–49.8	6.2	63 06.4	–49.7	6.4	64 06.1	–49.6	6.7	65 05.6	–49.4	6.9	84
85	57 17.8	–50.8	4.5	58 17.6	–50.7	4.6	59 17.4	–50.6	4.7	60 17.2	–50.5	4.9	61 16.9	–50.4	5.0	62 16.7	–50.3	5.2	63 16.4	–50.2	5.4	64 16.2	–50.1	5.6	85
86	56 27.0	–51.2	3.5	57 26.9	–51.1	3.6	58 26.8	–51.1	3.7	59 26.7	–51.0	3.8	60 26.5	–50.9	3.9	61 26.4	–50.9	4.1	62 26.2	–50.8	4.2	63 26.0	–50.7	4.3	86
87	55 35.8	–51.5	2.6	56 35.8	–51.5	2.6	57 35.7	–51.5	2.7	58 35.7	–51.5	2.7	59 35.6	–51.4	2.9	60 35.5	–51.4	3.0	61 35.4	–51.3	3.1	62 35.3	–51.2	3.2	87
88	54 44.3	–52.0	1.7	55 44.2	–51.9	1.7	56 44.2	–51.9	1.8	57 44.2	–51.9	1.8	58 44.2	–51.9	1.9	59 44.1	–51.8	1.9	60 44.1	–51.8	2.0	61 44.0	–51.7	2.0	88
89	53 52.3	–52.3	0.8	54 52.3	–52.3	0.8	55 52.3	–52.3	0.9	56 52.3	–52.3	0.9	57 52.3	–52.3	0.9	58 52.3	–52.3	0.9	59 52.3	–52.3	1.0	60 52.3	–52.3	1.0	89
90	53 00.0	–52.6	0.0	54 00.0	–52.6	0.0	55 00.0	–52.6	0.0	56 00.0	–52.7	0.0	57 00.0	–52.7	0.0	58 00.0	–52.7	0.0	59 00.0	–52.7	0.0	60 00.0	–52.7	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	31 45.6	−56.4	145.2	30 56.2	−56.6	145.6	30 06.6	−56.8	145.9	29 16.8	−57.0	146.2	28 26.8	−57.2	146.5	27 36.7	−57.4	146.8	26 46.4	−57.6	147.1	25 55.9	−57.8	147.4	0
1	30 49.2	−56.5	145.6	29 59.6	−56.7	146.0	29 09.8	−57.0	146.3	28 19.8	−57.1	146.6	27 29.6	−57.3	146.9	26 39.3	−57.5	147.2	25 48.8	−57.7	147.5	24 58.1	−57.8	147.7	1
2	29 52.7	−56.5	146.0	29 02.9	−56.8	146.3	28 12.8	−56.9	146.6	27 22.6	−57.1	146.9	26 32.3	−57.4	147.2	25 41.8	−57.5	147.5	24 51.1	−57.7	147.7	24 00.3	−57.9	148.0	2
3	28 56.2	−56.6	146.4	28 06.1	−56.8	146.7	27 15.9	−57.0	147.0	26 25.5	−57.2	147.3	25 34.9	−57.4	147.5	24 44.2	−57.6	147.8	23 53.4	−57.7	148.0	23 02.4	−57.8	148.3	3
4	27 59.6	−56.7	146.8	27 09.3	−56.9	147.1	26 18.9	−57.1	147.3	25 28.3	−57.3	147.6	24 37.5	−57.4	147.9	23 46.7	−57.6	148.1	22 55.7	−57.8	148.3	22 04.6	−58.0	148.5	4
5	27 02.9	−56.7	147.2	26 12.4	−56.9	147.4	25 21.8	−57.1	147.7	24 31.0	−57.3	147.9	23 40.1	−57.5	148.2	22 49.1	−57.7	148.4	21 57.9	−57.8	148.6	21 06.6	−57.9	148.8	5
6	26 06.2	−56.8	147.5	25 15.5	−56.9	147.8	24 24.7	−57.2	148.0	23 33.7	−57.3	148.3	22 42.6	−57.5	148.5	21 51.4	−57.6	148.7	21 00.1	−57.8	148.9	20 08.7	−58.0	149.1	6
7	25 09.4	−56.8	147.9	24 18.6	−57.1	148.1	23 27.5	−57.2	148.4	22 36.4	−57.4	148.6	21 45.1	−57.5	148.8	20 53.8	−57.7	149.0	20 02.3	−57.9	149.2	19 10.7	−58.0	149.4	7
8	24 12.6	−56.8	148.2	23 21.5	−57.1	148.5	22 30.3	−57.2	148.7	21 39.0	−57.4	148.9	20 47.6	−57.6	149.1	19 56.1	−57.8	149.3	19 04.4	−57.9	149.5	18 12.7	−58.1	149.6	8
9	23 15.8	−57.0	148.6	22 24.5	−57.1	148.8	21 33.1	−57.3	149.0	20 41.6	−57.4	149.2	19 50.0	−57.6	149.4	18 58.3	−57.7	149.6	18 06.5	−57.9	149.7	17 14.7	−58.1	149.9	9
10	22 18.8	−56.9	148.9	21 27.4	−57.1	149.1	20 35.8	−57.3	149.3	19 44.2	−57.5	149.5	18 52.4	−57.6	149.7	18 00.6	−57.8	149.9	17 08.6	−57.9	150.0	16 16.6	−58.0	150.2	10
11	21 21.9	−57.0	149.3	20 30.3	−57.2	149.5	19 38.5	−57.3	149.6	18 46.7	−57.5	149.8	17 54.8	−57.7	150.0	17 02.8	−57.8	150.1	16 10.7	−57.9	150.3	15 18.6	−58.0	150.4	11
12	20 24.9	−57.1	149.6	19 33.1	−57.2	149.8	18 41.2	−57.4	150.0	17 49.2	−57.5	150.1	16 57.1	−57.7	150.3	16 05.0	−57.8	150.4	15 12.8	−58.0	150.6	14 20.5	−58.1	150.7	12
13	19 27.8	−57.0	149.9	18 35.9	−57.3	150.1	17 43.8	−57.4	150.3	16 51.7	−57.6	150.4	15 59.4	−57.7	150.6	15 07.2	−57.9	150.7	14 14.8	−58.0	150.8	13 22.4	−58.1	151.0	13
14	18 30.8	−57.1	150.3	17 38.6	−57.3	150.4	16 46.4	−57.4	150.6	15 54.1	−57.6	150.7	15 01.7	−57.7	150.9	14 09.3	−57.9	151.0	13 16.8	−58.0	151.1	12 24.3	−58.2	151.2	14
15	17 33.7	−57.2	150.6	16 41.4	−57.3	150.7	15 49.0	−57.5	150.9	14 56.5	−57.6	151.0	14 04.0	−57.7	151.1	13 11.4	−57.8	151.3	12 18.8	−58.0	151.4	11 26.1	−58.1	151.5	15
16	16 36.5	−57.1	150.9	15 44.1	−57.3	151.0	14 51.5	−57.4	151.2	13 58.9	−57.6	151.3	13 06.3	−57.8	151.4	12 13.6	−57.9	151.5	11 20.8	−58.0	151.6	10 28.0	−58.2	151.7	16
17	15 39.4	−57.2	151.2	14 46.7	−57.3	151.3	13 54.1	−57.5	151.5	13 01.3	−57.6	151.6	12 08.5	−57.8	151.7	11 15.7	−57.9	151.8	10 22.8	−58.1	151.9	9 29.8	−58.2	152.0	17
18	14 42.2	−57.2	151.5	13 49.4	−57.4	151.7	12 56.6	−57.6	151.8	12 03.7	−57.7	151.9	11 10.7	−57.8	152.0	10 17.8	−58.0	152.1	9 24.7	−58.0	152.1	8 31.7	−58.2	152.2	18
19	13 45.0	−57.3	151.8	12 52.0	−57.4	152.0	11 59.0	−57.5	152.1	11 06.0	−57.7	152.2	10 12.9	−57.8	152.2	9 19.8	−57.9	152.3	8 26.7	−58.1	152.4	7 33.5	−58.2	152.5	19
20	12 47.7	−57.3	152.1	11 54.6	−57.4	152.3	11 01.5	−57.6	152.3	10 08.3	−57.6	152.4	9 15.1	−57.8	152.5	8 21.9	−58.0	152.6	7 28.6	−58.1	152.6	6 35.3	−58.2	152.7	20
21	11 50.4	−57.2	152.5	10 57.2	−57.4	152.5	10 04.0	−57.6	152.6	9 10.7	−57.7	152.7	8 17.3	−57.8	152.8	7 23.9	−57.9	152.8	6 30.5	−58.0	152.9	5 37.1	−58.2	152.9	21
22	10 53.2	−57.3	152.8	9 59.8	−57.4	152.8	9 06.4	−57.6	152.9	8 13.0	−57.8	153.0	7 19.5	−57.8	153.1	6 26.0	−58.0	153.1	5 32.5	−58.1	153.2	4 38.9	−58.2	153.2	22
23	9 55.9	−57.3	153.1	9 02.4	−57.5	153.1	8 08.8	−57.6	153.2	7 15.2	−57.7	153.3	6 21.7	−57.9	153.3	5 28.0	−57.9	153.4	4 34.4	−58.1	153.4	3 40.7	−58.2	153.4	23
24	8 58.6	−57.4	153.4	8 04.9	−57.5	153.4	7 11.2	−57.6	153.5	6 17.5	−57.7	153.5	5 23.8	−57.9	153.6	4 30.1	−58.0	153.6	3 36.3	−58.1	153.7	2 42.5	−58.2	153.7	24
25	8 01.2	−57.3	153.7	7 07.4	−57.5	153.7	6 13.6	−57.6	153.8	5 19.8	−57.7	153.8	4 25.9	−57.8	153.9	3 32.1	−58.0	153.9	2 38.2	−58.1	153.9	1 44.3	−58.2	153.9	25
26	7 03.9	−57.4	154.0	6 10.0	−57.5	154.0	5 16.0	−57.6	154.0	4 22.1	−57.8	154.1	3 28.1	−57.9	154.1	2 34.1	−58.0	154.1	1 40.1	−58.1	154.2	0 46.1	−58.2	154.2	26
27	6 06.5	−57.3	154.3	5 12.5	−57.5	154.3	4 18.4	−57.6	154.3	3 24.3	−57.7	154.4	2 30.2	−57.8	154.4	1 36.1	−58.0	154.4	0 42.0	−58.1	154.4	0 12.1	+58.2	25.6	27
28	5 09.2	−57.4	154.5	4 15.0	−57.5	154.6	3 20.8	−57.6	154.6	2 26.6	−57.8	154.6	1 32.4	−57.9	154.6	0 38.1	−58.0	154.7	0 16.1	+58.1	25.3	1 10.3	+58.2	25.3	28
29	4 11.8	−57.4	154.8	3 17.5	−57.5	154.9	2 23.2	−57.7	154.9	1 28.8	−57.7	154.9	0 34.5	−57.9	154.9	0 19.9	+57.9	25.1	1 14.2	+58.1	25.1	2 08.5	+58.2	25.1	29
30	3 14.4	−57.4	155.1	2 20.0	−57.5	155.2	1 25.5	−57.6	155.2	0 31.1	−57.8	155.2	0 23.4	+57.9	24.8	1 17.8	+58.0	24.8	2 12.3	+58.1	24.8	3 06.7	+58.2	24.9	30
31	2 17.0	−57.4	155.4	1 22.5	−57.5	155.4	0 27.9	−57.6	155.5	0 26.7	+57.7	24.6	1 21.3	+57.8	24.6	2 15.8	+58.0	24.6	3 10.4	+58.1	24.6	4 04.9	+58.2	24.6	31
32	1 19.6	−57.3	155.7	0 25.0	−57.6	155.7	0 29.7	+57.7	24.3	1 24.4	+57.8	24.3	2 19.1	+57.9	24.3	3 13.8	+58.0	24.3	4 08.5	+58.1	24.3	5 03.1	+58.2	24.4	32
33	0 22.3	−57.4	156.0	0 32.6	+57.5	24.0	1 27.4	+57.6	24.0	2 22.2	+57.7	24.0	3 17.0	+57.8	24.0	4 11.8	+58.0	24.1	5 06.6	+58.0	24.1	6 01.3	+58.2	24.1	33
34	0 35.1	+57.4	23.7	1 30.1	+57.5	23.7	2 25.0	+57.6	23.7	3 19.9	+57.8	23.7	4 14.8	+57.9	23.8	5 09.8	+57.9	23.8	6 04.6	+58.1	23.8	6 59.5	+58.2	23.9	34
35	1 32.5	+57.4	23.4	2 27.6	+57.5	23.4	3 22.6	+57.7	23.4	4 17.7	+57.7	23.5	5 12.7	+57.9	23.5	6 07.7	+58.0	23.5	7 02.7	+58.1	23.6	7 57.7	+58.2	23.6	35
36	2 29.9	+57.4	23.1	3 25.1	+57.5	23.1	4 20.3	+57.6	23.2	5 15.4	+57.7	23.2	6 10.6	+57.8	23.2	7 05.7	+57.9	23.3	8 00.8	+58.0	23.3	8 55.9	+58.1	23.4	36
37	3 27.3	+57.4	22.8	4 22.6	+57.5	22.8	5 17.9	+57.6	22.9	6 13.1	+57.8	22.9	7 08.4	+57.8	23.0	8 03.6	+58.0	23.0	8 58.8	+58.1	23.1	9 54.0	+58.2	23.1	37
38	4 24.7	+57.4	22.5	5 20.1	+57.5	22.6	6 15.5	+57.6	22.6	7 10.9	+57.7	22.6	8 06.2	+57.8	22.7	9 01.6	+57.9	22.8	9 56.9	+58.0	22.8	10 52.2	+58.1	22.9	38
39	5 22.0	+57.4	22.2	6 17.6	+57.4	22.3	7 13.1	+57.6	22.3	8 08.6	+57.7	22.4	9 04.0	+57.9	22.4	9 59.5	+57.9	22.5	10 54.9	+58.0	22.6	11 50.3	+58.1	22.6	39
40	6 19.4	+57.3	21.9	7 15.0	+57.5	22.0	8 10.7	+57.5	22.0	9 06.3	+57.7	22.1	10 01.9	+57.8	22.2	10 57.4	+57.9	22.2	11 52.9	+58.0	22.3	12 48.4	+58.1	22.4	40
41	7 16.7	+57.3	21.6	8 12.5	+57.5	21.7	9 08.2	+57.6	21.8	10 04.0	+57.6	21.8	10 59.7	+57.7	21.9	11 55.3	+57.9	22.0	12 50.9	+58.0	22.0	13 46.5	+58.1	22.1	41
42	8 14.1	+57.3	21.3	9 10.0	+57.4	21.4	10 05.8	+57.6	21.5	11 01.6	+57.7	21.5	11 57.4	+57.8	21.6	12 53.2	+57.9	21.7	13 48.9	+58.0	21.8	14 44.6	+58.1	21.9	42
43	9 11.4	+57.3	21.0	10 07.4	+57.4	21.1	11 03.4	+57.5	21.2	11 59.3	+57.6	21.3	12 55.2	+57.7	21.3	13 51.1	+57.8	21.4	14 46.9	+58.0	21.5	15 42.7	+58.1	21.6	43
44	10 08.7	+57.3	20.7	11 04.8	+57.4	20.8	12 00.9	+57.5	20.9	12 56.9	+57.7	21.0	13 52.9	+57.8	21.1	14 48.9	+57.9	21.1	15 44.9	+57.9	21.2	16 40.8	+58.1	21.3	44
45	11 06.0	+57.3	20.4	12 02.2	+57.4	20.5	12 58.4	+57.5	20.6	13 54.6	+57.6	20.7	14 50.7	+57.7	20.8	15 46.8	+57.8	20.9	16 42.8	+57.9	21.0	17 38.8	+58.0	21.1	45
46	12 03.3	+57.3	20.1	12 59.6	+57.4	20.2	13 55.9	+57.5	20.3	14 52.2	+57.5	20.4	15 48.4	+57.7	20.5	16 44.6	+57.8	20.6	17 40.7	+57.9	20.7	18 36.8	+58.0	20.8	46
47	13 00.6	+57.2	19.8	13 57.0	+57.3	19.9	14 53.4	+57.4	20.0	15 49.7	+57.6	20.1	16 46.1	+57.6	20.2	17 42.4	+57.7	20.3	18 38.6	+57.9	20.4	19 34.8	+58.0	20.5	47
48	13 57.8	+57.2	19.5	14 54.3	+57.3	19.6	15 50.8	+57.5	19.7	16 47.3	+57.5	19.8	17 43.7	+57.7	19.9	18 40.1	+57.8	20.0	19 36.5	+57.8	20.1	20 32.8	+57.9	20.3	48
49	14 55.0	+57.2	19.2	15 51.6	+57.3	19.3	16 48.3	+57.4	19.4	17 44.8	+57.5	19.5	18 41.4	+57.6	19.6	19 37.9	+57.7	19.7	20 34.3	+57.8	19.9	21 30.7	+57.9	20.0	49
50	15 52.2	+57.2	18.9	16 48.9	+57.3	19.0	17 45.7	+57.3	19.1	18 42.3	+57.5	19.2	19 39.0	+57.5	19.3	20 35.6	+57.7	19.4	21 32.1	+57.9	19.6	22 28.6	+57.9	19.7	50
51	16 49.4	+57.1	18.6	17 46.2	+57.2	18.7	18 43.0	+57.4	18.8	19 39.8	+57.5	18.9	20 36.5	+57.6	19.0	21 33.3	+57.6	19.1	22 29.9	+57.7	19.3	23 26.5	+57.9	19.4	51
52	17 46.5	+57.1	18.3	18 43.4	+57.2	18.4	19 40.4	+57.3	18.5	20 37.3	+57.4	18.6	21 34.1	+57.5	18.7	22 30.9	+57.6	18.9	23 27.7	+57.7	19.0	24 24.4	+57.8	19.1	52
53	18 43.6	+57.1	17.9	19 40.6	+57.2	18.1	20 37.7	+57.2	18.2	21 34.7	+57.3	18.3	22 31.6	+57.5	18.4	23 28.5	+57.6	18.5	24 25.4	+57.7	18.7	25 22.2	+57.8	18.8	53
54	19 40.6	+57.1	17.6	20 37.8	+57.1	17.7	21 34.9	+57.2	17.8	22 32.0	+57.4	18.0	23 29.1	+57.4	18.1	24 26.1	+57.5	18.2	25 23.1	+57.6	18.4	26 20.0	+57.7	18.5	54
55	20 37.7	+57.0	17.3	21 34.9	+57.1	17.4	22 32.2	+57.2	17.5	23 29.4	+57.3	17.6	24 26.5	+57.4	17.8	25 23.6	+57.5	17.9	26 20.7	+57.6	18.1	27 17.7	+57.7	18.2	55
56	21 34.7	+56.9	16.9	22 32.0	+57.1	17.1	23 29.4	+57.1	17.2	24 26.7	+57.2	17.3	25 23.9	+57.4	17.5	26 21.1	+57.5	17.6	27 18.3	+57.6	17.8	28 15.4	+57.7	17.9	56
57	22 31.6	+56.9	16.6	23 29.1	+57.0	16.7	24 26.5	+57.1	16.9	25 23.9	+57.2	17.0	26 21.3	+57.3	17.1	27 18.6	+57.5	17.3	28 15.9	+57.5	17.4	29 13.1	+57.6	17.6	57
58	23 28.5	+56.9	16.3	24 26.1	+57.0	16.4	25 23.6	+57.1	16.5	26 21.1	+57.2	16.7	27 18.6	+57.3	16.8	28 16.0	+57.4	17.0	29 13.4	+57.4	17.1	30 10.7	+57.6	17.3	58
59	24 25.4	+56.8	15.9	25 23.1	+56.9	16.0	26 20.7	+57.0	16.2	27 18.3	+57.1	16.3	28 15.9	+57.2	16.4	29 13.4	+57.3	16.6	30 10.8	+57.5	16.8	31 08.3	+57.5	17.0	59
60	25 22.2	+56.7	15.6	26 20.0	+56.8	15.7	27 17.7	+57.0	16.0	28 15.4	+57.1	16.0	29 13.1	+57.1	16.1	30 10.7	+57.3	16.3	31 08.3	+57.3	16.5	32 05.8	+57.4	16.6	60
61	26 18.9	+56.8	15.2	27 16.8	+56.8	15.3	28 14.7	+56.9	15.5	29 12.5	+57.0	15.6	30 10.2	+57.1	15.8	31 08.0	+57.2	15.9	32 05.6	+57.3	16.1	33 03.2	+57.5	16.3	61
62	27 15.7	+56.6	14.8	28 13.6	+56.8	15.0	29 11.6	+56.8	15.1	30 09.5	+56.9	15.3	31 07.3	+57.1	15.4	32 05.2	+57.1	15.6	33 02.9	+57.3	15.8	34 00.7	+57.3	15.9	62
63	28 12.3	+56.6	14.5	29 10.4	+56.7	14.6	30 08.4	+56.8	14.7	31 06.4	+56.9	14.9	32 04.4	+57.0	15.1	33 02.3	+57.1	15.2	34 00.2	+57.2	15.4	34 58.0	+57.3	15.6	63
64	29 08.9	+56.5	14.1	30 07.1	+56.6	14.2	31 05.2	+56.7	14.4	32 03.3	+56.8	14.5	33 01.4	+56.9	14.7	33 59.4	+57.0	14.9	34 57.4	+57.1	15.0	35 55.3	+57.2	15.2	64
65	30 05.4	+56.5	13.7	31 03.7	+56.5	13.8	32 01.9	+56.7	14.0	33 00.1	+56.8	14.1	33 58.3	+56.8	14.3	34 56.4	+56.9	14.5	35 54.5	+57.0	14.7	36 52.5	+57.1	14.8	65
66	31 01.9	+56.3	13.3	32 00.2	+56.5	13.4	32 58.6	+56.5	13.6	33 56.9	+56.6	13.8	34 55.1	+56.8	13.9	35 53.3	+56.9	14.1	36 51.5	+57.0	14.3	37 49.6	+57.1	14.5	66
67	31 58.2	+56.3	12.9	32 56.7	+56.4	13.0	33 55.1	+56.5	13.2	34 53.5	+56.6	13.4	35 51.9	+56.7	13.5	36 50.2	+56.8	13.7	37 48.5	+56.9	13.9	38 46.7	+57.0	14.1	67
68	32 54.5	+56.3	12.5	33 53.1	+56.3	12.6	34 51.6	+56.4	12.8	35 50.1	+56.5	12.9	36 48.6	+56.6	13.1	37 47.0	+56.7	13.3	38 45.4	+56.8	13.5	39 43.7	+56.9	13.7	68
69	33 50.8	+56.1	12.1	34 49.4	+56.2	12.2	35 48.0	+56.3	12.3	36 46.6	+56.4	12.5	37 45.2	+56.5	12.7	38 43.7	+56.6	12.9	39 42.2	+56.7	13.1	40 40.6	+56.8	13.2	69
70	34 46.9	+56.0	11.6	35 45.6	+56.2	11.8	36 44.3	+56.3	11.9	37 43.0	+56.4	12.1	38 41.7	+56.4	12.3	39 40.3	+56.5	12.4	40 38.9	+56.6	12.6	41 37.4	+56.7	12.8	70
71	35 42.9	+56.0	11.2	36 41.8	+56.0	11.4	37 40.6	+56.1	11.5	38 39.4	+56.2	11.7	39 38.1	+56.3	11.8	40 36.8	+56.4	12.0	41 35.5	+56.5	12.2	42 34.1	+56.6	12.4	71
72	36 38.9	+55.8	10.8	37 37.8	+55.9	10.9	38 36.7	+56.0	11.1	39 35.6	+56.1	11.2	40 34.4	+56.2	11.4	41 33.2	+56.3	11.5	42 32.0	+56.4	11.7	43 30.7	+56.4	11.9	72
73	37 34.7	+55.7	10.3	38 33.7	+55.8	10.4	39 32.7	+55.9	10.6	40 31.7	+56.0	10.7	41 30.6	+56.1	10.9	42 29.5	+56.2	11.1	43 28.4	+56.2	11.3	44 27.2	+56.4	11.5	73
74	38 30.4	+55.6	9.8	39 29.5	+55.7	10.0	40 28.6	+55.8	10.1	41 27.7	+55.8	10.3	42 26.7	+56.0	10.4	43 25.7	+56.0	10.6	44 24.6	+56.2	10.8	45 23.6	+56.2	11.0	74
75	39 26.0	+55.5	9.3	40 25.2	+55.6	9.5	41 24.4	+55.7	9.6	42 23.5	+55.8	9.8	43 22.7	+55.8	9.9	44 21.7	+56.0	10.1	45 20.8	+56.0	10.3	46 19.8	+56.1	10.5	75
76	40 21.5	+55.4	8.9	41 20.8	+55.5	9.0	42 20.1	+55.5	9.1	43 19.3	+55.6	9.3	44 18.5	+55.7	9.4	45 17.7	+55.8	9.6	46 16.8	+55.9	9.8	47 15.9	+56.0	10.0	76
77	41 16.9	+55.2	8.3	42 16.3	+55.3	8.5	43 15.6	+55.4	8.6	44 14.9	+55.5	8.8	45 14.2	+55.5	8.9	46 13.5	+55.6	9.1	47 12.7	+55.7	9.2	48 11.9	+55.8	9.4	77
78	42 12.1	+55.1	7.8	43 11.6	+55.1	7.9	44 11.0	+55.2	8.1	45 10.4	+55.3	8.2	46 09.7	+55.4	8.4	47 09.1	+55.5	8.5	48 08.4	+55.6	8.7	49 07.7	+55.7	8.9	78
79	43 07.2	+54.9	7.3	44 06.7	+55.0	7.4	45 06.2	+55.1	7.5	46 05.7	+55.1	7.7	47 05.1	+55.2	7.8	48 04.6	+55.3	8.0	49 04.0	+55.4	8.1	50 03.4	+55.4	8.3	79
80	44 02.1	+54.8	6.7	45 01.7	+54.8	6.8	46 01.3	+54.9	7.0	47 00.8	+55.0	7.1	48 00.3	+55.1	7.2	48 59.9	+55.1	7.4	49 59.4	+55.1	7.5	50 58.8	+55.3	7.7	80
81	44 56.9	+54.5	6.2	45 56.5	+54.7	6.3	46 56.2	+54.7	6.4	47 55.8	+54.7	6.5	48 55.4	+54.8	6.6	49 55.0	+54.9	6.8	50 54.6	+55.0	6.9	51 54.1	+55.0	7.1	81
82	45 51.4	+54.4	5.6	46 51.2	+54.5	5.7	47 50.9	+54.5	5.8	48 50.5	+54.6	5.9	49 50.2	+54.7	6.0	50 49.9	+54.7	6.1	51 49.5	+54.8	6.3	52 49.2	+54.8	6.4	82
83	46 45.8	+54.2	4.9	47 45.6	+54.2	5.0	48 45.4	+54.3	5.1	49 45.1	+54.4	5.2	50 44.9	+54.4	5.4	51 44.6	+54.5	5.5	52 44.3	+54.6	5.6	53 44.0	+54.6	5.7	83
84	47 40.0	+54.0	4.2	48 39.8	+54.0	4.3	49 39.7	+54.0	4.5	50 39.5	+54.1	4.6	51 39.3	+54.1	4.7	52 39.1	+54.2	4.8	53 38.9	+54.2	4.9	54 38.6	+54.4	5.0	84
85	48 34.0	+53.7	3.7	49 33.8	+53.8	3.7	50 33.7	+53.8	3.8	51 33.6	+53.8	3.9	52 33.4	+54.0	4.0	53 33.3	+54.0	4.1	54 33.1	+54.1	4.2	55 33.0	+54.0	4.3	85
86	49 27.7	+53.5	3.0	50 27.6	+53.5	3.0	51 27.5	+53.6	3.1	52 27.4	+53.6	3.2	53 27.4	+53.6	3.3	54 27.3	+53.6	3.3	55 27.2	+53.7	3.4	56 27.0	+53.8	3.5	86
87	50 21.2	+53.2	2.3	51 21.1	+53.3	2.4	52 21.1	+53.3	2.4	53 21.0	+53.4	2.4	54 21.0	+53.4	2.5	55 20.9	+53.4	2.5	56 20.9	+53.4	2.6	57 20.8	+53.4	2.7	87
88	51 14.4	+53.0	1.5	52 14.4	+53.0	1.6	53 14.4	+53.0	1.6	54 14.4	+52.9	1.7	55 14.3	+53.0	1.7	56 14.3	+53.0	1.7	57 14.3	+53.0	1.8	58 14.2	+53.1	1.8	88
89	52 07.4	+52.6	0.8	53 07.4	+52.6	0.8	54 07.4	+52.6	0.8	55 07.3	+52.7	0.8	56 07.3	+52.7	0.9	57 07.3	+52.7	0.9	58 07.3	+52.7	0.9	59 07.3	+52.7	0.9	89
90	53 00.0	+52.3	0.0	54 00.0	+52.3	0.0	55 00.0	+52.3	0.0	56 00.0	+52.3	0.0	57 00.0	+52.3	0.0	58 00.0	+52.3	0.0	59 00.0	+52.3	0.0	60 00.0	+52.3	0.0	90

30°, 330° L.H.A.   LATITUDE SAME NAME AS DECLINATION

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	31 24.7	+56.1	144.1	30 36.0	+56.3	144.5	29 47.0	+56.6	144.8	28 57.9	+56.8	145.1	28 08.6	+57.0	145.5	27 19.1	+57.2	145.8	26 29.4	+57.4	146.0	25 39.5	+57.7	146.3	0
1	32 20.8	+56.0	143.7	31 32.3	+56.3	144.1	30 43.6	+56.6	144.4	29 54.7	+56.8	144.8	29 05.6	+57.0	145.1	28 16.3	+57.2	145.4	27 26.8	+57.5	145.7	26 37.2	+57.5	146.0	1
2	33 16.8	+56.0	143.3	32 28.6	+56.2	143.7	31 40.2	+56.4	144.0	30 51.5	+56.7	144.4	30 02.6	+56.9	144.7	29 13.5	+57.1	145.1	28 24.2	+57.4	145.4	27 34.7	+57.6	145.7	2
3	34 12.8	+55.8	142.9	33 24.8	+56.1	143.3	32 36.6	+56.4	143.6	31 48.2	+56.6	144.0	30 59.5	+56.9	144.4	30 10.6	+57.1	144.7	29 21.6	+57.3	145.0	28 32.3	+57.5	145.4	3
4	35 08.6	+55.8	142.4	34 20.9	+56.1	142.8	33 33.0	+56.3	143.2	32 44.8	+56.6	143.6	31 56.4	+56.8	144.0	31 07.7	+57.0	144.4	30 18.9	+57.2	144.7	29 29.8	+57.4	145.0	4
5	36 04.4	+55.6	142.0	35 17.0	+55.9	142.4	34 29.3	+56.2	142.8	33 41.4	+56.4	143.2	32 53.2	+56.7	143.6	32 04.7	+57.0	144.0	31 16.1	+57.2	144.4	30 27.2	+57.4	144.7	5
6	37 00.0	+55.5	141.5	36 12.9	+55.8	142.0	35 25.5	+56.1	142.4	34 37.8	+56.4	142.8	33 49.9	+56.6	143.2	33 01.7	+56.9	143.6	32 13.3	+57.1	144.0	31 24.6	+57.4	144.4	6
7	37 55.5	+55.4	141.1	37 08.7	+55.7	141.5	36 21.6	+56.0	142.0	35 34.2	+56.3	142.4	34 46.5	+56.6	142.8	33 58.6	+56.8	143.2	33 10.4	+57.1	143.6	32 22.0	+57.3	144.0	7
8	38 50.9	+55.3	140.5	38 04.4	+55.6	141.0	37 17.6	+55.9	141.5	36 30.5	+56.2	142.0	35 43.1	+56.5	142.4	34 55.4	+56.8	142.9	34 07.5	+56.9	143.3	33 19.2	+57.3	143.7	8
9	39 46.2	+55.1	140.0	39 00.0	+55.5	140.5	38 13.5	+55.8	141.1	37 26.7	+56.1	141.5	36 39.6	+56.4	142.0	35 52.2	+56.6	142.5	35 04.4	+57.0	142.9	34 16.5	+57.1	143.3	9
10	40 41.3	+54.9	139.6	39 55.5	+55.4	140.1	39 09.3	+55.7	140.6	38 22.8	+56.0	141.1	37 36.0	+56.3	141.6	36 48.8	+56.6	142.1	36 01.4	+56.8	142.5	35 13.6	+57.1	142.9	10
11	41 36.3	+54.9	139.0	40 50.9	+55.2	139.5	40 05.0	+55.6	140.1	39 18.8	+55.9	140.6	38 32.3	+56.2	141.1	37 45.4	+56.5	141.6	36 58.2	+56.8	142.1	36 10.7	+57.0	142.6	11
12	42 31.2	+54.7	138.4	41 46.1	+55.1	139.0	41 00.6	+55.4	139.6	40 14.7	+55.8	140.2	39 28.5	+56.1	140.7	38 41.9	+56.4	141.2	37 55.0	+56.6	141.7	37 07.7	+57.0	142.2	12
13	43 25.9	+54.5	137.9	42 41.2	+54.9	138.5	41 56.0	+55.3	139.1	41 10.5	+55.5	139.7	40 24.6	+55.9	140.2	39 38.3	+56.2	140.8	38 51.6	+56.5	141.3	38 04.7	+56.8	141.8	13
14	44 20.4	+54.3	137.3	43 36.1	+54.7	137.9	42 51.3	+55.2	138.6	42 06.1	+55.5	139.2	41 20.5	+55.9	139.7	40 34.5	+56.2	140.3	39 48.2	+56.5	140.8	39 01.5	+56.8	141.4	14
15	45 14.7	+54.2	136.7	44 30.8	+54.6	137.4	43 46.5	+54.9	138.0	43 01.6	+55.4	138.6	42 16.4	+55.7	139.3	41 30.7	+56.1	139.8	40 44.7	+56.4	140.4	39 58.3	+56.6	140.9	15
16	46 08.9	+53.9	136.1	45 25.4	+54.4	136.8	44 41.4	+54.9	137.5	43 57.0	+55.2	138.1	43 12.1	+55.6	138.7	42 26.8	+55.9	139.4	41 41.1	+56.2	139.9	40 54.9	+56.6	140.5	16
17	47 02.8	+53.7	135.4	46 19.8	+54.2	136.2	45 36.3	+54.6	136.9	44 52.2	+55.1	137.6	44 07.7	+55.4	138.2	43 22.7	+55.8	138.9	42 37.3	+56.2	139.5	41 51.5	+56.5	140.1	17
18	47 56.5	+53.5	134.8	47 14.0	+54.0	135.5	46 30.9	+54.4	136.3	45 47.3	+54.8	137.0	45 03.1	+55.3	137.7	44 18.5	+55.7	138.4	43 33.5	+56.0	139.0	42 48.0	+56.3	139.6	18
19	48 50.0	+53.3	134.1	48 08.0	+53.7	134.9	47 25.3	+54.3	135.7	46 42.1	+54.7	136.4	45 58.4	+55.1	137.1	45 14.2	+55.5	137.8	44 29.5	+55.9	138.5	43 44.3	+56.3	139.1	19
20	49 43.3	+52.9	133.4	49 01.7	+53.5	134.2	48 19.6	+54.0	135.0	47 36.8	+54.5	135.8	46 53.5	+55.0	136.6	46 09.7	+55.3	137.3	45 25.4	+55.7	138.0	44 40.6	+56.1	138.6	20
21	50 36.2	+52.7	132.7	49 55.2	+53.3	133.5	49 13.6	+53.8	134.4	48 31.3	+54.3	135.2	47 48.5	+54.7	136.0	47 05.1	+55.1	136.7	46 21.1	+55.6	137.4	45 36.7	+55.9	138.1	21
22	51 28.9	+52.4	131.9	50 48.5	+53.0	132.8	50 07.4	+53.5	133.7	49 25.6	+54.1	134.5	48 43.2	+54.6	135.3	48 00.2	+55.0	136.1	47 16.7	+55.4	136.8	46 32.6	+55.9	137.6	22
23	52 21.3	+52.0	131.1	51 41.5	+52.6	132.1	51 00.9	+53.3	133.0	50 19.7	+53.8	133.9	49 37.8	+54.3	134.7	48 55.2	+54.8	135.5	48 12.1	+55.3	136.3	47 28.5	+55.6	137.1	23
24	53 13.3	+51.7	130.3	52 34.1	+52.4	131.3	51 54.2	+53.0	132.2	51 13.5	+53.5	133.2	50 32.1	+54.1	134.1	49 50.0	+54.6	134.9	49 07.4	+55.0	135.7	48 24.1	+55.5	136.5	24
25	54 05.0	+51.3	129.4	53 26.5	+52.0	130.5	52 47.2	+52.6	131.5	52 07.0	+53.3	132.4	51 26.2	+53.8	133.4	50 44.6	+54.3	134.3	50 02.4	+54.9	135.1	49 19.6	+55.3	135.9	25
26	54 56.3	+50.9	128.5	54 18.5	+51.6	129.6	53 39.8	+52.3	130.7	53 00.3	+53.0	131.7	52 20.0	+53.6	132.7	51 39.0	+54.1	133.6	50 57.3	+54.6	134.5	50 14.9	+55.2	135.3	26
27	55 47.2	+50.5	127.6	55 10.1	+51.3	128.7	54 32.1	+52.0	129.8	53 53.3	+52.6	130.9	53 13.6	+53.3	131.9	52 33.1	+53.9	132.9	51 51.9	+54.5	133.8	51 10.1	+54.9	134.7	27
28	56 37.7	+50.0	126.6	56 01.4	+50.8	127.8	55 24.1	+51.6	129.0	54 45.9	+52.3	130.1	54 06.9	+53.0	131.1	53 27.0	+53.6	132.2	52 46.4	+54.1	133.1	52 05.0	+54.7	134.0	28
29	57 27.7	+49.4	125.6	56 52.2	+50.4	126.9	56 15.7	+51.2	128.1	55 38.2	+52.0	129.2	54 59.9	+52.6	130.3	54 20.6	+53.3	131.4	53 40.5	+53.9	132.4	52 59.7	+54.4	133.4	29
30	58 17.1	+48.9	124.5	57 42.6	+49.8	125.8	57 06.9	+50.7	127.1	56 30.2	+51.5	128.3	55 52.5	+52.3	129.5	55 13.9	+53.0	130.6	54 34.4	+53.6	131.7	53 54.1	+54.2	132.7	30
31	59 06.0	+48.4	123.4	58 32.4	+49.3	124.8	57 57.6	+50.2	126.1	57 21.7	+51.1	127.4	56 44.8	+51.8	128.6	56 06.9	+52.6	129.8	55 28.0	+53.3	130.9	54 48.3	+53.9	132.0	31
32	59 54.4	+47.6	122.3	59 21.7	+48.7	123.7	58 47.8	+49.7	125.1	58 12.8	+50.6	126.4	57 36.6	+51.5	127.7	56 59.5	+52.2	128.9	56 21.3	+53.0	130.1	55 42.2	+53.7	131.2	32
33	60 42.0	+47.0	121.0	60 10.4	+48.1	122.5	59 37.5	+49.1	124.0	59 03.4	+50.1	125.4	58 28.1	+51.0	126.7	57 51.7	+51.8	128.0	57 14.3	+52.6	129.2	56 35.9	+53.3	130.4	33
34	61 29.0	+46.2	119.7	60 58.5	+47.4	121.3	60 26.6	+48.5	122.8	59 53.5	+49.5	124.3	59 19.1	+50.5	125.7	58 43.5	+51.4	127.0	58 06.9	+52.1	128.3	57 29.2	+52.9	129.5	34
35	62 15.2	+45.3	118.4	61 45.9	+46.6	120.0	61 15.1	+47.8	121.6	60 43.0	+48.9	123.1	60 09.6	+49.9	124.6	59 34.9	+50.9	126.0	58 59.0	+51.8	127.4	58 22.1	+52.5	128.7	35
36	63 00.5	+44.5	117.0	62 32.5	+45.8	118.7	62 02.9	+47.1	120.3	61 31.9	+48.3	121.9	60 59.5	+49.3	123.5	60 25.8	+50.3	124.9	59 50.8	+51.3	126.4	59 14.6	+52.2	127.7	36
37	63 45.0	+43.4	115.5	63 18.3	+44.9	117.3	62 50.0	+46.3	119.0	62 20.2	+47.5	120.7	61 48.8	+48.7	122.3	61 16.1	+49.8	123.8	60 42.1	+50.7	125.3	60 06.8	+51.6	126.7	37
38	64 28.4	+42.4	113.9	64 03.2	+44.0	115.8	63 36.3	+45.4	117.6	63 07.7	+46.7	119.3	62 37.5	+48.0	121.0	62 05.9	+49.1	122.7	61 32.8	+50.2	124.2	60 58.4	+51.2	125.7	38
39	65 10.8	+41.3	112.2	64 47.2	+42.9	114.2	64 21.7	+44.4	116.1	63 54.4	+45.9	117.9	63 25.5	+47.2	119.7	62 55.0	+48.4	121.4	62 23.0	+49.6	123.0	61 49.6	+50.6	124.6	39
40	65 52.1	+39.9	110.5	65 30.1	+41.7	112.5	65 06.1	+43.4	114.5	64 40.3	+44.9	116.5	64 12.7	+46.4	118.3	63 43.4	+47.7	120.1	63 12.6	+48.9	121.8	62 40.2	+50.0	123.5	40
41	66 32.0	+38.6	108.6	66 11.8	+40.5	110.7	65 49.5	+42.3	112.9	65 25.2	+43.9	114.9	64 59.1	+45.4	116.8	64 31.1	+46.8	118.7	64 01.5	+48.1	120.5	63 30.2	+49.4	122.2	41
42	67 10.6	+37.1	106.7	66 52.3	+39.1	108.9	66 31.8	+40.9	111.1	66 09.1	+42.8	113.2	65 44.5	+44.4	115.3	65 17.9	+46.0	117.2	64 49.6	+47.3	119.1	64 19.6	+48.6	120.9	42
43	67 47.7	+35.5	104.6	67 31.4	+37.6	107.0	67 12.7	+39.7	109.2	66 51.9	+41.5	111.5	66 28.9	+43.3	113.6	66 03.9	+44.9	115.7	65 36.9	+46.5	117.7	65 08.2	+47.8	119.6	43
44	68 23.2	+33.7	102.5	68 09.0	+36.0	104.9	67 52.4	+38.1	107.3	67 33.4	+40.1	109.6	67 12.2	+42.0	111.8	66 48.8	+43.8	114.0	66 23.4	+45.4	116.1	65 56.0	+47.0	118.1	44
45	68 56.9	+31.8•	100.2	68 45.0	+34.2	102.7	68 30.5	+36.5	105.2	68 13.5	+38.7	107.6	67 54.2	+40.7	110.0	67 32.6	+42.6	112.2	67 08.8	+44.4	114.4	66 43.0	+45.9	116.6	45
46	69 28.7	+29.7•	97.8	69 19.2	+32.3•	100.4	69 07.0	+34.7	103.0	68 52.2	+37.0	105.5	68 34.9	+39.2	108.0	68 15.2	+41.2	110.4	67 53.2	+43.1	112.7	67 28.9	+44.9	114.9	46
47	69 58.4	+27.5•	95.3	69 51.5	+30.2•	98.0	69 41.7	+32.8•	100.7	69 29.2	+35.3	103.3	69 14.1	+37.6	105.9	68 56.4	+39.8	108.4	68 36.3	+41.8	110.8	68 13.8	+43.7	113.2	47
48	70 25.9	+25.1•	92.7	70 21.7	+27.9•	95.5	70 14.5	+30.7•	98.2	70 04.5	+33.3•	101.0	69 51.7	+35.8	103.7	69 36.2	+38.1	106.3	69 18.1	+40.4	108.8	68 57.5	+42.4	111.3	48
49	70 51.0	+22.6•	89.9	70 49.6	+25.6•	92.8	70 45.2	+28.4•	95.7	70 37.8	+31.2•	98.5	70 27.5	+33.8•	101.3	70 14.3	+36.4	104.0	69 58.5	+38.7	106.7	69 39.9	+40.9	109.3	49
50	71 13.6	+19.9•	87.1	71 15.2	+22.9•	90.0	71 13.6	+26.0•	93.0	71 09.0	+28.9•	95.9	71 01.3	+31.7•	98.8	70 50.7	+34.4•	101.6	70 37.2	+36.9	104.4	70 20.8	+39.3	107.1	50
51	71 33.5	+17.1•	84.1	71 38.1	+20.3•	87.1	71 39.6	+23.3•	90.1	71 37.9	+26.4•	93.1	71 33.0	+29.4•	96.1	71 25.1	+32.2•	99.1	71 14.1	+34.9•	102.0	71 00.1	+37.5	104.8	51
52	71 50.6	+14.1•	81.1	71 58.4	+17.3•	84.1	72 02.9	+20.6•	87.2	72 04.3	+23.7•	90.3	72 02.4	+26.8•	93.3	71 57.3	+29.9•	96.4	71 49.0	+32.8•	99.4	71 37.6	+35.6•	102.4	52
53	72 04.7	+11.0•	77.9	72 15.7	+14.3•	81.1	72 23.5	+17.5•	84.1	72 28.0	+20.9•	87.2	72 29.2	+24.2•	90.4	72 27.2	+27.3•	93.6	72 21.8	+30.4•	96.7	72 13.2	+33.4•	99.8	53
54	72 15.7	+7.8•	74.7	72 30.0	+11.1•	77.8	72 41.0	+14.4•	80.9	72 48.9	+17.8•	84.1	72 53.4	+21.2•	87.3	72 54.5	+24.5•	90.6	72 52.2	+27.8•	93.8	72 46.5	+30.9•	97.0	54
55	72 23.5	+4.5•	71.4	72 41.1	+7.8•	74.5	72 55.5	+11.2•	77.6	73 06.7	+14.7•	80.8	73 14.6	+18.1•	84.1	73 19.0	+21.6•	87.4	73 20.0	+24.9•	90.8	73 17.4	+28.3•	94.1	55
56	72 28.0	+1.2•	68.1	72 48.9	+4.5•	71.1	73 06.7	+7.9•	74.3	73 21.4	+11.3•	77.5	73 32.7	+14.9•	80.8	73 40.6	+18.4•	84.2	73 44.9	+22.0•	87.6	73 45.7	+25.4•	91.0	56
57	72 29.2	−2.0•	64.8	72 53.4	+1.1•	67.8	73 14.6	+4.4•	70.8	73 32.7	+7.9•	74.0	73 47.6	+11.4•	77.3	73 59.0	+15.0•	80.7	74 06.9	+18.6•	84.2	74 11.1	+22.3•	87.7	57
58	72 27.2	−5.4•	61.5	72 54.5	−2.3•	64.4	73 19.0	+1.0•	67.4	73 40.6	+4.3•	70.5	73 59.0	+7.9•	73.8	74 14.0	+11.5•	77.2	74 25.5	+15.2•	80.7	74 33.4	+18.9•	84.3	58
59	72 21.8	−8.6•	58.2	72 52.2	−5.7•	61.0	73 20.0	−2.6•	63.9	73 44.9	+0.8•	67.0	74 06.9	+4.2•	70.2	74 25.5	+7.9•	73.6	74 40.7	+11.6•	77.1	74 52.3	+15.4•	80.7	59
60	72 13.2	−11.8•	55.0	72 46.5	−9.0•	57.8	73 17.4	−6.0•	60.4	73 45.7	−2.9•	63.4	74 11.1	+0.5•	66.5	74 33.4	+4.1•	69.9	74 52.3	+7.9•	73.3	75 07.7	+11.7•	76.9	60
61	72 01.4	−14.9•	51.8	72 37.5	−12.3•	54.3	73 11.4	−9.5•	56.9	73 42.8	−6.4•	59.8	74 11.6	−3.1•	62.9	74 37.5	+0.3•	66.1	75 00.2	+3.9•	69.5	75 19.4	+7.8•	73.1	61
62	71 46.5	−17.8•	48.8	72 25.2	−15.4•	51.0	73 01.9	−12.7•	53.5	73 36.4	−9.8•	56.3	74 08.5	−6.8•	59.2	74 37.8	−3.5•	62.3	75 04.1	+0.1•	65.6	75 27.2	+3.8•	69.2	62
63	71 28.7	−20.6•	45.6	72 09.8	−18.3•	47.8	72 49.2	−15.9•	50.2	73 26.6	−13.3•	52.8	74 01.7	−10.4•	55.6	74 34.3	−7.3•	58.6	75 04.2	−3.9•	61.8	75 31.0	−0.3•	65.2	63
64	71 08.1	−23.3•	42.7	71 51.5	−21.3•	44.7	72 33.3	−19.0•	47.0	73 13.3	−16.6•	49.4	73 51.3	−13.9•	52.0	74 27.0	−10.9•	54.8	75 00.3	−7.8•	57.9	75 30.7	−4.3•	61.2	64
65	70 44.8	−25.7•	39.9	71 30.2	−23.9•	41.8	72 14.3	−21.9•	43.8	72 56.7	−19.6•	46.1	73 37.4	−17.2•	48.5	74 16.1	−14.5•	51.2	74 52.5	−11.5•	54.1	75 26.4	−8.3•	57.2	65
66	70 19.1	−28.1•	37.1	71 06.3	−26.4•	38.9	71 52.4	−24.6•	40.8	72 37.1	−22.6•	42.9	73 20.2	−20.3•	45.2	74 01.6	−17.8•	47.6	74 41.0	−15.2•	50.3	75 18.1	−12.2•	53.3	66
67	69 51.0	−30.3•	34.5	70 39.9	−28.8•	36.2	71 27.8	−27.1•	37.9	72 14.5	−25.3•	39.8	72 59.9	−23.3•	41.9	73 43.8	−21.1•	44.2	74 25.8	−18.6•	46.7	75 05.9	−15.8•	49.4	67
68	69 20.7	−32.3•	32.1	70 11.1	−30.9•	33.5	71 00.7	−29.5•	35.1	71 49.2	−27.9•	36.9	72 36.6	−26.1•	38.8	73 22.7	−24.1•	40.9	74 07.2	−21.8•	43.2	74 50.1	−19.4•	45.7	68
69	68 48.4	−34.2	29.7	69 40.2	−33.0•	31.0	70 31.2	−31.7•	32.5	71 21.3	−30.2•	34.1	72 10.5	−28.6•	35.8	72 58.6	−26.9•	37.7	73 45.4	−24.9•	39.8	74 30.7	−22.7•	42.1	69
70	68 14.2	−35.8	27.5	69 07.2	−34.9	28.7	69 59.5	−33.7	30.0	70 51.1	−32.4•	31.4	71 41.9	−31.1•	33.0	72 31.7	−29.5•	34.7	73 20.5	−27.9•	36.6	74 08.0	−25.8•	38.7	70
71	67 38.4	−37.5	25.3	68 32.3	−36.5	26.4	69 25.8	−35.5	27.6	70 18.7	−34.5	28.9	71 10.8	−33.2•	30.3	72 02.2	−31.8•	31.9	72 52.7	−30.3•	33.6	73 42.2	−28.7•	35.5	71
72	67 00.9	−39.0	23.3	67 55.8	−38.2	24.3	68 50.2	−37.2	25.3	69 44.2	−36.3	26.5	70 37.6	−35.2	27.8	71 30.4	−34.1•	29.1	72 22.4	−32.8•	30.7	73 13.5	−31.2•	32.4	72
73	66 21.9	−40.3	21.4	67 17.6	−39.6	22.3	68 13.0	−38.9	23.2	69 07.9	−38.0	24.2	70 02.4	−37.1	25.4	70 56.3	−36.0	26.6	71 49.6	−34.9•	28.0	72 42.3	−33.6•	29.5	73
74	65 41.6	−41.5	19.6	66 38.0	−40.9	20.3	67 34.1	−40.3	21.2	68 29.9	−39.6	22.1	69 25.3	−38.8	23.1	70 20.3	−37.9	24.2	71 14.7	−36.8	25.4	72 08.7	−35.8•	26.7	74
75	65 00.1	−42.7	17.8	65 57.1	−42.2	18.5	66 53.8	−41.5	19.3	67 50.3	−40.9	20.1	68 46.5	−40.2	20.8	69 42.4	−39.5	21.9	70 37.9	−38.7	23.0	71 32.9	−37.8	24.1	75
76	64 17.4	−43.7	16.2	65 14.9	−43.3	16.8	66 12.3	−42.8	17.4	67 09.4	−42.3	18.2	68 06.3	−41.7	18.9	69 02.9	−41.0	19.8	69 59.2	−40.3	20.7	70 55.1	−39.5	21.7	76
77	63 33.7	−44.7	14.6	64 31.6	−44.3	15.2	65 29.5	−43.9	15.7	66 27.1	−43.4	16.4	67 24.6	−42.9	17.0	68 21.9	−42.4	17.8	69 18.9	−41.8	18.6	70 15.6	−41.1	19.5	77
78	62 49.0	−45.6	13.2	63 47.3	−45.3	13.6	64 45.6	−44.9	14.1	65 43.7	−44.5	14.6	66 41.7	−44.1	15.2	67 39.5	−43.6	15.9	68 37.1	−43.1	16.6	69 34.5	−42.6	17.3	78
79	62 03.4	−46.4	11.7	63 02.1	−46.1	12.1	64 00.7	−45.8	12.6	64 59.2	−45.5	13.0	65 57.6	−45.1	13.5	66 55.9	−44.8	14.1	67 54.0	−44.3	14.7	68 51.9	−43.8	15.3	79
80	61 17.0	−47.1	10.4	62 16.0	−46.9	10.8	63 14.9	−46.7	11.1	64 13.7	−46.4	11.5	65 12.5	−46.1	11.9	66 11.1	−45.8	12.4	67 09.7	−45.5	12.9	68 08.1	−45.1	13.5	80
81	60 29.9	−47.9	9.1	61 29.1	−47.7	9.4	62 28.2	−47.5	9.7	63 27.3	−47.2	10.1	64 26.4	−47.0	10.4	65 25.3	−46.7	10.8	66 23.9	−46.4	11.3	67 23.0	−46.1	11.7	81
82	59 42.0	−48.7	7.9	60 41.4	−48.3	8.2	61 40.8	−48.1	8.4	62 40.1	−47.9	8.7	63 39.4	−47.7	9.0	64 38.6	−47.5	9.4	65 37.8	−47.3	9.7	66 36.9	−47.0	10.1	82
83	58 53.5	−49.0	6.8	59 53.1	−48.9	7.0	60 52.7	−48.8	7.2	61 52.2	−48.7	7.4	62 51.7	−48.5	7.7	63 51.1	−48.3	7.9	64 50.5	−48.1	8.2	65 49.9	−48.0	8.6	83
84	58 04.5	−49.6	5.7	59 04.2	−49.5	5.8	60 03.9	−49.4	6.0	61 03.5	−49.3	6.2	62 03.2	−49.0	6.4	63 02.8	−49.0	6.6	64 02.4	−48.9	6.9	65 01.9	−48.7	7.1	84
85	57 14.9	−50.1	4.6	58 14.7	−50.0	4.7	59 14.5	−50.0	4.9	60 14.2	−49.8	5.0	61 14.0	−49.8	5.2	62 13.8	−49.7	5.4	63 13.5	−49.6	5.6	64 13.2	−49.5	5.8	85
86	56 24.8	−50.6	3.6	57 24.7	−50.6	3.7	58 24.5	−50.4	3.8	59 24.4	−50.4	3.9	60 24.2	−50.3	4.0	61 24.1	−50.2	4.2	62 23.9	−50.2	4.3	63 23.7	−50.0	4.5	86
87	55 34.2	−51.0	2.7	56 34.1	−50.9	2.7	57 34.1	−51.0	2.8	58 34.0	−50.9	2.9	59 33.9	−50.9	2.9	60 33.8	−50.8	3.1	61 33.7	−50.7	3.2	62 33.7	−50.7	3.3	87
88	54 43.2	−51.4	1.7	55 43.2	−51.4	1.8	56 43.1	−51.3	1.8	57 43.1	−51.3	1.9	58 43.1	−51.3	1.9	59 43.0	−51.3	2.0	60 43.0	−51.3	2.0	61 43.0	−51.3	2.1	88
89	53 51.8	−51.8	0.8	54 51.8	−51.8	0.9	55 51.8	−51.8	0.9	56 51.8	−51.8	0.9	57 51.8	−51.8	0.9	58 51.7	−51.7	1.0	59 51.7	−51.7	1.0	60 51.7	−51.7	1.0	89
90	53 00.0	−52.1	0.0	54 00.0	−52.1	0.0	55 00.0	−52.1	0.0	56 00.0	−52.2	0.0	57 00.0	−52.2	0.0	58 00.0	−52.2	0.0	59 00.0	−52.2	0.0	60 00.0	−52.2	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	31 24.7	−56.2	144.1	30 36.0	−56.4	144.5	29 47.0	−56.6	144.8	28 57.9	−56.9	145.1	28 08.6	−57.1	145.5	27 19.1	−57.3	145.8	26 29.4	−57.5	146.0	25 39.5	−57.6	146.3	0
1	30 28.5	−56.2	144.5	29 39.6	−56.5	144.9	28 50.4	−56.7	145.2	28 01.0	−56.9	145.5	27 11.5	−57.2	145.8	26 21.8	−57.4	146.1	25 31.9	−57.5	146.4	24 41.9	−57.7	146.6	1
2	29 32.3	−56.4	144.9	28 43.1	−56.6	145.3	27 53.7	−56.8	145.6	27 04.1	−57.0	145.9	26 14.3	−57.2	146.1	25 24.4	−57.4	146.4	24 34.4	−57.6	146.7	23 44.2	−57.8	146.9	2
3	28 35.9	−56.4	145.3	27 46.5	−56.6	145.6	26 56.9	−56.9	145.9	26 07.1	−57.1	146.2	25 17.1	−57.2	146.5	24 27.0	−57.4	146.7	23 36.8	−57.6	147.0	22 46.4	−57.7	147.2	3
4	27 39.5	−56.4	145.7	26 49.9	−56.7	146.0	26 00.0	−56.9	146.3	25 10.0	−57.0	146.6	24 19.9	−57.3	146.8	23 29.6	−57.4	147.1	22 39.2	−57.6	147.3	21 48.7	−57.8	147.5	4
5	26 43.1	−56.5	146.1	25 53.2	−56.7	146.4	25 03.1	−56.9	146.6	24 13.0	−57.2	146.9	23 22.6	−57.3	147.1	22 32.2	−57.5	147.4	21 41.6	−57.7	147.6	20 50.9	−57.9	147.8	5
6	25 46.6	−56.6	146.5	24 56.5	−56.8	146.7	24 06.2	−57.0	147.0	23 15.8	−57.1	147.2	22 25.3	−57.3	147.5	21 34.7	−57.6	147.7	20 43.9	−57.7	147.9	19 53.0	−57.8	148.1	6
7	24 50.0	−56.6	146.8	23 59.7	−56.9	147.1	23 09.2	−57.0	147.3	22 18.7	−57.3	147.6	21 28.0	−57.4	147.8	20 37.1	−57.5	148.0	19 46.2	−57.7	148.2	18 55.2	−57.9	148.4	7
8	23 53.3	−56.6	147.2	23 02.8	−56.8	147.4	22 12.2	−57.1	147.7	21 21.4	−57.2	147.9	20 30.6	−57.5	148.1	19 39.6	−57.6	148.3	18 48.5	−57.8	148.5	17 57.3	−57.9	148.6	8
9	22 56.7	−56.8	147.6	22 06.0	−57.0	147.8	21 15.1	−57.1	148.0	20 24.2	−57.3	148.2	19 33.1	−57.4	148.4	18 42.0	−57.6	148.6	17 50.7	−57.7	148.7	16 59.4	−57.9	148.9	9
10	21 59.9	−56.7	147.9	21 09.0	−56.9	148.1	20 18.0	−57.1	148.3	19 26.9	−57.3	148.5	18 35.7	−57.5	148.7	17 44.4	−57.7	148.9	16 53.0	−57.8	149.0	16 01.5	−58.0	149.2	10
11	21 03.2	−56.9	148.3	20 12.1	−57.0	148.5	19 20.9	−57.2	148.7	18 29.6	−57.4	148.8	17 38.2	−57.5	149.0	16 46.7	−57.6	149.2	15 55.2	−57.9	149.3	15 03.5	−57.9	149.5	11
12	20 06.3	−56.8	148.6	19 15.1	−57.1	148.8	18 23.7	−57.2	149.0	17 32.2	−57.3	149.1	16 40.7	−57.5	149.3	15 49.1	−57.7	149.4	14 57.3	−57.8	149.6	14 05.6	−58.0	149.7	12
13	19 09.5	−56.9	149.0	18 18.0	−57.0	149.1	17 26.5	−57.3	149.3	16 34.9	−57.4	149.4	15 43.2	−57.6	149.6	14 51.4	−57.7	149.7	13 59.5	−57.8	149.9	13 07.6	−58.0	150.0	13
14	18 12.6	−56.9	149.3	17 21.0	−57.1	149.5	16 29.2	−57.2	149.6	15 37.5	−57.5	149.8	14 45.6	−57.6	149.9	13 53.7	−57.8	150.0	13 01.7	−57.9	150.1	12 09.6	−58.0	150.2	14
15	17 15.7	−57.0	149.6	16 23.9	−57.2	149.8	15 32.0	−57.3	149.9	14 40.0	−57.4	150.1	13 48.0	−57.6	150.2	12 55.9	−57.7	150.3	12 03.8	−57.9	150.4	11 11.6	−58.0	150.5	15
16	16 18.7	−57.0	149.9	15 26.7	−57.1	150.1	14 34.7	−57.3	150.2	13 42.6	−57.5	150.3	12 50.4	−57.6	150.5	11 58.2	−57.8	150.6	11 05.9	−57.9	150.7	10 13.6	−58.1	150.8	16
17	15 21.7	−57.0	150.3	14 29.6	−57.2	150.4	13 37.4	−57.4	150.5	12 45.1	−57.5	150.6	11 52.8	−57.7	150.8	11 00.4	−57.8	150.8	10 08.0	−57.9	150.9	9 15.5	−58.0	151.0	17
18	14 24.7	−57.0	150.6	13 32.4	−57.2	150.7	12 40.0	−57.3	150.8	11 47.6	−57.5	150.9	10 55.1	−57.6	151.0	10 02.6	−57.8	151.1	9 10.1	−58.0	151.2	8 17.5	−58.1	151.3	18
19	13 27.7	−57.1	150.9	12 35.2	−57.2	151.0	11 42.7	−57.4	151.1	10 50.1	−57.5	151.2	9 57.5	−57.7	151.3	9 04.8	−57.8	151.4	8 12.1	−57.9	151.5	7 19.4	−58.1	151.5	19
20	12 30.6	−57.1	151.2	11 38.0	−57.3	151.3	10 45.3	−57.4	151.4	9 52.6	−57.6	151.5	8 59.8	−57.7	151.6	8 07.0	−57.8	151.7	7 14.2	−57.9	151.7	6 21.3	−58.0	151.8	20
21	11 33.5	−57.1	151.5	10 40.7	−57.2	151.6	9 47.9	−57.4	151.7	8 55.0	−57.5	151.8	8 02.1	−57.6	151.9	7 09.2	−57.8	151.9	6 16.3	−58.0	152.0	5 23.3	−58.1	152.0	21
22	10 36.4	−57.1	151.9	9 43.5	−57.3	151.9	8 50.5	−57.4	152.0	7 57.5	−57.6	152.1	7 04.5	−57.8	152.2	6 11.4	−57.8	152.2	5 18.3	−58.0	152.3	4 25.2	−58.1	152.3	22
23	9 39.3	−57.2	152.2	8 46.2	−57.3	152.2	7 53.1	−57.5	152.3	6 59.9	−57.6	152.4	6 06.7	−57.7	152.4	5 13.6	−57.9	152.5	4 20.3	−57.9	152.5	3 27.1	−58.1	152.5	23
24	8 42.1	−57.1	152.5	7 48.9	−57.3	152.5	6 55.6	−57.4	152.6	6 02.3	−57.5	152.7	5 09.0	−57.7	152.7	4 15.7	−57.8	152.7	3 22.4	−58.0	152.8	2 29.0	−58.1	152.8	24
25	7 45.0	−57.2	152.8	6 51.6	−57.3	152.8	5 58.2	−57.5	152.9	5 04.8	−57.6	152.9	4 11.3	−57.7	153.0	3 17.9	−57.9	153.0	2 24.4	−58.0	153.0	1 30.9	−58.1	153.0	25
26	6 47.8	−57.2	153.1	5 54.3	−57.4	153.1	5 00.7	−57.5	153.2	4 07.2	−57.6	153.2	3 13.6	−57.7	153.2	2 20.0	−57.8	153.3	1 26.4	−58.0	153.3	0 32.8	−58.1	153.3	26
27	5 50.6	−57.2	153.4	4 56.9	−57.3	153.4	4 03.3	−57.5	153.5	3 09.6	−57.6	153.5	2 15.9	−57.8	153.5	1 22.2	−57.9	153.5	0 28.4	−57.9	153.5	0 25.3	+58.1	26.5	27
28	4 53.4	−57.2	153.7	3 59.6	−57.3	153.7	3 05.8	−57.5	153.8	2 12.0	−57.6	153.8	1 18.1	−57.7	153.8	0 24.3	−57.8	153.8	0 29.5	+58.0	26.2	1 23.4	+58.1	26.2	28
29	3 56.2	−57.2	154.0	3 02.3	−57.3	154.0	2 08.3	−57.5	154.0	1 14.4	−57.6	154.1	0 20.4	−57.7	154.1	0 33.5	+57.9	25.9	1 27.5	+57.9	25.9	2 21.5	+58.0	26.0	29
30	2 59.0	−57.2	154.3	2 04.9	−57.3	154.3	1 10.8	−57.4	154.3	0 16.8	−57.6	154.3	0 37.3	+57.8	25.7	1 31.4	+57.9	25.7	2 25.5	+57.9	25.7	3 19.5	+58.1	25.7	30
31	2 01.8	−57.2	154.6	1 07.6	−57.4	154.6	0 13.4	−57.5	154.6	0 40.8	+57.7	25.4	1 35.1	+57.7	25.4	2 29.3	+57.8	25.4	3 23.4	+58.0	25.4	4 17.6	+58.1	25.5	31
32	1 04.6	−57.3	154.9	0 10.2	−57.3	154.9	0 44.1	+57.5	25.1	1 38.5	+57.6	25.1	2 32.8	+57.7	25.1	3 27.1	+57.8	25.1	4 21.4	+58.0	25.2	5 15.7	+58.1	25.2	32
33	0 07.3	−57.2	155.2	0 47.1	+57.4	24.8	1 41.6	+57.5	24.8	2 36.1	+57.6	24.8	3 30.5	+57.7	24.8	4 24.9	+57.9	24.9	5 19.4	+57.9	24.9	6 13.8	+58.1	24.9	33
34	0 49.9	+57.2	24.5	1 44.5	+57.3	24.5	2 39.1	+57.4	24.5	3 33.7	+57.5	24.5	4 28.2	+57.7	24.6	5 22.8	+57.8	24.6	6 17.3	+58.0	24.6	7 11.9	+58.0	24.7	34
35	1 47.1	+57.2	24.2	2 41.8	+57.4	24.2	3 36.5	+57.5	24.2	4 31.2	+57.6	24.3	5 25.9	+57.8	24.3	6 20.6	+57.8	24.3	7 15.3	+57.9	24.4	8 09.9	+58.1	24.4	35
36	2 44.3	+57.2	23.9	3 39.2	+57.3	23.9	4 34.0	+57.5	23.9	5 28.8	+57.6	24.0	6 23.7	+57.7	24.0	7 18.4	+57.9	24.1	8 13.2	+57.9	24.1	9 08.0	+58.0	24.2	36
37	3 41.5	+57.2	23.6	4 36.5	+57.3	23.7	5 31.5	+57.4	23.7	6 26.4	+57.6	23.7	7 21.4	+57.6	23.7	8 16.3	+57.8	23.8	9 11.1	+58.0	23.9	10 06.0	+58.0	23.9	37
38	4 38.7	+57.2	23.3	5 33.8	+57.3	23.3	6 28.9	+57.5	23.4	7 24.0	+57.5	23.4	8 19.0	+57.7	23.5	9 14.1	+57.7	23.5	10 09.1	+57.9	23.7	11 04.0	+58.0	23.7	38
39	5 35.9	+57.2	23.0	6 31.1	+57.4	23.0	7 26.4	+57.4	23.1	8 21.5	+57.6	23.1	9 16.7	+57.7	23.2	10 11.9	+57.7	23.3	11 07.0	+57.9	23.3	12 02.0	+58.0	23.4	39
40	6 33.1	+57.1	22.7	7 28.5	+57.3	22.7	8 23.8	+57.4	22.8	9 19.1	+57.5	22.8	10 14.4	+57.6	22.9	11 09.6	+57.8	23.0	12 04.9	+57.8	23.1	13 00.0	+58.0	23.1	40
41	7 30.3	+57.1	22.4	8 25.8	+57.2	22.4	9 21.2	+57.4	22.5	10 16.6	+57.5	22.6	11 12.0	+57.7	22.6	12 07.4	+57.7	22.7	13 02.7	+57.9	22.8	13 58.0	+58.0	22.9	41
42	8 27.4	+57.2	22.1	9 23.0	+57.3	22.1	10 18.6	+57.4	22.2	11 14.1	+57.6	22.3	12 09.7	+57.6	22.3	13 05.1	+57.8	22.4	14 00.6	+57.9	22.5	14 56.0	+57.9	22.6	42
43	9 24.6	+57.1	21.8	10 20.3	+57.3	21.8	11 16.0	+57.4	21.9	12 11.7	+57.4	22.0	13 07.3	+57.6	22.1	14 02.9	+57.7	22.1	14 58.4	+57.8	22.2	15 53.9	+58.0	22.3	43
44	10 21.7	+57.1	21.4	11 17.6	+57.2	21.5	12 13.4	+57.3	21.6	13 09.1	+57.5	21.7	14 04.9	+57.6	21.8	15 00.6	+57.7	21.9	15 56.2	+57.8	22.0	16 51.9	+57.9	22.1	44
45	11 18.8	+57.1	21.1	12 14.8	+57.2	21.2	13 10.7	+57.3	21.3	14 06.6	+57.4	21.4	15 02.5	+57.5	21.5	15 58.3	+57.6	21.6	16 54.0	+57.8	21.7	17 49.8	+57.9	21.8	45
46	12 15.9	+57.1	20.8	13 12.0	+57.2	20.9	14 08.0	+57.3	21.0	15 04.0	+57.5	21.1	16 00.0	+57.5	21.2	16 55.9	+57.7	21.3	17 51.8	+57.8	21.4	18 47.7	+57.8	21.5	46
47	13 13.0	+57.1	20.5	14 09.2	+57.2	20.6	15 05.3	+57.3	20.7	16 01.5	+57.3	20.8	16 57.5	+57.5	20.9	17 53.6	+57.6	21.0	18 49.6	+57.7	21.1	19 45.5	+57.8	21.2	47
48	14 10.1	+57.0	20.2	15 06.4	+57.1	20.3	16 02.6	+57.3	20.4	16 58.8	+57.4	20.5	17 55.0	+57.5	20.6	18 51.2	+57.6	20.7	19 47.3	+57.7	20.8	20 43.3	+57.8	21.0	48
49	15 07.1	+57.0	19.9	16 03.5	+57.1	20.0	16 59.9	+57.2	20.1	17 56.2	+57.3	20.2	18 52.5	+57.5	20.3	19 48.8	+57.5	20.4	20 45.0	+57.6	20.5	21 41.1	+57.8	20.7	49
50	16 04.1	+56.9	19.5	17 00.6	+57.1	19.6	17 57.1	+57.2	19.7	18 53.5	+57.4	19.9	19 50.0	+57.4	20.0	20 46.3	+57.6	20.1	21 42.6	+57.7	20.2	22 38.9	+57.8	20.4	50
51	17 01.0	+57.0	19.2	17 57.7	+57.0	19.3	18 54.3	+57.2	19.4	19 50.9	+57.2	19.5	20 47.4	+57.4	19.7	21 43.9	+57.4	19.8	22 40.3	+57.6	19.9	23 36.7	+57.7	20.1	51
52	17 58.0	+56.9	18.9	18 54.7	+57.0	19.0	19 51.5	+57.1	19.1	20 48.1	+57.3	19.2	21 44.8	+57.3	19.4	22 41.3	+57.5	19.5	23 37.9	+57.5	19.6	24 34.4	+57.6	19.8	52
53	18 54.9	+56.8	18.5	19 51.7	+57.0	18.7	20 48.6	+57.1	18.8	21 45.4	+57.2	18.9	22 42.1	+57.4	19.0	23 38.8	+57.4	19.2	24 35.4	+57.6	19.3	25 32.0	+57.7	19.5	53
54	19 51.7	+56.9	18.2	20 48.7	+57.0	18.3	21 45.7	+57.0	18.5	22 42.6	+57.1	18.6	23 39.4	+57.3	18.7	24 36.2	+57.4	18.9	25 33.0	+57.4	19.0	26 29.7	+57.6	19.2	54
55	20 48.6	+56.8	17.9	21 45.7	+56.9	18.0	22 42.7	+57.0	18.1	23 39.7	+57.1	18.2	24 36.7	+57.2	18.4	25 33.6	+57.3	18.5	26 30.4	+57.5	18.7	27 27.3	+57.5	18.9	55
56	21 45.4	+56.7	17.5	22 42.6	+56.8	17.6	23 39.7	+57.0	17.8	24 36.8	+57.1	17.9	25 33.9	+57.2	18.1	26 30.9	+57.3	18.2	27 27.9	+57.4	18.4	28 24.8	+57.5	18.5	56
57	22 42.1	+56.7	17.2	23 39.4	+56.8	17.3	24 36.7	+56.9	17.4	25 33.9	+57.0	17.6	26 31.1	+57.1	17.7	27 28.2	+57.2	17.9	28 25.3	+57.3	18.0	29 22.3	+57.5	18.2	57
58	23 38.8	+56.6	16.8	24 36.2	+56.8	16.9	25 33.6	+56.8	17.1	26 30.9	+57.0	17.2	27 28.2	+57.1	17.4	28 25.4	+57.2	17.5	29 22.6	+57.3	17.7	30 19.8	+57.4	17.9	58
59	24 35.4	+56.6	16.5	25 33.0	+56.7	16.6	26 30.4	+56.9	16.7	27 27.9	+56.9	16.9	28 25.3	+57.0	17.0	29 22.6	+57.2	17.2	30 19.9	+57.3	17.4	31 17.2	+57.3	17.5	59
60	25 32.0	+56.6	16.1	26 29.7	+56.6	16.2	27 27.3	+56.7	16.4	28 24.8	+56.9	16.5	29 22.3	+57.0	16.7	30 19.8	+57.0	16.8	31 17.2	+57.1	17.0	32 14.5	+57.3	17.2	60
61	26 28.6	+56.4	15.7	27 26.3	+56.6	15.9	28 24.0	+56.7	16.0	29 21.7	+56.8	16.1	30 19.3	+56.9	16.3	31 16.8	+57.0	16.5	32 14.3	+57.2	16.7	33 11.8	+57.2	16.8	61
62	27 25.0	+56.5	15.3	28 22.9	+56.5	15.5	29 20.7	+56.6	15.6	30 18.5	+56.7	15.8	31 15.2	+56.7	15.9	32 13.8	+57.0	16.1	33 11.5	+57.0	16.3	34 09.0	+57.2	16.5	62
63	28 21.5	+56.3	14.9	29 19.4	+56.5	15.1	30 17.3	+56.6	15.4	31 15.2	+56.7	15.4	32 13.0	+56.8	15.6	33 10.8	+56.9	15.7	34 08.5	+57.1	15.9	35 06.2	+57.1	16.1	63
64	29 17.8	+56.3	14.6	30 15.9	+56.4	14.7	31 13.9	+56.5	14.9	32 11.9	+56.6	15.0	33 09.8	+56.7	15.2	34 07.7	+56.8	15.4	35 05.5	+56.9	15.5	36 03.3	+57.0	15.7	64
65	30 14.1	+56.2	14.2	31 12.3	+56.3	14.3	32 10.4	+56.4	14.5	33 08.5	+56.5	14.6	34 06.5	+56.6	14.8	35 04.5	+56.7	15.0	36 02.4	+56.9	15.1	37 00.3	+57.0	15.3	65
66	31 10.3	+56.1	13.7	32 08.6	+56.2	13.9	33 06.8	+56.3	14.1	34 05.0	+56.4	14.2	35 03.1	+56.6	14.4	36 01.2	+56.7	14.6	36 59.3	+56.7	14.8	37 57.3	+56.8	14.9	66
67	32 06.4	+56.1	13.3	33 04.8	+56.1	13.5	34 03.1	+56.3	13.6	35 01.4	+56.4	13.8	35 59.7	+56.4	14.0	36 57.9	+56.5	14.2	37 56.0	+56.7	14.3	38 54.1	+56.8	14.5	67
68	33 02.5	+55.9	12.9	34 00.9	+56.1	13.1	34 59.4	+56.1	13.2	35 57.8	+56.2	13.4	36 56.1	+56.4	13.6	37 54.4	+56.5	13.7	38 52.7	+56.6	13.9	39 50.9	+56.7	14.1	68
69	33 58.4	+55.9	12.5	34 57.0	+56.0	12.6	35 55.5	+56.1	12.8	36 54.0	+56.2	12.9	37 52.5	+56.2	13.1	38 50.9	+56.4	13.3	39 49.3	+56.4	13.5	40 47.6	+56.6	13.7	69
70	34 54.3	+55.8	12.0	35 53.0	+55.8	12.2	36 51.6	+55.9	12.3	37 50.2	+56.0	12.5	38 48.7	+56.2	12.7	39 47.3	+56.2	12.9	40 45.7	+56.4	13.0	41 44.2	+56.4	13.2	70
71	35 50.1	+55.6	11.6	36 48.8	+55.8	11.7	37 47.5	+55.9	11.9	38 46.2	+56.0	12.1	39 44.9	+56.1	12.2	40 43.5	+56.2	12.4	41 42.1	+56.3	12.6	42 40.6	+56.4	12.8	71
72	36 45.7	+55.5	11.1	37 44.6	+55.6	11.3	38 43.4	+55.7	11.4	39 42.2	+55.8	11.6	40 41.0	+55.9	11.8	41 39.7	+56.0	11.9	42 38.4	+56.1	12.1	43 37.0	+56.3	12.3	72
73	37 41.3	+55.4	10.6	38 40.2	+55.5	10.8	39 39.1	+55.7	10.9	40 38.0	+55.8	11.1	41 36.9	+55.8	11.3	42 35.7	+55.9	11.5	43 34.5	+56.0	11.6	44 33.3	+56.1	11.8	73
74	38 36.7	+55.3	10.2	39 35.7	+55.4	10.3	40 34.8	+55.5	10.5	41 33.8	+55.5	10.6	42 32.7	+55.7	10.8	43 31.6	+55.8	11.0	44 30.5	+55.9	11.1	45 29.4	+56.0	11.3	74
75	39 32.0	+55.2	9.7	40 31.1	+55.3	9.8	41 30.3	+55.3	10.0	42 29.3	+55.5	10.1	43 28.4	+55.5	10.3	44 27.4	+55.7	10.4	45 26.4	+55.7	10.6	46 25.4	+55.8	10.8	75
76	40 27.2	+55.0	9.1	41 26.4	+55.1	9.3	42 25.6	+55.2	9.4	43 24.8	+55.3	9.6	44 23.9	+55.4	9.7	45 23.1	+55.4	9.9	46 22.1	+55.6	10.1	47 21.2	+55.7	10.3	76
77	41 22.2	+54.9	8.6	42 21.5	+55.0	8.8	43 20.8	+55.1	8.9	44 20.1	+55.1	9.0	45 19.3	+55.3	9.2	46 18.5	+55.4	9.4	47 17.7	+55.5	9.5	48 16.9	+55.5	9.7	77
78	42 17.1	+54.7	8.0	43 16.5	+54.8	8.2	44 15.9	+54.9	8.3	45 15.2	+55.0	8.5	46 14.6	+55.0	8.6	47 13.9	+55.1	8.8	48 13.2	+55.2	9.0	49 12.4	+55.3	9.2	78
79	43 11.8	+54.6	7.5	44 11.3	+54.7	7.6	45 10.8	+54.7	7.8	46 10.2	+54.8	7.9	47 09.6	+54.9	8.1	48 09.0	+55.0	8.2	49 08.4	+55.1	8.4	50 07.7	+55.2	8.6	79
80	44 06.4	+54.4	6.9	45 06.0	+54.4	7.1	46 05.5	+54.5	7.2	47 05.0	+54.6	7.3	48 04.5	+54.7	7.5	49 04.0	+54.8	7.6	50 03.5	+54.8	7.8	51 02.9	+54.9	7.9	80
81	45 00.8	+54.2	6.4	46 00.4	+54.3	6.5	47 00.0	+54.4	6.6	47 59.6	+54.4	6.7	48 59.2	+54.5	6.8	49 58.8	+54.5	7.0	50 58.3	+54.7	7.1	51 57.8	+54.8	7.3	81
82	45 55.0	+54.0	5.7	46 54.7	+54.0	5.8	47 54.4	+54.1	6.0	48 54.0	+54.2	6.1	49 53.7	+54.3	6.2	50 53.3	+54.4	6.3	51 53.0	+54.4	6.5	52 52.6	+54.5	6.6	82
83	46 49.0	+53.8	5.1	47 48.7	+53.9	5.2	48 48.5	+53.9	5.3	49 48.2	+54.0	5.4	50 48.0	+54.0	5.5	51 47.7	+54.1	5.7	52 47.4	+54.1	5.8	53 47.1	+54.2	5.9	83
84	47 42.8	+53.5	4.5	48 42.6	+53.6	4.5	49 42.4	+53.6	4.6	50 42.2	+53.7	4.7	51 42.0	+53.7	4.8	52 41.8	+53.8	4.9	53 41.5	+53.9	5.1	54 41.3	+54.0	5.2	84
85	48 36.3	+53.3	3.8	49 36.2	+53.3	3.9	50 36.0	+53.4	3.9	51 35.9	+53.4	4.0	52 35.7	+53.5	4.1	53 35.6	+53.5	4.2	54 35.4	+53.6	4.3	55 35.3	+53.6	4.4	85
86	49 29.6	+53.1	3.1	50 29.5	+53.1	3.1	51 29.4	+53.2	3.2	52 29.3	+53.2	3.3	53 29.2	+53.2	3.4	54 29.1	+53.3	3.4	55 29.0	+53.3	3.5	56 28.9	+53.3	3.6	86
87	50 22.7	+52.7	2.4	51 22.6	+52.8	2.4	52 22.6	+52.8	2.5	53 22.5	+52.8	2.5	54 22.4	+52.9	2.6	55 22.4	+52.9	2.6	56 22.3	+53.0	2.7	57 22.2	+53.0	2.8	87
88	51 15.4	+52.5	1.6	52 15.4	+52.5	1.6	53 15.4	+52.5	1.7	54 15.3	+52.5	1.7	55 15.3	+52.5	1.8	56 15.3	+52.5	1.8	57 15.3	+52.5	1.8	58 15.2	+52.6	1.9	88
89	52 07.9	+52.1	0.8	53 07.9	+52.1	0.8	54 07.9	+52.1	0.9	55 07.8	+52.2	0.9	56 07.8	+52.2	0.9	57 07.8	+52.2	0.9	58 07.8	+52.2	0.9	59 07.8	+52.2	1.0	89
90	53 00.0	+51.8	0.0	54 00.0	+51.8	0.0	55 00.0	+51.8	0.0	56 00.0	+51.8	0.0	57 00.0	+51.8	0.0	58 00.0	+51.7	0.0	59 00.0	+51.7	0.0	60 00.0	+51.7	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

LATITUDE SAME NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	31 03.3	+55.9	143.0	30 15.2	+56.2	143.4	29 26.9	+56.5	143.7	28 38.5	+56.6	144.1	27 49.8	+56.9	144.4	27 00.9	+57.1	144.7	26 11.9	+57.3	145.0	25 22.7	+57.5	145.2	0
1	31 59.2	+55.8	142.6	31 11.4	+56.1	143.0	30 23.4	+56.6	143.3	29 35.1	+56.6	143.7	28 46.7	+56.8	144.0	27 58.0	+57.0	144.3	27 09.2	+57.2	144.6	26 20.2	+57.4	144.9	1
2	32 55.0	+55.7	142.2	32 07.5	+56.0	142.6	31 19.7	+56.3	142.9	30 31.7	+56.5	143.3	29 43.5	+56.7	143.7	28 55.0	+57.0	144.0	28 06.4	+57.2	144.3	27 17.6	+57.4	144.6	2
3	33 50.7	+55.6	141.7	33 03.5	+55.9	142.1	32 16.0	+56.1	142.5	31 28.2	+56.4	142.9	30 40.2	+56.7	143.3	29 52.0	+56.9	143.6	29 03.6	+57.2	144.0	28 15.0	+57.4	144.3	3
4	34 46.3	+55.5	141.3	33 59.4	+55.8	141.7	33 12.1	+56.1	142.1	32 24.6	+56.4	142.5	31 36.9	+56.6	142.9	30 48.9	+56.9	143.3	30 00.8	+57.0	143.6	29 12.4	+57.3	143.9	4
5	35 41.8	+55.4	140.8	34 55.2	+55.7	141.3	34 08.2	+56.0	141.7	33 21.0	+56.3	142.1	32 33.5	+56.6	142.5	31 45.8	+56.8	142.9	30 57.8	+57.1	143.2	30 09.7	+57.2	143.6	5
6	36 37.2	+55.3	140.3	35 50.9	+55.6	140.8	35 04.2	+55.9	141.3	34 17.3	+56.2	141.7	33 30.1	+56.4	142.1	32 42.6	+56.7	142.5	31 54.9	+56.9	142.9	31 06.9	+57.2	143.3	6
7	37 32.5	+55.2	139.9	36 46.5	+55.5	140.4	36 00.1	+55.8	140.8	35 13.5	+56.1	141.3	34 26.5	+56.4	141.7	33 39.3	+56.7	142.1	32 51.8	+56.9	142.5	32 04.1	+57.1	142.9	7
8	38 27.7	+55.0	139.4	37 42.0	+55.3	139.9	36 55.9	+55.7	140.4	36 09.6	+56.0	140.8	35 22.9	+56.3	141.3	34 36.0	+56.5	141.7	33 48.7	+56.9	142.1	33 01.2	+57.1	142.5	8
9	39 22.7	+54.9	138.8	38 37.3	+55.3	139.4	37 51.6	+55.6	139.9	37 05.6	+55.9	140.4	36 19.2	+56.2	140.8	35 32.5	+56.5	141.3	34 45.6	+56.7	141.7	33 58.3	+57.0	142.2	9
10	40 17.6	+54.7	138.3	39 32.6	+55.1	138.9	38 47.2	+55.5	139.4	38 01.5	+55.8	139.9	37 15.4	+56.1	140.4	36 29.0	+56.4	140.9	35 42.3	+56.7	141.3	34 55.3	+56.9	141.8	10
11	41 12.3	+54.6	137.8	40 27.7	+55.0	138.4	39 42.7	+55.3	138.9	38 57.3	+55.6	139.4	38 11.5	+56.0	140.0	37 25.4	+56.3	140.5	36 39.0	+56.6	140.9	35 52.2	+56.9	141.4	11
12	42 06.9	+54.5	137.2	41 22.7	+54.8	137.8	40 38.0	+55.2	138.4	39 52.9	+55.6	139.0	39 07.5	+55.9	139.5	38 21.7	+56.2	140.0	37 35.6	+56.4	140.5	36 49.1	+56.7	141.0	12
13	43 01.4	+54.3	136.7	42 17.5	+54.7	137.3	41 33.2	+55.1	137.9	40 48.5	+55.4	138.5	40 03.4	+55.7	139.0	39 17.9	+56.1	139.6	38 32.0	+56.4	140.1	37 45.8	+56.7	140.6	13
14	43 55.6	+54.1	136.1	43 12.2	+54.5	136.7	42 28.3	+54.9	137.4	41 43.9	+55.3	138.0	40 59.1	+55.6	138.5	40 14.0	+56.0	139.1	39 28.4	+56.3	139.7	38 42.5	+56.6	140.2	14
15	44 49.7	+53.8	135.5	44 06.7	+54.3	136.1	43 23.2	+54.7	136.8	42 39.2	+55.1	137.4	41 54.8	+55.5	138.0	41 10.0	+55.8	138.6	40 24.7	+56.2	139.2	39 39.1	+56.5	139.7	15
16	45 43.5	+53.7	134.8	45 01.0	+54.1	135.5	44 17.9	+54.6	136.2	43 34.3	+55.0	136.9	42 50.3	+55.4	137.5	42 05.8	+55.7	138.1	41 20.9	+56.1	138.7	40 35.6	+56.4	139.3	16
17	46 37.2	+53.4	134.2	45 55.1	+53.9	134.9	45 12.5	+54.3	135.6	44 29.3	+54.8	136.3	43 45.7	+55.2	137.0	43 01.5	+55.6	137.6	42 17.0	+55.9	138.3	41 32.0	+56.3	138.9	17
18	47 30.6	+53.2	133.5	46 49.0	+53.7	134.3	46 06.8	+54.2	135.0	45 24.1	+54.6	135.8	44 40.9	+55.0	136.5	43 57.1	+55.5	137.1	43 12.9	+55.9	137.8	42 28.3	+56.2	138.4	18
19	48 23.8	+52.9	132.8	47 42.7	+53.5	133.6	47 01.0	+54.0	134.4	46 18.7	+54.5	135.2	45 35.9	+54.9	135.9	44 52.6	+55.3	136.6	44 08.8	+55.6	137.3	43 24.5	+56.0	137.9	19
20	49 16.7	+52.7	132.1	48 36.2	+53.2	133.0	47 55.0	+53.7	133.8	47 13.2	+54.2	134.6	46 30.8	+54.7	135.3	45 47.9	+55.1	136.0	45 04.4	+55.6	136.7	44 20.5	+55.9	137.4	20
21	50 09.4	+52.4	131.4	49 29.4	+52.9	132.3	48 48.7	+53.5	133.1	48 07.4	+54.0	133.9	47 25.5	+54.5	134.7	46 43.0	+55.0	135.5	46 00.0	+55.3	136.2	45 16.4	+55.8	136.9	21
22	51 01.8	+52.0	130.6	50 22.3	+52.7	131.5	49 42.2	+53.3	132.4	49 01.4	+53.8	133.3	48 20.0	+54.3	134.1	47 38.0	+54.7	134.9	46 55.3	+55.2	135.6	46 12.2	+55.6	136.4	22
23	51 53.8	+51.7	129.8	51 15.0	+52.4	130.8	50 35.5	+52.9	131.7	49 55.2	+53.5	132.6	49 14.3	+54.1	133.4	48 32.7	+54.6	134.3	47 50.5	+55.1	135.1	47 07.8	+55.5	135.8	23
24	52 45.5	+51.4	129.0	52 07.4	+52.0	130.0	51 28.4	+52.7	130.9	50 48.7	+53.3	131.9	50 08.4	+53.8	132.8	49 27.3	+54.3	133.6	48 45.6	+54.8	134.5	48 03.2	+55.3	135.3	24
25	53 36.9	+50.9	128.1	52 59.4	+51.7	129.2	52 21.1	+52.4	130.2	51 42.0	+53.0	131.1	51 02.2	+53.5	132.1	50 21.6	+54.1	133.0	49 40.4	+54.6	133.8	48 58.5	+55.1	134.7	25
26	54 27.8	+50.6	127.2	53 51.1	+51.3	128.3	53 13.5	+52.0	129.4	52 35.0	+52.7	130.4	51 55.7	+53.3	131.3	51 15.7	+53.9	132.3	50 35.0	+54.4	133.2	49 53.6	+54.9	134.1	26
27	55 18.4	+50.1	126.3	54 42.4	+50.9	127.4	54 05.5	+51.6	128.5	53 27.7	+52.3	129.6	52 49.0	+53.0	130.6	52 09.6	+53.6	131.6	51 29.4	+54.2	132.5	50 48.5	+54.7	133.4	27
28	56 08.5	+49.6	125.3	55 33.3	+50.4	126.5	54 57.1	+51.3	127.6	54 20.0	+52.0	128.7	53 42.0	+52.7	129.8	53 03.2	+53.3	130.8	52 23.6	+53.9	131.8	51 43.2	+54.4	132.8	28
29	56 58.1	+49.1	124.3	56 23.7	+50.0	125.5	55 48.4	+50.8	126.7	55 12.0	+51.6	127.9	54 34.7	+52.3	129.0	53 56.5	+53.0	130.1	53 17.5	+53.6	131.1	52 37.6	+54.3	132.1	29
30	57 47.2	+48.5	123.2	57 13.7	+49.5	124.5	56 39.2	+50.4	125.8	56 03.6	+51.2	127.0	55 27.0	+52.0	128.1	54 49.5	+52.7	129.3	54 11.1	+53.3	130.3	53 31.9	+53.9	131.4	30
31	58 35.7	+47.9	122.1	58 03.2	+48.9	123.5	57 29.6	+49.9	124.8	56 54.8	+50.7	126.0	56 19.0	+51.5	127.2	55 42.2	+52.3	128.4	55 04.4	+53.0	129.5	54 25.8	+53.6	130.6	31
32	59 23.6	+47.3	120.9	58 52.1	+48.4	122.3	58 19.4	+49.3	123.7	57 45.5	+50.3	125.0	57 10.5	+51.2	126.3	56 34.5	+51.9	127.5	55 57.4	+52.7	128.7	55 19.4	+53.4	129.9	32
33	60 10.9	+46.5	119.7	59 40.5	+47.7	121.2	59 08.7	+48.8	122.6	58 35.8	+49.7	124.0	58 01.7	+50.6	125.3	57 26.4	+51.5	126.6	56 50.1	+52.3	127.9	56 12.8	+53.0	129.0	33
34	60 57.4	+45.8	118.4	60 28.2	+46.9	120.0	59 57.5	+48.1	121.5	59 25.5	+49.2	122.9	58 52.3	+50.1	124.3	58 17.9	+51.0	125.7	57 42.4	+51.8	126.9	57 05.8	+52.6	128.2	34
35	61 43.2	+45.0	117.1	61 15.1	+46.3	118.7	60 45.6	+47.4	120.3	60 14.7	+48.5	121.8	59 42.4	+49.6	123.2	59 08.9	+50.6	124.6	58 34.2	+51.5	126.0	57 58.4	+52.3	127.3	35
36	62 28.2	+44.0	115.7	62 01.4	+45.4	117.4	61 33.0	+46.7	119.0	61 03.2	+47.9	120.6	60 32.0	+49.0	122.1	59 59.5	+50.0	123.6	59 25.7	+50.9	125.0	58 50.7	+51.8	126.4	36
37	63 12.2	+43.1	114.2	62 46.8	+44.5	115.9	62 19.7	+45.9	117.7	61 51.1	+47.2	119.3	61 21.0	+48.3	120.9	60 49.5	+49.4	122.5	60 16.6	+50.4	123.9	59 42.5	+51.4	125.4	37
38	63 55.3	+42.0	112.6	63 31.3	+43.6	114.5	63 05.6	+45.0	116.3	62 38.3	+46.4	118.0	62 09.3	+47.6	119.7	61 38.9	+48.8	121.3	61 07.0	+49.9	122.8	60 33.9	+50.8	124.3	38
39	64 37.3	+40.8	111.0	64 14.9	+42.5	112.9	63 50.6	+44.1	114.8	63 24.6	+45.5	116.6	62 56.9	+46.9	118.3	62 27.7	+48.0	120.0	61 56.9	+49.2	121.7	61 24.7	+50.3	123.2	39
40	65 18.1	+39.6	109.2	64 57.4	+41.3	111.2	64 34.7	+43.0	113.2	64 10.1	+44.5	115.1	63 43.8	+45.9	117.0	63 15.7	+47.3	118.7	62 46.1	+48.5	120.4	62 15.0	+49.7	122.1	40
41	65 57.7	+38.2	107.4	65 38.7	+40.1	109.5	65 17.7	+41.8	111.6	64 54.6	+43.5	113.6	64 29.7	+45.1	115.5	64 03.0	+46.5	117.3	63 34.6	+47.8	119.1	63 04.7	+49.0	120.9	41
42	66 35.9	+36.8	105.5	66 18.8	+38.8	107.7	65 59.5	+40.6	109.8	65 38.1	+42.4	111.9	65 14.8	+44.0	113.9	64 49.5	+45.6	115.9	64 22.4	+47.0	117.8	63 53.7	+48.2	119.6	42
43	67 12.7	+35.2	103.5	66 57.6	+37.2	105.8	66 40.1	+39.3	108.0	66 20.5	+41.2	110.2	65 58.8	+42.9	112.3	65 35.1	+44.5	114.3	65 09.4	+46.1	116.3	64 41.9	+47.5	118.2	43
44	67 47.9	+33.4	101.4	67 34.8	+35.7	103.7	67 19.4	+37.8	106.1	67 01.7	+39.8	108.3	66 41.7	+41.7	110.5	66 19.6	+43.4	112.7	65 55.5	+45.0	114.7	65 29.4	+46.6	116.7	44
45	68 21.3	+31.6	99.1	68 10.5	+33.9	101.6	67 57.2	+36.2	104.0	67 41.5	+38.3	106.4	67 23.4	+40.3	108.7	67 03.0	+42.3	110.9	66 40.5	+44.0	113.1	66 16.0	+45.6	115.2	45
46	68 52.9	+29.5•	96.8	68 44.4	+32.1	99.3	68 33.4	+34.4	101.9	68 19.8	+36.7	104.3	68 03.7	+38.9	106.7	67 45.3	+40.9	109.1	67 24.5	+42.8	111.4	67 01.6	+44.5	113.6	46
47	69 22.4	+27.4•	94.4	69 16.5	+30.0•	97.0	69 07.8	+32.6	99.6	68 56.5	+35.0	102.2	68 42.6	+37.3	104.7	68 26.2	+39.4	107.1	68 07.3	+41.5	109.5	67 46.1	+43.4	111.8	47
48	69 49.8	+25.1•	91.8	69 46.5	+27.9•	94.5	69 40.4	+30.5•	97.2	69 31.5	+33.1•	99.9	69 19.9	+35.5	102.5	69 05.6	+37.8	105.0	68 48.8	+40.0	107.5	68 29.5	+42.0	110.0	48
49	70 14.9	+22.7•	89.1	70 14.4	+25.5•	91.9	70 10.9	+28.3•	94.7	70 04.6	+31.0•	97.4	69 55.4	+33.6•	100.2	69 43.4	+36.1	102.8	69 28.8	+38.4	105.4	69 11.5	+40.6	108.0	49
50	70 37.6	+20.0•	86.4	70 39.9	+23.0•	89.2	70 39.2	+26.0•	92.1	70 35.6	+28.8•	94.9	70 29.0	+31.5•	97.7	70 19.5	+34.1•	100.5	70 07.2	+36.6	103.2	69 52.1	+39.0	105.9	50
51	70 57.6	+17.4•	83.5	71 02.9	+20.4•	86.4	71 05.2	+23.4•	89.3	71 04.4	+26.3•	92.2	71 00.5	+29.3•	95.1	70 53.6	+32.1•	98.0	70 43.8	+34.7•	100.9	70 31.1	+37.2	103.6	51
52	71 15.0	+14.4•	80.6	71 23.3	+17.6•	83.5	71 28.6	+20.7•	86.4	71 30.7	+23.8•	89.4	71 29.8	+26.8•	92.4	71 25.7	+29.7•	95.4	71 18.5	+32.6•	98.3	71 08.3	+35.2•	101.2	52
53	71 29.4	+11.5•	77.5	71 40.9	+14.6•	80.5	71 49.3	+17.8•	83.5	71 54.5	+21.0•	86.6	71 56.6	+24.2•	89.7	71 55.4	+27.3•	92.8	71 51.1	+30.4•	95.9	71 43.5	+33.3•	99.0	53
54	71 40.9	+8.4•	74.4	71 55.5	+11.6•	77.4	72 07.1	+14.8•	80.4	72 15.5	+18.1•	83.5	72 20.8	+21.3•	86.6	72 22.7	+24.6•	89.7	72 21.3	+27.8•	92.9	72 16.7	+30.8•	96.0	54
55	71 49.3	+5.2•	71.2	72 07.1	+8.4•	74.2	72 21.9	+11.7•	77.2	72 33.6	+15.1•	80.3	72 42.1	+18.4•	83.5	72 47.3	+21.7•	86.7	72 49.1	+25.0•	89.9	72 47.5	+28.2•	93.1	55
56	71 54.5	+2.1•	68.0	72 15.5	+5.3•	70.9	72 33.6	+8.5•	73.9	72 48.7	+11.8•	77.1	73 00.5	+15.2•	80.2	73 09.0	+18.6•	83.5	73 14.1	+22.0•	86.8	73 15.7	+25.4•	90.1	56
57	71 56.6	−1.2•	64.8	72 20.8	+1.9•	67.7	72 42.1	+5.2•	70.6	73 00.5	+8.5•	73.7	73 15.7	+11.9•	76.9	73 27.6	+15.4•	80.2	73 36.1	+19.0•	83.5	73 41.1	+22.5•	86.9	57
58	71 55.4	−4.3•	61.6	72 22.7	−1.4•	64.4	72 47.3	+1.8•	67.3	73 09.0	+5.1•	70.3	73 27.6	+8.5•	73.5	73 43.0	+12.1•	76.8	73 55.1	+15.6•	80.1	74 03.6	+19.2•	83.6	58
59	71 51.1	−7.6•	58.4	72 21.3	−4.6•	61.1	72 49.1	−1.6•	63.9	73 14.1	+1.6•	66.9	73 36.1	+5.0•	70.0	73 55.1	+8.5•	73.2	74 10.7	+12.1•	76.6	74 22.8	+15.7•	80.1	59
60	71 43.5	−10.6•	55.2	72 16.7	−7.9•	57.8	72 47.5	−5.0•	60.5	73 15.7	−1.9•	63.4	73 41.1	+1.4•	66.5	74 03.6	+4.8•	69.7	74 22.8	+8.4•	73.0	74 38.5	+12.2•	76.5	60
61	71 32.9	−13.6•	52.1	72 08.8	−11.1•	54.5	72 42.5	−8.3•	57.1	73 13.8	−5.3•	59.9	73 42.5	−2.1•	62.9	74 08.4	+1.2•	66.0	74 31.2	+4.8•	69.3	74 50.7	+8.5•	72.8	61
62	71 19.3	−16.5•	49.0	71 57.7	−14.1•	51.3	72 34.2	−11.5•	53.8	73 08.5	−8.7•	56.5	73 40.4	−5.7•	59.3	74 09.6	−2.5•	62.4	74 36.0	+0.9•	65.6	74 59.2	+4.5•	69.0	62
63	71 02.8	−19.3•	46.0	71 43.6	−17.1•	48.2	72 22.7	−14.7•	50.6	72 59.8	−12.1•	53.1	73 34.7	−9.2•	55.8	74 07.1	−6.1•	58.7	74 36.9	−2.8•	61.8	75 03.7	+0.7•	65.1	63
64	70 43.5	−21.9•	43.2	71 26.5	−19.9•	45.2	72 08.0	−17.7•	47.4	72 47.7	−15.2•	49.8	73 25.5	−12.6•	52.3	74 01.0	−9.7•	55.1	74 34.1	−6.6•	58.0	75 04.4	−3.2•	61.2	64
65	70 21.6	−24.5•	40.4	71 06.6	−22.5•	42.2	71 50.3	−20.5•	44.3	72 32.5	−18.3•	46.5	73 12.9	−15.9•	48.9	73 51.3	−13.2•	51.5	74 27.5	−10.3•	54.3	75 01.2	−7.2•	57.4	65
66	69 57.1	−26.7•	37.7	70 44.1	−25.1•	39.4	71 29.8	−23.3•	41.3	72 14.2	−21.3•	43.4	72 57.0	−19.0•	45.6	73 38.1	−16.6•	48.0	74 17.2	−13.9•	50.7	74 54.0	−10.9•	53.5	66
67	69 30.4	−29.0•	35.1	70 19.0	−27.5•	36.7	71 06.5	−25.8•	38.4	71 52.9	−23.9•	40.3	72 38.0	−22.0•	42.4	73 21.5	−19.7•	44.6	74 03.3	−17.3•	47.1	74 43.1	−14.6•	49.8	67
68	69 01.4	−31.0•	32.6	69 51.5	−29.7•	34.1	70 40.7	−28.1•	35.7	71 29.0	−26.6•	37.4	72 16.0	−24.7•	39.3	73 01.8	−22.8•	41.4	73 46.0	−20.5•	43.6	74 28.5	−18.1•	46.1	68
69	68 30.4	−33.0	30.2	69 21.8	−31.7	31.6	70 12.6	−30.4•	33.0	71 02.4	−28.9•	34.6	71 51.3	−27.4•	36.3	72 39.0	−25.5•	38.2	73 25.5	−23.6•	40.3	74 10.4	−21.3•	42.6	69
70	67 57.4	−34.6	28.0	68 50.1	−33.6	29.2	69 42.2	−32.5	30.5	70 33.5	−31.2•	32.0	71 23.9	−29.7•	33.5	72 13.5	−28.2•	35.2	73 01.9	−26.4•	37.1	73 49.1	−24.5•	39.2	70
71	67 22.8	−36.4	25.8	68 16.5	−35.4	26.9	69 09.7	−34.3	28.1	70 02.3	−33.2	29.4	70 54.2	−31.9•	30.8	71 45.3	−30.6•	32.4	72 35.5	−29.0•	34.1	73 24.6	−27.3•	36.0	71
72	66 46.4	−37.8	23.8	67 41.1	−37.0	24.8	68 35.4	−36.1	25.8	69 29.1	−35.1	27.0	70 22.3	−34.1	28.3	71 14.7	−32.7•	29.7	72 06.5	−31.5•	31.2	72 57.3	−29.9•	32.9	72
73	66 08.6	−39.2	21.9	67 04.1	−38.5	22.7	67 59.3	−37.7	23.7	68 54.0	−36.9	24.7	69 48.2	−35.8	25.9	70 42.0	−34.9•	27.1	71 35.0	−33.6•	28.5	72 27.4	−32.3•	30.0	73
74	65 29.4	−40.5	20.0	66 25.6	−39.9	20.8	67 21.6	−39.2	21.6	68 17.1	−38.4	22.6	69 12.4	−37.7	23.6	70 07.1	−36.7	24.7	71 01.4	−35.7•	25.9	71 55.1	−34.6•	27.2	74
75	64 48.9	−41.7	18.3	65 45.7	−41.1	18.9	66 42.4	−40.6	19.7	67 38.7	−39.9	20.5	68 34.7	−39.1	21.4	69 30.4	−38.4	22.4	70 25.7	−37.6	23.4	71 20.5	−36.6	24.6	75
76	64 07.2	−42.8	16.6	65 04.6	−42.3	17.2	66 01.8	−41.8	17.9	66 58.8	−41.2	18.6	67 55.6	−40.7	19.4	68 52.0	−39.9	20.2	69 48.1	−39.2	21.2	70 43.9	−38.4	22.2	76
77	63 24.4	−43.8	15.0	64 22.3	−43.4	15.5	65 20.0	−42.9	16.1	66 17.6	−42.5	16.7	67 14.9	−41.9	17.4	68 12.1	−41.4	18.2	69 08.9	−40.7	19.0	70 05.5	−40.0	19.9	77
78	62 40.6	−44.7	13.5	63 38.9	−44.3	14.0	64 37.1	−44.0	14.5	65 35.1	−43.6	15.0	66 33.0	−43.2	15.6	67 30.7	−42.7	16.3	68 28.2	−42.2	17.0	69 25.5	−41.6	17.7	78
79	61 55.9	−45.5	12.1	62 54.6	−45.3	12.5	63 53.1	−44.9	12.9	64 51.5	−44.6	13.4	65 49.8	−44.2	13.9	66 48.0	−43.8	14.4	67 46.0	−43.3	15.1	68 43.9	−42.9	15.7	79
80	61 10.4	−46.4	10.7	62 09.3	−46.1	11.0	63 08.2	−45.9	11.4	64 06.9	−45.5	11.8	65 05.6	−45.2	12.3	66 04.2	−44.9	12.7	67 02.7	−44.6	13.3	68 01.0	−44.2	13.8	80
81	60 24.0	−47.0	9.4	61 23.2	−46.9	9.7	62 22.3	−46.6	10.0	63 21.4	−46.4	10.4	64 20.4	−46.2	10.7	65 19.3	−45.9	11.1	66 18.1	−45.6	11.6	67 16.8	−45.2	12.0	81
82	59 37.0	−47.8	8.1	60 36.3	−47.5	8.4	61 35.7	−47.4	8.7	62 35.0	−47.2	9.0	63 34.2	−47.0	9.3	64 33.4	−46.8	9.6	65 32.5	−46.5	10.0	66 31.6	−46.3	10.4	82
83	58 49.2	−48.3	7.0	59 48.8	−48.2	7.2	60 48.3	−48.1	7.4	61 47.8	−47.9	7.6	62 47.2	−47.7	7.9	63 46.6	−47.5	8.2	64 46.0	−47.4	8.5	65 45.3	−47.1	8.8	83
84	58 00.9	−49.0	5.8	59 00.6	−48.9	6.0	60 00.2	−48.8	6.2	60 59.9	−48.6	6.4	61 59.5	−48.5	6.6	62 59.1	−48.4	6.8	63 58.6	−48.1	7.0	64 58.1	−48.0	7.3	84
85	57 11.9	−49.4	4.8	58 11.7	−49.4	4.9	59 11.5	−49.3	5.0	60 11.3	−49.2	5.2	61 11.0	−49.1	5.3	62 10.7	−49.0	5.5	63 10.5	−48.9	5.7	64 10.1	−48.7	5.9	85
86	56 22.5	−50.0	3.7	57 22.3	−49.9	3.8	58 22.2	−49.8	3.9	59 22.1	−49.8	4.0	60 21.9	−49.7	4.2	61 21.7	−49.6	4.3	62 21.6	−49.6	4.4	63 21.4	−49.5	4.6	86
87	55 32.5	−50.4	2.7	56 32.4	−50.4	2.8	57 32.4	−50.4	2.9	58 32.3	−50.3	3.0	59 32.2	−50.2	3.0	60 32.1	−50.2	3.2	61 32.0	−50.1	3.2	62 31.9	−50.1	3.4	87
88	54 42.1	−50.9	1.8	55 42.1	−50.9	1.8	56 42.0	−50.8	1.9	57 42.0	−50.8	1.9	58 42.0	−50.8	2.0	59 41.9	−50.7	2.0	60 41.9	−50.7	2.1	61 41.8	−50.6	2.2	88
89	53 51.2	−51.2	0.9	54 51.2	−51.2	0.9	55 51.2	−51.2	0.9	56 51.2	−51.2	0.9	57 51.2	−51.2	1.0	58 51.2	−51.2	1.0	59 51.2	−51.2	1.0	60 51.2	−51.2	1.1	89
90	53 00.0	−51.6	0.0	54 00.0	−51.6	0.0	55 00.0	−51.6	0.0	56 00.0	−51.6	0.0	57 00.0	−51.6	0.0	58 00.0	−51.6	0.0	59 00.0	−51.7	0.0	60 00.0	−51.7	0.0	90

Bottom column headers: 53° 54° 55° 56° 57° 58° 59° 60°

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 31°, 329°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	31 03.3	−56.0	143.0	30 15.2	−56.2	143.4	29 26.9	−56.4	143.7	28 38.5	−56.7	144.1	27 49.8	−56.9	144.4	27 00.9	−57.1	144.7	26 11.9	−57.4	145.0	25 22.7	−57.6	145.2	0
1	30 07.3	−56.0	143.5	29 19.0	−56.3	143.8	28 30.5	−56.6	144.1	27 41.8	−56.8	144.4	26 52.9	−57.0	144.7	26 03.8	−57.2	145.0	25 14.5	−57.3	145.3	24 25.1	−57.6	145.5	1
2	29 11.3	−56.2	143.9	28 22.7	−56.4	144.2	27 33.9	−56.6	144.5	26 45.0	−56.8	144.8	25 55.9	−57.1	145.1	25 06.6	−57.2	145.4	24 17.2	−57.5	145.6	23 27.6	−57.6	145.9	2
3	28 15.1	−56.2	144.3	27 26.3	−56.4	144.6	26 37.3	−56.6	144.9	25 48.2	−56.9	145.2	24 58.8	−57.0	145.4	24 09.4	−57.3	145.7	23 19.7	−57.4	145.9	22 30.0	−57.7	146.2	3
4	27 18.9	−56.3	144.7	26 29.9	−56.5	145.0	25 40.7	−56.7	145.2	24 51.3	−56.9	145.5	24 01.8	−57.2	145.8	23 12.1	−57.3	146.0	22 23.3	−57.5	146.2	21 32.3	−57.7	146.5	4
5	26 22.7	−56.4	145.1	25 33.4	−56.6	145.3	24 44.0	−56.8	145.6	23 54.4	−57.0	145.9	23 04.6	−57.1	146.1	22 14.8	−57.4	146.3	21 24.8	−57.6	146.6	20 34.6	−57.7	146.8	5
6	25 26.3	−56.3	145.4	24 36.8	−56.6	145.7	23 47.2	−56.8	146.0	22 57.4	−57.0	146.2	22 07.5	−57.2	146.4	21 17.4	−57.4	146.7	20 27.2	−57.5	146.9	19 36.9	−57.7	147.1	6
7	24 30.0	−56.5	145.8	23 40.2	−56.6	146.1	22 50.4	−56.9	146.3	22 00.4	−57.1	146.5	21 10.3	−57.3	146.8	20 20.0	−57.4	147.0	19 29.7	−57.6	147.2	18 39.2	−57.7	147.3	7
8	23 33.5	−56.5	146.2	22 43.6	−56.7	146.4	21 53.5	−56.9	146.7	21 03.3	−57.1	146.9	20 13.0	−57.2	147.1	19 22.6	−57.4	147.3	18 32.1	−57.5	147.5	17 41.5	−57.8	147.6	8
9	22 37.0	−56.5	146.6	21 46.9	−56.7	146.8	20 56.6	−56.9	147.0	20 06.3	−57.2	147.2	19 15.8	−57.3	147.4	18 25.2	−57.5	147.6	17 34.5	−57.7	147.8	16 43.7	−57.8	147.9	9
10	21 40.5	−56.6	146.9	20 50.2	−56.8	147.1	19 59.7	−57.0	147.3	19 09.1	−57.1	147.5	18 18.5	−57.4	147.7	17 27.7	−57.5	147.9	16 36.8	−57.6	148.0	15 45.9	−57.8	148.2	10
11	20 43.9	−56.6	147.3	19 53.4	−56.9	147.5	19 02.7	−57.0	147.7	18 12.0	−57.2	147.8	17 21.1	−57.3	148.0	16 30.2	−57.5	148.2	15 39.2	−57.7	148.3	14 48.1	−57.9	148.5	11
12	19 47.3	−56.7	147.6	18 56.5	−56.8	147.8	18 05.7	−57.0	148.0	17 14.8	−57.2	148.2	16 23.8	−57.4	148.3	15 32.7	−57.6	148.5	14 41.5	−57.7	148.6	13 50.2	−57.8	148.7	12
13	18 50.6	−56.7	148.0	17 59.7	−56.9	148.2	17 08.7	−57.1	148.3	16 17.6	−57.3	148.5	15 26.4	−57.4	148.6	14 35.1	−57.6	148.8	13 43.8	−57.8	148.9	12 52.4	−57.9	149.0	13
14	17 53.9	−56.8	148.3	17 02.8	−56.9	148.5	16 11.6	−57.1	148.6	15 20.3	−57.3	148.8	14 29.0	−57.5	148.9	13 37.5	−57.6	149.1	12 46.0	−57.7	149.2	11 54.5	−57.9	149.3	14
15	16 57.1	−56.7	148.7	16 05.9	−57.0	148.8	15 14.5	−57.1	149.0	14 23.0	−57.3	149.1	13 31.5	−57.4	149.2	12 39.9	−57.6	149.3	11 48.3	−57.9	149.5	10 56.6	−57.9	149.6	15
16	16 00.4	−56.8	149.0	15 08.9	−57.0	149.1	14 17.4	−57.2	149.3	13 25.7	−57.3	149.4	12 34.1	−57.5	149.5	11 42.3	−57.6	149.6	10 50.5	−57.7	149.7	9 58.7	−57.9	149.8	16
17	15 03.6	−56.9	149.3	14 11.9	−57.0	149.5	13 20.2	−57.2	149.6	12 28.4	−57.3	149.7	11 36.6	−57.5	149.8	10 44.7	−57.7	149.9	9 52.8	−57.8	150.0	9 00.8	−58.0	150.1	17
18	14 06.7	−56.9	149.7	13 14.9	−57.0	149.8	12 23.0	−57.2	149.9	11 31.1	−57.4	150.0	10 39.1	−57.5	150.1	9 47.0	−57.6	150.2	8 55.0	−57.8	150.3	8 02.8	−57.9	150.3	18
19	13 09.8	−56.8	150.0	12 17.9	−57.1	150.1	11 25.8	−57.2	150.2	10 33.7	−57.4	150.3	9 41.6	−57.5	150.4	8 49.4	−57.7	150.5	7 57.2	−57.9	150.5	7 04.9	−58.0	150.6	19
20	12 13.0	−57.0	150.3	11 20.8	−57.1	150.4	10 28.6	−57.2	150.5	9 36.3	−57.4	150.6	8 44.0	−57.5	150.7	7 51.7	−57.7	150.8	6 59.3	−57.9	150.8	6 06.9	−57.9	150.9	20
21	11 16.0	−56.9	150.6	10 23.7	−57.1	150.7	9 31.4	−57.3	150.8	8 39.0	−57.4	150.9	7 46.5	−57.5	151.0	6 54.0	−57.7	151.0	6 01.5	−57.8	151.1	5 09.0	−58.0	151.1	21
22	10 19.1	−56.9	151.0	9 26.6	−57.1	151.0	8 34.1	−57.3	151.1	7 41.6	−57.5	151.2	6 49.0	−57.6	151.3	5 56.3	−57.7	151.3	5 03.7	−57.8	151.4	4 11.0	−57.9	151.4	22
23	9 22.2	−57.0	151.3	8 29.5	−57.1	151.4	7 36.8	−57.2	151.4	6 44.1	−57.4	151.5	5 51.4	−57.5	151.5	4 58.6	−57.7	151.6	4 05.9	−57.9	151.6	3 13.1	−58.0	151.7	23
24	8 25.2	−57.0	151.6	7 32.4	−57.2	151.7	6 39.6	−57.3	151.7	5 46.7	−57.4	151.8	4 53.8	−57.5	151.8	4 00.9	−57.7	151.9	3 08.0	−57.8	151.9	2 15.1	−58.0	151.9	24
25	7 28.2	−57.0	151.9	6 35.2	−57.1	152.0	5 42.3	−57.3	152.0	4 49.3	−57.5	152.1	3 56.3	−57.6	152.1	3 03.2	−57.7	152.1	2 10.2	−57.9	152.2	1 17.1	−58.0	152.2	25
26	6 31.2	−57.0	152.2	5 38.1	−57.2	152.3	4 45.0	−57.3	152.3	3 51.8	−57.4	152.4	2 58.7	−57.6	152.4	2 05.5	−57.7	152.4	1 12.3	−57.8	152.4	0 19.1	−57.9	152.4	26
27	5 34.2	−57.0	152.5	4 40.9	−57.1	152.6	3 47.7	−57.3	152.6	2 54.4	−57.5	152.6	2 01.1	−57.6	152.7	1 07.8	−57.7	152.7	0 14.5	−57.9	152.7	0 38.8	+58.0	27.3	27
28	4 37.2	−57.1	152.9	3 43.8	−57.2	152.9	2 50.4	−57.4	152.9	1 56.9	−57.5	152.9	1 03.5	−57.8	152.9	0 10.1	−57.8	153.0	0 43.4	+57.8	27.1	1 36.8	+58.0	27.1	28
29	3 40.1	−57.0	153.2	2 46.6	−57.3	153.2	1 53.0	−57.3	153.2	0 59.5	−57.5	153.2	0 05.9	−57.6	153.2	0 47.7	+57.7	26.8	1 41.2	+57.7	26.8	2 34.8	+58.0	26.8	29
30	2 43.1	−57.0	153.5	1 49.4	−57.2	153.5	0 55.7	−57.3	153.5	0 02.0	−57.4	153.5	0 51.7	+57.6	26.5	1 45.4	+57.7	26.5	2 39.1	+57.8	26.5	3 32.8	+57.9	26.5	30
31	1 46.1	−57.1	153.8	0 52.2	−57.2	153.8	0 01.6	+57.3	26.2	0 55.4	+57.5	26.2	1 49.3	+57.6	26.2	2 43.1	+57.7	26.2	3 36.9	+57.9	26.3	4 30.7	+58.0	26.3	31
32	0 49.0	−57.0	154.1	0 05.0	+57.1	25.9	0 58.9	+57.3	25.9	1 52.9	+57.5	25.9	2 46.9	+57.5	25.9	3 40.8	+57.7	26.0	4 34.8	+57.8	26.0	5 28.7	+57.9	26.0	32
33	0 08.0	+57.1	25.6	1 02.1	+57.2	25.6	1 56.2	+57.4	25.6	2 50.4	+57.4	25.6	3 44.4	+57.6	25.6	4 38.5	+57.7	25.7	5 32.6	+57.8	25.7	6 26.6	+58.0	25.8	33
34	1 05.1	+57.0	25.3	1 59.3	+57.2	25.3	2 53.6	+57.3	25.3	3 47.8	+57.4	25.3	4 42.0	+57.6	25.4	5 36.2	+57.7	25.4	6 30.4	+57.8	25.5	7 24.6	+57.9	25.5	34
35	2 02.1	+57.1	25.0	2 56.5	+57.2	25.0	3 50.9	+57.3	25.0	4 45.2	+57.5	25.0	5 39.6	+57.6	25.1	6 33.9	+57.7	25.1	7 28.2	+57.8	25.2	8 22.5	+57.9	25.2	35
36	2 59.2	+57.0	24.7	3 53.7	+57.1	24.7	4 48.2	+57.3	24.7	5 42.7	+57.4	24.8	6 37.2	+57.5	24.8	7 31.6	+57.7	24.9	8 26.0	+57.8	24.9	9 20.4	+58.0	25.0	36
37	3 56.2	+57.0	24.3	4 50.8	+57.2	24.4	5 45.5	+57.3	24.4	6 40.1	+57.4	24.5	7 34.7	+57.6	24.5	8 29.3	+57.7	24.6	9 23.8	+57.8	24.6	10 18.4	+57.9	24.7	37
38	4 53.2	+57.0	24.0	5 48.0	+57.2	24.1	6 42.8	+57.3	24.1	7 37.5	+57.4	24.2	8 32.3	+57.5	24.2	9 27.0	+57.6	24.3	10 21.6	+57.8	24.4	11 16.3	+57.8	24.4	38
39	5 50.2	+57.0	23.7	6 45.2	+57.1	23.8	7 40.1	+57.2	23.8	8 34.9	+57.4	23.9	9 29.8	+57.5	23.9	10 24.6	+57.6	24.0	11 19.4	+57.7	24.1	12 14.1	+57.9	24.2	39
40	6 47.2	+57.0	23.4	7 42.3	+57.1	23.5	8 37.3	+57.3	23.5	9 32.3	+57.4	23.6	10 27.3	+57.5	23.7	11 22.2	+57.7	23.7	12 17.1	+57.8	23.8	13 12.0	+57.9	23.9	40
41	7 44.2	+57.0	23.1	8 39.4	+57.1	23.2	9 34.6	+57.2	23.2	10 29.7	+57.4	23.3	11 24.8	+57.5	23.4	12 19.9	+57.6	23.4	13 14.9	+57.7	23.5	14 09.9	+57.8	23.6	41
42	8 41.2	+57.0	22.8	9 36.5	+57.1	22.8	10 31.8	+57.2	22.9	11 27.1	+57.3	23.0	12 22.3	+57.4	23.1	13 17.5	+57.5	23.2	14 12.6	+57.7	23.3	15 07.7	+57.8	23.4	42
43	9 38.2	+56.9	22.5	10 33.6	+57.1	22.5	11 29.0	+57.2	22.6	12 24.4	+57.3	22.7	13 19.7	+57.5	22.8	14 15.0	+57.6	22.9	15 10.3	+57.7	23.0	16 05.5	+57.8	23.1	43
44	10 35.1	+57.0	22.1	11 30.7	+57.0	22.2	12 26.2	+57.2	22.3	13 21.7	+57.3	22.4	14 17.2	+57.4	22.5	15 12.6	+57.5	22.6	16 08.0	+57.6	22.7	17 03.3	+57.8	22.8	44
45	11 32.1	+56.9	21.8	12 27.7	+57.1	21.9	13 23.4	+57.2	22.0	14 19.0	+57.3	22.1	15 14.6	+57.4	22.2	16 10.1	+57.6	22.3	17 05.6	+57.4	22.4	18 01.1	+57.7	22.5	45
46	12 29.0	+56.9	21.5	13 24.8	+57.0	21.6	14 20.6	+57.1	21.7	15 16.3	+57.2	21.8	16 12.0	+57.4	21.9	17 07.7	+57.4	22.0	18 03.3	+57.6	22.1	18 58.8	+57.8	22.2	46
47	13 25.9	+56.8	21.2	14 21.8	+57.0	21.3	15 17.7	+57.1	21.4	16 13.5	+57.1	21.5	17 09.4	+57.3	21.6	18 05.1	+57.5	21.7	19 00.9	+57.5	21.8	19 56.6	+57.6	21.9	47
48	14 22.7	+56.8	20.8	15 18.8	+56.9	20.9	16 14.8	+57.1	21.0	17 10.8	+57.2	21.1	18 06.7	+57.3	21.3	19 02.6	+57.4	21.4	19 58.4	+57.6	21.5	20 54.2	+57.7	21.6	48
49	15 19.5	+56.8	20.5	16 15.7	+56.9	20.6	17 11.9	+57.0	20.7	18 08.0	+57.1	20.8	19 04.0	+57.3	20.9	20 00.0	+57.4	21.1	20 56.0	+57.5	21.2	21 51.9	+57.6	21.4	49
50	16 16.3	+56.8	20.1	17 12.6	+56.9	20.3	18 08.9	+57.0	20.4	19 05.1	+57.2	20.5	20 01.3	+57.2	20.6	20 57.4	+57.4	20.8	21 53.5	+57.5	20.9	22 49.5	+57.6	21.1	50
51	17 13.1	+56.7	19.8	18 09.5	+56.9	19.9	19 05.9	+57.0	20.1	20 02.3	+57.0	20.2	20 58.5	+57.3	20.3	21 54.8	+57.3	20.4	22 51.0	+57.4	20.6	23 47.1	+57.6	20.7	51
52	18 09.8	+56.7	19.5	19 06.4	+56.8	19.6	20 02.9	+56.9	19.7	20 59.3	+57.1	19.9	21 55.8	+57.1	20.0	22 52.1	+57.3	20.1	23 48.4	+57.4	20.3	24 44.7	+57.5	20.4	52
53	19 06.5	+56.7	19.1	20 03.2	+56.8	19.3	20 59.8	+56.9	19.5	21 56.4	+57.0	19.5	22 52.9	+57.2	19.7	23 49.4	+57.3	19.8	24 45.8	+57.4	20.0	25 42.2	+57.5	20.1	53
54	20 03.2	+56.6	18.8	21 00.0	+56.7	18.9	21 56.7	+56.9	19.0	22 53.4	+57.0	19.1	23 50.1	+57.0	19.3	24 46.7	+57.2	19.5	25 43.2	+57.3	19.6	26 39.7	+57.4	19.8	54
55	20 59.8	+56.6	18.4	21 56.7	+56.7	18.6	22 53.6	+56.8	18.7	23 50.4	+56.9	18.8	24 47.1	+57.1	19.0	25 43.9	+57.1	19.1	26 40.5	+57.3	19.3	27 37.1	+57.4	19.5	55
56	21 56.4	+56.5	18.1	22 53.4	+56.7	18.2	23 50.4	+56.7	18.5	24 47.3	+56.9	18.5	25 44.2	+57.0	18.6	26 41.0	+57.1	18.8	27 37.8	+57.2	19.0	28 34.5	+57.3	19.1	56
57	22 52.9	+56.5	17.7	23 50.1	+56.6	17.9	24 47.1	+56.8	18.0	25 44.2	+56.8	18.1	26 41.2	+56.9	18.3	27 38.1	+57.1	18.5	28 35.0	+57.2	18.6	29 31.8	+57.3	18.8	57
58	23 49.4	+56.4	17.4	24 46.7	+56.5	17.5	25 43.9	+56.6	17.6	26 41.0	+56.8	17.8	27 38.1	+56.9	17.9	28 35.2	+57.0	18.1	29 32.2	+57.1	18.3	30 29.1	+57.2	18.5	58
59	24 45.8	+56.4	17.0	25 43.2	+56.5	17.3	26 40.5	+56.6	17.3	27 37.8	+56.7	17.4	28 35.0	+56.8	17.6	29 32.2	+56.9	17.9	30 29.3	+57.0	17.9	31 26.3	+57.2	18.1	59
60	25 42.2	+56.3	16.6	26 39.7	+56.4	16.7	27 37.1	+56.5	16.8	28 34.5	+56.6	17.1	29 31.8	+56.8	17.2	30 29.1	+56.9	17.4	31 26.3	+57.0	17.6	32 23.5	+57.1	17.8	60
61	26 38.5	+56.2	16.2	27 36.1	+56.4	16.4	28 33.6	+56.5	16.5	29 31.1	+56.6	16.7	30 28.6	+56.7	16.8	31 26.0	+56.8	17.0	32 23.3	+57.0	17.2	33 20.6	+57.1	17.4	61
62	27 34.7	+56.2	15.8	28 32.5	+56.2	16.0	29 30.1	+56.4	16.1	30 27.7	+56.5	16.3	31 25.3	+56.6	16.5	32 22.8	+56.8	16.6	33 20.3	+56.8	16.8	34 17.7	+56.9	17.0	62
63	28 30.9	+56.1	15.4	29 28.7	+56.3	15.6	30 26.5	+56.3	15.7	31 24.2	+56.5	15.9	32 21.9	+56.6	16.1	33 19.6	+56.6	16.3	34 17.1	+56.8	16.4	35 14.6	+56.9	16.6	63
64	29 27.0	+56.1	15.0	30 25.0	+56.1	15.2	31 22.8	+56.3	15.3	32 20.7	+56.4	15.5	33 18.5	+56.5	15.7	34 16.2	+56.6	15.9	35 13.9	+56.7	16.0	36 11.5	+56.9	16.2	64
65	30 23.1	+55.9	14.6	31 21.1	+56.1	14.8	32 19.1	+56.1	14.9	33 17.1	+56.2	15.1	34 15.0	+56.3	15.3	35 12.8	+56.5	15.3	36 10.6	+56.5	15.5	37 08.4	+56.7	15.8	65
66	31 19.0	+55.9	14.2	32 17.2	+55.9	14.3	33 15.3	+56.1	14.5	34 13.3	+56.0	14.7	35 11.4	+56.3	14.9	36 09.3	+56.3	15.0	37 07.2	+56.5	15.2	38 05.1	+56.7	15.4	66
67	32 14.9	+55.8	13.8	33 13.1	+55.9	13.9	34 11.4	+56.0	14.1	35 09.5	+56.1	14.2	36 07.7	+56.2	14.4	37 05.8	+56.3	14.6	38 03.8	+56.4	14.8	39 01.8	+56.5	15.0	67
68	33 10.7	+55.7	13.3	34 09.0	+55.8	13.6	35 07.4	+55.9	13.6	36 05.6	+56.1	13.8	37 03.9	+56.1	14.0	38 02.1	+56.2	14.2	39 00.2	+56.4	14.4	39 58.3	+56.5	14.6	68
69	34 06.4	+55.5	12.9	35 04.8	+55.7	13.0	36 03.3	+55.8	13.2	37 01.7	+55.9	13.4	38 00.0	+56.0	13.5	38 58.3	+56.1	13.7	39 56.6	+56.2	13.9	40 54.8	+56.3	14.1	69
70	35 01.9	+55.5	12.4	36 00.5	+55.6	12.6	36 59.1	+55.7	12.7	37 57.6	+55.9	12.9	38 56.0	+55.9	13.1	39 54.4	+56.1	13.3	40 52.8	+56.1	13.5	41 51.1	+56.3	13.7	70
71	35 57.4	+55.4	12.0	36 56.1	+55.5	12.1	37 54.8	+55.5	12.3	38 53.4	+55.6	12.4	39 51.9	+55.8	12.6	40 50.5	+55.9	12.8	41 48.9	+56.1	13.0	42 47.4	+56.1	13.2	71
72	36 52.8	+55.2	11.5	37 51.6	+55.3	11.8	38 50.3	+55.5	11.8	39 49.0	+55.6	12.0	40 47.7	+55.7	12.1	41 46.4	+55.8	12.3	42 45.0	+55.8	12.5	43 43.5	+56.0	12.7	72
73	37 48.0	+55.2	11.0	38 46.9	+55.3	11.1	39 45.8	+55.3	11.3	40 44.6	+55.4	11.5	41 43.4	+55.5	11.6	42 42.1	+55.7	11.8	43 40.8	+55.8	12.0	44 39.5	+55.9	12.2	73
74	38 43.2	+55.0	10.5	39 42.2	+55.0	10.8	40 41.1	+55.2	10.8	41 40.0	+55.3	11.0	42 38.9	+55.4	11.1	43 37.8	+55.5	11.3	44 36.6	+55.6	11.5	45 35.4	+55.7	11.7	74
75	39 38.2	+54.8	10.0	40 37.2	+55.0	10.1	41 36.3	+55.0	10.3	42 35.3	+55.2	10.4	43 34.3	+55.3	10.6	44 33.3	+55.3	10.8	45 32.2	+55.4	11.0	46 31.1	+55.5	11.2	75
76	40 33.0	+54.7	9.4	41 32.2	+54.8	9.6	42 31.3	+54.9	9.7	43 30.5	+55.0	9.9	44 29.6	+55.0	10.1	45 28.6	+55.2	10.2	46 27.6	+55.3	10.4	47 26.6	+55.4	10.6	76
77	41 27.7	+54.6	8.9	42 27.0	+54.6	9.0	43 26.2	+54.8	9.2	44 25.5	+54.8	9.3	45 24.6	+55.0	9.5	46 23.8	+55.0	9.7	47 22.9	+55.2	9.9	48 22.0	+55.3	10.0	77
78	42 22.3	+54.3	8.3	43 21.6	+54.5	8.5	44 21.0	+54.5	8.6	45 20.3	+54.6	8.8	46 19.6	+54.7	8.9	47 18.8	+54.9	9.1	48 18.1	+54.9	9.3	49 17.3	+55.0	9.4	78
79	43 16.6	+54.2	7.8	44 16.1	+54.3	7.9	45 15.5	+54.4	8.0	46 14.9	+54.5	8.2	47 14.3	+54.5	8.3	48 13.7	+54.6	8.5	49 13.0	+54.7	8.7	50 12.3	+54.8	8.8	79
80	44 10.8	+54.1	7.2	45 10.4	+54.1	7.3	46 09.9	+54.1	7.4	47 09.4	+54.2	7.6	48 08.8	+54.4	7.7	49 08.3	+54.4	7.9	50 07.7	+54.5	8.0	51 07.1	+54.6	8.2	80
81	45 04.9	+53.8	6.6	46 04.5	+53.8	6.8	47 04.0	+54.0	6.8	48 03.6	+54.0	6.9	49 03.2	+54.1	7.1	50 02.7	+54.2	7.2	51 02.2	+54.3	7.4	52 01.7	+54.4	7.5	81
82	45 58.7	+53.6	5.9	46 58.3	+53.7	6.0	47 58.0	+53.7	6.1	48 57.6	+53.9	6.3	49 57.3	+53.9	6.4	50 56.9	+54.0	6.5	51 56.5	+54.0	6.7	52 56.1	+54.1	6.8	82
83	46 52.3	+53.3	5.3	47 52.0	+53.4	5.4	48 51.7	+53.5	5.5	49 51.5	+53.5	5.6	50 51.2	+53.6	5.7	51 50.9	+53.6	5.8	52 50.5	+53.8	6.0	53 50.2	+53.9	6.1	83
84	47 45.6	+53.1	4.7	48 45.4	+53.2	4.8	49 45.2	+53.2	4.8	50 45.0	+53.4	4.9	51 44.8	+53.4	5.0	52 44.5	+53.5	5.1	53 44.3	+53.5	5.3	54 44.1	+53.6	5.4	84
85	48 38.7	+52.9	3.9	49 38.6	+52.9	4.0	50 38.4	+53.0	4.1	51 38.3	+53.0	4.1	52 38.1	+53.1	4.2	53 38.0	+53.1	4.3	54 37.8	+53.2	4.4	55 37.6	+53.2	4.6	85
86	49 31.6	+52.6	3.2	50 31.5	+52.6	3.2	51 31.4	+52.6	3.3	52 31.3	+52.7	3.4	53 31.2	+52.7	3.5	54 31.1	+52.8	3.5	55 31.0	+52.8	3.6	56 30.8	+52.9	3.7	86
87	50 24.2	+52.2	2.4	51 24.1	+52.3	2.5	52 24.0	+52.4	2.5	53 24.0	+52.4	2.6	54 23.9	+52.4	2.7	55 23.9	+52.4	2.7	56 23.8	+52.5	2.8	57 23.7	+52.5	2.9	87
88	51 16.4	+52.0	1.6	52 16.4	+52.0	1.7	53 16.4	+52.0	1.7	54 16.4	+52.0	1.8	55 16.3	+52.1	1.8	56 16.3	+52.1	1.9	57 16.3	+52.0	1.9	58 16.2	+52.1	2.0	88
89	52 08.4	+51.6	0.8	53 08.4	+51.6	0.9	54 08.4	+51.6	0.9	55 08.4	+51.6	0.9	56 08.4	+51.6	0.9	57 08.4	+51.6	0.9	58 08.3	+51.7	1.0	59 08.3	+51.7	1.0	89
90	53 00.0	+51.2	0.0	54 00.0	+51.2	0.0	55 00.0	+51.2	0.0	56 00.0	+51.2	0.0	57 00.0	+51.2	0.0	58 00.0	+51.2	0.0	59 00.0	+51.2	0.0	60 00.0	+51.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 149°, 211°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	30 41.3	+55.7	142.0	29 53.9	+56.0	142.3	29 06.3	+56.3	142.7	28 18.5	+56.5	143.0	27 30.5	+56.7	143.3	26 42.3	+56.9	143.6	25 53.9	+57.2	143.9	25 05.3	+57.4	144.2	0
1	31 37.0	+55.6	141.5	30 49.9	+55.9	141.9	30 02.6	+56.1	142.2	29 15.0	+56.4	142.6	28 27.2	+56.7	142.9	27 39.2	+56.9	143.3	26 51.1	+57.1	143.6	26 02.7	+57.3	143.9	1
2	32 32.6	+55.5	141.1	31 45.8	+55.7	141.5	30 58.7	+56.1	141.9	30 11.4	+56.3	142.2	29 23.9	+56.5	142.6	28 36.1	+56.8	142.9	27 48.2	+57.0	143.2	27 00.0	+57.3	143.5	2
3	33 28.1	+55.3	140.6	32 41.5	+55.7	141.0	31 54.8	+55.9	141.4	31 07.7	+56.3	141.8	30 20.4	+56.5	142.2	29 32.9	+56.8	142.5	28 45.2	+57.0	142.9	27 57.3	+57.2	143.2	3
4	34 23.4	+55.3	140.2	33 37.2	+55.6	140.6	32 50.7	+55.9	141.0	32 04.0	+56.1	141.4	31 16.9	+56.5	141.8	30 29.7	+56.7	142.2	29 42.2	+56.9	142.5	28 54.5	+57.1	142.9	4
5	35 18.7	+55.2	139.7	34 32.8	+55.5	140.1	33 46.6	+55.8	140.6	33 00.1	+56.1	141.0	32 13.4	+56.3	141.4	31 26.4	+56.6	141.8	30 39.1	+56.9	142.1	29 51.6	+57.1	142.5	5
6	36 13.9	+55.1	139.2	35 28.3	+55.4	139.7	34 42.4	+55.7	140.1	33 56.2	+56.0	140.6	33 09.7	+56.3	141.0	32 23.0	+56.5	141.4	31 36.0	+56.8	141.8	30 48.7	+57.1	142.1	6
7	37 09.0	+54.9	138.7	36 23.7	+55.3	139.2	35 38.1	+55.6	139.7	34 52.2	+55.9	140.1	34 06.0	+56.2	140.6	33 19.5	+56.5	141.0	32 32.8	+56.7	141.4	31 45.8	+57.0	141.8	7
8	38 03.9	+54.8	138.2	37 19.0	+55.1	138.7	36 33.7	+55.5	139.2	35 48.1	+55.8	139.7	35 02.2	+56.1	140.1	34 16.0	+56.4	140.6	33 29.5	+56.7	141.0	32 42.8	+56.9	141.4	8
9	38 58.7	+54.6	137.7	38 14.1	+55.0	138.2	37 29.2	+55.4	138.7	36 43.9	+55.7	139.2	35 58.3	+56.0	139.7	35 12.4	+56.3	140.2	34 26.2	+56.6	140.6	33 39.7	+56.8	141.0	9
10	39 53.3	+54.5	137.1	39 09.1	+54.9	137.7	38 24.6	+55.2	138.2	37 39.6	+55.6	138.8	36 54.3	+55.9	139.3	36 08.7	+56.2	139.7	35 22.8	+56.5	140.2	34 36.5	+56.8	140.6	10
11	40 47.8	+54.3	136.6	40 04.0	+54.7	137.2	39 19.8	+55.1	137.7	38 35.2	+55.5	138.3	37 50.2	+55.8	138.8	37 04.9	+56.1	139.3	36 19.3	+56.4	139.8	35 33.3	+56.7	140.3	11
12	41 42.1	+54.2	136.0	40 58.7	+54.6	136.6	40 14.9	+55.0	137.2	39 30.7	+55.3	137.8	38 46.0	+55.7	138.3	38 01.0	+56.0	138.9	37 15.7	+56.3	139.4	36 30.0	+56.6	139.8	12
13	42 36.3	+54.0	135.5	41 53.3	+54.4	136.1	41 09.9	+54.8	136.7	40 26.0	+55.2	137.3	39 41.7	+55.6	137.9	38 57.0	+55.9	138.4	38 12.0	+56.2	138.9	37 26.6	+56.5	139.4	13
14	43 30.3	+53.8	134.9	42 47.7	+54.3	135.5	42 04.7	+54.6	136.2	41 21.2	+55.0	136.8	40 37.3	+55.4	137.4	39 52.9	+55.8	137.9	39 08.2	+56.1	138.5	38 23.1	+56.4	139.0	14
15	44 24.1	+53.6	134.2	43 42.0	+54.0	134.9	42 59.3	+54.5	135.6	42 16.2	+54.9	136.2	41 32.7	+55.3	136.9	40 48.7	+55.7	137.4	40 04.3	+56.0	138.0	39 19.5	+56.3	138.6	15
16	45 17.7	+53.3	133.6	44 36.0	+53.9	134.3	43 53.8	+54.3	135.0	43 11.1	+54.8	135.7	42 28.0	+55.1	136.3	41 44.4	+55.5	136.9	41 00.3	+55.9	137.5	40 15.8	+56.2	138.1	16
17	46 11.0	+53.2	132.9	45 29.9	+53.6	133.7	44 48.1	+54.2	134.4	44 05.9	+54.5	135.1	43 23.1	+55.0	135.8	42 39.9	+55.4	136.4	41 56.2	+55.7	137.1	41 12.0	+56.1	137.7	17
18	47 04.2	+52.9	132.3	46 23.5	+53.4	133.1	45 42.3	+53.9	133.8	45 00.4	+54.4	134.5	44 18.1	+54.8	135.2	43 35.3	+55.2	135.9	42 51.9	+55.6	136.6	42 08.1	+56.0	137.2	18
19	47 57.1	+52.7	131.6	47 16.9	+53.2	132.4	46 36.2	+53.7	133.2	45 54.8	+54.2	133.9	45 12.9	+54.7	134.7	44 30.5	+55.1	135.4	43 47.5	+55.5	136.0	43 04.1	+55.9	136.7	19
20	48 49.7	+52.3	130.9	48 10.1	+52.9	131.7	47 29.9	+53.4	132.5	46 49.0	+54.0	133.3	46 07.6	+54.4	134.1	45 25.6	+54.9	134.8	44 43.0	+55.3	135.5	44 00.0	+55.7	136.2	20
21	49 42.0	+52.1	130.1	49 03.0	+52.7	131.0	48 23.3	+53.3	131.8	47 43.0	+53.7	132.7	47 02.0	+54.3	133.5	46 20.5	+54.7	134.2	45 38.3	+55.2	135.0	44 55.7	+55.5	135.7	21
22	50 34.1	+51.7	129.3	49 55.7	+52.3	130.2	49 16.6	+52.9	131.1	48 36.7	+53.6	132.0	47 56.3	+54.0	132.8	47 15.2	+54.5	133.6	46 33.5	+55.0	134.4	45 51.2	+55.4	135.2	22
23	51 25.8	+51.4	128.5	50 48.0	+52.1	129.5	50 09.5	+52.7	130.4	49 30.3	+53.3	131.3	48 50.3	+53.7	132.2	48 09.7	+54.3	133.0	47 28.5	+54.8	133.8	46 46.6	+55.3	134.6	23
24	52 17.2	+51.0	127.7	51 40.1	+51.7	128.7	51 02.2	+52.4	129.7	50 23.5	+53.0	130.6	49 44.1	+53.6	131.5	49 04.0	+54.1	132.4	48 23.3	+54.6	133.2	47 41.9	+55.1	134.0	24
25	53 08.2	+50.6	126.8	52 31.8	+51.4	127.9	51 54.6	+52.0	128.9	51 16.5	+52.7	129.9	50 37.7	+53.3	130.8	49 58.1	+53.9	131.7	49 17.9	+54.3	132.6	48 37.0	+54.8	133.4	25
26	53 58.8	+50.2	125.9	53 23.2	+50.9	127.0	52 46.6	+51.7	128.1	52 09.2	+52.4	129.1	51 31.0	+53.0	130.1	50 52.0	+53.6	131.0	50 12.2	+54.2	131.9	49 31.8	+54.7	132.8	26
27	54 49.0	+49.7	125.0	54 14.1	+50.6	126.1	53 38.3	+51.3	127.2	53 01.6	+52.0	128.3	52 24.0	+52.7	129.3	51 45.6	+53.3	130.3	51 06.4	+53.9	131.2	50 26.5	+54.4	132.2	27
28	55 38.7	+49.3	124.0	55 04.7	+50.1	125.1	54 29.6	+50.9	126.3	53 53.6	+51.7	127.4	53 16.7	+52.4	128.5	52 38.9	+53.0	129.5	52 00.3	+53.7	130.5	51 20.9	+54.3	131.5	28
29	56 28.0	+48.7	123.0	55 54.8	+49.6	124.2	55 20.5	+50.5	125.4	54 45.3	+51.3	126.6	54 09.1	+52.0	127.7	53 31.9	+52.8	128.8	52 54.0	+53.3	129.8	52 15.2	+53.9	130.8	29
30	57 16.7	+48.2	121.9	56 44.4	+49.2	123.2	56 11.0	+50.1	124.5	55 36.6	+50.8	125.7	55 01.1	+51.6	126.8	54 24.7	+52.3	127.9	53 47.3	+53.1	129.0	53 09.1	+53.7	130.1	30
31	58 04.9	+47.5	120.8	57 33.6	+48.5	122.1	57 01.1	+49.5	123.4	56 27.4	+50.4	124.7	55 52.7	+51.3	125.9	55 17.0	+52.1	127.1	54 40.4	+52.7	128.2	54 02.8	+53.4	129.3	31
32	58 52.4	+46.9	119.6	58 22.1	+48.0	121.0	57 50.6	+49.0	122.4	57 17.8	+50.0	123.7	56 44.0	+50.8	125.0	56 09.1	+51.6	126.2	55 33.1	+52.4	127.4	54 56.2	+53.1	128.5	32
33	59 39.3	+46.2	118.4	59 10.1	+47.3	119.9	58 39.6	+48.3	121.3	58 07.8	+49.4	122.7	57 34.8	+50.3	124.0	57 00.7	+51.2	125.3	56 25.5	+52.0	126.5	55 49.3	+52.7	127.7	33
34	60 25.5	+45.4	117.1	59 57.4	+46.6	118.7	59 27.9	+47.7	120.1	58 57.2	+48.7	121.6	58 25.1	+49.8	122.9	57 51.9	+50.7	124.3	57 17.5	+51.5	125.6	56 42.0	+52.3	126.9	34
35	61 10.9	+44.5	115.8	60 44.0	+45.9	117.4	60 15.7	+47.1	118.9	59 46.0	+48.2	120.4	59 14.9	+49.2	121.9	58 42.6	+50.2	123.3	58 09.0	+51.2	124.7	57 34.4	+51.9	126.0	35
36	61 55.4	+43.7	114.4	61 29.9	+45.0	116.1	61 02.8	+46.3	117.7	60 34.2	+47.5	119.3	60 04.1	+48.7	120.8	59 32.8	+49.7	122.2	59 00.2	+50.6	123.6	58 26.3	+51.5	125.0	36
37	62 39.1	+42.7	112.9	62 14.9	+44.1	114.6	61 49.1	+45.5	116.3	61 21.7	+46.8	118.0	60 52.8	+47.9	119.6	60 22.5	+49.0	121.1	59 50.8	+50.1	122.6	59 17.8	+51.1	124.0	37
38	63 21.8	+41.6	111.3	62 59.0	+43.2	113.2	62 34.6	+44.6	115.0	62 08.5	+46.0	116.7	61 40.7	+47.3	118.3	61 11.5	+48.5	119.9	60 40.9	+49.5	121.5	60 08.9	+50.5	123.0	38
39	64 03.4	+40.5	109.7	63 42.2	+42.1	111.6	63 19.2	+43.7	113.5	62 54.4	+45.2	115.3	62 28.0	+46.5	117.0	62 00.0	+47.7	118.7	61 30.4	+48.9	120.3	60 59.4	+50.0	121.9	39
40	64 43.9	+39.2	108.0	64 24.3	+41.0	110.0	64 02.9	+42.6	111.9	63 39.6	+44.1	113.8	63 14.5	+45.6	115.6	62 47.7	+46.9	117.4	62 19.3	+48.2	119.1	61 49.4	+49.3	120.7	40
41	65 23.1	+37.9	106.2	65 05.3	+39.8	108.3	64 45.5	+41.5	110.3	64 23.7	+43.2	112.3	64 00.1	+44.6	114.2	63 34.6	+46.1	116.0	63 07.5	+47.4	117.8	62 38.7	+48.7	119.5	41
42	66 01.0	+36.5	104.3	65 45.1	+38.4	106.5	65 27.0	+40.3	108.6	65 06.9	+42.0	110.6	64 44.7	+43.7	112.6	64 20.7	+45.2	114.5	63 54.9	+46.6	116.4	63 27.4	+47.9	118.2	42
43	66 37.5	+34.9	102.4	66 23.5	+37.0	104.6	66 07.3	+38.9	106.8	65 48.9	+40.8	108.9	65 28.4	+42.6	110.9	65 05.9	+44.2	113.0	64 41.5	+45.8	115.0	64 15.3	+47.2	116.8	43
44	67 12.4	+33.2	100.3	67 00.5	+35.4	102.6	66 46.2	+37.5	104.9	66 29.7	+39.5	107.1	66 11.0	+41.3	109.3	65 50.1	+43.1	111.4	65 27.3	+44.7	113.4	65 02.5	+46.2	115.4	44
45	67 45.6	+31.4	98.1	67 35.9	+33.7	100.5	67 23.7	+35.9	102.9	67 09.2	+38.0	105.2	66 52.3	+40.0	107.5	66 33.2	+41.9	109.7	66 12.0	+43.6	111.8	65 48.7	+45.3	113.9	45
46	68 17.0	+29.4•	95.8	68 09.6	+31.9	98.3	67 59.6	+34.3	100.8	67 47.2	+36.4	103.2	67 32.3	+38.6	105.5	67 15.1	+40.6	107.8	66 55.6	+42.5	110.1	66 34.0	+44.1	112.2	46
47	68 46.4	+27.3•	93.4	68 41.5	+29.8•	96.0	68 33.9	+32.3	98.5	68 23.6	+34.8	101.0	68 10.9	+37.0	103.5	67 55.7	+39.1	105.9	67 38.1	+41.1	108.2	67 18.1	+43.1	110.5	47
48	69 13.7	+25.1•	91.0	69 11.3	+27.8•	93.6	69 06.2	+30.4•	96.2	68 58.4	+32.9•	98.8	68 47.9	+35.3	101.3	68 34.8	+37.5	103.8	68 19.2	+39.7	106.3	68 01.2	+41.7	108.7	48
49	69 38.8	+22.8•	88.4	69 39.1	+25.5•	91.1	69 36.6	+28.2•	93.8	69 31.3	+30.8•	96.4	69 23.2	+33.4•	99.1	69 12.3	+35.9	101.7	68 58.9	+38.1	104.2	68 42.9	+40.2	106.7	49
50	70 01.6	+20.2•	85.7	70 04.6	+23.1•	88.4	70 04.8	+26.0•	91.2	70 02.1	+28.7•	94.0	69 56.6	+31.3•	96.7	69 48.2	+33.9•	99.4	69 37.0	+36.4	102.0	69 23.1	+38.7	104.7	50
51	70 21.8	+17.6•	82.9	70 27.7	+20.6•	85.7	70 30.8	+23.4•	88.5	70 30.8	+26.4•	91.4	70 27.9	+29.2•	94.2	70 22.1	+31.9•	97.0	70 13.4	+34.5•	99.7	70 01.8	+37.0	102.4	51
52	70 39.4	+14.8•	80.0	70 48.3	+17.8•	82.9	70 54.2	+20.9•	85.7	70 57.2	+23.8•	88.6	70 57.1	+26.8•	91.5	70 54.0	+29.6•	94.4	70 47.9	+32.4•	97.3	70 38.8	+35.1•	100.1	52
53	70 54.2	+11.9•	77.1	71 06.1	+15.0•	79.9	71 15.1	+18.1•	82.8	71 21.0	+21.2•	85.8	71 23.9	+24.2•	88.8	71 23.6	+27.3•	91.7	71 20.3	+30.1•	94.7	71 13.9	+32.9•	97.6	53
54	71 06.1	+9.0•	74.1	71 21.1	+12.1•	76.9	71 33.2	+15.2•	79.9	71 42.2	+18.4•	82.8	71 48.1	+21.6•	85.9	71 50.9	+24.6•	88.9	71 50.4	+27.8•	91.9	71 46.8	+30.7•	95.0	54
55	71 15.1	+5.9•	71.0	71 33.2	+9.0•	73.9	71 48.4	+12.2•	76.8	72 00.6	+15.4•	79.8	72 09.7	+18.6•	82.8	72 15.5	+21.9•	85.9	72 18.2	+25.0•	89.1	72 17.5	+28.2•	92.2	55
56	71 21.0	+2.9•	67.9	71 42.2	+5.9•	70.7	72 00.6	+9.1•	73.6	72 16.0	+12.3•	76.6	72 28.3	+15.6•	79.7	72 37.4	+18.9•	82.9	72 43.2	+22.2•	86.0	72 45.7	+25.5•	89.3	56
57	71 23.9	–0.3•	64.8	71 48.1	+2.8•	67.5	72 09.7	+5.8•	70.4	72 28.3	+9.1•	73.4	72 43.9	+12.4•	76.5	72 56.3	+15.8•	79.6	73 05.4	+19.2•	82.9	73 11.2	+22.6•	86.2	57
58	71 23.6	–3.3•	61.7	71 50.9	–0.5•	64.3	72 15.5	+2.7•	67.2	72 37.4	+5.8•	70.1	72 56.3	+9.1•	73.2	73 12.1	+12.5•	76.3	73 24.6	+16.0•	79.6	73 33.8	+19.4•	82.9	58
59	71 20.3	–6.4•	58.5	71 50.4	–3.6•	61.1	72 18.2	–0.7•	63.9	72 43.2	+2.5•	66.8	73 05.4	+5.8•	69.8	73 24.6	+9.2•	72.9	73 40.6	+12.6•	76.2	73 53.2	+16.0•	79.6	59
60	71 13.9	–9.5•	55.4	71 46.8	–6.8•	57.9	72 17.5	–3.9•	60.6	72 45.7	–0.9•	63.4	73 11.2	+2.3•	66.3	73 33.8	+5.6•	69.4	73 53.2	+9.1•	72.7	74 09.4	+12.7•	76.1	60
61	71 04.4	–12.4•	52.4	71 40.0	–9.9•	54.8	72 13.6	–7.2•	57.3	72 44.8	–4.3•	60.0	73 13.5	–1.2•	62.9	73 39.4	+2.1•	65.9	74 02.3	+5.5•	69.1	74 22.1	+9.1•	72.4	61
62	70 52.0	–15.3•	49.4	71 30.1	–12.9•	51.6	72 06.4	–10.4•	54.1	72 40.5	–7.6•	56.7	73 12.3	–4.7•	59.8	73 41.5	–1.5•	62.4	74 07.8	+1.9•	65.5	74 31.2	+5.3•	68.8	62
63	70 36.7	–18.0•	46.4	71 17.2	–15.8•	48.6	71 56.0	–13.4•	50.9	72 32.9	–10.8•	53.3	73 07.6	–8.0•	56.0	73 40.0	–5.1•	58.8	74 09.7	–1.9•	61.8	74 36.5	+1.6•	65.0	63
64	70 18.7	–20.6•	43.6	71 01.4	–18.6•	45.6	71 42.6	–16.4•	47.8	72 22.1	–14.0•	50.1	72 59.6	–11.4•	52.6	73 34.9	–8.6•	55.3	74 07.8	–5.5•	58.2	74 38.1	–2.2•	61.3	64
65	69 58.1	–23.2•	40.8	70 42.8	–21.2•	42.7	71 26.2	–19.2•	44.7	72 08.1	–17.1•	46.9	72 48.2	–14.6•	49.2	73 26.3	–12.0•	51.8	74 02.3	–9.1•	54.5	74 35.9	–6.0•	57.5	65
66	69 34.9	–25.4•	38.2	70 21.6	–23.8•	39.9	71 07.0	–22.0•	41.8	71 51.0	–19.9•	43.8	72 33.6	–17.7•	46.0	73 14.3	–15.2•	48.4	73 53.2	–12.6•	51.0	74 29.9	–9.8•	53.7	66
67	69 09.5	–27.7•	35.6	69 57.8	–26.2•	37.2	70 45.0	–24.4•	38.9	71 31.1	–22.6•	40.8	72 15.9	–20.7•	42.8	72 59.1	–18.5•	45.0	73 40.6	–16.0•	47.4	74 20.1	–13.3•	50.1	67
68	68 41.8	–29.8	33.1	69 31.6	–28.4	34.6	70 20.6	–26.9•	36.2	71 08.5	–25.3•	37.9	71 55.2	–23.4•	39.8	72 40.6	–21.4•	41.8	73 24.6	–19.2•	44.0	74 06.8	–16.7•	46.5	68
69	68 12.0	–31.6	30.8	69 03.2	–30.4•	32.1	69 53.7	–29.1•	33.5	70 43.2	–27.6•	35.1	71 31.8	–26.0•	36.8	72 19.2	–24.2•	38.7	73 05.4	–22.2•	40.8	73 50.1	–20.1•	43.0	69
70	67 40.4	–33.5	28.5	68 32.8	–32.4	29.7	69 24.6	–31.2•	31.0	70 15.6	–29.9•	32.5	71 05.8	–28.5•	34.0	71 55.0	–26.8•	35.7	72 43.2	–25.1•	37.6	73 30.0	–23.1•	39.7	70
71	67 06.9	–35.2	26.3	68 00.4	–34.2	27.4	68 53.4	–33.2	28.6	69 45.7	–32.0•	29.9	70 37.3	–30.7•	31.3	71 28.2	–29.3•	32.9	72 18.1	–27.7•	34.6	73 06.9	–26.0•	36.4	71
72	66 31.7	–36.7	24.3	67 26.2	–35.8	25.3	68 20.2	–34.9	26.3	69 13.7	–33.9	27.5	70 06.6	–32.7•	28.8	70 58.9	–31.6•	30.2	71 50.4	–30.2•	31.7	72 40.9	–28.6•	33.4	72
73	65 55.0	–38.1	22.3	66 50.4	–37.4	23.2	67 45.3	–36.6	24.2	68 39.8	–35.6	25.2	69 33.9	–34.7	26.3	70 27.3	–33.6	27.6	71 20.2	–32.4•	29.0	72 12.3	–31.1•	30.5	73
74	65 16.9	–39.5	20.4	66 13.0	–38.8	21.2	67 08.7	–38.1	22.1	68 04.2	–37.4	23.0	68 59.2	–36.5	24.0	69 53.7	–35.5	25.1	70 47.8	–34.5•	26.4	71 41.2	–33.3•	27.7	74
75	64 37.4	–40.8	18.7	65 34.2	–40.1	19.4	66 30.6	–39.4	20.1	67 26.8	–38.8	21.0	68 22.7	–38.1	21.9	69 18.2	–37.3	22.8	70 13.3	–36.4	23.9	71 07.9	–35.4•	25.1	75
76	63 56.8	–41.8	17.0	64 54.1	–41.4	17.6	65 51.2	–40.8	18.3	66 48.0	–40.2	19.0	67 44.6	–39.6	19.8	68 40.9	–38.9	20.6	69 36.9	–38.1	21.6	70 32.5	–37.3	22.6	76
77	63 15.0	–42.9	15.4	64 12.7	–42.4	15.9	65 10.4	–42.0	16.5	66 07.8	–41.5	17.1	67 05.0	–40.9	17.8	68 02.0	–40.3	18.6	68 58.8	–39.7	19.4	69 55.2	–39.0	20.3	77
78	62 32.1	–43.8	13.8	63 30.3	–43.4	14.3	64 28.4	–43.1	14.8	65 26.3	–42.6	15.4	66 24.1	–42.2	16.0	67 21.7	–41.7	16.6	68 19.1	–41.2	17.4	69 16.2	–40.5	18.1	78
79	61 48.3	–44.7	12.4	62 46.9	–44.4	12.8	63 45.3	–44.0	13.2	64 43.7	–43.7	13.7	65 41.9	–43.3	14.2	66 40.0	–42.9	14.8	67 37.9	–42.4	15.4	68 35.7	–42.0	16.1	79
80	61 03.6	–45.5	11.0	62 02.5	–45.3	11.3	63 01.3	–45.0	11.7	64 00.0	–44.7	12.1	64 58.6	–44.4	12.6	65 57.1	–44.0	13.1	66 55.5	–43.7	13.6	67 53.7	–43.2	14.2	80
81	60 18.1	–46.3	9.6	61 17.2	–46.1	9.9	62 16.3	–45.9	10.3	63 15.3	–45.6	10.6	64 14.2	–45.3	11.0	65 13.1	–45.1	11.4	66 11.8	–44.7	11.9	67 10.5	–44.4	12.3	81
82	59 31.8	–47.0	8.4	60 31.1	–46.8	8.6	61 30.4	–46.6	8.9	62 29.7	–46.4	9.2	63 28.9	–46.2	9.5	64 28.0	–45.9	9.9	65 27.1	–45.7	10.2	66 26.1	–45.4	10.6	82
83	58 44.8	–47.6	7.2	59 44.3	–47.5	7.4	60 43.8	–47.3	7.6	61 43.3	–47.2	7.8	62 42.7	–47.0	8.1	63 42.1	–46.9	8.4	64 41.4	–46.6	8.7	65 40.7	–46.4	9.0	83
84	57 57.2	–48.3	6.0	58 56.8	–48.1	6.2	59 56.5	–48.1	6.3	60 56.1	–47.9	6.5	61 55.7	–47.8	6.7	62 55.2	–47.6	7.0	63 54.8	–47.5	7.2	64 54.3	–47.3	7.5	84
85	57 08.9	–48.8	4.9	58 08.7	–48.7	5.0	59 08.4	–48.6	5.2	60 08.2	–48.5	5.3	61 07.9	–48.4	5.5	62 07.6	–48.3	5.7	63 07.3	–48.2	5.9	64 07.0	–48.1	6.1	85
86	56 20.1	–49.3	3.8	57 20.0	–49.3	3.9	58 19.8	–49.2	4.0	59 19.7	–49.2	4.2	60 19.5	–49.1	4.3	61 19.3	–49.0	4.4	62 19.1	–48.9	4.6	63 18.9	–48.8	4.7	86
87	55 30.8	–49.9	2.8	56 30.7	–49.8	2.9	57 30.6	–49.8	3.0	58 30.5	–49.7	3.0	59 30.4	–49.5	3.1	60 30.3	–49.5	3.2	61 30.2	–49.5	3.3	62 30.1	–49.4	3.4	87
88	54 40.9	–50.2	1.8	55 40.9	–50.2	1.9	56 40.8	–50.2	1.9	57 40.8	–50.1	2.0	58 40.8	–50.1	2.0	59 40.8	–50.1	2.1	60 40.7	–50.1	2.2	61 40.7	–50.1	2.2	88
89	53 50.7	–50.7	0.9	54 50.7	–50.7	0.9	55 50.7	–50.7	0.9	56 50.7	–50.7	1.0	57 50.7	–50.7	1.0	58 50.6	–50.6	1.0	59 50.6	–50.6	1.1	60 50.6	–50.6	1.1	89
90	53 00.0	–51.1	0.0	54 00.0	–51.1	0.0	55 00.0	–51.1	0.0	56 00.0	–51.1	0.0	57 00.0	–51.1	0.0	58 00.0	–51.1	0.0	59 00.0	–51.1	0.0	60 00.0	–51.1	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	30 41.3	−55.8	142.0	29 53.9	−56.0	142.3	29 06.3	−56.3	142.7	28 18.5	−56.5	143.0	27 30.5	−56.8	143.3	26 42.3	−57.0	143.6	25 53.9	−57.2	143.9	25 05.3	−57.4	144.2	0
1	29 45.5	−55.8	142.4	28 57.9	−56.1	142.7	28 10.0	−56.3	143.1	27 22.0	−56.6	143.4	26 33.7	−56.8	143.7	25 45.3	−57.0	144.0	24 56.7	−57.2	144.2	24 07.9	−57.4	144.5	1
2	28 49.7	−55.9	142.8	28 01.8	−56.2	143.1	27 13.7	−56.4	143.4	26 25.4	−56.6	143.7	25 36.9	−56.8	144.0	24 48.3	−57.1	144.3	23 59.5	−57.3	144.6	23 10.5	−57.5	144.8	2
3	27 53.8	−56.0	143.2	27 05.6	−56.2	143.5	26 17.3	−56.5	143.8	25 28.8	−56.7	144.1	24 40.1	−57.0	144.4	23 51.2	−57.1	144.6	23 02.2	−57.3	144.9	22 13.0	−57.5	145.1	3
4	26 57.8	−56.1	143.6	26 09.4	−56.3	143.9	25 20.8	−56.5	144.2	24 32.1	−56.7	144.5	23 43.1	−56.9	144.7	22 54.1	−57.2	145.0	22 04.9	−57.3	145.2	21 15.5	−57.5	145.4	4
5	26 01.7	−56.1	144.0	25 13.1	−56.4	144.3	24 24.3	−56.6	144.6	23 35.3	−56.8	144.8	22 46.2	−57.0	145.1	21 56.9	−57.2	145.3	21 07.5	−57.4	145.5	20 18.0	−57.6	145.7	5
6	25 05.6	−56.2	144.4	24 16.7	−56.4	144.7	23 27.7	−56.7	144.9	22 38.5	−56.8	145.2	21 49.2	−57.1	145.4	20 59.7	−57.2	145.6	20 10.1	−57.4	145.8	19 20.4	−57.6	146.0	6
7	24 09.4	−56.2	144.8	23 20.3	−56.5	145.1	22 31.0	−56.6	145.3	21 41.7	−56.9	145.5	20 52.1	−57.1	145.7	20 02.5	−57.3	146.0	19 12.7	−57.5	146.2	18 22.8	−57.6	146.3	7
8	23 13.2	−56.3	145.2	22 23.8	−56.5	145.4	21 34.4	−56.8	145.6	20 44.8	−57.0	145.9	19 55.0	−57.1	146.1	19 05.2	−57.3	146.3	18 15.2	−57.5	146.5	17 25.2	−57.7	146.6	8
9	22 16.9	−56.4	145.6	21 27.3	−56.5	145.8	20 37.6	−56.7	146.0	19 47.8	−56.9	146.2	18 57.9	−57.1	146.4	18 07.9	−57.3	146.6	17 17.8	−57.5	146.8	16 27.5	−57.6	146.9	9
10	21 20.5	−56.4	145.9	20 30.8	−56.7	146.1	19 40.9	−56.8	146.3	18 50.9	−57.0	146.5	18 00.8	−57.2	146.7	17 10.6	−57.4	146.9	16 20.3	−57.6	147.1	15 29.9	−57.7	147.2	10
11	20 24.1	−56.4	146.3	19 34.1	−56.6	146.5	18 44.1	−56.9	146.7	17 53.9	−57.1	146.9	17 03.6	−57.2	147.0	16 13.2	−57.4	147.2	15 22.7	−57.6	147.4	14 32.2	−57.7	147.5	11
12	19 27.7	−56.5	146.7	18 37.5	−56.7	146.8	17 47.2	−56.9	147.0	16 56.8	−57.0	147.2	16 06.4	−57.3	147.3	15 15.8	−57.4	147.5	14 25.2	−57.6	147.6	13 34.4	−57.7	147.8	12
13	18 31.2	−56.5	147.0	17 40.8	−56.7	147.2	16 50.3	−56.9	147.4	15 59.8	−57.1	147.5	15 09.1	−57.2	147.7	14 18.4	−57.4	147.8	13 27.6	−57.6	147.9	12 36.7	−57.8	148.1	13
14	17 34.7	−56.6	147.4	16 44.1	−56.8	147.5	15 53.4	−56.9	147.7	15 02.7	−57.1	147.8	14 11.9	−57.3	148.0	13 21.0	−57.5	148.1	12 30.0	−57.6	148.2	11 38.9	−57.7	148.3	14
15	16 38.1	−56.6	147.7	15 47.3	−56.7	147.9	14 56.5	−57.0	148.0	14 05.6	−57.2	148.1	13 14.6	−57.3	148.3	12 23.5	−57.5	148.4	11 32.4	−57.7	148.5	10 41.2	−57.8	148.6	15
16	15 41.5	−56.6	148.1	14 50.6	−56.8	148.2	13 59.5	−57.0	148.3	13 08.4	−57.1	148.5	12 17.3	−57.4	148.6	11 26.0	−57.5	148.7	10 34.7	−57.6	148.8	9 43.4	−57.8	148.9	16
17	14 44.9	−56.7	148.4	13 53.7	−56.8	148.5	13 02.5	−57.0	148.7	12 11.3	−57.2	148.8	11 19.9	−57.3	148.9	10 28.5	−57.5	149.0	9 37.1	−57.7	149.1	8 45.6	−57.8	149.2	17
18	13 48.2	−56.7	148.7	12 56.9	−56.9	148.9	12 05.5	−57.0	149.0	11 14.1	−57.2	149.1	10 22.6	−57.4	149.2	9 31.0	−57.5	149.3	8 39.4	−57.6	149.4	7 47.8	−57.8	149.4	18
19	12 51.5	−56.7	149.1	12 00.0	−56.8	149.2	11 08.5	−57.1	149.3	10 16.9	−57.3	149.4	9 25.2	−57.4	149.5	8 33.5	−57.5	149.6	7 41.8	−57.7	149.6	6 50.0	−57.9	149.7	19
20	11 54.8	−56.7	149.4	11 03.2	−57.0	149.5	10 11.4	−57.1	149.6	9 19.6	−57.2	149.7	8 27.8	−57.4	149.8	7 36.0	−57.5	149.8	6 44.1	−57.7	149.9	5 52.1	−57.9	150.0	20
21	10 58.1	−56.8	149.7	10 06.2	−56.9	149.8	9 14.3	−57.0	149.9	8 22.4	−57.2	150.0	7 30.4	−57.4	150.1	6 38.4	−57.5	150.1	5 46.4	−57.7	150.2	4 54.3	−57.8	150.2	21
22	10 01.3	−56.7	150.1	9 09.3	−56.9	150.2	8 17.3	−57.2	150.2	7 25.2	−57.3	150.3	6 33.0	−57.4	150.4	5 40.9	−57.6	150.4	4 48.7	−57.7	150.5	3 56.5	−57.9	150.5	22
23	9 04.6	−56.8	150.4	8 12.4	−57.0	150.5	7 20.1	−57.1	150.5	6 27.9	−57.3	150.6	5 35.6	−57.4	150.7	4 43.3	−57.6	150.7	3 51.0	−57.8	150.7	2 58.6	−57.8	150.8	23
24	8 07.8	−56.8	150.7	7 15.4	−57.0	150.8	6 23.0	−57.1	150.8	5 30.6	−57.3	150.9	4 38.2	−57.5	150.9	3 45.7	−57.6	151.0	2 53.2	−57.7	151.0	2 00.8	−57.9	151.0	24
25	7 11.0	−56.9	151.0	6 18.4	−56.9	151.1	5 25.9	−57.1	151.2	4 33.3	−57.3	151.2	3 40.7	−57.4	151.2	2 48.1	−57.5	151.3	1 55.5	−57.7	151.3	1 02.9	−57.8	151.3	25
26	6 14.1	−56.8	151.4	5 21.5	−57.1	151.4	4 28.8	−57.2	151.5	3 36.0	−57.3	151.5	2 43.3	−57.4	151.5	1 50.6	−57.5	151.5	0 57.8	−57.7	151.6	0 05.1	−57.9	151.6	26
27	5 17.3	−56.8	151.7	4 24.5	−57.0	151.7	3 31.6	−57.1	151.8	2 38.7	−57.3	151.8	1 45.9	−57.5	151.8	0 53.0	−57.6	151.8	0 00.1	−57.7	151.8	0 52.8	+57.9	28.2	27
28	4 20.5	−56.9	152.0	3 27.5	−57.0	152.0	2 34.5	−57.2	152.1	1 41.4	−57.3	152.1	0 48.4	−57.4	152.1	0 04.6	+57.6	27.9	0 57.6	+57.8	27.9	1 50.7	+57.8	27.9	28
29	3 23.6	−56.9	152.3	2 30.5	−57.1	152.4	1 37.3	−57.2	152.4	0 44.1	−57.3	152.4	0 09.0	+57.5	27.6	1 02.2	+57.6	27.6	1 55.4	+57.7	27.6	2 48.5	+57.9	27.6	29
30	2 26.7	−56.8	152.7	1 33.4	−57.0	152.7	0 40.1	−57.1	152.7	0 13.2	+57.3	27.3	1 06.5	+57.4	27.3	1 59.8	+57.6	27.3	2 53.1	+57.7	27.4	3 46.4	+57.8	27.4	30
31	1 29.9	−56.9	153.0	0 36.4	−57.0	153.0	0 17.0	+57.2	27.0	1 10.5	+57.3	27.0	2 03.9	+57.5	27.0	2 57.4	+57.5	27.1	3 50.8	+57.7	27.1	4 44.2	+57.8	27.1	31
32	0 33.0	−56.8	153.3	0 20.6	+57.0	26.7	1 14.2	+57.1	26.7	2 07.8	+57.3	26.7	3 01.4	+57.4	26.7	3 54.9	+57.6	26.8	4 48.5	+57.7	26.8	5 42.0	+57.9	26.8	32
33	0 23.8	+56.9	26.4	1 17.6	+57.0	26.4	2 11.3	+57.2	26.4	3 05.1	+57.3	26.4	3 58.8	+57.4	26.5	4 52.5	+57.6	26.5	5 46.2	+57.7	26.5	6 39.9	+57.8	26.6	33
34	1 20.7	+56.9	26.1	2 14.6	+57.0	26.1	3 08.5	+57.1	26.1	4 02.4	+57.3	26.1	4 56.2	+57.5	26.2	5 50.1	+57.5	26.2	6 43.9	+57.7	26.3	7 37.7	+57.8	26.3	34
35	2 17.6	+56.9	25.7	3 11.6	+57.0	25.8	4 05.6	+57.2	25.8	4 59.7	+57.2	25.8	5 53.7	+57.4	25.9	6 47.6	+57.6	25.9	7 41.6	+57.7	26.0	8 35.5	+57.8	26.0	35
36	3 14.4	+56.9	25.4	4 08.6	+57.0	25.5	5 02.8	+57.1	25.5	5 56.9	+57.4	25.5	6 51.1	+57.4	25.6	7 45.2	+57.5	25.6	8 39.3	+57.6	25.7	9 33.3	+57.8	25.8	36
37	4 11.3	+56.8	25.1	5 05.6	+57.0	25.1	5 59.9	+57.1	25.2	6 54.2	+57.3	25.2	7 48.5	+57.4	25.3	8 42.7	+57.5	25.4	9 36.9	+57.7	25.4	10 31.1	+57.8	25.5	37
38	5 08.1	+56.8	24.8	6 02.6	+57.0	24.8	6 57.0	+57.2	24.9	7 51.5	+57.2	24.9	8 45.9	+57.3	25.0	9 40.2	+57.5	25.1	10 34.6	+57.6	25.1	11 28.9	+57.7	25.2	38
39	6 05.0	+56.8	24.5	6 59.6	+56.9	24.5	7 54.2	+57.1	24.6	8 48.7	+57.2	24.6	9 43.2	+57.4	24.7	10 37.7	+57.5	24.8	11 32.2	+57.6	24.9	12 26.6	+57.8	24.9	39
40	7 01.8	+56.8	24.1	7 56.5	+57.0	24.2	8 51.3	+57.0	24.3	9 45.9	+57.3	24.3	10 40.6	+57.3	24.4	11 35.2	+57.5	24.5	12 29.8	+57.6	24.6	13 24.4	+57.7	24.7	40
41	7 58.6	+56.8	23.8	8 53.5	+56.9	23.9	9 48.3	+57.1	23.9	10 43.2	+57.2	24.0	11 37.9	+57.4	24.1	12 32.7	+57.5	24.2	13 27.4	+57.6	24.3	14 22.1	+57.7	24.4	41
42	8 55.4	+56.8	23.5	9 50.4	+56.9	23.6	10 45.4	+57.0	23.6	11 40.4	+57.1	23.7	12 35.3	+57.3	23.8	13 30.2	+57.4	23.9	14 25.0	+57.5	24.0	15 19.8	+57.5	24.1	42
43	9 52.2	+56.7	23.2	10 47.3	+56.9	23.3	11 42.4	+57.1	23.3	12 37.5	+57.2	23.4	13 32.6	+57.3	23.5	14 27.6	+57.4	23.6	15 22.5	+57.6	23.7	16 17.5	+57.6	23.8	43
44	10 48.9	+56.6	22.8	11 44.2	+56.9	22.9	12 39.5	+57.0	23.0	13 34.7	+57.1	23.1	14 29.9	+57.2	23.2	15 25.0	+57.4	23.3	16 20.1	+57.5	23.4	17 15.1	+57.6	23.5	44
45	11 45.7	+56.7	22.5	12 41.1	+56.8	22.6	13 36.5	+57.0	22.7	14 31.8	+57.1	22.8	15 27.1	+57.3	22.9	16 22.4	+57.3	23.0	17 17.6	+57.5	23.1	18 12.7	+57.5	23.2	45
46	12 42.4	+56.7	22.2	13 37.9	+56.9	22.3	14 33.5	+56.9	22.4	15 28.9	+57.1	22.5	16 24.4	+57.2	22.6	17 19.7	+57.4	22.7	18 15.1	+57.4	22.8	19 10.4	+57.5	22.9	46
47	13 39.1	+56.6	21.8	14 34.8	+56.8	21.9	15 30.4	+56.9	22.0	16 26.0	+57.1	22.1	17 21.6	+57.1	22.3	18 17.1	+57.3	22.4	19 12.5	+57.5	22.5	20 07.9	+57.6	22.6	47
48	14 35.7	+56.5	21.5	15 31.6	+56.7	21.6	16 27.3	+56.9	21.7	17 23.1	+57.0	21.8	18 18.7	+57.2	21.9	19 14.4	+57.2	22.1	20 10.0	+57.5	22.2	21 05.5	+57.5	22.3	48
49	15 32.4	+56.6	21.2	16 28.3	+56.8	21.3	17 24.2	+56.9	21.4	18 20.1	+57.0	21.5	19 15.9	+57.1	21.6	20 11.6	+57.3	21.7	21 07.3	+57.4	21.9	22 03.0	+57.5	22.0	49
50	16 29.0	+56.6	20.8	17 25.1	+56.6	21.0	18 21.1	+56.8	21.0	19 17.1	+56.9	21.2	20 13.0	+57.1	21.3	21 08.9	+57.2	21.4	22 04.7	+57.3	21.6	23 00.5	+57.4	21.7	50
51	17 25.6	+56.5	20.5	18 21.7	+56.7	20.6	19 17.9	+56.8	20.7	20 14.0	+56.9	20.8	21 10.1	+57.0	21.0	22 06.1	+57.1	21.1	23 02.0	+57.3	21.2	23 57.9	+57.4	21.4	51
52	18 22.1	+56.5	20.1	19 18.4	+56.6	20.2	20 14.7	+56.7	20.3	21 10.9	+56.9	20.5	22 07.1	+57.0	20.6	23 03.2	+57.1	20.8	23 59.3	+57.2	20.9	24 55.3	+57.4	21.1	52
53	19 18.6	+56.4	19.8	20 15.0	+56.6	19.9	21 11.4	+56.7	20.0	22 07.8	+56.8	20.1	23 04.1	+56.9	20.3	24 00.3	+57.1	20.4	24 56.5	+57.2	20.6	25 52.7	+57.3	20.8	53
54	20 15.0	+56.4	19.4	21 11.6	+56.5	19.5	22 08.1	+56.7	19.6	23 04.6	+56.8	19.8	24 01.0	+56.9	19.9	24 57.4	+57.0	20.1	25 53.7	+57.2	20.3	26 50.0	+57.3	20.4	54
55	21 11.4	+56.4	19.0	22 08.1	+56.5	19.2	23 04.8	+56.6	19.3	24 01.4	+56.7	19.4	24 57.9	+56.9	19.6	25 54.4	+57.0	19.7	26 50.9	+57.1	19.9	27 47.3	+57.2	20.1	55
56	22 07.8	+56.3	18.7	23 04.6	+56.4	18.8	24 01.4	+56.5	18.9	24 58.1	+56.7	19.1	25 54.8	+56.8	19.2	26 51.4	+56.9	19.4	27 48.0	+57.0	19.6	28 44.5	+57.1	19.8	56
57	23 04.1	+56.2	18.3	24 01.0	+56.4	18.4	24 57.9	+56.5	18.6	25 54.8	+56.6	18.7	26 51.6	+56.7	18.9	27 48.3	+56.9	19.0	28 45.0	+57.0	19.2	29 41.6	+57.2	19.4	57
58	24 00.3	+56.2	17.9	24 57.4	+56.3	18.0	25 54.4	+56.5	18.2	26 51.4	+56.6	18.3	27 48.3	+56.7	18.5	28 45.2	+56.8	18.7	29 42.0	+56.9	18.9	30 38.8	+57.0	19.1	58
59	24 56.5	+56.2	17.5	25 53.7	+56.3	17.7	26 50.9	+56.4	17.8	27 48.0	+56.5	18.0	28 45.0	+56.6	18.1	29 42.0	+56.8	18.3	30 38.9	+56.9	18.5	31 35.8	+57.0	18.7	59
60	25 52.7	+56.0	17.1	26 50.0	+56.2	17.3	27 47.3	+56.3	17.4	28 44.5	+56.4	17.6	29 41.6	+56.6	17.8	30 38.8	+56.6	17.9	31 35.8	+56.8	18.1	32 32.8	+56.9	18.3	60
61	26 48.7	+56.0	16.7	27 46.2	+56.1	16.9	28 43.6	+56.2	17.0	29 40.9	+56.4	17.2	30 38.2	+56.5	17.4	31 35.4	+56.7	17.6	32 32.6	+56.8	17.7	33 29.7	+56.9	17.9	61
62	27 44.7	+55.8	16.3	28 42.3	+56.1	16.5	29 39.8	+56.2	16.6	30 37.3	+56.3	16.8	31 34.7	+56.4	17.0	32 32.1	+56.5	17.2	33 29.4	+56.6	17.4	34 26.6	+56.8	17.6	62
63	28 40.7	+55.8	15.9	29 38.4	+55.9	16.1	30 36.0	+56.1	16.2	31 33.6	+56.2	16.4	32 31.1	+56.3	16.6	33 28.6	+56.4	16.8	34 26.0	+56.6	17.0	35 23.4	+56.7	17.2	63
64	29 36.5	+55.8	15.5	30 34.3	+55.9	15.7	31 32.1	+56.0	15.8	32 29.8	+56.1	16.0	33 27.4	+56.3	16.2	34 25.0	+56.4	16.4	35 22.6	+56.5	16.6	36 20.1	+56.6	16.8	64
65	30 32.3	+55.7	15.1	31 30.2	+55.8	15.2	32 28.1	+55.9	15.4	33 25.9	+56.1	15.6	34 23.7	+56.2	15.7	35 21.4	+56.3	15.9	36 19.1	+56.4	16.1	37 16.7	+56.6	16.3	65
66	31 28.0	+55.6	14.6	32 26.0	+55.8	14.8	33 24.0	+55.9	15.0	34 22.0	+55.9	15.1	35 19.9	+56.0	15.3	36 17.7	+56.2	15.5	37 15.5	+56.3	15.7	38 13.2	+56.5	15.9	66
67	32 23.6	+55.5	14.2	33 21.8	+55.6	14.4	34 19.9	+55.7	14.5	35 17.9	+55.9	14.7	36 15.9	+56.0	14.9	37 13.9	+56.1	15.1	38 11.8	+56.2	15.3	39 09.7	+56.3	15.5	67
68	33 19.1	+55.4	13.7	34 17.4	+55.5	13.9	35 15.6	+55.6	14.1	36 13.8	+55.7	14.2	37 11.9	+55.8	14.4	38 10.0	+56.0	14.6	39 08.0	+56.1	14.8	40 06.0	+56.2	15.0	68
69	34 14.5	+55.3	13.3	35 12.9	+55.4	13.4	36 11.2	+55.6	13.6	37 09.5	+55.7	13.8	38 07.8	+55.7	14.0	39 06.0	+55.9	14.2	40 04.1	+56.0	14.4	41 02.2	+56.1	14.6	69
70	35 09.8	+55.2	12.8	36 08.3	+55.3	13.0	37 06.8	+55.4	13.1	38 05.2	+55.5	13.3	39 03.5	+55.7	13.5	40 01.9	+55.7	13.7	41 00.1	+55.9	13.9	41 58.3	+56.0	14.1	70
71	36 05.0	+55.1	12.3	37 03.6	+55.2	12.5	38 02.2	+55.3	12.7	39 00.7	+55.4	12.8	39 59.2	+55.5	13.0	40 57.6	+55.7	13.2	41 56.0	+55.8	13.4	42 54.3	+55.9	13.6	71
72	37 00.1	+54.9	11.8	37 58.8	+55.1	12.0	38 57.5	+55.1	12.2	39 56.1	+55.3	12.3	40 54.7	+55.4	12.5	41 53.3	+55.5	12.7	42 51.8	+55.6	12.9	43 50.2	+55.8	13.1	72
73	37 55.0	+54.8	11.3	38 53.8	+55.0	11.5	39 52.6	+55.1	11.6	40 51.4	+55.1	11.8	41 50.1	+55.2	12.0	42 48.8	+55.3	12.2	43 47.4	+55.4	12.4	44 46.0	+55.5	12.6	73
74	38 49.8	+54.7	10.8	39 48.8	+54.7	11.1	40 47.7	+54.8	11.1	41 46.5	+55.0	11.3	42 45.3	+55.1	11.5	43 44.1	+55.2	11.7	44 42.8	+55.4	11.9	45 41.5	+55.5	12.1	74
75	39 44.5	+54.5	10.3	40 43.5	+54.7	10.4	41 42.5	+54.8	10.6	42 41.5	+54.8	10.8	43 40.4	+55.0	10.9	44 39.3	+55.1	11.1	45 38.2	+55.1	11.3	46 37.0	+55.3	11.5	75
76	40 39.0	+54.4	9.7	41 38.2	+54.4	9.9	42 37.3	+54.5	10.0	43 36.3	+54.7	10.2	44 35.4	+54.7	10.4	45 34.4	+54.8	10.6	46 33.3	+55.0	10.7	47 32.3	+55.0	10.9	76
77	41 33.4	+54.2	9.2	42 32.6	+54.3	9.3	43 31.8	+54.4	9.5	44 31.0	+54.5	9.6	45 30.1	+54.6	9.8	46 29.2	+54.7	10.0	47 28.3	+54.8	10.2	48 27.3	+55.0	10.4	77
78	42 27.6	+54.1	8.6	43 26.9	+54.1	8.8	44 26.2	+54.2	8.9	45 25.5	+54.3	9.0	46 24.7	+54.4	9.2	47 23.9	+54.5	9.4	48 23.1	+54.6	9.5	49 22.3	+54.7	9.7	78
79	43 21.6	+53.8	8.0	44 21.0	+53.9	8.1	45 20.4	+54.0	8.3	46 19.8	+54.0	8.4	47 19.1	+54.2	8.6	48 18.4	+54.3	8.7	49 17.7	+54.4	8.9	50 17.0	+54.4	9.1	79
80	44 15.4	+53.6	7.4	45 14.9	+53.7	7.5	46 14.4	+53.8	7.6	47 13.8	+53.9	7.8	48 13.3	+53.9	7.9	49 12.7	+54.1	8.1	50 12.1	+54.1	8.3	51 11.4	+54.3	8.4	80
81	45 09.0	+53.4	6.8	46 08.6	+53.5	6.9	47 08.2	+53.6	7.0	48 07.7	+53.7	7.1	49 07.2	+53.8	7.3	50 06.8	+53.8	7.4	51 06.2	+54.0	7.6	52 05.7	+54.0	7.8	81
82	46 02.4	+53.2	6.1	47 02.1	+53.2	6.2	48 01.7	+53.4	6.3	49 01.4	+53.4	6.5	50 01.0	+53.5	6.6	51 00.6	+53.5	6.7	52 00.2	+53.6	6.9	52 59.7	+53.7	7.0	82
83	46 55.6	+53.0	5.4	47 55.3	+53.0	5.5	48 55.1	+53.0	5.6	49 54.8	+53.1	5.8	50 54.5	+53.2	5.9	51 54.1	+53.3	6.0	52 53.8	+53.4	6.1	53 53.4	+53.5	6.3	83
84	47 48.6	+52.6	4.7	48 48.3	+52.8	4.8	49 48.1	+52.8	4.9	50 47.9	+52.9	5.0	51 47.7	+52.9	5.1	52 47.4	+53.0	5.3	53 47.2	+53.0	5.4	54 46.9	+53.1	5.5	84
85	48 41.2	+52.4	4.0	49 41.1	+52.4	4.1	50 40.9	+52.5	4.2	51 40.8	+52.5	4.3	52 40.6	+52.6	4.4	53 40.4	+52.7	4.5	54 40.2	+52.7	4.6	55 40.0	+52.8	4.7	85
86	49 33.6	+52.1	3.3	50 33.5	+52.2	3.3	51 33.4	+52.2	3.4	52 33.3	+52.2	3.5	53 33.2	+52.3	3.6	54 33.1	+52.3	3.7	55 32.9	+52.4	3.7	56 32.8	+52.4	3.8	86
87	50 25.7	+51.8	2.5	51 25.7	+51.8	2.5	52 25.6	+51.8	2.6	53 25.5	+51.9	2.7	54 25.5	+51.9	2.7	55 25.4	+51.9	2.8	56 25.3	+52.0	2.9	57 25.2	+52.1	3.0	87
88	51 17.5	+51.4	1.7	52 17.5	+51.4	1.7	53 17.4	+51.5	1.8	54 17.4	+51.5	1.8	55 17.4	+51.5	1.9	56 17.3	+51.6	1.9	57 17.3	+51.6	2.0	58 17.3	+51.6	2.0	88
89	52 08.9	+51.1	0.9	53 08.9	+51.1	0.9	54 08.9	+51.1	0.9	55 08.9	+51.1	0.9	56 08.9	+51.1	1.0	57 08.9	+51.1	1.0	58 08.9	+51.1	1.0	59 08.9	+51.1	1.0	89
90	53 00.0	+50.7	0.0	54 00.0	+50.7	0.0	55 00.0	+50.7	0.0	56 00.0	+50.7	0.0	57 00.0	+50.7	0.0	58 00.0	+50.6	0.0	59 00.0	+50.6	0.0	60 00.0	+50.6	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 148°, 212°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	30 18.8	+55.4	140.9	29 32.1	+55.8	141.2	28 45.2	+56.0	141.6	27 58.1	+56.3	141.9	27 10.7	+56.6	142.2	26 23.2	+56.8	142.6	25 35.5	+57.0	142.9	24 47.6	+57.2	143.1	0
1	31 14.2	+55.4	140.4	30 27.9	+55.6	140.8	29 41.2	+56.0	141.2	28 54.4	+56.2	141.5	28 07.3	+56.5	141.9	27 20.0	+56.7	142.2	26 32.5	+56.9	142.5	25 44.8	+57.1	142.8	1
2	32 09.6	+55.3	140.0	31 23.5	+55.6	140.4	30 37.2	+55.8	140.8	29 50.6	+56.1	141.1	29 03.8	+56.4	141.5	28 16.7	+56.6	141.8	27 29.4	+56.9	142.2	26 41.9	+57.2	142.5	2
3	33 04.9	+55.2	139.5	32 19.1	+55.5	139.9	31 33.0	+55.8	140.3	30 46.7	+56.1	140.7	30 00.2	+56.3	141.1	29 13.3	+56.6	141.4	28 26.3	+56.8	141.8	27 39.1	+57.0	142.1	3
4	34 00.1	+55.0	139.1	33 14.6	+55.4	139.5	32 28.8	+55.7	139.9	31 42.8	+56.0	140.3	30 56.5	+56.2	140.7	30 09.9	+56.6	141.1	29 23.1	+56.8	141.4	28 36.1	+57.0	141.8	4
5	34 55.1	+54.9	138.6	34 10.0	+55.2	139.0	33 24.5	+55.6	139.5	32 38.8	+55.9	139.9	31 52.7	+56.2	140.3	31 06.5	+56.4	140.7	30 19.9	+56.7	141.1	29 33.1	+57.0	141.4	5
6	35 50.0	+54.9	138.1	35 05.2	+55.2	138.6	34 20.1	+55.5	139.0	33 34.7	+55.8	139.4	32 48.9	+56.1	139.9	32 02.9	+56.4	140.3	31 16.6	+56.7	140.7	30 30.1	+56.9	141.0	6
7	36 44.9	+54.6	137.6	36 00.4	+55.0	138.1	35 15.6	+55.4	138.5	34 30.5	+55.7	139.0	33 45.0	+56.0	139.4	32 59.3	+56.3	139.9	32 13.3	+56.5	140.3	31 27.0	+56.8	140.7	7
8	37 39.5	+54.6	137.1	36 55.4	+55.0	137.6	36 11.0	+55.2	138.1	35 26.2	+55.6	138.6	34 41.0	+55.9	139.0	33 55.6	+56.2	139.5	33 09.8	+56.5	139.9	32 23.8	+56.8	140.3	8
9	38 34.1	+54.4	136.5	37 50.4	+54.7	137.1	37 06.2	+55.2	137.6	36 21.8	+55.4	138.1	35 36.9	+55.9	138.6	34 51.8	+56.1	139.0	34 06.3	+56.4	139.5	33 20.6	+56.7	139.9	9
10	39 28.5	+54.2	136.0	38 45.1	+54.7	136.5	38 01.4	+55.0	137.1	37 17.2	+55.4	137.6	36 32.8	+55.7	138.1	35 47.9	+56.0	138.6	35 02.7	+56.4	139.1	34 17.3	+56.6	139.5	10
11	40 22.7	+54.1	135.4	39 39.8	+54.5	136.0	38 56.4	+54.9	136.6	38 12.6	+55.3	137.1	37 28.5	+55.6	137.6	36 43.9	+56.0	138.2	35 59.1	+56.2	138.6	35 13.9	+56.5	139.1	11
12	41 16.8	+53.9	134.9	40 34.3	+54.3	135.5	39 51.3	+54.7	136.1	39 07.9	+55.1	136.6	38 24.1	+55.4	137.2	37 39.9	+55.8	137.7	36 55.3	+56.1	138.2	36 10.4	+56.4	138.7	12
13	42 10.7	+53.7	134.3	41 28.6	+54.2	134.9	40 46.0	+54.6	135.5	40 03.0	+55.0	136.1	39 19.5	+55.4	136.7	38 35.7	+55.7	137.2	37 51.4	+56.1	137.8	37 06.8	+56.4	138.3	13
14	43 04.4	+53.5	133.7	42 22.8	+53.9	134.3	41 40.6	+54.4	135.0	40 58.0	+54.8	135.6	40 14.9	+55.2	136.2	39 31.4	+55.6	136.8	38 47.5	+55.9	137.3	38 03.2	+56.2	137.8	14
15	43 57.9	+53.4	133.0	43 16.7	+53.8	133.7	42 35.0	+54.2	134.4	41 52.8	+54.7	135.0	41 10.1	+55.1	135.7	40 27.0	+55.4	136.3	39 43.4	+55.8	136.8	38 59.4	+56.2	137.4	15
16	44 51.3	+53.0	132.4	44 10.5	+53.6	133.1	43 29.2	+54.1	133.8	42 47.5	+54.5	134.5	42 05.2	+54.9	135.1	41 22.4	+55.3	135.8	40 39.2	+55.7	136.4	39 55.6	+56.0	136.9	16
17	45 44.3	+52.9	131.7	45 04.1	+53.4	132.5	44 23.3	+53.9	133.2	43 42.0	+54.3	133.9	43 00.1	+54.8	134.6	42 17.7	+55.2	135.2	41 34.9	+55.5	135.9	40 51.6	+55.9	136.5	17
18	46 37.2	+52.6	131.0	45 57.5	+53.1	131.8	45 17.2	+53.6	132.6	44 36.3	+54.1	133.3	43 54.9	+54.5	134.0	43 12.9	+55.0	134.7	42 30.4	+55.5	135.4	41 47.5	+55.8	136.0	18
19	47 29.8	+52.3	130.3	46 50.6	+52.9	131.1	46 10.8	+53.5	131.9	45 30.4	+54.0	132.7	44 49.4	+54.4	133.4	44 07.9	+54.9	134.2	43 25.9	+55.2	134.8	42 43.3	+55.7	135.5	19
20	48 22.1	+52.1	129.6	47 43.5	+52.7	130.5	47 04.3	+53.2	131.3	46 24.4	+53.7	132.1	45 43.8	+54.3	132.8	45 02.8	+54.6	133.6	44 21.1	+55.1	134.3	43 39.0	+55.5	135.0	20
21	49 14.2	+51.7	128.9	48 36.2	+52.3	129.7	47 57.5	+52.9	130.6	47 18.1	+53.5	131.4	46 38.1	+54.0	132.2	45 57.4	+54.5	133.0	45 16.2	+55.0	133.7	44 34.5	+55.3	134.5	21
22	50 05.9	+51.4	128.1	49 28.5	+52.1	129.0	48 50.4	+52.7	129.9	48 11.6	+53.3	130.8	47 32.1	+53.8	131.6	46 51.9	+54.3	132.4	46 11.2	+54.7	133.2	45 29.8	+55.3	133.9	22
23	50 57.3	+51.1	127.3	50 20.6	+51.7	128.2	49 43.1	+52.4	129.2	49 04.8	+53.0	130.1	48 25.9	+53.5	130.9	47 46.2	+54.1	131.8	47 05.9	+54.6	132.6	46 25.1	+55.0	133.3	23
24	51 48.4	+50.7	126.4	51 12.3	+51.4	127.4	50 35.5	+52.0	128.4	49 57.8	+52.7	129.3	49 19.4	+53.3	130.2	48 40.3	+53.8	131.1	48 00.5	+54.4	132.0	47 20.1	+54.8	132.8	24
25	52 39.1	+50.2	125.5	52 03.7	+51.1	126.6	51 27.5	+51.8	127.6	50 50.5	+52.4	128.6	50 12.7	+53.0	129.5	49 34.1	+53.7	130.4	48 54.9	+54.1	131.3	48 14.9	+54.7	132.2	25
26	53 29.3	+49.9	124.6	52 54.8	+50.6	125.7	52 19.3	+51.4	126.8	51 42.9	+52.1	127.8	51 05.7	+52.8	128.8	50 27.8	+53.3	129.7	49 49.0	+53.9	130.7	49 09.6	+54.4	131.5	26
27	54 19.2	+49.4	123.7	53 45.4	+50.2	124.8	53 10.7	+51.0	125.9	52 35.0	+51.7	127.0	51 58.5	+52.4	128.0	51 21.1	+53.1	129.0	50 42.9	+53.7	130.0	50 04.0	+54.2	130.9	27
28	55 08.6	+48.9	122.7	54 35.6	+49.8	123.9	54 01.7	+50.6	125.0	53 26.7	+51.4	126.2	52 50.9	+52.1	127.2	52 14.2	+52.7	128.3	51 36.6	+53.4	129.3	50 58.2	+54.0	130.2	28
29	55 57.5	+48.4	121.7	55 25.4	+49.3	122.9	54 52.3	+50.1	124.1	54 18.1	+51.0	125.3	53 43.0	+51.7	126.4	53 06.9	+52.5	127.5	52 30.0	+53.1	128.5	51 52.2	+53.7	129.5	29
30	56 45.9	+47.7	120.6	56 14.7	+48.8	121.9	55 42.4	+49.7	123.2	55 09.1	+50.5	124.4	54 34.7	+51.4	125.5	53 59.4	+52.1	126.7	53 23.1	+52.8	127.7	52 45.9	+53.5	128.8	30
31	57 33.6	+47.2	119.5	57 03.5	+48.2	120.9	56 32.1	+49.2	122.2	55 59.6	+50.1	123.4	55 26.1	+50.9	124.6	54 51.5	+51.7	125.8	54 15.9	+52.4	126.9	53 39.4	+53.1	128.0	31
32	58 20.8	+46.5	118.3	57 51.7	+47.6	119.7	57 21.3	+48.6	121.1	56 49.7	+49.6	122.4	56 17.0	+50.5	123.7	55 43.2	+51.3	124.9	55 08.3	+52.1	126.1	54 32.5	+52.8	127.2	32
33	59 07.3	+45.8	117.1	58 39.3	+47.0	118.6	58 09.9	+48.1	120.0	57 39.3	+49.1	121.4	57 07.5	+50.0	122.7	56 34.5	+50.9	124.0	56 00.4	+51.7	125.2	55 25.3	+52.5	126.4	33
34	59 53.1	+45.1	115.8	59 26.3	+46.2	117.4	58 58.0	+47.4	118.9	58 28.4	+48.4	120.3	57 57.5	+49.5	121.7	57 25.4	+50.4	123.0	56 52.1	+51.3	124.3	56 17.8	+52.1	125.5	34
35	60 38.2	+44.2	114.5	60 12.5	+45.5	116.1	59 45.4	+46.7	117.7	59 16.8	+47.9	119.1	58 47.0	+48.9	120.6	58 15.8	+49.9	122.0	57 43.4	+50.8	123.3	57 09.9	+51.6	124.6	35
36	61 22.4	+43.3	113.1	60 58.0	+44.7	114.8	60 32.1	+46.0	116.4	60 04.7	+47.2	118.0	59 35.9	+48.3	119.5	59 05.7	+49.3	120.9	58 34.2	+50.4	122.3	58 01.5	+51.3	123.7	36
37	62 05.7	+42.3	111.7	61 42.7	+43.8	113.4	61 18.1	+45.1	115.1	60 51.9	+46.4	116.7	60 24.2	+47.6	118.3	59 55.0	+48.8	119.8	59 24.6	+49.7	121.3	58 52.8	+50.7	122.7	37
38	62 48.0	+41.3	110.1	62 26.5	+42.8	111.9	62 03.2	+44.3	113.7	61 38.3	+45.6	115.4	61 11.8	+46.9	117.0	60 43.8	+48.1	118.6	60 14.3	+49.2	120.2	59 43.5	+50.2	121.6	38
39	63 29.3	+40.1	108.5	63 09.3	+41.8	110.4	62 47.5	+43.3	112.2	62 23.9	+44.8	114.0	61 58.7	+46.1	115.7	61 31.9	+47.4	117.4	61 03.5	+48.6	119.0	60 33.7	+49.7	120.5	39
40	64 09.4	+39.0	106.8	63 51.1	+40.6	108.8	63 30.8	+42.3	110.7	63 08.7	+43.8	112.5	62 44.8	+45.3	114.3	62 19.3	+46.6	116.1	61 52.1	+47.9	117.8	61 23.4	+49.0	119.4	40
41	64 48.4	+37.6	105.1	64 31.7	+39.5	107.1	64 13.1	+41.2	109.1	63 52.5	+42.8	111.0	63 30.1	+44.3	112.9	63 05.9	+45.8	114.7	62 40.0	+47.1	116.5	62 12.4	+48.4	118.2	41
42	65 26.0	+36.2	103.2	65 11.2	+38.1	105.3	64 54.3	+39.9	107.4	64 35.3	+41.7	109.4	64 14.4	+43.4	111.4	63 51.7	+44.8	113.3	63 27.1	+46.3	115.1	63 00.8	+47.6	116.9	42
43	66 02.2	+34.6	101.3	65 49.3	+36.7	103.5	65 34.2	+38.7	105.6	65 17.0	+40.5	107.7	64 57.8	+42.2	109.7	64 36.5	+43.9	111.7	64 13.4	+45.4	113.7	63 48.4	+46.8	115.5	43
44	66 36.8	+33.0	99.2	66 26.0	+35.1	101.5	66 12.9	+37.2	103.7	65 57.5	+39.2	105.9	65 40.0	+41.0	108.0	65 20.4	+42.8	110.1	64 58.8	+44.4	112.1	64 35.2	+45.9	114.1	44
45	67 09.8	+31.2	97.1	67 01.1	+33.5	99.5	66 50.1	+35.7	101.8	66 36.7	+37.8	104.0	66 21.0	+39.8	106.2	66 03.2	+41.5	108.4	65 43.2	+43.3	110.5	65 21.1	+45.0	112.6	45
46	67 41.0	+29.3	94.9	67 34.6	+31.8	97.3	67 25.8	+34.0	99.7	67 14.5	+36.2	102.0	67 00.8	+38.2	104.4	66 44.7	+40.3	106.6	66 26.5	+42.1	108.8	66 06.1	+43.8	111.0	46
47	68 10.3	+27.3•	92.6	68 06.4	+29.7•	95.1	67 59.8	+32.2	97.5	67 50.7	+34.5	100.0	67 39.0	+36.8	102.4	67 25.0	+38.8	104.7	67 08.6	+40.8	107.0	66 49.9	+42.7	109.2	47
48	68 37.6	+25.2•	90.1	68 36.1	+27.8•	92.7	68 32.0	+30.2•	95.2	68 25.2	+32.7	97.8	68 15.8	+35.0	100.2	68 03.8	+37.3	102.7	67 49.4	+39.5	105.1	67 32.6	+41.4	107.4	48
49	69 02.8	+22.8•	87.6	69 03.9	+25.5•	90.2	69 02.2	+28.2•	92.9	68 57.9	+30.7•	95.5	68 50.8	+33.3	98.0	68 41.1	+35.6	100.6	68 28.9	+37.8	103.1	68 14.0	+40.0	105.5	49
50	69 25.6	+20.4•	85.0	69 29.4	+23.2•	87.7	69 30.4	+26.0•	90.4	69 28.6	+28.7•	93.0	69 24.1	+31.2•	95.7	69 16.7	+33.8	98.3	69 06.7	+36.2	100.9	68 54.0	+38.5	103.5	50
51	69 46.0	+17.8•	82.3	69 52.6	+20.7•	85.0	69 56.4	+23.5•	87.8	69 57.3	+26.3•	90.5	69 55.3	+29.1•	93.2	69 50.5	+31.8•	96.0	69 42.9	+34.3	98.7	69 32.5	+36.7	101.3	51
52	70 03.8	+15.2•	79.5	70 13.3	+18.1•	82.3	70 19.9	+21.1•	85.1	70 23.6	+24.0•	87.9	70 24.4	+26.8•	90.7	70 22.3	+29.6•	93.5	70 17.2	+32.3•	96.3	70 09.2	+34.9	99.0	52
53	70 19.0	+12.4•	76.7	70 31.4	+15.4•	79.4	70 41.0	+18.4•	82.2	70 47.6	+21.4•	85.1	70 51.2	+24.4•	88.0	70 51.9	+27.2•	90.8	70 49.5	+30.1•	93.7	70 44.1	+32.8•	96.6	53
54	70 31.4	+9.6•	73.8	70 46.8	+12.6•	76.5	70 59.4	+15.5•	79.3	71 09.0	+18.6•	82.2	71 15.6	+21.7•	85.1	71 19.1	+24.7•	88.1	71 19.6	+27.7•	91.1	71 16.9	+30.6•	94.0	54
55	70 41.0	+6.6•	70.8	70 59.4	+9.6•	73.5	71 14.9	+12.7•	76.4	71 27.6	+15.8•	79.3	71 37.3	+18.9•	82.2	71 43.8	+22.1•	85.2	71 47.3	+25.1•	88.2	71 47.5	+28.2•	91.3	55
56	70 47.6	+3.6•	67.8	71 09.0	+6.9•	70.5	71 27.6	+9.7•	73.3	71 43.4	+12.8•	76.2	71 56.2	+16.0•	79.2	72 05.9	+19.2•	82.2	72 12.4	+22.4•	85.3	72 15.7	+25.6•	88.4	56
57	70 51.2	+0.7•	64.7	71 15.6	+3.5•	67.4	71 37.3	+6.5•	70.2	71 56.2	+9.7•	73.1	72 12.2	+12.9•	76.0	72 25.1	+16.2•	79.1	72 34.8	+19.5•	82.2	72 41.3	+22.7•	85.4	57
58	70 51.9	−2.4•	61.7	71 19.1	+0.5•	64.3	71 43.8	+3.5•	67.0	72 05.9	+6.5•	69.9	72 25.1	+9.7•	72.8	72 41.3	+13.0•	75.9	72 54.3	+16.3•	79.1	73 04.0	+19.8•	82.3	58
59	70 49.5	−5.4•	58.7	71 19.6	−2.7•	61.2	71 47.3	+0.2•	63.8	72 12.4	+3.3•	66.6	72 34.8	+6.5•	69.6	72 54.3	+9.7•	72.8	73 10.6	+13.2•	75.8	73 23.8	+16.5•	79.0	59
60	70 44.1	−8.4•	55.6	71 16.9	−5.7•	58.1	71 47.5	−2.9•	60.6	72 15.7	0.0•	63.4	72 41.3	+3.1•	66.2	73 04.0	+6.4•	69.2	73 23.8	+9.7•	72.4	73 40.3	+13.2•	75.6	60
61	70 35.7	−11.2•	52.6	71 11.2	−8.8•	55.0	71 44.6	−6.1•	57.4	72 15.7	−3.3•	60.1	72 44.4	−0.3•	62.9	73 10.4	+2.9•	65.8	73 33.5	+6.2•	68.9	73 53.5	+9.7•	72.1	61
62	70 24.5	−14.0•	49.7	71 02.4	−11.7•	51.9	71 38.5	−9.2•	54.3	72 12.4	−6.5•	56.8	72 44.1	−3.6•	59.5	73 13.3	−0.6•	62.3	73 39.7	+2.7•	65.4	74 03.2	+6.2•	68.5	62
63	70 10.5	−16.8•	46.8	70 50.7	−14.5•	48.9	71 29.3	−12.2•	51.1	72 05.9	−9.6•	53.6	72 40.5	−6.9•	56.1	73 12.7	−4.0•	58.9	73 42.4	−0.8•	61.8	74 09.4	+2.4•	64.9	63
64	69 53.7	−19.3•	44.0	70 36.2	−17.4•	46.0	71 17.1	−15.2•	48.1	71 56.3	−12.8•	50.4	72 33.6	−10.2•	52.8	73 08.7	−7.4•	55.4	73 41.6	−4.5•	58.2	74 11.8	−1.2•	61.2	64
65	69 34.4	−21.9•	41.3	70 18.8	−20.0•	43.1	71 01.9	−17.9•	45.1	71 43.5	−15.8•	47.2	72 23.4	−13.4•	49.5	73 01.3	−10.8•	52.0	73 37.1	−7.9•	54.7	74 10.6	−5.0•	57.6	65
66	69 12.5	−24.2•	38.6	69 58.8	−22.4•	40.3	70 44.0	−20.7•	42.2	71 27.7	−18.4•	44.2	72 10.0	−16.4•	46.3	72 50.5	−14.0•	48.7	73 29.2	−11.4•	51.2	74 05.6	−8.5•	53.9	66
67	68 48.3	−26.4•	36.1	69 36.4	−24.9•	37.6	70 23.3	−23.2•	39.3	71 09.1	−21.3•	41.2	71 53.6	−19.4•	43.2	72 36.5	−17.1•	45.4	73 17.8	−14.8•	47.8	73 57.1	−12.1•	50.3	67
68	68 21.9	−28.5•	33.6	69 11.5	−27.1•	35.1	70 00.1	−25.6•	36.6	70 47.8	−24.0•	38.3	71 34.2	−22.1•	40.2	72 19.4	−20.1•	42.2	73 03.0	−17.9•	44.4	73 45.0	−15.5•	46.8	68
69	67 53.4	−30.4•	31.2	68 44.4	−29.2•	32.6	69 34.5	−27.8•	34.0	70 23.8	−26.3•	35.6	71 12.1	−24.7•	37.3	71 59.3	−23.0•	39.1	72 45.1	−20.9•	41.2	73 29.5	−18.7•	43.4	69
70	67 23.0	−32.3•	29.0	68 15.2	−31.2•	30.2	69 06.7	−30.0•	31.5	69 57.5	−28.7•	32.9	70 47.4	−27.2•	34.5	71 36.3	−25.5•	36.2	72 24.2	−23.8•	38.0	73 10.8	−21.8•	40.1	70
71	66 50.7	−34.0•	26.8	67 44.0	−33.0•	27.9	68 36.7	−31.9•	29.1	69 28.8	−30.7•	30.4	70 20.2	−29.4•	31.8	71 10.8	−28.0•	33.3	72 00.4	−26.4•	35.0	72 49.0	−24.7•	36.9	71
72	66 16.7	−35.5•	24.7	67 11.0	−34.7•	25.7	68 04.8	−33.7•	26.8	68 58.1	−32.7•	28.0	69 50.8	−31.6•	29.2	70 42.8	−30.3•	30.6	71 34.0	−28.9•	32.2	72 24.3	−27.3•	33.8	72
73	65 41.2	−37.0•	22.8	66 36.3	−36.2•	23.6	67 31.1	−35.4•	24.6	68 25.4	−34.5•	25.7	69 19.2	−33.5•	26.8	70 12.5	−32.4•	28.1	71 05.1	−31.2•	29.4	71 57.0	−29.8•	30.9	73
74	65 04.2	−38.4•	20.9	66 00.1	−37.7•	21.7	66 55.7	−37.0•	22.5	67 50.9	−36.2•	23.5	68 45.7	−35.3•	24.5	69 40.1	−34.4•	25.6	70 33.9	−33.3•	26.8	71 27.2	−32.2•	28.2	74
75	64 25.8	−39.7•	19.1	65 22.4	−39.1•	19.8	66 18.7	−38.4•	20.5	67 14.7	−37.7•	21.4	68 10.4	−37.0•	22.3	69 05.7	−36.1•	23.3	70 00.6	−35.2•	24.4	70 55.0	−34.2•	25.5	75
76	63 46.1	−40.8•	17.3	64 43.3	−40.3•	18.0	65 40.3	−39.8•	18.7	66 37.0	−39.2•	19.4	67 33.4	−38.5•	20.2	68 29.6	−37.8•	21.1	69 25.4	−37.0•	22.0	70 20.8	−36.1•	23.1	76
77	63 05.3	−41.9•	15.7	64 03.0	−41.5•	16.3	65 00.5	−41.0•	16.9	65 57.8	−40.5•	17.5	66 54.9	−39.9•	18.2	67 51.8	−39.3•	19.0	68 48.4	−38.6•	19.8	69 44.7	−37.9•	20.7	77
78	62 23.4	−42.9•	14.1	63 21.5	−42.5•	14.6	64 19.5	−42.1•	15.2	65 17.3	−41.7•	15.7	66 15.0	−41.2•	16.3	67 12.5	−40.7•	17.0	68 09.8	−40.2•	17.7	69 06.8	−39.5•	18.5	78
79	61 40.5	−43.8•	12.7	62 39.0	−43.5•	13.1	63 37.4	−43.2•	13.5	64 35.6	−42.8•	14.0	65 33.8	−42.4•	14.5	66 31.8	−42.0•	15.1	67 29.6	−41.5•	15.8	68 27.3	−41.0•	16.4	79
80	60 56.7	−44.7	11.2	61 55.5	−44.5	11.6	62 54.2	−44.1	12.0	63 52.8	−43.8	12.4	64 51.4	−43.5	12.9	65 49.8	−43.1	13.4	66 48.1	−42.7	13.9	67 46.3	−42.3	14.5	80
81	60 12.0	−45.5	9.9	61 11.0	−45.2	10.2	62 10.1	−45.0	10.5	63 09.0	−44.7	10.9	64 07.9	−44.5	11.3	65 06.7	−44.2	11.7	66 05.4	−43.8	12.1	67 04.0	−43.5	12.6	81
82	59 26.5	−46.3	8.6	60 25.8	−46.1	8.8	61 25.0	−45.8	9.1	62 24.3	−45.7	9.4	63 23.4	−45.4	9.7	64 22.5	−45.1	10.1	65 21.6	−44.9	10.5	66 20.5	−44.6	10.9	82
83	58 40.2	−46.9	7.3	59 39.7	−46.7	7.6	60 39.2	−46.6	7.8	61 38.6	−46.4	8.0	62 38.0	−46.2	8.3	63 37.4	−46.1	8.6	64 36.7	−45.9	8.9	65 35.9	−45.6	9.2	83
84	57 53.3	−47.5	6.1	58 53.0	−47.4	6.3	59 52.6	−47.2	6.5	60 52.2	−47.2	6.7	61 51.8	−47.0	6.9	62 51.3	−46.8	7.2	63 50.8	−46.7	7.4	64 50.3	−46.5	7.7	84
85	57 05.8	−48.1	5.2	58 05.6	−48.1	5.2	59 05.3	−47.9	5.3	60 05.0	−47.8	5.5	61 04.8	−47.8	5.6	62 04.5	−47.7	5.8	63 04.1	−47.5	6.0	64 03.8	−47.4	6.2	85
86	56 17.7	−48.7	3.9	57 17.5	−48.6	4.0	58 17.4	−48.6	4.1	59 17.2	−48.5	4.3	60 17.0	−48.4	4.4	61 16.8	−48.3	4.5	62 16.6	−48.2	4.7	63 16.4	−48.1	4.8	86
87	55 29.0	−49.2	2.9	56 28.9	−49.2	3.0	57 28.8	−49.1	3.0	58 28.7	−49.0	3.1	59 28.6	−49.0	3.2	60 28.5	−48.9	3.3	61 28.4	−48.9	3.4	62 28.3	−48.8	3.5	87
88	54 39.8	−49.7	1.9	55 39.7	−49.6	1.9	56 39.7	−49.6	2.0	57 39.7	−49.6	2.0	58 39.6	−49.5	2.1	59 39.6	−49.5	2.2	60 39.5	−49.4	2.2	61 39.5	−49.5	2.3	88
89	53 50.1	−50.1	0.9	54 50.1	−50.1	0.9	55 50.1	−50.1	1.0	56 50.1	−50.1	1.0	57 50.1	−50.1	1.0	58 50.1	−50.1	1.1	59 50.1	−50.1	1.1	60 50.0	−50.0	1.1	89
90	53 00.0	−50.5	0.0	54 00.0	−50.5	0.0	55 00.0	−50.5	0.0	56 00.0	−50.5	0.0	57 00.0	−50.6	0.0	58 00.0	−50.6	0.0	59 00.0	−50.6	0.0	60 00.0	−50.6	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	30 18.8	−55.6	140.9	29 32.1	−55.8	141.2	28 45.2	−56.1	141.6	27 58.1	−56.4	141.9	27 10.7	−56.6	142.2	26 23.2	−56.8	142.6	25 35.5	−57.1	142.9	24 47.6	−57.3	143.1	0
1	29 23.2	−55.6	141.3	28 36.3	−55.9	141.7	27 49.1	−56.2	142.0	27 01.7	−56.4	142.3	26 14.1	−56.6	142.6	25 26.4	−56.9	142.9	24 38.4	−57.1	143.2	23 50.3	−57.3	143.5	1
2	28 27.6	−55.7	141.7	27 40.4	−56.0	142.1	26 52.9	−56.2	142.4	26 05.3	−56.5	142.7	25 17.5	−56.7	143.0	24 29.5	−56.9	143.3	23 41.3	−57.1	143.5	22 53.0	−57.3	143.8	2
3	27 31.9	−55.8	142.2	26 44.4	−56.0	142.5	25 56.7	−56.3	142.8	25 08.8	−56.5	143.1	24 20.8	−56.8	143.3	23 32.6	−57.0	143.6	22 44.2	−57.2	143.8	21 55.7	−57.4	144.1	3
4	26 36.1	−55.9	142.6	25 48.4	−56.2	142.9	25 00.4	−56.3	143.2	24 12.3	−56.6	143.4	23 24.0	−56.8	143.7	22 35.6	−57.0	144.0	21 47.0	−57.2	144.2	20 58.3	−57.4	144.4	4
5	25 40.2	−55.9	143.0	24 52.2	−56.1	143.3	24 04.1	−56.4	143.5	23 15.7	−56.6	143.8	22 27.2	−56.8	144.1	21 38.6	−57.1	144.3	20 49.8	−57.3	144.5	20 00.9	−57.5	144.7	5
6	24 44.3	−56.0	143.4	23 56.1	−56.3	143.7	23 07.7	−56.5	143.9	22 19.1	−56.7	144.2	21 30.4	−56.9	144.4	20 41.5	−57.1	144.6	19 52.5	−57.2	144.8	19 03.4	−57.4	145.0	6
7	23 48.3	−56.1	143.8	22 59.8	−56.2	144.0	22 11.2	−56.5	144.3	21 22.4	−56.7	144.5	20 33.5	−56.9	144.7	19 44.4	−57.1	144.9	18 55.3	−57.4	145.1	18 06.0	−57.5	145.2	7
8	22 52.3	−56.1	144.2	22 03.6	−56.4	144.4	21 14.7	−56.6	144.6	20 25.7	−56.8	144.9	19 36.6	−57.0	145.1	18 47.3	−57.1	145.3	17 57.9	−57.3	145.5	17 08.5	−57.5	145.6	8
9	21 56.2	−56.2	144.6	21 07.2	−56.3	144.8	20 18.1	−56.5	145.0	19 28.9	−56.8	145.2	18 39.6	−57.0	145.4	17 50.2	−57.2	145.6	17 00.6	−57.4	145.8	16 10.9	−57.5	145.9	9
10	21 00.0	−56.2	144.9	20 10.9	−56.5	145.1	19 21.6	−56.7	145.3	18 32.1	−56.8	145.5	17 42.6	−57.0	145.7	16 53.0	−57.3	145.9	16 03.2	−57.4	146.1	15 13.4	−57.6	146.2	10
11	20 03.8	−56.2	145.3	19 14.4	−56.4	145.5	18 24.9	−56.7	145.7	17 35.3	−56.9	145.9	16 45.6	−57.1	146.1	15 55.7	−57.2	146.2	15 05.8	−57.4	146.4	14 15.8	−57.6	146.5	11
12	19 07.6	−56.3	145.7	18 18.0	−56.5	145.9	17 28.2	−56.7	146.0	16 38.4	−56.9	146.2	15 48.5	−57.1	146.4	14 58.5	−57.3	146.5	14 08.4	−57.4	146.7	13 18.2	−57.6	146.8	12
13	18 11.3	−56.4	146.0	17 21.5	−56.6	146.2	16 31.5	−56.7	146.4	15 41.5	−56.9	146.5	14 51.4	−57.1	146.8	14 01.2	−57.3	146.8	13 11.0	−57.5	147.0	12 20.6	−57.6	147.1	13
14	17 14.9	−56.4	146.4	16 24.9	−56.6	146.6	15 34.8	−56.8	146.7	14 44.6	−57.0	146.9	13 54.3	−57.1	147.0	13 03.9	−57.3	147.1	12 13.5	−57.4	147.3	11 23.0	−57.6	147.4	14
15	16 18.6	−56.4	146.8	15 28.3	−56.6	146.9	14 38.0	−56.8	147.1	13 47.6	−57.0	147.2	12 57.2	−57.2	147.3	12 06.6	−57.3	147.4	11 16.0	−57.5	147.6	10 25.3	−57.6	147.7	15
16	15 22.2	−56.5	147.1	14 31.7	−56.6	147.3	13 41.2	−56.8	147.4	12 50.6	−57.0	147.5	12 00.0	−57.2	147.6	11 09.3	−57.4	147.7	10 18.5	−57.5	147.9	9 27.7	−57.7	147.9	16
17	14 25.7	−56.5	147.5	13 35.1	−56.7	147.6	12 44.4	−56.9	147.7	11 53.6	−57.0	147.8	11 02.8	−57.2	147.9	10 11.9	−57.4	148.0	9 21.0	−57.6	148.1	8 30.0	−57.7	148.2	17
18	13 29.2	−56.5	147.8	12 38.4	−56.7	147.9	11 47.5	−56.8	148.1	10 56.6	−57.0	148.2	10 05.6	−57.2	148.3	9 14.6	−57.4	148.3	8 23.5	−57.6	148.4	7 32.3	−57.7	148.5	18
19	12 32.7	−56.5	148.2	11 41.7	−56.7	148.3	10 50.7	−56.9	148.4	9 59.6	−57.1	148.5	9 08.4	−57.3	148.6	8 17.2	−57.4	148.6	7 25.9	−57.5	148.7	6 34.6	−57.7	148.8	19
20	11 36.2	−56.5	148.5	10 45.0	−56.7	148.6	9 53.8	−56.9	148.7	9 02.5	−57.1	148.8	8 11.1	−57.2	148.9	7 19.8	−57.4	148.9	6 28.4	−57.6	149.0	5 36.9	−57.7	149.1	20
21	10 39.7	−56.6	148.8	9 48.3	−56.8	148.9	8 56.9	−57.0	149.0	8 05.4	−57.1	149.1	7 13.9	−57.3	149.2	6 22.4	−57.5	149.2	5 30.8	−57.6	149.3	4 39.2	−57.7	149.3	21
22	9 43.1	−56.6	149.2	8 51.5	−56.7	149.3	7 59.9	−56.9	149.3	7 08.3	−57.1	149.4	6 16.6	−57.2	149.5	5 24.9	−57.4	149.5	4 33.2	−57.6	149.6	3 41.5	−57.7	149.6	22
23	8 46.5	−56.6	149.5	7 54.8	−56.8	149.6	7 03.0	−57.0	149.7	6 11.2	−57.1	149.7	5 19.4	−57.3	149.8	4 27.5	−57.4	149.8	3 35.6	−57.5	149.8	2 43.8	−57.8	149.9	23
24	7 49.9	−56.7	149.9	6 58.0	−56.8	149.9	6 06.0	−56.9	150.0	5 14.1	−57.2	150.0	4 22.1	−57.3	150.1	3 30.1	−57.5	150.1	2 38.1	−57.6	150.1	1 46.0	−57.7	150.1	24
25	6 53.2	−56.6	150.2	6 01.2	−56.8	150.3	5 09.1	−57.0	150.3	4 16.9	−57.1	150.3	3 24.8	−57.3	150.4	2 32.6	−57.4	150.4	1 40.5	−57.6	150.4	0 48.3	−57.7	150.4	25
26	5 56.6	−56.7	150.5	5 04.4	−56.9	150.6	4 12.1	−57.0	150.6	3 19.8	−57.1	150.6	2 27.5	−57.3	150.7	1 35.2	−57.4	150.7	0 42.9	−57.5	150.7	0 09.4	+57.8	29.3	26
27	4 59.9	−56.6	150.8	4 07.5	−56.8	150.9	3 15.1	−57.0	150.9	2 22.7	−57.2	150.9	1 30.2	−57.3	151.0	0 37.8	−57.5	151.0	0 14.7	+57.6	29.0	1 07.2	+57.7	29.0	27
28	4 03.3	−56.7	151.2	3 10.7	−56.8	151.2	2 18.1	−57.0	151.2	1 25.5	−57.1	151.2	0 32.9	−57.3	151.3	0 19.7	+57.4	28.7	1 12.3	+57.6	28.8	2 04.9	+57.7	28.8	28
29	3 06.6	−56.7	151.5	2 13.9	−56.8	151.5	1 21.1	−57.0	151.5	0 28.4	−57.2	151.6	0 24.4	+57.3	28.4	1 17.1	+57.5	28.5	2 09.9	+57.6	28.5	3 02.6	+57.7	28.5	29
30	2 09.9	−56.7	151.8	1 17.0	−56.8	151.8	0 24.1	−57.0	151.9	0 28.8	+57.1	28.1	1 21.7	+57.3	28.2	2 14.6	+57.4	28.2	3 07.5	+57.6	28.2	4 00.3	+57.8	28.2	30
31	1 13.2	−56.7	152.2	0 20.2	−56.9	152.2	0 32.9	+57.0	27.8	1 25.9	+57.2	27.8	2 19.0	+57.3	27.9	3 12.0	+57.5	27.9	4 05.1	+57.7	27.9	4 58.1	+57.7	27.9	31
32	0 16.6	−56.7	152.5	0 36.7	+56.8	27.5	1 29.9	+57.0	27.5	2 23.1	+57.1	27.5	3 16.3	+57.3	27.6	4 09.5	+57.4	27.6	5 02.6	+57.6	27.6	5 55.8	+57.7	27.7	32
33	0 40.1	+56.7	27.2	1 33.5	+56.8	27.2	2 26.9	+56.9	27.2	3 20.2	+57.2	27.2	4 13.6	+57.2	27.3	5 06.9	+57.4	27.3	6 00.2	+57.6	27.3	6 53.5	+57.7	27.4	33
34	1 36.8	+56.7	26.9	2 30.3	+56.9	26.9	3 23.8	+57.0	26.9	4 17.4	+57.1	26.9	5 10.8	+57.3	27.0	6 04.3	+57.4	27.0	6 57.8	+57.5	27.1	7 51.2	+57.7	27.1	34
35	2 33.5	+56.7	26.5	3 27.2	+56.8	26.5	4 20.8	+57.0	26.6	5 14.5	+57.1	26.6	6 08.1	+57.3	26.7	7 01.7	+57.4	26.7	7 55.3	+57.5	26.8	8 48.9	+57.6	26.8	35
36	3 30.2	+56.6	26.2	4 24.0	+56.8	26.2	5 17.8	+57.0	26.3	6 11.6	+57.1	26.3	7 05.4	+57.2	26.4	7 59.1	+57.4	26.4	8 52.8	+57.5	26.5	9 46.5	+57.6	26.6	36
37	4 26.8	+56.7	25.9	5 20.8	+56.8	25.9	6 14.8	+56.9	25.9	7 08.7	+57.1	26.0	8 02.6	+57.3	26.1	8 56.5	+57.4	26.1	9 50.4	+57.5	26.2	10 44.2	+57.6	26.3	37
38	5 23.5	+56.6	25.5	6 17.6	+56.8	25.6	7 11.7	+57.0	25.6	8 05.8	+57.1	25.7	8 59.9	+57.2	25.8	9 53.9	+57.3	25.8	10 47.9	+57.5	25.9	11 41.8	+57.7	26.0	38
39	6 20.1	+56.7	25.2	7 14.4	+56.8	25.3	8 08.7	+56.9	25.3	9 02.9	+57.1	25.4	9 57.1	+57.2	25.5	10 51.2	+57.4	25.5	11 45.4	+57.4	25.6	12 39.5	+57.6	25.7	39
40	7 16.8	+56.6	24.9	8 11.2	+56.8	24.9	9 05.6	+56.9	25.0	10 00.0	+57.0	25.1	10 54.3	+57.2	25.1	11 48.6	+57.3	25.2	12 42.8	+57.5	25.3	13 37.1	+57.5	25.4	40
41	8 13.4	+56.6	24.5	9 08.0	+56.7	24.6	10 02.5	+56.9	24.7	10 57.0	+57.0	24.8	11 51.5	+57.1	24.8	12 45.9	+57.3	24.9	13 40.3	+57.4	25.0	14 34.6	+57.6	25.1	41
42	9 10.0	+56.6	24.2	10 04.7	+56.7	24.3	10 59.4	+56.9	24.3	11 54.0	+57.0	24.4	12 48.6	+57.2	24.5	13 43.2	+57.3	24.6	14 37.7	+57.4	24.7	15 32.2	+57.5	24.8	42
43	10 06.6	+56.6	23.9	11 01.4	+56.8	23.9	11 56.3	+56.8	24.0	12 51.0	+57.0	24.1	13 45.8	+57.1	24.2	14 40.5	+57.2	24.3	15 35.1	+57.4	24.4	16 29.7	+57.6	24.5	43
44	11 03.2	+56.5	23.5	11 58.2	+56.6	23.6	12 53.1	+56.8	23.7	13 48.0	+57.0	23.8	14 42.9	+57.1	23.9	15 37.7	+57.3	24.0	16 32.5	+57.4	24.1	17 27.3	+57.5	24.2	44
45	11 59.7	+56.5	23.2	12 54.8	+56.7	23.3	13 49.9	+56.8	23.4	14 45.0	+56.9	23.5	15 40.0	+57.1	23.6	16 35.0	+57.3	23.7	17 29.9	+57.3	23.8	18 24.8	+57.4	23.9	45
46	12 56.2	+56.5	22.8	13 51.5	+56.6	22.9	14 46.7	+56.8	23.0	15 41.9	+56.9	23.1	16 37.1	+57.0	23.3	17 32.2	+57.1	23.4	18 27.2	+57.3	23.5	19 22.2	+57.4	23.6	46
47	13 52.7	+56.5	22.5	14 48.1	+56.6	22.6	15 43.5	+56.7	22.7	16 38.8	+56.9	22.8	17 34.1	+57.0	22.9	18 29.3	+57.2	23.1	19 24.5	+57.3	23.2	20 19.6	+57.4	23.3	47
48	14 49.2	+56.4	22.1	15 44.7	+56.6	22.2	16 40.2	+56.7	22.4	17 35.7	+56.8	22.5	18 31.1	+57.0	22.6	19 26.5	+57.1	22.7	20 21.8	+57.2	22.9	21 17.0	+57.4	23.0	48
49	15 45.6	+56.4	21.8	16 41.3	+56.5	21.9	17 36.9	+56.7	22.0	18 32.5	+56.8	22.1	19 28.1	+56.9	22.3	20 23.6	+57.1	22.4	21 19.0	+57.2	22.6	22 14.4	+57.3	22.7	49
50	16 42.0	+56.4	21.4	17 37.8	+56.5	21.6	18 33.6	+56.6	21.7	19 29.3	+56.8	21.8	20 25.0	+56.9	21.9	21 20.7	+57.0	22.1	22 16.2	+57.2	22.2	23 11.7	+57.3	22.4	50
51	17 38.4	+56.3	21.1	18 34.3	+56.5	21.2	19 30.2	+56.6	21.3	20 26.1	+56.7	21.5	21 21.9	+56.9	21.6	22 17.7	+57.0	21.7	23 13.4	+57.1	21.9	24 09.0	+57.3	22.1	51
52	18 34.7	+56.3	20.7	19 30.8	+56.4	20.8	20 26.8	+56.6	21.0	21 22.8	+56.7	21.1	22 18.8	+56.8	21.3	23 14.7	+56.9	21.4	24 10.5	+57.1	21.6	25 06.3	+57.2	21.7	52
53	19 31.0	+56.2	20.3	20 27.2	+56.4	20.5	21 23.4	+56.5	20.6	22 19.5	+56.6	20.8	23 15.6	+56.7	20.9	24 11.6	+56.9	21.1	25 07.6	+57.0	21.2	26 03.5	+57.1	21.4	53
54	20 27.2	+56.2	20.0	21 23.6	+56.3	20.1	22 19.9	+56.4	20.2	23 16.1	+56.6	20.4	24 12.3	+56.8	20.5	25 08.5	+56.8	20.7	26 04.6	+57.0	20.9	27 00.6	+57.1	21.1	54
55	21 23.4	+56.1	19.6	22 19.9	+56.2	19.7	23 16.3	+56.4	19.9	24 12.7	+56.5	20.0	25 09.1	+56.6	20.2	26 05.3	+56.8	20.4	27 01.6	+56.9	20.5	27 57.7	+57.1	20.7	55
56	22 19.5	+56.1	19.2	23 16.1	+56.2	19.4	24 12.7	+56.4	19.5	25 09.2	+56.5	19.7	26 05.7	+56.6	19.8	27 02.1	+56.8	20.0	27 58.5	+56.8	20.2	28 54.8	+57.0	20.4	56
57	23 15.6	+56.0	18.8	24 12.3	+56.2	19.0	25 09.1	+56.2	19.1	26 05.7	+56.4	19.3	27 02.3	+56.6	19.5	27 58.9	+56.6	19.6	28 55.3	+56.9	19.8	29 51.8	+56.9	20.0	57
58	24 11.6	+56.0	18.4	25 08.5	+56.1	18.6	26 05.3	+56.3	18.7	27 02.1	+56.4	18.9	27 58.9	+56.4	19.1	28 55.5	+56.7	19.3	29 52.2	+56.7	19.4	30 48.7	+56.9	19.6	58
59	25 07.6	+55.9	18.0	26 04.6	+56.0	18.2	27 01.6	+56.1	18.4	27 58.5	+56.3	18.5	28 55.3	+56.5	18.7	29 52.2	+56.5	18.9	30 48.9	+56.7	19.1	31 45.6	+56.8	19.3	59
60	26 03.5	+55.8	17.6	27 00.6	+56.0	17.8	27 57.7	+56.1	17.9	28 54.8	+56.2	18.1	29 51.8	+56.3	18.3	30 48.7	+56.5	18.5	31 45.6	+56.6	18.7	32 42.4	+56.7	18.9	60
61	26 59.3	+55.7	17.2	27 56.6	+55.9	17.4	28 53.8	+56.0	17.6	29 51.0	+56.1	17.7	30 48.1	+56.3	17.9	31 45.2	+56.4	18.1	32 42.2	+56.5	18.3	33 39.1	+56.7	18.5	61
62	27 55.0	+55.7	16.8	28 52.5	+55.8	17.0	29 49.8	+56.0	17.1	30 47.1	+56.1	17.3	31 44.4	+56.2	17.5	32 41.6	+56.3	17.7	33 38.7	+56.5	17.9	34 35.8	+56.6	18.1	62
63	28 50.7	+55.6	16.4	29 48.3	+55.7	16.6	30 45.8	+55.8	16.7	31 43.2	+56.0	16.9	32 40.6	+56.1	17.1	33 37.9	+56.2	17.3	34 35.2	+56.3	17.5	35 32.4	+56.5	17.7	63
64	29 46.3	+55.5	16.0	30 44.0	+55.6	16.1	31 41.6	+55.8	16.3	32 39.2	+55.9	16.5	33 36.7	+56.0	16.7	34 34.1	+56.2	16.9	35 31.5	+56.3	17.1	36 28.9	+56.4	17.3	64
65	30 41.8	+55.5	15.5	31 39.6	+55.6	15.7	32 37.4	+55.6	15.9	33 35.1	+55.8	16.0	34 32.7	+55.9	16.2	35 30.3	+56.0	16.4	36 27.8	+56.2	16.6	37 25.3	+56.3	16.8	65
66	31 37.3	+55.3	15.1	32 35.2	+55.4	15.2	33 33.0	+55.6	15.4	34 30.9	+55.7	15.6	35 28.6	+55.9	15.8	36 26.3	+56.0	16.0	37 24.0	+56.1	16.2	38 21.6	+56.2	16.4	66
67	32 32.6	+55.2	14.6	33 30.6	+55.4	14.8	34 28.6	+55.5	15.0	35 26.6	+55.6	15.1	36 24.5	+55.7	15.3	37 22.3	+55.8	15.5	38 20.1	+55.9	15.7	39 17.8	+56.1	16.0	67
68	33 27.8	+55.1	14.2	34 26.0	+55.2	14.3	35 24.1	+55.4	14.5	36 22.2	+55.4	14.7	37 20.2	+55.6	14.9	38 18.1	+55.7	15.1	39 16.0	+55.9	15.3	40 13.9	+56.0	15.5	68
69	34 22.9	+55.1	13.7	35 21.2	+55.1	13.8	36 19.5	+55.2	14.0	37 17.6	+55.4	14.2	38 15.8	+55.5	14.4	39 13.9	+55.6	14.6	40 11.9	+55.8	14.8	41 09.9	+55.9	15.0	69
70	35 18.0	+54.8	13.2	36 16.3	+55.1	13.4	37 14.7	+55.1	13.5	38 13.0	+55.3	13.7	39 11.3	+55.3	13.9	40 09.5	+55.5	14.1	41 07.7	+55.6	14.3	42 05.8	+55.7	14.5	70
71	36 12.8	+54.8	12.7	37 11.4	+54.8	12.9	38 09.8	+55.0	13.0	39 08.3	+55.1	13.2	40 06.6	+55.3	13.4	41 05.0	+55.3	13.6	42 03.3	+55.5	13.8	43 01.5	+55.6	14.0	71
72	37 07.6	+54.6	12.2	38 06.2	+54.8	12.3	39 04.8	+54.9	12.5	40 03.4	+54.9	12.7	41 01.9	+55.1	12.9	42 00.3	+55.3	13.1	42 58.8	+55.3	13.3	43 57.1	+55.5	13.5	72
73	38 02.2	+54.5	11.7	39 01.0	+54.6	11.8	39 59.7	+54.7	12.0	40 58.3	+54.9	12.2	41 57.0	+54.9	12.4	42 55.6	+55.0	12.6	43 54.1	+55.2	12.8	44 52.6	+55.3	13.0	73
74	38 56.7	+54.3	11.1	39 55.6	+54.4	11.3	40 54.4	+54.5	11.5	41 53.2	+54.6	11.6	42 51.9	+54.8	11.8	43 50.6	+54.9	12.0	44 49.3	+55.0	12.2	45 47.9	+55.2	12.4	74
75	39 51.0	+54.2	10.6	40 50.0	+54.3	10.7	41 48.9	+54.4	10.9	42 47.8	+54.5	11.1	43 46.7	+54.6	11.3	44 45.5	+54.8	11.5	45 44.3	+54.9	11.7	46 43.1	+54.9	11.9	75
76	40 45.2	+54.0	10.0	41 44.3	+54.1	10.2	42 43.3	+54.3	10.3	43 42.3	+54.4	10.5	44 41.3	+54.5	10.7	45 40.3	+54.5	10.9	46 39.2	+54.6	11.1	47 38.0	+54.8	11.3	76
77	41 39.2	+53.9	9.4	42 38.4	+53.9	9.6	43 37.6	+54.0	9.7	44 36.7	+54.1	9.9	45 35.8	+54.2	10.1	46 34.8	+54.4	10.3	47 33.8	+54.5	10.5	48 32.8	+54.6	10.7	77
78	42 33.1	+53.6	8.8	43 32.3	+53.8	9.0	44 31.6	+53.8	9.1	45 30.8	+53.9	9.3	46 30.0	+54.0	9.5	47 29.2	+54.1	9.7	48 28.3	+54.3	9.8	49 27.4	+54.4	10.0	78
79	43 26.7	+53.4	8.2	44 26.1	+53.5	8.4	45 25.4	+53.6	8.5	46 24.7	+53.8	8.7	47 24.0	+53.9	8.8	48 23.3	+53.9	9.0	49 22.6	+54.0	9.2	50 21.8	+54.1	9.4	79
80	44 20.1	+53.2	7.6	45 19.6	+53.3	7.7	46 19.0	+53.4	7.9	47 18.5	+53.5	8.0	48 17.9	+53.5	8.2	49 17.2	+53.7	8.3	50 16.6	+53.8	8.5	51 15.9	+53.9	8.7	80
81	45 13.3	+53.0	6.9	46 12.9	+53.1	7.1	47 12.4	+53.2	7.2	48 12.0	+53.2	7.3	49 11.4	+53.4	7.5	50 10.9	+53.5	7.6	51 10.4	+53.5	7.8	52 09.8	+53.6	8.0	81
82	46 06.3	+52.8	6.3	47 06.0	+52.8	6.4	48 05.6	+52.9	6.5	49 05.2	+53.0	6.6	50 04.8	+53.1	6.8	51 04.4	+53.1	6.9	52 03.9	+53.3	7.1	53 03.4	+53.4	7.2	82
83	46 59.1	+52.5	5.6	47 58.8	+52.6	5.7	48 58.5	+52.6	5.8	49 58.2	+52.7	5.9	50 57.9	+52.7	6.0	51 57.5	+52.9	6.2	52 57.2	+52.9	6.3	53 56.8	+53.0	6.5	83
84	47 51.6	+52.2	4.9	48 51.4	+52.2	5.0	49 51.1	+52.4	5.1	50 50.9	+52.4	5.2	51 50.6	+52.5	5.3	52 50.4	+52.5	5.4	53 50.1	+52.6	5.5	54 49.8	+52.7	5.7	84
85	48 43.8	+51.9	4.1	49 43.6	+52.0	4.2	50 43.5	+52.0	4.3	51 43.3	+52.1	4.4	52 43.1	+52.2	4.5	53 42.9	+52.2	4.6	54 42.7	+52.3	4.7	55 42.5	+52.4	4.8	85
86	49 35.7	+51.6	3.4	50 35.6	+51.6	3.4	51 35.5	+51.7	3.5	52 35.4	+51.7	3.6	53 35.3	+51.7	3.7	54 35.1	+51.9	3.8	55 35.0	+51.9	3.9	56 34.9	+51.9	4.0	86
87	50 27.3	+51.3	2.6	51 27.2	+51.3	2.7	52 27.2	+51.4	2.7	53 27.1	+51.4	2.7	54 27.0	+51.5	2.8	55 27.0	+51.4	2.8	56 26.9	+51.5	2.9	57 26.8	+51.5	3.0	87
88	51 18.6	+50.9	1.7	52 18.5	+51.0	1.8	53 18.5	+51.0	1.8	54 18.5	+51.0	1.9	55 18.4	+51.0	1.9	56 18.4	+51.0	2.0	57 18.4	+51.0	2.0	58 18.3	+51.1	2.1	88
89	52 09.5	+50.5	0.9	53 09.5	+50.5	0.9	54 09.5	+50.5	0.9	55 09.5	+50.5	1.0	56 09.4	+50.6	1.0	57 09.4	+50.6	1.0	58 09.4	+50.6	1.0	59 09.4	+50.6	1.1	89
90	53 00.0	+50.1	0.0	54 00.0	+50.1	0.0	55 00.0	+50.1	0.0	56 00.0	+50.1	0.0	57 00.0	+50.1	0.0	58 00.0	+50.1	0.0	59 00.0	+50.1	0.0	60 00.0	+50.0	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 147°, 213°**

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	29 55.7	+55.3	139.8	29 09.8	+55.5	140.2	28 23.6	+55.8	140.5	27 37.1	+56.2	140.9	26 50.5	+56.4	141.2	26 03.6	+56.7	141.5	25 16.6	+56.8	141.8	24 29.3	+57.1	142.1	0
1	30 51.0	+55.1	139.4	30 05.3	+55.5	139.7	29 19.4	+55.8	140.1	28 33.3	+56.0	140.5	27 46.9	+56.3	140.8	27 00.3	+56.5	141.1	26 13.4	+56.8	141.4	25 26.4	+57.0	141.7	1
2	31 46.1	+55.1	138.9	31 00.8	+55.3	139.3	30 15.2	+55.6	139.7	29 29.3	+55.9	140.1	28 43.2	+56.2	140.4	27 56.8	+56.5	140.8	27 10.2	+56.7	141.1	26 23.4	+57.0	141.4	2
3	32 41.2	+54.9	138.4	31 56.1	+55.3	138.8	31 10.8	+55.6	139.3	30 25.2	+55.9	139.6	29 39.4	+56.2	140.0	28 53.3	+56.4	140.4	28 07.0	+56.7	140.7	27 20.4	+56.9	141.0	3
4	33 36.1	+54.9	138.0	32 51.4	+55.2	138.4	32 06.4	+55.5	138.8	31 21.1	+55.8	139.2	30 35.6	+56.0	139.6	29 49.7	+56.4	140.0	29 03.7	+56.6	140.3	28 17.3	+56.9	140.7	4
5	34 31.0	+54.7	137.5	33 46.6	+55.0	137.9	33 01.9	+55.4	138.4	32 16.9	+55.7	138.8	31 31.6	+56.0	139.2	30 46.1	+56.3	139.6	30 00.3	+56.5	140.0	29 14.2	+56.8	140.3	5
6	35 25.7	+54.5	137.0	34 41.6	+55.0	137.4	33 57.3	+55.3	137.9	33 12.6	+55.6	138.3	32 27.6	+55.9	138.8	31 42.4	+56.2	139.2	30 56.8	+56.5	139.6	30 11.0	+56.8	140.0	6
7	36 20.2	+54.3	136.4	35 36.6	+54.8	136.9	34 52.6	+55.1	137.3	34 08.2	+55.4	137.9	33 23.5	+55.9	138.3	32 38.6	+56.1	138.8	31 53.3	+56.4	139.2	31 07.8	+56.6	139.7	7
8	37 14.7	+54.3	135.9	36 31.4	+54.7	136.4	35 47.7	+55.1	136.9	35 03.7	+55.4	137.4	34 19.4	+55.7	137.9	33 34.7	+56.0	138.3	32 49.7	+56.3	138.8	32 04.4	+56.6	139.2	8
9	38 09.0	+54.1	135.4	37 26.1	+54.5	135.9	36 42.8	+54.9	136.5	35 59.1	+55.3	137.0	35 15.1	+55.6	137.4	34 30.7	+56.0	137.9	33 46.0	+56.3	138.4	33 01.0	+56.6	138.8	9
10	39 03.1	+54.0	134.8	38 20.6	+54.4	135.4	37 37.7	+54.8	135.9	36 54.4	+55.1	136.5	36 10.7	+55.5	137.0	35 26.7	+55.8	137.5	34 42.3	+56.1	137.9	33 57.6	+56.4	138.4	10
11	39 57.1	+53.9	134.3	39 15.0	+54.3	134.9	38 32.5	+54.6	135.4	37 49.5	+55.1	136.0	37 06.2	+55.3	136.5	36 22.5	+55.7	137.0	35 38.4	+56.1	137.5	34 54.0	+56.4	138.0	11
12	40 51.0	+53.6	133.7	40 09.3	+54.1	134.3	39 27.1	+54.5	134.9	38 44.6	+54.9	135.5	38 01.6	+55.3	136.0	37 18.2	+55.7	136.6	36 34.5	+55.9	137.1	35 50.4	+56.2	137.6	12
13	41 44.6	+53.4	133.1	41 03.4	+53.9	133.7	40 21.6	+54.4	134.4	39 39.5	+54.7	134.9	38 56.9	+55.1	135.5	38 13.9	+55.5	136.1	37 30.4	+55.9	136.6	36 46.6	+56.2	137.1	13
14	42 38.0	+53.3	132.5	41 57.3	+53.7	133.1	41 16.0	+54.2	133.8	40 34.2	+54.6	134.4	39 52.0	+55.0	135.0	39 09.4	+55.3	135.6	38 26.3	+55.7	136.2	37 42.8	+56.1	136.7	14
15	43 31.3	+53.0	131.8	42 51.0	+53.5	132.5	42 10.2	+54.0	133.2	41 28.8	+54.5	133.9	40 47.0	+54.9	134.5	40 04.7	+55.3	135.1	39 22.0	+55.7	135.7	38 38.9	+56.0	136.2	15
16	44 24.3	+52.8	131.2	43 44.5	+53.4	131.9	43 04.2	+53.8	132.6	42 23.3	+54.2	133.3	41 41.9	+54.7	134.0	41 00.0	+55.1	134.6	40 17.7	+55.4	135.2	39 34.9	+55.8	135.8	16
17	45 17.1	+52.6	130.5	44 37.9	+53.1	131.3	43 58.0	+53.6	132.0	43 17.5	+54.1	132.7	42 36.6	+54.5	133.4	41 55.1	+55.0	134.1	41 13.1	+55.4	134.7	40 30.7	+55.8	135.3	17
18	46 09.7	+52.3	129.8	45 31.0	+52.8	130.6	44 51.6	+53.4	131.4	44 11.6	+53.9	132.1	43 31.1	+54.4	132.8	42 50.1	+54.8	133.5	42 08.5	+55.2	134.2	41 26.5	+55.6	134.8	18
19	47 02.0	+52.1	129.1	46 23.8	+52.6	129.9	45 45.0	+53.2	130.7	45 05.5	+53.7	131.5	44 25.5	+54.2	132.2	43 44.9	+54.6	133.0	43 03.7	+55.1	133.6	42 22.1	+55.4	134.3	19
20	47 54.1	+51.7	128.4	47 16.4	+52.4	129.2	46 38.2	+52.9	130.1	45 59.2	+53.5	130.9	45 19.7	+53.9	131.6	44 39.5	+54.5	132.4	43 58.8	+54.9	133.1	43 17.5	+55.4	133.8	20
21	48 45.8	+51.4	127.6	48 08.8	+52.1	128.5	47 31.1	+52.7	129.4	46 52.7	+53.2	130.2	46 13.6	+53.8	131.0	45 34.0	+54.2	131.8	44 53.7	+54.7	132.5	44 12.9	+55.1	133.2	21
22	49 37.2	+51.1	126.8	49 00.9	+51.7	127.8	48 23.8	+52.4	128.7	47 45.9	+53.0	129.5	47 07.4	+53.5	130.4	46 28.2	+54.1	131.2	45 48.4	+54.6	131.9	45 08.0	+55.0	132.7	22
23	50 28.3	+50.8	126.0	49 52.6	+51.5	127.0	49 16.2	+52.1	127.9	48 38.9	+52.7	128.8	48 00.9	+53.3	129.7	47 22.3	+53.8	130.5	46 43.0	+54.3	131.3	46 03.0	+54.8	132.1	23
24	51 19.1	+50.3	125.2	50 44.1	+51.1	126.2	50 08.3	+51.7	127.2	49 31.6	+52.5	128.1	48 54.2	+53.1	129.0	48 16.1	+53.6	129.9	47 37.3	+54.2	130.7	46 57.8	+54.7	131.5	24
25	52 09.4	+50.0	124.3	51 35.2	+50.7	125.3	51 00.0	+51.5	126.4	50 24.1	+52.1	127.3	49 47.3	+52.7	128.3	49 09.7	+53.4	129.2	48 31.5	+53.9	130.1	47 52.5	+54.4	130.9	25
26	52 59.4	+49.5	123.4	52 25.9	+50.3	124.5	51 51.5	+51.1	125.5	51 16.2	+51.8	126.6	50 40.0	+52.5	127.5	50 03.1	+53.1	128.5	49 25.4	+53.6	129.4	48 46.9	+54.2	130.3	26
27	53 48.9	+49.1	122.4	53 16.2	+50.0	123.6	52 42.6	+50.7	124.7	52 08.0	+51.4	125.7	51 32.5	+52.2	126.8	50 56.2	+52.8	127.8	50 19.0	+53.5	128.7	49 41.1	+54.0	129.6	27
28	54 38.0	+48.6	121.5	54 06.2	+49.4	122.6	53 33.3	+50.3	123.8	52 59.4	+51.1	124.9	52 24.7	+51.8	126.0	51 49.0	+52.5	127.0	51 12.5	+53.1	128.0	50 35.1	+53.8	129.0	28
29	55 26.6	+48.0	120.4	54 55.6	+49.0	121.7	54 23.6	+49.8	122.9	53 50.5	+50.7	124.0	53 16.5	+51.4	125.1	52 41.5	+52.2	126.2	52 05.6	+52.9	127.2	51 28.9	+53.4	128.2	29
30	56 14.6	+47.4	119.4	55 44.6	+48.4	120.6	55 13.4	+49.4	121.9	54 41.2	+50.2	123.1	54 07.9	+51.1	124.3	53 33.7	+51.8	125.4	52 58.5	+52.5	126.5	52 22.3	+53.2	127.5	30
31	57 02.0	+46.9	118.3	56 33.0	+47.9	119.5	56 02.8	+48.9	120.9	55 31.4	+49.8	122.1	54 59.0	+50.6	123.4	54 25.5	+51.4	124.5	53 51.0	+52.2	125.7	53 15.5	+52.9	126.7	31
32	57 48.9	+46.1	117.1	57 20.9	+47.3	118.5	56 51.7	+48.3	119.8	56 21.2	+49.3	121.1	55 49.6	+50.2	122.4	55 16.9	+51.0	123.6	54 43.2	+51.8	124.8	54 08.4	+52.5	126.0	32
33	58 35.0	+45.5	115.9	58 08.2	+46.6	117.3	57 40.0	+47.7	118.7	57 10.5	+48.7	120.1	56 39.8	+49.7	121.4	56 07.9	+50.6	122.7	55 35.0	+51.4	123.9	55 01.0	+52.2	125.1	33
34	59 20.5	+44.7	114.6	58 54.8	+45.9	116.1	58 27.7	+47.0	117.6	57 59.2	+48.2	119.0	57 29.5	+49.1	120.4	56 58.5	+50.1	121.7	56 26.4	+50.9	122.9	55 53.2	+51.8	124.2	34
35	60 05.2	+43.8	113.3	59 40.7	+45.1	114.9	59 14.7	+46.4	116.4	58 47.4	+47.5	117.9	58 18.6	+48.6	119.3	57 48.6	+49.6	120.7	57 17.4	+50.5	122.0	56 45.0	+51.4	123.3	35
36	60 49.0	+43.0	111.9	60 25.8	+44.4	113.5	60 01.1	+45.6	115.1	59 34.9	+46.8	116.7	59 07.2	+48.0	118.2	58 38.2	+49.1	119.6	58 07.9	+50.1	121.0	57 36.4	+50.9	122.4	36
37	61 32.0	+42.0	110.5	61 10.2	+43.4	112.2	60 46.7	+44.8	113.8	60 21.7	+46.1	115.4	59 55.2	+47.3	117.0	59 27.3	+48.4	118.5	58 58.0	+49.5	120.0	58 27.3	+50.5	121.4	37
38	62 14.0	+40.9	108.9	61 53.6	+42.5	110.7	61 31.6	+43.9	112.4	61 07.8	+45.3	114.1	60 42.5	+46.5	115.8	60 15.7	+47.8	117.3	59 47.5	+48.8	118.9	59 17.8	+49.9	120.3	38
39	62 54.9	+39.9	107.4	62 36.1	+41.5	109.2	62 15.5	+43.0	111.0	61 53.1	+44.5	112.7	61 29.1	+45.8	114.4	61 03.5	+47.1	116.1	60 36.3	+48.3	117.7	60 07.7	+49.4	119.2	39
40	63 34.8	+38.6	105.7	63 17.6	+40.3	107.6	62 58.5	+42.0	109.5	62 37.6	+43.5	111.3	62 14.9	+45.0	113.1	61 50.6	+46.3	114.8	61 24.6	+47.6	116.5	60 57.1	+48.7	118.1	40
41	64 13.4	+37.3	104.0	63 57.9	+39.2	105.9	63 40.5	+40.8	107.9	63 21.1	+42.5	109.8	62 59.9	+44.0	111.6	62 36.9	+45.4	113.4	62 12.2	+46.8	115.1	61 45.8	+48.1	116.8	41
42	64 50.7	+36.0	102.1	64 37.1	+37.8	104.2	64 21.3	+39.7	106.2	64 03.6	+41.4	108.2	63 43.9	+43.0	110.1	63 22.3	+44.6	112.0	62 59.0	+45.9	113.8	62 33.9	+47.3	115.6	42
43	65 26.7	+34.4	100.2	65 14.9	+36.5	102.4	65 01.0	+38.4	104.5	64 45.0	+40.2	106.5	64 26.9	+41.9	108.5	64 06.9	+43.5	110.5	63 45.9	+45.1	112.4	63 21.2	+46.5	114.2	43
44	66 01.1	+32.8	98.2	65 51.4	+34.9	100.4	65 39.4	+36.9	102.6	65 25.2	+38.9	104.8	65 08.8	+40.8	106.8	64 50.4	+42.5	108.9	64 30.0	+44.1	110.9	64 07.7	+45.6	112.8	44
45	66 33.9	+31.1	96.2	66 26.3	+33.3	98.4	66 16.3	+35.5	100.7	66 04.1	+37.5	102.9	65 49.6	+39.4	105.1	65 32.9	+41.3	107.2	65 14.1	+43.0	109.3	64 53.3	+44.6	111.3	45
46	67 05.0	+29.3	94.0	66 59.6	+31.6	96.3	66 51.8	+33.8	98.7	66 41.6	+36.0	101.0	66 29.0	+38.1	103.2	66 14.2	+40.0	105.4	65 57.1	+41.9	107.6	65 37.9	+43.6	109.7	46
47	67 34.3	+27.2•	91.7	67 31.2	+29.2•	94.1	67 25.6	+32.1•	96.5	67 17.6	+34.3	98.9	67 07.1	+36.5	101.3	66 54.2	+38.6	103.6	66 39.0	+40.5	105.8	66 21.5	+42.4	108.0	47
48	68 01.5	+25.2•	89.4	68 00.9	+27.7•	91.8	67 57.7	+30.2•	94.3	67 51.9	+32.6	96.8	67 43.6	+34.8	99.2	67 32.8	+37.0	101.6	67 19.5	+39.2	103.9	67 03.9	+41.2	106.2	48
49	68 26.7	+22.9•	86.9	68 28.6	+25.6•	89.4	68 27.9	+28.1•	92.0	68 24.5	+30.6•	94.5	68 18.4	+33.1	97.0	68 09.8	+35.4	99.5	67 58.7	+37.6	101.9	67 45.1	+39.7	104.3	49
50	68 49.6	+20.6•	84.4	68 54.2	+23.3•	87.0	68 56.0	+26.0•	89.5	68 55.1	+28.6•	92.1	68 51.5	+31.2•	94.7	68 45.2	+33.7	97.3	68 36.3	+36.0	99.8	68 24.8	+38.2	102.3	50
51	69 10.2	+18.1•	81.7	69 17.5	+20.9•	84.4	69 22.0	+23.7•	87.0	69 23.7	+26.4•	89.7	69 22.7	+29.0•	92.3	69 18.9	+31.6•	95.0	69 12.3	+34.1	97.6	69 03.0	+36.5	100.2	51
52	69 28.3	+15.6•	79.1	69 38.4	+18.4•	81.7	69 45.7	+21.2•	84.4	69 50.1	+24.1•	87.1	69 51.7	+26.9•	89.8	69 50.5	+29.6•	92.5	69 46.4	+32.2•	95.3	69 39.5	+34.7	97.9	52
53	69 43.9	+12.9•	76.3	69 56.8	+15.7•	78.9	70 06.9	+18.7•	81.7	70 14.2	+21.5•	84.4	70 18.6	+24.4•	87.2	70 20.1	+27.2•	90.0	70 18.6	+30.1•	92.8	70 14.2	+32.8•	95.6	53
54	69 56.8	+10.1•	73.4	70 12.5	+13.1•	76.1	70 25.6	+15.9•	78.8	70 35.7	+19.0•	81.6	70 43.0	+21.9•	84.4	70 47.3	+24.9•	87.3	70 48.7	+27.7•	90.2	70 47.0	+30.5•	93.0	54
55	70 06.9	+7.3•	70.6	70 25.6	+10.1•	73.2	70 41.5	+13.2•	75.9	70 54.7	+16.1•	78.7	71 04.9	+19.2•	81.6	71 12.2	+22.2•	84.5	71 16.4	+25.2•	87.4	71 17.5	+28.2•	90.4	55
56	70 14.2	+4.4•	67.6	70 35.7	+7.3•	70.3	70 54.7	+10.2•	73.0	71 10.8	+13.3•	75.8	71 24.1	+16.4•	78.7	71 34.4	+19.5•	81.6	71 41.6	+22.6•	84.6	71 45.7	+25.7•	87.6	56
57	70 18.6	+1.5•	64.7	70 43.0	+4.3•	67.3	71 04.9	+7.3•	69.9	71 24.1	+10.3•	72.7	71 40.5	+13.4•	75.6	71 53.9	+16.5•	78.6	72 04.2	+19.8•	81.6	72 11.4	+22.9•	84.7	57
58	70 20.1	−1.5•	61.7	70 47.3	+1.4•	64.2	71 12.2	+4.2•	66.9	71 34.4	+7.2•	69.6	71 53.9	+10.3•	72.5	72 10.4	+13.6•	75.5	72 24.0	+16.7•	78.5	72 34.3	+20.0•	81.6	58
59	70 18.6	−4.4•	58.7	70 48.7	−1.7•	61.2	71 16.4	+1.1•	63.8	71 41.6	+4.1•	66.5	72 04.2	+7.2•	69.3	72 24.0	+10.3•	72.3	72 40.7	+13.6•	75.3	72 54.3	+17.0•	78.5	59
60	70 14.2	−7.2•	55.8	70 47.0	−4.7•	58.2	71 17.5	−2.0•	60.7	71 45.7	+0.9•	63.3	72 11.4	+3.9•	66.1	72 34.3	+7.1•	69.0	72 54.3	+10.4•	72.0	73 11.3	+13.7•	75.2	60
61	70 07.0	−10.1•	52.9	70 42.3	−7.7•	55.1	71 15.5	−5.0•	57.5	71 46.6	−2.2•	60.1	72 15.3	+0.7•	62.8	72 41.4	+3.7•	65.7	73 04.7	+7.0•	68.7	73 25.0	+10.3•	71.8	61
62	69 56.9	−12.8•	50.0	70 34.6	−10.5•	52.1	71 10.5	−8.1•	54.4	71 44.4	−5.5•	56.9	72 16.0	−2.6•	59.5	72 45.1	+0.4•	62.3	73 11.7	+3.5•	65.2	73 35.3	+6.9•	68.3	62
63	69 44.1	−15.6•	47.1	70 24.1	−13.4•	49.2	71 02.4	−11.0•	51.4	71 38.9	−8.5•	53.7	72 13.4	−5.9•	56.3	72 45.5	−3.0•	58.9	73 15.2	+0.1•	61.8	73 42.2	+3.3•	64.8	63
64	69 28.5	−18.1•	44.4	70 10.7	−16.1•	46.3	70 51.4	−13.9•	48.4	71 30.4	−11.6•	50.6	72 07.5	−9.1•	53.0	72 42.5	−6.3•	55.6	73 15.3	−3.4•	58.3	73 45.5	−0.3•	61.2	64
65	69 10.4	−20.5•	41.7	69 54.6	−18.7•	43.5	70 37.5	−16.7•	45.4	71 18.8	−14.5•	47.5	71 58.4	−12.1•	49.8	72 36.2	−9.6•	52.2	73 11.9	−6.9•	54.8	73 45.2	−3.8•	57.6	65
66	68 49.9	−22.9•	39.0	69 35.9	−21.2•	40.7	70 20.8	−19.4•	42.6	71 04.3	−17.4•	44.5	71 46.3	−15.2•	46.6	72 26.6	−12.8•	48.9	73 05.0	−10.2•	51.4	73 41.4	−7.4•	54.1	66
67	68 27.0	−25.2•	36.5	69 14.7	−23.6•	38.1	70 01.4	−21.9•	39.8	70 46.9	−20.1•	41.6	71 31.1	−18.1•	43.6	72 13.8	−15.9•	45.7	72 54.8	−13.5•	48.0	73 34.0	−10.9•	50.6	67
68	68 01.8	−27.2•	34.1	68 51.1	−25.8•	35.5	69 39.5	−24.2•	37.1	70 26.8	−22.4•	38.6	71 13.0	−20.8•	40.6	71 57.9	−18.4•	42.6	72 41.3	−16.6•	44.7	73 23.1	−14.2•	47.1	68
69	67 34.6	−29.2•	31.7	68 25.3	−28.0•	33.0	69 15.2	−26.6•	34.5	70 04.2	−25.1•	36.0	70 52.2	−23.4•	37.7	71 39.1	−21.6•	39.5	72 24.7	−19.6•	41.5	73 08.9	−17.5•	43.7	69
70	67 05.4	−31.1	29.4	67 57.3	−29.9	30.6	68 48.6	−28.7•	31.9	69 39.1	−27.3•	33.4	70 28.8	−25.9•	34.9	71 17.5	−24.3•	36.6	72 05.1	−22.5•	38.4	72 51.4	−20.5•	40.5	70
71	66 34.3	−32.8	27.3	67 27.4	−31.8	28.4	68 19.9	−30.7	29.5	69 11.8	−29.5•	30.8	70 02.9	−28.2•	32.2	70 53.2	−26.7•	33.8	71 42.6	−25.1•	35.5	72 30.9	−23.4•	37.3	71
72	66 01.5	−34.4	25.2	66 55.6	−33.5	26.2	67 49.2	−32.5	27.2	68 42.3	−31.5	28.4	69 34.7	−30.3•	29.7	70 26.5	−29.1•	31.1	71 17.5	−27.7•	32.6	72 07.5	−26.0•	34.3	72
73	65 27.1	−35.9	23.2	66 22.1	−35.2	24.1	67 16.7	−34.3	25.0	68 10.8	−33.4	26.1	69 04.4	−32.3	27.2	69 57.4	−31.1•	28.5	70 49.8	−29.9•	29.9	71 41.5	−28.6•	31.4	73
74	64 51.2	−37.3	21.3	65 46.9	−36.6	22.1	66 42.4	−35.9	22.9	67 37.4	−35.0	23.9	68 32.1	−34.2	24.9	69 26.3	−33.2	26.0	70 19.9	−32.1•	27.3	71 12.9	−30.9•	28.6	74
75	64 13.9	−38.7	19.4	65 10.3	−38.0	20.2	66 06.5	−37.4	20.9	67 02.4	−36.7	21.8	67 57.9	−35.8	22.7	68 53.1	−35.0	23.7	69 47.8	−34.1	24.8	70 42.0	−33.0•	26.0	75
76	63 35.2	−39.8	17.7	64 32.3	−39.3	18.3	65 29.1	−38.7	19.0	66 25.7	−38.1	19.8	67 22.1	−37.5	20.6	68 18.1	−36.7	21.5	69 13.7	−35.9	22.4	70 09.0	−35.0	23.5	76
77	62 55.4	−40.9	16.0	63 53.0	−40.5	16.6	64 50.4	−40.0	17.2	65 47.6	−39.4	17.9	66 44.6	−38.9	18.6	67 41.4	−38.3	19.4	68 37.8	−37.5	20.2	69 34.0	−36.8	21.1	77
78	62 14.5	−42.0	14.5	63 12.5	−41.6	14.9	64 10.4	−41.2	15.5	65 08.2	−40.6	16.1	66 05.7	−40.2	16.7	67 03.1	−39.7	17.3	68 00.3	−39.1	18.1	68 57.2	−38.5	18.9	78
79	61 32.5	−43.0	12.9	62 30.9	−42.6	13.4	63 29.2	−42.2	13.8	64 27.4	−41.8	14.3	65 25.5	−41.5	14.9	66 23.4	−41.0	15.5	67 21.2	−40.6	16.1	68 18.7	−40.0	16.8	79
80	60 49.5	−43.8	11.5	61 48.3	−43.6	11.9	62 47.0	−43.3	12.3	63 45.6	−43.0	12.7	64 44.0	−42.5	13.2	65 42.4	−42.2	13.7	66 40.6	−41.7	14.2	67 38.7	−41.3	14.8	80
81	60 05.7	−44.7	10.1	61 04.7	−44.4	10.4	62 03.7	−44.2	10.8	63 02.6	−43.9	11.1	64 01.5	−43.7	11.5	65 00.2	−43.3	11.9	65 58.9	−43.0	12.4	66 57.4	−42.6	12.9	81
82	59 21.0	−45.4	8.8	60 20.3	−45.3	9.0	61 19.5	−45.0	9.3	62 18.7	−44.8	9.6	63 17.8	−44.6	10.0	64 16.9	−44.3	10.3	65 15.9	−44.1	10.7	66 14.8	−43.8	11.1	82
83	58 35.6	−46.2	7.5	59 35.0	−46.0	7.7	60 34.5	−45.9	8.0	61 33.9	−45.7	8.2	62 33.2	−45.4	8.5	63 32.6	−45.3	8.8	64 31.8	−45.0	9.1	65 31.0	−44.7	9.5	83
84	57 49.4	−46.8	6.3	58 49.0	−46.7	6.5	59 48.6	−46.5	6.7	60 48.2	−46.4	6.9	61 47.8	−46.1	7.1	62 47.3	−46.1	7.3	63 46.8	−45.9	7.6	64 46.3	−45.8	7.9	84
85	57 02.6	−47.5	5.1	58 02.3	−47.3	5.3	59 02.1	−47.3	5.4	60 01.8	−47.1	5.6	61 01.5	−47.0	5.8	62 01.2	−46.9	6.0	63 00.9	−46.8	6.2	64 00.5	−46.6	6.4	85
86	56 15.1	−48.0	4.0	57 15.0	−48.0	4.1	58 14.8	−47.8	4.3	59 14.7	−47.8	4.4	60 14.5	−47.7	4.5	61 14.3	−47.6	4.6	62 14.1	−47.5	4.8	63 13.9	−47.5	5.0	86
87	55 27.1	−48.5	3.0	56 27.0	−48.5	3.0	57 26.9	−48.4	3.1	58 26.9	−48.4	3.2	59 26.8	−48.3	3.3	60 26.7	−48.3	3.4	61 26.6	−48.3	3.5	62 26.4	−48.1	3.6	87
88	54 38.6	−49.1	1.9	55 38.5	−49.0	2.0	56 38.5	−49.0	2.0	57 38.5	−49.0	2.1	58 38.4	−48.9	2.1	59 38.4	−48.9	2.2	60 38.3	−48.8	2.3	61 38.3	−48.8	2.4	88
89	53 49.5	−49.5	0.9	54 49.5	−49.5	1.0	55 49.5	−49.5	1.0	56 49.5	−49.5	1.0	57 49.5	−49.5	1.1	58 49.5	−49.5	1.1	59 49.5	−49.5	1.1	60 49.5	−49.5	1.1	89
90	53 00.0	−50.0	0.0	54 00.0	−50.0	0.0	55 00.0	−50.0	0.0	56 00.0	−50.0	0.0	57 00.0	−50.0	0.0	58 00.0	−50.0	0.0	59 00.0	−50.0	0.0	60 00.0	−50.0	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	29 55.7	−55.3	139.8	29 09.8	−55.6	140.2	28 23.6	−55.9	140.5	27 37.1	−56.1	140.9	26 50.5	−56.4	141.2	26 03.6	−56.6	141.5	25 16.6	−56.9	141.8	24 29.3	−57.1	142.1	0
1	29 00.4	−55.4	140.3	28 14.2	−55.8	140.6	27 27.7	−56.0	140.9	26 41.0	−56.3	141.3	25 54.1	−56.5	141.6	25 07.0	−56.7	141.9	24 19.7	−57.0	142.2	23 32.2	−57.1	142.4	1
2	28 05.0	−55.5	140.7	27 18.4	−55.7	141.0	26 31.7	−56.1	141.3	25 44.7	−56.3	141.7	24 57.6	−56.6	141.9	24 10.3	−56.8	142.2	23 22.7	−57.0	142.5	22 35.1	−57.2	142.8	2
3	27 09.5	−55.6	141.1	26 22.7	−55.9	141.4	25 35.6	−56.1	141.7	24 48.4	−56.3	142.0	24 01.0	−56.5	142.3	23 13.5	−56.8	142.6	22 25.7	−57.0	142.8	21 37.9	−57.3	143.1	3
4	26 13.9	−55.7	141.5	25 26.8	−55.9	141.8	24 39.5	−56.1	142.1	23 52.1	−56.4	142.4	23 04.5	−56.7	142.7	22 16.7	−56.9	142.9	21 28.7	−57.1	143.2	20 40.6	−57.3	143.4	4
5	25 18.2	−55.7	142.0	24 30.9	−55.9	142.2	23 43.4	−56.3	142.5	22 55.7	−56.5	142.8	22 07.8	−56.7	143.0	21 19.8	−56.9	143.3	20 31.6	−57.1	143.5	19 43.3	−57.3	143.7	5
6	24 22.5	−55.8	142.4	23 34.9	−56.0	142.6	22 47.1	−56.2	142.9	21 59.2	−56.5	143.1	21 11.1	−56.7	143.4	20 22.9	−56.9	143.6	19 34.5	−57.1	143.8	18 46.0	−57.3	144.0	6
7	23 26.7	−55.8	142.8	22 38.9	−56.1	143.0	21 50.9	−56.4	143.3	21 02.7	−56.6	143.5	20 14.4	−56.8	143.7	19 26.0	−57.0	143.9	18 37.4	−57.2	144.1	17 48.7	−57.4	144.3	7
8	22 30.9	−55.9	143.2	21 42.8	−56.2	143.4	20 54.5	−56.3	143.6	20 06.1	−56.6	143.9	19 17.6	−56.8	144.1	18 29.0	−57.0	144.3	17 40.2	−57.2	144.5	16 51.3	−57.4	144.6	8
9	21 35.0	−56.0	143.6	20 46.6	−56.1	143.8	19 58.2	−56.5	144.0	19 09.6	−56.7	144.2	18 20.8	−56.8	144.4	17 32.0	−57.1	144.6	16 43.0	−57.2	144.8	15 53.9	−57.4	145.0	9
10	20 39.0	−56.0	143.9	19 50.5	−56.3	144.2	19 01.7	−56.4	144.4	18 12.9	−56.7	144.6	17 24.0	−56.9	144.8	16 34.9	−57.1	144.9	15 45.8	−57.3	145.1	14 56.5	−57.4	145.3	10
11	19 43.0	−56.0	144.3	18 54.2	−56.3	144.5	18 05.3	−56.5	144.7	17 16.2	−56.7	144.9	16 27.1	−56.9	145.1	15 37.8	−57.1	145.2	14 48.5	−57.3	145.4	13 59.1	−57.4	145.6	11
12	18 47.0	−56.1	144.7	17 57.9	−56.3	144.9	17 08.8	−56.6	145.1	16 19.5	−56.7	145.3	15 30.2	−57.0	145.4	14 40.7	−57.1	145.6	13 51.2	−57.3	145.7	13 01.6	−57.5	145.8	12
13	17 50.9	−56.2	145.1	17 01.6	−56.4	145.3	16 12.2	−56.5	145.4	15 22.8	−56.8	145.6	14 33.2	−56.9	145.7	13 43.6	−57.1	145.9	12 53.9	−57.3	146.0	12 04.1	−57.5	146.1	13
14	16 54.7	−56.2	145.5	16 05.2	−56.4	145.6	15 15.7	−56.6	145.8	14 26.0	−56.8	145.9	13 36.3	−57.0	146.1	12 46.5	−57.2	146.2	11 56.6	−57.4	146.3	11 06.6	−57.5	146.4	14
15	15 58.5	−56.2	145.8	15 08.8	−56.4	146.0	14 19.1	−56.7	146.1	13 29.2	−56.8	146.3	12 39.3	−57.0	146.4	11 49.3	−57.2	146.5	10 59.2	−57.4	146.6	10 09.1	−57.5	146.7	15
16	15 02.3	−56.3	146.2	14 12.4	−56.4	146.3	13 22.4	−56.6	146.5	12 32.4	−56.9	146.6	11 42.3	−57.1	146.7	10 52.1	−57.3	146.8	10 01.8	−57.3	146.9	9 11.6	−57.6	147.0	16
17	14 06.0	−56.4	146.5	13 16.0	−56.5	146.7	12 25.8	−56.6	146.8	11 35.5	−56.8	146.9	10 45.2	−57.0	147.0	9 54.9	−57.2	147.1	9 04.5	−57.4	147.2	8 14.0	−57.6	147.3	17
18	13 09.8	−56.4	146.9	12 19.5	−56.6	147.0	11 29.1	−56.7	147.1	10 38.7	−56.9	147.2	9 48.2	−57.1	147.3	8 57.7	−57.3	147.4	8 07.1	−57.4	147.5	7 16.4	−57.5	147.6	18
19	12 13.4	−56.3	147.2	11 22.9	−56.5	147.4	10 32.4	−56.7	147.5	9 41.8	−56.9	147.6	8 51.1	−57.1	147.6	8 00.4	−57.3	147.7	7 09.7	−57.5	147.8	6 18.9	−57.6	147.9	19
20	11 17.1	−56.4	147.6	10 26.4	−56.6	147.7	9 35.7	−56.8	147.8	8 44.9	−57.0	147.9	7 54.0	−57.1	148.0	7 03.2	−57.3	148.0	6 12.2	−57.4	148.1	5 21.3	−57.6	148.1	20
21	10 20.7	−56.4	147.9	9 29.8	−56.5	148.0	8 38.9	−56.7	148.1	7 47.9	−56.9	148.2	6 56.9	−57.1	148.3	6 05.9	−57.3	148.3	5 14.8	−57.4	148.4	4 23.7	−57.6	148.4	21
22	9 24.3	−56.4	148.3	8 33.3	−56.6	148.4	7 42.2	−56.8	148.5	6 51.0	−56.9	148.6	5 59.8	−57.1	148.6	5 08.6	−57.3	148.6	4 17.4	−57.5	148.7	3 26.1	−57.6	148.7	22
23	8 27.9	−56.4	148.6	7 36.7	−56.6	148.7	6 45.4	−56.8	148.8	5 54.1	−57.0	148.8	5 02.7	−57.1	148.9	4 11.3	−57.3	148.9	3 19.9	−57.4	149.0	2 28.5	−57.6	149.0	23
24	7 31.5	−56.4	149.0	6 40.1	−56.7	149.0	5 48.6	−56.8	149.1	4 57.1	−57.0	149.2	4 05.6	−57.2	149.2	3 14.0	−57.3	149.2	2 22.5	−57.5	149.3	1 30.9	−57.6	149.3	24
25	6 35.1	−56.5	149.3	5 43.4	−56.6	149.4	4 51.8	−56.8	149.4	4 00.1	−57.0	149.5	3 08.4	−57.1	149.5	2 16.7	−57.3	149.5	1 25.0	−57.4	149.5	0 33.3	−57.6	149.5	25
26	5 38.6	−56.5	149.7	4 46.8	−56.6	149.7	3 55.0	−56.8	149.7	3 03.1	−56.9	149.8	2 11.3	−57.2	149.8	1 19.4	−57.3	149.8	0 27.6	−57.3	149.8	0 24.3	+57.6	30.2	26
27	4 42.1	−56.6	150.0	3 50.2	−56.7	150.0	2 58.2	−56.9	150.1	2 06.2	−57.0	150.1	1 14.1	−57.1	150.1	0 22.1	−57.3	150.1	0 29.9	+57.5	29.9	1 21.9	+57.6	29.9	27
28	3 45.6	−56.5	150.3	2 53.5	−56.7	150.4	2 01.3	−56.8	150.4	1 09.2	−57.1	150.4	0 17.0	−57.2	150.4	0 35.2	+57.3	29.6	1 27.4	+57.4	29.6	2 19.5	+57.6	29.6	28
29	2 49.2	−56.5	150.7	1 56.8	−56.7	150.7	1 04.5	−56.8	150.7	0 12.2	−57.0	150.7	0 40.2	+57.1	29.3	1 32.5	+57.3	29.3	2 24.8	+57.3	29.3	3 17.1	+57.6	29.3	29
30	1 52.7	−56.5	151.0	1 00.2	−56.7	151.0	0 07.7	−56.9	151.0	0 44.8	+57.0	29.0	1 37.3	+57.2	29.0	2 29.8	+57.3	29.0	3 22.3	+57.4	29.0	4 14.7	+57.6	29.1	30
31	0 56.2	−56.7	151.4	0 03.5	−56.7	151.4	0 49.2	+56.8	28.6	1 41.8	+57.0	28.7	2 34.5	+57.1	28.7	3 27.1	+57.3	28.7	4 19.7	+57.5	28.7	5 12.3	+57.6	28.8	31
32	0 00.3	+56.5	28.3	0 53.2	+56.6	28.3	1 46.0	+56.8	28.3	2 38.8	+57.0	28.3	3 31.6	+57.1	28.4	4 24.4	+57.3	28.4	5 17.2	+57.4	28.4	6 09.9	+57.6	28.5	32
33	0 56.8	+56.6	28.0	1 49.8	+56.7	28.0	2 42.8	+56.8	28.0	3 35.8	+57.0	28.0	4 28.7	+57.2	28.1	5 21.7	+57.2	28.1	6 14.6	+57.4	28.1	7 07.5	+57.5	28.2	33
34	1 53.3	+56.5	27.6	2 46.5	+56.6	27.7	3 39.6	+56.8	27.7	4 32.8	+56.9	27.7	5 25.9	+57.1	27.8	6 18.9	+57.3	27.8	7 12.0	+57.4	27.9	8 05.0	+57.6	27.9	34
35	2 49.8	+56.5	27.3	3 43.1	+56.7	27.3	4 36.4	+56.8	27.4	5 29.7	+57.0	27.4	6 23.0	+57.1	27.4	7 16.2	+57.3	27.5	8 09.4	+57.4	27.6	9 02.6	+57.5	27.6	35
36	3 46.3	+56.5	27.0	4 39.8	+56.6	27.0	5 33.2	+56.8	27.0	6 26.7	+56.9	27.1	7 20.1	+57.1	27.1	8 13.5	+57.2	27.2	9 06.8	+57.4	27.3	10 00.1	+57.5	27.3	36
37	4 42.8	+56.5	26.6	5 36.4	+56.7	26.7	6 30.0	+56.8	26.7	7 23.6	+57.0	26.8	8 17.2	+57.1	26.8	9 10.7	+57.2	26.9	10 04.2	+57.4	26.9	10 57.6	+57.6	27.1	37
38	5 39.3	+56.4	26.3	6 33.1	+56.6	26.3	7 26.8	+56.8	26.4	8 20.6	+56.9	26.4	9 14.3	+57.0	26.5	10 07.9	+57.2	26.6	11 01.6	+57.3	26.7	11 55.2	+57.4	26.8	38
39	6 35.7	+56.5	25.9	7 29.7	+56.6	26.0	8 23.6	+56.7	26.1	9 17.5	+56.9	26.1	10 11.3	+57.1	26.2	11 05.1	+57.2	26.3	11 58.9	+57.3	26.4	12 52.6	+57.5	26.5	39
40	7 32.2	+56.4	25.6	8 26.3	+56.5	25.7	9 20.3	+56.8	25.7	10 14.4	+56.8	25.8	11 08.4	+57.0	25.9	12 02.3	+57.2	26.0	12 56.2	+57.4	26.1	13 50.1	+57.5	26.2	40
41	8 28.6	+56.4	25.3	9 22.8	+56.6	25.3	10 17.1	+56.7	25.4	11 11.2	+56.9	25.5	12 05.4	+57.0	25.6	12 59.5	+57.1	25.7	13 53.6	+57.2	25.8	14 47.6	+57.4	25.9	41
42	9 25.0	+56.4	24.9	10 19.4	+56.6	25.0	11 13.8	+56.7	25.1	12 08.1	+56.8	25.2	13 02.4	+57.0	25.2	13 56.6	+57.2	25.4	14 50.8	+57.3	25.5	15 45.0	+57.4	25.6	42
43	10 21.4	+56.4	24.6	11 16.0	+56.5	24.6	12 10.5	+56.6	24.7	13 04.9	+56.9	24.8	13 59.4	+56.9	24.9	14 53.8	+57.1	25.0	15 48.1	+57.2	25.2	16 42.4	+57.4	25.3	43
44	11 17.8	+56.3	24.2	12 12.5	+56.5	24.3	13 07.1	+56.7	24.4	14 01.8	+56.7	24.5	14 56.3	+57.0	24.6	15 50.9	+57.0	24.7	16 45.3	+57.2	24.8	17 39.8	+57.3	25.0	44
45	12 14.1	+56.3	23.9	13 09.0	+56.4	24.0	14 03.8	+56.6	24.1	14 58.5	+56.8	24.2	15 53.3	+56.9	24.3	16 47.9	+57.1	24.4	17 42.5	+57.2	24.5	18 37.1	+57.3	24.7	45
46	13 10.4	+56.3	23.5	14 05.4	+56.5	23.6	15 00.4	+56.6	23.7	15 55.3	+56.7	23.8	16 50.2	+56.8	23.9	17 45.0	+57.0	24.1	18 39.7	+57.2	24.2	19 34.4	+57.3	24.3	46
47	14 06.7	+56.3	23.2	15 01.9	+56.4	23.3	15 57.0	+56.5	23.4	16 52.0	+56.7	23.5	17 47.0	+56.9	23.6	18 42.0	+56.9	23.7	19 36.9	+57.1	23.9	20 31.7	+57.2	24.0	47
48	15 03.0	+56.2	22.8	15 58.3	+56.3	22.9	16 53.5	+56.5	23.0	17 48.7	+56.7	23.1	18 43.9	+56.7	23.3	19 38.9	+57.0	23.4	20 34.0	+57.0	23.6	21 28.9	+57.2	23.7	48
49	15 59.2	+56.2	22.4	16 54.6	+56.4	22.5	17 50.0	+56.5	22.7	18 45.4	+56.6	22.8	19 40.6	+56.8	22.9	20 35.9	+56.9	23.1	21 31.0	+57.1	23.2	22 26.2	+57.1	23.4	49
50	16 55.4	+56.1	22.1	17 51.0	+56.2	22.2	18 46.5	+56.4	22.3	19 42.0	+56.5	22.4	20 37.4	+56.7	22.6	21 32.8	+56.8	22.7	22 28.1	+57.0	22.9	23 23.3	+57.1	23.1	50
51	17 51.5	+56.1	21.7	18 47.2	+56.3	21.8	19 42.9	+56.4	22.0	20 38.5	+56.6	22.1	21 34.1	+56.7	22.2	22 29.6	+56.8	22.4	23 25.1	+56.9	22.6	24 20.4	+57.1	22.7	51
52	18 47.6	+56.1	21.3	19 43.5	+56.2	21.5	20 39.3	+56.4	21.6	21 35.1	+56.5	21.7	22 30.8	+56.6	21.9	23 26.4	+56.8	22.0	24 22.0	+56.9	22.2	25 17.5	+57.1	22.4	52
53	19 43.7	+56.0	20.9	20 39.7	+56.1	21.1	21 35.7	+56.2	21.2	22 31.6	+56.4	21.4	23 27.4	+56.5	21.5	24 23.2	+56.7	21.7	25 18.9	+56.9	21.9	26 14.6	+56.9	22.2	53
54	20 39.7	+56.0	20.6	21 35.8	+56.1	20.7	22 31.9	+56.3	20.8	23 28.0	+56.4	21.0	24 24.0	+56.5	21.2	25 19.9	+56.7	21.3	26 15.8	+56.8	21.5	27 11.5	+57.0	21.7	54
55	21 35.7	+55.9	20.2	22 31.9	+56.1	20.3	23 28.2	+56.2	20.5	24 24.4	+56.3	20.6	25 20.5	+56.5	20.8	26 16.6	+56.6	21.0	27 12.6	+56.7	21.1	28 08.5	+56.9	21.3	55
56	22 31.6	+55.8	19.8	23 28.0	+56.0	19.9	24 24.4	+56.1	20.1	25 20.7	+56.3	20.2	26 17.0	+56.4	20.4	27 13.2	+56.5	20.6	28 09.3	+56.7	20.8	29 05.4	+56.8	21.0	56
57	23 27.4	+55.8	19.4	24 24.0	+55.9	19.5	25 20.5	+56.1	19.7	26 17.0	+56.2	19.9	27 13.4	+56.3	20.0	28 09.7	+56.5	20.2	29 06.0	+56.6	20.4	30 02.2	+56.7	20.6	57
58	24 23.2	+55.7	19.0	25 19.9	+55.9	19.1	26 16.6	+56.0	19.3	27 13.2	+56.1	19.5	28 09.7	+56.3	19.6	29 06.2	+56.4	19.8	30 02.6	+56.5	20.0	30 58.9	+56.7	20.2	58
59	25 18.9	+55.7	18.6	26 15.8	+55.7	18.7	27 12.6	+55.9	18.9	28 09.3	+56.1	19.1	29 06.0	+56.2	19.2	30 02.6	+56.3	19.4	30 58.9	+56.5	19.6	31 55.6	+56.6	19.8	59
60	26 14.6	+55.5	18.2	27 11.5	+55.8	18.3	28 08.5	+55.8	18.5	29 05.4	+55.9	18.7	30 02.2	+56.1	18.8	30 58.9	+56.4	19.0	31 55.6	+56.4	19.2	32 52.2	+56.6	19.4	60
61	27 10.1	+55.5	17.7	28 07.3	+55.6	17.9	29 04.3	+55.8	18.1	30 01.3	+56.0	18.2	30 58.3	+56.0	18.4	31 55.2	+56.2	18.6	32 52.0	+56.3	18.8	33 48.8	+56.4	19.0	61
62	28 05.6	+55.5	17.3	29 02.9	+55.6	17.5	30 00.1	+55.7	17.6	30 57.3	+55.8	17.8	31 54.3	+56.0	18.0	32 51.4	+56.1	18.2	33 48.3	+56.3	18.4	34 45.2	+56.4	18.6	62
63	29 01.1	+55.3	16.9	29 58.5	+55.4	17.0	30 55.8	+55.6	17.2	31 53.1	+55.7	17.4	32 50.3	+55.9	17.6	33 47.5	+56.0	17.8	34 44.6	+56.1	18.0	35 41.6	+56.3	18.2	63
64	29 56.4	+55.2	16.4	30 53.9	+55.4	16.6	31 51.4	+55.5	16.8	32 48.8	+55.7	17.0	33 46.2	+55.8	17.2	34 43.5	+55.9	17.4	35 40.7	+56.1	17.6	36 37.9	+56.2	17.8	64
65	30 51.6	+55.2	16.0	31 49.3	+55.3	16.1	32 46.9	+55.4	16.3	33 44.5	+55.5	16.5	34 42.0	+55.6	16.7	35 39.4	+55.8	16.9	36 36.8	+55.9	17.1	37 34.1	+56.1	17.3	65
66	31 46.8	+55.1	15.5	32 44.6	+55.2	15.7	33 42.3	+55.3	15.9	34 40.0	+55.4	16.1	35 37.6	+55.6	16.2	36 35.2	+55.7	16.5	37 32.7	+55.9	16.7	38 30.2	+56.0	16.9	66
67	32 41.8	+55.0	15.0	33 39.8	+55.0	15.2	34 37.6	+55.2	15.4	35 35.5	+55.3	15.6	36 33.2	+55.5	15.8	37 30.9	+55.6	16.0	38 28.6	+55.7	16.2	39 26.2	+55.8	16.4	67
68	33 36.8	+54.8	14.6	34 34.8	+55.0	14.7	35 32.8	+55.1	14.9	36 30.8	+55.2	15.1	37 28.7	+55.3	15.3	38 26.5	+55.5	15.5	39 24.3	+55.6	15.7	40 22.0	+55.8	16.0	68
69	34 31.6	+54.7	14.1	35 29.8	+54.8	14.2	36 27.9	+55.0	14.4	37 26.0	+55.1	14.6	38 24.0	+55.2	14.8	39 22.0	+55.4	15.0	40 19.9	+55.5	15.2	41 17.8	+55.6	15.5	69
70	35 26.3	+54.6	13.6	36 24.6	+54.7	13.7	37 22.9	+54.8	13.9	38 21.1	+54.9	14.1	39 19.2	+55.1	14.3	40 17.4	+55.2	14.5	41 15.4	+55.4	14.7	42 13.4	+55.5	15.0	70
71	36 20.9	+54.4	13.1	37 19.3	+54.6	13.3	38 17.7	+54.7	13.4	39 16.0	+54.9	13.6	40 14.3	+55.0	13.8	41 12.6	+55.1	14.0	42 10.8	+55.2	14.2	43 08.9	+55.3	14.4	71
72	37 15.3	+54.3	12.5	38 13.9	+54.4	12.7	39 12.4	+54.5	12.9	40 10.9	+54.6	13.1	41 09.3	+54.8	13.3	42 07.7	+54.9	13.5	43 06.0	+55.0	13.7	44 04.2	+55.2	13.9	72
73	38 09.6	+54.2	12.0	39 08.3	+54.3	12.2	40 06.9	+54.4	12.3	41 05.5	+54.5	12.5	42 04.1	+54.6	12.7	43 02.6	+54.7	12.9	44 01.0	+54.9	13.1	44 59.4	+55.1	13.4	73
74	39 03.8	+54.0	11.4	40 02.6	+54.1	11.6	41 01.3	+54.2	11.8	42 00.0	+54.4	12.0	42 58.7	+54.5	12.2	43 57.3	+54.6	12.4	44 55.9	+54.8	12.6	45 54.5	+54.8	12.8	74
75	39 57.8	+53.8	10.9	40 56.7	+53.9	11.0	41 55.5	+54.1	11.2	42 54.4	+54.1	11.4	43 53.2	+54.3	11.6	44 51.9	+54.4	11.8	45 50.7	+54.5	12.0	46 49.3	+54.7	12.2	75
76	40 51.6	+53.6	10.3	41 50.6	+53.8	10.5	42 49.6	+53.9	10.6	43 48.5	+54.0	10.8	44 47.5	+54.1	11.0	45 46.3	+54.3	11.2	46 45.2	+54.3	11.4	47 44.0	+54.5	11.6	76
77	41 45.2	+53.5	9.7	42 44.4	+53.5	9.9	43 43.5	+53.6	10.0	44 42.5	+53.8	10.2	45 41.6	+53.9	10.4	46 40.6	+54.0	10.6	47 39.5	+54.2	10.8	48 38.5	+54.2	11.0	77
78	42 38.7	+53.2	9.1	43 37.9	+53.4	9.2	44 37.1	+53.5	9.4	45 36.3	+53.6	9.6	46 35.5	+53.7	9.7	47 34.6	+53.8	9.9	48 33.7	+53.9	10.1	49 32.7	+54.0	10.3	78
79	43 31.9	+53.1	8.5	44 31.3	+53.1	8.6	45 30.6	+53.2	8.8	46 29.9	+53.3	8.9	47 29.1	+53.5	9.1	48 28.4	+53.5	9.3	49 27.6	+53.6	9.4	50 26.7	+53.8	9.6	79
80	44 25.0	+52.8	7.8	45 24.4	+52.9	8.0	46 23.8	+53.0	8.1	47 23.2	+53.1	8.2	48 22.6	+53.2	8.4	49 21.9	+53.3	8.6	50 21.2	+53.4	8.8	51 20.5	+53.5	8.9	80
81	45 17.8	+52.5	7.1	46 17.3	+52.7	7.3	47 16.8	+52.8	7.4	48 16.3	+52.8	7.6	49 15.8	+52.9	7.7	50 15.2	+53.0	7.9	51 14.6	+53.2	8.0	52 14.0	+53.3	8.2	81
82	46 10.3	+52.3	6.5	47 10.0	+52.3	6.6	48 09.6	+52.4	6.7	49 09.1	+52.6	6.8	50 08.7	+52.6	7.0	51 08.2	+52.8	7.1	52 07.8	+52.8	7.3	53 07.3	+52.9	7.5	82
83	47 02.6	+52.1	5.7	48 02.3	+52.1	5.8	49 02.0	+52.2	6.0	50 01.7	+52.3	6.1	51 01.3	+52.4	6.2	52 01.0	+52.4	6.4	53 00.6	+52.5	6.5	54 00.2	+52.6	6.7	83
84	47 54.7	+51.7	5.0	48 54.4	+51.9	5.1	49 54.2	+51.9	5.2	50 54.0	+51.9	5.3	51 53.7	+52.0	5.4	52 53.4	+52.1	5.5	53 53.1	+52.2	5.7	54 52.8	+52.3	5.8	84
85	48 46.4	+51.4	4.2	49 46.3	+51.4	4.3	50 46.1	+51.5	4.4	51 45.9	+51.6	4.5	52 45.7	+51.7	4.6	53 45.5	+51.7	4.7	54 45.3	+51.8	4.8	55 45.1	+51.9	5.0	85
86	49 37.8	+51.1	3.5	50 37.7	+51.2	3.5	51 37.6	+51.2	3.6	52 37.5	+51.2	3.7	53 37.4	+51.3	3.8	54 37.2	+51.4	3.9	55 37.1	+51.4	4.0	56 37.0	+51.4	4.1	86
87	50 28.9	+50.8	2.6	51 28.9	+50.8	2.7	52 28.8	+50.8	2.8	53 28.7	+50.9	2.8	54 28.7	+50.9	2.9	55 28.6	+50.9	2.9	56 28.5	+51.0	3.0	57 28.4	+51.0	3.1	87
88	51 19.7	+50.3	1.8	52 19.7	+50.3	1.8	53 19.6	+50.4	1.9	54 19.6	+50.4	1.9	55 19.6	+50.4	2.0	56 19.5	+50.5	2.0	57 19.5	+50.5	2.1	58 19.4	+50.6	2.1	88
89	52 10.0	+50.0	0.9	53 10.0	+50.0	0.9	54 10.0	+50.0	1.0	55 10.0	+50.0	1.0	56 10.0	+50.0	1.0	57 10.0	+50.0	1.0	58 10.0	+50.0	1.1	59 10.0	+50.0	1.1	89
90	53 00.0	+49.5	0.0	54 00.0	+49.5	0.0	55 00.0	+49.5	0.0	56 00.0	+49.5	0.0	57 00.0	+49.5	0.0	58 00.0	+49.5	0.0	59 00.0	+49.5	0.0	60 00.0	+49.5	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 146°, 214°**

35°, 325° L.H.A.　　LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	29 32.2	+55.0	138.8	28 46.9	+55.4	139.1	28 01.5	+55.6	139.5	27 15.7	+56.0	139.8	26 29.8	+56.2	140.1	25 43.6	+56.5	140.5	24 57.3	+56.7	140.8	24 10.7	+56.9	141.0	0
1	30 27.2	+54.9	138.3	29 42.3	+55.2	138.7	28 57.1	+55.6	139.1	28 11.7	+55.8	139.4	27 26.0	+56.1	139.7	26 40.1	+56.4	140.1	25 54.0	+56.6	140.4	25 07.6	+56.9	140.7	1
2	31 22.1	+54.9	137.8	30 37.5	+55.2	138.2	29 52.7	+55.4	138.6	29 07.5	+55.8	139.0	28 22.1	+56.1	139.3	27 36.5	+56.3	139.7	26 50.6	+56.6	140.0	26 04.5	+56.8	140.3	2
3	32 17.0	+54.7	137.3	31 32.7	+55.0	137.8	30 48.1	+55.4	138.2	30 03.3	+55.7	138.6	29 18.2	+55.9	138.9	28 32.8	+56.3	139.3	27 47.2	+56.5	139.7	27 01.3	+56.8	140.0	3
4	33 11.7	+54.6	136.9	32 27.7	+55.0	137.3	31 43.5	+55.3	137.7	30 59.0	+55.6	138.1	30 14.1	+55.9	138.5	29 29.1	+56.1	138.9	28 43.7	+56.5	139.3	27 58.1	+56.7	139.6	4
5	34 06.3	+54.5	136.4	33 22.7	+54.8	136.8	32 38.8	+55.2	137.3	31 54.6	+55.5	137.7	31 10.0	+55.9	138.1	30 25.2	+56.2	138.5	29 40.2	+56.4	138.9	28 54.8	+56.7	139.2	5
6	35 00.8	+54.3	135.9	34 17.5	+54.7	136.3	33 34.0	+55.0	136.8	32 50.1	+55.4	137.2	32 05.9	+55.7	137.7	31 21.4	+56.0	138.1	30 36.6	+56.3	138.5	29 51.5	+56.6	138.9	6
7	35 55.1	+54.3	135.3	35 12.2	+54.5	135.8	34 29.0	+55.0	136.3	33 45.5	+55.3	136.8	33 01.6	+55.6	137.2	32 17.4	+55.9	137.7	31 32.9	+56.2	138.1	30 48.1	+56.5	138.5	7
8	36 49.3	+54.1	134.8	36 06.8	+54.5	135.3	35 24.0	+54.8	135.8	34 40.8	+55.2	136.3	33 57.2	+55.5	136.8	33 13.3	+55.9	137.2	32 29.1	+56.2	137.7	31 44.6	+56.5	138.1	8
9	37 43.4	+53.9	134.3	37 01.3	+54.3	134.8	36 18.8	+54.7	135.3	35 36.0	+55.0	135.8	34 52.7	+55.5	136.3	34 09.2	+55.7	136.8	33 25.3	+56.0	137.3	32 41.1	+56.3	137.7	9
10	38 37.3	+53.7	133.7	37 55.6	+54.2	134.3	37 13.5	+54.6	134.8	36 31.0	+55.0	135.3	35 48.2	+55.3	135.9	35 04.9	+55.7	136.3	34 21.3	+56.0	136.8	33 37.4	+56.3	137.3	10
11	39 31.0	+53.6	133.1	38 49.8	+54.0	133.7	38 08.1	+54.4	134.3	37 26.0	+54.8	134.8	36 43.5	+55.2	135.4	36 00.6	+55.5	135.9	35 17.3	+55.9	136.4	34 33.7	+56.2	136.9	11
12	40 24.6	+53.4	132.5	39 43.8	+53.8	133.2	39 02.5	+54.3	133.8	38 20.8	+54.7	134.3	37 38.7	+55.0	134.9	36 56.1	+55.5	135.4	36 13.2	+55.8	135.9	35 29.9	+56.1	136.4	12
13	41 18.0	+53.2	131.9	40 37.6	+53.7	132.6	39 56.8	+54.1	133.2	39 15.5	+54.5	133.8	38 33.7	+55.0	134.4	37 51.6	+55.3	134.9	37 09.0	+55.7	135.5	36 26.0	+56.0	136.0	13
14	42 11.2	+53.0	131.3	41 31.3	+53.5	132.0	40 50.9	+53.9	132.6	40 10.0	+54.4	133.3	39 28.7	+54.8	133.9	38 46.9	+55.2	134.4	38 04.7	+55.5	135.0	37 22.0	+55.9	135.6	14
15	43 04.2	+52.7	130.7	42 24.8	+53.2	131.4	41 44.8	+53.8	132.0	41 04.4	+54.2	132.7	40 23.5	+54.6	133.3	39 42.1	+55.0	133.9	39 00.2	+55.5	134.5	38 17.9	+55.8	135.1	15
16	43 56.9	+52.6	130.0	43 18.0	+53.1	130.7	42 38.6	+53.6	131.4	41 58.6	+54.1	132.1	41 18.1	+54.5	132.8	40 37.1	+54.9	133.3	39 55.7	+55.3	134.0	39 13.7	+55.7	134.6	16
17	44 49.5	+52.2	129.3	44 11.1	+52.9	130.1	43 32.2	+53.3	130.8	42 52.7	+53.8	131.5	42 12.6	+54.3	132.2	41 32.0	+54.8	132.9	40 51.0	+55.1	133.5	40 09.4	+55.6	134.1	17
18	45 41.7	+52.1	128.6	45 04.0	+52.6	129.4	44 25.5	+53.2	130.2	43 46.5	+53.7	130.9	43 06.9	+54.2	131.6	42 26.8	+54.6	132.3	41 46.1	+55.0	133.0	41 05.0	+55.4	133.6	18
19	46 33.8	+51.7	127.9	45 56.6	+52.3	128.7	45 18.7	+52.9	129.5	44 40.2	+53.4	130.3	44 01.1	+53.9	131.0	43 21.4	+54.4	131.8	42 41.1	+54.9	132.5	42 00.4	+55.3	133.1	19
20	47 25.5	+51.5	127.2	46 48.9	+52.1	128.0	46 11.6	+52.7	128.9	45 33.6	+53.2	129.7	44 55.0	+53.7	130.4	44 15.8	+54.2	131.2	43 36.0	+54.7	131.9	42 55.7	+55.1	132.6	20
21	48 17.0	+51.1	126.4	47 41.0	+51.8	127.3	47 04.3	+52.4	128.2	46 26.8	+53.0	129.0	45 48.7	+53.6	129.8	45 10.0	+54.1	130.6	44 30.7	+54.5	131.3	43 50.8	+55.0	132.1	21
22	49 08.1	+50.8	125.6	48 32.8	+51.4	126.5	47 56.7	+52.1	127.4	47 19.8	+52.7	128.3	46 42.3	+53.3	129.1	46 04.1	+53.8	130.0	45 25.2	+54.3	130.7	44 45.8	+54.8	131.5	22
23	49 58.9	+50.4	124.8	49 24.2	+51.2	125.8	48 48.8	+51.8	126.7	48 12.5	+52.5	127.6	47 35.6	+53.0	128.5	46 57.9	+53.6	129.3	46 19.5	+54.2	130.1	45 40.6	+54.6	130.9	23
24	50 49.3	+50.1	124.0	50 15.4	+50.8	125.0	49 40.6	+51.5	125.9	49 05.0	+52.2	126.9	48 28.6	+52.8	127.8	47 51.5	+53.4	128.7	47 13.7	+53.9	129.5	46 35.2	+54.4	130.3	24
25	51 39.4	+49.6	123.1	51 06.2	+50.4	124.1	50 32.1	+51.2	125.1	49 57.2	+51.8	126.1	49 21.4	+52.5	127.1	48 44.9	+53.1	128.0	48 07.6	+53.7	128.8	47 29.6	+54.2	129.7	25
26	52 29.0	+49.3	122.2	51 56.6	+50.1	123.2	51 23.3	+50.8	124.3	50 49.0	+51.5	125.3	50 13.9	+52.2	126.3	49 38.0	+52.8	127.3	49 01.3	+53.4	128.2	48 23.8	+54.0	129.1	26
27	53 18.3	+48.7	121.2	52 46.7	+49.5	122.3	52 14.1	+50.4	123.4	51 40.5	+51.2	124.5	51 06.1	+51.9	125.5	50 30.8	+52.6	126.5	49 54.7	+53.2	127.5	49 17.8	+53.8	128.4	27
28	54 07.0	+48.2	120.2	53 36.2	+49.2	121.4	53 04.5	+50.0	122.5	52 31.7	+50.8	123.6	51 58.0	+51.5	124.7	51 23.4	+52.2	125.8	50 47.9	+52.9	126.7	50 11.6	+53.5	127.7	28
29	54 55.2	+47.7	119.2	54 25.4	+48.6	120.4	53 54.5	+49.5	121.6	53 22.5	+50.4	122.8	52 49.5	+51.1	123.9	52 15.6	+51.9	125.0	51 40.8	+52.6	126.0	51 05.1	+53.3	127.0	29
30	55 42.9	+47.1	118.1	55 14.0	+48.2	119.4	54 44.0	+49.1	120.6	54 12.9	+49.9	121.8	53 40.7	+50.8	123.0	53 07.5	+51.6	124.1	52 33.4	+52.3	125.2	51 58.4	+52.9	126.3	30
31	56 30.0	+46.5	117.0	56 02.2	+47.5	118.4	55 33.1	+48.5	119.6	55 02.8	+49.5	120.9	54 31.5	+50.3	122.1	53 59.1	+51.1	123.3	53 25.7	+51.9	124.4	52 51.3	+52.6	125.5	31
32	57 16.5	+45.9	115.9	56 49.7	+47.0	117.3	56 21.6	+48.0	118.6	55 52.3	+49.0	119.9	55 21.8	+49.9	121.1	54 50.2	+50.8	122.4	54 17.6	+51.6	123.5	53 43.9	+52.4	124.7	32
33	58 02.4	+45.1	114.7	57 36.7	+46.2	116.1	57 09.6	+47.4	117.5	56 41.3	+48.4	118.8	56 11.7	+49.4	120.2	55 41.0	+50.3	121.4	55 09.2	+51.1	122.7	54 36.3	+51.9	123.9	33
34	58 47.5	+44.4	113.4	58 22.9	+45.6	114.9	57 57.0	+46.7	116.4	57 29.7	+47.8	117.8	57 01.1	+48.9	119.1	56 31.3	+49.8	120.5	56 00.3	+50.7	121.7	55 28.2	+51.6	123.0	34
35	59 31.9	+43.5	112.1	59 08.5	+44.9	113.6	58 43.7	+46.1	115.2	58 17.5	+47.2	116.6	57 50.0	+48.1	118.1	57 21.1	+49.3	119.4	56 51.0	+50.3	120.8	56 19.8	+51.1	122.1	35
36	60 15.4	+42.6	110.7	59 53.4	+44.0	112.3	59 29.8	+45.3	113.9	59 04.7	+46.6	115.4	58 38.3	+47.6	116.9	58 10.4	+48.8	118.4	57 41.3	+49.7	119.8	57 10.9	+50.7	121.1	36
37	60 58.0	+41.7	109.3	60 37.4	+43.1	111.0	60 15.1	+44.5	112.6	59 51.3	+45.8	114.2	59 25.9	+47.0	115.7	58 59.2	+48.1	117.3	58 31.0	+49.2	118.7	58 01.6	+50.1	120.1	37
38	61 39.7	+40.7	107.8	61 20.5	+42.2	109.5	60 59.6	+43.6	111.2	60 37.1	+45.0	112.9	60 12.9	+46.3	114.5	59 47.3	+47.5	116.1	59 20.2	+48.6	117.6	58 51.7	+49.7	119.1	38
39	62 20.4	+39.5	106.2	62 02.7	+41.2	108.0	61 43.2	+42.7	109.8	61 22.1	+44.1	111.5	60 59.2	+45.5	113.2	60 34.8	+46.8	114.8	60 08.8	+48.0	116.4	59 41.4	+49.1	118.0	39
40	62 59.9	+38.4	104.6	62 43.9	+40.0	106.5	62 25.9	+41.7	108.3	62 06.2	+43.2	110.1	61 44.7	+44.7	111.8	61 21.6	+46.0	113.6	60 56.8	+47.3	115.2	60 30.5	+48.4	116.8	40
41	63 38.3	+37.1	102.9	63 23.9	+38.9	104.8	63 07.6	+40.6	106.7	62 49.4	+42.2	108.6	62 29.4	+43.7	110.4	62 07.6	+45.1	112.2	61 44.1	+46.5	113.9	61 18.9	+47.8	115.6	41
42	64 15.4	+35.7	101.1	64 02.8	+37.6	103.1	63 48.2	+39.4	105.1	63 31.6	+41.1	107.0	63 13.1	+42.7	108.9	62 52.7	+44.3	110.8	62 30.6	+45.6	112.6	62 06.7	+47.0	114.3	42
43	64 51.1	+34.2	99.2	64 40.4	+36.2	101.3	64 27.6	+38.1	103.4	64 12.7	+39.9	105.4	63 55.8	+41.7	107.3	63 37.0	+43.2	109.3	63 16.2	+44.8	111.1	62 53.7	+46.2	113.0	43
44	65 25.3	+32.7	97.3	65 16.6	+34.8	99.4	65 05.7	+36.8	101.5	64 52.6	+38.7	103.6	64 37.5	+40.4	105.7	64 20.2	+42.2	107.7	64 01.0	+43.8	109.6	63 39.9	+45.3	111.6	44
45	65 58.0	+31.0	95.2	65 51.4	+33.1	97.4	65 42.5	+35.2	99.6	65 31.3	+37.3	101.8	65 17.9	+39.2	103.9	65 02.4	+41.0	106.0	64 44.8	+42.8	108.1	64 25.2	+44.4	110.1	45
46	66 29.0	+29.2	93.1	66 24.5	+31.5	95.4	66 17.7	+33.7	97.7	66 08.6	+35.8	99.9	65 57.1	+37.8	102.1	65 43.4	+39.8	104.3	65 27.6	+41.5	106.4	65 09.6	+43.3	108.5	46
47	66 58.2	+27.2	90.9	66 56.0	+29.6	93.2	66 51.4	+31.9	95.6	66 44.4	+34.1	97.9	66 34.9	+36.4	100.2	66 23.2	+38.4	102.4	66 09.1	+40.4	104.5	65 52.9	+42.1	106.8	47
48	67 25.4	+25.2	88.6	67 25.6	+27.7	91.0	67 23.3	+30.2	93.4	67 18.5	+32.5	95.8	67 11.3	+34.7	98.1	67 01.6	+36.8	100.5	66 49.5	+38.9	102.8	66 35.0	+40.9	105.0	48
49	67 50.6	+23.1	86.2	67 53.3	+25.7	88.7	67 53.5	+28.1	91.1	67 51.0	+30.6	93.6	67 46.0	+32.9	96.0	67 38.4	+35.3	98.4	67 28.4	+37.4	100.8	67 15.9	+39.5	103.2	49
50	68 13.7	+20.8	83.7	68 19.0	+23.4	86.2	68 21.6	+28.6	88.8	68 21.6	+28.6	91.3	68 18.9	+31.1	93.8	68 13.7	+33.5	96.3	68 05.8	+35.8	98.8	67 55.4	+38.0	101.2	50
51	68 34.5	+18.4	81.2	68 42.4	+21.1	83.7	68 47.6	+23.8	86.3	68 50.2	+26.4	88.9	68 50.0	+29.1	91.4	68 47.2	+31.5	94.0	68 41.6	+34.0	96.6	68 33.4	+36.4	99.1	51
52	68 52.9	+16.0	78.6	69 03.5	+18.7	81.1	69 11.4	+21.5	83.7	69 16.6	+24.2	86.3	69 19.1	+26.9	89.0	69 18.7	+29.6	91.6	69 15.6	+32.1	94.3	69 09.8	+34.6	96.9	52
53	69 08.9	+13.3	75.9	69 22.2	+16.1	78.4	69 32.9	+18.9	81.1	69 40.8	+21.8	83.7	69 46.0	+24.5	86.4	69 48.3	+27.3	89.1	69 47.7	+30.1	91.9	69 44.4	+32.6	94.6	53
54	69 22.2	+10.7	73.1	69 38.3	+13.5	75.7	69 51.8	+16.4	78.3	70 02.6	+19.2	81.0	70 10.5	+22.1	83.8	70 15.6	+24.9	86.5	70 17.8	+27.7	89.3	70 17.0	+30.5	92.1	54
55	69 32.9	+7.9	70.3	69 51.8	+10.8	72.9	70 08.2	+13.6	75.5	70 21.8	+16.5	78.2	70 32.6	+19.5	81.0	70 40.5	+22.5	83.8	70 45.5	+25.4	86.7	70 47.5	+28.2	89.5	55
56	69 40.8	+5.2	67.5	70 02.6	+7.9	70.0	70 21.8	+10.8	72.6	70 38.3	+13.8	75.4	70 52.1	+16.8	78.1	71 03.0	+19.7	81.0	71 10.9	+22.8	83.9	71 15.7	+25.8	86.8	56
57	69 46.0	+2.3	64.6	70 10.5	+5.1	67.1	70 32.6	+7.9	69.7	70 52.1	+10.9	72.4	71 08.9	+13.8	75.2	71 22.7	+17.0	78.1	71 33.7	+20.0	81.0	71 41.5	+23.1	84.0	57
58	69 48.3	−0.6	61.7	70 15.6	+2.2	64.1	70 40.5	+5.0	66.7	71 03.0	+7.9	69.4	71 22.7	+11.0	72.2	71 39.7	+14.0	75.0	71 53.7	+17.2	78.0	72 04.6	+20.4	81.0	58
59	69 47.7	−3.3	58.8	70 17.8	−0.8	61.2	70 45.5	+2.0	63.7	71 10.9	+4.8	66.3	71 33.7	+7.8	69.1	71 53.7	+10.9	71.9	72 10.9	+14.1	74.9	72 25.0	+17.3	77.9	59
60	69 44.4	−6.2	55.9	70 17.0	−3.7	58.2	70 47.5	−1.0	60.7	71 15.7	+1.8	63.2	71 41.5	+4.7	65.9	72 04.6	+7.8	68.7	72 25.0	+10.9	71.7	72 42.3	+14.2	74.7	60
61	69 38.2	−9.0	53.0	70 13.3	−6.5	55.3	70 46.5	−4.0	57.6	71 17.5	−1.3	60.1	71 46.2	+1.6	62.7	72 12.4	+4.6	65.5	72 35.9	+7.7	68.4	72 56.5	+11.0	71.4	61
62	69 29.2	−11.7	50.2	70 06.8	−9.4	52.3	70 42.5	−7.0	54.6	71 16.2	−4.4	57.0	71 47.8	−1.6	59.5	72 17.0	+1.3	62.2	72 43.6	+4.4	65.1	73 07.5	+7.6	68.1	62
63	69 17.5	−14.3	47.4	69 57.4	−12.2	49.4	70 35.5	−9.9	51.6	71 11.8	−7.4	53.9	71 46.2	−4.8	56.3	72 18.3	−2.0	58.9	72 48.0	+1.0	61.7	73 15.1	+4.1	64.6	63
64	69 03.2	−16.8	44.7	69 45.2	−14.9	46.6	70 25.6	−12.7	48.6	71 04.4	−10.4	50.8	71 41.4	−8.0	53.2	72 16.3	−5.3	55.7	72 49.0	−2.4	58.3	73 19.2	+0.7	61.2	64
65	68 46.4	−19.4	42.0	69 30.3	−17.5	43.8	70 12.9	−15.5	45.7	70 54.0	−13.3	47.8	71 33.4	−10.9	50.0	72 11.0	−8.4	52.4	72 46.6	−5.8	55.0	73 19.9	−2.8	57.7	65
66	68 27.0	−21.6	39.4	69 12.8	−19.9	41.1	69 57.4	−18.1	42.9	70 40.7	−16.1	44.8	71 22.5	−14.0	46.9	72 02.6	−11.6	49.2	72 40.8	−9.0	51.6	73 17.1	−6.3	54.2	66
67	68 05.4	−23.9	36.9	68 52.9	−22.4	38.5	69 39.3	−20.6	40.1	70 24.6	−18.8	41.9	71 08.5	−16.8	43.9	71 51.0	−14.7	46.0	72 31.8	−12.3	48.3	73 10.8	−9.7	50.8	67
68	67 41.5	−26.0	34.5	68 30.5	−24.5	35.9	69 18.7	−23.1	37.5	70 05.8	−21.4	39.1	70 51.7	−19.6	40.9	71 36.3	−17.5	42.9	72 19.5	−15.4	45.0	73 01.1	−13.0	47.4	68
69	67 15.5	−28.0	32.1	68 06.0	−26.8	33.4	68 55.6	−25.3	34.9	69 44.4	−23.8	36.4	70 32.1	−22.1	38.1	71 18.8	−20.4	39.9	72 04.1	−18.3	41.9	72 48.1	−16.2	44.0	69
70	66 47.5	−29.8	29.9	67 39.2	−28.7	31.1	68 30.3	−27.5	32.4	69 20.6	−26.1	33.8	70 10.0	−24.6	35.3	70 58.4	−23.0	37.0	71 45.8	−21.2	38.8	72 31.9	−19.2	40.8	70
71	66 17.7	−31.7	27.7	67 10.5	−30.6	28.8	68 02.8	−29.5	30.0	68 54.5	−28.3	31.3	69 45.4	−27.0	32.7	70 35.4	−25.4	34.2	71 24.6	−23.9	35.9	72 12.7	−22.1	37.7	71
72	65 46.0	−33.2	25.6	66 39.9	−32.3	26.6	67 33.3	−31.3	27.7	68 26.2	−30.3	28.8	69 18.4	−29.1	30.1	70 10.0	−27.8	31.5	71 00.7	−26.3	33.0	71 50.6	−24.8	34.7	72
73	65 12.8	−34.8	23.6	66 07.6	−34.0	24.5	67 02.0	−33.1	25.5	67 55.9	−32.2	26.5	68 49.3	−31.1	27.7	69 42.2	−30.0	28.9	70 34.4	−28.8	30.3	71 25.8	−27.4	31.8	73
74	64 38.0	−36.3	21.7	65 33.6	−35.5	22.5	66 28.9	−34.8	23.3	67 23.7	−33.9	24.3	68 18.2	−33.0	25.3	69 12.2	−32.0	26.4	70 05.6	−30.9	27.7	70 58.4	−29.6	29.0	74
75	64 01.7	−37.5	19.8	64 58.1	−37.0	20.5	65 54.1	−36.3	21.3	66 49.8	−35.5	22.2	67 45.2	−34.7	23.1	68 40.2	−33.9	24.1	69 34.7	−32.9	25.2	70 28.8	−31.9	26.4	75
76	63 24.2	−38.9	18.1	64 21.1	−38.3	18.7	65 17.8	−37.7	19.4	66 14.3	−37.1	20.1	67 10.5	−36.4	21.0	68 06.3	−35.6	21.8	69 01.8	−34.7	22.8	69 56.9	−33.8	23.9	76
77	62 45.3	−39.9	16.4	63 42.8	−39.5	16.9	64 40.1	−39.0	17.6	65 37.2	−38.4	18.2	66 34.1	−37.8	18.9	67 30.7	−37.2	19.7	68 27.1	−36.5	20.6	69 23.1	−35.7	21.5	77
78	62 05.4	−41.1	14.8	63 03.3	−40.6	15.3	64 01.1	−40.2	15.8	64 58.8	−39.8	16.4	65 56.3	−39.0	17.0	66 53.5	−38.6	17.7	67 50.6	−38.1	18.4	68 47.4	−37.4	19.2	78
79	61 24.3	−42.0	13.2	62 22.7	−41.7	13.7	63 20.9	−41.3	14.1	64 19.0	−40.9	14.6	65 17.0	−40.5	15.2	66 14.9	−40.1	15.8	67 12.5	−39.5	16.4	68 10.0	−39.0	17.1	79
80	60 42.3	−43.0	11.7	61 41.0	−42.7	12.1	62 39.6	−42.4	12.5	63 38.1	−42.0	13.0	64 36.5	−41.6	13.4	65 34.8	−41.3	13.9	66 33.0	−40.9	14.5	67 31.0	−40.4	15.1	80
81	59 59.3	−43.9	10.3	60 58.3	−43.6	10.7	61 57.2	−43.3	11.0	62 56.1	−43.1	11.4	63 54.9	−42.8	11.8	64 53.5	−42.4	12.2	65 52.1	−42.0	12.7	66 50.6	−41.7	13.2	81
82	59 15.4	−44.6	9.0	60 14.7	−44.5	9.3	61 13.9	−44.2	9.5	62 13.0	−44.0	9.9	63 12.1	−43.7	10.2	64 11.1	−43.5	10.6	65 10.1	−43.2	11.0	66 08.9	−42.8	11.4	82
83	58 30.8	−45.4	7.7	59 30.2	−45.2	7.9	60 29.7	−45.1	8.2	61 29.0	−44.8	8.4	62 28.4	−44.7	8.7	63 27.6	−44.4	9.0	64 26.9	−44.2	9.3	65 26.1	−44.0	9.7	83
84	57 45.4	−46.1	6.5	58 45.0	−45.9	6.6	59 44.6	−45.8	6.8	60 44.2	−45.6	7.0	61 43.7	−45.5	7.3	62 43.2	−45.3	7.5	63 42.7	−45.2	7.8	64 42.1	−45.0	8.1	84
85	56 59.3	−46.7	5.3	57 59.1	−46.7	5.4	58 58.8	−46.5	5.6	59 58.5	−46.4	5.7	60 58.2	−46.3	5.9	61 57.9	−46.2	6.1	62 57.5	−46.0	6.3	63 57.1	−45.9	6.5	85
86	56 12.6	−47.4	4.1	57 12.4	−47.2	4.2	58 12.3	−47.2	4.4	59 12.1	−47.1	4.5	60 11.9	−47.0	4.6	61 11.7	−46.9	4.8	62 11.5	−46.9	4.9	63 11.2	−46.7	5.1	86
87	55 25.2	−47.9	3.0	56 25.2	−47.9	3.1	57 25.1	−47.8	3.2	58 25.0	−47.7	3.3	59 24.9	−47.7	3.4	60 24.8	−47.7	3.5	61 24.6	−47.5	3.6	62 24.5	−47.5	3.7	87
88	54 37.3	−48.4	2.0	55 37.3	−48.4	2.0	56 37.3	−48.4	2.1	57 37.2	−48.3	2.1	58 37.2	−48.3	2.2	59 37.1	−48.2	2.3	60 37.1	−48.2	2.3	61 37.0	−48.2	2.4	88
89	53 48.9	−48.9	1.0	54 48.9	−48.9	1.0	55 48.9	−48.9	1.0	56 48.9	−48.9	1.0	57 48.9	−48.9	1.1	58 48.9	−48.9	1.1	59 48.9	−48.9	1.1	60 48.8	−48.8	1.2	89
90	53 00.0	−49.4	0.0	54 00.0	−49.4	0.0	55 00.0	−49.4	0.0	56 00.0	−49.4	0.0	57 00.0	−49.4	0.0	58 00.0	−49.4	0.0	59 00.0	−49.4	0.0	60 00.0	−49.4	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

35°, 325° L.H.A.　　LATITUDE **SAME** NAME AS DECLINATION

LATITUDE **CONTRARY** NAME TO DECLINATION   **L.H.A. 35°, 325°**

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	29 32.2 −55.1 138.8	28 46.9 −55.4 139.1	28 01.5 −55.8 139.5	27 15.7 −56.0 139.8	26 29.8 −56.3 140.1	25 43.6 −56.5 140.5	24 57.3 −56.8 140.8	24 10.7 −57.0 141.0	0
1	28 37.1 −55.2 139.2	27 51.5 −55.5 139.6	27 05.7 −55.9 139.9	26 19.7 −56.0 140.2	25 33.5 −56.3 140.5	24 47.1 −56.6 140.8	24 00.5 −56.8 141.1	23 13.7 −57.0 141.4	1
2	27 41.9 −55.3 139.7	26 56.0 −55.6 140.0	26 10.0 −55.9 140.3	25 23.7 −56.1 140.6	24 37.2 −56.4 140.9	23 50.5 −56.6 141.2	23 03.7 −56.8 141.5	22 16.7 −57.1 141.7	2
3	26 46.6 −55.4 140.1	26 00.4 −55.6 140.4	25 14.1 −55.9 140.7	24 27.6 −56.2 141.0	23 40.8 −56.4 141.3	22 53.9 −56.6 141.6	22 06.9 −56.9 141.8	21 19.6 −57.1 142.1	3
4	25 51.2 −55.5 140.5	25 04.8 −55.7 140.8	24 18.2 −56.0 141.1	23 31.4 −56.3 141.4	22 44.4 −56.5 141.7	21 57.3 −56.7 141.9	21 10.0 −57.0 142.2	20 22.5 −57.1 142.4	4
5	24 55.7 −55.5 140.9	24 09.1 −55.8 141.2	23 22.2 −56.1 141.5	22 35.1 −56.2 141.8	21 47.9 −56.5 142.0	21 00.6 −56.8 142.3	20 13.0 −56.9 142.5	19 25.4 −57.2 142.7	5
6	24 00.2 −55.6 141.4	23 13.3 −55.9 141.6	22 26.1 −56.1 141.9	21 38.9 −56.4 142.1	20 51.4 −56.6 142.4	20 03.8 −56.8 142.6	19 16.1 −57.0 142.8	18 28.2 −57.2 143.0	6
7	23 04.6 −55.6 141.8	22 17.4 −55.9 142.0	21 30.0 −56.1 142.3	20 42.5 −56.4 142.5	19 54.8 −56.6 142.7	19 07.0 −56.8 142.9	18 19.1 −57.1 143.2	17 31.0 −57.2 143.3	7
8	22 09.0 −55.7 142.2	21 21.5 −55.9 142.4	20 33.9 −56.2 142.7	19 46.1 −56.4 142.9	18 58.2 −56.6 143.1	18 10.2 −56.9 143.3	17 22.0 −57.1 143.5	16 33.8 −57.3 143.7	8
9	21 13.3 −55.8 142.6	20 25.6 −56.0 142.8	19 37.7 −56.2 143.0	18 49.7 −56.5 143.2	18 01.6 −56.7 143.4	17 13.3 −56.9 143.6	16 25.0 −57.1 143.8	15 36.5 −57.3 144.0	9
10	20 17.5 −55.8 143.0	19 29.6 −56.1 143.2	18 41.5 −56.3 143.4	17 53.2 −56.5 143.6	17 04.9 −56.7 143.8	16 16.4 −56.9 144.0	15 27.9 −57.2 144.1	14 39.2 −57.3 144.3	10
11	19 21.7 −55.9 143.4	18 33.5 −56.1 143.6	17 45.2 −56.3 143.8	16 56.7 −56.5 143.9	16 08.2 −56.8 144.1	15 19.5 −57.0 144.3	14 30.7 −57.1 144.4	13 41.9 −57.4 144.6	11
12	18 25.8 −55.9 143.7	17 37.4 −56.1 143.9	16 48.8 −56.3 144.1	16 00.2 −56.6 144.3	15 11.4 −56.8 144.5	14 22.5 −56.9 144.6	13 33.6 −57.2 144.8	12 44.5 −57.3 144.9	12
13	17 29.9 −55.9 144.1	16 41.3 −56.2 144.3	15 52.5 −56.4 144.5	15 03.6 −56.6 144.6	14 14.6 −56.8 144.8	13 25.6 −57.0 144.9	12 36.4 −57.2 145.1	11 47.2 −57.4 145.2	13
14	16 34.0 −56.0 144.5	15 45.1 −56.2 144.7	14 56.1 −56.4 144.8	14 07.0 −56.6 145.0	13 17.8 −56.8 145.1	12 28.6 −57.1 145.2	11 39.2 −57.2 145.4	10 49.8 −57.4 145.5	14
15	15 38.0 −56.0 144.9	14 48.9 −56.3 145.0	13 59.7 −56.5 145.2	13 10.4 −56.7 145.3	12 21.0 −56.9 145.4	11 31.5 −57.0 145.6	10 42.0 −57.2 145.7	9 52.4 −57.4 145.8	15
16	14 42.0 −56.1 145.2	13 52.6 −56.3 145.4	13 03.2 −56.5 145.5	12 13.7 −56.7 145.7	11 24.1 −56.9 145.8	10 34.5 −57.1 145.9	9 44.8 −57.3 146.0	8 55.0 −57.4 146.1	16
17	13 45.9 −56.1 145.6	12 56.3 −56.3 145.8	12 06.7 −56.5 145.9	11 17.0 −56.7 146.0	10 27.2 −56.9 146.1	9 37.4 −57.1 146.2	8 47.5 −57.3 146.3	7 57.6 −57.4 146.4	17
18	12 49.8 −56.1 146.0	12 00.0 −56.3 146.1	11 10.2 −56.5 146.2	10 20.3 −56.7 146.3	9 30.3 −56.9 146.4	8 40.3 −57.1 146.5	7 50.3 −57.3 146.6	7 00.2 −57.5 146.7	18
19	11 53.7 −56.2 146.3	11 03.7 −56.4 146.5	10 13.7 −56.6 146.6	9 23.6 −56.8 146.7	8 33.4 −56.9 146.7	7 43.2 −57.1 146.8	6 53.0 −57.3 146.9	6 02.7 −57.4 147.0	19
20	10 57.5 −56.2 146.7	10 07.3 −56.4 146.8	9 17.1 −56.6 146.9	8 26.8 −56.8 147.0	7 36.5 −57.0 147.1	6 46.1 −57.1 147.1	5 55.7 −57.3 147.2	5 05.3 −57.5 147.2	20
21	10 01.3 −56.2 147.1	9 10.9 −56.4 147.2	8 20.5 −56.6 147.2	7 30.0 −56.7 147.3	6 39.5 −56.9 147.4	5 49.0 −57.2 147.4	4 58.4 −57.3 147.5	4 07.8 −57.5 147.5	21
22	9 05.1 −56.2 147.4	8 14.5 −56.4 147.5	7 23.9 −56.6 147.6	6 33.3 −56.8 147.6	5 42.6 −57.0 147.7	4 51.8 −57.1 147.7	4 01.1 −57.3 147.8	3 10.3 −57.5 147.8	22
23	8 08.9 −56.3 147.8	7 18.1 −56.4 147.8	6 27.3 −56.6 147.9	5 36.5 −56.8 148.0	4 45.6 −57.0 148.0	3 54.7 −57.2 148.0	3 03.8 −57.3 148.1	2 12.8 −57.4 148.1	23
24	7 12.7 −56.3 148.1	6 21.7 −56.5 148.2	5 30.7 −56.6 148.2	4 39.7 −56.8 148.3	3 48.6 −57.0 148.3	2 57.5 −57.1 148.4	2 06.5 −57.4 148.4	1 15.4 −57.5 148.4	24
25	6 16.4 −56.3 148.5	5 25.2 −56.4 148.5	4 34.1 −56.7 148.6	3 42.9 −56.9 148.6	2 51.6 −57.0 148.6	2 00.4 −57.2 148.7	1 09.1 −57.3 148.7	0 17.9 −57.5 148.7	25
26	5 20.1 −56.3 148.8	4 28.8 −56.5 148.9	3 37.4 −56.6 148.9	2 46.0 −56.8 148.9	1 54.6 −57.0 148.9	1 03.2 −57.1 149.0	0 11.8 −57.3 149.0	0 39.6 +57.5 31.0	26
27	4 23.8 −56.3 149.2	3 32.3 −56.5 149.2	2 40.8 −56.7 149.2	1 49.2 −56.8 149.2	0 57.6 −57.0 149.3	0 06.1 −57.2 149.3	0 45.5 +57.3 30.7	1 37.1 +57.4 30.7	27
28	3 27.5 −56.3 149.5	2 35.8 −56.5 149.5	1 44.1 −56.6 149.6	0 52.4 −56.8 149.6	0 00.6 −56.9 149.6	0 51.1 +57.1 30.4	1 42.8 +57.3 30.4	2 34.5 +57.5 30.5	28
29	2 31.2 −56.3 149.9	1 39.4 −56.5 149.9	0 47.5 −56.7 149.9	0 04.4 +56.9 30.1	0 56.3 +57.0 30.1	1 48.2 +57.2 30.1	2 40.1 +57.4 30.1	3 32.0 +57.5 30.2	29
30	1 34.9 −56.3 150.2	0 42.9 −56.5 150.2	0 09.2 +56.7 29.8	1 01.3 +56.8 29.8	1 53.3 +57.0 29.8	2 45.4 +57.2 29.8	3 37.5 +57.3 29.8	4 29.5 +57.4 29.9	30
31	0 38.6 −56.3 150.5	0 13.6 +56.5 29.4	1 05.9 +56.6 29.5	1 58.1 +56.8 29.5	2 50.3 +57.0 29.5	3 42.6 +57.1 29.5	4 34.8 +57.3 29.6	5 26.9 +57.5 29.6	31
32	0 17.7 +56.3 29.1	1 10.1 +56.5 29.1	2 02.5 +56.7 29.1	2 54.9 +56.8 29.1	3 47.3 +57.0 29.2	4 39.7 +57.1 29.2	5 32.1 +57.2 29.3	6 24.4 +57.4 29.3	32
33	1 14.0 +56.3 28.8	2 06.6 +56.5 28.8	2 59.2 +56.6 28.8	3 51.7 +56.9 28.8	4 44.3 +57.0 28.9	5 36.8 +57.0 28.9	6 29.4 +57.2 29.0	7 21.8 +57.5 29.0	33
34	2 10.3 +56.3 28.4	3 03.1 +56.4 28.4	3 55.8 +56.7 28.5	4 48.6 +56.8 28.5	5 41.3 +56.9 28.5	6 34.0 +57.1 28.6	7 26.6 +57.3 28.7	8 19.3 +57.4 28.7	34
35	3 06.6 +56.3 28.1	3 59.5 +56.5 28.1	4 52.5 +56.6 28.1	5 45.4 +56.8 28.2	6 38.2 +57.0 28.2	7 31.1 +57.1 28.3	8 23.9 +57.3 28.4	9 16.7 +57.4 28.4	35
36	4 02.9 +56.3 27.7	4 56.0 +56.5 27.8	5 49.1 +56.6 27.8	6 42.2 +56.7 27.9	7 35.2 +56.9 27.9	8 28.2 +57.1 28.0	9 21.2 +57.2 28.1	10 14.1 +57.4 28.1	36
37	4 59.2 +56.3 27.4	5 52.5 +56.4 27.4	6 45.7 +56.6 27.5	7 38.9 +56.8 27.5	8 32.1 +56.9 27.6	9 25.3 +57.1 27.7	10 18.4 +57.2 27.7	11 11.5 +57.3 27.8	37
38	5 55.5 +56.2 27.0	6 48.9 +56.4 27.1	7 42.3 +56.6 27.1	8 35.7 +56.7 27.2	9 29.0 +56.9 27.3	10 22.4 +57.0 27.4	11 15.6 +57.2 27.4	12 08.8 +57.4 27.5	38
39	6 51.7 +56.3 26.7	7 45.3 +56.4 26.7	8 38.9 +56.6 26.8	9 32.4 +56.8 26.9	10 25.9 +56.9 27.0	11 19.4 +57.0 27.0	12 12.8 +57.2 27.1	13 06.2 +57.3 27.2	39
40	7 48.0 +56.2 26.3	8 41.7 +56.4 26.4	9 35.5 +56.5 26.5	10 29.2 +56.7 26.5	11 22.8 +56.9 26.6	12 16.4 +57.1 26.7	13 10.0 +57.2 26.8	14 03.5 +57.3 26.9	40
41	8 44.2 +56.2 26.0	9 38.1 +56.4 26.0	10 32.0 +56.6 26.1	11 25.9 +56.7 26.2	12 19.7 +56.8 26.3	13 13.5 +57.0 26.4	14 07.2 +57.1 26.5	15 00.8 +57.3 26.6	41
42	9 40.4 +56.2 25.6	10 34.5 +56.4 25.7	11 28.6 +56.5 25.8	12 22.6 +56.6 25.9	13 16.5 +56.8 26.0	14 10.4 +57.0 26.1	15 04.3 +57.1 26.2	15 58.1 +57.3 26.3	42
43	10 36.6 +56.2 25.3	11 30.9 +56.3 25.3	12 25.1 +56.4 25.4	13 19.2 +56.7 25.5	14 13.3 +56.8 25.6	15 07.4 +56.9 25.8	16 01.4 +57.1 25.9	16 55.4 +57.2 26.0	43
44	11 32.8 +56.1 24.9	12 27.2 +56.3 25.0	13 21.5 +56.5 25.1	14 15.9 +56.6 25.2	15 10.1 +56.8 25.3	16 04.3 +56.9 25.4	16 58.5 +57.0 25.5	17 52.6 +57.2 25.7	44
45	12 28.9 +56.1 24.5	13 23.5 +56.2 24.6	14 18.0 +56.4 24.7	15 12.5 +56.5 24.9	16 06.9 +56.7 25.0	17 01.2 +56.9 25.1	17 55.5 +57.1 25.2	18 49.8 +57.2 25.4	45
46	13 25.0 +56.1 24.2	14 19.7 +56.3 24.3	15 14.4 +56.4 24.4	16 09.0 +56.6 24.5	17 03.6 +56.7 24.6	17 58.1 +56.8 24.8	18 52.6 +56.9 24.9	19 47.0 +57.1 25.1	46
47	14 21.1 +56.1 23.8	15 16.0 +56.2 23.9	16 10.8 +56.4 24.0	17 05.6 +56.5 24.2	18 00.3 +56.6 24.3	18 54.9 +56.8 24.4	19 49.5 +57.0 24.6	20 44.1 +57.1 24.7	47
48	15 17.2 +56.0 23.4	16 12.2 +56.1 23.6	17 07.2 +56.3 23.7	18 02.1 +56.4 23.8	18 56.9 +56.7 23.9	19 51.7 +56.8 24.1	20 46.5 +56.9 24.2	21 41.2 +57.0 24.4	48
49	16 13.2 +55.9 23.1	17 08.3 +56.2 23.2	18 03.5 +56.2 23.3	18 58.5 +56.5 23.4	19 53.6 +56.5 23.6	20 48.5 +56.7 23.7	21 43.4 +56.9 23.9	22 38.2 +57.0 24.1	49
50	17 09.1 +56.0 22.7	18 04.5 +56.0 22.8	18 59.7 +56.3 22.9	19 55.0 +56.3 23.1	20 50.1 +56.5 23.2	21 45.2 +56.7 23.4	22 40.3 +56.8 23.6	23 35.2 +57.0 23.7	50
51	18 05.1 +55.8 22.3	19 00.5 +56.1 22.4	19 56.0 +56.1 22.6	20 51.3 +56.4 22.7	21 46.6 +56.5 22.9	22 41.9 +56.6 23.0	23 37.1 +56.8 23.2	24 32.2 +56.9 23.4	51
52	19 00.9 +55.9 21.9	19 56.6 +56.0 22.1	20 52.1 +56.2 22.2	21 47.7 +56.2 22.4	22 43.1 +56.5 22.5	23 38.5 +56.6 22.7	24 33.9 +56.7 22.8	25 29.1 +56.9 23.0	52
53	19 56.8 +55.7 21.5	20 52.6 +55.9 21.7	21 48.3 +56.1 21.8	22 43.9 +56.3 22.0	23 39.6 +56.3 22.1	24 35.1 +56.5 22.3	25 30.6 +56.6 22.5	26 26.0 +56.8 22.7	53
54	20 52.6 +55.7 21.2	21 48.5 +55.9 21.3	22 44.4 +56.0 21.6	23 40.2 +56.1 21.6	24 35.9 +56.4 21.8	25 31.6 +56.5 21.9	26 27.2 +56.7 22.1	27 22.8 +56.7 22.3	54
55	21 48.3 +55.6 20.8	22 44.4 +55.8 20.9	23 40.4 +55.9 21.1	24 36.3 +56.2 21.2	25 32.3 +56.2 21.4	26 28.1 +56.4 21.6	27 23.9 +56.5 21.7	28 19.5 +56.7 21.9	55
56	22 43.9 +55.7 20.3	23 40.2 +55.7 20.5	24 36.3 +56.0 20.7	25 32.5 +56.0 20.8	26 28.5 +56.2 21.0	27 24.5 +56.3 21.2	28 20.4 +56.5 21.4	29 16.2 +56.7 21.6	56
57	23 39.6 +55.5 19.9	24 35.9 +55.7 20.1	25 32.3 +55.8 20.3	26 28.5 +56.0 20.4	27 24.7 +56.1 20.6	28 20.8 +56.3 20.8	29 16.9 +56.4 21.0	30 12.9 +56.5 21.2	57
58	24 35.1 +55.5 19.5	25 31.6 +55.6 19.7	26 28.1 +55.8 19.8	27 24.5 +55.9 20.0	28 20.8 +56.1 20.2	29 17.1 +56.2 20.4	30 13.3 +56.4 20.6	31 09.4 +56.5 20.8	58
59	25 30.6 +55.4 19.1	26 27.2 +55.6 19.3	27 23.9 +55.6 19.4	28 20.4 +55.8 19.6	29 16.9 +56.0 19.8	30 13.3 +56.1 20.0	31 09.7 +56.2 20.2	32 05.9 +56.4 20.4	59
60	26 26.0 +55.3 18.7	27 22.8 +55.5 18.8	28 19.5 +55.7 19.0	29 16.2 +55.8 19.2	30 12.9 +55.9 19.4	31 09.4 +56.1 19.6	32 05.9 +56.2 19.8	33 02.3 +56.4 20.0	60
61	27 21.3 +55.2 18.2	28 18.3 +55.3 18.4	29 15.2 +55.5 18.6	30 12.0 +55.7 18.8	31 08.8 +55.8 19.0	32 05.5 +55.9 19.2	33 02.1 +56.1 19.4	33 58.7 +56.2 19.6	61
62	28 16.5 +55.2 17.8	29 13.6 +55.3 18.0	30 10.7 +55.4 18.1	31 07.7 +55.6 18.3	32 04.6 +55.7 18.5	33 01.4 +55.9 18.7	33 58.2 +56.1 18.9	34 54.9 +56.2 19.2	62
63	29 11.7 +55.1 17.4	30 08.9 +55.2 17.5	31 06.1 +55.4 17.7	32 03.3 +55.4 17.9	33 00.3 +55.7 18.1	33 57.3 +55.8 18.3	34 54.3 +55.9 18.5	35 51.1 +56.1 18.7	63
64	30 06.8 +54.9 16.9	31 04.1 +55.1 17.1	32 01.5 +55.2 17.3	32 58.7 +55.4 17.4	33 56.0 +55.5 17.6	34 53.1 +55.7 17.8	35 50.2 +55.8 18.1	36 47.2 +55.9 18.3	64
65	31 01.7 +54.9 16.4	31 59.2 +55.1 16.6	32 56.7 +55.2 16.8	33 54.1 +55.3 17.0	34 51.5 +55.4 17.2	35 48.8 +55.5 17.4	36 46.0 +55.7 17.6	37 43.1 +55.9 17.8	65
66	31 56.6 +54.7 16.0	32 54.3 +54.8 16.1	33 51.9 +55.0 16.3	34 49.4 +55.0 16.5	35 46.9 +55.3 16.7	36 44.3 +55.5 16.9	37 41.7 +55.6 17.1	38 39.0 +55.8 17.4	66
67	32 51.3 +54.7 15.5	33 49.1 +54.8 15.6	34 46.9 +54.9 15.8	35 44.6 +55.0 16.0	36 42.2 +55.2 16.2	37 39.8 +55.3 16.4	38 37.3 +55.5 16.7	39 34.8 +55.6 16.9	67
68	33 46.0 +54.5 15.0	34 43.9 +54.7 15.2	35 41.8 +54.8 15.3	36 39.6 +55.0 15.5	37 37.4 +55.1 15.7	38 35.1 +55.3 16.0	39 32.8 +55.4 16.2	40 30.4 +55.5 16.4	68
69	34 40.5 +54.4 14.5	35 38.6 +54.5 14.7	36 36.6 +54.7 14.8	37 34.6 +54.8 15.0	38 32.5 +54.9 15.2	39 30.4 +55.0 15.5	40 28.2 +55.2 15.7	41 25.9 +55.4 15.9	69
70	35 34.9 +54.3 14.0	36 33.1 +54.4 14.1	37 31.3 +54.5 14.3	38 29.4 +54.6 14.5	39 27.4 +54.8 14.7	40 25.4 +55.0 14.9	41 23.4 +55.1 15.2	42 21.3 +55.2 15.4	70
71	36 29.2 +54.1 13.4	37 27.5 +54.2 13.6	38 25.8 +54.4 13.8	39 24.0 +54.6 14.0	40 22.2 +54.7 14.2	41 20.4 +54.8 14.4	42 18.5 +54.9 14.6	43 16.5 +55.1 14.9	71
72	37 23.3 +53.9 12.9	38 21.7 +54.1 13.1	39 20.2 +54.2 13.2	40 18.6 +54.3 13.4	41 16.9 +54.5 13.6	42 15.2 +54.6 13.9	43 13.4 +54.8 14.1	44 11.6 +54.9 14.3	72
73	38 17.2 +53.8 12.3	39 15.8 +54.0 12.5	40 14.4 +54.1 12.7	41 12.9 +54.2 12.9	42 11.4 +54.3 13.1	43 09.8 +54.4 13.3	44 08.2 +54.6 13.5	45 06.5 +54.7 13.7	73
74	39 11.0 +53.7 11.8	40 09.8 +53.7 11.9	41 08.5 +53.8 12.1	42 07.1 +54.0 12.3	43 05.7 +54.1 12.5	44 04.2 +54.3 12.7	45 02.8 +54.4 12.9	46 01.2 +54.6 13.2	74
75	40 04.7 +53.4 11.2	41 03.5 +53.6 11.4	42 02.3 +53.7 11.5	43 01.1 +53.8 11.7	43 59.8 +54.0 11.9	44 58.5 +54.1 12.1	45 57.2 +54.2 12.3	46 55.8 +54.3 12.6	75
76	40 58.1 +53.3 10.6	41 57.1 +53.4 10.8	42 56.0 +53.6 10.9	43 54.9 +53.6 11.1	44 53.8 +53.7 11.3	45 52.6 +53.9 11.5	46 51.4 +54.0 11.7	47 50.1 +54.1 11.9	76
77	41 51.4 +53.1 10.0	42 50.5 +53.2 10.1	43 49.5 +53.3 10.3	44 48.5 +53.5 10.5	45 47.5 +53.6 10.7	46 46.5 +53.6 10.9	47 45.4 +53.8 11.1	48 44.2 +54.0 11.3	77
78	42 44.5 +52.8 9.3	43 43.7 +52.9 9.4	44 42.8 +53.1 9.7	45 42.0 +53.1 9.8	46 41.1 +53.3 10.0	47 40.1 +53.5 10.2	48 39.2 +53.5 10.4	49 38.2 +53.6 10.6	78
79	43 37.3 +52.6 8.7	44 36.6 +52.7 8.8	45 35.9 +52.8 9.0	46 35.1 +53.0 9.2	47 34.4 +53.0 9.3	48 33.6 +53.1 9.5	49 32.7 +53.3 9.7	50 31.8 +53.4 9.9	79
80	44 29.9 +52.4 8.0	45 29.3 +52.5 8.2	46 28.7 +52.6 8.3	47 28.1 +52.7 8.5	48 27.4 +52.8 8.6	49 26.7 +52.9 8.8	50 26.0 +53.0 9.0	51 25.2 +53.2 9.2	80
81	45 22.3 +52.2 7.3	46 21.8 +52.2 7.6	47 21.3 +52.3 7.6	48 20.8 +52.4 7.8	49 20.2 +52.5 7.9	50 19.6 +52.6 8.1	51 19.0 +52.7 8.3	52 18.4 +52.8 8.4	81
82	46 14.5 +51.8 6.6	47 14.0 +52.0 6.8	48 13.6 +52.0 6.9	49 13.2 +52.1 7.0	50 12.7 +52.2 7.2	51 12.2 +52.4 7.3	52 11.7 +52.5 7.5	53 11.2 +52.5 7.7	82
83	47 06.3 +51.6 5.9	48 06.0 +51.6 6.0	49 05.6 +51.8 6.1	50 05.3 +51.8 6.3	51 04.9 +51.9 6.4	52 04.6 +51.9 6.5	53 04.2 +52.0 6.7	54 03.7 +52.2 6.8	83
84	47 57.9 +51.3 5.1	48 57.6 +51.3 5.2	49 57.4 +51.4 5.3	50 57.1 +51.5 5.5	51 56.8 +51.6 5.6	52 56.5 +51.7 5.7	53 56.2 +51.7 5.9	54 55.9 +51.8 6.0	84
85	48 49.1 +51.0 4.4	49 48.9 +51.0 4.4	50 48.8 +51.0 4.5	51 48.6 +51.1 4.6	52 48.4 +51.2 4.7	53 48.2 +51.2 4.9	54 47.9 +51.4 5.0	55 47.7 +51.4 5.1	85
86	49 40.1 +50.5 3.5	50 39.9 +50.7 3.6	51 39.8 +50.7 3.7	52 39.7 +50.7 3.8	53 39.6 +50.7 3.9	54 39.4 +50.9 4.0	55 39.3 +50.9 4.1	56 39.1 +51.0 4.2	86
87	50 30.6 +50.2 2.7	51 30.6 +50.2 2.8	52 30.5 +50.3 2.8	53 30.4 +50.3 2.9	54 30.3 +50.4 3.0	55 30.3 +50.4 3.1	56 30.2 +50.4 3.1	57 30.1 +50.5 3.2	87
88	51 20.8 +49.8 1.8	52 20.8 +49.8 1.9	53 20.8 +49.8 1.9	54 20.7 +49.9 2.0	55 20.7 +49.9 2.0	56 20.7 +49.9 2.1	57 20.6 +50.0 2.1	58 20.6 +50.0 2.2	88
89	52 10.6 +49.4 0.9	53 10.6 +49.4 1.0	54 10.6 +49.4 1.0	55 10.6 +49.4 1.0	56 10.6 +49.4 1.0	57 10.6 +49.4 1.0	58 10.6 +49.4 1.1	59 10.6 +49.4 1.1	89
90	53 00.0 +48.9 0.0	54 00.0 +48.9 0.0	55 00.0 +48.9 0.0	56 00.0 +48.9 0.0	57 00.0 +48.9 0.0	58 00.0 +48.9 0.0	59 00.0 +48.9 0.0	60 00.0 +48.8 0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 145°, 215°**

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	29 08.1	+54.8	137.7	28 23.6	+55.2	138.1	27 38.9	+55.4	138.4	26 53.9	+55.7	138.8	26 08.6	+56.0	139.1	25 23.2	+56.2	139.4	24 37.5	+56.5	139.7	23 51.6	+56.8	140.0	0
1	30 02.9	+54.8	137.2	29 18.8	+55.0	137.6	28 34.3	+55.4	138.0	27 49.6	+55.7	138.4	27 04.6	+56.0	138.7	26 19.4	+56.3	139.0	25 34.0	+56.5	139.3	24 48.4	+56.8	139.7	1
2	30 57.7	+54.6	136.7	30 13.8	+54.9	137.2	29 29.7	+55.2	137.6	28 45.3	+55.5	137.9	28 00.6	+55.8	138.3	27 15.7	+56.1	138.6	26 30.5	+56.5	139.0	25 45.2	+56.6	139.3	2
3	31 52.3	+54.5	136.3	31 08.7	+54.9	136.7	30 24.9	+55.2	137.1	29 40.8	+55.5	137.5	28 56.5	+55.8	137.9	28 11.8	+56.1	138.2	27 27.0	+56.3	138.6	26 41.8	+56.7	138.9	3
4	32 46.8	+54.3	135.8	32 03.6	+54.7	136.2	31 20.1	+55.1	136.6	30 36.3	+55.4	137.1	29 52.3	+55.7	137.5	29 07.9	+56.0	137.8	28 23.3	+56.3	138.2	27 38.5	+56.5	138.6	4
5	33 41.1	+54.3	135.3	32 58.3	+54.6	135.7	32 15.2	+55.0	136.2	31 31.7	+55.4	136.6	30 48.0	+55.6	137.0	30 03.9	+56.0	137.4	29 19.6	+56.3	137.8	28 35.0	+56.6	138.2	5
6	34 35.4	+54.1	134.8	33 52.9	+54.5	135.2	33 10.2	+54.8	135.7	32 27.1	+55.2	136.2	31 43.6	+55.6	136.6	30 59.9	+55.8	137.0	30 15.9	+56.1	137.4	29 31.6	+56.4	137.8	6
7	35 29.5	+53.9	134.2	34 47.4	+54.4	134.7	34 05.0	+54.8	135.1	33 22.3	+55.1	135.7	32 39.2	+55.4	136.1	31 55.7	+55.8	136.6	31 12.0	+56.1	137.0	30 28.0	+56.4	137.4	7
8	36 23.4	+53.9	133.7	35 41.8	+54.2	134.2	34 59.8	+54.6	134.7	34 17.4	+55.0	135.2	33 34.6	+55.3	135.7	32 51.5	+55.7	136.1	32 08.1	+56.0	136.6	31 24.4	+56.3	137.0	8
9	37 17.3	+53.6	133.1	36 36.0	+54.1	133.7	35 54.4	+54.5	134.2	35 12.4	+54.8	134.7	34 30.0	+55.2	135.2	33 47.2	+55.6	135.7	33 04.1	+55.9	136.2	32 20.7	+56.2	136.6	9
10	38 10.9	+53.5	132.6	37 30.1	+53.9	133.1	36 48.9	+54.3	133.7	36 07.2	+54.8	134.2	35 25.2	+55.1	134.7	34 42.8	+55.4	135.2	34 00.0	+55.8	135.7	33 16.9	+56.1	136.2	10
11	39 04.4	+53.3	132.0	38 24.0	+53.8	132.6	37 43.2	+54.2	133.2	37 02.0	+54.6	133.7	36 20.3	+55.0	134.3	35 38.2	+55.4	134.8	34 55.8	+55.7	135.3	34 13.0	+56.0	135.8	11
12	39 57.7	+53.2	131.4	39 17.8	+53.6	132.0	38 37.4	+54.1	132.6	37 56.6	+54.4	133.2	37 15.3	+54.9	133.8	36 33.6	+55.2	134.3	35 51.5	+55.6	134.8	35 09.0	+56.0	135.3	12
13	40 50.9	+53.0	130.8	40 11.4	+53.4	131.4	39 31.5	+53.9	132.1	38 51.0	+54.4	132.7	38 10.2	+54.7	133.2	37 28.8	+55.2	133.8	36 47.1	+55.5	134.3	36 05.0	+55.8	134.9	13
14	41 43.8	+52.7	130.2	41 04.8	+53.3	130.8	40 25.4	+53.7	131.5	39 45.4	+54.1	132.1	39 04.9	+54.6	132.7	38 24.0	+55.0	133.3	37 42.6	+55.4	133.9	37 00.8	+55.7	134.4	14
15	42 36.5	+52.5	129.5	41 58.1	+53.0	130.2	41 19.1	+53.5	130.9	40 39.5	+54.0	131.5	39 59.5	+54.4	132.2	39 19.0	+54.8	132.8	38 38.0	+55.2	133.4	37 56.5	+55.7	134.0	15
16	43 29.0	+52.3	128.9	42 51.1	+52.8	129.6	42 12.6	+53.3	130.3	41 33.5	+53.8	131.0	40 53.9	+54.3	131.6	40 13.8	+54.7	132.3	39 33.2	+55.1	132.9	38 52.2	+55.5	133.5	16
17	44 21.3	+52.0	128.2	43 43.9	+52.6	128.9	43 05.9	+53.1	129.7	42 27.3	+53.6	130.4	41 48.2	+54.1	131.1	41 08.5	+54.6	131.7	40 28.3	+55.0	132.4	39 47.7	+55.3	133.0	17
18	45 13.3	+51.8	127.5	44 36.5	+52.3	128.3	43 59.0	+52.9	129.0	43 20.9	+53.5	129.8	42 42.3	+53.9	130.5	42 03.1	+54.3	131.2	41 23.3	+54.8	131.8	40 43.0	+55.3	132.5	18
19	46 05.1	+51.4	126.7	45 28.8	+52.1	127.5	44 51.9	+52.7	128.4	44 14.4	+53.2	129.1	43 36.2	+53.7	129.9	42 57.4	+54.2	130.6	42 18.1	+54.7	131.3	41 38.3	+55.1	132.0	19
20	46 56.5	+51.2	126.0	46 20.9	+51.8	126.9	45 44.6	+52.4	127.7	45 07.6	+52.9	128.5	44 29.9	+53.5	129.3	43 51.6	+54.1	130.0	43 12.8	+54.5	130.7	42 33.4	+54.9	131.4	20
21	47 47.7	+50.8	125.2	47 12.7	+51.5	126.1	46 37.0	+52.1	127.0	46 00.5	+52.8	127.8	45 23.4	+53.3	128.6	44 45.7	+53.8	129.4	44 07.3	+54.3	130.1	43 28.3	+54.8	130.9	21
22	48 38.5	+50.5	124.4	48 04.2	+51.2	125.4	47 29.1	+51.9	126.2	46 53.3	+52.4	127.1	46 16.7	+53.1	128.0	45 39.5	+53.6	128.8	45 01.6	+54.1	129.5	44 23.1	+54.6	130.3	22
23	49 29.0	+50.2	123.6	48 55.4	+50.9	124.6	48 21.0	+51.5	125.5	47 45.7	+52.2	126.4	47 09.8	+52.8	127.3	46 33.1	+53.4	128.1	45 55.7	+53.9	128.9	45 17.7	+54.4	129.7	23
24	50 19.2	+49.7	122.8	49 46.3	+50.5	123.8	49 12.5	+51.3	124.7	48 37.9	+51.9	125.7	48 02.6	+52.5	126.6	47 26.5	+53.1	127.4	46 49.6	+53.7	128.3	46 12.1	+54.2	129.1	24
25	51 08.9	+49.4	121.9	50 36.8	+50.1	122.9	50 03.8	+50.8	123.9	49 29.8	+51.6	124.9	48 55.1	+52.3	125.8	48 19.6	+52.9	126.8	47 43.3	+53.5	127.6	47 06.3	+54.0	128.5	25
26	51 58.3	+48.9	121.0	51 26.9	+49.8	122.0	50 54.6	+50.5	123.1	50 21.4	+51.3	124.1	49 47.4	+51.9	125.1	49 12.5	+52.6	126.0	48 36.8	+53.2	127.0	48 00.3	+53.8	127.9	26
27	52 47.2	+48.4	120.0	52 16.7	+49.3	121.1	51 45.1	+50.2	122.2	51 12.7	+50.9	123.3	50 39.3	+51.6	124.3	50 05.1	+52.3	125.3	49 30.0	+52.9	126.3	48 54.1	+53.6	127.2	27
28	53 35.6	+47.9	119.0	53 06.0	+48.8	120.2	52 35.3	+49.7	121.3	52 03.6	+50.5	122.4	51 30.9	+51.3	123.5	50 57.4	+52.0	124.5	50 22.9	+52.7	125.5	49 47.7	+53.3	126.5	28
29	54 23.5	+47.4	118.0	53 54.8	+48.3	119.2	53 25.0	+49.2	120.4	52 54.1	+50.1	121.5	52 22.2	+50.9	122.6	51 49.4	+51.6	123.7	51 15.6	+52.4	124.8	50 41.0	+53.0	125.8	29
30	55 10.9	+46.8	116.9	54 43.1	+47.8	118.2	54 14.2	+48.8	119.4	53 44.2	+49.7	120.6	53 13.1	+50.5	121.8	52 41.0	+51.3	122.9	52 08.0	+52.0	124.0	51 34.0	+52.7	125.0	30
31	55 57.7	+46.2	115.8	55 30.9	+47.3	117.1	55 03.0	+48.2	118.4	54 33.9	+49.1	119.7	54 03.6	+50.1	120.9	53 32.3	+50.9	122.0	53 00.0	+51.7	123.2	52 26.7	+52.4	124.2	31
32	56 43.9	+45.5	114.7	56 18.2	+46.6	116.0	55 51.2	+47.7	117.4	55 23.0	+48.7	118.7	54 53.7	+49.6	119.9	54 23.2	+50.5	121.1	53 51.7	+51.3	122.3	53 19.1	+52.1	123.4	32
33	57 29.4	+44.8	113.5	57 04.8	+46.0	114.9	56 38.9	+47.1	116.3	56 11.7	+48.1	117.6	55 43.3	+49.1	118.9	55 13.7	+50.0	120.2	54 43.0	+50.9	121.4	54 11.2	+51.7	122.6	33
34	58 14.2	+44.1	112.2	57 50.8	+45.3	113.7	57 26.0	+46.4	115.1	56 59.8	+47.6	116.5	56 32.4	+48.6	117.9	56 03.7	+49.6	119.2	55 33.9	+50.4	120.5	55 02.9	+51.3	121.7	34
35	58 58.3	+43.2	110.9	58 36.1	+44.5	112.5	58 12.4	+45.8	114.0	57 47.4	+46.9	115.4	57 21.0	+48.0	116.8	56 53.3	+49.0	118.2	56 24.3	+50.0	119.5	55 54.2	+50.8	120.8	35
36	59 41.5	+42.3	109.6	59 20.6	+43.7	111.2	58 58.2	+45.0	112.7	58 34.3	+46.2	114.2	58 09.0	+47.4	115.7	57 42.3	+48.4	117.1	57 14.3	+49.5	118.5	56 45.0	+50.4	119.9	36
37	60 23.8	+41.4	108.1	60 04.3	+42.9	109.8	59 43.2	+44.2	111.4	59 20.5	+45.5	113.0	58 56.4	+46.7	114.5	58 30.7	+47.9	116.0	58 03.8	+48.9	117.5	57 35.4	+50.0	118.9	37
38	61 05.2	+40.4	106.7	60 47.2	+41.9	108.4	60 27.4	+43.3	110.1	60 06.0	+44.7	111.7	59 43.1	+46.0	113.3	59 18.6	+47.2	114.8	58 52.7	+48.3	116.3	58 25.4	+49.4	117.8	38
39	61 45.6	+39.3	105.1	61 29.1	+40.8	106.9	61 10.7	+42.5	108.6	60 50.7	+43.9	110.3	60 29.1	+45.2	112.0	60 05.8	+46.5	113.6	59 41.0	+47.7	115.2	59 14.8	+48.8	116.7	39
40	62 24.9	+38.1	103.5	62 09.9	+39.8	105.3	61 53.2	+41.4	107.2	61 34.6	+42.9	108.9	61 14.3	+44.3	110.6	60 52.3	+45.7	112.3	60 28.7	+47.0	114.0	60 03.6	+48.1	115.6	40
41	63 03.0	+36.9	101.8	62 49.7	+38.7	103.7	62 34.6	+40.3	105.6	62 17.5	+41.9	107.4	61 58.6	+43.5	109.2	61 38.0	+44.9	111.0	61 15.7	+46.2	112.7	60 51.7	+47.5	114.4	41
42	63 39.9	+35.5	100.1	63 28.4	+37.4	102.0	63 14.9	+39.1	104.0	62 59.4	+40.9	105.9	62 42.1	+42.4	107.7	62 22.9	+43.9	109.6	62 01.9	+45.4	111.3	61 39.2	+46.8	113.1	42
43	64 15.4	+34.1	98.2	64 05.8	+36.0	100.3	63 54.0	+37.9	102.3	63 40.3	+39.7	104.2	63 24.5	+41.4	106.2	63 06.8	+43.0	108.1	62 47.3	+44.5	109.9	62 26.0	+45.9	111.7	43
44	64 49.5	+32.5	96.3	64 41.8	+34.6	98.4	64 31.9	+36.6	100.5	64 20.0	+38.4	102.5	64 05.9	+40.2	104.5	63 49.8	+42.0	106.5	63 31.8	+43.5	108.4	63 11.9	+45.0	110.3	44
45	65 22.0	+30.9	94.3	65 16.4	+33.0	96.5	65 08.5	+35.1	98.6	64 58.4	+37.1	100.7	64 46.1	+39.0	102.8	64 31.8	+40.7	104.9	64 15.3	+42.5	106.9	63 56.9	+44.1	108.8	45
46	65 52.9	+29.1	92.2	65 49.4	+31.4	94.5	65 43.6	+33.5	96.7	65 35.5	+35.6	98.9	65 25.1	+37.6	101.0	65 12.5	+39.6	103.2	64 57.8	+41.4	105.2	64 41.0	+43.1	107.3	46
47	66 22.0	+27.3	90.1	66 20.8	+29.6	92.4	66 17.1	+31.9	94.6	66 11.1	+34.0	96.9	66 02.7	+36.2	99.1	65 52.1	+38.1	101.3	65 39.2	+40.1	103.5	65 24.1	+41.9	105.6	47
48	66 49.3	+25.3	87.8	66 50.4	+27.7	90.2	66 49.0	+30.0	92.5	66 45.1	+32.4	94.8	66 38.9	+34.6	97.1	66 30.2	+36.7	99.4	66 19.3	+38.7	101.7	66 06.0	+40.6	103.6	48
49	67 14.6	+23.2	85.5	67 18.1	+25.7	87.9	67 19.0	+28.2	90.3	67 17.5	+30.5	92.7	67 13.5	+32.8	95.1	67 06.9	+35.1	97.4	66 58.0	+37.2	99.7	66 46.6	+39.3	102.0	49
50	67 37.8	+21.1	83.1	67 43.8	+23.6	85.5	67 47.2	+26.1	88.0	67 48.0	+28.6	90.4	67 46.3	+31.0	92.9	67 42.0	+33.4	95.3	67 35.2	+35.7	97.7	67 25.9	+37.9	100.1	50
51	67 58.9	+18.7	80.6	68 07.4	+21.3	83.1	68 13.3	+23.9	85.6	68 16.6	+26.6	88.1	68 17.3	+29.1	90.6	68 15.4	+31.6	93.1	68 10.9	+33.9	95.6	68 03.8	+36.2	98.1	51
52	68 17.6	+16.3	78.1	68 28.7	+19.0	80.6	68 37.2	+21.7	83.1	68 43.2	+24.3	85.6	68 46.4	+27.0	88.2	68 47.0	+29.5	90.8	68 44.8	+32.0	93.3	68 40.0	+34.4	95.9	52
53	68 33.9	+13.8	75.5	68 47.7	+16.5	77.9	68 58.9	+19.3	80.5	69 07.5	+22.0	83.1	69 13.4	+24.7	85.7	69 16.5	+27.4	88.3	69 16.8	+30.1	91.0	69 14.4	+32.6	93.6	53
54	68 47.7	+11.2	72.8	69 04.2	+14.0	75.3	69 18.2	+16.7	77.8	69 29.5	+19.5	80.4	69 38.1	+22.3	83.1	69 43.9	+25.1	85.8	69 46.9	+27.8	88.5	69 47.0	+30.5	91.2	54
55	68 58.9	+8.6	70.0	69 18.2	+11.3	72.5	69 34.9	+14.1	75.1	69 49.0	+16.9	77.7	70 00.4	+19.8	80.4	70 09.0	+22.6	83.1	70 14.7	+25.5	85.9	70 17.5	+28.3	88.7	55
56	69 07.5	+5.9	67.3	69 29.5	+8.7	69.7	69 49.0	+11.4	72.3	70 05.9	+14.3	74.9	70 20.2	+17.1	77.6	70 31.6	+20.1	80.4	70 40.2	+23.0	83.2	70 45.8	+25.9	86.0	56
57	69 13.4	+3.1	64.5	69 38.1	+5.8	66.9	70 00.4	+8.6	69.4	70 20.2	+11.4	72.1	70 37.3	+14.4	74.8	70 51.7	+17.3	77.5	71 03.2	+20.3	80.4	71 11.7	+23.3	83.3	57
58	69 16.5	+0.3	61.7	69 43.9	+3.0	64.0	70 09.0	+5.7	66.5	70 31.6	+8.6	69.1	70 51.7	+11.5	71.8	71 09.0	+14.5	74.6	71 23.5	+17.6	77.5	71 35.0	+20.7	80.4	58
59	69 16.8	−2.4	58.8	69 46.9	+0.1	61.2	70 14.7	+2.9	63.6	70 40.2	+5.6	66.1	71 03.2	+8.5	68.8	71 23.5	+11.5	71.6	71 41.1	+14.6	74.4	71 55.7	+17.7	77.4	59
60	69 14.4	−5.1	56.0	69 47.0	−2.7	58.3	70 17.5	−0.1	60.6	70 45.8	+2.6	63.1	71 11.7	+5.5	65.7	71 35.0	+8.5	68.5	71 55.7	+11.5	71.3	72 13.4	+14.7	74.3	60
61	69 09.3	−7.9	53.2	69 44.3	−5.5	55.4	70 17.4	−3.0	57.7	70 48.4	−0.3	60.1	71 17.2	+2.4	62.6	71 43.5	+5.4	65.3	72 07.2	+8.4	68.2	72 28.1	+11.6	71.1	61
62	69 01.4	−10.5	50.4	69 38.8	−8.3	52.5	70 14.4	−5.9	54.7	70 48.1	−3.4	57.0	71 19.6	−0.6	59.5	71 48.9	+2.1	62.2	72 15.6	+5.2	64.9	72 39.7	+8.3	67.8	62
63	68 50.9	−13.1	47.7	69 30.5	−11.0	49.7	70 08.5	−8.8	51.8	70 44.7	−6.3	54.0	71 19.0	−3.8	56.4	71 51.0	−1.0	58.9	72 20.8	+1.9	61.6	72 48.0	+5.0	64.5	63
64	68 37.8	−15.7	45.0	69 19.5	−13.7	46.9	69 59.7	−11.5	48.9	70 38.4	−9.3	51.0	71 15.2	−6.8	53.3	71 50.0	−4.2	55.7	72 22.7	−1.4	58.3	72 53.0	+1.5	61.1	64
65	68 22.1	−18.1	42.4	69 05.8	−16.2	44.1	69 48.2	−14.3	46.0	70 29.1	−12.1	48.0	71 08.4	−9.9	50.2	71 45.8	−7.3	52.5	72 21.3	−4.7	55.0	72 54.5	−1.8	57.7	65
66	68 04.0	−20.4	39.8	68 49.6	−18.8	41.4	69 33.9	−16.9	43.2	70 17.0	−14.9	45.1	70 58.5	−12.7	47.2	71 38.5	−10.4	49.4	72 16.6	−7.9	51.8	72 52.7	−5.2	54.3	66
67	67 43.6	−22.6	37.3	68 30.8	−21.0	38.8	69 17.0	−19.4	40.5	70 02.1	−17.6	42.3	70 45.8	−15.6	44.2	71 28.1	−13.5	46.3	72 08.7	−11.1	48.5	72 47.5	−8.6	50.9	67
68	67 21.0	−24.8	34.9	68 09.8	−23.4	36.3	68 57.6	−21.8	37.8	69 44.5	−20.1	39.5	70 30.2	−18.3	41.3	71 14.6	−16.3	43.2	71 57.6	−14.2	45.3	72 38.9	−11.8	47.6	68
69	66 56.2	−26.8	32.5	67 46.4	−25.5	33.8	68 35.8	−24.0	35.3	69 24.4	−22.6	36.8	70 11.9	−20.9	38.4	70 58.3	−19.1	40.2	71 43.4	−17.1	42.2	72 27.1	−14.9	44.3	69
70	66 29.4	−28.6	30.3	67 20.9	−27.5	31.5	68 11.8	−26.3	32.8	69 01.8	−24.9	34.2	69 51.0	−23.4	35.7	70 39.2	−21.7	37.4	71 26.3	−19.9	39.2	72 12.2	−18.0	41.1	70
71	66 00.8	−30.5	28.1	66 53.4	−29.4	29.2	67 45.5	−28.2	30.4	68 36.9	−27.0	31.7	69 27.6	−25.7	33.1	70 17.5	−24.2	34.6	71 06.4	−22.6	36.2	71 54.2	−20.8	38.0	71
72	65 30.3	−32.1	26.0	66 24.0	−31.1	27.0	67 17.3	−30.2	28.1	68 09.9	−29.1	29.2	69 01.9	−27.8	30.5	69 53.3	−26.6	31.9	70 43.8	−25.1	33.4	71 33.4	−23.5	35.0	72
73	64 58.2	−33.7	24.0	65 52.9	−32.9	24.9	66 47.1	−32.0	25.8	67 40.8	−31.0	26.9	68 34.1	−30.0	28.1	69 26.7	−28.8	29.3	70 18.7	−27.5	30.7	71 09.9	−26.1	32.2	73
74	64 24.5	−35.1	22.0	65 20.0	−34.4	22.8	66 15.1	−33.6	23.7	67 09.8	−32.7	24.7	68 04.1	−31.8	25.7	68 57.9	−30.8	26.8	69 51.2	−29.7	28.1	70 43.8	−28.4	29.4	74
75	63 49.4	−36.5	20.2	64 45.6	−35.9	20.9	65 41.5	−35.2	21.7	66 37.1	−34.4	22.5	67 32.3	−33.6	23.5	68 27.1	−32.7	24.5	69 21.5	−31.7	25.6	70 15.4	−30.7	26.8	75
76	63 12.9	−37.8	18.4	64 09.7	−37.2	19.0	65 06.3	−36.6	19.7	66 02.6	−36.0	20.5	66 58.7	−35.3	21.3	67 54.4	−34.5	22.2	68 49.8	−33.7	23.2	69 44.7	−32.7	24.3	76
77	62 35.1	−39.0	16.7	63 32.5	−38.6	17.3	64 29.7	−38.0	17.9	65 26.6	−37.4	18.6	66 23.4	−36.8	19.3	67 19.9	−36.1	20.1	68 16.1	−35.4	20.9	69 12.0	−34.6	21.9	77
78	61 56.1	−40.1	15.1	62 53.9	−39.6	15.6	63 51.7	−39.3	16.1	64 49.2	−38.7	16.7	65 46.6	−38.2	17.3	66 43.8	−37.7	18.0	67 40.7	−37.0	18.8	68 37.4	−36.4	19.6	78
79	61 16.0	−41.2	13.5	62 14.3	−40.8	13.9	63 12.4	−40.4	14.4	64 10.5	−40.0	14.9	65 08.4	−39.5	15.5	66 06.1	−39.0	16.1	67 03.7	−38.5	16.7	68 01.0	−37.9	17.4	79
80	60 34.8	−42.1	12.0	61 33.5	−41.8	12.4	62 32.0	−41.4	12.8	63 30.5	−41.1	13.2	64 28.9	−40.8	13.7	65 27.1	−40.3	14.2	66 25.2	−39.9	14.8	67 23.1	−39.4	15.4	80
81	59 52.7	−43.0	10.6	60 51.7	−42.7	10.9	61 50.6	−42.5	11.2	62 49.4	−42.2	11.6	63 48.1	−41.8	12.0	64 46.8	−41.6	12.5	65 45.3	−41.2	12.9	66 43.7	−40.8	13.5	81
82	59 09.7	−43.8	9.2	60 09.0	−43.7	9.5	61 08.1	−43.4	9.8	62 07.2	−43.1	10.1	63 06.3	−42.9	10.4	64 05.2	−42.6	10.8	65 04.1	−42.3	11.2	66 02.9	−41.9	11.6	82
83	58 25.9	−44.6	7.9	59 25.3	−44.4	8.1	60 24.7	−44.2	8.3	61 24.1	−44.1	8.6	62 23.4	−43.9	8.9	63 22.6	−43.6	9.2	64 21.8	−43.4	9.5	65 21.0	−43.2	9.9	83
84	57 41.3	−45.3	6.6	58 40.9	−45.2	6.8	59 40.5	−45.1	7.0	60 40.0	−44.7	7.2	61 39.5	−44.7	7.4	62 39.0	−44.6	7.7	63 38.4	−44.3	8.0	64 37.8	−44.1	8.2	84
85	56 56.0	−46.1	5.4	57 55.7	−45.9	5.5	58 55.4	−45.8	5.7	59 55.1	−45.7	5.9	60 54.8	−45.6	6.0	61 54.4	−45.4	6.2	62 54.1	−45.3	6.5	63 53.7	−45.1	6.7	85
86	56 10.0	−46.7	4.2	57 09.8	−46.6	4.3	58 09.6	−46.5	4.5	59 09.4	−46.4	4.6	60 09.2	−46.3	4.7	61 09.0	−46.2	4.9	62 08.8	−46.1	5.0	63 08.6	−46.0	5.2	86
87	55 23.3	−47.2	3.1	56 23.2	−47.2	3.2	57 23.1	−47.1	3.3	58 23.0	−47.0	3.4	59 22.9	−47.0	3.5	60 22.8	−46.9	3.6	61 22.7	−46.9	3.7	62 22.6	−46.8	3.8	87
88	54 36.1	−47.8	2.0	55 36.0	−47.7	2.1	56 36.0	−47.7	2.1	57 36.0	−47.7	2.2	58 35.9	−47.6	2.3	59 35.9	−47.7	2.3	60 35.8	−47.6	2.4	61 35.8	−47.6	2.5	88
89	53 48.3	−48.3	1.0	54 48.3	−48.3	1.0	55 48.3	−48.3	1.0	56 48.3	−48.3	1.1	57 48.3	−48.3	1.1	58 48.2	−48.2	1.1	59 48.2	−48.2	1.2	60 48.2	−48.2	1.2	89
90	53 00.0	−48.8	0.0	54 00.0	−48.8	0.0	55 00.0	−48.8	0.0	56 00.0	−48.8	0.0	57 00.0	−48.8	0.0	58 00.0	−48.8	0.0	59 00.0	−48.8	0.0	60 00.0	−48.8	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

Dec.	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec.
0	29 08.1 −54.9 137.7	28 23.6 −55.2 138.1	27 38.9 −55.6 138.4	26 53.9 −55.9 138.8	26 08.6 −56.1 139.1	25 23.2 −56.4 139.4	24 37.5 −56.6 139.7	23 51.6 −56.8 140.0	0
1	28 13.2 −55.0 138.2	27 28.4 −55.3 138.5	26 43.3 −55.6 138.9	25 58.0 −55.8 139.2	25 12.5 −56.1 139.5	24 26.8 −56.3 139.8	23 40.9 −56.7 140.1	22 54.8 −56.9 140.4	1
2	27 18.2 −55.0 138.6	26 33.1 −55.4 139.0	25 47.7 −55.6 139.3	25 02.2 −56.0 139.6	24 16.4 −56.2 139.9	23 30.4 −56.5 140.2	22 44.2 −56.7 140.4	21 57.9 −56.9 140.7	2
3	26 23.2 −55.2 139.1	25 37.7 −55.4 139.4	24 52.1 −55.8 139.7	24 06.2 −56.0 140.0	23 20.2 −56.3 140.3	22 33.9 −56.5 140.5	21 47.5 −56.7 140.8	21 01.0 −57.0 141.1	3
4	25 28.0 −55.3 139.5	24 42.3 −55.6 139.8	23 56.3 −55.8 140.1	23 10.2 −56.1 140.4	22 23.9 −56.3 140.6	21 37.4 −56.5 140.9	20 50.8 −56.8 141.1	20 04.0 −57.0 141.4	4
5	24 32.7 −55.3 139.9	23 46.7 −55.6 140.2	23 00.5 −55.8 140.5	22 14.1 −56.1 140.8	21 27.6 −56.4 141.0	20 40.9 −56.6 141.3	19 54.0 −56.8 141.5	19 07.0 −57.1 141.7	5
6	23 37.4 −55.3 140.4	22 51.1 −55.6 140.6	22 04.7 −55.9 140.9	21 18.0 −56.1 141.1	20 31.2 −56.4 141.4	19 44.3 −56.7 141.6	18 57.2 −56.9 141.8	18 09.9 −57.0 142.0	6
7	22 42.1 −55.5 140.8	21 55.5 −55.7 141.0	21 08.8 −56.0 141.3	20 21.9 −56.2 141.5	19 34.8 −56.4 141.7	18 47.6 −56.6 142.0	18 00.3 −56.9 142.2	17 12.9 −57.1 142.4	7
8	21 46.6 −55.5 141.2	20 59.8 −55.8 141.4	20 12.8 −56.0 141.7	19 25.7 −56.3 141.9	18 38.4 −56.5 142.1	17 51.0 −56.7 142.3	17 03.4 −56.9 142.5	16 15.8 −57.2 142.7	8
9	20 51.1 −55.6 141.6	20 04.0 −55.8 141.8	19 16.8 −56.1 142.0	18 29.4 −56.3 142.3	17 41.9 −56.5 142.5	16 54.2 −56.7 142.6	16 06.5 −57.0 142.8	15 18.6 −57.1 143.0	9
10	19 55.5 −55.6 142.0	19 08.2 −55.9 142.2	18 20.7 −56.1 142.6	17 33.1 −56.4 142.6	16 45.4 −56.6 142.8	15 57.5 −56.8 143.0	15 09.5 −56.9 143.1	14 21.5 −57.2 143.3	10
11	18 59.9 −55.9 142.4	18 12.3 −55.9 142.6	17 24.6 −56.2 142.8	16 36.7 −56.3 143.0	15 48.8 −56.6 143.2	15 00.7 −56.8 143.3	14 12.6 −57.1 143.5	13 24.3 −57.2 143.6	11
12	18 04.3 −55.8 142.8	17 16.4 −55.9 143.0	16 28.4 −56.1 143.2	15 40.4 −56.4 143.3	14 52.2 −56.6 143.5	14 03.9 −56.8 143.7	13 15.5 −57.0 143.8	12 27.1 −57.2 143.9	12
13	17 08.5 −55.7 143.2	16 20.5 −56.0 143.4	15 32.3 −56.3 143.7	14 44.0 −56.5 143.7	13 55.6 −56.7 143.8	13 07.1 −56.9 144.0	12 18.5 −57.1 144.1	11 29.9 −57.3 144.2	13
14	16 12.8 −55.8 143.6	15 24.5 −56.1 143.7	14 36.0 −56.2 143.9	13 47.5 −56.5 144.0	12 58.9 −56.7 144.2	12 10.2 −56.9 144.3	11 21.4 −57.0 144.4	10 32.6 −57.3 144.5	14
15	15 17.0 −55.9 143.9	14 28.4 −56.0 144.1	13 39.8 −56.3 144.2	12 51.0 −56.5 144.4	12 02.2 −56.7 144.5	11 13.3 −56.9 144.6	10 24.4 −57.1 144.7	9 35.3 −57.2 144.8	15
16	14 21.1 −55.8 144.3	13 32.4 −56.1 144.4	12 43.5 −56.3 144.6	11 54.5 −56.5 144.7	11 05.5 −56.7 144.8	10 16.4 −56.9 145.0	9 27.3 −57.1 145.1	8 38.1 −57.3 145.1	16
17	13 25.3 −55.9 144.7	12 36.3 −56.2 144.8	11 47.2 −56.4 145.0	10 58.0 −56.5 145.1	10 08.8 −56.8 145.2	9 19.5 −56.9 145.3	8 30.2 −57.2 145.4	7 40.8 −57.3 145.4	17
18	12 29.4 −56.0 145.1	11 40.1 −56.1 145.2	10 50.8 −56.3 145.3	10 01.5 −56.6 145.4	9 12.0 −56.7 145.5	8 22.6 −57.0 145.6	7 33.0 −57.1 145.7	6 43.5 −57.4 145.7	18
19	11 33.4 −55.9 145.4	10 44.0 −56.2 145.6	9 54.5 −56.4 145.7	9 04.9 −56.6 145.7	8 15.3 −56.8 145.8	7 25.6 −57.0 145.9	6 35.9 −57.2 146.0	5 46.1 −57.3 146.0	19
20	10 37.5 −56.0 145.8	9 47.8 −56.2 145.9	8 58.1 −56.4 146.0	8 08.3 −56.6 146.1	7 18.5 −56.8 146.2	6 28.6 −56.9 146.2	5 38.7 −57.1 146.3	4 48.8 −57.3 146.3	20
21	9 41.5 −56.1 146.2	8 51.6 −56.2 146.3	8 01.7 −56.5 146.3	7 11.7 −56.6 146.4	6 21.7 −56.8 146.5	5 31.7 −57.0 146.5	4 41.6 −57.2 146.6	3 51.5 −57.4 146.6	21
22	8 45.4 −56.0 146.5	7 55.4 −56.3 146.6	7 05.2 −56.4 146.7	6 15.1 −56.6 146.8	5 24.9 −56.8 146.8	4 34.7 −57.0 146.9	3 44.4 −57.2 146.9	2 54.1 −57.3 146.9	22
23	7 49.4 −56.0 146.9	6 59.1 −56.2 147.0	6 08.8 −56.4 147.0	5 18.5 −56.7 147.1	4 28.1 −56.9 147.1	3 37.7 −57.0 147.2	2 47.2 −57.1 147.2	1 56.8 −57.3 147.2	23
24	6 53.4 −56.1 147.3	6 02.9 −56.3 147.3	5 12.4 −56.5 147.4	4 21.8 −56.6 147.4	3 31.2 −56.8 147.5	2 40.7 −57.1 147.5	1 50.1 −57.2 147.5	0 59.5 −57.4 147.5	24
25	5 57.3 −56.1 147.6	5 06.6 −56.3 147.7	4 15.9 −56.5 147.7	3 25.2 −56.7 147.7	2 34.4 −56.8 147.8	1 43.6 −57.0 147.8	0 52.9 −57.2 147.8	0 02.1 −57.3 147.8	25
26	5 01.2 −56.1 148.0	4 10.3 −56.3 148.0	3 19.4 −56.5 148.0	2 28.5 −56.7 148.1	1 37.6 −56.9 148.1	0 46.6 −57.0 148.1	0 04.3 +57.2 31.9	0 55.2 +57.4 31.9	26
27	4 05.1 −56.1 148.3	3 14.0 −56.3 148.4	2 22.9 −56.4 148.4	1 31.8 −56.6 148.4	0 40.7 −56.8 148.4	0 10.4 +57.0 31.6	1 01.5 +57.2 31.6	1 52.6 +57.3 31.6	27
28	3 09.0 −56.1 148.7	2 17.7 −56.3 148.7	1 26.5 −56.5 148.7	0 35.2 −56.7 148.7	0 16.1 +56.8 31.3	1 07.4 +57.0 31.3	1 58.7 +57.1 31.3	2 49.9 +57.4 31.3	28
29	2 12.9 −56.1 149.0	1 21.4 −56.3 149.1	0 30.0 −56.5 149.1	0 21.5 +56.7 30.9	1 12.9 +56.9 30.9	2 04.4 +57.0 31.0	2 55.9 +57.1 31.0	3 47.3 +57.3 31.0	29
30	1 16.8 −56.1 149.4	0 25.1 −56.3 149.4	0 26.5 +56.5 30.6	1 18.2 +56.6 30.6	2 09.8 +56.8 30.6	3 01.4 +57.0 30.6	3 53.0 +57.2 30.7	4 44.6 +57.3 30.7	30
31	0 20.7 −56.2 149.7	0 31.2 +56.3 30.3	1 23.0 +56.5 30.3	2 14.8 +56.7 30.3	3 06.6 +56.9 30.3	3 58.4 +57.0 30.3	4 50.2 +57.2 30.4	5 41.9 +57.4 30.4	31
32	0 35.5 +56.1 29.9	1 27.5 +56.3 29.9	2 19.5 +56.5 29.9	3 11.5 +56.6 30.0	4 03.5 +56.8 30.0	4 55.4 +57.0 30.0	5 47.4 +57.1 30.1	6 39.3 +57.3 30.1	32
33	1 31.6 +56.1 29.5	2 23.8 +56.3 29.6	3 16.0 +56.4 29.6	4 08.1 +56.7 29.6	5 00.3 +56.8 29.7	5 52.4 +57.0 29.7	6 44.5 +57.1 29.8	7 36.6 +57.3 29.8	33
34	2 27.7 +56.1 29.2	3 20.1 +56.3 29.2	4 12.4 +56.5 29.2	5 04.8 +56.6 29.3	5 57.1 +56.8 29.3	6 49.4 +56.9 29.4	7 41.6 +57.2 29.5	8 33.9 +57.3 29.5	34
35	3 23.8 +56.1 28.8	4 16.4 +56.2 28.9	5 08.9 +56.4 28.9	6 01.4 +56.6 29.0	6 53.9 +56.8 29.0	7 46.3 +57.0 29.1	8 38.8 +57.1 29.1	9 31.2 +57.2 29.2	35
36	4 19.9 +56.1 28.5	5 12.6 +56.3 28.5	6 05.3 +56.5 28.6	6 58.0 +56.6 28.6	7 50.7 +56.8 28.7	8 43.3 +56.9 28.8	9 35.9 +57.1 28.8	10 28.4 +57.3 28.9	36
37	5 16.0 +56.1 28.1	6 08.9 +56.3 28.2	7 01.8 +56.4 28.3	7 54.6 +56.6 28.3	8 47.5 +56.7 28.4	9 40.2 +56.9 28.4	10 33.0 +57.0 28.5	11 25.7 +57.2 28.6	37
38	6 12.1 +56.0 27.8	7 05.2 +56.2 27.8	7 58.2 +56.4 27.9	8 51.2 +56.6 28.0	9 44.2 +56.7 28.0	10 37.1 +56.9 28.1	11 30.0 +57.1 28.2	12 22.9 +57.2 28.3	38
39	7 08.1 +56.1 27.4	8 01.4 +56.2 27.5	8 54.6 +56.4 27.5	9 47.8 +56.6 27.6	10 40.9 +56.8 27.7	11 34.0 +56.9 27.8	12 27.1 +57.0 27.9	13 20.1 +57.2 28.0	39
40	8 04.2 +56.0 27.1	8 57.6 +56.2 27.1	9 51.0 +56.4 27.2	10 44.4 +56.5 27.3	11 37.7 +56.7 27.4	12 30.9 +56.9 27.5	13 24.1 +57.0 27.6	14 17.3 +57.2 27.7	40
41	9 00.2 +56.0 26.7	9 53.8 +56.2 26.8	10 47.4 +56.3 26.9	11 40.9 +56.5 26.9	12 34.4 +56.6 27.0	13 27.8 +56.8 27.1	14 21.1 +57.0 27.3	15 14.5 +57.1 27.4	41
42	9 56.2 +56.0 26.3	10 50.0 +56.1 26.4	11 43.7 +56.3 26.5	12 37.4 +56.5 26.6	13 31.0 +56.6 26.7	14 24.6 +56.8 26.8	15 18.1 +57.0 26.9	16 11.6 +57.1 27.1	42
43	10 52.2 +56.0 26.0	11 46.1 +56.2 26.0	12 40.0 +56.3 26.1	13 33.9 +56.4 26.2	14 27.7 +56.6 26.4	15 21.4 +56.8 26.5	16 15.1 +56.9 26.6	17 08.7 +57.1 26.7	43
44	11 48.2 +55.9 25.6	12 42.3 +56.1 25.7	13 36.3 +56.3 25.8	14 30.3 +56.4 25.9	15 24.3 +56.6 26.0	16 18.2 +56.7 26.1	17 12.0 +56.9 26.3	18 05.8 +57.0 26.4	44
45	12 44.1 +55.9 25.2	13 38.4 +56.0 25.3	14 32.6 +56.2 25.4	15 26.7 +56.4 25.5	16 20.9 +56.5 25.7	17 14.9 +56.7 25.8	18 08.9 +56.8 25.9	19 02.8 +57.0 26.1	45
46	13 40.0 +55.9 24.8	14 34.4 +56.1 25.0	15 28.8 +56.2 25.1	16 23.1 +56.4 25.2	17 17.4 +56.5 25.3	18 11.6 +56.7 25.5	19 05.7 +56.9 25.6	19 59.8 +57.0 25.8	46
47	14 35.9 +55.8 24.5	15 30.5 +56.0 24.6	16 25.0 +56.2 24.7	17 19.5 +56.3 24.8	18 13.9 +56.5 25.0	19 08.3 +56.6 25.1	20 02.6 +56.7 25.3	20 56.8 +56.9 25.4	47
48	15 31.7 +55.8 24.1	16 26.5 +55.9 24.2	17 21.2 +56.1 24.3	18 15.8 +56.3 24.5	19 10.4 +56.4 24.6	20 04.9 +56.6 24.8	20 59.3 +56.8 24.9	21 53.7 +56.9 25.1	48
49	16 27.5 +55.7 23.7	17 22.4 +55.9 23.8	18 17.3 +56.0 24.0	19 12.1 +56.2 24.1	20 06.8 +56.4 24.2	21 01.5 +56.5 24.4	21 56.1 +56.7 24.6	22 50.6 +56.9 24.7	49
50	17 23.2 +55.7 23.3	18 18.3 +55.9 23.5	19 13.3 +56.1 23.6	20 08.3 +56.2 23.7	21 03.2 +56.3 23.9	21 58.0 +56.5 24.0	22 52.8 +56.6 24.2	23 47.5 +56.8 24.4	50
51	18 18.9 +55.7 22.9	19 14.2 +55.8 23.1	20 09.4 +55.9 23.2	21 04.5 +56.1 23.4	21 59.5 +56.3 23.5	22 54.5 +56.4 23.7	23 49.4 +56.6 23.9	24 44.3 +56.7 24.0	51
52	19 14.6 +55.6 22.5	20 10.0 +55.8 22.7	21 05.3 +55.9 22.8	22 00.6 +56.1 23.0	22 55.8 +56.2 23.1	23 50.9 +56.4 23.3	24 46.0 +56.5 23.5	25 41.0 +56.7 23.7	52
53	20 10.2 +55.6 22.1	21 05.8 +55.7 22.3	22 01.2 +55.9 22.4	22 56.7 +56.0 22.6	23 52.0 +56.2 22.8	24 47.3 +56.4 22.9	25 42.6 +56.4 23.1	26 37.7 +56.6 23.3	53
54	21 05.8 +55.4 21.7	22 01.5 +55.6 21.9	22 57.1 +55.8 22.0	23 52.7 +56.0 22.2	24 48.2 +56.1 22.4	25 43.7 +56.2 22.6	26 39.0 +56.5 22.7	27 34.3 +56.6 22.9	54
55	22 01.2 +55.5 21.3	22 57.1 +55.6 21.5	23 52.9 +55.8 21.6	24 48.7 +55.8 21.8	25 44.3 +56.1 22.0	26 39.9 +56.2 22.2	27 35.5 +56.3 22.4	28 30.9 +56.5 22.6	55
56	22 56.7 +55.3 20.9	23 52.7 +55.5 21.1	24 48.7 +55.6 21.2	25 44.5 +55.7 21.4	26 40.4 +56.0 21.6	27 36.1 +56.2 21.8	28 31.8 +56.3 22.0	29 27.4 +56.5 22.2	56
57	23 52.0 +55.3 20.5	24 48.2 +55.5 20.7	25 44.3 +55.6 20.8	26 40.4 +55.7 21.0	27 36.4 +55.9 21.2	28 32.3 +56.0 21.4	29 28.1 +56.2 21.6	30 23.9 +56.3 21.8	57
58	24 47.3 +55.2 20.1	25 43.7 +55.3 20.2	26 39.9 +55.6 20.4	27 36.1 +55.7 20.6	28 32.3 +55.8 20.8	29 28.3 +56.0 21.0	30 24.3 +56.2 21.2	31 20.2 +56.3 21.4	58
59	25 42.6 +55.1 19.6	26 39.0 +55.3 19.8	27 35.5 +55.4 20.0	28 31.8 +55.6 20.2	29 28.1 +55.8 20.3	30 24.3 +55.9 20.5	31 20.5 +56.0 20.8	32 16.5 +56.2 21.0	59
60	26 37.7 +55.1 19.2	27 34.3 +55.2 19.4	28 30.9 +55.4 19.5	29 27.4 +55.5 19.7	30 23.9 +55.6 19.9	31 20.2 +55.8 20.1	32 16.5 +56.0 20.3	33 12.7 +56.2 20.6	60
61	27 32.8 +54.9 18.7	28 29.5 +55.2 18.9	29 26.3 +55.2 19.1	30 22.9 +55.5 19.3	31 19.5 +55.6 19.5	32 16.1 +55.7 19.7	33 11.8 +55.9 19.9	34 08.9 +56.0 20.1	61
62	28 27.7 +54.9 18.3	29 24.7 +55.0 18.5	30 21.5 +55.2 18.7	31 18.4 +55.3 18.8	32 15.1 +55.5 19.0	33 11.8 +55.6 19.3	34 08.4 +55.9 19.5	35 04.9 +56.0 19.7	62
63	29 22.6 +54.8 17.8	30 19.7 +54.9 18.0	31 16.7 +55.1 18.2	32 13.7 +55.2 18.4	33 10.6 +55.4 18.6	34 07.4 +55.6 18.8	35 04.2 +55.7 19.0	36 00.9 +55.8 19.3	63
64	30 17.4 +54.7 17.4	31 14.6 +54.9 17.5	32 11.8 +55.0 17.7	33 08.9 +55.2 17.9	34 06.0 +55.3 18.1	35 03.0 +55.4 18.3	35 59.9 +55.6 18.6	36 56.7 +55.8 18.8	64
65	31 12.1 +54.5 16.9	32 09.5 +54.7 17.1	33 06.8 +54.9 17.3	34 04.1 +55.0 17.5	35 01.3 +55.1 17.7	35 58.4 +55.3 17.9	36 55.5 +55.4 18.1	37 52.5 +55.6 18.4	65
66	32 06.6 +54.5 16.4	33 04.2 +54.6 16.6	34 01.7 +54.7 16.8	34 59.1 +54.9 17.0	35 56.4 +55.1 17.2	36 53.7 +55.2 17.4	37 50.9 +55.4 17.6	38 48.1 +55.5 17.9	66
67	33 01.1 +54.3 15.9	33 58.8 +54.5 16.1	34 56.4 +54.6 16.3	35 54.0 +54.8 16.5	36 51.5 +54.9 16.7	37 48.9 +55.1 16.9	38 46.3 +55.2 17.1	39 43.6 +55.4 17.4	67
68	33 55.4 +54.3 15.4	34 53.3 +54.3 15.6	35 51.0 +54.5 15.8	36 48.8 +54.6 16.0	37 46.4 +54.8 16.2	38 44.0 +54.9 16.4	39 41.5 +55.1 16.6	40 39.0 +55.2 16.9	68
69	34 49.7 +54.0 14.9	35 47.6 +54.2 15.1	36 45.5 +54.4 15.2	37 43.4 +54.5 15.4	38 41.2 +54.7 15.7	39 38.9 +54.8 15.9	40 36.6 +55.0 16.1	41 34.2 +55.1 16.4	69
70	35 43.7 +54.0 14.3	36 41.8 +54.1 14.5	37 39.9 +54.2 14.7	38 37.9 +54.4 14.9	39 35.9 +54.5 15.1	40 33.7 +54.7 15.3	41 31.6 +54.8 15.6	42 29.3 +55.0 15.8	70
71	36 37.7 +53.7 13.8	37 35.9 +53.9 14.0	38 34.1 +54.1 14.2	39 32.3 +54.2 14.4	40 30.4 +54.3 14.6	41 28.4 +54.5 14.8	42 26.4 +54.6 15.0	43 24.3 +54.8 15.3	71
72	37 31.4 +53.7 13.2	38 29.8 +53.8 13.4	39 28.2 +53.9 13.6	40 26.5 +54.0 13.8	41 24.7 +54.2 14.0	42 22.9 +54.3 14.2	43 21.0 +54.5 14.5	44 19.1 +54.6 14.7	72
73	38 25.1 +53.4 12.7	39 23.6 +53.6 12.8	40 22.1 +53.7 13.0	41 20.5 +53.8 13.2	42 18.9 +54.0 13.4	43 17.2 +54.1 13.7	44 15.5 +54.3 13.9	45 13.7 +54.4 14.1	73
74	39 18.5 +53.3 12.1	40 17.2 +53.4 12.3	41 15.8 +53.5 12.4	42 14.3 +53.7 12.6	43 12.9 +53.8 12.8	44 11.3 +54.0 13.1	45 09.8 +54.0 13.3	46 08.1 +54.3 13.5	74
75	40 11.8 +53.1 11.5	41 10.6 +53.2 11.7	42 09.3 +53.3 11.8	43 08.0 +53.4 12.0	44 06.7 +53.6 12.2	45 05.3 +53.7 12.4	46 03.8 +53.9 12.7	47 02.4 +54.0 12.9	75
76	41 04.9 +52.8 10.9	42 03.8 +53.0 11.0	43 02.6 +53.2 11.2	44 01.5 +53.2 11.4	45 00.3 +53.4 11.6	45 59.0 +53.6 11.8	46 57.7 +53.7 12.0	47 56.4 +53.8 12.3	76
77	41 57.7 +52.7 10.2	42 56.8 +52.8 10.4	43 55.8 +52.9 10.6	44 54.7 +53.1 10.8	45 53.7 +53.1 11.0	46 52.5 +53.3 11.2	47 51.4 +53.4 11.4	48 50.2 +53.6 11.6	77
78	42 50.4 +52.5 9.5	43 49.6 +52.5 9.7	44 48.7 +52.6 9.9	45 47.8 +52.7 10.1	46 46.8 +52.9 10.3	47 45.8 +53.1 10.5	48 44.8 +53.2 10.7	49 43.8 +53.3 10.9	78
79	43 42.9 +52.2 8.9	44 42.1 +52.3 9.1	45 41.3 +52.5 9.2	46 40.6 +52.5 9.4	47 39.7 +52.7 9.6	48 38.9 +52.8 9.8	49 38.0 +52.9 10.0	50 37.1 +53.0 10.2	79
80	44 35.1 +51.9 8.2	45 34.4 +52.1 8.4	46 33.8 +52.1 8.5	47 33.1 +52.3 8.7	48 32.4 +52.4 8.9	49 31.7 +52.5 9.0	50 30.9 +52.6 9.2	51 30.1 +52.7 9.4	80
81	45 27.0 +51.7 7.5	46 26.5 +51.7 7.7	47 25.9 +51.9 7.8	48 25.4 +51.9 8.0	49 24.8 +52.1 8.1	50 24.2 +52.3 8.3	51 23.5 +52.3 8.5	52 22.8 +52.5 8.7	81
82	46 18.7 +51.4 6.8	47 18.2 +51.5 6.9	48 17.8 +51.6 7.1	49 17.3 +51.7 7.2	50 16.9 +51.7 7.4	51 16.3 +51.9 7.5	52 15.8 +52.0 7.7	53 15.3 +52.1 7.9	82
83	47 10.1 +51.0 6.0	48 09.7 +51.2 6.2	49 09.4 +51.2 6.3	50 09.0 +51.3 6.4	51 08.6 +51.4 6.6	52 08.2 +51.5 6.7	53 07.8 +51.6 6.9	54 07.4 +51.7 7.0	83
84	48 01.1 +50.8 5.3	49 00.9 +50.8 5.4	50 00.6 +50.9 5.5	51 00.3 +51.0 5.6	52 00.0 +51.1 5.7	52 59.7 +51.2 5.8	53 59.4 +51.3 6.0	54 59.1 +51.3 6.1	84
85	48 51.9 +50.4 4.5	49 51.7 +50.5 4.6	50 51.5 +50.6 4.7	51 51.3 +50.6 4.8	52 51.1 +50.7 4.9	53 50.9 +50.7 5.0	54 50.7 +50.8 5.1	55 50.4 +50.9 5.2	85
86	49 42.3 +50.1 3.6	50 42.2 +50.1 3.7	51 42.1 +50.1 3.8	52 41.9 +50.2 3.9	53 41.8 +50.2 4.0	54 41.6 +50.4 4.1	55 41.5 +50.4 4.2	56 41.3 +50.5 4.3	86
87	50 32.4 +49.6 2.8	51 32.3 +49.7 2.8	52 32.2 +49.7 2.9	53 32.1 +49.8 3.0	54 32.0 +49.8 3.0	55 32.0 +49.9 3.1	56 31.9 +49.9 3.2	57 31.8 +49.9 3.3	87
88	51 22.0 +49.2 1.9	52 22.0 +49.2 1.9	53 21.9 +49.3 2.0	54 21.9 +49.3 2.0	55 21.9 +49.3 2.1	56 21.8 +49.4 2.1	57 21.8 +49.4 2.2	58 21.7 +49.5 2.2	88
89	52 11.2 +48.8 1.0	53 11.2 +48.8 1.0	54 11.2 +48.8 1.0	55 11.2 +48.8 1.0	56 11.2 +48.8 1.1	57 11.2 +48.8 1.1	58 11.2 +48.8 1.1	59 11.2 +48.8 1.1	89
90	53 00.0 +48.3 0.0	54 00.0 +48.3 0.0	55 00.0 +48.3 0.0	56 00.0 +48.3 0.0	57 00.0 +48.3 0.0	58 00.0 +48.2 0.0	59 00.0 +48.2 0.0	60 00.0 +48.2 0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 144°, 216°**

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	28 43.6	+54.6	136.7	27 59.8	+55.0	137.0	27 15.8	+55.2	137.4	26 31.5	+55.6	137.7	25 47.0	+55.8	138.1	25 02.3	+56.1	138.4	24 17.3	+56.4	138.7	23 32.1	+56.7	139.0	0
1	29 38.2	+54.5	136.2	28 54.8	+54.8	136.6	28 11.0	+55.2	136.9	27 27.1	+55.4	137.3	26 42.8	+55.8	137.7	25 58.4	+56.0	138.0	25 13.7	+56.3	138.3	24 28.8	+56.6	138.6	1
2	30 32.7	+54.4	135.7	29 49.6	+54.7	136.1	29 06.2	+55.1	136.5	28 22.5	+55.4	136.9	27 38.6	+55.7	137.2	26 54.4	+56.0	137.6	26 10.0	+56.3	137.9	25 25.4	+56.5	138.2	2
3	31 27.1	+54.2	135.2	30 44.3	+54.7	135.6	30 01.3	+55.0	136.0	29 17.9	+55.4	136.4	28 34.3	+55.7	136.8	27 50.4	+56.0	137.2	27 06.3	+56.2	137.5	26 21.9	+56.5	137.9	3
4	32 21.3	+54.2	134.7	31 39.0	+54.5	135.2	30 56.3	+54.8	135.6	30 13.3	+55.2	136.0	29 30.0	+55.5	136.4	28 46.4	+55.8	136.8	28 02.5	+56.2	137.1	27 18.4	+56.4	137.5	4
5	33 15.5	+54.0	134.2	32 33.5	+54.4	134.7	31 51.1	+54.8	135.1	31 08.5	+55.1	135.5	30 25.5	+55.4	136.0	29 42.2	+55.8	136.4	28 58.7	+56.0	136.7	28 14.8	+56.4	137.1	5
6	34 09.5	+53.9	133.7	33 27.9	+54.2	134.2	32 45.9	+54.7	134.6	32 03.6	+55.0	135.1	31 20.9	+55.4	135.5	30 38.0	+55.7	135.9	29 54.7	+56.0	136.3	29 11.2	+56.3	136.7	6
7	35 03.4	+53.7	133.1	34 22.1	+54.2	133.6	33 40.6	+54.5	134.1	32 58.6	+54.9	134.6	32 16.3	+55.3	135.1	31 33.7	+55.6	135.5	30 50.7	+55.9	135.9	30 07.5	+56.2	136.3	7
8	35 57.1	+53.6	132.6	35 16.3	+54.0	133.1	34 35.1	+54.4	133.6	33 53.5	+54.8	134.1	33 11.6	+55.1	134.6	32 29.3	+55.5	135.0	31 46.6	+55.9	135.4	31 03.7	+56.1	135.9	8
9	36 50.7	+53.4	132.0	36 10.3	+53.9	132.6	35 29.5	+54.3	133.1	34 48.3	+54.7	133.6	34 06.7	+55.1	134.1	33 24.8	+55.4	134.6	32 42.5	+55.7	135.1	31 59.8	+56.1	135.5	9
10	37 44.1	+53.3	131.5	37 04.2	+53.7	132.0	36 23.8	+54.1	132.6	35 43.0	+54.5	133.1	35 01.8	+54.9	133.6	34 20.2	+55.2	134.1	33 38.2	+55.6	134.6	32 55.9	+56.0	135.1	10
11	38 37.4	+53.0	130.9	37 57.9	+53.5	131.5	37 17.9	+54.0	132.0	36 37.5	+54.4	132.6	35 56.7	+54.8	133.1	35 15.4	+55.2	133.7	34 33.8	+55.6	134.2	33 51.9	+55.8	134.6	11
12	39 30.4	+52.9	130.3	38 51.4	+53.4	130.9	38 11.9	+53.8	131.5	37 31.9	+54.3	132.1	36 51.5	+54.6	132.6	36 10.6	+55.1	133.2	35 29.4	+55.4	133.7	34 47.7	+55.8	134.2	12
13	40 23.3	+52.7	129.7	39 44.8	+53.1	130.3	39 05.7	+53.6	130.9	38 26.2	+54.1	131.5	37 46.1	+54.6	132.1	37 05.7	+54.9	132.7	36 24.8	+55.3	133.2	35 43.5	+55.7	133.8	13
14	41 16.0	+52.5	129.0	40 37.9	+53.0	129.7	39 59.3	+53.5	130.3	39 20.3	+53.9	131.0	38 40.7	+54.3	131.6	38 00.6	+54.8	132.2	37 20.1	+55.2	132.7	36 39.2	+55.5	133.3	14
15	42 08.5	+52.2	128.4	41 30.9	+52.8	129.1	40 52.8	+53.3	129.7	40 14.2	+53.8	130.4	39 35.0	+54.3	131.0	38 55.4	+54.7	131.7	38 15.3	+55.1	132.2	37 34.7	+55.5	132.8	15
16	43 00.7	+52.0	127.7	42 23.7	+52.6	128.4	41 46.1	+53.1	129.1	41 08.0	+53.5	129.8	40 29.3	+54.0	130.5	39 50.1	+54.5	131.1	39 10.4	+54.9	131.7	38 30.2	+55.3	132.3	16
17	43 52.7	+51.7	127.0	43 16.3	+52.3	127.8	42 39.2	+52.9	128.5	42 01.5	+53.4	129.2	41 23.3	+53.9	129.9	40 44.6	+54.3	130.6	40 05.3	+54.8	131.2	39 25.5	+55.2	131.8	17
18	44 44.4	+51.5	126.3	44 08.6	+52.1	127.1	43 32.1	+52.6	127.9	42 54.9	+53.2	128.6	42 17.2	+53.7	129.3	41 38.9	+54.2	130.0	41 00.1	+54.6	130.7	40 20.7	+55.1	131.3	18
19	45 35.9	+51.2	125.6	45 00.7	+51.8	126.4	44 24.7	+52.4	127.2	43 48.1	+53.0	128.0	43 10.9	+53.5	128.7	42 33.1	+54.0	129.4	41 54.7	+54.5	130.1	41 15.8	+54.9	130.8	19
20	46 27.1	+50.9	124.8	45 52.5	+51.5	125.7	45 17.1	+52.2	126.5	44 41.1	+52.7	127.3	44 04.4	+53.3	128.1	43 27.1	+53.8	128.8	42 49.2	+54.3	129.6	42 10.7	+54.7	130.3	20
21	47 18.0	+50.6	124.1	46 44.0	+51.2	124.9	46 09.3	+51.9	125.8	45 33.8	+52.5	126.6	44 57.7	+53.0	127.4	44 20.9	+53.6	128.2	43 43.5	+54.1	129.0	43 05.4	+54.6	129.7	21
22	48 08.6	+50.2	123.3	47 35.2	+51.0	124.2	47 01.2	+51.5	125.1	46 26.3	+52.2	125.9	45 50.7	+52.9	126.8	45 14.5	+53.4	127.6	44 37.6	+53.9	128.4	44 00.0	+54.4	129.1	22
23	48 58.8	+49.8	122.4	48 26.2	+50.6	123.4	47 52.7	+51.3	124.3	47 18.5	+52.0	125.2	46 43.6	+52.5	126.1	46 07.9	+53.1	126.9	45 31.5	+53.7	127.7	44 54.4	+54.2	128.5	23
24	49 48.6	+49.5	121.6	49 16.8	+50.2	122.6	48 44.0	+51.0	123.5	48 10.5	+51.6	124.5	47 36.1	+52.3	125.4	47 01.0	+52.9	126.3	46 25.2	+53.5	127.1	45 48.6	+54.1	127.9	24
25	50 38.1	+49.0	120.7	50 07.0	+49.8	121.7	49 35.0	+50.6	122.7	49 02.1	+51.4	123.7	48 28.4	+52.0	124.6	47 53.9	+52.7	125.6	47 18.7	+53.2	126.4	46 42.7	+53.8	127.3	25
26	51 27.1	+48.6	119.8	50 56.8	+49.5	120.8	50 25.6	+50.2	121.9	49 53.5	+50.9	122.9	49 20.4	+51.7	123.9	48 46.6	+52.3	124.8	48 11.9	+53.0	125.8	47 36.5	+53.6	126.7	26
27	52 15.7	+48.1	118.8	51 46.3	+49.0	119.9	51 15.8	+49.9	121.0	50 44.4	+50.7	122.1	50 12.1	+51.4	123.1	49 38.9	+52.1	124.1	49 04.9	+52.7	125.0	48 30.0	+53.4	126.0	27
28	53 03.8	+47.7	117.8	52 35.3	+48.5	119.0	52 05.7	+49.4	120.1	51 35.1	+50.2	121.2	51 03.5	+51.0	122.3	50 31.0	+51.7	123.3	49 57.6	+52.4	124.3	49 23.4	+53.0	125.3	28
29	53 51.5	+47.0	116.8	53 23.8	+48.1	118.0	52 55.1	+49.0	119.2	52 25.3	+49.8	120.3	51 54.5	+50.7	121.4	51 22.7	+51.4	122.5	50 50.0	+52.2	123.5	50 16.4	+52.8	124.6	29
30	54 38.5	+46.5	115.8	54 11.9	+47.5	117.0	53 44.1	+48.4	118.2	53 15.1	+49.4	119.4	52 45.2	+50.2	120.6	52 14.1	+51.1	121.7	51 42.2	+51.7	122.8	51 09.2	+52.5	123.8	30
31	55 25.0	+45.9	114.7	54 59.4	+46.9	116.0	54 32.5	+48.0	117.2	54 04.5	+48.9	118.5	53 35.4	+49.8	119.6	53 05.2	+50.6	120.8	52 33.9	+51.5	121.9	52 01.7	+52.2	123.0	31
32	56 10.9	+45.2	113.5	55 46.3	+46.4	114.9	55 20.5	+47.4	116.2	54 53.4	+48.4	117.5	54 25.2	+49.3	118.7	53 55.8	+50.2	119.9	53 25.4	+51.0	121.1	52 53.9	+51.8	122.2	32
33	56 56.1	+44.6	112.3	56 32.7	+45.7	113.7	56 07.9	+46.8	115.1	55 41.8	+47.9	116.4	55 14.5	+48.9	117.7	54 46.0	+49.8	119.0	54 16.4	+50.7	120.2	53 45.7	+51.5	121.4	33
34	57 40.7	+43.7	111.1	57 18.4	+45.0	112.6	56 54.7	+46.1	114.0	56 29.7	+47.2	115.3	56 03.4	+48.3	116.6	55 35.8	+49.3	118.0	55 07.1	+50.2	119.3	54 37.2	+51.0	120.5	34
35	58 24.4	+42.9	109.8	58 03.4	+44.2	111.3	57 40.8	+45.5	112.8	57 16.9	+46.7	114.2	56 51.7	+47.7	115.6	56 25.1	+48.7	117.0	55 57.3	+49.7	118.3	55 28.2	+50.7	119.6	35
36	59 07.3	+42.1	108.4	58 47.6	+43.4	110.0	58 26.3	+44.7	111.5	58 03.6	+45.9	113.0	57 39.4	+47.1	114.5	57 13.8	+48.2	115.9	56 47.0	+49.2	117.3	56 18.9	+50.1	118.6	36
37	59 49.4	+41.1	107.0	59 31.0	+42.6	108.7	59 11.0	+44.0	110.2	58 49.5	+45.2	111.8	58 26.5	+46.4	113.3	58 02.0	+47.6	114.8	57 36.2	+48.6	116.2	57 09.0	+49.7	117.6	37
38	60 30.5	+40.2	105.6	60 13.6	+41.6	107.3	59 55.0	+43.0	108.9	59 34.7	+44.4	110.5	59 12.9	+45.7	112.1	58 49.6	+46.9	113.6	58 24.8	+48.1	115.1	57 58.7	+49.1	116.6	38
39	61 10.7	+39.0	104.0	60 55.2	+40.6	105.8	60 38.0	+42.2	107.5	60 19.1	+43.6	109.2	59 58.6	+45.0	110.8	59 36.5	+46.2	112.4	59 12.9	+47.4	114.0	58 47.8	+48.6	115.5	39
40	61 49.7	+37.9	102.4	61 35.8	+39.6	104.3	61 20.2	+41.1	106.0	61 02.7	+42.7	107.8	60 43.6	+44.1	109.5	60 22.7	+45.5	111.1	60 00.3	+46.7	112.8	59 36.4	+47.9	114.3	40
41	62 27.6	+36.7	100.8	62 15.4	+38.4	102.7	62 01.3	+40.1	104.5	61 45.4	+41.7	106.3	61 27.7	+43.1	108.1	61 08.2	+44.6	109.8	60 47.0	+46.0	111.5	60 24.3	+47.2	113.1	41
42	63 04.3	+35.3	99.1	62 53.8	+37.2	101.0	62 41.4	+38.9	102.9	62 27.1	+40.6	104.8	62 10.8	+42.1	106.6	61 52.8	+43.7	108.4	61 33.0	+45.1	110.1	61 11.5	+46.5	111.9	42
43	63 39.6	+34.0	97.3	63 31.0	+35.9	99.2	63 20.3	+37.7	101.2	63 07.7	+39.4	103.2	62 53.1	+41.1	105.1	62 36.5	+42.8	106.9	62 18.1	+44.3	108.7	61 58.0	+45.6	110.5	43
44	64 13.6	+32.4	95.4	64 06.9	+34.4	97.4	63 58.0	+36.4	99.5	63 47.1	+38.3	101.5	63 34.2	+40.0	103.4	63 19.3	+41.7	105.4	63 02.4	+43.3	107.3	62 43.6	+44.8	109.1	44
45	64 46.0	+30.8	93.4	64 41.3	+32.9	95.5	64 34.4	+35.0	97.6	64 25.4	+36.9	99.7	64 14.2	+38.8	101.7	64 01.0	+40.5	103.8	63 45.7	+42.2	105.7	63 28.4	+43.9	107.7	45
46	65 16.8	+29.1	91.4	65 14.2	+31.3	93.6	65 09.4	+33.4	95.7	65 02.3	+35.5	97.9	64 53.0	+37.4	100.0	64 41.5	+39.3	102.1	64 27.9	+41.2	104.1	64 12.3	+42.8	106.1	46
47	65 45.9	+27.3	89.3	65 45.5	+29.6	91.5	65 42.8	+31.8	93.7	65 37.8	+33.9	95.9	65 30.4	+36.0	98.1	65 20.8	+38.0	100.3	65 09.1	+39.8	102.4	64 55.1	+41.7	104.5	47
48	66 13.3	+25.3•	87.1	66 15.1	+27.7	89.3	66 14.6	+30.0	91.6	66 11.7	+32.3	93.9	66 06.4	+34.5	96.2	65 58.8	+36.6	98.4	65 48.9	+38.6	100.6	65 36.8	+40.4	102.8	48
49	66 38.6	+23.4•	84.8	66 42.8	+25.8	87.1	66 44.6	+28.2	89.5	66 44.0	+30.5	91.8	66 40.9	+32.8	94.1	66 35.4	+35.0	96.4	66 27.5	+37.1	98.7	66 17.2	+39.2	101.0	49
50	67 02.0	+21.3•	82.5	67 08.6	+23.8•	84.8	67 12.8	+26.2•	87.2	67 14.5	+28.6	89.6	67 13.7	+31.0	92.0	67 10.4	+33.3	94.3	67 04.6	+35.6	96.7	66 56.4	+37.6	99.0	50
51	67 23.3	+19.0•	80.1	67 32.4	+21.5•	82.5	67 39.0	+24.1•	84.9	67 43.1	+26.6•	87.3	67 44.7	+29.0	89.7	67 43.7	+31.5	92.2	67 40.1	+33.8	94.6	67 34.0	+36.1	97.0	51
52	67 42.3	+16.7•	77.6	67 53.9	+19.3•	80.0	68 03.1	+21.9•	82.4	68 09.7	+24.5•	84.9	68 13.7	+27.1•	87.4	68 15.2	+29.5•	89.9	68 13.9	+32.0	92.4	68 10.1	+34.4	94.9	52
53	67 59.0	+14.2•	75.0	68 13.2	+16.9•	77.5	68 25.0	+19.5•	79.9	68 34.2	+22.2•	82.4	68 40.8	+24.8•	85.0	68 44.7	+27.5•	87.5	68 45.9	+30.1•	90.1	68 44.5	+32.5	92.7	53
54	68 13.2	+11.8•	72.4	68 30.1	+14.4•	74.9	68 44.5	+17.2•	77.3	68 56.4	+19.8•	79.9	69 05.6	+22.6•	82.4	69 12.2	+25.2•	85.1	69 16.0	+27.9•	87.7	69 17.0	+30.5•	90.3	54
55	68 25.0	+9.2•	69.8	68 44.5	+11.9•	72.2	69 01.7	+14.5•	74.7	69 16.2	+17.4•	77.2	69 28.2	+20.1•	79.8	69 37.4	+22.9•	82.5	69 43.9	+25.6•	85.2	69 47.5	+28.4•	87.9	55
56	68 34.2	+6.6•	67.1	68 56.4	+9.2•	69.5	69 16.2	+12.0•	71.9	69 33.6	+14.7•	74.5	69 48.3	+17.5•	77.1	70 00.3	+20.4•	79.8	70 09.5	+23.2•	82.5	70 15.9	+26.0•	85.3	56
57	68 40.8	+3.9•	64.4	69 05.6	+6.6•	66.7	69 28.2	+9.2•	69.2	69 48.3	+12.0•	71.7	70 05.8	+14.9•	74.3	70 20.7	+17.7•	77.0	70 32.7	+20.7•	79.8	70 41.9	+23.6•	82.6	57
58	68 44.7	+1.2•	61.6	69 12.2	+3.8•	63.9	69 37.4	+6.5•	66.3	70 00.3	+9.2•	68.9	70 20.7	+12.0•	71.5	70 38.4	+15.0•	74.2	70 53.4	+17.9•	76.9	71 05.5	+20.9•	79.8	58
59	68 45.9	−1.4•	58.8	69 16.0	+1.0•	61.1	69 43.9	+3.5•	63.5	70 09.5	+6.4•	66.0	70 32.7	+9.2•	68.5	70 53.4	+12.1•	71.2	71 11.3	+15.1•	74.0	71 26.4	+18.2•	76.9	59
60	68 44.5	−4.1•	56.1	69 17.0	−1.7•	58.3	69 47.5	+0.8•	60.6	70 15.9	+3.5•	63.0	70 41.9	+6.3•	65.6	71 05.5	+9.1•	68.2	71 26.4	+12.2•	71.0	71 44.6	+15.2•	73.8	60
61	68 40.4	−6.8•	53.3	69 15.3	−4.5•	55.5	69 48.3	−2.0•	57.7	70 19.4	+0.5•	60.1	70 48.2	+3.3•	62.5	71 14.6	+6.2•	65.1	71 38.6	+9.1•	67.9	71 59.8	+12.1•	70.7	61
62	68 33.6	−9.5•	50.6	69 10.8	−7.2•	52.6	69 46.3	−4.9•	54.8	70 19.9	−2.4•	57.1	70 51.5	+0.2•	59.5	71 20.8	+3.0•	62.0	71 47.7	+5.9•	64.7	72 11.9	+9.0•	67.5	62
63	68 24.1	−11.9•	47.9	69 03.6	−9.9•	49.9	69 41.4	−7.6•	51.9	70 17.5	−5.2•	54.1	70 51.7	−2.7•	56.4	71 23.8	−0.1•	58.9	71 53.6	+2.8•	61.5	72 20.9	+5.8•	64.3	63
64	68 12.2	−14.5•	45.3	68 53.7	−12.5•	47.1	69 33.8	−10.4•	49.1	70 12.3	−8.2•	51.2	70 49.0	−5.8•	53.4	71 23.7	−3.1•	55.8	71 56.4	−0.4•	58.3	72 26.7	+2.5•	61.0	64
65	67 57.7	−16.9•	42.7	68 41.2	−15.0•	44.4	69 23.4	−13.1•	46.3	70 04.1	−11.0•	48.3	70 43.2	−8.7•	50.4	71 20.6	−6.3•	52.7	71 56.0	−3.7•	55.1	72 29.2	−0.9•	57.7	65
66	67 40.8	−19.2•	40.1	68 26.2	−17.6•	41.8	69 10.3	−15.7•	43.5	69 53.1	−13.7•	45.4	70 34.5	−11.5•	47.4	71 14.3	−9.3•	49.6	71 52.3	−6.8•	51.9	72 28.3	−4.1•	54.4	66
67	67 21.6	−21.4•	37.7	68 08.6	−19.8•	39.2	68 54.6	−18.1•	40.8	69 39.4	−16.3•	42.6	70 23.0	−14.4•	44.5	71 05.0	−12.2•	46.5	71 45.5	−9.9•	48.7	72 24.2	−7.4•	51.1	67
68	67 00.2	−23.5•	35.2	67 48.8	−22.1•	36.7	68 36.5	−20.6•	38.2	69 23.1	−18.9•	39.8	70 08.6	−17.1•	41.6	70 52.8	−15.1•	43.5	71 35.6	−13.0•	45.6	72 16.8	−10.7•	47.8	68
69	66 36.7	−25.6•	32.9	67 26.7	−24.3•	34.2	68 15.9	−22.9•	35.6	69 04.2	−21.3•	37.1	69 51.5	−19.7•	38.8	70 37.7	−17.9•	40.6	71 22.6	−15.8•	42.5	72 06.1	−13.7•	44.6	69
70	66 11.1	−27.4•	30.6	67 02.4	−26.3•	31.8	67 53.0	−25.0•	33.1	68 42.9	−23.7•	34.5	69 31.8	−22.1•	36.1	70 19.8	−20.4•	37.7	71 06.8	−18.7•	39.5	71 52.4	−16.7•	41.4	70
71	65 43.7	−29.3•	28.5	66 36.1	−28.2•	29.6	67 28.0	−27.0•	30.7	68 19.2	−25.8•	32.0	69 09.7	−24.4•	33.4	69 59.4	−23.0•	34.9	70 48.1	−21.4•	36.6	71 35.7	−19.6•	38.4	71
72	65 14.4	−31.0•	26.4	66 07.9	−30.0•	27.4	67 01.0	−29.0•	28.4	67 53.4	−27.9•	29.6	68 45.3	−26.7•	30.9	69 36.4	−25.3•	32.3	70 26.7	−23.9•	33.8	71 16.1	−22.3•	35.4	72
73	64 43.4	−32.5•	24.3	65 37.9	−31.7•	25.2	66 32.0	−30.8•	26.2	67 25.5	−29.8•	27.3	68 18.6	−28.7•	28.4	69 11.1	−27.6•	29.7	70 02.8	−26.2•	31.0	70 53.8	−24.8•	32.5	73
74	64 10.9	−34.1•	22.4	65 06.2	−33.3•	23.2	66 01.2	−32.5•	24.1	66 55.7	−31.6•	25.0	67 49.9	−30.7•	26.1	68 43.5	−29.6•	27.2	69 36.6	−28.5•	28.4	70 29.0	−27.2•	29.8	74
75	63 36.8	−35.4•	20.5	64 32.9	−34.8•	21.3	65 28.7	−34.1•	22.0	66 24.1	−33.3•	22.9	67 19.2	−32.5•	23.8	68 13.9	−31.6•	24.8	69 08.1	−30.6•	25.9	70 01.8	−29.5•	27.1	75
76	63 01.4	−36.8•	18.7	63 58.1	−36.2•	19.4	64 54.6	−35.6•	20.1	65 50.8	−34.9•	20.8	66 46.7	−34.2•	21.7	67 42.3	−33.4•	22.6	68 37.5	−32.5•	23.5	69 32.3	−31.6•	24.6	76
77	62 24.6	−38.0•	17.0	63 21.9	−37.5•	17.6	64 19.0	−37.0•	18.2	65 15.9	−36.4•	18.9	66 12.5	−35.7•	19.6	67 08.9	−35.0•	20.4	68 05.0	−34.3•	21.3	69 00.7	−33.5•	22.2	77
78	61 46.6	−39.1•	15.3	62 44.4	−38.7•	15.9	63 42.0	−38.2•	16.4	64 39.5	−37.7•	17.0	65 36.8	−37.2•	17.6	66 33.9	−36.7•	18.3	67 30.7	−36.0•	19.1	68 27.2	−35.2•	19.9	78
79	61 07.5	−40.2•	13.8	62 05.7	−39.8•	14.2	63 03.8	−39.4•	14.7	64 01.8	−39.0•	15.2	64 59.6	−38.6•	15.8	65 57.2	−38.0•	16.4	66 54.7	−37.5•	17.0	67 52.0	−36.9•	17.7	79
80	60 27.3	−41.2•	12.2	61 25.9	−40.9•	12.6	62 24.4	−40.6•	13.0	63 22.8	−40.2•	13.5	64 21.0	−39.8•	14.0	65 19.2	−39.4•	14.5	66 17.2	−38.9•	15.1	67 15.1	−38.4•	15.7	80
81	59 46.1	−42.2•	10.8	60 45.0	−41.9•	11.1	61 43.8	−41.6•	11.5	62 42.6	−41.3•	11.8	63 41.2	−41.0•	12.3	64 39.8	−40.6•	12.7	65 38.3	−40.2•	13.2	66 36.7	−39.7•	13.7	81
82	59 03.9	−43.0•	9.4	60 03.1	−42.8•	9.7	61 02.2	−42.5•	10.0	62 01.3	−42.3•	10.3	63 00.3	−42.0•	10.6	63 59.2	−41.7•	11.0	64 58.1	−41.5•	11.4	65 56.8	−41.0•	11.9	82
83	58 20.9	−43.8•	8.0	59 20.3	−43.6•	8.3	60 19.7	−43.5•	8.5	61 19.0	−43.3•	8.8	62 18.3	−43.1•	9.1	63 17.5	−42.8•	9.4	64 16.6	−42.5•	9.7	65 15.8	−42.3•	10.1	83
84	57 37.1	−44.6•	6.7	58 36.7	−44.4•	6.9	59 36.2	−44.2•	7.1	60 35.7	−44.1•	7.4	61 35.2	−43.9•	7.6	62 34.7	−43.8•	7.9	63 34.1	−43.6•	8.1	64 33.5	−43.4•	8.4	84
85	56 52.5	−45.2•	5.5	57 52.3	−45.2•	5.7	58 52.0	−45.1•	5.8	59 51.6	−44.9•	6.0	60 51.3	−44.8•	6.2	61 50.9	−44.6•	6.4	62 50.5	−44.5•	6.6	63 50.1	−44.3•	6.8	85
86	56 07.3	−46.0•	4.3	57 07.1	−45.9•	4.4	58 06.9	−45.8•	4.6	59 06.7	−45.7•	4.7	60 06.5	−45.6•	4.8	61 06.3	−45.5•	5.0	62 06.0	−45.3•	5.1	63 05.8	−45.3•	5.3	86
87	55 21.3	−46.5•	3.2	56 21.2	−46.5•	3.3	57 21.1	−46.4•	3.4	58 21.0	−46.3•	3.4	59 20.9	−46.3•	3.5	60 20.8	−46.2•	3.7	61 20.7	−46.2•	3.8	62 20.5	−46.1•	3.9	87
88	54 34.8	−47.1•	2.1	55 34.7	−47.0•	2.1	56 34.7	−47.1•	2.2	57 34.7	−47.1•	2.2	58 34.6	−47.0•	2.3	59 34.6	−47.0•	2.4	60 34.5	−46.9•	2.5	61 34.4	−46.8•	2.5	88
89	53 47.7	−47.7•	1.0	54 47.7	−47.7•	1.0	55 47.6	−47.6•	1.1	56 47.6	−47.6•	1.1	57 47.6	−47.6•	1.1	58 47.6	−47.6•	1.2	59 47.6	−47.6•	1.2	60 47.6	−47.6•	1.2	89
90	53 00.0	−48.2	0.0	54 00.0	−48.2	0.0	55 00.0	−48.2	0.0	56 00.0	−48.2	0.0	57 00.0	−48.2	0.0	58 00.0	−48.2	0.0	59 00.0	−48.2	0.0	60 00.0	−48.2	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 37°, 323°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	28 43.6	−54.7	136.7	27 59.8	−55.0	137.0	27 15.8	−55.3	137.4	26 31.5	−55.6	137.7	25 47.0	−55.9	138.1	25 02.3	−56.2	138.4	24 17.3	−56.5	138.7	23 32.1	−56.7	139.0	0
1	27 48.9	−54.8	137.1	27 04.8	−55.1	137.5	26 20.5	−55.5	137.8	25 35.9	−55.7	138.1	24 51.1	−56.0	138.5	24 06.1	−56.3	138.8	23 20.8	−56.5	139.1	22 35.4	−56.7	139.4	1
2	26 54.1	−54.9	137.6	26 09.7	−55.2	137.9	25 25.1	−55.5	138.2	24 40.2	−55.8	138.6	23 55.1	−56.0	138.9	23 09.8	−56.3	139.1	22 24.3	−56.5	139.4	21 38.7	−56.8	139.7	2
3	25 59.2	−54.9	138.0	25 14.5	−55.2	138.4	24 29.6	−55.6	138.7	23 44.4	−55.8	139.0	22 59.1	−56.1	139.2	22 13.5	−56.3	139.5	21 27.8	−56.6	139.8	20 41.9	−56.8	140.0	3
4	25 04.3	−55.0	138.5	24 19.3	−55.4	138.8	23 34.0	−55.6	139.1	22 48.6	−55.9	139.4	22 03.0	−56.2	139.6	21 17.2	−56.3	139.9	20 31.2	−56.6	140.1	19 45.1	−56.9	140.4	4
5	24 09.3	−55.1	138.9	23 23.9	−55.4	139.2	22 38.4	−55.7	139.5	21 52.7	−55.9	139.8	21 06.8	−56.2	140.0	20 20.8	−56.5	140.3	19 34.6	−56.7	140.5	18 48.2	−56.9	140.7	5
6	23 14.2	−55.2	139.4	22 28.5	−55.4	139.6	21 42.7	−55.7	139.9	20 56.8	−56.0	140.1	20 10.6	−56.2	140.4	19 24.3	−56.5	140.6	18 37.9	−56.7	140.8	17 51.3	−57.0	141.0	6
7	22 19.0	−55.3	139.8	21 33.1	−55.5	140.0	20 47.0	−55.8	140.3	20 00.8	−56.1	140.5	19 14.4	−56.3	140.7	18 27.8	−56.5	141.0	17 41.2	−56.8	141.2	16 54.3	−56.9	141.4	7
8	21 23.7	−55.3	140.2	20 37.6	−55.6	140.4	19 51.2	−55.8	140.7	19 04.7	−56.1	140.9	18 18.1	−56.4	141.1	17 31.3	−56.6	141.3	16 44.4	−56.8	141.5	15 57.4	−57.0	141.7	8
9	20 28.4	−55.3	140.6	19 42.0	−55.7	140.8	18 55.4	−55.9	141.1	18 08.6	−56.1	141.3	17 21.7	−56.3	141.5	16 34.7	−56.6	141.7	15 47.6	−56.8	141.8	15 00.4	−57.0	142.0	9
10	19 33.1	−55.5	141.1	18 46.3	−55.6	141.2	17 59.5	−55.9	141.5	17 12.5	−56.2	141.7	16 25.4	−56.4	141.9	15 38.1	−56.6	142.0	14 50.8	−56.9	142.2	14 03.4	−57.1	142.4	10
11	18 37.6	−55.4	141.4	17 50.7	−55.8	141.6	17 03.6	−56.0	141.8	16 16.3	−56.2	142.0	15 29.0	−56.5	142.2	14 41.5	−56.6	142.4	13 54.0	−56.9	142.5	13 06.3	−57.1	142.7	11
12	17 42.2	−55.5	141.8	16 54.9	−55.7	142.0	16 07.6	−56.0	142.2	15 20.1	−56.2	142.4	14 32.5	−56.4	142.5	13 44.9	−56.7	142.7	12 57.1	−56.9	142.8	12 09.2	−57.1	143.0	12
13	16 46.7	−55.6	142.2	15 59.2	−55.8	142.4	15 11.6	−56.1	142.6	14 23.9	−56.3	142.7	13 36.1	−56.5	142.9	12 48.2	−56.7	143.0	12 00.2	−56.9	143.2	11 12.1	−57.1	143.3	13
14	15 51.1	−55.6	142.6	15 03.4	−55.9	142.8	14 15.5	−56.1	143.0	13 27.6	−56.3	143.1	12 39.6	−56.6	143.2	11 51.5	−56.8	143.4	11 03.3	−57.0	143.5	10 15.0	−57.1	143.6	14
15	14 55.5	−55.7	143.0	14 07.5	−55.9	143.2	13 19.4	−56.1	143.3	12 31.3	−56.4	143.5	11 43.0	−56.5	143.6	10 54.7	−56.7	143.7	10 06.3	−56.9	143.8	9 17.9	−57.2	143.9	15
16	13 59.8	−55.6	143.4	13 11.6	−55.9	143.5	12 23.3	−56.1	143.7	11 34.9	−56.3	143.8	10 46.5	−56.6	143.9	9 58.0	−56.6	144.0	9 09.4	−57.0	144.1	8 20.7	−57.1	144.2	16
17	13 04.2	−55.8	143.8	12 15.7	−55.9	143.9	11 27.2	−56.2	144.0	10 38.6	−56.4	144.2	9 49.9	−56.6	144.3	9 01.2	−56.6	144.4	8 12.4	−57.0	144.4	7 23.6	−57.2	144.5	17
18	12 08.4	−55.7	144.2	11 19.8	−56.0	144.3	10 31.0	−56.2	144.4	9 42.2	−56.4	144.5	8 53.3	−56.6	144.6	8 04.4	−56.8	144.6	7 15.4	−57.0	144.8	6 26.4	−57.2	144.8	18
19	11 12.7	−55.8	144.5	10 23.8	−56.0	144.7	9 34.8	−56.2	144.7	8 45.8	−56.4	144.8	7 56.7	−56.6	144.9	7 07.6	−56.6	144.9	6 18.4	−57.0	145.1	5 29.2	−57.2	145.1	19
20	10 16.9	−55.8	144.9	9 27.8	−56.0	145.0	8 38.6	−56.2	145.1	7 49.4	−56.5	145.2	7 00.1	−56.7	145.3	6 10.8	−56.9	145.3	5 21.4	−57.0	145.4	4 32.0	−57.2	145.4	20
21	9 21.1	−55.8	145.3	8 31.8	−56.1	145.4	7 42.4	−56.3	145.5	6 52.9	−56.4	145.5	6 03.4	−56.6	145.6	5 13.9	−56.8	145.7	4 24.4	−57.1	145.7	3 34.8	−57.2	145.7	21
22	8 25.3	−55.8	145.7	7 35.7	−56.0	145.7	6 46.1	−56.2	145.9	5 56.5	−56.5	145.9	5 06.8	−56.7	145.9	4 17.1	−56.9	146.0	3 27.3	−57.0	146.0	2 37.6	−57.2	146.0	22
23	7 29.5	−55.9	146.0	6 39.7	−56.1	146.1	5 49.9	−56.3	146.2	5 00.0	−56.5	146.2	4 10.1	−56.6	146.3	3 20.2	−56.9	146.3	2 30.3	−57.0	146.3	1 40.4	−57.3	146.3	23
24	6 33.6	−55.9	146.4	5 43.6	−56.1	146.5	4 53.6	−56.3	146.5	4 03.5	−56.5	146.6	3 13.5	−56.7	146.6	2 23.4	−56.9	146.6	1 33.3	−57.1	146.6	0 43.1	−57.2	146.6	24
25	5 37.7	−55.9	146.8	4 47.5	−56.1	146.8	3 57.3	−56.3	146.9	3 07.0	−56.4	146.9	2 16.8	−56.7	146.9	1 26.5	−56.9	146.9	0 36.2	−57.0	146.9	0 14.1	+57.2	33.1	25
26	4 41.8	−55.9	147.1	3 51.4	−56.1	147.2	3 01.0	−56.3	147.2	2 10.6	−56.5	147.2	1 20.1	−56.7	147.2	0 29.6	−56.8	147.3	0 20.8	+57.1	32.7	1 11.3	+57.2	32.8	26
27	3 45.9	−55.9	147.5	2 55.3	−56.1	147.5	2 04.7	−56.3	147.5	1 14.1	−56.5	147.6	0 23.4	−56.7	147.6	0 27.2	+56.9	32.4	1 17.9	+57.0	32.4	2 08.5	+57.2	32.5	27
28	2 50.0	−55.9	147.9	1 59.2	−56.1	147.9	1 08.4	−56.3	147.9	0 17.6	−56.5	147.9	0 33.3	+56.7	32.1	1 24.1	+56.9	32.1	2 14.9	+57.1	32.1	3 05.7	+57.2	31.8	28
29	1 54.1	−55.9	148.2	1 03.1	−56.1	148.2	0 12.1	−56.3	148.2	0 38.9	+56.5	31.8	1 30.0	+56.6	31.8	2 21.0	+56.8	31.8	3 12.0	+57.0	31.8	4 02.9	+57.2	31.8	29
30	0 58.2	−56.0	148.6	0 07.0	−56.2	148.6	0 44.2	+56.3	31.4	1 35.4	+56.5	31.4	2 26.6	+56.7	31.4	3 17.8	+56.9	31.5	4 09.0	+57.0	31.5	5 00.1	+57.2	31.5	30
31	0 02.2	−55.9	148.9	0 49.2	+56.1	31.1	1 40.5	+56.4	31.1	2 31.9	+56.5	31.1	3 23.3	+56.7	31.1	4 14.7	+56.8	31.1	5 06.0	+57.0	31.2	5 57.3	+57.2	31.2	31
32	0 53.7	+55.9	30.7	1 45.3	+56.1	30.7	2 36.9	+56.3	30.7	3 28.4	+56.5	30.8	4 20.0	+56.6	30.8	5 11.5	+56.9	30.8	6 03.0	+57.0	30.9	6 54.5	+57.2	30.9	32
33	1 49.6	+55.9	30.3	2 41.4	+56.1	30.4	3 33.2	+56.3	30.4	4 24.9	+56.5	30.4	5 16.6	+56.7	30.5	6 08.4	+56.8	30.5	7 00.0	+57.0	30.6	7 51.7	+57.1	30.6	33
34	2 45.5	+55.9	30.0	3 37.5	+56.0	30.0	4 29.5	+56.2	30.0	5 21.4	+56.4	30.1	6 13.3	+56.6	30.1	7 05.2	+56.8	30.2	7 57.0	+57.0	30.2	8 48.8	+57.2	30.2	34
35	3 41.4	+55.9	29.6	4 33.6	+56.1	29.6	5 25.7	+56.3	29.7	6 17.8	+56.4	29.7	7 09.9	+56.7	29.8	8 02.0	+56.8	29.9	8 54.0	+57.0	29.9	9 46.0	+57.1	30.0	35
36	4 37.3	+55.9	29.2	5 29.7	+56.1	29.3	6 22.0	+56.3	29.3	7 14.3	+56.4	29.4	8 06.6	+56.6	29.5	8 58.8	+56.8	29.5	9 51.0	+56.9	29.6	10 43.1	+57.1	29.7	36
37	5 33.2	+55.9	28.9	6 25.8	+56.0	28.9	7 18.3	+56.2	29.0	8 10.7	+56.4	29.0	9 03.2	+56.6	29.1	9 55.6	+56.7	29.2	10 47.9	+56.9	29.3	11 40.2	+57.1	29.4	37
38	6 29.1	+55.8	28.5	7 21.8	+56.1	28.6	8 14.5	+56.2	28.6	9 07.1	+56.4	28.7	9 59.8	+56.5	28.8	10 52.3	+56.8	28.9	11 44.8	+56.9	29.0	12 37.3	+57.1	29.1	38
39	7 25.0	+55.8	28.1	8 17.9	+56.0	28.2	9 10.7	+56.2	28.3	10 03.5	+56.4	28.4	10 56.3	+56.6	28.4	11 49.1	+56.7	28.5	12 41.7	+56.9	28.6	13 34.4	+57.0	28.8	39
40	8 20.8	+55.8	27.8	9 13.9	+56.0	27.8	10 06.9	+56.2	27.9	10 59.9	+56.4	28.0	11 52.9	+56.5	28.1	12 45.8	+56.7	28.2	13 38.6	+56.9	28.3	14 31.4	+57.0	28.4	40
41	9 16.6	+55.8	27.4	10 09.9	+56.0	27.5	11 03.1	+56.2	27.6	11 56.3	+56.3	27.7	12 49.4	+56.5	27.8	13 42.5	+56.6	27.9	14 35.5	+56.8	28.0	15 28.4	+57.0	28.2	41
42	10 12.4	+55.8	27.0	11 05.9	+55.9	27.1	11 59.3	+56.1	27.2	12 52.6	+56.3	27.3	13 45.9	+56.5	27.4	14 39.1	+56.6	27.5	15 32.3	+56.8	27.7	16 25.4	+57.0	27.8	42
43	11 08.2	+55.8	26.7	12 01.8	+56.0	26.7	12 55.4	+56.1	26.8	13 48.9	+56.3	27.0	14 42.4	+56.4	27.1	15 35.7	+56.6	27.2	16 29.1	+56.7	27.3	17 22.4	+56.9	27.5	43
44	12 04.0	+55.7	26.3	12 57.8	+55.8	26.4	13 51.5	+56.0	26.5	14 45.2	+56.2	26.6	15 38.8	+56.4	26.7	16 32.3	+56.6	26.8	17 25.8	+56.8	26.9	18 19.3	+56.9	27.1	44
45	12 59.7	+55.7	25.9	13 53.6	+55.9	26.0	14 47.5	+56.1	26.1	15 41.4	+56.2	26.2	16 35.2	+56.3	26.4	17 28.9	+56.5	26.5	18 22.6	+56.7	26.6	19 16.2	+56.8	26.8	45
46	13 55.4	+55.6	25.5	14 49.5	+55.8	25.6	15 43.6	+56.0	25.7	16 37.6	+56.1	25.9	17 31.5	+56.4	26.0	18 25.4	+56.5	26.1	19 19.3	+56.6	26.3	20 13.0	+56.8	26.5	46
47	14 51.0	+55.6	25.1	15 45.3	+55.8	25.2	16 39.6	+55.9	25.3	17 33.7	+56.2	25.5	18 27.9	+56.3	25.6	19 21.9	+56.5	25.8	20 15.9	+56.6	25.9	21 09.8	+56.8	26.1	47
48	15 46.6	+55.6	24.7	16 41.1	+55.7	24.9	17 35.5	+55.9	25.0	18 29.5	+56.0	25.1	19 24.2	+56.2	25.3	20 18.4	+56.4	25.4	21 12.5	+56.5	25.6	22 06.6	+56.7	25.8	48
49	16 42.2	+55.5	24.3	17 36.8	+55.7	24.5	18 31.4	+55.9	24.6	19 25.9	+56.1	24.8	20 20.4	+56.2	24.9	21 14.8	+56.3	25.1	22 09.1	+56.5	25.2	23 03.3	+56.7	25.4	49
50	17 37.7	+55.5	23.9	18 32.5	+55.7	24.1	19 27.3	+55.8	24.2	20 22.0	+55.9	24.4	21 16.6	+56.1	24.5	22 11.1	+56.3	24.7	23 05.6	+56.4	24.9	24 00.0	+56.6	25.1	50
51	18 33.2	+55.4	23.5	19 28.2	+55.6	23.7	20 23.1	+55.7	23.8	21 17.9	+55.9	24.0	22 12.7	+56.1	24.1	23 07.4	+56.2	24.3	24 02.1	+56.4	24.5	24 56.6	+56.6	24.7	51
52	19 28.6	+55.4	23.1	20 23.8	+55.5	23.3	21 18.8	+55.7	23.4	22 13.9	+55.8	23.6	23 08.8	+56.0	23.8	24 03.7	+56.2	23.9	24 58.5	+56.3	24.1	25 53.2	+56.5	24.3	52
53	20 24.0	+55.3	22.7	21 19.3	+55.4	22.9	22 14.5	+55.6	23.0	23 09.7	+55.8	23.2	24 04.8	+55.8	23.4	25 00.0	+55.9	23.6	25 54.8	+56.1	23.7	26 49.7	+56.3	23.9	53
54	21 19.3	+55.2	22.3	22 14.8	+55.4	22.5	23 10.2	+55.6	22.6	24 05.5	+55.8	22.8	25 00.8	+55.8	23.0	25 56.0	+56.0	23.2	26 51.1	+56.1	23.4	27 46.2	+56.4	23.6	54
55	22 14.5	+55.2	21.9	23 10.2	+55.3	22.1	24 05.8	+55.5	22.2	25 01.3	+55.5	22.4	25 56.7	+55.8	22.6	26 52.1	+56.0	22.8	27 47.4	+56.1	23.0	28 42.6	+56.3	23.2	55
56	23 09.7	+55.1	21.5	24 05.5	+55.3	21.6	25 01.3	+55.4	21.8	25 56.9	+55.6	22.0	26 52.5	+55.8	22.2	27 48.1	+55.9	22.4	28 43.5	+56.1	22.6	29 38.9	+56.2	22.8	56
57	24 04.8	+55.1	21.0	25 00.8	+55.2	21.2	25 56.7	+55.4	21.4	26 52.5	+55.6	21.6	27 48.3	+55.7	21.7	28 44.0	+55.9	22.0	29 39.6	+56.0	22.2	30 35.1	+56.2	22.4	57
58	24 59.9	+54.9	20.6	25 56.0	+55.1	20.8	26 52.1	+55.3	20.9	27 48.1	+55.4	21.1	28 44.0	+55.6	21.3	29 39.9	+55.7	21.5	30 35.6	+56.0	21.7	31 31.3	+56.1	22.0	58
59	25 54.8	+54.9	20.2	26 51.1	+55.1	20.3	27 47.4	+55.2	20.5	28 43.5	+55.5	20.7	29 39.6	+55.7	20.9	30 35.6	+55.7	21.1	31 31.6	+55.8	21.3	32 27.4	+56.0	21.5	59
60	26 49.7	+54.8	19.7	27 46.2	+54.9	19.9	28 42.6	+55.1	20.1	29 38.9	+55.3	20.3	30 35.1	+55.5	20.5	31 31.3	+55.6	20.7	32 27.4	+55.8	20.9	33 23.4	+55.9	21.1	60
61	27 44.5	+54.7	19.2	28 41.1	+54.9	19.4	29 37.7	+55.0	19.6	30 34.2	+55.1	19.8	31 30.6	+55.3	20.0	32 26.9	+55.5	20.2	33 23.2	+55.6	20.5	34 19.3	+55.9	20.7	61
62	28 39.2	+54.6	18.8	29 36.0	+54.7	19.0	30 32.7	+54.9	19.2	31 29.3	+55.0	19.4	32 25.9	+55.1	19.6	33 22.4	+55.4	19.8	34 18.8	+55.6	20.0	35 14.4	+55.7	20.2	62
63	29 33.8	+54.5	18.3	30 30.7	+54.7	18.5	31 27.6	+54.8	18.7	32 24.4	+55.0	18.9	33 21.2	+55.1	19.1	34 17.8	+55.2	19.3	35 14.4	+55.4	19.5	36 10.9	+55.6	19.8	63
64	30 28.3	+54.4	17.8	31 25.4	+54.5	18.0	32 22.4	+54.7	18.2	33 19.4	+54.9	18.4	34 16.3	+55.0	18.6	35 13.1	+55.2	18.8	36 09.9	+55.3	19.1	37 06.5	+55.5	19.3	64
65	31 22.7	+54.3	17.3	32 19.9	+54.3	17.5	33 17.1	+54.7	17.7	34 14.3	+54.7	17.9	35 11.3	+54.8	18.1	36 08.3	+55.1	18.4	37 05.2	+55.2	18.6	38 02.0	+55.3	18.8	65
66	32 17.0	+54.1	16.8	33 14.4	+54.3	17.0	34 11.7	+54.5	17.2	35 09.0	+54.5	17.4	36 03.6	+54.8	17.6	37 03.4	+54.9	17.9	38 00.4	+55.1	18.1	38 57.4	+55.3	18.3	66
67	33 11.1	+54.1	16.3	34 08.7	+54.2	16.5	35 06.2	+54.3	16.7	36 03.6	+54.6	16.9	37 01.0	+54.6	17.1	37 58.3	+54.8	17.4	38 55.5	+55.0	17.6	39 52.7	+55.1	17.8	67
68	34 05.2	+53.8	15.8	35 02.9	+54.0	16.0	36 00.5	+54.2	16.2	36 58.1	+54.4	16.4	37 55.6	+54.5	16.6	38 53.1	+54.7	16.8	39 50.5	+54.8	17.0	40 47.8	+55.0	17.2	68
69	34 59.0	+53.8	15.3	35 56.9	+53.9	15.5	36 54.7	+54.0	15.6	37 52.4	+54.2	15.9	38 50.1	+54.4	16.1	39 47.8	+54.5	16.3	40 45.3	+54.7	16.5	41 42.8	+54.8	16.8	69
70	35 52.8	+53.6	14.7	36 50.8	+53.7	14.9	37 48.7	+53.9	15.1	38 46.6	+54.1	15.3	39 44.5	+54.2	15.5	40 42.3	+54.3	15.8	41 40.0	+54.5	16.0	42 37.6	+54.7	16.2	70
71	36 46.4	+53.4	14.2	37 44.4	+53.6	14.3	38 42.6	+53.8	14.5	39 40.7	+53.9	14.7	40 38.4	+54.0	15.0	41 36.6	+54.2	15.2	42 34.5	+54.3	15.4	43 32.3	+54.5	15.7	71
72	37 39.8	+53.3	13.6	38 38.1	+53.4	13.8	39 36.4	+53.7	14.0	40 34.6	+53.7	14.2	41 32.7	+53.9	14.4	42 30.8	+54.0	14.6	43 28.8	+54.2	14.9	44 26.8	+54.3	15.1	72
73	38 33.1	+53.1	13.0	39 31.5	+53.2	13.2	40 29.9	+53.4	13.4	41 28.3	+53.5	13.6	42 26.6	+53.6	13.8	43 24.8	+53.8	14.0	44 23.0	+53.9	14.3	45 21.1	+54.1	14.5	73
74	39 26.2	+52.9	12.4	40 24.7	+53.1	12.6	41 23.3	+53.2	12.8	42 21.8	+53.3	13.0	43 20.2	+53.5	13.2	44 18.6	+53.6	13.4	45 17.0	+53.7	13.6	46 15.2	+53.9	13.9	74
75	40 19.1	+52.7	11.8	41 17.8	+52.8	12.0	42 16.5	+52.9	12.2	43 15.1	+53.1	12.3	44 13.7	+53.2	12.6	45 12.2	+53.4	12.8	46 10.7	+53.6	13.0	47 09.1	+53.7	13.2	75
76	41 11.8	+52.4	11.2	42 10.6	+52.6	11.3	43 09.4	+52.8	11.5	44 08.2	+52.9	11.7	45 06.9	+53.0	11.9	46 05.6	+53.2	12.1	47 04.3	+53.3	12.3	48 02.8	+53.5	12.6	76
77	42 04.2	+52.3	10.5	43 03.2	+52.4	10.7	44 02.2	+52.5	10.9	45 01.1	+52.6	11.0	45 59.9	+52.8	11.2	46 58.8	+52.9	11.4	47 57.6	+53.0	11.7	48 56.3	+53.2	11.9	77
78	42 56.5	+52.0	9.8	43 55.6	+52.1	10.0	44 54.7	+52.2	10.2	45 53.7	+52.4	10.4	46 52.7	+52.5	10.5	47 51.7	+52.6	10.7	48 50.6	+52.8	11.0	49 49.5	+52.9	11.2	78
79	43 48.5	+51.8	9.2	44 47.7	+51.9	9.3	45 46.9	+52.0	9.5	46 46.1	+52.1	9.7	47 45.2	+52.3	9.8	48 44.3	+52.4	10.0	49 43.4	+52.5	10.2	50 42.4	+52.7	10.4	79
80	44 40.3	+51.5	8.5	45 39.6	+51.6	8.6	46 38.9	+51.8	8.8	47 38.2	+51.9	8.9	48 37.5	+51.9	9.1	49 36.7	+52.1	9.3	50 35.9	+52.2	9.5	51 35.1	+52.3	9.7	80
81	45 31.8	+51.2	7.7	46 31.2	+51.4	7.9	47 30.7	+51.5	8.0	48 30.1	+51.6	8.2	49 29.4	+51.8	8.3	50 28.8	+51.9	8.5	51 28.1	+52.1	8.7	52 27.4	+52.2	8.9	81
82	46 23.0	+50.9	7.0	47 22.6	+51.0	7.1	48 22.1	+51.1	7.2	49 21.6	+51.2	7.4	50 21.1	+51.3	7.5	51 20.6	+51.4	7.7	52 20.0	+51.5	7.9	53 19.4	+51.7	8.1	82
83	47 13.9	+50.6	6.2	48 13.6	+50.6	6.3	49 13.2	+50.7	6.4	50 12.8	+50.9	6.6	51 12.4	+50.9	6.7	52 12.0	+51.0	6.9	53 11.5	+51.2	7.0	54 11.1	+51.2	7.2	83
84	48 04.5	+50.2	5.5	49 04.2	+50.3	5.6	50 03.9	+50.5	5.8	51 03.7	+50.4	5.9	52 03.3	+50.6	6.0	53 03.0	+50.7	6.1	54 02.7	+50.7	6.2	55 02.3	+50.9	6.3	84
85	48 54.7	+49.9	4.6	49 54.6	+49.9	4.7	50 54.4	+50.0	4.8	51 54.1	+50.1	4.9	52 53.9	+50.2	5.0	53 53.7	+50.2	5.1	54 53.4	+50.4	5.2	55 53.2	+50.4	5.4	85
86	49 44.6	+49.5	3.7	50 44.5	+49.5	3.8	51 44.4	+49.6	3.9	52 44.2	+49.7	4.0	53 44.1	+49.7	4.1	54 43.9	+49.8	4.2	55 43.8	+49.8	4.3	56 43.6	+49.9	4.4	86
87	50 34.1	+49.1	2.8	51 34.0	+49.2	2.8	52 34.0	+49.1	3.0	53 33.9	+49.2	3.0	54 33.8	+49.3	3.1	55 33.7	+49.3	3.2	56 33.6	+49.4	3.3	57 33.5	+49.4	3.4	87
88	51 23.2	+48.6	1.9	52 23.2	+48.6	1.9	53 23.1	+48.7	2.0	54 23.1	+48.7	2.1	55 23.1	+48.7	2.1	56 23.0	+48.8	2.2	57 23.0	+48.8	2.2	58 22.9	+48.9	2.3	88
89	52 11.8	+48.2	1.0	53 11.8	+48.2	1.0	54 11.8	+48.2	1.0	55 11.8	+48.2	1.1	56 11.8	+48.2	1.1	57 11.8	+48.2	1.1	58 11.8	+48.2	1.1	59 11.8	+48.2	1.2	89
90	53 00.0	+47.7	0.0	54 00.0	+47.7	0.0	55 00.0	+47.6	0.0	56 00.0	+47.6	0.0	57 00.0	+47.6	0.0	58 00.0	+47.6	0.0	59 00.0	+47.6	0.0	60 00.0	+47.6	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 143°, 217°

Dec.	53° (Hc / d / Z)	54° (Hc / d / Z)	55° (Hc / d / Z)	56° (Hc / d / Z)	57° (Hc / d / Z)	58° (Hc / d / Z)	59° (Hc / d / Z)	60° (Hc / d / Z)	Dec.
0	28 18.6 +54.4 135.6	27 35.6 +54.7 136.0	26 52.3 +55.0 136.4	26 08.7 +55.4 136.7	25 24.9 +55.7 137.0	24 40.9 +56.0 137.3	23 56.7 +56.2 137.7	23 12.6 +56.5 137.9	0
1	29 13.0 +54.2 135.1	28 30.3 +54.6 135.5	27 47.3 +55.0 135.9	27 04.1 +55.3 136.3	26 20.6 +55.6 136.6	25 36.9 +55.9 136.9	24 52.9 +56.2 137.3	24 08.7 +56.5 137.6	1
2	30 07.2 +54.2 134.7	29 24.9 +54.5 135.1	28 42.3 +54.9 135.5	27 59.4 +55.2 135.8	27 16.2 +55.5 136.2	26 32.8 +55.8 136.5	25 49.1 +56.1 136.9	25 05.2 +56.4 137.2	2
3	31 01.4 +54.0 134.2	30 19.4 +54.4 134.6	29 37.2 +54.7 135.0	28 54.6 +55.1 135.4	28 11.7 +55.5 135.8	27 28.6 +55.8 136.1	26 45.2 +56.1 136.5	26 01.6 +56.3 136.8	3
4	31 55.4 +53.9 133.6	31 13.8 +54.4 134.1	30 31.9 +54.7 134.5	29 49.7 +55.0 134.9	29 07.2 +55.4 135.3	28 24.4 +55.7 135.7	27 41.3 +56.0 136.1	26 57.9 +56.3 136.4	4
5	32 49.3 +53.8 133.1	32 08.2 +54.1 133.6	31 26.6 +54.6 134.0	30 44.7 +55.0 134.5	30 02.6 +55.2 134.9	29 20.1 +55.6 135.3	28 37.3 +55.9 135.7	27 54.2 +56.2 136.1	5
6	33 43.1 +53.7 132.6	33 02.3 +54.1 133.1	32 21.2 +54.4 133.5	31 39.7 +54.8 134.0	30 57.8 +55.2 134.4	30 15.7 +55.5 134.9	29 33.2 +55.8 135.3	28 50.4 +56.2 135.7	6
7	34 36.8 +53.5 132.1	33 56.4 +53.9 132.6	33 15.6 +54.3 133.0	32 34.5 +54.7 133.5	31 53.0 +55.1 134.0	31 11.2 +55.4 134.4	30 29.0 +55.8 134.8	29 46.6 +56.0 135.2	7
8	35 30.3 +53.3 131.5	34 50.3 +53.8 132.0	34 09.9 +54.2 132.5	33 29.2 +54.6 133.0	32 48.1 +54.9 133.5	32 06.6 +55.3 134.0	31 24.8 +55.6 134.4	30 42.6 +56.0 134.8	8
9	36 23.6 +53.2 130.9	35 44.1 +53.6 131.5	35 04.1 +54.1 132.0	34 23.8 +54.4 132.5	33 43.0 +54.9 133.0	33 01.9 +55.2 133.5	32 20.4 +55.6 134.0	31 38.6 +55.9 134.4	9
10	37 16.8 +53.0 130.4	36 37.7 +53.5 130.9	35 58.2 +53.9 131.5	35 18.2 +54.4 132.0	34 37.9 +54.7 132.5	33 57.1 +55.1 133.0	33 16.0 +55.5 133.5	32 34.5 +55.8 134.0	10
11	38 09.8 +52.8 129.8	37 31.2 +53.3 130.4	36 52.1 +53.8 130.9	36 12.6 +54.2 131.5	35 32.6 +54.6 132.0	34 52.2 +55.0 132.6	34 11.5 +55.3 133.1	33 30.3 +55.7 133.5	11
12	39 02.6 +52.7 129.2	38 24.5 +53.1 129.8	37 45.9 +53.6 130.4	37 06.8 +54.0 131.0	36 27.2 +54.5 131.5	35 47.2 +54.9 132.1	35 06.8 +55.3 132.6	34 26.0 +55.6 133.1	12
13	39 55.3 +52.4 128.5	39 17.6 +53.0 129.2	38 39.5 +53.4 129.8	38 00.8 +53.9 130.4	37 21.7 +54.3 131.0	36 42.1 +54.7 131.6	36 02.1 +55.1 132.1	35 21.6 +55.5 132.6	13
14	40 47.7 +52.2 127.9	40 10.6 +52.7 128.6	39 32.9 +53.2 129.2	38 54.7 +53.7 129.9	38 16.0 +54.2 130.5	37 36.8 +54.6 131.1	36 57.2 +55.0 131.6	36 17.1 +55.4 132.2	14
15	41 39.9 +52.0 127.2	41 03.3 +52.6 127.9	40 26.1 +53.1 128.6	39 48.4 +53.6 129.3	39 10.2 +54.0 129.9	38 31.4 +54.5 130.5	37 52.2 +54.9 131.1	37 12.5 +55.3 131.7	15
16	42 31.9 +51.7 126.6	41 55.9 +52.3 127.3	41 19.2 +52.9 128.0	40 42.0 +53.3 128.7	40 04.2 +53.9 129.3	39 25.9 +54.3 130.0	38 47.1 +54.7 130.6	38 07.8 +55.2 131.2	16
17	43 23.6 +51.5 125.9	42 48.2 +52.0 126.6	42 12.1 +52.6 127.4	41 35.3 +53.2 128.1	40 58.1 +53.6 128.8	40 20.2 +54.2 129.4	39 41.8 +54.6 130.1	39 03.0 +55.0 130.7	17
18	44 15.1 +51.2 125.2	43 40.2 +51.9 126.0	43 04.7 +52.4 126.7	42 28.5 +53.0 127.5	41 51.7 +53.5 128.2	41 14.4 +53.9 128.9	40 36.4 +54.5 129.5	39 58.0 +54.9 130.2	18
19	45 06.3 +51.0 124.4	44 32.1 +51.5 125.2	43 57.1 +52.2 126.0	43 21.5 +52.7 126.8	42 45.2 +53.3 127.6	42 08.3 +53.8 128.3	41 30.9 +54.2 129.0	40 52.9 +54.7 129.7	19
20	45 57.3 +50.6 123.7	45 23.6 +51.3 124.5	44 49.3 +51.9 125.4	44 14.2 +52.5 126.1	43 38.5 +53.0 126.9	43 02.1 +53.6 127.7	42 25.1 +54.1 128.4	41 47.6 +54.5 129.1	20
21	46 47.9 +50.3 122.9	46 14.9 +51.0 123.8	45 41.2 +51.6 124.6	45 06.7 +52.2 125.5	44 31.5 +52.9 126.3	43 55.7 +53.4 127.1	43 19.2 +53.9 127.8	42 42.1 +54.4 128.5	21
22	47 38.2 +49.9 122.1	47 05.9 +50.6 123.0	46 32.8 +51.3 123.9	45 58.9 +52.0 124.8	45 24.4 +52.6 125.6	44 49.1 +53.2 126.4	44 13.1 +53.7 127.2	43 36.5 +54.3 128.0	22
23	48 28.1 +49.6 121.3	47 56.5 +50.3 122.2	47 24.1 +51.1 123.1	46 50.9 +51.7 124.0	46 17.0 +52.3 124.9	45 42.3 +52.9 125.8	45 06.8 +53.5 126.6	44 30.8 +54.0 127.4	23
24	49 17.7 +49.1 120.4	48 46.8 +50.0 121.4	48 15.2 +50.7 122.4	47 42.6 +51.4 123.3	47 09.3 +52.1 124.2	46 35.2 +52.7 125.1	46 00.3 +53.3 125.9	45 24.8 +53.8 126.8	24
25	50 06.8 +48.8 119.5	49 36.8 +49.6 120.6	49 05.9 +50.3 121.6	48 34.0 +51.1 122.5	48 01.4 +51.7 123.5	47 27.9 +52.4 124.4	46 53.6 +53.0 125.3	46 18.6 +53.6 126.1	25
26	50 55.6 +48.3 118.6	50 26.4 +49.1 119.7	49 56.2 +50.0 120.7	49 25.1 +50.7 121.7	48 53.1 +51.5 122.7	48 20.3 +52.1 123.6	47 46.6 +52.8 124.6	47 12.2 +53.4 125.5	26
27	51 43.9 +47.8 117.7	51 15.5 +48.8 118.8	50 46.2 +49.5 119.8	50 15.8 +50.4 120.9	49 44.6 +51.1 121.9	49 12.4 +51.8 122.9	48 39.4 +52.5 123.9	48 05.6 +53.1 124.8	27
28	52 31.7 +47.4 116.7	52 04.3 +48.2 117.8	51 35.7 +49.2 118.9	51 06.2 +50.0 120.0	50 35.7 +50.8 121.1	50 04.2 +51.6 122.1	49 31.9 +52.2 123.1	48 58.7 +52.9 124.1	28
29	53 19.1 +46.8 115.7	52 52.5 +47.8 116.9	52 24.9 +48.7 118.0	51 56.2 +49.5 119.1	51 26.5 +50.4 120.2	50 55.8 +51.1 121.3	50 24.1 +51.9 122.4	49 51.6 +52.5 123.4	29
30	54 05.9 +46.2 114.6	53 40.3 +47.2 115.8	53 13.6 +48.2 117.0	52 45.7 +49.2 118.2	52 16.8 +50.0 119.4	51 46.9 +50.8 120.5	51 16.0 +51.5 121.6	50 44.1 +52.3 122.6	30
31	54 52.1 +45.6 113.5	54 27.5 +46.7 114.8	54 01.8 +47.7 116.0	53 34.9 +48.6 117.3	53 06.8 +49.6 118.5	52 37.7 +50.4 119.6	52 07.5 +51.2 120.7	51 36.4 +51.9 121.8	31
32	55 37.7 +44.9 112.4	55 14.2 +46.1 113.7	54 49.5 +47.1 115.0	54 23.5 +48.1 116.3	53 56.4 +49.0 117.5	53 28.1 +50.0 118.7	52 58.7 +50.8 119.9	52 28.3 +51.6 121.0	32
33	56 22.6 +44.2 111.2	56 00.3 +45.4 112.6	55 36.6 +46.5 113.9	55 11.6 +47.6 115.2	54 45.4 +48.6 116.5	54 18.1 +49.5 117.8	53 49.5 +50.4 119.0	53 19.9 +51.3 120.2	33
34	57 06.8 +43.5 109.9	56 45.7 +44.7 111.4	56 23.1 +45.9 112.8	55 59.2 +47.0 114.2	55 34.0 +48.0 115.5	55 07.6 +49.0 116.8	54 39.9 +50.0 118.1	54 11.2 +50.9 119.3	34
35	57 50.3 +42.7 108.7	57 30.4 +43.9 110.2	57 09.0 +45.2 111.6	56 46.2 +46.3 113.0	56 22.0 +47.3 114.4	55 56.6 +48.5 115.8	55 29.9 +49.5 117.1	55 02.0 +50.4 118.4	35
36	58 33.0 +41.8 107.3	58 14.3 +43.2 108.9	57 54.2 +44.4 110.4	57 32.5 +45.7 111.9	57 09.5 +46.8 113.3	56 45.1 +47.9 114.7	56 19.4 +48.9 116.1	55 52.4 +49.9 117.4	36
37	59 14.8 +40.9 105.9	58 57.5 +42.3 107.5	58 38.6 +43.7 109.1	58 18.2 +45.0 110.6	57 56.3 +46.2 112.1	57 33.0 +47.3 113.6	57 08.3 +48.4 115.0	56 42.3 +49.4 116.4	37
38	59 55.7 +39.8 104.5	59 39.8 +41.4 106.2	59 22.3 +42.8 107.8	59 03.2 +44.1 109.4	58 42.5 +45.5 110.9	58 20.3 +46.7 112.4	57 56.7 +47.8 113.9	57 31.7 +48.9 115.4	38
39	60 35.5 +38.9 103.0	60 21.2 +40.4 104.7	60 05.1 +41.9 106.4	59 47.3 +43.4 108.0	59 28.0 +44.6 109.7	59 07.0 +46.0 111.2	58 44.5 +47.2 112.8	58 20.6 +48.3 114.3	39
40	61 14.4 +37.7 101.4	61 01.6 +39.3 103.2	60 47.0 +40.9 104.9	60 30.7 +42.4 106.6	60 12.6 +43.9 108.3	59 53.0 +45.2 110.0	59 31.7 +46.5 111.6	59 08.9 +47.7 113.1	40
41	61 52.1 +36.5 99.8	61 40.9 +38.2 101.6	61 27.9 +39.9 103.4	61 13.1 +41.4 105.2	60 56.5 +42.9 106.9	60 38.2 +44.3 108.6	60 18.2 +45.7 110.3	59 56.6 +46.9 111.9	41
42	62 28.6 +35.2 98.1	62 19.1 +37.0 100.0	62 07.8 +38.7 101.8	61 54.5 +40.4 103.7	61 39.4 +42.0 105.5	61 22.5 +43.5 107.2	61 03.9 +44.9 109.0	60 43.5 +46.3 110.7	42
43	63 03.8 +33.8 96.3	62 56.1 +35.8 98.3	62 46.5 +37.6 100.2	62 34.9 +39.3 102.1	62 21.4 +41.0 104.0	62 06.0 +42.5 105.8	61 48.8 +44.0 107.6	61 29.8 +45.4 109.3	43
44	63 37.6 +32.3 94.5	63 31.9 +34.3 96.5	63 24.1 +36.2 98.5	63 14.2 +38.1 100.4	63 02.4 +39.8 102.4	62 48.5 +41.5 104.3	62 32.8 +43.1 106.1	62 15.2 +44.6 108.0	44
45	64 09.9 +30.8 92.6	64 06.2 +32.8 94.6	64 00.3 +34.8 96.7	63 52.3 +36.7 98.7	63 42.2 +38.5 100.7	63 30.0 +40.4 102.7	63 15.9 +42.0 104.6	62 59.8 +43.6 106.5	45
46	64 40.7 +29.1 90.6	64 39.0 +31.3 92.7	64 35.1 +33.3 94.8	64 29.0 +35.4 96.9	64 20.7 +37.3 98.9	64 10.4 +39.1 101.0	63 57.9 +40.9 103.0	63 43.4 +42.6 105.0	46
47	65 09.8 +27.4 88.5	65 10.3 +29.5 90.7	65 08.4 +31.8 92.8	65 04.4 +33.8 95.0	64 58.0 +35.9 97.1	64 49.5 +37.8 99.2	64 38.8 +39.7 101.3	64 26.0 +41.5 103.4	47
48	65 37.2 +25.5 86.4	65 39.8 +27.8 88.6	65 40.2 +30.0 90.8	65 38.2 +32.2 93.0	65 33.9 +34.4 95.2	65 27.3 +36.4 97.4	65 18.5 +38.4 99.5	65 07.5 +40.2 101.7	48
49	66 02.7 +23.5• 84.2	66 07.6 +25.9 86.4	66 10.2 +28.2 88.7	66 10.4 +30.5 90.9	66 08.3 +32.7 93.2	66 03.7 +34.9 95.4	65 56.9 +37.0 97.7	65 47.7 +39.0 99.9	49
50	66 26.2 +21.5• 81.9	66 33.5 +23.9• 84.2	66 38.4 +26.3 86.5	66 40.9 +28.7 88.8	66 41.0 +31.0 91.1	66 38.6 +33.3 93.4	66 33.9 +35.4 95.7	66 26.7 +37.5 98.0	50
51	66 47.7 +19.3• 79.5	66 57.4 +21.8• 81.8	67 04.7 +24.3• 84.2	67 09.6 +26.7• 86.5	67 12.0 +29.1 88.9	67 11.9 +31.5 91.3	67 09.3 +33.8 93.7	67 04.2 +36.0 96.0	51
52	67 07.0 +17.1• 77.1	67 19.2 +19.6• 79.4	67 29.0 +22.1• 81.8	67 36.3 +24.7• 84.2	67 41.1 +27.1• 86.6	67 43.4 +29.6• 89.1	67 43.1 +31.9 91.5	67 40.2 +34.3 93.9	52
53	67 24.1 +14.7• 74.6	67 38.8 +17.3• 77.0	67 51.1 +19.9• 79.4	68 01.0 +22.4• 81.8	68 08.2 +25.1• 84.3	68 13.0 +27.5• 86.8	68 15.0 +30.1 89.3	68 14.5 +32.5 91.8	53
54	67 38.8 +12.3• 72.1	67 56.1 +14.9• 74.4	68 11.0 +17.5• 76.8	68 23.4 +20.1• 79.3	68 33.3 +22.7• 81.8	68 40.5 +25.4• 84.3	68 45.1 +28.0• 86.9	68 47.0 +30.6• 89.5	54
55	67 51.1 +9.9• 69.5	68 11.0 +12.4• 71.8	68 28.5 +15.0• 74.2	68 43.5 +17.8• 76.7	68 56.0 +20.5• 79.2	69 05.9 +23.1• 81.8	69 13.1 +25.8• 84.4	69 17.6 +28.4• 87.1	55
56	68 01.0 +7.2• 66.9	68 23.4 +9.9• 69.2	68 43.5 +12.5• 71.6	69 01.3 +15.2• 74.1	69 16.5 +17.9• 76.6	69 29.0 +20.7• 79.2	69 38.9 +23.4• 81.9	69 46.0 +26.2• 84.5	56
57	68 08.2 +4.8• 64.2	68 33.3 +7.2• 66.5	68 56.0 +9.9• 68.9	69 16.5 +12.5• 71.4	69 34.4 +15.3• 73.9	69 49.7 +18.1• 76.5	70 02.3 +21.0• 79.2	70 12.2 +23.8• 81.9	57
58	68 13.0 +2.0• 61.5	68 40.5 +4.6• 63.8	69 05.9 +7.2• 66.1	69 29.0 +9.9• 68.6	69 49.7 +12.6• 71.1	70 07.8 +15.5• 73.7	70 23.3 +18.3• 76.4	70 36.0 +21.2• 79.2	58
59	68 15.0 −0.5• 58.8	68 45.1 +1.9• 61.0	69 13.1 +4.5• 63.3	69 38.9 +7.1• 65.7	70 02.3 +9.9• 68.3	70 23.3 +12.7• 70.9	70 41.6 +15.6• 73.6	70 57.2 +18.6• 76.3	59
60	68 14.5 −3.1• 56.1	68 47.0 −0.8• 58.3	69 17.6 +1.7• 60.5	69 46.0 +4.3• 62.9	70 12.2 +7.0• 65.4	70 36.0 +9.8• 67.9	70 57.2 +12.8• 70.6	71 15.8 +15.7• 73.4	60
61	68 11.4 −5.8• 53.5	68 46.2 −3.5• 55.5	69 19.3 −1.1• 57.7	69 50.3 +1.5• 60.0	70 19.2 +4.1• 62.4	70 45.8 +6.9• 65.0	71 10.0 +9.7• 67.6	71 31.5 +12.7• 70.4	61
62	68 05.6 −8.3• 50.8	68 42.7 −6.1• 52.8	69 18.2 −3.9• 54.9	69 51.8 −1.5• 57.1	70 23.3 +1.2• 59.4	70 52.7 +3.9• 61.9	71 19.7 +6.8• 64.5	71 44.2 +9.7• 67.3	62
63	67 57.3 −10.8• 48.1	68 36.6 −8.8• 50.0	69 14.3 −6.6• 52.0	69 50.3 −4.2• 54.2	70 24.5 −1.8• 56.5	70 56.6 +0.8• 58.9	71 26.5 +3.6• 61.4	71 53.9 +6.6• 64.1	63
64	67 46.5 −13.3• 45.5	68 27.8 −11.3• 47.3	69 07.7 −9.2• 49.2	69 46.1 −7.1• 51.3	70 22.7 −4.7• 53.5	70 57.4 −2.1• 55.8	71 30.1 +0.5• 58.3	72 00.5 +3.3• 60.9	64
65	67 33.2 −15.7• 43.0	68 16.5 −13.9• 44.7	68 58.5 −11.9• 46.5	69 39.0 −9.8• 48.4	70 18.0 −7.6• 50.5	70 55.3 −5.2• 52.8	71 30.6 −2.6• 55.1	72 03.8 +0.1• 57.7	65
66	67 17.5 −18.0• 40.4	68 02.6 −16.3• 42.0	68 46.6 −14.5• 43.8	69 29.2 −12.5• 45.6	70 10.4 −10.4• 47.6	70 50.1 −8.2• 49.7	71 28.0 −5.7• 52.0	72 03.9 −3.1• 54.4	66
67	66 59.5 −20.2• 38.0	67 46.3 −18.6• 39.5	68 32.1 −17.0• 41.1	69 16.7 −15.2• 42.8	70 00.0 −13.2• 44.7	70 41.9 −11.0• 46.7	71 22.3 −8.8• 48.9	72 00.8 −6.3• 51.2	67
68	66 39.3 −22.3• 35.6	67 27.7 −20.9• 37.0	68 15.1 −19.3• 38.5	69 01.5 −17.6• 40.1	69 46.8 −15.8• 41.9	70 30.9 −13.9• 43.7	71 13.5 −11.8• 45.8	71 54.5 −9.5• 48.0	68
69	66 17.0 −24.4 33.3	67 06.8 −23.1• 34.6	67 55.8 −21.7• 36.0	68 43.9 −20.1• 37.5	69 31.0 −18.5• 39.1	70 17.0 −16.7• 40.8	71 01.7 −14.7• 42.7	71 45.0 −12.5• 44.8	69
70	65 52.6 −26.2 31.0	66 43.7 −25.1 32.2	67 34.1 −23.8• 33.5	68 23.8 −22.4 34.9	69 12.5 −20.9• 36.4	70 00.3 −19.2• 38.0	70 47.0 −17.4• 39.8	71 32.5 −15.5• 41.7	70
71	65 26.4 −28.1 28.8	66 18.6 −27.0 29.9	67 10.3 −25.8• 31.1	68 01.4 −24.6• 32.4	68 51.6 −23.2• 33.8	69 41.1 −21.8• 35.3	70 29.6 −20.1• 36.9	71 17.0 −18.3• 38.7	71
72	64 58.3 −29.8 26.7	65 51.6 −28.8 27.7	66 44.5 −27.8 28.8	67 36.8 −26.7• 30.0	68 28.4 −25.4• 31.2	69 19.3 −24.1• 32.6	70 09.5 −22.7• 34.1	70 58.7 −21.1• 35.7	72
73	64 28.5 −31.5 24.7	65 22.8 −30.6 25.6	66 16.7 −29.7 26.6	67 10.1 −28.7 27.6	68 03.0 −27.6• 28.8	68 55.2 −26.3• 30.0	69 46.8 −25.0• 31.4	70 37.6 −23.6• 32.9	73
74	63 57.0 −32.9 22.7	64 52.2 −32.2 23.6	65 47.0 −31.4 24.4	66 41.4 −30.4 25.4	67 35.4 −29.5 26.4	68 28.9 −28.5• 27.6	69 21.8 −27.3• 28.8	70 14.0 −26.0• 30.1	74
75	63 24.1 −34.4 20.8	64 20.0 −33.7 21.6	65 15.6 −32.9 22.4	66 11.0 −32.2 23.2	67 05.9 −31.4 24.2	68 00.4 −30.4 25.2	68 54.5 −29.4• 26.3	69 48.0 −28.3• 27.5	75
76	62 49.7 −35.7 19.0	63 46.3 −35.1 19.7	64 42.7 −34.5 20.4	65 38.8 −33.9 21.2	66 34.5 −33.0 22.0	67 30.0 −32.3 22.9	68 25.1 −31.4 23.9	69 19.7 −30.4• 25.0	76
77	62 14.0 −37.0 17.3	63 11.2 −36.5 17.9	64 08.2 −36.0 18.5	65 04.9 −35.3 19.2	66 01.5 −34.7 19.9	66 57.7 −33.9 20.7	67 53.7 −33.2 21.6	68 49.3 −32.4 22.5	77
78	61 37.0 −38.2 15.6	62 34.7 −37.7 16.1	63 32.2 −37.2 16.7	64 29.6 −36.7 17.3	65 26.8 −36.2 17.9	66 23.8 −35.6 18.6	67 20.5 −34.9 19.4	68 16.9 −34.1 20.2	78
79	60 58.8 −39.3 14.0	61 57.0 −38.9 14.5	62 55.0 −38.5 15.0	63 52.9 −38.0 15.5	64 50.6 −37.5 16.0	65 48.2 −37.0 16.7	66 45.6 −36.5 17.3	67 42.8 −35.9 18.0	79
80	60 19.5 −40.3 12.5	61 18.1 −40.0 12.9	62 16.5 −39.6 13.3	63 14.9 −39.3 13.7	64 13.1 −38.9 14.2	65 11.2 −38.4 14.8	66 09.1 −37.9 15.3	67 06.9 −37.4 16.0	80
81	59 39.2 −41.2 11.0	60 38.1 −41.0 11.3	61 36.9 −40.7 11.7	62 35.6 −40.4 12.1	63 34.2 −40.0 12.5	64 32.8 −39.7 12.9	65 31.2 −39.3 13.4	66 29.5 −38.9 14.0	81
82	58 58.0 −42.2 9.6	59 57.1 −41.9 9.9	60 56.2 −41.7 10.2	61 55.2 −41.4 10.5	62 54.2 −41.2 10.8	63 53.1 −40.9 11.2	64 51.9 −40.5 11.6	65 50.6 −40.2 12.1	82
83	58 15.8 −43.0 8.2	59 15.2 −42.8 8.4	60 14.5 −42.6 8.7	61 13.8 −42.4 9.0	62 13.0 −42.1 9.3	63 12.2 −41.9 9.6	64 11.4 −41.7 9.9	65 10.4 −41.4 10.3	83
84	57 32.8 −43.8 6.9	58 32.4 −43.7 7.1	59 31.9 −43.5 7.3	60 30.9 −43.2 7.5	61 30.9 −42.9 7.8	62 30.3 −42.9 8.0	63 29.0 −42.7 8.3	64 29.2 −42.2 8.6	84
85	56 49.0 −44.5 5.6	57 48.7 −44.4 5.8	58 48.4 −44.3 5.9	59 48.1 −44.2 6.1	60 47.7 −44.0 6.3	61 47.4 −43.9 6.5	62 47.0 −43.8 6.7	63 46.5 −43.5 7.0	85
86	56 04.5 −45.2 4.4	57 04.3 −45.1 4.5	58 04.1 −45.0 4.7	59 03.9 −44.9 4.8	60 03.7 −44.8 4.9	61 03.5 −44.7 5.1	62 03.2 −44.6 5.3	63 03.0 −44.5 5.4	86
87	55 19.3 −45.8 3.2	56 19.1 −45.7 3.3	57 19.1 −45.7 3.4	58 19.0 −45.7 3.5	59 18.9 −45.6 3.6	60 18.8 −45.6 3.7	61 18.6 −45.4 3.8	62 18.5 −45.4 4.0	87
88	54 33.5 −46.5 2.1	55 33.4 −46.4 2.2	56 33.4 −46.4 2.2	57 33.3 −46.3 2.3	58 33.3 −46.3 2.4	59 33.2 −46.2 2.4	60 33.2 −46.3 2.5	61 33.1 −46.2 2.6	88
89	53 47.0 −47.0 1.0	54 47.0 −47.0 1.1	55 47.0 −47.0 1.1	56 47.0 −47.0 1.1	57 47.0 −47.0 1.2	58 47.0 −47.0 1.2	59 46.9 −46.9 1.2	60 46.9 −46.9 1.3	89
90	53 00.0 −47.5 0.0	54 00.0 −47.5 0.0	55 00.0 −47.6 0.0	56 00.0 −47.6 0.0	57 00.0 −47.6 0.0	58 00.0 −47.6 0.0	59 00.0 −47.6 0.0	60 00.0 −47.6 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

38°, 322° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	28 18.6	−54.5	135.6	27 35.6	−54.9	136.0	26 52.3	−55.2	136.4	26 08.7	−55.4	136.7	25 24.9	−55.7	137.0	24 40.9	−56.0	137.3	23 56.7	−56.3	137.7	23 12.2	−56.5	137.9	0
1	27 24.1	−54.6	136.1	26 40.7	−54.9	136.5	25 57.1	−55.5	137.1	25 13.3	−55.5	137.1	24 29.2	−55.8	137.4	23 44.9	−56.1	137.7	23 00.4	−56.4	138.0	22 15.7	−56.6	138.3	1
2	26 29.5	−54.6	136.6	25 45.8	−54.9	136.9	25 01.9	−55.3	137.2	24 17.8	−55.6	137.5	23 33.4	−55.9	137.8	22 48.8	−56.1	138.1	22 04.0	−56.4	138.4	21 19.1	−56.7	138.7	2
3	25 34.9	−54.8	137.0	24 50.9	−55.1	137.3	24 06.6	−55.3	137.7	23 22.2	−55.7	138.0	22 37.5	−55.9	138.2	21 52.7	−56.2	138.5	21 07.6	−56.4	138.8	20 22.4	−56.7	139.0	3
4	24 40.1	−54.8	137.5	23 55.8	−55.1	137.8	23 11.3	−55.5	138.1	22 26.5	−55.7	138.4	21 41.6	−56.0	138.6	20 56.5	−56.3	138.9	20 11.2	−56.5	139.1	19 25.7	−56.7	139.4	4
5	23 45.3	−54.9	137.9	23 00.7	−55.2	138.2	22 15.8	−55.5	138.5	21 30.8	−55.8	138.8	20 45.6	−56.0	139.0	20 00.2	−56.3	139.3	19 14.7	−56.6	139.5	18 29.0	−56.8	139.7	5
6	22 50.4	−55.0	138.4	22 05.5	−55.3	138.6	21 20.3	−55.5	138.9	20 35.0	−55.8	139.2	19 49.6	−56.1	139.4	19 03.9	−56.3	139.6	18 18.1	−56.5	139.8	17 32.2	−56.8	140.0	6
7	21 55.4	−55.0	138.8	21 10.2	−55.3	139.1	20 24.8	−55.6	139.3	19 39.2	−55.9	139.5	18 53.5	−56.1	139.8	18 07.6	−56.4	140.0	17 21.6	−56.6	140.2	16 35.4	−56.8	140.4	7
8	21 00.4	−55.1	139.2	20 14.9	−55.5	139.5	19 29.2	−55.7	139.7	18 43.3	−55.9	139.9	17 57.4	−56.2	140.1	17 11.2	−56.4	140.3	16 25.0	−56.7	140.5	15 38.6	−56.9	140.7	8
9	20 05.3	−55.2	139.6	19 19.5	−55.5	139.9	18 33.5	−55.7	140.1	17 47.4	−55.9	140.3	17 01.2	−56.2	140.5	16 14.8	−56.4	140.7	15 28.3	−56.7	140.9	14 41.7	−56.9	141.0	9
10	19 10.1	−55.2	140.1	18 24.0	−55.5	140.3	17 37.8	−55.7	140.5	16 51.5	−56.0	140.7	16 05.0	−56.3	140.9	15 18.4	−56.5	141.1	14 31.6	−56.7	141.2	13 44.8	−56.9	141.4	10
11	18 14.9	−55.3	140.5	17 28.5	−55.5	140.7	16 42.1	−55.8	140.9	15 55.5	−56.1	141.1	15 08.7	−56.3	141.2	14 21.9	−56.5	141.4	13 34.9	−56.6	141.6	12 47.9	−56.9	141.7	11
12	17 19.6	−55.3	140.9	16 33.0	−55.6	141.1	15 46.3	−55.9	141.3	14 59.4	−56.1	141.4	14 12.4	−56.3	141.6	13 25.4	−56.6	141.7	12 38.2	−56.7	141.9	11 51.0	−57.0	142.0	12
13	16 24.3	−55.4	141.3	15 37.4	−55.6	141.5	14 50.4	−55.8	141.8	14 03.3	−56.1	141.8	13 16.1	−56.3	142.0	12 28.8	−56.5	142.1	11 41.5	−56.8	142.2	10 54.0	−57.0	142.3	13
14	15 28.9	−55.4	141.7	14 41.8	−55.7	141.9	13 54.6	−55.9	142.0	13 07.2	−56.1	142.2	12 19.8	−56.4	142.3	11 32.3	−56.6	142.4	10 44.7	−56.8	142.6	9 57.0	−57.0	142.7	14
15	14 33.5	−55.4	142.1	13 46.1	−55.7	142.2	12 58.7	−56.0	142.4	12 11.1	−56.2	142.5	11 23.4	−56.4	142.7	10 35.7	−56.6	142.8	9 47.9	−56.8	142.9	9 00.0	−57.0	143.0	15
16	13 38.1	−55.5	142.5	12 50.4	−55.7	142.6	12 02.7	−55.9	142.8	11 14.9	−56.2	142.9	10 27.0	−56.4	143.0	9 39.1	−56.6	143.1	8 51.1	−56.9	143.2	8 03.0	−57.0	143.3	16
17	12 42.6	−55.5	142.9	11 54.7	−55.7	143.0	11 06.8	−56.0	143.1	10 18.7	−56.2	143.2	9 30.6	−56.4	143.3	8 42.5	−56.7	143.4	7 54.2	−56.8	143.5	7 06.0	−57.1	143.6	17
18	11 47.1	−55.6	143.3	10 59.0	−55.8	143.4	10 10.8	−56.1	143.5	9 22.5	−56.2	143.6	8 34.2	−56.5	143.7	7 45.8	−56.7	143.8	6 57.4	−56.9	143.9	6 08.9	−57.1	143.9	18
19	10 51.5	−55.6	143.6	10 03.2	−55.8	143.8	9 14.7	−56.0	143.9	8 26.3	−56.3	144.0	7 37.7	−56.4	144.0	6 49.1	−56.6	144.1	6 00.5	−56.9	144.2	5 11.8	−57.0	144.2	19
20	9 55.9	−55.6	144.0	9 07.4	−55.9	144.1	8 18.7	−56.1	144.2	7 30.0	−56.3	144.3	6 41.3	−56.5	144.4	5 52.5	−56.7	144.4	5 03.6	−56.9	144.5	4 14.8	−57.1	144.5	20
21	9 00.3	−55.6	144.4	8 11.5	−55.8	144.5	7 22.6	−56.0	144.6	6 33.7	−56.3	144.7	5 44.8	−56.5	144.7	4 55.8	−56.7	144.8	4 06.8	−56.9	144.8	3 17.7	−57.1	144.8	21
22	8 04.7	−55.6	144.8	7 15.7	−55.9	144.9	6 26.6	−56.1	144.9	5 37.4	−56.3	145.1	4 48.3	−56.5	145.1	3 59.1	−56.7	145.1	3 09.9	−56.9	145.1	2 20.6	−57.1	145.2	22
23	7 09.1	−55.7	145.2	6 19.8	−55.9	145.2	5 30.5	−56.1	145.3	4 41.1	−56.3	145.3	3 51.8	−56.5	145.4	3 02.4	−56.7	145.4	2 13.0	−56.9	145.4	1 23.5	−57.1	145.5	23
24	6 13.4	−55.7	145.5	5 23.9	−55.9	145.6	4 34.4	−56.1	145.7	3 44.8	−56.3	145.7	2 55.3	−56.6	145.7	2 05.7	−56.7	145.7	1 16.1	−56.9	145.8	0 26.5	−57.1	145.8	24
25	5 17.7	−55.7	145.9	4 28.0	−55.9	146.0	3 38.3	−56.2	146.0	2 48.5	−56.3	146.1	1 58.7	−56.5	146.1	1 09.0	−56.8	146.1	0 19.2	−56.9	146.1	0 30.6	+57.1	33.9	25
26	4 22.0	−55.7	146.3	3 32.1	−56.0	146.3	2 42.1	−56.1	146.4	1 52.2	−56.3	146.4	1 02.2	−56.5	146.4	0 12.2	−56.7	146.4	0 37.7	+56.9	33.6	1 27.7	+57.1	33.6	26
27	3 26.3	−55.7	146.7	2 36.2	−56.0	146.7	1 46.0	−56.1	146.7	0 55.9	−56.4	146.7	0 05.7	−56.5	146.7	0 44.5	+56.7	33.3	1 34.6	+56.9	33.3	2 24.8	+57.1	33.3	27
28	2 30.6	−55.7	147.0	1 40.2	−55.9	147.1	0 49.9	−56.2	147.1	0 00.5	+56.3	32.9	0 50.8	+56.6	32.9	1 41.2	+56.7	32.9	2 31.5	+56.9	33.0	3 21.9	+57.0	33.0	28
29	1 34.9	−55.8	147.4	0 44.3	−55.9	147.4	0 06.3	+56.1	32.6	0 56.8	+56.3	32.6	1 47.4	+56.5	32.6	2 37.9	+56.7	32.6	3 28.4	+56.9	32.6	4 18.9	+57.1	32.7	29
30	0 39.1	−55.7	147.8	0 11.6	+56.0	32.2	1 02.4	+56.1	32.2	1 53.1	+56.4	32.2	2 43.9	+56.5	32.3	3 34.6	+56.7	32.3	4 25.3	+56.9	32.3	5 16.0	+57.1	32.4	30
31	0 16.6	+55.7	31.9	1 07.6	+55.9	31.9	1 58.5	+56.1	31.9	2 49.5	+56.3	31.9	3 40.4	+56.5	31.9	4 31.3	+56.7	32.0	5 22.2	+56.9	32.0	6 13.1	+57.0	32.1	31
32	1 12.3	+55.8	31.5	2 03.5	+55.9	31.5	2 54.6	+56.2	31.5	3 45.8	+56.3	31.5	4 36.9	+56.5	31.6	5 28.0	+56.7	31.6	6 19.1	+56.9	31.7	7 10.1	+57.0	31.8	32
33	2 08.1	+55.7	31.1	2 59.4	+55.9	31.1	3 50.8	+56.1	31.2	4 42.1	+56.3	31.2	5 33.4	+56.5	31.3	6 24.7	+56.7	31.3	7 15.9	+56.9	31.4	8 07.1	+57.1	31.4	33
34	3 03.8	+55.7	30.7	3 55.3	+55.9	30.8	4 46.9	+56.1	30.8	5 38.4	+56.3	30.9	6 29.9	+56.5	30.9	7 21.4	+56.6	31.0	8 12.8	+56.8	31.0	9 04.2	+57.0	31.1	34
35	3 59.5	+55.7	30.4	4 51.2	+55.9	30.4	5 43.0	+56.1	30.5	6 34.7	+56.3	30.5	7 26.4	+56.4	30.6	8 18.0	+56.6	30.6	9 09.6	+56.8	30.7	10 01.2	+56.9	30.8	35
36	4 55.2	+55.7	30.0	5 47.1	+55.9	30.0	6 39.1	+56.0	30.1	7 31.0	+56.2	30.2	8 22.8	+56.5	30.2	9 14.6	+56.6	30.3	10 06.4	+56.8	30.4	10 58.1	+57.0	30.5	36
37	5 50.9	+55.7	29.6	6 43.0	+55.9	29.7	7 35.1	+56.1	29.7	8 27.2	+56.3	29.8	9 19.3	+56.4	29.9	10 11.3	+56.6	30.0	11 03.2	+56.8	30.0	11 55.1	+57.0	30.2	37
38	6 46.6	+55.6	29.2	7 38.9	+55.8	29.3	8 31.2	+56.0	29.4	9 23.5	+56.2	29.5	10 15.7	+56.4	29.5	11 07.9	+56.5	29.6	12 00.0	+56.7	29.7	12 52.1	+56.9	29.8	38
39	7 42.2	+55.6	28.9	8 34.7	+55.9	28.9	9 27.2	+56.0	29.0	10 19.7	+56.2	29.1	11 12.1	+56.3	29.2	12 04.4	+56.6	29.3	12 56.7	+56.8	29.4	13 49.0	+56.9	29.5	39
40	8 37.8	+55.7	28.5	9 30.6	+55.8	28.6	10 23.2	+56.0	28.7	11 15.9	+56.1	28.7	12 08.4	+56.4	28.8	13 01.0	+56.5	29.0	13 53.5	+56.6	29.1	14 45.9	+56.8	29.2	40
41	9 33.5	+55.6	28.1	10 26.4	+55.7	28.2	11 19.2	+56.0	28.3	12 12.0	+56.2	28.4	13 04.8	+56.3	28.5	13 57.5	+56.5	28.6	14 50.1	+56.7	28.7	15 42.7	+56.9	28.8	41
42	10 29.1	+55.5	27.7	11 22.1	+55.8	27.8	12 15.2	+55.9	27.9	13 08.2	+56.1	28.0	14 01.1	+56.3	28.1	14 54.0	+56.5	28.3	15 46.8	+56.6	28.4	16 39.6	+56.8	28.5	42
43	11 24.6	+55.6	27.3	12 17.9	+55.7	27.4	13 11.1	+55.9	27.5	14 04.3	+56.1	27.7	14 57.4	+56.3	27.8	15 50.5	+56.4	27.9	16 43.4	+56.6	28.0	17 36.4	+56.7	28.2	43
44	12 20.2	+55.5	27.0	13 13.6	+55.7	27.1	14 07.0	+55.8	27.2	15 00.4	+56.0	27.3	15 53.7	+56.2	27.4	16 46.9	+56.4	27.6	17 40.0	+56.6	27.7	18 33.1	+56.8	27.8	44
45	13 15.7	+55.4	26.6	14 09.3	+55.6	26.7	15 02.9	+55.8	26.8	15 56.4	+56.0	26.9	16 49.9	+56.1	27.1	17 43.3	+56.3	27.2	18 36.6	+56.5	27.3	19 29.9	+56.7	27.5	45
46	14 11.1	+55.4	26.2	15 04.9	+55.6	26.3	15 58.7	+55.8	26.4	16 52.4	+56.0	26.5	17 46.0	+56.2	26.7	18 39.6	+56.3	26.8	19 33.1	+56.5	27.0	20 26.6	+56.6	27.2	46
47	15 06.5	+55.4	25.8	16 00.5	+55.6	25.9	16 54.5	+55.7	26.0	17 48.4	+55.9	26.2	18 42.2	+56.1	26.3	19 35.9	+56.3	26.5	20 29.6	+56.4	26.6	21 23.2	+56.6	26.8	47
48	16 01.9	+55.4	25.4	16 56.1	+55.5	25.5	17 50.2	+55.7	25.6	18 44.3	+55.9	25.8	19 38.3	+56.0	25.9	20 32.2	+56.2	26.1	21 26.0	+56.4	26.3	22 19.8	+56.6	26.4	48
49	16 57.3	+55.3	25.0	17 51.6	+55.5	25.1	18 45.9	+55.7	25.3	19 40.2	+55.8	25.4	20 34.3	+56.0	25.6	21 28.4	+56.2	25.7	22 22.4	+56.4	25.9	23 16.4	+56.5	26.1	49
50	17 52.6	+55.2	24.6	18 47.1	+55.4	24.7	19 41.6	+55.6	24.9	20 36.0	+55.7	25.0	21 30.3	+56.0	25.2	22 24.6	+56.1	25.3	23 18.8	+56.2	25.5	24 12.9	+56.4	25.7	50
51	18 47.8	+55.2	24.2	19 42.5	+55.4	24.3	20 37.2	+55.5	24.5	21 31.7	+55.8	24.6	22 26.3	+55.8	24.8	23 20.7	+56.0	25.0	24 15.0	+56.3	25.1	25 09.3	+56.4	25.3	51
52	19 43.0	+55.1	23.7	20 37.9	+55.3	23.9	21 32.7	+55.5	24.0	22 27.5	+55.6	24.2	23 22.1	+55.9	24.4	24 16.7	+56.0	24.6	25 11.3	+56.1	24.8	26 05.7	+56.3	25.0	52
53	20 38.1	+55.1	23.3	21 33.2	+55.2	23.5	22 28.2	+55.4	23.6	23 23.1	+55.6	23.8	24 18.0	+55.7	24.0	25 12.7	+56.0	24.2	26 07.4	+56.1	24.4	27 02.0	+56.3	24.6	53
54	21 33.2	+55.0	22.9	22 28.4	+55.2	23.1	23 23.6	+55.3	23.2	24 18.7	+55.5	23.4	25 13.7	+55.7	23.6	26 08.7	+55.8	23.8	27 03.5	+56.1	24.0	27 58.3	+56.2	24.2	54
55	22 28.2	+54.9	22.5	23 23.6	+55.1	22.6	24 18.9	+55.3	22.8	25 14.2	+55.5	23.0	26 09.4	+55.6	23.2	27 04.5	+55.8	23.4	27 59.6	+55.9	23.6	28 54.5	+56.1	23.8	55
56	23 23.1	+54.9	22.0	24 18.7	+55.0	22.2	25 14.2	+55.2	22.4	26 09.7	+55.3	22.6	27 05.0	+55.6	22.7	28 00.3	+55.7	23.0	28 55.5	+55.9	23.2	29 50.6	+56.1	23.4	56
57	24 18.0	+54.7	21.6	25 13.7	+54.9	21.8	26 09.4	+55.1	21.9	27 05.0	+55.3	22.1	28 00.6	+55.4	22.3	28 56.0	+55.7	22.5	29 51.4	+55.8	22.7	30 46.7	+56.0	23.0	57
58	25 12.7	+54.7	21.1	26 08.7	+54.8	21.3	27 04.5	+55.1	21.5	28 00.3	+55.2	21.7	28 56.0	+55.4	21.9	29 51.7	+55.5	22.1	30 47.2	+55.7	22.3	31 42.7	+55.9	22.6	58
59	26 07.4	+54.6	20.7	27 03.5	+54.8	20.9	27 59.6	+54.9	21.0	28 55.5	+55.1	21.2	29 51.4	+55.3	21.4	30 47.2	+55.5	21.7	31 42.9	+55.7	21.9	32 38.6	+55.8	22.1	59
60	27 02.0	+54.4	20.2	27 58.3	+54.7	20.4	28 54.5	+54.9	20.6	29 50.6	+55.1	20.8	30 46.7	+55.2	21.0	31 42.7	+55.3	21.2	32 38.6	+55.5	21.4	33 34.4	+55.7	21.7	60
61	27 56.6	+54.4	19.7	28 53.0	+54.6	19.9	29 49.4	+54.7	20.1	30 45.7	+54.9	20.3	31 41.9	+55.1	20.5	32 38.0	+55.3	20.8	33 34.1	+55.4	21.0	34 30.1	+55.6	21.2	61
62	28 51.0	+54.3	19.3	29 47.6	+54.5	19.5	30 44.1	+54.7	19.6	31 40.6	+54.8	19.9	32 37.0	+55.0	20.1	33 33.3	+55.2	20.3	34 29.5	+55.4	20.5	35 25.7	+55.5	20.8	62
63	29 45.3	+54.2	18.8	30 42.1	+54.3	19.0	31 38.8	+54.5	19.2	32 35.4	+54.7	19.4	33 32.0	+54.9	19.6	34 28.5	+55.0	19.8	35 24.9	+55.2	20.1	36 21.2	+55.4	20.3	63
64	30 39.5	+54.1	18.3	31 36.4	+54.3	18.5	32 33.3	+54.4	18.7	33 30.1	+54.6	18.9	34 26.9	+54.7	19.1	35 23.5	+54.9	19.3	36 20.1	+55.1	19.6	37 16.6	+55.2	19.8	64
65	31 33.6	+54.0	17.8	32 30.7	+54.1	18.0	33 27.7	+54.3	18.2	34 24.7	+54.5	18.4	35 21.6	+54.6	18.6	36 18.4	+54.8	18.8	37 15.2	+54.9	19.1	38 11.8	+55.2	19.3	65
66	32 27.6	+53.8	17.3	33 24.8	+54.0	17.5	34 22.0	+54.2	17.7	35 19.2	+54.3	17.9	36 16.2	+54.5	18.1	37 13.2	+54.7	18.3	38 10.1	+54.9	18.6	39 07.0	+55.0	18.8	66
67	33 21.4	+53.7	16.7	34 18.8	+53.9	16.9	35 16.2	+54.0	17.1	36 13.5	+54.2	17.3	37 10.7	+54.4	17.6	38 07.9	+54.5	17.8	39 05.0	+54.7	18.1	40 02.0	+54.9	18.3	67
68	34 15.1	+53.6	16.2	35 12.7	+53.7	16.4	36 10.2	+53.9	16.6	37 07.7	+54.0	16.8	38 05.1	+54.2	17.0	39 02.4	+54.4	17.3	39 59.7	+54.5	17.5	40 56.9	+54.7	17.8	68
69	35 08.7	+53.4	15.7	36 06.4	+53.6	15.8	37 04.1	+53.7	16.1	38 01.7	+53.9	16.3	38 59.3	+54.0	16.5	39 56.8	+54.2	16.7	40 54.2	+54.4	17.0	41 51.6	+54.5	17.2	69
70	36 02.1	+53.2	15.1	37 00.0	+53.4	15.3	37 57.8	+53.6	15.5	38 55.6	+53.7	15.7	39 53.3	+53.9	15.9	40 51.0	+54.1	16.2	41 48.6	+54.2	16.4	42 46.1	+54.4	16.7	70
71	36 55.3	+53.1	14.5	37 53.4	+53.2	14.7	38 51.4	+53.4	14.9	39 49.3	+53.6	15.1	40 47.2	+53.7	15.4	41 45.1	+53.8	15.6	42 42.8	+54.0	15.8	43 40.5	+54.2	16.1	71
72	37 48.4	+52.9	13.9	38 46.6	+53.1	14.1	39 44.8	+53.2	14.3	40 42.9	+53.3	14.5	41 40.9	+53.5	14.8	42 38.9	+53.7	15.0	43 36.8	+53.9	15.2	44 34.7	+54.0	15.5	72
73	38 41.3	+52.7	13.3	39 39.7	+52.8	13.5	40 38.0	+53.0	13.7	41 36.2	+53.2	13.9	42 34.5	+53.3	14.1	43 32.6	+53.5	14.4	44 30.7	+53.6	14.6	45 28.7	+53.8	14.9	73
74	39 34.0	+52.5	12.7	40 32.5	+52.7	12.9	41 31.0	+52.8	13.1	42 29.4	+53.0	13.3	43 27.8	+53.1	13.5	44 26.1	+53.2	13.7	45 24.3	+53.4	14.0	46 22.5	+53.6	14.2	74
75	40 26.5	+52.3	12.1	41 25.2	+52.4	12.3	42 23.8	+52.6	12.5	43 22.4	+52.7	12.7	44 20.9	+52.9	12.9	45 19.3	+53.1	13.1	46 17.7	+53.3	13.3	47 16.1	+53.4	13.6	75
76	41 18.8	+52.1	11.4	42 17.6	+52.2	11.6	43 16.4	+52.3	11.8	44 15.1	+52.5	12.0	45 13.8	+52.6	12.2	46 12.4	+52.8	12.4	47 10.9	+53.0	12.7	48 09.5	+53.1	12.9	76
77	42 10.9	+51.9	10.8	43 09.8	+52.0	10.9	44 08.7	+52.1	11.1	45 07.6	+52.2	11.3	46 06.4	+52.4	11.5	47 05.2	+52.5	11.7	48 03.9	+52.7	12.0	49 02.6	+52.8	12.2	77
78	43 02.8	+51.5	10.1	44 01.8	+51.7	10.3	45 00.8	+51.9	10.4	45 59.8	+52.0	10.6	46 58.8	+52.1	10.8	47 57.7	+52.3	11.0	48 56.6	+52.4	11.2	49 55.4	+52.5	11.5	78
79	43 54.3	+51.4	9.4	44 53.5	+51.5	9.5	45 52.7	+51.5	9.7	46 51.8	+51.7	9.9	47 50.9	+51.8	10.1	48 50.0	+51.9	10.3	49 49.0	+52.1	10.5	50 47.9	+52.3	10.7	79
80	44 45.7	+51.0	8.7	45 45.0	+51.1	8.8	46 44.2	+51.3	9.0	47 43.5	+51.4	9.1	48 42.7	+51.5	9.3	49 41.9	+51.7	9.5	50 41.1	+51.8	9.7	51 40.2	+51.9	9.9	80
81	45 36.7	+50.7	7.9	46 36.1	+50.9	8.1	47 35.5	+51.0	8.2	48 34.9	+51.1	8.4	49 34.2	+51.2	8.5	50 33.6	+51.3	8.7	51 32.9	+51.4	8.9	52 32.1	+51.6	9.1	81
82	46 27.4	+50.5	7.1	47 27.0	+50.5	7.3	48 26.5	+50.6	7.4	49 26.0	+50.7	7.6	50 25.4	+50.9	7.7	51 24.9	+50.9	7.9	52 24.3	+51.1	8.1	53 23.7	+51.2	8.3	82
83	47 17.9	+50.0	6.4	48 17.5	+50.2	6.5	49 17.1	+50.3	6.6	50 16.7	+50.4	6.7	51 16.3	+50.4	6.9	52 15.8	+50.6	7.0	53 15.4	+50.6	7.2	54 14.9	+50.8	7.4	83
84	48 07.9	+49.8	5.6	49 07.7	+49.8	5.8	50 07.4	+49.9	5.8	51 07.1	+49.9	5.9	52 06.7	+50.1	6.0	53 06.4	+50.1	6.2	54 06.0	+50.3	6.3	55 05.7	+50.3	6.5	84
85	48 57.7	+49.3	4.7	49 57.5	+49.4	4.8	50 57.2	+49.5	4.9	51 57.0	+49.6	5.0	52 56.8	+49.6	5.1	53 56.5	+49.8	5.2	54 56.3	+49.8	5.4	55 56.0	+49.9	5.5	85
86	49 47.0	+48.9	3.8	50 46.9	+49.0	3.9	51 46.7	+49.1	4.0	52 46.6	+49.1	4.1	53 46.4	+49.2	4.2	54 46.3	+49.2	4.3	55 46.1	+49.3	4.4	56 45.9	+49.4	4.5	86
87	50 35.9	+48.5	2.9	51 35.9	+48.5	3.0	52 35.8	+48.6	3.0	53 35.6	+48.7	3.1	54 35.6	+48.7	3.2	55 35.5	+48.7	3.2	56 35.3	+48.8	3.4	57 35.3	+48.8	3.4	87
88	51 24.4	+48.1	2.0	52 24.4	+48.1	2.0	53 24.4	+48.0	2.1	54 24.3	+48.1	2.1	55 24.3	+48.1	2.2	56 24.2	+48.2	2.2	57 24.2	+48.2	2.3	58 24.1	+48.3	2.4	88
89	52 12.5	+47.5	1.0	53 12.5	+47.5	1.0	54 12.4	+47.6	1.1	55 12.4	+47.6	1.1	56 12.4	+47.6	1.1	57 12.4	+47.6	1.1	58 12.4	+47.6	1.2	59 12.4	+47.6	1.2	89
90	53 00.0	+47.0	0.0	54 00.0	+47.0	0.0	55 00.0	+47.0	0.0	56 00.0	+47.0	0.0	57 00.0	+47.0	0.0	58 00.0	+47.0	0.0	59 00.0	+46.9	0.0	60 00.0	+46.9	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	27 53.1	+54.2	134.6	27 10.8	+54.5	135.0	26 28.3	+54.9	135.3	25 45.5	+55.2	135.7	25 02.4	+55.6	136.0	24 19.2	+55.8	136.3	23 35.7	+56.1	136.6	22 51.9	+56.4	136.9	0
1	28 47.3	+54.0	134.1	28 05.3	+54.5	134.5	27 23.2	+54.7	134.9	26 40.7	+55.1	135.2	25 58.0	+55.4	135.6	25 15.0	+55.7	135.9	24 31.8	+56.0	136.2	23 48.3	+56.3	136.5	1
2	29 41.3	+54.0	133.6	28 59.8	+54.3	134.0	28 17.9	+54.7	134.4	27 35.8	+55.0	134.8	26 53.4	+55.3	135.2	26 10.7	+55.7	135.5	25 27.8	+56.0	135.8	24 44.6	+56.3	136.2	2
3	30 35.3	+53.8	133.1	29 54.1	+54.2	133.5	29 12.6	+54.6	133.9	28 30.8	+54.9	134.3	27 48.7	+55.3	134.7	27 06.4	+55.6	135.1	26 23.8	+55.9	135.4	25 40.9	+56.2	135.8	3
4	31 29.1	+53.7	132.6	30 48.3	+54.1	133.0	30 07.2	+54.5	133.5	29 25.7	+54.9	133.9	28 44.0	+55.2	134.3	28 02.0	+55.5	134.7	27 19.7	+55.8	135.0	26 37.1	+56.1	135.4	4
5	32 22.8	+53.5	132.1	31 42.4	+54.0	132.5	31 01.7	+54.3	133.0	30 20.6	+54.7	133.4	29 39.2	+55.1	133.8	28 57.5	+55.4	134.2	28 15.5	+55.7	134.6	27 33.2	+56.1	135.0	5
6	33 16.3	+53.4	131.5	32 36.4	+53.8	132.0	31 56.0	+54.3	132.5	31 15.3	+54.6	132.9	30 34.3	+55.0	133.4	29 52.9	+55.4	133.8	29 11.2	+55.7	134.2	28 29.3	+55.9	134.6	6
7	34 09.7	+53.3	131.0	33 30.2	+53.7	131.5	32 50.3	+54.1	132.0	32 09.9	+54.6	132.4	31 29.3	+54.9	132.9	30 48.3	+55.2	133.3	30 06.9	+55.6	133.8	29 25.2	+56.0	134.2	7
8	35 03.0	+53.1	130.4	34 23.9	+53.6	131.0	33 44.4	+54.0	131.5	33 04.5	+54.3	132.0	32 24.2	+54.7	132.4	31 43.5	+55.1	132.9	31 02.5	+55.5	133.3	30 21.2	+55.8	133.8	8
9	35 56.1	+53.0	129.9	35 17.5	+53.4	130.4	34 38.4	+53.8	130.9	33 58.8	+54.3	131.4	33 18.9	+54.7	131.9	32 38.6	+55.1	132.4	31 58.0	+55.4	132.9	31 17.0	+55.7	133.3	9
10	36 49.1	+52.7	129.3	36 10.9	+53.2	129.8	35 32.2	+53.7	130.4	34 53.1	+54.1	130.9	34 13.6	+54.5	131.4	33 33.7	+54.9	131.9	32 53.4	+55.3	132.4	32 12.7	+55.7	132.8	10
11	37 41.8	+52.6	128.7	37 04.1	+53.1	129.3	36 25.9	+53.5	129.8	35 47.2	+54.0	130.4	35 08.1	+54.4	130.9	34 28.6	+54.8	131.5	33 48.7	+55.2	132.0	33 08.4	+55.5	132.5	11
12	38 34.4	+52.4	128.1	37 57.2	+52.9	128.7	37 19.4	+53.4	129.3	36 41.2	+53.9	129.9	36 02.5	+54.3	130.4	35 23.4	+54.7	131.0	34 43.9	+55.1	131.5	34 03.9	+55.5	132.0	12
13	39 26.8	+52.2	127.4	38 50.1	+52.7	128.1	38 12.8	+53.2	128.7	37 35.1	+53.6	129.3	36 56.8	+54.1	129.9	36 18.1	+54.6	130.5	35 39.0	+54.9	131.0	34 59.4	+55.3	131.5	13
14	40 19.0	+52.0	126.8	39 42.8	+52.5	127.5	39 06.0	+53.1	128.1	38 28.7	+53.6	128.7	37 50.9	+54.0	129.3	37 12.7	+54.4	129.9	36 33.9	+54.8	130.5	35 54.7	+55.2	131.1	14
15	41 11.0	+51.7	126.1	40 35.3	+52.3	126.8	39 59.1	+52.8	127.5	39 22.3	+53.3	128.2	38 44.9	+53.8	128.8	38 07.1	+54.2	129.4	37 28.7	+54.7	130.0	36 49.9	+55.2	130.6	15
16	42 02.7	+51.5	125.5	41 27.6	+52.1	126.2	40 51.9	+52.6	126.9	40 15.6	+53.1	127.6	39 38.7	+53.7	128.2	39 01.3	+54.2	128.9	38 23.4	+54.6	129.5	37 45.1	+54.9	130.1	16
17	42 54.2	+51.2	124.8	42 19.7	+51.8	125.5	41 44.5	+52.4	126.2	41 08.7	+53.0	126.9	40 32.4	+53.4	127.6	39 55.5	+53.9	128.3	39 18.0	+54.4	128.9	38 40.0	+54.9	129.6	17
18	43 45.4	+51.0	124.0	43 11.5	+51.6	124.8	42 36.9	+52.2	125.6	42 01.7	+52.7	126.3	41 25.8	+53.3	127.0	40 49.4	+53.8	127.7	40 12.4	+54.3	128.4	39 34.9	+54.7	129.1	18
19	44 36.4	+50.6	123.3	44 03.1	+51.3	124.1	43 29.1	+51.9	124.9	42 54.4	+52.5	125.7	42 19.1	+53.1	126.4	41 43.2	+53.6	127.1	41 06.7	+54.0	127.8	40 29.6	+54.5	128.5	19
20	45 27.0	+50.4	122.5	44 54.4	+51.0	123.4	44 21.0	+51.6	124.2	43 46.9	+52.3	125.0	43 12.2	+52.8	125.8	42 36.8	+53.3	126.5	42 00.7	+53.9	127.3	41 24.1	+54.4	128.0	20
21	46 17.4	+50.0	121.8	45 45.4	+50.7	122.6	45 12.6	+51.4	123.5	44 39.2	+52.0	124.3	44 05.0	+52.6	125.1	43 30.1	+53.2	125.9	42 54.6	+53.7	126.7	42 18.5	+54.2	127.4	21
22	47 07.4	+49.6	121.0	46 36.1	+50.4	121.9	46 04.0	+51.1	122.8	45 31.2	+51.7	123.6	44 57.6	+52.4	124.5	44 23.3	+53.0	125.3	43 48.3	+53.5	126.1	43 12.7	+54.0	126.8	22
23	47 57.0	+49.3	120.1	47 26.5	+50.1	121.1	46 55.1	+50.8	122.0	46 22.9	+51.5	122.9	45 50.0	+52.1	123.8	45 16.3	+52.7	124.6	44 41.8	+53.3	125.4	44 06.7	+53.9	126.2	23
24	48 46.3	+48.9	119.3	48 16.6	+49.7	120.3	47 45.9	+50.4	121.2	47 14.4	+51.2	122.1	46 42.1	+51.8	123.0	46 09.0	+52.4	123.9	45 35.1	+53.1	124.8	45 00.6	+53.6	125.6	24
25	49 35.2	+48.5	118.4	49 06.3	+49.3	119.4	48 36.3	+50.1	120.4	48 05.6	+50.8	121.4	47 33.9	+51.5	122.3	47 01.4	+52.2	123.2	46 28.2	+52.8	124.1	45 54.2	+53.4	125.0	25
26	50 23.7	+48.1	117.5	49 55.6	+48.9	118.5	49 26.4	+49.8	119.6	48 56.4	+50.5	120.6	48 25.4	+51.3	121.5	47 53.6	+51.9	122.5	47 21.0	+52.6	123.4	46 47.6	+53.2	124.3	26
27	51 11.8	+47.5	116.5	50 44.5	+48.4	117.6	50 16.2	+49.3	118.7	49 46.9	+50.1	119.7	49 16.7	+50.8	120.7	48 45.5	+51.6	121.7	48 13.6	+52.2	122.7	47 40.8	+52.9	123.6	27
28	51 59.3	+47.1	115.5	51 32.9	+48.0	116.7	51 05.5	+48.8	117.8	50 37.0	+49.7	118.9	50 07.5	+50.6	119.9	49 37.1	+51.3	120.9	49 05.8	+52.0	121.9	48 33.7	+52.6	122.9	28
29	52 46.4	+46.5	114.5	52 20.9	+47.5	115.7	51 54.3	+48.5	116.9	51 26.7	+49.3	118.0	50 58.1	+50.1	119.1	50 28.4	+50.9	120.1	49 57.8	+51.7	121.2	49 26.3	+52.4	122.2	29
30	53 32.9	+45.9	113.5	53 08.4	+47.0	114.7	52 42.8	+47.9	115.9	52 16.0	+48.9	117.1	51 48.2	+49.7	118.2	51 19.3	+50.6	119.3	50 49.5	+51.3	120.4	50 18.7	+52.0	121.4	30
31	54 18.8	+45.3	112.4	53 55.4	+46.4	113.6	53 30.7	+47.4	114.9	53 04.9	+48.4	116.1	52 37.9	+49.3	117.3	52 09.9	+50.1	118.3	51 40.8	+51.0	119.5	51 10.7	+51.8	120.6	31
32	55 04.1	+44.7	111.2	54 41.8	+45.8	112.6	54 18.1	+46.9	113.8	53 53.3	+47.8	115.1	53 27.2	+48.8	116.3	53 00.0	+49.8	117.5	52 31.8	+50.6	118.7	52 02.5	+51.3	119.8	32
33	55 48.8	+44.0	110.1	55 27.6	+45.1	111.4	55 05.0	+46.2	112.8	54 41.1	+47.3	114.1	54 16.0	+48.4	115.3	53 49.8	+49.2	116.6	53 22.4	+50.1	117.8	52 53.8	+51.0	119.0	33
34	56 32.8	+43.2	108.8	56 12.7	+44.4	110.3	55 51.2	+45.5	111.6	55 28.4	+46.6	113.0	55 04.4	+47.8	114.3	54 39.0	+48.8	115.5	54 12.5	+49.7	116.9	53 44.8	+50.7	118.1	34
35	57 16.0	+42.4	107.6	56 57.1	+43.8	109.0	56 36.9	+44.9	110.5	56 15.2	+46.1	111.9	55 52.2	+47.2	113.3	55 27.8	+48.3	114.6	55 02.2	+49.3	115.9	54 35.4	+50.2	117.2	35
36	57 58.4	+41.6	106.2	57 40.9	+42.9	107.8	57 21.8	+44.2	109.3	57 01.3	+45.4	110.7	56 39.4	+46.6	112.1	56 16.1	+47.7	113.5	55 51.5	+48.7	114.9	55 25.6	+49.7	116.2	36
37	58 40.0	+40.6	104.9	58 23.8	+42.0	106.5	58 06.0	+43.3	108.0	57 46.7	+44.7	109.5	57 26.0	+45.9	111.0	57 03.8	+47.0	112.4	56 40.2	+48.2	113.8	56 15.3	+49.2	115.2	37
38	59 20.6	+39.7	103.4	59 05.8	+41.2	105.1	58 49.4	+42.6	106.7	58 31.4	+43.9	108.2	58 11.9	+45.2	109.8	57 50.8	+46.5	111.3	57 28.4	+47.5	112.7	57 04.5	+48.6	114.2	38
39	60 00.3	+38.6	102.0	59 47.0	+40.2	103.6	59 32.0	+41.7	105.3	59 15.3	+43.1	106.9	58 57.1	+44.4	108.5	58 37.3	+45.7	110.1	58 15.9	+46.9	111.6	57 53.1	+48.1	113.1	39
40	60 38.9	+37.5	100.4	60 27.2	+39.1	102.2	60 13.7	+40.7	103.9	59 58.4	+42.2	105.5	59 41.5	+43.6	107.2	59 23.0	+44.9	108.8	59 02.8	+46.3	110.4	58 41.2	+47.4	111.9	40
41	61 16.4	+36.4	98.8	61 06.3	+38.1	100.6	60 54.4	+39.6	102.4	60 40.6	+41.3	104.1	60 25.1	+42.8	105.8	60 07.9	+44.2	107.5	59 49.1	+45.5	109.1	59 28.6	+46.8	110.7	41
42	61 52.8	+35.0	97.1	61 44.4	+36.8	99.0	61 34.0	+38.6	100.8	61 21.9	+40.2	102.6	61 07.9	+41.7	104.4	60 52.1	+43.2	106.1	60 34.6	+44.6	107.8	60 15.4	+46.0	109.5	42
43	62 27.8	+33.8	95.4	62 21.2	+35.6	97.3	62 12.6	+37.4	99.2	62 02.1	+39.1	101.0	61 49.6	+40.8	102.9	61 35.3	+42.3	104.7	61 19.2	+43.8	106.5	61 01.4	+45.2	108.2	43
44	63 01.6	+32.2	93.6	62 56.8	+34.2	95.5	62 50.0	+36.1	97.5	62 41.2	+37.9	99.4	62 30.4	+39.6	101.3	62 17.6	+41.3	103.2	62 03.0	+42.9	105.0	61 46.6	+44.3	106.8	44
45	63 33.8	+30.8	91.7	63 31.0	+32.8	93.7	63 26.1	+34.7	95.7	63 19.1	+36.6	97.7	63 10.0	+38.4	99.7	62 58.9	+40.2	101.6	62 45.9	+41.8	103.5	62 30.9	+43.4	105.4	45
46	64 04.6	+29.1	89.8	64 03.8	+31.2	91.8	64 00.8	+33.3	93.9	63 55.7	+35.2	95.9	63 48.4	+37.2	97.9	63 39.1	+39.0	99.9	63 27.7	+40.8	101.9	63 14.3	+42.4	103.9	46
47	64 33.7	+27.5	87.8	64 35.0	+29.6	89.9	64 34.1	+31.7	92.0	64 30.9	+33.8	94.1	64 25.6	+35.7	96.1	64 18.1	+37.7	98.2	64 08.5	+39.5	100.3	63 56.7	+41.3	102.3	47
48	65 01.2	+25.6	85.7	65 04.6	+27.9	87.8	65 05.0	+30.0	90.0	65 04.7	+32.2	92.1	65 01.3	+34.3	94.3	64 55.8	+36.3	96.4	64 48.0	+38.2	98.5	64 38.0	+40.1	100.6	48
49	65 26.8	+23.7	83.5	65 32.5	+26.0	85.7	65 35.8	+28.3	87.9	65 36.9	+30.5	90.1	65 35.6	+32.7	92.3	65 32.1	+34.8	94.5	65 26.2	+36.9	96.7	65 18.1	+38.8	98.8	49
50	65 50.5	+21.7•	81.3	65 58.5	+24.1•	83.5	66 04.1	+26.4	85.7	66 07.4	+28.7	88.0	66 08.3	+31.0	90.2	66 06.9	+33.2	92.5	66 03.1	+35.3	94.8	65 56.9	+37.5	97.0	50
51	66 12.2	+19.7•	79.0	66 22.6	+22.0•	81.2	66 30.5	+24.5•	83.5	66 36.1	+26.9	85.8	66 39.3	+29.2	88.1	66 40.1	+31.5	90.4	66 38.4	+33.8	92.7	66 34.4	+35.9	95.0	51
52	66 31.9	+17.4•	76.6	66 44.6	+19.9•	78.9	66 55.0	+22.3•	81.2	67 03.0	+24.8•	83.5	67 08.5	+27.3•	85.9	67 11.6	+29.6	88.3	67 12.2	+31.9	90.6	67 10.3	+34.2	93.0	52
53	66 49.3	+15.2•	74.2	67 04.5	+17.7•	76.5	67 17.3	+20.2•	78.8	67 27.8	+22.7•	81.2	67 35.8	+25.1•	83.6	67 41.2	+27.7•	86.0	67 44.1	+30.2	88.4	67 44.5	+32.5	90.9	53
54	67 04.5	+12.8•	71.7	67 22.2	+15.3•	74.0	67 37.5	+17.9•	76.3	67 50.5	+20.4•	78.7	68 00.9	+23.1•	81.2	68 08.9	+25.6•	83.6	68 14.3	+28.1•	86.1	68 17.0	+30.6	88.6	54
55	67 17.3	+10.5•	69.2	67 37.5	+13.0•	71.5	67 55.4	+15.5•	73.8	68 10.9	+18.1•	76.2	68 24.0	+20.7•	78.7	68 34.5	+23.3•	81.2	68 42.4	+25.9•	83.7	68 47.6	+28.6•	86.3	55
56	67 27.8	+8.0•	66.7	67 50.5	+10.4•	68.9	68 10.9	+13.1•	71.2	68 29.0	+15.7•	73.6	68 44.7	+18.3•	76.1	68 57.8	+21.0•	78.6	69 08.3	+23.7•	81.2	69 16.2	+26.3•	83.8	56
57	67 35.8	+5.4•	64.1	68 00.9	+8.0•	66.3	68 24.0	+10.5•	68.6	68 44.7	+13.1•	71.0	69 03.0	+15.8•	73.5	69 18.8	+18.6•	76.0	69 32.0	+21.3•	78.6	69 42.5	+24.1•	81.2	57
58	67 41.2	+2.9•	61.4	68 08.9	+5.4•	63.6	68 34.5	+7.9•	65.9	68 57.8	+10.5•	68.3	69 18.8	+13.2•	70.7	69 37.4	+15.9•	73.3	69 53.3	+18.7•	75.9	70 06.6	+21.5•	78.6	58
59	67 44.1	+0.4•	58.8	68 14.3	+2.7•	61.0	68 42.4	+5.4•	63.2	69 08.3	+7.9•	65.5	69 32.0	+10.6•	67.9	69 53.3	+13.3•	70.5	70 12.0	+16.1•	73.1	70 28.1	+19.0•	75.8	59
60	67 44.5	−2.2•	56.2	68 17.0	+0.1•	58.3	68 47.6	+2.6•	60.4	69 16.2	+5.1•	62.7	69 42.5	+7.8•	65.1	70 06.6	+10.4•	67.6	70 28.1	+13.3•	70.3	70 47.1	+16.2•	73.0	60
61	67 42.3	−4.7•	53.5	68 17.1	−2.4•	55.6	68 50.2	−0.2•	57.7	69 21.3	+2.3•	59.9	69 50.3	+4.9•	62.3	70 17.0	+7.7•	64.7	70 41.4	+10.5•	67.3	71 03.3	+13.3•	70.0	61
62	67 37.6	−7.2•	50.9	68 14.7	−5.2•	52.9	68 50.0	−2.8•	54.9	69 23.6	−0.5•	57.1	69 55.2	+2.1•	59.4	70 24.7	+4.7•	61.8	70 51.9	+7.4•	64.3	71 16.6	+10.4•	67.0	62
63	67 30.4	−9.8•	48.3	68 09.5	−7.6•	50.2	68 47.2	−5.6•	52.1	69 23.1	−3.2•	54.2	69 57.3	−0.9•	56.5	70 29.4	+1.7•	58.8	70 59.3	+4.5•	61.3	71 27.0	+7.3•	63.9	63
64	67 20.6	−12.1•	45.7	68 01.9	−10.3•	47.5	68 41.6	−8.1•	49.4	69 19.9	−6.0•	51.4	69 56.4	−3.6•	53.5	70 31.1	−1.1•	55.8	71 03.8	+1.4•	58.2	71 34.3	+4.2•	60.8	64
65	67 08.5	−14.5•	43.2	67 51.6	−12.7•	44.9	68 33.5	−10.8•	46.7	69 13.9	−8.7•	48.6	69 52.8	−6.5•	50.6	70 30.0	−4.2•	52.8	71 05.2	−1.6•	55.1	71 38.5	+1.0•	57.6	65
66	66 54.0	−16.8•	40.7	67 38.9	−15.1•	42.3	68 22.7	−13.3•	44.0	69 05.2	−11.4•	45.8	69 46.3	−9.3•	47.8	70 25.8	−7.0•	49.8	71 03.6	−4.6•	52.1	71 39.5	−2.1•	54.4	66
67	66 37.2	−19.0•	38.3	67 23.8	−17.4•	39.8	68 09.4	−15.8•	41.4	68 53.8	−13.9•	43.1	69 37.0	−12.0•	44.9	70 18.8	−10.0•	46.9	70 59.0	−7.7•	49.0	71 37.4	−5.2•	51.3	67
68	66 18.2	−21.1•	35.9	67 06.4	−19.7•	37.3	67 53.6	−18.1•	38.8	68 39.9	−16.5•	40.4	69 25.0	−14.7•	42.1	70 08.8	−12.7•	44.0	70 51.3	−10.6•	46.0	71 32.2	−8.3•	48.1	68
69	65 57.1	−23.2•	33.6	66 46.7	−21.9•	34.9	67 35.5	−20.4•	36.3	68 23.4	−18.9•	37.8	69 10.3	−17.2•	39.4	69 56.1	−15.4•	41.1	70 40.7	−13.5•	43.0	71 23.9	−11.4•	45.0	69
70	65 33.9	−25.1	31.4	66 24.8	−23.8•	32.5	67 15.1	−22.6•	33.8	68 04.5	−21.2•	35.2	68 53.1	−19.7•	36.7	69 40.7	−18.0•	38.3	70 27.2	−16.2•	40.0	71 12.5	−14.3•	41.9	70
71	65 08.8	−26.9	29.2	66 01.0	−25.9	30.3	66 52.5	−24.7•	31.4	67 43.3	−23.4•	32.7	68 33.4	−22.0•	34.1	69 22.7	−20.6•	35.5	70 11.0	−18.9•	37.2	70 58.2	−17.1•	38.9	71
72	64 41.9	−28.6	27.1	65 35.1	−27.7	28.1	66 27.8	−26.6	29.1	67 19.9	−25.5•	30.3	68 11.4	−24.3•	31.6	69 02.1	−22.9	32.9	69 52.1	−21.5•	34.4	70 41.1	−19.8•	36.0	72
73	64 13.3	−30.3	25.0	65 07.4	−29.4	25.9	66 01.2	−28.5	26.9	66 54.4	−27.4	28.0	67 47.1	−26.3•	29.1	68 39.2	−25.1	30.4	69 30.6	−23.8•	31.7	70 21.3	−22.4•	33.2	73
74	63 43.0	−31.9	23.1	64 38.0	−31.1	23.9	65 32.7	−30.2	24.8	66 27.0	−29.4	25.7	67 20.8	−28.4	26.8	68 14.1	−27.3•	27.9	69 06.8	−26.1•	29.1	69 58.9	−24.8•	30.4	74
75	63 11.1	−33.2	21.2	64 06.9	−32.6	21.9	65 02.5	−31.9	22.7	65 57.6	−31.0	23.6	66 52.4	−30.2	24.5	67 46.8	−29.3	25.5	68 40.7	−28.2•	26.6	69 34.1	−27.1•	27.8	75
76	62 37.8	−34.7	19.3	63 34.3	−34.1	20.0	64 30.6	−33.5	20.7	65 26.6	−32.8	21.5	66 22.2	−31.9	22.3	67 17.5	−31.1	23.2	68 12.5	−30.3	24.2	69 07.0	−29.3•	25.3	76
77	62 03.1	−35.9	17.6	63 00.2	−35.4	18.2	63 57.1	−34.8	18.8	64 53.8	−34.2	19.5	65 50.3	−33.6	20.2	66 46.4	−32.9	21.0	67 42.2	−32.0	21.9	68 37.7	−31.2	22.9	77
78	61 27.2	−37.2	15.9	62 24.8	−36.7	16.4	63 22.3	−36.3	17.0	64 19.6	−35.7	17.6	65 16.7	−35.2	18.2	66 13.5	−34.5	18.9	67 10.2	−33.9	19.7	68 06.5	−33.1	20.5	78
79	60 50.0	−38.6	14.3	61 48.1	−37.9	14.7	62 46.0	−37.5	15.2	63 43.9	−37.1	15.7	64 41.5	−36.5	16.3	65 39.0	−36.0	16.9	66 36.3	−35.4	17.6	67 33.4	−34.8	18.3	79
80	60 11.7	−39.4	12.7	61 10.2	−39.1	13.1	62 08.5	−38.6	13.5	63 06.8	−38.3	14.0	64 05.0	−37.9	14.5	65 03.0	−37.4	15.0	66 00.9	−37.0	15.6	66 58.6	−36.4	16.2	80
81	59 32.3	−40.4	11.2	60 31.1	−40.1	11.5	61 29.9	−39.7	11.9	62 28.5	−39.4	12.3	63 27.1	−39.1	12.7	64 25.6	−38.8	13.2	65 23.9	−38.3	13.7	66 22.2	−37.9	14.2	81
82	58 51.9	−41.3	9.8	59 51.0	−41.0	10.0	60 50.1	−40.8	10.4	61 49.1	−40.6	10.7	62 48.0	−40.3	11.0	63 46.8	−39.9	11.4	64 45.6	−39.6	11.9	65 44.3	−39.3	12.3	82
83	58 10.6	−42.2	8.4	59 10.0	−42.0	8.6	60 09.3	−41.8	8.9	61 08.5	−41.5	9.1	62 07.7	−41.3	9.4	63 06.9	−41.1	9.8	64 06.0	−40.8	10.1	65 05.0	−40.5	10.5	83
84	57 28.4	−42.9	7.0	58 28.0	−42.7	7.2	59 27.5	−42.7	7.4	60 27.0	−42.5	7.7	61 26.4	−42.2	7.9	62 25.8	−42.1	8.2	63 25.2	−41.9	8.5	64 24.5	−41.6	8.8	84
85	56 45.5	−43.8	5.7	57 45.1	−43.6	5.9	58 44.8	−43.5	6.1	59 44.5	−43.4	6.2	60 44.1	−43.2	6.4	61 43.7	−43.1	6.6	62 43.3	−42.9	6.9	63 42.9	−42.8	7.1	85
86	56 01.7	−44.5	4.5	57 01.5	−44.4	4.6	58 01.3	−44.3	4.8	59 01.1	−44.2	4.9	60 00.9	−44.1	5.0	61 00.6	−43.9	5.2	62 00.4	−43.9	5.4	63 00.1	−43.7	5.5	86
87	55 17.2	−45.1	3.3	56 17.1	−45.0	3.4	57 17.0	−45.0	3.5	58 16.9	−44.9	3.6	59 16.8	−44.9	3.6	60 16.7	−44.8	3.8	61 16.5	−44.7	3.9	62 16.4	−44.7	4.1	87
88	54 32.1	−45.8	2.2	55 32.1	−45.8	2.2	56 32.0	−45.7	2.3	57 32.0	−45.7	2.3	58 31.9	−45.6	2.4	59 31.9	−45.6	2.5	60 31.8	−45.5	2.6	61 31.7	−45.4	2.6	88
89	53 46.3	−46.3	1.1	54 46.3	−46.3	1.1	55 46.3	−46.3	1.1	56 46.3	−46.3	1.1	57 46.3	−46.3	1.2	58 46.3	−46.3	1.2	59 46.3	−46.3	1.3	60 46.3	−46.3	1.3	89
90	53 00.0	−46.9	0.0	54 00.0	−46.9	0.0	55 00.0	−46.9	0.0	56 00.0	−46.9	0.0	57 00.0	−46.9	0.0	58 00.0	−47.0	0.0	59 00.0	−47.0	0.0	60 00.0	−47.0	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	27 53.1	−54.3	134.6	27 10.8	−54.6	135.0	26 28.3	−55.0	135.3	25 45.5	−55.3	135.7	25 02.4	−55.5	136.0	24 19.2	−55.9	136.3	23 35.7	−56.2	136.6	22 51.9	−56.4	136.9	0
1	26 58.8	−54.3	135.1	26 16.2	−54.7	135.4	25 33.3	−55.0	135.8	24 50.2	−55.3	136.1	24 06.9	−55.7	136.4	23 23.3	−55.9	136.7	22 39.5	−56.2	137.0	21 55.5	−56.4	137.3	1
2	26 04.5	−54.5	135.6	25 21.5	−54.8	135.9	24 38.3	−55.1	136.2	23 54.9	−55.4	136.5	23 11.2	−55.7	136.8	22 27.4	−56.0	137.1	21 43.3	−56.2	137.4	20 59.1	−56.6	137.7	2
3	25 10.0	−54.5	136.0	24 26.7	−54.8	136.3	23 43.2	−55.2	136.7	22 59.5	−55.5	137.0	22 15.5	−55.7	137.2	21 31.4	−56.1	137.5	20 47.1	−56.3	137.8	20 02.5	−56.5	138.0	3
4	24 15.5	−54.6	136.5	23 31.9	−55.0	136.8	22 48.0	−55.2	137.1	22 04.0	−55.5	137.4	21 19.8	−55.8	137.6	20 35.3	−56.0	137.9	19 50.8	−56.4	138.1	19 06.0	−56.6	138.4	4
5	23 20.9	−54.7	136.9	22 36.9	−55.0	137.2	21 52.8	−55.3	137.5	21 08.5	−55.6	137.8	20 24.0	−55.9	138.0	19 39.3	−56.2	138.3	18 54.4	−56.4	138.5	18 09.4	−56.6	138.7	5
6	22 26.2	−54.8	137.4	21 41.9	−55.0	137.7	20 57.5	−55.4	137.9	20 12.9	−55.7	138.2	19 28.1	−55.9	138.4	18 43.1	−56.2	138.6	17 58.0	−56.4	138.9	17 12.8	−56.7	139.1	6
7	21 31.4	−54.8	137.8	20 46.9	−55.2	138.1	20 02.1	−55.4	138.3	19 17.2	−55.7	138.6	18 32.2	−56.0	138.8	17 46.9	−56.2	139.0	17 01.6	−56.5	139.2	16 16.1	−56.7	139.4	7
8	20 36.6	−54.9	138.3	19 51.7	−55.2	138.5	19 06.7	−55.5	138.7	18 21.5	−55.8	139.0	17 36.2	−56.0	139.2	16 50.7	−56.2	139.4	16 05.1	−56.5	139.6	15 19.4	−56.7	139.7	8
9	19 41.7	−55.0	138.7	18 56.5	−55.2	138.9	18 11.2	−55.5	139.1	17 25.8	−55.8	139.3	16 40.2	−56.1	139.5	15 54.5	−56.3	139.7	15 08.6	−56.5	139.9	14 22.7	−56.8	140.1	9
10	18 46.7	−55.0	139.1	18 01.3	−55.3	139.3	17 15.7	−55.6	139.5	16 30.0	−55.8	139.7	15 44.1	−56.0	139.9	14 58.2	−56.4	140.1	14 12.1	−56.6	140.3	13 25.9	−56.8	140.4	10
11	17 51.7	−55.1	139.5	17 06.0	−55.4	139.7	16 20.1	−55.6	139.9	15 34.2	−55.9	140.1	14 48.1	−56.2	140.3	14 01.8	−56.3	140.4	13 15.5	−56.6	140.6	12 29.1	−56.8	140.7	11
12	16 56.6	−55.1	139.9	16 10.6	−55.4	140.1	15 24.5	−55.6	140.3	14 38.3	−55.9	140.5	13 51.9	−56.1	140.7	13 05.5	−56.4	140.8	12 18.9	−56.6	140.9	11 32.3	−56.8	141.1	12
13	16 01.5	−55.2	140.4	15 15.2	−55.4	140.5	14 28.9	−55.7	140.7	13 42.4	−56.0	140.9	12 55.8	−56.2	141.0	12 09.1	−56.4	141.2	11 22.3	−56.6	141.3	10 35.5	−56.9	141.4	13
14	15 06.3	−55.2	140.8	14 19.8	−55.5	140.9	13 33.2	−55.8	141.1	12 46.4	−56.0	141.2	11 59.6	−56.2	141.4	11 12.7	−56.5	141.5	10 25.7	−56.7	141.6	9 38.6	−56.9	141.7	14
15	14 11.1	−55.2	141.2	13 24.3	−55.5	141.3	12 37.4	−55.7	141.5	11 50.5	−56.0	141.6	11 03.4	−56.2	141.7	10 16.2	−56.4	141.8	9 29.0	−56.6	142.0	8 41.7	−56.8	142.1	15
16	13 15.9	−55.3	141.6	12 28.8	−55.5	141.7	11 41.7	−55.8	141.8	10 54.5	−56.1	142.0	10 07.2	−56.3	142.1	9 19.8	−56.5	142.2	8 32.4	−56.7	142.3	7 44.9	−56.9	142.4	16
17	12 20.6	−55.3	142.0	11 33.3	−55.6	142.1	10 45.9	−55.8	142.2	9 58.4	−56.0	142.3	9 10.9	−56.3	142.4	8 23.3	−56.5	142.5	7 35.7	−56.7	142.6	6 48.0	−57.0	142.7	17
18	11 25.3	−55.4	142.4	10 37.7	−55.6	142.5	9 50.1	−55.9	142.6	9 02.4	−56.1	142.7	8 14.6	−56.3	142.8	7 26.8	−56.5	142.9	6 39.0	−56.8	142.9	5 51.0	−56.9	143.0	18
19	10 29.9	−55.4	142.8	9 42.1	−55.6	142.9	8 54.2	−55.8	143.0	8 06.3	−56.1	143.1	7 18.3	−56.3	143.1	6 30.3	−56.5	143.2	5 42.2	−56.7	143.3	4 54.1	−56.9	143.3	19
20	9 34.5	−55.4	143.1	8 46.5	−55.7	143.2	7 58.4	−55.9	143.3	7 10.2	−56.1	143.4	6 22.0	−56.3	143.5	5 33.8	−56.6	143.5	4 45.5	−56.7	143.6	3 57.2	−57.0	143.6	20
21	8 39.1	−55.4	143.5	7 50.8	−55.6	143.6	7 02.5	−55.9	143.7	6 14.1	−56.1	143.8	5 25.7	−56.3	143.8	4 37.2	−56.5	143.9	3 48.8	−56.8	143.9	3 00.2	−56.9	144.0	21
22	7 43.7	−55.5	143.9	6 55.2	−55.7	144.0	6 06.6	−55.9	144.1	5 18.0	−56.1	144.1	4 29.4	−56.4	144.2	3 40.7	−56.6	144.2	2 52.0	−56.7	144.3	2 03.3	−56.9	144.3	22
23	6 48.2	−55.4	144.3	5 59.5	−55.7	144.4	5 10.7	−55.9	144.4	4 21.9	−56.2	144.5	3 33.0	−56.3	144.5	2 44.1	−56.5	144.6	1 55.3	−56.8	144.6	1 06.4	−57.0	144.6	23
24	5 52.7	−55.4	144.7	5 03.8	−55.8	144.7	4 14.8	−56.0	144.8	3 25.7	−56.1	144.8	2 36.7	−56.4	144.9	1 47.6	−56.6	144.9	0 58.5	−56.8	144.9	0 09.4	−57.0	144.9	24
25	4 57.3	−55.5	145.1	4 08.0	−55.7	145.1	3 18.8	−55.9	145.2	2 29.6	−56.2	145.2	1 40.3	−56.4	145.2	0 51.0	−56.6	145.2	0 01.7	−56.7	145.2	0 47.6	+56.9	34.8	25
26	4 01.8	−55.5	145.5	3 12.3	−55.7	145.5	2 22.9	−56.0	145.5	1 33.4	−56.2	145.5	0 43.9	−56.3	145.6	0 05.5	+56.6	34.4	0 55.0	+56.8	34.5	1 44.5	+56.9	34.5	26
27	3 06.2	−55.5	145.8	2 16.6	−55.8	145.9	1 26.9	−55.9	145.9	0 37.2	−56.1	145.9	0 12.4	+56.4	34.1	1 02.1	+56.6	34.1	1 51.8	+56.7	34.1	2 41.4	+57.0	34.1	27
28	2 10.7	−55.5	146.2	1 20.8	−55.7	146.2	0 31.0	−56.0	146.2	0 18.9	+56.2	33.8	1 08.8	+56.4	33.8	1 58.7	+56.5	33.8	2 48.5	+56.8	33.8	3 38.4	+56.9	33.8	28
29	1 15.2	−55.5	146.6	0 25.1	−55.7	146.6	0 25.0	+55.9	33.4	1 15.1	+56.1	33.4	2 05.2	+56.3	33.4	2 55.2	+56.5	33.4	3 45.3	+56.7	33.5	4 35.3	+57.0	33.5	29
30	0 19.7	−55.6	147.0	0 30.6	+55.8	33.0	1 20.9	+56.0	33.0	2 11.2	+56.2	33.1	3 01.5	+56.4	33.1	3 51.8	+56.5	33.1	4 42.0	+56.8	33.2	5 32.3	+56.9	33.2	30
31	0 35.9	+55.5	32.6	1 26.4	+55.7	32.7	2 16.9	+55.9	32.7	3 07.4	+56.1	32.7	3 57.9	+56.3	32.7	4 48.3	+56.6	32.8	5 38.8	+56.7	32.8	6 29.2	+56.9	32.9	31
32	1 31.4	+55.5	32.3	2 22.1	+55.8	32.3	3 12.8	+56.0	32.3	4 03.5	+56.2	32.3	4 54.2	+56.4	32.4	5 44.9	+56.5	32.4	6 35.5	+56.7	32.5	7 26.1	+56.9	32.6	32
33	2 26.9	+55.5	31.9	3 17.9	+55.7	31.9	4 08.8	+55.9	31.9	4 59.7	+56.1	32.0	5 50.5	+56.4	32.0	6 41.4	+56.5	32.1	7 32.2	+56.7	32.2	8 23.0	+56.8	32.2	33
34	3 22.4	+55.5	31.5	4 13.6	+55.7	31.6	5 04.7	+55.9	31.6	5 55.8	+56.1	31.6	6 46.9	+56.3	31.7	7 37.9	+56.5	31.8	8 28.9	+56.7	31.8	9 19.8	+56.9	31.9	34
35	4 17.9	+55.5	31.1	5 09.3	+55.7	31.2	6 00.6	+55.9	31.2	6 51.9	+56.1	31.3	7 43.2	+56.3	31.3	8 34.4	+56.5	31.4	9 25.6	+56.6	31.5	10 16.7	+56.8	31.6	35
36	5 13.4	+55.5	30.7	6 05.0	+55.7	30.8	6 56.5	+55.9	30.9	7 48.0	+56.1	30.9	8 39.5	+56.2	31.0	9 30.9	+56.4	31.1	10 22.2	+56.7	31.2	11 13.5	+56.9	31.3	36
37	6 08.9	+55.5	30.4	7 00.7	+55.6	30.4	7 52.4	+55.9	30.5	8 44.1	+56.0	30.6	9 35.7	+56.3	30.6	10 27.3	+56.5	30.7	11 18.9	+56.6	30.8	12 10.4	+56.8	30.9	37
38	7 04.4	+55.4	30.0	7 56.3	+55.7	30.0	8 48.3	+55.8	30.1	9 40.1	+56.1	30.2	10 32.0	+56.2	30.3	11 23.8	+56.4	30.4	12 15.5	+56.6	30.5	13 07.2	+56.7	30.6	38
39	7 59.8	+55.5	29.6	8 52.0	+55.6	29.7	9 44.1	+55.8	29.8	10 36.2	+56.0	29.8	11 28.2	+56.2	29.9	12 20.2	+56.3	30.0	13 12.1	+56.5	30.2	14 03.9	+56.8	30.3	39
40	8 55.3	+55.4	29.2	9 47.6	+55.6	29.3	10 39.9	+55.8	29.4	11 32.2	+56.0	29.5	12 24.4	+56.2	29.6	13 16.5	+56.4	29.7	14 08.6	+56.6	29.8	15 00.7	+56.7	29.9	40
41	9 50.7	+55.3	28.8	10 43.2	+55.6	28.9	11 35.7	+55.8	29.0	12 28.2	+55.9	29.1	13 20.6	+56.1	29.2	14 12.9	+56.3	29.3	15 05.2	+56.5	29.5	15 57.4	+56.7	29.6	41
42	10 46.0	+55.4	28.4	11 38.8	+55.5	28.5	12 31.5	+55.7	28.6	13 24.1	+55.9	28.7	14 16.7	+56.1	28.9	15 09.2	+56.3	29.0	16 01.7	+56.4	29.1	16 54.1	+56.6	29.3	42
43	11 41.4	+55.3	28.0	12 34.3	+55.5	28.1	13 27.2	+55.7	28.2	14 20.0	+55.9	28.4	15 12.8	+56.1	28.5	16 05.5	+56.3	28.6	16 58.1	+56.5	28.8	17 50.7	+56.6	28.9	43
44	12 36.7	+55.3	27.6	13 29.8	+55.5	27.7	14 22.9	+55.7	27.9	15 15.9	+55.9	28.0	16 08.9	+56.0	28.1	17 01.8	+56.2	28.3	17 54.6	+56.4	28.4	18 47.3	+56.6	28.6	44
45	13 32.0	+55.2	27.2	14 25.3	+55.4	27.4	15 18.6	+55.6	27.5	16 11.8	+55.8	27.6	17 04.9	+56.0	27.7	17 58.0	+56.1	27.9	18 51.0	+56.3	28.0	19 43.9	+56.5	28.2	45
46	14 27.2	+55.2	26.8	15 20.7	+55.4	27.0	16 14.2	+55.6	27.1	17 07.6	+55.7	27.2	18 00.9	+55.9	27.4	18 54.1	+56.2	27.5	19 47.3	+56.3	27.7	20 40.4	+56.5	27.9	46
47	15 22.4	+55.2	26.3	16 16.1	+55.4	26.5	17 09.8	+55.5	26.7	18 03.3	+55.8	26.8	18 56.8	+55.9	27.0	19 50.3	+56.0	27.1	20 43.6	+56.3	27.3	21 36.9	+56.4	27.5	47
48	16 17.6	+55.1	26.0	17 11.5	+55.3	26.2	18 05.3	+55.5	26.3	18 59.1	+55.6	26.4	19 52.7	+55.9	26.6	20 46.3	+56.1	26.8	21 39.9	+56.2	26.9	22 33.3	+56.4	27.1	48
49	17 12.7	+55.0	25.6	18 06.8	+55.2	25.7	19 00.8	+55.4	25.9	19 54.7	+55.6	26.0	20 48.6	+55.8	26.2	21 42.4	+56.0	26.4	22 36.1	+56.1	26.6	23 29.7	+56.3	26.8	49
50	18 07.7	+55.0	25.2	19 02.0	+55.2	25.3	19 56.2	+55.4	25.5	20 50.3	+55.6	25.6	21 44.4	+55.7	25.8	22 38.4	+55.9	26.0	23 32.2	+56.1	26.2	24 26.0	+56.3	26.4	50
51	19 02.7	+55.0	24.8	19 57.2	+55.1	24.9	20 51.6	+55.3	25.1	21 45.9	+55.5	25.2	22 40.1	+55.7	25.4	23 34.3	+55.8	25.6	24 28.3	+56.1	25.8	25 22.3	+56.2	26.0	51
52	19 57.7	+54.9	24.3	20 52.3	+55.1	24.5	21 46.9	+55.2	24.7	22 41.4	+55.4	24.8	23 35.8	+55.6	25.0	24 30.1	+55.8	25.2	25 24.4	+55.9	25.4	26 18.5	+56.2	25.6	52
53	20 52.6	+54.8	23.9	21 47.4	+55.0	24.1	22 42.1	+55.2	24.2	23 36.8	+55.4	24.4	24 31.4	+55.6	24.6	25 25.9	+55.7	24.8	26 20.3	+55.9	25.0	27 14.7	+56.1	25.2	53
54	21 47.4	+54.7	23.5	22 42.4	+54.9	23.6	23 37.3	+55.1	23.8	24 32.2	+55.3	24.0	25 27.0	+55.4	24.2	26 21.6	+55.7	24.4	27 16.2	+55.9	24.6	28 10.8	+56.0	24.8	54
55	22 42.1	+54.7	23.0	23 37.3	+54.9	23.2	24 32.4	+55.1	23.4	25 27.5	+55.2	23.6	26 22.4	+55.4	23.8	27 17.3	+55.6	24.0	28 12.1	+55.7	24.2	29 06.8	+55.9	24.4	55
56	23 36.8	+54.6	22.6	24 32.2	+54.8	22.8	25 27.5	+54.9	22.9	26 22.7	+55.1	23.1	27 17.8	+55.3	23.3	28 12.9	+55.5	23.5	29 07.8	+55.7	23.7	30 02.7	+55.9	24.0	56
57	24 31.4	+54.5	22.1	25 27.0	+54.6	22.3	26 22.4	+54.9	22.5	27 17.8	+55.1	22.7	28 13.1	+55.3	22.9	29 08.4	+55.4	23.1	30 03.5	+55.6	23.3	30 58.6	+55.7	23.6	57
58	25 25.9	+54.4	21.7	26 21.6	+54.6	21.9	27 17.3	+54.8	22.0	28 12.9	+54.9	22.2	29 08.4	+55.1	22.4	30 03.8	+55.3	22.7	30 59.1	+55.5	22.9	31 54.3	+55.7	23.1	58
59	26 20.3	+54.4	21.2	27 16.2	+54.6	21.4	28 12.1	+54.7	21.6	29 07.8	+54.9	21.8	30 03.5	+55.1	22.0	30 59.1	+55.2	22.2	31 54.6	+55.4	22.4	32 50.0	+55.6	22.7	59
60	27 14.7	+54.2	20.7	28 10.8	+54.4	20.9	29 06.8	+54.6	21.1	30 02.7	+54.8	21.3	30 58.6	+54.9	21.5	31 54.3	+55.1	21.8	32 50.0	+55.3	22.0	33 45.6	+55.5	22.2	60
61	28 08.9	+54.1	20.2	29 05.2	+54.3	20.4	30 01.4	+54.4	20.6	30 57.5	+54.6	20.8	31 53.5	+54.8	21.1	32 49.5	+55.0	21.3	33 45.3	+55.2	21.5	34 41.1	+55.4	21.8	61
62	29 03.0	+54.1	19.8	29 59.5	+54.2	19.9	30 55.8	+54.4	20.1	31 52.1	+54.6	20.4	32 48.3	+54.7	20.6	33 44.5	+54.9	20.8	34 40.5	+55.1	21.1	35 36.5	+55.2	21.3	62
63	29 57.1	+53.9	19.3	30 53.7	+54.0	19.4	31 50.2	+54.3	19.7	32 46.7	+54.4	19.9	33 43.1	+54.6	20.1	34 39.4	+54.8	20.3	35 35.6	+55.0	20.6	36 31.7	+55.2	20.8	63
64	30 51.0	+53.7	18.7	31 47.7	+54.0	18.9	32 44.5	+54.1	19.1	33 41.1	+54.3	19.4	34 37.7	+54.5	19.6	35 34.2	+54.6	19.8	36 30.6	+54.8	20.1	37 26.9	+55.0	20.3	64
65	31 44.7	+53.7	18.2	32 41.7	+53.8	18.4	33 38.6	+54.0	18.6	34 35.4	+54.2	18.8	35 32.2	+54.3	19.1	36 28.8	+54.6	19.3	37 25.4	+54.7	19.6	38 21.9	+54.9	19.8	65
66	32 38.4	+53.5	17.7	33 35.5	+53.7	17.9	34 32.6	+53.9	18.1	35 29.6	+54.0	18.3	36 26.5	+54.2	18.6	37 23.4	+54.3	18.8	38 20.1	+54.6	19.1	39 16.8	+54.7	19.3	66
67	33 31.9	+53.4	17.2	34 29.2	+53.6	17.4	35 26.5	+53.7	17.6	36 23.6	+53.9	17.8	37 20.7	+54.1	18.0	38 17.7	+54.3	18.3	39 14.7	+54.4	18.5	40 11.5	+54.6	18.8	67
68	34 25.3	+53.2	16.6	35 22.8	+53.4	16.8	36 20.2	+53.5	17.0	37 17.5	+53.7	17.2	38 14.8	+53.9	17.5	39 12.0	+54.1	17.7	40 09.1	+54.3	18.0	41 06.1	+54.5	18.2	68
69	35 18.5	+53.1	16.0	36 16.2	+53.2	16.2	37 13.7	+53.4	16.5	38 11.2	+53.6	16.7	39 08.7	+53.7	16.9	40 06.1	+53.9	17.1	41 03.4	+54.0	17.4	42 00.6	+54.2	17.7	69
70	36 11.6	+52.9	15.5	37 09.4	+53.0	15.7	38 07.1	+53.3	15.9	39 04.8	+53.4	16.1	40 02.4	+53.6	16.3	41 00.0	+53.7	16.6	41 57.4	+53.9	16.8	42 54.8	+54.1	17.1	70
71	37 04.5	+52.7	14.9	38 02.4	+52.9	15.1	39 00.4	+53.0	15.3	39 58.2	+53.2	15.5	40 56.0	+53.4	15.7	41 53.7	+53.5	16.0	42 51.3	+53.8	16.2	43 48.9	+53.9	16.5	71
72	37 57.2	+52.5	14.3	38 55.3	+52.7	14.5	39 53.4	+52.8	14.7	40 51.4	+53.0	14.9	41 49.4	+53.1	15.1	42 47.2	+53.3	15.4	43 45.1	+53.5	15.6	44 42.8	+53.7	15.9	72
73	38 49.7	+52.4	13.7	39 48.0	+52.5	13.9	40 46.2	+52.7	14.1	41 44.4	+52.8	14.3	42 42.5	+53.0	14.5	43 40.6	+53.1	14.7	44 38.6	+53.3	15.0	45 36.5	+53.5	15.2	73
74	39 42.1	+52.1	13.0	40 40.5	+52.3	13.2	41 38.9	+52.4	13.4	42 37.2	+52.6	13.6	43 35.5	+52.7	13.9	44 33.7	+52.9	14.1	45 31.9	+53.1	14.3	46 30.0	+53.2	14.6	74
75	40 34.2	+51.9	12.4	41 32.8	+52.0	12.6	42 31.3	+52.2	12.8	43 29.8	+52.3	13.0	44 28.2	+52.5	13.2	45 26.6	+52.7	13.4	46 25.0	+52.8	13.7	47 23.2	+53.0	13.9	75
76	41 26.1	+51.6	11.7	42 24.8	+51.8	11.9	43 23.5	+52.0	12.1	44 22.1	+52.1	12.3	45 20.7	+52.3	12.5	46 19.3	+52.4	12.7	47 17.8	+52.6	13.0	48 16.2	+52.8	13.2	76
77	42 17.7	+51.5	11.0	43 16.6	+51.6	11.2	44 15.5	+51.6	11.4	45 14.2	+51.9	11.6	46 13.0	+52.0	11.8	47 11.7	+52.1	12.0	48 10.4	+52.3	12.3	49 09.0	+52.4	12.5	77
78	43 09.2	+51.1	10.3	44 08.2	+51.2	10.5	45 07.1	+51.5	10.7	46 06.1	+51.5	10.9	47 05.0	+51.7	11.1	48 03.8	+51.9	11.3	49 02.7	+52.0	11.5	50 01.4	+52.2	11.8	78
79	44 00.3	+50.9	9.6	44 59.4	+51.0	9.8	45 58.6	+51.1	9.9	46 57.6	+51.3	10.1	47 56.7	+51.4	10.3	48 55.7	+51.5	10.5	49 54.7	+51.6	10.7	50 53.6	+51.8	11.0	79
80	44 51.2	+50.5	8.9	45 50.4	+50.7	9.0	46 49.7	+50.8	9.2	47 48.9	+50.9	9.4	48 48.1	+51.1	9.6	49 47.2	+51.2	9.7	50 46.3	+51.4	10.0	51 45.4	+51.5	10.2	80
81	45 41.7	+50.3	8.1	46 41.1	+50.4	8.3	47 40.5	+50.5	8.4	48 39.8	+50.6	8.6	49 39.2	+50.7	8.7	50 38.4	+50.9	8.9	51 37.7	+51.0	9.1	52 36.9	+51.1	9.3	81
82	46 32.0	+49.9	7.3	47 31.5	+50.0	7.5	48 31.0	+50.1	7.6	49 30.4	+50.3	7.8	50 29.9	+50.3	7.9	51 29.3	+50.5	8.1	52 28.7	+50.6	8.3	53 28.0	+50.8	8.5	82
83	47 21.9	+49.6	6.5	48 21.5	+49.7	6.6	49 21.1	+49.8	6.8	50 20.7	+49.8	6.9	51 20.2	+50.0	7.1	52 19.8	+50.0	7.2	53 19.3	+50.2	7.4	54 18.8	+50.3	7.6	83
84	48 11.5	+49.2	5.8	49 11.2	+49.2	5.9	50 10.9	+49.3	5.9	51 10.5	+49.5	6.0	52 10.2	+49.5	6.2	53 09.8	+49.7	6.3	54 09.5	+49.7	6.5	55 09.1	+49.8	6.6	84
85	49 00.7	+48.7	4.8	50 00.4	+48.9	4.9	51 00.2	+48.9	5.0	52 00.0	+49.0	5.1	52 59.7	+49.1	5.2	53 59.5	+49.2	5.4	54 59.2	+49.3	5.5	55 58.9	+49.4	5.6	85
86	49 49.4	+48.4	3.9	50 49.3	+48.4	4.0	51 49.1	+48.5	4.1	52 49.0	+48.5	4.2	53 48.8	+48.6	4.3	54 48.7	+48.6	4.4	55 48.5	+48.7	4.5	56 48.3	+48.8	4.6	86
87	50 37.8	+47.9	3.0	51 37.7	+47.9	3.0	52 37.6	+48.0	3.1	53 37.5	+48.1	3.2	54 37.4	+48.1	3.2	55 37.3	+48.2	3.3	56 37.2	+48.2	3.4	57 37.1	+48.3	3.5	87
88	51 25.7	+47.4	2.0	52 25.6	+47.5	2.1	53 25.6	+47.5	2.1	54 25.6	+47.5	2.2	55 25.5	+47.6	2.2	56 25.5	+47.5	2.3	57 25.4	+47.6	2.3	58 25.4	+47.6	2.4	88
89	52 13.1	+46.9	1.0	53 13.1	+46.9	1.1	54 13.1	+46.9	1.1	55 13.1	+46.9	1.1	56 13.0	+46.9	1.1	57 13.0	+47.0	1.2	58 13.0	+47.0	1.2	59 13.0	+47.0	1.2	89
90	53 00.0	+46.3	0.0	54 00.0	+46.3	0.0	55 00.0	+46.3	0.0	56 00.0	+46.3	0.0	57 00.0	+46.3	0.0	58 00.0	+46.3	0.0	59 00.0	+46.3	0.0	60 00.0	+46.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION   L.H.A. **141°, 219°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	27 27.2	+53.9	133.6	26 45.7	+54.3	134.0	26 03.9	+54.6	134.3	25 21.8	+55.0	134.7	24 39.5	+55.4	135.0	23 57.0	+55.7	135.3	23 14.2	+56.0	135.6	22 31.3	+56.2	135.9	0
1	28 21.1	+53.8	133.1	27 40.0	+54.2	133.5	26 58.5	+54.6	133.9	26 16.8	+55.0	134.2	25 34.9	+55.2	134.6	24 52.7	+55.5	134.9	24 10.2	+55.9	135.2	23 27.5	+56.2	135.5	1
2	29 14.9	+53.8	132.6	28 34.2	+54.1	133.0	27 53.1	+54.5	133.4	27 11.8	+54.8	133.8	26 30.1	+55.2	134.1	25 48.2	+55.5	134.5	25 06.1	+55.8	134.8	24 23.7	+56.1	135.1	2
3	30 08.7	+53.6	132.1	29 28.3	+54.0	132.5	28 47.6	+54.4	132.9	28 06.6	+54.8	133.3	27 25.3	+55.1	133.7	26 43.7	+55.5	134.1	26 01.9	+55.7	134.4	25 19.8	+56.0	134.8	3
4	31 02.3	+53.4	131.6	30 22.3	+53.9	132.0	29 42.0	+54.3	132.4	29 01.4	+54.6	132.8	28 20.4	+55.0	133.2	27 39.2	+55.3	133.6	26 57.6	+55.7	134.0	26 15.8	+56.0	134.4	4
5	31 55.7	+53.4	131.0	31 16.2	+53.7	131.5	30 36.3	+54.1	131.9	29 56.0	+54.5	132.4	29 15.4	+54.9	132.8	28 34.5	+55.3	133.2	27 53.3	+55.6	133.6	27 11.8	+55.9	134.0	5
6	32 49.1	+53.2	130.5	32 09.9	+53.7	131.0	31 30.4	+54.1	131.4	30 50.5	+54.5	131.9	30 10.3	+54.8	132.3	29 29.8	+55.1	132.7	28 48.9	+55.5	133.1	28 07.7	+55.8	133.5	6
7	33 42.3	+53.1	129.9	33 03.6	+53.4	130.4	32 24.5	+53.9	130.9	31 45.0	+54.3	131.4	31 05.1	+54.7	131.8	30 24.9	+55.1	132.2	29 44.4	+55.4	132.7	29 03.5	+55.8	133.1	7
8	34 35.3	+52.9	129.4	33 57.0	+53.4	129.9	33 18.4	+53.9	130.4	32 39.3	+54.2	130.9	31 59.8	+54.6	131.4	31 20.0	+55.0	131.8	30 39.8	+55.3	132.3	29 59.3	+55.7	132.7	8
9	35 28.2	+52.7	128.8	34 50.4	+53.2	129.3	34 12.1	+53.7	129.9	33 33.5	+54.1	130.4	32 54.4	+54.5	130.9	32 15.0	+54.8	131.4	31 35.1	+55.3	131.8	30 55.0	+55.6	132.3	9
10	36 20.9	+52.5	128.2	35 43.6	+53.0	128.8	35 05.8	+53.5	129.3	34 27.6	+53.9	129.8	33 48.9	+54.3	130.4	33 09.8	+54.8	130.9	32 30.4	+55.1	131.4	31 50.6	+55.4	131.8	10
11	37 13.4	+52.4	127.6	36 36.6	+52.8	128.2	35 59.3	+53.3	128.8	35 21.5	+53.8	129.3	34 43.2	+54.3	129.9	34 04.6	+54.6	130.4	33 25.5	+55.0	130.9	32 46.0	+55.4	131.4	11
12	38 05.8	+52.1	127.0	37 29.4	+52.7	127.6	36 52.6	+53.2	128.2	36 15.3	+53.6	128.8	35 37.5	+54.0	129.3	34 59.2	+54.5	129.9	34 20.5	+54.9	130.4	33 41.4	+55.3	130.9	12
13	38 57.9	+52.0	126.3	38 22.1	+52.5	127.0	37 45.8	+52.9	127.6	37 08.9	+53.5	128.2	36 31.5	+54.0	128.8	35 53.7	+54.4	129.4	35 15.4	+54.8	129.9	34 36.7	+55.2	130.4	13
14	39 49.9	+51.7	125.7	39 14.6	+52.3	126.4	38 38.7	+52.8	127.0	38 02.4	+53.3	127.6	37 25.5	+53.8	128.2	36 48.1	+54.2	128.8	36 10.2	+54.7	129.4	35 31.9	+55.1	130.0	14
15	40 41.6	+51.5	125.0	40 06.9	+52.0	125.7	39 31.5	+52.6	126.4	38 55.7	+53.1	127.0	38 19.3	+53.6	127.7	37 42.3	+54.1	128.3	37 04.9	+54.5	128.9	36 27.0	+54.9	129.5	15
16	41 33.1	+51.2	124.3	40 58.9	+51.5	125.1	40 24.1	+52.4	125.8	39 48.8	+52.9	126.4	39 12.9	+53.4	127.1	38 36.4	+53.9	127.7	37 59.4	+54.4	128.3	37 21.9	+54.8	129.0	16
17	42 24.3	+51.0	123.6	41 50.8	+51.5	124.4	41 16.5	+52.2	125.1	40 41.7	+52.7	125.8	40 06.3	+53.2	126.5	39 30.3	+53.8	127.2	38 53.8	+54.2	127.8	38 16.7	+54.7	128.5	17
18	43 15.3	+50.7	122.9	42 42.3	+51.4	123.7	42 08.7	+51.9	124.5	41 34.4	+52.6	125.2	40 59.6	+53.0	125.9	40 24.1	+53.5	126.6	39 48.0	+54.1	127.3	39 11.4	+54.5	127.9	18
19	44 06.0	+50.4	122.2	43 33.7	+51.0	123.0	43 00.6	+51.7	123.8	42 27.0	+52.2	124.5	41 52.6	+52.9	125.3	41 17.6	+53.4	126.0	40 42.1	+53.9	126.7	40 05.9	+54.4	127.4	19
20	44 56.4	+50.1	121.4	44 24.7	+50.8	122.3	43 52.3	+51.5	123.1	43 19.2	+51.2	123.9	42 45.5	+52.6	124.6	42 11.0	+53.2	125.4	41 36.0	+53.7	126.1	41 00.3	+54.2	126.8	20
21	45 46.5	+49.7	120.6	45 15.5	+50.5	121.5	44 43.8	+51.1	122.4	44 11.3	+51.8	123.2	43 38.1	+52.4	124.0	43 04.2	+53.0	124.8	42 29.7	+53.5	125.5	41 54.5	+54.0	126.3	21
22	46 36.2	+49.4	119.8	46 06.0	+50.1	120.7	45 34.9	+50.9	121.6	45 03.1	+51.5	122.5	44 30.5	+52.1	123.3	43 57.2	+52.7	124.1	43 23.2	+53.3	124.9	42 48.5	+53.9	125.7	22
23	47 25.6	+49.1	119.0	46 56.1	+49.8	119.9	46 25.8	+50.5	120.9	45 54.6	+51.2	121.7	45 22.6	+51.9	122.6	44 49.9	+52.5	123.5	44 16.5	+53.1	124.3	43 42.4	+53.6	125.1	23
24	48 14.7	+48.6	118.1	47 45.9	+49.5	119.1	47 16.3	+50.2	120.1	46 45.8	+50.9	121.0	46 14.5	+51.6	121.9	45 42.4	+52.3	122.8	45 09.6	+52.8	123.6	44 36.0	+53.4	124.4	24
25	49 03.3	+48.2	117.3	48 35.4	+49.0	118.3	48 06.5	+49.8	119.3	47 36.7	+50.6	120.2	47 06.1	+51.3	121.1	46 34.7	+51.9	122.1	46 02.4	+52.6	122.9	45 29.4	+53.2	123.8	25
26	49 51.5	+47.8	116.3	49 24.4	+48.7	117.4	48 56.3	+49.5	118.4	48 27.3	+50.3	119.4	47 57.4	+51.0	120.4	47 26.6	+51.7	121.3	46 55.0	+52.4	122.2	46 22.6	+53.0	123.1	26
27	50 39.3	+47.3	115.4	50 13.1	+48.2	116.5	49 45.8	+49.1	117.5	49 17.6	+49.8	118.6	48 48.4	+50.7	119.6	48 18.3	+51.4	120.6	47 47.4	+52.1	121.5	47 15.6	+52.7	122.4	27
28	51 26.6	+46.8	114.4	51 01.3	+47.7	115.5	50 34.9	+48.6	116.6	50 07.4	+49.5	117.7	49 39.1	+50.3	118.8	49 09.7	+51.1	119.8	48 39.5	+51.7	120.8	48 08.3	+52.5	121.7	28
29	52 13.4	+46.2	113.4	51 49.0	+47.2	114.6	51 23.5	+48.2	115.7	50 56.9	+49.1	116.8	50 29.3	+49.9	117.9	50 00.8	+50.7	119.0	49 31.2	+51.5	120.0	49 00.8	+52.1	121.0	29
30	52 59.6	+45.7	112.4	52 36.2	+46.7	113.6	52 11.7	+47.6	114.8	51 46.0	+48.6	115.9	51 19.2	+49.5	117.0	50 51.5	+50.3	118.1	50 22.7	+51.1	119.2	49 52.9	+51.9	120.2	30
31	53 45.3	+45.1	111.3	53 22.9	+46.2	112.5	52 59.3	+47.2	113.8	52 34.6	+48.1	115.0	52 08.7	+49.1	116.1	51 41.8	+49.9	117.3	51 13.8	+50.7	118.4	50 44.8	+51.5	119.5	31
32	54 30.4	+44.4	110.1	54 09.1	+45.5	111.4	53 46.5	+46.6	112.7	53 22.7	+47.7	114.0	52 57.8	+48.6	115.2	52 31.7	+49.5	116.4	52 04.5	+50.4	117.5	51 36.3	+51.1	118.6	32
33	55 14.8	+43.7	109.0	54 54.6	+44.9	110.3	54 33.1	+46.0	111.6	54 10.4	+47.0	112.9	53 46.4	+48.1	114.2	53 21.2	+49.0	115.4	52 54.9	+49.9	116.6	52 27.4	+50.8	117.8	33
34	55 58.5	+43.0	107.8	55 39.5	+44.2	109.2	55 19.1	+45.4	110.5	54 57.4	+46.5	111.9	54 34.5	+47.5	113.2	54 10.2	+48.6	114.4	53 44.8	+49.5	115.7	53 18.2	+50.4	116.9	34
35	56 41.5	+42.1	106.5	56 23.7	+43.5	107.9	56 04.5	+44.7	109.4	55 43.9	+45.9	110.7	55 22.0	+47.0	112.1	54 58.8	+48.0	113.4	54 34.3	+49.0	114.7	54 08.6	+49.9	116.0	35
36	57 23.6	+41.4	105.2	57 07.2	+42.7	106.7	56 49.2	+44.0	108.2	56 29.8	+45.2	109.6	56 09.0	+46.3	111.0	55 46.8	+47.5	112.4	55 23.3	+48.5	113.7	54 58.5	+49.5	115.0	36
37	58 05.0	+40.4	103.8	57 49.9	+41.8	105.4	57 33.2	+43.2	106.9	57 15.0	+44.5	108.4	56 55.3	+45.7	109.8	56 34.3	+46.8	111.3	56 11.8	+47.9	112.7	55 48.0	+49.0	114.0	37
38	58 45.4	+39.5	102.4	58 31.7	+40.9	104.0	58 16.4	+42.3	105.6	57 59.5	+43.7	107.1	57 41.0	+45.0	108.6	57 21.1	+46.2	110.1	56 59.7	+47.4	111.6	56 37.0	+48.4	113.0	38
39	59 24.9	+38.5	101.0	59 12.6	+40.0	102.6	58 58.7	+41.5	104.2	58 43.2	+42.8	105.8	58 26.0	+44.2	107.4	58 07.3	+45.5	108.9	57 47.1	+46.7	110.4	57 25.4	+47.8	111.9	39
40	60 03.4	+37.3	99.4	59 52.6	+39.0	101.1	59 40.2	+40.5	102.8	59 26.0	+42.0	104.5	59 10.2	+43.4	106.1	58 52.8	+44.7	107.7	58 33.8	+46.0	109.2	58 13.2	+47.2	110.8	40
41	60 40.7	+36.2	97.9	60 31.6	+37.9	99.6	60 20.7	+39.5	101.3	60 08.0	+41.1	103.0	59 53.6	+42.5	104.7	59 37.5	+44.0	106.4	59 19.8	+45.2	108.0	59 00.4	+46.5	109.6	41
42	61 16.9	+35.0	96.2	61 09.5	+36.7	98.0	61 00.2	+38.4	99.8	60 49.1	+40.0	101.6	60 36.1	+41.6	103.3	60 21.5	+43.0	105.0	60 05.0	+44.5	106.7	59 47.0	+45.8	108.4	42
43	61 51.9	+33.6	94.5	61 46.2	+35.5	96.4	61 38.6	+37.2	98.2	61 29.1	+38.9	100.0	61 17.7	+40.6	101.8	61 04.5	+42.1	103.6	60 49.5	+43.6	105.3	60 32.8	+45.0	107.1	43
44	62 25.5	+32.2	92.7	62 21.7	+34.1	94.6	62 15.8	+36.0	96.5	62 08.0	+37.7	98.4	61 58.3	+39.4	100.3	61 46.6	+41.1	102.1	61 33.1	+42.7	103.9	61 17.8	+44.1	105.7	44
45	62 57.7	+30.8	90.9	62 55.8	+32.7	92.8	62 51.8	+34.6	94.8	62 45.8	+36.5	96.7	62 37.7	+38.3	98.7	62 27.7	+40.0	100.6	62 15.8	+41.6	102.4	62 01.9	+43.2	104.3	45
46	63 28.5	+29.2	89.0	63 28.5	+31.2	91.0	63 26.4	+33.3	93.0	63 22.3	+35.1	95.0	63 16.0	+37.1	97.0	63 07.7	+38.9	98.9	62 57.4	+40.6	100.9	62 45.1	+42.3	102.8	46
47	63 57.7	+27.5	87.0	63 59.7	+29.7	89.1	63 59.7	+31.7	91.1	63 57.4	+33.7	93.2	63 53.1	+35.6	95.2	63 46.6	+37.5	97.2	63 38.0	+39.4	99.2	63 27.4	+41.1	101.2	47
48	64 25.2	+25.8	85.0	64 29.4	+27.9	87.1	64 31.4	+30.0	89.2	64 31.1	+32.2	91.3	64 28.7	+34.3	93.3	64 24.1	+36.3	95.4	64 17.4	+38.1	97.5	64 08.5	+40.0	99.5	48
49	64 51.0	+23.9	82.9	64 57.3	+26.2	85.0	65 01.4	+28.4	87.1	65 03.3	+30.6	89.3	65 03.0	+32.6	91.4	65 00.4	+34.7	93.6	64 55.5	+36.8	95.7	64 48.5	+38.6	97.8	49
50	65 14.9	+21.9	80.7	65 23.5	+24.2	82.8	65 29.8	+26.6	85.0	65 33.9	+28.8	87.2	65 35.6	+31.1	89.4	65 35.1	+33.2	91.6	65 32.3	+35.3	93.8	65 27.1	+37.4	96.0	50
51	65 36.8	+20.0•	78.4	65 47.7	+22.3•	80.6	65 56.4	+24.6•	82.8	66 02.7	+26.9	85.1	66 06.7	+29.2	87.3	66 08.3	+31.5	89.6	66 07.6	+33.7	91.8	66 04.5	+35.9	94.1	51
52	65 56.8	+17.8•	76.1	66 10.0	+20.2•	78.3	66 21.0	+22.6•	80.6	66 29.6	+25.1•	82.8	66 35.9	+27.4	85.1	66 39.8	+29.7	87.5	66 41.3	+32.0	89.8	66 40.3	+34.2	92.1	52
53	66 14.6	+15.6•	73.8	66 30.2	+18.1•	76.0	66 43.6	+20.5•	78.3	66 54.7	+22.9•	80.5	67 03.3	+25.4•	82.9	67 09.5	+27.8	85.2	67 13.3	+30.1	87.6	67 14.5	+32.5	90.0	53
54	66 30.2	+13.4•	71.4	66 48.3	+15.8•	73.6	67 04.1	+18.3•	75.9	67 17.6	+20.8•	78.2	67 28.7	+23.3•	80.5	67 37.3	+25.8•	82.9	67 43.4	+28.3•	85.4	67 47.0	+30.7	87.8	54
55	66 43.6	+11.1•	68.9	67 04.1	+13.5•	71.1	67 22.4	+16.0•	73.4	67 38.4	+18.5•	75.7	67 52.0	+21.0•	78.1	68 03.1	+23.6•	80.5	68 11.7	+26.1•	83.0	68 17.7	+28.7•	85.5	55
56	66 54.7	+8.6•	66.4	67 17.6	+11.1•	68.6	67 38.4	+13.6•	70.9	67 56.9	+16.1•	73.2	68 13.0	+18.7•	75.6	68 26.7	+21.3•	78.1	68 37.8	+24.0•	80.6	68 46.4	+26.5•	83.1	56
57	67 03.3	+6.2•	63.9	67 28.7	+8.6•	66.1	67 52.0	+11.1•	68.3	68 13.0	+13.7•	70.6	68 31.7	+16.3•	73.0	68 48.0	+18.9•	75.5	69 01.8	+21.6•	78.0	69 12.9	+24.3•	80.6	57
58	67 09.5	+3.8•	61.3	67 37.3	+6.1•	63.5	68 03.1	+8.6•	65.7	68 26.7	+11.1•	68.0	68 48.0	+13.8•	70.4	69 06.9	+16.5•	72.8	69 23.4	+19.1•	75.4	69 37.2	+21.9•	78.0	58
59	67 13.3	+1.2•	58.8	67 43.4	+3.6•	60.9	68 11.7	+6.0•	63.0	68 37.8	+8.6•	65.3	69 01.8	+11.1•	67.7	69 23.4	+13.8•	70.1	69 42.5	+16.6•	72.7	69 59.1	+19.3•	75.3	59
60	67 14.5	−1.2•	56.2	67 47.0	+1.1•	58.2	68 17.7	+3.4•	60.3	68 46.4	+5.8•	62.6	69 12.9	+8.5•	64.9	69 37.2	+11.1•	67.4	69 59.1	+13.8•	69.9	70 18.4	+16.7•	72.5	60
61	67 13.3	−3.7•	53.6	67 48.1	−1.6•	55.6	68 21.1	+0.8•	57.6	68 52.2	+3.2•	59.8	69 21.4	+5.7•	62.1	69 48.3	+8.4•	64.5	70 12.9	+11.1•	67.0	70 35.1	+13.9•	69.6	61
62	67 09.6	−6.2•	51.0	67 46.5	−4.1•	52.9	68 21.9	−1.9•	54.9	68 55.4	+0.5•	57.1	69 27.1	+2.9•	59.3	69 56.7	+5.5•	61.6	70 24.0	+8.3•	64.1	70 49.0	+11.0•	66.7	62
63	67 03.4	−8.7•	48.5	67 42.4	−6.6•	50.3	68 20.0	−4.5•	52.2	68 55.9	−2.2•	54.3	69 30.0	+0.2•	56.4	70 02.2	+2.6•	58.7	70 32.3	+5.3•	61.1	71 00.0	+8.1•	63.7	63
64	66 54.7	−11.0•	45.9	67 35.8	−9.1•	47.7	68 15.5	−7.1•	49.5	68 53.7	−5.0•	51.5	69 30.2	−2.7•	53.6	70 04.8	−0.2•	55.8	70 37.6	+2.3•	58.1	71 08.1	+5.1•	60.6	64
65	66 43.7	−13.3•	43.4	67 26.7	−11.6•	45.1	68 08.4	−9.7•	46.9	68 48.7	−7.6•	48.7	69 27.5	−5.4•	50.7	70 04.6	−3.1•	52.9	70 39.9	−0.7•	55.1	71 13.2	+1.9•	57.5	65
66	66 30.4	−15.7•	41.0	67 15.1	−13.9•	42.5	67 58.7	−12.1•	44.2	68 41.1	−10.2•	46.0	69 22.1	−8.2•	47.9	70 01.5	−6.0•	49.9	70 39.2	−3.6•	52.1	71 15.1	−1.1•	54.4	66
67	66 14.7	−17.8•	38.6	67 01.2	−16.3•	40.0	67 46.6	−14.6•	41.6	68 30.9	−12.8•	43.3	69 13.9	−10.9•	45.1	69 55.5	−8.8•	47.0	70 35.6	−6.5•	49.1	71 14.0	−4.2•	51.3	67
68	65 56.9	−19.9•	36.2	66 44.9	−18.5•	37.6	67 32.0	−17.0•	39.1	68 18.1	−15.3•	40.8	69 03.0	−13.5•	42.3	69 46.7	−11.5•	44.2	70 29.1	−9.5•	46.1	71 09.8	−7.2•	48.2	68
69	65 37.0	−22.0	33.9	66 26.4	−20.6•	35.2	67 15.0	−19.2•	36.6	68 02.8	−17.7•	38.0	68 49.5	−16.0•	39.6	69 35.2	−14.3•	41.3	70 19.6	−12.3•	43.2	71 02.6	−10.2•	45.2	69
70	65 15.0	−23.8	31.7	66 05.8	−22.7•	32.9	66 55.8	−21.4•	34.1	67 45.1	−20.0•	35.5	68 33.5	−18.5•	37.0	69 20.9	−16.8•	38.6	70 07.3	−15.1•	40.3	70 52.4	−13.1•	42.1	70
71	64 51.2	−25.8	29.5	65 43.1	−24.7	30.6	66 34.4	−23.4•	31.8	67 25.1	−22.2•	33.0	68 15.0	−20.8•	34.4	69 04.1	−19.3•	35.9	69 52.2	−17.7•	37.5	70 39.3	−15.9•	39.2	71
72	64 25.4	−27.5	27.4	65 18.4	−26.5	28.4	66 11.0	−25.5	29.5	67 02.9	−24.3•	30.6	67 54.2	−23.1•	31.9	68 44.8	−21.7•	33.2	69 34.5	−20.2•	34.7	70 23.4	−18.6•	36.3	72
73	63 57.9	−29.2	25.4	64 51.9	−28.3	26.3	65 45.5	−27.3	27.2	66 38.6	−26.3	28.3	67 31.1	−25.1•	29.4	68 23.1	−24.0•	30.7	69 14.3	−22.6•	32.0	70 04.8	−21.2•	33.5	73
74	63 28.7	−30.7	23.4	64 23.6	−29.9	24.2	65 18.2	−29.1	25.1	66 12.3	−28.2	26.0	67 06.0	−27.2•	27.1	67 59.1	−26.1•	28.2	68 51.7	−24.9•	29.4	69 43.6	−23.6•	30.8	74
75	62 58.0	−32.2	21.5	63 53.7	−31.5	22.2	64 49.1	−30.8	23.0	65 44.1	−29.9	23.9	66 38.8	−29.1	24.8	67 33.0	−28.1	25.8	68 26.8	−27.1•	26.9	69 20.0	−25.9•	28.1	75
76	62 25.8	−33.7	19.6	63 22.2	−33.0	20.3	64 18.3	−32.3	21.0	65 14.2	−31.7	21.8	66 09.7	−30.8	22.6	67 04.9	−30.0	23.5	67 59.7	−29.1	24.5	68 54.1	−28.1•	25.6	76
77	61 52.1	−34.9	17.9	62 49.2	−34.4	18.5	63 46.0	−33.9	19.1	64 42.5	−33.1	19.8	65 38.9	−32.5	20.5	66 34.9	−31.8	21.3	67 30.6	−30.9	22.2	68 26.0	−30.1	23.2	77
78	61 17.2	−36.2	16.2	62 14.8	−35.8	16.7	63 12.1	−35.2	17.2	64 09.4	−34.7	17.9	65 06.4	−34.1	18.5	66 03.1	−33.4	19.2	66 59.7	−32.8	20.0	67 55.9	−32.0	20.8	78
79	60 41.0	−37.3	14.5	61 39.0	−36.9	15.0	62 36.9	−36.5	15.5	63 34.7	−36.1	16.0	64 32.3	−35.6	16.6	65 29.7	−35.0	17.2	66 26.9	−34.4	17.9	67 23.9	−33.8	18.6	79
80	60 03.7	−38.5	12.9	61 02.1	−38.1	13.3	62 00.4	−37.7	13.8	62 58.6	−37.3	14.2	63 56.7	−36.9	14.7	64 54.7	−36.4	15.3	65 52.5	−35.9	15.8	66 50.1	−35.4	16.5	80
81	59 25.2	−39.5	11.4	60 24.0	−39.2	11.7	61 22.7	−38.9	12.1	62 21.3	−38.5	12.5	63 19.8	−38.1	12.9	64 18.3	−37.7	13.4	65 16.6	−37.4	13.9	66 14.7	−36.9	14.5	81
82	58 45.7	−40.4	9.9	59 44.8	−40.2	10.2	60 43.8	−39.9	10.5	61 42.8	−39.7	10.9	62 41.7	−39.4	11.2	63 40.5	−39.0	11.6	64 39.2	−38.7	12.1	65 37.8	−38.3	12.5	82
83	58 05.3	−41.3	8.5	59 04.6	−41.1	8.8	60 03.9	−40.9	9.0	61 03.1	−40.6	9.3	62 02.3	−40.4	9.6	63 01.5	−40.2	9.9	64 00.5	−39.9	10.3	64 59.5	−39.6	10.7	83
84	57 24.0	−42.2	7.2	58 23.5	−42.0	7.4	59 23.0	−41.9	7.6	60 22.5	−41.7	7.8	61 21.9	−41.5	8.1	62 21.3	−41.3	8.3	63 20.6	−41.0	8.6	64 19.9	−40.8	8.9	84
85	56 41.8	−43.0	5.9	57 41.5	−42.9	6.0	58 41.1	−42.7	6.2	59 40.8	−42.6	6.4	60 40.4	−42.4	6.6	61 40.0	−42.3	6.8	62 39.6	−42.1	7.0	63 39.1	−41.9	7.3	85
86	55 58.8	−43.7	4.6	56 58.6	−43.6	4.7	57 58.4	−43.5	4.9	58 58.2	−43.4	5.0	59 58.0	−43.3	5.1	60 57.7	−43.2	5.3	61 57.5	−43.1	5.5	62 57.2	−43.0	5.7	86
87	55 15.1	−44.4	3.4	56 15.0	−44.3	3.5	57 14.9	−44.3	3.6	58 14.8	−44.2	3.7	59 14.7	−44.2	3.8	60 14.5	−44.0	3.9	61 14.4	−44.0	4.0	62 14.2	−43.9	4.1	87
88	54 30.7	−45.0	2.2	55 30.7	−45.0	2.3	56 30.6	−45.0	2.3	57 30.6	−45.0	2.4	58 30.5	−44.9	2.5	59 30.5	−44.9	2.5	60 30.4	−44.8	2.6	61 30.3	−44.7	2.7	88
89	53 45.7	−45.7	1.1	54 45.7	−45.7	1.1	55 45.6	−45.6	1.1	56 45.6	−45.6	1.2	57 45.6	−45.6	1.2	58 45.6	−45.6	1.2	59 45.6	−45.6	1.3	60 45.6	−45.6	1.3	89
90	53 00.0	−46.2	0.0	54 00.0	−46.3	0.0	55 00.0	−46.3	0.0	56 00.0	−46.3	0.0	57 00.0	−46.3	0.0	58 00.0	−46.3	0.0	59 00.0	−46.3	0.0	60 00.0	−46.3	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	27 27.2	−54.1	133.6	26 45.7	−54.5	134.0	26 03.9	−54.8	134.3	25 21.8	−55.1	134.7	24 39.5	−55.4	135.0	23 57.0	−55.7	135.3	23 14.2	−56.0	135.6	22 31.3	−56.3	135.9	0
1	26 33.1	−54.1	134.1	25 51.2	−54.5	134.4	25 09.1	−54.8	134.8	24 26.7	−55.1	135.1	23 44.1	−55.4	135.4	23 01.3	−55.8	135.7	22 18.2	−56.1	136.0	21 35.0	−56.4	136.3	1
2	25 39.0	−54.3	134.6	24 56.7	−54.5	134.9	24 14.3	−54.9	135.2	23 31.6	−55.2	135.5	22 48.7	−55.6	135.8	22 05.5	−55.8	136.1	21 22.2	−56.1	136.4	20 38.7	−56.4	136.6	2
3	24 44.7	−54.3	135.0	24 02.2	−54.7	135.3	23 19.4	−55.0	135.7	22 36.4	−55.3	136.0	21 53.1	−55.6	136.2	21 09.7	−55.9	136.5	20 26.1	−56.2	136.8	19 42.3	−56.5	137.0	3
4	23 50.4	−54.3	135.5	23 07.5	−54.7	135.8	22 24.4	−55.1	136.1	21 41.1	−55.4	136.4	20 57.5	−55.6	136.6	20 13.8	−55.9	136.9	19 29.9	−56.2	137.1	18 45.9	−56.5	137.4	4
5	22 56.0	−54.5	135.9	22 12.8	−54.8	136.2	21 29.3	−55.1	136.5	20 45.7	−55.4	136.8	20 01.9	−55.7	137.0	19 17.9	−56.0	137.3	18 33.7	−56.2	137.5	17 49.4	−56.5	137.7	5
6	22 01.5	−54.6	136.4	21 18.0	−54.9	136.7	20 34.2	−55.2	136.9	19 50.3	−55.5	137.2	19 06.2	−55.8	137.4	18 21.9	−56.0	137.7	17 37.5	−56.3	137.9	16 52.9	−56.5	138.1	6
7	21 06.9	−54.6	136.8	20 23.1	−55.0	137.1	19 39.0	−55.2	137.4	18 54.8	−55.5	137.6	18 10.4	−55.8	137.8	17 25.9	−56.1	138.0	16 41.2	−56.3	138.2	15 56.4	−56.6	138.4	7
8	20 12.3	−54.7	137.3	19 28.1	−55.0	137.5	18 43.8	−55.3	137.8	17 59.3	−55.6	138.0	17 14.6	−55.8	138.2	16 29.8	−56.1	138.4	15 44.9	−56.4	138.6	14 59.8	−56.6	138.8	8
9	19 17.6	−54.8	137.7	18 33.1	−55.0	138.0	17 48.5	−55.4	138.2	17 03.7	−55.6	138.4	16 18.8	−55.9	138.6	15 33.7	−56.1	138.8	14 48.5	−56.4	139.0	14 03.2	−56.6	139.1	9
10	18 22.8	−54.8	138.2	17 38.1	−55.1	138.4	16 53.1	−55.3	138.6	16 08.1	−55.7	138.8	15 22.9	−55.9	139.0	14 37.6	−56.2	139.1	13 52.1	−56.4	139.3	13 06.6	−56.7	139.5	10
11	17 28.0	−54.8	138.6	16 43.0	−55.2	138.8	15 57.8	−55.5	139.0	15 12.4	−55.7	139.3	14 27.0	−56.0	139.3	13 41.4	−56.2	139.5	12 55.7	−56.4	139.7	12 09.9	−56.6	139.8	11
12	16 33.2	−55.0	139.0	15 47.8	−55.2	139.2	15 02.3	−55.5	139.4	14 16.7	−55.7	139.6	13 31.0	−56.0	139.7	12 45.2	−56.2	139.9	11 59.3	−56.5	140.0	11 13.3	−56.7	140.1	12
13	15 38.2	−54.9	139.4	14 52.6	−55.3	139.6	14 06.8	−55.5	139.8	13 21.0	−55.8	139.9	12 35.0	−56.0	140.1	11 49.0	−56.3	140.2	11 02.8	−56.5	140.3	10 16.6	−56.8	140.5	13
14	14 43.3	−55.0	139.8	13 57.4	−55.3	140.0	13 11.3	−55.5	140.2	12 25.2	−55.8	140.3	11 39.0	−56.1	140.4	10 52.7	−56.3	140.6	10 06.3	−56.5	140.7	9 19.8	−56.7	140.8	14
15	13 48.3	−55.1	140.3	13 02.1	−55.4	140.4	12 15.8	−55.6	140.6	11 29.4	−55.8	140.7	10 42.9	−56.0	140.8	9 56.4	−56.3	140.9	9 09.8	−56.5	141.0	8 23.1	−56.7	141.1	15
16	12 53.2	−55.1	140.7	12 06.7	−55.3	140.8	11 20.2	−55.6	140.9	10 33.6	−55.9	141.1	9 46.9	−56.1	141.2	9 00.1	−56.3	141.3	8 13.3	−56.6	141.4	7 26.4	−56.8	141.5	16
17	11 58.1	−55.1	141.1	11 11.4	−55.4	141.2	10 24.6	−55.6	141.3	9 37.7	−55.9	141.4	8 50.8	−56.1	141.5	8 03.8	−56.4	141.6	7 16.7	−56.5	141.7	6 29.6	−56.8	141.8	17
18	11 03.0	−55.2	141.5	10 16.0	−55.4	141.6	9 29.0	−55.7	141.7	8 41.8	−55.9	141.8	7 54.7	−56.2	141.9	7 07.4	−56.3	142.0	6 20.1	−56.5	142.0	5 32.8	−56.8	142.1	18
19	10 07.8	−55.2	141.9	9 20.6	−55.4	142.0	8 33.3	−55.7	142.1	7 45.9	−55.9	142.2	6 58.5	−56.1	142.2	6 11.1	−56.4	142.3	5 23.6	−56.6	142.4	4 36.0	−56.8	142.4	19
20	9 12.6	−55.2	142.3	8 25.2	−55.5	142.4	7 37.6	−55.7	142.5	6 50.0	−55.9	142.5	6 02.4	−56.2	142.6	5 14.7	−56.4	142.7	4 27.0	−56.6	142.7	3 39.2	−56.8	142.8	20
21	8 17.4	−55.2	142.7	7 29.7	−55.5	142.8	6 41.9	−55.7	142.8	5 54.1	−56.0	142.9	5 06.2	−56.2	143.0	4 18.3	−56.4	143.0	3 30.4	−56.6	143.0	2 42.4	−56.8	143.1	21
22	7 22.2	−55.3	143.1	6 34.2	−55.5	143.1	5 46.2	−55.8	143.2	4 58.1	−55.9	143.3	4 10.0	−56.2	143.3	3 21.9	−56.4	143.3	2 33.8	−56.7	143.4	1 45.6	−56.8	143.4	22
23	6 26.9	−55.3	143.5	5 38.7	−55.5	143.5	4 50.4	−55.7	143.6	4 02.2	−56.0	143.6	3 13.8	−56.2	143.7	2 25.5	−56.4	143.7	1 37.1	−56.7	143.7	0 48.8	−56.8	143.7	23
24	5 31.7	−55.3	143.8	4 43.2	−55.5	143.9	3 54.7	−55.8	143.9	3 06.2	−56.0	144.0	2 17.6	−56.2	144.0	1 29.1	−56.4	144.0	0 40.5	−56.6	144.0	0 08.0	+56.8	36.0	24
25	4 36.4	−55.3	144.2	3 47.7	−55.6	144.3	2 58.9	−55.7	144.3	2 10.2	−56.0	144.3	1 21.4	−56.2	144.4	0 32.7	−56.4	144.4	0 16.1	+56.6	35.6	1 04.8	+56.9	35.6	25
26	3 41.1	−55.3	144.6	2 52.1	−55.5	144.7	2 03.2	−55.8	144.7	1 14.2	−56.0	144.7	0 25.2	−56.2	144.7	0 23.7	+56.4	35.3	1 12.7	+56.6	35.3	2 01.7	+56.8	35.3	26
27	2 45.8	−55.4	145.0	1 56.6	−55.6	145.0	1 07.4	−55.8	145.1	0 18.2	−56.0	145.1	0 31.0	+56.2	34.9	1 20.1	+56.4	35.0	2 09.3	+56.6	35.0	2 58.5	+56.8	35.0	27
28	1 50.4	−55.5	145.4	1 01.0	−55.5	145.4	0 11.6	−55.7	145.4	0 37.8	+56.0	34.6	1 27.2	+56.2	34.6	2 16.5	+56.4	34.6	3 05.9	+56.6	34.6	3 55.3	+56.8	34.7	28
29	0 55.1	−55.3	145.8	0 05.5	−55.6	145.8	0 44.1	+55.8	34.2	1 33.8	+55.9	34.2	2 23.4	+56.1	34.2	3 12.9	+56.4	34.3	4 02.5	+56.6	34.3	4 52.1	+56.8	34.3	29
30	0 00.2	+55.4	33.8	0 50.1	+55.5	33.8	1 39.9	+55.8	33.8	2 29.7	+56.0	33.9	3 19.6	+56.1	33.9	4 09.3	+56.4	33.9	4 59.1	+56.6	34.0	5 48.9	+56.7	34.0	30
31	0 55.6	+55.3	33.4	1 45.6	+55.6	33.5	2 35.7	+55.7	33.5	3 25.7	+56.0	33.5	4 15.7	+56.2	33.5	5 05.7	+56.4	33.6	5 55.7	+56.6	33.6	6 45.6	+56.8	33.7	31
32	1 50.9	+55.4	33.1	2 41.2	+55.5	33.1	3 31.4	+55.8	33.1	4 21.7	+55.9	33.1	5 11.9	+56.2	33.2	6 02.1	+56.4	33.2	6 52.3	+56.5	33.3	7 42.4	+56.8	33.4	32
33	2 46.2	+55.3	32.7	3 36.7	+55.5	32.7	4 27.2	+55.7	32.7	5 17.6	+56.0	32.8	6 08.1	+56.1	32.8	6 58.5	+56.4	32.9	7 48.8	+56.6	33.0	8 39.2	+56.7	33.0	33
34	3 41.5	+55.3	32.3	4 32.2	+55.5	32.3	5 22.9	+55.8	32.4	6 13.6	+55.9	32.4	7 04.2	+56.2	32.5	7 54.8	+56.4	32.5	8 45.4	+56.5	32.6	9 35.9	+56.7	32.7	34
35	4 36.8	+55.3	31.9	5 27.7	+55.6	31.9	6 18.7	+55.7	32.0	7 09.5	+55.9	32.1	8 00.4	+56.1	32.1	8 51.2	+56.3	32.2	9 41.9	+56.5	32.3	10 32.6	+56.7	32.4	35
36	5 32.1	+55.3	31.5	6 23.3	+55.4	31.6	7 14.4	+55.7	31.6	8 05.4	+55.9	31.7	8 56.5	+56.1	31.8	9 47.5	+56.3	31.9	10 38.4	+56.5	31.9	11 29.3	+56.7	32.0	36
37	6 27.4	+55.2	31.1	7 18.7	+55.5	31.2	8 10.1	+55.6	31.2	9 01.3	+55.9	31.3	9 52.6	+56.0	31.4	10 43.8	+56.2	31.5	11 34.9	+56.4	31.6	12 26.0	+56.6	31.7	37
38	7 22.6	+55.3	30.7	8 14.2	+55.4	30.8	9 05.7	+55.7	30.9	9 57.2	+55.9	30.9	10 48.6	+56.1	31.0	11 40.0	+56.1	31.1	12 31.3	+56.5	31.3	13 22.6	+56.6	31.4	38
39	8 17.9	+55.2	30.3	9 09.6	+55.5	30.4	10 01.4	+55.6	30.5	10 53.1	+55.8	30.6	11 44.7	+56.0	30.7	12 36.3	+56.2	30.8	13 27.8	+56.4	30.9	14 19.2	+56.6	31.0	39
40	9 13.1	+55.2	29.9	10 05.1	+55.4	30.0	10 57.0	+55.6	30.1	11 48.9	+55.8	30.2	12 40.7	+56.0	30.3	13 32.5	+56.2	30.4	14 24.2	+56.3	30.6	15 15.8	+56.6	30.7	40
41	10 08.3	+55.1	29.5	11 00.5	+55.3	29.6	11 52.6	+55.6	29.7	12 44.7	+55.7	29.8	13 36.7	+56.0	29.9	14 28.7	+56.1	30.1	15 20.5	+56.4	30.2	16 12.4	+56.5	30.3	41
42	11 03.4	+55.2	29.1	11 55.8	+55.3	29.2	12 48.2	+55.5	29.3	13 40.4	+55.6	29.4	14 32.7	+55.9	29.6	15 24.8	+56.1	29.7	16 16.9	+56.3	29.8	17 08.9	+56.5	30.0	42
43	11 58.6	+55.1	28.7	12 51.1	+55.3	28.8	13 43.7	+55.5	28.9	14 36.2	+55.6	29.1	15 28.6	+55.9	29.2	16 20.9	+56.1	29.3	17 13.2	+56.2	29.5	18 05.4	+56.4	29.6	43
44	12 53.7	+55.0	28.3	13 46.4	+55.3	28.4	14 39.2	+55.4	28.6	15 31.8	+55.7	28.7	16 24.5	+55.8	28.8	17 17.0	+56.0	29.0	18 09.4	+56.3	29.1	19 01.8	+56.4	29.3	44
45	13 48.7	+55.0	27.9	14 41.7	+55.2	28.0	15 34.6	+55.4	28.2	16 27.5	+55.6	28.3	17 20.3	+55.8	28.4	18 13.0	+55.9	28.6	19 05.7	+56.1	28.7	19 58.2	+56.4	28.9	45
46	14 43.7	+55.0	27.5	15 36.9	+55.2	27.6	16 30.0	+55.4	27.8	17 23.1	+55.6	27.9	18 16.1	+55.7	28.0	19 09.0	+55.9	28.2	20 01.8	+56.2	28.4	20 54.6	+56.3	28.6	46
47	15 38.7	+54.9	27.1	16 32.1	+55.1	27.2	17 25.4	+55.3	27.4	18 18.7	+55.5	27.5	19 11.8	+55.7	27.7	20 04.9	+55.9	27.8	20 58.0	+56.0	28.0	21 50.9	+56.3	28.2	47
48	16 33.6	+54.9	26.7	17 27.2	+55.1	26.8	18 20.7	+55.3	26.9	19 14.2	+55.4	27.1	20 07.5	+55.7	27.3	21 00.8	+55.9	27.4	21 54.0	+56.1	27.6	22 47.2	+56.2	27.8	48
49	17 28.5	+54.8	26.2	18 22.3	+55.0	26.4	19 16.0	+55.2	26.5	20 09.6	+55.4	26.7	21 03.2	+55.6	26.9	21 56.7	+55.7	27.0	22 50.1	+55.9	27.2	23 43.4	+56.1	27.4	49
50	18 23.3	+54.8	25.8	19 17.3	+54.9	26.0	20 11.2	+55.1	26.1	21 05.0	+55.4	26.3	21 58.8	+55.5	26.5	22 52.4	+55.8	26.6	23 46.0	+55.9	26.8	24 39.5	+56.1	27.0	50
51	19 18.1	+54.7	25.4	20 12.2	+54.9	25.5	21 06.3	+55.1	25.7	22 00.4	+55.2	25.9	22 54.3	+55.5	26.0	23 48.2	+55.6	26.2	24 41.9	+55.9	26.4	25 35.6	+56.0	26.6	51
52	20 12.8	+54.6	24.9	21 07.1	+54.8	25.1	22 01.4	+55.0	25.3	22 55.6	+55.2	25.4	23 49.8	+55.4	25.6	24 43.8	+55.6	25.8	25 37.8	+55.8	26.0	26 31.6	+56.0	26.3	52
53	21 07.4	+54.5	24.5	22 01.9	+54.8	24.7	22 56.4	+55.0	24.8	23 50.8	+55.2	25.0	24 45.2	+55.3	25.2	25 39.4	+55.5	25.4	26 33.6	+55.7	25.6	27 27.6	+55.9	25.8	53
54	22 01.9	+54.5	24.1	22 56.7	+54.7	24.2	23 51.4	+54.8	24.4	24 46.0	+55.0	24.6	25 40.5	+55.2	24.8	26 34.9	+55.5	25.0	27 29.3	+55.6	25.2	28 23.5	+55.8	25.4	54
55	22 56.4	+54.4	23.6	23 51.4	+54.6	23.8	24 46.2	+54.8	24.0	25 41.0	+55.0	24.1	26 35.7	+55.2	24.4	27 30.4	+55.3	24.6	28 24.9	+55.5	24.8	29 19.3	+55.7	25.0	55
56	23 50.8	+54.2	23.1	24 46.0	+54.5	23.3	25 41.0	+54.7	23.5	26 36.0	+54.9	23.7	27 30.9	+55.1	23.9	28 25.7	+55.3	24.1	29 20.4	+55.5	24.3	30 15.0	+55.7	24.6	56
57	24 45.2	+54.2	22.7	25 40.5	+54.4	22.9	26 35.7	+54.7	23.1	27 30.9	+54.8	23.2	28 26.0	+55.0	23.5	29 21.0	+55.2	23.7	30 15.9	+55.4	23.9	31 10.7	+55.6	24.2	57
58	25 39.4	+54.2	22.2	26 34.9	+54.4	22.4	27 30.4	+54.5	22.6	28 25.7	+54.7	22.8	29 21.0	+54.9	23.0	30 16.2	+55.1	23.2	31 11.3	+55.2	23.5	32 06.3	+55.4	23.7	58
59	26 33.6	+54.0	21.7	27 29.3	+54.2	21.9	28 24.9	+54.4	22.1	29 20.4	+54.6	22.3	30 15.9	+54.8	22.5	31 11.3	+55.0	22.8	32 06.5	+55.2	23.0	33 01.7	+55.4	23.3	59
60	27 27.6	+53.9	21.2	28 23.5	+54.1	21.4	29 19.3	+54.3	21.6	30 15.0	+54.5	21.8	31 10.7	+54.7	22.1	32 06.3	+54.9	22.3	33 01.7	+55.1	22.5	33 57.1	+55.2	22.8	60
61	28 21.5	+53.9	20.7	29 17.6	+54.0	20.9	30 13.6	+54.2	21.1	31 09.5	+54.4	21.4	32 05.4	+54.6	21.6	33 01.1	+54.8	21.8	33 56.8	+54.9	22.1	34 52.3	+55.2	22.3	61
62	29 15.4	+53.7	20.2	30 11.6	+54.0	20.4	31 07.8	+54.1	20.6	32 03.9	+54.3	20.9	33 00.0	+54.4	21.1	33 55.9	+54.7	21.3	34 51.7	+54.9	21.6	35 47.5	+55.0	21.8	62
63	30 09.1	+53.6	19.7	31 05.6	+53.7	19.9	32 01.9	+54.0	20.1	32 58.2	+54.2	20.4	33 54.4	+54.4	20.6	34 50.6	+54.5	20.8	35 46.6	+54.7	21.1	36 42.5	+54.9	21.3	63
64	31 02.7	+53.5	19.2	31 59.3	+53.7	19.4	32 55.9	+53.8	19.6	33 52.4	+54.0	19.8	34 48.8	+54.2	20.1	35 45.1	+54.4	20.3	36 41.3	+54.6	20.6	37 37.4	+54.8	20.8	64
65	31 56.2	+53.3	18.7	32 53.0	+53.5	18.9	33 49.7	+53.7	19.1	34 46.4	+53.9	19.3	35 43.0	+54.0	19.5	36 39.5	+54.2	19.8	37 35.9	+54.4	20.1	38 32.2	+54.6	20.3	65
66	32 49.5	+53.2	18.1	33 46.5	+53.4	18.3	34 43.4	+53.6	18.5	35 40.3	+53.7	18.8	36 37.0	+53.9	19.0	37 33.7	+54.1	19.3	38 30.3	+54.3	19.5	39 26.8	+54.5	19.8	66
67	33 42.7	+53.0	17.6	34 39.9	+53.2	17.8	35 37.0	+53.4	18.0	36 34.0	+53.6	18.2	37 30.9	+53.8	18.5	38 27.8	+54.0	18.7	39 24.6	+54.1	19.0	40 21.3	+54.3	19.2	67
68	34 35.7	+52.9	17.0	35 33.1	+53.0	17.2	36 30.4	+53.2	17.4	37 27.6	+53.4	17.7	38 24.7	+53.6	17.9	39 21.8	+53.7	18.1	40 18.7	+54.0	18.4	41 15.6	+54.2	18.7	68
69	35 28.6	+52.7	16.4	36 26.1	+52.9	16.6	37 23.6	+53.1	16.9	38 21.0	+53.2	17.1	39 18.3	+53.4	17.3	40 15.5	+53.6	17.6	41 12.7	+53.8	17.8	42 09.8	+54.0	18.1	69
70	36 21.3	+52.6	15.8	37 19.0	+52.7	16.0	38 16.7	+52.8	16.3	39 14.2	+53.1	16.5	40 11.7	+53.3	16.7	41 09.1	+53.5	17.0	42 06.5	+53.6	17.2	43 03.8	+53.7	17.5	70
71	37 13.9	+52.3	15.2	38 11.7	+52.5	15.4	39 09.5	+52.7	15.7	40 07.3	+52.8	15.9	41 05.0	+53.0	16.1	42 02.6	+53.2	16.4	43 00.1	+53.4	16.6	43 57.5	+53.6	16.9	71
72	38 06.2	+52.2	14.6	39 04.2	+52.4	14.8	40 02.2	+52.5	15.0	41 00.1	+52.7	15.3	41 58.0	+52.8	15.5	42 55.8	+53.0	15.7	43 53.5	+53.2	16.0	44 51.1	+53.4	16.3	72
73	38 58.4	+51.9	14.0	39 56.6	+52.1	14.2	40 54.7	+52.3	14.4	41 52.8	+52.4	14.6	42 50.8	+52.6	14.9	43 48.8	+52.8	15.1	44 46.7	+52.9	15.4	45 44.5	+53.1	15.6	73
74	39 50.3	+51.7	13.3	40 48.7	+51.8	13.5	41 47.0	+52.0	13.7	42 45.2	+52.2	14.0	43 43.4	+52.4	14.2	44 41.6	+52.5	14.4	45 39.6	+52.8	14.7	46 37.6	+52.9	15.0	74
75	40 42.0	+51.5	12.7	41 40.5	+51.7	12.9	42 39.0	+51.8	13.1	43 37.4	+52.0	13.3	44 35.8	+52.1	13.5	45 34.1	+52.3	13.7	46 32.4	+52.4	14.0	47 30.5	+52.7	14.3	75
76	41 33.5	+51.2	12.0	42 32.2	+51.4	12.2	43 30.8	+51.5	12.4	44 29.4	+51.7	12.6	45 27.9	+51.9	12.8	46 26.4	+52.0	13.0	47 24.8	+52.2	13.3	48 23.2	+52.3	13.5	76
77	42 24.7	+51.0	11.3	43 23.6	+51.1	11.5	44 22.3	+51.3	11.7	45 21.1	+51.4	11.9	46 19.8	+51.5	12.1	47 18.4	+51.7	12.3	48 17.0	+51.9	12.5	49 15.5	+52.1	12.8	77
78	43 15.7	+50.7	10.6	44 14.7	+50.8	10.8	45 13.6	+51.0	10.9	46 12.5	+51.1	11.1	47 11.3	+51.3	11.3	48 10.1	+51.5	11.5	49 08.9	+51.6	11.8	50 07.6	+51.8	12.0	78
79	44 06.4	+50.4	9.8	45 05.5	+50.5	10.0	46 04.6	+50.6	10.2	47 03.6	+50.8	10.4	48 02.6	+51.0	10.6	49 01.6	+51.1	10.8	50 00.5	+51.3	11.0	50 59.4	+51.4	11.2	79
80	44 56.8	+50.1	9.1	45 56.0	+50.2	9.2	46 55.2	+50.4	9.4	47 54.4	+50.5	9.6	48 53.6	+50.6	9.8	49 52.7	+50.7	10.0	50 51.8	+50.9	10.2	51 50.8	+51.0	10.4	80
81	45 46.9	+49.7	8.3	46 46.2	+49.9	8.5	47 45.6	+50.0	8.6	48 44.9	+50.1	8.8	49 44.2	+50.2	9.0	50 43.4	+50.4	9.1	51 42.7	+50.5	9.3	52 41.8	+50.7	9.6	81
82	46 36.6	+49.4	7.5	47 36.1	+49.5	7.6	48 35.6	+49.6	7.8	49 35.0	+49.8	7.9	50 34.4	+49.9	8.1	51 33.8	+50.0	8.3	52 33.2	+50.1	8.5	53 32.5	+50.3	8.7	82
83	47 26.0	+49.1	6.7	48 25.6	+49.2	6.8	49 25.2	+49.2	6.9	50 24.8	+49.3	7.1	51 24.3	+49.4	7.2	52 23.8	+49.6	7.4	53 23.3	+49.7	7.5	54 22.8	+49.8	7.7	83
84	48 15.1	+48.6	5.9	49 14.8	+48.7	6.0	50 14.4	+48.8	6.0	51 14.1	+48.9	6.2	52 13.7	+49.0	6.3	53 13.4	+49.1	6.4	54 13.0	+49.2	6.6	55 12.6	+49.3	6.8	84
85	49 03.7	+48.2	4.9	50 03.5	+48.3	5.0	51 03.2	+48.4	5.1	52 03.0	+48.5	5.2	53 02.7	+48.6	5.3	54 02.5	+48.6	5.5	55 02.2	+48.7	5.6	56 01.9	+48.8	5.8	85
86	49 51.9	+47.8	4.0	50 51.8	+47.8	4.1	51 51.6	+47.9	4.2	52 51.5	+47.9	4.3	53 51.3	+48.0	4.4	54 51.1	+48.1	4.5	55 50.9	+48.2	4.6	56 50.7	+48.3	4.7	86
87	50 39.7	+47.3	3.0	51 39.6	+47.3	3.1	52 39.5	+47.4	3.2	53 39.4	+47.4	3.3	54 39.3	+47.5	3.3	55 39.2	+47.6	3.4	56 39.1	+47.6	3.6	57 39.0	+47.6	3.6	87
88	51 27.0	+46.8	2.1	52 26.9	+46.8	2.1	53 26.9	+46.8	2.2	54 26.8	+46.9	2.2	55 26.8	+46.9	2.3	56 26.8	+46.9	2.3	57 26.7	+47.0	2.4	58 26.6	+47.1	2.5	88
89	52 13.8	+46.2	1.0	53 13.7	+46.3	1.1	54 13.7	+46.3	1.1	55 13.7	+46.3	1.1	56 13.7	+46.3	1.2	57 13.7	+46.3	1.2	58 13.7	+46.3	1.2	59 13.7	+46.3	1.3	89
90	53 00.0	+45.7	0.0	54 00.0	+45.7	0.0	55 00.0	+45.6	0.0	56 00.0	+45.6	0.0	57 00.0	+45.6	0.0	58 00.0	+45.6	0.0	59 00.0	+45.6	0.0	60 00.0	+45.6	0.0	90

| | **53°** | | | **54°** | | | **55°** | | | **56°** | | | **57°** | | | **58°** | | | **59°** | | | **60°** | | | |

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	27 00.8 +53.7 132.6	26 20.1 +54.1 132.9	25 39.0 +54.5 133.3	24 57.8 +54.8 133.6	24 16.2 +55.2 134.0	23 34.4 +55.5 134.3	22 52.4 +55.8 134.6	22 10.2 +56.1 134.9	0
1	27 54.5 +53.6 132.1	27 14.2 +54.0 132.5	26 33.5 +54.4 132.8	25 52.6 +54.7 133.2	25 11.4 +55.1 133.5	24 29.9 +55.4 133.9	23 48.2 +55.7 134.2	23 06.3 +56.0 134.5	1
2	28 48.1 +53.6 131.6	28 08.2 +53.9 132.0	27 27.9 +54.3 132.4	26 47.3 +54.7 132.7	26 06.5 +55.0 133.1	25 25.3 +55.4 133.5	24 43.9 +55.7 133.8	24 02.3 +56.0 134.1	2
3	29 41.7 +53.3 131.0	29 02.1 +53.8 131.5	28 22.2 +54.2 131.9	27 42.0 +54.5 132.3	27 01.5 +54.9 132.7	26 20.7 +55.2 133.0	25 39.6 +55.5 133.4	24 58.3 +55.9 133.7	3
4	30 35.0 +53.3 130.5	29 55.9 +53.6 131.0	29 16.4 +54.0 131.4	28 36.5 +54.5 131.8	27 56.4 +54.8 132.2	27 15.9 +55.2 132.6	26 35.2 +55.5 133.0	25 54.2 +55.8 133.3	4
5	31 28.3 +53.1 130.0	30 49.5 +53.6 130.4	30 10.4 +54.0 130.9	29 31.0 +54.4 131.3	28 51.2 +54.8 131.7	28 11.1 +55.1 132.1	27 30.7 +55.4 132.5	26 50.0 +55.8 132.9	5
6	32 21.4 +53.0 129.4	31 43.1 +53.4 129.9	31 04.4 +53.8 130.4	30 25.4 +54.2 130.8	29 46.0 +54.6 131.3	29 06.2 +55.0 131.7	28 26.1 +55.4 132.1	27 45.8 +55.7 132.5	6
7	33 14.4 +52.9 128.9	32 36.5 +53.3 129.4	31 58.2 +53.8 129.9	31 19.6 +54.1 130.3	30 40.6 +54.5 130.8	30 01.2 +54.9 131.2	29 21.5 +55.3 131.7	28 41.5 +55.6 132.1	7
8	34 07.2 +52.6 128.3	33 29.8 +53.1 128.8	32 52.0 +53.5 129.3	32 13.7 +54.0 129.8	31 35.1 +54.4 130.3	30 56.1 +54.8 130.8	30 16.8 +55.1 131.2	29 37.1 +55.5 131.6	8
9	34 59.8 +52.5 127.7	34 22.9 +53.0 128.3	33 45.5 +53.5 128.8	33 07.7 +53.9 129.3	32 29.5 +54.3 129.8	31 50.9 +54.7 130.3	31 11.9 +55.1 130.8	30 32.6 +55.4 131.2	9
10	35 52.3 +52.3 127.1	35 15.9 +52.8 127.7	34 39.0 +53.2 128.2	34 01.6 +53.7 128.8	33 23.8 +54.2 129.3	32 45.6 +54.6 129.8	32 07.0 +55.0 130.3	31 28.0 +55.4 130.8	10
11	36 44.6 +52.1 126.5	36 08.7 +52.6 127.1	35 32.2 +53.1 127.7	34 55.3 +53.6 128.2	34 18.0 +54.0 128.8	33 40.2 +54.4 129.3	33 02.0 +54.8 129.8	32 23.4 +55.2 130.3	11
12	37 36.7 +52.0 125.9	37 01.3 +52.4 126.5	36 25.4 +52.9 127.1	35 48.9 +53.4 127.7	35 12.0 +53.9 128.2	34 34.6 +54.3 128.8	33 56.8 +54.8 129.3	33 18.6 +55.1 129.8	12
13	38 28.7 +51.7 125.3	37 53.7 +52.3 125.9	37 18.3 +52.8 126.5	36 42.3 +53.3 127.1	36 05.9 +53.7 127.7	35 28.9 +54.2 128.3	34 51.6 +54.6 128.8	34 13.7 +55.0 129.4	13
14	39 20.4 +51.4 124.6	38 46.0 +52.0 125.3	38 11.1 +52.6 125.9	37 35.6 +53.1 126.5	36 59.6 +53.6 127.2	36 23.1 +54.1 127.7	35 46.2 +54.5 128.3	35 08.7 +54.9 128.9	14
15	40 11.8 +51.3 123.9	39 38.0 +51.9 124.6	39 03.7 +52.3 125.3	38 28.7 +52.9 126.0	37 53.2 +53.4 126.6	37 17.2 +53.9 127.2	36 40.7 +54.3 127.8	36 03.6 +54.8 128.4	15
16	41 03.1 +51.0 123.3	40 29.9 +51.6 124.0	39 56.0 +52.2 124.7	39 21.6 +52.7 125.3	38 46.6 +53.3 126.0	38 11.1 +53.7 126.6	37 35.0 +54.2 127.3	36 58.4 +54.7 127.9	16
17	41 54.1 +50.7 122.5	41 21.5 +51.3 123.3	40 48.2 +52.0 124.0	40 14.3 +52.5 124.7	39 39.9 +53.0 125.4	39 04.8 +53.6 126.1	38 29.2 +54.0 126.7	37 53.1 +54.5 127.4	17
18	42 44.8 +50.4 121.8	42 12.8 +51.1 122.6	41 40.2 +51.7 123.4	41 06.8 +52.3 124.1	40 32.9 +52.9 124.8	39 58.4 +53.3 125.5	39 23.2 +53.9 126.2	38 47.6 +54.3 126.8	18
19	43 35.2 +50.2 121.1	43 03.9 +50.8 121.9	42 31.9 +51.4 122.7	41 59.1 +52.1 123.4	41 25.8 +52.6 124.2	40 51.7 +53.2 124.9	40 17.1 +53.7 125.6	39 41.9 +54.2 126.3	19
20	44 25.4 +49.8 120.3	43 54.7 +50.6 121.2	43 23.3 +51.2 122.0	42 51.2 +51.8 122.8	42 18.4 +52.4 123.5	41 44.9 +53.0 124.3	41 10.8 +53.5 125.0	40 36.1 +54.0 125.7	20
21	45 15.2 +49.5 119.5	44 45.3 +50.2 120.4	44 14.5 +50.9 121.2	43 43.0 +51.6 122.1	43 10.8 +52.2 122.9	42 37.9 +52.8 123.6	42 04.3 +53.4 124.4	41 30.1 +53.9 125.1	21
22	46 04.7 +49.2 118.7	45 35.5 +49.9 119.6	45 05.4 +50.6 120.5	44 34.6 +51.3 121.4	44 03.0 +51.9 122.2	43 30.7 +52.5 123.0	42 57.7 +53.1 123.8	42 24.0 +53.6 124.5	22
23	46 53.9 +48.8 117.9	46 25.4 +49.5 118.8	45 56.0 +50.3 119.7	45 25.9 +51.0 120.6	44 54.9 +51.7 121.5	44 23.2 +52.3 122.3	43 50.8 +52.9 123.1	43 17.6 +53.5 123.9	23
24	47 42.7 +48.4 117.0	47 14.9 +49.2 118.0	46 46.3 +50.0 118.9	46 16.9 +50.7 119.9	45 46.6 +51.4 120.8	45 15.5 +52.1 121.6	44 43.7 +52.6 122.5	44 11.1 +53.2 123.3	24
25	48 31.1 +47.9 116.1	48 04.1 +48.8 117.2	47 36.3 +49.6 118.1	47 07.6 +50.3 119.1	46 38.0 +51.1 120.0	46 07.6 +51.7 120.9	45 36.3 +52.4 121.8	45 04.3 +53.1 122.7	25
26	49 19.0 +47.5 115.2	48 52.9 +48.4 116.3	48 25.9 +49.2 117.3	47 57.9 +50.0 118.3	47 29.1 +50.7 119.2	46 59.3 +51.5 120.2	46 28.7 +52.2 121.1	45 57.4 +52.7 122.0	26
27	50 06.5 +47.1 114.3	49 41.3 +48.0 115.4	49 15.1 +48.8 116.4	48 47.9 +49.7 117.4	48 19.8 +50.5 118.4	47 50.8 +51.2 119.4	47 20.9 +51.8 120.4	46 50.1 +52.6 121.3	27
28	50 53.6 +46.5 113.3	50 29.3 +47.5 114.4	50 03.9 +48.4 115.5	49 37.6 +49.2 116.6	49 10.3 +50.0 117.6	48 42.0 +50.8 118.6	48 12.7 +51.6 119.6	47 42.7 +52.2 120.6	28
29	51 40.1 +46.0 112.3	51 16.8 +47.0 113.5	50 52.3 +48.0 114.6	50 26.8 +48.9 115.7	50 00.3 +49.7 116.8	49 32.8 +50.5 117.8	49 04.3 +51.2 118.9	48 34.9 +52.0 119.8	29
30	52 26.1 +45.4 111.3	52 03.8 +46.4 112.5	51 40.3 +47.4 113.6	51 15.7 +48.3 114.8	50 50.0 +49.3 115.9	50 23.3 +50.1 117.0	49 55.5 +50.9 118.0	49 26.9 +51.6 119.1	30
31	53 11.5 +44.8 110.2	52 50.2 +45.9 111.4	52 27.7 +46.9 112.6	52 04.0 +47.9 113.8	51 39.3 +48.8 115.0	51 14.4 +49.7 116.1	50 46.4 +50.6 117.2	50 18.5 +51.3 118.3	31
32	53 56.3 +44.2 109.1	53 36.1 +45.3 110.3	53 14.6 +46.4 111.6	52 51.9 +47.4 112.8	52 28.1 +48.3 114.0	52 03.1 +49.2 115.2	51 37.0 +50.1 116.4	51 09.8 +51.0 117.5	32
33	54 40.5 +43.5 107.9	54 21.4 +44.7 109.2	54 01.0 +45.8 110.5	53 39.3 +46.9 111.8	53 16.4 +47.9 113.1	52 52.3 +48.9 114.3	52 27.1 +49.7 115.5	52 00.8 +50.5 116.6	33
34	55 24.0 +42.7 106.7	55 06.1 +43.9 108.1	54 46.8 +45.1 109.4	54 26.2 +46.2 110.7	54 04.3 +47.3 112.0	53 41.2 +48.3 113.2	53 16.8 +49.3 114.4	52 51.3 +50.2 115.7	34
35	56 06.7 +42.0 105.5	55 50.0 +43.3 106.9	55 31.9 +44.5 108.3	55 12.4 +45.7 109.6	54 51.6 +46.8 111.0	54 29.5 +47.8 112.3	54 06.1 +48.8 113.6	53 41.5 +49.7 114.8	35
36	56 48.7 +41.1 104.2	56 33.3 +42.5 105.6	56 16.4 +43.7 107.1	55 58.1 +44.9 108.5	55 38.4 +46.1 109.9	55 17.3 +47.2 111.2	54 54.9 +48.3 112.6	54 31.2 +49.3 113.9	36
37	57 29.8 +40.3 102.8	57 15.8 +41.6 104.3	57 00.1 +43.0 105.8	56 43.0 +44.3 107.3	56 24.5 +45.5 108.7	56 04.5 +46.6 110.1	55 43.2 +47.7 111.5	55 20.5 +48.7 112.9	37
38	58 10.1 +39.3 101.4	57 57.4 +40.8 103.0	57 43.1 +42.2 104.5	57 27.3 +43.5 106.1	57 10.0 +44.7 107.5	56 51.1 +46.0 109.0	56 30.9 +47.1 110.4	56 09.2 +48.3 111.8	38
39	58 49.4 +38.3 100.0	58 38.2 +39.8 101.6	58 25.3 +41.3 103.2	58 10.8 +42.7 104.8	57 54.7 +44.0 106.3	57 37.1 +45.3 107.8	57 18.0 +46.5 109.3	56 57.5 +47.6 110.8	39
40	59 27.7 +37.2 98.5	59 18.0 +38.8 100.1	59 06.6 +40.3 101.8	58 53.5 +41.8 103.4	58 38.7 +43.2 105.0	58 22.4 +44.5 106.6	58 04.5 +45.8 108.1	57 45.1 +47.0 109.6	40
41	60 04.9 +36.1 96.9	59 56.8 +37.7 98.6	59 46.9 +39.3 100.3	59 35.3 +40.8 102.0	59 21.9 +42.4 103.7	59 06.9 +43.8 105.3	58 50.3 +45.1 106.9	58 32.1 +46.3 108.5	41
42	60 41.0 +34.9 95.3	60 34.5 +36.6 97.1	60 26.2 +38.3 98.8	60 16.1 +39.9 100.5	60 04.3 +41.4 102.3	59 50.7 +42.8 103.9	59 35.4 +44.2 105.6	59 18.4 +45.6 107.2	42
43	61 15.9 +33.5 93.6	61 11.1 +35.4 95.4	61 04.5 +37.1 97.2	60 56.0 +38.8 99.0	60 45.7 +40.4 100.8	60 33.5 +42.0 102.5	60 19.6 +43.4 104.3	60 04.0 +44.8 105.9	43
44	61 49.4 +32.2 91.9	61 46.5 +34.1 93.7	61 41.6 +35.9 95.6	61 34.8 +37.6 97.4	61 26.1 +39.3 99.3	61 15.5 +41.0 101.1	61 03.0 +42.5 102.8	60 48.8 +44.0 104.6	44
45	62 21.6 +30.8 90.1	62 20.6 +32.7 92.0	62 17.5 +34.6 93.9	62 12.4 +36.4 95.8	62 05.4 +38.2 97.7	61 56.4 +39.9 99.5	61 45.5 +41.5 101.4	61 32.8 +43.0 103.2	45
46	62 52.4 +29.2 88.2	62 53.3 +31.2 90.2	62 52.1 +33.1 92.1	62 48.8 +35.1 94.1	62 43.6 +36.9 96.0	62 36.3 +38.7 97.9	62 27.0 +40.4 99.8	62 15.8 +42.1 101.7	46
47	63 21.6 +27.6 86.3	63 24.5 +29.7 88.3	63 25.2 +31.7 90.3	63 23.9 +33.7 92.3	63 20.5 +35.6 94.3	63 15.0 +37.5 96.2	63 07.4 +39.3 98.2	62 57.9 +41.0 100.1	47
48	63 49.2 +25.9 84.3	63 54.2 +28.0 86.3	63 56.9 +30.2 88.4	63 57.6 +32.2 90.4	63 56.1 +34.2 92.4	63 52.5 +36.1 94.5	63 46.7 +38.0 96.5	63 38.9 +39.8 98.5	48
49	64 15.1 +24.2 82.2	64 22.2 +26.3 84.3	64 27.1 +28.4 86.4	64 29.8 +30.6 88.5	64 30.3 +32.7 90.6	64 28.6 +34.7 92.7	64 24.7 +36.7 94.7	64 18.7 +38.6 96.8	49
50	64 39.3 +22.2 80.1	64 48.5 +24.5 82.2	64 55.5 +26.7 84.3	65 00.4 +28.9 86.4	65 03.0 +31.0 88.6	65 03.3 +33.2 90.7	65 01.4 +35.3 92.9	64 57.3 +37.2 95.0	50
51	65 01.5 +20.3• 77.9	65 13.0 +22.5 80.0	65 22.2 +24.9 82.2	65 29.3 +27.1 84.4	65 34.0 +29.4 86.5	65 36.5 +31.6 88.7	65 36.7 +33.7 91.0	65 34.5 +35.9 93.2	51
52	65 21.8 +18.2• 75.7	65 35.5 +20.6• 77.8	65 47.1 +22.9• 80.0	65 56.4 +25.2 82.2	66 03.4 +27.5 84.4	66 08.1 +29.8 86.7	66 10.4 +32.0 88.9	66 10.3 +34.2 91.2	52
53	65 40.0 +16.1• 73.4	65 56.1 +18.4• 75.5	66 10.0 +20.8• 77.7	66 21.6 +23.2• 79.9	66 30.9 +25.6• 82.2	66 37.9 +27.9 84.5	66 42.4 +30.3 86.8	66 44.5 +32.2 89.1	53
54	65 56.1 +13.9• 71.0	66 14.5 +16.3• 73.2	66 30.8 +18.7• 75.4	66 44.8 +21.1• 77.6	66 56.5 +23.5• 79.9	67 05.8 +25.9• 82.2	67 12.7 +28.3 84.6	67 17.1 +30.7 87.0	54
55	66 10.0 +11.6• 68.6	66 30.8 +14.0• 70.8	66 49.5 +16.4• 73.0	67 05.9 +18.9• 75.2	67 20.0 +21.4• 77.5	67 31.7 +23.9• 79.9	67 41.0 +26.4• 82.3	67 47.8 +28.8• 84.7	55
56	66 21.6 +9.3• 66.2	66 44.8 +11.7• 68.3	67 05.9 +14.1• 70.5	67 24.8 +16.6• 72.8	67 41.4 +19.1• 75.1	67 55.6 +21.7• 77.5	68 07.4 +24.2• 79.9	68 16.6 +26.7• 82.4	56
57	66 30.9 +7.0 63.7	66 56.5 +9.3• 65.8	67 20.0 +11.7• 68.0	67 41.4 +14.2• 70.3	68 00.5 +16.8• 72.6	68 17.3 +19.3• 75.0	68 31.6 +21.9• 77.4	68 43.3 +24.6• 79.9	57
58	66 37.9 +4.5 61.2	67 05.8 +6.9 63.3	67 31.7 +9.3• 65.4	67 55.6 +11.8• 67.7	68 17.3 +14.3• 70.0	68 36.6 +16.9• 72.4	68 53.5 +19.5• 74.9	69 07.9 +22.2• 77.4	58
59	66 42.4 +2.1 58.7	67 12.7 +4.4 60.7	67 41.0 +6.8 62.9	68 07.4 +9.2• 65.1	68 31.6 +11.7• 67.4	68 53.5 +14.4• 69.8	69 13.0 +17.1• 72.2	69 30.1 +19.7• 74.8	59
60	66 44.5 −0.3 56.2	67 17.1 +1.9 58.2	67 47.8 +4.2 60.2	68 16.6 +6.6 62.4	68 43.3 +9.2• 64.7	69 07.9 +11.7• 67.0	69 30.1 +14.4• 69.5	69 49.8 +17.2• 72.1	60
61	66 44.2 −2.7 53.6	67 19.0 −0.6 55.6	67 52.0 +1.7 57.6	68 23.2 +4.1 59.7	68 52.5 +6.5 61.9	69 19.6 +9.1• 64.3	69 44.5 +11.8• 66.7	70 07.0 +14.5• 69.3	61
62	66 41.5 −5.2 51.1	67 18.4 −3.1 53.0	67 53.7 −0.9 54.9	68 27.3 +1.4 57.0	68 59.0 +3.8 59.2	69 28.7 +6.3• 61.5	69 56.3 +8.9• 63.9	70 21.5 +11.7• 66.4	62
63	66 36.3 −7.5 48.6	67 15.3 −5.6 50.4	67 52.8 −3.5 52.3	68 28.7 −1.3 54.3	69 02.8 +1.1 56.4	69 35.0 +3.6 58.6	70 05.2 +6.1• 61.0	70 33.2 +8.8• 63.5	63
64	66 28.8 −10.0 46.1	67 09.7 −8.0 47.8	67 49.3 −6.0 49.6	68 27.4 −3.9 51.6	69 03.9 −1.7 53.6	69 38.6 +0.7 55.8	70 11.3 +3.2 58.1	70 42.0 +5.9 60.5	64
65	66 18.8 −12.2• 43.6	67 01.7 −10.5• 45.3	67 43.3 −8.6 47.0	68 23.5 −6.6 48.8	69 02.2 −4.4 50.8	69 39.3 −2.1 52.9	70 14.5 +0.4 55.1	70 47.9 +2.8• 57.5	65
66	66 06.6 −14.4• 41.2	66 51.2 −12.8• 42.8	67 34.7 −11.0 44.4	68 16.9 −9.1• 46.1	68 57.8 −7.1 48.0	69 37.2 −5.0 50.0	70 14.9 −2.6 52.1	70 50.7 −0.1 54.4	66
67	65 52.2 −16.7• 38.8	66 38.4 −15.1• 40.3	67 23.7 −13.5• 41.8	68 07.8 −11.6 43.5	68 50.7 −9.7 45.3	69 32.2 −7.7 47.2	70 12.3 −5.5 49.2	70 50.6 −3.1 51.4	67
68	65 35.5 −18.7• 36.5	66 23.3 −17.3• 37.9	67 10.2 −15.7• 39.3	67 56.2 −14.2• 40.9	68 41.0 −12.4• 42.5	69 24.5 −10.4 44.3	70 06.8 −8.4 46.3	70 47.5 −6.2 48.3	68
69	65 16.8 −20.8• 34.2	66 06.0 −19.4• 35.5	66 54.5 −18.1• 36.8	67 42.0 −16.5 38.3	68 28.6 −14.8• 39.9	69 14.1 −13.0• 41.5	69 58.4 −11.1• 43.4	70 41.3 −9.0 45.3	69
70	64 56.0 −22.7 32.0	65 46.6 −21.5• 33.2	66 36.4 −20.2• 34.4	67 25.5 −18.8• 35.8	68 13.8 −17.3• 37.2	69 01.1 −15.7• 38.8	69 47.3 −13.9• 40.5	70 32.3 −12.0 42.3	70
71	64 33.3 −24.6 29.8	65 25.1 −23.5 30.9	66 16.2 −22.2• 32.1	67 06.7 −21.0 33.3	67 56.5 −19.6• 34.7	68 45.4 −18.1• 36.1	69 33.4 −16.5• 37.7	70 20.3 −14.7• 39.4	71
72	64 08.7 −26.3 27.7	65 01.6 −25.4 28.7	65 54.0 −24.3• 29.8	66 45.7 −23.1• 30.9	67 36.9 −21.9• 32.2	68 27.3 −20.5• 33.5	69 16.9 −19.0• 35.0	70 05.6 −17.4• 36.5	72
73	63 42.4 −28.1 25.7	64 36.2 −27.1 26.6	65 29.7 −26.2 27.5	66 22.6 −25.1 28.6	67 15.0 −24.0• 29.7	68 06.8 −22.8• 31.0	68 57.9 −21.5• 32.3	69 48.2 −20.0• 33.8	73
74	63 14.3 −29.6 23.7	64 09.1 −28.8 24.5	65 03.5 −28.0 25.4	65 57.5 −27.0 26.4	66 51.0 −26.0 27.4	67 44.0 −24.9• 28.5	68 36.4 −23.7• 29.7	69 28.2 −22.4• 31.0	74
75	62 44.7 −31.1 21.8	63 40.3 −30.4 22.5	64 35.5 −29.6 23.3	65 30.5 −28.9 24.2	66 25.0 −27.9 25.1	67 19.1 −26.9• 26.1	68 12.7 −25.9• 27.2	69 05.8 −24.7• 28.4	75
76	62 13.6 −32.6 19.9	63 09.9 −32.0 20.6	64 05.9 −31.3 21.3	65 01.6 −30.5 22.1	65 57.1 −29.8 22.9	66 52.2 −28.9 23.8	67 46.8 −27.9 24.8	68 41.1 −27.0 25.9	76
77	61 41.0 −33.9 18.1	62 37.9 −33.3 18.7	63 34.6 −32.7 19.4	64 31.1 −32.1 20.1	65 27.3 −31.4 20.8	66 23.3 −30.7 21.6	67 18.9 −29.9 22.5	68 14.1 −28.9 23.5	77
78	61 07.1 −35.2 16.4	62 04.6 −34.7 16.9	63 01.9 −34.1 17.5	63 59.0 −33.6 18.1	64 55.9 −33.0 18.7	65 52.6 −32.4 19.5	66 49.0 −31.6 20.3	67 45.2 −30.9 21.1	78
79	60 31.9 −36.4 14.7	61 29.9 −36.0 15.2	62 27.7 −35.5 15.7	63 25.4 −35.1 16.2	64 22.9 −34.5 16.8	65 20.2 −33.9 17.5	66 17.4 −33.4 18.1	67 14.3 −32.7 18.9	79
80	59 55.5 −37.5 13.1	60 53.9 −37.1 13.5	61 52.2 −36.8 14.0	62 50.3 −36.3 14.5	63 48.4 −35.9 15.0	64 46.3 −35.5 15.5	65 44.0 −34.9 16.1	66 41.6 −34.4 16.7	80
81	59 18.0 −38.6 11.6	60 16.8 −38.3 11.9	61 15.4 −37.9 12.3	62 14.0 −37.6 12.7	63 12.5 −37.2 13.2	64 10.8 −36.8 13.6	65 09.1 −36.4 14.1	66 07.2 −35.9 14.7	81
82	58 39.5 −39.6 10.1	59 38.5 −39.3 10.4	60 37.5 −39.0 10.7	61 36.4 −38.7 11.1	62 35.3 −38.5 11.4	63 34.0 −38.1 11.8	64 32.7 −37.7 12.3	65 31.3 −37.4 12.7	82
83	57 59.9 −40.5 8.7	58 59.2 −40.3 8.9	59 58.5 −40.1 9.2	60 57.7 −39.8 9.5	61 56.8 −39.5 9.8	62 55.9 −39.3 10.1	63 55.0 −39.1 10.5	64 53.9 −38.7 10.9	83
84	57 19.4 −41.2 7.3	58 18.9 −41.1 7.5	59 18.4 −41.0 7.7	60 17.9 −40.9 7.9	61 17.3 −40.7 8.2	62 16.6 −40.4 8.5	63 16.0 −40.3 8.8	64 15.2 −40.1 9.1	84
85	56 38.1 −42.2 6.0	57 37.8 −42.1 6.1	58 37.4 −41.9 6.3	59 37.0 −41.7 6.5	60 36.6 −41.6 6.7	61 36.2 −41.4 6.9	62 35.8 −41.3 7.1	63 35.3 −41.1 7.4	85
86	55 55.9 −42.9 4.7	56 55.7 −42.8 4.8	57 55.5 −42.7 4.9	58 55.3 −42.7 5.1	59 55.0 −42.5 5.2	60 54.8 −42.4 5.4	61 54.5 −42.3 5.6	62 54.2 −42.2 5.8	86
87	55 13.0 −43.7 3.5	56 12.9 −43.6 3.5	57 12.8 −43.6 3.6	58 12.6 −43.5 3.7	59 12.5 −43.4 3.8	60 12.4 −43.3 4.0	61 12.2 −43.2 4.1	62 12.0 −43.1 4.2	87
88	54 29.3 −44.3 2.3	55 29.3 −44.3 2.3	56 29.2 −44.2 2.4	57 29.1 −44.2 2.4	58 29.1 −44.2 2.5	59 29.1 −44.2 2.6	60 29.0 −44.1 2.7	61 28.9 −44.0 2.7	88
89	53 45.0 −45.0 1.1	54 45.0 −45.0 1.1	55 45.0 −45.0 1.2	56 44.9 −44.9 1.2	57 44.9 −44.9 1.2	58 44.9 −44.9 1.3	59 44.9 −44.9 1.3	60 44.9 −44.9 1.3	89
90	53 00.0 −45.6 0.0	54 00.0 −45.6 0.0	55 00.0 −45.6 0.0	56 00.0 −45.6 0.0	57 00.0 −45.6 0.0	58 00.0 −45.6 0.0	59 00.0 −45.6 0.0	60 00.0 −45.7 0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

LATITUDE **CONTRARY** NAME TO DECLINATION — L.H.A. 41°, 319°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	27 00.8	−53.8	132.6	26 20.1	−54.3	132.9	25 39.0	−54.5	133.3	24 57.8	−54.9	133.6	24 16.2	−55.2	134.0	23 34.4	−55.5	134.3	22 52.4	−55.8	134.6	22 10.2	−56.1	134.9	0
1	26 07.0	−54.0	133.1	25 25.8	−54.3	133.4	24 44.5	−54.7	133.8	24 02.9	−55.0	134.1	23 21.0	−55.3	134.4	22 38.9	−55.6	134.7	21 56.6	−55.9	135.0	21 14.1	−56.2	135.3	1
2	25 13.0	−54.0	133.6	24 31.5	−54.3	133.9	23 49.8	−54.7	134.2	23 07.9	−55.1	134.5	22 25.7	−55.4	134.8	21 43.3	−55.7	135.1	21 00.7	−56.0	135.4	20 17.9	−56.3	135.6	2
3	24 19.0	−54.1	134.0	23 37.2	−54.5	134.4	22 55.1	−54.8	134.7	22 12.8	−55.1	135.0	21 30.3	−55.5	135.2	20 47.6	−55.7	135.5	20 04.7	−56.0	135.8	19 21.6	−56.2	136.0	3
4	23 24.9	−54.2	134.5	22 42.7	−54.5	134.8	22 00.3	−54.9	135.1	21 17.7	−55.2	135.4	20 34.9	−55.5	135.6	19 51.9	−55.8	135.9	19 08.7	−56.0	136.1	18 25.4	−56.4	136.4	4
5	22 30.7	−54.3	135.0	21 48.2	−54.7	135.3	21 05.4	−54.9	135.5	20 22.5	−55.2	135.8	19 39.4	−55.5	136.1	18 56.1	−55.8	136.3	18 12.7	−56.1	136.5	17 29.0	−56.3	136.7	5
6	21 36.4	−54.4	135.4	20 53.5	−54.6	135.7	20 10.5	−55.0	136.0	19 27.3	−55.3	136.2	18 43.9	−55.6	136.5	18 00.3	−55.9	136.7	17 16.6	−56.2	136.9	16 32.7	−56.4	137.1	6
7	20 42.0	−54.4	135.9	19 58.9	−54.8	136.1	19 15.5	−55.1	136.4	18 32.0	−55.4	136.6	17 48.3	−55.7	136.9	17 04.4	−55.9	137.1	16 20.4	−56.1	137.3	15 36.3	−56.4	137.5	7
8	19 47.6	−54.5	136.3	19 04.1	−54.8	136.6	18 20.4	−55.1	136.8	17 36.6	−55.4	137.0	16 52.6	−55.6	137.2	16 08.5	−55.9	137.4	15 24.3	−56.3	137.6	14 39.9	−56.5	137.8	8
9	18 53.1	−54.6	136.8	18 09.3	−54.9	137.0	17 25.3	−55.1	137.2	16 41.2	−55.4	137.4	15 57.0	−55.8	137.6	15 12.6	−56.0	137.8	14 28.0	−56.2	138.0	13 43.4	−56.5	138.2	9
10	17 58.5	−54.6	137.2	17 14.4	−54.9	137.4	16 30.2	−55.3	137.6	15 45.8	−55.5	137.8	15 01.2	−55.7	138.0	14 16.6	−56.0	138.2	13 31.8	−56.3	138.4	12 46.9	−56.5	138.5	10
11	17 03.9	−54.6	137.6	16 19.5	−55.0	137.9	15 35.0	−55.3	138.0	14 50.3	−55.6	138.2	14 05.5	−55.8	138.4	13 20.6	−56.1	138.6	12 35.5	−56.3	138.7	11 50.4	−56.6	138.9	11
12	16 09.3	−54.8	138.1	15 24.5	−55.0	138.3	14 39.7	−55.3	138.4	13 54.7	−55.5	138.6	13 09.7	−55.9	138.8	12 24.5	−56.1	138.9	11 39.2	−56.3	139.1	10 53.8	−56.5	139.2	12
13	15 14.5	−54.7	138.5	14 29.5	−55.0	138.7	13 44.4	−55.3	138.8	12 59.2	−55.6	139.0	12 13.8	−55.8	139.1	11 28.4	−56.1	139.3	10 42.9	−56.4	139.4	9 57.3	−56.6	139.5	13
14	14 19.8	−54.8	138.9	13 34.5	−55.1	139.1	12 49.1	−55.4	139.2	12 03.6	−55.7	139.4	11 18.0	−55.9	139.5	10 32.3	−56.1	139.6	9 46.5	−56.3	139.8	9 00.7	−56.6	139.9	14
15	13 25.0	−54.9	139.3	12 39.4	−55.2	139.5	11 53.7	−55.4	139.6	11 07.9	−55.6	139.8	10 22.1	−55.9	139.9	9 36.2	−56.2	140.0	8 50.2	−56.4	140.1	8 04.1	−56.6	140.2	15
16	12 30.1	−54.9	139.8	11 44.2	−55.1	139.9	10 58.3	−55.4	140.0	10 12.3	−55.7	140.1	9 26.2	−56.0	140.3	8 40.0	−56.2	140.4	7 53.8	−56.4	140.5	7 07.5	−56.7	140.5	16
17	11 35.2	−54.9	140.2	10 49.1	−55.2	140.3	10 02.9	−55.5	140.4	9 16.6	−55.7	140.5	8 30.2	−55.9	140.6	7 43.8	−56.2	140.7	6 57.4	−56.5	140.8	6 10.8	−56.6	140.9	17
18	10 40.3	−55.0	140.6	9 53.9	−55.2	140.7	9 07.4	−55.5	140.8	8 20.9	−55.8	140.9	7 34.3	−56.0	141.0	6 47.6	−56.2	141.1	6 00.9	−56.4	141.1	5 14.2	−56.7	141.2	18
19	9 45.3	−55.0	141.0	8 58.7	−55.3	141.1	8 11.9	−55.5	141.2	7 25.1	−55.7	141.3	6 38.3	−56.0	141.4	5 51.4	−56.2	141.4	5 04.5	−56.4	141.5	4 17.5	−56.6	141.5	19
20	8 50.3	−55.0	141.4	8 03.4	−55.3	141.5	7 16.4	−55.5	141.6	6 29.4	−55.8	141.6	5 42.3	−56.0	141.7	4 55.2	−56.2	141.8	4 08.1	−56.5	141.8	3 20.9	−56.7	141.9	20
21	7 55.3	−55.0	141.8	7 08.1	−55.3	141.9	6 20.9	−55.5	142.0	5 33.6	−55.8	142.0	4 46.3	−56.0	142.1	3 59.0	−56.3	142.1	3 11.6	−56.5	142.2	2 24.2	−56.7	142.2	21
22	7 00.3	−55.1	142.2	6 12.8	−55.3	142.3	5 25.4	−55.6	142.3	4 37.8	−55.7	142.4	3 50.3	−56.0	142.4	3 02.7	−56.2	142.5	2 15.1	−56.4	142.5	1 27.5	−56.6	142.5	22
23	6 05.2	−55.1	142.6	5 17.5	−55.3	142.7	4 29.8	−55.6	142.7	3 42.1	−55.8	142.8	2 54.3	−56.1	142.8	2 06.5	−56.3	142.8	1 18.7	−56.5	142.8	0 30.9	−56.7	142.8	23
24	5 10.1	−55.0	143.0	4 22.2	−55.3	143.1	3 34.2	−55.5	143.1	2 46.3	−55.9	143.1	1 58.2	−56.0	143.2	1 10.2	−56.2	143.2	0 22.2	−56.5	143.2	0 25.8	+56.7	36.8	24
25	4 15.1	−55.2	143.4	3 26.9	−55.4	143.4	2 38.7	−55.6	143.5	1 50.4	−55.8	143.5	1 02.2	−56.0	143.5	0 14.0	−55.5	143.5	0 34.3	+56.4	36.5	1 22.5	+56.7	36.5	25
26	3 19.9	−55.1	143.8	2 31.5	−55.3	143.8	1 43.1	−55.6	143.8	0 54.6	−55.8	143.9	0 06.2	−56.1	143.9	0 42.3	+56.2	36.1	1 30.7	+56.5	36.1	2 19.2	+56.7	36.2	26
27	2 24.8	−55.1	144.2	1 36.2	−55.4	144.2	0 47.5	−55.6	144.2	0 01.2	+55.8	35.8	0 49.9	+56.0	35.8	1 38.5	+56.3	35.8	2 27.2	+56.5	35.8	3 15.9	+56.6	35.8	27
28	1 29.7	−55.1	144.6	0 40.8	−55.3	144.6	0 08.1	+55.6	35.4	0 57.0	+55.8	35.4	1 45.9	+56.0	35.4	2 34.8	+56.2	35.4	3 23.7	+56.3	35.5	4 12.5	+56.7	35.5	28
29	0 34.6	−55.1	145.0	0 14.5	+55.4	35.0	1 03.7	+55.6	35.0	1 52.8	+55.8	35.0	2 41.9	+56.1	35.1	3 31.0	+56.3	35.1	4 20.1	+56.5	35.1	5 09.2	+56.6	35.2	29
30	0 20.5	+55.2	34.6	1 09.9	+55.4	34.6	1 59.3	+55.6	34.6	2 48.6	+55.8	34.7	3 38.0	+56.0	34.7	4 27.3	+56.2	34.7	5 16.6	+56.4	34.8	6 05.8	+56.7	34.8	30
31	1 15.7	+55.1	34.2	2 05.3	+55.3	34.2	2 54.9	+55.5	34.3	3 44.4	+55.8	34.3	4 34.0	+56.0	34.3	5 23.5	+56.2	34.4	6 13.0	+56.4	34.4	7 02.5	+56.6	34.5	31
32	2 10.8	+55.1	33.8	3 00.6	+55.3	33.9	3 50.4	+55.6	33.9	4 40.2	+55.8	33.9	5 30.0	+56.0	34.0	6 19.7	+56.2	34.0	7 09.4	+56.4	34.1	7 59.1	+56.6	34.2	32
33	3 05.9	+55.1	33.4	3 56.0	+55.3	33.5	4 46.0	+55.5	33.5	5 36.0	+55.8	33.6	6 26.0	+56.0	33.6	7 15.9	+56.2	33.7	8 05.8	+56.4	33.8	8 55.7	+56.6	33.8	33
34	4 01.0	+55.1	33.0	4 51.3	+55.3	33.1	5 41.5	+55.6	33.1	6 31.8	+55.7	33.2	7 22.0	+55.9	33.3	8 12.1	+56.2	33.4	9 02.2	+56.4	33.4	9 52.3	+56.5	33.5	34
35	4 56.1	+55.1	32.6	5 46.6	+55.3	32.7	6 37.1	+55.5	32.8	7 27.5	+55.8	32.8	8 17.9	+56.0	32.9	9 08.3	+56.1	33.0	9 58.6	+56.3	33.1	10 48.8	+56.6	33.2	35
36	5 51.2	+55.0	32.2	6 41.9	+55.3	32.3	7 32.6	+55.5	32.4	8 23.3	+55.7	32.4	9 13.9	+55.9	32.5	10 04.4	+56.1	32.6	10 54.9	+56.4	32.7	11 45.4	+56.5	32.8	36
37	6 46.2	+55.1	31.8	7 37.2	+55.2	31.9	8 28.1	+55.5	32.0	9 18.9	+55.6	32.1	10 09.8	+55.9	32.2	11 00.5	+56.1	32.3	11 51.3	+56.3	32.4	12 41.9	+56.5	32.5	37
38	7 41.3	+55.0	31.4	8 32.4	+55.3	31.5	9 23.6	+55.4	31.6	10 14.7	+55.6	31.7	11 05.7	+55.8	31.8	11 56.6	+56.1	31.9	12 47.6	+56.2	32.0	13 38.4	+56.4	32.1	38
39	8 36.3	+55.0	31.0	9 27.7	+55.2	31.1	10 19.0	+55.4	31.2	11 10.3	+55.6	31.3	12 01.5	+55.9	31.4	12 52.7	+56.1	31.5	13 43.8	+56.3	31.7	14 34.9	+56.4	31.8	39
40	9 31.3	+55.0	30.6	10 22.9	+55.2	30.7	11 14.4	+55.4	30.8	12 05.9	+55.6	30.9	12 57.4	+55.8	31.0	13 48.8	+56.0	31.2	14 40.1	+56.2	31.3	15 31.3	+56.4	31.4	40
41	10 26.3	+54.9	30.2	11 18.1	+55.1	30.3	12 09.8	+55.4	30.4	13 01.5	+55.6	30.5	13 53.2	+55.8	30.7	14 44.8	+55.9	30.8	15 36.3	+56.1	30.9	16 27.7	+56.4	31.1	41
42	11 21.2	+54.9	29.8	12 13.2	+55.1	29.9	13 05.2	+55.3	30.0	13 57.1	+55.5	30.2	14 49.0	+55.7	30.3	15 40.7	+56.0	30.4	16 32.4	+56.2	30.6	17 24.1	+56.3	30.7	42
43	12 16.1	+54.9	29.4	13 08.3	+55.1	29.5	14 00.5	+55.3	29.6	14 52.6	+55.5	29.8	15 44.7	+55.7	29.9	16 36.7	+55.9	30.0	17 28.6	+56.0	30.2	18 20.4	+56.3	30.4	43
44	13 11.0	+54.8	29.0	14 03.4	+55.1	29.1	14 55.8	+55.2	29.2	15 48.1	+55.5	29.4	16 40.4	+55.6	29.5	17 32.6	+55.8	29.7	18 24.6	+56.1	29.8	19 16.7	+56.2	30.0	44
45	14 05.8	+54.8	28.6	14 58.5	+54.9	28.7	15 51.0	+55.2	28.8	16 43.6	+55.4	29.0	17 36.0	+55.6	29.1	18 28.4	+55.8	29.3	19 20.7	+56.0	29.4	20 12.9	+56.2	29.6	45
46	15 00.6	+54.7	28.2	15 53.4	+55.0	28.3	16 46.2	+55.2	28.4	17 39.0	+55.3	28.6	18 31.6	+55.6	28.7	19 24.2	+55.8	28.9	20 16.7	+55.9	29.1	21 09.1	+56.1	29.3	46
47	15 55.3	+54.7	27.7	16 48.4	+54.9	27.9	17 41.4	+55.1	28.0	18 34.3	+55.3	28.2	19 27.2	+55.5	28.3	20 20.0	+55.6	28.5	21 12.6	+55.9	28.7	22 05.2	+56.1	28.9	47
48	16 50.0	+54.6	27.3	17 43.3	+54.8	27.4	18 36.5	+55.0	27.6	19 29.6	+55.3	27.8	20 22.7	+55.4	27.9	21 15.6	+55.7	28.1	22 08.5	+55.9	28.3	23 01.3	+56.0	28.5	48
49	17 44.6	+54.6	26.9	18 38.1	+54.8	27.0	19 31.5	+55.0	27.2	20 24.9	+55.1	27.3	21 18.1	+55.4	27.5	22 11.3	+55.6	27.7	23 04.4	+55.7	27.9	23 57.3	+56.0	28.1	49
50	18 39.2	+54.5	26.4	19 32.9	+54.7	26.6	20 26.5	+54.9	26.7	21 20.0	+55.2	26.9	22 13.5	+55.3	27.1	23 06.9	+55.5	27.3	24 00.1	+55.8	27.5	24 53.3	+55.9	27.7	50
51	19 33.7	+54.4	26.0	20 27.6	+54.6	26.1	21 21.4	+54.9	26.3	22 15.2	+55.0	26.5	23 08.8	+55.3	26.7	24 02.4	+55.4	26.9	24 55.9	+55.6	27.1	25 49.2	+55.9	27.3	51
52	20 28.1	+54.4	25.5	21 22.2	+54.6	25.7	22 16.3	+54.8	25.9	23 10.2	+55.0	26.1	24 04.1	+55.1	26.3	24 57.8	+55.4	26.5	25 51.5	+55.6	26.7	26 45.1	+55.7	26.9	52
53	21 22.5	+54.3	25.1	22 16.8	+54.5	25.3	23 11.1	+54.7	25.6	24 05.2	+54.9	25.6	24 59.2	+55.1	25.8	25 53.2	+55.2	26.0	26 47.1	+55.5	26.2	27 40.8	+55.7	26.5	53
54	22 16.8	+54.3	24.6	23 11.3	+54.5	24.8	24 05.8	+54.6	25.0	25 00.1	+54.8	25.2	25 54.3	+55.1	25.4	26 48.5	+55.2	25.6	27 42.6	+55.3	25.8	28 36.5	+55.6	26.1	54
55	23 11.1	+54.1	24.2	24 05.8	+54.3	24.3	25 00.4	+54.5	24.5	25 54.9	+54.8	24.7	26 49.4	+54.9	24.9	27 43.7	+55.2	25.2	28 38.0	+55.3	25.4	29 32.1	+55.6	25.6	55
56	24 05.2	+54.0	23.7	25 00.1	+54.2	23.9	25 54.9	+54.5	24.1	26 49.7	+54.6	24.3	27 44.3	+54.9	24.5	28 38.9	+55.0	24.7	29 33.3	+55.3	24.9	30 27.7	+55.4	25.2	56
57	24 59.2	+54.0	23.2	25 54.3	+54.2	23.4	26 49.4	+54.3	23.6	27 44.3	+54.6	23.8	28 39.2	+54.7	24.0	29 33.9	+55.0	24.3	30 28.6	+55.1	24.5	31 23.1	+55.4	24.7	57
58	25 53.2	+53.9	22.7	26 48.5	+54.1	22.9	27 43.7	+54.3	23.1	28 38.9	+54.4	23.3	29 33.9	+54.7	23.6	30 28.9	+54.8	23.8	31 23.7	+55.1	24.0	32 18.5	+55.2	24.3	58
59	26 47.1	+53.7	22.2	27 42.6	+53.9	22.4	28 38.0	+54.1	22.6	29 33.3	+54.4	22.9	30 28.6	+54.5	23.1	31 23.7	+54.8	23.3	32 18.8	+54.9	23.6	33 13.7	+55.1	23.8	59
60	27 40.8	+53.7	21.7	28 36.5	+53.9	21.9	29 32.1	+54.1	22.1	30 27.7	+54.2	22.4	31 23.1	+54.4	22.6	32 18.5	+54.6	22.8	33 13.7	+54.8	23.1	34 08.8	+55.1	23.4	60
61	28 34.5	+53.5	21.2	29 30.4	+53.7	21.4	30 26.2	+53.9	21.6	31 21.9	+54.1	21.9	32 17.5	+54.4	22.1	33 13.1	+54.5	22.3	34 08.5	+54.7	22.6	35 03.9	+54.9	22.9	61
62	29 28.0	+53.4	20.7	30 24.1	+53.6	20.9	31 20.1	+53.8	21.1	32 16.0	+54.0	21.4	33 11.9	+54.1	21.6	34 07.6	+54.4	21.8	35 03.2	+54.6	22.1	35 58.8	+54.8	22.4	62
63	30 21.4	+53.3	20.2	31 17.7	+53.5	20.4	32 13.9	+53.7	20.6	33 10.0	+53.9	20.8	34 06.0	+54.1	21.1	35 02.0	+54.3	21.3	35 57.8	+54.5	21.6	36 53.6	+54.6	21.9	63
64	31 14.7	+53.2	19.7	32 11.2	+53.3	19.9	33 07.6	+53.5	20.1	34 03.9	+53.7	20.3	35 00.1	+53.9	20.6	35 56.2	+54.2	20.8	36 52.3	+54.3	21.1	37 48.2	+54.5	21.3	64
65	32 07.9	+53.0	19.1	33 04.5	+53.2	19.3	34 01.1	+53.4	19.5	34 57.6	+53.6	19.8	35 54.0	+53.8	20.0	36 50.4	+53.9	20.3	37 46.6	+54.2	20.5	38 42.7	+54.4	20.8	65
66	33 00.9	+52.8	18.6	33 57.7	+53.1	18.8	34 54.5	+53.2	19.0	35 51.2	+53.4	19.2	36 47.8	+53.6	19.5	37 44.3	+53.9	19.7	38 40.8	+54.0	20.0	39 37.1	+54.2	20.3	66
67	33 53.7	+52.7	18.0	34 50.8	+52.8	18.2	35 47.7	+53.1	18.4	36 44.6	+53.3	18.7	37 41.4	+53.5	18.9	38 38.1	+53.7	19.2	39 34.8	+53.8	19.4	40 31.3	+54.0	19.7	67
68	34 46.4	+52.6	17.4	35 43.6	+52.8	17.6	36 40.8	+52.9	17.8	37 37.9	+53.1	18.1	38 34.9	+53.2	18.3	39 31.8	+53.5	18.6	40 28.6	+53.7	18.8	41 25.3	+53.9	19.1	68
69	35 39.0	+52.3	16.8	36 36.4	+52.5	17.0	37 33.7	+52.7	17.3	38 31.0	+52.9	17.5	39 28.1	+53.1	17.7	40 25.3	+53.2	18.0	41 22.3	+53.5	18.3	42 19.2	+53.7	18.5	69
70	36 31.3	+52.2	16.2	37 28.9	+52.3	16.4	38 26.4	+52.5	16.6	39 23.9	+52.7	16.9	40 21.2	+52.9	17.1	41 18.5	+53.1	17.4	42 15.8	+53.2	17.6	43 12.9	+53.5	17.9	70
71	37 23.5	+51.9	15.6	38 21.2	+52.2	15.8	39 18.9	+52.4	16.0	40 16.6	+52.5	16.3	41 14.1	+52.7	16.5	42 11.6	+52.9	16.8	43 09.0	+53.1	17.0	44 06.4	+53.2	17.3	71
72	38 15.4	+51.8	15.0	39 13.4	+51.9	15.2	40 11.3	+52.1	15.4	41 09.1	+52.3	15.6	42 06.8	+52.5	15.9	43 04.5	+52.7	16.1	44 02.1	+52.8	16.4	44 59.6	+53.1	16.7	72
73	39 07.2	+51.5	14.3	40 05.3	+51.7	14.5	41 03.4	+51.8	14.7	42 01.4	+52.0	15.0	42 59.3	+52.2	15.2	43 57.2	+52.4	15.5	44 54.9	+52.7	15.7	45 52.7	+52.8	16.0	73
74	39 58.7	+51.3	13.6	40 57.0	+51.5	13.9	41 55.2	+51.7	14.1	42 53.4	+51.8	14.3	43 51.5	+52.0	14.5	44 49.6	+52.1	14.8	45 47.6	+52.3	15.0	46 45.5	+52.5	15.3	74
75	40 50.0	+51.1	13.0	41 48.5	+51.2	13.2	42 46.9	+51.4	13.4	43 45.2	+51.6	13.6	44 43.5	+51.7	13.8	45 41.7	+51.9	14.1	46 39.9	+52.1	14.3	47 38.0	+52.3	14.6	75
76	41 41.1	+50.8	12.3	42 39.7	+51.0	12.5	43 38.3	+51.1	12.7	44 36.8	+51.3	12.9	45 35.2	+51.5	13.1	46 33.6	+51.7	13.3	47 32.0	+51.8	13.6	48 30.3	+52.0	13.9	76
77	42 31.9	+50.5	11.6	43 30.7	+50.6	11.7	44 29.4	+50.8	11.9	45 28.1	+50.9	12.1	46 26.7	+51.1	12.4	47 25.3	+51.3	12.6	48 23.8	+51.5	12.8	49 22.3	+51.6	13.1	77
78	43 22.4	+50.2	10.8	44 21.3	+50.4	11.0	45 20.2	+50.5	11.2	46 19.0	+50.7	11.4	47 17.8	+50.9	11.6	48 16.6	+51.1	11.8	49 15.3	+51.2	12.0	50 13.9	+51.4	12.3	78
79	44 12.6	+50.0	10.1	45 11.7	+50.1	10.2	46 10.7	+50.2	10.4	47 09.7	+50.4	10.6	48 08.7	+50.5	10.8	49 07.6	+50.6	11.0	50 06.5	+50.8	11.3	51 05.3	+51.0	11.5	79
80	45 02.6	+49.5	9.3	46 01.8	+49.7	9.4	47 00.9	+49.9	9.6	48 00.1	+50.0	9.8	48 59.2	+50.1	10.0	49 58.2	+50.3	10.2	50 57.3	+50.4	10.4	51 56.3	+50.6	10.6	80
81	45 52.1	+49.3	8.5	46 51.5	+49.4	8.6	47 50.8	+49.5	8.8	48 50.1	+49.6	9.0	49 49.3	+49.8	9.2	50 48.5	+49.9	9.3	51 47.7	+50.1	9.5	52 46.9	+50.2	9.8	81
82	46 41.4	+48.9	7.6	47 40.8	+49.0	7.8	48 40.3	+49.1	7.9	49 39.7	+49.2	8.1	50 39.1	+49.3	8.3	51 38.4	+49.5	8.5	52 37.8	+49.6	8.7	53 37.1	+49.7	8.9	82
83	47 30.3	+48.5	6.8	48 29.8	+48.6	6.9	49 29.4	+48.7	7.1	50 28.9	+48.8	7.2	51 28.4	+49.0	7.4	52 27.9	+49.1	7.5	53 27.4	+49.2	7.7	54 26.8	+49.3	7.9	83
84	48 18.8	+48.3	6.0	49 18.4	+48.2	6.2	50 18.1	+48.4	6.2	51 17.7	+48.4	6.3	52 17.4	+48.4	6.4	53 17.0	+48.6	6.6	54 16.6	+48.7	6.9	55 16.1	+48.8	6.9	84
85	49 06.8	+47.7	5.0	50 06.6	+47.7	5.1	51 06.3	+47.8	5.2	52 06.1	+47.9	5.3	53 05.8	+48.0	5.5	54 05.5	+48.1	5.6	55 05.3	+48.1	5.7	56 04.9	+48.3	5.9	85
86	49 54.5	+47.1	4.1	50 54.3	+47.2	4.2	51 54.1	+47.3	4.3	52 54.0	+47.3	4.4	53 53.8	+47.4	4.5	54 53.6	+47.5	4.6	55 53.4	+47.6	4.7	56 53.2	+47.7	4.8	86
87	50 41.6	+46.7	3.1	51 41.5	+46.8	3.2	52 41.4	+46.8	3.2	53 41.3	+46.9	3.3	54 41.2	+46.9	3.4	55 41.1	+47.0	3.5	56 41.0	+47.0	3.6	57 40.9	+47.0	3.7	87
88	51 28.3	+46.1	2.1	52 28.2	+46.2	2.2	53 28.2	+46.2	2.2	54 28.2	+46.2	2.3	55 28.1	+46.3	2.3	56 28.1	+46.3	2.4	57 28.0	+46.4	2.4	58 27.9	+46.4	2.5	88
89	52 14.4	+45.6	1.1	53 14.4	+45.6	1.1	54 14.4	+45.6	1.1	55 14.4	+45.6	1.2	56 14.4	+45.6	1.2	57 14.4	+45.6	1.2	58 14.4	+45.6	1.2	59 14.3	+45.7	1.3	89
90	53 00.0	+45.0	0.0	54 00.0	+45.0	0.0	55 00.0	+45.0	0.0	56 00.0	+44.9	0.0	57 00.0	+44.9	0.0	58 00.0	+44.9	0.0	59 00.0	+44.9	0.0	60 00.0	+44.9	0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z ; L.H.A. less than 180° .... Zn=180°+Z

LATITUDE **SAME** NAME AS DECLINATION — L.H.A. 139°, 221°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	26 34.0	+53.5	131.6	25 54.0	+53.9	131.9	25 13.8	+54.3	132.3	24 33.3	+54.6	132.6	23 52.5	+55.0	133.0	23 11.5	+55.3	133.3	22 30.2	+55.7	133.6	21 48.8	+55.9	133.9	0
1	27 27.5	+53.4	131.1	26 47.9	+53.9	131.5	26 08.1	+54.2	131.8	25 27.9	+54.6	132.2	24 47.5	+54.9	132.5	24 06.8	+55.3	132.9	23 25.9	+55.6	133.2	22 44.7	+55.9	133.5	1
2	28 20.9	+53.3	130.5	27 41.8	+53.7	131.0	27 02.3	+54.1	131.3	26 22.5	+54.5	131.7	25 42.4	+54.8	132.1	25 02.1	+55.1	132.4	24 21.5	+55.5	132.8	23 40.6	+55.8	133.1	2
3	29 14.2	+53.2	130.0	28 35.5	+53.5	130.4	27 56.4	+54.0	130.9	27 17.0	+54.3	131.2	26 37.2	+54.8	131.6	25 57.2	+55.1	132.0	25 17.0	+55.4	132.4	24 36.4	+55.8	132.7	3
4	30 07.4	+53.0	129.5	29 29.0	+53.5	129.9	28 50.4	+53.8	130.4	28 11.3	+54.3	130.8	27 32.0	+54.6	131.2	26 52.3	+55.1	131.6	26 12.4	+55.4	131.9	25 32.2	+55.6	132.3	4
5	31 00.4	+52.9	128.9	30 22.5	+53.3	129.4	29 44.2	+53.8	129.9	29 05.6	+54.2	130.3	28 26.6	+54.6	130.7	27 47.4	+54.9	131.1	27 07.8	+55.2	131.5	26 27.8	+55.7	131.9	5
6	31 53.3	+52.7	128.4	31 15.8	+53.2	128.9	30 38.0	+53.6	129.3	29 59.8	+54.0	129.8	29 21.2	+54.4	130.2	28 42.3	+54.8	130.6	28 03.0	+55.2	131.1	27 23.5	+55.5	131.5	6
7	32 46.0	+52.6	127.8	32 09.0	+53.1	128.3	31 31.6	+53.5	128.8	30 53.8	+54.0	129.3	30 15.6	+54.4	129.7	29 37.1	+54.7	130.2	28 58.2	+55.1	130.6	28 19.0	+55.5	131.0	7
8	33 38.6	+52.5	127.3	33 02.1	+52.9	127.8	32 25.1	+53.4	128.3	31 47.8	+53.8	128.8	31 10.0	+54.2	129.3	30 31.8	+54.7	129.7	29 53.3	+55.0	130.2	29 14.5	+55.3	130.6	8
9	34 31.1	+52.2	126.7	33 55.0	+52.8	127.2	33 18.5	+53.2	127.7	32 41.6	+53.6	128.3	32 04.2	+54.1	128.7	31 26.5	+54.5	129.2	30 48.3	+54.9	129.7	30 09.8	+55.3	130.1	9
10	35 23.3	+52.1	126.1	34 47.8	+52.6	126.6	34 11.7	+53.1	127.2	33 35.2	+53.6	127.7	32 58.3	+54.0	128.2	32 21.0	+54.4	128.7	31 43.2	+54.8	129.2	31 05.1	+55.2	129.7	10
11	36 15.4	+51.9	125.5	35 40.4	+52.4	126.0	35 04.8	+52.9	126.6	34 28.8	+53.4	127.2	33 52.3	+53.8	127.7	33 15.4	+54.3	128.2	32 38.0	+54.7	128.7	32 00.3	+55.1	129.2	11
12	37 07.3	+51.7	124.8	36 32.8	+52.2	125.4	35 57.7	+52.8	126.0	35 22.2	+53.2	126.6	34 46.1	+53.7	127.2	34 09.7	+54.1	127.7	33 32.7	+54.6	128.3	32 55.4	+54.9	128.8	12
13	37 59.0	+51.4	124.2	37 25.0	+52.0	124.8	36 50.5	+52.5	125.4	36 15.4	+53.1	126.0	35 39.8	+53.6	126.6	35 03.8	+54.0	127.2	34 27.3	+54.4	127.7	33 50.3	+54.9	128.3	13
14	38 50.4	+51.3	123.5	38 17.0	+51.8	124.2	37 43.0	+52.4	124.8	37 08.5	+52.9	125.5	36 33.4	+53.4	126.1	35 57.8	+53.9	126.7	35 21.7	+54.4	127.2	34 45.2	+54.7	127.8	14
15	39 41.7	+51.0	122.9	39 08.8	+51.6	123.5	38 35.4	+52.1	124.2	38 01.4	+52.7	124.9	37 26.8	+53.2	125.5	36 51.7	+53.7	126.1	36 16.1	+54.1	126.7	35 39.9	+54.7	127.3	15
16	40 32.7	+50.8	122.2	40 00.4	+51.4	122.9	39 27.5	+52.0	123.6	38 54.1	+52.5	124.3	38 20.0	+53.0	124.9	37 45.4	+53.5	125.5	37 10.2	+54.0	126.2	36 34.6	+54.4	126.8	16
17	41 23.5	+50.4	121.5	40 51.8	+51.1	122.2	40 19.5	+51.7	122.9	39 46.6	+52.3	123.6	39 13.0	+52.9	124.3	38 38.9	+53.4	125.0	38 04.2	+53.9	125.6	37 29.0	+54.4	126.3	17
18	42 13.9	+50.2	120.7	41 42.9	+50.9	121.5	41 11.2	+51.5	122.3	40 38.9	+52.1	123.0	40 05.9	+52.6	123.7	39 32.3	+53.2	124.4	38 58.1	+53.7	125.1	38 23.4	+54.1	125.7	18
19	43 04.1	+50.0	120.0	42 33.8	+50.6	120.8	42 02.7	+51.3	121.6	41 31.0	+51.8	122.3	40 58.5	+52.5	123.1	40 25.5	+53.0	123.8	39 51.8	+53.5	124.5	39 17.5	+54.1	125.2	19
20	43 54.1	+49.6	119.2	43 24.4	+50.3	120.1	42 54.0	+50.9	120.9	42 22.8	+51.6	121.7	41 51.0	+52.2	122.4	41 18.5	+52.8	123.2	40 45.3	+53.4	123.9	40 11.6	+53.8	124.6	20
21	44 43.7	+49.2	118.4	44 14.7	+50.0	119.3	43 44.9	+50.7	120.1	43 14.4	+51.4	121.0	42 43.2	+52.0	121.8	42 11.3	+52.5	122.5	41 38.7	+53.1	123.3	41 05.4	+53.7	124.0	21
22	45 32.9	+48.9	117.6	45 04.7	+49.6	118.5	44 35.6	+50.4	119.4	44 05.8	+51.0	120.2	43 35.2	+51.7	121.1	43 03.8	+52.4	121.9	42 31.8	+52.9	122.7	41 59.1	+53.5	123.4	22
23	46 21.8	+48.6	116.8	45 54.3	+49.4	117.7	45 26.0	+50.1	118.6	44 56.8	+50.8	119.5	44 26.9	+51.5	120.4	43 56.2	+52.1	121.2	43 24.7	+52.7	122.0	42 52.6	+53.3	122.8	23
24	47 10.4	+48.1	115.9	46 43.7	+48.9	116.9	46 16.1	+49.7	117.8	45 47.6	+50.5	118.8	45 18.4	+51.1	119.6	44 48.3	+51.8	120.5	44 17.4	+52.5	121.4	43 45.9	+53.0	122.2	24
25	47 58.5	+47.7	115.1	47 32.6	+48.6	116.1	47 05.8	+49.4	117.0	46 38.1	+50.1	118.0	46 09.5	+50.9	118.9	45 40.1	+51.6	119.8	45 09.9	+52.2	120.7	44 38.9	+52.9	121.5	25
26	48 46.2	+47.3	114.1	48 21.2	+48.1	115.2	47 55.2	+49.0	116.2	47 28.2	+49.8	117.2	47 00.4	+50.5	118.1	46 31.7	+51.2	119.1	46 02.1	+52.0	120.0	45 31.8	+52.5	120.9	26
27	49 33.5	+46.8	113.2	49 09.3	+47.7	114.3	48 44.2	+48.6	115.3	48 18.0	+49.4	116.3	47 50.9	+50.3	117.3	47 22.9	+51.0	118.3	46 54.1	+51.6	119.2	46 24.3	+52.4	120.2	27
28	50 20.3	+46.3	112.2	49 57.0	+47.3	113.3	49 32.8	+48.1	114.4	49 07.4	+49.1	115.5	48 41.2	+49.8	116.5	48 13.9	+50.6	117.5	47 45.7	+51.4	118.5	47 16.7	+52.0	119.4	28
29	51 06.6	+45.7	111.2	50 44.3	+46.7	112.4	50 20.9	+47.7	113.5	49 56.5	+48.6	114.6	49 31.0	+49.5	115.7	49 04.5	+50.3	116.7	48 37.1	+51.0	117.7	48 08.7	+51.8	118.7	29
30	51 52.3	+45.2	110.2	51 31.0	+46.3	111.4	51 08.6	+47.2	112.5	50 45.1	+48.1	113.7	50 20.5	+49.0	114.8	49 54.8	+49.9	115.9	49 28.1	+50.7	116.9	49 00.5	+51.4	117.9	30
31	52 37.5	+44.6	109.1	52 17.3	+45.6	110.3	51 55.8	+46.7	111.5	51 33.2	+47.7	112.7	51 09.5	+48.6	113.9	50 44.7	+49.5	115.0	50 18.8	+50.3	116.1	49 51.9	+51.2	117.2	31
32	53 22.1	+44.0	108.0	53 02.9	+45.1	109.3	52 42.5	+46.2	110.5	52 20.9	+47.2	111.7	51 58.1	+48.1	112.9	51 34.2	+49.0	114.1	51 09.1	+50.0	115.2	50 43.1	+50.7	116.3	32
33	54 06.1	+43.2	106.9	53 48.0	+44.4	108.2	53 28.7	+45.5	109.4	53 08.1	+46.6	110.7	52 46.2	+47.7	111.9	52 23.2	+48.6	113.1	51 59.1	+49.5	114.3	51 33.8	+50.4	115.5	33
34	54 49.3	+42.6	105.7	54 32.4	+43.8	107.0	54 14.2	+44.9	108.3	53 54.7	+46.0	109.6	53 33.9	+47.1	110.8	53 11.8	+48.1	112.1	52 48.6	+49.1	113.3	52 24.2	+50.0	114.6	34
35	55 31.9	+41.7	104.4	55 16.2	+43.0	105.8	54 59.1	+44.3	107.2	54 40.7	+45.5	108.6	54 21.0	+46.5	109.9	53 59.9	+47.6	111.2	53 37.7	+48.5	112.4	53 14.2	+49.5	113.7	35
36	56 13.6	+41.0	103.1	55 59.2	+42.3	104.6	55 43.4	+43.6	106.0	55 26.2	+44.7	107.4	55 07.5	+45.9	108.8	54 47.5	+47.1	110.1	54 26.2	+48.1	111.4	54 03.7	+49.0	112.7	36
37	56 54.6	+40.0	101.8	56 41.5	+41.5	103.3	56 27.0	+42.7	104.8	56 10.9	+44.1	106.2	55 53.4	+45.3	107.6	55 34.6	+46.4	109.0	55 14.3	+47.5	110.4	54 52.7	+48.6	111.7	37
38	57 34.6	+39.2	100.4	57 23.0	+40.6	102.0	57 09.7	+42.0	103.5	56 55.0	+43.3	105.0	56 38.7	+44.5	106.5	56 21.0	+45.8	107.9	56 01.8	+47.0	109.3	55 41.3	+48.0	110.7	38
39	58 13.8	+38.1	99.0	58 03.6	+39.6	100.6	57 51.7	+41.1	102.2	57 38.3	+42.5	103.7	57 23.3	+43.8	105.2	57 06.8	+45.0	106.7	56 48.8	+46.2	108.2	56 29.3	+47.4	109.6	39
40	58 51.9	+37.1	97.5	58 43.2	+38.7	99.2	58 32.8	+40.2	100.8	58 20.8	+41.6	102.4	58 07.1	+43.0	104.0	57 51.8	+44.4	105.5	57 35.0	+45.6	107.0	57 16.7	+46.8	108.5	40
41	59 29.0	+36.0	96.0	59 21.9	+37.6	97.7	59 13.0	+39.2	99.3	59 02.4	+40.7	101.0	58 50.1	+42.2	102.6	58 36.2	+43.5	104.2	58 20.6	+44.9	105.8	58 03.5	+46.2	107.3	41
42	60 05.0	+34.8	94.4	59 59.5	+36.5	96.1	59 52.2	+38.1	97.9	59 43.1	+39.7	99.6	59 32.3	+41.2	101.2	59 19.7	+42.7	102.9	59 05.5	+44.1	104.5	58 49.7	+45.4	106.1	42
43	60 39.8	+33.5	92.8	60 36.0	+35.3	94.5	60 30.3	+37.0	96.3	60 22.8	+38.7	98.1	60 13.5	+40.3	99.8	60 02.4	+41.8	101.5	59 49.6	+43.3	103.2	59 35.1	+44.6	104.8	43
44	61 13.3	+32.2	91.1	61 11.3	+34.0	92.9	61 07.3	+35.8	94.7	61 01.5	+37.5	96.5	60 53.8	+39.2	98.3	60 44.2	+40.8	100.0	60 32.9	+42.3	101.8	60 19.7	+43.8	103.5	44
45	61 45.5	+30.8	89.3	61 45.3	+32.7	91.1	61 43.1	+34.6	93.0	61 39.0	+36.3	94.9	61 33.0	+38.0	96.7	61 25.0	+39.8	98.5	61 15.2	+41.3	100.3	61 03.5	+42.9	102.1	45
46	62 16.3	+29.3	87.5	62 18.0	+31.2	89.4	62 17.7	+33.1	91.3	62 15.3	+35.1	93.2	62 11.0	+36.9	95.1	62 04.8	+38.6	96.9	61 56.5	+40.3	98.8	61 46.4	+41.9	100.6	46
47	62 45.6	+27.7	85.6	62 49.2	+29.8	87.5	62 50.8	+31.8	89.5	62 50.4	+33.6	91.4	62 47.9	+35.5	93.4	62 43.4	+37.4	95.3	62 36.8	+39.2	97.2	62 28.3	+40.9	99.1	47
48	63 13.3	+26.1	83.6	63 19.0	+28.1	85.6	63 22.6	+30.1	87.6	63 24.0	+32.3	89.6	63 23.4	+34.2	91.6	63 20.8	+36.0	93.6	63 16.0	+37.9	95.5	63 09.2	+39.7	97.5	48
49	63 39.4	+24.3	81.6	63 47.1	+26.5	83.6	63 52.7	+28.6	85.6	63 56.3	+30.6	87.7	63 57.6	+32.7	89.7	63 56.8	+34.7	91.8	63 53.9	+36.6	93.8	63 48.9	+38.5	95.8	49
50	64 03.7	+22.5	79.5	64 13.6	+24.7	81.6	64 21.3	+26.9	83.6	64 26.9	+29.0	85.7	64 30.3	+31.1	87.8	64 31.5	+33.2	89.9	64 30.5	+35.3	92.0	64 27.4	+37.1	94.1	50
51	64 26.2	+20.6	77.4	64 38.3	+22.8	79.4	64 48.2	+25.0	81.5	64 55.9	+27.3	83.7	65 01.4	+29.5	85.8	65 04.7	+31.6	87.9	65 05.8	+33.7	90.1	65 04.5	+35.8	92.2	51
52	64 46.8	+18.6•	75.2	65 01.1	+20.9•	77.3	65 13.2	+23.2	79.4	65 23.2	+25.4	81.5	65 30.9	+27.7	83.7	65 36.3	+29.9	85.9	65 39.5	+32.1	88.1	65 40.3	+34.2	90.3	52
53	65 05.4	+16.6•	73.0	65 22.0	+18.8•	75.0	65 36.4	+21.1•	77.2	65 48.6	+23.5•	79.3	65 58.6	+25.7	81.5	66 06.2	+28.1	83.8	66 11.6	+30.3	86.0	66 14.5	+32.6	88.3	53
54	65 22.0	+14.4•	70.7	65 40.8	+16.7•	72.7	65 57.5	+19.1•	74.9	66 12.1	+21.4•	77.1	66 24.3	+23.8•	79.3	66 34.3	+26.2•	81.6	66 41.9	+28.5	83.9	66 47.1	+30.8	86.2	54
55	65 36.4	+12.2•	68.3	65 57.5	+14.6•	70.4	66 16.6	+16.9•	72.5	66 33.5	+19.3•	74.7	66 48.1	+21.7•	77.0	67 00.5	+24.1•	79.3	67 10.4	+26.6•	81.6	67 17.9	+29.0	84.0	55
56	65 48.6	+10.0•	65.9	66 12.1	+12.2•	68.0	66 33.5	+14.6•	70.1	66 52.8	+17.0•	72.3	67 09.8	+19.6•	74.6	67 24.6	+22.0•	76.9	67 37.0	+24.4•	79.3	67 46.9	+26.9•	81.7	56
57	65 58.6	+7.6•	63.5	66 24.3	+10.0•	65.6	66 48.1	+12.4•	67.7	67 09.8	+14.8•	69.9	67 29.4	+17.2•	72.2	67 46.6	+19.7•	74.5	68 01.4	+22.3•	76.9	68 13.8	+24.8•	79.3	57
58	66 06.2	+5.4•	61.1	66 34.3	+7.6•	63.1	67 00.5	+9.9•	65.2	67 24.6	+12.4•	67.4	67 46.6	+14.8•	69.6	68 06.3	+17.4•	72.0	68 23.7	+19.9•	74.4	68 38.6	+22.6•	76.8	58
59	66 11.6	+2.9•	58.6	66 41.9	+5.2•	60.6	67 10.4	+7.5•	62.7	67 37.0	+9.9•	64.8	68 01.4	+12.4•	67.1	68 23.7	+14.9•	69.4	68 43.7	+17.5•	71.8	69 01.2	+20.1•	74.3	59
60	66 14.5	+0.6•	56.1	66 47.1	+2.8•	58.1	67 17.9	+5.1•	60.1	67 46.9	+7.4•	62.2	68 13.8	+9.9•	64.4	68 38.6	+12.4•	66.7	69 01.2	+15.0•	69.1	69 21.3	+17.7•	71.6	60
61	66 15.1	−1.8	53.7	66 49.9	+0.3•	55.5	67 23.0	+2.5•	57.5	67 54.3	+4.8•	59.6	68 23.7	+7.2•	61.8	68 51.0	+9.8	64.0	69 16.2	+12.3•	66.4	69 39.0	+15.0•	68.9	61
62	66 13.3	−4.1	51.2	66 50.2	−2.1	53.0	67 25.5	+0.1•	54.9	67 59.1	+2.3•	56.9	68 30.9	+4.7•	59.1	69 00.8	+7.1•	61.3	69 28.5	+9.7•	63.6	69 54.0	+12.4•	66.1	62
63	66 09.2	−6.5•	48.7	66 48.1	−4.6•	50.5	67 25.6	−2.5•	52.3	68 01.4	−0.3•	54.3	68 35.6	+2.0•	56.3	69 07.9	+4.4•	58.5	69 38.2	+6.9•	60.8	70 06.4	+9.5•	63.2	63
64	66 02.7	−8.8•	46.3	66 43.5	−6.9•	47.9	67 23.1	−5.0•	49.7	68 01.1	−2.9•	51.6	68 37.6	−0.7•	53.6	69 12.3	+1.6•	55.7	69 45.1	+4.1•	57.9	70 15.9	+6.7•	60.3	64
65	65 53.9	−11.1•	43.8	66 36.6	−9.4•	45.4	67 18.1	−7.5•	47.1	67 58.2	−5.5•	48.9	68 36.9	−3.4•	50.9	69 13.9	−1.1•	52.9	69 49.2	+1.3•	55.1	70 22.6	+3.7•	57.4	65
66	65 42.8	−13.3•	41.4	66 27.2	−11.6•	42.9	67 10.6	−9.9•	44.6	67 52.7	−8.0•	46.3	68 33.5	−6.0•	48.1	69 12.8	−3.9•	50.1	69 50.5	−1.7•	52.2	70 26.3	+0.9•	54.4	66
67	65 29.5	−15.5•	39.1	66 15.6	−14.0•	40.5	67 00.7	−12.3•	42.0	67 44.7	−10.5•	43.7	68 27.5	−8.7•	45.4	69 08.9	−6.6•	47.3	69 48.8	−4.4•	49.3	70 27.2	−2.2•	51.4	67
68	65 14.0	−17.6•	36.8	66 01.6	−16.1•	38.1	66 48.4	−14.5•	39.5	67 34.2	−12.9•	41.1	68 18.8	−11.2•	42.7	69 02.3	−9.3•	44.5	69 44.4	−7.2•	46.4	70 25.0	−5.0•	48.4	68
69	64 56.4	−19.6	34.5	65 45.5	−18.3•	35.7	66 33.8	−16.9•	37.1	67 21.2	−15.3•	38.5	68 07.6	−13.6•	40.1	68 53.0	−11.9•	41.7	69 37.2	−10.1•	43.5	70 20.0	−8.0•	45.4	69
70	64 36.8	−21.5	32.3	65 27.2	−20.3•	33.4	66 16.9	−19.0•	34.7	67 05.9	−17.7•	36.0	67 54.0	−16.2•	37.5	68 41.1	−14.5•	39.0	69 27.1	−12.7•	40.7	70 12.0	−10.8•	42.5	70
71	64 15.3	−23.5	30.1	65 06.9	−22.3	31.2	65 57.9	−21.1•	32.3	66 48.2	−19.5•	33.5	67 37.8	−18.4•	34.9	68 26.6	−16.9•	36.4	69 14.4	−15.3•	37.9	70 01.2	−13.5•	39.6	71
72	63 51.8	−25.2	28.0	64 44.6	−24.2	29.0	65 36.8	−23.1	30.1	66 28.4	−21.9•	31.2	67 19.4	−20.7•	32.4	68 09.7	−19.3•	33.8	68 59.1	−17.8•	35.2	69 47.7	−16.2•	36.8	72
73	63 26.6	−26.9	26.0	64 20.4	−26.0	26.9	65 13.7	−25.0	27.8	66 06.5	−24.0•	28.9	66 58.7	−22.8•	30.0	67 50.4	−21.6•	31.2	68 41.3	−20.2•	32.6	69 31.5	−18.8•	34.0	73
74	62 59.7	−28.5	24.0	63 54.4	−27.7	24.8	64 48.7	−26.9	25.7	65 42.5	−25.9	26.6	66 35.9	−24.8•	27.7	67 28.8	−23.8•	28.8	68 21.1	−22.6•	30.0	69 12.7	−21.2•	31.3	74
75	62 31.2	−30.0	22.0	63 26.7	−29.3	22.8	64 21.8	−28.5	23.6	65 16.6	−27.6	24.5	66 11.1	−26.8	25.4	67 05.0	−25.8	26.4	67 58.5	−24.7•	27.5	68 51.5	−23.6•	28.7	75
76	62 01.2	−31.5	20.2	62 57.4	−30.9	20.9	63 53.3	−30.2	21.6	64 49.0	−29.5	22.4	65 44.3	−28.6	23.2	66 39.2	−27.7	24.1	67 33.8	−26.8•	25.1	68 27.9	−25.8•	26.2	76
77	61 29.7	−32.9	18.4	62 26.5	−32.3	19.0	63 23.1	−31.7	19.6	64 19.5	−31.0	20.3	65 15.7	−30.4	21.1	66 11.5	−29.6	21.9	67 07.0	−28.8	22.8	68 02.1	−27.8•	23.7	77
78	60 56.8	−34.2	16.6	61 54.2	−33.7	17.2	62 51.4	−33.1	17.8	63 48.5	−32.6	18.4	64 45.3	−31.9	19.0	65 41.9	−31.3	19.8	66 38.2	−30.5	20.5	67 34.3	−29.8	21.4	78
79	60 22.6	−35.4	15.0	61 20.5	−34.9	15.4	62 18.3	−34.5	15.9	63 15.9	−34.0	16.5	64 13.4	−33.5	17.1	65 10.6	−32.9	17.7	66 07.7	−32.3	18.4	67 04.5	−31.6	19.1	79
80	59 47.2	−36.5	13.4	60 45.6	−36.2	13.8	61 43.8	−35.8	14.2	62 41.9	−35.4	14.7	63 39.9	−34.9	15.2	64 37.7	−34.4	15.7	65 35.4	−33.9	16.3	66 32.9	−33.4	17.0	80
81	59 10.7	−37.6	11.8	60 09.4	−37.3	12.1	61 08.0	−37.0	12.5	62 06.5	−36.6	12.9	63 05.0	−36.3	13.4	64 03.3	−35.8	13.9	65 01.5	−35.4	14.4	65 59.5	−34.9	14.9	81
82	58 33.1	−38.7	10.3	59 32.1	−38.4	10.6	60 31.0	−38.1	10.9	61 29.9	−37.9	11.3	62 28.7	−37.5	11.6	63 27.4	−37.1	12.0	64 26.1	−36.8	12.5	65 24.6	−36.4	12.9	82
83	57 54.4	−39.6	8.8	58 53.7	−39.4	9.1	59 52.9	−39.2	9.4	60 52.1	−38.9	9.6	61 51.2	−38.7	10.0	62 50.3	−38.4	10.3	63 49.3	−38.1	10.7	64 48.2	−37.8	11.0	83
84	57 14.8	−40.5	7.4	58 14.3	−40.3	7.6	59 13.7	−40.1	7.9	60 13.2	−40.0	8.1	61 12.5	−39.7	8.4	62 11.9	−39.5	8.6	63 11.2	−39.3	8.9	64 10.4	−39.0	9.2	84
85	56 34.3	−41.4	6.1	57 34.0	−41.3	6.2	58 33.6	−41.1	6.4	59 33.2	−40.9	6.6	60 32.8	−40.8	6.8	61 32.4	−40.7	7.0	62 31.9	−40.4	7.3	63 31.4	−40.2	7.5	85
86	55 52.9	−42.1	4.8	56 52.7	−42.0	4.9	57 52.5	−42.0	5.0	58 52.3	−41.9	5.2	59 52.0	−41.7	5.3	60 51.7	−41.6	5.5	61 51.5	−41.5	5.7	62 51.2	−41.4	5.9	86
87	55 10.8	−42.9	3.5	56 10.7	−42.9	3.6	57 10.5	−42.7	3.7	58 10.4	−42.7	3.8	59 10.3	−42.6	3.9	60 10.1	−42.5	4.0	61 10.0	−42.5	4.2	62 09.8	−42.3	4.3	87
88	54 27.9	−43.6	2.3	55 27.8	−43.5	2.4	56 27.8	−43.6	2.4	57 27.7	−43.5	2.5	58 27.7	−43.5	2.6	59 27.6	−43.4	2.6	60 27.5	−43.3	2.7	61 27.5	−43.3	2.8	88
89	53 44.3	−44.3	1.1	54 44.3	−44.3	1.2	55 44.2	−44.2	1.2	56 44.2	−44.2	1.2	57 44.2	−44.2	1.3	58 44.2	−44.2	1.3	59 44.2	−44.2	1.3	60 44.2	−44.2	1.4	89
90	53 00.0	−44.9	0.0	54 00.0	−44.9	0.0	55 00.0	−44.9	0.0	56 00.0	−44.9	0.0	57 00.0	−44.9	0.0	58 00.0	−45.0	0.0	59 00.0	−45.0	0.0	60 00.0	−45.0	0.0	90

53°	54°	55°	56°	57°	58°	59°	60°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	26 34.0	−53.6	131.6	25 54.0	−54.0	131.9	25 13.8	−54.4	132.3	24 33.3	−54.7	132.6	23 52.5	−55.1	133.0	23 11.5	−55.4	133.3	22 30.2	−55.7	133.6	21 48.8	−56.0	133.9	0
1	25 40.4	−53.8	132.1	25 00.0	−54.1	132.4	24 19.4	−54.4	132.8	23 38.6	−54.9	133.1	22 57.4	−55.1	133.4	22 16.1	−55.4	133.7	21 34.5	−55.7	134.0	20 52.8	−55.9	134.3	1
2	24 46.6	−53.8	132.6	24 05.9	−54.2	132.9	23 25.0	−54.6	133.2	22 43.7	−54.8	133.5	22 02.3	−55.2	133.8	21 20.7	−55.6	134.1	20 38.8	−55.8	134.4	19 56.7	−56.1	134.7	2
3	23 52.8	−53.9	133.0	23 11.7	−54.2	133.4	22 30.4	−54.6	133.7	21 48.9	−55.0	134.0	21 07.1	−55.3	134.2	20 25.1	−55.5	134.5	19 43.0	−55.9	134.8	19 00.6	−56.1	135.0	3
4	22 58.9	−54.0	133.5	22 17.5	−54.4	133.8	21 35.8	−54.7	134.1	20 53.9	−55.0	134.4	20 11.8	−55.3	134.7	19 29.6	−55.6	134.9	18 47.1	−55.9	135.2	18 04.5	−56.2	135.4	4
5	22 04.9	−54.1	134.0	21 23.1	−54.4	134.3	20 41.1	−54.7	134.6	19 58.9	−55.1	134.8	19 16.5	−55.3	135.1	18 34.0	−55.7	135.3	17 51.2	−55.9	135.5	17 08.3	−56.2	135.8	5
6	21 10.8	−54.1	134.5	20 28.7	−54.5	134.7	19 46.4	−54.8	135.0	19 03.8	−55.1	135.2	18 21.2	−55.5	135.5	17 38.3	−55.7	135.7	16 55.3	−56.0	135.9	16 12.1	−56.3	136.1	6
7	20 16.7	−54.3	134.9	19 34.2	−54.6	135.2	18 51.6	−54.9	135.4	18 08.7	−55.2	135.7	17 25.7	−55.4	135.9	16 42.6	−55.8	136.1	15 59.3	−56.1	136.3	15 15.8	−56.3	136.5	7
8	19 22.4	−54.2	135.4	18 39.6	−54.6	135.6	17 56.7	−54.9	135.9	17 13.5	−55.2	136.1	16 30.3	−55.6	136.3	15 46.8	−55.8	136.5	15 03.2	−56.0	136.7	14 19.5	−56.3	136.9	8
9	18 28.2	−54.4	135.8	17 45.0	−54.6	136.1	17 01.8	−55.0	136.3	16 18.3	−55.3	136.5	15 34.7	−55.5	136.7	14 51.0	−55.8	136.9	14 07.2	−56.1	137.0	13 23.2	−56.4	137.2	9
10	17 33.8	−54.4	136.3	16 50.4	−54.8	136.5	16 06.8	−55.1	136.7	15 23.0	−55.3	136.9	14 39.2	−55.6	137.1	13 55.2	−55.9	137.2	13 11.1	−56.2	137.4	12 26.8	−56.3	137.6	10
11	16 39.4	−54.5	136.7	15 55.6	−54.7	136.9	15 11.7	−55.0	137.1	14 27.7	−55.3	137.3	13 43.6	−55.7	137.5	12 59.3	−55.9	137.6	12 14.9	−56.1	137.8	11 30.5	−56.4	137.9	11
12	15 44.9	−54.5	137.2	15 00.9	−54.9	137.3	14 16.7	−55.1	137.5	13 32.4	−55.4	137.7	12 47.9	−55.6	137.8	12 03.4	−55.9	138.0	11 18.8	−56.2	138.1	10 34.1	−56.5	138.3	12
13	14 50.4	−54.6	137.6	14 06.0	−54.8	137.8	13 21.6	−55.2	137.9	12 37.0	−55.5	138.1	11 52.3	−55.8	138.2	11 07.5	−56.0	138.4	10 22.6	−56.2	138.5	9 37.6	−56.4	138.6	13
14	13 55.8	−54.6	138.0	13 11.2	−54.9	138.2	12 26.4	−55.2	138.3	11 41.5	−55.4	138.5	10 56.6	−55.8	138.6	10 11.5	−56.0	138.7	9 26.4	−56.2	138.8	8 41.2	−56.5	138.9	14
15	13 01.2	−54.6	138.4	12 16.3	−55.0	138.6	11 31.2	−55.2	138.7	10 46.1	−55.5	138.9	10 00.8	−55.7	139.0	9 15.5	−56.0	139.1	8 30.2	−56.3	139.2	7 44.7	−56.5	139.3	15
16	12 06.6	−54.7	138.9	11 21.3	−55.0	139.0	10 36.0	−55.3	139.1	9 50.6	−55.5	139.4	9 05.1	−55.8	139.4	8 19.5	−56.0	139.5	7 33.9	−56.3	139.5	6 48.2	−56.5	139.6	16
17	11 11.9	−54.7	139.3	10 26.3	−55.0	139.4	9 40.7	−55.2	139.5	8 55.1	−55.6	139.6	8 09.3	−55.8	139.7	7 23.5	−56.0	139.8	6 37.6	−56.2	139.9	5 51.7	−56.5	140.0	17
18	10 17.1	−54.7	139.7	9 31.3	−55.0	139.8	8 45.5	−55.3	139.9	7 59.5	−55.5	140.0	7 13.5	−55.8	140.1	6 27.5	−56.1	140.2	5 41.4	−56.3	140.2	4 55.2	−56.5	140.3	18
19	9 22.4	−54.8	140.1	8 36.3	−55.1	140.2	7 50.2	−55.4	140.3	7 04.0	−55.6	140.4	6 17.7	−55.8	140.5	5 31.4	−56.1	140.5	4 45.1	−56.3	140.6	3 58.7	−56.5	140.6	19
20	8 27.6	−54.8	140.5	7 41.2	−55.0	140.6	6 54.8	−55.3	140.7	6 08.4	−55.6	140.8	5 21.9	−55.9	140.8	4 35.3	−56.0	140.9	3 48.8	−56.3	140.9	3 02.2	−56.6	141.0	20
21	7 32.8	−54.9	140.9	6 46.2	−55.1	141.0	5 59.5	−55.4	141.1	5 12.8	−55.6	141.2	4 26.0	−55.8	141.2	3 39.3	−56.1	141.2	2 52.5	−56.4	141.3	2 05.6	−56.5	141.3	21
22	6 37.9	−54.8	141.3	5 51.1	−55.2	141.4	5 04.1	−55.3	141.5	4 17.2	−55.6	141.5	3 30.2	−55.9	141.6	2 43.2	−56.1	141.6	1 56.1	−56.3	141.6	1 09.1	−56.5	141.6	22
23	5 43.1	−54.9	141.8	4 55.9	−55.1	141.8	4 08.8	−55.4	141.9	3 21.6	−55.7	141.9	2 34.3	−55.8	141.9	1 47.1	−56.1	142.0	0 59.8	−56.3	142.0	0 12.6	−56.6	142.0	23
24	4 48.2	−54.9	142.2	4 00.8	−55.1	142.2	3 13.4	−55.4	142.2	2 25.9	−55.6	142.3	1 38.5	−55.9	142.3	0 51.0	−56.1	142.3	0 03.5	−56.3	142.3	0 44.0	+56.5	37.7	24
25	3 53.3	−54.9	142.6	3 05.7	−55.2	142.6	2 18.0	−55.4	142.6	1 30.3	−55.7	142.7	0 42.6	−55.9	142.7	0 05.1	+56.1	37.3	0 52.8	+56.4	37.3	1 40.5	+56.6	37.4	25
26	2 58.4	−54.9	143.0	2 10.5	−55.2	143.0	1 22.6	−55.4	143.0	0 34.6	−55.6	143.0	0 13.3	+55.9	37.0	1 01.2	+56.1	37.0	1 49.2	+56.3	37.0	2 37.1	+56.3	37.0	26
27	2 03.5	−54.9	143.4	1 15.3	−55.1	143.4	0 27.2	−55.4	143.4	0 21.0	+55.6	36.6	1 09.2	+55.8	36.6	1 57.3	+56.1	36.6	2 45.5	+56.3	36.6	3 33.6	+56.5	36.7	27
28	1 08.6	−54.9	143.8	0 20.2	−55.2	143.8	0 28.2	+55.4	36.2	1 16.6	+55.7	36.2	2 05.0	+55.9	36.2	2 53.4	+56.1	36.3	3 41.8	+56.3	36.3	4 30.1	+56.5	36.3	28
29	0 13.7	−55.0	144.2	0 35.0	+55.1	35.8	1 23.6	+55.4	35.8	2 12.3	+55.6	35.9	3 00.9	+55.9	35.9	3 49.5	+56.1	35.9	4 38.1	+56.3	36.0	5 26.6	+56.5	36.0	29
30	0 41.3	+54.9	35.4	1 30.1	+55.2	35.4	2 19.0	+55.4	35.4	3 07.9	+55.6	35.5	3 56.8	+55.8	35.5	4 45.6	+56.1	35.6	5 34.4	+56.3	35.6	6 23.1	+56.5	35.7	30
31	1 36.2	+54.9	35.0	2 25.3	+55.2	35.0	3 14.4	+55.4	35.1	4 03.5	+55.6	35.1	4 52.6	+55.8	35.1	5 41.7	+56.0	35.2	6 30.7	+56.2	35.3	7 19.6	+56.5	35.3	31
32	2 31.1	+54.9	34.6	3 20.5	+55.1	34.6	4 09.8	+55.4	34.7	4 59.1	+55.6	34.7	5 48.4	+55.9	34.8	6 37.7	+56.0	34.8	7 26.9	+56.2	34.9	8 16.1	+56.5	35.0	32
33	3 26.0	+54.9	34.2	4 15.6	+55.1	34.2	5 05.2	+55.3	34.3	5 54.7	+55.6	34.3	6 44.3	+55.8	34.4	7 33.7	+56.1	34.5	8 23.2	+56.2	34.6	9 12.6	+56.4	34.6	33
34	4 20.9	+54.9	33.8	5 10.7	+55.1	33.8	6 00.5	+55.4	33.9	6 50.3	+55.6	34.0	7 40.1	+55.8	34.0	8 29.8	+56.0	34.1	9 19.4	+56.2	34.2	10 09.0	+56.4	34.3	34
35	5 15.8	+54.8	33.4	6 05.8	+55.1	33.5	6 55.9	+55.3	33.5	7 45.9	+55.5	33.6	8 35.9	+55.7	33.7	9 25.8	+55.9	33.8	10 15.6	+56.2	33.9	11 05.4	+56.4	34.0	35
36	6 10.6	+54.8	33.0	7 00.9	+55.1	33.1	7 51.2	+55.3	33.1	8 41.4	+55.6	33.2	9 31.6	+55.8	33.3	10 21.7	+56.0	33.4	11 11.8	+56.2	33.5	12 01.8	+56.3	33.6	36
37	7 05.5	+54.8	32.6	7 56.0	+55.1	32.7	8 46.5	+55.3	32.7	9 37.0	+55.5	32.8	10 27.4	+55.7	32.9	11 17.7	+55.9	33.0	12 08.0	+56.1	33.1	12 58.2	+56.3	33.3	37
38	8 00.3	+54.8	32.2	8 51.1	+55.0	32.3	9 41.8	+55.2	32.3	10 32.5	+55.5	32.4	11 23.1	+55.7	32.5	12 13.6	+55.9	32.7	13 04.1	+56.1	32.8	13 54.5	+56.3	32.9	38
39	8 55.1	+54.8	31.8	9 46.1	+55.0	31.8	10 37.0	+55.3	31.9	11 27.9	+55.5	32.0	12 18.8	+55.6	32.2	13 09.5	+55.9	32.3	14 00.2	+56.1	32.4	14 50.8	+56.3	32.5	39
40	9 49.9	+54.7	31.3	10 41.1	+55.0	31.4	11 32.3	+55.2	31.5	12 23.4	+55.4	31.7	13 14.4	+55.6	31.8	14 05.4	+55.8	31.9	14 56.3	+56.0	32.0	15 47.1	+56.2	32.2	40
41	10 44.6	+54.7	30.9	11 36.1	+54.9	31.0	12 27.5	+55.1	31.1	13 18.8	+55.3	31.3	14 10.0	+55.6	31.4	15 01.2	+55.8	31.5	15 52.3	+56.0	31.7	16 43.3	+56.2	31.8	41
42	11 39.3	+54.7	30.5	12 31.0	+54.9	30.6	13 22.6	+55.1	30.7	14 14.1	+55.4	30.9	15 05.6	+55.6	31.0	15 57.0	+55.8	31.1	16 48.3	+56.0	31.3	17 39.5	+56.2	31.5	42
43	12 34.0	+54.7	30.1	13 25.9	+54.9	30.2	14 17.7	+55.1	30.3	15 09.5	+55.3	30.5	16 01.2	+55.5	30.6	16 52.8	+55.7	30.8	17 44.3	+55.9	30.9	18 35.7	+56.1	31.1	43
44	13 28.7	+54.5	29.7	14 20.8	+54.8	29.8	15 12.8	+55.0	29.9	16 04.8	+55.2	30.1	16 56.7	+55.4	30.2	17 48.5	+55.6	30.4	18 40.2	+55.8	30.5	19 31.8	+56.1	30.7	44
45	14 23.2	+54.6	29.2	15 15.6	+54.7	29.4	16 07.8	+55.0	29.5	17 00.0	+55.2	29.7	17 52.1	+55.4	29.8	18 44.1	+55.6	30.0	19 36.0	+55.9	30.1	20 27.9	+56.0	30.3	45
46	15 17.8	+54.5	28.8	16 10.3	+54.7	28.9	17 02.8	+54.9	29.1	17 55.2	+55.1	29.2	18 47.5	+55.4	29.4	19 39.7	+55.6	29.6	20 31.9	+55.7	29.8	21 23.9	+56.0	29.9	46
47	16 12.3	+54.4	28.4	17 05.0	+54.7	28.5	17 57.7	+54.9	28.7	18 50.3	+55.1	28.8	19 42.9	+55.2	29.0	20 35.3	+55.5	29.2	21 27.6	+55.7	29.4	22 19.9	+55.9	29.6	47
48	17 06.7	+54.4	27.9	17 59.7	+54.6	28.1	18 52.6	+54.8	28.2	19 45.4	+55.0	28.4	20 38.1	+55.3	28.6	21 30.8	+55.4	28.8	22 23.3	+55.7	29.0	23 15.8	+55.8	29.2	48
49	18 01.1	+54.3	27.5	18 54.3	+54.5	27.6	19 47.4	+54.8	27.8	20 40.4	+55.0	28.0	21 33.4	+55.1	28.2	22 26.2	+55.4	28.4	23 19.0	+55.6	28.6	24 11.6	+55.8	28.8	49
50	18 55.4	+54.3	27.0	19 48.8	+54.5	27.2	20 42.2	+54.6	27.4	21 35.4	+54.9	27.6	22 28.5	+55.2	27.7	23 21.6	+55.3	27.9	24 14.6	+55.5	28.1	25 07.4	+55.7	28.4	50
51	19 49.7	+54.2	26.6	20 43.3	+54.4	26.8	21 36.8	+54.7	26.9	22 30.3	+54.8	27.1	23 23.7	+55.0	27.3	24 16.9	+55.3	27.5	25 10.1	+55.4	27.7	26 03.1	+55.7	28.0	51
52	20 43.9	+54.1	26.1	21 37.7	+54.3	26.3	22 31.5	+54.5	26.5	23 25.1	+54.8	26.7	24 18.7	+54.9	26.9	25 12.2	+55.1	27.1	26 05.5	+55.4	27.3	26 58.8	+55.6	27.5	52
53	21 38.0	+54.0	25.7	22 32.0	+54.3	25.9	23 26.0	+54.5	26.0	24 19.9	+54.6	26.2	25 13.6	+54.9	26.4	26 07.3	+55.1	26.6	27 00.9	+55.3	26.8	27 54.4	+55.5	27.1	53
54	22 32.0	+54.0	25.2	23 26.3	+54.2	25.4	24 20.5	+54.3	25.6	25 14.5	+54.6	25.8	26 08.5	+54.8	26.0	27 02.4	+55.0	26.2	27 56.2	+55.2	26.4	28 49.8	+55.5	26.7	54
55	23 26.0	+53.9	24.7	24 20.5	+54.0	24.9	25 14.8	+54.3	25.1	26 09.1	+54.5	25.3	27 03.3	+54.7	25.5	27 57.4	+54.9	25.8	28 51.4	+55.1	26.0	29 45.3	+55.3	26.2	55
56	24 19.9	+53.7	24.2	25 14.5	+54.0	24.4	26 09.1	+54.2	24.6	27 03.6	+54.4	24.8	27 58.0	+54.6	25.1	28 52.3	+54.8	25.3	29 46.5	+55.0	25.5	30 40.6	+55.2	25.8	56
57	25 13.6	+53.7	23.8	26 08.5	+53.9	24.0	27 03.3	+54.1	24.2	27 58.0	+54.3	24.4	28 52.6	+54.5	24.6	29 47.1	+54.7	24.8	30 41.5	+54.9	25.1	31 35.8	+55.1	25.3	57
58	26 07.3	+53.6	23.3	27 02.4	+53.8	23.5	27 57.4	+54.0	23.7	28 52.3	+54.2	23.9	29 47.1	+54.4	24.1	30 41.8	+54.6	24.4	31 36.4	+54.8	24.6	32 30.9	+55.1	24.9	58
59	27 00.9	+53.5	22.8	27 56.2	+53.6	23.0	28 51.4	+53.9	23.2	29 46.5	+54.1	23.4	30 41.5	+54.3	23.6	31 36.4	+54.5	23.8	32 31.2	+54.8	24.1	33 26.0	+54.9	24.4	59
60	27 54.4	+53.3	22.2	28 49.8	+53.6	22.5	29 45.3	+53.7	22.7	30 40.6	+53.9	22.9	31 35.8	+54.2	23.1	32 30.9	+54.4	23.4	33 26.0	+54.6	23.6	34 20.9	+54.8	23.9	60
61	28 47.7	+53.2	21.7	29 43.4	+53.4	21.9	30 39.0	+53.7	22.2	31 34.5	+53.9	22.4	32 30.0	+54.0	22.6	33 25.3	+54.3	22.9	34 20.5	+54.5	23.1	35 15.7	+54.6	23.4	61
62	29 40.9	+53.1	21.2	30 36.8	+53.3	21.4	31 32.7	+53.5	21.6	32 28.4	+53.7	21.9	33 24.0	+53.9	22.1	34 19.6	+54.2	22.4	35 15.0	+54.3	22.6	36 10.3	+54.6	22.9	62
63	30 34.0	+53.0	20.7	31 30.1	+53.2	20.9	32 26.2	+53.3	21.1	33 22.1	+53.6	21.3	34 17.9	+53.8	21.6	35 13.7	+54.0	21.8	36 09.3	+54.2	22.1	37 04.9	+54.4	22.4	63
64	31 27.0	+52.8	20.1	32 23.3	+53.0	20.3	33 19.5	+53.2	20.6	34 15.7	+53.4	20.8	35 11.7	+53.6	21.0	36 07.7	+53.8	21.3	37 03.5	+54.1	21.6	37 59.3	+54.2	21.8	64
65	32 19.8	+52.7	19.6	33 16.3	+52.9	19.8	34 12.7	+53.1	20.0	35 09.1	+53.3	20.2	36 05.3	+53.5	20.5	37 01.5	+53.7	20.7	37 57.6	+53.8	21.0	38 53.5	+54.1	21.3	65
66	33 12.5	+52.5	19.0	34 09.2	+52.7	19.2	35 05.8	+52.9	19.4	36 02.4	+53.1	19.7	36 58.8	+53.3	19.9	37 55.2	+53.5	20.2	38 51.4	+53.8	20.5	39 47.6	+53.9	20.7	66
67	34 05.0	+52.3	18.4	35 01.9	+52.5	18.6	35 58.7	+52.8	18.8	36 55.5	+52.9	19.1	37 52.1	+53.2	19.3	38 48.7	+53.3	19.6	39 45.2	+53.5	19.9	40 41.5	+53.8	20.2	67
68	34 57.3	+52.2	17.8	35 54.4	+52.4	18.0	36 51.5	+52.5	18.3	37 48.4	+52.7	18.5	38 45.3	+52.9	18.7	39 42.0	+53.2	19.0	40 38.7	+53.4	19.3	41 35.3	+53.6	19.6	68
69	35 49.5	+52.0	17.2	36 46.8	+52.2	17.4	37 44.0	+52.4	17.7	38 41.1	+52.6	17.9	39 38.2	+52.8	18.1	40 35.2	+52.9	18.4	41 32.1	+53.1	18.7	42 28.9	+53.3	19.0	69
70	36 41.5	+51.8	16.6	37 39.0	+51.9	16.8	38 36.4	+52.1	17.0	39 33.7	+52.4	17.3	40 31.0	+52.5	17.5	41 28.1	+52.8	17.8	42 25.2	+53.0	18.1	43 22.2	+53.2	18.4	70
71	37 33.3	+51.6	15.9	38 30.9	+51.8	16.2	39 28.5	+52.0	16.4	40 26.1	+52.1	16.6	41 23.5	+52.3	16.9	42 20.9	+52.5	17.1	43 18.2	+52.7	17.4	44 15.4	+52.9	17.7	71
72	38 24.9	+51.3	15.3	39 22.7	+51.5	15.5	40 20.5	+51.7	15.7	41 18.2	+51.9	16.0	42 15.8	+52.2	16.2	43 13.4	+52.3	16.5	44 10.9	+52.5	16.8	45 08.3	+52.7	17.0	72
73	39 16.2	+51.1	14.6	40 14.2	+51.3	14.8	41 12.2	+51.5	15.1	42 10.1	+51.7	15.3	43 08.0	+51.8	15.5	44 05.7	+52.1	15.8	45 03.4	+52.3	16.1	46 01.0	+52.5	16.4	73
74	40 07.3	+50.9	14.0	41 05.5	+51.1	14.2	42 03.7	+51.2	14.4	43 01.8	+51.4	14.6	43 59.8	+51.6	14.9	44 57.8	+51.8	15.1	45 55.7	+51.9	15.4	46 53.5	+52.2	15.7	74
75	40 58.2	+50.6	13.3	41 56.6	+50.8	13.5	42 54.9	+51.0	13.7	43 53.2	+51.1	13.9	44 51.4	+51.3	14.1	45 49.6	+51.5	14.4	46 47.6	+51.7	14.7	47 45.7	+51.9	14.9	75
76	41 48.8	+50.4	12.5	42 47.4	+50.5	12.7	43 45.9	+50.7	13.0	44 44.3	+50.9	13.2	45 42.7	+51.1	13.4	46 41.1	+51.2	13.6	47 39.3	+51.4	13.9	48 37.6	+51.5	14.2	76
77	42 39.2	+50.1	11.8	43 37.9	+50.2	12.0	44 36.6	+50.4	12.2	45 35.2	+50.5	12.4	46 33.8	+50.7	12.6	47 32.3	+50.9	12.9	48 30.7	+51.1	13.1	49 29.1	+51.3	13.4	77
78	43 29.3	+49.7	11.1	44 28.1	+49.9	11.2	45 27.0	+50.0	11.4	46 25.7	+50.3	11.6	47 24.5	+50.4	11.9	48 23.2	+50.5	12.1	49 21.8	+50.8	12.3	50 20.4	+50.9	12.6	78
79	44 19.0	+49.4	10.3	45 18.0	+49.6	10.5	46 17.0	+49.7	10.6	47 16.0	+49.8	10.8	48 14.9	+50.0	11.1	49 13.7	+50.2	11.3	50 12.6	+50.3	11.5	51 11.3	+50.6	11.8	79
80	45 08.4	+49.1	9.5	46 07.6	+49.2	9.7	47 06.7	+49.4	9.8	48 05.8	+49.6	10.0	49 04.9	+49.7	10.2	50 03.9	+49.9	10.4	51 02.9	+50.0	10.7	52 01.9	+50.1	10.9	80
81	45 57.5	+48.8	8.7	46 56.8	+48.9	8.8	47 56.1	+49.0	9.0	48 55.4	+49.1	9.2	49 54.6	+49.2	9.4	50 53.8	+49.4	9.6	51 52.9	+49.6	9.8	52 52.0	+49.7	10.0	81
82	46 46.3	+48.3	7.8	47 45.7	+48.4	8.0	48 45.1	+48.6	8.1	49 44.5	+48.7	8.3	50 43.8	+48.9	8.5	51 43.2	+49.0	8.6	52 42.5	+49.1	8.8	53 41.7	+49.3	9.0	82
83	47 34.6	+47.9	6.9	48 34.1	+48.1	7.1	49 33.7	+48.1	7.2	50 33.2	+48.3	7.4	51 32.7	+48.4	7.5	52 32.2	+48.5	7.7	53 31.6	+48.6	7.9	54 31.0	+48.8	8.1	83
84	48 22.5	+47.5	6.0	49 22.2	+47.6	6.2	50 21.8	+47.7	6.3	51 21.5	+47.7	6.4	52 21.1	+47.9	6.5	53 20.7	+48.0	6.7	54 20.2	+48.2	6.9	55 19.8	+48.3	7.1	84
85	49 10.0	+47.0	5.1	50 09.8	+47.1	5.2	51 09.5	+47.2	5.3	52 09.2	+47.3	5.5	53 09.0	+47.4	5.6	54 08.7	+47.5	5.7	55 08.4	+47.6	5.9	56 08.1	+47.6	6.0	85
86	49 57.0	+46.6	4.2	50 56.9	+46.6	4.2	51 56.7	+46.7	4.3	52 56.5	+46.8	4.4	53 56.4	+46.8	4.5	54 56.2	+46.9	4.7	55 56.0	+47.0	4.8	56 55.7	+47.1	4.9	86
87	50 43.6	+46.0	3.2	51 43.5	+46.1	3.2	52 43.4	+46.1	3.3	53 43.3	+46.2	3.4	54 43.2	+46.2	3.5	55 43.1	+46.3	3.6	56 43.0	+46.3	3.6	57 42.8	+46.5	3.8	87
88	51 29.6	+45.5	2.1	52 29.6	+45.5	2.2	53 29.5	+45.6	2.2	54 29.5	+45.6	2.3	55 29.4	+45.7	2.4	56 29.4	+45.7	2.4	57 29.3	+45.7	2.5	58 29.3	+45.7	2.6	88
89	52 15.1	+44.9	1.1	53 15.1	+44.9	1.1	54 15.1	+44.9	1.1	55 15.1	+44.9	1.2	56 15.1	+44.9	1.2	57 15.0	+45.0	1.2	58 15.0	+45.0	1.3	59 15.0	+45.0	1.3	89
90	53 00.0	+44.3	0.0	54 00.0	+44.3	0.0	55 00.0	+44.2	0.0	56 00.0	+44.2	0.0	57 00.0	+44.2	0.0	58 00.0	+44.2	0.0	59 00.0	+44.2	0.0	60 00.0	+44.2	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 138°, 222°**

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LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	53°			54°			55°			56°			57°			58°			59°			60°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	26 06.8	+53.3	130.6	25 27.6	+53.7	130.9	24 48.1	+54.1	131.3	24 08.4	+54.5	131.6	23 28.4	+54.8	132.0	22 48.2	+55.1	132.3	22 07.7	+55.5	132.6	21 27.0	+55.8	132.9	0
1	27 00.1	+53.2	130.1	26 21.3	+53.6	130.4	25 42.2	+54.0	130.8	25 02.9	+54.3	131.2	24 23.2	+54.8	131.5	23 43.3	+55.1	131.9	23 03.2	+55.4	132.2	22 22.8	+55.7	132.5	1
2	27 53.3	+53.1	129.5	27 14.9	+53.5	129.9	26 36.2	+53.9	130.3	25 57.2	+54.3	130.7	25 18.0	+54.6	131.1	24 38.4	+55.0	131.4	23 58.6	+55.3	131.8	23 18.5	+55.7	132.1	2
3	28 46.4	+52.9	129.0	28 08.4	+53.4	129.4	27 30.1	+53.8	129.8	26 51.5	+54.2	130.2	26 12.6	+54.6	130.6	25 33.4	+55.0	131.0	24 53.9	+55.3	131.4	24 14.2	+55.6	131.7	3
4	29 39.3	+52.8	128.5	29 01.8	+53.3	128.9	28 23.9	+53.7	129.3	27 45.7	+54.1	129.8	27 07.2	+54.5	130.1	26 28.4	+54.8	130.5	25 49.2	+55.2	130.9	25 09.8	+55.5	131.3	4
5	30 32.1	+52.7	127.9	29 55.1	+53.1	128.4	29 17.6	+53.6	128.8	28 39.8	+54.0	129.3	28 01.7	+54.4	129.7	27 23.2	+54.8	130.1	26 44.4	+55.1	130.5	26 05.3	+55.5	130.8	5
6	31 24.8	+52.5	127.4	30 48.2	+53.0	127.8	30 11.2	+53.4	128.3	29 33.8	+53.9	128.8	28 56.1	+54.2	129.2	28 18.0	+54.6	129.6	27 39.5	+55.1	130.0	27 00.8	+55.4	130.4	6
7	32 17.3	+52.4	126.8	31 41.2	+52.8	127.3	31 04.6	+53.3	127.8	30 27.7	+53.7	128.3	29 50.3	+54.2	128.7	29 12.6	+54.6	129.1	28 34.6	+54.9	129.6	27 56.2	+55.3	130.0	7
8	33 09.7	+52.2	126.2	32 34.0	+52.7	126.7	31 57.9	+53.2	127.2	31 21.4	+53.6	127.7	30 44.5	+54.0	128.2	30 07.2	+54.5	128.7	29 29.5	+54.9	129.1	28 51.5	+55.2	129.5	8
9	34 01.9	+52.1	125.6	33 26.7	+52.6	126.2	32 51.1	+53.0	126.7	32 15.0	+53.5	127.2	31 38.5	+54.0	127.7	31 01.7	+54.3	128.2	30 24.4	+54.7	128.6	29 46.7	+55.1	129.1	9
10	34 54.0	+51.8	125.0	34 19.3	+52.3	125.6	33 44.1	+52.9	126.1	33 08.5	+53.4	126.7	32 32.5	+53.8	127.2	31 56.0	+54.2	127.7	31 19.1	+54.7	128.2	30 41.8	+55.1	128.6	10
11	35 45.8	+51.7	124.4	35 11.6	+52.2	125.0	34 37.0	+52.7	125.6	34 01.9	+53.2	126.1	33 26.3	+53.6	126.7	32 50.2	+54.1	127.2	32 13.8	+54.5	127.7	31 36.9	+54.9	128.2	11
12	36 37.5	+51.4	123.8	36 03.8	+52.0	124.4	35 29.7	+52.5	125.0	34 55.1	+53.0	125.6	34 19.9	+53.5	126.1	33 44.3	+54.0	126.7	33 08.3	+54.4	127.2	32 31.8	+54.8	127.7	12
13	37 28.9	+51.3	123.1	36 55.8	+51.9	123.8	36 22.2	+52.4	124.4	35 48.1	+52.9	125.0	35 13.4	+53.4	125.6	34 38.3	+53.8	126.1	34 02.7	+54.3	126.7	33 26.6	+54.7	127.2	13
14	38 20.2	+51.0	122.5	37 47.7	+51.6	123.1	37 14.6	+52.1	123.8	36 41.0	+52.6	124.4	36 06.8	+53.2	125.0	35 32.1	+53.7	125.6	34 57.0	+54.1	126.2	34 21.3	+54.6	126.7	14
15	39 11.2	+50.8	121.8	38 39.3	+51.3	122.5	38 06.7	+52.0	123.1	37 33.6	+52.6	123.8	37 00.0	+53.0	124.4	36 25.8	+53.5	125.0	35 51.1	+54.0	125.6	35 15.9	+54.5	126.2	15
16	40 02.0	+50.5	121.1	39 30.6	+51.2	121.8	38 58.7	+51.7	122.5	38 26.2	+52.3	123.2	37 53.0	+52.9	123.8	37 19.3	+53.4	124.5	36 45.1	+53.9	125.1	36 10.4	+54.3	125.7	16
17	40 52.5	+50.2	120.4	40 21.8	+50.9	121.1	39 50.4	+51.6	121.9	39 18.5	+52.1	122.6	38 45.9	+52.6	123.2	38 12.7	+53.2	123.9	37 39.0	+53.7	124.5	37 04.7	+54.1	125.2	17
18	41 42.7	+50.0	119.7	41 12.7	+50.6	120.4	40 42.0	+51.2	121.2	40 10.6	+51.8	121.9	39 38.5	+52.5	122.6	39 05.9	+53.0	123.3	38 32.7	+53.5	124.0	37 58.8	+54.1	124.6	18
19	42 32.7	+49.7	118.9	42 03.3	+50.4	119.7	41 33.2	+51.0	120.5	41 02.4	+51.7	121.2	40 31.0	+52.2	122.0	39 58.9	+52.8	122.7	39 26.2	+53.3	123.4	38 52.9	+53.8	124.1	19
20	43 22.4	+49.3	118.2	42 53.7	+50.1	119.0	42 24.2	+50.8	119.8	41 54.1	+51.4	120.6	41 23.2	+52.0	121.3	40 51.7	+52.6	122.1	40 19.5	+53.2	122.8	39 46.7	+53.7	123.5	20
21	44 11.7	+49.1	117.4	43 43.8	+49.7	118.2	43 15.0	+50.5	119.1	42 45.5	+51.1	119.9	42 15.2	+51.8	120.7	41 44.3	+52.4	121.4	41 12.7	+52.9	122.2	40 40.4	+53.5	122.9	21
22	45 00.8	+48.6	116.6	44 33.5	+49.5	117.4	44 05.5	+50.1	118.3	43 36.6	+50.9	119.2	43 07.0	+51.5	120.0	42 36.7	+52.1	120.8	42 05.6	+52.8	121.6	41 33.9	+53.3	122.3	22
23	45 49.4	+48.3	115.7	45 23.0	+49.1	116.6	44 55.6	+49.9	117.5	44 27.5	+50.6	118.4	43 58.5	+51.3	119.3	43 28.8	+51.9	120.1	42 58.4	+52.5	120.9	42 27.2	+53.1	121.7	23
24	46 37.7	+47.9	114.9	46 12.1	+48.7	115.8	45 45.5	+49.5	116.7	45 18.1	+50.2	117.7	44 49.8	+51.0	118.5	44 20.7	+51.7	119.4	43 50.9	+52.3	120.2	43 20.3	+52.9	121.1	24
25	47 25.6	+47.5	114.0	47 00.8	+48.3	115.0	46 35.0	+49.1	115.9	46 08.3	+49.9	116.9	45 40.8	+50.6	117.8	45 12.4	+51.3	118.7	44 43.2	+52.0	119.6	44 13.2	+52.6	120.4	25
26	48 13.1	+47.1	113.1	47 49.1	+47.9	114.1	47 24.1	+48.8	115.1	46 58.2	+49.6	116.1	46 31.4	+50.4	117.0	46 03.7	+51.1	117.9	45 35.2	+51.8	118.8	45 05.8	+52.5	119.7	26
27	49 00.2	+46.5	112.1	48 37.0	+47.5	113.2	48 12.9	+48.4	114.2	47 47.8	+49.2	115.2	47 21.8	+50.0	116.2	46 54.8	+50.8	117.2	46 27.0	+51.4	118.1	45 58.3	+52.1	119.0	27
28	49 46.7	+46.1	111.2	49 24.5	+47.1	112.3	49 01.3	+47.9	113.3	48 37.0	+48.8	114.4	48 11.8	+49.6	115.4	47 45.6	+50.4	116.4	47 18.4	+51.2	117.3	46 50.4	+51.9	118.3	28
29	50 32.8	+45.5	110.2	50 11.6	+46.5	111.3	49 49.2	+47.5	112.4	49 25.8	+48.4	113.5	49 01.4	+49.3	114.5	48 36.0	+50.1	115.6	48 09.6	+50.8	116.6	47 42.3	+51.6	117.6	29
30	51 18.3	+45.0	109.1	50 58.1	+46.0	110.3	50 36.7	+47.0	111.4	50 14.2	+48.0	112.6	49 50.7	+48.8	113.7	49 26.1	+49.6	114.7	49 00.4	+50.5	115.8	48 33.9	+51.2	116.8	30
31	52 03.3	+44.4	108.1	51 44.1	+45.4	109.3	51 23.7	+46.5	110.5	51 02.2	+47.4	111.6	50 39.5	+48.4	112.8	50 15.7	+49.3	113.9	49 50.9	+50.2	115.0	49 25.1	+50.9	116.0	31
32	52 47.7	+43.7	107.0	52 29.5	+44.9	108.2	52 10.2	+45.9	109.4	51 49.6	+47.0	110.6	51 27.9	+47.9	111.8	51 05.0	+48.9	113.0	50 41.1	+49.7	114.1	50 16.0	+50.6	115.2	32
33	53 31.4	+43.1	105.8	53 14.4	+44.2	107.1	52 56.1	+45.4	108.4	52 36.6	+46.4	109.6	52 15.8	+47.4	110.8	51 53.9	+48.4	112.0	51 30.8	+49.3	113.2	51 06.6	+50.2	114.4	33
34	54 14.5	+42.3	104.6	53 58.6	+43.6	106.0	53 41.5	+44.7	107.3	53 23.0	+45.8	108.6	53 03.2	+46.9	109.8	52 42.3	+47.9	111.1	52 20.1	+48.9	112.3	51 56.8	+49.8	113.5	34
35	54 56.8	+41.6	103.4	54 42.2	+42.8	104.8	54 26.2	+44.0	106.1	54 08.8	+45.2	107.5	53 50.1	+46.4	108.8	53 30.2	+47.4	110.1	53 09.0	+48.4	111.3	52 46.6	+49.3	112.6	35
36	55 38.4	+40.8	102.2	55 25.0	+42.1	103.6	55 10.2	+43.4	105.0	54 54.0	+44.6	106.3	54 36.5	+45.7	107.7	54 17.6	+46.8	109.0	53 57.4	+47.8	110.3	53 35.9	+48.9	111.6	36
37	56 19.2	+39.9	100.8	56 07.1	+41.3	102.3	55 53.6	+42.6	103.7	55 38.6	+43.9	105.2	55 22.2	+45.1	106.6	55 04.4	+46.2	107.9	54 45.2	+47.4	109.3	54 24.8	+48.3	110.6	37
38	56 59.1	+39.0	99.5	56 48.4	+40.4	101.0	56 36.2	+41.8	102.5	56 22.5	+43.1	104.0	56 07.3	+44.4	105.4	55 50.6	+45.6	106.8	55 32.6	+46.7	108.2	55 13.1	+47.8	109.6	38
39	57 38.1	+38.0	98.1	57 28.8	+39.5	99.6	57 18.0	+41.0	101.2	57 05.6	+42.3	102.7	56 51.7	+43.6	104.2	56 36.2	+44.9	105.7	56 19.3	+46.1	107.1	56 00.9	+47.3	108.5	39
40	58 16.1	+37.0	96.6	58 08.3	+38.6	98.2	57 59.0	+40.0	99.8	57 47.9	+41.5	101.4	57 35.3	+42.9	102.9	57 21.1	+44.2	104.4	57 05.4	+45.4	105.9	56 48.2	+46.6	107.4	40
41	58 53.1	+35.9	95.1	58 46.9	+37.5	96.8	58 39.0	+39.0	98.4	58 29.4	+40.5	100.0	58 18.2	+42.0	101.6	58 05.3	+43.4	103.2	57 50.8	+44.7	104.7	57 34.8	+46.0	106.2	41
42	59 29.0	+34.7	93.5	59 24.4	+36.4	95.2	59 18.0	+38.1	96.9	59 10.0	+39.6	98.6	59 00.2	+41.1	100.2	58 48.7	+42.5	101.8	58 35.5	+44.0	103.5	58 20.8	+45.2	105.0	42
43	60 03.7	+33.5	91.9	60 00.8	+35.2	93.7	59 56.1	+36.9	95.4	59 49.6	+38.5	97.1	59 41.3	+40.1	98.8	59 31.2	+41.7	100.5	59 19.5	+43.0	102.1	59 06.0	+44.5	103.8	43
44	60 37.2	+32.2	90.2	60 36.0	+34.0	92.0	60 33.0	+35.7	93.8	60 28.1	+37.5	95.6	60 21.4	+39.1	97.3	60 12.9	+40.6	99.0	60 02.5	+42.2	100.8	59 50.5	+43.6	102.4	44
45	61 09.4	+30.9	88.5	61 10.0	+32.7	90.3	61 08.7	+34.5	92.1	61 05.6	+36.2	94.0	61 00.5	+38.0	95.8	60 53.5	+39.7	97.5	60 44.7	+41.3	99.3	60 34.1	+42.8	101.1	45
46	61 40.3	+29.3	86.7	61 42.7	+31.3	88.6	61 43.2	+33.2	90.4	61 41.8	+35.0	92.3	61 38.5	+36.7	94.1	61 33.2	+38.5	96.0	61 26.0	+40.1	97.8	61 16.9	+41.7	99.6	46
47	62 09.6	+27.9	84.9	62 14.0	+29.8	86.8	62 16.4	+31.8	88.7	62 16.8	+33.7	90.6	62 15.2	+35.6	92.5	62 11.7	+37.3	94.4	62 06.1	+39.1	96.2	61 58.6	+40.8	98.1	47
48	62 37.5	+26.2	83.0	62 43.8	+28.3	84.9	62 48.2	+30.3	86.8	62 50.5	+32.2	88.8	62 50.8	+34.1	90.7	62 49.0	+36.1	92.7	62 45.2	+37.9	94.6	62 39.4	+39.6	96.5	48
49	63 03.7	+24.5	81.0	63 12.1	+26.6	82.9	63 18.5	+28.6	84.9	63 22.7	+30.8	86.9	63 24.9	+32.8	88.9	63 25.1	+34.6	90.9	63 23.1	+36.6	92.9	63 19.0	+38.4	94.9	49
50	63 28.2	+22.8	79.0	63 38.7	+24.9	80.9	63 47.1	+27.1	82.9	63 53.5	+29.1	85.0	63 57.7	+31.2	87.0	63 59.7	+33.3	89.0	63 59.7	+35.2	91.1	63 57.4	+37.2	93.1	50
51	63 51.0	+20.9	76.9	64 03.6	+23.1	78.9	64 14.2	+25.2	80.9	64 22.6	+27.4	83.0	64 28.9	+29.5	85.0	64 33.0	+31.6	87.1	64 34.9	+33.7	89.2	64 34.6	+35.7	91.3	51
52	64 11.9	+19.0	74.7	64 26.7	+21.2	76.7	64 39.4	+23.4	78.8	64 50.0	+25.6	80.9	64 58.4	+27.9	83.0	65 04.6	+30.0	85.1	65 08.6	+32.1	87.3	65 10.3	+34.3	89.4	52
53	64 30.9	+17.0•	72.5	64 47.9	+19.3•	74.6	65 02.8	+21.5	76.6	65 15.6	+23.8	78.7	65 26.3	+26.0	80.9	65 34.6	+28.3	83.1	65 40.7	+30.5	85.3	65 44.6	+32.6	87.5	53
54	64 47.9	+14.9•	70.3	65 07.2	+17.1•	72.3	65 24.3	+19.5•	74.4	65 39.4	+21.8•	76.5	65 52.3	+24.2	78.7	66 02.9	+26.4	80.9	66 11.2	+28.7	83.1	66 17.2	+30.9	85.4	54
55	65 02.8	+12.8•	68.0	65 24.3	+15.1•	70.0	65 43.8	+17.4•	72.1	66 01.2	+19.6•	74.3	66 16.3	+22.1•	76.4	66 29.3	+24.4•	78.7	66 39.9	+26.7	80.9	66 48.1	+29.1	83.3	55
56	65 15.6	+10.7•	65.7	65 39.4	+12.9•	67.7	66 01.2	+15.1•	69.8	66 20.8	+17.6•	71.9	66 38.4	+19.9•	74.1	66 53.7	+22.3•	76.4	67 06.6	+24.8•	78.7	67 17.2	+27.2•	81.0	56
57	65 26.3	+8.3•	63.3	65 52.3	+10.6•	65.3	66 16.3	+13.0•	67.4	66 38.4	+15.3•	69.5	66 58.3	+17.7•	71.7	67 16.0	+20.1•	74.0	67 31.4	+22.6•	76.3	67 44.4	+25.1•	78.7	57
58	65 34.6	+6.1•	60.9	66 02.9	+8.3•	62.9	66 29.3	+10.6•	64.9	66 53.7	+12.9•	67.1	67 16.0	+15.4•	69.3	67 36.1	+17.9•	71.5	67 54.0	+20.3•	73.9	68 09.5	+22.8•	76.3	58
59	65 40.7	+3.9•	58.5	66 11.2	+6.0•	60.5	66 39.9	+8.2•	62.5	67 06.6	+10.6•	64.6	67 31.4	+13.0•	66.8	67 54.0	+15.5•	69.0	68 14.3	+18.0•	71.3	68 32.3	+20.6•	73.8	59
60	65 44.6	+1.4•	56.1	66 17.2	+3.6•	58.0	66 48.1	+5.9•	60.0	67 17.2	+8.2•	62.0	67 44.4	+10.5•	64.2	68 09.5	+13.0•	66.4	68 32.3	+15.6•	68.8	68 52.9	+18.1•	71.2	60
61	65 46.0	−0.8•	53.7	66 20.8	+1.3•	55.5	66 54.0	+3.4•	57.4	67 25.4	+5.6•	59.5	67 54.9	+8.0•	61.6	68 22.5	+10.4•	63.8	68 47.9	+13.0•	66.1	69 11.0	+15.6•	68.5	61
62	65 45.2	−3.2•	51.2	66 22.1	−1.2•	53.0	66 57.4	+0.9•	54.9	67 31.0	+3.2•	56.9	68 02.9	+5.5•	58.9	68 32.9	+7.9•	61.1	69 00.9	+10.4•	63.4	69 26.6	+13.0•	65.8	62
63	65 42.0	−5.4•	48.8	66 20.9	−3.6•	50.5	66 58.3	−1.5•	52.3	67 34.2	+0.6•	54.2	68 08.4	+2.9•	56.3	68 40.8	+5.2•	58.4	69 11.3	+7.6•	60.6	69 39.6	+10.3•	63.0	63
64	65 36.6	−7.8•	46.4	66 17.3	−5.9•	48.0	66 56.8	−4.0•	49.8	67 34.8	−1.9•	51.6	68 11.3	+0.2•	53.6	68 46.0	+2.6•	55.6	69 18.9	+5.0•	57.8	69 49.9	+7.4•	60.1	64
65	65 28.8	−10.0•	44.0	66 11.4	−8.2•	45.6	66 52.8	−6.4•	47.2	67 32.9	−4.5•	49.0	68 11.5	−2.4•	50.9	68 48.6	−0.2•	52.9	69 23.9	+2.1•	55.0	69 57.3	+4.7•	57.2	65
66	65 18.8	−12.1•	41.6	66 03.2	−10.6•	43.1	66 46.4	−8.8•	44.7	67 28.4	−6.9•	46.4	68 09.1	−4.9•	48.2	68 48.4	−2.9•	50.1	69 26.0	−0.6•	52.2	70 02.0	+1.7•	54.3	66
67	65 06.7	−14.4•	39.3	65 52.6	−12.8•	40.7	66 37.6	−11.2•	42.2	67 21.5	−9.4•	43.8	68 04.2	−7.6•	45.5	68 45.5	−5.5•	47.4	69 25.4	−3.4•	49.3	70 03.7	−1.1•	51.4	67
68	64 52.3	−16.4•	37.0	65 39.8	−15.0•	38.3	66 26.4	−13.4•	39.7	67 12.1	−11.8•	41.2	67 56.6	−10.0•	42.8	68 40.0	−8.2•	44.6	69 22.0	−6.1•	46.5	70 02.6	−4.0•	48.5	68
69	64 35.9	−18.4•	34.7	65 24.8	−17.1•	36.0	66 13.0	−15.7•	37.3	66 58.9	−14.2•	38.7	67 46.6	−12.6•	40.3	68 31.8	−10.8•	41.9	69 15.9	−8.9•	43.7	69 58.6	−6.9•	45.5	69
70	64 17.5	−20.4	32.5	65 07.7	−19.1•	33.7	65 57.3	−17.9•	34.9	66 46.1	−16.5•	36.3	67 34.0	−14.9•	37.7	68 21.0	−13.3•	39.2	69 07.0	−11.6•	40.9	69 51.7	−9.6•	42.7	70
71	63 57.1	−22.3	30.4	64 48.6	−21.2	31.4	65 39.4	−19.9•	32.6	66 29.6	−18.6•	33.8	67 19.1	−17.3•	35.2	68 07.7	−15.8•	36.6	68 55.4	−14.1•	38.1	69 42.1	−12.4•	39.8	71
72	63 34.8	−24.0	28.3	64 27.4	−23.0	29.3	65 19.5	−22.0	30.3	66 11.0	−20.8•	31.5	67 01.8	−19.5•	32.7	67 51.9	−18.1•	34.0	68 41.3	−16.7•	35.4	69 29.7	−15.1•	37.0	72
73	63 10.8	−25.8	26.2	64 04.4	−24.9	27.1	64 57.5	−23.8	28.1	65 50.2	−22.8	29.2	66 42.3	−21.6•	30.3	67 33.8	−20.4•	31.5	68 24.6	−19.0•	32.8	69 14.6	−17.6•	34.2	73
74	62 45.0	−27.4	24.2	63 39.5	−26.5	25.1	64 33.7	−25.7	26.0	65 27.4	−24.7	26.9	66 20.7	−23.7•	27.9	67 13.4	−22.6•	29.1	68 05.6	−21.4•	30.3	68 57.0	−20.0•	31.6	74
75	62 17.6	−29.0	22.3	63 13.0	−28.3	23.1	64 08.0	−27.4	23.9	65 02.7	−26.6	24.7	65 57.0	−25.7	25.7	66 50.8	−24.6•	26.7	67 44.2	−23.6•	27.8	68 37.0	−22.4•	29.0	75
76	61 48.6	−30.4	20.4	62 44.7	−29.7	21.1	63 40.6	−29.1	21.8	64 36.1	−28.3	22.6	65 31.3	−27.5	23.5	66 26.2	−26.6	24.4	67 20.6	−25.6•	25.4	68 14.6	−24.6•	26.4	76
77	61 18.2	−31.8	18.6	62 15.0	−31.3	19.2	63 11.5	−30.6	19.9	64 07.8	−30.0	20.6	65 03.8	−29.2	21.3	65 59.6	−28.5	22.2	66 55.0	−27.7	23.0	67 50.0	−26.7•	24.0	77
78	60 46.4	−33.2	16.9	61 43.7	−32.6	17.4	62 40.9	−32.1	18.0	63 37.8	−31.5	18.6	64 34.6	−30.9	19.3	65 31.1	−30.2	20.0	66 27.3	−29.4	20.8	67 23.3	−28.7	21.6	78
79	60 13.2	−34.4	15.2	61 11.1	−34.0	15.7	62 08.8	−33.5	16.2	63 06.3	−33.0	16.7	64 03.7	−32.4	17.3	65 00.9	−31.9	17.9	65 57.9	−31.3	18.6	66 54.6	−30.6	19.4	79
80	59 38.8	−35.5	13.6	60 37.1	−35.2	14.0	61 35.3	−34.8	14.4	62 33.3	−34.3	14.9	63 31.3	−33.9	15.4	64 29.0	−33.4	16.0	65 26.6	−32.8	16.6	66 24.0	−32.2	17.2	80
81	59 03.3	−36.7	12.0	60 01.9	−36.4	12.3	61 00.5	−36.0	12.7	61 59.0	−35.6	13.1	62 57.4	−35.3	13.6	63 55.6	−34.8	14.0	64 53.8	−34.4	14.5	65 51.8	−34.0	15.1	81
82	58 26.6	−37.8	10.4	59 25.5	−37.4	10.8	60 24.5	−37.2	11.1	61 23.3	−36.9	11.4	62 22.1	−36.6	11.8	63 20.8	−36.2	12.2	64 19.4	−35.9	12.7	65 17.8	−35.4	13.1	82
83	57 48.8	−38.7	9.0	58 48.1	−38.5	9.2	59 47.3	−38.3	9.5	60 46.4	−38.0	9.8	61 45.5	−37.7	10.1	62 44.6	−37.5	10.5	63 43.5	−37.1	10.8	64 42.4	−36.8	11.2	83
84	57 10.1	−39.7	7.6	58 09.6	−39.5	7.8	59 09.0	−39.3	8.0	60 08.4	−39.1	8.3	61 07.8	−38.9	8.5	62 07.1	−38.7	8.8	63 06.4	−38.5	9.1	64 05.6	−38.2	9.4	84
85	56 30.4	−40.5	6.2	57 30.1	−40.4	6.4	58 29.7	−40.2	6.5	59 29.3	−40.1	6.7	60 28.9	−40.0	6.9	61 28.4	−39.7	7.1	62 27.9	−39.5	7.4	63 27.4	−39.3	7.6	85
86	55 49.9	−41.3	4.9	56 49.7	−41.3	5.0	57 49.5	−41.2	5.1	58 49.2	−41.0	5.3	59 48.9	−40.9	5.4	60 48.7	−40.8	5.6	61 48.4	−40.7	5.8	62 48.1	−40.5	6.0	86
87	55 08.6	−42.2	3.6	56 08.4	−42.0	3.7	57 08.3	−42.0	3.8	58 08.2	−41.9	3.9	59 08.0	−41.8	4.0	60 07.9	−41.8	4.1	61 07.7	−41.6	4.2	62 07.6	−41.6	4.4	87
88	54 26.4	−42.8	2.3	55 26.4	−42.9	2.4	56 26.3	−42.8	2.5	57 26.3	−42.8	2.5	58 26.2	−42.7	2.6	59 26.1	−42.6	2.7	60 26.1	−42.6	2.8	61 26.0	−42.6	2.9	88
89	53 43.6	−43.6	1.2	54 43.5	−43.5	1.2	55 43.5	−43.5	1.2	56 43.5	−43.5	1.2	57 43.5	−43.5	1.3	58 43.5	−43.5	1.3	59 43.5	−43.5	1.4	60 43.4	−43.4	1.4	89
90	53 00.0	−44.2	0.0	54 00.0	−44.2	0.0	55 00.0	−44.2	0.0	56 00.0	−44.2	0.0	57 00.0	−44.2	0.0	58 00.0	−44.3	0.0	59 00.0	−44.3	0.0	60 00.0	−44.3	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	26 06.8	−53.5	130.6	25 27.6	−53.8	130.9	24 48.1	−54.2	131.3	24 08.4	−54.5	131.6	23 28.4	−54.9	132.0	22 48.2	−55.3	132.3	22 07.7	−55.6	132.6	21 27.0	−55.9	132.9	0
1	25 13.3	−53.5	131.1	24 33.8	−53.9	131.4	23 53.9	−54.2	131.8	23 13.9	−54.7	132.1	22 33.5	−55.0	132.4	21 52.9	−55.3	132.7	21 12.1	−55.6	133.0	20 31.1	−55.9	133.3	1
2	24 19.8	−53.6	131.6	23 39.9	−54.0	131.9	22 59.7	−54.4	132.2	22 19.2	−54.7	132.5	21 38.5	−55.0	132.9	20 57.6	−55.3	133.1	20 16.5	−55.6	133.4	19 35.2	−56.0	133.7	2
3	23 26.2	−53.7	132.1	22 45.9	−54.1	132.4	22 05.3	−54.4	132.7	21 24.5	−54.7	133.0	20 43.5	−55.1	133.3	20 02.3	−55.4	133.5	19 20.9	−55.8	133.8	18 39.2	−56.0	134.1	3
4	22 32.5	−53.8	132.6	21 51.8	−54.1	132.9	21 10.9	−54.5	133.1	20 29.8	−54.9	133.4	19 48.4	−55.1	133.7	19 06.9	−55.4	133.9	18 25.1	−55.7	134.2	17 43.2	−56.0	134.4	4
5	21 38.7	−53.9	133.0	20 57.7	−54.3	133.3	20 16.4	−54.6	133.6	19 34.9	−54.9	133.9	18 53.3	−55.3	134.1	18 11.4	−55.5	134.3	17 29.4	−55.8	134.6	16 47.2	−56.1	134.8	5
6	20 44.8	−53.9	133.5	20 03.4	−54.3	133.8	19 21.8	−54.6	134.0	18 40.0	−54.9	134.3	17 58.0	−55.2	134.5	17 15.9	−55.6	134.7	16 33.6	−55.9	135.0	15 51.1	−56.1	135.2	6
7	19 50.9	−54.0	134.0	19 09.1	−54.3	134.2	18 27.2	−54.7	134.5	17 45.1	−55.0	134.7	17 02.8	−55.3	134.9	16 20.3	−55.6	135.1	15 37.7	−55.9	135.3	14 55.0	−56.2	135.5	7
8	18 56.9	−54.1	134.4	18 14.8	−54.4	134.7	17 32.5	−54.7	134.9	16 50.1	−55.1	135.1	16 07.5	−55.4	135.3	15 24.7	−55.6	135.5	14 41.8	−55.9	135.7	13 58.8	−56.2	135.9	8
9	18 02.8	−54.2	134.9	17 20.4	−54.5	135.1	16 37.8	−54.8	135.3	15 55.0	−55.1	135.5	15 12.1	−55.4	135.7	14 29.1	−55.7	135.9	13 45.9	−55.9	136.1	13 02.6	−56.2	136.3	9
10	17 08.6	−54.2	135.3	16 25.9	−54.6	135.5	15 43.0	−54.9	135.8	14 59.9	−55.1	136.0	14 16.7	−55.4	136.1	13 33.4	−55.7	136.3	12 50.0	−56.0	136.5	12 06.4	−56.2	136.6	10
11	16 14.4	−54.3	135.8	15 31.3	−54.5	136.0	14 48.1	−54.9	136.2	14 04.8	−55.2	136.4	13 21.3	−55.5	136.5	12 37.7	−55.8	136.7	11 54.0	−56.0	136.8	11 10.2	−56.3	137.0	11
12	15 20.1	−54.3	136.2	14 36.8	−54.7	136.4	13 53.2	−54.9	136.6	13 09.6	−55.2	136.8	12 25.8	−55.5	136.9	11 41.9	−55.7	137.1	10 58.0	−56.1	137.2	10 13.9	−56.3	137.3	12
13	14 25.8	−54.5	136.7	13 42.1	−54.7	136.8	12 58.3	−55.0	137.0	12 14.4	−55.3	137.2	11 30.3	−55.5	137.3	10 46.2	−55.8	137.4	10 01.9	−56.0	137.6	9 17.6	−56.3	137.7	13
14	13 31.5	−54.5	137.1	12 47.4	−54.7	137.3	12 03.3	−55.0	137.4	11 19.1	−55.3	137.6	10 34.8	−55.6	137.7	9 50.4	−55.9	137.8	9 05.9	−56.1	137.9	8 21.3	−56.3	138.0	14
15	12 37.0	−54.4	137.5	11 52.7	−54.7	137.7	11 08.3	−55.0	137.8	10 23.8	−55.3	138.0	9 39.2	−55.6	138.1	8 54.5	−55.8	138.2	8 09.8	−56.1	138.3	7 25.0	−56.4	138.4	15
16	11 42.6	−54.5	138.0	10 58.0	−54.8	138.1	10 13.3	−55.1	138.2	9 28.5	−55.3	138.5	8 43.6	−55.6	138.5	7 58.7	−55.9	138.5	7 13.7	−56.1	138.7	6 28.6	−56.4	138.7	16
17	10 48.1	−54.5	138.4	10 03.2	−54.8	138.5	9 18.2	−55.1	138.6	8 33.1	−55.3	138.7	7 48.0	−55.6	138.8	7 02.8	−55.8	138.9	6 17.6	−56.2	139.0	5 32.2	−56.3	139.1	17
18	9 53.6	−54.6	138.8	9 08.4	−54.9	138.9	8 23.1	−55.1	139.0	7 37.8	−55.4	139.1	6 52.4	−55.7	139.2	6 06.9	−55.9	139.3	5 21.4	−56.1	139.3	4 35.9	−56.4	139.4	18
19	8 59.0	−54.6	139.2	8 13.5	−54.8	139.3	7 28.0	−55.2	139.4	6 42.4	−55.4	139.5	5 56.7	−55.7	139.6	5 11.0	−55.9	139.6	4 25.3	−56.2	139.7	3 39.5	−56.4	139.7	19
20	8 04.4	−54.6	139.7	7 18.7	−54.9	139.8	6 32.8	−55.1	139.8	5 47.0	−55.5	139.9	5 01.0	−55.6	140.0	4 15.1	−55.9	140.0	3 29.1	−56.2	140.1	2 43.1	−56.4	140.1	20
21	7 09.8	−54.6	140.1	6 23.8	−54.9	140.2	5 37.7	−55.2	140.2	4 51.5	−55.4	140.3	4 05.4	−55.7	140.3	3 19.2	−56.0	140.4	2 32.9	−56.1	140.4	1 46.7	−56.4	140.4	21
22	6 15.2	−54.7	140.5	5 28.9	−55.0	140.6	4 42.5	−55.2	140.6	3 56.1	−55.4	140.7	3 09.7	−55.7	140.7	2 23.2	−55.9	140.7	1 36.8	−56.2	140.8	0 50.3	−56.4	140.8	22
23	5 20.5	−54.7	140.9	4 33.9	−54.9	141.0	3 47.3	−55.2	141.0	3 00.7	−55.5	141.0	2 14.0	−55.7	141.1	1 27.3	−55.9	141.1	0 40.6	−56.2	141.1	0 06.1	+56.4	38.9	23
24	4 25.8	−54.6	141.3	3 39.0	−55.0	141.4	2 52.1	−55.2	141.4	2 05.2	−55.5	141.4	1 18.3	−55.7	141.4	0 31.4	−56.0	141.5	0 15.6	+56.2	38.5	1 02.5	+56.4	38.5	24
25	3 31.2	−54.7	141.7	2 44.0	−54.9	141.8	1 56.9	−55.2	141.8	1 09.7	−55.4	141.8	0 22.6	−55.7	141.8	0 24.6	+55.9	38.2	1 11.8	+56.1	38.2	1 58.9	+56.4	38.2	25
26	2 36.5	−54.7	142.1	1 49.1	−55.0	142.2	1 01.7	−55.2	142.2	0 14.3	−55.5	142.2	0 33.1	+55.7	37.8	1 20.5	+56.0	37.8	2 07.9	+56.2	37.8	2 55.3	+56.4	37.9	26
27	1 41.8	−54.8	142.6	0 54.1	−55.0	142.6	0 06.5	−55.3	142.6	0 41.2	+55.5	37.4	1 28.8	+55.7	37.4	2 16.5	+55.9	37.5	3 04.1	+56.2	37.5	3 51.7	+56.4	37.5	27
28	0 47.0	−54.9	143.0	0 00.9	+54.9	37.0	0 48.8	+55.2	37.0	1 36.7	+55.4	37.0	2 24.5	+55.7	37.1	3 12.4	+55.9	37.1	4 00.3	+56.1	37.1	4 48.1	+56.4	37.2	28
29	0 07.7	+54.7	36.6	0 55.8	+55.0	36.6	1 44.0	+55.2	36.6	2 32.1	+55.5	36.7	3 20.2	+55.7	36.7	4 08.3	+56.0	36.7	4 56.4	+56.2	36.8	5 44.5	+56.3	36.8	29
30	1 02.4	+54.7	36.2	1 50.8	+55.0	36.2	2 39.2	+55.2	36.2	3 27.6	+55.4	36.3	4 15.9	+55.7	36.3	5 04.3	+55.9	36.4	5 52.6	+56.1	36.4	6 40.8	+56.4	36.5	30
31	1 57.1	+54.7	35.8	2 45.8	+54.9	35.8	3 34.4	+55.2	35.9	4 23.0	+55.4	35.9	5 11.6	+55.7	35.9	6 00.2	+55.9	36.0	6 48.7	+56.1	36.1	7 37.2	+56.3	36.1	31
32	2 51.8	+54.7	35.4	3 40.7	+54.9	35.4	4 29.6	+55.2	35.5	5 18.4	+55.5	35.5	6 07.3	+55.6	35.6	6 56.1	+55.9	35.6	7 44.8	+56.1	35.7	8 33.5	+56.3	35.8	32
33	3 46.5	+54.7	35.0	4 35.6	+55.0	35.0	5 24.8	+55.1	35.1	6 13.9	+55.4	35.1	7 02.9	+55.6	35.2	7 51.9	+55.9	35.3	8 40.9	+56.1	35.4	9 29.8	+56.3	35.4	33
34	4 41.2	+54.6	34.6	5 30.6	+54.9	34.6	6 19.9	+55.2	34.7	7 09.3	+55.3	34.7	7 58.5	+55.7	34.8	8 47.8	+55.8	34.9	9 37.0	+56.0	35.0	10 26.1	+56.3	35.1	34
35	5 35.8	+54.7	34.1	6 25.5	+54.9	34.2	7 15.1	+55.1	34.3	8 04.6	+55.4	34.4	8 54.2	+55.5	34.4	9 43.6	+55.8	34.5	10 33.0	+56.0	34.6	11 22.4	+56.2	34.7	35
36	6 30.5	+54.6	33.7	7 20.4	+54.8	33.8	8 10.2	+55.1	33.9	9 00.0	+55.3	34.0	9 49.7	+55.6	34.1	10 39.4	+55.8	34.2	11 29.0	+56.0	34.3	12 18.6	+56.2	34.4	36
37	7 25.1	+54.6	33.3	8 15.2	+54.9	33.5	9 05.3	+55.1	33.5	9 55.3	+55.3	33.6	10 45.3	+55.5	33.7	11 35.2	+55.8	33.8	12 25.0	+56.0	33.9	13 14.8	+56.2	34.0	37
38	8 19.7	+54.6	32.9	9 10.1	+54.8	33.0	10 00.4	+55.0	33.1	10 50.6	+55.3	33.2	11 40.8	+55.5	33.3	12 31.0	+55.7	33.4	13 21.0	+55.9	33.5	14 11.0	+56.1	33.7	38
39	9 14.3	+54.6	32.5	10 04.9	+54.8	32.6	10 55.4	+55.1	32.7	11 45.9	+55.3	32.8	12 36.3	+55.5	32.9	13 26.7	+55.7	33.0	14 16.9	+55.9	33.2	15 07.1	+56.1	33.3	39
40	10 08.9	+54.5	32.1	10 59.7	+54.7	32.2	11 50.5	+54.9	32.3	12 41.2	+55.2	32.4	13 31.8	+55.4	32.5	14 22.4	+55.6	32.6	15 12.8	+55.9	32.8	16 03.2	+56.1	32.9	40
41	11 03.4	+54.5	31.6	11 54.4	+54.8	31.7	12 45.4	+55.0	31.9	13 36.4	+55.1	32.0	14 27.2	+55.4	32.1	15 18.0	+55.6	32.3	16 08.7	+55.8	32.4	16 59.3	+56.1	32.6	41
42	11 57.9	+54.4	31.2	12 49.2	+54.6	31.3	13 40.4	+54.9	31.4	14 31.5	+55.2	31.6	15 22.6	+55.4	31.7	16 13.6	+55.6	31.9	17 04.5	+55.8	32.0	17 55.4	+56.0	32.2	42
43	12 52.3	+54.4	30.8	13 43.8	+54.7	30.9	14 35.3	+54.8	31.0	15 26.7	+55.0	31.2	16 18.0	+55.3	31.3	17 09.2	+55.5	31.5	18 00.3	+55.7	31.6	18 51.4	+55.9	31.8	43
44	13 46.7	+54.4	30.3	14 38.5	+54.6	30.6	15 30.1	+54.8	30.6	16 21.7	+55.1	30.8	17 13.3	+55.2	30.9	18 04.7	+55.5	31.1	18 56.0	+55.7	31.2	19 47.3	+55.9	31.4	44
45	14 41.1	+54.3	29.9	15 33.0	+54.6	30.0	16 24.9	+54.8	30.2	17 16.8	+55.0	30.3	18 08.5	+55.2	30.5	19 00.2	+55.4	30.7	19 51.7	+55.7	30.8	20 43.2	+55.8	31.0	45
46	15 35.4	+54.2	29.5	16 27.6	+54.5	29.6	17 19.7	+54.7	29.8	18 11.8	+54.9	29.9	19 03.7	+55.2	30.1	19 55.6	+55.3	30.3	20 47.4	+55.5	30.4	21 39.0	+55.8	30.6	46
47	16 29.6	+54.2	29.0	17 22.1	+54.4	29.2	18 14.4	+54.7	29.3	19 06.7	+54.8	29.5	19 58.9	+55.0	29.7	20 50.9	+55.4	29.8	21 42.9	+55.6	30.0	22 34.8	+55.6	30.2	47
48	17 23.8	+54.2	28.6	18 16.5	+54.3	28.7	19 09.1	+54.5	28.9	20 01.5	+54.8	29.1	20 53.9	+55.1	29.2	21 46.3	+55.2	29.4	22 38.5	+55.4	29.6	23 30.6	+55.6	29.8	48
49	18 18.0	+54.0	28.1	19 10.8	+54.3	28.3	20 03.6	+54.6	28.4	20 56.3	+54.8	28.6	21 49.0	+54.9	28.8	22 41.5	+55.2	29.0	23 33.9	+55.4	29.2	24 26.2	+55.6	29.4	49
50	19 12.0	+54.0	27.7	20 05.1	+54.3	27.8	20 58.2	+54.4	28.0	21 51.1	+54.6	28.2	22 43.9	+54.9	28.4	23 36.7	+55.1	28.6	24 29.3	+55.3	28.7	25 21.8	+55.5	29.0	50
51	20 06.0	+54.0	27.2	20 59.4	+54.1	27.4	21 52.6	+54.4	27.5	22 45.7	+54.6	27.7	23 38.8	+54.8	27.9	24 31.8	+55.0	28.1	25 24.6	+55.2	28.4	26 17.3	+55.5	28.6	51
52	21 00.0	+53.8	26.7	21 53.5	+54.1	26.9	22 47.0	+54.3	27.1	23 40.3	+54.5	27.3	24 33.6	+54.7	27.5	25 26.8	+54.9	27.7	26 19.8	+55.2	27.9	27 12.8	+55.4	28.2	52
53	21 53.8	+53.8	26.3	22 47.6	+54.0	26.4	23 41.3	+54.2	26.6	24 34.8	+54.5	26.8	25 28.3	+54.7	27.0	26 21.7	+54.9	27.3	27 15.0	+55.1	27.3	28 08.2	+55.2	27.7	53
54	22 47.6	+53.7	25.8	23 41.6	+53.9	26.0	24 35.5	+54.1	26.2	25 29.3	+54.3	26.4	26 23.0	+54.5	26.6	27 16.6	+54.8	26.8	28 10.1	+55.0	27.0	29 03.5	+55.2	27.3	54
55	23 41.3	+53.5	25.3	24 35.5	+53.8	25.5	25 29.6	+54.0	25.7	26 23.6	+54.3	25.9	27 17.5	+54.5	26.1	28 11.4	+54.6	26.3	29 05.1	+54.9	26.6	29 58.7	+55.1	26.8	55
56	24 34.8	+53.5	24.8	25 29.3	+53.7	25.0	26 23.6	+53.9	25.2	27 17.9	+54.1	25.4	28 12.0	+54.4	25.6	29 06.0	+54.6	25.9	30 00.0	+54.8	26.1	30 53.8	+55.0	26.4	56
57	25 28.3	+53.4	24.3	26 23.0	+53.6	24.5	27 17.5	+53.9	24.7	28 12.0	+54.1	24.9	29 06.4	+54.2	25.2	30 00.6	+54.5	25.4	30 54.8	+54.6	25.7	31 48.8	+54.9	25.9	57
58	26 21.7	+53.3	23.8	27 16.6	+53.5	24.0	28 11.4	+53.7	24.2	29 06.1	+54.0	24.4	30 00.6	+54.2	24.7	30 55.1	+54.3	24.9	31 49.4	+54.6	25.2	32 43.7	+54.8	25.4	58
59	27 15.0	+53.4	23.3	28 10.1	+53.4	23.5	29 05.1	+53.6	23.7	30 00.0	+53.8	23.9	30 54.8	+54.0	24.2	31 49.4	+54.3	24.4	32 44.0	+54.5	24.7	33 38.5	+54.7	25.0	59
60	28 08.2	+53.0	22.7	29 03.5	+53.2	23.0	29 58.7	+53.4	23.2	30 53.8	+53.7	23.4	31 48.8	+53.9	23.7	32 43.7	+54.1	23.9	33 38.5	+54.3	24.2	34 33.2	+54.5	24.5	60
61	29 01.2	+52.9	22.2	29 56.7	+53.1	22.4	30 52.1	+53.4	22.7	31 47.5	+53.5	22.9	32 42.7	+53.7	23.1	33 37.8	+54.0	23.4	34 32.8	+54.2	23.7	35 27.7	+54.4	24.0	61
62	29 54.1	+52.8	21.7	30 49.8	+53.0	21.9	31 45.5	+53.2	22.1	32 41.0	+53.4	22.4	33 36.4	+53.6	22.6	34 31.8	+53.8	22.9	35 27.0	+54.1	23.2	36 22.1	+54.3	23.5	62
63	30 46.9	+52.6	21.1	31 42.8	+52.9	21.3	32 38.7	+53.0	21.6	33 34.4	+53.3	21.8	34 30.1	+53.5	22.1	35 25.6	+53.7	22.3	36 21.1	+53.9	22.6	37 16.4	+54.1	22.9	63
64	31 39.5	+52.5	20.6	32 35.7	+52.7	20.8	33 31.7	+52.9	21.0	34 27.7	+53.1	21.3	35 23.6	+53.3	21.5	36 19.3	+53.6	21.8	37 15.0	+53.8	22.1	38 10.5	+54.0	22.4	64
65	32 32.0	+52.4	20.0	33 28.4	+52.5	20.2	34 24.6	+52.8	20.4	35 20.8	+53.0	20.7	36 16.9	+53.2	20.9	37 12.9	+53.4	21.2	38 08.8	+53.6	21.5	39 04.5	+53.8	21.8	65
66	33 24.4	+52.1	19.4	34 20.9	+52.4	19.6	35 17.4	+52.6	19.9	36 13.8	+52.8	20.1	37 10.1	+53.0	20.4	38 06.3	+53.2	20.6	39 02.4	+53.4	20.9	39 58.3	+53.7	21.2	66
67	34 16.5	+52.0	18.8	35 13.3	+52.2	19.0	36 10.0	+52.4	19.3	37 06.6	+52.6	19.5	38 03.1	+52.8	19.8	38 59.5	+53.0	20.1	39 55.8	+53.2	20.3	40 52.0	+53.5	20.6	67
68	35 08.5	+51.8	18.2	36 05.5	+52.0	18.4	37 02.4	+52.2	18.7	37 59.2	+52.4	18.9	38 55.9	+52.6	19.2	39 52.5	+52.8	19.4	40 49.0	+53.1	19.7	41 45.5	+53.2	20.0	68
69	36 00.3	+51.6	17.6	36 57.5	+51.8	17.8	37 54.6	+52.0	18.1	38 51.6	+52.2	18.3	39 48.5	+52.4	18.6	40 45.3	+52.7	18.8	41 42.1	+52.8	19.1	42 38.7	+53.1	19.4	69
70	36 51.9	+51.4	17.0	37 49.3	+51.6	17.2	38 46.6	+51.8	17.4	39 43.8	+52.0	17.7	40 40.9	+52.2	17.9	41 38.0	+52.4	18.2	42 34.9	+52.6	18.5	43 31.8	+52.8	18.8	70
71	37 43.3	+51.2	16.3	38 40.9	+51.3	16.5	39 38.4	+51.5	16.8	40 35.8	+51.7	17.0	41 33.1	+52.0	17.3	42 30.4	+52.1	17.5	43 27.5	+52.4	17.8	44 24.6	+52.6	18.1	71
72	38 34.5	+50.9	15.6	39 32.2	+51.2	15.9	40 29.9	+51.4	16.1	41 27.5	+51.6	16.3	42 25.1	+51.7	16.6	43 22.5	+52.0	16.9	44 19.9	+52.2	17.1	45 17.2	+52.4	17.4	72
73	39 25.4	+50.7	15.0	40 23.4	+50.9	15.2	41 21.3	+51.0	15.4	42 19.1	+51.2	15.6	43 16.8	+51.5	15.9	44 14.5	+51.6	16.2	45 12.1	+51.8	16.4	46 09.6	+52.1	16.7	73
74	40 16.1	+50.5	14.3	41 14.3	+50.6	14.5	42 12.3	+50.9	14.7	43 10.3	+51.0	14.9	44 08.3	+51.2	15.2	45 06.1	+51.4	15.4	46 03.9	+51.6	15.7	47 01.7	+51.8	16.0	74
75	41 06.6	+50.2	13.5	42 04.9	+50.4	13.8	43 03.2	+50.5	14.0	44 01.3	+50.8	14.2	44 59.5	+50.9	14.5	45 57.5	+51.2	14.7	46 55.5	+51.3	15.0	47 53.5	+51.5	15.3	75
76	41 56.8	+49.9	12.8	42 55.3	+50.0	13.0	43 53.7	+50.2	13.2	44 52.1	+50.4	13.5	45 50.4	+50.6	13.7	46 48.7	+50.7	13.9	47 46.8	+51.0	14.2	48 45.0	+51.2	14.5	76
77	42 46.7	+49.6	12.1	43 45.3	+49.8	12.3	44 43.9	+50.0	12.5	45 42.5	+50.1	12.7	46 41.0	+50.3	12.9	47 39.4	+50.5	13.2	48 37.8	+50.7	13.4	49 36.2	+50.8	13.7	77
78	43 36.3	+49.2	11.3	44 35.1	+49.4	11.5	45 33.9	+49.5	11.7	46 32.6	+49.7	11.9	47 31.3	+49.9	12.1	48 29.9	+50.1	12.4	49 28.5	+50.3	12.6	50 27.0	+50.5	12.9	78
79	44 25.5	+49.0	10.5	45 24.5	+49.1	10.7	46 23.4	+49.3	10.9	47 22.3	+49.4	11.1	48 21.2	+49.6	11.3	49 20.0	+49.8	11.5	50 18.8	+49.9	11.8	51 17.5	+50.1	12.0	79
80	45 14.5	+48.5	9.7	46 13.6	+48.7	9.9	47 12.7	+48.8	10.0	48 11.7	+49.1	10.2	49 10.8	+49.1	10.4	50 09.8	+49.3	10.7	51 08.7	+49.5	10.9	52 07.6	+49.7	11.1	80
81	46 03.0	+48.2	8.8	47 02.3	+48.3	9.0	48 01.5	+48.5	9.2	49 00.8	+48.6	9.4	49 59.9	+48.8	9.6	50 59.1	+48.9	9.8	51 58.2	+49.1	9.9	52 57.3	+49.2	10.2	81
82	46 51.2	+47.8	8.0	47 50.6	+47.9	8.1	48 50.0	+48.0	8.3	49 49.4	+48.1	8.5	50 48.7	+48.3	8.6	51 48.0	+48.5	8.8	52 47.3	+48.6	9.0	53 46.5	+48.8	9.2	82
83	47 39.0	+47.4	7.1	48 38.5	+47.5	7.2	49 38.0	+47.6	7.4	50 37.5	+47.7	7.5	51 37.0	+47.8	7.7	52 36.5	+47.9	7.9	53 35.9	+48.1	8.1	54 35.3	+48.2	8.2	83
84	48 26.4	+46.9	6.2	49 26.0	+47.0	6.3	50 25.6	+47.1	6.4	51 25.2	+47.3	6.6	52 24.8	+47.5	6.7	53 24.4	+47.5	6.9	54 24.0	+47.6	7.2	55 23.5	+47.7	7.2	84
85	49 13.3	+46.4	5.2	50 13.0	+46.5	5.3	51 12.7	+46.7	5.4	52 12.5	+46.7	5.6	53 12.3	+46.8	5.7	54 11.9	+46.9	5.8	55 11.6	+47.0	6.0	56 11.2	+47.1	6.1	85
86	49 59.7	+45.9	4.2	50 59.5	+46.0	4.3	51 59.4	+46.0	4.4	52 59.2	+46.1	4.6	53 59.0	+46.2	4.6	54 58.8	+46.3	4.8	55 58.6	+46.4	4.9	56 58.3	+46.5	5.0	86
87	50 45.6	+45.4	3.2	51 45.5	+45.5	3.3	52 45.4	+45.5	3.4	53 45.3	+45.6	3.5	54 45.2	+45.7	3.6	55 45.1	+45.7	3.6	56 45.0	+45.7	3.8	57 44.8	+45.8	3.8	87
88	51 31.0	+44.8	2.2	52 31.0	+44.8	2.2	53 30.9	+44.9	2.3	54 30.9	+44.9	2.3	55 30.8	+45.0	2.4	56 30.8	+45.0	2.4	57 30.7	+45.1	2.5	58 30.6	+45.1	2.6	88
89	52 15.8	+44.2	1.1	53 15.8	+44.2	1.1	54 15.8	+44.2	1.2	55 15.8	+44.2	1.2	56 15.8	+44.2	1.2	57 15.7	+44.3	1.3	58 15.7	+44.3	1.3	59 15.7	+44.3	1.3	89
90	53 00.0	+43.6	0.0	54 00.0	+43.5	0.0	55 00.0	+43.5	0.0	56 00.0	+43.5	0.0	57 00.0	+43.5	0.0	58 00.0	+43.5	0.0	59 00.0	+43.5	0.0	60 00.0	+43.4	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	25 39.1	+53.1	129.6	25 00.8	+53.5	130.0	24 22.1	+53.9	130.3	23 43.1	+54.3	130.6	23 03.9	+54.7	131.0	22 24.5	+55.0	131.3	21 44.7	+55.4	131.6	21 04.8	+55.7	131.9	0
1	26 32.2	+53.0	129.1	25 54.3	+53.4	129.5	25 16.0	+53.8	129.8	24 37.4	+54.2	130.2	23 58.6	+54.5	130.5	23 19.5	+54.9	130.9	22 40.1	+55.3	131.2	22 00.5	+55.6	131.5	1
2	27 25.2	+52.9	128.5	26 47.7	+53.3	128.9	26 09.8	+53.7	129.3	25 31.6	+54.1	129.7	24 53.1	+54.5	130.1	24 14.4	+54.8	130.4	23 35.4	+55.2	130.8	22 56.1	+55.5	131.1	2
3	28 18.1	+52.7	128.0	27 41.0	+53.2	128.4	27 03.5	+53.6	128.8	26 25.7	+54.0	129.2	25 47.6	+54.4	129.6	25 09.2	+54.8	130.0	24 30.6	+55.1	130.3	23 51.6	+55.5	130.7	3
4	29 10.8	+52.6	127.5	28 34.2	+53.0	127.9	27 57.1	+53.5	128.3	27 19.7	+54.0	128.7	26 42.0	+54.3	129.1	26 04.0	+54.7	129.5	25 25.7	+55.0	129.9	24 47.1	+55.4	130.2	4
5	30 03.4	+52.5	126.9	29 27.2	+52.9	127.4	28 50.6	+53.4	127.8	28 13.7	+53.8	128.2	27 36.3	+54.2	128.7	26 58.7	+54.6	129.1	26 20.7	+55.0	129.4	25 42.5	+55.3	129.8	5
6	30 55.9	+52.3	126.4	30 20.1	+52.8	126.8	29 44.0	+53.2	127.3	29 07.5	+53.6	127.7	28 30.5	+54.2	128.2	27 53.3	+54.5	128.6	27 15.7	+54.9	129.0	26 37.8	+55.2	129.4	6
7	31 48.2	+52.2	125.8	31 12.9	+52.7	126.3	30 37.2	+53.1	126.8	30 01.1	+53.6	127.2	29 24.7	+53.9	127.7	28 47.8	+54.4	128.1	28 10.6	+54.8	128.5	27 33.0	+55.2	129.0	7
8	32 40.4	+52.0	125.2	32 05.6	+52.5	125.7	31 30.3	+53.0	126.2	30 54.7	+53.4	126.7	30 18.6	+53.9	127.2	29 42.2	+54.3	127.6	29 05.4	+54.7	128.1	28 28.2	+55.1	128.5	8
9	33 32.4	+51.8	124.6	32 58.1	+52.3	125.1	32 23.3	+52.8	125.7	31 48.1	+53.3	126.2	31 12.5	+53.8	126.7	30 36.5	+54.2	127.1	30 00.1	+54.6	127.6	29 23.3	+54.9	128.1	9
10	34 24.2	+51.6	124.0	33 50.4	+52.2	124.5	33 16.1	+52.7	125.1	32 41.4	+53.2	125.6	32 06.3	+53.6	126.1	31 30.7	+54.0	126.6	30 54.7	+54.4	127.1	30 18.2	+54.8	127.6	10
11	35 15.8	+51.5	123.4	34 42.6	+52.0	124.0	34 08.8	+52.5	124.5	33 34.6	+53.0	125.1	32 59.9	+53.5	125.6	32 24.7	+54.0	126.1	31 49.1	+54.4	126.6	31 13.1	+54.8	127.1	11
12	36 07.3	+51.2	122.7	35 34.6	+51.8	123.3	35 01.3	+52.4	123.9	34 27.6	+52.8	124.5	33 53.4	+53.3	125.1	33 18.7	+53.7	125.6	32 43.5	+54.2	126.1	32 07.9	+54.7	126.6	12
13	36 58.5	+51.0	122.1	36 26.4	+51.5	122.7	35 53.7	+52.1	123.3	35 20.4	+52.7	123.9	34 46.7	+53.2	124.5	34 12.4	+53.7	125.1	33 37.7	+54.2	125.6	33 02.6	+54.5	126.2	13
14	37 49.5	+50.8	121.4	37 17.9	+51.4	122.1	36 45.8	+52.0	122.7	36 13.1	+52.5	123.3	35 39.9	+53.0	123.9	35 06.1	+53.5	124.5	34 31.9	+53.9	125.1	33 57.1	+54.4	125.7	14
15	38 40.3	+50.6	120.7	38 09.3	+51.2	121.4	37 37.8	+51.7	122.1	37 05.6	+52.3	122.7	36 32.9	+52.8	123.4	35 59.6	+53.4	124.0	35 25.8	+53.9	124.6	34 51.5	+54.3	125.1	15
16	39 30.9	+50.3	120.1	39 00.5	+50.9	120.8	38 29.5	+51.5	121.4	37 57.9	+52.1	122.1	37 25.7	+52.7	122.8	36 53.0	+53.1	123.4	36 19.7	+53.6	124.0	35 45.8	+54.2	124.6	16
17	40 21.2	+50.0	119.3	39 51.4	+50.7	120.1	39 21.0	+51.3	120.8	38 50.0	+51.9	121.5	38 18.4	+52.4	122.2	37 46.1	+53.1	122.8	37 13.3	+53.6	123.5	36 40.0	+54.0	124.1	17
18	41 11.2	+49.7	118.6	40 42.1	+50.4	119.4	40 12.3	+51.1	120.1	39 41.9	+51.7	120.8	39 10.8	+52.3	121.5	38 39.2	+52.8	122.2	38 06.9	+53.3	122.9	37 34.0	+53.8	123.5	18
19	42 00.9	+49.5	117.9	41 32.5	+50.2	118.7	41 03.4	+50.9	119.4	40 33.6	+51.4	120.2	40 03.1	+52.1	120.9	39 32.0	+52.6	121.6	39 00.2	+53.2	122.3	38 27.8	+53.7	123.0	19
20	42 50.4	+49.1	117.1	42 22.7	+49.8	117.9	41 54.2	+50.6	118.7	41 25.0	+51.2	119.5	40 55.2	+51.8	120.2	40 24.6	+52.4	121.0	39 53.4	+53.0	121.7	39 21.5	+53.6	122.4	20
21	43 39.5	+48.8	116.3	43 12.5	+49.6	117.2	42 44.8	+50.2	118.0	42 16.2	+51.0	118.8	41 47.0	+51.6	119.6	41 17.0	+52.2	120.3	40 46.4	+52.7	121.1	40 15.1	+53.3	121.8	21
22	44 28.3	+48.5	115.5	44 02.1	+49.2	116.4	43 35.0	+50.0	117.2	43 07.2	+50.6	118.1	42 38.6	+51.3	118.9	42 09.2	+52.0	119.7	41 39.1	+52.6	120.5	41 08.4	+53.1	121.2	22
23	45 16.8	+48.0	114.7	44 51.3	+48.9	115.6	44 25.0	+49.6	116.5	43 57.8	+50.4	117.3	43 29.9	+51.0	118.2	43 01.2	+51.7	119.0	42 31.7	+52.4	119.8	42 01.5	+53.0	120.6	23
24	46 04.8	+47.7	113.8	45 40.2	+48.5	114.8	45 14.6	+49.3	115.7	44 48.2	+50.0	116.6	44 20.9	+50.8	117.4	43 52.9	+51.4	118.3	43 24.1	+52.1	119.1	42 54.5	+52.7	120.0	24
25	46 52.5	+47.3	112.9	46 28.7	+48.1	113.9	46 03.9	+48.9	114.9	45 38.2	+49.6	115.8	45 11.7	+50.5	116.7	44 44.3	+51.2	117.6	44 16.2	+51.8	118.5	43 47.2	+52.5	119.3	25
26	47 39.8	+46.8	112.0	47 16.8	+47.7	113.0	46 52.8	+48.6	114.0	46 28.0	+49.3	115.0	46 02.2	+50.1	115.9	45 35.5	+50.9	116.8	45 08.0	+51.6	117.7	44 39.7	+52.2	118.6	26
27	48 26.6	+46.3	111.1	48 04.5	+47.3	112.1	47 41.4	+48.2	113.1	47 17.3	+49.0	114.1	46 52.3	+49.8	115.1	46 26.4	+50.5	116.1	45 59.6	+51.3	117.0	45 31.9	+52.0	117.9	27
28	49 12.9	+45.9	110.1	48 51.8	+46.8	111.2	48 29.6	+47.7	112.3	48 06.3	+48.6	113.3	47 42.1	+49.5	114.3	47 16.9	+50.3	115.3	46 50.9	+50.9	116.3	46 23.9	+51.7	117.2	28
29	49 58.8	+45.3	109.1	49 38.6	+46.3	110.2	49 17.3	+47.3	111.3	48 54.9	+48.2	112.4	48 31.6	+49.0	113.5	48 07.2	+49.8	114.5	47 41.8	+50.7	115.5	47 15.6	+51.3	116.5	29
30	50 44.1	+44.8	108.1	50 24.9	+45.8	109.3	50 04.6	+46.7	110.4	49 43.1	+47.7	111.5	49 20.6	+48.6	112.6	48 57.0	+49.5	113.6	48 32.5	+50.3	114.7	48 06.9	+51.1	115.7	30
31	51 28.9	+44.1	107.0	51 10.7	+45.2	108.2	50 51.3	+46.3	109.4	50 30.8	+47.3	110.5	50 09.2	+48.2	111.7	49 46.5	+49.1	112.8	49 22.8	+49.9	113.9	48 58.0	+50.8	114.9	31
32	52 13.0	+43.6	105.9	51 55.9	+44.7	107.2	51 37.6	+45.8	108.4	51 18.1	+46.8	109.6	50 57.4	+47.7	110.7	50 35.6	+48.7	111.9	50 12.7	+49.6	113.0	49 48.8	+50.4	114.1	32
33	52 56.6	+42.9	104.8	52 40.6	+44.0	106.1	52 23.4	+45.1	107.3	52 04.9	+46.2	108.6	51 45.2	+47.2	109.8	51 24.3	+48.2	110.9	51 02.3	+49.1	112.1	50 39.2	+50.0	113.2	33
34	53 39.5	+42.1	103.6	53 24.6	+43.4	105.0	53 08.5	+44.5	106.2	52 51.1	+45.6	107.5	52 32.4	+46.7	108.8	52 12.5	+47.7	110.0	51 51.4	+48.7	111.2	51 29.2	+49.5	112.4	34
35	54 21.6	+41.4	102.4	54 08.0	+42.7	103.8	53 53.0	+43.9	105.1	53 36.7	+45.1	106.4	53 19.1	+46.2	107.7	53 00.2	+47.2	109.0	52 40.1	+48.2	110.2	52 18.7	+49.2	111.4	35
36	55 03.0	+40.6	101.2	54 50.7	+41.9	102.6	54 36.9	+43.2	103.9	54 21.8	+44.4	105.3	54 05.3	+45.5	106.6	53 47.4	+46.7	107.9	53 28.3	+47.7	109.2	53 07.9	+48.7	110.5	36
37	55 43.6	+39.8	99.9	55 32.6	+41.1	101.3	55 20.1	+42.4	102.7	55 06.2	+43.7	104.1	54 50.8	+44.9	105.5	54 34.1	+46.0	106.8	54 16.0	+47.1	108.2	53 56.6	+48.2	109.5	37
38	56 23.4	+38.9	98.5	56 13.7	+40.3	100.0	56 02.5	+41.7	101.5	55 49.9	+42.9	102.9	55 35.7	+44.2	104.4	55 20.1	+45.4	105.8	55 03.1	+46.6	107.1	54 44.8	+47.6	108.5	38
39	57 02.3	+37.9	97.2	56 54.0	+39.4	98.7	56 44.2	+40.8	100.2	56 32.8	+42.2	101.7	56 19.9	+43.5	103.1	56 05.5	+44.8	104.6	55 49.7	+45.9	106.0	55 32.4	+47.1	107.4	39
40	57 40.2	+36.9	95.7	57 33.4	+38.4	97.3	57 25.0	+39.9	98.8	57 15.0	+41.3	100.4	57 03.4	+42.7	101.9	56 50.3	+44.0	103.4	56 35.6	+45.3	104.9	56 19.5	+46.4	106.3	40
41	58 17.1	+35.8	94.2	58 11.8	+37.4	95.8	58 04.9	+39.0	97.4	57 56.3	+40.4	99.0	57 46.1	+41.9	100.6	57 34.3	+43.2	102.1	57 20.9	+44.5	103.7	57 05.9	+45.8	105.2	41
42	58 52.9	+34.7	92.7	58 49.2	+36.4	94.3	58 43.9	+37.9	96.0	58 36.7	+39.5	97.6	58 28.0	+40.9	99.2	58 17.5	+42.4	100.8	58 05.4	+43.8	102.4	57 51.7	+45.1	104.0	42
43	59 27.6	+33.5	91.1	59 25.6	+35.2	92.8	59 21.8	+36.8	94.5	59 16.2	+38.5	96.2	59 08.9	+40.0	97.8	58 59.9	+41.5	99.5	58 49.2	+42.9	101.1	58 36.8	+44.3	102.7	43
44	60 01.1	+32.2	89.4	60 00.8	+34.0	91.2	59 58.6	+35.7	92.9	59 54.7	+37.4	94.6	59 48.9	+39.0	96.4	59 41.4	+40.6	98.1	59 32.1	+42.1	99.7	59 21.1	+43.5	101.4	44
45	60 33.3	+30.9	87.7	60 34.8	+32.7	89.5	60 34.3	+34.5	91.3	60 32.1	+36.2	93.1	60 27.9	+37.9	94.8	60 22.0	+39.5	96.6	60 14.2	+41.1	98.3	60 04.6	+42.6	100.0	45
46	61 04.2	+29.5	86.0	61 07.5	+31.3	87.8	61 08.8	+33.2	89.6	61 08.3	+35.0	91.4	61 05.8	+36.8	93.2	61 01.5	+38.5	95.0	60 55.3	+40.1	96.8	60 47.2	+41.7	98.6	46
47	61 33.7	+28.0	84.2	61 38.8	+29.8	86.0	61 42.0	+31.8	87.9	61 43.3	+33.7	89.7	61 42.6	+35.5	91.6	61 40.0	+37.2	93.4	61 35.4	+39.0	95.3	61 28.9	+40.7	97.1	47
48	62 01.7	+26.4	82.3	62 08.7	+28.4	84.2	62 13.8	+30.4	86.1	62 17.0	+32.2	88.0	62 18.1	+34.2	89.9	62 17.2	+36.1	91.8	62 14.4	+37.8	93.7	62 09.6	+39.5	95.6	48
49	62 28.1	+24.7	80.4	62 37.1	+26.8	82.3	62 44.2	+28.8	84.2	62 49.2	+30.9	86.1	62 52.3	+32.7	88.1	62 53.3	+34.6	90.0	62 52.2	+36.6	92.0	62 49.1	+38.4	93.9	49
50	62 52.8	+23.1	78.4	63 03.9	+25.2	80.3	63 13.0	+27.2	82.3	63 20.1	+29.2	84.2	63 25.0	+31.3	86.2	63 27.9	+33.3	88.2	63 28.8	+35.2	90.2	63 27.5	+37.1	92.2	50
51	63 15.9	+21.2	76.4	63 29.1	+23.3	78.3	63 40.2	+25.5	80.3	63 49.3	+27.6	82.3	63 56.3	+29.7	84.3	64 01.2	+31.8	86.3	64 04.0	+33.7	88.4	64 04.6	+35.9	90.5	51
52	63 37.1	+19.4	74.3	63 52.4	+21.6	76.2	64 05.7	+23.7	78.2	64 16.9	+25.9	80.2	64 26.0	+28.0	82.3	64 33.0	+30.1	84.4	64 37.7	+32.3	86.5	64 40.3	+34.3	88.6	52
53	63 56.5	+17.5•	72.1	64 14.0	+19.6•	74.1	64 29.4	+21.8	76.1	64 42.8	+23.9	78.2	64 54.0	+26.3	80.2	65 03.1	+28.4	82.4	65 10.0	+30.6	84.5	65 14.6	+32.7	86.7	53
54	64 14.0	+15.4•	69.9	64 33.6	+17.6•	71.9	64 51.2	+19.9•	73.9	65 06.8	+22.1	76.0	65 20.3	+24.3	78.1	65 31.5	+26.6	80.3	65 40.6	+28.8	82.4	65 47.3	+31.1	84.6	54
55	64 29.4	+13.4•	67.7	64 51.2	+15.6•	69.7	65 11.1	+17.8•	71.7	65 28.9	+20.1•	73.8	65 44.6	+22.4•	75.9	65 58.1	+24.7	78.1	66 09.4	+27.0	80.3	66 18.4	+29.2	82.5	55
56	64 42.8	+11.2•	65.4	65 06.8	+13.5•	67.4	65 28.9	+15.7•	69.4	65 49.0	+18.0•	71.5	66 07.0	+20.3•	73.6	66 22.8	+22.7•	75.8	66 36.4	+25.0•	78.1	66 47.6	+27.4	80.3	56
57	64 54.0	+9.1•	63.1	65 20.3	+11.2•	65.1	65 44.6	+13.5•	67.1	66 07.0	+15.8•	69.1	66 27.3	+18.2•	71.3	66 45.5	+20.5•	73.5	67 01.4	+22.9•	75.7	67 15.0	+25.3•	78.1	57
58	65 03.1	+6.9•	60.8	65 31.5	+9.1•	62.7	65 58.1	+11.3•	64.7	66 22.8	+13.6•	66.7	66 45.5	+15.9•	68.9	67 06.0	+18.3•	71.1	67 24.3	+20.8•	73.4	67 40.3	+23.3•	75.7	58
59	65 10.0	+4.6•	58.4	65 40.6	+6.7•	60.3	66 09.4	+9.0•	62.3	66 36.4	+11.2•	64.3	67 01.4	+13.6•	66.4	67 24.3	+16.0•	68.6	67 45.1	+18.5•	70.9	68 03.6	+20.9•	73.2	59
60	65 14.6	+2.4•	56.0	65 47.3	+4.5•	57.9	66 18.4	+6.6•	59.8	66 47.6	+8.9•	61.8	67 15.0	+11.2•	63.9	67 40.3	+13.7•	66.1	68 03.6	+16.1•	68.4	68 24.5	+18.7•	70.7	60
61	65 17.0	0.0•	53.6	65 51.8	+2.1•	55.4	66 25.0	+4.2•	57.3	66 56.5	+6.5•	59.3	67 26.2	+8.8•	61.4	67 54.0	+11.1•	63.5	68 19.7	+13.6•	65.8	68 43.2	+16.1•	68.1	61
62	65 17.0	−2.1•	51.3	65 53.9	−0.2•	53.0	66 29.2	+1.9•	54.8	67 03.0	+4.0•	56.9	67 35.0	+6.2•	58.8	68 05.1	+8.6•	60.9	68 33.3	+11.1•	63.1	68 59.3	+13.6•	65.4	62
63	65 14.9	−4.5•	48.9	65 53.7	−2.6•	50.5	66 31.1	−0.6•	52.3	67 07.0	+1.5•	54.2	67 41.2	+3.8•	56.2	68 13.7	+6.1•	58.2	68 44.4	+8.4•	60.4	69 12.9	+11.0•	62.7	63
64	65 10.4	−6.7•	46.5	65 51.1	−4.9•	48.1	66 30.5	−3.0•	49.8	67 08.5	−0.9•	51.6	67 45.0	+1.2•	53.5	68 19.8	+3.4•	55.6	68 52.8	+5.8•	57.7	69 23.9	+8.2•	59.9	64
65	65 03.7	−8.9•	44.1	65 46.2	−7.2•	45.7	66 27.5	−5.3•	47.3	67 07.6	−3.5•	49.0	67 46.2	−1.4•	50.9	68 23.2	+0.8•	52.8	68 58.6	+3.0•	54.9	69 32.1	+5.5•	57.1	65
66	64 54.8	−11.1•	41.8	65 39.0	−9.4•	43.3	66 22.2	−7.7•	44.8	67 04.1	−5.9•	46.5	67 44.8	−4.0•	48.3	68 24.0	−1.9•	50.1	69 01.6	+0.4•	52.1	69 37.6	+2.7•	54.3	66
67	64 43.7	−13.2•	39.5	65 29.6	−11.7•	40.9	66 14.5	−10.1•	42.4	66 58.2	−8.3•	43.9	67 40.8	−6.4•	45.6	68 22.1	−4.5•	47.4	69 02.0	−2.4•	49.3	69 40.3	−0.2•	51.4	67
68	64 30.5	−15.2•	37.2	65 17.9	−13.8•	38.5	66 04.4	−12.3•	39.9	66 49.9	−10.7•	41.4	67 34.4	−9.0•	43.0	68 17.6	−7.1•	44.7	68 59.6	−5.1•	46.5	69 40.1	−3.0•	48.5	68
69	64 15.3	−17.3•	35.0	65 04.1	−16.0•	36.2	65 52.1	−14.6•	37.5	66 39.2	−13.0•	38.9	67 25.4	−11.4•	40.4	68 10.5	−9.6•	42.0	68 54.5	−7.8•	43.8	69 37.1	−5.7•	45.6	69
70	63 58.0	−19.3	32.8	64 48.1	−18.0•	33.9	65 37.5	−16.7•	35.1	66 26.2	−15.3•	36.5	67 14.0	−13.8•	37.9	68 00.9	−12.2•	39.4	68 46.7	−10.4•	41.0	69 31.4	−8.6•	42.8	70
71	63 38.7	−21.1	30.6	64 30.1	−20.0	31.7	65 20.8	−18.8•	32.8	66 10.9	−17.5•	34.1	67 00.2	−16.1•	35.4	67 48.7	−14.6•	36.8	68 36.3	−13.0•	38.3	69 22.8	−11.2•	40.0	71
72	63 17.6	−22.9	28.5	64 10.1	−21.9	29.5	65 02.0	−20.7	30.6	65 53.4	−19.6•	31.7	66 44.1	−18.3•	32.9	67 34.1	−17.0•	34.2	68 23.3	−15.5•	35.6	69 11.6	−13.9•	37.2	72
73	62 54.7	−24.6	26.5	63 48.2	−23.7	27.4	64 41.3	−22.7	28.4	65 33.8	−21.6•	29.4	66 25.8	−20.5•	30.5	67 17.1	−19.2•	31.7	68 07.8	−17.9•	33.0	68 57.7	−16.4•	34.5	73
74	62 30.1	−26.3	24.5	63 24.5	−25.4	25.3	64 18.6	−24.6	26.2	65 12.2	−23.6	27.2	66 05.3	−22.5•	28.2	66 57.9	−21.4•	29.3	67 49.9	−20.2•	30.5	68 41.3	−18.9•	31.8	74
75	62 03.8	−27.8	22.6	62 59.1	−27.1	23.3	63 54.0	−26.2	24.1	64 48.6	−25.5	25.0	65 42.8	−24.5	25.9	66 36.5	−23.5•	26.9	67 29.7	−22.4•	28.0	68 22.4	−21.2•	29.2	75
76	61 36.0	−29.4	20.7	62 32.0	−28.7	21.4	63 27.7	−28.0	22.1	64 23.1	−27.2	22.9	65 18.3	−26.4	23.7	66 13.0	−25.5	24.6	67 07.3	−24.5•	25.6	68 01.2	−23.5•	26.7	76
77	61 06.6	−30.8	18.9	62 03.3	−30.2	19.5	62 59.7	−29.5	20.1	63 55.9	−28.8	20.8	64 51.9	−28.2	21.6	65 47.5	−27.3	22.4	66 42.8	−26.5	23.3	67 37.7	−25.5•	24.2	77
78	60 35.8	−32.1	17.1	61 33.1	−31.6	17.6	62 30.2	−31.1	18.2	63 27.1	−30.5	18.9	64 23.7	−29.8	19.5	65 20.2	−29.2	20.2	66 16.3	−28.4	21.0	67 12.2	−27.6•	21.9	78
79	60 03.7	−33.4	15.4	61 01.5	−33.0	15.9	61 59.1	−32.4	16.4	62 56.6	−31.9	16.9	63 53.9	−31.4	17.5	64 51.0	−30.8	18.2	65 47.9	−30.1	18.9	66 44.6	−29.5	19.6	79
80	59 30.3	−34.6	13.8	60 28.5	−34.2	14.2	61 26.7	−33.8	14.6	62 24.7	−33.4	15.1	63 22.5	−32.9	15.6	64 20.2	−32.4	16.2	65 17.8	−31.9	16.8	66 15.1	−31.2	17.4	80
81	58 55.7	−35.7	12.2	59 54.3	−35.4	12.5	60 52.9	−35.1	12.9	61 51.3	−34.7	13.3	62 49.6	−34.3	13.8	63 47.8	−33.8	14.2	64 45.9	−33.4	14.8	65 43.9	−32.9	15.3	81
82	58 20.0	−36.8	10.6	59 18.9	−36.5	10.9	60 17.8	−36.3	11.3	61 16.6	−35.9	11.6	62 15.3	−35.6	12.0	63 14.0	−35.3	12.4	64 12.5	−34.8	12.8	65 11.0	−34.5	13.3	82
83	57 43.2	−37.9	9.1	58 42.4	−37.6	9.4	59 41.5	−37.3	9.7	60 40.7	−37.1	10.0	61 39.7	−36.8	10.3	62 38.7	−36.5	10.6	63 37.7	−36.2	11.0	64 36.5	−35.8	11.4	83
84	57 05.3	−38.7	7.7	58 04.8	−38.6	7.9	59 04.2	−38.4	8.1	60 03.6	−38.3	8.4	61 02.9	−38.0	8.6	62 02.2	−37.8	8.9	63 01.5	−37.6	9.2	64 00.7	−37.3	9.5	84
85	56 26.5	−39.7	6.3	57 26.2	−39.6	6.5	58 25.8	−39.4	6.6	59 25.3	−39.2	6.8	60 24.9	−39.1	7.0	61 24.4	−38.9	7.3	62 23.9	−38.7	7.5	63 23.4	−38.5	7.8	85
86	55 46.8	−40.5	4.9	56 46.6	−40.4	5.1	57 46.4	−40.4	5.2	58 46.1	−40.2	5.4	59 45.8	−40.1	5.5	60 45.5	−39.9	5.7	61 45.2	−39.8	5.9	62 44.9	−39.7	6.1	86
87	55 06.3	−41.4	3.6	56 06.2	−41.3	3.7	57 06.0	−41.2	3.8	58 05.9	−41.1	3.9	59 05.7	−41.0	4.1	60 05.6	−41.0	4.2	61 05.4	−40.8	4.3	62 05.2	−40.7	4.5	87
88	54 24.9	−42.1	2.4	55 24.9	−42.1	2.4	56 24.8	−42.0	2.5	57 24.8	−42.0	2.6	58 24.7	−41.9	2.7	59 24.6	−41.9	2.7	60 24.6	−41.9	2.8	61 24.5	−41.8	2.9	88
89	53 42.8	−42.8	1.2	54 42.8	−42.8	1.2	55 42.8	−42.8	1.2	56 42.8	−42.8	1.3	57 42.8	−42.8	1.3	58 42.7	−42.7	1.3	59 42.7	−42.7	1.4	60 42.7	−42.7	1.4	89
90	53 00.0	−43.5	0.0	54 00.0	−43.5	0.0	55 00.0	−43.5	0.0	56 00.0	−43.5	0.0	57 00.0	−43.5	0.0	58 00.0	−43.6	0.0	59 00.0	−43.6	0.0	60 00.0	−43.6	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	25 39.1	−53.2	129.6	25 00.8	−53.7	130.0	24 22.1	−54.0	130.3	23 43.1	−54.3	130.6	23 03.9	−54.7	131.0	22 24.5	−55.1	131.3	21 44.7	−55.4	131.6	21 04.8	−55.7	131.9	0
1	24 45.9	−53.3	130.1	24 07.1	−53.7	130.4	23 28.1	−54.1	130.8	22 48.8	−54.5	131.1	22 09.2	−54.8	131.4	21 29.4	−55.2	131.7	20 49.3	−55.4	132.0	20 09.1	−55.8	132.3	1
2	23 52.6	−53.4	130.6	23 13.4	−53.8	130.9	22 34.0	−54.2	131.3	21 54.3	−54.5	131.6	21 14.4	−54.9	131.9	20 34.2	−55.2	132.1	19 53.9	−55.5	132.4	19 13.3	−55.8	132.7	2
3	22 59.2	−53.5	131.1	22 19.6	−53.8	131.4	21 39.8	−54.2	131.7	20 59.8	−54.6	132.0	20 19.5	−54.9	132.3	19 39.0	−55.2	132.6	18 58.4	−55.6	132.8	18 17.5	−55.9	133.1	3
4	22 05.7	−53.6	131.6	21 25.8	−54.0	131.9	20 45.6	−54.3	132.2	20 05.2	−54.7	132.5	19 24.6	−55.0	132.7	18 43.8	−55.3	133.0	18 02.8	−55.6	133.2	17 21.6	−55.9	133.4	4
5	21 12.1	−53.7	132.1	20 31.8	−54.0	132.4	19 51.3	−54.4	132.6	19 10.5	−54.7	132.9	18 29.6	−55.0	133.1	17 48.5	−55.4	133.4	17 07.2	−55.7	133.6	16 25.7	−55.9	133.8	5
6	20 18.4	−53.7	132.6	19 37.8	−54.1	132.8	18 56.9	−54.5	133.1	18 15.8	−54.8	133.3	17 34.6	−55.1	133.6	16 53.1	−55.4	133.8	16 11.5	−55.7	134.0	15 29.8	−56.0	134.2	6
7	19 24.7	−53.8	133.0	18 43.7	−54.2	133.3	18 02.4	−54.5	133.5	17 21.0	−54.8	133.8	16 39.5	−55.2	134.0	15 57.7	−55.4	134.2	15 15.8	−55.7	134.4	14 33.8	−56.0	134.6	7
8	18 30.9	−53.9	133.5	17 49.5	−54.2	133.7	17 07.9	−54.5	134.0	16 26.2	−54.9	134.2	15 44.3	−55.2	134.4	15 02.3	−55.5	134.6	14 20.1	−55.8	134.8	13 37.8	−56.1	134.9	8
9	17 37.0	−54.0	134.0	16 55.3	−54.3	134.2	16 13.4	−54.6	134.4	15 31.3	−54.9	134.6	14 49.1	−55.2	134.8	14 06.8	−55.5	135.0	13 24.3	−55.8	135.1	12 41.7	−56.1	135.3	9
10	16 43.0	−54.0	134.4	16 01.0	−54.4	134.6	15 18.8	−54.7	134.8	14 36.4	−55.0	135.0	13 53.9	−55.3	135.2	13 11.3	−55.6	135.4	12 28.5	−55.8	135.5	11 45.6	−56.1	135.7	10
11	15 49.0	−54.1	134.9	15 06.6	−54.4	135.1	14 24.1	−54.7	135.2	13 41.4	−55.0	135.4	12 58.6	−55.3	135.6	12 15.7	−55.6	135.7	11 32.7	−55.9	135.9	10 49.5	−56.1	136.0	11
12	14 55.0	−54.2	135.3	14 12.2	−54.4	135.5	13 29.4	−54.8	135.7	12 46.4	−55.1	135.8	12 03.3	−55.3	136.0	11 20.1	−55.6	136.1	10 36.8	−55.9	136.3	9 53.4	−56.2	136.4	12
13	14 00.8	−54.1	135.8	13 17.8	−54.5	135.9	12 34.6	−54.8	136.1	11 51.3	−55.0	136.2	11 08.0	−55.4	136.4	10 24.5	−55.7	136.5	9 40.9	−55.9	136.6	8 57.2	−56.1	136.7	13
14	13 06.7	−54.2	136.2	12 23.3	−54.5	136.4	11 39.8	−54.8	136.5	10 56.3	−55.2	136.6	10 12.6	−55.4	136.8	9 28.8	−55.7	136.9	8 45.0	−56.0	137.0	8 01.1	−56.2	137.1	14
15	12 12.5	−54.3	136.6	11 28.8	−54.6	136.8	10 45.0	−54.9	136.9	10 01.1	−55.1	137.0	9 17.2	−55.5	137.2	8 33.1	−55.7	137.3	7 49.0	−55.9	137.4	7 04.9	−56.3	137.5	15
16	11 18.2	−54.3	137.1	10 34.2	−54.6	137.2	9 50.1	−54.8	137.3	9 06.0	−55.2	137.4	8 21.7	−55.4	137.6	7 37.4	−55.7	137.6	6 53.1	−56.0	137.7	6 08.6	−56.2	137.8	16
17	10 23.9	−54.3	137.5	9 39.6	−54.6	137.6	8 55.3	−55.0	137.7	8 10.8	−55.2	137.8	7 26.3	−55.5	137.9	6 41.7	−55.7	138.0	5 57.1	−56.0	138.1	5 12.4	−56.2	138.2	17
18	9 29.6	−54.4	137.9	8 45.0	−54.7	138.1	8 00.3	−54.9	138.2	7 15.6	−55.2	138.2	6 30.8	−55.5	138.3	5 46.0	−55.8	138.4	5 01.1	−56.0	138.5	4 16.2	−56.3	138.5	18
19	8 35.2	−54.4	138.4	7 50.3	−54.6	138.5	7 05.4	−55.0	138.6	6 20.4	−55.2	138.6	5 35.3	−55.5	138.7	4 50.2	−55.7	138.8	4 05.1	−56.0	138.8	3 19.9	−56.2	138.9	19
20	7 40.8	−54.4	138.8	6 55.7	−54.7	138.9	6 10.4	−54.9	139.0	5 25.2	−55.3	139.0	4 39.8	−55.5	139.1	3 54.5	−55.8	139.1	3 09.1	−56.0	139.2	2 23.7	−56.3	139.2	20
21	6 46.4	−54.4	139.2	6 01.0	−54.8	139.3	5 15.5	−55.0	139.4	4 29.9	−55.3	139.4	3 44.3	−55.5	139.5	2 58.7	−55.8	139.5	2 13.1	−56.1	139.5	1 27.4	−56.2	139.6	21
22	5 52.0	−54.5	139.6	5 06.2	−54.7	139.7	4 20.5	−55.0	139.8	3 34.6	−55.2	139.8	2 48.8	−55.5	139.9	2 02.9	−55.8	139.9	1 17.0	−56.0	139.9	0 31.2	−56.3	139.9	22
23	4 57.5	−54.4	140.1	4 11.5	−54.7	140.1	3 25.5	−55.1	140.2	2 39.4	−55.3	140.2	1 53.3	−55.6	140.2	1 07.1	−55.7	140.2	0 21.0	−56.0	140.2	0 25.1	+56.3	39.8	23
24	4 03.1	−54.5	140.5	3 16.8	−54.8	140.5	2 30.4	−55.0	140.6	1 44.1	−55.3	140.6	0 57.7	−55.5	140.6	0 11.4	−55.8	140.6	0 35.0	+56.0	39.4	1 21.4	+56.2	39.4	24
25	3 08.6	−54.5	140.9	2 22.0	−54.8	140.9	1 35.4	−55.0	141.0	0 48.8	−55.3	141.0	0 02.2	−55.6	141.0	0 44.4	+55.8	39.0	1 31.0	+56.1	39.0	2 17.6	+56.3	39.1	25
26	2 14.1	−54.5	141.3	1 27.2	−54.7	141.4	0 40.4	−55.0	141.4	0 06.5	+55.3	38.6	0 53.4	+55.5	38.6	1 40.2	+55.8	38.7	2 27.1	+56.0	38.7	3 13.9	+56.2	38.7	26
27	1 19.6	−54.5	141.7	0 32.5	−54.8	141.8	0 14.6	+55.1	38.2	1 01.8	+55.3	38.2	1 48.9	+55.5	38.3	2 36.0	+55.8	38.3	3 23.1	+56.0	38.3	4 10.1	+56.3	38.4	27
28	0 25.1	−54.5	142.2	0 22.3	+54.8	37.8	1 09.7	+55.0	37.8	1 57.1	+55.2	37.9	2 44.4	+55.5	37.9	3 31.8	+55.7	37.9	4 19.1	+56.0	38.0	5 06.4	+56.2	38.0	28
29	0 29.4	+54.5	37.4	1 17.1	+54.7	37.4	2 04.7	+55.0	37.4	2 52.3	+55.3	37.5	3 39.9	+55.6	37.5	4 27.5	+55.8	37.5	5 15.1	+56.0	37.6	6 02.6	+56.2	37.7	29
30	1 23.9	+54.5	37.0	2 11.8	+54.8	37.0	2 59.7	+55.0	37.0	3 47.6	+55.3	37.1	4 35.5	+55.5	37.1	5 23.3	+55.7	37.2	6 11.1	+55.9	37.2	6 58.8	+56.2	37.3	30
31	2 18.4	+54.5	36.6	3 06.6	+54.7	36.6	3 54.7	+55.0	36.6	4 42.9	+55.2	36.7	5 31.0	+55.5	36.7	6 19.0	+55.8	36.8	7 07.0	+56.0	36.9	7 55.0	+56.2	37.0	31
32	3 12.9	+54.5	36.2	4 01.3	+54.8	36.2	4 49.7	+55.0	36.2	5 38.1	+55.2	36.3	6 26.5	+55.4	36.4	7 14.8	+55.7	36.4	8 03.0	+55.9	36.5	8 51.2	+56.2	36.6	32
33	4 07.4	+54.5	35.7	4 56.1	+54.7	35.8	5 44.7	+55.0	35.8	6 33.3	+55.3	35.9	7 21.9	+55.5	36.0	8 10.5	+55.6	36.1	8 58.9	+56.0	36.1	9 47.4	+56.1	36.2	33
34	5 01.9	+54.4	35.3	5 50.8	+54.7	35.4	6 39.7	+55.0	35.4	7 28.6	+55.2	35.5	8 17.4	+55.4	35.6	9 06.1	+55.7	35.7	9 54.9	+55.8	35.8	10 43.5	+56.1	35.9	34
35	5 56.3	+54.4	34.9	6 45.5	+54.7	35.0	7 34.7	+54.9	35.0	8 23.8	+55.1	35.1	9 12.8	+55.4	35.2	10 01.8	+55.6	35.3	10 50.7	+55.9	35.4	11 39.6	+56.1	35.5	35
36	6 50.7	+54.4	34.5	7 40.2	+54.6	34.5	8 29.6	+54.9	34.6	9 18.9	+55.2	34.7	10 08.2	+55.4	34.8	10 57.4	+55.7	34.9	11 46.6	+55.8	35.0	12 35.7	+56.1	35.2	36
37	7 45.1	+54.4	34.0	8 34.8	+54.7	34.1	9 24.5	+54.9	34.2	10 14.1	+55.1	34.3	11 03.6	+55.3	34.4	11 53.1	+55.5	34.5	12 42.4	+55.8	34.7	13 31.8	+56.0	34.8	37
38	8 39.5	+54.4	33.6	9 29.5	+54.6	33.7	10 19.4	+54.8	33.8	11 09.2	+55.1	33.9	11 58.9	+55.4	34.0	12 48.6	+55.6	34.2	13 38.2	+55.8	34.3	14 27.8	+56.0	34.4	38
39	9 33.9	+54.3	33.2	10 24.1	+54.5	33.3	11 14.2	+54.8	33.4	12 04.3	+55.0	33.5	12 54.3	+55.2	33.6	13 44.2	+55.5	33.8	14 34.0	+55.7	33.9	15 23.8	+55.9	34.1	39
40	10 28.2	+54.3	32.8	11 18.6	+54.6	32.9	12 09.0	+54.8	33.0	12 59.3	+55.0	33.1	13 49.5	+55.3	33.2	14 39.7	+55.4	33.4	15 29.7	+55.7	33.5	16 19.7	+55.9	33.7	40
41	11 22.5	+54.3	32.3	12 13.2	+54.5	32.5	13 03.8	+54.7	32.6	13 54.3	+55.0	32.7	14 44.8	+55.2	32.8	15 35.1	+55.5	33.0	16 25.4	+55.7	33.1	17 15.6	+55.9	33.3	41
42	12 16.8	+54.2	31.9	13 07.7	+54.4	32.0	13 58.5	+54.7	32.1	14 49.3	+54.9	32.3	15 40.0	+55.1	32.4	16 30.6	+55.3	32.6	17 21.1	+55.6	32.7	18 11.5	+55.8	32.9	42
43	13 11.0	+54.1	31.5	14 02.1	+54.4	31.6	14 53.2	+54.6	31.7	15 44.2	+54.9	31.9	16 35.1	+55.1	32.0	17 25.9	+55.4	32.2	18 16.7	+55.5	32.3	19 07.3	+55.8	32.5	43
44	14 05.1	+54.1	31.0	14 56.5	+54.4	31.1	15 47.8	+54.6	31.3	16 39.1	+54.8	31.4	17 30.2	+55.1	31.6	18 21.3	+55.3	31.8	19 12.2	+55.5	31.9	20 03.1	+55.7	32.1	44
45	14 59.2	+54.1	30.6	15 50.9	+54.3	30.7	16 42.4	+54.6	30.9	17 33.9	+54.8	31.0	18 25.3	+55.0	31.2	19 16.6	+55.2	31.4	20 07.7	+55.5	31.5	20 58.8	+55.7	31.7	45
46	15 53.3	+54.0	30.1	16 45.2	+54.2	30.3	17 37.0	+54.4	30.4	18 28.7	+54.7	30.6	19 20.3	+54.9	30.8	20 11.8	+55.1	30.9	21 03.2	+55.4	31.1	21 54.5	+55.6	31.3	46
47	16 47.3	+54.0	29.7	17 39.4	+54.2	29.8	18 31.4	+54.4	30.0	19 23.4	+54.6	30.1	20 15.2	+54.9	30.3	21 06.9	+55.1	30.5	21 58.6	+55.3	30.7	22 50.1	+55.5	30.9	47
48	17 41.3	+53.8	29.2	18 33.6	+54.1	29.4	19 25.8	+54.4	29.5	20 18.0	+54.6	29.7	21 10.1	+54.8	29.9	22 02.0	+55.1	30.1	22 53.9	+55.2	30.3	23 45.6	+55.5	30.5	48
49	18 35.1	+53.9	28.7	19 27.7	+54.1	28.9	20 20.2	+54.3	29.1	21 12.6	+54.5	29.3	22 04.9	+54.7	29.5	22 57.1	+54.9	29.7	23 49.1	+55.2	29.9	24 41.1	+55.4	30.1	49
50	19 29.0	+53.7	28.3	20 21.8	+53.9	28.4	21 14.5	+54.2	28.6	22 07.1	+54.4	28.8	22 59.6	+54.7	29.0	23 52.0	+54.9	29.2	24 44.3	+55.1	29.4	25 36.5	+55.4	29.7	50
51	20 22.7	+53.7	27.8	21 15.7	+53.9	28.0	22 08.7	+54.1	28.2	23 01.5	+54.4	28.4	23 54.3	+54.6	28.6	24 46.9	+54.8	28.8	25 39.4	+55.1	29.0	26 31.9	+55.2	29.2	51
52	21 16.4	+53.5	27.3	22 09.6	+53.8	27.5	23 02.8	+54.0	27.7	23 55.9	+54.2	27.9	24 48.9	+54.4	28.1	25 41.7	+54.7	28.3	26 34.5	+54.9	28.6	27 27.1	+55.2	28.8	52
53	22 09.9	+53.5	26.8	23 03.4	+53.8	27.0	23 56.8	+54.0	27.2	24 50.1	+54.2	27.4	25 43.3	+54.5	27.6	26 36.4	+54.7	27.9	27 29.4	+54.9	28.1	28 22.3	+55.1	28.4	53
54	23 03.4	+53.4	26.3	23 57.2	+53.6	26.5	24 50.8	+53.9	26.7	25 44.3	+54.1	27.0	26 37.8	+54.3	27.2	27 31.1	+54.5	27.4	28 24.3	+54.7	27.7	29 17.4	+55.0	27.9	54
55	23 56.8	+53.3	25.8	24 50.8	+53.5	26.0	25 44.7	+53.7	26.3	26 38.4	+54.0	26.5	27 32.1	+54.2	26.7	28 25.6	+54.5	26.9	29 19.0	+54.7	27.2	30 12.4	+54.8	27.5	55
56	24 50.1	+53.2	25.3	25 44.3	+53.5	25.5	26 38.4	+53.7	25.8	27 32.4	+53.9	26.0	28 26.3	+54.1	26.2	29 20.1	+54.3	26.5	30 13.7	+54.6	26.8	31 07.2	+54.8	27.0	56
57	25 43.3	+53.1	24.8	26 37.8	+53.3	25.0	27 32.1	+53.5	25.3	28 26.3	+53.8	25.5	29 20.4	+54.0	25.7	30 14.4	+54.2	26.0	31 08.3	+54.4	26.2	32 02.0	+54.7	26.5	57
58	26 36.4	+53.0	24.3	27 31.1	+53.2	24.5	28 25.6	+53.4	24.7	29 20.1	+53.6	25.0	30 14.4	+53.9	25.2	31 08.6	+54.1	25.5	32 02.7	+54.4	25.7	32 56.7	+54.6	26.0	58
59	27 29.4	+52.9	23.8	28 24.3	+53.1	24.0	29 19.0	+53.4	24.2	30 13.7	+53.5	24.5	31 08.3	+53.8	24.7	32 02.7	+54.0	25.0	32 57.1	+54.2	25.3	33 51.3	+54.4	25.5	59
60	28 22.3	+52.7	23.2	29 17.4	+52.9	23.5	30 12.4	+53.1	23.7	31 07.2	+53.4	23.9	32 02.0	+53.7	24.2	32 56.7	+53.9	24.4	33 51.3	+54.0	24.7	34 45.7	+54.3	25.0	60
61	29 15.0	+52.6	22.7	30 10.3	+52.8	22.9	31 05.5	+53.1	23.2	32 00.6	+53.3	23.4	32 55.7	+53.4	23.7	33 50.6	+53.7	23.9	34 45.3	+54.0	24.2	35 40.0	+54.2	24.5	61
62	30 07.6	+52.5	22.2	31 03.1	+52.7	22.4	31 58.6	+52.9	22.6	32 53.9	+53.1	22.9	33 49.1	+53.3	23.1	34 44.3	+53.5	23.4	35 39.3	+53.8	23.7	36 34.2	+54.0	24.0	62
63	31 00.1	+52.3	21.6	31 55.8	+52.5	21.8	32 51.5	+52.7	22.1	33 47.0	+53.0	22.3	34 42.5	+53.2	22.6	35 37.8	+53.5	22.8	36 33.1	+53.6	23.1	37 28.2	+53.9	23.4	63
64	31 52.4	+52.1	21.0	32 48.3	+52.4	21.2	33 44.2	+52.6	21.5	34 40.0	+52.8	21.7	35 35.7	+53.0	22.0	36 31.3	+53.2	22.3	37 26.7	+53.5	22.6	38 22.1	+53.7	22.9	64
65	32 44.5	+52.0	20.4	33 40.7	+52.2	20.7	34 36.8	+52.4	20.9	35 32.8	+52.6	21.2	36 28.7	+52.9	21.4	37 24.5	+53.1	21.7	38 20.2	+53.3	22.0	39 15.8	+53.5	22.3	65
66	33 36.5	+51.8	19.8	34 32.9	+52.0	20.1	35 29.2	+52.2	20.3	36 25.4	+52.5	20.6	37 21.6	+52.6	20.8	38 17.6	+52.9	21.1	39 13.5	+53.1	21.4	40 09.3	+53.4	21.7	66
67	34 28.3	+51.6	19.2	35 24.9	+51.8	19.5	36 21.4	+52.1	19.7	37 17.9	+52.2	20.0	38 14.2	+52.5	20.2	39 10.5	+52.7	20.5	40 06.6	+53.0	20.8	41 02.7	+53.1	21.1	67
68	35 19.9	+51.4	18.6	36 16.7	+51.7	18.8	37 13.5	+51.8	19.1	38 10.1	+52.1	19.3	39 06.7	+52.3	19.6	40 03.2	+52.5	19.9	40 59.6	+52.7	20.2	41 55.8	+53.0	20.5	68
69	36 11.3	+51.3	18.0	37 08.4	+51.4	18.2	38 05.3	+51.7	18.4	39 02.2	+51.9	18.7	39 59.0	+52.1	19.0	40 55.7	+52.3	19.2	41 52.3	+52.5	19.5	42 48.8	+52.7	19.8	69
70	37 02.6	+51.0	17.3	37 59.8	+51.2	17.5	38 57.0	+51.4	17.8	39 54.1	+51.6	18.0	40 51.1	+51.8	18.3	41 48.0	+52.0	18.6	42 44.8	+52.3	18.9	43 41.5	+52.5	19.2	70
71	37 53.6	+50.7	16.7	38 51.0	+51.0	16.9	39 48.4	+51.2	17.1	40 45.7	+51.4	17.4	41 42.9	+51.6	17.6	42 40.0	+51.9	17.9	43 37.1	+52.0	18.2	44 34.0	+52.3	18.5	71
72	38 44.3	+50.6	16.0	39 42.0	+50.7	16.2	40 39.6	+50.9	16.4	41 37.1	+51.1	16.7	42 34.5	+51.4	16.9	43 31.9	+51.5	17.2	44 29.1	+51.8	17.5	45 26.3	+52.0	17.8	72
73	39 34.9	+50.2	15.3	40 32.7	+50.5	15.5	41 30.5	+50.7	15.7	42 28.2	+50.9	16.0	43 25.9	+51.0	16.2	44 23.4	+51.3	16.5	45 20.9	+51.5	16.8	46 18.3	+51.7	17.1	73
74	40 25.1	+50.0	14.6	41 23.2	+50.2	14.8	42 21.2	+50.4	15.0	43 19.1	+50.6	15.3	44 16.9	+50.8	15.5	45 14.7	+51.0	15.8	46 12.4	+51.2	16.1	47 10.0	+51.4	16.4	74
75	41 15.1	+49.8	13.8	42 13.4	+49.9	14.1	43 11.6	+50.1	14.3	44 09.7	+50.3	14.5	45 07.7	+50.5	14.8	46 05.7	+50.7	15.0	47 03.6	+50.9	15.3	48 01.4	+51.2	15.6	75
76	42 04.9	+49.4	13.1	43 03.3	+49.6	13.3	44 01.7	+49.7	13.5	45 00.0	+49.9	13.7	45 58.2	+50.2	14.0	46 56.4	+50.4	14.2	47 54.5	+50.6	14.5	48 52.6	+50.7	14.8	76
77	42 54.3	+49.1	12.3	43 52.9	+49.3	12.5	44 51.4	+49.5	12.7	45 49.9	+49.7	13.0	46 48.4	+49.8	13.2	47 46.8	+50.0	13.4	48 45.1	+50.2	13.7	49 43.3	+50.5	14.0	77
78	43 43.4	+48.8	11.5	44 42.2	+48.9	11.7	45 40.9	+49.1	12.1	46 39.6	+49.3	12.1	47 38.2	+49.5	12.4	48 36.8	+49.6	12.6	49 35.3	+49.8	12.9	50 33.8	+50.0	13.1	78
79	44 32.2	+48.4	10.7	45 31.1	+48.6	10.9	46 30.0	+48.7	11.1	47 28.9	+48.9	11.3	48 27.9	+49.1	11.5	49 26.4	+49.3	11.8	50 25.1	+49.5	12.0	51 23.8	+49.6	12.3	79
80	45 20.6	+48.0	9.9	46 19.7	+48.2	10.1	47 18.7	+48.4	10.2	48 17.8	+48.5	10.4	49 16.8	+48.6	10.7	50 15.7	+48.8	10.9	51 14.6	+49.0	11.1	52 13.4	+49.2	11.4	80
81	46 08.6	+47.7	9.0	47 07.9	+47.8	9.2	48 07.1	+47.9	9.4	49 06.3	+48.1	9.6	50 05.4	+48.3	9.8	51 04.5	+48.4	10.0	52 03.6	+48.6	10.2	53 02.6	+48.8	10.4	81
82	46 56.3	+47.2	8.1	47 55.7	+47.3	8.3	48 55.0	+47.5	8.5	49 54.4	+47.6	8.6	50 53.7	+47.7	8.8	51 52.9	+48.0	9.0	52 52.2	+48.1	9.2	53 51.4	+48.2	9.4	82
83	47 43.5	+46.8	7.2	48 43.0	+46.9	7.4	49 42.5	+47.0	7.5	50 42.0	+47.1	7.7	51 41.4	+47.3	7.8	52 40.9	+47.4	8.0	53 40.3	+47.5	8.2	54 39.6	+47.7	8.4	83
84	48 30.3	+46.3	6.3	49 29.9	+46.4	6.4	50 29.5	+46.5	6.6	51 29.1	+46.6	6.7	52 28.7	+46.6	6.8	53 28.3	+46.8	7.0	54 27.8	+46.9	7.2	55 27.3	+47.2	7.4	84
85	49 16.6	+45.8	5.3	50 16.3	+45.9	5.4	51 16.0	+46.0	5.6	52 15.8	+46.0	5.7	53 15.5	+46.1	5.8	54 15.1	+46.3	5.9	55 14.8	+46.4	6.1	56 14.5	+46.5	6.3	85
86	50 02.4	+45.3	4.3	51 02.2	+45.4	4.4	52 02.0	+45.5	4.5	53 01.8	+45.6	4.6	54 01.6	+45.6	4.7	55 01.4	+45.7	4.8	56 01.2	+45.8	5.0	57 01.0	+45.8	5.1	86
87	50 47.7	+44.7	3.3	51 47.6	+44.8	3.4	52 47.5	+44.8	3.4	53 47.4	+44.8	3.5	54 47.2	+45.0	3.6	55 47.1	+45.0	3.7	56 47.0	+45.1	3.8	57 46.8	+45.2	3.9	87
88	51 32.4	+44.1	2.2	52 32.3	+44.2	2.3	53 32.3	+44.2	2.3	54 32.1	+44.3	2.4	55 32.2	+44.3	2.5	56 32.1	+44.3	2.5	57 32.1	+44.3	2.6	58 32.0	+44.4	2.7	88
89	52 16.5	+43.5	1.1	53 16.5	+43.5	1.2	54 16.5	+43.5	1.2	55 16.5	+43.5	1.2	56 16.5	+43.5	1.3	57 16.4	+43.6	1.3	58 16.4	+43.6	1.3	59 16.4	+43.6	1.4	89
90	53 00.0	+42.8	0.0	54 00.0	+42.8	0.0	55 00.0	+42.8	0.0	56 00.0	+42.8	0.0	57 00.0	+42.8	0.0	58 00.0	+42.7	0.0	59 00.0	+42.7	0.0	60 00.0	+42.7	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 136°, 224°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	25 11.1	+52.9	128.6	24 33.5	+53.3	129.0	23 55.6	+53.8	129.3	23 17.5	+54.1	129.7	22 39.1	+54.5	130.0	22 00.4	+54.8	130.3	21 21.5	+55.1	130.6	20 42.3	+55.5	130.9	0
1	26 04.0	+52.8	128.1	25 26.8	+53.3	128.5	24 49.4	+53.6	128.8	24 11.6	+54.0	129.2	23 33.6	+54.4	129.5	22 55.2	+54.8	130.2	22 16.6	+55.2	130.2	21 37.8	+55.5	130.5	1
2	26 56.8	+52.7	127.6	26 20.1	+53.1	128.0	25 43.0	+53.5	128.3	25 05.6	+54.0	128.7	24 28.0	+54.3	129.1	23 50.0	+54.7	129.4	23 11.8	+55.0	129.8	22 33.3	+55.4	130.1	2
3	27 49.5	+52.5	127.0	27 13.2	+52.9	127.4	26 36.5	+53.4	127.8	25 59.6	+53.8	128.2	25 22.3	+54.2	128.6	24 44.7	+54.6	129.0	24 06.8	+55.0	129.3	23 28.7	+55.3	129.7	3
4	28 42.0	+52.4	126.5	28 06.1	+52.9	126.9	27 29.9	+53.3	127.3	26 53.4	+53.7	127.7	26 16.5	+54.1	128.1	25 39.3	+54.5	128.5	25 01.8	+54.9	128.9	24 24.0	+55.3	129.2	4
5	29 34.4	+52.2	125.9	28 59.0	+52.7	126.4	28 23.2	+53.2	126.8	27 47.1	+53.6	127.2	27 10.6	+54.1	127.6	26 33.8	+54.5	128.0	25 56.7	+54.8	128.4	25 19.3	+55.1	128.8	5
6	30 26.6	+52.1	125.3	29 51.7	+52.6	125.8	29 16.4	+53.1	126.3	28 40.7	+53.5	126.7	28 04.7	+53.9	127.2	27 28.3	+54.3	127.6	26 51.5	+54.7	128.0	26 14.4	+55.1	128.4	6
7	31 18.7	+52.0	124.8	30 44.3	+52.5	125.3	30 09.5	+52.9	125.7	29 34.2	+53.4	126.2	28 58.6	+53.8	126.7	28 22.6	+54.2	127.1	27 46.2	+54.7	127.5	27 09.5	+55.1	128.0	7
8	32 10.7	+51.8	124.2	31 36.8	+52.3	124.7	31 02.4	+52.8	125.2	30 27.6	+53.3	125.7	29 52.4	+53.7	126.1	29 16.8	+54.2	126.6	28 40.9	+54.5	127.0	28 04.6	+54.9	127.5	8
9	33 02.5	+51.6	123.6	32 29.1	+52.1	124.1	31 55.2	+52.6	124.6	31 20.9	+53.1	125.1	30 46.1	+53.6	125.6	30 11.0	+54.0	126.1	29 35.4	+54.4	126.6	28 59.5	+54.8	127.0	9
10	33 54.1	+51.4	123.0	33 21.2	+51.9	123.5	32 47.8	+52.5	124.1	32 14.0	+52.9	124.6	31 39.7	+53.4	125.1	31 05.0	+53.9	125.6	30 29.8	+54.4	126.1	29 54.3	+54.7	126.6	10
11	34 45.5	+51.2	122.3	34 13.1	+51.8	122.9	33 40.3	+52.3	123.5	33 06.9	+52.8	124.0	32 33.1	+53.3	124.6	31 58.9	+53.7	125.0	31 24.2	+54.2	125.6	30 49.0	+54.6	126.1	11
12	35 36.7	+51.0	121.7	35 04.9	+51.6	122.3	34 32.6	+52.1	122.9	33 59.8	+52.6	123.5	33 26.4	+53.2	124.0	32 52.6	+53.7	124.6	32 18.4	+54.1	125.1	31 43.7	+54.5	125.6	12
13	36 27.7	+50.8	121.1	35 56.5	+51.4	121.7	35 24.7	+52.0	122.3	34 52.4	+52.5	122.9	34 19.6	+53.0	123.5	33 46.3	+53.4	124.1	33 12.5	+53.9	124.6	32 38.2	+54.4	125.1	13
14	37 18.5	+50.6	120.4	36 47.9	+51.2	121.0	36 16.7	+51.7	121.7	35 44.9	+52.3	122.3	35 12.6	+52.8	122.9	34 39.7	+53.4	123.5	34 06.4	+53.8	124.0	33 32.6	+54.2	124.6	14
15	38 09.1	+50.4	119.7	37 39.1	+50.9	120.4	37 08.4	+51.6	121.0	36 37.2	+52.1	121.7	36 05.4	+52.7	122.3	35 33.1	+53.2	122.9	35 00.2	+53.7	123.5	34 26.8	+54.2	124.1	15
16	38 59.5	+50.0	119.0	38 30.0	+50.8	119.7	38 00.0	+51.3	120.4	37 29.3	+51.9	121.1	36 58.1	+52.5	121.7	36 26.3	+53.0	122.3	35 53.9	+53.5	123.0	35 21.0	+54.0	123.6	16
17	39 49.5	+49.8	118.3	39 20.8	+50.4	119.0	38 51.3	+51.1	119.7	38 21.2	+51.7	120.4	37 50.6	+52.2	121.1	37 19.3	+52.8	121.8	36 47.4	+53.4	122.4	36 15.0	+53.8	123.0	17
18	40 39.3	+49.6	117.6	40 11.2	+50.2	118.3	39 42.4	+50.9	119.1	39 12.9	+51.5	119.8	38 42.8	+52.1	120.5	38 12.1	+52.6	121.2	37 40.8	+53.1	121.8	37 08.8	+53.7	122.5	18
19	41 28.9	+49.2	116.8	41 01.4	+50.0	117.6	40 33.3	+50.6	118.4	40 04.4	+51.3	119.1	39 34.9	+51.9	119.8	39 04.7	+52.5	120.5	38 33.9	+53.0	121.2	38 02.5	+53.6	121.9	19
20	42 18.1	+48.9	116.1	41 51.4	+49.6	116.9	41 23.9	+50.3	117.7	40 55.7	+51.0	118.4	40 26.8	+51.6	119.2	39 57.2	+52.2	119.9	39 26.9	+52.9	120.6	38 56.1	+53.3	121.3	20
21	43 07.0	+48.6	115.3	42 41.0	+49.3	116.1	42 14.2	+50.1	116.9	41 46.7	+50.7	117.7	41 18.4	+51.4	118.5	40 49.4	+52.0	119.3	40 19.8	+52.6	120.0	39 49.4	+53.2	120.7	21
22	43 55.6	+48.2	114.5	43 30.3	+49.0	115.3	43 04.3	+49.7	116.2	42 37.4	+50.5	117.0	42 09.8	+51.1	117.8	41 41.4	+51.8	118.6	41 12.4	+52.4	119.4	40 42.6	+53.0	120.1	22
23	44 43.8	+47.9	113.6	44 19.3	+48.7	114.5	43 54.0	+49.5	115.4	43 27.9	+50.1	116.3	43 00.9	+50.9	117.1	42 33.2	+51.6	117.9	42 04.8	+52.1	118.7	41 35.6	+52.7	119.5	23
24	45 31.7	+47.4	112.8	45 08.0	+48.3	113.7	44 43.5	+49.0	114.6	44 18.0	+49.9	115.5	43 51.8	+50.6	116.4	43 24.8	+51.2	117.2	42 56.9	+51.9	118.1	42 28.3	+52.6	118.9	24
25	46 19.1	+47.1	111.9	45 56.3	+47.9	112.9	45 32.5	+48.8	113.8	45 07.9	+49.5	114.7	44 42.4	+50.3	115.6	44 16.0	+51.0	116.5	43 48.8	+51.7	117.4	43 20.9	+52.3	118.2	25
26	47 06.2	+46.6	111.0	46 44.2	+47.5	112.0	46 21.3	+48.3	113.0	45 57.4	+49.2	113.9	45 32.7	+49.9	114.8	45 07.0	+50.7	115.8	44 40.5	+51.4	116.7	44 13.2	+52.0	117.5	26
27	47 52.8	+46.1	110.1	47 31.7	+47.1	111.1	47 09.6	+48.0	112.1	46 46.6	+48.8	113.1	46 22.6	+49.6	114.0	45 57.7	+50.4	115.0	45 31.9	+51.1	115.9	45 05.2	+51.8	116.8	27
28	48 38.9	+45.7	109.1	48 18.8	+46.6	110.2	47 57.6	+47.5	111.2	47 35.4	+48.4	112.2	47 12.2	+49.3	113.2	46 48.1	+50.0	114.2	46 23.0	+50.8	115.2	45 57.0	+51.6	116.1	28
29	49 24.6	+45.1	108.1	49 05.4	+46.1	109.2	48 45.1	+47.1	110.3	48 23.8	+48.0	111.3	48 01.5	+48.8	112.4	47 38.1	+49.7	113.4	47 13.8	+50.5	114.4	46 48.6	+51.2	115.4	29
30	50 09.7	+44.6	107.1	49 51.5	+45.6	108.2	49 32.2	+46.6	109.3	49 11.8	+47.5	110.4	48 50.3	+48.5	111.5	48 27.8	+49.3	112.6	48 04.3	+50.1	113.6	47 39.8	+50.9	114.6	30
31	50 54.3	+43.9	106.0	50 37.1	+45.1	107.2	50 18.8	+46.1	108.4	49 59.3	+47.1	109.5	49 38.8	+48.0	110.6	49 17.1	+48.9	111.7	48 54.4	+49.8	112.8	48 30.7	+50.6	113.8	31
32	51 38.2	+43.4	104.9	51 22.2	+44.4	106.2	51 04.9	+45.5	107.3	50 46.4	+46.6	108.5	50 26.8	+47.5	109.7	50 06.0	+48.5	110.8	49 44.2	+49.3	111.9	49 21.3	+50.2	113.0	32
33	52 21.6	+42.7	103.8	52 06.6	+43.9	105.1	51 50.4	+45.0	106.3	51 33.0	+46.0	107.5	51 14.3	+47.1	108.7	50 54.5	+48.0	109.9	50 33.5	+49.0	111.0	50 11.5	+49.8	112.1	33
34	53 04.3	+42.0	102.7	52 50.5	+43.2	103.9	52 35.4	+44.3	105.2	52 19.0	+45.5	106.5	52 01.4	+46.5	107.7	51 42.5	+47.6	108.9	51 22.5	+48.5	110.1	51 01.3	+49.4	111.3	34
35	53 46.3	+41.2	101.5	53 33.7	+42.5	102.8	53 19.7	+43.7	104.1	53 04.5	+44.8	105.4	52 47.9	+46.0	106.7	52 30.1	+47.0	107.9	52 11.0	+48.0	109.1	51 50.7	+49.0	110.4	35
36	54 27.5	+40.5	100.2	54 16.2	+41.8	101.6	54 03.4	+43.1	102.9	53 49.3	+44.3	104.3	53 33.9	+45.3	105.6	53 17.1	+46.5	106.9	52 59.0	+47.5	108.2	52 39.7	+48.5	109.4	36
37	55 08.0	+39.7	98.9	54 58.0	+41.0	100.3	54 46.5	+42.3	101.7	54 33.6	+43.5	103.1	54 19.2	+44.8	104.5	54 03.6	+45.8	105.8	53 46.5	+47.0	107.1	53 28.2	+48.0	108.4	37
38	55 47.7	+38.7	97.6	55 39.0	+40.1	99.1	55 28.8	+41.5	100.5	55 17.1	+42.8	101.9	55 04.0	+44.1	103.3	54 49.4	+45.3	104.7	54 33.5	+46.4	106.1	54 16.2	+47.5	107.4	38
39	56 26.4	+37.8	96.2	56 19.1	+39.3	97.7	56 10.3	+40.6	99.2	55 59.9	+42.0	100.7	55 48.0	+43.4	102.1	55 34.7	+44.6	103.6	55 19.9	+45.8	105.0	55 03.7	+46.9	106.4	39
40	57 04.2	+36.9	94.8	56 58.4	+38.3	96.4	56 50.9	+39.8	97.9	56 41.9	+41.2	99.4	56 31.4	+42.5	100.9	56 19.3	+43.8	102.4	56 05.7	+45.1	103.8	55 50.6	+46.3	105.3	40
41	57 41.1	+35.7	93.4	57 36.7	+37.4	94.9	57 30.7	+38.9	96.5	57 23.1	+40.4	98.1	57 13.9	+41.8	99.6	57 03.1	+43.1	101.1	56 50.8	+44.4	102.6	56 36.9	+45.7	104.1	41
42	58 16.8	+34.7	91.9	58 14.1	+36.3	93.5	58 09.6	+37.9	95.1	58 03.5	+39.3	96.7	57 55.7	+40.8	98.3	57 46.2	+42.3	99.8	57 35.2	+43.6	101.4	57 22.6	+44.9	102.9	42
43	58 51.5	+33.5	90.3	58 50.4	+35.1	91.9	58 47.5	+36.8	93.6	58 42.8	+38.4	95.2	58 36.5	+39.9	96.9	58 28.5	+41.4	98.5	58 18.8	+42.8	100.1	58 07.5	+44.2	101.7	43
44	59 25.0	+32.3	88.7	59 25.5	+34.0	90.4	59 24.3	+35.6	92.1	59 21.2	+37.4	93.7	59 16.4	+39.0	95.4	59 09.9	+40.5	97.1	59 01.6	+42.0	98.7	58 51.7	+43.3	100.4	44
45	59 57.3	+30.9	87.0	59 59.5	+32.7	88.7	59 59.9	+34.5	90.5	59 58.6	+36.1	92.2	59 55.4	+37.8	93.9	59 50.4	+39.4	95.6	59 43.6	+41.0	97.3	59 35.0	+42.5	99.0	45
46	60 28.2	+29.6	85.3	60 32.2	+31.5	87.0	60 34.4	+33.2	88.8	60 34.7	+35.0	90.6	60 33.2	+36.7	92.4	60 29.8	+38.4	94.1	60 24.6	+40.0	95.9	60 17.5	+41.6	97.6	46
47	60 57.8	+28.1	83.5	61 03.7	+30.0	85.3	61 07.6	+31.9	87.1	61 09.7	+33.7	88.9	61 09.9	+35.5	90.7	61 08.2	+37.2	92.5	61 04.6	+38.9	94.4	60 59.1	+40.6	96.1	47
48	61 25.9	+26.6	81.7	61 33.7	+28.5	83.5	61 39.5	+30.5	85.3	61 43.4	+32.4	87.2	61 45.4	+34.2	89.0	61 45.4	+36.1	90.9	61 43.5	+37.8	92.8	61 39.7	+39.5	94.6	48
49	61 52.5	+25.0	79.8	62 02.2	+27.0	81.6	62 10.0	+28.9	83.5	62 15.8	+30.9	85.4	62 19.6	+32.9	87.3	62 21.5	+34.7	89.2	62 21.3	+36.6	91.1	62 19.2	+38.3	93.0	49
50	62 17.5	+23.3	77.8	62 29.2	+25.4	79.7	62 38.9	+27.4	81.6	62 46.7	+29.4	83.5	62 52.5	+31.3	85.5	62 56.2	+33.3	87.4	62 57.9	+35.2	89.4	62 57.5	+37.1	91.3	50
51	62 40.8	+21.6	75.8	62 54.6	+23.6	77.7	63 06.3	+25.8	79.7	63 16.1	+27.8	81.6	63 23.8	+29.9	83.6	63 29.5	+31.8	85.6	63 33.1	+33.8	87.6	63 34.6	+35.7	89.6	51
52	63 02.4	+19.8	73.8	63 18.2	+21.9	75.7	63 32.1	+23.9	77.6	63 43.9	+26.1	79.6	63 53.7	+28.1	81.6	64 01.3	+30.3	83.7	64 06.9	+32.3	85.7	64 10.3	+34.4	87.8	52
53	63 22.2	+17.9	71.7	63 40.1	+20.0	73.6	63 56.0	+22.2	75.6	64 10.0	+24.3	77.6	64 21.8	+26.5	79.6	64 31.6	+28.6	81.7	64 39.2	+30.7	83.8	64 44.7	+32.8	85.9	53
54	63 40.1	+15.9	69.6	64 00.1	+18.1	71.5	64 18.2	+20.3	73.4	64 34.3	+22.4	75.5	64 48.3	+24.6	77.5	65 00.2	+26.8	79.6	65 09.9	+29.1	81.7	65 17.5	+31.1	83.9	54
55	63 56.0	+14.0	67.4	64 18.2	+16.1	69.3	64 38.5	+18.2	71.3	64 56.7	+20.5	73.3	65 12.9	+22.8	75.4	65 27.0	+25.0	77.5	65 39.0	+27.2	79.6	65 48.6	+29.5	81.8	55
56	64 10.0	+11.8	65.1	64 34.3	+14.0	67.1	64 56.7	+16.2	69.0	65 17.2	+18.5	71.0	65 35.7	+20.7	73.1	65 52.0	+23.0	75.3	66 06.2	+25.3	77.4	66 18.1	+27.6	79.7	56
57	64 21.8	+9.8	62.9	64 48.3	+11.9	64.8	65 12.9	+14.1	66.7	65 35.7	+16.3	68.8	65 56.4	+18.6	70.8	66 15.0	+21.0	73.0	66 31.5	+23.3	75.2	66 45.7	+25.6	77.4	57
58	64 31.6	+7.6	60.6	65 00.2	+9.7	62.5	65 27.0	+12.0	64.4	65 52.0	+14.2	66.4	66 15.0	+16.5	68.5	66 36.0	+18.8	70.6	66 54.8	+21.1	72.9	67 11.3	+23.6	75.1	58
59	64 39.2	+5.5	58.3	65 09.9	+7.6	60.1	65 39.0	+9.7	62.0	66 06.2	+11.9	64.0	66 31.5	+14.2	66.1	66 54.8	+16.5	68.2	67 15.9	+19.0	70.5	67 34.9	+21.4	72.7	59
60	64 44.7	+3.2	56.0	65 17.5	+5.2	57.8	65 48.6	+7.4	59.6	66 18.1	+9.6	61.6	66 45.7	+11.9	63.6	67 11.3	+14.2	65.8	67 34.9	+16.6	68.0	67 56.3	+19.1	70.3	60
61	64 47.9	+1.0	53.6	65 22.7	+3.0	55.4	65 56.0	+5.1	57.2	66 27.7	+7.2	59.1	66 57.6	+9.4	61.2	67 25.5	+11.9	63.3	67 51.5	+14.3	65.4	68 15.4	+16.7	67.7	61
62	64 48.9	–1.2	51.3	65 25.7	+0.7	53.0	66 01.1	+2.7	54.8	66 34.9	+4.9	56.6	67 07.0	+7.1	58.6	67 37.4	+9.3	60.7	68 05.8	+11.7	62.9	68 32.1	+14.2	65.1	62
63	64 47.7	–3.5	48.9	65 26.4	–1.6	50.6	66 03.8	+0.4	52.3	66 39.8	+2.4	54.1	67 14.1	+4.6	56.1	67 46.7	+6.9	58.1	68 17.5	+9.2	60.2	68 46.3	+11.6	62.4	63
64	64 44.2	–5.6	46.6	65 24.8	–3.8	48.2	66 04.2	–2.0	49.8	66 42.2	0.0	51.6	67 18.7	+2.1	53.5	67 53.6	+4.3	55.5	68 26.7	+6.6	57.5	68 57.9	+9.1	59.7	64
65	64 38.6	–7.9	44.2	65 21.0	–6.2	45.8	66 02.2	–4.3	47.4	66 42.2	–2.4	49.1	67 20.8	–0.4	50.9	67 57.9	+1.7	52.8	68 33.3	+4.0	54.8	69 07.0	+6.3	57.0	65
66	64 30.7	–10.0	41.9	65 14.8	–8.3	43.4	65 57.9	–6.7	44.9	66 39.8	–4.9	46.6	67 20.4	–2.9	48.3	67 59.6	–0.9	50.1	68 37.3	+1.2	52.1	69 13.3	+3.5	54.2	66
67	64 20.7	–12.0	39.7	65 06.5	–10.6	41.0	65 51.2	–8.9	42.5	66 34.9	–7.2	44.0	67 17.5	–5.4	45.7	67 58.7	–3.5	47.5	68 38.5	–1.3	49.3	69 16.8	+0.9	51.3	67
68	64 08.7	–14.2	37.4	64 55.9	–12.7	38.7	65 42.3	–11.2	40.1	66 27.7	–9.6	41.6	67 12.1	–7.9	43.1	67 55.2	–6.0	44.8	68 37.2	–4.1	46.6	69 17.7	–2.0	48.5	68
69	63 54.5	–16.1	35.2	64 43.2	–14.8	36.4	65 31.1	–13.4	37.7	66 18.1	–11.9	39.1	67 04.2	–10.3	40.6	67 49.2	–8.5	42.2	68 33.1	–6.7	43.9	69 15.7	–4.7	45.7	69
70	63 38.4	–18.1	33.0	64 28.4	–16.9	34.1	65 17.7	–15.6	35.4	66 06.2	–14.1	36.7	66 53.9	–12.6	38.1	67 40.7	–11.1	39.5	68 26.4	–9.3	41.2	69 11.0	–7.5	42.9	70
71	63 20.3	–20.0	30.9	64 11.5	–18.8	31.9	65 02.1	–17.6	33.1	65 52.1	–16.4	34.3	66 41.3	–15.0	35.6	67 29.6	–13.4	37.0	68 17.1	–11.9	38.5	69 03.5	–10.1	40.1	71
72	63 00.3	–21.7	28.8	63 52.7	–20.8	29.8	64 44.5	–19.7	30.8	65 35.7	–18.4	31.9	66 26.3	–17.2	33.1	67 16.2	–15.8	34.4	68 05.2	–14.3	35.8	68 53.4	–12.7	37.4	72
73	62 38.6	–23.5	26.7	63 31.9	–22.5	27.6	64 24.8	–21.5	28.6	65 17.3	–20.5	29.6	66 09.1	–19.3	30.8	67 00.4	–18.1	32.0	67 50.9	–16.7	33.3	68 40.7	–15.3	34.7	73
74	62 15.1	–25.2	24.7	63 09.4	–24.4	25.6	64 03.3	–23.4	26.5	64 56.8	–22.5	27.4	65 49.8	–21.4	28.4	66 42.3	–20.3	29.5	67 34.2	–19.0	30.7	68 25.4	–17.7	32.0	74
75	61 49.9	–26.8	22.8	62 45.0	–26.0	23.6	63 39.9	–25.2	24.4	64 34.3	–24.3	25.2	65 28.4	–23.4	26.2	66 22.0	–22.3	27.2	67 15.2	–21.3	28.2	68 07.7	–20.0	29.4	75
76	61 23.1	–28.6	20.9	62 19.0	–27.5	21.6	63 14.7	–26.9	22.3	64 10.0	–26.1	23.1	65 05.0	–25.2	24.0	65 59.7	–24.4	24.9	66 53.9	–23.4	25.8	67 47.7	–22.3	26.9	76
77	60 54.5	–29.8	19.1	61 51.5	–29.2	19.7	62 47.8	–28.4	20.4	63 43.9	–27.7	21.1	64 39.8	–27.0	21.8	65 35.3	–26.2	22.6	66 30.5	–25.3	23.5	67 25.4	–24.5	24.5	77
78	60 25.1	–31.0	17.3	61 22.3	–30.5	17.9	62 19.4	–30.0	18.5	63 16.2	–29.4	19.1	64 12.8	–28.8	19.8	65 09.1	–28.0	20.5	66 05.2	–27.3	21.3	67 00.9	–26.5	22.1	78
79	59 54.1	–32.4	15.6	60 51.8	–31.9	16.1	61 49.4	–31.5	16.6	62 46.8	–30.9	17.2	63 44.0	–30.3	17.8	64 41.1	–29.8	18.4	65 37.9	–29.1	19.1	66 34.4	–28.3	19.8	79
80	59 21.7	–33.6	13.9	60 19.9	–33.3	14.4	61 17.9	–32.8	14.8	62 15.9	–32.4	15.3	63 13.7	–31.9	15.8	64 11.3	–31.3	16.4	65 08.8	–30.8	17.0	66 06.1	–30.2	17.6	80
81	58 48.1	–34.8	12.3	59 46.6	–34.4	12.7	60 45.1	–34.1	13.1	61 43.5	–33.7	13.5	62 41.8	–33.3	14.0	63 40.0	–32.9	14.4	64 38.0	–32.4	15.0	65 35.9	–31.9	15.5	81
82	58 13.3	–35.9	10.8	59 12.2	–35.6	11.1	60 11.0	–35.3	11.4	61 09.8	–35.0	11.8	62 08.5	–34.6	12.2	63 07.1	–34.3	12.6	64 05.6	–33.9	13.0	65 04.0	–33.4	13.5	82
83	57 37.4	–36.9	9.3	58 36.6	–36.7	9.5	59 35.7	–36.4	9.8	60 34.8	–36.2	10.1	61 33.9	–35.9	10.4	62 32.8	–35.6	10.8	63 31.7	–35.2	11.1	64 30.6	–35.0	11.6	83
84	57 00.5	–38.0	7.8	57 59.9	–37.8	8.0	58 59.3	–37.6	8.2	59 58.6	–37.3	8.5	60 58.0	–37.1	8.7	61 57.2	–36.8	9.0	62 56.5	–36.6	9.4	63 55.6	–36.3	9.7	84
85	56 22.5	–38.8	6.4	57 22.2	–38.7	6.6	58 21.7	–38.5	6.7	59 21.3	–38.4	6.9	60 20.9	–38.2	7.2	61 20.4	–38.0	7.4	62 19.9	–37.9	7.6	63 19.3	–37.6	7.9	85
86	55 43.7	–39.7	5.0	56 43.5	–39.7	5.2	57 43.2	–39.5	5.3	58 42.9	–39.3	5.5	59 42.7	–39.3	5.6	60 42.4	–39.2	5.8	61 42.0	–38.9	6.0	62 41.7	–38.8	6.2	86
87	55 04.0	–40.6	3.7	56 03.8	–40.4	3.8	57 03.7	–40.4	3.9	58 03.6	–40.4	4.0	59 03.4	–40.2	4.1	60 03.2	–40.1	4.3	61 03.1	–40.1	4.4	62 02.9	–40.0	4.5	87
88	54 23.4	–41.3	2.4	55 23.4	–41.3	2.5	56 23.3	–41.3	2.6	57 23.2	–41.2	2.6	58 23.2	–41.2	2.7	59 23.1	–41.1	2.8	60 23.0	–41.0	2.9	61 22.9	–40.9	3.0	88
89	53 42.1	–42.1	1.2	54 42.1	–42.1	1.2	55 42.0	–42.0	1.3	56 42.0	–42.0	1.3	57 42.0	–42.0	1.3	58 42.0	–42.0	1.4	59 42.0	–42.0	1.4	60 42.0	–42.0	1.4	89
90	53 00.0	–42.8	0.0	54 00.0	–42.8	0.0	55 00.0	–42.8	0.0	56 00.0	–42.8	0.0	57 00.0	–42.8	0.0	58 00.0	–42.8	0.0	59 00.0	–42.9	0.0	60 00.0	–42.9	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	25 11.1	−53.0	128.6	24 33.5	−53.4	129.0	23 55.6	−53.8	129.3	23 17.5	−54.2	129.7	22 39.1	−54.6	130.0	22 00.4	−54.9	130.3	21 21.5	−55.3	130.6	20 42.3	−55.6	130.9	0
1	24 18.1	−53.1	129.1	23 40.1	−53.5	129.5	23 01.8	−53.9	129.8	22 23.3	−54.3	130.1	21 44.5	−54.6	130.4	21 05.5	−55.0	130.7	20 26.2	−55.3	131.0	19 46.7	−55.6	131.3	1
2	23 25.0	−53.2	129.6	22 46.6	−53.6	130.0	22 07.9	−54.0	130.3	21 29.0	−54.3	130.6	20 49.9	−54.7	130.9	20 10.5	−55.1	131.2	19 30.9	−55.4	131.4	18 51.1	−55.7	131.7	2
3	22 31.8	−53.3	130.1	21 53.0	−53.7	130.5	21 13.9	−54.0	130.8	20 34.7	−54.5	131.0	19 55.2	−54.8	131.3	19 15.4	−55.1	131.6	18 35.5	−55.4	131.8	17 55.4	−55.7	132.1	3
4	21 38.5	−53.4	130.6	20 59.3	−53.8	130.9	20 19.9	−54.1	131.2	19 40.2	−54.4	131.5	19 00.4	−54.8	131.7	18 20.3	−55.1	132.0	17 40.1	−55.5	132.2	16 59.7	−55.8	132.5	4
5	20 45.1	−53.5	131.1	20 05.5	−53.8	131.4	19 25.8	−54.2	131.7	18 45.8	−54.6	131.9	18 05.6	−54.9	132.2	17 25.2	−55.2	132.4	16 44.6	−55.5	132.6	16 03.9	−55.8	132.9	5
6	19 51.6	−53.5	131.6	19 11.7	−53.9	131.9	18 31.6	−54.3	132.1	17 51.2	−54.6	132.4	17 10.7	−54.9	132.6	16 30.0	−55.3	132.8	15 49.1	−55.5	133.0	15 08.1	−55.9	133.2	6
7	18 58.1	−53.6	132.1	18 17.8	−54.0	132.3	17 37.3	−54.3	132.6	16 56.6	−54.7	132.8	16 15.8	−55.0	133.0	15 34.7	−55.3	133.2	14 53.6	−55.6	133.4	14 12.2	−55.8	133.6	7
8	18 04.5	−53.7	132.6	17 23.8	−54.0	132.8	16 43.0	−54.4	133.0	16 01.9	−54.7	133.2	15 20.8	−55.1	133.4	14 39.4	−55.3	133.6	13 58.0	−55.7	133.8	13 16.4	−56.0	134.0	8
9	17 10.8	−53.8	133.0	16 29.8	−54.1	133.2	15 48.6	−54.5	133.5	15 07.2	−54.7	133.7	14 25.7	−55.0	133.9	13 44.1	−55.4	134.0	13 02.3	−55.6	134.2	12 20.4	−55.9	134.4	9
10	16 17.0	−53.8	133.5	15 35.7	−54.2	133.7	14 54.1	−54.4	133.9	14 12.5	−54.8	134.1	13 30.7	−55.1	134.3	12 48.7	−55.3	134.4	12 06.7	−55.7	134.6	11 24.5	−56.0	134.7	10
11	15 23.2	−53.8	134.0	14 41.5	−54.2	134.1	13 59.7	−54.6	134.3	13 17.7	−54.9	134.5	12 35.6	−55.2	134.7	11 53.3	−55.4	134.8	11 11.0	−55.8	135.0	10 28.5	−56.0	135.1	11
12	14 29.4	−53.9	134.4	13 47.3	−54.2	134.6	13 05.1	−54.5	134.8	12 22.8	−54.9	134.9	11 40.4	−55.2	135.1	10 57.9	−55.5	135.2	10 15.2	−55.7	135.3	9 32.5	−56.0	135.5	12
13	13 35.5	−54.0	134.9	12 53.1	−54.3	135.0	12 10.6	−54.5	135.2	11 27.9	−54.9	135.3	10 45.2	−55.2	135.5	10 02.4	−55.5	135.6	9 19.5	−55.8	135.7	8 36.5	−56.0	135.8	13
14	12 41.5	−54.0	135.3	11 58.8	−54.4	135.5	11 16.0	−54.7	135.6	10 33.0	−54.9	135.7	9 50.0	−55.2	135.9	9 06.9	−55.5	136.0	8 23.7	−55.8	136.1	7 40.5	−56.1	136.2	14
15	11 47.5	−54.1	135.8	11 04.4	−54.3	135.9	10 21.3	−54.7	136.0	9 38.1	−55.0	136.1	8 54.8	−55.3	136.3	8 11.4	−55.6	136.4	7 27.9	−55.8	136.5	6 44.4	−56.1	136.5	15
16	10 53.4	−54.1	136.2	10 10.1	−54.4	136.3	9 26.6	−54.7	136.4	8 43.1	−55.0	136.5	7 59.5	−55.3	136.7	7 15.8	−55.5	136.7	6 32.1	−55.8	136.8	5 48.3	−56.1	136.9	16
17	9 59.3	−54.1	136.6	9 15.7	−54.5	136.8	8 31.9	−54.7	136.9	7 48.1	−55.0	137.0	7 04.2	−55.3	137.0	6 20.3	−55.6	137.1	5 36.3	−55.9	137.2	4 52.2	−56.1	137.3	17
18	9 05.2	−54.2	137.1	8 21.2	−54.4	137.2	7 37.2	−54.8	137.3	6 53.1	−55.1	137.4	6 08.9	−55.3	137.4	5 24.7	−55.6	137.5	4 40.4	−55.8	137.6	3 56.1	−56.1	137.6	18
19	8 11.0	−54.1	137.5	7 26.8	−54.5	137.6	6 42.4	−54.8	137.7	5 58.0	−55.0	137.8	5 13.6	−55.4	137.8	4 29.1	−55.6	137.9	3 44.6	−55.9	137.9	3 00.0	−56.1	138.0	19
20	7 16.9	−54.3	137.9	6 32.3	−54.5	138.0	5 47.6	−54.8	138.1	5 03.0	−55.1	138.2	4 18.2	−55.3	138.2	3 33.5	−55.6	138.3	2 48.7	−55.9	138.3	2 03.9	−56.1	138.3	20
21	6 22.6	−54.2	138.4	5 37.8	−54.6	138.4	4 52.8	−54.8	138.5	4 07.9	−55.1	138.6	3 22.9	−55.4	138.6	2 37.9	−55.6	138.6	1 52.8	−55.8	138.7	1 07.8	−56.1	138.7	21
22	5 28.4	−54.2	138.8	4 43.2	−54.5	138.9	3 58.0	−54.8	138.9	3 12.8	−55.1	139.0	2 27.5	−55.3	139.0	1 42.3	−55.7	139.0	0 57.0	−55.9	139.0	0 11.7	−56.2	139.0	22
23	4 34.2	−54.3	139.2	3 48.7	−54.5	139.3	3 03.2	−54.8	139.3	2 17.7	−55.1	139.4	1 32.2	−55.4	139.4	0 46.6	−55.6	139.4	0 01.1	−55.9	139.4	0 44.5	+56.1	40.6	23
24	3 39.9	−54.3	139.7	2 54.2	−54.6	139.7	2 08.4	−54.9	139.7	1 22.6	−55.1	139.7	0 36.8	−55.4	139.8	0 09.0	+55.6	40.2	0 54.8	+55.9	40.2	1 40.6	+56.1	40.3	24
25	2 45.6	−54.3	140.1	1 59.6	−54.6	140.1	1 13.5	−54.8	140.1	0 27.5	−55.1	140.1	0 18.6	+55.3	39.9	1 04.6	+55.7	39.9	1 50.7	+55.8	39.9	2 36.7	+56.1	39.9	25
26	1 51.3	−54.3	140.5	1 05.0	−54.5	140.5	0 18.7	−54.8	140.5	0 27.6	+55.1	39.5	1 13.9	+55.4	39.5	2 00.3	+55.6	39.5	2 46.5	+55.9	39.5	3 32.8	+56.1	39.6	26
27	0 57.0	−54.3	140.9	0 10.5	−54.6	140.9	0 36.1	+54.9	39.1	1 22.7	+55.1	39.1	2 09.3	+55.4	39.1	2 55.9	+55.6	39.1	3 42.4	+55.9	39.2	4 28.9	+56.1	39.2	27
28	0 02.7	−54.2	141.4	0 44.1	+54.6	38.6	1 31.0	+54.8	38.6	2 17.8	+55.1	38.7	3 04.7	+55.3	38.7	3 51.5	+55.6	38.7	4 38.3	+55.8	38.8	5 25.0	+56.1	38.8	28
29	0 51.5	+54.3	38.2	1 38.7	+54.6	38.2	2 25.8	+54.9	38.2	3 12.9	+55.1	38.3	4 00.0	+55.4	38.3	4 47.1	+55.6	38.4	5 34.1	+55.8	38.4	6 21.1	+56.1	38.5	29
30	1 45.8	+54.3	37.8	2 33.3	+54.5	37.8	3 20.7	+54.8	37.8	4 08.0	+55.1	37.9	4 55.4	+55.3	37.9	5 42.7	+55.6	38.0	6 29.9	+55.9	38.0	7 17.2	+56.0	38.1	30
31	2 40.1	+54.3	37.4	3 27.8	+54.6	37.4	4 15.5	+54.8	37.5	5 03.1	+55.1	37.5	5 50.7	+55.3	37.5	6 38.3	+55.5	37.6	7 25.8	+55.8	37.7	8 13.2	+56.1	37.8	31
32	3 34.4	+54.3	36.9	4 22.4	+54.5	37.0	5 10.3	+54.8	37.0	5 58.2	+55.0	37.1	6 46.0	+55.3	37.1	7 33.8	+55.5	37.2	8 21.6	+55.7	37.3	9 09.3	+56.0	37.4	32
33	4 28.7	+54.2	36.5	5 16.9	+54.5	36.6	6 05.1	+54.7	36.6	6 53.2	+55.0	36.7	7 41.3	+55.3	36.8	8 29.3	+55.6	36.8	9 17.3	+55.8	36.9	10 05.3	+56.0	37.0	33
34	5 22.9	+54.3	36.1	6 11.4	+54.5	36.2	6 59.8	+54.8	36.2	7 48.2	+55.0	36.3	8 36.6	+55.2	36.4	9 24.9	+55.5	36.5	10 13.1	+55.7	36.6	11 01.3	+55.9	36.7	34
35	6 17.2	+54.2	35.6	7 05.9	+54.5	35.7	7 54.6	+54.7	35.8	8 43.2	+55.0	35.9	9 31.8	+55.2	36.0	10 20.4	+55.4	36.1	11 08.8	+55.7	36.2	11 57.2	+55.9	36.3	35
36	7 11.4	+54.2	35.2	8 00.4	+54.4	35.3	8 49.3	+54.7	35.4	9 38.2	+55.0	35.5	10 27.0	+55.2	35.6	11 15.8	+55.5	35.7	12 04.5	+55.7	35.8	12 53.1	+55.9	35.9	36
37	8 05.6	+54.1	34.8	8 54.8	+54.4	34.9	9 44.0	+54.7	35.0	10 33.2	+54.9	35.1	11 22.2	+55.2	35.2	12 11.3	+55.3	35.3	13 00.2	+55.6	35.4	13 49.0	+55.9	35.6	37
38	8 59.7	+54.1	34.3	9 49.2	+54.4	34.4	10 38.7	+54.6	34.5	11 28.1	+54.9	34.6	12 17.4	+55.1	34.8	13 06.6	+55.4	34.9	13 55.8	+55.6	35.0	14 44.9	+55.8	35.2	38
39	9 53.8	+54.1	33.9	10 43.6	+54.4	34.0	11 33.3	+54.6	34.1	12 23.0	+54.8	34.2	13 12.5	+55.1	34.4	14 02.0	+55.3	34.5	14 51.4	+55.6	34.6	15 40.7	+55.8	34.8	39
40	10 47.9	+54.1	33.5	11 38.0	+54.3	33.6	12 27.9	+54.6	33.7	13 17.8	+54.8	33.8	14 07.6	+55.1	34.0	14 57.3	+55.3	34.1	15 47.0	+55.5	34.3	16 36.5	+55.8	34.4	40
41	11 42.0	+54.0	33.0	12 32.3	+54.2	33.1	13 22.5	+54.5	33.3	14 12.6	+54.8	33.4	15 02.7	+55.0	33.5	15 52.6	+55.3	33.9	16 42.5	+55.5	33.9	17 32.3	+55.7	34.0	41
42	12 36.0	+54.0	32.6	13 26.5	+54.3	32.7	14 17.0	+54.5	32.8	15 07.4	+54.7	33.0	15 57.7	+54.9	33.1	16 47.9	+55.1	33.3	17 38.0	+55.4	33.5	18 28.0	+55.6	33.6	42
43	13 30.0	+53.9	32.1	14 20.8	+54.1	32.3	15 11.5	+54.4	32.4	16 02.1	+54.6	32.6	16 52.6	+54.9	32.7	17 43.0	+55.2	32.9	18 33.4	+55.4	33.1	19 23.6	+55.6	33.2	43
44	14 23.9	+53.9	31.7	15 14.9	+54.2	31.8	16 05.9	+54.3	32.0	16 56.7	+54.6	32.1	17 47.5	+54.9	32.3	18 38.2	+55.1	32.5	19 28.8	+55.3	32.7	20 19.2	+55.6	32.8	44
45	15 17.8	+53.8	31.2	16 09.1	+54.0	31.4	17 00.2	+54.4	31.5	17 51.3	+54.6	31.7	18 42.4	+54.7	31.9	19 33.3	+55.0	32.0	20 24.1	+55.2	32.2	21 14.8	+55.4	32.4	45
46	16 11.6	+53.8	30.8	17 03.1	+54.0	30.9	17 54.6	+54.2	31.1	18 45.9	+54.5	31.2	19 37.1	+54.8	31.4	20 28.3	+54.9	31.6	21 19.3	+55.2	31.8	22 10.2	+55.5	32.0	46
47	17 05.4	+53.7	30.3	17 57.1	+54.0	30.5	18 48.8	+54.2	30.6	19 40.4	+54.4	30.8	20 31.9	+54.6	31.0	21 23.2	+54.9	31.2	22 14.5	+55.1	31.4	23 05.7	+55.3	31.6	47
48	17 59.1	+53.6	29.8	18 51.1	+53.8	30.0	19 43.0	+54.1	30.2	20 34.8	+54.4	30.4	21 26.5	+54.6	30.6	22 18.1	+54.9	30.8	23 09.6	+55.1	31.0	24 01.0	+55.3	31.2	48
49	18 52.7	+53.5	29.4	19 44.9	+53.8	29.5	20 37.1	+54.0	29.7	21 29.1	+54.3	29.9	22 21.1	+54.5	30.1	23 13.0	+54.7	30.3	24 04.7	+55.0	30.5	24 56.3	+55.2	30.8	49
50	19 46.2	+53.5	28.9	20 38.7	+53.7	29.1	21 31.1	+54.0	29.2	22 23.4	+54.2	29.4	23 15.6	+54.5	29.7	24 07.7	+54.7	29.9	24 59.7	+54.9	30.1	25 51.5	+55.2	30.3	50
51	20 39.7	+53.4	28.4	21 32.4	+53.7	28.6	22 25.1	+53.9	28.8	23 17.6	+54.1	29.0	24 10.1	+54.3	29.2	25 02.4	+54.6	29.4	25 54.6	+54.8	29.7	26 46.7	+55.0	29.9	51
52	21 33.1	+53.3	27.9	22 26.1	+53.5	28.1	23 19.0	+53.7	28.3	24 11.7	+54.1	28.5	25 04.4	+54.3	28.7	25 57.0	+54.5	29.0	26 49.4	+54.7	29.2	27 41.7	+55.0	29.5	52
53	22 26.4	+53.2	27.4	23 19.6	+53.5	27.6	24 12.7	+53.7	27.8	25 05.8	+53.9	28.0	25 58.7	+54.1	28.3	26 51.5	+54.4	28.5	27 44.1	+54.7	28.7	28 36.7	+54.8	29.0	53
54	23 19.6	+53.1	26.9	24 13.1	+53.3	27.1	25 06.4	+53.6	27.3	25 59.7	+53.8	27.5	26 52.8	+54.1	27.8	27 45.9	+54.3	28.0	28 38.8	+54.5	28.3	29 31.5	+54.8	28.5	54
55	24 12.7	+53.1	26.4	25 06.4	+53.3	26.6	26 00.0	+53.5	26.8	26 53.5	+53.7	27.0	27 46.9	+54.0	27.3	28 40.2	+54.2	27.5	29 33.3	+54.4	27.8	30 26.3	+54.7	28.1	55
56	25 05.8	+52.9	25.9	25 59.7	+53.1	26.1	26 53.5	+53.4	26.3	27 47.2	+53.7	26.5	28 40.9	+53.8	26.8	29 34.4	+54.1	27.0	30 27.7	+54.4	27.3	31 21.0	+54.6	27.6	56
57	25 58.7	+52.8	25.4	26 52.8	+53.1	25.6	27 46.9	+53.3	25.8	28 40.9	+53.5	26.0	29 34.7	+53.8	26.3	30 28.5	+53.9	26.5	31 22.1	+54.2	26.8	32 15.6	+54.4	27.1	57
58	26 51.5	+52.6	24.8	27 45.9	+52.9	25.1	28 40.2	+53.1	25.3	29 34.4	+53.3	25.5	30 28.5	+53.6	25.8	31 22.4	+53.9	26.0	32 16.3	+54.1	26.3	33 10.0	+54.3	26.6	58
59	27 44.1	+52.6	24.3	28 38.8	+52.7	24.5	29 33.3	+53.0	24.8	30 27.7	+53.3	25.0	31 22.1	+53.5	25.2	32 16.3	+53.7	25.5	33 10.4	+53.9	25.8	34 04.3	+54.2	26.1	59
60	28 36.7	+52.4	23.7	29 31.5	+52.7	24.0	30 26.3	+52.9	24.2	31 21.0	+53.1	24.5	32 15.6	+53.4	24.7	33 10.0	+53.6	25.0	34 04.3	+53.8	25.3	34 58.5	+54.1	25.6	60
61	29 29.1	+52.3	23.2	30 24.2	+52.5	23.4	31 19.2	+52.7	23.7	32 14.1	+53.0	23.9	33 08.9	+53.2	24.2	34 03.6	+53.4	24.4	34 58.1	+53.7	24.7	35 52.6	+53.9	25.0	61
62	30 21.4	+52.1	22.7	31 16.7	+52.3	22.9	32 11.9	+52.6	23.1	33 07.1	+52.8	23.4	34 02.1	+53.1	23.6	34 57.0	+53.3	23.9	35 51.8	+53.5	24.2	36 46.5	+53.8	24.5	62
63	31 13.5	+51.9	22.0	32 09.0	+52.2	22.3	33 04.5	+52.4	22.5	33 59.9	+52.6	22.8	34 55.2	+52.8	23.0	35 50.3	+53.1	23.3	36 45.3	+53.4	23.6	37 40.3	+53.6	23.9	63
64	32 05.4	+51.8	21.5	33 01.2	+52.1	21.7	33 56.9	+52.3	21.9	34 52.5	+52.5	22.2	35 48.0	+52.8	22.5	36 43.4	+53.0	22.8	37 38.7	+53.2	23.0	38 33.9	+53.4	23.4	64
65	32 57.2	+51.7	20.9	33 53.3	+51.8	21.1	34 49.2	+52.1	21.3	35 45.0	+52.3	21.6	36 40.8	+52.5	21.9	37 36.4	+52.8	22.2	38 31.9	+53.0	22.5	39 27.3	+53.2	22.8	65
66	33 48.9	+51.4	20.3	34 45.1	+51.7	20.5	35 41.3	+51.9	20.7	36 37.3	+52.1	21.0	37 33.3	+52.3	21.3	38 29.2	+52.5	21.6	39 24.9	+52.8	21.9	40 20.5	+53.1	22.2	66
67	34 40.3	+51.2	19.6	35 36.8	+51.4	19.9	36 33.2	+51.6	20.1	37 29.4	+52.0	20.4	38 25.6	+52.2	20.7	39 21.7	+52.4	20.9	40 17.7	+52.6	21.2	41 13.6	+52.8	21.6	67
68	35 31.5	+51.1	19.0	36 28.2	+51.3	19.2	37 24.8	+51.5	19.5	38 21.4	+51.7	19.7	39 17.8	+51.9	20.0	40 14.1	+52.2	20.3	41 10.3	+52.4	20.6	42 06.4	+52.7	20.9	68
69	36 22.6	+50.8	18.3	37 19.5	+51.0	18.6	38 16.3	+51.3	18.8	39 13.1	+51.5	19.1	40 09.7	+51.7	19.4	41 06.3	+51.9	19.7	42 02.7	+52.2	20.0	42 59.1	+52.4	20.3	69
70	37 13.4	+50.6	17.7	38 10.5	+50.9	17.9	39 07.6	+51.0	18.2	40 04.6	+51.2	18.4	41 01.4	+51.5	18.7	41 58.2	+51.7	19.0	42 54.9	+51.9	19.3	43 51.5	+52.2	19.6	70
71	38 04.0	+50.4	17.0	39 01.4	+50.5	17.2	39 58.6	+50.8	17.5	40 55.8	+51.0	17.7	41 52.9	+51.2	18.0	42 49.9	+51.5	18.3	43 46.8	+51.7	18.6	44 43.7	+51.9	18.9	71
72	38 54.4	+50.1	16.3	39 51.9	+50.3	16.5	40 49.4	+50.5	16.8	41 46.8	+50.7	17.0	42 44.1	+51.0	17.3	43 41.4	+51.1	17.6	44 38.5	+51.4	17.9	45 35.6	+51.6	18.2	72
73	39 44.5	+49.8	15.6	40 42.2	+50.1	15.8	41 39.9	+50.3	16.1	42 37.5	+50.5	16.3	43 35.1	+50.7	16.6	44 32.5	+51.0	16.9	45 29.9	+51.1	17.2	46 27.2	+51.4	17.5	73
74	40 34.3	+49.6	14.9	41 32.3	+49.7	15.1	42 30.2	+49.9	15.3	43 28.0	+50.2	15.6	44 25.8	+50.3	15.8	45 23.4	+50.6	16.1	46 21.0	+50.9	16.4	47 18.6	+51.0	16.7	74
75	41 23.9	+49.2	14.1	42 22.0	+49.5	14.3	43 20.1	+49.7	14.6	44 18.2	+49.8	14.8	45 16.1	+50.1	15.1	46 14.0	+50.3	15.3	47 11.9	+50.4	15.6	48 09.6	+50.7	15.9	75
76	42 13.1	+49.0	13.4	43 11.5	+49.1	13.6	44 09.8	+49.3	13.8	45 08.0	+49.5	14.0	46 06.2	+49.7	14.3	47 04.3	+49.9	14.5	48 02.3	+50.2	14.8	49 00.3	+50.4	15.1	76
77	43 02.1	+48.6	12.6	44 00.6	+48.8	12.8	44 59.1	+49.0	13.0	45 57.5	+49.2	13.2	46 55.9	+49.4	13.5	47 54.2	+49.6	13.7	48 52.5	+49.8	14.0	49 50.7	+50.0	14.3	77
78	43 50.7	+48.3	11.8	44 49.4	+48.4	12.0	45 48.1	+48.6	12.2	46 46.7	+48.8	12.4	47 45.3	+49.0	12.6	48 43.8	+49.2	12.9	49 42.3	+49.3	13.1	50 40.7	+49.5	13.4	78
79	44 39.0	+47.8	10.9	45 37.8	+48.1	11.1	46 36.7	+48.2	11.3	47 35.5	+48.4	11.5	48 34.3	+48.6	11.8	49 33.0	+48.8	12.0	50 31.6	+49.0	12.3	51 30.2	+49.2	12.5	79
80	45 26.8	+47.5	10.1	46 25.9	+47.7	10.3	47 24.9	+47.8	10.5	48 23.9	+48.0	10.7	49 22.9	+48.1	10.9	50 21.8	+48.3	11.1	51 20.6	+48.5	11.3	52 19.4	+48.7	11.6	80
81	46 14.3	+47.1	9.2	47 13.6	+47.2	9.4	48 12.7	+47.4	9.6	49 11.9	+47.5	9.7	50 11.0	+47.7	9.9	51 10.1	+47.9	10.2	52 09.1	+48.1	10.4	53 08.1	+48.2	10.6	81
82	47 01.4	+46.7	8.3	48 00.8	+46.8	8.5	49 00.1	+47.0	8.6	49 59.4	+47.1	8.8	50 58.7	+47.2	9.0	51 58.0	+47.3	9.2	52 57.2	+47.5	9.4	53 56.3	+47.8	9.6	82
83	47 48.1	+46.2	7.4	48 47.6	+46.3	7.5	49 47.1	+46.4	7.7	50 46.5	+46.6	7.8	51 45.9	+46.7	8.0	52 45.3	+46.9	8.2	53 44.7	+47.0	8.4	54 44.1	+47.1	8.6	83
84	48 34.3	+45.7	6.4	49 33.9	+45.8	6.5	50 33.5	+45.9	6.7	51 33.1	+46.0	6.8	52 32.6	+46.2	7.0	53 32.2	+46.3	7.1	54 31.7	+46.4	7.3	55 31.2	+46.6	7.5	84
85	49 20.0	+45.1	5.4	50 19.7	+45.3	5.5	51 19.4	+45.4	5.7	52 19.1	+45.5	5.8	53 18.8	+45.6	5.9	54 18.5	+45.7	6.1	55 18.1	+45.8	6.2	56 17.8	+45.9	6.4	85
86	50 05.1	+44.7	4.4	51 05.0	+44.7	4.5	52 04.8	+44.8	4.6	53 04.6	+44.8	4.7	54 04.4	+44.9	4.8	55 04.2	+45.0	4.9	56 03.9	+45.2	5.1	57 03.7	+45.2	5.2	86
87	50 49.8	+44.0	3.4	51 49.7	+44.1	3.4	52 49.6	+44.1	3.5	53 49.4	+44.2	3.6	54 49.3	+44.3	3.7	55 49.2	+44.3	3.8	56 49.1	+44.4	3.9	57 48.9	+44.5	4.0	87
88	51 33.8	+43.4	2.3	52 33.8	+43.4	2.3	53 33.7	+43.5	2.4	54 33.7	+43.5	2.4	55 33.6	+43.6	2.5	56 33.5	+43.7	2.6	57 33.5	+43.6	2.6	58 33.4	+43.7	2.7	88
89	52 17.2	+42.8	1.2	53 17.2	+42.8	1.2	54 17.2	+42.8	1.2	55 17.2	+42.8	1.2	56 17.2	+42.8	1.3	57 17.2	+42.8	1.3	58 17.1	+42.9	1.3	59 17.1	+42.9	1.4	89
90	53 00.0	+42.1	0.0	54 00.0	+42.1	0.0	55 00.0	+42.0	0.0	56 00.0	+42.0	0.0	57 00.0	+42.0	0.0	58 00.0	+42.0	0.0	59 00.0	+42.0	0.0	60 00.0	+42.0	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 135°, 225°**

275

46°, 314° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	24 42.7	+52.7	127.6	24 05.9	+53.1	128.0	23 28.8	+53.6	128.3	22 51.5	+53.9	128.7	22 13.8	+54.4	129.0	21 36.0	+54.6	129.3	20 57.8	+55.1	129.6	20 19.4	+55.4	129.9	0
1	25 35.4	+52.6	127.1	24 59.0	+53.1	127.5	24 22.4	+53.4	127.9	23 45.4	+53.9	128.2	23 08.2	+54.2	128.5	22 30.6	+54.7	128.9	21 52.9	+54.9	129.2	21 14.8	+55.3	129.5	1
2	26 28.0	+52.4	126.6	25 52.1	+52.9	127.0	25 15.8	+53.4	127.4	24 39.3	+53.7	127.7	24 02.4	+54.2	128.1	23 25.3	+54.5	128.4	22 47.8	+54.9	128.8	22 10.1	+55.3	129.1	2
3	27 20.4	+52.4	126.0	26 45.0	+52.8	126.4	26 09.2	+53.2	126.8	25 33.0	+53.7	127.2	24 56.6	+54.0	127.6	24 19.8	+54.5	128.0	23 42.7	+54.9	128.3	23 05.4	+55.2	128.7	3
4	28 12.8	+52.2	125.5	27 37.8	+52.6	125.9	27 02.4	+53.1	126.3	26 26.7	+53.5	126.7	25 50.6	+54.0	127.1	25 14.3	+54.3	127.5	24 37.6	+54.7	127.9	24 00.6	+55.1	128.2	4
5	29 05.0	+52.0	124.9	28 30.4	+52.6	125.4	27 55.5	+53.0	125.8	27 20.2	+53.5	126.2	26 44.6	+53.9	126.6	26 08.6	+54.3	127.0	25 32.3	+54.7	127.4	24 55.7	+55.0	127.8	5
6	29 57.0	+51.9	124.3	29 23.0	+52.3	124.8	28 48.5	+52.9	125.3	28 13.7	+53.3	125.7	27 38.5	+53.7	126.1	27 02.9	+54.2	126.6	26 27.0	+54.6	127.0	25 50.7	+55.0	127.4	6
7	30 48.9	+51.7	123.8	30 15.3	+52.3	124.3	29 41.4	+52.7	124.7	29 07.0	+53.2	125.2	28 32.2	+53.7	125.6	27 57.1	+54.0	126.1	27 21.6	+54.4	126.5	26 45.7	+54.9	126.9	7
8	31 40.6	+51.6	123.2	31 07.6	+52.1	123.7	30 34.1	+52.6	124.2	30 00.2	+53.1	124.7	29 25.9	+53.5	125.1	28 51.1	+54.0	125.6	28 16.0	+54.4	126.0	27 40.6	+54.8	126.5	8
9	32 32.2	+51.4	122.6	31 59.7	+51.9	123.1	31 26.7	+52.4	123.6	30 53.3	+52.9	124.1	30 19.4	+53.4	124.6	29 45.1	+53.9	125.1	29 10.4	+54.3	125.5	28 35.4	+54.7	126.0	9
10	33 23.6	+51.2	122.0	32 51.6	+51.8	122.5	32 19.1	+52.3	123.0	31 46.2	+52.8	123.6	31 12.8	+53.3	124.1	30 39.0	+53.7	124.6	30 04.7	+54.2	125.1	29 30.1	+54.5	125.5	10
11	34 14.8	+51.0	121.3	33 43.4	+51.5	121.9	33 11.4	+52.1	122.5	32 39.0	+52.6	123.0	32 06.1	+53.1	123.5	31 32.7	+53.6	124.0	30 58.9	+54.0	124.6	30 24.6	+54.5	125.0	11
12	35 05.8	+50.8	120.7	34 34.9	+51.4	121.3	34 03.5	+52.0	121.9	33 31.6	+52.5	122.4	32 59.2	+53.0	123.0	32 26.3	+53.4	123.5	31 52.9	+53.9	124.0	31 19.1	+54.4	124.6	12
13	35 56.6	+50.6	120.0	35 26.3	+51.2	120.7	34 55.5	+51.7	121.3	34 24.1	+52.3	121.8	33 52.2	+52.8	122.4	33 19.7	+53.3	123.0	32 46.8	+53.8	123.5	32 13.5	+54.2	124.1	13
14	36 47.2	+50.4	119.4	36 17.5	+51.0	120.0	35 47.2	+51.6	120.6	35 16.4	+52.1	121.2	34 45.0	+52.6	121.8	34 13.1	+53.1	122.4	33 40.6	+53.7	123.0	33 07.7	+54.1	123.5	14
15	37 37.6	+50.1	118.7	37 08.5	+50.7	119.3	36 38.8	+51.3	120.0	36 08.5	+51.9	120.6	35 37.6	+52.5	121.3	35 06.2	+53.0	121.9	34 34.3	+53.5	122.5	34 01.8	+54.0	123.0	15
16	38 27.7	+49.9	118.0	37 59.2	+50.6	118.7	37 30.1	+51.2	119.4	37 00.4	+51.8	120.0	36 30.1	+52.3	120.7	35 59.2	+52.9	121.3	35 27.8	+53.4	121.9	34 55.8	+53.9	122.5	16
17	39 17.6	+49.6	117.3	38 49.8	+50.2	118.0	38 21.3	+50.9	118.7	37 52.2	+51.5	119.4	37 22.4	+52.1	120.0	36 52.1	+52.6	120.7	36 21.2	+53.2	121.3	35 49.7	+53.7	122.0	17
18	40 07.2	+49.3	116.5	39 40.0	+50.0	117.3	39 12.2	+50.6	118.0	38 43.7	+51.3	118.7	38 14.5	+51.9	119.4	37 44.7	+52.5	120.1	37 14.4	+53.0	120.8	36 43.4	+53.5	121.4	18
19	40 56.5	+49.0	115.8	40 30.0	+49.8	116.6	40 02.8	+50.5	117.3	39 35.0	+51.0	118.1	39 06.4	+51.7	118.8	38 37.2	+52.3	119.5	38 07.4	+52.8	120.2	37 36.9	+53.4	120.8	19
20	41 45.5	+48.7	115.0	41 19.8	+49.4	115.8	40 53.3	+50.1	116.6	40 26.0	+50.8	117.4	39 58.1	+51.4	118.1	39 29.5	+52.0	118.8	39 00.2	+52.7	119.6	38 30.3	+53.2	120.3	20
21	42 34.2	+48.4	114.2	42 09.2	+49.1	115.1	41 43.4	+49.8	115.9	41 16.8	+50.6	116.7	40 49.5	+51.3	117.4	40 21.5	+51.9	118.2	39 52.9	+52.4	118.9	39 23.5	+53.0	119.7	21
22	43 22.6	+48.0	113.4	42 58.3	+48.8	114.3	42 33.2	+49.6	115.1	42 07.4	+50.3	115.9	41 40.8	+50.9	116.7	41 13.4	+51.6	117.5	40 45.3	+52.2	118.3	40 16.5	+52.8	119.1	22
23	44 10.6	+47.7	112.6	43 47.1	+48.5	113.5	43 22.8	+49.2	114.4	42 57.7	+49.9	115.2	42 31.7	+50.7	116.0	42 05.0	+51.3	116.9	41 37.5	+52.0	117.6	41 09.3	+52.6	118.4	23
24	44 58.3	+47.2	111.7	44 35.6	+48.1	112.7	44 12.0	+48.9	113.6	43 47.6	+49.7	114.4	43 22.4	+50.4	115.3	42 56.3	+51.1	116.1	42 29.5	+51.8	117.0	42 01.9	+52.4	117.8	24
25	45 45.5	+46.9	110.9	45 23.7	+47.7	111.8	45 00.9	+48.6	112.7	44 37.3	+49.3	113.7	44 12.8	+50.1	114.6	43 47.4	+50.8	115.4	43 21.3	+51.5	116.3	42 54.3	+52.2	117.1	25
26	46 32.4	+46.4	110.0	46 11.4	+47.3	110.9	45 49.5	+48.1	111.9	45 26.6	+49.0	112.9	45 02.9	+49.7	113.8	44 38.2	+50.6	114.7	44 12.8	+51.2	115.6	43 46.5	+51.9	116.4	26
27	47 18.8	+45.9	109.0	46 58.7	+46.9	110.0	46 37.6	+47.8	111.0	46 15.6	+48.6	112.0	45 52.6	+49.5	113.0	45 28.8	+50.2	113.9	45 04.0	+50.9	114.8	44 38.4	+51.6	115.7	27
28	48 04.7	+45.4	108.1	47 45.6	+46.4	109.1	47 25.4	+47.3	110.2	47 04.2	+48.2	111.2	46 42.1	+49.0	112.2	46 19.0	+49.8	113.1	45 54.9	+50.6	114.1	45 30.0	+51.3	115.0	28
29	48 50.1	+45.0	107.1	48 32.0	+45.9	108.2	48 12.7	+46.9	109.2	47 52.4	+47.8	110.3	47 31.1	+48.7	111.3	47 08.8	+49.5	112.3	46 45.5	+50.4	113.3	46 21.3	+51.1	114.3	29
30	49 35.1	+44.4	106.1	49 17.9	+45.4	107.2	48 59.6	+46.4	108.3	48 40.2	+47.4	109.4	48 19.8	+48.3	110.4	47 58.3	+49.2	111.5	47 35.9	+49.9	112.5	47 12.4	+50.7	113.5	30
31	50 19.5	+43.8	105.0	50 03.3	+44.9	106.2	49 46.0	+45.9	107.3	49 27.6	+46.9	108.4	49 08.1	+47.8	109.5	48 47.5	+48.7	110.6	48 25.8	+49.6	111.7	48 03.1	+50.4	112.7	31
32	51 03.3	+43.2	104.0	50 48.2	+44.3	105.1	50 31.9	+45.4	106.3	50 14.5	+46.4	107.5	49 55.9	+47.4	108.6	49 36.2	+48.3	109.7	49 15.4	+49.2	110.8	48 53.5	+50.1	111.9	32
33	51 46.5	+42.5	102.8	51 32.5	+43.7	104.1	51 17.3	+44.8	105.3	51 00.9	+45.8	106.5	50 43.3	+46.8	107.7	50 24.5	+47.9	108.8	50 04.6	+48.8	109.9	49 43.6	+49.6	111.1	33
34	52 29.0	+41.8	101.7	52 16.2	+43.0	103.0	52 02.1	+44.2	104.2	51 46.7	+45.3	105.4	51 30.1	+46.4	106.7	51 12.4	+47.3	107.9	50 53.4	+48.3	109.0	50 33.2	+49.3	110.2	34
35	53 10.8	+41.2	100.5	52 59.2	+42.4	101.8	52 46.3	+43.5	103.1	52 32.0	+44.7	104.4	52 16.5	+45.8	105.6	51 59.7	+46.9	106.9	51 41.7	+47.9	108.1	51 22.5	+48.8	109.3	35
36	53 52.0	+40.3	99.3	53 41.6	+41.6	100.6	53 29.8	+42.9	102.0	53 16.7	+44.1	103.3	53 02.3	+45.2	104.6	52 46.6	+46.3	105.8	52 29.6	+47.3	107.1	52 11.3	+48.4	108.3	36
37	54 32.3	+39.5	98.0	54 22.7	+40.8	99.4	54 12.7	+42.2	100.8	54 00.8	+43.4	102.1	53 47.5	+44.6	103.5	53 32.9	+45.7	104.8	53 16.9	+46.8	106.1	52 59.7	+47.8	107.4	37
38	55 11.8	+38.7	96.7	55 04.1	+40.0	98.1	54 54.9	+41.4	99.5	54 44.2	+42.7	100.9	54 32.1	+43.9	102.3	54 18.6	+45.1	103.7	54 03.7	+46.3	105.0	53 47.5	+47.3	106.3	38
39	55 50.5	+37.7	95.4	55 44.1	+39.2	96.8	55 36.3	+40.5	98.3	55 26.9	+41.9	99.7	55 16.0	+43.2	101.1	55 03.7	+44.5	102.5	54 50.0	+45.6	103.9	54 34.8	+46.8	105.3	39
40	56 28.2	+36.8	94.0	56 23.3	+38.3	95.5	56 16.8	+39.7	97.0	56 08.8	+41.1	98.4	55 59.2	+42.5	99.9	55 48.2	+43.7	101.4	55 35.6	+45.0	102.8	55 21.6	+46.2	104.2	40
41	57 05.0	+35.8	92.5	57 01.6	+37.2	94.1	56 56.5	+38.8	95.6	56 49.9	+40.2	97.1	56 41.7	+41.6	98.6	56 31.9	+43.0	100.1	56 20.6	+44.2	101.6	56 07.8	+45.5	103.1	41
42	57 40.8	+34.6	91.0	57 38.8	+36.3	92.6	57 35.3	+37.8	94.2	57 30.1	+39.3	95.7	57 23.3	+40.7	97.3	57 14.9	+42.1	98.8	57 04.8	+43.5	100.4	56 53.3	+44.8	101.9	42
43	58 15.4	+33.5	89.5	58 15.1	+35.2	91.1	58 13.1	+36.8	92.7	58 09.4	+38.3	94.3	58 04.0	+39.9	95.9	57 57.0	+41.3	97.5	57 48.3	+42.8	99.1	57 38.1	+44.0	100.7	43
44	58 48.9	+32.3	87.9	58 50.3	+34.0	89.6	58 49.9	+35.6	91.2	58 47.7	+37.3	92.9	58 43.9	+38.8	94.5	58 38.3	+40.4	96.1	58 31.1	+41.8	97.8	58 22.1	+43.3	99.4	44
45	59 21.2	+31.1	86.3	59 24.3	+32.7	87.9	59 25.5	+34.5	89.6	59 25.0	+36.2	91.3	59 22.7	+37.8	93.0	59 18.7	+39.4	94.7	59 12.9	+40.9	96.4	59 05.4	+42.4	98.0	45
46	59 52.3	+29.6	84.6	59 57.0	+31.5	86.3	60 00.0	+33.3	88.0	60 01.2	+35.0	89.7	60 00.5	+36.7	91.5	59 58.1	+38.3	93.2	59 53.8	+40.0	94.9	59 47.8	+41.5	96.6	46
47	60 21.9	+28.3	82.8	60 28.5	+30.2	84.6	60 33.3	+31.9	86.3	60 36.2	+33.7	88.1	60 37.2	+35.5	89.9	60 36.4	+37.3	91.7	60 33.8	+38.9	93.4	60 29.3	+40.4	95.2	47
48	60 50.2	+26.8	81.0	60 58.7	+28.6	82.8	61 05.2	+30.6	84.6	61 09.9	+32.5	86.4	61 12.7	+34.3	88.2	61 13.7	+36.0	90.0	61 12.7	+37.7	91.9	61 09.7	+39.5	93.7	48
49	61 17.0	+25.2	79.2	61 27.3	+27.2	81.0	61 35.8	+29.1	82.8	61 42.4	+31.0	84.6	61 47.0	+32.9	86.5	61 49.7	+34.7	88.4	61 50.4	+36.6	90.2	61 49.2	+38.3	92.1	49
50	61 42.2	+23.7	77.3	61 54.5	+25.6	79.1	62 04.9	+27.6	81.0	62 13.4	+29.5	82.8	62 19.9	+31.5	84.7	62 24.4	+33.4	86.6	62 27.0	+35.2	88.5	62 27.5	+37.1	90.5	50
51	62 05.9	+21.9	75.3	62 20.1	+24.0	77.2	62 32.5	+26.0	79.0	62 42.9	+28.0	80.9	62 51.4	+30.0	82.9	62 57.8	+32.0	84.8	63 02.2	+33.9	86.8	63 04.6	+35.8	88.7	51
52	62 27.8	+20.2	73.3	62 44.1	+22.2	75.2	62 58.5	+24.2	77.1	63 10.9	+26.3	79.0	63 21.4	+28.3	81.0	63 29.8	+30.4	82.9	63 36.1	+32.4	84.9	63 40.4	+34.3	86.9	52
53	62 48.0	+18.3	71.3	63 06.3	+20.4	73.2	63 22.7	+22.5	75.0	63 37.2	+24.6	77.0	63 49.7	+26.7	79.0	64 00.2	+28.8	81.0	64 08.5	+30.9	83.0	64 14.7	+33.0	85.1	53
54	63 06.3	+16.4	69.2	63 26.7	+18.6	71.0	63 45.3	+20.6	73.0	64 01.8	+22.8	74.9	64 16.4	+25.0	76.9	64 29.0	+27.0	79.0	64 39.4	+29.2	81.0	64 47.7	+31.3	83.1	54
55	63 22.7	+14.5	67.0	63 45.3	+16.5•	68.9	64 05.9	+18.7	70.8	64 24.6	+20.9	72.8	64 41.4	+23.0	74.8	64 56.0	+25.3	76.9	65 08.6	+27.4	79.0	65 19.0	+29.6	81.1	55
56	63 37.2	+12.5•	64.9	64 01.8	+14.6	66.7	64 24.6	+16.9•	68.6	64 45.5	+18.9•	70.6	65 04.4	+21.2	72.6	65 21.3	+23.4•	74.7	65 36.0	+25.6	76.8	65 48.6	+27.8	79.0	56
57	63 49.7	+10.5•	62.7	64 16.4	+12.6•	64.5	64 41.4	+14.6•	66.4	65 04.4	+16.9•	68.4	65 25.6	+19.1•	70.4	65 44.7	+21.3•	72.5	66 01.6	+23.7•	74.6	66 16.4	+26.0	76.8	57
58	64 00.2	+8.3•	60.4	64 29.0	+10.4•	62.2	64 56.0	+12.6•	64.1	65 21.3	+14.7•	66.1	65 44.7	+16.9•	68.1	66 06.0	+19.3•	70.2	66 25.3	+21.6•	72.4	66 42.4	+23.9•	74.6	58
59	64 08.5	+6.2•	58.2	64 39.4	+8.4•	59.9	65 08.6	+10.6•	61.8	65 36.0	+12.6•	63.7	66 01.6	+14.8•	65.8	66 25.3	+17.1•	67.8	66 45.6	+19.4•	70.0	67 06.3	+21.8•	72.2	59
60	64 14.7	+4.1•	55.9	64 47.7	+6.0•	57.6	65 19.0	+8.1•	59.5	65 48.6	+10.3•	61.4	66 16.4	+12.6•	63.4	66 42.4	+14.8•	65.4	67 06.3	+17.1•	67.6	67 28.1	+19.5•	69.8	60
61	64 18.8	+1.9•	53.6	64 53.7	+3.9•	55.3	65 27.1	+5.9•	57.1	65 58.9	+8.0•	59.0	66 29.0	+10.2•	60.9	66 57.2	+12.5•	63.0	67 23.4	+14.9•	65.1	67 47.6	+17.3•	67.3	61
62	64 20.7	–0.3•	51.3	64 57.6	+1.6•	52.9	65 33.0	+3.6•	54.7	66 06.9	+5.7•	56.5	66 39.2	+7.8•	58.4	67 09.7	+10.1•	60.5	67 38.3	+12.4•	62.6	68 04.9	+14.8•	64.8	62
63	64 20.4	–2.4•	49.0	64 59.2	–0.6•	50.6	65 36.6	+1.3•	52.3	66 12.6	+3.3•	54.1	66 47.0	+5.5•	55.9	67 19.8	+7.6•	57.9	67 50.7	+10.0•	60.0	68 19.7	+12.4•	62.2	63
64	64 18.0	–4.7•	46.6	64 58.6	–2.9•	48.2	65 37.9	–1.0•	49.8	66 15.9	+1.0•	51.6	66 52.5	+2.9•	53.4	67 27.4	+5.2•	55.3	68 00.7	+7.4•	57.4	68 32.1	+9.7•	59.5	64
65	64 13.3	–6.7•	44.4	64 55.7	–5.1•	45.8	65 36.9	–3.3•	47.4	66 16.9	–1.5•	49.1	66 55.4	+0.6•	50.9	67 32.6	+2.6•	52.7	68 08.1	+4.8•	54.7	68 41.8	+7.2•	56.8	65
66	64 06.6	–8.9•	42.1	64 50.6	–7.3•	43.5	65 33.6	–5.6•	45.0	66 15.4	–3.8•	46.6	66 56.0	–1.9•	48.3	67 35.2	+0.1•	50.1	68 12.9	+2.2•	52.0	68 49.0	+4.4•	54.1	66
67	63 57.7	–11.0•	39.8	64 43.3	–9.5•	41.2	65 28.0	–7.9•	42.6	66 11.6	–6.2•	44.1	66 54.1	–4.4•	45.8	67 35.3	–2.5•	47.5	68 15.1	–0.4•	49.3	68 53.4	+1.8•	51.3	67
68	63 46.7	–13.0•	37.6	64 33.8	–11.6•	38.9	65 20.1	–10.1•	40.2	66 05.4	–8.5•	41.7	66 49.7	–6.8•	43.2	67 32.8	–4.9•	44.9	68 14.7	–3.0•	46.6	68 55.2	–1.0•	48.5	68
69	63 33.7	–15.1	35.4	64 22.2	–13.7•	36.6	65 10.0	–12.3•	37.9	65 56.9	–10.8•	39.2	66 42.9	–9.2•	40.7	67 27.9	–7.5•	42.3	68 11.7	–5.7•	43.9	68 54.2	–3.7•	45.7	69
70	63 18.6	–16.9	33.2	64 08.5	–15.7•	34.3	64 57.7	–14.4•	35.5	65 46.1	–13.0•	36.8	66 33.7	–11.5•	38.2	67 20.4	–9.9•	39.7	68 06.0	–8.2•	41.3	68 50.5	–6.3•	43.0	70
71	63 01.7	–18.8	31.1	63 52.8	–17.7	32.1	64 43.3	–16.5•	33.3	65 33.1	–15.2•	34.5	66 22.2	–13.8•	35.8	67 10.5	–12.3•	37.1	67 57.8	–10.7•	38.6	68 44.2	–9.0•	40.2	71
72	62 42.9	–20.7	29.0	63 35.1	–19.6	30.0	64 26.8	–18.5	31.0	65 17.9	–17.3•	32.1	66 08.4	–16.0•	33.3	66 58.2	–14.7•	34.6	67 47.1	–13.2•	36.0	68 35.2	–11.6•	37.5	72
73	62 22.2	–22.3	27.0	63 15.5	–21.4	27.9	64 08.3	–20.4	28.8	65 00.6	–19.3	29.9	65 52.4	–18.2•	31.0	66 43.5	–16.9•	32.2	67 33.9	–15.5•	33.4	68 23.6	–14.1•	34.8	73
74	61 59.9	–24.1	25.0	62 54.1	–23.2	25.8	63 47.9	–22.3	26.7	64 41.3	–21.3	27.6	65 34.2	–20.3•	28.6	66 26.6	–19.1•	29.7	67 18.4	–17.9•	30.9	68 09.5	–16.6•	32.2	74
75	61 35.8	–25.6	23.0	62 30.9	–24.9	23.8	63 25.6	–24.1	24.6	64 20.0	–23.2	25.5	65 13.9	–22.2	26.4	66 07.5	–21.2•	27.4	67 00.5	–20.1•	28.5	67 52.9	–18.9•	29.6	75
76	61 10.2	–27.2	21.2	62 06.0	–26.5	21.8	63 01.5	–25.7	22.6	63 56.8	–25.0	23.3	64 51.7	–24.1	24.2	65 46.3	–23.3	25.1	66 40.4	–22.2•	26.1	67 34.0	–21.1•	27.1	76
77	60 43.0	–28.7	19.3	61 39.5	–28.0	19.9	62 35.8	–27.4	20.6	63 31.8	–26.7	21.3	64 27.6	–25.9	22.0	65 23.0	–25.1	22.9	66 18.2	–24.3•	23.7	67 12.9	–23.3•	24.7	77
78	60 14.3	–30.1	17.5	61 11.5	–29.5	18.1	62 08.4	–28.9	18.7	63 05.1	–28.3	19.3	64 01.7	–27.7	20.0	64 57.9	–26.9	20.7	65 53.9	–26.2	21.5	66 49.6	–25.2•	22.3	78
79	59 44.3	–31.4	15.8	60 42.0	–30.9	16.3	61 39.5	–30.4	16.8	62 36.8	–29.8	17.4	63 34.0	–29.3	18.0	64 31.0	–28.7	18.6	65 27.7	–28.0	19.3	66 24.2	–27.3	20.1	79
80	59 12.9	–32.6	14.1	60 11.1	–32.3	14.5	61 09.1	–31.8	15.0	62 07.0	–31.4	15.5	63 04.7	–30.8	16.0	64 02.3	–30.3	16.6	64 59.7	–29.7	17.2	65 56.9	–29.1	17.8	80
81	58 40.3	–33.8	12.5	59 38.8	–33.4	12.9	60 37.3	–33.1	13.3	61 35.6	–32.7	13.7	62 33.9	–32.3	14.1	63 32.0	–31.8	14.6	64 30.0	–31.4	15.2	65 27.8	–30.8	15.7	81
82	58 06.5	–35.0	10.9	59 05.4	–34.7	11.2	60 04.2	–34.4	11.6	61 02.9	–34.0	11.9	62 01.6	–33.7	12.3	63 00.2	–33.3	12.7	63 58.6	–32.9	13.2	64 57.0	–32.5	13.7	82
83	57 31.5	–36.0	9.4	58 30.7	–35.8	9.7	59 29.8	–35.5	9.9	60 28.9	–35.3	10.2	61 27.9	–35.0	10.6	62 26.9	–34.7	10.9	63 25.7	–34.3	11.3	64 24.5	–33.9	11.7	83
84	56 55.5	–37.0	7.9	57 54.9	–36.8	8.1	58 54.3	–36.6	8.4	59 53.6	–36.4	8.6	60 52.9	–36.1	8.8	61 52.2	–35.9	9.2	62 51.4	–35.7	9.5	63 50.6	–35.4	9.8	84
85	56 18.5	–37.8	6.5	57 18.1	–37.8	6.7	58 17.7	–37.7	6.9	59 17.2	–37.5	7.1	60 16.8	–37.4	7.3	61 16.3	–37.2	7.5	62 15.7	–36.9	7.7	63 15.2	–36.7	8.0	85
86	55 40.5	–38.9	5.1	56 40.3	–38.8	5.2	57 40.0	–38.7	5.4	58 39.7	–38.5	5.5	59 39.4	–38.4	5.7	60 39.1	–38.2	5.9	61 38.8	–38.1	6.1	62 38.5	–38.0	6.3	86
87	55 01.6	–39.7	3.8	56 01.5	–39.7	3.9	57 01.3	–39.6	4.0	58 01.2	–39.5	4.1	59 01.0	–39.4	4.2	60 00.9	–39.4	4.3	61 00.7	–39.2	4.5	62 00.5	–39.1	4.6	87
88	54 21.9	–40.6	2.5	55 21.8	–40.5	2.5	56 21.7	–40.4	2.6	57 21.7	–40.4	2.7	58 21.6	–40.3	2.7	59 21.5	–40.3	2.8	60 21.5	–40.3	2.9	61 21.4	–40.2	3.0	88
89	53 41.3	–41.3	1.2	54 41.3	–41.3	1.2	55 41.3	–41.3	1.3	56 41.3	–41.3	1.3	57 41.3	–41.3	1.3	58 41.2	–41.2	1.4	59 41.2	–41.2	1.4	60 41.2	–41.2	1.5	89
90	53 00.0	–42.0	0.0	54 00.0	–42.0	0.0	55 00.0	–42.1	0.0	56 00.0	–42.1	0.0	57 00.0	–42.1	0.0	58 00.0	–42.1	0.0	59 00.0	–42.1	0.0	60 00.0	–42.1	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

46°, 314° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	24 42.7	−52.8	127.6	24 05.9	−53.2	128.0	23 28.8	−53.6	128.3	22 51.5	−54.0	128.7	22 13.8	−54.4	129.0	21 36.0	−54.8	129.3	20 57.8	−55.1	129.6	20 19.4	−55.4	129.9	0
1	23 49.9	−52.9	128.2	23 12.7	−53.3	128.5	22 35.2	−53.7	128.8	21 57.5	−54.1	129.2	21 19.4	−54.4	129.5	20 41.2	−54.8	129.8	20 02.7	−55.2	130.0	19 24.0	−55.5	130.3	1
2	22 57.0	−53.0	128.7	22 19.4	−53.4	129.0	21 41.5	−53.8	129.3	21 03.4	−54.2	129.6	20 25.0	−54.6	129.9	19 46.4	−54.9	130.2	19 07.5	−55.2	130.5	18 28.5	−55.5	130.7	2
3	22 04.0	−53.1	129.2	21 26.0	−53.5	129.5	20 47.7	−53.9	129.8	20 09.2	−54.3	130.1	19 30.4	−54.6	130.4	18 51.5	−55.0	130.6	18 12.3	−55.3	130.9	17 33.0	−55.6	131.1	3
4	21 10.9	−53.2	129.7	20 32.5	−53.6	130.0	19 53.8	−53.9	130.3	19 14.9	−54.3	130.5	18 35.8	−54.6	130.8	17 56.5	−55.0	131.0	17 17.0	−55.3	131.3	16 37.4	−55.7	131.5	4
5	20 17.7	−53.2	130.2	19 38.9	−53.7	130.5	18 59.9	−54.1	130.7	18 20.6	−54.4	131.0	17 41.2	−54.7	131.2	17 01.5	−55.0	131.5	16 21.7	−55.3	131.7	15 41.7	−55.6	131.9	5
6	19 24.5	−53.4	130.7	18 45.2	−53.7	130.9	18 05.8	−54.0	131.2	17 26.2	−54.4	131.4	16 46.5	−54.8	131.7	16 06.5	−55.1	131.9	15 26.4	−55.5	132.1	14 46.1	−55.7	132.3	6
7	18 31.1	−53.4	131.2	17 51.5	−53.8	131.4	17 11.8	−54.2	131.6	16 31.8	−54.5	131.9	15 51.7	−54.8	132.1	15 11.4	−55.2	132.3	14 30.9	−55.4	132.5	13 50.4	−55.8	132.7	7
8	17 37.7	−53.5	131.6	16 57.7	−53.8	131.9	16 17.6	−54.2	132.1	15 37.3	−54.5	132.3	14 56.9	−54.9	132.5	14 16.2	−55.1	132.7	13 35.5	−55.5	132.9	12 54.6	−55.8	133.0	8
9	16 44.2	−53.5	132.1	16 03.9	−53.9	132.3	15 23.4	−54.2	132.5	14 42.8	−54.6	132.7	14 02.0	−54.9	132.9	13 21.1	−55.3	133.1	12 40.0	−55.5	133.3	11 58.8	−55.8	133.4	9
10	15 50.7	−53.7	132.6	15 10.0	−54.0	132.8	14 29.2	−54.3	133.0	13 48.2	−54.6	133.2	13 07.1	−55.0	133.3	12 25.8	−55.2	133.5	11 44.5	−55.6	133.7	11 03.0	−55.8	133.8	10
11	14 57.0	−53.6	133.0	14 16.0	−54.1	133.2	13 34.9	−54.4	133.4	12 53.6	−54.7	133.6	12 12.1	−55.0	133.7	11 30.6	−55.3	133.9	10 48.9	−55.6	134.0	10 07.2	−55.9	134.2	11
12	14 03.4	−53.7	133.5	13 22.0	−54.1	133.7	12 40.5	−54.4	133.8	11 58.9	−54.7	134.0	11 17.1	−55.0	134.2	10 35.3	−55.3	134.3	9 53.3	−55.6	134.4	9 11.3	−55.9	134.5	12
13	13 09.7	−53.8	134.0	12 27.9	−54.1	134.1	11 46.1	−54.4	134.3	11 04.2	−54.8	134.4	10 22.1	−55.0	134.6	9 40.0	−55.4	134.7	8 57.7	−55.6	134.8	8 15.4	−55.9	134.9	13
14	12 15.9	−53.8	134.4	11 33.8	−54.1	134.6	10 51.7	−54.5	134.7	10 09.4	−54.8	134.8	9 27.1	−55.1	135.0	8 44.6	−55.3	135.1	8 02.1	−55.6	135.2	7 19.5	−55.9	135.3	14
15	11 22.1	−53.9	134.9	10 39.7	−54.2	135.0	9 57.2	−54.5	135.1	9 14.6	−54.8	135.3	8 32.0	−55.1	135.4	7 49.3	−55.4	135.5	7 06.5	−55.7	135.6	6 23.6	−56.0	135.6	15
16	10 28.2	−53.9	135.3	9 45.5	−54.2	135.4	9 02.7	−54.5	135.5	8 19.8	−54.8	135.7	7 36.9	−55.1	135.8	6 53.9	−55.4	135.9	6 10.8	−55.7	135.9	5 27.6	−55.9	136.0	16
17	9 34.3	−53.9	135.8	8 51.3	−54.2	135.9	8 08.2	−54.6	136.0	7 25.0	−54.8	136.1	6 41.8	−55.2	136.2	5 58.5	−55.5	136.2	5 15.1	−55.7	136.3	4 31.7	−56.0	136.4	17
18	8 40.4	−53.9	136.2	7 57.1	−54.3	136.3	7 13.6	−54.5	136.4	6 30.2	−54.9	136.5	5 46.6	−55.1	136.6	5 03.0	−55.4	136.6	4 19.4	−55.7	136.7	3 35.7	−55.9	136.7	18
19	7 46.5	−54.0	136.6	7 02.8	−54.3	136.7	6 19.1	−54.6	136.8	5 35.3	−54.9	136.9	4 51.5	−55.2	137.0	4 07.6	−55.5	137.0	3 23.7	−55.7	137.1	2 39.8	−56.0	137.1	19
20	6 52.5	−54.0	137.1	6 08.5	−54.3	137.2	5 24.5	−54.6	137.2	4 40.4	−54.9	137.3	3 56.3	−55.2	137.3	3 12.1	−55.4	137.4	2 28.0	−55.8	137.4	1 43.8	−56.0	137.4	20
21	5 58.5	−54.1	137.5	5 14.2	−54.4	137.6	4 29.9	−54.7	137.7	3 45.5	−54.9	137.7	3 01.1	−55.2	137.7	2 16.7	−55.5	137.8	1 32.2	−55.7	137.8	0 47.8	−56.0	137.8	21
22	5 04.4	−54.0	138.0	4 19.8	−54.3	138.0	3 35.2	−54.6	138.1	2 50.6	−54.9	138.1	2 05.9	−55.2	138.1	1 21.2	−55.4	138.2	0 36.5	−55.7	138.2	0 08.2	+56.0	41.8	22
23	4 10.4	−54.1	138.4	3 25.5	−54.3	138.4	2 40.6	−54.7	138.5	1 55.7	−55.0	138.5	1 10.7	−55.2	138.5	0 25.8	−55.5	138.5	0 19.2	+55.7	41.5	1 04.2	+56.0	41.5	23
24	3 16.3	−54.0	138.8	2 31.1	−54.3	138.9	1 45.9	−54.6	138.9	1 00.7	−54.9	138.9	0 15.5	−55.2	138.9	0 29.7	+55.5	41.1	1 14.9	+55.8	41.1	2 00.2	+55.9	41.1	24
25	2 22.3	−54.1	139.3	1 36.8	−54.3	139.3	0 51.3	−54.7	139.3	0 05.8	−54.9	139.3	0 39.7	+55.2	40.7	1 25.2	+55.5	40.7	2 10.7	+55.7	40.7	2 56.1	+56.0	40.8	25
26	1 28.2	−54.1	139.7	0 42.4	−54.4	139.7	0 03.4	+54.6	40.3	0 49.1	+55.0	40.3	1 34.9	+55.2	40.3	2 20.7	+55.5	40.3	3 06.4	+55.7	40.4	3 52.1	+56.0	40.4	26
27	0 34.1	−54.1	140.1	0 12.0	+54.3	39.9	0 58.0	+54.7	39.9	1 44.1	+54.9	39.9	2 30.1	+55.2	39.9	3 16.1	+55.5	39.9	4 02.1	+55.7	40.0	4 48.1	+55.9	40.0	27
28	0 20.0	+54.1	39.4	1 06.3	+54.4	39.4	1 52.7	+54.6	39.5	2 39.0	+54.9	39.5	3 25.3	+55.2	39.5	4 11.6	+55.4	39.6	4 57.8	+55.7	39.6	5 44.0	+55.9	39.7	28
29	1 14.1	+54.1	39.0	2 00.7	+54.4	39.0	2 47.3	+54.6	39.1	3 33.9	+54.9	39.1	4 20.5	+55.1	39.1	5 07.0	+55.4	39.2	5 53.5	+55.7	39.2	6 39.9	+56.0	39.3	29
30	2 08.2	+54.0	38.6	2 55.1	+54.3	38.6	3 41.9	+54.7	38.6	4 28.8	+54.9	38.7	5 15.6	+55.2	38.7	6 02.4	+55.4	38.8	6 49.2	+55.6	38.9	7 35.9	+55.9	38.9	30
31	3 02.2	+54.1	38.1	3 49.4	+54.4	38.2	4 36.6	+54.6	38.2	5 23.7	+54.9	38.3	6 10.8	+55.1	38.3	6 57.8	+55.4	38.4	7 44.8	+55.7	38.5	8 31.8	+55.8	38.5	31
32	3 56.3	+54.1	37.7	4 43.8	+54.3	37.7	5 31.2	+54.6	37.8	6 18.6	+54.8	37.9	7 05.9	+55.1	37.9	7 53.2	+55.4	38.0	8 40.5	+55.6	38.1	9 27.6	+55.9	38.2	32
33	4 50.3	+54.1	37.3	5 38.1	+54.3	37.3	6 25.8	+54.5	37.4	7 13.4	+54.9	37.5	8 01.0	+55.1	37.5	8 48.6	+55.3	37.6	9 36.1	+55.6	37.7	10 23.5	+55.8	37.8	33
34	5 44.4	+54.0	36.8	6 32.4	+54.3	36.9	7 20.3	+54.6	37.0	8 08.3	+54.8	37.0	8 56.1	+55.1	37.1	9 43.9	+55.3	37.2	10 31.7	+55.5	37.3	11 19.3	+55.8	37.4	34
35	6 38.4	+54.0	36.4	7 26.7	+54.2	36.5	8 14.9	+54.5	36.5	9 03.1	+54.8	36.6	9 51.2	+55.0	36.7	10 39.2	+55.3	36.8	11 27.2	+55.6	37.0	12 15.1	+55.8	37.1	35
36	7 32.4	+53.9	35.9	8 20.9	+54.3	36.0	9 09.4	+54.5	36.1	9 57.9	+54.7	36.2	10 46.2	+55.0	36.3	11 34.5	+55.3	36.4	12 22.8	+55.5	36.6	13 10.9	+55.7	36.7	36
37	8 26.3	+54.0	35.5	9 15.2	+54.2	35.6	10 03.9	+54.5	35.7	10 52.6	+54.7	35.8	11 41.2	+55.0	35.9	12 29.8	+55.2	36.0	13 18.3	+55.4	36.2	14 06.6	+55.8	36.3	37
38	9 20.3	+53.9	35.1	10 09.4	+54.1	35.2	10 58.4	+54.4	35.3	11 47.3	+54.7	35.4	12 36.2	+54.9	35.5	13 25.0	+55.2	35.6	14 13.7	+55.4	35.8	15 02.4	+55.6	35.9	38
39	10 14.2	+53.8	34.6	11 03.5	+54.1	34.7	11 52.8	+54.4	34.8	12 42.0	+54.7	35.0	13 31.1	+54.9	35.1	14 20.2	+55.1	35.2	15 09.1	+55.4	35.4	15 58.0	+55.6	35.6	39
40	11 08.0	+53.9	34.2	11 57.6	+54.1	34.3	12 47.2	+54.3	34.4	13 36.7	+54.6	34.5	14 26.0	+54.9	34.7	15 15.3	+55.1	34.8	16 04.5	+55.4	35.0	16 53.6	+55.6	35.2	40
41	12 01.9	+53.7	33.7	12 51.7	+54.1	33.8	13 41.5	+54.3	34.0	14 31.3	+54.5	34.1	15 20.9	+54.8	34.3	16 10.4	+55.1	34.4	16 59.9	+55.3	34.6	17 49.2	+55.5	34.8	41
42	12 55.6	+53.8	33.3	13 45.8	+54.0	33.4	14 35.8	+54.3	33.5	15 25.8	+54.5	33.7	16 15.7	+54.7	33.8	17 05.5	+55.0	34.0	17 55.2	+55.2	34.2	18 44.7	+55.5	34.4	42
43	13 49.4	+53.7	32.8	14 39.8	+53.9	32.9	15 30.1	+54.2	33.1	16 20.3	+54.4	33.2	17 10.4	+54.7	33.4	18 00.5	+54.9	33.6	18 50.4	+55.2	33.8	19 40.2	+55.4	34.0	43
44	14 43.1	+53.6	32.3	15 33.7	+53.9	32.5	16 24.3	+54.1	32.6	17 14.7	+54.4	32.8	18 05.1	+54.7	33.0	18 55.4	+54.9	33.2	19 45.6	+55.1	33.4	20 35.6	+55.4	33.6	44
45	15 36.7	+53.5	31.9	16 27.6	+53.8	32.0	17 18.4	+54.1	32.2	18 09.1	+54.4	32.4	18 59.8	+54.5	32.5	19 50.3	+54.8	32.7	20 40.7	+55.1	32.9	21 31.0	+55.3	33.1	45
46	16 30.2	+53.6	31.4	17 21.4	+53.8	31.6	18 12.5	+54.0	31.7	19 03.5	+54.2	31.9	19 54.3	+54.6	32.1	20 45.1	+54.8	32.3	21 35.8	+55.0	32.5	22 26.3	+55.2	32.7	46
47	17 23.8	+53.4	30.9	18 15.2	+53.7	31.1	19 06.5	+53.9	31.3	19 57.7	+54.2	31.5	20 48.9	+54.4	31.7	21 39.9	+54.7	31.9	22 30.8	+54.9	32.1	23 21.5	+55.2	32.3	47
48	18 17.2	+53.4	30.5	19 08.9	+53.6	30.6	20 00.4	+53.9	30.8	20 51.9	+54.1	31.0	21 43.3	+54.4	31.2	22 34.6	+54.5	31.4	23 25.7	+54.9	31.6	24 16.7	+55.1	31.9	48
49	19 10.6	+53.2	30.0	20 02.5	+53.5	30.2	20 54.3	+53.8	30.3	21 46.0	+54.1	30.5	22 37.7	+54.2	30.7	23 29.2	+54.5	31.0	24 20.6	+54.7	31.2	25 11.8	+55.0	31.4	49
50	20 03.8	+53.2	29.5	20 56.0	+53.5	29.7	21 48.1	+53.7	29.9	22 40.1	+53.9	30.1	23 31.9	+54.2	30.3	24 23.7	+54.4	30.5	25 15.3	+54.7	30.7	26 06.8	+55.0	31.0	50
51	20 57.0	+53.0	29.0	21 49.5	+53.3	29.2	22 41.8	+53.6	29.4	23 34.0	+53.9	29.6	24 26.1	+54.2	29.8	25 18.1	+54.4	30.0	26 10.0	+54.6	30.3	27 01.8	+54.8	30.5	51
52	21 50.2	+53.0	28.5	22 42.8	+53.3	28.7	23 35.4	+53.6	28.9	24 27.9	+53.8	29.1	25 20.3	+54.0	29.3	26 12.5	+54.3	29.6	27 04.6	+54.5	29.8	27 56.6	+54.8	30.1	52
53	22 43.2	+52.9	28.0	23 36.1	+53.2	28.2	24 29.0	+53.4	28.4	25 21.7	+53.7	28.6	26 14.3	+53.9	28.9	27 06.8	+54.1	29.1	27 59.1	+54.4	29.4	28 51.4	+54.6	29.6	53
54	23 36.1	+52.9	27.5	24 29.3	+53.1	27.7	25 22.4	+53.3	27.9	26 15.4	+53.5	28.1	27 08.2	+53.8	28.4	28 00.9	+54.1	28.6	28 53.5	+54.4	28.9	29 46.0	+54.6	29.1	54
55	24 29.0	+52.7	27.0	25 22.4	+53.0	27.2	26 15.7	+53.2	27.4	27 08.9	+53.5	27.6	28 02.0	+53.7	27.9	28 55.0	+54.0	28.1	29 47.9	+54.2	28.4	30 40.6	+54.4	28.7	55
56	25 21.7	+52.6	26.4	26 15.4	+52.8	26.6	27 08.9	+53.1	26.9	28 02.4	+53.3	27.1	28 55.7	+53.6	27.4	29 49.0	+53.8	27.7	30 42.1	+54.0	27.9	31 35.0	+54.4	28.2	56
57	26 14.3	+52.5	25.9	27 08.2	+52.7	26.1	28 02.0	+53.0	26.4	28 55.7	+53.3	26.6	29 49.3	+53.5	26.8	30 42.8	+53.7	27.1	31 36.1	+54.0	27.4	32 29.4	+54.2	27.7	57
58	27 06.8	+52.3	25.4	28 00.9	+52.6	25.6	28 55.0	+52.9	25.8	29 49.0	+53.1	26.1	30 42.8	+53.3	26.3	31 36.5	+53.6	26.6	32 30.1	+53.8	26.9	33 23.6	+54.0	27.2	58
59	27 59.1	+52.3	24.8	28 53.5	+52.5	25.0	29 47.9	+52.7	25.3	30 42.1	+52.9	25.5	31 36.1	+53.3	25.8	32 30.1	+53.5	26.0	33 23.9	+53.7	26.3	34 17.6	+54.0	26.6	59
60	28 51.4	+52.0	24.2	29 46.0	+52.3	24.5	30 40.6	+52.5	24.7	31 35.0	+52.8	25.0	32 29.4	+53.0	25.2	33 23.6	+53.3	25.5	34 17.6	+53.6	25.8	35 11.6	+53.8	26.1	60
61	29 43.4	+52.0	23.7	30 38.3	+52.2	23.9	31 33.1	+52.5	24.2	32 27.8	+52.7	24.4	33 22.4	+52.9	24.7	34 16.9	+53.1	25.0	35 11.2	+53.4	25.3	36 05.4	+53.6	25.6	61
62	30 35.4	+51.8	23.1	31 30.5	+52.0	23.3	32 25.6	+52.2	23.6	33 20.5	+52.5	23.8	34 15.3	+52.7	24.1	35 10.0	+53.0	24.4	36 04.6	+53.2	24.7	36 59.0	+53.5	25.0	62
63	31 27.2	+51.6	22.5	32 22.5	+51.9	22.7	33 17.8	+52.1	23.0	34 13.0	+52.3	23.3	35 08.1	+52.6	23.5	36 03.0	+52.9	23.8	36 57.8	+53.1	24.1	37 52.5	+53.4	24.4	63
64	32 18.8	+51.4	21.9	33 14.4	+51.7	22.1	34 09.9	+51.9	22.4	35 05.3	+52.2	22.7	36 00.7	+52.4	22.9	36 55.9	+52.6	23.2	37 50.9	+52.9	23.5	38 45.9	+53.1	23.9	64
65	33 10.2	+51.3	21.3	34 06.1	+51.5	21.5	35 01.8	+51.8	21.8	35 57.5	+52.0	22.1	36 53.1	+52.2	22.3	37 48.5	+52.5	22.6	38 43.8	+52.7	22.9	39 39.0	+53.0	23.3	65
66	34 01.5	+51.1	20.7	34 57.6	+51.3	20.9	35 53.6	+51.5	21.2	36 49.5	+51.7	21.4	37 45.3	+52.0	21.7	38 41.0	+52.2	22.0	39 36.5	+52.5	22.3	40 32.0	+52.7	22.6	66
67	34 52.6	+50.8	20.0	35 48.9	+51.1	20.3	36 45.1	+51.3	20.5	37 41.2	+51.6	20.8	38 37.3	+51.8	21.1	39 33.2	+52.1	21.4	40 29.0	+52.3	21.7	41 24.7	+52.6	22.0	67
68	35 43.4	+50.7	19.4	36 40.0	+50.8	19.6	37 36.4	+51.1	19.9	38 32.8	+51.4	20.2	39 29.1	+51.6	20.4	40 25.3	+51.8	20.7	41 21.3	+52.1	21.0	42 17.3	+52.3	21.4	68
69	36 34.1	+50.4	18.7	37 30.8	+50.7	19.0	38 27.5	+50.9	19.2	39 24.2	+51.1	19.5	40 20.7	+51.3	19.8	41 17.1	+51.6	20.1	42 13.4	+51.8	20.4	43 09.6	+52.1	20.7	69
70	37 24.5	+50.2	18.0	38 21.5	+50.4	18.3	39 18.4	+50.7	18.5	40 15.3	+50.8	18.8	41 12.0	+51.1	19.1	42 08.7	+51.3	19.4	43 05.2	+51.6	19.7	44 01.7	+51.8	20.0	70
71	38 14.7	+49.9	17.3	39 11.9	+50.2	17.6	40 09.1	+50.3	17.8	41 06.1	+50.6	18.1	42 03.1	+50.9	18.4	43 00.0	+51.1	18.7	43 56.8	+51.3	19.0	44 53.5	+51.5	19.3	71
72	39 04.6	+49.7	16.6	40 02.1	+49.8	16.9	40 59.4	+50.1	17.1	41 56.7	+50.4	17.4	42 54.0	+50.5	17.7	43 51.1	+50.8	18.0	44 48.1	+51.0	18.3	45 45.0	+51.3	18.6	72
73	39 54.3	+49.4	15.9	40 51.9	+49.6	16.1	41 49.5	+49.9	16.4	42 47.1	+50.0	16.7	43 44.5	+50.3	16.9	44 41.9	+50.5	17.2	45 39.1	+50.8	17.5	46 36.3	+51.0	17.8	73
74	40 43.7	+49.1	15.2	41 41.5	+49.3	15.4	42 39.4	+49.5	15.6	43 37.1	+49.7	15.9	44 34.8	+49.9	16.2	45 32.4	+50.1	16.4	46 29.9	+50.4	16.7	47 27.3	+50.6	17.1	74
75	41 32.8	+48.7	14.4	42 30.8	+49.0	14.6	43 28.9	+49.2	14.9	44 26.8	+49.4	15.1	45 24.7	+49.6	15.4	46 22.5	+49.9	15.7	47 20.3	+50.0	16.0	48 17.9	+50.3	16.3	75
76	42 21.5	+48.5	13.6	43 19.8	+48.7	13.8	44 18.1	+48.8	14.1	45 16.2	+49.1	14.3	46 14.3	+49.3	14.6	47 12.4	+49.5	14.8	48 10.3	+49.7	15.1	49 08.2	+49.9	15.4	76
77	43 10.0	+48.1	12.8	44 08.5	+48.3	13.0	45 06.9	+48.5	13.3	46 05.3	+48.7	13.5	47 03.6	+48.9	13.7	48 01.9	+49.1	14.0	49 00.0	+49.4	14.3	49 58.1	+49.6	14.6	77
78	43 58.1	+47.8	12.2	44 56.8	+47.9	12.3	45 55.4	+48.1	12.5	46 54.0	+48.3	12.6	47 52.5	+48.5	12.9	48 51.0	+48.7	13.1	49 49.4	+48.9	13.4	50 47.7	+49.1	13.7	78
79	44 45.9	+47.3	11.1	45 44.7	+47.5	11.3	46 43.5	+47.7	11.6	47 42.3	+47.9	11.8	48 41.0	+48.1	12.0	49 39.7	+48.2	12.2	50 38.3	+48.4	12.5	51 36.8	+48.7	12.8	79
80	45 33.2	+47.0	10.3	46 32.2	+47.2	10.5	47 31.2	+47.3	10.7	48 30.2	+47.4	10.9	49 29.1	+47.6	11.1	50 27.9	+47.9	11.3	51 26.7	+48.1	11.6	52 25.5	+48.2	11.8	80
81	46 20.2	+46.5	9.4	47 19.4	+46.6	9.6	48 18.5	+46.8	9.7	49 17.6	+47.0	9.9	50 16.7	+47.2	10.1	51 15.8	+47.3	10.4	52 14.8	+47.5	10.6	53 13.7	+47.7	10.8	81
82	47 06.7	+46.1	8.5	48 06.0	+46.2	8.6	49 05.3	+46.4	8.8	50 04.6	+46.5	9.0	51 03.9	+46.6	9.2	52 03.1	+46.8	9.4	53 02.3	+47.0	9.6	54 01.4	+47.2	9.8	82
83	47 52.8	+45.5	7.5	48 52.2	+45.7	7.7	49 51.7	+45.8	7.8	50 51.1	+46.0	8.0	51 50.5	+46.1	8.2	52 49.9	+46.3	8.3	53 49.3	+46.4	8.5	54 48.6	+46.6	8.7	83
84	48 38.3	+45.1	6.5	49 37.9	+45.2	6.7	50 37.5	+45.3	6.8	51 37.1	+45.4	7.0	52 36.6	+45.6	7.1	53 36.2	+45.7	7.3	54 35.7	+45.8	7.4	55 35.2	+45.9	7.6	84
85	49 23.4	+44.5	5.5	50 23.1	+44.7	5.6	51 22.8	+44.8	5.8	52 22.5	+44.9	5.9	53 22.2	+44.9	6.0	54 21.9	+45.0	6.2	55 21.5	+45.2	6.3	56 21.1	+45.3	6.5	85
86	50 07.9	+44.0	4.5	51 07.8	+44.0	4.6	52 07.6	+44.1	4.7	53 07.4	+44.2	4.8	54 07.1	+44.3	4.9	55 06.9	+44.4	5.0	56 06.7	+44.5	5.2	57 06.4	+44.6	5.3	86
87	50 51.9	+43.4	3.4	51 51.8	+43.5	3.5	52 51.7	+43.5	3.6	53 51.6	+43.5	3.7	54 51.4	+43.6	3.8	55 51.3	+43.7	3.9	56 51.2	+43.7	4.0	57 51.0	+43.8	4.1	87
88	51 35.3	+42.7	2.3	52 35.2	+42.8	2.4	53 35.2	+42.7	2.4	54 35.1	+42.8	2.5	55 35.0	+42.9	2.5	56 35.0	+42.9	2.6	57 34.9	+43.0	2.7	58 34.8	+43.1	2.8	88
89	52 18.0	+42.0	1.2	53 18.0	+42.0	1.2	54 17.9	+42.1	1.2	55 17.9	+42.1	1.3	56 17.9	+42.1	1.3	57 17.9	+42.1	1.3	58 17.9	+42.1	1.4	59 17.9	+42.1	1.4	89
90	53 00.0	+41.3	0.0	54 00.0	+41.3	0.0	55 00.0	+41.3	0.0	56 00.0	+41.3	0.0	57 00.0	+41.3	0.0	58 00.0	+41.2	0.0	59 00.0	+41.2	0.0	60 00.0	+41.2	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z   L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 134°, 226°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	24 13.9	+52.5	126.7	23 37.9	+53.0	127.0	23 01.7	+53.3	127.4	22 25.1	+53.8	127.7	21 48.3	+54.1	128.0	21 11.2	+54.5	128.3	20 33.8	+54.9	128.6	19 56.3	+55.2	128.9	0
1	25 06.4	+52.4	126.1	24 30.9	+52.8	126.5	23 55.0	+53.3	126.9	23 18.9	+53.7	127.2	22 42.4	+54.1	127.6	22 05.7	+54.5	127.9	21 28.7	+54.9	128.2	20 51.5	+55.2	128.5	1
2	25 58.8	+52.3	125.6	25 23.7	+52.7	126.0	24 48.3	+53.1	126.4	24 12.6	+53.5	126.7	23 36.5	+54.0	127.1	23 00.2	+54.4	127.4	22 23.6	+54.7	127.8	21 46.7	+55.1	128.1	2
3	26 51.1	+52.1	125.1	26 16.4	+52.6	125.5	25 41.4	+53.1	125.9	25 06.1	+53.5	126.2	24 30.5	+53.9	126.6	23 54.6	+54.3	127.0	23 18.3	+54.7	127.3	22 41.8	+55.1	127.7	3
4	27 43.2	+52.0	124.5	27 09.0	+52.5	124.9	26 34.5	+52.9	125.3	25 59.6	+53.4	125.7	25 24.4	+53.8	126.1	24 48.9	+54.2	126.5	24 13.0	+54.6	126.9	23 36.9	+54.9	127.2	4
5	28 35.2	+51.8	123.9	28 01.5	+52.3	124.4	27 27.4	+52.8	124.8	26 53.0	+53.3	125.2	26 18.2	+53.7	125.6	25 43.1	+54.1	126.0	25 07.6	+54.5	126.4	24 31.8	+54.9	126.8	5
6	29 27.0	+51.7	123.4	28 53.8	+52.2	123.8	28 20.2	+52.7	124.3	27 46.3	+53.1	124.7	27 11.9	+53.6	125.1	26 37.2	+54.0	125.6	26 02.1	+54.5	126.0	25 26.7	+54.9	126.3	6
7	30 18.7	+51.5	122.8	29 46.0	+52.1	123.3	29 12.9	+52.6	123.7	28 39.4	+53.0	124.2	28 05.5	+53.5	124.6	27 31.2	+53.9	125.1	26 56.6	+54.3	125.5	26 21.6	+54.7	125.9	7
8	31 10.2	+51.4	122.2	30 38.1	+51.9	122.7	30 05.5	+52.4	123.2	29 32.4	+52.9	123.6	28 59.0	+53.3	124.1	28 25.1	+53.8	124.6	27 50.9	+54.2	125.0	27 16.3	+54.6	125.4	8
9	32 01.6	+51.2	121.6	31 30.0	+51.7	122.1	30 57.9	+52.2	122.6	30 25.3	+52.8	123.1	29 52.3	+53.3	123.6	29 18.9	+53.7	124.1	28 45.1	+54.2	124.5	28 10.9	+54.6	125.0	9
10	32 52.8	+51.0	120.9	32 21.7	+51.6	121.5	31 50.1	+52.1	122.0	31 18.1	+52.6	122.5	30 45.6	+53.1	123.1	30 12.6	+53.6	123.5	29 39.3	+54.0	124.0	29 05.5	+54.4	124.5	10
11	33 43.8	+50.9	120.3	33 13.3	+51.3	120.9	32 42.2	+51.9	121.4	32 10.7	+52.4	122.0	31 38.7	+52.9	122.5	31 06.2	+53.4	123.0	30 33.3	+53.9	123.5	29 59.9	+54.3	124.0	11
12	34 34.6	+50.6	119.7	34 04.6	+51.2	120.3	33 34.1	+51.8	120.8	33 03.1	+52.3	121.4	32 31.6	+52.8	122.0	31 59.6	+53.3	122.5	31 27.2	+53.7	123.0	30 54.3	+54.2	123.5	12
13	35 25.2	+50.4	119.0	34 55.8	+51.0	119.6	34 25.9	+51.6	120.2	33 55.4	+52.1	120.8	33 24.4	+52.7	121.4	32 52.9	+53.2	121.9	32 20.9	+53.7	122.5	31 48.5	+54.1	123.0	13
14	36 15.6	+50.2	118.4	35 46.8	+50.8	119.0	35 17.5	+51.3	119.6	34 47.5	+52.0	120.2	34 17.1	+52.5	120.8	33 46.1	+53.0	121.4	33 14.6	+53.5	122.0	32 42.6	+53.9	122.5	14
15	37 05.8	+49.9	117.7	36 37.6	+50.6	118.3	36 08.8	+51.2	119.0	35 39.5	+51.7	119.6	35 09.6	+52.3	120.2	34 39.1	+52.8	120.8	34 08.1	+53.3	121.4	33 36.5	+53.9	122.0	15
16	37 55.7	+49.6	117.0	37 28.2	+50.3	117.7	37 00.0	+50.9	118.3	36 31.2	+51.6	119.0	36 01.9	+52.1	119.6	35 31.9	+52.7	120.2	35 01.4	+53.2	120.9	34 30.4	+53.7	121.4	16
17	38 45.3	+49.4	116.3	38 18.5	+50.1	117.0	37 50.9	+50.8	117.7	37 22.8	+51.3	118.3	36 54.0	+51.9	119.0	36 24.6	+52.5	119.7	35 54.6	+53.1	120.3	35 24.1	+53.5	120.9	17
18	39 34.7	+49.1	115.5	39 08.5	+49.8	116.3	38 41.7	+50.4	117.0	38 14.1	+51.1	117.7	37 45.9	+51.7	118.4	37 17.1	+52.3	119.0	36 47.7	+52.8	119.7	36 17.6	+53.4	120.3	18
19	40 23.8	+48.9	114.8	39 58.3	+49.6	115.5	39 32.1	+50.2	116.3	39 05.2	+50.9	117.0	38 37.6	+51.5	117.7	38 09.4	+52.1	118.4	37 40.5	+52.7	119.1	37 11.0	+53.2	119.8	19
20	41 12.7	+48.5	114.0	40 47.9	+49.2	114.8	40 22.3	+50.0	115.6	39 56.1	+50.6	116.3	39 29.1	+51.3	117.1	39 01.5	+51.9	117.8	38 33.2	+52.5	118.5	38 04.2	+53.1	119.2	20
21	42 01.2	+48.1	113.2	41 37.1	+48.9	114.0	41 12.3	+49.7	114.8	40 46.7	+50.4	115.6	40 20.4	+51.0	116.4	39 53.4	+51.7	117.1	39 25.7	+52.2	117.9	38 57.3	+52.8	118.6	21
22	42 49.3	+47.8	112.4	42 26.0	+48.7	113.3	42 02.0	+49.3	114.1	41 37.1	+50.1	114.9	41 11.4	+50.8	115.7	40 45.1	+51.4	116.5	40 17.9	+52.1	117.2	39 50.1	+52.7	118.0	22
23	43 37.1	+47.5	111.6	43 14.7	+48.2	112.5	42 51.3	+49.1	113.3	42 27.2	+49.8	114.2	42 02.2	+50.5	115.0	41 36.5	+51.2	115.8	41 10.0	+51.8	116.6	40 42.8	+52.3	117.4	23
24	44 24.6	+47.1	110.7	44 02.9	+47.9	111.6	43 40.4	+48.7	112.5	43 17.0	+49.4	113.4	42 52.7	+50.2	114.3	42 27.7	+50.9	115.1	42 01.8	+51.6	115.9	41 35.2	+52.3	116.7	24
25	45 11.7	+46.6	109.9	44 50.8	+47.5	110.8	44 29.1	+48.3	111.7	44 06.4	+49.2	112.6	43 42.9	+49.9	113.5	43 18.6	+50.6	114.3	42 53.4	+51.4	115.2	42 27.5	+52.0	116.0	25
26	45 58.3	+46.2	109.0	45 38.3	+47.1	109.9	45 17.4	+48.0	110.9	44 55.6	+48.8	111.8	44 32.8	+49.6	112.7	44 09.2	+50.4	113.6	43 44.8	+51.0	114.5	43 19.5	+51.7	115.4	26
27	46 44.5	+45.8	108.0	46 25.4	+46.7	109.0	46 05.4	+47.6	110.0	45 44.4	+48.4	111.0	45 22.4	+49.3	111.9	44 59.6	+50.0	112.9	44 35.8	+50.8	113.8	44 11.2	+51.5	114.7	27
28	47 30.3	+45.2	107.1	47 12.1	+46.3	108.1	46 53.0	+47.1	109.1	46 32.8	+48.1	110.1	46 11.7	+48.9	111.1	45 49.6	+49.7	112.1	45 26.6	+50.5	113.0	45 02.7	+51.2	113.9	28
29	48 15.5	+44.8	106.1	47 58.4	+45.7	107.2	47 40.1	+46.7	108.2	47 20.9	+47.6	109.3	47 00.6	+48.5	110.3	46 39.3	+49.3	111.3	46 17.1	+50.1	112.2	45 53.9	+50.9	113.2	29
30	49 00.3	+44.2	105.1	48 44.1	+45.3	106.2	48 26.8	+46.3	107.3	48 08.5	+47.2	108.3	47 49.1	+48.1	109.4	47 28.6	+49.0	110.4	47 07.2	+49.8	111.4	46 44.8	+50.6	112.4	30
31	49 44.5	+43.7	104.1	49 29.4	+44.7	105.2	49 13.1	+45.7	106.3	48 55.7	+46.7	107.4	48 37.2	+47.6	108.5	48 17.6	+48.6	109.6	47 57.0	+49.4	110.6	47 35.4	+50.2	111.6	31
32	50 28.2	+43.0	103.0	50 14.1	+44.1	104.2	49 58.8	+45.2	105.3	49 42.4	+46.2	106.5	49 24.8	+47.2	107.6	49 06.2	+48.1	108.7	48 46.4	+49.0	109.8	48 25.6	+49.9	110.8	32
33	51 11.2	+42.4	101.9	50 58.2	+43.6	103.1	50 44.0	+44.7	104.3	50 28.6	+45.7	105.5	50 12.0	+46.8	106.6	49 54.3	+47.7	107.8	49 35.4	+48.7	108.9	49 15.5	+49.5	110.0	33
34	51 53.6	+41.7	100.7	51 41.8	+42.9	102.0	51 28.7	+44.1	103.2	51 14.3	+45.2	104.4	50 58.8	+46.2	105.6	50 42.0	+47.2	106.8	50 24.1	+48.1	107.9	50 05.0	+49.1	109.1	34
35	52 35.3	+41.0	99.6	52 24.7	+42.2	100.9	52 12.7	+43.4	102.1	51 59.5	+44.5	103.4	51 45.0	+45.6	104.6	51 29.2	+46.7	105.8	51 12.2	+47.7	107.0	50 54.1	+48.6	108.2	35
36	53 16.3	+40.2	98.4	53 06.9	+41.5	99.7	52 56.1	+42.8	101.0	52 44.0	+43.9	102.3	52 30.6	+45.1	103.6	52 15.9	+46.2	104.8	51 59.9	+47.3	106.0	51 42.7	+48.2	107.3	36
37	53 56.5	+39.4	97.1	53 48.4	+40.7	98.5	53 38.9	+42.0	99.8	53 27.9	+43.3	101.1	53 15.7	+44.4	102.5	53 02.1	+45.6	103.8	52 47.2	+46.6	105.0	52 30.9	+47.8	106.3	37
38	54 35.9	+38.6	95.8	54 29.1	+40.0	97.2	54 20.9	+41.3	98.6	54 11.2	+42.6	100.0	54 00.1	+43.8	101.3	53 47.7	+44.9	102.7	53 33.8	+46.1	104.0	53 18.7	+47.1	105.3	38
39	55 14.5	+37.7	94.5	55 09.1	+39.1	95.9	55 02.2	+40.4	97.3	54 53.8	+41.8	98.8	54 43.9	+43.1	100.1	54 32.6	+44.3	101.5	54 19.9	+45.5	102.9	54 05.8	+46.7	104.2	39
40	55 52.2	+36.7	93.1	55 48.2	+38.2	94.6	55 42.6	+39.6	96.0	55 35.6	+41.0	97.5	55 27.0	+42.3	98.9	55 16.9	+43.6	100.4	55 05.4	+44.8	101.8	54 52.5	+46.0	103.2	40
41	56 28.9	+35.7	91.7	56 26.4	+37.2	93.2	56 22.2	+38.8	94.7	56 16.6	+40.1	96.2	56 09.3	+41.5	97.7	56 00.5	+42.9	99.1	55 50.2	+44.2	100.6	55 38.5	+45.3	102.0	41
42	57 04.6	+34.7	90.2	57 03.6	+36.2	91.8	57 01.0	+37.7	93.3	56 56.7	+39.2	94.8	56 50.8	+40.7	96.4	56 43.4	+42.1	97.9	56 34.4	+43.4	99.4	56 23.8	+44.7	100.9	42
43	57 39.3	+33.5	88.7	57 39.8	+35.2	90.3	57 38.7	+36.7	91.9	57 35.9	+38.3	93.4	57 31.5	+39.8	95.0	57 25.5	+41.2	96.6	57 17.8	+42.6	98.1	57 08.5	+44.0	99.7	43
44	58 12.8	+32.4	87.1	58 15.0	+34.0	88.8	58 15.4	+35.7	90.4	58 14.2	+37.3	92.0	58 11.3	+38.8	93.6	58 06.7	+40.3	95.2	58 00.4	+41.8	96.8	57 52.5	+43.1	98.4	44
45	58 45.2	+31.1	85.5	58 49.0	+32.9	87.2	58 51.1	+34.5	88.8	58 51.5	+36.1	90.5	58 50.1	+37.8	92.1	58 47.0	+39.3	93.8	58 42.2	+40.8	95.4	58 35.6	+42.3	97.1	45
46	59 16.3	+29.8	83.9	59 21.9	+31.5	85.5	59 25.6	+33.4	87.2	59 27.6	+35.1	88.9	59 27.9	+36.7	90.6	59 26.3	+38.3	92.3	59 23.0	+39.9	94.0	59 17.9	+41.5	95.7	46
47	59 46.1	+28.5	82.2	59 53.4	+30.3	83.9	59 59.0	+32.0	85.6	60 02.7	+33.8	87.3	60 04.6	+35.5	89.1	60 04.6	+37.1	90.8	60 02.9	+38.9	92.5	59 59.4	+40.4	94.3	47
48	60 14.6	+27.0	80.4	60 23.7	+28.8	82.1	60 31.0	+30.7	83.9	60 36.5	+32.5	85.6	60 40.1	+34.3	87.4	60 41.9	+36.0	89.2	60 41.8	+37.7	91.0	60 39.8	+39.4	92.8	48
49	60 41.6	+25.5	78.6	60 52.5	+27.4	80.3	61 01.7	+29.3	82.1	61 09.0	+31.1	83.9	61 14.4	+33.0	85.7	61 17.9	+34.8	87.6	61 19.5	+36.6	89.4	61 19.2	+38.3	91.2	49
50	61 07.1	+23.9	76.7	61 19.9	+25.9	78.5	61 31.0	+27.8	80.3	61 40.1	+29.7	82.1	61 47.4	+31.6	84.0	61 52.7	+33.5	85.8	61 56.1	+35.3	87.7	61 57.5	+37.1	89.6	50
51	61 31.0	+22.2	74.8	61 45.8	+24.2	76.6	61 58.8	+26.2	78.4	62 09.8	+28.2	80.3	62 19.0	+30.1	82.2	62 26.2	+32.0	84.1	62 31.4	+33.9	86.0	62 34.6	+35.8	87.9	51
52	61 53.2	+20.6	72.9	62 10.0	+22.6	74.7	62 25.0	+24.5	76.5	62 38.0	+26.6	78.4	62 49.1	+28.6	80.3	62 58.2	+30.6	82.2	63 05.3	+32.6	84.2	63 10.4	+34.5	86.1	52
53	62 13.8	+18.8	70.9	62 32.6	+20.8	72.7	62 49.5	+23.0	74.5	63 04.6	+24.9	76.4	63 17.7	+26.9	78.4	63 28.8	+29.0	80.3	63 37.9	+31.0	82.3	63 44.9	+33.0	84.3	53
54	62 32.6	+16.9	68.8	62 53.4	+19.0	70.6	63 12.4	+21.0	72.5	63 29.5	+23.1	74.4	63 44.6	+25.3	76.3	63 57.8	+27.3	78.3	64 08.9	+29.4	80.4	64 17.9	+31.5	82.4	54
55	62 49.5	+15.1	66.7	63 12.4	+17.1	68.5	63 33.4	+19.2	70.4	63 52.6	+21.3	72.3	64 09.9	+23.4	74.3	64 25.1	+25.6	76.3	64 38.3	+27.7	78.3	64 49.4	+29.8	80.4	55
56	63 04.6	+13.1•	64.6	63 29.5	+15.1	66.4	63 52.6	+17.2•	68.3	64 13.9	+19.4	70.2	64 33.3	+21.5	72.2	64 50.7	+23.7	74.2	65 06.0	+25.9	76.2	65 19.2	+28.1	78.4	56
57	63 17.7	+11.1•	62.4	63 44.6	+13.2•	64.2	64 09.8	+15.2•	66.1	64 33.3	+17.4•	68.0	64 54.8	+19.6•	70.0	65 14.4	+21.7	72.0	65 31.9	+24.0	74.1	65 47.3	+26.2	76.2	57
58	63 28.8	+9.1•	60.2	63 57.8	+11.1•	62.0	64 25.1	+13.2•	63.8	64 50.7	+15.3•	65.7	65 14.4	+17.5•	67.7	65 36.1	+19.8•	69.8	65 55.9	+22.0•	71.9	66 13.5	+24.2	74.0	58
59	63 37.9	+7.0•	58.0	64 08.9	+9.0•	59.8	64 38.3	+11.1•	61.6	65 06.0	+13.2•	63.5	65 31.9	+15.4•	65.5	65 55.9	+17.6•	67.5	66 17.9	+19.8•	69.6	66 37.7	+22.3•	71.7	59
60	63 44.9	+4.9•	55.8	64 17.9	+6.9•	57.5	64 49.4	+8.9•	59.3	65 19.2	+11.0•	61.1	65 47.3	+13.1•	63.1	66 13.5	+15.4•	65.1	66 37.7	+17.8•	67.2	67 00.0	+20.0•	69.4	60
61	63 49.8	+2.7•	53.5	64 24.8	+4.6•	55.2	64 58.3	+6.6•	56.9	65 30.2	+8.8•	58.8	66 00.4	+11.0•	60.7	66 28.9	+13.1•	62.7	66 55.5	+15.4•	64.8	67 20.0	+17.8•	66.9	61
62	63 52.5	+0.7•	51.2	64 29.4	+2.6•	52.9	65 04.9	+4.5•	54.6	65 39.0	+6.4•	56.4	66 11.4	+8.6•	58.3	66 42.0	+10.9•	60.2	67 10.9	+13.1•	62.3	67 37.8	+15.4•	64.4	62
63	63 53.2	-1.5•	49.0	64 32.0	+0.3•	50.5	65 09.4	+2.2•	52.2	65 45.4	+4.2•	54.0	66 20.0	+6.2•	55.8	66 52.9	+8.4•	57.7	67 24.0	+10.7•	59.8	67 53.2	+13.0•	61.9	63
64	63 51.7	-3.6•	46.7	64 32.3	-1.9•	48.2	65 11.6	0.0•	49.8	65 49.6	+1.9•	51.5	66 26.2	+3.9•	53.3	67 01.3	+6.0•	55.2	67 34.7	+8.2•	57.2	68 06.2	+10.5•	59.3	64
65	63 48.1	-5.8•	44.4	64 30.4	-4.1•	45.9	65 11.6	-2.4•	47.4	65 51.5	-0.5•	49.1	66 30.1	+1.5•	50.8	67 07.3	+3.5•	52.7	67 42.9	+5.6•	54.6	68 16.7	+8.0•	56.6	65
66	63 42.3	-7.8•	42.2	64 26.3	-6.2•	43.6	65 09.2	-4.5•	45.1	65 51.0	-2.8•	46.6	66 31.6	-1.0•	48.3	67 10.8	+1.0•	50.1	67 48.5	+3.2•	52.0	68 24.7	+5.3•	53.9	66
67	63 34.5	-9.9•	40.0	64 20.1	-8.4•	41.3	65 04.7	-6.9•	42.7	65 48.2	-5.1•	44.2	66 30.6	-3.3•	45.8	67 11.8	-1.4•	47.5	67 51.7	+0.5•	49.3	68 30.0	+2.7•	51.2	67
68	63 24.6	-11.9•	37.7	64 11.7	-10.5•	39.0	64 57.8	-9.0•	40.3	65 43.1	-7.4•	41.8	66 27.3	-5.7•	43.3	67 10.4	-3.9•	44.9	67 52.2	-2.0•	46.7	68 32.7	0.0•	48.5	68
69	63 12.7	-13.9	35.6	64 01.2	-12.6•	36.7	64 48.8	-11.1•	38.0	65 35.7	-9.7•	39.4	66 21.6	-8.1•	40.8	67 06.5	-6.4•	42.4	67 50.2	-4.6•	44.0	68 32.7	-2.6•	45.8	69
70	62 58.8	-15.8	33.4	63 48.6	-14.6•	34.5	64 37.7	-13.3•	35.7	65 26.0	-11.9•	37.0	66 13.5	-10.4•	38.3	67 00.1	-8.9•	39.8	67 45.6	-7.1•	41.4	68 30.1	-5.3•	43.0	70
71	62 43.0	-17.7	31.3	63 34.0	-16.6	32.3	64 24.4	-15.4•	33.4	65 14.1	-14.1•	34.6	66 03.1	-12.7•	35.9	66 51.2	-11.2•	37.3	67 38.5	-9.6•	38.8	68 24.8	-7.9•	40.3	71
72	62 25.3	-19.5	29.2	63 17.4	-18.4	30.2	64 09.0	-17.3	31.2	65 00.0	-16.1•	32.3	65 50.4	-14.9•	33.5	66 40.0	-13.5•	34.8	67 28.9	-12.0•	36.2	68 16.9	-10.3•	37.6	72
73	62 05.8	-21.2	27.2	62 59.0	-20.3	28.1	63 51.7	-19.3	29.0	64 43.9	-18.2•	30.1	65 35.5	-17.0•	31.2	66 26.5	-15.8•	32.3	67 16.9	-14.5•	33.6	68 06.4	-12.9•	35.0	73
74	61 44.6	-23.0	25.2	62 38.7	-22.1	26.0	63 32.4	-21.2	26.9	64 25.7	-20.2	27.8	65 18.5	-19.1•	28.9	66 10.7	-17.9•	29.9	67 02.4	-16.7•	31.1	67 53.5	-15.4•	32.4	74
75	61 21.6	-24.5	23.3	62 16.6	-23.8	24.0	63 11.2	-22.9	24.8	64 05.5	-22.1	25.7	64 59.4	-21.1	26.6	65 52.8	-20.1•	27.6	66 45.7	-19.0•	28.7	67 38.1	-17.8•	29.8	75
76	60 57.1	-26.1	21.4	61 52.8	-25.4	22.0	62 48.3	-24.7	22.8	63 43.4	-23.8	23.6	64 38.3	-23.0	24.4	65 32.7	-22.1	25.3	66 26.7	-21.0•	26.3	67 20.3	-20.0•	27.3	76
77	60 31.0	-27.6	19.5	61 27.4	-26.9	20.1	62 23.6	-26.3	20.8	63 19.6	-25.6	21.5	64 15.3	-24.9	22.3	65 10.6	-24.0	23.1	66 05.7	-23.2•	24.0	67 00.3	-22.2•	24.9	77
78	60 03.4	-29.0	17.7	61 00.5	-28.5	18.2	61 57.3	-27.9	18.9	62 54.0	-27.2	19.5	63 50.4	-26.5	20.2	64 46.6	-25.8	20.9	65 42.5	-25.0	21.7	66 38.1	-24.2•	22.5	78
79	59 34.4	-30.3	16.0	60 32.0	-29.9	16.5	61 29.4	-29.4	17.0	62 26.8	-28.9	17.6	63 23.9	-28.3	18.2	64 20.8	-27.6	18.8	65 17.5	-27.0	19.5	66 13.9	-26.2	20.3	79
80	59 04.1	-31.7	14.3	60 02.1	-31.2	14.7	61 00.1	-30.8	15.2	61 57.9	-30.3	15.7	62 55.6	-29.8	16.2	63 53.2	-29.3	16.8	64 50.5	-28.6	17.4	65 47.7	-28.1	18.0	80
81	58 32.4	-32.8	12.7	59 30.9	-32.5	13.0	60 29.3	-32.1	13.4	61 27.6	-31.7	13.9	62 25.8	-31.2	14.3	63 23.9	-30.8	14.8	64 21.9	-30.4	15.3	65 19.6	-29.8	15.9	81
82	57 59.6	-34.0	11.1	58 58.4	-33.7	11.4	59 57.2	-33.4	11.7	60 55.9	-33.0	12.1	61 54.6	-32.7	12.5	62 53.1	-32.3	12.9	63 51.5	-31.9	13.4	64 49.8	-31.4	13.8	82
83	57 25.6	-35.1	9.5	58 24.7	-34.8	9.8	59 23.8	-34.5	10.1	60 22.9	-34.3	10.4	61 21.9	-34.0	10.7	62 20.8	-33.7	11.1	63 19.6	-33.3	11.5	64 18.4	-33.0	11.9	83
84	56 50.5	-36.1	8.0	57 49.9	-35.9	8.3	58 49.3	-35.7	8.5	59 48.6	-35.5	8.7	60 47.9	-35.3	9.0	61 47.1	-35.0	9.3	62 46.3	-34.8	9.6	63 45.4	-34.4	10.0	84
85	56 14.4	-37.1	6.6	57 14.0	-37.0	6.8	58 13.5	-36.8	7.0	59 13.1	-36.6	7.2	60 12.6	-36.4	7.4	61 12.1	-36.2	7.6	62 11.5	-36.0	7.9	63 11.0	-35.8	8.1	85
86	55 37.3	-38.1	5.2	56 37.0	-37.9	5.3	57 36.7	-37.8	5.5	58 36.5	-37.7	5.6	59 36.2	-37.6	5.8	60 35.9	-37.4	6.0	61 35.5	-37.2	6.2	62 35.2	-37.1	6.4	86
87	54 59.2	-38.9	3.8	55 59.1	-38.9	3.9	56 58.9	-38.7	4.0	57 58.8	-38.7	4.1	58 58.6	-38.5	4.3	59 58.5	-38.4	4.4	60 58.3	-38.4	4.5	61 58.1	-38.3	4.7	87
88	54 20.3	-39.8	2.5	55 20.2	-39.7	2.6	56 20.2	-39.7	2.6	57 20.1	-39.6	2.7	58 20.1	-39.6	2.8	59 20.1	-39.5	2.9	60 19.9	-39.5	3.0	61 19.8	-39.4	3.0	88
89	53 40.5	-40.5	1.2	54 40.5	-40.5	1.3	55 40.5	-40.5	1.3	56 40.5	-40.5	1.3	57 40.5	-40.5	1.4	58 40.5	-40.5	1.4	59 40.4	-40.4	1.4	60 40.4	-40.4	1.5	89
90	53 00.0	-41.3	0.0	54 00.0	-41.3	0.0	55 00.0	-41.3	0.0	56 00.0	-41.3	0.0	57 00.0	-41.3	0.0	58 00.0	-41.4	0.0	59 00.0	-41.4	0.0	60 00.0	-41.4	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 47°, 313°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	24 13.9	−52.6	126.7	23 37.9	−53.0	127.0	23 01.7	−53.5	127.4	22 25.1	−53.8	127.7	21 48.3	−54.3	128.0	21 11.2	−54.6	128.3	20 33.8	−54.9	128.6	19 56.3	−55.3	128.9	0
1	23 21.3	−52.7	127.2	22 44.9	−53.1	127.5	22 08.2	−53.5	127.9	21 31.3	−54.0	128.2	20 54.0	−54.3	128.5	20 16.6	−54.7	128.8	19 38.9	−55.0	129.1	19 01.0	−55.4	129.3	1
2	22 28.6	−52.8	127.7	21 51.8	−53.2	128.0	21 14.7	−53.6	128.4	20 37.3	−54.0	128.7	19 59.7	−54.3	128.9	19 21.9	−54.7	129.2	18 43.9	−55.1	129.5	18 05.6	−55.4	129.7	2
3	21 35.8	−52.9	128.2	20 58.6	−53.3	128.5	20 21.1	−53.7	128.8	19 43.3	−54.1	129.1	19 05.4	−54.5	129.4	18 27.2	−54.8	129.7	17 48.8	−55.1	129.9	17 10.2	−55.5	130.1	3
4	20 42.9	−53.0	128.7	20 05.3	−53.4	129.0	19 27.4	−53.8	129.3	18 49.2	−54.1	129.6	18 10.9	−54.5	129.8	17 32.4	−54.9	130.1	16 53.7	−55.2	130.3	16 14.7	−55.6	130.5	4
5	19 49.9	−53.0	129.2	19 11.9	−53.5	129.5	18 33.6	−53.8	129.8	17 55.1	−54.2	130.0	17 16.4	−54.5	130.3	16 37.5	−54.9	130.5	15 58.5	−55.2	130.7	15 19.2	−55.5	130.9	5
6	18 56.9	−53.2	129.7	18 18.4	−53.5	130.0	17 39.8	−54.0	130.2	17 00.9	−54.3	130.5	16 21.9	−54.7	130.7	15 42.6	−54.9	130.9	15 03.3	−55.3	131.1	14 23.7	−55.6	131.3	6
7	18 03.7	−53.2	130.2	17 24.9	−53.6	130.5	16 45.8	−53.9	130.7	16 06.6	−54.3	131.0	15 27.2	−54.6	131.1	14 47.7	−55.0	131.3	14 08.0	−55.3	131.5	13 28.1	−55.6	131.7	7
8	17 10.5	−53.3	130.7	16 31.3	−53.7	130.9	15 51.9	−54.0	131.2	15 12.3	−54.4	131.4	14 32.6	−54.7	131.6	13 52.7	−55.0	131.8	13 12.7	−55.4	131.9	12 32.5	−55.6	132.1	8
9	16 17.2	−53.3	131.2	15 37.6	−53.7	131.4	14 57.9	−54.1	131.6	14 17.9	−54.4	131.8	13 37.9	−54.8	132.0	12 57.7	−55.1	132.2	12 17.3	−55.3	132.3	11 36.9	−55.7	132.5	9
10	15 23.9	−53.4	131.7	14 43.9	−53.8	131.9	14 03.8	−54.1	132.1	13 23.5	−54.4	132.2	12 43.1	−54.8	132.4	12 02.6	−55.1	132.6	11 22.0	−55.5	132.7	10 41.2	−55.7	132.9	10
11	14 30.5	−53.5	132.1	13 50.1	−53.8	132.3	13 09.7	−54.2	132.5	12 29.1	−54.5	132.7	11 48.3	−54.8	132.8	11 07.5	−55.1	133.0	10 26.5	−55.4	133.1	9 45.5	−55.7	133.2	11
12	13 37.0	−53.5	132.6	12 56.3	−53.9	132.8	12 15.5	−54.2	132.9	11 34.6	−54.6	133.1	10 53.5	−54.8	133.2	10 12.4	−55.2	133.4	9 31.1	−55.5	133.5	8 49.8	−55.8	133.6	12
13	12 43.5	−53.6	133.1	12 02.4	−53.9	133.2	11 21.3	−54.3	133.4	10 40.0	−54.6	133.5	9 58.7	−54.9	133.7	9 17.2	−55.2	133.8	8 35.6	−55.4	133.9	7 54.0	−55.8	134.0	13
14	11 49.9	−53.6	133.5	11 08.5	−53.9	133.7	10 27.0	−54.2	133.8	9 45.4	−54.6	133.9	9 03.8	−54.9	134.1	8 22.0	−55.2	134.2	7 40.2	−55.6	134.3	6 58.2	−55.8	134.4	14
15	10 56.3	−53.7	134.0	10 14.6	−54.0	134.1	9 32.8	−54.4	134.2	8 50.8	−54.6	134.4	8 08.9	−55.0	134.5	7 26.8	−55.3	134.6	6 44.6	−55.5	134.7	6 02.4	−55.8	134.7	15
16	10 02.6	−53.7	134.4	9 20.6	−54.0	134.6	8 38.4	−54.3	134.7	7 56.2	−54.6	134.8	7 13.9	−54.9	134.9	6 31.5	−55.2	135.0	5 49.1	−55.5	135.0	5 06.6	−55.8	135.1	16
17	9 08.9	−53.7	134.9	8 26.6	−54.1	135.0	7 44.1	−54.4	135.1	7 01.6	−54.7	135.2	6 19.0	−55.0	135.3	5 36.3	−55.3	135.4	4 53.6	−55.6	135.4	4 10.8	−55.8	135.5	17
18	8 15.2	−53.7	135.3	7 32.5	−54.1	135.4	6 49.7	−54.4	135.5	6 06.9	−54.7	135.6	5 24.0	−55.0	135.7	4 41.0	−55.3	135.7	3 58.0	−55.5	135.8	3 15.0	−55.8	135.8	18
19	7 21.5	−53.8	135.8	6 38.4	−54.1	135.9	5 55.3	−54.4	136.0	5 12.2	−54.7	136.0	4 29.0	−55.0	136.1	3 45.7	−55.3	136.1	3 02.5	−55.6	136.2	2 19.2	−55.9	136.2	19
20	6 27.7	−53.8	136.2	5 44.3	−54.1	136.3	5 00.9	−54.4	136.4	4 17.5	−54.8	136.4	3 34.0	−55.1	136.5	2 50.4	−55.3	136.5	2 06.9	−55.6	136.6	1 23.3	−55.9	136.6	20
21	5 33.9	−53.8	136.7	4 50.2	−54.1	136.7	4 06.5	−54.5	136.8	3 22.7	−54.7	136.8	2 38.9	−55.0	136.9	1 55.1	−55.3	136.9	1 11.3	−55.6	136.9	0 27.5	−55.9	136.9	21
22	4 40.1	−53.9	137.1	3 56.1	−54.2	137.2	3 12.0	−54.4	137.2	2 28.0	−54.8	137.3	1 43.9	−55.0	137.3	0 59.8	−55.3	137.3	0 15.7	−55.5	137.3	0 28.4	+55.8	42.7	22
23	3 46.2	−53.8	137.6	3 01.9	−54.1	137.6	2 17.6	−54.5	137.6	1 33.2	−54.7	137.7	0 48.9	−55.0	137.7	0 04.5	−55.3	137.7	0 39.8	+55.6	42.3	1 24.2	+55.8	42.3	23
24	2 52.4	−53.9	138.0	2 07.8	−54.2	138.0	1 23.1	−54.4	138.1	0 38.5	−54.8	138.1	0 06.1	+55.1	41.9	0 50.8	+55.3	41.9	1 35.4	+55.6	41.9	2 20.0	+55.9	42.0	24
25	1 58.5	−53.9	138.5	1 13.6	−54.2	138.5	0 28.7	−54.5	138.5	0 16.3	+54.7	41.5	1 01.2	+55.0	41.5	1 46.1	+55.3	41.5	2 31.0	+55.6	41.6	3 15.9	+55.8	41.6	25
26	1 04.6	−53.8	138.9	0 19.4	−54.2	138.9	0 25.8	+54.5	41.1	1 11.0	+54.8	41.1	1 56.2	+55.0	41.1	2 41.4	+55.3	41.2	3 26.6	+55.5	41.2	4 11.7	+55.8	41.2	26
27	0 10.8	−53.9	139.3	0 34.8	+54.1	40.7	1 20.3	+54.4	40.7	2 05.8	+54.7	40.7	2 51.2	+55.1	40.7	3 36.7	+55.3	40.8	4 22.1	+55.6	40.8	5 07.5	+55.8	40.9	27
28	0 43.1	+53.9	40.2	1 28.9	+54.2	40.2	2 14.7	+54.5	40.3	3 00.5	+54.7	40.3	3 46.3	+55.0	40.3	4 32.0	+55.3	40.4	5 17.7	+55.5	40.4	6 03.3	+55.8	40.5	28
29	1 37.0	+53.9	39.8	2 23.1	+54.1	39.8	3 09.2	+54.4	39.8	3 55.2	+54.8	39.9	4 41.3	+55.0	39.9	5 27.3	+55.2	40.0	6 13.2	+55.5	40.0	6 59.1	+55.8	40.1	29
30	2 30.9	+53.8	39.3	3 17.2	+54.2	39.4	4 03.6	+54.4	39.4	4 50.0	+54.7	39.5	5 36.3	+54.9	39.5	6 22.5	+55.3	39.6	7 08.7	+55.5	39.7	7 54.9	+55.7	39.8	30
31	3 24.7	+53.9	38.9	4 11.4	+54.1	38.9	4 58.0	+54.5	39.0	5 44.7	+54.6	39.1	6 31.2	+55.0	39.1	7 17.8	+55.2	39.2	8 04.2	+55.5	39.3	8 50.6	+55.8	39.4	31
32	4 18.6	+53.8	38.5	5 05.5	+54.1	38.5	5 52.5	+54.4	38.6	6 39.3	+54.7	38.6	7 26.2	+54.9	38.7	8 13.0	+55.2	38.8	8 59.7	+55.5	38.9	9 46.4	+55.7	39.0	32
33	5 12.4	+53.8	38.0	5 59.6	+54.1	38.1	6 46.9	+54.3	38.1	7 34.0	+54.7	38.2	8 21.1	+54.9	38.3	9 08.2	+55.1	38.4	9 55.2	+55.4	38.5	10 42.1	+55.6	38.6	33
34	6 06.2	+53.8	37.6	6 53.7	+54.1	37.7	7 41.2	+54.4	37.7	8 28.7	+54.6	37.8	9 16.0	+54.9	37.9	10 03.3	+55.2	38.0	10 50.6	+55.4	38.1	11 37.7	+55.6	38.2	34
35	7 00.0	+53.8	37.1	7 47.8	+54.1	37.2	8 35.6	+54.3	37.3	9 23.3	+54.6	37.4	10 10.9	+54.9	37.5	10 58.5	+55.1	37.6	11 46.0	+55.3	37.7	12 33.4	+55.6	37.9	35
36	7 53.8	+53.7	36.7	8 41.9	+54.0	36.8	9 29.9	+54.3	36.9	10 17.9	+54.5	37.0	11 05.8	+54.8	37.1	11 53.6	+55.1	37.2	12 41.3	+55.4	37.3	13 29.0	+55.6	37.5	36
37	8 47.5	+53.7	36.2	9 35.9	+53.9	36.3	10 24.2	+54.2	36.4	11 12.4	+54.5	36.5	12 00.6	+54.8	36.7	12 48.7	+55.0	36.8	13 36.7	+55.3	36.9	14 24.6	+55.5	37.1	37
38	9 41.2	+53.7	35.8	10 29.8	+54.0	35.9	11 18.4	+54.2	36.0	12 06.9	+54.5	36.1	12 55.4	+54.7	36.2	13 43.7	+55.0	36.4	14 32.0	+55.2	36.5	15 20.1	+55.5	36.7	38
39	10 34.9	+53.6	35.3	11 23.8	+53.9	35.4	12 12.6	+54.2	35.6	13 01.4	+54.4	35.7	13 50.1	+54.7	35.8	14 38.7	+55.0	36.0	15 27.2	+55.2	36.1	16 15.6	+55.5	36.3	39
40	11 28.5	+53.6	34.9	12 17.7	+53.9	35.0	13 06.8	+54.1	35.1	13 55.8	+54.4	35.3	14 44.8	+54.6	35.4	15 33.7	+54.9	35.6	16 22.4	+55.2	35.7	17 11.1	+55.4	35.9	40
41	12 22.1	+53.5	34.4	13 11.6	+53.8	34.5	14 00.9	+54.1	34.7	14 50.2	+54.4	34.8	15 39.4	+54.6	35.0	16 28.6	+54.8	35.1	17 17.6	+55.1	35.3	18 06.5	+55.3	35.5	41
42	13 15.6	+53.5	33.9	14 05.4	+53.7	34.1	14 55.0	+54.0	34.2	15 44.6	+54.3	34.4	16 34.0	+54.6	34.5	17 23.4	+54.8	34.7	18 12.7	+55.0	34.9	19 01.8	+55.3	35.1	42
43	14 09.1	+53.4	33.5	14 59.1	+53.7	33.6	15 49.0	+54.0	33.8	16 38.9	+54.2	33.9	17 28.6	+54.5	34.1	18 18.2	+54.8	34.3	19 07.7	+55.0	34.5	19 57.1	+55.3	34.7	43
44	15 02.5	+53.4	33.0	15 52.8	+53.7	33.2	16 43.0	+53.9	33.3	17 33.1	+54.2	33.5	18 23.1	+54.4	33.7	19 13.0	+54.6	33.9	20 02.7	+55.0	34.1	20 52.4	+55.2	34.3	44
45	15 55.9	+53.3	32.5	16 46.5	+53.5	32.7	17 36.9	+53.9	32.9	18 27.3	+54.1	33.0	19 17.5	+54.4	33.2	20 07.6	+54.7	33.4	20 57.7	+54.8	33.6	21 47.6	+55.1	33.8	45
46	16 49.2	+53.3	32.1	17 40.0	+53.6	32.2	18 30.8	+53.7	32.4	19 21.4	+54.0	32.6	20 11.9	+54.3	32.8	21 02.3	+54.5	33.0	21 52.5	+54.8	33.2	22 42.7	+55.0	33.4	46
47	17 42.5	+53.2	31.6	18 33.6	+53.4	31.7	19 24.5	+53.7	31.9	20 15.4	+54.0	32.1	21 06.2	+54.2	32.3	21 56.8	+54.5	32.5	22 47.3	+54.8	32.8	23 37.7	+55.0	33.0	47
48	18 35.7	+53.1	31.1	19 27.0	+53.4	31.3	20 18.2	+53.7	31.5	21 09.4	+53.8	31.7	22 00.4	+54.1	31.9	22 51.3	+54.4	32.1	23 42.1	+54.6	32.3	24 32.7	+54.9	32.5	48
49	19 28.8	+53.0	30.6	20 20.4	+53.2	30.8	21 11.9	+53.5	31.0	22 03.2	+53.8	31.2	22 54.5	+54.1	31.4	23 45.7	+54.3	31.6	24 36.7	+54.6	31.9	25 27.6	+54.8	32.1	49
50	20 21.8	+52.9	30.1	21 13.6	+53.2	30.3	22 05.4	+53.5	30.5	22 57.0	+53.8	30.7	23 48.6	+54.0	30.9	24 40.0	+54.2	31.2	25 31.3	+54.5	31.4	26 22.4	+54.8	31.6	50
51	21 14.7	+52.9	29.6	22 06.8	+53.1	29.8	22 58.9	+53.3	30.0	23 50.8	+53.6	30.2	24 42.6	+53.8	30.4	25 34.2	+54.2	30.7	26 25.8	+54.3	30.9	27 17.2	+54.6	31.2	51
52	22 07.6	+52.7	29.1	22 59.9	+53.0	29.3	23 52.2	+53.3	29.5	24 44.4	+53.5	29.7	25 36.4	+53.8	30.0	26 28.4	+54.0	30.2	27 20.1	+54.3	30.5	28 11.8	+54.5	30.7	52
53	23 00.3	+52.6	28.6	23 52.9	+52.9	28.8	24 45.5	+53.1	29.0	25 37.9	+53.4	29.2	26 30.2	+53.7	29.5	27 22.4	+53.9	29.7	28 14.4	+54.2	30.0	29 06.3	+54.5	30.2	53
54	23 52.9	+52.6	28.0	24 45.8	+52.8	28.3	25 38.6	+53.1	28.5	26 31.3	+53.3	28.7	27 23.9	+53.6	29.0	28 16.3	+53.8	29.2	29 08.6	+54.1	29.5	30 00.8	+54.3	29.8	54
55	24 45.5	+52.4	27.5	25 38.6	+52.7	27.7	26 31.7	+52.9	28.0	27 24.6	+53.2	28.2	28 17.5	+53.4	28.4	29 10.1	+53.7	28.7	30 02.7	+54.0	29.0	30 55.1	+54.2	29.3	55
56	25 37.9	+52.3	27.0	26 31.3	+52.6	27.2	27 24.6	+52.9	27.4	28 17.8	+53.1	27.7	29 10.9	+53.3	27.9	30 03.8	+53.6	28.3	30 56.7	+53.8	28.5	31 49.3	+54.1	28.8	56
57	26 30.2	+52.2	26.4	27 23.9	+52.4	26.7	28 17.5	+52.6	26.9	29 10.9	+52.9	27.1	30 04.2	+53.2	27.4	30 57.4	+53.5	27.7	31 50.5	+53.7	28.0	32 43.4	+54.0	28.3	57
58	27 22.4	+52.0	25.9	28 16.3	+52.3	26.1	29 10.1	+52.6	26.3	30 03.8	+52.9	26.6	30 57.4	+53.1	26.9	31 50.9	+53.3	27.1	32 44.2	+53.6	27.4	33 37.4	+53.8	27.7	58
59	28 14.4	+51.9	25.3	29 08.6	+52.2	25.5	30 02.7	+52.4	25.8	30 56.7	+52.6	26.1	31 50.5	+52.9	26.3	32 44.2	+53.2	26.6	33 37.8	+53.4	26.9	34 31.2	+53.7	27.2	59
60	29 06.3	+51.8	24.7	30 00.8	+52.0	25.0	30 55.1	+52.3	25.2	31 49.3	+52.5	25.5	32 43.4	+52.8	25.8	33 37.4	+53.0	26.0	34 31.2	+53.3	26.3	35 24.9	+53.6	26.7	60
61	29 58.1	+51.6	24.2	30 52.8	+51.8	24.4	31 47.4	+52.1	24.7	32 41.8	+52.4	24.9	33 36.2	+52.6	25.2	34 30.4	+52.9	25.5	35 24.5	+53.1	25.8	36 18.5	+53.4	26.1	61
62	30 49.7	+51.4	23.6	31 44.6	+51.7	23.8	32 39.5	+51.9	24.1	33 34.2	+52.2	24.3	34 28.8	+52.5	24.6	35 23.3	+52.7	24.9	36 17.6	+53.0	25.2	37 11.9	+53.2	25.5	62
63	31 41.1	+51.3	23.0	32 36.3	+51.5	23.2	33 31.4	+51.8	23.5	34 26.4	+52.0	23.7	35 21.3	+52.2	24.0	36 16.0	+52.5	24.3	37 10.6	+52.8	24.6	38 05.1	+53.0	25.0	63
64	32 32.4	+51.1	22.4	33 27.8	+51.4	22.6	34 23.2	+51.5	22.9	35 18.4	+51.8	23.1	36 13.5	+52.1	23.4	37 08.5	+52.4	23.7	38 03.4	+52.6	24.0	38 58.1	+52.9	24.4	64
65	33 23.5	+50.9	21.7	34 19.2	+51.2	22.0	35 14.7	+51.4	22.2	36 10.2	+51.7	22.5	37 05.6	+51.9	22.8	38 00.9	+52.1	23.1	38 56.0	+52.4	23.4	39 51.0	+52.6	23.7	65
66	34 14.4	+50.6	21.1	35 10.3	+50.9	21.3	36 06.1	+51.2	21.6	37 01.9	+51.4	21.9	37 57.5	+51.7	22.2	38 53.0	+51.9	22.5	39 48.4	+52.2	22.8	40 43.6	+52.5	23.1	66
67	35 05.0	+50.5	20.4	36 01.2	+50.7	20.7	36 57.3	+51.0	21.0	37 53.3	+51.2	21.2	38 49.2	+51.4	21.5	39 44.9	+51.7	21.8	40 40.6	+51.9	22.1	41 36.1	+52.2	22.5	67
68	35 55.5	+50.3	19.8	36 51.9	+50.5	20.0	37 48.3	+50.7	20.3	38 44.5	+51.0	20.6	39 40.6	+51.2	20.9	40 36.6	+51.5	21.2	41 32.5	+51.7	21.5	42 28.3	+52.0	21.8	68
69	36 45.8	+50.0	19.1	37 42.4	+50.3	19.3	38 39.0	+50.5	19.6	39 35.5	+50.7	19.9	40 31.8	+51.0	20.2	41 28.1	+51.2	20.5	42 24.2	+51.5	20.8	43 20.3	+51.7	21.1	69
70	37 35.8	+49.7	18.4	38 32.7	+50.0	18.7	39 29.5	+50.2	18.9	40 26.2	+50.5	19.2	41 22.8	+50.7	19.5	42 19.3	+51.0	19.8	43 15.7	+51.2	20.1	44 12.0	+51.5	20.4	70
71	38 25.5	+49.5	17.7	39 22.7	+49.7	17.9	40 19.7	+50.0	18.2	41 16.7	+50.2	18.5	42 13.5	+50.5	18.8	43 10.3	+50.7	19.1	44 06.9	+51.0	19.4	45 03.5	+51.2	19.7	71
72	39 15.0	+49.3	17.0	40 12.4	+49.4	17.2	41 09.7	+49.6	17.5	42 06.9	+49.9	17.7	43 04.0	+50.1	18.0	44 01.0	+50.4	18.3	44 57.9	+50.6	18.6	45 54.7	+50.9	19.0	72
73	40 04.3	+48.9	16.2	41 01.8	+49.2	16.5	41 59.3	+49.4	16.7	42 56.8	+49.6	17.0	43 54.1	+49.9	17.3	44 51.4	+50.0	17.6	45 48.5	+50.3	17.9	46 45.6	+50.6	18.2	73
74	40 53.2	+48.6	15.5	41 51.0	+48.8	15.7	42 48.7	+49.1	15.9	43 46.4	+49.3	16.2	44 44.0	+49.5	16.5	45 41.4	+49.8	16.8	46 38.8	+50.0	17.1	47 36.2	+50.2	17.4	74
75	41 41.8	+48.3	14.7	42 39.8	+48.6	14.9	43 37.8	+48.7	15.1	44 35.7	+48.9	15.4	45 33.5	+49.1	15.7	46 31.2	+49.4	16.0	47 28.8	+49.7	16.3	48 26.4	+49.9	16.6	75
76	42 30.1	+48.0	13.9	43 28.4	+48.1	14.1	44 26.5	+48.4	14.3	45 24.6	+48.6	14.6	46 22.6	+48.8	14.9	47 20.6	+49.0	15.1	48 18.5	+49.3	15.4	49 16.3	+49.5	15.7	76
77	43 18.1	+47.6	13.1	44 16.5	+47.8	13.3	45 14.9	+48.0	13.5	46 13.2	+48.2	13.8	47 11.4	+48.5	14.0	48 09.6	+48.7	14.3	49 07.7	+48.9	14.6	50 05.8	+49.1	14.9	77
78	44 05.7	+47.2	12.2	45 04.3	+47.4	12.4	46 02.9	+47.6	12.7	47 01.4	+47.8	12.9	47 59.9	+48.0	13.1	48 58.3	+48.2	13.4	49 56.6	+48.4	13.7	50 54.9	+48.6	14.0	78
79	44 52.9	+46.8	11.4	45 51.7	+47.0	11.6	46 50.5	+47.2	11.8	47 49.2	+47.4	12.0	48 47.9	+47.5	12.2	49 46.5	+47.7	12.5	50 45.0	+48.0	12.7	51 43.5	+48.2	13.0	79
80	45 39.7	+46.4	10.5	46 38.7	+46.6	10.7	47 37.7	+46.7	10.9	48 36.6	+46.9	11.1	49 35.4	+47.1	11.3	50 34.2	+47.3	11.5	51 33.0	+47.5	11.8	52 31.7	+47.7	12.0	80
81	46 26.1	+46.0	9.6	47 25.3	+46.1	9.7	48 24.4	+46.3	9.9	49 23.5	+46.4	10.1	50 22.5	+46.6	10.3	51 21.5	+46.8	10.6	52 20.5	+47.0	10.8	53 19.4	+47.2	11.0	81
82	47 12.1	+45.5	8.6	48 11.4	+45.6	8.8	49 10.7	+45.7	9.0	50 09.9	+45.9	9.1	51 09.1	+46.1	9.3	52 08.3	+46.3	9.5	53 07.5	+46.4	9.8	54 06.6	+46.6	10.0	82
83	47 57.5	+45.0	7.6	48 57.0	+45.1	7.8	49 56.4	+45.2	8.0	50 55.8	+45.4	8.1	51 55.2	+45.5	8.3	52 54.6	+45.6	8.5	53 53.9	+45.8	8.7	54 53.2	+46.0	8.9	83
84	48 42.5	+44.4	6.7	49 42.1	+44.5	6.8	50 41.6	+44.7	6.9	51 41.2	+44.7	7.1	52 40.7	+45.0	7.2	53 40.2	+45.1	7.4	54 39.7	+45.2	7.6	55 39.2	+45.4	7.8	84
85	49 26.9	+43.9	5.6	50 26.6	+44.0	5.7	51 26.3	+44.1	5.9	52 26.0	+44.2	6.0	53 25.7	+44.3	6.1	54 25.3	+44.4	6.3	55 24.9	+44.6	6.4	56 24.6	+44.6	6.6	85
86	50 10.8	+43.3	4.6	51 10.6	+43.4	4.7	52 10.4	+43.4	4.8	53 10.2	+43.5	4.9	54 10.0	+43.6	5.0	55 09.7	+43.8	5.1	56 09.5	+43.8	5.3	57 09.2	+44.0	5.4	86
87	50 54.1	+42.6	3.5	51 54.0	+42.7	3.6	52 53.8	+42.8	3.6	53 53.7	+42.9	3.7	54 53.6	+42.9	3.8	55 53.5	+42.9	3.9	56 53.3	+43.1	4.0	57 53.2	+43.1	4.1	87
88	51 36.7	+42.0	2.4	52 36.7	+42.0	2.4	53 36.6	+42.1	2.5	54 36.6	+42.1	2.5	55 36.5	+42.2	2.6	56 36.4	+42.2	2.7	57 36.4	+42.2	2.7	58 36.3	+42.3	2.8	88
89	52 18.7	+41.3	1.2	53 18.7	+41.3	1.2	54 18.7	+41.3	1.3	55 18.7	+41.3	1.3	56 18.7	+41.3	1.3	57 18.6	+41.4	1.4	58 18.6	+41.4	1.4	59 18.6	+41.4	1.4	89
90	53 00.0	+40.5	0.0	54 00.0	+40.5	0.0	55 00.0	+40.5	0.0	56 00.0	+40.5	0.0	57 00.0	+40.5	0.0	58 00.0	+40.5	0.0	59 00.0	+40.4	0.0	60 00.0	+40.4	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 133°, 227°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	23 44.8	+52.3	125.7	23 09.6	+52.8	126.1	22 34.1	+53.2	126.4	21 58.4	+53.6	126.7	21 22.4	+54.0	127.1	20 46.1	+54.4	127.4	20 09.5	+54.8	127.7	19 32.8	+55.1	127.9	0
1	24 37.1	+52.2	125.2	24 02.4	+52.6	125.6	23 27.3	+53.1	125.9	22 52.0	+53.5	126.3	22 16.4	+53.9	126.6	21 40.5	+54.3	126.9	21 04.3	+54.7	127.2	20 27.9	+55.0	127.5	1
2	25 29.3	+52.0	124.6	24 55.0	+52.5	125.0	24 20.4	+53.0	125.4	23 45.5	+53.4	125.8	23 10.3	+53.8	126.1	22 34.8	+54.2	126.5	21 59.0	+54.6	126.8	21 22.9	+55.0	127.1	2
3	26 21.3	+52.0	124.1	25 47.5	+52.4	124.5	25 13.4	+52.8	124.9	24 38.9	+53.3	125.3	24 04.1	+53.7	125.6	23 29.0	+54.1	126.0	22 53.6	+54.5	126.3	22 17.9	+54.9	126.7	3
4	27 13.3	+51.7	123.5	26 39.9	+52.3	123.9	26 06.2	+52.8	124.4	25 32.2	+53.2	124.8	24 57.8	+53.7	125.1	24 23.1	+54.1	125.5	23 48.1	+54.5	125.9	23 12.8	+54.9	126.2	4
5	28 05.0	+51.7	123.0	27 32.2	+52.2	123.4	26 59.0	+52.6	123.8	26 25.4	+53.1	124.2	25 51.5	+53.5	124.6	25 17.2	+54.0	125.0	24 42.6	+54.4	125.4	24 07.7	+54.7	125.8	5
6	28 56.7	+51.5	122.4	28 24.4	+52.0	122.8	27 51.6	+52.5	123.3	27 18.5	+53.0	123.7	26 45.0	+53.4	124.1	26 11.2	+53.8	124.6	25 37.0	+54.2	125.0	25 02.4	+54.7	125.3	6
7	29 48.2	+51.3	121.8	29 16.4	+51.8	122.3	28 44.1	+52.4	122.7	28 11.5	+52.8	123.2	27 38.4	+53.4	123.6	27 05.0	+53.8	124.1	26 31.2	+54.2	124.5	25 57.1	+54.6	124.9	7
8	30 39.5	+51.2	121.2	30 08.2	+51.7	121.7	29 36.5	+52.2	122.2	29 04.3	+52.7	122.6	28 31.8	+53.2	123.1	27 58.8	+53.6	123.6	27 25.4	+54.1	124.0	26 51.7	+54.5	124.4	8
9	31 30.7	+51.0	120.6	30 59.9	+51.6	121.1	30 28.7	+52.1	121.6	29 57.0	+52.6	122.1	29 25.0	+53.0	122.6	28 52.4	+53.6	123.0	28 19.5	+54.0	123.5	27 46.2	+54.4	123.9	9
10	32 21.7	+50.8	120.0	31 51.5	+51.3	120.5	31 20.8	+51.9	121.0	30 49.6	+52.5	121.5	30 18.0	+52.9	122.0	29 46.0	+53.4	122.5	29 13.5	+53.9	123.0	28 40.6	+54.3	123.5	10
11	33 12.5	+50.6	119.3	32 42.8	+51.2	119.9	32 12.7	+51.7	120.4	31 42.1	+52.2	121.0	31 10.9	+52.8	121.5	30 39.4	+53.3	122.0	30 07.4	+53.7	122.5	29 34.9	+54.2	123.0	11
12	34 03.1	+50.4	118.7	33 34.0	+51.0	119.3	33 04.4	+51.6	119.8	32 34.3	+52.2	120.4	32 03.7	+52.7	120.9	31 32.7	+53.1	121.5	31 01.1	+53.6	122.0	30 29.1	+54.1	122.5	12
13	34 53.5	+50.2	118.0	34 25.0	+50.8	118.6	33 56.0	+51.4	119.2	33 26.5	+51.9	119.8	32 56.4	+52.5	120.4	32 25.8	+53.0	120.9	31 54.7	+53.5	121.5	31 23.2	+53.9	122.0	13
14	35 43.7	+49.9	117.3	35 15.8	+50.6	118.0	34 47.4	+51.2	118.6	34 18.4	+51.8	119.2	33 48.9	+52.3	119.8	33 18.8	+52.8	120.4	32 48.2	+53.4	120.9	32 17.1	+53.9	121.5	14
15	36 33.6	+49.8	116.7	36 06.4	+50.4	117.3	35 38.6	+51.0	118.0	35 10.2	+51.5	118.6	34 41.2	+52.1	119.2	34 11.6	+52.7	119.8	33 41.6	+53.2	120.4	33 11.0	+53.7	120.9	15
16	37 23.4	+49.4	116.0	36 56.8	+50.1	116.6	36 29.6	+50.7	117.3	36 01.7	+51.4	118.0	35 33.3	+52.0	118.6	35 04.3	+52.5	119.2	34 34.8	+53.0	119.8	34 04.7	+53.5	120.4	16
17	38 12.8	+49.2	115.2	37 46.9	+49.9	115.9	37 20.3	+50.5	116.6	36 53.1	+51.2	117.3	36 25.3	+51.7	118.0	35 56.8	+52.4	118.6	35 27.8	+52.9	119.3	34 58.2	+53.4	119.9	17
18	39 02.0	+48.9	114.5	38 36.8	+49.6	115.2	38 10.8	+50.3	116.0	37 44.3	+50.9	116.7	37 17.0	+51.6	117.3	36 49.2	+52.1	118.0	36 20.7	+52.7	118.7	35 51.6	+53.2	119.3	18
19	39 50.9	+48.6	113.8	39 26.4	+49.3	114.5	39 01.1	+50.1	115.3	38 35.2	+50.7	116.0	38 08.6	+51.3	116.7	37 41.3	+51.9	117.3	37 13.4	+52.5	118.1	36 44.8	+53.1	118.7	19
20	40 39.5	+48.4	113.0	40 15.7	+49.1	113.8	39 51.2	+49.7	114.5	39 25.9	+50.4	115.3	38 59.9	+51.1	116.0	38 33.2	+51.8	116.8	38 05.9	+52.3	117.5	37 37.9	+52.9	118.1	20
21	41 27.9	+47.9	112.2	41 04.8	+48.7	113.0	40 40.9	+49.5	113.8	40 16.3	+50.2	114.6	39 51.0	+50.9	115.4	39 25.0	+51.5	116.1	38 58.2	+52.1	116.8	38 30.8	+52.7	117.5	21
22	42 15.8	+47.7	111.4	41 53.5	+48.4	112.2	41 30.4	+49.2	113.1	41 06.5	+49.9	113.9	40 41.9	+50.6	114.7	40 16.5	+51.2	115.4	39 50.3	+51.9	116.2	39 23.5	+52.5	116.9	22
23	43 03.5	+47.2	110.6	42 41.9	+48.1	111.4	42 19.6	+48.9	112.3	41 56.4	+49.6	113.1	41 32.5	+50.3	113.9	41 07.7	+51.1	114.7	40 42.2	+51.7	115.5	40 16.0	+52.3	116.3	23
24	43 50.7	+46.9	109.7	43 30.0	+47.7	110.6	43 08.5	+48.5	111.5	42 46.0	+49.3	112.4	42 22.8	+50.1	113.2	41 58.8	+50.7	114.0	41 33.9	+51.5	114.9	41 08.3	+52.1	115.7	24
25	44 37.6	+46.5	108.9	44 17.7	+47.4	109.8	43 57.0	+48.2	110.7	43 35.3	+49.0	111.6	43 12.9	+49.7	112.5	42 49.5	+50.5	113.3	42 25.4	+51.1	114.2	42 00.4	+51.8	115.0	25
26	45 24.1	+46.0	108.0	45 05.1	+46.9	108.9	44 45.2	+47.8	109.9	44 24.3	+48.7	110.8	44 02.6	+49.4	111.7	43 40.0	+50.2	112.6	43 16.5	+50.9	113.4	42 52.2	+51.6	114.3	26
27	46 10.1	+45.6	107.0	45 52.0	+46.5	108.0	45 33.0	+47.4	109.0	45 13.0	+48.2	110.0	44 52.0	+49.1	110.9	44 30.2	+49.8	111.8	44 07.4	+50.6	112.7	43 43.8	+51.4	113.6	27
28	46 55.7	+45.1	106.1	46 38.5	+46.1	107.1	46 20.4	+46.9	108.1	46 01.2	+47.9	109.1	45 41.1	+48.7	110.1	45 20.0	+49.6	111.0	44 58.0	+50.3	112.0	44 35.2	+51.0	112.8	28
29	47 40.8	+44.6	105.1	47 24.6	+45.6	106.2	47 07.3	+46.6	107.2	46 49.1	+47.4	108.2	46 29.8	+48.4	109.2	46 09.6	+49.1	110.2	45 48.3	+50.0	111.2	45 26.2	+50.7	112.1	29
30	48 25.4	+44.0	104.1	48 10.2	+45.1	105.2	47 53.9	+46.1	106.3	47 36.5	+47.1	107.3	47 18.2	+47.9	108.4	46 58.7	+48.8	109.4	46 38.3	+49.7	110.4	46 16.9	+50.5	111.4	30
31	49 09.4	+43.5	103.1	48 55.3	+44.5	104.2	48 40.0	+45.5	105.3	48 23.6	+46.5	106.4	48 06.1	+47.5	107.5	47 47.5	+48.5	108.5	47 28.0	+49.2	109.6	47 07.4	+50.1	110.6	31
32	49 52.9	+42.9	102.0	49 39.8	+44.0	103.2	49 25.5	+45.1	104.3	49 10.1	+46.1	105.4	48 53.6	+47.0	106.6	48 36.0	+47.9	107.6	48 17.2	+48.9	108.7	47 57.5	+49.7	109.8	32
33	50 35.8	+42.2	100.9	50 23.8	+43.4	102.1	50 10.6	+44.5	103.3	49 56.2	+45.6	104.5	49 40.6	+46.6	105.6	49 23.9	+47.6	106.7	49 06.1	+48.5	107.8	48 47.2	+49.4	108.9	33
34	51 18.0	+41.6	99.8	51 07.2	+42.8	101.0	50 55.1	+43.9	102.2	50 41.8	+45.0	103.4	50 27.2	+46.1	104.6	50 11.5	+47.0	105.8	49 54.6	+48.0	106.9	49 36.6	+48.9	108.1	34
35	51 59.6	+40.9	98.6	51 50.0	+42.1	99.9	51 39.0	+43.3	101.2	51 26.8	+44.4	102.4	51 13.3	+45.5	103.6	50 58.5	+46.6	104.8	50 42.6	+47.6	106.0	50 25.5	+48.5	107.2	35
36	52 40.5	+40.1	97.4	52 32.1	+41.4	98.7	52 22.3	+42.6	100.0	52 11.2	+43.8	101.3	51 58.8	+44.9	102.6	51 45.1	+46.0	103.8	51 30.2	+47.0	105.0	51 14.0	+48.1	106.2	36
37	53 20.6	+39.4	96.2	53 13.5	+40.6	97.5	53 05.0	+41.8	98.9	52 55.0	+43.1	100.2	52 43.7	+44.3	101.5	52 31.1	+45.5	102.7	52 17.2	+46.6	104.0	52 02.1	+47.5	105.3	37
38	54 00.0	+38.5	94.9	53 54.1	+39.9	96.3	53 46.8	+41.2	97.7	53 38.1	+42.5	99.0	53 28.0	+43.7	100.3	53 16.6	+44.8	101.7	53 03.8	+45.9	103.0	52 49.6	+47.1	104.3	38
39	54 38.5	+37.6	93.6	54 34.0	+39.0	95.0	54 28.0	+40.4	96.4	54 20.6	+41.7	97.8	54 11.7	+43.0	99.2	54 01.4	+44.2	100.5	53 49.7	+45.4	101.9	53 36.7	+46.5	103.2	39
40	55 16.1	+36.7	92.3	55 13.0	+38.1	93.7	55 08.4	+39.5	95.1	55 02.3	+40.9	96.6	54 54.7	+42.2	98.0	54 45.6	+43.5	99.4	54 35.1	+44.7	100.8	54 23.2	+45.9	102.1	40
41	55 52.8	+35.7	90.9	55 51.1	+37.2	92.3	55 47.9	+38.7	93.8	55 43.2	+40.0	95.3	55 36.9	+41.4	96.7	55 29.1	+42.8	98.2	55 19.8	+44.1	99.6	55 09.1	+45.2	101.0	41
42	56 28.5	+34.7	89.4	56 28.3	+36.3	90.9	56 26.6	+37.7	92.4	56 23.2	+39.2	93.9	56 18.3	+40.6	95.4	56 11.9	+41.9	96.9	56 03.9	+43.3	98.4	55 54.3	+44.6	99.9	42
43	57 03.2	+33.6	87.9	57 04.6	+35.1	89.5	57 04.3	+36.7	91.0	57 02.4	+38.3	92.6	56 58.9	+39.8	94.1	56 53.8	+41.2	95.6	56 47.2	+42.5	97.2	56 38.9	+43.9	98.7	43
44	57 36.8	+32.4	86.4	57 39.7	+34.1	88.0	57 41.0	+35.7	89.6	57 40.7	+37.2	91.1	57 38.7	+38.7	92.7	57 35.0	+40.2	94.3	57 29.7	+41.7	95.9	57 22.8	+43.0	97.4	44
45	58 09.2	+31.2	84.8	58 13.8	+32.9	86.4	58 16.7	+34.6	88.0	58 17.9	+36.2	89.7	58 17.4	+37.8	91.3	58 15.2	+39.4	92.9	58 11.4	+40.8	94.5	58 05.8	+42.3	96.1	45
46	58 40.4	+30.0	83.2	58 46.7	+31.7	84.8	58 51.3	+33.4	86.5	58 54.1	+35.1	88.1	58 55.2	+36.7	89.8	58 54.6	+38.3	91.4	58 52.2	+39.8	93.1	58 48.1	+41.3	94.7	46
47	59 10.4	+28.6	81.5	59 18.4	+30.4	83.2	59 24.7	+32.1	84.9	59 29.2	+33.8	86.5	59 31.9	+35.6	88.2	59 32.9	+37.2	89.9	59 32.0	+38.9	91.6	59 29.4	+40.4	93.3	47
48	59 39.0	+27.2	79.8	59 48.8	+29.0	81.5	59 56.8	+30.8	83.2	60 03.0	+32.6	84.9	60 07.5	+34.3	86.6	60 10.1	+36.0	88.4	60 10.9	+37.7	90.1	60 09.8	+39.4	91.9	48
49	60 06.2	+25.8	78.0	60 17.8	+27.6	79.7	60 27.6	+29.5	81.5	60 35.6	+31.3	83.2	60 41.8	+33.1	85.0	60 46.1	+34.9	86.8	60 48.6	+36.6	88.5	60 49.2	+38.3	90.3	49
50	60 32.0	+24.2	76.2	60 45.4	+26.1	77.9	60 57.1	+28.0	79.7	61 06.9	+29.9	81.5	61 14.9	+31.7	83.3	61 21.0	+33.6	85.1	61 25.2	+35.4	86.9	61 27.5	+37.1	88.7	50
51	60 56.2	+22.6	74.3	61 11.5	+24.6	76.1	61 25.1	+26.4	77.8	61 36.8	+28.4	79.6	61 46.6	+30.3	81.5	61 54.6	+32.2	83.3	62 00.6	+34.0	85.2	62 04.6	+35.9	87.1	51
52	61 18.8	+20.9	72.4	61 36.1	+22.9	74.1	61 51.5	+24.9	75.9	62 05.2	+26.8	77.8	62 16.9	+28.8	79.6	62 26.8	+30.7	81.5	62 34.6	+32.7	83.4	62 40.5	+34.5	85.3	52
53	61 39.7	+19.3	70.4	61 59.0	+21.2	72.2	62 16.4	+23.2	74.0	62 32.0	+25.2	75.9	62 45.7	+27.2	77.7	62 57.5	+29.2	79.6	63 07.3	+31.2	81.6	63 15.0	+33.2	83.5	53
54	61 59.0	+17.4	68.4	62 20.2	+19.4	70.2	62 39.6	+21.5	72.0	62 57.2	+23.5	73.9	63 12.9	+25.6	75.8	63 26.7	+27.6	77.7	63 38.5	+29.6	79.7	63 48.2	+31.6	81.7	54
55	62 16.4	+15.6	66.4	62 39.6	+17.6	68.1	63 01.1	+19.6	70.0	63 20.7	+21.7	71.8	63 38.5	+23.7	73.7	63 54.3	+25.8	75.7	64 08.1	+27.9	77.7	64 19.8	+30.0	79.7	55
56	62 32.0	+13.7	64.3	62 57.2	+15.7	66.1	63 20.7	+17.8	67.9	63 42.4	+19.8	69.7	64 02.2	+22.0	71.7	64 20.1	+24.1	73.6	64 36.0	+26.2	75.7	64 49.8	+28.4	77.7	56
57	62 45.7	+11.8	62.2	63 12.9	+13.8	63.9	63 38.5	+15.8•	65.7	64 02.2	+17.9	67.6	64 24.2	+20.0•	69.5	64 44.2	+22.2•	71.5	65 02.2	+24.3	73.5	65 18.2	+26.5	75.6	57
58	62 57.5	+9.8•	60.0	63 26.7	+11.8•	61.7	63 54.3	+13.8•	63.5	64 20.1	+15.9•	65.4	64 44.2	+18.0•	67.3	65 06.4	+20.1•	69.3	65 26.5	+22.4	71.4	65 44.7	+24.6	73.5	58
59	63 07.3	+7.7•	57.8	63 38.5	+9.7•	59.5	64 08.1	+11.7•	61.3	64 36.0	+13.8•	63.3	65 02.2	+16.0•	65.1	65 26.5	+18.2•	67.1	65 48.9	+20.4•	69.1	66 09.3	+22.6•	71.2	59
60	63 15.0	+5.8•	55.6	63 48.2	+7.6•	57.3	64 19.8	+9.6•	59.1	64 49.8	+11.7•	60.9	65 18.2	+13.8•	62.8	65 44.7	+16.0•	64.8	66 09.3	+18.2•	66.8	66 31.9	+20.5•	68.9	60
61	63 20.8	+3.6•	53.4	63 55.8	+5.5•	55.1	64 29.4	+7.5•	56.8	65 01.5	+9.5•	58.6	65 32.0	+11.6•	60.4	66 00.7	+13.8•	62.4	66 27.5	+16.1•	64.4	66 52.4	+18.4•	66.5	61
62	63 24.4	+1.6•	51.2	64 01.3	+3.4•	52.8	64 36.9	+5.4•	54.5	65 11.0	+7.3•	56.2	65 43.6	+9.4•	58.1	66 14.5	+11.5•	60.0	66 43.6	+13.7•	62.0	67 10.8	+16.0•	64.1	62
63	63 26.0	−0.6•	49.0	64 04.7	+1.3•	50.5	64 42.2	+3.1•	52.1	65 18.3	+5.1•	53.9	65 53.0	+7.0•	55.7	66 26.0	+9.2•	57.5	66 57.3	+11.4•	59.5	67 26.8	+13.7•	61.6	63
64	63 25.4	−2.6•	46.7	64 06.0	−1.0•	48.2	64 45.3	+0.9•	49.8	65 23.4	+2.7•	51.5	66 00.0	+4.8•	53.2	66 35.2	+6.8•	55.1	67 08.7	+9.0•	57.0	67 40.5	+11.2•	59.0	64
65	63 22.8	−4.7•	44.5	64 05.0	−3.0•	45.9	64 46.2	−1.3•	47.5	65 26.1	+0.5•	49.1	66 04.8	+2.4•	50.8	66 42.0	+4.4•	52.6	67 17.7	+6.5•	54.5	67 51.7	+8.8•	56.5	65
66	63 18.1	−6.8•	42.3	64 02.0	−5.2•	43.7	64 44.9	−3.6•	45.1	65 26.6	−1.8•	46.7	66 07.2	0.0•	48.3	66 46.4	+2.0•	50.0	67 24.2	+4.0•	51.9	68 00.5	+6.1•	53.8	66
67	63 11.3	−8.8•	40.1	63 56.8	−7.4•	41.4	64 41.3	−5.8•	42.8	65 24.8	−4.1•	44.3	66 07.2	−2.3•	45.8	66 48.4	−0.5•	47.5	67 28.2	+1.5•	49.3	68 06.6	+3.6•	51.2	67
68	63 02.5	−10.9•	37.9	63 49.4	−9.4•	39.1	64 35.5	−7.9•	40.5	65 20.7	−6.3•	41.9	66 04.9	−4.7•	43.4	66 47.9	−2.9•	45.0	67 29.7	−1.0•	46.7	68 10.2	+1.0•	48.5	68
69	62 51.7	−12.8	35.7	63 40.0	−11.5•	36.9	64 27.6	−10.1•	38.1	65 14.4	−8.6•	39.5	66 00.2	−7.0•	40.9	66 45.0	−5.3•	42.4	67 28.7	−3.5•	44.1	68 11.2	−1.6•	45.8	69
70	62 38.9	−14.7	33.6	63 28.5	−13.4•	34.7	64 17.5	−12.1•	35.9	65 05.8	−10.8•	37.1	65 53.2	−9.3•	38.5	66 39.7	−7.7•	39.9	67 25.2	−6.0•	41.4	68 09.6	−4.2•	43.1	70
71	62 24.2	−16.6	31.5	63 15.1	−15.5	32.5	64 05.4	−14.3•	33.6	64 55.0	−13.0•	34.8	65 43.9	−11.6•	36.1	66 32.0	−10.1•	37.4	67 19.2	−8.6•	38.9	68 05.4	−6.9•	40.4	71
72	62 07.6	−18.4	29.4	62 59.6	−17.3	30.4	63 51.1	−16.2	31.4	64 42.0	−15.0•	32.5	65 32.3	−13.7•	33.7	66 21.9	−12.4•	34.9	67 10.6	−10.9•	36.3	67 58.5	−9.3•	37.8	72
73	61 49.2	−20.1	27.4	62 42.3	−19.2	28.3	63 34.9	−18.1	29.2	64 27.0	−17.1•	30.2	65 18.6	−15.9•	31.3	66 09.5	−14.7•	32.5	66 59.7	−13.3•	33.8	67 49.2	−11.8•	35.1	73
74	61 29.1	−21.8	25.4	62 23.1	−20.9	26.2	63 16.8	−20.1	27.1	64 09.9	−19.0	28.0	65 02.7	−18.0•	29.0	65 54.8	−16.8•	30.1	66 46.4	−15.6•	31.3	67 37.4	−14.3•	32.6	74
75	61 07.3	−23.4	23.5	62 02.2	−22.7	24.2	62 56.7	−21.8	25.0	63 50.9	−20.9	25.9	64 44.7	−20.0	26.8	65 38.0	−18.9•	27.8	66 30.8	−17.8•	28.9	67 23.1	−16.6•	30.0	75
76	60 43.9	−25.1	21.6	61 39.5	−24.3	22.3	62 34.9	−23.5	23.0	63 30.0	−22.8	23.8	64 24.7	−21.9	24.6	65 19.1	−21.0•	25.5	66 13.0	−19.9•	26.5	67 06.5	−18.9•	27.5	76
77	60 18.8	−26.5	19.7	61 15.2	−25.9	20.3	62 11.4	−25.3	21.0	63 07.2	−24.5	21.7	64 02.8	−23.7	22.5	64 58.1	−22.9	23.3	65 53.1	−22.0•	24.2	66 47.6	−21.0•	25.1	77
78	59 52.3	−27.9	17.9	60 49.3	−27.4	18.5	61 46.1	−26.8	19.1	62 42.7	−26.1	19.7	63 39.1	−25.5	20.4	64 35.2	−24.7	21.1	65 31.1	−24.0	21.9	66 26.6	−23.2	22.7	78
79	59 24.4	−29.3	16.2	60 21.9	−28.8	16.7	61 19.3	−28.3	17.2	62 16.6	−27.8	17.7	63 13.6	−27.1	18.3	64 10.5	−26.6	19.0	65 07.1	−25.9	19.7	66 03.4	−25.1	20.5	79
80	58 55.1	−30.6	14.5	59 53.1	−30.2	14.9	60 51.0	−29.7	15.4	61 48.8	−29.2	15.9	62 46.5	−28.8	16.4	63 43.9	−28.2	17.0	64 41.2	−27.6	17.6	65 38.3	−26.9	18.2	80
81	58 24.5	−31.9	12.8	59 22.9	−31.5	13.2	60 21.3	−31.1	13.6	61 19.6	−30.7	14.0	62 17.7	−30.2	14.5	63 15.7	−29.7	15.0	64 13.6	−29.3	15.5	65 11.4	−28.7	16.1	81
82	57 52.6	−33.0	11.2	58 51.4	−32.7	11.5	59 50.2	−32.4	11.9	60 48.9	−32.1	12.2	61 47.5	−31.7	12.6	62 46.0	−31.4	13.1	63 44.3	−30.8	13.5	64 42.6	−30.4	14.0	82
83	57 19.6	−34.2	9.7	58 18.7	−33.9	9.9	59 17.8	−33.7	10.2	60 16.8	−33.4	10.5	61 15.8	−33.1	10.9	62 14.6	−32.7	11.2	63 13.5	−32.4	11.6	64 12.2	−32.0	12.0	83
84	56 45.4	−35.2	8.1	57 44.8	−35.0	8.4	58 44.1	−34.8	8.6	59 43.4	−34.5	8.9	60 42.7	−34.3	9.1	61 41.9	−34.0	9.4	62 41.1	−33.8	9.7	63 40.2	−33.5	10.1	84
85	56 10.2	−36.2	6.7	57 09.8	−36.1	6.9	58 09.3	−35.9	7.1	59 08.9	−35.7	7.3	60 08.4	−35.5	7.5	61 07.9	−35.4	7.7	62 07.3	−35.1	8.0	63 06.7	−34.9	8.2	85
86	55 34.0	−37.2	5.3	56 33.7	−37.0	5.4	57 33.4	−36.9	5.5	58 33.2	−36.9	5.7	59 32.8	−36.6	5.9	60 32.5	−36.5	6.1	61 32.2	−36.4	6.2	62 31.8	−36.2	6.5	86
87	54 56.8	−38.1	3.9	55 56.7	−38.1	4.0	56 56.5	−37.9	4.1	57 56.2	−37.8	4.2	58 56.2	−37.8	4.3	59 56.0	−37.6	4.5	60 55.8	−37.5	4.6	61 55.6	−37.4	4.7	87
88	54 18.7	−38.9	2.5	55 18.6	−38.9	2.6	56 18.6	−38.9	2.7	57 18.4	−38.8	2.8	58 18.4	−38.7	2.8	59 18.4	−38.7	2.9	60 18.3	−38.6	3.0	61 18.2	−38.6	3.1	88
89	53 39.8	−39.8	1.3	54 39.7	−39.7	1.3	55 39.7	−39.7	1.3	56 39.7	−39.7	1.4	57 39.7	−39.7	1.4	58 39.7	−39.7	1.4	59 39.7	−39.7	1.5	60 39.6	−39.6	1.5	89
90	53 00.0	−40.5	0.0	54 00.0	−40.5	0.0	55 00.0	−40.6	0.0	56 00.0	−40.6	0.0	57 00.0	−40.6	0.0	58 00.0	−40.6	0.0	59 00.0	−40.6	0.0	60 00.0	−40.6	0.0	90

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	23 44.8	−52.4	125.7	23 09.6	−52.8	126.1	22 34.1	−53.2	126.4	21 58.4	−53.7	126.7	21 22.4	−54.1	127.1	20 46.1	−54.5	127.4	20 09.5	−54.8	127.7	19 32.8	−55.2	127.9	0
1	22 52.4	−52.5	126.2	22 16.8	−53.0	126.6	21 40.9	−53.4	126.9	21 04.7	−53.7	127.2	20 28.3	−54.2	127.5	19 51.6	−54.5	127.8	19 14.7	−54.9	128.1	18 37.6	−55.2	128.3	1
2	21 59.9	−52.6	126.8	21 23.8	−53.0	127.1	20 47.5	−53.4	127.4	20 11.0	−53.9	127.7	19 34.1	−54.2	128.0	18 57.1	−54.6	128.3	18 19.8	−54.9	128.5	17 42.4	−55.3	128.8	2
3	21 07.3	−52.7	127.3	20 30.8	−53.1	127.6	19 54.1	−53.5	127.9	19 17.1	−53.9	128.2	18 39.9	−54.3	128.4	18 02.5	−54.6	128.7	17 24.9	−55.0	128.9	16 47.1	−55.3	129.2	3
4	20 14.6	−52.8	127.8	19 37.7	−53.2	128.1	19 00.6	−53.6	128.4	18 23.2	−54.0	128.6	17 45.6	−54.3	128.9	17 07.9	−54.7	129.1	16 29.9	−55.0	129.4	15 51.8	−55.3	129.6	4
5	19 21.8	−52.9	128.3	18 44.5	−53.3	128.6	18 07.0	−53.7	128.8	17 29.2	−54.0	129.1	16 51.3	−54.4	129.3	16 13.2	−54.8	129.6	15 34.9	−55.1	129.8	14 56.4	−55.4	130.0	5
6	18 28.9	−52.9	128.8	17 51.2	−53.3	129.1	17 13.3	−53.7	129.3	16 35.2	−54.1	129.5	15 56.9	−54.4	129.8	15 18.4	−54.8	130.0	14 39.8	−55.1	130.2	14 01.0	−55.4	130.4	6
7	17 36.0	−53.0	129.3	16 57.9	−53.4	129.5	16 19.6	−53.8	129.8	15 41.1	−54.1	130.0	15 02.5	−54.5	130.2	14 23.6	−54.8	130.4	13 44.7	−55.2	130.6	13 05.6	−55.5	130.8	7
8	16 43.0	−53.1	129.8	16 04.5	−53.5	130.0	15 25.8	−53.9	130.2	14 47.0	−54.2	130.4	14 08.0	−54.6	130.6	13 28.8	−54.9	130.8	12 49.5	−55.2	131.0	12 10.1	−55.5	131.2	8
9	15 49.9	−53.2	130.3	15 11.0	−53.5	130.5	14 31.9	−53.8	130.7	13 52.8	−54.3	130.9	13 13.4	−54.6	131.1	12 33.9	−54.9	131.2	11 54.3	−55.2	131.4	11 14.6	−55.6	131.6	9
10	14 56.7	−53.2	130.8	14 17.5	−53.6	131.0	13 38.1	−54.0	131.1	12 58.5	−54.3	131.3	12 18.8	−54.6	131.5	11 39.0	−54.9	131.6	10 59.1	−55.3	131.8	10 19.0	−55.5	131.9	10
11	14 03.5	−53.3	131.2	13 23.9	−53.7	131.4	12 44.1	−54.0	131.6	12 04.2	−54.3	131.8	11 24.2	−54.7	131.9	10 44.1	−55.0	132.1	10 03.8	−55.3	132.2	9 23.5	−55.6	132.3	11
12	13 10.2	−53.3	131.7	12 30.2	−53.6	131.9	11 50.1	−54.0	132.0	11 09.9	−54.4	132.2	10 29.5	−54.7	132.3	9 49.1	−55.0	132.5	9 08.5	−55.3	132.6	8 27.9	−55.6	132.7	12
13	12 16.9	−53.4	132.2	11 36.6	−53.8	132.3	10 56.1	−54.1	132.5	10 15.5	−54.4	132.7	9 34.8	−54.7	132.7	8 54.1	−55.1	132.9	8 13.2	−55.3	133.0	7 32.3	−55.7	133.1	13
14	11 23.5	−53.4	132.6	10 42.8	−53.7	132.8	10 02.0	−54.1	132.9	9 21.1	−54.4	133.0	8 40.1	−54.7	133.2	7 59.0	−55.0	133.3	7 17.9	−55.4	133.4	6 36.6	−55.6	133.5	14
15	10 30.1	−53.4	133.1	9 49.1	−53.8	133.2	9 07.9	−54.1	133.4	8 26.7	−54.5	133.5	7 45.4	−54.8	133.6	7 04.0	−55.1	133.7	6 22.5	−55.4	133.8	5 41.0	−55.7	133.8	15
16	9 36.7	−53.5	133.6	8 55.3	−53.9	133.7	8 13.8	−54.2	133.8	7 32.2	−54.5	133.9	6 50.6	−54.8	134.0	6 08.9	−55.1	134.1	5 27.1	−55.4	134.1	4 45.3	−55.7	134.2	16
17	8 43.2	−53.5	134.0	8 01.4	−53.8	134.1	7 19.6	−54.2	134.2	6 37.7	−54.5	134.3	5 55.8	−54.8	134.4	5 13.8	−55.1	134.5	4 31.7	−55.4	134.5	3 49.6	−55.7	134.6	17
18	7 49.7	−53.6	134.5	7 07.6	−53.9	134.6	6 25.4	−54.2	134.7	5 43.2	−54.5	134.7	5 01.0	−54.9	134.8	4 18.7	−55.2	134.9	3 36.3	−55.4	134.9	2 53.9	−55.7	135.0	18
19	6 56.1	−53.6	134.9	6 13.7	−53.9	135.0	5 31.2	−54.2	135.1	4 48.7	−54.5	135.2	4 06.1	−54.8	135.2	3 23.5	−55.1	135.3	2 40.9	−55.4	135.3	1 58.2	−55.7	135.3	19
20	6 02.5	−53.6	135.4	5 19.8	−53.9	135.5	4 37.0	−54.3	135.5	3 54.2	−54.6	135.6	3 11.3	−54.9	135.6	2 28.4	−55.2	135.7	1 45.5	−55.4	135.7	1 02.5	−55.7	135.7	20
21	5 08.9	−53.6	135.8	4 25.9	−54.0	135.9	3 42.7	−54.2	136.0	2 59.6	−54.6	136.0	2 16.4	−54.8	136.0	1 33.2	−55.1	136.0	0 50.0	−55.4	136.1	0 06.8	−55.7	136.1	21
22	4 15.3	−53.6	136.3	3 31.9	−53.9	136.3	2 48.5	−54.3	136.4	2 05.0	−54.6	136.4	1 21.6	−54.9	136.4	0 38.1	−55.2	136.4	0 05.4	+55.4	43.6	0 48.9	+55.7	43.6	22
23	3 21.7	−53.7	136.7	2 38.0	−54.0	136.8	1 54.2	−54.3	136.8	1 10.5	−54.6	136.8	0 26.7	−54.9	136.8	0 17.1	+55.1	43.2	1 00.8	+55.4	43.2	1 44.6	+55.7	43.2	23
24	2 28.0	−53.6	137.2	1 44.0	−54.0	137.2	0 59.9	−54.2	137.2	0 15.9	−54.6	137.2	0 28.2	+54.8	42.8	1 12.2	+55.2	42.8	1 56.2	+55.5	42.8	2 40.3	+55.7	42.8	24
25	1 34.4	−53.7	137.6	0 50.0	−54.0	137.7	0 05.7	−54.3	137.7	0 38.7	+54.5	42.3	1 23.0	+54.9	42.4	2 07.4	+55.1	42.4	2 51.7	+55.4	42.4	3 36.0	+55.6	42.4	25
26	0 40.7	−53.7	138.1	0 04.0	+53.9	41.9	0 48.6	+54.3	41.9	1 33.2	+54.5	41.9	2 17.9	+54.8	41.9	3 02.5	+55.1	42.0	3 47.1	+55.4	42.0	4 31.6	+55.7	42.1	26
27	0 13.0	+53.6	41.5	0 57.9	+54.0	41.5	1 42.9	+54.2	41.5	2 27.8	+54.6	41.5	3 12.7	+54.9	41.5	3 57.6	+55.1	41.6	4 42.5	+55.4	41.6	5 27.3	+55.7	41.7	27
28	1 06.6	+53.7	41.0	1 51.9	+54.0	41.1	2 37.1	+54.3	41.1	3 22.4	+54.5	41.1	4 07.6	+54.8	41.1	4 52.7	+55.2	41.2	5 37.9	+55.4	41.2	6 23.0	+55.6	41.3	28
29	2 00.3	+53.6	40.6	2 45.9	+53.9	40.6	3 31.4	+54.3	40.6	4 16.9	+54.6	40.7	5 02.4	+54.8	40.7	5 47.9	+55.0	40.8	6 33.3	+55.3	40.9	7 18.6	+55.6	40.9	29
30	2 53.9	+53.7	40.1	3 39.8	+53.9	40.2	4 25.7	+54.2	40.2	5 11.5	+54.5	40.3	5 57.2	+54.8	40.3	6 42.9	+55.1	40.4	7 28.6	+55.4	40.5	8 14.2	+55.6	40.6	30
31	3 47.6	+53.6	39.7	4 33.7	+54.0	39.8	5 19.9	+54.2	39.8	6 06.0	+54.5	39.8	6 52.0	+54.8	39.9	7 38.0	+55.1	40.0	8 24.0	+55.3	40.1	9 09.8	+55.6	40.2	31
32	4 41.2	+53.6	39.2	5 27.7	+53.9	39.3	6 14.1	+54.2	39.3	7 00.5	+54.5	39.4	7 46.8	+54.8	39.5	8 33.1	+55.0	39.6	9 19.3	+55.3	39.7	10 05.4	+55.6	39.8	32
33	5 34.8	+53.6	38.8	6 21.6	+53.9	38.8	7 08.3	+54.2	38.9	7 55.0	+54.4	39.0	8 41.6	+54.7	39.1	9 28.1	+55.0	39.2	10 14.6	+55.2	39.3	11 01.0	+55.5	39.4	33
34	6 28.4	+53.6	38.3	7 15.5	+53.8	38.4	8 02.5	+54.1	38.5	8 49.4	+54.4	38.6	9 36.3	+54.7	38.7	10 23.1	+55.0	38.8	11 09.8	+55.3	38.9	11 56.5	+55.5	39.0	34
35	7 22.0	+53.5	37.9	8 09.3	+53.8	37.9	8 56.6	+54.1	38.1	9 43.8	+54.4	38.1	10 31.0	+54.6	38.3	11 18.1	+54.9	38.4	12 05.1	+55.1	38.5	12 52.0	+55.4	38.6	35
36	8 15.5	+53.5	37.4	9 03.1	+53.8	37.5	9 50.7	+54.1	37.6	10 38.2	+54.4	37.7	11 25.6	+54.7	37.8	12 13.0	+54.9	38.0	13 00.2	+55.2	38.1	13 47.4	+55.4	38.2	36
37	9 09.0	+53.5	37.0	9 56.9	+53.8	37.1	10 44.8	+54.0	37.2	11 32.6	+54.3	37.3	12 20.3	+54.6	37.4	13 07.9	+54.8	37.5	13 55.4	+55.1	37.7	14 42.8	+55.3	37.7	37
38	10 02.5	+53.4	36.5	10 50.7	+53.7	36.6	11 38.8	+54.0	36.7	12 26.9	+54.3	36.8	13 14.9	+54.5	37.0	14 02.7	+54.8	37.1	14 50.5	+55.1	37.3	15 38.2	+55.3	37.5	38
39	10 55.9	+53.4	36.0	11 44.4	+53.7	36.1	12 32.8	+54.0	36.3	13 21.2	+54.2	36.4	14 09.4	+54.5	36.6	14 57.5	+54.8	36.7	15 45.6	+55.0	36.9	16 33.5	+55.3	37.1	39
40	11 49.3	+53.4	35.6	12 38.1	+53.6	35.7	13 26.8	+53.9	35.8	14 15.4	+54.2	36.0	15 03.9	+54.4	36.1	15 52.3	+54.7	36.3	16 40.6	+55.0	36.5	17 28.8	+55.3	36.6	40
41	12 42.7	+53.3	35.1	13 31.7	+53.6	35.2	14 20.7	+53.8	35.5	15 09.6	+54.1	35.5	15 58.3	+54.4	35.7	16 47.0	+54.7	35.9	17 35.6	+54.9	36.0	18 24.1	+55.1	36.2	41
42	13 36.0	+53.2	34.6	14 25.3	+53.5	34.8	15 14.5	+53.8	34.9	16 03.7	+54.1	35.1	16 52.7	+54.4	35.2	17 41.7	+54.6	35.4	18 30.5	+54.9	35.6	19 19.2	+55.2	35.8	42
43	14 29.2	+53.2	34.1	15 18.8	+53.5	34.5	16 08.3	+53.8	34.5	16 57.8	+54.0	34.6	17 47.1	+54.3	34.8	18 36.3	+54.5	35.0	19 25.4	+54.8	35.2	20 14.4	+55.0	35.4	43
44	15 22.4	+53.1	33.7	16 12.3	+53.4	33.8	17 02.1	+53.7	34.0	17 51.8	+53.9	34.2	18 41.4	+54.2	34.4	19 30.8	+54.5	34.6	20 20.2	+54.7	34.8	21 09.4	+55.0	35.0	44
45	16 15.5	+53.1	33.2	17 05.7	+53.3	33.4	17 55.8	+53.6	33.5	18 45.7	+53.9	33.7	19 35.6	+54.1	33.9	20 25.3	+54.4	34.1	21 14.9	+54.7	34.3	22 04.4	+55.0	34.5	45
46	17 08.6	+53.0	32.7	17 59.0	+53.3	32.9	18 49.4	+53.5	33.1	19 39.6	+53.8	33.2	20 29.7	+54.1	33.4	21 19.7	+54.4	33.7	22 09.6	+54.6	33.9	22 59.4	+54.8	34.1	46
47	18 01.6	+52.9	32.2	18 52.3	+53.2	32.4	19 42.9	+53.5	32.8	20 33.4	+53.7	32.8	21 23.8	+54.0	33.0	22 14.1	+54.2	33.2	23 04.2	+54.5	33.4	23 54.2	+54.8	33.7	47
48	18 54.5	+52.8	31.7	19 45.5	+53.1	31.9	20 36.4	+53.3	32.1	21 27.1	+53.7	32.3	22 17.8	+53.9	32.5	23 08.3	+54.2	32.7	23 58.7	+54.5	33.0	24 49.0	+54.7	33.2	48
49	19 47.3	+52.8	31.2	20 38.6	+53.0	31.4	21 29.7	+53.3	31.6	22 20.8	+53.5	31.8	23 11.7	+53.8	32.0	24 02.5	+54.1	32.3	24 53.2	+54.3	32.5	25 43.7	+54.6	32.8	49
50	20 40.1	+52.6	30.7	21 31.6	+52.9	30.9	22 23.0	+53.2	31.1	23 14.3	+53.5	31.3	24 05.5	+53.8	31.6	24 56.6	+54.0	31.8	25 47.5	+54.3	32.0	26 38.3	+54.5	32.2	50
51	21 32.7	+52.6	30.2	22 24.5	+52.8	30.4	23 16.2	+53.1	30.6	24 07.8	+53.4	30.8	24 59.3	+53.6	31.1	25 50.6	+53.9	31.3	26 41.8	+54.1	31.6	27 32.8	+54.5	31.8	51
52	22 25.3	+52.4	29.7	23 17.3	+52.8	29.9	24 09.3	+53.0	30.1	25 01.2	+53.2	30.3	25 52.9	+53.5	30.6	26 44.5	+53.8	30.8	27 35.9	+54.1	31.1	28 27.3	+54.3	31.4	52
53	23 17.7	+52.4	29.1	24 10.1	+52.6	29.3	25 02.3	+52.9	29.6	25 54.4	+53.2	29.8	26 46.4	+53.5	30.1	27 38.3	+53.7	30.3	28 30.0	+54.0	30.6	29 21.6	+54.2	30.9	53
54	24 10.1	+52.2	28.6	25 02.7	+52.5	28.8	25 55.2	+52.8	29.1	26 47.6	+53.0	29.3	27 39.9	+53.3	29.6	28 32.0	+53.6	29.8	29 24.0	+53.8	30.1	30 15.8	+54.1	30.4	54
55	25 02.3	+52.1	28.1	25 55.2	+52.4	28.3	26 48.0	+52.6	28.5	27 40.6	+53.0	28.8	28 33.2	+53.2	29.0	29 25.6	+53.4	29.3	30 17.8	+53.7	29.6	31 09.9	+54.0	29.9	55
56	25 54.4	+51.9	27.5	26 47.6	+52.2	27.7	27 40.6	+52.6	28.0	28 33.6	+52.8	28.2	29 26.4	+53.0	28.5	30 19.0	+53.3	28.8	31 11.5	+53.6	29.1	32 03.9	+53.9	29.4	56
57	26 46.4	+51.9	27.0	27 39.9	+52.1	27.2	28 33.2	+52.4	27.4	29 26.4	+52.6	27.7	30 19.4	+52.9	28.0	31 12.3	+53.1	28.2	32 05.1	+53.5	28.5	32 57.8	+53.7	28.8	57
58	27 38.3	+51.7	26.4	28 32.0	+52.0	26.6	29 25.6	+52.2	26.9	30 19.0	+52.5	27.1	31 12.3	+52.8	27.4	32 05.5	+53.1	27.7	32 58.6	+53.3	28.0	33 51.5	+53.6	28.3	58
59	28 30.0	+51.6	25.8	29 24.0	+51.8	26.1	30 17.8	+52.1	26.3	31 11.5	+52.4	26.6	32 05.1	+52.7	26.9	32 58.6	+52.9	27.1	33 51.9	+53.2	27.4	34 45.1	+53.4	27.7	59
60	29 21.6	+51.4	25.2	30 15.8	+51.7	25.5	31 09.9	+52.0	25.7	32 03.9	+52.2	26.0	32 57.8	+52.4	26.3	33 51.5	+52.7	26.6	34 45.1	+53.0	26.9	35 38.5	+53.3	27.2	60
61	30 13.0	+51.3	24.6	31 07.5	+51.5	24.9	32 01.9	+51.7	25.1	32 56.1	+52.1	25.4	33 50.2	+52.3	25.7	34 44.2	+52.6	26.0	35 38.1	+52.8	26.3	36 31.8	+53.1	26.6	61
62	31 04.3	+51.0	24.0	31 59.0	+51.3	24.3	32 53.6	+51.6	24.6	33 48.2	+51.8	24.8	34 42.5	+52.2	25.1	35 36.8	+52.4	25.4	36 30.9	+52.7	25.7	37 24.9	+53.0	26.1	62
63	31 55.3	+50.9	23.4	32 50.3	+51.2	23.7	33 45.2	+51.5	23.9	34 40.0	+51.7	24.2	35 34.7	+51.9	24.5	36 29.2	+52.3	24.8	37 23.6	+52.5	25.1	38 17.9	+52.7	25.5	63
64	32 46.2	+50.8	22.8	33 41.5	+51.0	23.1	34 36.7	+51.2	23.3	35 31.7	+51.5	23.6	36 26.6	+51.8	23.9	37 21.4	+52.0	24.2	38 16.1	+52.3	24.5	39 10.6	+52.6	24.8	64
65	33 37.0	+50.5	22.2	34 32.5	+50.7	22.4	35 27.9	+51.0	22.7	36 23.2	+51.3	23.0	37 18.4	+51.5	23.3	38 13.4	+51.9	23.6	39 08.4	+52.1	23.9	40 03.2	+52.3	24.2	65
66	34 27.5	+50.3	21.5	35 23.2	+50.6	21.8	36 18.9	+50.8	22.0	37 14.5	+51.0	22.3	38 09.9	+51.4	22.6	39 05.3	+51.5	22.9	40 00.5	+51.8	23.2	40 55.5	+52.1	23.6	66
67	35 17.8	+50.0	20.8	36 13.8	+50.3	21.1	37 09.7	+50.6	21.4	38 05.5	+50.9	21.7	39 01.3	+51.1	21.9	39 56.8	+51.4	22.3	40 52.3	+51.6	22.6	41 47.6	+51.9	22.9	67
68	36 07.8	+49.9	20.2	37 04.1	+50.1	20.4	38 00.3	+50.3	20.7	38 56.4	+50.6	21.0	39 52.4	+50.8	21.3	40 48.2	+51.1	21.6	41 43.9	+51.4	21.9	42 39.5	+51.7	22.2	68
69	36 57.7	+49.6	19.5	37 54.2	+49.9	19.7	38 50.6	+50.1	20.0	39 47.0	+50.3	20.3	40 43.2	+50.6	20.6	41 39.3	+50.9	20.9	42 35.3	+51.1	21.2	43 31.2	+51.4	21.5	69
70	37 47.3	+49.3	18.8	38 44.1	+49.5	19.0	39 40.7	+49.9	19.3	40 37.3	+50.1	19.6	41 33.8	+50.3	19.9	42 30.2	+50.6	20.2	43 26.4	+50.9	20.5	44 22.6	+51.1	20.8	70
71	38 36.6	+49.1	18.0	39 33.6	+49.3	18.3	40 30.6	+49.5	18.6	41 27.4	+49.8	18.8	42 24.1	+50.1	19.1	43 20.8	+50.3	19.4	44 17.3	+50.5	19.8	45 13.7	+50.8	20.1	71
72	39 25.7	+48.8	17.3	40 22.9	+49.0	17.5	41 20.1	+49.2	17.8	42 17.2	+49.5	18.1	43 14.2	+49.7	18.4	44 11.1	+49.9	18.7	45 07.8	+50.3	19.0	46 04.5	+50.5	19.3	72
73	40 14.5	+48.4	16.5	41 11.9	+48.7	16.8	42 09.3	+49.0	17.0	43 06.7	+49.1	17.3	44 03.9	+49.4	17.6	45 01.0	+49.7	17.9	45 58.1	+49.9	18.2	46 55.0	+50.2	18.5	73
74	41 02.9	+48.2	15.8	42 00.6	+48.4	16.0	42 58.3	+48.6	16.3	43 55.8	+48.9	16.5	44 53.3	+49.1	16.8	45 50.7	+49.3	17.1	46 48.0	+49.6	17.4	47 45.2	+49.8	17.7	74
75	41 51.1	+47.8	15.0	42 49.0	+48.0	15.2	43 46.9	+48.2	15.5	44 44.7	+48.4	15.7	45 42.4	+48.7	16.0	46 40.0	+49.0	16.3	47 37.6	+49.2	16.6	48 35.0	+49.5	16.9	75
76	42 38.9	+47.4	14.1	43 37.0	+47.7	14.4	44 35.1	+47.9	14.6	45 33.1	+48.1	14.9	46 31.1	+48.3	15.1	47 29.0	+48.5	15.4	48 26.8	+48.8	15.7	49 24.5	+49.0	16.0	76
77	43 26.3	+47.1	13.3	44 24.7	+47.3	13.5	45 23.0	+47.5	13.8	46 21.2	+47.7	14.0	47 19.4	+47.9	14.3	48 17.5	+48.2	14.6	49 15.6	+48.4	14.8	50 13.5	+48.7	15.1	77
78	44 13.4	+46.7	12.5	45 12.0	+46.8	12.7	46 10.5	+47.1	12.9	47 08.9	+47.3	13.1	48 07.3	+47.5	13.4	49 05.7	+47.7	13.6	50 04.0	+47.9	13.9	51 02.2	+48.1	14.2	78
79	45 00.1	+46.2	11.6	45 58.8	+46.5	11.8	46 57.6	+46.6	12.0	47 56.2	+46.9	12.2	48 54.8	+47.1	12.5	49 53.4	+47.2	12.7	50 51.9	+47.5	13.0	51 50.3	+47.7	13.3	79
80	45 46.3	+45.9	10.7	46 45.3	+46.0	10.9	47 44.2	+46.2	11.1	48 43.1	+46.3	11.3	49 41.9	+46.5	11.5	50 40.6	+46.8	11.8	51 39.4	+46.9	12.0	52 38.0	+47.2	12.3	80
81	46 32.2	+45.5	9.7	47 31.3	+45.5	9.9	48 30.4	+45.7	10.1	49 29.4	+45.9	10.3	50 28.4	+46.1	10.5	51 27.4	+46.2	10.8	52 26.3	+46.5	11.0	53 25.2	+46.6	11.2	81
82	47 17.5	+44.9	8.8	48 16.8	+45.0	8.9	49 16.1	+45.1	9.1	50 15.3	+45.3	9.3	51 14.5	+45.5	9.5	52 13.6	+45.7	9.7	53 12.8	+45.8	9.9	54 11.8	+46.1	10.2	82
83	48 02.4	+44.3	7.8	49 01.8	+44.5	7.9	50 01.2	+44.6	8.1	51 00.6	+44.8	8.3	52 00.0	+44.9	8.5	52 59.3	+45.1	8.7	53 58.6	+45.2	8.9	54 57.9	+45.4	9.1	83
84	48 46.7	+43.8	6.8	49 46.3	+43.9	6.9	50 45.8	+44.1	7.1	51 45.4	+44.1	7.2	52 44.9	+44.3	7.4	53 44.4	+44.4	7.5	54 43.8	+44.6	7.7	55 43.3	+44.7	7.9	84
85	49 30.5	+43.2	5.7	50 30.2	+43.3	5.8	51 29.9	+43.4	5.9	52 29.5	+43.6	6.1	53 29.2	+43.6	6.2	54 28.8	+43.8	6.4	55 28.4	+43.9	6.6	56 28.0	+44.1	6.7	85
86	50 13.7	+42.6	4.6	51 13.5	+42.7	4.7	52 13.3	+42.7	4.9	53 13.1	+42.8	5.0	54 12.8	+43.0	5.1	55 12.6	+43.0	5.2	56 12.3	+43.2	5.3	57 12.1	+43.2	5.5	86
87	50 56.3	+41.9	3.5	51 56.2	+42.0	3.6	52 56.0	+42.1	3.7	53 55.9	+42.2	3.8	54 55.8	+42.2	3.9	55 55.6	+42.3	4.0	56 55.5	+42.4	4.1	57 55.3	+42.5	4.2	87
88	51 38.2	+41.3	2.4	52 38.2	+41.3	2.4	53 38.1	+41.3	2.5	54 38.1	+41.3	2.6	55 38.0	+41.4	2.6	56 37.9	+41.5	2.7	57 37.9	+41.5	2.8	58 37.8	+41.6	2.9	88
89	52 19.5	+40.5	1.2	53 19.5	+40.5	1.2	54 19.4	+40.6	1.3	55 19.4	+40.6	1.3	56 19.4	+40.6	1.3	57 19.4	+40.6	1.3	58 19.4	+40.6	1.4	59 19.4	+40.6	1.5	89
90	53 00.0	+39.8	0.0	54 00.0	+39.7	0.0	55 00.0	+39.7	0.0	56 00.0	+39.7	0.0	57 00.0	+39.7	0.0	58 00.0	+39.7	0.0	59 00.0	+39.7	0.0	60 00.0	+39.6	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 132°, 228°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	23 15.3	+52.1	124.8	22 40.9	+52.6	125.1	22 06.3	+53.0	125.5	21 31.3	+53.5	125.8	20 56.1	+53.9	126.1	20 20.6	+54.3	126.4	19 44.9	+54.6	126.7	19 09.0	+54.9	127.0	0
1	24 07.4	+52.0	124.2	23 33.5	+52.5	124.6	22 59.3	+52.9	124.9	22 24.8	+53.3	125.3	21 50.0	+53.7	125.6	21 14.9	+54.1	125.9	20 39.5	+54.4	126.2	20 03.9	+54.9	126.5	1
2	24 59.4	+51.9	123.7	24 26.0	+52.3	124.1	23 52.2	+52.8	124.4	23 18.1	+53.2	124.8	22 43.7	+53.7	125.1	22 09.0	+54.1	125.5	21 34.1	+54.4	125.8	20 58.8	+54.9	126.1	2
3	25 51.3	+51.7	123.1	25 18.3	+52.2	123.5	24 45.0	+52.7	123.9	24 11.3	+53.2	124.3	23 37.4	+53.6	124.7	23 03.1	+54.0	125.0	22 28.5	+54.5	125.4	21 53.7	+54.8	125.7	3
4	26 43.0	+51.6	122.6	26 10.5	+52.1	123.0	25 37.7	+52.5	123.4	25 04.5	+53.0	123.8	24 31.0	+53.4	124.2	23 57.1	+53.9	124.5	23 22.9	+54.4	124.9	22 48.5	+54.7	125.2	4
5	27 34.6	+51.4	122.0	27 02.6	+52.0	122.4	26 30.2	+52.5	122.8	25 57.5	+52.9	123.3	25 24.4	+53.4	123.7	24 51.0	+53.8	124.0	24 17.3	+54.2	124.4	23 43.2	+54.6	124.8	5
6	28 26.0	+51.3	121.4	27 54.6	+51.8	121.9	27 22.7	+52.3	122.3	26 50.4	+52.8	122.7	26 17.8	+53.3	123.2	25 44.8	+53.7	123.6	25 11.5	+54.1	124.0	24 37.8	+54.5	124.3	6
7	29 17.3	+51.2	120.8	28 46.4	+51.7	121.3	28 15.0	+52.2	121.7	27 43.2	+52.7	122.2	27 11.1	+53.1	122.6	26 38.5	+53.6	123.1	26 05.6	+54.1	123.5	25 32.3	+54.5	123.9	7
8	30 08.5	+50.9	120.2	29 38.1	+51.5	120.7	29 07.2	+52.0	121.2	28 35.9	+52.6	121.7	28 04.2	+53.1	122.1	27 32.1	+53.5	122.6	26 59.7	+53.9	123.0	26 26.8	+54.4	123.4	8
9	30 59.4	+50.8	119.6	30 29.6	+51.3	120.1	29 59.2	+51.9	120.6	29 28.5	+52.4	121.1	28 57.3	+52.9	121.6	28 25.6	+53.4	122.0	27 53.6	+53.8	122.5	27 21.2	+54.2	122.9	9
10	31 50.2	+50.7	119.0	31 20.9	+51.2	119.5	30 51.1	+51.8	120.0	30 20.9	+52.2	120.5	29 50.2	+52.7	121.0	29 19.0	+53.3	121.5	28 47.4	+53.7	122.0	28 15.4	+54.2	122.5	10
11	32 40.9	+50.4	118.3	32 12.1	+51.0	118.9	31 42.9	+51.5	119.4	31 13.1	+52.1	120.0	30 42.9	+52.7	120.5	30 12.3	+53.1	121.0	29 41.1	+53.6	121.5	29 09.6	+54.0	122.0	11
12	33 31.3	+50.2	117.7	33 03.1	+50.8	118.3	32 34.4	+51.4	118.8	32 05.2	+52.0	119.4	31 35.6	+52.4	119.9	31 05.4	+53.0	120.5	30 34.7	+53.5	121.0	30 03.6	+54.0	121.5	12
13	34 21.5	+50.0	117.0	33 53.9	+50.6	117.6	33 25.8	+51.2	118.2	32 57.2	+51.8	118.8	32 28.0	+52.4	119.4	31 58.4	+52.8	119.9	31 28.2	+53.4	120.4	30 57.6	+53.8	121.0	13
14	35 11.5	+49.7	116.4	34 44.5	+50.4	117.0	34 17.0	+51.0	117.6	33 49.0	+51.6	118.2	33 20.4	+52.1	118.8	32 51.2	+52.7	119.3	32 21.6	+53.2	119.9	31 51.4	+53.7	120.4	14
15	36 01.2	+49.6	115.7	35 34.9	+50.2	116.3	35 08.0	+50.8	117.0	34 40.6	+51.4	117.6	34 12.5	+52.0	118.2	33 43.9	+52.5	118.8	33 14.8	+53.0	119.3	32 45.1	+53.5	119.9	15
16	36 50.8	+49.2	115.0	36 25.1	+50.0	115.6	35 58.8	+50.6	116.3	35 32.0	+51.2	116.9	35 04.5	+51.8	117.6	34 36.4	+52.4	118.2	34 07.8	+52.9	118.8	33 38.6	+53.4	119.4	16
17	37 40.0	+49.0	114.2	37 15.1	+49.6	114.9	36 49.4	+50.4	115.6	36 23.2	+50.9	116.3	35 56.3	+51.6	116.9	35 28.8	+52.1	117.6	35 00.7	+52.7	118.2	34 32.0	+53.3	118.8	17
18	38 29.0	+48.8	113.5	38 04.7	+49.5	114.2	37 39.8	+50.1	114.9	37 14.1	+50.8	115.6	36 47.9	+51.3	116.3	36 20.9	+52.0	117.0	35 53.4	+52.6	117.6	35 25.3	+53.1	118.3	18
19	39 17.8	+48.4	112.8	38 54.2	+49.1	113.5	38 29.9	+49.8	114.2	38 04.9	+50.5	115.0	37 39.2	+51.2	115.7	37 12.9	+51.8	116.4	36 46.0	+52.3	117.0	36 18.4	+52.9	117.7	19
20	40 06.2	+48.1	112.0	39 43.3	+48.9	112.8	39 19.7	+49.6	113.5	38 55.4	+50.3	114.3	38 30.4	+51.0	115.0	38 04.7	+51.6	115.7	37 38.3	+52.2	116.4	37 11.3	+52.8	117.1	20
21	40 54.3	+47.8	111.2	40 32.2	+48.6	112.0	40 09.3	+49.3	112.8	39 45.7	+50.0	113.6	39 21.4	+50.6	114.3	38 56.3	+51.3	115.1	38 30.5	+52.0	115.8	38 04.1	+52.5	116.5	21
22	41 42.1	+47.4	110.4	41 20.8	+48.2	111.2	40 58.6	+49.0	112.0	40 35.7	+49.8	112.8	40 12.0	+50.5	113.6	39 47.6	+51.1	114.4	39 22.5	+51.7	115.1	38 56.6	+52.4	115.9	22
23	42 29.5	+47.1	109.6	42 09.0	+47.9	110.4	41 47.6	+48.7	111.3	41 25.5	+49.4	112.1	41 02.5	+50.2	112.9	40 38.7	+50.9	113.7	40 14.2	+51.6	114.5	39 49.0	+52.2	115.2	23
24	43 16.6	+46.7	108.7	42 56.9	+47.5	109.6	42 36.3	+48.4	110.5	42 14.9	+49.1	111.3	41 52.7	+49.8	112.2	41 29.6	+50.6	113.0	41 05.8	+51.2	113.8	40 41.2	+51.9	114.6	24
25	44 03.3	+46.3	107.9	43 44.4	+47.2	108.8	43 24.7	+48.0	109.7	43 04.0	+48.9	110.6	42 42.5	+49.6	111.4	42 20.2	+50.3	112.3	41 57.0	+51.1	113.1	41 33.1	+51.7	113.9	25
26	44 49.6	+45.9	107.0	44 31.6	+46.8	107.9	44 12.7	+47.6	108.9	43 52.9	+48.4	109.8	43 32.1	+49.3	110.7	43 10.5	+50.0	111.5	42 48.1	+50.7	112.4	42 24.8	+51.4	113.3	26
27	45 35.5	+45.4	106.1	45 18.4	+46.3	107.0	45 00.3	+47.3	108.0	44 41.3	+48.1	108.9	44 21.4	+48.9	109.9	44 00.5	+49.8	110.8	43 38.8	+50.5	111.7	43 16.2	+51.2	112.6	27
28	46 20.9	+44.9	105.1	46 04.7	+45.9	106.1	45 47.6	+46.8	107.1	45 29.4	+47.7	108.1	45 10.3	+48.6	109.1	44 50.3	+49.3	110.0	44 29.3	+50.1	110.9	44 07.4	+50.9	111.8	28
29	47 05.8	+44.5	104.2	46 50.6	+45.5	105.2	46 34.4	+46.4	106.2	46 17.1	+47.3	107.2	45 58.9	+48.2	108.2	45 39.6	+49.1	109.2	45 19.4	+49.9	110.1	44 58.3	+50.6	111.1	29
30	47 50.3	+43.9	103.2	47 36.1	+44.9	104.2	47 20.8	+45.9	105.3	47 04.4	+46.9	106.3	46 47.1	+47.7	107.3	46 28.7	+48.6	108.4	46 09.3	+49.5	109.3	45 48.9	+50.3	110.3	30
31	48 34.2	+43.3	102.1	48 21.0	+44.3	103.2	48 06.7	+45.4	104.3	47 51.3	+46.4	105.4	47 34.8	+47.4	106.5	47 17.3	+48.3	107.5	46 58.8	+49.1	108.5	46 39.2	+49.9	109.5	31
32	49 17.5	+42.8	101.1	49 05.4	+43.9	102.2	48 52.1	+44.9	103.3	48 37.7	+45.9	104.4	48 22.2	+46.9	105.5	48 05.6	+47.8	106.6	47 47.9	+48.7	107.7	47 29.1	+49.6	108.7	32
33	50 00.3	+42.1	100.0	49 49.3	+43.2	101.2	49 37.0	+44.4	102.3	49 23.6	+45.5	103.5	49 09.1	+46.4	104.6	48 53.4	+47.4	105.7	48 36.6	+48.3	106.8	48 18.7	+49.2	107.9	33
34	50 42.4	+41.5	98.9	50 32.5	+42.7	100.1	50 21.4	+43.8	101.3	50 09.1	+44.8	102.5	49 55.5	+45.9	103.6	49 40.8	+46.9	104.8	49 24.9	+47.9	105.9	49 07.9	+48.9	107.0	34
35	51 23.9	+40.8	97.7	51 15.2	+42.0	99.0	51 05.2	+43.1	100.2	50 53.9	+44.3	101.4	50 41.4	+45.3	102.6	50 27.7	+46.5	103.8	50 12.8	+47.5	105.0	49 56.8	+48.3	106.1	35
36	52 04.7	+40.0	96.6	51 57.2	+41.3	97.8	51 48.3	+42.6	99.1	51 38.2	+43.7	100.3	51 26.8	+44.8	101.6	51 14.2	+45.9	102.8	51 00.3	+46.9	104.0	50 45.1	+48.0	105.2	36
37	52 44.7	+39.3	95.3	52 38.5	+40.5	96.6	52 30.9	+41.8	97.9	52 21.9	+43.0	99.2	52 11.6	+44.2	100.5	52 00.1	+45.3	101.8	51 47.2	+46.3	103.0	51 33.1	+47.4	104.2	37
38	53 24.0	+38.4	94.1	53 19.0	+39.8	95.4	53 12.7	+41.1	96.7	53 04.9	+42.4	98.1	52 55.8	+43.6	99.4	52 45.4	+44.7	100.7	52 33.6	+45.8	102.0	52 20.5	+46.9	103.2	38
39	54 02.4	+37.6	92.8	53 58.8	+39.0	94.2	53 53.8	+40.3	95.5	53 47.3	+41.6	96.9	53 39.4	+42.9	98.2	53 30.1	+44.1	99.6	53 19.4	+45.3	100.9	53 07.4	+46.4	102.2	39
40	54 40.0	+36.7	91.4	54 37.8	+38.1	92.8	54 34.1	+39.5	94.3	54 28.9	+40.8	95.7	54 22.3	+42.1	97.0	54 14.2	+43.4	98.4	54 04.7	+44.6	99.8	53 53.8	+45.8	101.1	40
41	55 16.7	+35.7	90.1	55 15.9	+37.2	91.5	55 13.6	+38.6	92.9	55 09.7	+40.1	94.4	55 04.4	+41.4	95.8	54 57.6	+42.7	97.2	54 49.3	+44.0	98.6	54 39.6	+45.1	100.0	41
42	55 52.4	+34.7	88.6	55 53.1	+36.2	90.1	55 52.2	+37.7	91.6	55 49.8	+39.1	93.1	55 45.8	+40.5	94.5	55 40.3	+41.9	96.0	55 33.3	+43.2	97.4	55 24.7	+44.5	98.9	42
43	56 27.1	+33.7	87.2	56 29.3	+35.2	88.7	56 29.9	+36.7	90.2	56 28.9	+38.2	91.7	56 26.3	+39.7	93.2	56 22.2	+41.1	94.7	56 16.5	+42.4	96.2	56 09.2	+43.8	97.7	43
44	57 00.8	+32.5	85.7	57 04.5	+34.1	87.2	57 06.6	+35.7	88.7	57 07.1	+37.1	90.3	57 06.0	+38.8	91.8	57 03.3	+40.2	93.4	56 58.9	+41.7	94.9	56 53.0	+43.0	96.4	44
45	57 33.3	+31.3	84.1	57 38.6	+33.0	85.7	57 42.3	+34.6	87.3	57 44.4	+36.2	88.8	57 44.8	+37.7	90.4	57 43.5	+39.3	92.0	57 40.6	+40.7	93.6	57 36.0	+42.2	95.2	45
46	58 04.6	+30.1	82.5	58 11.6	+31.8	84.1	58 16.9	+33.5	85.7	58 20.6	+35.1	87.3	58 22.5	+36.7	89.0	58 22.8	+38.3	90.6	58 21.3	+39.8	92.2	58 18.2	+41.3	93.8	46
47	58 34.7	+28.8	80.9	58 43.4	+30.5	82.5	58 50.4	+32.3	84.1	58 55.7	+33.9	85.8	58 59.2	+35.6	87.4	59 01.1	+37.2	89.1	59 01.1	+38.9	90.8	58 59.5	+40.3	92.4	47
48	59 03.5	+27.4	79.2	59 13.9	+29.2	80.8	59 22.7	+30.9	82.5	59 29.6	+32.7	84.2	59 34.8	+34.5	85.9	59 38.3	+36.1	87.6	59 40.0	+37.7	89.3	59 39.8	+39.4	91.0	48
49	59 30.9	+26.0	77.4	59 43.1	+27.9	79.1	59 53.6	+29.7	80.8	60 02.3	+31.5	82.5	60 09.3	+33.2	84.2	60 14.4	+34.9	86.0	60 17.7	+36.7	87.7	60 19.2	+38.3	89.5	49
50	59 56.9	+24.6	75.6	60 11.0	+26.5	77.3	60 23.3	+28.2	79.0	60 33.8	+30.0	80.8	60 42.5	+31.8	82.5	60 49.3	+33.7	84.3	60 54.4	+35.4	86.1	60 57.5	+37.2	87.9	50
51	60 21.5	+22.9	73.8	60 37.3	+24.9	75.5	60 51.5	+26.7	77.2	61 03.8	+28.6	79.0	61 14.3	+30.5	80.8	61 23.0	+32.3	82.6	61 29.8	+34.1	84.4	61 34.7	+35.9	86.3	51
52	60 44.4	+21.4	71.9	61 02.2	+23.2	73.6	61 18.2	+25.2	75.4	61 32.4	+27.1	77.2	61 44.8	+29.0	79.0	61 55.3	+31.0	80.8	62 03.9	+32.8	82.7	62 10.6	+34.7	84.6	52
53	61 05.8	+19.6	70.0	61 25.4	+21.6	71.7	61 43.4	+23.5	73.5	61 59.5	+25.5	75.3	62 13.8	+27.5	77.1	62 26.3	+29.4	79.0	62 36.7	+31.4	80.9	62 45.3	+33.2	82.8	53
54	61 25.4	+18.0	68.0	61 47.0	+19.9	69.8	62 06.9	+21.9	71.5	62 25.0	+23.9	73.3	62 41.3	+25.9	75.2	62 55.7	+27.8	77.1	63 08.1	+29.8	79.0	63 18.5	+31.8	81.0	54
55	61 43.4	+16.1	66.0	62 06.9	+18.1	67.8	62 28.8	+20.1	69.5	62 48.9	+22.1	71.4	63 07.1	+24.2	73.2	63 23.5	+26.2	75.1	63 37.9	+28.2	77.1	63 50.3	+30.3	79.1	55
56	61 59.5	+14.3	64.0	62 25.0	+16.3	65.7	62 48.9	+18.5	67.5	63 11.0	+20.3	69.3	63 31.3	+22.3	71.2	63 49.7	+24.4	73.1	64 06.1	+26.5	75.1	64 20.6	+28.5	77.1	56
57	62 13.8	+12.5	61.9	62 41.3	+14.4	63.6	63 07.1	+16.4	65.4	63 31.3	+18.4	67.2	63 53.6	+20.5	69.1	64 14.1	+22.6	71.0	64 32.6	+24.7	73.0	64 49.1	+26.9	75.0	57
58	62 26.3	+10.4	59.8	62 55.7	+12.4•	61.5	63 23.5	+14.4•	63.2	63 49.7	+16.4	65.1	64 14.1	+18.5•	66.9	64 36.7	+20.6	68.9	64 57.3	+22.8	70.9	65 16.0	+24.9	72.9	58
59	62 36.7	+8.6	57.7	63 08.1	+10.4•	59.3	63 37.9	+12.4•	61.1	64 06.1	+14.5•	62.9	64 32.6	+16.5•	64.7	64 57.3	+18.7•	66.7	65 20.1	+20.8•	68.7	65 40.9	+23.1	70.7	59
60	62 45.3	+6.5•	55.5	63 18.5	+8.4•	57.1	63 50.3	+10.4•	58.9	64 20.6	+12.3•	60.6	64 49.1	+14.5•	62.5	65 16.0	+16.5•	64.4	65 40.9	+18.8•	66.4	66 04.0	+21.0•	68.5	60
61	62 51.8	+4.5•	53.3	63 26.9	+6.4•	54.9	64 00.7	+8.2•	56.6	64 32.9	+10.3•	58.4	65 03.6	+12.3•	60.2	65 32.5	+14.5•	62.1	65 59.7	+16.6•	64.1	66 25.0	+18.8•	66.1	61
62	62 56.3	+2.4•	51.1	63 33.3	+4.2•	52.7	64 08.9	+6.2•	54.3	64 43.2	+8.1•	56.1	65 15.9	+10.1•	57.9	65 47.0	+12.2•	59.8	66 16.3	+14.4•	61.7	66 43.8	+16.7•	63.7	62
63	62 58.7	+0.4•	49.0	63 37.5	+2.2•	50.5	64 15.1	+3.9•	52.1	64 51.3	+5.8•	53.7	65 26.0	+7.9•	55.5	65 59.2	+9.9•	57.3	66 30.7	+12.1•	59.3	67 00.5	+14.3•	61.3	63
64	62 59.1	−1.6•	46.8	63 39.7	0.0•	48.2	64 19.0	+1.8•	49.8	64 57.1	+3.7•	51.4	65 33.9	+5.6•	53.1	66 09.1	+7.7•	54.9	66 42.8	+9.8•	56.8	67 14.8	+11.9•	58.8	64
65	62 57.5	−3.7•	44.6	63 39.7	−2.1•	46.0	64 20.8	−0.3•	47.5	65 00.8	+1.4•	49.0	65 39.5	+3.3•	50.7	66 16.8	+5.3•	52.5	66 52.6	+7.3•	54.3	67 26.7	+9.6•	56.3	65
66	62 53.8	−5.8•	42.4	63 37.6	−4.2•	43.7	64 20.5	−2.6•	45.1	65 02.2	−0.8•	46.7	65 42.8	+1.0•	48.3	66 22.1	+2.8•	50.0	66 59.9	+4.9•	51.8	67 36.3	+7.0•	53.7	66
67	62 48.0	−7.7•	40.2	63 33.4	−6.3•	41.5	64 17.9	−4.7•	42.8	65 01.4	−3.1•	44.3	65 43.8	−1.4•	45.8	66 24.9	+0.6•	47.5	67 04.8	+2.5•	49.2	67 43.3	+4.5•	51.1	67
68	62 40.3	−9.8	38.0	63 27.1	−8.3•	39.2	64 13.2	−6.9•	40.5	64 58.3	−5.3•	41.9	65 42.4	−3.6•	43.4	66 25.5	−1.9•	45.0	67 07.3	−0.1•	46.7	67 47.8	+1.9•	48.4	68
69	62 30.5	−11.6	35.9	63 18.8	−10.4•	37.0	64 06.3	−9.0•	38.3	64 53.0	−7.5•	39.6	65 38.8	−6.0•	41.0	66 23.6	−4.3•	42.5	67 07.2	−2.5•	44.1	67 49.7	−0.6•	45.8	69
70	62 18.9	−13.6	33.7	63 08.4	−12.3	34.8	63 57.3	−11.0•	36.0	64 45.5	−9.7•	37.3	65 32.8	−8.2•	38.6	66 19.3	−6.7•	40.0	67 04.7	−5.0•	41.5	67 49.1	−3.2•	43.1	70
71	62 05.3	−15.5	31.7	62 56.1	−14.3•	32.7	63 46.3	−13.1•	33.8	64 35.8	−11.8•	35.0	65 24.6	−10.4•	36.2	66 12.6	−9.0•	37.5	66 59.7	−7.4•	39.0	67 45.9	−5.7•	40.5	71
72	61 49.8	−17.2	29.6	62 41.8	−16.3	30.6	63 33.2	−15.1•	31.6	64 24.0	−13.9•	32.7	65 14.2	−12.7•	33.8	66 03.6	−11.3•	35.1	66 52.3	−9.8•	36.4	67 40.2	−8.3•	37.9	72
73	61 32.6	−19.0	27.6	62 25.5	−18.0	28.5	63 18.1	−17.1	29.4	64 10.1	−16.0•	30.4	65 01.5	−14.8•	31.5	65 52.3	−13.5•	32.7	66 42.5	−12.2•	33.9	67 31.9	−10.7•	35.3	73
74	61 13.6	−20.7	25.6	62 07.5	−19.8	26.4	63 01.0	−18.9	27.3	63 54.1	−17.9	28.2	64 46.7	−16.8•	29.2	65 38.8	−15.7•	30.3	66 30.3	−14.4•	31.5	67 21.2	−13.2•	32.7	74
75	60 52.9	−22.4	23.7	61 47.7	−21.6	24.4	62 42.1	−20.7	25.2	63 36.2	−19.8	26.1	64 29.9	−18.8•	27.0	65 23.1	−17.8•	28.0	66 15.9	−16.7•	29.0	67 08.0	−15.4•	30.2	75
76	60 30.5	−23.9	21.8	61 26.1	−23.2	22.4	62 21.4	−22.4	23.2	63 16.4	−21.6	24.0	64 11.1	−20.8	24.8	65 05.3	−19.8•	25.7	65 59.2	−18.8•	26.7	66 52.6	−17.8•	27.7	76
77	60 06.6	−25.4	19.9	61 02.9	−24.8	20.5	61 59.0	−24.2	21.2	62 54.8	−23.4	21.9	63 50.3	−22.6	22.6	64 45.5	−21.8	23.5	65 40.4	−20.9•	24.3	66 34.8	−19.9•	25.3	77
78	59 41.2	−26.9	18.1	60 38.1	−26.3	18.7	61 34.8	−25.7	19.3	62 31.4	−25.1	19.9	63 27.7	−24.6	20.5	64 23.7	−23.6	21.3	65 19.5	−22.9	22.1	66 14.9	−22.0•	22.9	78
79	59 14.3	−28.3	16.4	60 11.8	−27.8	16.8	61 09.1	−27.2	17.4	62 06.3	−26.7	17.9	63 03.1	−26.1	18.5	64 00.1	−25.5	19.2	64 56.6	−24.7	19.9	65 52.9	−24.0	20.6	79
80	58 46.0	−29.6	14.6	59 44.0	−29.2	15.1	60 41.9	−28.7	15.5	61 39.6	−28.2	16.0	62 37.2	−27.7	16.6	63 34.6	−27.1	17.1	64 31.9	−26.6	17.7	65 28.9	−25.9	18.4	80
81	58 16.4	−30.9	13.0	59 14.8	−30.5	13.3	60 13.2	−30.0	13.8	61 11.4	−29.7	14.2	62 09.5	−29.2	14.8	63 07.5	−28.8	15.1	64 05.3	−28.2	15.7	65 03.0	−27.7	16.3	81
82	57 45.5	−32.0	11.4	58 44.3	−31.7	11.7	59 43.1	−31.5	12.0	60 41.7	−31.1	12.4	61 40.3	−30.7	12.8	62 38.7	−30.3	13.2	63 37.1	−29.9	13.7	64 35.3	−29.4	14.2	82
83	57 13.5	−33.2	9.8	58 12.6	−33.0	10.1	59 11.6	−32.6	10.3	60 10.6	−32.4	10.7	61 09.6	−32.1	11.0	62 08.4	−31.7	11.4	63 07.2	−31.4	11.7	64 05.9	−31.0	12.2	83
84	56 40.3	−34.3	8.3	57 39.6	−34.1	8.5	58 39.0	−33.9	8.7	59 38.2	−33.6	9.0	60 37.5	−33.4	9.2	61 36.7	−33.1	9.6	62 35.8	−32.9	9.9	63 34.9	−32.5	10.2	84
85	56 06.0	−35.4	6.8	57 05.5	−35.1	7.0	58 05.1	−35.0	7.1	59 04.6	−34.8	7.4	60 04.1	−34.6	7.6	61 03.6	−34.5	7.8	62 03.0	−34.2	8.1	63 02.4	−34.0	8.3	85
86	55 30.6	−36.3	5.3	56 30.4	−36.2	5.5	57 30.1	−36.1	5.6	58 29.8	−35.9	5.8	59 29.5	−35.8	6.0	60 29.1	−35.6	6.1	61 28.8	−35.5	6.3	62 28.4	−35.3	6.5	86
87	54 54.3	−37.2	3.9	55 54.2	−37.2	4.0	56 54.0	−37.0	4.1	57 53.9	−37.0	4.3	58 53.7	−36.9	4.4	59 53.5	−36.8	4.5	60 53.3	−36.6	4.7	61 53.1	−36.6	4.8	87
88	54 17.1	−38.1	2.6	55 17.0	−38.1	2.7	56 17.0	−38.1	2.7	57 16.9	−38.0	2.8	58 16.8	−37.9	2.9	59 16.7	−37.8	3.0	60 16.7	−37.8	3.0	61 16.5	−37.8	3.1	88
89	53 39.0	−39.0	1.3	54 38.9	−38.9	1.3	55 38.9	−38.9	1.3	56 38.9	−38.9	1.4	57 38.9	−38.9	1.4	58 38.9	−38.9	1.5	59 38.9	−38.8	1.5	60 38.8	−38.8	1.5	89
90	53 00.0	−39.8	0.0	54 00.0	−39.8	0.0	55 00.0	−39.8	0.0	56 00.0	−39.8	0.0	57 00.0	−39.8	0.0	58 00.0	−39.8	0.0	59 00.0	−39.9	0.0	60 00.0	−39.9	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 49°, 311°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	23 15.3	−52.2	124.8	22 40.9	−52.6	125.1	22 06.3	−53.1	125.5	21 31.3	−53.5	125.8	20 56.1	−53.9	126.1	20 20.6	−54.3	126.4	19 44.9	−54.7	126.7	19 09.0	−55.1	127.0	0
1	22 23.1	−52.3	125.3	21 48.3	−52.8	125.6	21 13.2	−53.2	126.0	20 37.8	−53.6	126.3	20 02.2	−54.0	126.6	19 26.3	−54.3	126.8	18 50.2	−54.7	127.1	18 13.9	−55.1	127.4	1
2	21 30.8	−52.4	125.8	20 55.5	−52.8	126.1	20 20.0	−53.3	126.5	19 44.2	−53.6	126.7	19 08.2	−54.0	127.0	18 32.0	−54.5	127.3	17 55.5	−54.8	127.6	17 18.8	−55.1	127.8	2
3	20 38.4	−52.5	126.4	20 02.7	−53.0	126.7	19 26.7	−53.3	126.9	18 50.6	−53.8	127.2	18 14.2	−54.2	127.5	17 37.5	−54.4	127.7	17 00.7	−54.8	128.0	16 23.7	−55.2	128.2	3
4	19 45.9	−52.6	126.9	19 09.7	−53.0	127.2	18 33.4	−53.4	127.4	17 56.8	−53.8	127.7	17 20.0	−54.1	127.9	16 43.1	−54.6	128.2	16 05.9	−54.9	128.4	15 28.5	−55.2	128.6	4
5	18 53.3	−52.7	127.4	18 16.7	−53.0	127.6	17 40.0	−53.5	127.9	17 03.0	−53.8	128.1	16 25.9	−54.3	128.4	15 48.5	−54.6	128.6	15 11.0	−55.0	128.8	14 33.3	−55.3	129.0	5
6	18 00.6	−52.8	127.9	17 23.7	−53.2	128.1	16 46.5	−53.5	128.4	16 09.2	−54.0	128.6	15 31.6	−54.3	128.8	14 53.9	−54.6	129.0	14 16.0	−54.9	129.2	13 38.0	−55.3	129.4	6
7	17 07.8	−52.8	128.4	16 30.5	−53.2	128.6	15 53.0	−53.7	128.8	15 15.2	−54.0	129.1	14 37.3	−54.3	129.3	13 59.3	−54.7	129.5	13 21.1	−55.1	129.7	12 42.7	−55.4	129.8	7
8	16 15.0	−52.9	128.9	15 37.3	−53.3	129.1	14 59.3	−53.6	129.3	14 21.2	−54.0	129.5	13 43.0	−54.4	129.7	13 04.6	−54.7	129.9	12 26.0	−55.0	130.1	11 47.3	−55.3	130.2	8
9	15 22.1	−52.9	129.4	14 44.0	−53.4	129.6	14 05.7	−53.7	129.8	13 27.2	−54.1	130.0	12 48.6	−54.4	130.1	12 09.9	−54.8	130.3	11 31.0	−55.1	130.5	10 52.0	−55.4	130.6	9
10	14 29.2	−53.0	130.0	13 50.6	−53.4	130.1	13 12.0	−53.8	130.2	12 33.1	−54.1	130.4	11 54.2	−54.5	130.6	11 15.1	−54.8	130.7	10 35.9	−55.1	130.9	9 56.6	−55.5	131.0	10
11	13 36.2	−53.1	130.3	12 57.2	−53.4	130.5	12 18.2	−53.8	130.7	11 39.0	−54.2	130.8	10 59.7	−54.5	131.0	10 20.3	−54.9	131.1	9 40.8	−55.2	131.3	9 01.1	−55.4	131.4	11
12	12 43.1	−53.1	130.8	12 03.8	−53.5	131.0	11 24.4	−53.9	131.1	10 44.8	−54.2	131.3	10 05.2	−54.5	131.4	9 25.4	−54.8	131.6	8 45.6	−55.2	131.7	8 05.7	−55.5	131.8	12
13	11 50.0	−53.2	131.3	11 10.3	−53.5	131.4	10 30.5	−53.9	131.6	9 50.6	−54.2	131.7	9 10.7	−54.6	131.8	8 30.6	−54.9	132.0	7 50.4	−55.2	132.1	7 10.2	−55.5	132.2	13
14	10 56.8	−53.2	131.8	10 16.8	−53.6	131.9	9 36.6	−53.9	132.0	8 56.4	−54.3	132.2	8 16.1	−54.6	132.3	7 35.7	−54.9	132.4	6 55.2	−55.2	132.5	6 14.7	−55.5	132.6	14
15	10 03.6	−53.3	132.2	9 23.2	−53.6	132.4	8 42.7	−53.9	132.5	8 02.1	−54.2	132.6	7 21.5	−54.6	132.7	6 40.8	−54.9	132.8	6 00.0	−55.2	132.9	5 19.2	−55.6	132.9	15
16	9 10.3	−53.3	132.7	8 29.6	−53.7	132.8	7 48.8	−54.0	132.9	7 07.9	−54.4	133.0	6 26.9	−54.6	133.1	5 45.9	−55.0	133.2	5 04.8	−55.3	133.3	4 23.6	−55.5	133.3	16
17	8 17.0	−53.3	133.2	7 35.9	−53.6	133.3	6 54.8	−54.0	133.4	6 13.5	−54.3	133.4	5 32.3	−54.7	133.5	4 50.9	−54.7	133.6	4 09.5	−55.2	133.6	3 28.1	−55.6	133.7	17
18	7 23.7	−53.3	133.6	6 42.3	−53.7	133.7	6 00.8	−54.1	133.8	5 19.2	−54.3	133.9	4 37.6	−54.7	133.9	3 56.0	−55.0	134.0	3 14.3	−55.3	134.0	2 32.5	−55.5	134.1	18
19	6 30.4	−53.4	134.1	5 48.6	−53.7	134.2	5 06.7	−54.0	134.3	4 24.9	−54.4	134.3	3 42.9	−54.6	134.3	3 01.0	−55.0	134.4	2 19.0	−55.3	134.4	1 37.0	−55.6	134.4	19
20	5 37.0	−53.4	134.6	4 54.9	−53.8	134.6	4 12.7	−54.1	134.7	3 30.5	−54.4	134.7	2 48.3	−54.7	134.8	2 06.0	−55.0	134.8	1 23.7	−55.3	134.8	0 41.4	−55.5	134.8	20
21	4 43.6	−53.4	135.0	4 01.1	−53.7	135.1	3 18.6	−54.0	135.1	2 36.1	−54.4	135.1	1 53.6	−54.7	135.2	1 11.0	−55.0	135.2	0 28.4	−55.2	135.2	0 14.1	+55.6	44.8	21
22	3 50.2	−53.5	135.5	3 07.4	−53.8	135.5	2 24.6	−54.1	135.5	1 41.7	−54.4	135.5	0 58.9	−54.7	135.5	0 16.0	−55.0	135.6	0 26.8	+55.3	44.4	1 09.7	+55.6	44.4	22
23	2 56.7	−53.5	135.9	2 13.6	−53.8	136.0	1 30.5	−54.1	136.0	0 47.3	−54.4	136.0	0 04.2	−54.7	136.0	0 39.0	+55.0	44.0	1 22.1	+55.3	44.0	2 05.3	+55.5	44.0	23
24	2 03.3	−53.5	136.4	1 19.9	−53.8	136.4	0 36.4	−54.1	136.4	0 07.1	+54.4	43.6	0 50.5	+54.7	43.6	1 34.0	+55.0	43.6	2 17.4	+55.3	43.6	3 00.8	+55.6	43.7	24
25	1 09.8	−53.4	136.8	0 26.1	−53.8	136.8	0 17.7	+54.1	43.2	1 01.5	+54.3	43.2	1 45.2	+54.7	43.2	2 29.0	+54.9	43.2	3 12.7	+55.2	43.2	3 56.4	+55.5	43.3	25
26	0 16.4	−53.5	137.3	0 27.7	+53.8	42.7	1 11.8	+54.1	42.7	1 55.8	+54.4	42.7	2 39.7	+54.7	42.8	3 23.9	+55.0	42.8	4 07.9	+55.3	42.9	4 51.9	+55.5	42.9	26
27	0 37.1	+53.4	42.3	1 21.5	+53.7	42.3	2 05.9	+54.0	42.3	2 50.2	+54.4	42.3	3 34.6	+54.6	42.4	4 18.9	+55.0	42.4	5 03.2	+55.2	42.5	5 47.4	+55.5	42.5	27
28	1 30.5	+53.4	41.8	2 15.2	+53.8	41.8	2 59.9	+54.1	41.9	3 44.6	+54.4	41.9	4 29.2	+54.7	41.9	5 13.9	+54.9	42.0	5 58.4	+55.2	42.1	6 42.9	+55.5	42.1	28
29	2 24.0	+53.4	41.4	3 09.0	+53.7	41.4	3 54.0	+54.0	41.4	4 39.0	+54.3	41.5	5 23.9	+54.6	41.5	6 08.8	+54.9	41.6	6 53.6	+55.2	41.7	7 38.4	+55.5	41.8	29
30	3 17.4	+53.4	40.9	4 02.7	+53.8	40.9	4 48.0	+54.1	41.0	5 33.3	+54.3	41.0	6 18.5	+54.7	41.1	7 03.7	+54.9	41.2	7 48.8	+55.2	41.3	8 33.9	+55.4	41.4	30
31	4 10.8	+53.4	40.4	4 56.5	+53.7	40.5	5 42.1	+54.0	40.6	6 27.6	+54.4	40.6	7 13.2	+54.6	40.7	7 58.6	+54.9	40.8	8 44.0	+55.2	40.9	9 29.3	+55.5	41.0	31
32	5 04.2	+53.4	40.0	5 50.2	+53.7	40.0	6 36.1	+54.0	40.1	7 22.0	+54.2	40.2	8 07.8	+54.5	40.3	8 53.5	+54.8	40.4	9 39.2	+55.1	40.5	10 24.8	+55.4	40.6	32
33	5 57.6	+53.4	39.5	6 43.9	+53.6	39.6	7 30.1	+53.9	39.7	8 16.2	+54.3	39.8	9 02.3	+54.6	39.9	9 48.3	+54.9	40.0	10 34.3	+55.1	40.1	11 20.2	+55.3	40.2	33
34	6 51.0	+53.3	39.1	7 37.5	+53.7	39.2	8 24.0	+54.0	39.2	9 10.5	+54.2	39.3	9 56.9	+54.5	39.4	10 43.2	+54.8	39.6	11 29.4	+55.1	39.7	12 15.5	+55.4	39.8	34
35	7 44.3	+53.3	38.6	8 31.2	+53.6	38.7	9 18.0	+53.9	38.8	10 04.7	+54.2	38.9	10 51.4	+54.5	39.0	11 38.0	+54.7	39.1	12 24.5	+55.0	39.3	13 10.9	+55.2	39.4	35
36	8 37.6	+53.3	38.1	9 24.8	+53.6	38.2	10 11.9	+53.9	38.3	10 58.9	+54.2	38.5	11 45.9	+54.4	38.6	12 32.7	+54.7	38.7	13 19.5	+55.0	38.9	14 06.1	+55.3	39.0	36
37	9 30.9	+53.2	37.7	10 18.4	+53.5	37.7	11 05.8	+53.8	37.9	11 53.1	+54.1	38.0	12 40.3	+54.4	38.2	13 27.4	+54.7	38.3	14 14.5	+54.9	38.5	15 01.4	+55.2	38.6	37
38	10 24.1	+53.2	37.2	11 11.9	+53.5	37.3	11 59.6	+53.8	37.4	12 47.2	+54.0	37.6	13 34.7	+54.3	37.7	14 22.1	+54.6	37.9	15 09.4	+54.9	38.0	15 56.6	+55.2	38.2	38
39	11 17.3	+53.2	36.7	12 05.4	+53.4	36.9	12 53.4	+53.7	37.0	13 41.2	+54.1	37.1	14 29.0	+54.3	37.3	15 16.7	+54.6	37.4	16 04.3	+54.8	37.6	16 51.8	+55.1	37.8	39
40	12 10.5	+53.1	36.3	12 58.8	+53.4	36.4	13 47.1	+53.7	36.5	14 35.3	+53.9	36.7	15 23.3	+54.3	36.8	16 11.3	+54.5	37.0	16 59.1	+54.8	37.2	17 46.9	+55.0	37.4	40
41	13 03.6	+53.1	35.8	13 52.2	+53.3	35.9	14 40.8	+53.6	36.1	15 29.2	+53.9	36.2	16 17.6	+54.2	36.4	17 05.8	+54.5	36.6	17 53.9	+54.8	36.8	18 41.9	+55.0	37.0	41
42	13 56.7	+53.0	35.3	14 45.6	+53.3	35.5	15 34.4	+53.6	35.6	16 23.1	+53.9	35.8	17 11.8	+54.1	36.0	18 00.3	+54.4	36.1	18 48.7	+54.7	36.3	19 36.9	+55.0	36.5	42
43	14 49.7	+52.9	34.8	15 38.9	+53.2	35.0	16 28.0	+53.5	35.1	17 17.0	+53.8	35.3	18 05.9	+54.1	35.5	18 54.7	+54.3	35.7	19 43.4	+54.6	35.9	20 31.9	+54.9	36.1	43
44	15 42.6	+52.9	34.3	16 32.1	+53.1	34.5	17 21.5	+53.4	34.7	18 10.8	+53.7	34.8	19 00.0	+54.0	35.0	19 49.0	+54.3	35.2	20 38.0	+54.5	35.4	21 26.8	+54.8	35.7	44
45	16 35.5	+52.8	33.8	17 25.2	+53.1	34.0	18 14.9	+53.4	34.2	19 04.5	+53.7	34.4	19 54.0	+53.9	34.6	20 43.3	+54.2	34.8	21 32.5	+54.5	35.0	22 21.6	+54.7	35.2	45
46	17 28.3	+52.7	33.3	18 18.3	+53.0	33.5	19 08.3	+53.3	33.7	19 58.2	+53.5	33.9	20 47.9	+53.8	34.1	21 37.5	+54.1	34.3	22 27.0	+54.4	34.6	23 16.3	+54.7	34.8	46
47	18 21.0	+52.6	32.8	19 11.3	+53.0	33.0	20 01.6	+53.2	33.2	20 51.7	+53.5	33.4	21 41.7	+53.8	33.6	22 31.6	+54.1	33.9	23 21.4	+54.3	34.1	24 11.0	+54.6	34.3	47
48	19 13.6	+52.6	32.3	20 04.3	+52.8	32.5	20 54.8	+53.1	32.7	21 45.2	+53.4	32.9	22 35.5	+53.7	33.2	23 25.7	+53.9	33.4	24 15.7	+54.2	33.6	25 05.6	+54.5	33.9	48
49	20 06.2	+52.4	31.8	20 57.1	+52.8	32.0	21 47.9	+53.1	32.2	22 38.6	+53.3	32.4	23 29.2	+53.6	32.7	24 19.6	+53.9	32.9	25 09.9	+54.2	33.2	26 00.1	+54.4	33.4	49
50	20 58.6	+52.4	31.3	21 49.9	+52.6	31.5	22 41.0	+52.9	31.7	23 31.9	+53.2	31.9	24 22.8	+53.5	32.2	25 13.5	+53.8	32.4	26 04.1	+54.0	32.7	26 54.5	+54.3	33.0	50
51	21 51.0	+52.3	30.8	22 42.5	+52.6	31.0	23 33.9	+52.8	31.2	24 25.1	+53.2	31.4	25 16.3	+53.4	31.7	26 07.3	+53.6	31.9	26 58.1	+53.9	32.2	27 48.8	+54.2	32.5	51
52	22 43.3	+52.2	30.2	23 35.1	+52.4	30.5	24 26.7	+52.8	30.7	25 18.3	+53.0	30.9	26 09.7	+53.2	31.2	27 00.9	+53.6	31.4	27 52.0	+53.9	31.7	28 43.0	+54.1	32.0	52
53	23 35.5	+52.0	29.7	24 27.5	+52.4	29.9	25 19.5	+52.6	30.2	26 11.3	+52.9	30.4	27 02.9	+53.2	30.7	27 54.5	+53.4	30.9	28 45.9	+53.7	31.2	29 37.1	+54.0	31.5	53
54	24 27.5	+52.0	29.2	25 19.9	+52.2	29.4	26 12.1	+52.5	29.6	27 04.2	+52.7	29.9	27 56.1	+53.1	30.1	28 47.9	+53.3	30.4	29 39.6	+53.6	30.7	30 31.1	+53.9	31.0	54
55	25 19.5	+51.8	28.6	26 12.1	+52.1	28.8	27 04.6	+52.3	29.1	27 56.9	+52.7	29.3	28 49.2	+52.9	29.6	29 41.3	+53.2	29.9	30 33.2	+53.5	30.2	31 25.0	+53.7	30.5	55
56	26 11.3	+51.6	28.1	27 04.2	+51.9	28.3	27 56.9	+52.3	28.5	28 49.6	+52.5	28.8	29 42.1	+52.8	29.1	30 34.5	+53.0	29.4	31 26.7	+53.3	29.6	32 18.7	+53.7	30.0	56
57	27 02.9	+51.6	27.5	27 56.1	+51.8	27.7	28 49.2	+52.1	28.0	29 42.1	+52.4	28.2	30 34.9	+52.6	28.5	31 27.5	+53.0	28.8	32 20.0	+53.2	29.1	33 12.4	+53.4	29.4	57
58	27 54.5	+51.4	26.9	28 47.9	+51.7	27.2	29 41.3	+51.9	27.4	30 34.5	+52.2	27.7	31 27.5	+52.5	28.0	32 20.5	+52.7	28.3	33 13.2	+53.1	28.6	34 05.8	+53.4	28.9	58
59	28 45.9	+51.2	26.3	29 39.6	+51.5	26.6	30 33.2	+51.8	26.8	31 26.7	+52.0	27.1	32 20.0	+52.4	27.4	33 13.2	+52.6	27.7	34 06.3	+52.9	28.0	34 59.2	+53.2	28.3	59
60	29 37.1	+51.1	25.7	30 31.1	+51.4	26.0	31 25.0	+51.6	26.2	32 18.7	+51.9	26.5	33 12.4	+52.1	26.8	34 05.8	+52.5	27.1	34 59.2	+52.7	27.4	35 52.4	+53.0	27.8	60
61	30 28.2	+50.9	25.1	31 22.5	+51.1	25.4	32 16.6	+51.5	25.6	33 10.6	+51.8	25.9	34 04.5	+52.0	26.2	34 58.3	+52.3	26.5	35 51.9	+52.6	26.8	36 45.4	+52.8	27.2	61
62	31 19.1	+50.7	24.5	32 13.6	+51.0	24.8	33 08.1	+51.2	25.0	34 02.4	+51.5	25.3	34 56.5	+51.9	25.6	35 50.6	+52.1	25.9	36 44.5	+52.3	26.2	37 38.2	+52.7	26.6	62
63	32 09.8	+50.6	23.9	33 04.6	+50.8	24.1	33 59.3	+51.1	24.4	34 53.9	+51.4	24.7	35 48.4	+51.6	25.0	36 42.7	+51.9	25.3	37 36.8	+52.2	25.6	38 30.9	+52.4	26.0	63
64	33 00.4	+50.3	23.2	33 55.4	+50.6	23.5	34 50.4	+50.9	23.8	35 45.3	+51.1	24.1	36 40.0	+51.4	24.4	37 34.6	+51.7	24.7	38 29.0	+52.0	25.0	39 23.3	+52.3	25.3	64
65	33 50.7	+50.1	22.6	34 46.0	+50.4	22.8	35 41.3	+50.6	23.1	36 36.4	+50.9	23.4	37 31.4	+51.2	23.7	38 26.3	+51.5	24.0	39 21.0	+51.8	24.4	40 15.6	+52.0	24.7	65
66	34 40.8	+49.9	21.9	35 36.4	+50.2	22.2	36 31.9	+50.5	22.5	37 27.3	+50.7	22.7	38 22.6	+51.0	23.1	39 17.8	+51.3	23.4	40 12.8	+51.5	23.7	41 07.6	+51.8	24.0	66
67	35 30.7	+49.7	21.2	36 26.6	+49.9	21.5	37 22.4	+50.2	21.8	38 18.0	+50.5	22.1	39 13.6	+50.7	22.4	40 09.0	+51.0	22.7	41 04.3	+51.3	23.0	41 59.4	+51.6	23.4	67
68	36 20.4	+49.4	20.5	37 16.5	+49.7	20.8	38 12.6	+49.9	21.1	39 08.5	+50.2	21.4	40 04.3	+50.5	21.7	41 00.0	+50.8	22.0	41 55.6	+51.0	22.3	42 51.0	+51.3	22.7	68
69	37 09.8	+49.2	19.8	38 06.2	+49.5	20.1	39 02.5	+49.7	20.4	39 58.7	+50.0	20.7	40 54.8	+50.2	21.0	41 50.8	+50.4	21.3	42 46.6	+50.8	21.6	43 42.3	+51.1	22.0	69
70	37 59.0	+48.9	19.1	38 55.7	+49.1	19.4	39 52.2	+49.4	19.7	40 48.7	+49.6	19.9	41 45.0	+49.9	20.2	42 41.2	+50.2	20.6	43 37.4	+50.4	20.9	44 33.4	+50.7	21.2	70
71	38 47.9	+48.6	18.4	39 44.8	+48.9	18.6	40 41.6	+49.1	18.9	41 38.3	+49.4	19.2	42 34.9	+49.7	19.5	43 31.4	+49.9	19.8	44 27.8	+50.2	20.1	45 24.1	+50.4	20.5	71
72	39 36.5	+48.3	17.6	40 33.7	+48.5	17.9	41 30.7	+48.8	18.1	42 27.7	+49.0	18.4	43 24.6	+49.3	18.7	44 21.3	+49.6	19.0	45 18.0	+49.8	19.4	46 14.5	+50.2	19.7	72
73	40 24.8	+48.0	16.8	41 22.2	+48.2	17.1	42 19.5	+48.5	17.4	43 16.7	+48.8	17.6	44 13.9	+48.9	17.9	45 10.9	+49.2	18.2	46 07.8	+49.5	18.6	47 04.7	+49.7	18.9	73
74	41 12.8	+47.7	16.1	42 10.4	+47.9	16.3	43 08.0	+48.1	16.6	44 05.5	+48.3	16.8	45 02.8	+48.7	17.1	46 00.1	+48.9	17.4	46 57.3	+49.2	17.7	47 54.4	+49.4	18.1	74
75	42 00.5	+47.3	15.2	42 58.3	+47.6	15.5	43 56.1	+47.8	15.7	44 53.8	+48.0	16.0	45 51.5	+48.2	16.3	46 49.0	+48.5	16.6	47 46.5	+48.7	16.9	48 43.8	+49.0	17.2	75
76	42 47.8	+46.9	14.4	43 45.9	+47.1	14.6	44 43.9	+47.4	14.9	45 41.8	+47.6	15.2	46 39.7	+47.9	15.4	47 37.5	+48.1	15.7	48 35.2	+48.4	16.0	49 32.8	+48.6	16.3	76
77	43 34.7	+46.6	13.6	44 33.0	+46.8	13.8	45 31.3	+46.9	14.0	46 29.4	+47.2	14.3	47 27.6	+47.4	14.5	48 25.6	+47.7	14.8	49 23.6	+47.9	15.1	50 21.4	+48.2	15.4	77
78	44 21.3	+46.1	12.7	45 19.8	+46.3	12.9	46 18.2	+46.6	13.1	47 16.6	+46.8	13.4	48 15.0	+47.0	13.6	49 13.3	+47.2	13.9	50 11.5	+47.4	14.2	51 09.6	+47.7	14.5	78
79	45 07.4	+45.7	11.8	46 06.1	+45.9	12.0	47 04.8	+46.1	12.2	48 03.4	+46.3	12.4	49 02.0	+46.5	12.7	50 00.5	+46.7	12.9	50 58.9	+47.0	13.2	51 57.3	+47.2	13.5	79
80	45 53.1	+45.2	10.9	46 52.0	+45.4	11.1	47 50.9	+45.6	11.3	48 49.7	+45.8	11.5	49 48.5	+46.0	11.7	50 47.2	+46.2	12.0	51 45.9	+46.4	12.2	52 44.5	+46.6	12.5	80
81	46 38.3	+44.8	9.9	47 37.4	+44.9	10.1	48 36.5	+45.1	10.3	49 35.5	+45.3	10.5	50 34.5	+45.4	10.7	51 33.4	+45.7	10.9	52 32.3	+45.8	11.2	53 31.1	+46.1	11.5	81
82	47 23.1	+44.2	8.9	48 22.3	+44.4	9.1	49 21.6	+44.5	9.3	50 20.8	+44.7	9.5	51 19.9	+44.9	9.7	52 19.1	+45.0	9.9	53 18.1	+45.3	10.1	54 17.2	+45.4	10.4	82
83	48 07.3	+43.7	7.9	49 06.7	+43.9	8.1	50 06.1	+44.0	8.2	51 05.5	+44.1	8.4	52 04.8	+44.3	8.6	53 04.1	+44.5	8.8	54 03.4	+44.6	9.0	55 02.6	+44.9	9.2	83
84	48 51.0	+43.0	6.8	49 50.6	+43.2	7.0	50 50.1	+43.4	7.2	51 49.6	+43.5	7.3	52 49.1	+43.7	7.5	53 48.6	+43.8	7.7	54 48.0	+44.0	7.9	55 47.5	+44.1	8.1	84
85	49 34.1	+42.5	5.8	50 33.8	+42.6	5.9	51 33.5	+42.7	6.1	52 33.1	+42.9	6.2	53 32.8	+43.0	6.4	54 32.4	+43.1	6.5	55 32.0	+43.2	6.7	56 31.6	+43.4	6.8	85
86	50 16.6	+41.9	4.7	51 16.4	+42.0	4.8	52 16.2	+42.1	4.9	53 16.0	+42.2	5.0	54 15.8	+42.2	5.2	55 15.5	+42.4	5.3	56 15.2	+42.5	5.4	57 15.0	+42.6	5.6	86
87	50 58.5	+41.2	3.6	51 58.4	+41.3	3.7	52 58.3	+41.3	3.8	53 58.2	+41.4	3.9	54 58.0	+41.5	3.9	55 57.9	+41.5	4.0	56 57.7	+41.7	4.2	57 57.6	+41.7	4.3	87
88	51 39.7	+40.5	2.4	52 39.7	+40.5	2.5	53 39.6	+40.6	2.5	54 39.6	+40.6	2.6	55 39.5	+40.7	2.7	56 39.4	+40.7	2.7	57 39.4	+40.8	2.8	58 39.3	+40.8	2.9	88
89	52 20.2	+39.8	1.2	53 20.2	+39.8	1.3	54 20.2	+39.8	1.3	55 20.2	+39.8	1.3	56 20.2	+39.8	1.4	57 20.2	+39.8	1.4	58 20.2	+39.9	1.4	59 20.1	+39.9	1.5	89
90	53 00.0	+39.0	0.0	54 00.0	+38.9	0.0	55 00.0	+38.9	0.0	56 00.0	+38.9	0.0	57 00.0	+38.9	0.0	58 00.0	+38.9	0.0	59 00.0	+38.9	0.0	60 00.0	+38.8	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 131°, 229°

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	22 45.5	+51.9	123.8	22 11.9	+52.4	124.2	21 38.1	+52.8	124.5	21 04.0	+53.2	124.8	20 29.6	+53.6	125.1	19 54.9	+54.1	125.4	19 20.0	+54.5	125.7	18 44.8	+54.9	126.0	0
1	23 37.4	+51.8	123.3	23 04.3	+52.3	123.6	22 30.9	+52.7	124.0	21 57.2	+53.1	124.3	21 23.2	+53.6	124.7	20 49.0	+54.0	125.0	20 14.5	+54.3	125.3	19 39.7	+54.8	125.6	1
2	24 29.2	+51.6	122.7	23 56.6	+52.1	123.1	23 23.6	+52.7	123.5	22 50.4	+53.1	123.8	22 16.8	+53.5	124.2	21 43.0	+53.9	124.5	21 08.9	+54.3	124.8	20 34.5	+54.7	125.1	2
3	25 20.8	+51.6	122.2	24 48.7	+52.1	122.6	24 16.3	+52.5	122.9	23 43.5	+52.9	123.3	23 10.3	+53.5	123.7	22 36.9	+53.9	124.0	22 03.2	+54.2	124.4	21 29.2	+54.6	124.7	3
4	26 12.4	+51.4	121.6	25 40.8	+51.9	122.0	25 08.8	+52.4	122.4	24 36.4	+52.9	122.8	24 03.8	+53.3	123.2	23 30.8	+53.7	123.6	22 57.4	+54.2	123.9	22 23.8	+54.6	124.3	4
5	27 03.8	+51.3	121.0	26 32.7	+51.8	121.5	26 01.2	+52.3	121.9	25 29.3	+52.8	122.3	24 57.1	+53.2	122.7	24 24.5	+53.7	123.1	23 51.6	+54.1	123.4	23 18.4	+54.5	123.8	5
6	27 55.1	+51.1	120.4	27 24.5	+51.6	120.9	26 53.5	+52.1	121.3	26 22.1	+52.6	121.8	25 50.3	+53.1	122.2	25 18.2	+53.5	122.6	24 45.7	+54.0	123.0	24 12.9	+54.4	123.3	6
7	28 46.2	+50.9	119.8	28 16.1	+51.5	120.3	27 45.6	+52.0	120.8	27 14.7	+52.5	121.2	26 43.4	+53.0	121.7	26 11.7	+53.5	122.1	25 39.7	+53.9	122.5	25 07.3	+54.3	122.9	7
8	29 37.1	+50.8	119.2	29 07.6	+51.3	119.7	28 37.6	+51.9	120.2	28 07.2	+52.4	120.7	27 36.4	+52.9	121.1	27 05.2	+53.3	121.6	26 33.6	+53.8	122.0	26 01.6	+54.2	122.4	8
9	30 27.9	+50.6	118.6	29 58.9	+51.2	119.1	29 29.5	+51.7	119.6	28 59.6	+52.2	120.1	28 29.3	+52.7	120.6	27 58.5	+53.3	121.0	27 27.4	+53.7	121.5	26 55.8	+54.2	121.9	9
10	31 18.5	+50.4	118.0	30 50.1	+51.0	118.5	30 21.2	+51.6	119.0	29 51.8	+52.1	119.6	29 22.0	+52.6	120.0	28 51.8	+53.1	120.5	28 21.1	+53.6	121.0	27 50.0	+54.0	121.4	10
11	32 08.9	+50.2	117.4	31 41.1	+50.8	117.9	31 12.8	+51.3	118.4	30 43.9	+52.0	119.0	30 14.6	+52.5	119.5	29 44.9	+52.9	120.0	29 14.7	+53.4	120.5	28 44.0	+53.9	121.0	11
12	32 59.1	+50.1	116.7	32 31.9	+50.6	117.3	32 04.1	+51.3	117.8	31 35.9	+51.7	118.4	31 07.1	+52.3	118.9	30 37.8	+52.9	119.4	30 08.1	+53.3	120.0	29 37.9	+53.8	120.5	12
13	33 49.2	+49.8	116.0	33 22.5	+50.5	116.6	32 55.4	+51.0	117.2	32 27.6	+51.7	117.8	31 59.4	+52.2	118.4	31 30.7	+52.7	118.9	31 01.4	+53.2	119.4	30 31.7	+53.7	119.9	13
14	34 39.0	+49.6	115.4	34 13.0	+50.2	116.0	33 46.4	+50.8	116.6	33 19.3	+51.4	117.2	32 51.6	+52.0	117.8	32 23.4	+52.5	118.3	31 54.6	+53.1	118.9	31 25.4	+53.6	119.4	14
15	35 28.6	+49.3	114.7	35 03.2	+50.0	115.3	34 37.2	+50.7	116.0	34 10.7	+51.2	116.6	33 43.6	+51.8	117.2	33 15.9	+52.4	117.8	32 47.7	+52.9	118.3	32 19.0	+53.4	118.9	15
16	36 17.9	+49.1	114.0	35 53.2	+49.7	114.6	35 27.9	+50.4	115.3	35 01.9	+51.0	115.9	34 35.4	+51.6	116.6	34 08.3	+52.2	117.2	33 40.6	+52.7	117.8	33 12.4	+53.2	118.3	16
17	37 07.0	+48.8	113.3	36 42.9	+49.6	114.0	36 18.3	+50.1	114.6	35 52.9	+50.9	115.3	35 27.0	+51.4	115.9	35 00.5	+52.0	116.6	34 33.3	+52.6	117.2	34 05.6	+53.2	117.8	17
18	37 55.8	+48.5	112.5	37 32.5	+49.2	113.2	37 08.4	+50.0	113.9	36 43.8	+50.6	114.6	36 18.4	+51.3	115.3	35 52.5	+51.8	116.0	35 25.9	+52.4	116.6	34 58.8	+52.9	117.2	18
19	38 44.3	+48.3	111.8	38 21.7	+49.0	112.5	37 58.4	+49.7	113.2	37 34.4	+50.3	114.0	37 09.7	+51.0	114.7	36 44.3	+51.6	115.3	36 18.3	+52.3	116.0	35 51.7	+52.8	116.7	19
20	39 32.6	+47.9	111.0	39 10.7	+48.7	111.8	38 48.1	+49.4	112.5	38 24.7	+50.1	113.3	38 00.7	+50.8	114.0	37 35.9	+51.5	114.7	37 10.6	+52.0	115.4	36 44.5	+52.6	116.1	20
21	40 20.5	+47.6	110.2	39 59.4	+48.4	111.0	39 37.5	+49.1	111.8	39 14.8	+49.9	112.6	38 51.5	+50.5	113.3	38 27.4	+51.2	114.0	38 02.6	+51.8	114.8	37 37.1	+52.4	115.5	21
22	41 08.1	+47.3	109.4	40 47.8	+48.1	110.2	40 26.6	+48.9	111.0	40 04.7	+49.6	111.8	39 42.0	+50.3	112.6	39 18.6	+50.9	113.4	38 54.4	+51.6	114.1	38 29.5	+52.3	114.8	22
23	41 55.4	+46.9	108.6	41 35.9	+47.7	109.5	41 15.5	+48.5	110.3	40 54.3	+49.2	111.1	40 32.3	+50.0	111.9	40 09.5	+50.7	112.7	39 46.0	+51.4	113.5	39 21.8	+52.0	114.2	23
24	42 42.3	+46.6	107.8	42 23.6	+47.4	108.6	42 04.0	+48.2	109.5	41 43.5	+49.0	110.3	41 22.3	+49.7	111.2	41 00.2	+50.5	112.0	40 37.4	+51.1	112.8	40 13.8	+51.8	113.6	24
25	43 28.9	+46.1	106.9	43 11.0	+47.0	107.8	42 52.2	+47.8	108.7	42 32.5	+48.7	109.6	42 12.0	+49.4	110.4	41 50.7	+50.1	111.3	41 28.5	+50.9	112.1	41 05.6	+51.5	112.9	25
26	44 15.0	+45.7	106.0	43 58.0	+46.6	106.9	43 40.0	+47.5	107.9	43 21.2	+48.3	108.8	43 01.4	+49.2	109.6	42 40.8	+49.9	110.5	42 19.4	+50.6	111.4	41 57.1	+51.3	112.2	26
27	45 00.7	+45.3	105.1	44 44.6	+46.2	106.1	44 27.5	+47.1	107.0	44 09.5	+47.9	107.9	43 50.6	+48.7	108.9	43 30.7	+49.6	109.8	43 10.0	+50.3	110.6	42 48.4	+51.1	111.5	27
28	45 46.0	+44.7	104.2	45 30.8	+45.7	105.2	45 14.6	+46.7	106.1	44 57.4	+47.6	107.1	44 39.3	+48.4	108.0	44 20.3	+49.2	109.0	43 59.0	+50.0	109.9	43 39.5	+50.7	110.8	28
29	46 30.7	+44.3	103.2	46 16.5	+45.3	104.2	46 01.3	+46.2	105.2	45 45.0	+47.2	106.2	45 27.7	+48.1	107.2	45 09.5	+48.9	108.2	44 50.3	+49.7	109.1	44 30.2	+50.5	110.0	29
30	47 15.0	+43.8	102.2	47 01.8	+44.8	103.3	46 47.5	+45.8	104.3	46 32.2	+46.7	105.3	46 15.8	+47.6	106.3	45 58.4	+48.5	107.3	45 40.0	+49.3	108.3	45 20.7	+50.1	109.3	30
31	47 58.8	+43.2	101.2	47 46.6	+44.3	102.3	47 33.3	+45.3	103.4	47 18.9	+46.3	104.4	47 03.4	+47.2	105.5	46 46.9	+48.1	106.4	46 29.4	+49.0	107.5	46 10.8	+49.8	108.5	31
32	48 42.0	+42.7	100.2	48 30.9	+43.7	101.3	48 18.6	+44.8	102.4	48 05.2	+45.8	103.5	47 50.6	+46.8	104.5	47 35.0	+47.7	105.6	47 18.4	+48.6	106.7	47 00.6	+49.5	107.7	32
33	49 24.7	+42.0	99.1	49 14.6	+43.2	100.2	49 03.4	+44.2	101.4	48 51.0	+45.2	102.5	48 37.4	+46.3	103.6	48 22.7	+47.3	104.7	48 07.0	+48.1	105.8	47 50.1	+49.1	106.8	33
34	50 06.7	+41.4	98.0	49 57.8	+42.5	99.2	49 47.6	+43.7	100.3	49 36.2	+44.8	101.5	49 23.7	+45.8	102.6	49 10.0	+46.8	103.8	48 55.1	+47.8	104.9	48 39.2	+48.7	106.0	34
35	50 48.1	+40.7	96.8	50 40.3	+41.9	98.1	50 31.3	+43.0	99.3	50 21.0	+44.2	100.5	50 09.5	+45.3	101.6	49 56.8	+46.3	102.8	49 42.9	+47.3	104.0	49 27.9	+48.2	105.1	35
36	51 28.8	+39.9	95.7	51 22.2	+41.2	96.9	51 14.3	+42.4	98.2	51 05.2	+43.5	99.4	50 54.8	+44.7	100.6	50 43.1	+45.8	101.8	50 30.2	+46.8	103.0	50 16.1	+47.8	104.2	36
37	52 08.7	+39.3	94.5	52 03.4	+40.5	95.7	51 56.7	+41.8	97.0	51 48.7	+43.0	98.3	51 39.5	+44.0	99.5	51 28.9	+45.2	100.8	51 17.0	+46.3	102.0	51 03.9	+47.3	103.2	37
38	52 48.0	+38.4	93.2	52 43.9	+39.7	94.5	52 38.5	+41.0	95.8	52 31.7	+42.2	97.1	52 23.5	+43.5	98.4	52 14.1	+44.6	99.7	52 03.3	+45.8	101.0	51 51.2	+46.9	102.2	38
39	53 26.4	+37.5	91.9	53 23.6	+39.0	93.3	53 19.5	+40.2	94.6	53 13.9	+41.6	96.0	53 07.0	+42.8	97.3	52 58.7	+44.0	98.6	52 49.1	+45.1	99.9	52 38.1	+46.2	101.2	39
40	54 03.9	+36.7	90.6	54 02.6	+38.0	92.0	53 59.7	+39.5	93.4	53 55.5	+40.8	94.8	53 49.8	+42.1	96.1	53 42.7	+43.3	97.5	53 34.2	+44.5	98.8	53 24.3	+45.7	100.1	40
41	54 40.6	+35.7	89.3	54 40.6	+37.2	90.7	54 39.2	+38.6	92.1	54 36.3	+39.9	93.5	54 31.9	+41.3	94.9	54 26.0	+42.6	96.3	54 18.7	+43.9	97.7	54 10.0	+45.1	99.1	41
42	55 16.3	+34.8	87.9	55 17.8	+36.3	89.3	55 17.8	+37.7	90.8	55 16.2	+39.2	92.2	55 13.2	+40.5	93.6	55 08.6	+41.9	95.1	55 02.6	+43.1	96.5	54 55.1	+44.4	97.9	42
43	55 51.1	+33.7	86.4	55 54.1	+35.2	87.9	55 55.5	+36.7	89.4	55 55.4	+38.2	90.9	55 53.7	+39.6	92.3	55 50.5	+41.0	93.8	55 45.7	+42.4	95.3	55 39.5	+43.6	96.7	43
44	56 24.8	+32.6	84.9	56 29.3	+34.2	86.4	56 32.2	+35.8	88.0	56 33.6	+37.2	89.5	56 33.3	+38.8	91.0	56 31.5	+40.2	92.5	56 28.1	+41.6	94.0	56 23.1	+42.9	95.5	44
45	56 57.4	+31.4	83.4	57 03.5	+33.1	84.9	57 08.0	+34.6	86.5	57 10.8	+36.3	88.0	57 12.1	+37.8	89.6	57 11.7	+39.3	91.1	57 09.7	+40.7	92.7	57 06.1	+42.1	94.2	45
46	57 28.8	+30.3	81.8	57 36.6	+31.9	83.4	57 42.6	+33.6	85.0	57 47.1	+35.1	86.6	57 49.9	+36.7	88.1	57 51.0	+38.3	89.7	57 50.4	+39.8	91.3	57 48.2	+41.3	92.9	46
47	57 59.1	+29.0	80.2	58 08.5	+30.7	81.8	58 16.2	+32.4	83.4	58 22.2	+34.1	85.0	58 26.6	+35.7	86.6	58 29.3	+37.2	88.3	58 30.2	+38.9	89.9	58 29.5	+40.3	91.5	47
48	58 28.1	+27.6	78.6	58 39.2	+29.4	80.2	58 48.6	+31.1	81.8	58 56.3	+32.8	83.4	59 02.3	+34.5	85.1	59 06.5	+36.2	86.8	59 09.1	+37.8	88.4	59 09.8	+39.4	90.1	48
49	58 55.7	+26.3	76.9	59 08.6	+28.0	78.5	59 19.7	+29.8	80.1	59 29.1	+31.6	81.8	59 36.8	+33.3	83.5	59 42.7	+35.0	85.2	59 46.9	+36.6	86.9	59 49.2	+38.3	88.6	49
50	59 22.0	+24.8	75.1	59 36.6	+26.6	76.7	59 49.5	+28.4	78.4	60 00.7	+30.2	80.1	60 10.1	+32.0	81.8	60 17.7	+33.8	83.6	60 23.5	+35.6	85.3	60 27.5	+37.2	87.1	50
51	59 46.8	+23.3	73.3	60 03.2	+25.2	75.0	60 17.9	+27.0	76.7	60 30.9	+28.9	78.4	60 42.1	+30.7	80.1	60 51.5	+32.5	81.9	60 59.1	+34.2	83.7	61 04.7	+36.1	85.5	51
52	60 10.1	+21.8	71.5	60 28.4	+23.6	73.1	60 44.9	+25.5	74.8	60 59.8	+27.3	76.6	61 12.8	+29.2	78.3	61 24.0	+31.1	80.1	61 33.3	+33.0	82.0	61 40.8	+34.7	83.8	52
53	60 31.9	+20.1	69.6	60 52.0	+22.0	71.3	61 10.4	+23.9	73.0	61 27.1	+25.8	74.7	61 42.0	+27.7	76.5	61 55.1	+29.6	78.3	62 06.3	+31.5	80.2	62 15.5	+33.4	82.1	53
54	60 52.0	+18.4	67.6	61 14.0	+20.3	69.3	61 34.3	+22.3	71.1	61 52.9	+24.2	72.8	62 09.7	+26.2	74.6	62 24.7	+28.1	76.5	62 37.8	+30.0	78.4	62 48.9	+32.0	80.3	54
55	61 10.4	+16.7	65.7	61 34.3	+18.6	67.4	61 56.6	+20.5	69.1	62 17.1	+22.5	70.9	62 35.9	+24.5	72.7	62 52.8	+26.5	74.6	63 07.8	+28.5	76.5	63 20.9	+30.5	78.4	55
56	61 27.1	+14.9	63.7	61 52.9	+16.8	65.4	62 17.1	+18.8	67.1	62 39.6	+20.8	68.9	63 00.4	+22.7	70.7	63 19.3	+24.8	72.6	63 36.3	+26.8	74.5	63 51.4	+28.7	76.5	56
57	61 42.0	+13.1	61.6	62 09.7	+15.0	63.3	62 35.9	+16.9	65.0	63 00.4	+18.9	66.8	63 23.1	+21.0	68.6	63 44.1	+22.9	70.5	64 03.1	+25.1	72.5	64 20.1	+27.1	74.4	57
58	61 55.1	+11.2	59.6	62 24.7	+13.1	61.2	62 52.8	+15.0	62.9	63 19.3	+17.0	64.7	63 44.1	+19.0	66.5	64 07.0	+21.2	68.4	64 28.2	+23.2	70.4	64 47.3	+25.4	72.4	58
59	62 06.3	+9.2	57.5	62 37.8	+11.1	59.1	63 07.8	+13.1	60.8	63 36.3	+15.1•	62.6	64 03.1	+17.1	64.4	64 28.2	+19.1•	66.3	64 51.4	+21.3	68.2	65 12.7	+23.4	70.2	59
60	62 15.5	+7.3	55.4	62 48.9	+9.2•	57.0	63 20.9	+11.1•	58.6	63 51.4	+13.0•	60.4	64 20.2	+15.1•	62.2	64 47.3	+17.2•	64.1	65 12.7	+19.3•	66.0	65 36.1	+21.5•	68.0	60
61	62 22.8	+5.4•	53.2	62 58.1	+7.1•	54.8	63 32.0	+9.0•	56.4	64 04.4	+11.0•	58.1	64 35.3	+13.0•	59.9	65 04.5	+15.0•	61.8	65 32.0	+17.1•	63.7	65 57.6	+19.4•	65.7	61
62	62 28.2	+3.3•	51.1	63 05.2	+5.1•	52.6	63 41.0	+6.9•	54.2	64 15.4	+8.8•	55.9	64 48.3	+10.8•	57.6	65 19.5	+13.0•	59.5	65 49.1	+15.1•	61.4	66 17.0	+17.2•	63.4	62
63	62 31.5	+1.3•	48.9	63 10.3	+3.1•	50.4	63 47.9	+4.9•	52.0	64 24.2	+6.7•	53.6	64 59.1	+8.7•	55.3	65 32.5	+10.7•	57.1	66 04.2	+12.8•	59.0	66 34.2	+15.0•	61.0	63
64	62 32.8	−0.7•	46.8	63 13.4	+0.9•	48.2	63 52.8	+2.7•	49.7	64 30.9	+4.6•	51.3	65 07.8	+6.4•	53.0	65 43.2	+8.4•	54.8	66 17.0	+10.5•	56.6	66 49.2	+12.6•	58.6	64
65	62 32.1	−2.7•	44.6	63 14.3	−1.1•	46.0	63 55.5	+0.6•	47.4	64 35.5	+2.3•	49.0	65 14.2	+4.2•	50.6	65 51.6	+6.1•	52.3	66 27.5	+8.2•	54.1	67 01.8	+10.3•	56.1	65
66	62 29.4	−4.7•	42.4	63 13.2	−3.1•	43.8	63 56.1	−1.6•	45.2	64 37.8	+0.1•	46.7	65 18.4	+1.9•	48.2	65 57.7	+3.8•	49.9	66 35.7	+5.7•	51.7	67 12.1	+7.9•	53.5	66
67	62 24.7	−6.7	40.3	63 10.1	−5.3•	41.5	63 54.5	−3.7•	42.9	64 37.9	−2.0•	44.3	65 20.3	−0.3•	45.8	66 01.5	+1.5•	47.4	66 41.4	+3.4•	49.2	67 20.0	+5.3•	51.0	67
68	62 18.0	−8.6	38.1	63 04.8	−7.3	39.3	63 50.8	−5.8•	40.6	64 35.9	−4.3•	42.0	65 20.0	−2.7•	43.4	66 03.0	−0.9•	45.0	66 44.8	+0.9•	46.6	67 25.3	+2.9•	48.4	68
69	62 09.4	−10.6	36.0	62 57.5	−9.2•	37.1	63 45.0	−7.9•	38.4	64 31.6	−6.5•	39.7	65 17.3	−4.9•	41.0	66 02.1	−3.3•	42.5	66 45.7	−1.5•	44.1	67 28.2	+0.4•	45.8	69
70	61 58.8	−12.5	33.9	62 48.3	−11.3•	35.0	63 37.1	−10.0•	36.1	64 25.1	−8.6•	37.4	65 12.4	−7.1•	38.7	65 58.8	−5.6•	40.1	66 44.2	−3.9•	41.6	67 28.6	−2.2•	43.2	70
71	61 46.3	−14.4	31.8	62 37.0	−13.2	32.8	63 27.1	−12.0•	33.9	64 16.5	−10.7•	35.1	65 05.3	−9.4•	36.3	65 53.2	−7.9•	37.6	66 40.3	−6.3•	39.0	67 26.4	−4.7•	40.5	71
72	61 31.9	−16.1	29.8	62 23.8	−15.1	30.7	63 15.1	−14.0	31.7	64 05.8	−12.8•	32.8	64 55.9	−11.5•	34.0	65 45.3	−10.1•	35.2	66 34.0	−8.8•	36.5	67 21.7	−7.1•	38.0	72
73	61 15.8	−17.9	27.8	62 08.7	−16.9	28.6	63 01.1	−15.9	29.6	63 53.0	−14.8•	30.6	64 44.4	−13.7•	31.7	65 35.2	−12.4•	32.8	66 25.2	−11.0•	34.0	67 14.6	−9.7•	35.4	73
74	60 57.9	−19.6	25.8	61 51.8	−18.8	26.6	62 45.2	−17.8	27.5	63 38.2	−16.8	28.4	64 30.7	−15.7•	29.4	65 22.8	−14.6•	30.5	66 14.2	−13.4•	31.6	67 04.9	−12.0•	32.8	74
75	60 38.3	−21.2	23.9	61 33.0	−20.4	24.6	62 27.4	−19.6	25.4	63 21.4	−18.7	26.2	64 15.0	−17.7	27.2	65 08.2	−16.7•	28.1	66 00.8	−15.5•	29.2	66 52.9	−14.3•	30.3	75
76	60 17.1	−22.9	22.0	61 12.6	−22.1	22.6	62 07.8	−21.3	23.4	63 02.7	−20.5	24.1	63 57.3	−19.6	25.0	64 51.5	−18.7•	25.9	65 45.3	−17.7•	26.8	66 38.6	−16.6•	27.9	76
77	59 54.2	−24.3	20.1	60 50.5	−23.7	20.7	61 46.5	−23.1	21.4	62 42.2	−22.3	22.1	63 37.7	−21.5	22.8	64 32.8	−20.7	23.6	65 27.6	−19.8•	24.5	66 22.0	−18.8•	25.5	77
78	59 29.9	−25.8	18.3	60 26.8	−25.3	18.8	61 23.4	−24.6	19.4	62 19.9	−24.0	20.1	63 16.2	−23.3	20.7	64 12.1	−22.5	21.5	65 07.8	−21.7	22.3	66 03.2	−20.9•	23.1	78
79	59 04.1	−27.3	16.5	60 01.5	−26.7	17.0	60 58.8	−26.2	17.5	61 55.9	−25.6	18.1	62 52.9	−25.1	18.7	63 49.6	−24.4	19.4	64 46.1	−23.7	20.1	65 42.3	−22.9	20.8	79
80	58 36.8	−28.5	14.8	59 34.8	−28.2	15.2	60 32.6	−27.7	15.7	61 30.3	−27.2	16.2	62 27.8	−26.6	16.7	63 25.2	−26.1	17.3	64 22.4	−25.5	17.9	65 19.4	−24.8	18.6	80
81	58 08.3	−29.9	13.1	59 06.6	−29.3	13.5	60 04.9	−29.1	13.9	61 03.1	−28.6	14.3	62 01.2	−28.2	14.8	62 59.1	−27.7	15.3	63 56.9	−27.2	15.8	64 54.6	−26.7	16.4	81
82	57 38.4	−31.1	11.5	58 37.2	−30.8	11.8	59 35.8	−30.4	12.2	60 34.5	−30.1	12.5	61 33.0	−29.7	12.9	62 31.4	−29.3	13.4	63 29.7	−28.8	13.8	64 27.9	−28.3	14.3	82
83	57 07.3	−32.2	9.9	58 06.4	−32.0	10.2	59 05.4	−31.7	10.5	60 04.4	−31.4	10.8	61 03.3	−31.1	11.1	62 02.1	−30.7	11.5	63 00.9	−30.4	11.9	63 59.6	−30.0	12.3	83
84	56 35.1	−33.4	8.4	57 34.4	−33.2	8.6	58 33.7	−32.9	8.8	59 33.0	−32.7	9.1	60 32.2	−32.4	9.4	61 31.4	−32.2	9.7	62 30.5	−31.9	10.0	63 29.6	−31.6	10.3	84
85	56 01.7	−34.4	6.9	57 01.2	−34.2	7.0	58 00.8	−34.1	7.2	59 00.3	−33.9	7.4	59 59.8	−33.7	7.7	60 59.2	−33.5	7.9	61 58.6	−33.2	8.2	62 58.0	−33.0	8.4	85
86	55 27.3	−35.5	5.4	56 27.0	−35.3	5.5	57 26.7	−35.2	5.7	58 26.4	−35.0	5.9	59 26.1	−34.9	6.0	60 25.7	−34.7	6.2	61 25.4	−34.6	6.4	62 25.0	−34.4	6.6	86
87	54 51.8	−36.4	4.0	55 51.7	−36.3	4.1	56 51.5	−36.2	4.2	57 51.2	−36.0	4.4	58 51.2	−36.0	4.4	59 51.0	−35.9	4.6	60 50.8	−35.8	4.7	61 50.6	−35.7	4.9	87
88	54 15.4	−37.2	2.6	55 15.4	−37.3	2.7	56 15.3	−37.2	2.8	57 15.2	−37.1	2.8	58 15.2	−37.1	2.9	59 15.1	−37.0	3.0	60 15.0	−37.0	3.1	61 14.9	−36.9	3.2	88
89	53 38.2	−38.2	1.3	54 38.1	−38.1	1.3	55 38.1	−38.1	1.4	56 38.1	−38.1	1.4	57 38.1	−38.1	1.4	58 38.1	−38.1	1.5	59 38.0	−38.0	1.5	60 38.0	−38.0	1.6	89
90	53 00.0	−39.0	0.0	54 00.0	−39.0	0.0	55 00.0	−39.0	0.0	56 00.0	−39.0	0.0	57 00.0	−39.0	0.0	58 00.0	−39.0	0.0	59 00.0	−39.1	0.0	60 00.0	−39.1	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	22 45.5	−52.0	123.8	22 11.9	−52.4	124.2	21 38.1	−52.9	124.5	21 04.0	−53.4	124.8	20 29.6	−53.8	125.1	19 54.9	−54.2	125.4	19 20.0	−54.5	125.7	18 44.8	−54.9	126.0	0
1	21 53.5	−52.2	124.4	21 19.5	−52.6	124.7	20 45.2	−53.0	125.0	20 10.6	−53.4	125.3	19 35.8	−53.8	125.6	19 00.7	−54.3	125.9	18 25.5	−54.6	126.2	17 49.9	−54.9	126.4	1
2	21 01.3	−52.3	124.9	20 26.9	−52.7	125.2	19 52.2	−53.1	125.5	19 17.2	−53.5	125.8	18 42.0	−53.9	126.1	18 06.5	−54.3	126.3	17 30.9	−54.7	126.6	16 55.0	−55.0	126.9	2
3	20 09.1	−52.3	125.4	19 34.2	−52.7	125.7	18 59.1	−53.2	126.0	18 23.7	−53.6	126.3	17 48.1	−54.0	126.5	17 12.2	−54.3	126.8	16 36.2	−54.7	127.0	16 00.0	−55.1	127.3	3
4	19 16.8	−52.4	125.9	18 41.5	−52.9	126.2	18 05.9	−53.2	126.5	17 30.1	−53.6	126.7	16 54.1	−54.0	127.0	16 17.9	−54.4	127.2	15 41.5	−54.8	127.5	15 04.9	−55.1	127.7	4
5	18 24.4	−52.5	126.5	17 48.6	−52.9	126.7	17 12.7	−53.4	127.0	16 36.5	−53.7	127.2	16 00.1	−54.1	127.4	15 23.5	−54.4	127.7	14 46.7	−54.8	127.9	14 09.8	−55.1	128.1	5
6	17 31.9	−52.5	127.0	16 55.7	−52.9	127.2	16 19.3	−53.3	127.5	15 42.8	−53.8	127.7	15 06.0	−54.1	127.9	14 29.1	−54.5	128.1	13 51.9	−54.8	128.3	13 14.7	−55.2	128.5	6
7	16 39.4	−52.7	127.5	16 02.8	−53.1	127.7	15 26.0	−53.5	127.9	14 49.0	−53.8	128.1	14 11.9	−54.2	128.3	13 34.6	−54.6	128.5	12 57.1	−54.9	128.7	12 19.5	−55.2	128.7	7
8	15 46.7	−52.7	128.0	15 09.7	−53.1	128.2	14 32.5	−53.6	128.4	13 55.2	−53.9	128.6	13 17.7	−54.2	128.8	12 40.0	−54.6	129.0	12 02.2	−54.9	129.1	11 24.3	−55.3	129.3	8
9	14 54.0	−52.7	128.5	14 16.6	−53.1	128.7	13 39.1	−53.6	128.9	13 01.3	−53.9	129.1	12 23.5	−54.3	129.2	11 45.4	−54.6	129.4	11 07.3	−54.9	129.5	10 29.0	−55.2	129.7	9
10	14 01.3	−52.8	129.2	13 23.5	−53.2	129.2	12 45.5	−53.6	129.3	12 07.4	−53.9	129.5	11 29.2	−54.3	129.7	10 50.8	−54.6	129.8	10 12.4	−55.0	130.0	9 33.8	−55.3	130.1	10
11	13 08.4	−52.8	129.4	12 30.3	−53.3	129.6	11 51.9	−53.6	129.8	11 13.5	−54.0	129.9	10 34.9	−54.4	130.1	9 56.2	−54.7	130.2	9 17.4	−55.0	130.4	8 38.5	−55.4	130.5	11
12	12 15.6	−53.0	129.9	11 37.0	−53.3	130.1	10 58.3	−53.7	130.2	10 19.5	−54.1	130.4	9 40.5	−54.3	130.5	9 01.5	−54.7	130.7	8 22.4	−55.1	130.8	7 43.1	−55.3	130.9	12
13	11 22.6	−53.0	130.4	10 43.7	−53.4	130.6	10 04.6	−53.7	130.8	9 25.4	−54.0	130.8	8 46.2	−54.5	131.0	8 06.8	−54.7	131.1	7 27.3	−55.0	131.2	6 47.8	−55.4	131.3	13
14	10 29.7	−53.0	130.9	9 50.3	−53.3	131.0	9 10.9	−53.7	131.2	8 31.4	−54.1	131.3	7 51.7	−54.4	131.4	7 12.0	−54.7	131.5	6 32.3	−55.1	131.6	5 52.4	−55.3	131.7	14
15	9 36.7	−53.1	131.4	8 57.0	−53.5	131.5	8 17.2	−53.8	131.6	7 37.3	−54.1	131.7	6 57.3	−54.4	131.8	6 17.3	−54.8	131.9	5 37.2	−55.1	132.0	4 57.0	−55.4	132.0	15
16	8 43.6	−53.1	131.8	8 03.5	−53.4	132.0	7 23.4	−53.8	132.1	6 43.2	−54.2	132.1	6 02.9	−54.5	132.2	5 22.5	−54.8	132.3	4 42.1	−55.1	132.4	4 01.6	−55.4	132.4	16
17	7 50.5	−53.1	132.3	7 10.1	−53.4	132.4	6 29.6	−53.8	132.5	5 49.0	−54.2	132.6	5 08.4	−54.5	132.6	4 27.7	−54.8	132.7	3 47.0	−55.1	132.8	3 06.2	−55.4	132.8	17
18	6 57.4	−53.2	132.8	6 16.6	−53.5	132.9	5 35.8	−53.9	132.9	4 54.8	−54.1	133.0	4 13.9	−54.5	133.1	3 32.9	−54.8	133.1	2 51.9	−55.1	133.2	2 10.8	−55.4	133.2	18
19	6 04.2	−53.1	133.2	5 23.1	−53.5	133.3	4 41.9	−53.9	133.4	4 00.7	−54.2	133.4	3 19.4	−54.5	133.5	2 38.1	−54.8	133.5	1 56.8	−55.2	133.6	1 15.4	−55.4	133.6	19
20	5 11.1	−53.2	133.7	4 29.6	−53.6	133.8	3 48.0	−53.8	133.8	3 06.5	−54.2	133.9	2 24.9	−54.5	133.9	1 43.3	−54.9	133.9	1 01.6	−55.1	133.9	0 20.0	−55.4	134.0	20
21	4 17.9	−53.2	134.2	3 36.0	−53.5	134.2	2 54.2	−53.9	134.3	2 12.3	−54.2	134.3	1 30.4	−54.6	134.3	0 48.4	−54.8	134.3	0 06.5	−55.1	134.3	0 35.4	+55.5	45.7	21
22	3 24.7	−53.3	134.6	2 42.5	−53.6	134.7	2 00.3	−53.9	134.7	1 18.1	−54.3	134.7	0 35.8	−54.5	134.7	0 06.4	+54.8	45.3	0 48.6	+55.2	45.3	1 30.9	+55.4	45.3	22
23	2 31.4	−53.2	135.1	1 48.9	−53.6	135.1	1 06.4	−53.9	135.1	0 23.8	−54.2	135.2	0 18.7	+54.5	44.8	1 01.2	+54.5	44.9	1 43.8	+55.1	44.9	2 26.3	+55.4	44.9	23
24	1 38.2	−53.2	135.6	0 55.3	−53.5	135.6	0 12.5	−53.9	135.6	0 30.4	+54.2	44.4	1 13.2	+54.5	44.4	1 56.1	+54.8	44.4	2 38.9	+55.1	44.5	3 21.7	+55.4	44.5	24
25	0 45.0	−53.3	136.0	0 01.8	−53.6	136.0	0 41.4	+53.9	44.0	1 24.6	+54.2	44.0	2 07.7	+54.6	44.0	2 50.9	+54.8	44.0	3 34.0	+55.1	44.1	4 17.1	+55.4	44.1	25
26	0 08.3	+53.2	43.5	0 51.8	+53.6	43.5	1 35.3	+53.9	43.5	2 18.8	+54.2	43.6	3 02.3	+54.5	43.6	3 45.7	+54.8	43.6	4 29.1	+55.1	43.7	5 12.5	+55.4	43.7	26
27	1 01.5	+53.3	43.1	1 45.4	+53.5	43.1	2 29.2	+53.9	43.1	3 13.0	+54.2	43.1	3 56.8	+54.5	43.2	4 40.5	+54.8	43.2	5 24.2	+55.1	43.3	6 07.9	+55.3	43.4	27
28	1 54.8	+53.2	42.6	2 38.9	+53.6	42.6	3 23.1	+53.8	42.7	4 07.2	+54.2	42.7	4 51.3	+54.4	42.8	5 35.3	+54.8	42.8	6 19.3	+55.0	42.9	7 03.2	+55.4	43.0	28
29	2 48.0	+53.2	42.1	3 32.5	+53.5	42.2	4 16.9	+53.9	42.2	5 01.4	+54.1	42.3	5 45.7	+54.5	42.3	6 30.1	+54.7	42.4	7 14.3	+55.1	42.5	7 58.6	+55.3	42.6	29
30	3 41.2	+53.2	41.7	4 26.0	+53.5	41.7	5 10.8	+53.8	41.8	5 55.5	+54.2	41.8	6 40.2	+54.4	41.9	7 24.8	+54.8	42.0	8 09.4	+55.0	42.1	8 53.9	+55.3	42.2	30
31	4 34.4	+53.2	41.2	5 19.5	+53.6	41.3	6 04.6	+53.8	41.3	6 49.7	+54.1	41.4	7 34.6	+54.5	41.5	8 19.6	+54.7	41.6	9 04.4	+55.0	41.7	9 49.2	+55.2	41.8	31
32	5 27.6	+53.2	40.7	6 13.1	+53.4	40.8	6 58.4	+53.8	40.9	7 43.8	+54.1	41.0	8 29.1	+54.3	41.1	9 14.3	+54.6	41.2	9 59.4	+55.0	41.3	10 44.4	+55.3	41.4	32
33	6 20.8	+53.1	40.3	7 06.5	+53.5	40.3	7 52.2	+53.8	40.4	8 37.9	+54.0	40.5	9 23.4	+54.4	40.6	10 08.9	+54.7	40.7	10 54.4	+54.9	40.9	11 39.7	+55.2	41.0	33
34	7 13.9	+53.1	39.8	8 00.0	+53.4	39.9	8 46.0	+53.7	40.0	9 31.9	+54.1	40.1	10 17.8	+54.4	40.2	11 03.6	+54.6	40.3	11 49.3	+54.9	40.5	12 34.9	+55.2	40.6	34
35	8 07.0	+53.1	39.3	8 53.4	+53.4	39.4	9 39.7	+53.7	39.5	10 26.0	+53.9	39.6	11 12.1	+54.3	39.8	11 58.2	+54.6	39.9	12 44.2	+54.8	40.0	13 30.1	+55.1	40.2	35
36	9 00.1	+53.1	38.9	9 46.8	+53.3	39.0	10 33.4	+53.7	39.1	11 19.9	+54.0	39.2	12 06.4	+54.2	39.3	12 52.8	+54.5	39.5	13 39.0	+54.8	39.6	14 25.2	+55.1	39.8	36
37	9 53.2	+53.0	38.4	10 40.1	+53.4	38.5	11 27.1	+53.6	38.6	12 13.9	+53.9	38.8	13 00.6	+54.2	38.9	13 47.3	+54.5	39.0	14 33.8	+54.8	39.2	15 20.3	+55.0	39.4	37
38	10 46.2	+52.9	37.9	11 33.5	+53.2	38.0	12 20.7	+53.5	38.2	13 07.8	+53.9	38.3	13 54.8	+54.2	38.5	14 41.8	+54.4	38.6	15 28.6	+54.7	38.8	16 15.3	+55.0	39.0	38
39	11 39.1	+52.9	37.4	12 26.7	+53.2	37.6	13 14.2	+53.6	37.7	14 01.7	+53.8	37.9	14 49.0	+54.1	38.0	15 36.2	+54.4	38.2	16 23.3	+54.7	38.4	17 10.3	+54.9	38.5	39
40	12 32.0	+52.9	37.0	13 19.9	+53.2	37.1	14 07.8	+53.4	37.2	14 55.5	+53.7	37.4	15 43.1	+54.0	37.6	16 30.6	+54.3	37.7	17 18.0	+54.6	37.9	18 05.2	+54.9	38.1	40
41	13 24.9	+52.8	36.5	14 13.1	+53.1	36.6	15 01.2	+53.4	36.8	15 49.2	+53.7	36.9	16 37.1	+54.0	37.1	17 24.9	+54.3	37.3	18 12.6	+54.5	37.5	19 00.1	+54.9	37.7	41
42	14 17.7	+52.7	36.0	15 06.2	+53.0	36.1	15 54.6	+53.4	36.3	16 42.9	+53.7	36.5	17 31.1	+53.9	36.7	18 19.2	+54.2	36.8	19 07.1	+54.5	37.1	19 55.0	+54.7	37.3	42
43	15 10.4	+52.7	35.5	15 59.2	+53.0	35.6	16 48.0	+53.2	35.8	17 36.6	+53.5	36.0	18 25.0	+53.9	36.2	19 13.4	+54.1	36.4	20 01.6	+54.4	36.6	20 49.7	+54.7	36.8	43
44	16 03.1	+52.6	35.0	16 52.2	+52.9	35.2	17 41.2	+53.2	35.3	18 30.1	+53.5	35.5	19 18.9	+53.8	35.7	20 07.5	+54.1	35.9	20 56.0	+54.4	36.2	21 44.4	+54.6	36.4	44
45	16 55.7	+52.6	34.5	17 45.1	+52.9	34.7	18 34.4	+53.2	34.9	19 23.6	+53.4	35.0	20 12.7	+53.7	35.3	21 01.6	+54.0	35.5	21 50.4	+54.3	35.7	22 39.0	+54.6	35.9	45
46	17 48.3	+52.4	34.0	18 38.0	+52.7	34.2	19 27.6	+53.0	34.4	20 17.0	+53.4	34.6	21 06.4	+53.6	34.8	21 55.6	+53.9	35.0	22 44.7	+54.2	35.2	23 33.6	+54.5	35.5	46
47	18 40.7	+52.4	33.5	19 30.7	+52.7	33.7	20 20.6	+53.0	33.9	21 10.4	+53.2	34.1	22 00.0	+53.5	34.3	22 49.5	+53.8	34.5	23 38.9	+54.1	34.8	24 28.1	+54.4	35.0	47
48	19 33.1	+52.3	33.0	20 23.4	+52.6	33.2	21 13.6	+52.8	33.4	22 03.6	+53.1	33.6	22 53.5	+53.5	33.8	23 43.3	+53.6	34.0	24 33.0	+54.0	34.3	25 22.5	+54.2	34.6	48
49	20 25.4	+52.2	32.4	21 16.0	+52.4	32.6	22 06.4	+52.8	32.9	22 56.8	+53.0	33.1	23 47.0	+53.3	33.3	24 37.1	+53.6	33.6	25 27.0	+53.9	33.8	26 16.7	+54.2	34.1	49
50	21 17.6	+52.1	31.9	22 08.4	+52.3	32.1	22 59.2	+52.7	32.3	23 49.8	+53.0	32.6	24 40.3	+53.3	32.8	25 30.7	+53.5	33.1	26 20.9	+53.8	33.3	27 10.9	+54.2	33.6	50
51	22 09.7	+51.9	31.4	23 00.8	+52.3	31.6	23 51.9	+52.5	31.8	24 42.8	+52.9	32.1	25 33.6	+53.1	32.3	26 24.2	+53.5	32.6	27 14.7	+53.7	32.8	28 05.1	+53.9	33.1	51
52	23 01.6	+51.9	30.8	23 53.1	+52.2	31.1	24 44.4	+52.5	31.3	25 35.7	+52.7	31.5	26 26.7	+53.1	31.8	27 17.7	+53.3	32.1	28 08.4	+53.6	32.3	28 59.0	+53.9	32.6	52
53	23 53.5	+51.8	30.3	24 45.3	+52.0	30.5	25 36.9	+52.3	30.7	26 28.4	+52.6	31.0	27 19.8	+52.9	31.3	28 11.0	+53.2	31.5	29 02.0	+53.5	31.8	29 52.9	+53.8	32.1	53
54	24 45.3	+51.6	29.7	25 37.3	+51.9	30.0	26 29.2	+52.2	30.2	27 21.0	+52.5	30.5	28 12.7	+52.8	30.7	29 04.2	+53.0	31.0	29 55.5	+53.4	31.3	30 46.7	+53.6	31.6	54
55	25 36.9	+51.5	29.2	26 29.2	+51.8	29.4	27 21.4	+52.1	29.7	28 13.5	+52.4	29.9	29 05.5	+52.6	30.2	29 57.2	+53.0	30.5	30 48.9	+53.2	30.8	31 40.3	+53.6	31.1	55
56	26 28.4	+51.4	28.6	27 21.0	+51.7	28.8	28 13.5	+52.0	29.1	29 05.9	+52.2	29.4	29 58.1	+52.5	29.6	30 50.2	+52.8	29.9	31 42.1	+53.1	30.2	32 33.9	+53.3	30.5	56
57	27 19.8	+51.2	28.0	28 12.7	+51.5	28.3	29 05.5	+51.7	28.5	29 58.1	+52.1	28.8	30 50.6	+52.4	29.1	31 43.0	+52.6	29.4	32 35.2	+52.9	29.7	33 27.2	+53.3	30.0	57
58	28 11.0	+51.0	27.4	29 04.2	+51.3	27.7	29 57.2	+51.7	27.9	30 50.2	+51.9	28.2	31 43.0	+52.2	28.5	32 35.6	+52.5	28.8	33 28.1	+52.8	29.1	34 20.5	+53.0	29.4	58
59	29 02.0	+50.9	26.8	29 55.5	+51.2	27.1	30 48.9	+51.4	27.3	31 42.1	+51.8	27.6	32 35.2	+52.0	27.9	33 28.1	+52.4	28.2	34 20.9	+52.6	28.5	35 13.5	+53.0	28.9	59
60	29 52.9	+50.8	26.2	30 46.7	+51.0	26.5	31 40.3	+51.3	26.7	32 33.9	+51.5	27.0	33 27.2	+51.9	27.3	34 20.5	+52.1	27.6	35 13.5	+52.5	28.0	36 06.5	+52.7	28.3	60
61	30 43.7	+50.5	25.6	31 37.7	+50.8	25.9	32 31.6	+51.2	26.1	33 25.4	+51.4	26.4	34 19.1	+51.7	26.7	35 12.6	+52.0	27.0	36 06.0	+52.3	27.4	36 59.2	+52.6	27.7	61
62	31 34.2	+50.4	25.0	32 28.5	+50.7	25.2	33 22.8	+50.9	25.5	34 16.8	+51.3	25.8	35 10.8	+51.5	26.1	36 04.6	+51.8	26.4	36 58.3	+52.0	26.8	37 51.8	+52.3	27.1	62
63	32 24.6	+50.1	24.3	33 19.2	+50.4	24.6	34 13.7	+50.7	24.9	35 08.1	+51.0	25.2	36 02.3	+51.3	25.5	36 56.4	+51.6	25.8	37 50.3	+51.9	26.1	38 44.1	+52.2	26.5	63
64	33 14.7	+50.0	23.7	34 09.6	+50.3	23.9	35 04.4	+50.5	24.2	35 59.1	+50.8	24.5	36 53.6	+51.1	24.8	37 48.0	+51.3	25.2	38 42.2	+51.7	25.5	39 36.3	+51.9	25.8	64
65	34 04.7	+49.7	23.0	34 59.9	+50.0	23.3	35 54.9	+50.3	23.6	36 49.9	+50.5	23.9	37 44.7	+50.8	24.2	38 39.3	+51.2	24.5	39 33.9	+51.4	24.8	40 28.2	+51.8	25.2	65
66	34 54.4	+49.5	22.3	35 49.9	+49.8	22.6	36 45.2	+50.1	22.9	37 40.4	+50.4	23.2	38 35.5	+50.6	23.5	39 30.5	+50.9	23.8	40 25.3	+51.2	24.2	41 20.0	+51.4	24.5	66
67	35 43.9	+49.3	21.6	36 39.7	+49.5	21.9	37 35.3	+49.8	22.2	38 30.8	+50.0	22.5	39 26.1	+50.4	22.8	40 21.4	+50.6	23.1	41 16.5	+50.9	23.5	42 11.4	+51.3	23.8	67
68	36 33.2	+49.0	20.9	37 29.2	+49.3	21.2	38 25.1	+49.5	21.5	39 20.8	+49.9	21.8	40 16.7	+50.1	22.1	41 12.0	+50.4	22.4	42 07.4	+50.7	22.8	43 02.7	+50.9	23.1	68
69	37 22.2	+48.7	20.2	38 18.5	+49.0	20.5	39 14.6	+49.3	20.8	40 10.7	+49.5	21.1	41 06.6	+49.8	21.4	42 02.4	+50.1	21.7	42 58.1	+50.4	22.0	43 53.6	+50.7	22.4	69
70	38 10.9	+48.5	19.5	39 07.5	+48.7	19.7	40 03.9	+49.0	20.0	41 00.2	+49.3	20.3	41 56.4	+49.5	20.6	42 52.5	+49.8	20.9	43 48.5	+50.1	21.3	44 44.3	+50.4	21.6	70
71	38 59.4	+48.1	18.7	39 56.2	+48.4	19.0	40 52.9	+48.6	19.3	41 49.5	+48.9	19.6	42 45.9	+49.2	19.9	43 42.3	+49.5	20.2	44 38.6	+49.7	20.5	45 34.7	+50.1	20.9	71
72	39 47.5	+47.9	17.9	40 44.6	+48.1	18.2	41 41.5	+48.4	18.5	42 38.4	+48.6	18.8	43 35.1	+48.9	19.1	44 31.8	+49.2	19.4	45 28.3	+49.5	19.7	46 24.8	+49.7	20.1	72
73	40 35.4	+47.5	17.2	41 32.7	+47.7	17.4	42 29.9	+48.0	17.7	43 27.0	+48.3	18.0	44 24.0	+48.6	18.3	45 21.0	+48.7	18.6	46 17.8	+49.0	18.9	47 14.5	+49.3	19.3	73
74	41 22.9	+47.2	16.3	42 20.4	+47.4	16.6	43 17.9	+47.6	16.9	44 15.3	+47.9	17.1	45 12.6	+48.1	17.4	46 09.7	+48.5	17.7	47 06.8	+48.7	18.1	48 03.8	+49.0	18.4	74
75	42 10.1	+46.7	15.5	43 07.8	+47.1	15.8	44 05.5	+47.3	16.0	45 03.2	+47.5	16.3	46 00.7	+47.8	16.6	46 58.2	+48.0	16.9	47 55.5	+48.3	17.2	48 52.8	+48.7	17.5	75
76	42 56.8	+46.5	14.7	43 54.9	+46.6	14.9	44 52.8	+46.9	15.2	45 50.7	+47.1	15.4	46 48.5	+47.3	15.7	47 46.2	+47.6	16.0	48 43.8	+47.9	16.3	49 41.4	+48.1	16.6	76
77	43 43.3	+46.0	13.8	44 41.5	+46.2	14.0	45 39.7	+46.4	14.3	46 37.8	+46.7	14.5	47 35.8	+46.9	14.8	48 33.8	+47.2	15.1	49 31.7	+47.4	15.4	50 29.5	+47.7	15.7	77
78	44 29.3	+45.5	13.0	45 27.7	+45.8	13.1	46 26.1	+46.0	13.4	47 24.5	+46.2	13.6	48 22.7	+46.5	13.9	49 20.7	+46.7	14.2	50 19.1	+46.9	14.4	51 17.2	+47.2	14.8	78
79	45 14.8	+45.1	12.0	46 13.5	+45.3	12.2	47 12.1	+45.5	12.4	48 10.7	+45.7	12.7	49 09.2	+46.0	12.9	50 07.6	+46.2	13.2	51 06.0	+46.5	13.5	52 04.4	+46.6	13.8	79
80	45 59.9	+44.7	11.0	46 58.8	+44.8	11.2	47 57.6	+45.1	11.5	48 56.4	+45.2	11.7	49 55.2	+45.4	11.9	50 53.8	+45.7	12.2	51 52.5	+45.8	12.4	52 51.0	+46.1	12.7	80
81	46 44.6	+44.1	10.1	47 43.6	+44.4	10.3	48 42.7	+44.5	10.5	49 41.6	+44.7	10.7	50 40.6	+44.9	10.9	51 39.5	+45.1	11.1	52 38.3	+45.4	11.3	53 37.1	+45.5	11.7	81
82	47 28.7	+43.6	9.1	48 28.0	+43.7	9.3	49 27.2	+43.9	9.4	50 26.3	+44.1	9.6	51 25.5	+44.3	9.8	52 24.6	+44.4	10.1	53 23.6	+44.7	10.3	54 22.6	+44.9	10.5	82
83	48 12.3	+43.1	8.1	49 11.7	+43.2	8.2	50 11.1	+43.3	8.4	51 10.4	+43.5	8.6	52 09.8	+43.6	8.8	53 09.0	+43.9	9.0	54 08.3	+44.0	9.2	55 07.5	+44.2	9.4	83
84	48 55.4	+42.7	7.1	49 54.9	+42.6	7.1	50 54.4	+42.8	7.3	51 53.9	+42.9	7.5	52 53.4	+43.0	7.6	53 52.9	+43.1	7.8	54 52.3	+43.3	8.0	55 51.7	+43.5	8.2	84
85	49 37.8	+41.8	5.9	50 37.5	+41.9	6.0	51 37.2	+42.0	6.2	52 36.8	+42.2	6.3	53 36.4	+42.3	6.5	54 36.0	+42.5	6.6	55 35.6	+42.6	6.8	56 35.2	+42.7	7.0	85
86	50 19.6	+41.2	4.8	51 19.4	+41.3	4.9	52 19.2	+41.4	5.0	53 19.0	+41.4	5.1	54 18.7	+41.6	5.3	55 18.5	+41.6	5.4	56 18.2	+41.8	5.5	57 17.9	+41.9	5.7	86
87	51 00.8	+40.5	3.7	52 00.7	+40.5	3.8	53 00.6	+40.6	3.8	54 00.4	+40.7	3.9	55 00.3	+40.7	4.0	56 00.1	+40.9	4.1	57 00.0	+40.9	4.2	57 59.8	+41.0	4.3	87
88	51 41.3	+39.7	2.5	52 41.2	+39.8	2.5	53 41.2	+39.8	2.6	54 41.1	+39.9	2.7	55 41.0	+40.0	2.7	56 41.0	+40.0	2.8	57 40.9	+40.0	2.9	58 40.8	+40.1	2.9	88
89	52 21.0	+39.0	1.3	53 21.0	+39.0	1.3	54 21.0	+39.0	1.3	55 21.0	+39.0	1.3	56 21.0	+39.0	1.4	57 21.0	+39.0	1.4	58 20.9	+39.1	1.5	59 20.9	+39.1	1.5	89
90	53 00.0	+38.2	0.0	54 00.0	+38.1	0.0	55 00.0	+38.1	0.0	56 00.0	+38.1	0.0	57 00.0	+38.1	0.0	58 00.0	+38.1	0.0	59 00.0	+38.0	0.0	60 00.0	+38.0	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z ; L.H.A. less than 180°............Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION | **L.H.A. 130°, 230°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	22 15.3	+51.7	122.9	21 42.6	+52.2	123.2	21 09.6	+52.6	123.6	20 36.3	+53.1	123.9	20 02.7	+53.5	124.2	19 28.8	+54.0	124.5	18 54.8	+54.3	124.8	18 20.4	+54.7	125.0	0
1	23 07.0	+51.6	122.3	22 34.8	+52.1	122.7	22 02.2	+52.6	123.0	21 29.4	+53.0	123.4	20 56.2	+53.4	123.7	20 22.8	+53.8	124.0	19 49.1	+54.2	124.3	19 15.1	+54.7	124.6	1
2	23 58.6	+51.5	121.8	23 26.9	+51.9	122.2	22 54.8	+52.4	122.5	22 22.4	+52.9	122.9	21 49.6	+53.4	123.2	21 16.6	+53.8	123.5	20 43.3	+54.2	123.9	20 09.8	+54.6	124.2	2
3	24 50.1	+51.4	121.2	24 18.8	+51.9	121.6	23 47.2	+52.4	122.0	23 15.3	+52.8	122.4	22 43.0	+53.3	122.7	22 10.4	+53.7	123.1	21 37.5	+54.2	123.4	21 04.4	+54.5	123.7	3
4	25 41.5	+51.2	120.6	25 10.7	+51.7	121.1	24 39.6	+52.2	121.5	24 08.1	+52.7	121.8	23 36.3	+53.1	122.2	23 04.1	+53.6	122.6	22 31.7	+54.0	122.9	21 58.9	+54.4	123.3	4
5	26 32.7	+51.1	120.1	26 02.4	+51.6	120.5	25 31.8	+52.1	120.9	25 00.8	+52.6	121.3	24 29.4	+53.1	121.7	23 57.7	+53.5	122.1	23 25.7	+53.9	122.5	22 53.3	+54.4	122.8	5
6	27 23.8	+50.9	119.5	26 54.0	+51.5	119.9	26 23.9	+52.0	120.4	25 53.4	+52.5	120.8	25 22.5	+52.9	121.2	24 51.2	+53.5	121.6	24 19.6	+53.9	122.0	23 47.7	+54.3	122.4	6
7	28 14.7	+50.8	118.9	27 45.5	+51.3	119.3	27 15.9	+51.9	119.8	26 45.9	+52.3	120.2	26 15.4	+52.9	120.7	25 44.7	+53.3	121.1	25 13.5	+53.7	121.5	24 42.0	+54.2	121.9	7
8	29 05.5	+50.6	118.3	28 36.8	+51.2	118.8	28 07.7	+51.7	119.2	27 38.2	+52.2	119.7	27 08.3	+52.7	120.1	26 38.0	+53.2	120.6	26 07.2	+53.7	121.0	25 36.2	+54.0	121.4	8
9	29 56.1	+50.4	117.7	29 28.0	+51.0	118.2	28 59.4	+51.6	118.7	28 30.4	+52.1	119.1	28 01.0	+52.6	119.6	27 31.2	+53.0	120.1	27 00.9	+53.5	120.5	26 30.2	+54.0	120.9	9
10	30 46.5	+50.2	117.0	30 19.0	+50.8	117.6	29 51.0	+51.4	118.1	29 22.5	+51.9	118.6	28 53.6	+52.4	119.1	28 24.2	+53.0	119.5	27 54.4	+53.5	120.0	27 24.2	+53.9	120.4	10
11	31 36.7	+50.1	116.4	31 09.8	+50.6	116.9	30 42.4	+51.2	117.5	30 14.4	+51.8	118.0	29 46.0	+52.3	118.5	29 17.2	+52.8	119.0	28 47.9	+53.3	119.5	28 18.1	+53.8	120.0	11
12	32 26.8	+49.8	115.7	32 00.4	+50.5	116.3	31 33.6	+51.0	116.9	31 06.2	+51.6	117.4	30 38.4	+52.1	117.9	30 10.0	+52.7	118.4	29 41.2	+53.2	119.0	29 11.9	+53.7	119.4	12
13	33 16.6	+49.6	115.1	32 50.9	+50.2	115.7	32 24.6	+50.9	116.2	31 57.8	+51.5	116.8	31 30.5	+52.0	117.4	31 02.7	+52.5	117.9	30 34.4	+53.0	118.4	30 05.6	+53.5	118.9	13
14	34 06.2	+49.4	114.4	33 41.1	+50.1	115.0	33 15.5	+50.7	115.6	32 49.3	+51.2	116.2	32 22.5	+51.9	116.8	31 55.2	+52.4	117.3	31 27.4	+53.0	117.9	30 59.1	+53.5	118.4	14
15	34 55.6	+49.2	113.7	34 31.2	+49.8	114.3	34 06.2	+50.4	115.0	33 40.5	+51.1	115.6	33 14.4	+51.6	116.2	32 47.6	+52.2	116.7	32 20.4	+52.7	117.3	31 52.6	+53.2	117.9	15
16	35 44.8	+48.9	113.0	35 21.0	+49.6	113.7	34 56.6	+50.3	114.3	34 31.6	+50.9	114.9	34 06.0	+51.5	115.6	33 39.8	+52.1	116.2	33 13.1	+52.6	116.8	32 45.8	+53.2	117.3	16
17	36 33.7	+48.6	112.3	36 10.6	+49.3	113.0	35 46.9	+50.0	113.6	35 22.5	+50.6	114.3	34 57.5	+51.3	114.9	34 31.9	+51.9	115.6	34 05.7	+52.5	116.2	33 39.0	+53.0	116.8	17
18	37 22.3	+48.4	111.6	36 59.9	+49.1	112.3	36 36.9	+49.7	113.0	36 13.1	+50.5	113.6	35 48.8	+51.0	114.3	35 23.8	+51.7	114.9	34 58.2	+52.2	115.6	34 32.0	+52.8	116.2	18
19	38 10.7	+48.1	110.8	37 49.0	+48.8	111.6	37 26.6	+49.6	112.3	37 03.6	+50.2	113.0	36 39.8	+50.9	113.6	36 15.5	+51.4	114.3	35 50.4	+52.1	115.0	35 24.8	+52.6	115.6	19
20	38 58.8	+47.7	110.0	38 37.8	+48.6	110.8	38 16.2	+49.2	111.5	37 53.8	+49.9	112.3	37 30.7	+50.6	113.0	37 06.9	+51.3	113.7	36 42.5	+51.9	114.4	36 17.4	+52.5	115.0	20
21	39 46.5	+47.5	109.3	39 26.4	+48.2	110.0	39 05.4	+49.0	110.8	38 43.7	+49.7	111.6	38 21.3	+50.4	112.3	37 58.2	+51.1	113.0	37 34.4	+51.7	113.7	37 09.9	+52.3	114.4	21
22	40 34.0	+47.1	108.5	40 14.6	+47.9	109.3	39 54.4	+48.7	110.0	39 33.4	+49.5	110.8	39 11.7	+50.2	111.6	38 49.3	+50.8	112.4	38 26.1	+51.5	113.1	38 02.2	+52.1	113.8	22
23	41 21.1	+46.7	107.6	41 02.5	+47.6	108.5	40 43.1	+48.3	109.3	40 22.9	+49.1	110.1	40 01.9	+49.8	110.9	39 40.1	+50.5	111.7	39 17.6	+51.2	112.4	38 54.3	+51.9	113.2	23
24	42 07.8	+46.4	106.8	41 50.1	+47.2	107.7	41 31.4	+48.1	108.5	41 12.0	+48.8	109.3	40 51.7	+49.6	110.2	40 30.6	+50.3	111.0	40 08.8	+51.0	111.8	39 46.2	+51.6	112.5	24
25	42 54.2	+46.0	105.9	42 37.3	+46.8	106.8	42 19.5	+47.7	107.7	42 00.8	+48.5	108.6	41 41.3	+49.3	109.4	41 20.9	+50.1	110.2	40 59.8	+50.7	111.1	40 37.8	+51.4	111.9	25
26	43 40.2	+45.6	105.1	43 24.1	+46.5	106.0	43 07.2	+47.3	106.9	42 49.3	+48.2	107.8	42 30.6	+48.9	108.6	42 11.0	+49.7	109.5	41 50.5	+50.5	110.3	41 29.2	+51.2	111.2	26
27	44 25.8	+45.1	104.2	44 10.6	+46.1	105.1	43 54.5	+46.9	106.0	43 37.5	+47.8	106.9	43 19.5	+48.7	107.9	43 00.7	+49.4	108.7	42 41.0	+50.2	109.6	42 20.4	+50.9	110.5	27
28	45 10.9	+44.6	103.2	44 56.7	+45.6	104.2	44 41.4	+46.5	105.2	44 25.3	+47.4	106.1	44 08.2	+48.2	107.0	43 50.1	+49.1	107.9	43 31.2	+49.8	108.9	43 11.3	+50.6	109.8	28
29	45 55.5	+44.2	102.3	45 42.3	+45.1	103.3	45 28.0	+46.1	104.3	45 12.7	+47.0	105.2	44 56.4	+47.9	106.2	44 39.2	+48.8	107.2	44 21.0	+49.6	108.1	44 01.9	+50.4	109.0	29
30	46 39.7	+43.6	101.3	46 27.4	+44.7	102.3	46 14.1	+45.6	103.3	45 59.7	+46.6	104.4	45 44.3	+47.5	105.4	45 28.0	+48.3	106.3	45 10.6	+49.2	107.3	44 52.3	+50.0	108.3	30
31	47 23.3	+43.1	100.3	47 12.1	+44.1	101.3	46 59.7	+45.2	102.4	46 46.3	+46.2	103.4	46 31.8	+47.1	104.5	46 16.3	+48.0	105.5	45 59.8	+48.9	106.5	45 42.3	+49.7	107.5	31
32	48 06.4	+42.6	99.2	47 56.2	+43.6	100.3	47 44.9	+44.7	101.4	47 32.5	+45.6	102.5	47 18.9	+46.7	103.6	47 04.3	+47.6	104.6	46 48.7	+48.5	105.6	46 32.0	+49.3	106.7	32
33	48 49.0	+41.9	98.2	48 39.8	+43.1	99.3	48 29.6	+44.1	100.4	48 18.1	+45.2	101.5	48 05.6	+46.1	102.6	47 51.9	+47.1	103.7	47 37.1	+48.1	104.8	47 21.3	+49.0	105.8	33
34	49 30.9	+41.3	97.1	49 22.9	+42.4	98.2	49 13.7	+43.6	99.4	49 03.3	+44.6	100.5	48 51.7	+45.6	101.7	48 39.0	+46.7	102.8	48 25.2	+47.7	103.9	48 10.3	+48.6	105.0	34
35	50 12.2	+40.6	96.0	50 05.3	+41.8	97.2	49 57.3	+42.9	98.3	49 47.9	+44.1	99.5	49 37.4	+45.2	100.7	49 25.7	+46.2	101.8	49 12.9	+47.1	103.0	48 58.9	+48.2	104.1	35
36	50 52.8	+39.9	94.8	50 47.1	+41.2	96.0	50 40.2	+42.3	97.2	50 32.0	+43.5	98.5	50 22.6	+44.6	99.6	50 11.9	+45.7	100.8	50 00.0	+46.7	102.0	49 47.0	+47.7	103.2	36
37	51 32.7	+39.2	93.6	51 28.3	+40.4	94.9	51 22.5	+41.7	96.1	51 15.5	+42.9	97.4	51 07.2	+44.0	98.6	50 57.6	+45.1	99.8	50 46.7	+46.2	101.0	50 34.7	+47.2	102.2	37
38	52 11.9	+38.4	92.4	52 08.7	+39.7	93.7	52 04.2	+41.0	95.0	51 58.4	+42.1	96.2	51 51.2	+43.4	97.5	51 42.7	+44.5	98.8	51 32.9	+45.7	100.0	51 21.9	+46.7	101.2	38
39	52 50.3	+37.5	91.1	52 48.4	+38.9	92.4	52 45.2	+40.2	93.8	52 40.5	+41.5	95.1	52 34.6	+42.7	96.4	52 27.2	+43.9	97.7	52 18.6	+45.0	98.9	52 08.6	+46.1	100.2	39
40	53 27.8	+36.7	89.8	53 27.3	+38.1	91.2	53 25.4	+39.4	92.5	53 22.0	+40.8	93.9	53 17.3	+42.0	95.2	53 11.1	+43.3	96.5	53 03.6	+44.5	97.9	52 54.7	+45.6	99.2	40
41	54 04.5	+35.8	88.5	54 05.4	+37.2	89.9	54 04.8	+38.6	91.2	54 02.8	+39.9	92.6	53 59.3	+41.3	94.0	53 54.4	+42.5	95.4	53 48.1	+43.8	96.7	53 40.3	+45.0	98.1	41
42	54 40.3	+34.8	87.1	54 42.6	+36.2	88.5	54 43.4	+37.7	89.9	54 42.7	+39.1	91.3	54 40.6	+40.4	92.8	54 36.9	+41.8	94.2	54 31.9	+43.0	95.6	54 25.3	+44.3	97.0	42
43	55 15.1	+33.7	85.7	55 18.8	+35.3	87.1	55 21.1	+36.7	88.6	55 21.8	+38.2	90.0	55 21.0	+39.7	91.5	55 18.7	+41.0	92.9	55 14.9	+42.4	94.4	55 09.6	+43.7	95.8	43
44	55 48.8	+32.7	84.2	55 54.1	+34.3	85.7	55 57.8	+35.8	87.2	56 00.0	+37.3	88.7	56 00.7	+38.7	90.1	55 59.7	+40.2	91.6	55 57.3	+41.5	93.1	55 53.3	+42.8	94.6	44
45	56 21.5	+31.6	82.7	56 28.4	+33.1	84.2	56 33.6	+34.8	85.7	56 37.3	+36.3	87.2	56 39.4	+37.8	88.8	56 39.9	+39.3	90.3	56 38.8	+40.7	91.8	56 36.1	+42.1	93.3	45
46	56 53.1	+30.4	81.2	57 01.5	+32.1	82.7	57 08.4	+33.6	84.2	57 13.6	+35.2	85.8	57 17.2	+36.8	87.3	57 19.2	+38.3	88.9	57 19.5	+39.8	90.4	57 18.2	+41.3	92.0	46
47	57 23.5	+29.2	79.6	57 33.6	+30.8	81.1	57 42.0	+32.5	82.7	57 48.8	+34.2	84.3	57 54.0	+35.7	85.9	57 57.5	+37.3	87.5	57 59.3	+38.9	89.1	57 59.5	+40.3	90.7	47
48	57 52.7	+27.9	78.0	58 04.4	+29.6	79.5	58 14.5	+31.3	81.1	58 23.0	+32.9	82.7	58 29.7	+34.7	84.3	58 34.8	+36.3	86.0	58 38.2	+37.8	87.6	58 39.8	+39.4	89.2	48
49	58 20.6	+26.5	76.3	58 34.0	+28.3	77.9	58 45.8	+30.0	79.5	58 55.9	+31.8	81.1	59 04.4	+33.4	82.8	59 11.1	+35.1	84.4	59 16.0	+36.8	86.1	59 19.2	+38.4	87.8	49
50	58 47.1	+25.2	74.6	59 02.3	+26.9	76.2	59 15.8	+28.7	77.8	59 27.7	+30.4	79.5	59 37.8	+32.2	81.1	59 46.2	+33.9	82.8	59 52.8	+35.6	84.5	59 57.6	+37.3	86.3	50
51	59 12.3	+23.6	72.8	59 29.2	+25.5	74.4	59 44.5	+27.3	76.1	59 58.1	+29.1	77.7	60 10.0	+30.8	79.4	60 20.1	+32.6	81.2	60 28.4	+34.4	82.9	60 34.9	+36.1	84.7	51
52	59 35.9	+22.2	71.0	59 54.7	+23.9	72.6	60 11.8	+25.8	74.3	60 27.2	+27.6	76.0	60 40.8	+29.5	77.7	60 52.7	+31.3	79.5	61 02.8	+33.0	81.2	61 11.0	+34.8	83.0	52
53	59 58.1	+20.5	69.1	60 18.6	+22.4	70.8	60 37.6	+24.2	72.5	60 54.8	+26.1	74.2	61 10.3	+28.0	75.9	61 24.0	+29.8	77.7	61 35.8	+31.8	79.5	61 45.8	+33.6	81.3	53
54	60 18.6	+19.0	67.3	60 41.0	+20.8	68.9	61 01.8	+22.7	70.6	61 20.9	+24.6	72.3	61 38.3	+26.4	74.1	61 53.8	+28.4	75.9	62 07.6	+30.2	77.7	62 19.4	+32.2	79.6	54
55	60 37.6	+17.2	65.3	61 01.8	+19.1	67.0	61 24.5	+21.0	68.7	61 45.5	+22.9	70.4	62 04.7	+24.9	72.2	62 22.2	+26.8	74.0	62 37.8	+28.8	75.8	62 51.6	+30.6	77.7	55
56	60 54.8	+15.5	63.4	61 20.9	+17.4	65.0	61 45.5	+19.4	66.7	62 08.4	+21.2	68.4	62 29.6	+23.1	70.2	62 49.0	+25.1	72.0	63 06.6	+27.1	73.9	63 22.2	+29.1	75.8	56
57	61 10.3	+13.7	61.4	61 38.3	+15.5	63.0	62 04.7	+17.5	64.7	62 29.6	+19.4	66.4	62 52.7	+21.4	68.2	63 14.1	+23.4	70.0	63 33.7	+25.4	71.9	63 51.3	+27.5	73.9	57
58	61 24.0	+11.8	59.4	61 53.8	+13.8	61.0	62 22.2	+15.6	62.6	62 49.0	+17.6	64.4	63 14.1	+19.6	66.1	63 37.5	+21.6	68.0	63 59.1	+23.6	69.9	64 18.8	+25.7	71.8	58
59	61 35.8	+10.0	57.3	62 07.6	+11.8	58.9	62 37.8	+13.9	60.5	63 06.6	+15.6	62.2	63 33.7	+17.6	64.0	63 57.1	+19.7	65.9	64 22.7	+21.8	67.8	64 44.5	+23.8	69.7	59
60	61 45.8	+8.1	55.2	62 19.4	+9.9	56.8	62 51.6	+11.7•	58.4	63 22.2	+13.7	60.1	63 51.3	+15.7	61.9	64 18.8	+17.7•	63.7	64 44.5	+19.8•	65.6	65 08.3	+22.0	67.6	60
61	61 53.9	+6.2	53.1	62 29.3	+7.9	54.7	63 03.3	+9.8	56.3	63 35.9	+11.7•	57.9	64 07.0	+13.7•	59.7	64 36.5	+15.7•	61.5	65 04.3	+17.8•	63.4	65 30.3	+19.9•	65.3	61
62	62 00.1	+4.2•	51.0	62 37.2	+6.0•	52.5	63 13.1	+7.8•	54.1	63 47.6	+9.6•	55.7	64 20.7	+11.6•	57.4	64 52.2	+13.6•	59.3	65 22.1	+15.6•	61.1	65 50.2	+17.8•	63.0	62
63	62 04.3	+2.2	48.9	62 43.2	+3.9•	50.3	63 20.9	+5.6•	51.9	63 57.2	+7.6•	53.5	64 32.3	+9.4•	55.2	65 05.8	+11.4•	56.9	65 37.7	+13.5•	58.8	66 08.0	+15.6•	60.7	63
64	62 06.5	+0.3•	46.7	62 47.1	+1.9•	48.2	63 26.5	+3.6•	49.6	64 04.8	+5.4•	51.2	64 41.7	+7.3•	52.8	65 17.2	+9.2•	54.6	65 51.2	+11.3•	56.4	66 23.6	+13.4•	58.3	64
65	62 06.8	-1.8•	44.6	62 49.0	-0.2•	46.0	63 30.1	+1.6•	47.4	64 10.2	+3.2•	48.9	64 49.0	+5.0•	50.5	65 26.4	+7.0•	52.2	66 02.5	+8.9•	54.0	66 37.0	+11.0•	55.8	65
66	62 05.0	-3.7	42.5	62 48.8	-2.1•	43.8	63 31.7	-0.6•	45.2	64 13.4	+1.1•	46.6	64 54.0	+2.9•	48.2	65 33.4	+4.7•	49.8	66 11.4	+6.7•	51.5	66 48.0	+8.7•	53.4	66
67	62 01.3	-5.6	40.3	62 46.7	-4.3•	41.6	63 31.1	-2.7•	42.9	64 14.5	-1.1•	44.3	64 56.9	+0.6•	45.8	65 38.1	+2.4•	47.4	66 18.1	+4.3•	49.1	66 56.7	+6.2•	50.8	67
68	61 55.7	-7.6	38.2	62 42.4	-6.2	39.4	63 28.4	-4.8•	40.7	64 13.4	-3.2•	42.0	64 57.5	-1.6•	43.5	65 40.5	+0.1•	45.0	66 22.4	+1.8•	46.6	67 02.9	+3.8•	48.3	68
69	61 48.1	-9.5	36.1	62 36.2	-8.2•	37.2	63 23.6	-6.9•	38.5	64 10.2	-5.4•	39.7	64 55.9	-3.9•	41.1	65 40.6	-2.3•	42.5	66 24.2	-0.5•	44.1	67 06.7	+1.4•	45.7	69
70	61 38.6	-11.4	34.0	62 28.0	-10.2	35.1	63 16.7	-8.8•	36.2	64 04.8	-7.6•	37.4	64 52.0	-6.1•	38.7	65 38.3	-4.5•	40.1	66 23.7	-2.9•	41.6	67 08.1	-1.2•	43.2	70
71	61 27.2	-13.2	32.0	62 17.8	-12.1	33.0	63 07.9	-10.9•	34.0	63 57.2	-9.5•	35.2	64 45.9	-8.3•	36.4	65 33.8	-6.8•	37.7	66 20.8	-5.3•	39.1	67 06.9	-3.6•	40.6	71
72	61 14.0	-15.1	29.9	62 05.7	-14.0	30.9	62 57.0	-12.9	31.9	63 47.6	-11.7•	32.9	64 37.6	-10.4•	34.1	65 27.0	-9.1•	35.3	66 15.5	-7.6•	36.6	67 03.3	-6.1•	38.0	72
73	60 58.9	-16.7	27.9	61 51.7	-15.8	28.8	62 44.1	-14.8	29.7	63 35.9	-13.7	30.7	64 27.2	-12.5•	31.8	65 17.9	-11.3•	32.9	66 07.9	-9.9•	34.2	66 57.2	-8.6•	35.5	73
74	60 42.2	-18.5	26.0	61 35.9	-17.6	26.8	62 29.3	-16.7	27.6	63 22.2	-15.6	28.5	64 14.7	-14.6•	29.5	65 06.6	-13.4•	30.6	65 58.0	-12.3•	31.7	66 48.6	-10.9•	33.0	74
75	60 23.7	-20.2	24.0	61 18.3	-19.3	24.8	62 12.6	-18.5	25.6	63 06.6	-17.6	26.4	64 00.1	-16.6	27.3	64 53.2	-15.6•	28.3	65 45.7	-14.4•	29.3	66 37.7	-13.2•	30.5	75
76	60 03.5	-21.7	22.1	60 59.0	-21.0	22.8	61 54.1	-20.2	23.5	62 49.0	-19.4	24.3	63 43.5	-18.5	25.1	64 37.6	-17.6	26.0	65 31.3	-16.6•	27.0	66 24.5	-15.5•	28.0	76
77	59 41.8	-23.3	20.3	60 38.0	-22.7	20.9	61 33.9	-21.9	21.5	62 29.6	-21.2	22.2	63 25.0	-20.5	23.0	64 20.0	-19.5	23.8	65 14.7	-18.6•	24.7	66 09.0	-17.6•	25.6	77
78	59 18.5	-24.5	18.5	60 15.3	-24.2	19.0	61 12.0	-23.4	19.6	62 08.4	-22.7	20.2	63 04.5	-22.2	20.8	64 00.5	-21.5	21.6	64 56.1	-20.7	22.4	65 51.4	-19.8•	23.3	78
79	58 53.7	-26.1	16.7	59 51.1	-25.6	17.2	60 48.4	-25.1	17.7	61 45.5	-24.6	18.3	62 42.3	-23.9	18.9	63 39.0	-23.3	19.5	64 35.4	-22.5	20.2	65 31.6	-21.8	21.0	79
80	58 27.6	-27.6	15.0	59 25.5	-27.1	15.4	60 23.3	-26.7	15.8	61 20.9	-26.1	16.3	62 18.4	-25.6	16.9	63 15.7	-25.0	17.5	64 12.9	-24.4	18.1	65 09.8	-23.7	18.7	80
81	58 00.0	-28.8	13.3	58 58.4	-28.5	13.6	59 56.6	-28.0	14.0	60 54.8	-27.7	14.5	61 52.8	-27.2	14.9	62 50.7	-26.7	15.4	63 48.5	-26.2	16.0	64 46.1	-25.6	16.6	81
82	57 31.2	-30.1	11.6	58 29.9	-29.8	11.9	59 28.6	-29.5	12.3	60 27.1	-29.0	12.7	61 25.6	-28.6	13.1	62 24.0	-28.2	13.5	63 22.3	-27.8	14.0	64 20.5	-27.4	14.5	82
83	57 01.1	-31.3	10.0	58 00.1	-31.0	10.3	58 59.1	-30.7	10.6	59 58.1	-30.5	10.9	60 57.0	-30.2	11.2	61 55.8	-29.8	11.6	62 54.5	-29.4	12.0	63 53.1	-29.0	12.4	83
84	56 29.8	-32.5	8.5	57 29.1	-32.2	8.7	58 28.4	-32.0	8.9	59 27.6	-31.7	9.2	60 26.8	-31.4	9.5	61 26.0	-31.2	9.8	62 25.1	-30.9	10.1	63 24.1	-30.5	10.5	84
85	55 57.3	-33.5	6.9	56 56.9	-33.3	7.1	57 56.4	-33.1	7.3	58 55.9	-33.0	7.5	59 55.4	-32.7	7.8	60 54.8	-32.5	8.0	61 54.2	-32.3	8.3	62 53.6	-32.1	8.5	85
86	55 23.8	-34.5	5.5	56 23.6	-34.5	5.6	57 23.3	-34.3	5.8	58 22.9	-34.1	5.9	59 22.6	-34.0	6.1	60 22.3	-33.9	6.3	61 21.9	-33.7	6.5	62 21.5	-33.5	6.7	86
87	54 49.3	-35.5	4.0	55 49.1	-35.4	4.2	56 49.0	-35.4	4.3	57 48.6	-35.2	4.4	58 48.6	-35.1	4.5	59 48.4	-35.0	4.6	60 48.2	-34.9	4.8	61 48.0	-34.8	4.9	87
88	54 13.8	-36.5	2.7	55 13.7	-36.4	2.7	56 13.6	-36.3	2.8	57 13.4	-36.3	2.9	58 13.5	-36.2	3.0	59 13.4	-36.2	3.0	60 13.3	-36.1	3.1	61 13.2	-36.0	3.2	88
89	53 37.3	-37.3	1.3	54 37.3	-37.3	1.3	55 37.3	-37.3	1.4	56 37.3	-37.3	1.4	57 37.3	-37.3	1.5	58 37.2	-37.2	1.5	59 37.2	-37.2	1.5	60 37.2	-37.2	1.6	89
90	53 00.0	-38.2	0.0	54 00.0	-38.2	0.0	55 00.0	-38.2	0.0	56 00.0	-38.2	0.0	57 00.0	-38.2	0.0	58 00.0	-38.3	0.0	59 00.0	-38.3	0.0	60 00.0	-38.3	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | |

Dec.	53°			54°			55°			56°			57°			58°			59°			60°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	22 15.3	−51.8	122.9	21 42.6	−52.3	123.2	21 09.6	−52.8	123.6	20 36.3	−53.2	123.9	20 02.7	−53.6	124.2	19 28.8	−54.0	124.5	18 54.8	−54.4	124.8	18 20.4	−54.8	125.0	0
1	21 23.5	−51.9	123.4	20 50.3	−52.4	123.8	20 16.8	−52.8	124.1	19 43.1	−53.3	124.4	19 09.1	−53.7	124.7	18 34.8	−54.0	124.9	18 00.4	−54.5	125.2	17 25.6	−54.8	125.5	1
2	20 31.6	−52.1	124.0	19 57.9	−52.5	124.3	19 24.0	−52.9	124.6	18 49.8	−53.3	124.9	18 15.4	−53.7	125.1	17 40.8	−54.2	125.4	17 05.9	−54.5	125.7	16 30.8	−54.9	125.9	2
3	19 39.5	−52.1	124.5	19 05.4	−52.5	124.8	18 31.1	−53.0	125.1	17 56.5	−53.4	125.3	17 21.7	−53.9	125.6	16 46.6	−54.2	125.8	16 11.4	−54.6	126.1	15 35.9	−54.9	126.3	3
4	18 47.4	−52.2	125.0	18 12.9	−52.7	125.3	17 38.1	−53.1	125.6	17 03.1	−53.5	125.8	16 27.8	−53.8	126.1	15 52.4	−54.2	126.3	15 16.8	−54.5	126.5	14 41.0	−54.9	126.7	4
5	17 55.2	−52.3	125.5	17 20.2	−52.7	125.8	16 45.0	−53.1	126.1	16 09.6	−53.6	126.3	15 34.0	−53.9	126.5	14 58.2	−54.3	126.7	14 22.2	−54.7	126.9	13 46.1	−55.1	127.1	5
6	17 02.9	−52.4	126.1	16 27.5	−52.8	126.3	15 51.9	−53.2	126.5	15 16.0	−53.5	126.8	14 40.1	−54.0	127.0	14 03.9	−54.4	127.2	13 27.5	−54.7	127.4	12 51.0	−55.0	127.6	6
7	16 10.5	−52.4	126.6	15 34.7	−52.9	126.8	14 58.7	−53.3	127.0	14 22.5	−53.7	127.2	13 46.1	−54.1	127.4	13 09.5	−54.4	127.6	12 32.8	−54.7	127.8	11 56.0	−55.1	128.0	7
8	15 18.1	−52.5	127.1	14 41.8	−52.9	127.3	14 05.4	−53.3	127.5	13 28.8	−53.7	127.7	12 52.0	−54.0	127.9	12 15.1	−54.4	128.0	11 38.1	−54.8	128.2	11 00.9	−55.1	128.4	8
9	14 25.6	−52.6	127.6	13 48.9	−53.0	127.8	13 12.1	−53.4	128.0	12 35.1	−53.7	128.1	11 58.0	−54.1	128.3	11 20.7	−54.5	128.5	10 43.3	−54.8	128.6	10 05.8	−55.1	128.8	9
10	13 33.0	−52.6	128.1	12 55.9	−53.0	128.3	12 18.7	−53.4	128.4	11 41.4	−53.8	128.6	11 03.9	−54.2	128.8	10 26.2	−54.5	128.9	9 48.5	−54.9	129.0	9 10.7	−55.2	129.2	10
11	12 40.4	−52.7	128.6	12 02.9	−53.1	128.7	11 25.3	−53.5	128.9	10 47.6	−53.9	129.0	10 09.7	−54.2	129.2	9 31.7	−54.5	129.3	8 53.7	−54.9	129.5	8 15.5	−55.2	129.6	11
12	11 47.7	−52.7	129.1	11 09.8	−53.1	129.2	10 31.8	−53.4	129.4	9 53.7	−53.8	129.5	9 15.5	−54.2	129.6	8 37.2	−54.6	129.7	7 58.8	−54.9	129.9	7 20.3	−55.2	130.0	12
13	10 55.0	−52.8	129.5	10 16.7	−53.1	129.7	9 38.4	−53.6	129.8	8 59.9	−53.9	129.9	8 21.3	−54.2	130.1	7 42.6	−54.6	130.2	7 03.9	−54.9	130.3	6 25.1	−55.2	130.4	13
14	10 02.2	−52.8	130.0	9 23.6	−53.2	130.2	8 44.8	−53.6	130.3	8 06.0	−53.9	130.4	7 27.1	−54.3	130.5	6 48.1	−54.6	130.6	6 09.0	−54.9	130.7	5 29.9	−55.3	130.8	14
15	9 09.4	−52.9	130.5	8 30.4	−53.3	130.6	7 51.2	−53.5	130.7	7 12.1	−54.0	130.8	6 32.8	−54.3	130.9	5 53.5	−54.7	131.0	5 14.1	−55.0	131.1	4 34.6	−55.3	131.1	15
16	8 16.5	−52.9	131.0	7 37.1	−53.2	131.1	6 57.7	−53.7	131.2	6 18.1	−54.0	131.3	5 38.5	−54.3	131.4	4 58.8	−54.6	131.4	4 19.1	−55.0	131.5	3 39.3	−55.2	131.5	16
17	7 23.6	−52.9	131.5	6 43.9	−53.3	131.6	6 04.0	−53.6	131.6	5 24.1	−54.0	131.7	4 44.2	−54.3	131.8	4 04.2	−54.7	131.8	3 24.1	−55.0	131.9	2 44.1	−55.3	131.9	17
18	6 30.7	−52.9	131.9	5 50.6	−53.3	132.0	5 10.4	−53.7	132.1	4 30.1	−54.0	132.1	3 49.9	−54.4	132.2	3 09.5	−54.6	132.2	2 29.2	−55.0	132.3	1 48.8	−55.3	132.3	18
19	5 37.8	−53.0	132.4	4 57.3	−53.4	132.5	4 16.7	−53.7	132.5	3 36.1	−54.0	132.6	2 55.5	−54.4	132.6	2 14.9	−54.7	132.7	1 34.2	−55.0	132.7	0 53.5	−55.3	132.7	19
20	4 44.8	−53.0	132.9	4 03.9	−53.3	132.9	3 23.0	−53.7	133.0	2 42.1	−54.0	133.0	2 01.2	−54.4	133.1	1 20.2	−54.7	133.1	0 39.2	−55.0	133.1	0 01.8	+55.3	46.9	20
21	3 51.8	−53.0	133.3	3 10.6	−53.4	133.4	2 29.3	−53.7	133.4	1 48.1	−54.0	133.5	1 06.8	−54.3	133.5	0 25.5	−54.6	133.5	0 15.8	+54.9	46.5	0 57.1	+55.2	46.5	21
22	2 58.8	−53.0	133.8	2 17.2	−53.3	133.9	1 35.6	−53.7	133.9	0 54.1	−54.3	133.9	0 12.5	−54.4	133.9	0 29.1	+54.7	46.1	1 10.7	+55.0	46.1	1 52.3	+55.3	46.1	22
23	2 05.8	−53.1	134.3	1 23.9	−53.4	134.3	0 41.9	−53.7	134.3	0 00.0	−54.0	134.3	0 41.9	+54.4	45.7	1 23.8	+54.7	45.7	2 05.7	+55.0	45.7	2 47.6	+55.3	45.7	23
24	1 12.7	−53.0	134.8	0 30.5	−53.4	134.8	0 11.8	+53.7	45.2	0 54.0	+54.1	45.2	1 36.3	+54.3	45.3	2 18.5	+54.7	45.3	3 00.7	+55.0	45.3	3 42.9	+55.2	45.4	24
25	0 19.7	−53.0	135.2	0 22.9	+53.4	44.8	1 05.5	+53.7	44.8	1 48.1	+54.0	44.8	2 30.6	+54.4	44.8	3 13.2	+54.6	44.9	3 55.7	+54.9	44.9	4 38.1	+55.3	45.0	25
26	0 33.3	+53.1	44.3	1 16.3	+53.4	44.3	1 59.2	+53.7	44.3	2 42.1	+54.0	44.4	3 25.0	+54.3	44.4	4 07.8	+54.6	44.5	4 50.6	+55.0	44.5	5 33.4	+55.3	44.6	26
27	1 26.4	+53.0	43.8	2 09.6	+53.4	43.9	2 52.9	+53.7	43.9	3 36.1	+54.0	43.9	4 19.3	+54.3	44.0	5 02.4	+54.7	44.0	5 45.6	+54.9	44.1	6 28.6	+55.2	44.2	27
28	2 19.4	+53.0	43.4	3 03.0	+53.3	43.4	3 46.6	+53.6	43.4	4 30.1	+54.0	43.5	5 13.6	+54.3	43.6	5 57.1	+54.6	43.6	6 40.5	+54.9	43.7	7 23.8	+55.2	43.8	28
29	3 12.4	+53.0	42.9	3 56.3	+53.4	42.9	4 40.2	+53.7	43.0	5 24.1	+54.0	43.1	6 07.9	+54.3	43.1	6 51.7	+54.6	43.2	7 35.4	+54.9	43.3	8 19.0	+55.2	43.4	29
30	4 05.4	+53.0	42.4	4 49.7	+53.3	42.5	5 33.9	+53.6	42.5	6 18.1	+53.9	42.6	7 02.2	+54.3	42.7	7 46.3	+54.5	42.8	8 30.3	+54.8	42.9	9 14.2	+55.1	43.0	30
31	4 58.4	+53.0	42.0	5 43.0	+53.3	42.0	6 27.5	+53.6	42.1	7 12.0	+53.9	42.2	7 56.5	+54.2	42.3	8 40.8	+54.5	42.4	9 25.1	+54.8	42.5	10 09.3	+55.1	42.6	31
32	5 51.4	+52.9	41.5	6 36.3	+53.2	41.6	7 21.1	+53.6	41.6	8 05.9	+53.9	41.7	8 50.7	+54.2	41.8	9 35.3	+54.6	41.9	10 19.9	+54.8	42.1	11 04.4	+55.1	42.2	32
33	6 44.3	+52.9	41.0	7 29.5	+53.3	41.1	8 14.7	+53.6	41.2	8 59.8	+53.9	41.3	9 44.9	+54.2	41.4	10 29.9	+54.4	41.5	11 14.7	+54.8	41.6	11 59.5	+55.1	41.8	33
34	7 37.2	+52.9	40.5	8 22.8	+53.2	40.6	9 08.3	+53.5	40.7	9 53.7	+53.8	40.8	10 39.1	+54.1	41.0	11 24.3	+54.4	41.1	12 09.5	+54.7	41.2	12 54.6	+55.0	41.4	34
35	8 30.1	+52.8	40.1	9 16.0	+53.1	40.2	10 01.8	+53.5	40.3	10 47.5	+53.8	40.4	11 33.2	+54.1	40.5	12 18.7	+54.4	40.7	13 04.2	+54.7	40.8	13 49.6	+54.9	41.0	35
36	9 22.9	+52.9	39.6	10 09.1	+53.2	39.7	10 55.3	+53.4	39.8	11 41.3	+53.8	39.9	12 27.3	+54.0	40.1	13 13.1	+54.4	40.2	13 58.9	+54.6	40.4	14 44.5	+55.0	40.6	36
37	10 15.8	+52.7	39.1	11 02.3	+53.1	39.2	11 48.7	+53.4	39.4	12 35.1	+53.7	39.5	13 21.3	+54.0	39.6	14 07.5	+54.3	39.8	14 53.5	+54.6	40.0	15 39.5	+54.8	40.1	37
38	11 08.5	+52.7	38.6	11 55.4	+53.0	38.7	12 42.1	+53.4	38.8	13 28.8	+53.6	39.0	14 15.3	+54.0	39.2	15 01.8	+54.2	39.4	15 48.1	+54.5	39.5	16 34.3	+54.9	39.7	38
39	12 01.2	+52.7	38.1	12 48.4	+53.0	38.3	13 35.5	+53.2	38.4	14 22.4	+53.6	38.6	15 09.3	+53.9	38.7	15 56.0	+54.2	38.9	16 42.6	+54.5	39.1	17 29.2	+54.7	39.3	39
40	12 53.9	+52.6	37.6	13 41.4	+52.9	37.7	14 28.7	+53.3	37.9	15 16.0	+53.5	38.1	16 03.2	+53.8	38.3	16 50.2	+54.1	38.5	17 37.1	+54.5	38.7	18 23.9	+54.7	38.9	40
41	13 46.5	+52.6	37.1	14 34.3	+52.9	37.2	15 22.0	+53.2	37.5	16 09.5	+53.5	37.6	16 57.0	+53.8	37.8	17 44.3	+54.1	38.0	18 31.6	+54.3	38.2	19 18.6	+54.7	38.4	41
42	14 39.1	+52.5	36.7	15 27.2	+52.8	36.8	16 15.2	+53.1	37.0	17 03.0	+53.4	37.2	17 50.8	+53.7	37.4	18 38.4	+54.0	37.6	19 25.9	+54.3	37.8	20 13.3	+54.6	38.0	42
43	15 31.6	+52.4	36.1	16 20.0	+52.7	36.3	17 08.3	+53.0	36.5	17 56.4	+53.4	36.7	18 44.5	+53.6	36.9	19 32.4	+53.9	37.1	20 20.2	+54.2	37.3	21 07.9	+54.5	37.5	43
44	16 24.0	+52.3	35.6	17 12.7	+52.7	35.8	18 01.3	+53.0	36.0	18 49.8	+53.2	36.2	19 38.1	+53.6	36.4	20 26.3	+53.9	36.6	21 14.4	+54.2	36.9	22 02.4	+54.4	37.1	44
45	17 16.3	+52.3	35.1	18 05.4	+52.5	35.3	18 54.3	+52.8	35.5	19 43.0	+53.2	35.7	20 31.7	+53.5	35.9	21 20.2	+53.8	36.2	22 08.6	+54.0	36.4	22 56.8	+54.4	36.6	45
46	18 08.6	+52.2	34.6	18 57.9	+52.5	34.8	19 47.1	+52.8	35.0	20 36.2	+53.1	35.2	21 25.2	+53.4	35.4	22 14.0	+53.7	35.7	23 02.6	+54.0	35.9	23 51.2	+54.2	36.2	46
47	19 00.8	+52.1	34.1	19 50.4	+52.4	34.3	20 39.9	+52.7	34.5	21 29.3	+53.0	34.7	22 18.6	+53.3	35.0	23 07.7	+53.6	35.2	23 56.6	+53.9	35.4	24 45.4	+54.2	35.7	47
48	19 52.9	+52.0	33.6	20 42.8	+52.3	33.8	21 32.6	+52.7	34.0	22 22.3	+52.9	34.2	23 11.9	+53.2	34.5	24 01.3	+53.5	34.7	24 50.5	+53.8	35.0	25 39.6	+54.1	35.2	48
49	20 44.9	+51.9	33.0	21 35.1	+52.3	33.3	22 25.3	+52.5	33.5	23 15.2	+52.9	33.7	24 05.1	+53.1	34.0	24 54.8	+53.4	34.2	25 44.3	+53.7	34.5	26 33.7	+54.0	34.8	49
50	21 36.8	+51.8	32.5	22 27.4	+52.1	32.7	23 17.8	+52.4	32.9	24 08.1	+52.7	33.2	24 58.2	+53.0	33.4	25 48.2	+53.3	33.7	26 38.0	+53.6	34.0	27 27.7	+53.9	34.3	50
51	22 28.6	+51.7	32.0	23 19.5	+52.0	32.2	24 10.2	+52.3	32.4	25 00.8	+52.6	32.7	25 51.2	+52.9	32.9	26 41.5	+53.2	33.2	27 31.6	+53.5	33.5	28 21.6	+53.8	33.8	51
52	23 20.3	+51.6	31.4	24 11.5	+51.8	31.6	25 02.5	+52.1	31.9	25 53.4	+52.4	32.1	26 44.1	+52.8	32.4	27 34.7	+53.0	32.7	28 25.1	+53.4	33.0	29 15.4	+53.6	33.3	52
53	24 11.9	+51.4	30.8	25 03.3	+51.8	31.1	25 54.6	+52.1	31.3	26 45.8	+52.4	31.6	27 36.9	+52.6	31.9	28 27.7	+53.0	32.1	29 18.5	+53.2	32.4	30 09.0	+53.6	32.7	53
54	25 03.3	+51.3	30.3	25 55.1	+51.6	30.5	26 46.7	+51.9	30.8	27 38.2	+52.2	31.0	28 29.5	+52.5	31.3	29 20.7	+52.8	31.6	30 11.7	+53.1	31.9	31 02.6	+53.4	32.2	54
55	25 54.6	+51.2	29.7	26 46.7	+51.5	30.0	27 38.6	+51.8	30.2	28 30.4	+52.1	30.5	29 22.0	+52.4	30.8	30 13.5	+52.7	31.1	31 04.8	+53.0	31.4	31 56.0	+53.2	31.7	55
56	26 45.8	+51.1	29.1	27 38.2	+51.3	29.4	28 30.4	+51.6	29.6	29 22.5	+51.9	29.9	30 14.4	+52.1	30.2	31 06.2	+52.5	30.5	31 57.8	+52.8	30.8	32 49.2	+53.2	31.1	56
57	27 36.9	+50.8	28.5	28 29.5	+51.2	28.8	29 22.0	+51.5	29.1	30 14.4	+51.7	29.3	31 06.6	+52.1	29.6	31 58.7	+52.3	29.9	32 50.6	+52.7	30.3	33 42.4	+52.9	30.6	57
58	28 27.7	+50.8	27.9	29 20.7	+51.0	28.2	30 13.5	+51.3	28.5	31 06.2	+51.6	28.7	31 58.7	+51.9	29.0	32 51.1	+52.2	29.4	33 43.3	+52.5	29.7	34 35.3	+52.9	30.0	58
59	29 18.5	+50.5	27.3	30 11.7	+50.9	27.6	31 04.8	+51.2	27.9	31 57.8	+51.4	28.2	32 50.6	+51.8	28.5	33 43.3	+52.0	28.8	34 35.3	+52.4	29.1	35 28.2	+52.6	29.4	59
60	30 09.0	+50.4	26.7	31 02.6	+50.6	27.0	31 56.0	+50.9	27.2	32 49.2	+51.3	27.5	33 42.4	+51.5	27.8	34 35.3	+51.9	28.2	35 28.2	+52.1	28.5	36 20.8	+52.5	28.8	60
61	30 59.4	+50.2	26.1	31 53.2	+50.5	26.3	32 46.9	+50.8	26.6	33 40.5	+51.1	26.9	34 33.9	+51.4	27.2	35 27.2	+51.7	27.6	36 20.3	+52.0	27.9	37 13.3	+52.2	28.2	61
62	31 49.6	+50.0	25.4	32 43.7	+50.3	25.7	33 37.7	+50.6	26.0	34 31.6	+50.8	26.3	35 25.3	+51.2	26.6	36 18.9	+51.4	26.9	37 12.3	+51.8	27.3	38 05.5	+52.1	27.6	62
63	32 39.6	+49.8	24.8	33 34.0	+50.1	25.1	34 28.3	+50.4	25.3	35 22.4	+50.7	25.6	36 16.5	+50.9	26.0	37 10.3	+51.3	26.3	38 04.1	+51.5	26.6	38 57.6	+51.9	27.0	63
64	33 29.4	+49.5	24.1	34 24.1	+49.8	24.4	35 18.7	+50.1	24.7	36 13.1	+50.4	25.0	37 07.4	+50.8	25.3	38 01.6	+51.0	25.6	38 55.6	+51.4	26.0	39 49.5	+51.6	26.3	64
65	34 18.9	+49.4	23.4	35 13.9	+49.6	23.7	36 08.8	+49.9	24.0	37 03.5	+50.3	24.3	37 58.2	+50.5	24.6	38 52.6	+50.8	25.0	39 47.0	+51.1	25.3	40 41.1	+51.4	25.7	65
66	35 08.3	+49.1	22.7	36 03.5	+49.4	23.0	36 58.7	+49.7	23.3	37 53.8	+49.9	23.6	38 48.7	+50.2	23.9	39 43.4	+50.6	24.3	40 38.1	+50.8	24.6	41 32.5	+51.2	25.0	66
67	35 57.4	+48.8	22.0	36 52.9	+49.2	22.3	37 48.4	+49.4	22.6	38 43.7	+49.7	22.9	39 38.9	+50.0	23.2	40 34.0	+50.3	23.6	41 28.9	+50.6	23.9	42 23.7	+50.9	24.3	67
68	36 46.2	+48.6	21.3	37 42.1	+48.8	21.6	38 37.8	+49.1	21.9	39 33.4	+49.4	22.2	40 28.9	+49.7	22.5	41 24.3	+50.0	22.8	42 19.5	+50.3	23.2	43 14.6	+50.6	23.6	68
69	37 34.8	+48.3	20.6	38 30.9	+48.6	20.9	39 26.9	+48.9	21.1	40 22.8	+49.2	21.4	41 18.6	+49.4	21.8	42 14.3	+49.7	22.1	43 09.8	+50.0	22.4	44 05.2	+50.3	22.8	69
70	38 23.1	+48.0	19.8	39 19.5	+48.2	20.1	40 15.8	+48.5	20.4	41 12.0	+48.8	20.7	42 08.0	+49.1	21.0	43 04.0	+49.4	21.3	43 59.8	+49.7	21.7	44 55.5	+50.0	22.0	70
71	39 11.1	+47.7	19.1	40 07.7	+48.0	19.3	41 04.3	+48.2	19.6	42 00.8	+48.5	19.9	42 57.1	+48.8	20.2	43 53.4	+49.1	20.6	44 49.5	+49.4	20.9	45 45.5	+49.6	21.3	71
72	39 58.8	+47.3	18.3	40 55.7	+47.6	18.5	41 52.5	+47.9	18.8	42 49.3	+48.1	19.1	43 45.9	+48.5	19.4	44 42.5	+48.7	19.7	45 38.9	+49.0	20.1	46 35.1	+49.4	20.5	72
73	40 46.1	+47.0	17.5	41 43.3	+47.3	17.7	42 40.4	+47.6	18.0	43 37.4	+47.8	18.3	44 34.4	+48.0	18.6	45 31.2	+48.3	18.9	46 27.9	+48.6	19.3	47 24.5	+48.9	19.6	73
74	41 33.1	+46.7	16.6	42 30.6	+46.9	16.9	43 28.0	+47.1	17.2	44 25.2	+47.5	17.5	45 22.4	+47.7	17.8	46 19.5	+48.0	18.1	47 16.5	+48.3	18.4	48 13.4	+48.5	18.8	74
75	42 19.8	+46.3	15.8	43 17.5	+46.5	16.0	44 15.1	+46.8	16.3	45 12.7	+47.0	16.6	46 10.1	+47.3	16.9	47 07.5	+47.5	17.2	48 04.8	+47.8	17.5	49 01.9	+48.1	17.9	75
76	43 06.1	+45.8	14.9	44 04.0	+46.1	15.2	45 01.9	+46.3	15.4	45 59.7	+46.6	15.7	46 57.4	+46.9	16.0	47 55.0	+47.2	16.3	48 52.6	+47.4	16.6	49 50.0	+47.7	16.9	76
77	43 51.9	+45.5	14.0	44 50.1	+45.7	14.3	45 48.2	+45.9	14.5	46 46.3	+46.1	14.8	47 44.3	+46.4	15.1	48 42.2	+46.6	15.4	49 40.0	+46.9	15.7	50 37.7	+47.2	16.0	77
78	44 37.4	+45.0	13.1	45 35.8	+45.2	13.4	46 34.1	+45.5	13.6	47 32.4	+45.7	13.8	48 30.7	+45.9	14.1	49 28.8	+46.2	14.4	50 26.9	+46.4	14.7	51 24.9	+46.6	15.0	78
79	45 22.4	+44.5	12.2	46 21.0	+44.7	12.4	47 19.6	+44.9	12.6	48 18.1	+45.2	12.9	49 16.6	+45.4	13.1	50 15.0	+45.6	13.4	51 13.3	+45.9	13.7	52 11.5	+46.2	14.0	79
80	46 06.9	+44.1	11.2	47 05.7	+44.3	11.4	48 04.5	+44.5	11.7	49 03.3	+44.6	11.9	50 02.0	+44.8	12.1	51 00.6	+45.1	12.4	51 59.2	+45.3	12.7	52 57.7	+45.5	12.9	80
81	46 51.0	+43.5	10.2	47 50.0	+43.7	10.4	48 49.0	+43.8	10.6	49 47.9	+44.1	10.9	50 46.8	+44.3	11.1	51 45.7	+44.5	11.3	52 44.5	+44.7	11.6	53 43.2	+45.0	11.9	81
82	47 34.5	+42.9	9.2	48 33.7	+43.1	9.4	49 32.8	+43.4	9.6	50 32.0	+43.5	9.8	51 31.1	+43.7	10.0	52 30.2	+43.8	10.2	53 29.2	+44.1	10.5	54 28.2	+44.2	10.7	82
83	48 17.4	+42.4	8.2	49 16.8	+42.5	8.3	50 16.2	+42.6	8.5	51 15.5	+42.8	8.7	52 14.8	+43.0	8.9	53 14.0	+43.2	9.1	54 13.3	+43.3	9.3	55 12.4	+43.6	9.6	83
84	48 59.8	+41.8	7.1	49 59.3	+41.9	7.3	50 58.8	+42.1	7.4	51 58.3	+42.2	7.6	52 57.8	+42.3	7.8	53 57.2	+42.5	7.9	54 56.6	+42.7	8.1	55 56.0	+42.9	8.3	84
85	49 41.6	+41.1	6.0	50 41.2	+41.3	6.1	51 40.9	+41.3	6.3	52 40.5	+41.5	6.4	53 40.1	+41.6	6.6	54 39.7	+41.8	6.7	55 39.3	+41.9	6.9	56 38.9	+42.0	7.1	85
86	50 22.7	+40.4	4.9	51 22.5	+40.5	5.0	52 22.2	+40.7	5.1	53 22.0	+40.7	5.2	54 21.7	+40.9	5.3	55 21.5	+40.9	5.5	56 21.2	+41.1	5.6	57 20.9	+41.2	5.8	86
87	51 03.1	+39.8	3.7	52 03.0	+39.8	3.8	53 02.9	+39.9	3.9	54 02.7	+40.0	4.0	55 02.6	+40.0	4.1	56 02.4	+40.1	4.2	57 02.3	+40.2	4.3	58 02.1	+40.3	4.4	87
88	51 42.9	+38.9	2.5	52 42.8	+39.0	2.6	53 42.7	+39.1	2.6	54 42.7	+39.1	2.7	55 42.6	+39.2	2.8	56 42.5	+39.2	2.8	57 42.5	+39.2	2.9	58 42.4	+39.3	3.0	88
89	52 21.8	+38.2	1.3	53 21.8	+38.2	1.3	54 21.8	+38.2	1.3	55 21.8	+38.2	1.4	56 21.8	+38.2	1.4	57 21.7	+38.3	1.4	58 21.7	+38.3	1.5	59 21.7	+38.3	1.5	89
90	53 00.0	+37.3	0.0	54 00.0	+37.3	0.0	55 00.0	+37.3	0.0	56 00.0	+37.3	0.0	57 00.0	+37.3	0.0	58 00.0	+37.2	0.0	59 00.0	+37.2	0.0	60 00.0	+37.2	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION **L.H.A. 129°, 231°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	21 44.8	+51.6	122.0	21 12.9	+52.0	122.3	20 40.7	+52.5	122.6	20 08.2	+53.0	122.9	19 35.5	+53.4	123.2	19 02.5	+53.8	123.5	18 29.2	+54.2	123.8	17 55.7	+54.6	124.1	0
1	22 36.4	+51.4	121.4	22 04.9	+52.0	121.8	21 33.2	+52.4	122.1	21 01.2	+52.8	122.4	20 28.9	+53.3	122.7	19 56.3	+53.7	123.1	19 23.4	+54.1	123.4	18 50.3	+54.5	123.6	1
2	23 27.8	+51.3	120.8	22 56.9	+51.8	121.2	22 25.6	+52.3	121.6	21 54.0	+52.8	121.9	21 22.2	+53.2	122.3	20 50.0	+53.6	122.6	20 17.5	+54.1	122.9	19 44.8	+54.5	123.2	2
3	24 19.1	+51.2	120.3	23 48.7	+51.6	120.7	23 17.9	+52.2	121.0	22 46.8	+52.6	121.4	22 15.4	+53.1	121.8	21 43.6	+53.6	122.1	21 11.6	+54.0	122.4	20 39.3	+54.4	122.8	3
4	25 10.3	+51.0	119.7	24 40.3	+51.6	120.1	24 10.1	+52.0	120.5	23 39.4	+52.6	120.9	23 08.5	+53.0	121.3	22 37.2	+53.4	121.6	22 05.6	+53.9	122.0	21 33.7	+54.3	122.3	4
5	26 01.3	+50.9	119.1	25 31.9	+51.4	119.5	25 02.1	+52.0	120.0	24 32.0	+52.4	120.4	24 01.5	+52.9	120.7	23 30.6	+53.4	121.1	22 59.5	+53.8	121.5	22 28.0	+54.2	121.8	5
6	26 52.2	+50.7	118.5	26 23.3	+51.3	119.0	25 54.1	+51.8	119.4	25 24.4	+52.3	119.8	24 54.4	+52.8	120.2	24 24.0	+53.3	120.6	23 53.3	+53.7	121.0	23 22.2	+54.2	121.4	6
7	27 42.9	+50.6	117.9	27 14.6	+51.2	118.4	26 45.9	+51.7	118.8	26 16.7	+52.1	119.3	25 47.2	+52.7	119.7	25 17.3	+53.2	120.1	24 47.0	+53.6	120.5	24 16.4	+54.0	120.9	7
8	28 33.5	+50.4	117.3	28 05.8	+50.9	117.8	27 37.6	+51.5	118.3	27 08.9	+52.1	118.7	26 39.9	+52.6	119.2	26 10.5	+53.0	119.6	25 40.6	+53.5	120.0	25 10.4	+54.0	120.4	8
9	29 23.9	+50.3	116.7	28 56.7	+50.9	117.2	28 29.1	+51.4	117.7	28 01.0	+51.9	118.2	27 32.5	+52.4	118.6	27 03.5	+52.9	119.1	26 34.1	+53.5	119.5	26 04.4	+53.9	119.9	9
10	30 14.2	+50.0	116.0	29 47.6	+50.6	116.6	29 20.5	+51.2	117.1	28 52.9	+51.8	117.6	28 24.9	+52.3	118.1	27 56.4	+52.8	118.5	27 27.6	+53.3	119.0	26 58.3	+53.7	119.5	10
11	31 04.2	+49.9	115.4	30 38.2	+50.5	116.0	30 11.7	+51.0	116.5	29 44.7	+51.6	117.0	29 17.2	+52.2	117.5	28 49.2	+52.7	118.0	28 20.9	+53.1	118.5	27 52.0	+53.7	119.0	11
12	31 54.1	+49.7	114.8	31 28.7	+50.3	115.3	31 02.7	+50.9	115.9	30 36.3	+51.5	116.4	30 09.4	+52.0	116.9	29 41.9	+52.6	117.5	29 14.0	+53.1	118.0	28 45.7	+53.5	118.4	12
13	32 43.8	+49.4	114.1	32 19.0	+50.1	114.7	31 53.6	+50.7	115.3	31 27.8	+51.2	115.8	31 01.4	+51.8	116.4	30 34.5	+52.4	116.9	30 07.1	+52.9	117.4	29 39.2	+53.4	117.9	13
14	33 33.2	+49.2	113.4	33 09.1	+49.8	114.0	32 44.3	+50.5	114.6	32 19.0	+51.2	115.2	31 53.2	+51.7	115.8	31 26.9	+52.2	116.3	31 00.0	+52.8	116.9	30 32.6	+53.3	117.4	14
15	34 22.4	+49.0	112.7	33 58.9	+49.7	113.4	33 34.8	+50.3	114.0	33 10.2	+50.9	114.6	32 44.9	+51.5	115.2	32 19.1	+52.1	115.8	31 52.8	+52.6	116.3	31 25.9	+53.2	116.9	15
16	35 11.4	+48.8	112.0	34 48.6	+49.4	112.7	34 25.1	+50.1	113.3	34 01.1	+50.7	114.0	33 36.4	+51.3	114.6	33 11.2	+51.9	115.2	32 45.4	+52.5	115.7	32 19.1	+53.0	116.3	16
17	36 00.2	+48.4	111.3	35 38.0	+49.2	112.0	35 15.2	+49.9	112.7	34 51.8	+50.5	113.3	34 27.7	+51.2	113.9	34 03.1	+51.7	114.6	33 37.9	+52.3	115.2	33 12.1	+52.8	115.8	17
18	36 48.6	+48.2	110.6	36 27.2	+48.9	111.3	36 05.1	+49.6	112.0	35 42.3	+50.3	112.6	35 18.9	+50.9	113.3	34 54.8	+51.6	113.9	34 30.2	+52.1	114.6	34 04.9	+52.7	115.2	18
19	37 36.8	+48.0	109.8	37 16.1	+48.7	110.6	36 54.7	+49.4	111.3	36 32.6	+50.0	112.0	36 09.8	+50.7	112.6	35 46.4	+51.3	113.3	35 22.3	+52.0	114.0	34 57.6	+52.5	114.6	19
20	38 24.8	+47.6	109.1	38 04.8	+48.3	109.8	37 44.1	+49.1	110.6	37 22.6	+49.8	111.3	37 00.5	+50.5	112.0	36 37.7	+51.1	112.7	36 14.3	+51.7	113.4	35 50.1	+52.4	114.0	20
21	39 12.4	+47.2	108.3	38 53.1	+48.1	109.1	38 33.2	+48.8	109.8	38 12.4	+49.6	110.6	37 51.0	+50.2	111.3	37 28.8	+51.0	112.0	37 06.0	+51.6	112.7	36 42.5	+52.2	113.4	21
22	39 59.6	+47.0	107.5	39 41.2	+47.8	108.3	39 22.0	+48.5	109.1	39 02.0	+49.3	109.8	38 41.2	+50.0	110.6	38 19.8	+50.6	111.3	37 57.6	+51.3	112.1	37 34.7	+51.9	112.8	22
23	40 46.6	+46.6	106.7	40 29.0	+47.4	107.5	40 10.5	+48.2	108.3	39 51.3	+48.9	109.1	39 31.2	+49.7	109.9	39 10.4	+50.5	110.7	38 48.9	+51.1	111.4	38 26.6	+51.8	112.2	23
24	41 33.2	+46.2	105.9	41 16.4	+47.1	106.7	40 58.7	+47.9	107.5	40 40.2	+48.7	108.4	40 20.9	+49.5	109.2	40 00.9	+50.1	110.0	39 40.0	+50.8	110.7	39 18.4	+51.5	111.5	24
25	42 19.4	+45.9	105.0	42 03.5	+46.7	105.9	41 46.6	+47.6	106.7	41 28.9	+48.4	107.6	41 10.4	+49.1	108.4	40 51.0	+49.9	109.2	40 30.8	+50.6	110.0	40 09.9	+51.3	110.8	25
26	43 05.3	+45.4	104.1	42 50.2	+46.3	105.0	42 34.2	+47.2	105.9	42 17.3	+48.0	106.8	41 59.5	+48.8	107.6	41 40.9	+49.6	108.5	41 21.4	+50.4	109.3	41 01.2	+51.0	110.2	26
27	43 50.7	+45.0	103.2	43 36.5	+45.9	104.1	43 21.4	+46.8	105.1	43 05.3	+47.7	106.0	42 48.3	+48.5	106.9	42 30.5	+49.3	107.7	42 11.8	+50.0	108.6	41 52.2	+50.8	109.5	27
28	44 35.7	+44.5	102.3	44 22.4	+45.5	103.2	44 08.2	+46.4	104.2	43 53.0	+47.3	105.1	43 36.8	+48.2	106.1	43 19.8	+49.0	107.0	43 01.8	+49.8	107.9	42 43.0	+50.5	108.7	28
29	45 20.2	+44.0	101.3	45 07.9	+45.0	102.3	44 54.6	+45.9	103.3	44 40.3	+46.8	104.3	44 25.0	+47.8	105.2	44 08.8	+48.6	106.2	43 51.6	+49.4	107.1	43 33.5	+50.2	108.0	29
30	46 04.2	+43.6	100.4	45 52.9	+44.5	101.4	45 40.5	+45.6	102.4	45 27.1	+46.5	103.4	45 12.8	+47.3	104.4	44 57.4	+48.2	105.3	44 41.0	+49.1	106.3	44 23.7	+49.9	107.2	30
31	46 47.8	+43.0	99.4	46 37.4	+44.1	100.4	46 26.1	+45.0	101.5	46 13.6	+46.0	102.5	46 00.1	+47.0	103.5	45 45.6	+47.9	104.5	45 30.1	+48.7	105.5	45 13.6	+49.6	106.5	31
32	47 30.8	+42.4	98.3	47 21.5	+43.5	99.4	47 11.1	+44.6	100.5	46 59.6	+45.5	101.5	46 47.1	+46.5	102.6	46 33.5	+47.5	103.6	46 18.8	+48.4	104.6	46 03.2	+49.2	105.6	32
33	48 13.2	+41.8	97.3	48 05.0	+43.0	98.4	47 55.7	+44.0	99.5	47 45.2	+45.1	100.6	47 33.6	+46.1	101.7	47 21.0	+47.0	102.7	47 07.2	+48.0	103.8	46 52.4	+48.8	104.8	33
34	48 55.0	+41.3	96.2	48 48.0	+42.3	97.3	48 39.7	+43.5	98.5	48 30.3	+44.5	99.6	48 19.7	+45.6	100.7	48 08.0	+46.6	101.7	47 55.2	+47.5	102.8	47 41.2	+48.5	104.0	34
35	49 36.3	+40.5	95.1	49 30.3	+41.7	96.3	49 23.2	+42.8	97.4	49 14.8	+44.0	98.6	49 05.3	+44.9	99.7	48 54.6	+46.0	100.9	48 42.7	+47.1	102.0	48 29.7	+48.0	103.1	35
36	50 16.8	+39.9	94.0	50 12.0	+41.1	95.2	50 06.0	+42.3	96.3	49 58.8	+43.4	97.5	49 50.3	+44.5	98.7	49 40.6	+45.6	99.9	49 29.8	+46.6	101.0	49 17.7	+47.6	102.2	36
37	50 56.7	+39.1	92.8	50 53.1	+40.4	94.0	50 48.3	+41.6	95.2	50 42.2	+42.8	96.4	50 34.8	+44.0	97.7	50 26.2	+45.0	98.9	50 16.4	+46.1	100.0	50 05.3	+47.2	101.2	37
38	51 35.8	+38.4	91.6	51 33.5	+39.7	92.8	51 29.9	+40.9	94.1	51 25.0	+42.1	95.3	51 18.8	+43.3	96.6	51 11.2	+44.5	97.8	51 02.5	+45.5	99.0	50 52.4	+46.6	100.3	38
39	52 14.2	+37.5	90.3	52 13.2	+38.8	91.6	52 10.8	+40.2	92.9	52 07.1	+41.4	94.2	52 02.1	+42.6	95.5	51 55.7	+43.8	96.7	51 48.0	+45.0	98.0	51 39.0	+46.1	99.2	39
40	52 51.7	+36.7	89.0	52 52.0	+38.1	90.4	52 51.0	+39.4	91.7	52 48.5	+40.7	93.0	52 44.7	+42.0	94.3	52 39.5	+43.2	95.6	52 33.0	+44.3	96.9	52 25.1	+45.5	98.2	40
41	53 28.4	+35.8	87.7	53 30.1	+37.2	89.1	53 30.4	+38.6	90.4	53 29.2	+40.0	91.8	53 26.7	+41.2	93.1	53 22.7	+42.5	94.5	53 17.3	+43.8	95.8	53 10.6	+44.9	97.1	41
42	54 04.2	+34.9	86.4	54 07.3	+36.3	87.7	54 09.0	+37.7	89.1	54 09.2	+39.1	90.5	54 07.9	+40.5	91.9	54 05.2	+41.8	93.3	54 01.1	+43.0	94.6	53 55.5	+44.3	96.0	42
43	54 39.1	+33.8	85.0	54 43.6	+35.4	86.4	54 46.7	+36.8	87.8	54 48.3	+38.2	89.2	54 48.4	+39.6	90.6	54 47.0	+41.0	92.0	54 44.1	+42.3	93.4	54 39.8	+43.5	94.9	43
44	55 12.9	+32.9	83.5	55 19.0	+34.3	85.0	55 23.5	+35.8	86.4	55 26.5	+37.3	87.8	55 28.0	+38.7	89.3	55 28.0	+40.1	90.8	55 26.4	+41.5	92.2	55 23.3	+42.9	93.7	44
45	55 45.8	+31.7	82.0	55 53.3	+33.3	83.5	55 59.3	+34.9	85.0	56 03.8	+36.4	86.5	56 06.7	+37.9	87.9	56 08.1	+39.3	89.4	56 07.9	+40.7	90.9	56 06.2	+42.0	92.4	45
46	56 17.5	+30.6	80.5	56 26.6	+32.2	82.0	56 34.2	+33.7	83.5	56 40.2	+35.3	85.0	56 44.6	+36.8	86.5	56 47.4	+38.3	88.1	56 48.6	+39.8	89.6	56 48.2	+41.3	91.1	46
47	56 48.1	+29.3	79.0	56 58.8	+31.0	80.5	57 07.9	+32.7	82.0	57 15.5	+34.2	83.5	57 21.4	+35.8	85.1	57 25.7	+37.4	86.6	57 28.4	+38.9	88.2	57 29.5	+40.3	89.8	47
48	57 17.4	+28.2	77.4	57 29.8	+29.8	79.0	57 40.6	+31.4	80.4	57 49.7	+33.1	82.0	57 57.2	+34.8	83.6	58 03.1	+36.3	85.2	58 07.3	+37.9	86.8	58 09.8	+39.5	88.4	48
49	57 45.6	+26.8	75.7	57 59.6	+28.5	77.3	58 12.0	+30.2	78.8	58 22.8	+31.9	80.4	58 32.0	+33.5	82.0	58 39.4	+35.2	83.7	58 45.2	+36.8	85.3	58 49.3	+38.4	86.9	49
50	58 12.4	+25.4	74.0	58 28.1	+27.2	75.6	58 42.2	+28.9	77.2	58 54.7	+30.6	78.8	59 05.5	+32.4	80.4	59 14.6	+34.1	82.1	59 22.0	+35.7	83.8	59 27.7	+37.3	85.5	50
51	58 37.8	+24.1	72.3	58 55.3	+25.8	73.9	59 11.1	+27.6	75.5	59 25.3	+29.4	77.1	59 37.9	+31.0	78.8	59 48.7	+32.8	80.5	59 57.7	+34.5	82.2	60 05.0	+36.2	83.9	51
52	59 01.9	+22.5	70.5	59 21.1	+24.3	72.1	59 38.7	+26.1	73.7	59 54.7	+27.9	75.4	60 08.9	+29.7	77.1	60 21.5	+31.5	78.8	60 32.2	+33.3	80.5	60 41.2	+35.0	82.3	52
53	59 24.4	+21.0	68.7	59 45.4	+22.8	70.3	60 04.8	+24.7	71.9	60 22.6	+26.4	73.6	60 38.6	+28.3	75.3	60 53.0	+30.1	77.1	61 05.5	+31.9	78.8	61 16.2	+33.7	80.6	53
54	59 45.4	+19.4	66.9	60 08.2	+21.2	68.5	60 29.4	+23.1	70.1	60 49.0	+24.9	71.8	61 06.9	+26.8	73.5	61 23.1	+28.6	75.3	61 37.4	+30.5	77.1	61 49.9	+32.4	78.9	54
55	60 04.8	+17.8	65.0	60 29.4	+19.6	66.6	60 52.5	+21.4	68.2	61 13.9	+23.3	69.9	61 33.7	+25.2	71.6	61 51.7	+27.1	73.4	62 07.9	+29.0	75.2	62 22.3	+30.9	77.1	55
56	60 22.6	+16.0	63.1	60 49.0	+17.9	64.6	61 13.9	+19.8	66.3	61 37.2	+21.7	68.0	61 58.9	+23.5	69.7	62 18.8	+25.5	71.5	62 36.9	+27.4	73.3	62 53.2	+29.4	75.2	56
57	60 38.6	+14.4	61.1	61 06.9	+16.2	62.7	61 33.7	+18.0	64.3	61 58.9	+19.9	66.0	62 22.4	+21.9	67.8	62 44.3	+23.8	69.5	63 04.3	+25.8	71.4	63 22.6	+27.7	73.3	57
58	60 53.0	+12.5	59.1	61 23.1	+14.3	60.7	61 51.7	+16.2	62.3	62 18.8	+18.1	64.0	62 44.3	+20.0	65.7	63 08.1	+22.0	67.5	63 30.1	+24.1	69.4	63 50.3	+26.1	71.3	58
59	61 05.5	+10.7	57.1	61 37.4	+12.5	58.6	62 07.9	+14.3	60.3	62 36.9	+16.3	61.9	63 04.3	+18.3	63.7	63 30.1	+20.2	65.5	63 54.2	+22.2	67.3	64 16.4	+24.3	69.2	59
60	61 16.2	+8.9	55.1	61 49.9	+10.7	56.6	62 22.3	+12.4	58.2	62 53.2	+14.3	59.8	63 22.6	+16.3•	61.5	63 50.3	+18.3	63.3	64 16.4	+20.3	65.2	64 40.7	+22.3	67.1	60
61	61 25.1	+6.9	53.0	62 00.6	+8.7•	54.5	62 34.7	+10.6	56.1	63 07.5	+12.4	57.7	63 38.9	+14.3•	59.4	64 08.6	+16.3•	61.2	64 36.7	+18.3•	63.0	65 03.0	+20.5	64.9	61
62	61 32.0	+5.1	50.9	62 09.3	+6.7	52.4	62 45.3	+8.5•	53.9	63 19.9	+10.4•	55.5	63 53.2	+12.3	57.2	64 24.9	+14.3•	58.9	64 55.0	+16.3•	60.8	65 23.5	+18.4•	62.7	62
63	61 37.1	+3.1	48.8	62 16.0	+4.8	50.2	62 53.8	+6.5•	51.7	63 30.3	+8.3•	53.3	64 05.5	+10.2•	55.0	64 39.2	+12.1•	56.7	65 11.3	+14.2•	58.5	65 41.9	+16.2•	60.4	63
64	61 40.2	+1.2	46.7	62 20.8	+2.8•	48.1	63 00.3	+4.5•	49.6	63 38.6	+6.3•	51.1	64 15.7	+8.1•	52.7	64 51.3	+10.0•	54.4	65 25.5	+12.0•	56.2	65 58.1	+14.1•	58.0	64
65	61 41.4	-0.7	44.6	62 23.6	+0.8•	45.9	63 04.8	+2.5•	47.4	63 44.9	+4.1•	48.8	64 23.8	+5.9•	50.4	65 01.3	+7.8•	52.1	65 37.5	+9.8•	53.8	66 12.2	+11.8•	55.6	65
66	61 40.7	-2.7•	42.5	62 24.4	-1.2•	43.8	63 07.3	+0.3•	45.1	63 49.0	+2.1•	46.6	64 29.7	+3.8•	48.1	65 09.1	+5.6•	49.7	65 47.3	+7.5•	51.4	66 24.0	+9.4•	53.2	66
67	61 38.0	-4.7	40.4	62 23.2	-3.2	41.6	63 07.6	-1.7•	42.9	63 51.1	-0.1•	44.3	64 33.5	+1.5•	45.8	65 14.7	+3.3•	47.3	65 54.8	+5.1•	49.0	66 33.4	+7.2•	50.7	67
68	61 33.3	-6.5	38.3	62 20.0	-5.1•	39.5	63 05.9	-3.7•	40.7	63 51.0	-2.3•	42.0	64 35.0	-0.6•	43.5	65 18.0	+1.1•	44.9	65 59.9	+2.8•	46.5	66 40.6	+4.7•	48.2	68
69	61 26.8	-8.4	36.2	62 14.9	-7.2•	37.3	63 02.2	-5.8•	38.5	63 48.7	-4.4•	39.8	64 34.4	-2.9•	41.1	65 19.1	-1.3•	42.6	66 02.7	+0.5•	44.1	66 45.3	+2.2•	45.7	69
70	61 18.4	-10.4	34.1	62 07.7	-9.1	35.2	62 56.4	-7.8•	36.3	63 44.3	-6.4•	37.5	64 31.5	-5.0•	38.8	65 17.8	-3.5•	40.2	66 03.2	-1.9•	41.6	66 47.5	-0.1•	43.2	70
71	61 08.0	-12.1	32.1	61 58.6	-11.0	33.1	62 48.6	-9.9	34.2	63 37.9	-8.6•	35.3	64 26.5	-7.2•	36.5	65 14.3	-5.7•	37.8	66 01.3	-4.2•	39.1	66 47.4	-2.6•	40.6	71
72	60 55.9	-13.9	30.1	61 47.6	-12.9	31.0	62 38.7	-11.7	32.0	63 29.3	-10.6•	33.1	64 19.3	-9.3•	34.2	65 08.6	-8.0•	35.4	65 57.1	-6.6•	36.7	66 44.8	-5.1•	38.1	72
73	60 42.0	-15.7	28.1	61 34.7	-14.7	29.0	62 27.0	-13.7	29.9	63 18.7	-12.6	30.9	64 10.0	-11.5•	31.9	65 00.6	-10.2•	33.0	65 50.5	-8.8•	34.3	66 39.7	-7.4•	35.6	73
74	60 26.3	-17.4	26.1	61 20.0	-16.5	26.9	62 13.3	-15.6	27.8	63 06.1	-14.5	28.7	63 58.5	-13.5	29.7	64 50.4	-12.3•	30.7	65 41.7	-11.1•	31.9	66 32.3	-9.8•	33.1	74
75	60 08.9	-19.0	24.2	61 03.5	-18.2	24.9	61 57.7	-17.4	25.7	62 51.6	-16.5	26.6	63 45.0	-15.4•	27.5	64 38.1	-14.5•	28.4	65 30.6	-13.4•	29.5	66 22.5	-12.1•	30.6	75
76	59 49.9	-20.7	22.3	60 45.3	-20.0	23.0	61 40.3	-19.1	23.7	62 35.1	-18.3	24.5	63 29.6	-17.5	25.3	64 23.6	-16.5	26.2	65 17.2	-15.4•	27.1	66 10.4	-14.4•	28.2	76
77	59 29.2	-22.2	20.4	60 25.3	-21.5	21.0	61 21.2	-20.8	21.7	62 16.8	-20.1	22.4	63 12.1	-19.3	23.2	64 07.1	-18.4	24.0	65 01.8	-17.5•	24.8	65 56.0	-16.5•	25.8	77
78	59 07.0	-23.7	18.6	60 03.8	-23.1	19.2	61 00.4	-22.5	19.8	61 56.7	-21.8	20.4	62 52.8	-21.1	21.1	63 48.7	-20.4	21.8	64 43.3	-19.6•	22.6	65 39.5	-18.7•	23.4	78
79	58 43.3	-25.1	16.8	59 40.7	-24.6	17.3	60 37.9	-24.1	17.9	61 34.9	-23.5	18.4	62 31.7	-22.8	19.0	63 28.3	-22.2	19.7	64 24.7	-21.5	20.4	65 20.8	-20.7	21.1	79
80	58 18.2	-26.5	15.1	59 16.1	-26.1	15.5	60 13.8	-25.6	16.0	61 11.4	-25.1	16.5	62 08.9	-24.6	17.0	63 06.1	-23.9	17.6	64 03.2	-23.3	18.2	65 00.1	-22.6	18.9	80
81	57 51.7	-27.8	13.4	58 50.0	-27.4	13.8	59 48.2	-27.0	14.2	60 46.3	-26.6	14.6	61 44.3	-26.1	15.1	62 42.2	-25.6	15.6	63 39.9	-25.1	16.1	64 37.5	-24.5	16.7	81
82	57 23.9	-29.2	11.7	58 22.6	-28.8	12.1	59 21.2	-28.4	12.4	60 19.7	-28.0	12.8	61 18.2	-27.7	13.2	62 16.6	-27.3	13.6	63 14.8	-26.8	14.1	64 13.0	-26.3	14.6	82
83	56 54.7	-30.3	10.1	57 53.8	-30.1	10.4	58 52.8	-29.8	10.7	59 51.7	-29.5	11.0	60 50.5	-29.1	11.4	61 49.3	-28.7	11.7	62 48.0	-28.4	12.1	63 46.7	-28.0	12.6	83
84	56 24.4	-31.5	8.6	57 23.7	-31.2	8.8	58 23.0	-31.0	9.0	59 22.2	-30.7	9.3	60 21.4	-30.5	9.6	61 20.6	-30.2	9.9	62 19.6	-29.9	10.2	63 18.7	-29.5	10.6	84
85	55 52.9	-32.5	7.0	56 52.5	-32.4	7.2	57 52.0	-32.2	7.4	58 51.5	-32.0	7.6	59 50.9	-31.8	7.9	60 50.4	-31.6	8.1	61 49.7	-31.3	8.4	62 49.1	-31.1	8.6	85
86	55 20.4	-33.7	5.5	56 20.1	-33.5	5.7	57 19.8	-33.4	5.8	58 19.5	-33.3	6.0	59 19.1	-33.1	6.2	60 18.8	-32.9	6.4	61 18.4	-32.8	6.6	62 18.0	-32.6	6.8	86
87	54 46.7	-34.6	4.1	55 46.6	-34.6	4.2	56 46.4	-34.4	4.3	57 46.2	-34.4	4.4	58 46.0	-34.2	4.6	59 45.9	-34.2	4.7	60 45.6	-34.0	4.8	61 45.4	-33.9	5.0	87
88	54 12.1	-35.6	2.7	55 12.0	-35.5	2.8	56 12.0	-35.5	2.8	57 11.9	-35.5	2.9	58 11.8	-35.4	3.0	59 11.7	-35.3	3.1	60 11.6	-35.2	3.2	61 11.5	-35.1	3.3	88
89	53 36.5	-36.5	1.3	54 36.5	-36.5	1.4	55 36.5	-36.5	1.4	56 36.4	-36.4	1.4	57 36.4	-36.4	1.5	58 36.4	-36.4	1.5	59 36.4	-36.4	1.6	60 36.4	-36.4	1.6	89
90	53 00.0	-37.4	0.0	54 00.0	-37.4	0.0	55 00.0	-37.4	0.0	56 00.0	-37.4	0.0	57 00.0	-37.4	0.0	58 00.0	-37.4	0.0	59 00.0	-37.5	0.0	60 00.0	-37.5	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 52°, 308°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	21 44.8	-51.6	122.0	21 12.9	-52.1	122.3	20 40.7	-52.6	122.6	20 08.2	-53.0	122.9	19 35.5	-53.5	123.2	19 02.5	-53.9	123.5	18 29.2	-54.2	123.8	17 55.7	-54.6	124.1	0
1	20 53.2	-51.7	122.5	20 20.8	-52.2	122.8	19 48.1	-52.6	123.1	19 15.2	-53.1	123.4	18 42.0	-53.5	123.7	18 08.6	-53.9	124.0	17 35.0	-54.4	124.3	17 01.1	-54.7	124.5	1
2	20 01.5	-51.9	123.0	19 28.6	-52.3	123.3	18 55.5	-52.8	123.6	18 22.1	-53.2	123.9	17 48.5	-53.6	124.2	17 14.7	-54.0	124.5	16 40.6	-54.3	124.7	16 06.4	-54.8	124.9	2
3	19 09.6	-51.9	123.6	18 36.3	-52.4	123.9	18 02.7	-52.8	124.1	17 28.9	-53.2	124.4	16 54.9	-53.6	124.7	16 20.7	-54.0	124.9	15 46.3	-54.5	125.1	15 11.6	-54.8	125.4	3
4	18 17.7	-52.1	124.1	17 43.9	-52.5	124.4	17 09.9	-52.9	124.6	16 35.7	-53.3	124.9	16 01.3	-53.7	125.1	15 26.7	-54.2	125.4	14 51.8	-54.5	125.6	14 16.8	-54.8	125.8	4
5	17 25.6	-52.1	124.6	16 51.4	-52.5	124.9	16 17.0	-53.0	125.1	15 42.4	-53.4	125.4	15 07.6	-53.8	125.6	14 32.5	-54.1	125.8	13 57.4	-54.6	126.0	13 22.0	-54.9	126.2	5
6	16 33.5	-52.1	125.2	15 58.9	-52.6	125.4	15 24.0	-53.0	125.6	14 49.0	-53.4	125.8	14 13.8	-53.8	126.1	13 38.4	-54.2	126.3	13 02.8	-54.5	126.4	12 27.1	-54.9	126.6	6
7	15 41.4	-52.3	125.7	15 06.3	-52.7	125.9	14 31.0	-53.1	126.1	13 55.6	-53.5	126.3	13 20.0	-53.9	126.5	12 44.2	-54.3	126.7	12 08.3	-54.6	126.9	11 32.2	-55.0	127.0	7
8	14 49.1	-52.3	126.2	14 13.6	-52.7	126.4	13 37.9	-53.1	126.6	13 02.1	-53.5	126.8	12 26.1	-53.9	127.0	11 49.9	-54.2	127.1	11 13.7	-54.7	127.3	10 37.2	-54.9	127.4	8
9	13 56.8	-52.4	126.7	13 20.9	-52.8	126.9	12 44.8	-53.2	127.1	12 08.6	-53.6	127.2	11 32.2	-54.0	127.4	10 55.7	-54.4	127.6	10 19.0	-54.7	127.7	9 42.3	-55.0	127.9	9
10	13 04.4	-52.4	127.2	12 28.1	-52.9	127.4	11 51.6	-53.2	127.5	11 15.0	-53.7	127.7	10 38.2	-54.0	127.9	10 01.3	-54.3	128.0	9 24.3	-54.7	128.1	8 47.3	-55.1	128.3	10
11	12 12.0	-52.5	127.7	11 35.2	-52.9	127.8	10 58.4	-53.3	128.0	10 21.3	-53.6	128.2	9 44.2	-54.0	128.3	9 07.0	-54.4	128.4	8 29.6	-54.7	128.5	7 52.2	-55.0	128.7	11
12	11 19.5	-52.5	128.2	10 42.3	-52.9	128.3	10 05.1	-53.4	128.5	9 27.7	-53.7	128.6	8 50.2	-54.1	128.7	8 12.6	-54.4	128.9	7 34.9	-54.7	129.0	6 57.2	-55.1	129.1	12
13	10 27.0	-52.6	128.7	9 49.4	-53.0	128.8	9 11.7	-53.3	128.9	8 34.0	-53.7	129.1	7 56.1	-54.1	129.2	7 18.2	-54.4	129.3	6 40.2	-54.8	129.4	6 02.1	-55.1	129.5	13
14	9 34.4	-52.7	129.2	8 56.4	-53.0	129.3	8 18.4	-53.4	129.4	7 40.3	-53.8	129.5	7 02.0	-54.1	129.6	6 23.8	-54.5	129.7	5 45.4	-54.8	129.8	5 07.0	-55.1	129.9	14
15	8 41.7	-52.6	129.6	8 03.4	-53.0	129.8	7 25.0	-53.4	129.9	6 46.5	-53.8	130.0	6 07.9	-54.1	130.0	5 29.3	-54.5	130.1	4 50.6	-54.8	130.2	4 11.9	-55.2	130.3	15
16	7 49.1	-52.7	130.1	7 10.4	-53.1	130.2	6 31.6	-53.5	130.3	5 52.7	-53.8	130.4	5 13.8	-54.1	130.5	4 34.8	-54.5	130.5	3 55.8	-54.8	130.6	3 16.7	-55.1	130.6	16
17	6 56.4	-52.8	130.6	6 17.3	-53.1	130.7	5 38.1	-53.4	130.8	4 58.9	-53.8	130.8	4 19.7	-54.2	130.9	3 40.3	-54.5	131.0	3 01.0	-54.8	131.0	2 21.6	-55.1	131.0	17
18	6 03.7	-52.8	131.1	5 24.2	-53.1	131.2	4 44.7	-53.5	131.2	4 05.1	-53.8	131.3	3 25.5	-54.2	131.3	2 45.8	-54.5	131.4	2 06.2	-54.9	131.4	1 26.5	-55.2	131.4	18
19	5 10.9	-52.8	131.6	4 31.1	-53.2	131.6	3 51.2	-53.5	131.7	3 11.3	-53.9	131.7	2 31.3	-54.2	131.7	1 51.3	-54.5	131.8	1 11.3	-54.8	131.8	0 31.3	-55.1	131.8	19
20	4 18.1	-52.7	132.0	3 37.9	-53.1	132.1	2 57.7	-53.5	132.1	2 17.4	-53.8	132.2	1 37.1	-54.2	132.2	0 56.8	-54.5	132.2	0 16.5	-54.8	132.2	0 23.8	+55.2	47.8	20
21	3 25.4	-52.8	132.5	2 44.8	-53.2	132.6	2 04.2	-53.5	132.6	1 23.6	-53.9	132.6	0 42.9	-54.2	132.6	0 02.3	-54.5	132.6	0 38.3	+54.9	47.4	1 19.0	+55.1	47.4	21
22	2 32.6	-52.9	133.0	1 51.6	-53.2	133.0	1 10.7	-53.6	133.1	0 29.7	-53.9	133.1	0 11.3	+54.1	46.9	0 52.2	+54.5	46.9	1 33.2	+54.8	47.0	2 14.1	+55.2	47.0	22
23	1 39.7	-52.8	133.5	0 58.4	-53.1	133.5	0 17.1	-53.5	133.5	0 24.2	+53.8	46.5	1 05.4	+54.2	46.5	1 46.7	+54.5	46.5	2 28.0	+54.8	46.6	3 09.3	+55.1	46.6	23
24	0 46.9	-52.8	133.9	0 05.3	-53.2	134.0	0 36.4	+53.5	46.0	1 18.0	+53.9	46.1	1 59.6	+54.2	46.1	2 41.2	+54.5	46.1	3 22.8	+54.8	46.1	4 04.4	+55.1	46.2	24
25	0 05.9	+52.8	45.6	0 47.9	+53.2	45.6	1 29.9	+53.5	45.6	2 11.9	+53.8	45.6	2 53.8	+54.2	45.7	3 35.7	+54.5	45.7	4 17.6	+54.8	45.7	4 59.5	+55.1	45.8	25
26	0 58.7	+52.9	45.1	1 41.1	+53.1	45.1	2 23.4	+53.5	45.1	3 05.7	+53.8	45.2	3 48.0	+54.2	45.2	4 30.2	+54.5	45.3	5 12.4	+54.8	45.3	5 54.6	+55.1	45.4	26
27	1 51.5	+52.9	44.6	2 34.2	+53.2	44.7	3 16.9	+53.5	44.7	3 59.5	+53.9	44.7	4 42.2	+54.1	44.8	5 24.7	+54.5	44.9	6 07.2	+54.8	44.9	6 49.7	+55.0	45.0	27
28	2 44.4	+52.8	44.2	3 27.4	+53.1	44.2	4 10.4	+53.5	44.3	4 53.4	+53.8	44.3	5 36.3	+54.1	44.4	6 19.2	+54.4	44.4	7 02.0	+54.7	44.5	7 44.7	+55.1	44.6	28
29	3 37.2	+52.7	43.7	4 20.5	+53.2	43.7	5 03.9	+53.4	43.8	5 47.2	+53.8	43.8	6 30.4	+54.1	43.9	7 13.6	+54.4	44.0	7 56.7	+54.7	44.1	8 39.8	+55.0	44.2	29
30	4 29.9	+52.8	43.2	5 13.7	+53.1	43.3	5 57.3	+53.5	43.3	6 41.0	+53.7	43.4	7 24.5	+54.1	43.5	8 08.0	+54.4	43.6	8 51.4	+54.7	43.7	9 34.8	+55.0	43.8	30
31	5 22.7	+52.8	42.7	6 06.8	+53.0	42.8	6 50.8	+53.4	42.9	7 34.7	+53.7	43.0	8 18.6	+54.0	43.0	9 02.4	+54.4	43.2	9 46.1	+54.7	43.3	10 29.8	+54.9	43.4	31
32	6 15.5	+52.7	42.2	6 59.8	+53.1	42.3	7 44.2	+53.4	42.4	8 28.4	+53.7	42.5	9 12.6	+54.1	42.6	9 56.8	+54.3	42.7	10 40.8	+54.6	42.8	11 24.7	+55.0	43.0	32
33	7 08.2	+52.7	41.8	7 52.9	+53.0	41.9	8 37.6	+53.3	41.9	9 22.1	+53.7	42.1	10 06.7	+53.9	42.2	10 51.1	+54.3	42.3	11 35.4	+54.6	42.4	12 19.7	+54.8	42.6	33
34	8 00.9	+52.6	41.3	8 45.9	+53.0	41.4	9 30.9	+53.3	41.5	10 15.8	+53.6	41.6	11 00.6	+54.0	41.7	11 45.4	+54.2	41.9	12 30.0	+54.6	42.0	13 14.5	+54.9	42.2	34
35	8 53.5	+52.6	40.8	9 38.9	+52.9	40.9	10 24.2	+53.3	41.0	11 09.4	+53.6	41.1	11 54.6	+53.9	41.3	12 39.6	+54.2	41.4	13 24.6	+54.5	41.6	14 09.4	+54.8	41.7	35
36	9 46.1	+52.6	40.3	10 31.8	+52.9	40.4	11 17.5	+53.2	40.5	12 03.0	+53.6	40.7	12 48.5	+53.8	40.8	13 33.8	+54.2	41.0	14 19.1	+54.4	41.1	15 04.2	+54.7	41.3	36
37	10 38.7	+52.5	39.8	11 24.7	+52.9	39.9	12 10.7	+53.2	40.1	12 56.6	+53.5	40.2	13 42.3	+53.8	40.4	14 28.0	+54.1	40.5	15 13.5	+54.4	40.7	15 58.9	+54.7	40.9	37
38	11 31.2	+52.5	39.3	12 17.6	+52.8	39.5	13 03.9	+53.1	39.6	13 50.1	+53.4	39.8	14 36.1	+53.8	39.9	15 22.1	+54.0	40.1	16 07.9	+54.4	40.3	16 53.6	+54.7	40.5	38
39	12 23.7	+52.4	38.8	13 10.4	+52.8	39.0	13 57.0	+53.1	39.1	14 43.5	+53.4	39.3	15 29.9	+53.7	39.5	16 16.1	+54.0	39.6	17 02.3	+54.3	39.8	17 48.3	+54.6	40.0	39
40	13 16.1	+52.4	38.3	14 03.2	+52.6	38.5	14 50.1	+53.0	38.6	15 36.9	+53.3	38.8	16 23.6	+53.6	39.0	17 10.1	+54.0	39.2	17 56.6	+54.2	39.4	18 42.9	+54.5	39.6	40
41	14 08.5	+52.3	37.8	14 55.8	+52.7	38.0	15 43.1	+52.9	38.2	16 30.2	+53.3	38.3	17 17.2	+53.6	38.5	18 04.1	+53.8	38.7	18 50.8	+54.2	38.9	19 37.4	+54.5	39.2	41
42	15 00.8	+52.2	37.3	15 48.5	+52.5	37.5	16 36.0	+52.9	37.7	17 23.5	+53.1	37.9	18 10.8	+53.5	38.1	18 57.9	+53.8	38.3	19 45.0	+54.1	38.5	20 31.9	+54.4	38.7	42
43	15 53.0	+52.2	36.8	16 41.0	+52.5	37.0	17 28.9	+52.8	37.2	18 16.6	+53.1	37.4	19 04.3	+53.4	37.6	19 51.7	+53.8	37.8	20 39.1	+54.0	38.0	21 26.3	+54.3	38.3	43
44	16 45.2	+52.1	36.3	17 33.5	+52.4	36.5	18 21.7	+52.7	36.7	19 09.7	+53.1	36.9	19 57.7	+53.3	37.1	20 45.5	+53.6	37.3	21 33.1	+54.0	37.6	22 20.6	+54.2	37.8	44
45	17 37.3	+52.0	35.8	18 25.9	+52.3	36.0	19 14.4	+52.6	36.2	20 02.8	+52.9	36.4	20 51.0	+53.3	36.6	21 39.1	+53.6	36.8	22 27.1	+53.8	37.1	23 14.8	+54.2	37.3	45
46	18 29.3	+51.9	35.3	19 18.2	+52.3	35.5	20 07.0	+52.6	35.7	20 55.7	+52.9	35.9	21 44.3	+53.1	36.1	22 32.7	+53.4	36.3	23 20.9	+53.8	36.6	24 09.0	+54.1	36.9	46
47	19 21.2	+51.8	34.7	20 10.5	+52.1	34.9	20 59.6	+52.4	35.1	21 48.6	+52.7	35.4	22 37.4	+53.1	35.6	23 26.1	+53.3	35.9	24 14.7	+53.7	36.1	25 03.1	+54.0	36.4	47
48	20 13.0	+51.8	34.2	21 02.6	+52.0	34.4	21 52.0	+52.4	34.6	22 41.3	+52.7	34.9	23 30.5	+53.0	35.1	24 19.5	+53.3	35.4	25 08.4	+53.6	35.6	25 57.1	+53.8	35.9	48
49	21 04.8	+51.6	33.6	21 54.6	+52.0	33.9	22 44.4	+52.2	34.1	23 34.0	+52.6	34.3	24 23.5	+52.8	34.6	25 12.8	+53.2	34.8	26 02.0	+53.4	35.1	26 50.9	+53.8	35.4	49
50	21 56.4	+51.5	33.1	22 46.6	+51.8	33.3	23 36.6	+52.2	33.6	24 26.6	+52.4	33.8	25 16.3	+52.6	34.1	26 06.0	+53.0	34.3	26 55.4	+53.4	34.6	27 44.7	+53.7	34.9	50
51	22 47.9	+51.4	32.5	23 38.4	+51.7	32.8	24 28.8	+52.0	33.0	25 19.0	+52.3	33.3	26 09.1	+52.6	33.5	26 59.0	+53.0	33.8	27 48.8	+53.3	34.1	28 38.4	+53.6	34.4	51
52	23 39.3	+51.2	32.0	24 30.1	+51.6	32.2	25 20.8	+51.9	32.5	26 11.3	+52.2	32.7	27 01.7	+52.6	33.0	27 52.0	+52.8	33.3	28 42.1	+53.1	33.6	29 32.0	+53.4	33.9	52
53	24 30.5	+51.2	31.4	25 21.7	+51.4	31.7	26 12.7	+51.8	31.9	27 03.5	+52.1	32.2	27 54.5	+52.1	32.5	28 44.8	+52.7	32.7	29 35.2	+53.0	33.0	30 25.4	+53.3	33.3	53
54	25 21.7	+51.0	30.8	26 13.1	+51.4	31.1	27 04.5	+51.6	31.3	27 55.6	+52.0	31.6	28 46.6	+52.3	31.9	29 37.5	+52.6	32.2	30 28.2	+52.8	32.5	31 18.7	+53.2	32.8	54
55	26 12.7	+50.8	30.3	27 04.5	+51.1	30.5	27 56.1	+51.5	30.8	28 47.6	+51.7	31.0	29 38.9	+52.1	31.3	30 30.0	+52.5	31.6	31 21.0	+52.8	32.0	32 11.9	+53.0	32.3	55
56	27 03.5	+50.7	29.7	27 55.6	+51.0	29.9	28 47.6	+51.3	30.2	29 39.3	+51.5	30.5	30 31.0	+51.9	30.8	31 22.5	+52.1	31.0	32 13.8	+52.4	31.4	33 04.9	+52.9	31.7	56
57	27 54.3	+50.5	29.1	28 46.6	+50.9	29.3	29 38.9	+51.1	29.6	30 31.0	+51.5	29.9	31 22.9	+51.8	30.2	32 14.7	+52.1	30.5	33 06.3	+52.4	30.8	33 57.8	+52.7	31.2	57
58	28 44.8	+50.4	28.4	29 37.5	+50.7	28.7	30 30.0	+51.0	29.0	31 22.5	+51.3	29.3	32 14.7	+51.6	29.6	33 06.8	+51.9	29.9	33 58.7	+52.3	30.2	34 50.5	+52.5	30.6	58
59	29 35.2	+50.2	27.8	30 28.2	+50.5	28.0	31 21.0	+50.9	28.3	32 13.8	+51.1	28.7	33 06.3	+51.5	29.0	33 58.7	+51.8	29.3	34 51.0	+52.0	29.7	35 43.0	+52.4	30.0	59
60	30 25.4	+50.0	27.2	31 18.7	+50.3	27.5	32 11.9	+50.6	27.7	33 04.9	+50.9	28.0	33 57.8	+51.2	28.4	34 50.5	+51.5	28.7	35 43.0	+51.9	29.0	36 35.4	+52.2	29.4	60
61	31 15.4	+49.8	26.5	32 09.0	+50.1	26.8	33 02.5	+50.4	27.1	33 55.8	+50.8	27.4	34 49.0	+51.1	27.7	35 42.0	+51.4	28.1	36 34.9	+51.7	28.4	37 27.6	+52.0	28.8	61
62	32 05.2	+49.6	25.9	32 59.1	+50.0	26.1	33 52.9	+50.2	26.5	34 46.6	+50.5	26.8	35 40.1	+50.8	27.1	36 33.4	+51.1	27.4	37 26.6	+51.4	27.8	38 19.6	+51.7	28.1	62
63	32 54.8	+49.4	25.2	33 49.1	+49.7	25.5	34 43.1	+50.0	25.8	35 37.1	+50.3	26.1	36 30.9	+50.6	26.4	37 24.5	+51.0	26.8	38 18.0	+51.3	27.1	39 11.3	+51.6	27.5	63
64	33 44.2	+49.2	24.5	34 38.8	+49.4	24.8	35 33.1	+49.8	25.1	36 27.4	+50.1	25.4	37 21.5	+50.4	25.8	38 15.5	+50.7	26.1	39 09.3	+51.0	26.5	40 02.9	+51.3	26.8	64
65	34 33.4	+48.9	23.9	35 28.2	+49.3	24.1	36 22.9	+49.5	24.4	37 17.5	+49.8	24.7	38 11.9	+50.1	25.1	39 06.2	+50.4	25.4	40 00.3	+50.7	25.8	40 54.2	+51.1	26.1	65
66	35 22.3	+48.7	23.1	36 17.5	+48.9	23.4	37 12.4	+49.3	23.7	38 07.3	+49.6	24.0	39 02.0	+49.9	24.4	39 56.6	+50.2	24.7	40 51.0	+50.5	25.1	41 45.3	+50.8	25.4	66
67	36 11.0	+48.4	22.4	37 06.4	+48.7	22.7	38 01.7	+49.0	23.0	38 56.9	+49.3	23.3	39 51.9	+49.6	23.6	40 46.8	+49.9	24.0	41 41.5	+50.3	24.4	42 36.1	+50.6	24.7	67
68	36 59.4	+48.2	21.7	37 55.1	+48.5	21.9	38 50.7	+48.7	22.3	39 46.2	+49.0	22.6	40 41.5	+49.4	22.9	41 36.7	+49.6	23.3	42 31.8	+49.9	23.6	43 26.7	+50.2	24.0	68
69	37 47.6	+47.8	20.9	38 43.6	+48.1	21.2	39 39.4	+48.5	21.5	40 35.2	+48.7	21.8	41 30.8	+49.0	22.2	42 26.3	+49.3	22.5	43 21.7	+49.6	22.9	44 16.9	+49.9	23.2	69
70	38 35.4	+47.6	20.2	39 31.7	+47.8	20.5	40 27.9	+48.1	20.7	41 23.9	+48.4	21.1	42 19.8	+48.7	21.4	43 15.6	+49.0	21.7	44 11.3	+49.3	22.1	45 06.8	+49.7	22.5	70
71	39 23.0	+47.2	19.4	40 19.5	+47.5	19.7	41 16.0	+47.7	20.0	42 12.3	+48.1	20.3	43 08.5	+48.4	20.6	44 04.6	+48.7	20.9	45 00.6	+49.0	21.3	45 56.5	+49.2	21.6	71
72	40 10.2	+46.8	18.6	41 07.0	+47.1	18.9	42 03.7	+47.5	19.1	43 00.4	+47.7	19.5	43 56.9	+48.0	19.8	44 53.3	+48.3	20.1	45 49.6	+48.6	20.5	46 45.7	+48.9	20.8	72
73	40 57.0	+46.6	17.8	41 54.1	+46.8	18.0	42 51.2	+47.0	18.3	43 48.1	+47.3	18.6	44 44.9	+47.6	18.9	45 41.6	+47.9	19.3	46 38.2	+48.2	19.6	47 34.6	+48.5	20.0	73
74	41 43.6	+46.1	16.9	42 40.9	+46.4	17.2	43 38.2	+46.7	17.5	44 35.4	+46.9	17.8	45 32.5	+47.2	18.1	46 29.5	+47.5	18.4	47 26.4	+47.7	18.7	48 23.1	+48.1	19.1	74
75	42 29.7	+45.7	16.1	43 27.3	+46.0	16.3	44 24.9	+46.2	16.6	45 22.3	+46.5	16.9	46 19.7	+46.8	17.2	47 17.0	+47.0	17.5	48 14.1	+47.4	17.8	49 11.2	+47.7	18.2	75
76	43 15.4	+45.4	15.2	44 13.3	+45.6	15.4	45 11.1	+45.8	15.7	46 08.8	+46.1	16.0	47 06.5	+46.3	16.3	48 04.0	+46.6	16.6	49 01.5	+46.9	16.9	49 58.9	+47.1	17.2	76
77	44 00.8	+44.9	14.3	44 58.9	+45.1	14.5	45 56.9	+45.4	14.8	46 54.9	+45.6	15.0	47 52.8	+45.9	15.3	48 50.6	+46.2	15.6	49 48.4	+46.4	15.9	50 46.0	+46.7	16.3	77
78	44 45.7	+44.4	13.3	45 44.0	+44.6	13.6	46 42.3	+44.9	13.8	47 40.5	+45.1	14.1	48 38.7	+45.4	14.4	49 36.8	+45.6	14.7	50 34.8	+45.9	15.0	51 32.7	+46.2	15.3	78
79	45 30.1	+43.9	12.4	46 28.6	+44.2	12.6	47 27.2	+44.3	12.8	48 25.6	+44.6	13.1	49 24.1	+44.8	13.4	50 22.4	+45.1	13.6	51 20.7	+45.3	13.9	52 18.9	+45.6	14.2	79
80	46 14.0	+43.4	11.4	47 12.8	+43.6	11.6	48 11.5	+43.9	11.8	49 10.2	+44.1	12.1	50 08.9	+44.3	12.3	51 07.5	+44.5	12.6	52 06.0	+44.7	12.9	53 04.5	+44.9	13.2	80
81	46 57.4	+42.9	10.4	47 56.4	+43.1	10.6	48 55.4	+43.2	10.8	49 54.3	+43.4	11.0	50 53.2	+43.6	11.3	51 52.0	+43.9	11.5	52 50.7	+44.1	11.8	53 49.4	+44.4	12.1	81
82	47 40.3	+42.3	9.4	48 39.5	+42.5	9.6	49 38.6	+42.7	9.8	50 37.7	+42.9	10.0	51 36.8	+43.1	10.2	52 35.9	+43.2	10.4	53 34.8	+43.5	10.6	54 33.8	+43.7	10.9	82
83	48 22.6	+41.7	8.3	49 22.0	+41.8	8.5	50 21.3	+42.0	8.7	51 20.6	+42.2	8.8	52 19.9	+42.3	9.0	53 19.1	+42.6	9.3	54 18.3	+42.7	9.5	55 17.5	+42.9	9.7	83
84	49 04.3	+41.1	7.2	50 03.8	+41.2	7.4	51 03.3	+41.4	7.5	52 02.8	+41.5	7.7	53 02.2	+41.7	7.9	54 01.7	+41.8	8.1	55 01.0	+42.0	8.3	56 00.4	+42.2	8.5	84
85	49 45.4	+40.4	6.1	50 45.0	+40.6	6.2	51 44.7	+40.6	6.4	52 44.3	+40.8	6.5	53 43.9	+40.9	6.7	54 43.5	+41.0	6.8	55 43.0	+41.2	7.0	56 42.6	+41.3	7.2	85
86	50 25.8	+39.7	5.0	51 25.6	+39.8	5.1	52 25.3	+39.9	5.2	53 25.1	+40.0	5.3	54 24.8	+40.1	5.4	55 24.5	+40.3	5.6	56 24.2	+40.4	5.7	57 23.9	+40.5	5.9	86
87	51 05.5	+39.0	3.8	52 05.4	+39.0	3.9	53 05.2	+39.1	3.9	54 05.1	+39.2	4.0	55 04.9	+39.3	4.1	56 04.8	+39.3	4.2	57 04.6	+39.4	4.3	58 04.4	+39.6	4.5	87
88	51 44.5	+38.1	2.5	52 44.4	+38.2	2.6	53 44.3	+38.3	2.7	54 44.3	+38.3	2.7	55 44.2	+38.4	2.8	56 44.1	+38.5	2.9	57 44.0	+38.5	3.0	58 44.0	+38.5	3.0	88
89	52 22.6	+37.4	1.3	53 22.6	+37.4	1.3	54 22.6	+37.4	1.4	55 22.6	+37.4	1.4	56 22.6	+37.4	1.4	57 22.6	+37.4	1.5	58 22.5	+37.5	1.5	59 22.5	+37.5	1.5	89
90	53 00.0	+36.5	0.0	54 00.0	+36.5	0.0	55 00.0	+36.5	0.0	56 00.0	+36.4	0.0	57 00.0	+36.4	0.0	58 00.0	+36.4	0.0	59 00.0	+36.4	0.0	60 00.0	+36.4	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 128°, 232°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	21 14.1	+51.3	121.0	20 43.0	+51.8	121.4	20 11.6	+52.3	121.7	19 39.9	+52.8	122.0	19 08.0	+53.2	122.3	18 35.8	+53.7	122.6	18 03.4	+54.1	122.9	17 30.7	+54.5	123.1	0
1	22 05.4	+51.2	120.5	21 34.8	+51.8	120.8	21 03.9	+52.2	121.2	20 32.7	+52.7	121.5	20 01.2	+53.2	121.8	19 29.5	+53.6	122.1	18 57.5	+54.0	122.4	18 25.2	+54.4	122.7	1
2	22 56.6	+51.2	119.9	22 26.6	+51.6	120.3	21 56.1	+52.2	120.6	21 25.4	+52.6	121.0	20 54.4	+53.0	121.3	20 23.1	+53.5	121.6	19 51.5	+53.9	121.9	19 19.6	+54.3	122.2	2
3	23 47.8	+51.0	119.4	23 18.2	+51.5	119.7	22 48.3	+52.0	120.1	22 18.0	+52.5	120.5	21 47.4	+53.0	120.8	21 16.6	+53.4	121.1	20 45.4	+53.8	121.5	20 13.9	+54.3	121.8	3
4	24 38.8	+50.8	118.8	24 09.7	+51.4	119.2	23 40.3	+51.9	119.6	23 10.5	+52.4	119.9	22 40.4	+52.9	120.3	22 10.0	+53.3	120.7	21 39.2	+53.8	121.0	21 08.2	+54.2	121.3	4
5	25 29.6	+50.7	118.2	25 01.1	+51.2	118.6	24 32.2	+51.7	119.0	24 02.9	+52.3	119.4	23 33.3	+52.7	119.8	23 03.3	+53.2	120.2	22 33.0	+53.7	120.5	22 02.4	+54.1	120.9	5
6	26 20.3	+50.6	117.6	25 52.3	+51.1	118.0	25 23.9	+51.7	118.4	24 55.2	+52.1	118.9	24 26.0	+52.7	119.3	23 56.5	+53.1	119.7	23 26.7	+53.5	120.0	22 56.5	+54.0	120.4	6
7	27 10.9	+50.4	117.0	26 43.4	+51.0	117.4	26 15.6	+51.5	117.8	25 47.3	+52.1	118.3	25 18.7	+52.5	118.7	24 49.6	+53.1	119.1	24 20.2	+53.5	119.5	23 50.5	+53.9	119.9	7
8	28 01.3	+50.2	116.4	27 34.4	+50.8	116.8	27 07.1	+51.4	117.3	26 39.4	+51.9	117.8	26 11.2	+52.4	118.2	25 42.7	+52.9	118.6	25 13.7	+53.4	119.0	24 44.4	+53.9	119.4	8
9	28 51.5	+50.1	115.8	28 25.2	+50.7	116.2	27 58.5	+51.2	116.7	27 31.3	+51.7	117.2	27 03.6	+52.3	117.7	26 35.6	+52.8	118.1	26 07.1	+53.3	118.5	25 38.3	+53.7	119.0	9
10	29 41.6	+49.9	115.1	29 15.9	+50.5	115.6	28 49.7	+51.1	116.1	28 23.0	+51.6	116.6	27 55.9	+52.2	117.1	27 28.4	+52.7	117.6	27 00.4	+53.2	118.0	26 32.0	+53.6	118.5	10
11	30 31.5	+49.7	114.5	30 06.4	+50.3	115.0	29 40.8	+50.9	115.5	29 14.7	+51.4	116.0	28 48.1	+52.0	116.5	28 21.1	+52.5	117.0	27 53.6	+53.0	117.5	27 25.6	+53.6	118.0	11
12	31 21.2	+49.5	113.8	30 56.7	+50.1	114.4	30 31.7	+50.7	114.9	30 06.1	+51.3	115.4	29 40.1	+51.9	116.0	29 13.6	+52.4	116.5	28 46.6	+52.9	117.0	28 19.2	+53.4	117.5	12
13	32 10.7	+49.3	113.2	31 46.8	+49.9	113.7	31 22.4	+50.5	114.3	30 57.4	+51.2	114.8	30 32.0	+51.7	115.4	30 06.0	+52.3	115.9	29 39.5	+52.8	116.4	29 12.6	+53.3	116.9	13
14	33 00.0	+49.0	112.5	32 36.7	+49.7	113.1	32 12.9	+50.4	113.7	31 48.6	+50.9	114.2	31 23.7	+51.5	114.8	30 58.3	+52.1	115.3	30 32.3	+52.7	115.9	30 05.9	+53.1	116.4	14
15	33 49.0	+48.8	111.8	33 26.4	+49.5	112.4	33 03.3	+50.1	113.0	32 39.5	+50.8	113.6	32 15.2	+51.4	114.2	31 50.4	+51.9	114.8	31 25.0	+52.5	115.3	30 59.0	+53.1	115.9	15
16	34 37.8	+48.6	111.1	34 15.9	+49.3	111.7	33 53.4	+49.9	112.4	33 30.3	+50.6	113.0	33 06.6	+51.2	113.6	32 42.3	+51.8	114.2	32 17.5	+52.3	114.7	31 52.1	+52.8	115.3	16
17	35 26.4	+48.3	110.4	35 05.2	+49.0	111.0	34 43.3	+49.7	111.7	34 20.9	+50.3	112.3	33 57.8	+51.0	113.0	33 34.1	+51.6	113.6	33 09.8	+52.2	114.2	32 44.9	+52.8	114.8	17
18	36 14.7	+48.1	109.6	35 54.2	+48.8	110.3	35 33.0	+49.5	111.0	35 11.2	+50.2	111.7	34 48.8	+50.7	112.3	34 25.7	+51.4	113.0	34 02.0	+52.0	113.6	33 37.7	+52.5	114.2	18
19	37 02.8	+47.7	108.9	36 43.0	+48.5	109.6	36 22.5	+49.2	110.3	36 01.4	+49.9	111.0	35 39.5	+50.6	111.7	35 17.1	+51.2	112.3	34 54.0	+51.8	113.0	34 30.2	+52.4	113.6	19
20	37 50.5	+47.5	108.1	37 31.5	+48.2	108.9	37 11.7	+49.0	109.6	36 51.3	+49.6	110.3	36 30.1	+50.3	111.0	36 08.3	+51.0	111.7	35 45.8	+51.6	112.4	35 22.6	+52.3	113.0	20
21	38 38.0	+47.1	107.4	38 19.7	+47.9	108.1	38 00.7	+48.7	108.9	37 40.9	+49.4	109.6	37 20.4	+50.1	110.3	36 59.3	+50.7	111.0	36 37.4	+51.4	111.7	36 14.9	+52.0	112.4	21
22	39 25.1	+46.8	106.6	39 07.6	+47.6	107.3	38 49.4	+48.3	108.1	38 30.3	+49.2	108.9	38 10.5	+49.9	109.6	37 50.0	+50.6	110.3	37 28.8	+51.2	111.1	37 06.9	+51.8	111.8	22
23	40 11.9	+46.5	105.7	39 55.2	+47.3	106.6	39 37.7	+48.1	107.3	39 19.5	+48.8	108.1	39 00.4	+49.6	108.9	38 40.6	+50.3	109.7	38 20.0	+51.0	110.4	37 58.7	+51.7	111.1	23
24	40 58.4	+46.1	104.9	40 42.5	+47.0	105.7	40 25.8	+47.8	106.6	40 08.3	+48.5	107.4	39 50.0	+49.3	108.2	39 30.9	+50.0	109.0	39 11.0	+50.7	109.7	38 50.4	+51.4	110.5	24
25	41 44.5	+45.7	104.1	41 29.5	+46.5	104.9	41 13.6	+47.4	105.8	40 56.8	+48.3	106.6	40 39.3	+49.0	107.4	40 20.9	+49.8	108.2	40 01.7	+50.5	109.0	39 41.8	+51.1	109.8	25
26	42 30.2	+45.3	103.2	42 16.0	+46.2	104.1	42 01.0	+47.0	104.9	41 45.1	+47.9	105.8	41 28.3	+48.7	106.7	41 10.7	+49.4	107.5	40 52.2	+50.2	108.3	40 32.9	+50.9	109.1	26
27	43 15.5	+44.8	102.3	43 02.2	+45.8	103.2	42 48.0	+46.7	104.1	42 33.0	+47.5	105.0	42 17.0	+48.4	105.9	42 00.1	+49.2	106.7	41 42.4	+49.9	107.6	41 23.8	+50.7	108.4	27
28	44 00.3	+44.4	101.4	43 48.0	+45.4	102.3	43 34.7	+46.3	103.2	43 20.5	+47.2	104.2	43 05.4	+48.0	105.1	42 49.3	+48.8	106.0	42 32.3	+49.7	106.9	42 14.5	+50.4	107.7	28
29	44 44.7	+44.0	100.4	44 33.4	+44.9	101.4	44 21.0	+45.9	102.4	44 07.7	+46.7	103.3	43 53.4	+47.6	104.2	43 38.1	+48.5	105.2	43 22.0	+49.3	106.1	43 04.9	+50.1	107.0	29
30	45 28.7	+43.4	99.5	45 18.3	+44.4	100.5	45 06.9	+45.4	101.5	44 54.4	+46.4	102.4	44 41.0	+47.3	103.4	44 26.6	+48.2	104.4	44 11.3	+49.0	105.3	43 55.0	+49.8	106.2	30
31	46 12.1	+42.9	98.5	46 02.7	+44.0	99.5	45 52.3	+44.9	100.5	45 40.8	+45.9	101.5	45 28.3	+46.8	102.5	45 14.8	+47.7	103.5	45 00.3	+48.6	104.5	44 44.8	+49.4	105.5	31
32	46 55.0	+42.3	97.5	46 46.7	+43.4	98.5	46 37.2	+44.5	99.6	46 26.7	+45.5	100.6	46 15.1	+46.5	101.6	46 02.5	+47.4	102.6	45 48.9	+48.2	103.7	45 34.2	+49.1	104.6	32
33	47 37.3	+41.8	96.4	47 30.1	+42.8	97.5	47 21.7	+43.9	98.6	47 12.2	+44.9	99.6	47 01.6	+45.9	100.7	46 49.9	+46.9	101.8	46 37.1	+47.9	102.8	46 23.3	+48.7	103.8	33
34	48 19.1	+41.2	95.3	48 12.9	+42.3	96.5	48 05.6	+43.4	97.6	47 57.1	+44.5	98.7	47 47.5	+45.5	99.8	47 36.8	+46.5	100.8	47 25.0	+47.4	101.9	47 12.0	+48.4	103.0	34
35	49 00.3	+40.5	94.2	48 55.2	+41.7	95.4	48 49.0	+42.8	96.5	48 41.6	+43.9	97.7	48 33.0	+44.9	98.8	48 23.3	+46.0	99.9	48 12.4	+47.0	101.0	48 00.4	+47.9	102.1	35
36	49 40.8	+39.8	93.1	49 36.9	+41.0	94.3	49 31.8	+42.2	95.5	49 25.5	+43.3	96.6	49 18.0	+44.4	97.8	49 09.3	+45.5	98.9	48 59.4	+46.5	100.1	48 48.3	+47.5	101.2	36
37	50 20.6	+39.1	91.9	50 17.9	+40.4	93.1	50 14.0	+41.6	94.4	50 08.8	+42.7	95.5	50 02.4	+43.9	96.7	49 54.8	+44.9	97.9	49 45.9	+46.0	99.1	49 35.8	+47.0	100.2	37
38	50 59.7	+38.4	90.7	50 58.3	+39.6	92.0	50 55.6	+40.8	93.2	50 51.5	+42.1	94.4	50 46.3	+43.2	95.7	50 39.7	+44.4	96.9	50 31.9	+45.5	98.1	50 22.8	+46.6	99.3	38
39	51 38.1	+37.5	89.5	51 37.9	+38.9	90.8	51 36.4	+40.2	92.0	51 33.6	+41.4	93.3	51 29.5	+42.6	94.6	51 24.1	+43.8	95.8	51 17.4	+44.9	97.1	51 09.4	+46.0	98.3	39
40	52 15.6	+36.7	88.3	52 16.8	+38.0	89.5	52 16.6	+39.4	90.8	52 15.0	+40.7	92.1	52 12.1	+41.9	93.4	52 07.9	+43.1	94.7	52 02.3	+44.3	96.0	51 55.4	+45.4	97.3	40
41	52 52.3	+35.9	87.0	52 54.8	+37.3	88.3	52 56.0	+38.6	89.6	52 55.7	+39.9	90.9	52 54.0	+41.2	92.2	52 51.0	+42.5	93.6	52 46.6	+43.7	94.9	52 40.8	+44.8	96.2	41
42	53 28.2	+34.9	85.6	53 32.1	+36.3	87.0	53 34.6	+37.7	88.3	53 35.6	+39.1	89.7	53 35.2	+40.5	91.0	53 33.5	+41.7	92.4	53 30.3	+42.9	93.7	53 25.6	+44.2	95.1	42
43	54 03.1	+34.0	84.2	54 08.4	+35.4	85.6	54 12.3	+36.8	87.0	54 14.7	+38.3	88.4	54 15.7	+39.6	89.8	54 15.2	+41.0	91.2	54 13.2	+42.3	92.6	54 09.8	+43.6	93.9	43
44	54 37.1	+32.9	82.8	54 43.8	+34.5	84.2	54 49.1	+36.0	85.6	54 53.0	+37.3	87.1	54 55.3	+38.8	88.5	54 56.2	+40.1	89.9	54 55.5	+41.5	91.3	54 53.4	+42.8	92.7	44
45	55 10.0	+31.9	81.4	55 18.3	+33.4	82.8	55 25.1	+34.9	84.2	55 30.3	+36.4	85.7	55 34.1	+37.9	87.1	55 36.3	+39.3	88.6	55 37.0	+40.7	90.1	55 36.2	+42.0	91.5	45
46	55 41.9	+30.8	79.9	55 51.7	+32.3	81.3	56 00.0	+33.9	82.8	56 06.7	+35.5	84.3	56 12.0	+36.9	85.8	56 15.6	+38.4	87.2	56 17.7	+39.9	88.7	56 18.2	+41.3	90.2	46
47	56 12.7	+29.6	78.3	56 24.0	+31.2	79.8	56 33.9	+32.8	81.3	56 42.2	+34.3	82.8	56 48.9	+35.9	84.3	56 54.0	+37.4	85.9	56 57.6	+38.9	87.4	56 59.5	+40.4	88.9	47
48	56 42.3	+28.3	76.8	56 55.2	+30.0	78.3	57 06.7	+31.6	79.8	57 16.5	+33.3	81.3	57 24.8	+34.8	82.9	57 31.4	+36.5	84.4	57 36.5	+37.9	86.0	57 39.9	+39.4	87.6	48
49	57 10.6	+27.1	75.2	57 25.2	+28.8	76.7	57 38.3	+30.4	78.2	57 49.8	+32.0	79.8	57 59.6	+33.7	81.3	58 07.9	+35.3	82.9	58 14.4	+36.9	84.5	58 19.3	+38.5	86.1	49
50	57 37.7	+25.8	73.5	57 54.0	+27.5	75.0	58 08.7	+29.2	76.6	58 21.8	+30.9	78.2	58 33.3	+32.6	79.8	58 43.2	+34.2	81.4	58 51.3	+35.8	83.0	58 57.8	+37.4	84.7	50
51	58 03.5	+24.4	71.8	58 21.5	+26.1	73.3	58 37.9	+27.8	74.9	58 52.7	+29.5	76.5	59 05.9	+31.2	78.1	59 17.4	+32.9	79.8	59 27.1	+34.7	81.4	59 35.2	+36.3	83.1	51
52	58 27.9	+22.9	70.1	58 47.6	+24.6	71.6	59 05.7	+26.4	73.2	59 22.2	+28.2	74.8	59 37.1	+30.0	76.5	59 50.3	+31.7	78.1	60 01.8	+33.4	79.8	60 11.5	+35.1	81.5	52
53	58 50.8	+21.4	68.3	59 12.2	+23.2	69.8	59 32.1	+25.0	71.4	59 50.4	+26.8	73.1	60 07.1	+28.5	74.7	60 22.0	+30.3	76.4	60 35.2	+32.1	78.1	60 46.6	+33.9	79.9	53
54	59 12.2	+19.9	66.5	59 35.4	+21.7	68.0	59 57.1	+23.5	69.6	60 17.2	+25.3	71.3	60 35.6	+27.1	73.0	60 52.3	+29.0	74.7	61 07.3	+30.8	76.4	61 20.5	+32.6	78.2	54
55	59 32.1	+18.3	64.6	59 57.1	+20.1	66.2	60 20.6	+21.9	67.8	60 42.5	+23.7	69.4	61 02.7	+25.6	71.1	61 21.3	+27.4	72.9	61 38.1	+29.3	74.6	61 53.1	+31.1	76.4	55
56	59 50.4	+16.7	62.7	60 17.2	+18.4	64.3	60 42.5	+20.2	65.9	61 06.2	+22.1	67.5	61 28.3	+23.9	69.2	61 48.7	+25.8	71.0	62 07.4	+27.7	72.8	62 24.2	+29.7	74.6	56
57	60 07.1	+14.9	60.8	60 35.6	+16.7	62.4	61 02.7	+18.6	64.0	61 28.3	+20.4	65.6	61 52.2	+22.3	67.3	62 14.5	+24.3	69.1	62 35.1	+26.2	70.9	62 53.9	+28.1	72.7	57
58	60 22.0	+13.2	58.9	60 52.3	+15.0	60.4	61 21.3	+16.8	62.0	61 48.7	+18.7	63.6	62 14.5	+20.6	65.3	62 38.8	+22.5	67.1	63 01.3	+24.4	68.9	63 22.0	+26.4	70.7	58
59	60 35.2	+11.4	56.9	61 07.3	+13.2	58.4	61 38.1	+15.0	60.0	62 07.4	+16.8	61.6	62 35.1	+18.6	63.3	63 01.3	+20.7	65.0	63 25.7	+22.7	66.9	63 48.4	+24.7	68.7	59
60	60 46.6	+9.7	54.9	61 20.5	+11.4	56.4	61 53.1	+13.1	57.9	62 24.2	+15.0	59.5	62 53.9	+16.9	61.2	63 22.0	+18.8	63.0	63 48.4	+20.8	64.8	64 13.1	+22.8	66.6	60
61	60 56.3	+7.7	52.9	61 31.9	+9.5	54.3	62 06.2	+11.3	55.8	62 39.2	+13.1	57.4	63 10.8	+14.9	59.1	63 40.8	+16.9	60.8	64 09.2	+18.9	62.6	64 35.9	+21.0	64.5	61
62	61 04.0	+5.9	50.8	61 41.4	+7.5	52.2	62 17.5	+9.3	53.7	62 52.3	+11.1	55.3	63 25.7	+13.0	57.0	63 57.7	+14.9•	58.7	64 28.1	+16.9•	60.4	64 56.9	+18.9•	62.3	62
63	61 09.9	+4.0	48.7	61 48.9	+5.7	50.1	62 26.8	+7.4•	51.6	63 03.4	+9.2•	53.1	63 38.7	+11.0•	54.8	64 12.6	+12.9•	56.4	64 45.0	+14.9•	58.2	65 15.8	+16.9•	60.1	63
64	61 13.9	+2.2	46.7	61 54.6	+3.7•	48.0	62 34.2	+5.3•	49.5	63 12.6	+7.1•	51.0	63 49.7	+8.9•	52.5	64 25.5	+10.8•	54.2	64 59.9	+12.7•	55.9	65 32.7	+14.8•	57.7	64
65	61 16.1	+0.2•	44.6	61 58.3	+1.7	45.9	62 39.5	+3.4•	47.3	63 19.7	+5.0•	48.8	63 58.6	+6.8•	50.3	64 36.3	+8.6•	51.9	65 12.6	+10.5•	53.6	65 47.5	+12.5•	55.4	65
66	61 16.3	−1.8	42.5	62 00.0	−0.2	43.8	62 42.9	+1.3•	45.1	63 24.7	+2.9•	46.5	64 05.4	+4.6•	48.0	64 44.9	+6.5•	49.6	65 23.1	+8.4•	51.3	66 00.0	+10.3•	53.0	66
67	61 14.5	−3.6	40.4	61 59.8	−2.2•	41.7	62 44.2	−0.7•	42.9	63 27.6	+0.9•	44.3	64 10.0	+2.5•	45.7	64 51.4	+4.2•	47.3	65 31.5	+6.0•	48.9	66 10.3	+7.9•	50.6	67
68	61 10.9	−5.5	38.4	61 57.6	−4.2	39.5	62 43.5	−2.9	40.8	63 28.5	−1.3•	42.1	64 12.5	+0.4•	43.4	64 55.6	+2.0•	44.9	65 37.5	+3.8•	46.5	66 18.2	+5.6•	48.1	68
69	61 05.4	−7.3	36.3	61 53.4	−6.1	37.4	62 40.7	−4.7•	38.6	63 27.2	−3.3•	39.8	64 12.9	−1.9•	41.1	64 57.6	−0.3•	42.5	65 41.3	+1.4•	44.0	66 23.8	+3.2•	45.6	69
70	60 58.1	−9.3	34.3	61 47.3	−8.0	35.3	62 36.0	−6.8•	36.4	63 23.9	−5.4•	37.6	64 11.0	−4.0•	38.8	64 57.3	−2.5•	40.2	65 42.7	−0.9•	41.6	66 27.0	+0.8•	43.1	70
71	60 48.8	−11.0	32.2	61 39.3	−9.9	33.2	62 29.2	−8.7	34.3	63 18.5	−7.5•	35.4	64 07.0	−6.1•	36.6	64 54.8	−4.7•	37.8	65 41.8	−3.2•	39.2	66 27.8	−1.5•	40.6	71
72	60 37.8	−12.9	30.2	61 29.4	−11.8	31.1	62 20.5	−10.7	32.1	63 11.0	−9.5•	33.2	64 00.9	−8.2•	34.3	64 50.1	−6.9•	35.5	65 38.6	−5.5•	36.8	66 26.3	−4.0•	38.1	72
73	60 24.9	−14.5	28.2	61 17.6	−13.6	29.1	62 09.8	−12.6	30.0	63 01.5	−11.5	31.0	63 52.7	−10.4•	32.0	64 43.2	−9.1•	33.1	65 33.1	−7.8•	34.3	66 22.3	−6.4•	35.6	73
74	60 10.4	−16.3	26.3	61 04.0	−15.4	27.1	61 57.2	−14.4	27.9	62 50.0	−13.4	28.8	63 42.3	−12.4	29.8	64 34.1	−11.2•	30.8	65 25.3	−10.0•	32.0	66 15.9	−8.7•	33.2	74
75	59 54.1	−18.0	24.3	60 48.6	−17.2	25.1	61 42.8	−16.3	25.9	62 36.6	−15.4	26.7	63 29.9	−14.3	27.6	64 22.9	−13.3•	28.6	65 15.3	−12.2•	29.6	66 07.2	−11.0•	30.7	75
76	59 36.1	−19.5	22.4	60 31.4	−18.8	23.1	61 26.5	−18.1	23.8	62 21.2	−17.2	24.6	63 15.6	−16.3	25.4	64 09.6	−15.4•	26.3	65 03.1	−14.3•	27.3	65 56.2	−13.2•	28.3	76
77	59 16.6	−21.1	20.6	60 12.6	−20.4	21.2	61 08.4	−19.7	21.9	62 04.0	−19.0	22.6	62 59.3	−18.2	23.3	63 54.2	−17.3	24.1	64 48.8	−16.4•	25.0	65 43.0	−15.5•	25.9	77
78	58 55.5	−22.7	18.8	59 52.2	−22.1	19.3	60 48.7	−21.4	19.9	61 45.0	−20.7	20.5	62 41.1	−20.1	21.2	63 36.9	−19.3	21.9	64 32.4	−18.5•	22.7	65 27.5	−17.5•	23.6	78
79	58 32.8	−24.0	17.0	59 30.1	−23.5	17.5	60 27.3	−23.0	18.0	61 24.3	−22.4	18.6	62 21.0	−21.7	19.2	63 17.6	−21.1	19.8	64 13.9	−20.4	20.5	65 10.0	−19.6•	21.3	79
80	58 08.8	−25.5	15.2	59 06.6	−25.0	15.7	60 04.3	−24.5	16.1	61 01.9	−24.1	16.6	61 59.3	−23.5	17.2	62 56.5	−22.9	17.7	63 53.5	−22.2	18.4	64 50.4	−21.6	19.0	80
81	57 43.3	−26.8	13.5	58 41.6	−26.5	13.9	59 39.3	−25.9	14.3	60 37.8	−25.5	14.8	61 35.8	−25.1	15.3	62 33.6	−24.6	15.7	63 31.3	−24.0	16.3	64 28.8	−23.4	16.9	81
82	57 16.5	−28.1	11.9	58 15.1	−27.7	12.2	59 13.8	−27.5	12.5	60 12.3	−27.1	12.9	61 10.7	−26.6	13.3	62 09.0	−26.2	13.8	63 07.3	−25.8	14.2	64 05.4	−25.3	14.7	82
83	56 48.4	−29.4	10.2	57 47.4	−29.1	10.5	58 46.3	−28.7	10.8	59 45.2	−28.4	11.1	60 44.1	−28.1	11.5	61 42.8	−27.7	11.9	62 41.5	−27.4	12.2	63 40.1	−27.0	12.7	83
84	56 19.0	−30.6	8.7	57 18.3	−30.3	8.9	58 17.6	−30.1	9.1	59 16.8	−29.8	9.4	60 16.0	−29.6	9.7	61 15.1	−29.3	10.0	62 14.1	−28.9	10.3	63 13.1	−28.6	10.7	84
85	55 48.5	−31.6	7.1	56 48.0	−31.4	7.3	57 47.5	−31.3	7.5	58 47.0	−31.1	7.7	59 46.4	−30.8	7.9	60 45.8	−30.6	8.2	61 45.2	−30.4	8.5	62 44.5	−30.1	8.7	85
86	55 16.9	−32.8	5.6	56 16.6	−32.6	5.8	57 16.2	−32.4	5.9	58 15.9	−32.3	6.1	59 15.6	−32.2	6.3	60 15.2	−32.0	6.4	61 14.8	−31.8	6.7	62 14.4	−31.6	6.9	86
87	54 44.1	−33.7	4.2	55 44.0	−33.7	4.3	56 43.8	−33.4	4.4	57 43.6	−33.3	4.5	58 43.4	−33.3	4.6	59 43.2	−33.2	4.8	60 43.0	−33.1	4.9	61 42.8	−33.0	5.1	87
88	54 10.4	−34.7	2.7	55 10.3	−34.7	2.8	56 10.2	−34.6	2.9	57 10.2	−34.6	2.9	58 10.1	−34.5	3.0	59 10.0	−34.4	3.1	60 09.9	−34.4	3.2	61 09.8	−34.3	3.3	88
89	53 35.7	−35.7	1.3	54 35.6	−35.6	1.4	55 35.6	−35.6	1.4	56 35.6	−35.6	1.5	57 35.6	−35.6	1.5	58 35.6	−35.6	1.5	59 35.5	−35.5	1.6	60 35.5	−35.5	1.6	89
90	53 00.0	−36.5	0.0	54 00.0	−36.6	0.0	55 00.0	−36.6	0.0	56 00.0	−36.6	0.0	57 00.0	−36.6	0.0	58 00.0	−36.6	0.0	59 00.0	−36.7	0.0	60 00.0	−36.7	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	21 14.1	−51.5	121.0	20 43.0	−52.0	121.4	20 11.6	−52.4	121.7	19 39.9	−52.8	122.0	19 08.0	−53.3	122.3	18 35.8	−53.7	122.6	18 03.4	−54.1	122.9	17 30.7	−54.5	123.1	0
1	20 22.6	−51.6	121.6	19 51.0	−52.0	121.9	19 19.2	−52.5	122.2	18 47.1	−53.0	122.5	18 14.7	−53.4	122.8	17 42.1	−53.8	123.0	17 09.3	−54.2	123.3	16 36.2	−54.6	123.6	1
2	19 31.0	−51.6	122.1	18 59.0	−52.1	122.4	18 26.7	−52.6	122.7	17 54.1	−53.0	123.0	17 21.3	−53.4	123.2	16 48.3	−53.8	123.5	16 15.1	−54.3	123.8	15 41.6	−54.6	124.0	2
3	18 39.4	−51.8	122.7	18 06.9	−52.3	123.0	17 34.1	−52.7	123.2	17 01.1	−53.1	123.5	16 27.9	−53.5	123.7	15 54.5	−53.9	124.0	15 20.8	−54.2	124.2	14 47.0	−54.6	124.4	3
4	17 47.6	−51.8	123.2	17 14.6	−52.2	123.5	16 41.4	−52.7	123.7	16 08.0	−53.1	124.0	15 34.4	−53.6	124.2	15 00.6	−54.0	124.4	14 26.6	−54.4	124.6	13 52.4	−54.8	124.9	4
5	16 55.8	−51.9	123.7	16 22.4	−52.4	124.0	15 48.7	−52.8	124.2	15 14.9	−53.2	124.4	14 40.8	−53.6	124.7	14 06.6	−54.0	124.9	13 32.2	−54.4	125.1	12 57.6	−54.7	125.3	5
6	16 03.9	−52.0	124.3	15 30.0	−52.4	124.5	14 55.9	−52.8	124.7	14 21.7	−53.3	124.9	13 47.2	−53.7	125.1	13 12.6	−54.1	125.3	12 37.8	−54.4	125.5	12 02.9	−54.8	125.7	6
7	15 11.9	−52.1	124.8	14 37.6	−52.5	125.0	14 03.1	−53.0	125.2	13 28.4	−53.3	125.4	12 53.5	−53.7	125.6	12 18.5	−54.1	125.8	11 43.4	−54.5	125.9	11 08.1	−54.8	126.1	7
8	14 19.8	−52.1	125.3	13 45.1	−52.6	125.5	13 10.1	−52.9	125.7	12 35.1	−53.4	125.9	11 59.8	−53.7	126.0	11 24.4	−54.1	126.2	10 48.9	−54.5	126.4	10 13.3	−54.9	126.5	8
9	13 27.7	−52.2	125.8	12 52.5	−52.6	126.0	12 17.2	−53.1	126.2	11 41.7	−53.4	126.3	11 06.1	−53.8	126.5	10 30.3	−54.2	126.7	9 54.4	−54.5	126.8	9 18.4	−54.9	126.9	9
10	12 35.5	−52.3	126.3	11 59.9	−52.7	126.5	11 24.1	−53.0	126.6	10 48.3	−53.5	126.8	10 12.3	−53.9	127.0	9 36.1	−54.2	127.1	8 59.9	−54.6	127.2	8 23.5	−54.9	127.3	10
11	11 43.2	−52.3	126.8	11 07.2	−52.7	127.0	10 31.1	−53.1	127.1	9 54.8	−53.5	127.3	9 18.4	−53.9	127.4	8 41.9	−54.2	127.5	8 05.3	−54.6	127.6	7 28.6	−54.9	127.8	11
12	10 50.9	−52.3	127.3	10 14.5	−52.7	127.5	9 38.0	−53.2	127.6	9 01.3	−53.5	127.7	8 24.5	−53.9	127.8	7 47.7	−54.3	128.0	7 10.7	−54.6	128.1	6 33.7	−54.9	128.2	12
13	9 58.6	−52.4	127.8	9 21.8	−52.8	127.9	8 44.8	−53.2	128.1	8 07.8	−53.6	128.2	7 30.6	−53.9	128.3	6 53.4	−54.3	128.4	6 16.1	−54.6	128.5	5 38.8	−55.0	128.6	13
14	9 06.2	−52.4	128.3	8 29.0	−52.9	128.4	7 51.6	−53.2	128.5	7 14.2	−53.6	128.6	6 36.7	−53.9	128.7	5 59.1	−54.3	128.8	5 21.5	−54.7	128.9	4 43.8	−55.0	129.0	14
15	8 13.8	−52.5	128.8	7 36.1	−52.8	128.9	6 58.4	−53.2	129.0	6 20.6	−53.6	129.1	5 42.8	−54.0	129.2	5 04.8	−54.3	129.2	4 26.8	−54.6	129.3	3 48.8	−55.0	129.4	15
16	7 21.3	−52.5	129.3	6 43.3	−52.9	129.4	6 05.2	−53.3	129.5	5 27.0	−53.6	129.5	4 48.8	−54.0	129.6	4 10.5	−54.3	129.7	3 32.2	−54.7	129.7	2 53.8	−55.0	129.8	16
17	6 28.8	−52.5	129.8	5 50.4	−52.9	129.9	5 11.9	−53.3	129.9	4 33.4	−53.7	130.0	3 54.8	−54.0	130.0	3 16.2	−54.4	130.1	2 37.5	−54.7	130.1	1 58.8	−55.0	130.2	17
18	5 36.3	−52.6	130.3	4 57.5	−53.0	130.3	4 18.6	−53.3	130.4	3 39.7	−53.6	130.4	3 00.8	−54.0	130.5	2 21.8	−54.3	130.5	1 42.8	−54.7	130.5	1 03.8	−55.0	130.6	18
19	4 43.7	−52.5	130.7	4 04.5	−53.0	130.8	3 25.3	−53.3	130.8	2 46.1	−53.7	130.9	2 06.8	−54.0	130.9	1 27.5	−54.4	130.9	0 48.1	−54.6	131.0	0 08.8	−55.0	131.0	19
20	3 51.2	−52.6	131.2	3 11.6	−53.0	131.3	2 32.0	−53.3	131.3	1 52.4	−53.7	131.3	1 12.8	−54.1	131.4	0 33.1	−54.4	131.4	0 06.5	+54.7	48.6	0 46.2	+55.0	48.6	20
21	2 58.6	−52.6	131.7	2 18.6	−52.9	131.7	1 38.7	−53.3	131.8	0 58.7	−53.7	131.8	0 18.7	−54.0	131.8	0 21.3	+54.3	48.2	1 01.2	+54.7	48.2	1 41.2	+55.0	48.2	21
22	2 06.0	−52.6	132.2	1 25.7	−53.0	132.2	0 45.4	−53.3	132.2	0 05.0	−53.7	132.2	0 35.3	+54.0	47.8	1 15.6	+54.4	47.8	1 55.9	+54.7	47.8	2 36.2	+55.0	47.8	22
23	1 13.4	−52.7	132.7	0 32.7	−53.0	132.7	0 08.0	+53.3	47.3	0 48.7	+53.6	47.3	1 29.3	+54.0	47.3	2 10.0	+54.3	47.4	2 50.6	+54.7	47.4	3 31.2	+55.0	47.4	23
24	0 20.7	−52.6	133.1	0 20.3	+53.0	46.9	1 03.4	+53.3	46.9	1 42.3	+53.7	46.9	2 23.3	+54.0	46.9	3 04.3	+54.4	46.9	3 45.3	+54.6	47.0	4 26.2	+55.0	47.0	24
25	0 31.9	+52.6	46.4	1 13.3	+52.9	46.4	1 54.6	+53.4	46.4	2 36.0	+53.7	46.4	3 17.3	+54.0	46.5	3 58.7	+54.3	46.5	4 39.9	+54.7	46.5	5 21.2	+54.9	46.6	25
26	1 24.5	+52.6	45.9	2 06.2	+53.0	45.9	2 48.0	+53.3	45.9	3 29.7	+53.6	46.0	4 11.3	+54.0	46.0	4 53.0	+54.3	46.1	5 34.6	+54.6	46.2	6 16.1	+54.9	46.2	26
27	2 17.1	+52.6	45.4	2 59.2	+52.9	45.4	3 41.3	+53.3	45.5	4 23.3	+53.7	45.5	5 05.3	+54.0	45.6	5 47.3	+54.3	45.7	6 29.2	+54.6	45.7	7 11.0	+55.0	45.8	27
28	3 09.7	+52.6	44.9	3 52.1	+53.0	44.9	4 34.6	+53.3	45.1	5 17.0	+53.6	45.1	5 59.3	+53.9	45.2	6 41.6	+54.3	45.2	7 23.8	+54.6	45.4	8 06.0	+54.8	45.4	28
29	4 02.3	+52.5	44.4	4 45.1	+52.9	44.5	5 27.9	+53.2	44.6	6 10.6	+53.6	44.6	6 53.2	+54.0	44.7	7 35.9	+54.2	44.8	8 18.4	+54.5	44.9	9 00.8	+54.9	45.0	29
30	4 54.8	+52.6	44.0	5 38.0	+52.9	44.0	6 21.1	+53.3	44.1	7 04.2	+53.5	44.2	7 47.2	+53.9	44.3	8 30.1	+54.2	44.4	9 12.9	+54.6	44.5	9 55.7	+54.8	44.6	30
31	5 47.4	+52.5	43.5	6 30.9	+52.8	43.6	7 14.4	+53.2	43.6	7 57.7	+53.6	43.7	8 41.1	+53.8	43.8	9 24.3	+54.2	43.8	10 07.5	+54.5	44.1	10 50.5	+54.8	44.2	31
32	6 39.9	+52.5	43.0	7 23.8	+52.8	43.1	8 07.6	+53.1	43.2	8 51.3	+53.5	43.3	9 34.9	+53.9	43.4	10 18.5	+54.1	43.5	11 02.0	+54.4	43.6	11 45.3	+54.8	43.8	32
33	7 32.4	+52.5	42.5	8 16.6	+52.8	42.6	9 00.7	+53.2	42.7	9 44.8	+53.5	42.8	10 28.8	+53.7	42.9	11 12.6	+54.1	43.1	11 56.4	+54.4	43.2	12 40.1	+54.7	43.4	33
34	8 24.9	+52.4	42.1	9 09.4	+52.8	42.1	9 53.9	+53.1	42.2	10 38.3	+53.4	42.4	11 22.5	+53.8	42.5	12 06.7	+54.1	42.6	12 50.8	+54.4	42.9	13 34.8	+54.7	42.9	34
35	9 17.3	+52.4	41.5	10 02.2	+52.7	41.6	10 47.0	+53.0	41.8	11 31.7	+53.4	41.9	12 16.3	+53.7	42.0	13 00.8	+54.0	42.2	13 45.2	+54.4	42.3	14 29.5	+54.6	42.5	35
36	10 09.7	+52.3	41.0	10 54.9	+52.7	41.1	11 40.0	+53.0	41.3	12 25.1	+53.3	41.4	13 10.0	+53.7	41.6	13 54.8	+54.0	41.7	14 39.6	+54.2	41.9	15 24.1	+54.6	42.1	36
37	11 02.0	+52.3	40.5	11 47.6	+52.6	40.7	12 33.0	+53.0	40.8	13 18.4	+53.3	41.0	14 03.7	+53.6	41.1	14 48.8	+53.9	41.3	15 33.8	+54.3	41.5	16 18.7	+54.6	41.6	37
38	11 54.3	+52.2	40.0	12 40.2	+52.6	40.2	13 26.0	+52.9	40.3	14 11.7	+53.2	40.5	14 57.3	+53.6	40.6	15 42.7	+53.9	40.8	16 28.1	+54.1	41.0	17 13.3	+54.4	41.2	38
39	12 46.5	+52.2	39.5	13 32.8	+52.5	39.7	14 18.9	+52.8	39.8	15 04.9	+53.2	40.0	15 50.8	+53.5	40.2	16 36.6	+53.8	40.4	17 22.2	+54.1	40.6	18 07.7	+54.5	40.8	39
40	13 38.7	+52.1	39.0	14 25.3	+52.4	39.2	15 11.7	+52.8	39.3	15 58.1	+53.1	39.5	16 44.3	+53.4	39.7	17 30.4	+53.7	39.9	18 16.3	+54.1	40.1	19 02.2	+54.3	40.3	40
41	14 30.8	+52.1	38.5	15 17.7	+52.4	38.7	16 04.5	+52.7	38.8	16 51.2	+53.0	39.0	17 37.7	+53.4	39.2	18 24.1	+53.7	39.4	19 10.4	+54.0	39.7	19 56.5	+54.3	39.9	41
42	15 22.9	+51.9	38.0	16 10.1	+52.3	38.2	16 57.2	+52.6	38.4	17 44.2	+53.0	38.5	18 31.1	+53.2	38.7	19 17.8	+53.6	39.0	20 04.4	+53.9	39.2	20 50.8	+54.2	39.4	42
43	16 14.8	+51.9	37.5	17 02.4	+52.2	37.7	17 49.8	+52.6	37.8	18 37.2	+52.8	38.0	19 24.3	+53.2	38.3	20 11.4	+53.5	38.5	20 58.3	+53.8	38.7	21 45.0	+54.1	39.0	43
44	17 06.7	+51.9	36.9	17 54.6	+52.2	37.1	18 42.4	+52.5	37.3	19 30.0	+52.8	37.5	20 17.5	+53.2	37.8	21 04.9	+53.4	38.0	21 52.1	+53.7	38.2	22 39.1	+54.1	38.5	44
45	17 58.6	+51.7	36.4	18 46.8	+52.0	36.6	19 34.9	+52.4	36.8	20 22.8	+52.7	37.0	21 10.7	+53.0	37.3	21 58.3	+53.4	37.5	22 45.8	+53.7	37.8	23 33.2	+53.9	38.0	45
46	18 50.3	+51.6	35.9	19 38.8	+52.0	36.1	20 27.3	+52.3	36.3	21 15.5	+52.7	36.5	22 03.7	+52.9	36.8	22 51.7	+53.2	37.0	23 39.5	+53.6	37.3	24 27.1	+53.9	37.5	46
47	19 41.9	+51.6	35.3	20 30.8	+51.9	35.6	21 19.6	+52.2	35.8	22 08.2	+52.5	36.0	22 56.6	+52.9	36.3	23 44.9	+53.2	36.5	24 33.1	+53.4	36.8	25 21.0	+53.8	37.1	47
48	20 33.5	+51.4	34.8	21 22.7	+51.7	35.0	22 11.8	+52.0	35.3	23 00.7	+52.4	35.5	23 49.5	+52.7	35.7	24 38.1	+53.0	36.0	25 26.5	+53.4	36.3	26 14.8	+53.7	36.6	48
49	21 24.9	+51.3	34.3	22 14.4	+51.7	34.5	23 03.8	+52.0	34.7	23 53.1	+52.3	35.0	24 42.2	+52.6	35.2	25 31.1	+53.0	35.5	26 19.9	+53.2	35.8	27 08.5	+53.5	36.1	49
50	22 16.2	+51.3	33.7	23 06.1	+51.5	33.9	23 55.8	+51.9	34.2	24 45.4	+52.2	34.4	25 34.8	+52.5	34.7	26 24.1	+52.8	35.0	27 13.1	+53.2	35.3	28 02.0	+53.5	35.6	50
51	23 07.5	+51.1	33.1	23 57.6	+51.5	33.4	24 47.7	+51.7	33.6	25 37.6	+52.0	33.9	26 27.3	+52.4	34.2	27 16.9	+52.7	34.4	28 06.3	+53.0	34.7	28 55.5	+53.3	35.0	51
52	23 58.6	+50.9	32.6	24 49.1	+51.2	32.8	25 39.4	+51.6	33.1	26 29.6	+52.0	33.3	27 19.7	+52.2	33.6	28 09.6	+52.5	33.9	28 59.3	+52.9	34.2	29 48.8	+53.2	34.5	52
53	24 49.5	+50.8	32.0	25 40.3	+51.2	32.2	26 31.0	+51.5	32.5	27 21.6	+51.8	32.8	28 11.9	+52.1	33.0	29 02.1	+52.5	33.3	29 52.2	+52.7	33.7	30 42.0	+53.1	34.0	53
54	25 40.3	+50.7	31.4	26 31.5	+51.0	31.6	27 22.5	+51.3	31.9	28 13.4	+51.6	32.2	29 04.0	+52.0	32.5	29 54.6	+52.3	32.8	30 44.9	+52.6	33.1	31 35.1	+52.9	33.4	54
55	26 31.0	+50.6	30.8	27 22.5	+50.9	31.1	28 13.8	+51.2	31.3	29 05.0	+51.5	31.6	29 56.0	+51.8	31.9	30 46.9	+52.1	32.2	31 37.5	+52.5	32.5	32 28.0	+52.8	32.9	55
56	27 21.6	+50.5	30.2	28 13.4	+50.6	30.5	29 05.0	+51.0	30.7	29 56.5	+51.3	31.0	30 47.8	+51.7	31.3	31 39.0	+52.0	31.6	32 30.0	+52.3	32.0	33 20.8	+52.6	32.3	56
57	28 11.9	+50.2	29.6	29 04.0	+50.6	29.8	29 56.0	+50.9	30.1	30 47.8	+51.2	30.4	31 39.5	+51.5	30.7	32 31.0	+51.8	31.1	33 22.3	+52.1	31.4	34 13.4	+52.5	31.7	57
58	29 02.1	+50.1	29.0	29 54.6	+50.3	29.2	30 46.9	+50.6	29.5	31 39.0	+51.0	29.8	32 31.0	+51.3	30.1	33 22.8	+51.6	30.5	34 14.4	+52.0	30.8	35 05.9	+52.3	31.1	58
59	29 52.2	+49.8	28.3	30 44.9	+50.2	28.6	31 37.5	+50.5	28.9	32 30.0	+50.8	29.2	33 22.3	+51.1	29.5	34 14.4	+51.5	29.8	35 06.4	+51.8	30.2	35 58.2	+52.0	30.5	59
60	30 42.0	+49.7	27.7	31 35.1	+50.0	28.0	32 28.0	+50.3	28.2	33 20.8	+50.6	28.6	34 13.4	+50.9	28.9	35 05.9	+51.2	29.2	35 58.2	+51.5	29.6	36 50.2	+51.9	29.9	60
61	31 31.7	+49.4	27.0	32 25.1	+49.7	27.3	33 18.3	+50.1	27.6	34 11.4	+50.4	27.9	35 04.3	+50.8	28.2	35 57.1	+51.1	28.6	36 49.7	+51.4	28.9	37 42.1	+51.7	29.3	61
62	32 21.1	+49.3	26.3	33 14.8	+49.6	26.6	34 08.4	+49.8	26.9	35 01.8	+50.2	27.3	35 55.1	+50.5	27.6	36 48.2	+50.8	27.9	37 41.1	+51.1	28.3	38 33.8	+51.5	28.7	62
63	33 10.4	+49.0	25.7	34 04.4	+49.3	26.0	34 58.2	+49.7	26.3	35 52.0	+49.9	26.6	36 45.6	+50.2	26.9	37 39.0	+50.6	27.3	38 32.2	+51.0	27.6	39 25.3	+51.3	28.0	63
64	33 59.4	+48.7	25.0	34 53.7	+49.1	25.3	35 47.9	+49.4	25.6	36 41.9	+49.7	25.9	37 35.8	+50.1	26.2	38 29.6	+50.3	26.6	39 23.2	+50.6	26.9	40 16.6	+51.0	27.3	64
65	34 48.1	+48.6	24.3	35 42.8	+48.8	24.6	36 37.3	+49.1	24.9	37 31.6	+49.5	25.2	38 25.9	+49.7	25.5	39 19.9	+50.1	25.9	40 13.8	+50.4	26.2	41 07.6	+50.7	26.6	65
66	35 36.7	+48.2	23.6	36 31.6	+48.6	23.8	37 26.4	+48.9	24.1	38 21.1	+49.2	24.5	39 15.6	+49.5	24.8	40 10.0	+49.8	25.2	41 04.2	+50.2	25.5	41 58.3	+50.5	25.9	66
67	36 24.9	+48.0	22.8	37 20.2	+48.2	23.1	38 15.3	+48.6	23.4	39 10.3	+48.9	23.7	40 05.1	+49.2	24.1	40 59.8	+49.6	24.4	41 54.4	+49.8	24.8	42 48.8	+50.2	25.2	67
68	37 12.9	+47.7	22.1	38 08.4	+48.0	22.4	39 03.9	+48.3	22.7	39 59.2	+48.6	23.0	40 54.3	+49.0	23.3	41 49.4	+49.2	23.7	42 44.2	+49.6	24.0	43 39.0	+49.8	24.4	68
69	38 00.6	+47.4	21.3	38 56.4	+47.7	21.6	39 52.2	+47.9	21.9	40 47.8	+48.3	22.2	41 43.3	+48.6	22.5	42 38.6	+48.9	22.9	43 33.8	+49.2	23.3	44 28.8	+49.6	23.6	69
70	38 48.0	+47.0	20.5	39 44.1	+47.4	20.8	40 40.1	+47.7	21.1	41 36.1	+47.9	21.4	42 31.9	+48.2	21.8	43 27.5	+48.6	22.1	44 23.0	+48.9	22.5	45 18.4	+49.2	22.9	70
71	39 35.0	+46.8	19.7	40 31.5	+47.0	20.0	41 27.8	+47.3	20.3	42 24.0	+47.6	20.6	43 20.1	+47.9	20.9	44 16.1	+48.2	21.3	45 11.9	+48.6	21.7	46 07.6	+48.9	22.0	71
72	40 21.8	+46.4	18.9	41 18.5	+46.7	19.2	42 15.1	+47.0	19.5	43 11.6	+47.3	19.8	44 08.0	+47.6	20.1	45 04.3	+47.8	20.5	46 00.5	+48.1	20.8	46 56.5	+48.4	21.2	72
73	41 08.2	+46.0	18.1	42 05.2	+46.2	18.3	43 02.1	+46.5	18.6	43 58.9	+46.8	18.9	44 55.6	+47.1	19.3	45 52.1	+47.5	19.6	46 48.6	+47.8	19.9	47 44.9	+48.1	20.3	73
74	41 54.2	+45.6	17.2	42 51.4	+45.9	17.5	43 48.6	+46.2	17.8	44 45.7	+46.4	18.1	45 42.7	+46.7	18.4	46 39.6	+47.0	18.7	47 36.4	+47.3	19.1	48 33.0	+47.6	19.4	74
75	42 39.8	+45.2	16.3	43 37.3	+45.5	16.6	44 34.8	+45.7	16.9	45 32.1	+46.1	17.2	46 29.4	+46.3	17.5	47 26.6	+46.6	17.8	48 23.7	+46.9	18.1	49 20.6	+47.2	18.5	75
76	43 25.0	+44.7	15.4	44 22.8	+45.0	15.7	45 20.5	+45.3	16.0	46 18.2	+45.5	16.2	47 15.7	+45.8	16.5	48 13.2	+46.1	16.9	49 10.6	+46.3	17.2	50 07.8	+46.7	17.5	76
77	44 09.7	+44.3	14.5	45 07.8	+44.5	14.8	46 05.8	+44.8	15.0	47 03.7	+45.1	15.3	48 01.5	+45.4	15.6	48 59.3	+45.6	15.9	49 56.9	+45.9	16.2	50 54.5	+46.2	16.6	77
78	44 54.0	+43.9	13.6	45 52.3	+44.1	13.8	46 50.6	+44.3	14.0	47 48.8	+44.5	14.3	48 46.9	+44.8	14.6	49 44.9	+45.1	14.9	50 42.8	+45.4	15.2	51 40.7	+45.6	15.5	78
79	45 37.9	+43.3	12.6	46 36.4	+43.6	12.8	47 34.9	+43.8	13.1	48 33.3	+44.0	13.3	49 31.7	+44.2	13.6	50 30.0	+44.5	13.9	51 28.2	+44.7	14.2	52 26.3	+45.0	14.5	79
80	46 21.2	+42.8	11.6	47 20.0	+43.0	11.8	48 18.7	+43.2	12.0	49 17.3	+43.5	12.3	50 15.9	+43.7	12.5	51 14.5	+43.9	12.8	52 12.9	+44.2	13.1	53 11.3	+44.5	13.4	80
81	47 04.0	+42.2	10.6	48 03.0	+42.4	10.8	49 01.9	+42.6	11.0	50 00.8	+42.8	11.2	50 59.6	+43.0	11.4	51 58.4	+43.3	11.7	52 57.1	+43.5	12.0	53 55.8	+43.7	12.3	81
82	47 46.2	+41.7	9.5	48 45.4	+41.8	9.7	49 44.5	+42.0	9.9	50 43.6	+42.2	10.1	51 42.6	+42.4	10.3	52 41.6	+42.7	10.6	53 40.6	+42.8	10.8	54 39.5	+43.1	11.1	82
83	48 27.9	+41.0	8.4	49 27.2	+41.2	8.6	50 26.5	+41.4	8.8	51 25.8	+41.5	9.0	52 25.0	+41.7	9.2	53 24.3	+41.8	9.4	54 23.4	+42.1	9.6	55 22.6	+42.3	9.9	83
84	49 08.9	+40.3	7.3	50 08.4	+40.5	7.5	51 07.9	+40.6	7.6	52 07.3	+40.8	7.8	53 06.7	+41.0	8.0	54 06.1	+41.2	8.2	55 05.5	+41.3	8.4	56 04.9	+41.5	8.6	84
85	49 49.2	+39.7	6.2	50 48.9	+39.8	6.3	51 48.5	+39.9	6.5	52 48.1	+40.1	6.6	53 47.7	+40.2	6.8	54 47.3	+40.3	6.9	55 46.8	+40.5	7.1	56 46.4	+40.6	7.3	85
86	50 28.9	+39.0	5.0	51 28.7	+39.0	5.1	52 28.4	+39.2	5.2	53 28.2	+39.2	5.4	54 27.9	+39.4	5.5	55 27.6	+39.5	5.6	56 27.3	+39.7	5.8	57 27.0	+39.8	5.9	86
87	51 07.9	+38.2	3.8	52 07.7	+38.3	3.9	53 07.6	+38.3	4.0	54 07.4	+38.5	4.1	55 07.3	+38.5	4.2	56 07.1	+38.6	4.3	57 07.0	+38.6	4.4	58 06.8	+38.8	4.5	87
88	51 46.1	+37.4	2.6	52 46.0	+37.4	2.6	53 45.9	+37.5	2.7	54 45.9	+37.5	2.8	55 45.8	+37.6	2.8	56 45.7	+37.7	2.9	57 45.6	+37.7	3.0	58 45.6	+37.7	3.1	88
89	52 23.5	+36.5	1.3	53 23.4	+36.6	1.3	54 23.4	+36.6	1.4	55 23.4	+36.6	1.4	56 23.4	+36.6	1.4	57 23.4	+36.6	1.5	58 23.3	+36.7	1.5	59 23.3	+36.7	1.6	89
90	53 00.0	+35.7	0.0	54 00.0	+35.6	0.0	55 00.0	+35.6	0.0	56 00.0	+35.6	0.0	57 00.0	+35.6	0.0	58 00.0	+35.6	0.0	59 00.0	+35.5	0.0	60 00.0	+35.5	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION   L.H.A. 127°, 233°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	20 43.0	+51.1	120.1	20 12.7	+51.7	120.4	19 42.2	+52.1	120.8	19 11.3	+52.7	121.1	18 40.3	+53.0	121.4	18 08.9	+53.5	121.6	17 37.3	+53.9	121.9	17 05.5	+54.3	122.2	0
1	21 34.1	+51.1	119.6	21 04.4	+51.6	119.9	20 34.3	+52.1	120.2	20 04.0	+52.5	120.6	19 33.3	+53.0	120.9	19 02.4	+53.4	121.2	18 31.2	+53.9	121.5	17 59.8	+54.3	121.7	1
2	22 25.2	+50.9	119.0	21 56.0	+51.4	119.4	21 26.4	+51.9	119.7	20 56.5	+52.4	120.0	20 26.3	+52.9	120.4	19 55.8	+53.4	120.7	19 25.1	+53.8	121.0	18 54.1	+54.2	121.3	2
3	23 16.1	+50.9	118.4	22 47.4	+51.4	118.8	22 18.3	+51.9	119.2	21 48.9	+52.4	119.5	21 19.2	+52.8	119.9	20 49.2	+53.3	120.2	20 18.9	+53.7	120.5	19 48.3	+54.1	120.8	3
4	24 07.0	+50.6	117.8	23 38.8	+51.2	118.2	23 10.2	+51.7	118.6	22 41.3	+52.2	119.0	22 12.0	+52.8	119.3	21 42.5	+53.2	119.7	21 12.6	+53.6	120.0	20 42.4	+54.1	120.4	4
5	24 57.6	+50.6	117.3	24 30.0	+51.1	117.7	24 01.9	+51.7	118.1	23 33.5	+52.2	118.5	23 04.8	+52.6	118.8	22 35.7	+53.1	119.2	22 06.2	+53.6	119.6	21 36.5	+54.0	119.9	5
6	25 48.2	+50.4	116.7	25 21.1	+50.9	117.1	24 53.6	+51.4	117.5	24 25.7	+52.0	117.9	23 57.4	+52.5	118.3	23 28.8	+52.9	118.7	22 59.8	+53.4	119.1	22 30.5	+53.9	119.4	6
7	26 38.6	+50.1	116.1	26 12.0	+50.8	116.5	25 45.0	+51.4	116.9	25 17.7	+51.9	117.4	24 49.9	+52.4	117.8	24 21.7	+52.9	118.2	23 53.2	+53.4	118.6	23 24.4	+53.8	119.0	7
8	27 28.8	+50.1	115.4	27 02.8	+50.7	115.9	26 36.4	+51.2	116.4	26 09.6	+51.7	116.8	25 42.3	+52.3	117.2	25 14.6	+52.8	117.7	24 46.6	+53.2	118.1	24 18.2	+53.7	118.5	8
9	28 18.9	+49.9	114.8	27 53.5	+50.5	115.3	27 27.6	+51.1	115.8	27 01.3	+51.6	116.2	26 34.6	+52.1	116.7	26 07.4	+52.7	117.1	25 39.8	+53.2	117.6	25 11.9	+53.6	118.0	9
10	29 08.8	+49.7	114.2	28 44.0	+50.3	114.7	28 18.7	+50.9	115.2	27 52.9	+51.5	115.7	27 26.7	+52.0	116.1	27 00.1	+52.5	116.6	26 33.0	+53.0	117.0	26 05.5	+53.5	117.5	10
11	29 58.5	+49.5	113.5	29 34.3	+50.1	114.1	29 09.6	+50.7	114.6	28 44.4	+51.3	115.1	28 18.7	+51.9	115.6	27 52.6	+52.4	116.1	27 26.0	+52.9	116.5	26 59.0	+53.4	117.0	11
12	30 48.0	+49.4	112.9	30 24.4	+50.0	113.4	30 00.3	+50.6	114.0	29 35.7	+51.2	114.5	29 10.6	+51.7	115.0	28 45.0	+52.3	115.5	28 18.9	+52.8	116.0	27 52.4	+53.3	116.5	12
13	31 37.4	+49.1	112.2	31 14.4	+49.8	112.8	30 50.9	+50.4	113.3	30 26.9	+51.0	113.9	30 02.3	+51.6	114.4	29 37.3	+52.1	114.9	29 11.7	+52.7	115.4	28 45.7	+53.2	115.9	13
14	32 26.5	+48.9	111.5	32 04.2	+49.5	112.1	31 41.3	+50.2	112.7	31 17.9	+50.8	113.3	30 53.9	+51.4	113.8	30 29.4	+52.0	114.4	30 04.4	+52.5	114.9	29 38.9	+53.0	115.4	14
15	33 15.4	+48.6	110.9	32 53.7	+49.4	111.5	32 31.5	+50.0	112.1	32 08.7	+50.6	112.6	31 45.3	+51.2	113.2	31 21.4	+51.8	113.8	30 56.9	+52.4	114.3	30 31.9	+52.9	114.9	15
16	34 04.0	+48.5	110.1	33 43.1	+49.1	110.8	33 21.5	+49.8	111.4	32 59.3	+50.4	112.0	32 36.5	+51.1	112.6	32 13.2	+51.6	113.2	31 49.3	+52.2	113.8	31 24.8	+52.8	114.3	16
17	34 52.5	+48.1	109.4	34 32.2	+48.9	110.1	34 11.3	+49.5	110.7	33 49.7	+50.2	111.4	33 27.6	+50.8	112.0	33 04.8	+51.5	112.6	32 41.5	+52.0	113.2	32 17.6	+52.6	113.8	17
18	35 40.6	+47.9	108.7	35 21.1	+48.6	109.4	35 00.8	+49.3	110.0	34 39.9	+50.0	110.7	34 18.4	+50.7	111.3	33 56.3	+51.3	112.0	33 33.5	+51.9	112.6	33 10.2	+52.4	113.2	18
19	36 28.5	+47.6	108.0	36 09.7	+48.3	108.7	35 50.1	+49.1	109.3	35 29.9	+49.8	110.0	35 09.1	+50.4	110.7	34 47.6	+51.0	111.3	34 25.4	+51.7	112.0	34 02.6	+52.3	112.6	19
20	37 16.1	+47.3	107.2	36 58.0	+48.1	107.9	36 39.2	+48.8	108.6	36 19.7	+49.5	109.3	35 59.5	+50.2	110.0	35 38.6	+50.9	110.7	35 17.1	+51.5	111.4	34 54.9	+52.1	112.0	20
21	38 03.4	+47.0	106.4	37 46.1	+47.8	107.2	37 28.0	+48.6	107.9	37 09.2	+49.3	108.6	36 49.7	+50.0	109.3	36 29.5	+50.6	110.0	36 08.6	+51.3	110.7	35 47.0	+51.9	111.4	21
22	38 50.4	+46.7	105.6	38 33.9	+47.5	106.4	38 16.6	+48.2	107.2	37 58.5	+49.0	107.9	37 39.7	+49.7	108.6	37 20.1	+50.4	109.4	36 59.9	+51.1	110.1	36 38.9	+51.8	110.8	22
23	39 37.1	+46.3	104.8	39 21.4	+47.1	105.6	39 04.8	+48.0	106.4	38 47.5	+48.7	107.2	38 29.4	+49.4	107.9	38 10.5	+50.2	108.7	37 51.0	+50.8	109.4	37 30.7	+51.5	110.1	23
24	40 23.4	+46.0	104.0	40 08.5	+46.8	104.8	39 52.8	+47.6	105.6	39 36.2	+48.4	106.4	39 18.8	+49.2	107.2	39 00.7	+49.9	108.0	38 41.8	+50.6	108.7	38 22.2	+51.2	109.5	24
25	41 09.4	+45.5	103.1	40 55.3	+46.4	104.0	40 40.4	+47.3	104.8	40 24.6	+48.1	105.6	40 08.0	+48.9	106.5	39 50.6	+49.7	107.3	39 32.4	+50.4	108.1	39 13.4	+51.1	108.8	25
26	41 54.9	+45.2	102.3	41 41.7	+46.1	103.1	41 27.7	+46.9	104.0	41 12.7	+47.8	104.9	40 56.9	+48.6	105.7	40 40.3	+49.3	106.5	40 22.8	+50.1	107.3	40 04.5	+50.8	108.1	26
27	42 40.1	+44.8	101.4	42 27.8	+45.7	102.3	42 14.6	+46.6	103.2	42 00.5	+47.4	104.0	41 45.5	+48.2	104.9	41 29.6	+49.1	105.8	41 12.9	+49.8	106.6	40 55.3	+50.5	107.4	27
28	43 24.9	+44.3	100.5	43 13.5	+45.2	101.4	43 01.2	+46.1	102.3	42 47.9	+47.1	103.2	42 33.7	+47.9	104.1	42 18.7	+48.7	105.0	42 02.7	+49.5	105.9	41 45.8	+50.3	106.7	28
29	44 09.2	+43.8	99.5	43 58.7	+44.8	100.5	43 47.3	+45.8	101.4	43 35.0	+46.6	102.4	43 21.6	+47.6	103.3	43 07.4	+48.4	104.2	42 52.2	+49.2	105.1	42 36.1	+50.0	106.0	29
30	44 53.0	+43.3	98.6	44 43.5	+44.4	99.6	44 33.1	+45.3	100.5	44 21.6	+46.3	101.5	44 09.2	+47.1	102.4	43 55.8	+48.0	103.4	43 41.4	+48.9	104.3	43 26.1	+49.7	105.2	30
31	45 36.3	+42.9	97.6	45 27.9	+43.8	98.6	45 18.4	+44.8	99.6	45 07.9	+45.8	100.6	44 56.3	+46.8	101.6	44 43.8	+47.6	102.5	44 30.3	+48.5	103.5	44 15.8	+49.3	104.5	31
32	46 19.2	+42.2	96.6	46 11.7	+43.4	97.6	46 03.2	+44.4	98.7	45 53.7	+45.4	99.7	45 43.1	+46.3	100.7	45 31.4	+47.3	101.7	45 18.8	+48.1	102.7	45 05.1	+49.0	103.7	32
33	47 01.4	+41.7	95.5	46 55.1	+42.8	96.6	46 47.6	+43.9	97.7	46 39.1	+44.8	98.7	46 29.4	+45.9	99.8	46 18.7	+46.8	100.8	46 06.9	+47.8	101.8	45 54.1	+48.7	102.8	33
34	47 43.1	+41.1	94.5	47 37.9	+42.2	95.6	47 31.5	+43.3	96.7	47 23.9	+44.4	97.8	47 15.3	+45.4	98.8	47 05.5	+46.4	99.9	46 54.7	+47.3	100.9	46 42.8	+48.2	102.0	34
35	48 24.2	+40.5	93.4	48 20.1	+41.6	94.5	48 14.8	+42.7	95.6	48 08.3	+43.8	96.7	48 00.7	+44.9	97.9	47 51.9	+45.9	99.0	47 42.0	+46.9	100.0	47 31.0	+47.8	101.1	35
36	49 04.7	+39.8	92.3	49 01.7	+41.0	93.4	48 57.5	+42.2	94.6	48 52.1	+43.3	95.7	48 45.6	+44.3	96.9	48 37.8	+45.4	98.0	48 28.9	+46.4	99.1	48 18.8	+47.4	100.2	36
37	49 44.5	+39.1	91.1	49 42.7	+40.3	92.3	49 39.7	+41.5	93.5	49 35.4	+42.7	94.7	49 29.9	+43.8	95.8	49 23.2	+44.9	97.0	49 15.3	+46.0	98.1	49 06.2	+47.0	99.3	37
38	50 23.6	+38.4	89.9	50 23.0	+39.6	91.2	50 21.2	+40.8	92.4	50 18.1	+42.0	93.6	50 13.7	+43.2	94.8	50 08.1	+44.3	96.0	50 01.3	+45.4	97.1	49 53.2	+46.4	98.3	38
39	51 02.0	+37.5	88.7	51 02.6	+38.9	90.0	51 02.0	+40.2	91.2	51 00.1	+41.4	92.4	50 56.9	+42.6	93.7	50 52.4	+43.8	94.9	50 46.7	+44.8	96.1	50 39.6	+46.0	97.3	39
40	51 39.5	+36.8	87.5	51 41.5	+38.1	88.7	51 42.2	+39.4	90.0	51 41.5	+40.6	91.3	51 39.5	+41.9	92.5	51 36.2	+43.0	93.8	51 31.5	+44.3	95.1	51 25.6	+45.3	96.3	40
41	52 16.3	+35.9	86.2	52 19.6	+37.3	87.5	52 21.6	+38.6	88.8	52 22.1	+40.0	90.1	52 21.4	+41.2	91.4	52 19.2	+42.5	92.7	52 15.8	+43.6	94.0	52 10.9	+44.8	95.3	41
42	52 52.2	+35.0	84.9	52 56.9	+36.4	86.2	53 00.2	+37.7	87.5	53 02.1	+39.1	88.9	53 02.6	+40.4	90.2	53 01.7	+41.7	91.5	52 59.4	+43.0	92.8	52 55.7	+44.2	94.2	42
43	53 27.2	+34.1	83.5	53 33.3	+35.5	84.9	53 37.9	+37.0	86.2	53 41.2	+38.3	87.6	53 43.0	+39.7	88.9	53 43.4	+41.0	90.3	53 42.4	+42.2	91.7	53 39.9	+43.5	93.0	43
44	54 01.3	+33.1	82.1	54 08.8	+34.5	83.5	54 14.9	+35.9	84.9	54 19.5	+37.4	86.3	54 22.7	+38.8	87.7	54 24.4	+40.1	89.1	54 24.6	+41.5	90.5	54 23.4	+42.8	91.9	44
45	54 34.4	+32.0	80.7	54 43.3	+33.6	82.1	54 50.8	+35.1	83.5	54 56.9	+36.5	84.9	55 01.5	+37.9	86.3	55 04.5	+39.4	87.8	55 06.1	+40.7	89.2	55 06.2	+42.1	90.6	45
46	55 06.4	+30.9	79.2	55 16.9	+32.5	80.7	55 25.9	+34.0	82.1	55 33.4	+35.5	83.5	55 39.4	+37.0	85.0	55 43.9	+38.4	86.4	55 46.8	+39.9	87.9	55 48.3	+41.2	89.4	46
47	55 37.3	+29.8	77.7	55 49.4	+31.3	79.2	55 59.9	+32.9	80.6	56 08.9	+34.5	82.1	56 16.4	+36.0	83.6	56 22.3	+37.5	85.1	56 26.7	+39.0	86.6	56 29.5	+40.4	88.1	47
48	56 07.1	+28.7	76.2	56 20.7	+30.3	77.6	56 32.8	+31.8	79.1	56 43.4	+33.4	80.6	56 52.4	+35.0	82.1	56 59.8	+36.5	83.6	57 05.7	+38.0	85.2	57 09.9	+39.5	86.7	48
49	56 35.8	+27.3	74.6	56 51.0	+29.0	76.1	57 04.6	+30.7	77.6	57 16.8	+32.2	79.1	57 27.4	+33.8	80.6	57 36.3	+35.5	82.2	57 43.7	+37.0	83.7	57 49.4	+38.5	85.3	49
50	57 03.1	+26.1	73.0	57 20.0	+27.7	74.5	57 35.3	+29.4	76.0	57 49.0	+31.1	77.5	58 01.2	+32.7	79.1	58 11.8	+34.3	80.7	58 20.7	+35.9	82.3	58 27.9	+37.5	83.9	50
51	57 29.2	+24.8	71.3	57 47.7	+26.4	72.8	58 04.7	+28.1	74.3	58 20.1	+29.8	75.9	58 33.9	+31.5	77.5	58 46.1	+33.1	79.1	58 56.6	+34.8	80.7	59 05.4	+36.5	82.4	51
52	57 54.0	+23.3	69.6	58 14.1	+25.1	71.1	58 32.8	+26.7	72.7	58 49.9	+28.5	74.2	59 05.4	+30.2	75.8	59 19.2	+31.9	77.5	59 31.4	+33.6	79.1	59 41.9	+35.2	80.8	52
53	58 17.3	+21.9	67.9	58 39.2	+23.6	69.4	58 59.5	+25.4	70.9	59 18.4	+27.1	72.5	59 35.6	+28.8	74.1	59 51.1	+30.6	75.8	60 05.0	+32.3	77.5	60 17.1	+34.1	79.2	53
54	58 39.2	+20.3	66.1	59 02.8	+22.1	67.6	59 24.9	+23.9	69.2	59 45.5	+25.6	70.8	60 04.4	+27.4	72.4	60 21.7	+29.2	74.1	60 37.3	+31.0	75.8	60 51.2	+32.8	77.5	54
55	58 59.5	+18.9	64.3	59 24.9	+20.6	65.8	59 48.8	+22.3	67.3	60 11.1	+24.1	69.0	60 31.8	+26.0	70.6	60 50.9	+27.8	72.3	61 08.3	+29.6	74.0	61 24.0	+31.3	75.8	55
56	59 18.4	+17.2	62.4	59 45.5	+18.9	63.9	60 11.1	+20.7	65.5	60 35.2	+22.6	67.1	60 57.8	+24.3	68.8	61 18.8	+26.2	70.5	61 37.9	+28.1	72.2	61 55.3	+30.0	74.0	56
57	59 35.6	+15.5	60.5	60 04.4	+17.3	62.0	60 31.8	+19.1	63.6	60 57.8	+20.9	65.2	61 22.1	+22.8	66.9	61 44.9	+24.6	68.8	62 06.0	+26.5	70.3	62 25.3	+28.4	72.1	57
58	59 51.1	+13.9	58.6	60 21.7	+15.6	60.1	60 50.9	+17.4	61.7	61 18.7	+19.2	63.3	61 44.9	+21.1	64.9	62 09.5	+23.0	66.6	62 32.5	+24.8	68.4	62 53.7	+26.8	70.2	58
59	60 05.0	+12.1	56.7	60 37.3	+13.9	58.1	61 08.3	+15.6	59.7	61 37.9	+17.4	61.3	62 06.0	+19.3	63.0	62 32.5	+21.2	64.6	62 57.3	+23.2	66.4	63 20.5	+25.1	68.2	59
60	60 17.1	+10.4	54.7	60 51.2	+12.1	56.2	61 24.0	+13.8	57.7	61 55.3	+15.7	59.3	62 25.3	+17.5	60.9	62 53.7	+19.4	62.6	63 20.5	+21.3	64.4	63 45.6	+23.3	66.2	60
61	60 27.5	+8.6	52.7	61 03.3	+10.2	54.1	61 37.8	+12.0	55.6	62 11.0	+13.8	57.2	62 42.8	+15.6	58.8	63 13.1	+17.5	60.5	63 41.8	+19.5	62.3	64 08.9	+21.5	64.1	61
62	60 36.1	+6.7	50.7	61 13.5	+8.3	52.1	61 49.8	+10.1	53.6	62 24.8	+11.8	55.1	62 58.4	+13.7	56.7	63 30.6	+15.6	58.4	64 01.3	+17.5 •	60.1	64 30.4	+19.5 •	61.9	62
63	60 42.8	+4.9	48.7	61 21.8	+6.5	50.0	61 59.9	+8.1	51.5	62 36.6	+9.9	53.0	63 12.1	+11.7 •	54.6	63 46.2	+13.6 •	56.2	64 18.8	+15.5 •	57.9	64 49.9	+17.5 •	59.7	63
64	60 47.7	+3.0	46.6	61 28.4	+4.6	48.0	62 08.0	+6.2	49.4	62 46.5	+7.9 •	50.8	63 23.8	+9.7 •	52.4	63 59.8	+11.5 •	54.0	64 34.3	+13.5 •	55.7	65 07.4	+15.4 •	57.5	64
65	60 50.7	+1.0	44.6	61 33.0	+2.6	45.9	62 14.2	+4.3 •	47.2	62 54.4	+5.9 •	48.7	63 33.5	+7.6 •	50.2	64 11.3	+9.4 •	51.7	64 47.8	+11.3 •	53.4	65 22.8	+13.3 •	55.2	65
66	60 51.9	−0.8	42.5	61 35.6	+0.8	43.8	62 18.5	+2.2 •	45.1	63 00.3	+3.9	46.5	63 41.1	+5.6 •	47.9	64 20.7	+7.3	49.5	64 59.1	+9.1 •	51.1	65 36.1	+11.0 •	52.8	66
67	60 51.1	−2.6	40.5	61 36.4	−1.3	41.7	62 20.7	+0.3	42.9	63 04.2	+1.8	44.3	63 46.7	+3.4	45.7	64 28.0	+5.1	47.2	65 08.2	+6.9	48.7	65 47.1	+8.8	50.4	67
68	60 48.5	−4.5	38.4	61 35.1	−3.1	39.6	62 21.0	−1.7	40.8	63 06.0	−0.3	42.1	63 50.1	+1.3	43.4	64 33.1	+3.0	44.9	65 15.1	+4.7 •	46.4	65 55.9	+6.5 •	48.0	68
69	60 44.0	−6.3	36.4	61 32.0	−5.1	37.5	62 19.3	−3.8 •	38.6	63 05.7	−2.3	39.8	63 51.4	−0.9	41.1	64 36.1	+0.7	42.5	65 19.8	+2.4 •	44.0	66 02.4	+4.1 •	45.6	69
70	60 37.7	−8.2	34.3	61 26.9	−6.9	35.4	62 15.5	−5.7	36.5	63 03.4	−4.4	37.6	63 50.5	−2.9	38.9	64 36.8	−1.5	40.2	65 22.2	+0.1 •	41.6	66 06.5	+1.8 •	43.1	70
71	60 29.5	−9.9	32.3	61 20.0	−8.9	33.3	62 09.8	−7.6	34.3	62 59.0	−6.4	35.4	63 47.6	−5.1 •	36.6	64 35.3	−3.6 •	37.9	65 22.3	−2.2 •	39.2	66 08.3	−0.6 •	40.6	71
72	60 19.6	−11.8	30.3	61 11.1	−10.7	31.2	62 02.2	−9.6	32.2	62 52.6	−8.4	33.3	63 42.5	−7.2 •	34.4	64 31.7	−5.9 •	35.6	65 20.1	−4.4 •	36.8	66 07.7	−2.9 •	38.2	72
73	60 07.8	−13.5	28.4	61 00.4	−12.5	29.2	61 52.6	−11.5	30.1	62 44.2	−10.4 •	31.1	63 35.3	−9.2 •	32.1	64 25.8	−8.0	33.2	65 15.7	−6.7 •	34.4	66 04.8	−5.3 •	35.7	73
74	59 54.3	−15.2	26.4	60 47.9	−14.3	27.2	61 41.1	−13.4	28.0	62 33.8	−12.4	28.9	63 26.1	−11.3 •	29.9	64 17.8	−10.1 •	30.9	65 09.0	−9.0 •	32.0	65 59.5	−7.6 •	33.2	74
75	59 39.1	−16.8	24.5	60 33.6	−16.0	25.2	61 27.7	−15.2	26.0	62 21.4	−14.2	26.8	63 14.8	−13.3	27.7	64 07.7	−12.3	28.7	65 00.0	−11.1 •	29.7	65 51.9	−9.9 •	30.8	75
76	59 22.3	−18.5	22.6	60 17.6	−17.8	23.3	61 12.5	−16.9	24.0	62 07.2	−16.1	24.7	63 01.5	−15.2	25.6	63 55.4	−14.2 •	26.4	64 48.9	−13.2 •	27.4	65 42.0	−12.2 •	28.4	76
77	59 03.8	−20.0	20.7	59 59.8	−19.3	21.3	60 55.6	−18.7	22.0	61 51.1	−17.9	22.7	62 46.3	−17.1	23.4	63 41.2	−16.3	24.2	64 35.7	−15.3 •	25.1	65 29.8	−14.3 •	26.0	77
78	58 43.8	−21.6	18.9	59 40.5	−21.0	19.5	60 36.9	−20.3	20.0	61 33.2	−19.7	20.7	62 29.2	−18.9	21.4	63 24.9	−18.1	22.1	64 20.4	−17.3 •	22.9	65 15.5	−16.4 •	23.7	78
79	58 22.2	−23.0	17.1	59 19.5	−22.5	17.6	60 16.6	−21.9	18.1	61 13.5	−21.3	18.7	62 10.3	−20.7	19.3	63 06.8	−20.0	20.0	64 03.1	−19.3	20.7	64 59.1	−18.5 •	21.4	79
80	57 59.2	−24.4	15.4	58 57.0	−23.9	15.8	59 54.7	−23.5	16.3	60 52.2	−22.9	16.8	61 49.6	−22.4	17.3	62 46.8	−21.8	17.9	63 43.8	−21.2	18.5	64 40.6	−20.5	19.2	80
81	57 34.8	−25.8	13.7	58 33.1	−25.4	14.0	59 31.2	−25.0	14.4	60 29.3	−24.6	14.9	61 27.2	−24.1	15.4	62 25.0	−23.6	15.9	63 22.6	−23.0	16.4	64 20.1	−22.4	17.0	81
82	57 09.0	−27.1	12.0	58 07.7	−26.8	12.3	59 06.2	−26.4	12.7	60 04.7	−26.0	13.0	61 03.1	−25.6	13.5	62 01.4	−25.1	13.9	62 59.6	−24.7	14.4	63 57.7	−24.2	14.9	82
83	56 41.9	−28.3	10.3	57 40.9	−28.1	10.6	58 39.8	−27.7	10.9	59 38.7	−27.4	11.3	60 37.5	−27.1	11.6	61 36.3	−26.8	12.0	62 34.9	−26.4	12.4	63 33.5	−26.0	12.8	83
84	56 13.6	−29.6	8.7	57 12.8	−29.3	9.0	58 12.1	−29.0	9.2	59 11.3	−28.8	9.5	60 10.4	−28.6	9.8	61 09.5	−28.2	10.1	62 08.5	−28.0	10.4	63 07.5	−27.6	10.8	84
85	55 44.0	−30.7	7.2	56 43.5	−30.5	7.4	57 43.0	−30.3	7.6	58 42.5	−30.2	7.8	59 41.9	−29.9	8.0	60 41.3	−29.7	8.3	61 40.6	−29.4	8.5	62 40.0	−29.2	8.8	85
86	55 13.3	−31.8	5.7	56 13.0	−31.7	5.8	57 12.7	−31.5	6.0	58 12.3	−31.3	6.1	59 12.0	−31.2	6.3	60 11.6	−31.0	6.5	61 11.2	−30.8	6.7	62 10.8	−30.7	6.9	86
87	54 41.5	−32.8	4.2	55 41.3	−32.7	4.3	56 41.2	−32.7	4.4	57 41.0	−32.6	4.5	58 40.8	−32.5	4.6	59 40.6	−32.5	4.8	60 40.4	−32.2	5.0	61 40.1	−32.0	5.1	87
88	54 08.7	−33.9	2.8	55 08.6	−33.8	2.8	56 08.5	−33.7	2.9	57 08.4	−33.7	3.0	58 08.3	−33.6	3.1	59 08.1	−33.6	3.2	60 08.2	−33.5	3.3	61 08.1	−33.4	3.4	88
89	53 34.8	−34.8	1.4	54 34.8	−34.8	1.4	55 34.8	−34.8	1.4	56 34.7	−34.7	1.5	57 34.7	−34.7	1.5	58 34.7	−34.7	1.6	59 34.7	−34.7	1.6	60 34.7	−34.7	1.6	89
90	53 00.0	−35.7	0.0	54 00.0	−35.7	0.0	55 00.0	−35.7	0.0	56 00.0	−35.8	0.0	57 00.0	−35.8	0.0	58 00.0	−35.8	0.0	59 00.0	−35.8	0.0	60 00.0	−35.8	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 54°, 306°

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	20 43.0 −51.3 120.1	20 12.7 −51.8 120.4	19 42.2 −52.3 120.8	19 11.3 −52.7 121.1	18 40.3 −53.2 121.4	18 08.9 −53.6 121.6	17 37.3 −54.0 121.9	17 05.5 −54.4 122.2	0
1	19 51.7 −51.4 120.7	19 20.9 −51.8 121.0	18 49.9 −52.3 121.3	18 18.6 −52.8 121.6	17 47.1 −53.2 121.8	17 15.3 −53.6 122.1	16 43.3 −54.0 122.4	16 11.1 −54.5 122.6	1
2	19 00.3 −51.5 121.2	18 29.1 −52.0 121.5	17 57.6 −52.4 121.8	17 25.8 −52.8 122.1	16 53.9 −53.3 122.3	16 21.7 −53.7 122.6	15 49.3 −54.1 122.8	15 16.6 −54.5 123.1	2
3	18 08.8 −51.6 121.8	17 37.1 −52.0 122.0	17 05.2 −52.5 122.3	16 33.0 −53.0 122.6	16 00.6 −53.4 122.8	15 28.0 −53.8 123.0	14 55.2 −54.2 123.3	14 22.1 −54.5 123.5	3
4	17 17.2 −51.6 122.3	16 45.1 −52.1 122.6	16 12.7 −52.6 122.8	15 40.0 −52.9 123.1	15 07.2 −53.4 123.3	14 34.2 −53.8 123.5	14 01.0 −54.2 123.7	13 27.6 −54.6 123.9	4
5	16 25.6 −51.7 122.8	15 53.0 −52.2 123.1	15 20.1 −52.6 123.3	14 47.1 −53.1 123.5	14 13.8 −53.5 123.8	13 40.4 −53.9 124.0	13 06.8 −54.3 124.2	12 33.0 −54.6 124.3	5
6	15 33.9 −51.8 123.4	15 00.8 −52.3 123.6	14 27.5 −52.7 123.8	13 54.0 −53.1 124.0	13 20.3 −53.5 124.2	12 46.5 −53.9 124.4	12 12.5 −54.3 124.6	11 38.4 −54.7 124.8	6
7	14 42.1 −51.9 123.9	14 08.5 −52.3 124.1	13 34.8 −52.8 124.3	13 00.9 −53.2 124.5	12 26.8 −53.5 124.7	11 52.6 −54.0 124.9	11 18.2 −54.3 125.0	10 43.7 −54.7 125.2	7
8	13 50.2 −52.0 124.4	13 16.2 −52.4 124.6	12 42.0 −52.8 124.8	12 07.7 −53.2 125.0	11 33.3 −53.7 125.1	10 58.6 −54.0 125.3	10 23.9 −54.4 125.5	9 49.0 −54.7 125.6	8
9	12 58.2 −52.0 124.9	12 23.8 −52.5 125.1	11 49.2 −52.8 125.3	11 14.5 −53.3 125.4	10 39.6 −53.6 125.6	10 04.6 −54.0 125.7	9 29.5 −54.4 125.9	8 54.3 −54.7 126.0	9
10	12 06.2 −52.0 125.4	11 31.4 −52.5 125.6	10 56.4 −52.9 125.8	10 21.2 −53.3 125.9	9 46.0 −53.7 126.1	9 10.6 −54.0 126.2	8 35.1 −54.4 126.3	7 59.6 −54.8 126.4	10
11	11 14.2 −52.1 125.9	10 38.9 −52.5 126.1	10 03.5 −53.0 126.2	9 27.9 −53.3 126.4	8 52.3 −53.7 126.5	8 16.6 −54.1 126.6	7 40.7 −54.4 126.7	7 04.8 −54.8 126.8	11
12	10 22.1 −52.2 126.4	9 46.4 −52.6 126.6	9 10.5 −52.9 126.7	8 34.6 −53.4 126.8	7 58.6 −53.8 127.0	7 22.5 −54.2 127.1	6 46.3 −54.5 127.2	6 10.0 −54.8 127.3	12
13	9 29.9 −52.2 126.9	8 53.8 −52.6 127.1	8 17.6 −53.0 127.2	7 41.2 −53.4 127.3	7 04.8 −53.7 127.4	6 28.3 −54.1 127.5	5 51.8 −54.5 127.6	5 15.2 −54.9 127.7	13
14	8 37.7 −52.2 127.4	8 01.2 −52.7 127.6	7 24.6 −53.1 127.7	6 47.8 −53.4 127.8	6 11.1 −53.8 127.9	5 34.2 −54.1 127.9	4 57.3 −54.5 128.0	4 20.3 −54.8 128.1	14
15	7 45.5 −52.3 127.9	7 08.5 −52.7 128.0	6 31.5 −53.1 128.1	5 54.4 −53.4 128.2	5 17.3 −53.8 128.3	4 40.1 −54.2 128.4	4 02.8 −54.5 128.4	3 25.5 −54.9 128.5	15
16	6 53.2 −52.3 128.4	6 15.8 −52.7 128.5	5 38.4 −53.0 128.6	5 01.0 −53.5 128.7	4 23.5 −53.9 128.7	3 45.9 −54.2 128.8	3 08.3 −54.6 128.8	2 30.6 −54.8 128.9	16
17	6 00.9 −52.4 128.9	5 23.1 −52.7 129.0	4 45.4 −53.2 129.1	4 07.5 −53.5 129.1	3 29.6 −53.8 129.2	2 51.7 −54.2 129.2	2 13.7 −54.5 129.3	1 35.8 −54.9 129.3	17
18	5 08.5 −52.3 129.4	4 30.4 −52.7 129.5	3 52.2 −53.1 129.5	3 14.0 −53.5 129.6	2 35.8 −53.9 129.6	1 57.5 −54.2 129.7	1 19.2 −54.5 129.7	0 40.9 −54.9 129.7	18
19	4 16.2 −52.4 129.9	3 37.7 −52.8 130.0	2 59.1 −53.1 130.0	2 20.5 −53.5 130.1	1 41.9 −53.8 130.1	1 03.3 −54.2 130.1	0 24.7 −54.6 130.1	0 14.0 +54.9 49.9	19
20	3 23.8 −52.4 130.4	2 44.9 −52.7 130.4	2 06.0 −53.2 130.5	1 27.0 −53.5 130.5	0 48.1 −53.9 130.5	0 09.1 −54.2 130.5	0 29.9 +54.5 49.5	1 08.9 +54.8 49.5	20
21	2 31.4 −52.4 130.9	1 52.2 −52.8 130.9	1 12.8 −53.1 130.9	0 33.5 −53.5 130.9	0 05.8 +53.9 49.1	0 45.1 +54.2 49.1	1 24.4 +54.6 49.1	2 03.7 +54.9 49.1	21
22	1 39.0 −52.4 131.4	0 59.4 −52.8 131.4	0 19.7 −53.1 131.4	0 20.0 +53.5 48.6	0 59.7 +53.9 48.6	1 39.3 +54.2 48.6	2 19.0 +54.5 48.7	2 58.6 +54.8 48.7	22
23	0 46.6 −52.4 131.9	0 06.6 −52.8 131.9	0 33.4 +53.2 48.1	1 13.5 +53.5 48.1	1 53.5 +53.9 48.2	2 33.5 +54.2 48.2	3 13.5 +54.5 48.2	3 53.4 +54.9 48.3	23
24	0 05.8 +52.4 47.7	0 46.2 +52.8 47.7	1 26.6 +53.1 47.7	2 07.0 +53.5 47.7	2 47.4 +53.8 47.7	3 27.7 +54.2 47.8	4 08.0 +54.5 47.8	4 48.3 +54.8 47.9	24
25	0 58.2 +52.4 47.2	1 39.0 +52.7 47.2	2 19.7 +53.2 47.2	3 00.5 +53.5 47.2	3 41.2 +53.8 47.3	4 21.9 +54.1 47.3	5 02.5 +54.5 47.4	5 43.1 +54.8 47.5	25
26	1 50.6 +52.4 46.7	2 31.7 +52.8 46.7	3 12.9 +53.1 46.7	3 54.0 +53.4 46.8	4 35.0 +53.8 46.8	5 16.0 +54.2 46.9	5 57.0 +54.5 47.0	6 37.9 +54.8 47.1	26
27	2 43.0 +52.4 46.2	3 24.5 +52.7 46.2	4 06.0 +53.1 46.3	4 47.4 +53.5 46.3	5 28.8 +53.8 46.4	6 10.2 +54.1 46.5	6 51.5 +54.4 46.6	7 32.7 +54.8 46.6	27
28	3 35.4 +52.3 45.7	4 17.2 +52.8 45.8	4 59.1 +53.1 45.8	5 40.9 +53.4 45.9	6 22.6 +53.8 46.0	7 04.3 +54.1 46.1	7 45.9 +54.5 46.2	8 27.5 +54.7 46.2	28
29	4 27.7 +52.4 45.2	5 10.0 +52.7 45.3	5 52.2 +53.0 45.3	6 34.3 +53.4 45.4	7 16.4 +53.7 45.5	7 58.4 +54.1 45.6	8 40.4 +54.4 45.7	9 22.2 +54.7 45.8	29
30	5 20.1 +52.3 44.7	6 02.7 +52.7 44.8	6 45.2 +53.1 44.9	7 27.7 +53.4 45.0	8 10.1 +53.8 45.1	8 52.5 +54.0 45.2	9 34.8 +54.3 45.3	10 16.9 +54.7 45.4	30
31	6 12.4 +52.3 44.2	6 55.4 +52.6 44.3	7 38.3 +53.0 44.4	8 21.1 +53.3 44.5	9 03.9 +53.6 44.6	9 46.5 +54.0 44.7	10 29.1 +54.4 44.8	11 11.6 +54.6 45.0	31
32	7 04.7 +52.3 43.7	7 48.0 +52.6 43.8	8 31.3 +52.9 43.9	9 14.4 +53.3 44.0	9 57.5 +53.7 44.2	10 40.5 +54.0 44.3	11 23.4 +54.3 44.4	12 06.2 +54.6 44.6	32
33	7 57.0 +52.2 43.2	8 40.6 +52.6 43.3	9 24.2 +53.0 43.5	10 07.7 +53.3 43.6	10 51.2 +53.6 43.7	11 34.5 +53.9 43.8	12 17.7 +54.3 44.0	13 00.9 +54.5 44.1	33
34	8 49.2 +52.2 42.7	9 33.2 +52.6 42.9	10 17.2 +52.8 43.0	11 01.0 +53.3 43.1	11 44.8 +53.5 43.2	12 28.4 +53.9 43.4	13 12.0 +54.2 43.5	13 55.4 +54.5 43.7	34
35	9 41.4 +52.1 42.2	10 25.8 +52.5 42.4	11 10.0 +52.9 42.5	11 54.2 +53.2 42.6	12 38.3 +53.5 42.8	13 22.3 +53.9 42.9	14 06.2 +54.1 43.1	14 49.9 +54.5 43.3	35
36	10 33.5 +52.1 41.7	11 18.3 +52.4 41.9	12 02.9 +52.8 42.0	12 47.4 +53.1 42.2	13 31.8 +53.5 42.3	14 16.2 +53.7 42.5	15 00.3 +54.1 42.7	15 44.4 +54.4 42.8	36
37	11 25.6 +52.1 41.2	12 10.7 +52.4 41.5	12 55.7 +52.7 41.5	13 40.5 +53.1 41.7	14 25.3 +53.4 41.8	15 09.9 +53.8 42.0	15 54.4 +54.1 42.2	16 38.8 +54.4 42.4	37
38	12 17.7 +52.0 40.7	13 03.1 +52.3 40.9	13 48.4 +52.7 41.0	14 33.6 +53.0 41.2	15 18.7 +53.3 41.4	16 03.7 +53.6 41.6	16 48.5 +54.0 41.8	17 33.2 +54.3 42.0	38
39	13 09.7 +51.9 40.2	13 55.4 +52.3 40.4	14 41.1 +52.6 40.5	15 26.6 +53.0 40.7	16 12.0 +53.3 40.9	16 57.3 +53.6 41.1	17 42.5 +53.9 41.3	18 27.5 +54.2 41.5	39
40	14 01.6 +51.9 39.7	14 47.7 +52.2 39.9	15 33.7 +52.6 40.0	16 19.6 +52.9 40.2	17 05.3 +53.2 40.4	17 50.9 +53.6 40.6	18 36.4 +53.9 40.8	19 21.7 +54.2 41.1	40
41	14 53.5 +51.8 39.2	15 39.9 +52.2 39.4	16 26.3 +52.4 39.5	17 12.5 +52.8 39.7	17 58.5 +53.2 39.9	18 44.5 +53.4 40.1	19 30.3 +53.7 40.4	20 15.9 +54.1 40.6	41
42	15 45.3 +51.7 38.7	16 32.1 +52.0 38.8	17 18.7 +52.4 39.0	18 05.3 +52.7 39.2	18 51.7 +53.0 39.4	19 37.9 +53.4 39.7	20 24.0 +53.7 39.9	21 10.0 +54.0 40.1	42
43	16 37.0 +51.6 38.1	17 24.1 +52.0 38.3	18 11.1 +52.3 38.5	18 58.0 +52.6 38.7	19 44.7 +53.0 38.9	20 31.3 +53.3 39.2	21 17.7 +53.7 39.4	22 04.0 +54.0 39.7	43
44	17 28.6 +51.5 37.6	18 16.1 +51.9 37.8	19 03.4 +52.3 38.0	19 50.6 +52.6 38.2	20 37.7 +52.9 38.4	21 24.6 +53.2 38.7	22 11.4 +53.5 38.9	22 58.0 +53.8 39.2	44
45	18 20.2 +51.4 37.1	19 08.0 +51.8 37.3	19 55.7 +52.1 37.5	20 43.2 +52.5 37.7	21 30.6 +52.8 37.9	22 17.8 +53.2 38.2	23 04.9 +53.5 38.5	23 51.8 +53.8 38.7	45
46	19 11.6 +51.4 36.5	19 59.8 +51.7 36.7	20 47.8 +52.0 37.0	21 35.7 +52.3 37.2	22 23.4 +52.7 37.4	23 11.0 +53.0 37.7	23 58.4 +53.3 38.0	24 45.6 +53.6 38.2	46
47	20 03.0 +51.2 36.0	20 51.5 +51.6 36.2	21 39.8 +52.0 36.4	22 28.0 +52.3 36.7	23 16.1 +52.6 36.9	24 04.0 +52.9 37.2	24 51.7 +53.3 37.5	25 39.2 +53.6 37.7	47
48	20 54.2 +51.2 35.4	21 43.1 +51.5 35.6	22 31.8 +51.8 35.9	23 20.3 +52.2 36.1	24 08.7 +52.5 36.4	24 56.9 +52.8 36.7	25 45.0 +53.1 36.9	26 32.8 +53.5 37.2	48
49	21 45.4 +51.0 34.9	22 34.6 +51.3 35.1	23 23.6 +51.7 35.3	24 12.5 +52.0 35.6	25 01.2 +52.3 35.9	25 49.7 +52.7 36.1	26 38.1 +53.0 36.4	27 26.3 +53.3 36.7	49
50	22 36.4 +50.9 34.3	23 25.9 +51.3 34.5	24 15.3 +51.6 34.8	25 04.5 +51.9 35.0	25 53.5 +52.3 35.3	26 42.4 +52.6 35.6	27 31.1 +52.9 35.9	28 19.6 +53.3 36.2	50
51	23 27.3 +50.8 33.7	24 17.2 +51.1 34.0	25 06.9 +51.4 34.2	25 56.4 +51.9 34.5	26 45.8 +52.1 34.8	27 35.0 +52.4 35.1	28 24.0 +52.8 35.4	29 12.9 +53.1 35.7	51
52	24 18.1 +50.7 33.1	25 08.3 +51.0 33.4	25 58.3 +51.4 33.6	26 48.2 +51.7 33.9	27 37.9 +52.0 34.2	28 27.4 +52.4 34.5	29 16.8 +52.6 34.8	30 06.0 +52.9 35.1	52
53	25 08.8 +50.5 32.5	25 59.3 +50.8 32.8	26 49.7 +51.1 33.0	27 39.9 +51.5 33.3	28 29.9 +51.8 33.6	29 19.8 +52.1 33.9	30 09.4 +52.5 34.3	30 58.9 +52.9 34.6	53
54	25 59.3 +50.4 31.9	26 50.1 +50.7 32.2	27 40.8 +51.1 32.5	28 31.4 +51.3 32.8	29 21.7 +51.7 33.1	30 11.9 +52.1 33.4	31 01.9 +52.4 33.7	31 51.8 +52.7 34.0	54
55	26 49.7 +50.2 31.3	27 40.8 +50.6 31.6	28 31.9 +50.8 31.9	29 22.7 +51.2 32.2	30 13.4 +51.6 32.5	31 04.0 +51.8 32.8	31 54.3 +52.2 33.1	32 44.4 +52.6 33.5	55
56	27 39.9 +49.9 30.7	28 31.4 +50.3 31.0	29 22.7 +50.7 31.3	30 13.9 +51.1 31.6	31 05.0 +51.4 31.9	31 55.8 +51.7 32.2	32 46.5 +52.0 32.6	33 37.0 +52.3 32.9	56
57	28 29.9 +49.9 30.1	29 21.7 +50.2 30.4	30 13.4 +50.6 30.7	31 05.0 +50.8 31.0	31 56.3 +51.2 31.3	32 47.5 +51.5 31.6	33 38.5 +51.9 32.0	34 29.3 +52.2 32.3	57
58	29 19.8 +49.6 29.5	30 11.9 +50.0 29.7	31 04.0 +50.3 30.0	31 55.8 +50.7 30.3	32 47.5 +51.0 30.7	33 39.0 +51.4 31.0	34 30.4 +51.6 31.3	35 21.5 +52.0 31.7	58
59	30 09.4 +49.3 28.8	31 01.9 +49.9 29.1	31 54.3 +50.1 29.4	32 46.5 +50.5 29.7	33 38.5 +50.8 30.0	34 30.4 +51.1 30.4	35 22.0 +51.5 30.7	36 13.5 +51.8 31.1	59
60	30 58.9 +49.3 28.2	31 51.8 +49.6 28.4	32 44.4 +50.0 28.7	33 37.0 +50.2 29.1	34 29.3 +50.6 29.4	35 21.5 +51.0 29.7	36 13.5 +51.3 30.1	37 05.3 +51.6 30.5	60
61	31 48.2 +49.1 27.5	32 41.4 +49.4 27.8	33 34.4 +49.7 28.1	34 27.2 +50.1 28.4	35 19.9 +50.4 28.7	36 12.5 +50.7 29.1	37 04.8 +51.1 29.4	37 56.9 +51.4 29.8	61
62	32 37.3 +48.8 26.8	33 30.8 +49.1 27.1	34 24.1 +49.5 27.4	35 17.3 +49.8 27.7	36 10.3 +50.2 28.1	37 03.2 +50.5 28.4	37 55.9 +50.8 28.8	38 48.3 +51.2 29.2	62
63	33 26.1 +48.6 26.1	34 19.9 +49.0 26.4	35 13.6 +49.3 26.7	36 07.1 +49.6 27.0	37 00.5 +49.9 27.4	37 53.7 +50.2 27.7	38 46.7 +50.6 28.1	39 39.5 +50.9 28.5	63
64	34 14.7 +48.4 25.4	35 08.9 +48.6 25.7	36 02.9 +49.0 26.0	36 56.7 +49.3 26.3	37 50.4 +49.7 26.7	38 43.9 +50.0 27.0	39 37.3 +50.3 27.4	40 30.4 +50.7 27.8	64
65	35 03.1 +48.1 24.7	35 57.5 +48.5 25.0	36 51.9 +48.7 25.3	37 46.0 +49.1 25.6	38 40.1 +49.3 26.0	39 33.9 +49.7 26.3	40 27.6 +50.1 26.7	41 21.1 +50.4 27.1	65
66	35 51.2 +47.8 24.0	36 46.0 +48.1 24.3	37 40.6 +48.5 24.6	38 35.1 +48.8 24.9	39 29.4 +49.2 25.2	40 23.6 +49.5 25.6	41 17.7 +49.8 26.0	42 11.5 +50.1 26.4	66
67	36 39.0 +47.6 23.2	37 34.1 +47.9 23.5	38 29.1 +48.1 23.8	39 23.9 +48.5 24.1	40 18.6 +48.8 24.5	41 13.1 +49.1 24.8	42 07.5 +49.4 25.2	43 01.6 +49.9 25.6	67
68	37 26.6 +47.2 22.4	38 22.0 +47.5 22.7	39 17.2 +47.9 23.1	40 12.4 +48.2 23.4	41 07.4 +48.5 23.7	42 02.2 +48.9 24.1	42 56.9 +49.2 24.5	43 51.5 +49.5 24.9	68
69	38 13.8 +46.9 21.7	39 09.5 +47.2 22.0	40 05.1 +47.5 22.3	41 00.6 +47.8 22.6	41 55.9 +48.2 22.9	42 51.1 +48.5 23.3	43 46.1 +48.8 23.7	44 41.0 +49.1 24.1	69
70	39 00.7 +46.6 20.9	39 56.7 +46.9 21.2	40 52.6 +47.2 21.5	41 48.4 +47.5 21.8	42 44.1 +47.8 22.1	43 39.6 +48.1 22.5	44 34.9 +48.5 22.9	45 30.1 +48.9 23.3	70
71	39 47.3 +46.3 20.0	40 43.6 +46.6 20.3	41 39.8 +46.9 20.6	42 35.9 +47.2 21.0	43 31.9 +47.5 21.3	44 27.7 +47.8 21.7	45 23.4 +48.1 22.1	46 19.0 +48.4 22.4	71
72	40 33.6 +45.9 19.2	41 30.2 +46.1 19.5	42 26.7 +46.4 19.8	43 23.1 +46.7 20.1	44 19.4 +47.0 20.5	45 15.5 +47.4 20.8	46 11.5 +47.7 21.2	47 07.4 +48.0 21.6	72
73	41 19.4 +45.5 18.4	42 16.3 +45.8 18.6	43 13.1 +46.1 18.9	44 09.8 +46.4 19.3	45 06.4 +46.7 19.6	46 02.9 +47.0 19.9	46 59.2 +47.3 20.3	47 55.4 +47.7 20.7	73
74	42 04.9 +45.1 17.5	43 02.1 +45.4 17.8	43 59.2 +45.6 18.1	44 56.2 +45.9 18.4	45 53.1 +46.2 18.7	46 49.9 +46.5 19.0	47 46.5 +46.9 19.4	48 43.1 +47.1 19.8	74
75	42 50.0 +44.7 16.6	43 47.5 +44.9 16.9	44 44.8 +45.2 17.1	45 42.1 +45.5 17.4	46 39.3 +45.8 17.8	47 36.4 +46.1 18.1	48 33.4 +46.4 18.5	49 30.2 +46.7 18.8	75
76	43 34.7 +44.2 15.7	44 32.4 +44.4 15.9	45 30.0 +44.8 16.2	46 27.6 +45.0 16.5	47 25.1 +45.3 16.8	48 22.5 +45.6 17.1	49 19.8 +45.8 17.5	50 16.9 +46.2 17.8	76
77	44 18.9 +43.7 14.7	45 16.8 +44.0 15.0	46 14.8 +44.2 15.3	47 12.6 +44.5 15.5	48 10.4 +44.8 15.8	49 08.1 +45.0 16.1	50 05.6 +45.4 16.5	51 03.1 +45.7 16.8	77
78	45 02.6 +43.2 13.8	46 00.8 +43.5 14.0	46 59.0 +43.7 14.3	47 57.1 +44.0 14.5	48 55.2 +44.2 14.8	49 53.1 +44.5 15.1	50 51.0 +44.8 15.4	51 48.8 +45.1 15.8	78
79	45 45.8 +42.7 12.8	46 44.3 +42.9 13.0	47 42.7 +43.2 13.3	48 41.1 +43.4 13.5	49 39.4 +43.7 13.8	50 37.6 +44.0 14.1	51 35.8 +44.2 14.4	52 33.9 +44.4 14.7	79
80	46 28.5 +42.2 11.8	47 27.2 +42.4 12.0	48 25.9 +42.6 12.2	49 24.5 +42.8 12.5	50 23.1 +43.0 12.7	51 21.6 +43.3 13.0	52 20.0 +43.5 13.3	53 18.3 +43.9 13.6	80
81	47 10.7 +41.5 10.7	48 09.6 +41.8 10.9	49 08.5 +42.0 11.2	50 07.3 +42.2 11.4	51 06.1 +42.4 11.6	52 04.9 +42.6 11.9	53 03.5 +42.9 12.2	54 02.2 +43.1 12.4	81
82	47 52.2 +41.0 9.7	48 51.4 +41.1 9.9	49 50.5 +41.3 10.1	50 49.5 +41.6 10.3	51 48.5 +41.8 10.5	52 47.5 +42.0 10.7	53 46.4 +42.2 11.0	54 45.3 +42.4 11.3	82
83	48 33.2 +40.3 8.6	49 32.5 +40.5 8.7	50 31.8 +40.7 8.9	51 31.1 +40.8 9.1	52 30.3 +41.0 9.3	53 29.5 +41.2 9.5	54 28.6 +41.5 9.8	55 27.7 +41.7 10.0	83
84	49 13.5 +39.7 7.4	50 13.0 +39.8 7.6	51 12.5 +39.9 7.8	52 11.9 +40.1 7.9	53 11.3 +40.3 8.1	54 10.7 +40.5 8.3	55 10.1 +40.6 8.5	56 09.4 +40.8 8.7	84
85	49 53.2 +38.9 6.3	50 52.8 +39.1 6.4	51 52.4 +39.2 6.6	52 52.0 +39.3 6.7	53 51.6 +39.5 6.9	54 51.2 +39.6 7.0	55 50.7 +39.8 7.2	56 50.2 +40.0 7.4	85
86	50 32.1 +38.2 5.1	51 31.9 +38.3 5.2	52 31.6 +38.4 5.3	53 31.3 +38.6 5.4	54 31.1 +38.6 5.6	55 30.8 +38.7 5.7	56 30.5 +38.9 5.9	57 30.2 +39.0 6.0	86
87	51 10.3 +37.4 3.9	52 10.2 +37.4 4.0	53 10.0 +37.6 4.1	54 09.9 +37.6 4.1	55 09.7 +37.7 4.3	56 09.5 +37.9 4.4	57 09.4 +37.9 4.5	58 09.2 +38.0 4.6	87
88	51 47.7 +36.6 2.6	52 47.6 +36.7 2.7	53 47.6 +36.7 2.7	54 47.5 +36.7 2.8	55 47.4 +36.8 2.9	56 47.4 +36.8 3.0	57 47.3 +36.9 3.0	58 47.2 +37.0 3.1	88
89	52 24.3 +35.7 1.3	53 24.3 +35.7 1.4	54 24.3 +35.7 1.4	55 24.2 +35.8 1.4	56 24.2 +35.8 1.5	57 24.2 +35.8 1.5	58 24.2 +35.8 1.5	59 24.2 +35.8 1.6	89
90	53 00.0 +34.8 0.0	54 00.0 +34.8 0.0	55 00.0 +34.8 0.0	56 00.0 +34.7 0.0	57 00.0 +34.7 0.0	58 00.0 +34.7 0.0	59 00.0 +34.7 0.0	60 00.0 +34.7 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180°....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 126°, 234°

LATITUDE SAME NAME AS DECLINATION — N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	20 11.6	+51.0	119.2	19 42.2	+51.5	119.5	19 12.4	+52.0	119.8	18 42.5	+52.4	120.1	18 12.2	+52.9	120.4	17 41.7	+53.4	120.7	17 10.9	+53.8	121.0	16 39.9	+54.3	121.2	0
1	21 02.6	+50.9	118.7	20 33.7	+51.4	119.0	20 04.4	+52.0	119.3	19 34.9	+52.4	119.6	19 05.1	+52.9	119.9	18 35.1	+53.3	120.2	18 04.7	+53.8	120.5	17 34.2	+54.1	120.8	1
2	21 53.5	+50.8	118.1	21 25.1	+51.3	118.4	20 56.4	+51.8	118.8	20 27.3	+52.3	119.1	19 58.0	+52.8	119.4	19 28.4	+53.2	119.7	18 58.5	+53.6	120.0	18 28.3	+54.1	120.3	2
3	22 44.3	+50.7	117.5	22 16.4	+51.2	117.9	21 47.9	+51.7	118.2	21 19.6	+52.2	118.6	20 50.8	+52.6	118.9	20 21.6	+53.1	119.2	19 52.1	+53.6	119.6	19 22.4	+54.0	119.9	3
4	23 34.9	+50.5	116.9	23 07.6	+51.0	117.3	22 39.9	+51.5	117.7	22 11.8	+52.1	118.0	21 43.4	+52.6	118.4	21 14.7	+53.1	118.7	20 45.7	+53.5	119.1	20 16.4	+53.9	119.4	4
5	24 25.4	+50.4	116.3	23 58.6	+50.9	116.7	23 31.4	+51.5	117.1	23 03.9	+52.0	117.5	22 36.0	+52.5	117.9	22 07.8	+52.9	118.2	21 39.2	+53.4	118.6	21 10.3	+53.9	118.9	5
6	25 15.8	+50.2	115.7	24 49.5	+50.8	116.2	24 22.9	+51.3	116.6	23 55.9	+51.8	117.0	23 28.5	+52.4	117.4	23 00.7	+52.9	117.7	22 32.6	+53.4	118.1	22 04.2	+53.8	118.5	6
7	26 06.0	+50.1	115.1	25 40.3	+50.7	115.6	25 14.2	+51.2	116.0	24 47.7	+51.8	116.4	24 20.9	+52.2	116.8	23 53.6	+52.7	117.2	23 26.0	+53.2	117.6	22 58.0	+53.7	118.0	7
8	26 56.1	+49.9	114.5	26 31.0	+50.5	115.0	26 05.4	+51.1	115.4	25 39.5	+51.6	115.9	25 13.1	+52.1	116.3	24 46.4	+52.6	116.7	24 19.2	+53.1	117.1	23 51.7	+53.6	117.5	8
9	27 46.0	+49.7	113.9	27 21.5	+50.3	114.4	26 56.5	+50.9	114.8	26 31.1	+51.5	115.3	26 05.2	+52.1	115.7	25 39.0	+52.5	116.2	25 12.3	+53.1	116.6	24 45.3	+53.5	117.0	9
10	28 35.7	+49.6	113.3	28 11.8	+50.2	113.8	27 47.4	+50.8	114.2	27 22.6	+51.3	114.7	26 57.3	+51.8	115.2	26 31.5	+52.4	115.6	26 05.4	+52.9	116.1	25 38.8	+53.4	116.5	10
11	29 25.3	+49.4	112.6	29 02.0	+50.0	113.1	28 38.2	+50.6	113.6	28 13.9	+51.2	114.1	27 49.1	+51.8	114.6	27 23.9	+52.3	115.1	26 58.3	+52.8	115.5	26 32.2	+53.3	116.0	11
12	30 14.7	+49.1	112.0	29 52.0	+49.8	112.5	29 28.8	+50.4	113.0	29 05.1	+51.0	113.5	28 40.9	+51.6	114.0	28 16.2	+52.1	114.5	27 51.1	+52.6	115.0	27 25.5	+53.1	115.5	12
13	31 03.8	+49.0	111.3	30 41.8	+49.6	111.8	30 19.2	+50.2	112.4	29 56.1	+50.8	112.9	29 32.5	+51.4	113.4	29 08.3	+52.0	114.0	28 43.7	+52.6	114.5	28 18.6	+53.1	115.0	13
14	31 52.8	+48.7	110.6	31 31.4	+49.4	111.2	31 09.4	+50.1	111.8	30 46.9	+50.7	112.3	30 23.9	+51.3	112.9	30 00.3	+51.9	113.4	29 36.3	+52.3	113.9	29 11.7	+52.9	114.4	14
15	32 41.5	+48.5	109.9	32 20.8	+49.2	110.5	31 59.5	+49.8	111.1	31 37.6	+50.5	111.7	31 15.2	+51.0	112.2	30 52.2	+51.6	112.8	30 28.6	+52.3	113.4	30 04.6	+52.8	113.9	15
16	33 30.0	+48.3	109.2	33 10.0	+49.0	109.8	32 49.3	+49.7	110.4	32 28.1	+50.3	111.0	32 06.2	+51.0	111.6	31 43.8	+51.6	112.2	31 20.9	+52.1	112.8	30 57.4	+52.6	113.3	16
17	34 18.3	+48.0	108.5	33 59.0	+48.7	109.1	33 39.0	+49.4	109.8	33 18.4	+50.0	110.4	32 57.2	+50.7	111.0	32 35.4	+51.3	111.6	32 13.0	+51.9	112.2	31 50.0	+52.5	112.8	17
18	35 06.3	+47.8	107.8	34 47.7	+48.5	108.4	34 28.4	+49.2	109.1	34 08.4	+49.9	109.7	33 47.9	+50.5	110.4	33 26.7	+51.1	111.0	33 04.9	+51.8	111.6	32 42.5	+52.4	112.2	18
19	35 54.1	+47.4	107.0	35 36.2	+48.2	107.7	35 17.6	+48.9	108.4	34 58.3	+49.6	109.1	34 38.4	+50.3	109.7	34 17.8	+51.0	110.4	33 56.7	+51.5	111.0	33 34.9	+52.1	111.6	19
20	36 41.5	+47.2	106.3	36 24.4	+47.9	107.0	36 06.5	+48.7	107.7	35 47.9	+49.4	108.4	35 28.7	+50.1	109.0	35 08.8	+50.7	109.7	34 48.2	+51.4	110.4	34 27.0	+52.0	111.0	20
21	37 28.7	+46.9	105.5	37 12.3	+47.7	106.2	36 55.2	+48.4	107.0	36 37.3	+49.2	107.7	36 18.8	+49.8	108.4	35 59.5	+50.6	109.1	35 39.6	+51.2	109.7	35 19.0	+51.8	110.4	21
22	38 15.6	+46.5	104.7	38 00.0	+47.3	105.5	37 43.6	+48.1	106.2	37 26.5	+48.8	106.9	37 08.6	+49.6	107.7	36 50.1	+50.2	108.4	36 30.8	+50.9	109.1	36 10.8	+51.6	109.8	22
23	39 02.1	+46.2	103.9	38 47.3	+47.0	104.7	38 31.7	+47.8	105.4	38 15.3	+48.6	106.2	37 58.2	+49.4	107.0	37 40.3	+50.1	107.7	37 21.7	+50.8	108.4	37 02.4	+51.4	109.2	23
24	39 48.3	+45.8	103.1	39 34.3	+46.7	103.9	39 19.5	+47.5	104.7	39 03.9	+48.3	105.5	38 47.6	+49.0	106.2	38 30.4	+49.8	107.0	38 12.5	+50.5	107.8	37 53.8	+51.2	108.5	24
25	40 34.1	+45.5	102.2	40 21.0	+46.3	103.1	40 07.0	+47.2	103.9	39 52.2	+48.0	104.7	39 36.6	+48.8	105.5	39 20.2	+49.5	106.3	39 03.0	+50.2	107.1	38 45.0	+50.9	107.8	25
26	41 19.6	+45.1	101.4	41 07.3	+46.0	102.2	40 54.2	+46.8	103.1	40 40.2	+47.7	103.9	40 25.4	+48.4	104.7	40 09.7	+49.2	105.6	39 53.2	+50.0	106.4	39 35.9	+50.7	107.2	26
27	42 04.7	+44.6	100.5	41 53.3	+45.6	101.4	41 41.0	+46.5	102.2	41 27.9	+47.3	103.1	41 13.8	+48.2	104.0	40 58.9	+49.0	104.8	40 43.2	+49.7	105.6	40 26.6	+50.4	106.5	27
28	42 49.3	+44.2	99.6	42 38.9	+45.1	100.5	42 27.5	+46.0	101.4	42 15.2	+46.9	102.3	42 02.0	+47.8	103.2	41 47.9	+48.6	104.0	41 32.9	+49.4	104.9	41 17.0	+50.2	105.7	28
29	43 33.5	+43.7	98.6	43 24.0	+44.7	99.6	43 13.5	+45.7	100.5	43 02.1	+46.6	101.4	42 49.8	+47.4	102.3	42 36.5	+48.3	103.2	42 22.3	+49.1	104.1	42 07.2	+49.9	105.0	29
30	44 17.2	+43.3	97.7	44 08.7	+44.3	98.7	43 59.2	+45.2	99.6	43 48.7	+46.1	100.6	43 37.2	+47.1	101.5	43 24.8	+47.9	102.4	43 11.4	+48.8	103.3	42 57.1	+49.6	104.3	30
31	45 00.5	+42.8	96.7	44 53.0	+43.7	97.7	44 44.4	+44.8	98.7	44 34.8	+45.8	99.7	44 24.3	+46.6	100.6	44 12.7	+47.6	101.6	44 00.2	+48.4	102.5	43 46.7	+49.2	103.5	31
32	45 43.3	+42.2	95.7	45 36.7	+43.3	96.7	45 29.2	+44.3	97.7	45 20.6	+45.3	98.8	45 10.9	+46.3	99.7	45 00.3	+47.1	100.7	44 48.6	+48.0	101.7	44 35.9	+48.9	102.7	32
33	46 25.5	+41.6	94.7	46 20.0	+42.7	95.7	46 13.5	+43.8	96.8	46 05.9	+44.8	97.8	45 57.2	+45.8	98.8	45 47.4	+46.8	99.9	45 36.6	+47.7	100.9	45 24.8	+48.6	101.9	33
34	47 07.1	+41.1	93.6	47 02.7	+42.2	94.7	46 57.3	+43.2	95.8	46 50.7	+44.3	96.8	46 43.0	+45.3	97.9	46 34.2	+46.3	98.9	46 24.3	+47.2	100.0	46 13.4	+48.1	101.0	34
35	47 48.2	+40.4	92.6	47 44.9	+41.6	93.7	47 40.5	+42.7	94.8	47 35.0	+43.7	95.9	47 28.3	+44.8	96.9	47 20.5	+45.8	98.0	47 11.5	+46.9	99.1	47 01.5	+47.8	100.1	35
36	48 28.6	+39.8	91.5	48 26.5	+41.0	92.6	48 23.2	+42.1	93.7	48 18.7	+43.2	94.8	48 13.1	+44.3	95.9	48 06.3	+45.3	97.1	47 58.4	+46.3	98.2	47 49.3	+47.3	99.3	36
37	49 08.4	+39.1	90.3	49 07.5	+40.3	91.5	49 05.3	+41.5	92.6	49 01.9	+42.7	93.8	48 57.4	+43.7	94.9	48 51.6	+44.9	96.1	48 44.7	+45.9	97.2	48 36.6	+46.9	98.3	37
38	49 47.5	+38.4	89.2	49 47.8	+39.6	90.3	49 46.8	+40.8	91.5	49 44.6	+42.0	92.7	49 41.1	+43.2	93.9	49 36.5	+44.2	95.1	49 30.6	+45.3	96.2	49 23.5	+46.4	97.4	38
39	50 25.9	+37.6	88.0	50 27.4	+38.9	89.2	50 27.6	+40.1	90.4	50 26.6	+41.3	91.6	50 24.3	+42.5	92.8	50 20.7	+43.7	94.0	50 15.9	+44.8	95.2	50 09.9	+45.8	96.4	39
40	51 03.5	+36.8	86.7	51 06.3	+38.1	88.0	51 07.7	+39.4	89.2	51 07.9	+40.7	90.4	51 06.8	+41.9	91.7	51 04.4	+43.1	92.9	51 00.7	+44.2	94.2	50 55.7	+45.4	95.4	40
41	51 40.3	+36.0	85.5	51 44.4	+37.3	86.7	51 47.1	+38.7	88.0	51 48.6	+39.9	89.3	51 48.7	+41.2	90.5	51 47.5	+42.4	91.8	51 44.9	+43.6	93.1	51 41.1	+44.7	94.3	41
42	52 16.3	+35.1	84.2	52 21.7	+36.5	85.5	52 25.8	+37.8	86.7	52 28.5	+39.2	88.0	52 29.9	+40.4	89.3	52 29.9	+41.7	90.6	52 28.5	+43.0	92.0	52 25.8	+44.1	93.3	42
43	52 51.4	+34.1	82.8	52 58.2	+35.5	84.1	53 03.6	+37.0	85.5	53 07.7	+38.3	86.8	53 10.3	+39.7	88.1	53 11.6	+41.0	89.5	53 11.5	+42.2	90.8	53 09.9	+43.5	92.1	43
44	53 25.5	+33.3	81.5	53 33.8	+34.6	82.8	53 40.6	+36.1	84.1	53 46.0	+37.5	85.5	53 50.0	+38.9	86.9	53 52.6	+40.2	88.2	53 53.7	+41.5	89.6	53 53.4	+42.9	91.0	44
45	53 58.8	+32.2	80.0	54 08.4	+33.7	81.4	54 16.7	+35.1	82.8	54 23.5	+36.6	84.2	54 28.9	+38.0	85.6	54 32.8	+39.4	87.0	54 35.2	+40.8	88.4	54 36.2	+42.1	89.8	45
46	54 31.0	+31.1	78.6	54 42.1	+32.7	80.0	54 51.8	+34.2	81.4	55 00.1	+35.6	82.8	55 06.9	+37.0	84.2	55 12.2	+38.5	85.6	55 16.0	+39.9	87.1	55 18.3	+41.2	88.5	46
47	55 02.1	+30.0	77.1	55 14.8	+31.5	78.5	55 26.0	+33.1	79.9	55 35.7	+34.6	81.4	55 43.9	+36.1	82.8	55 50.7	+37.5	84.3	55 55.9	+39.0	85.8	55 59.5	+40.5	87.2	47
48	55 32.1	+28.9	75.6	55 46.3	+30.5	77.0	55 59.1	+32.0	78.5	56 10.3	+33.6	79.9	56 20.0	+35.1	81.4	56 28.2	+36.7	82.9	56 34.9	+38.1	84.4	56 40.0	+39.5	85.9	48
49	56 01.0	+27.7	74.0	56 16.8	+29.2	75.5	56 31.1	+30.8	76.9	56 43.9	+32.4	78.4	56 55.1	+34.1	79.9	57 04.9	+35.5	81.4	57 13.0	+37.1	83.0	57 19.5	+38.6	84.5	49
50	56 28.7	+26.4	72.4	56 46.0	+28.1	73.9	57 01.9	+29.7	75.4	57 16.3	+31.3	76.9	57 29.2	+32.9	78.4	57 40.4	+34.5	80.0	57 50.1	+36.0	81.5	57 58.1	+37.6	83.1	50
51	56 55.1	+25.1	70.8	57 14.1	+26.7	72.3	57 31.6	+28.4	73.8	57 47.6	+30.1	75.3	58 02.1	+31.6	76.8	58 14.9	+33.3	78.4	58 26.1	+35.0	80.0	58 35.7	+36.6	81.6	51
52	57 20.2	+23.7	69.1	57 40.8	+25.4	70.6	58 00.0	+27.1	72.1	58 17.7	+28.7	73.7	58 33.7	+30.5	75.2	58 48.2	+32.2	76.8	59 01.1	+33.8	78.4	59 12.3	+35.4	80.1	52
53	57 43.9	+22.3	67.4	58 06.2	+24.0	68.9	58 27.1	+25.7	70.4	58 46.4	+27.4	72.0	59 04.2	+29.1	73.6	59 20.4	+30.8	75.2	59 34.9	+32.5	76.8	59 47.7	+34.2	78.5	53
54	58 06.2	+20.9	65.7	58 30.2	+22.6	67.2	58 52.8	+24.2	68.7	59 13.8	+26.0	70.2	59 33.3	+27.8	71.8	59 51.2	+29.5	73.5	60 07.4	+31.3	75.1	60 21.9	+33.0	76.8	54
55	58 27.1	+19.3	63.9	58 52.8	+21.0	65.4	59 17.0	+22.8	66.9	59 39.8	+24.6	68.5	60 01.1	+26.3	70.1	60 20.7	+28.1	71.7	60 38.7	+29.8	73.4	60 54.9	+31.6	75.1	55
56	58 46.4	+17.8	62.1	59 13.8	+19.5	63.6	59 39.8	+21.3	65.1	60 04.4	+23.0	66.7	60 27.4	+24.7	68.3	60 48.8	+26.5	69.9	61 08.5	+28.4	71.6	61 26.5	+30.3	73.4	56
57	59 04.2	+16.2	60.2	59 33.3	+17.9	61.7	60 01.1	+19.6	63.2	60 27.4	+21.4	64.8	60 52.1	+23.2	66.4	61 15.3	+25.1	68.1	61 36.9	+26.9	69.8	61 56.8	+28.7	71.6	57
58	59 20.4	+14.5	58.3	59 51.2	+16.2	59.8	60 20.7	+18.0	61.3	60 48.8	+19.7	62.9	61 15.3	+21.6	64.5	61 40.4	+23.4	66.2	62 03.8	+25.3	67.9	62 25.5	+27.2	69.7	58
59	59 34.9	+12.8	56.4	60 07.4	+14.5	57.9	60 38.7	+16.2	59.4	61 08.5	+18.0	60.9	61 36.9	+19.9	62.6	62 03.8	+21.7	64.2	62 29.1	+23.6	66.0	62 52.7	+25.5	67.7	59
60	59 47.7	+11.1	54.5	60 21.9	+12.8	55.9	60 54.9	+14.5	57.4	61 26.5	+16.3	59.0	61 56.8	+18.1	60.6	62 25.5	+19.9	62.3	62 52.7	+21.8	63.8	63 18.2	+23.8	65.7	60
61	59 58.8	+9.4	52.5	60 34.7	+11.0	53.9	61 09.4	+12.7	55.4	61 42.8	+14.5	56.9	62 14.9	+16.2	58.5	62 45.4	+18.2	60.2	63 14.5	+20.0	61.9	63 42.0	+21.9	63.7	61
62	60 08.2	+7.5	50.6	60 45.7	+9.2	51.9	61 22.1	+10.9	53.4	61 57.3	+12.6	54.9	62 31.1	+14.4	56.4	63 03.6	+16.2	58.1	63 34.5	+18.2	59.8	64 03.9	+20.1	61.6	62
63	60 15.7	+5.8	48.6	60 54.9	+7.3	49.9	61 33.0	+8.9	51.3	62 09.9	+10.6	52.8	62 45.5	+12.5	54.3	63 19.8	+14.3	55.9	63 52.7	+16.1•	57.6	64 24.0	+18.1•	59.4	63
64	60 21.5	+3.9	46.6	61 02.2	+5.5	47.9	61 41.9	+7.1	49.2	62 20.5	+8.8	50.7	62 58.0	+10.4•	52.2	63 34.1	+12.3•	53.8	64 08.8	+14.2•	55.4	64 42.1	+16.1•	57.2	64
65	60 25.4	+2.0	44.5	61 07.7	+3.5	45.8	61 49.0	+5.1	47.1	62 29.3	+6.7•	48.5	63 08.4	+8.5•	50.0	63 46.4	+10.2•	51.6	64 23.0	+12.1•	53.2	64 58.2	+14.0	54.9	65
66	60 27.4	+0.3	42.5	61 11.2	+1.7	43.7	61 54.1	+3.2	45.0	62 36.0	+4.8•	46.4	63 16.9	+6.4•	47.8	63 56.6	+8.1•	49.3	64 35.1	+9.9•	50.9	65 12.2	+11.8•	52.6	66
67	60 27.7	−1.6	40.5	61 12.9	−0.2	41.7	61 57.3	+1.2	42.9	62 40.8	+2.7•	44.2	63 23.3	+4.3•	45.6	64 04.7	+6.0•	47.1	64 45.0	+7.8•	48.6	65 24.0	+9.6•	50.3	67
68	60 26.1	−3.5	38.5	61 12.7	−2.2	39.6	61 58.5	−0.7	40.8	62 43.5	+0.7	42.1	63 27.6	+2.3•	43.4	64 10.7	+3.9•	44.8	64 52.8	+5.5•	46.3	65 33.6	+7.4•	47.9	68
69	60 22.6	−5.3	36.4	61 10.5	−4.0	37.5	61 57.8	−2.7•	38.6	62 44.2	−1.3•	39.9	63 29.9	+0.1•	41.1	64 14.6	+1.7•	42.5	64 58.3	+3.4•	43.9	65 41.0	+5.0•	45.5	69
70	60 17.3	−7.1	34.4	61 06.5	−5.9	35.4	61 55.1	−4.7	36.5	62 42.9	−3.3•	37.7	63 30.0	−1.9•	38.9	64 16.3	−0.5•	40.2	65 01.7	+1.0•	41.6	65 46.0	+2.8•	43.0	70
71	60 10.2	−8.9	32.4	61 00.6	−7.8	33.4	61 50.4	−6.6	34.4	62 39.6	−5.4•	35.5	63 28.1	−4.1•	36.7	64 15.8	−2.6•	37.9	65 02.7	−1.1•	39.2	65 48.8	+0.4•	40.6	71
72	60 01.3	−10.7	30.4	60 52.8	−9.6	31.3	61 43.8	−8.5	32.3	62 34.2	−7.3•	33.3	63 24.0	−6.1•	34.4	64 13.2	−4.8•	35.6	65 01.6	−3.4•	36.8	65 49.2	−1.9•	38.2	72
73	59 50.6	−12.4	28.5	60 43.2	−11.5	29.3	61 35.3	−10.4	30.2	62 26.9	−9.4	31.2	63 17.9	−8.2•	32.2	64 08.4	−7.0•	33.3	64 58.2	−5.7•	34.5	65 47.3	−4.3•	35.7	73
74	59 38.2	−14.1	26.5	60 31.7	−13.2	27.3	61 24.9	−12.3	28.2	62 17.5	−11.2	29.1	63 09.7	−10.2	30.0	64 01.4	−9.0•	31.0	64 52.5	−7.8•	32.1	65 43.0	−6.5•	33.3	74
75	59 24.1	−15.7	24.6	60 18.5	−14.9	25.3	61 12.6	−14.1	26.1	62 06.3	−13.2	26.9	62 59.5	−12.1	27.8	63 52.4	−11.2	28.8	64 44.7	−10.0•	29.8	65 36.5	−8.8•	30.9	75
76	59 08.4	−17.4	22.7	60 03.6	−16.6	23.4	60 58.5	−15.8	24.1	61 53.1	−15.0	24.9	62 47.4	−14.1	25.7	63 41.2	−13.1	26.6	64 34.7	−12.1•	27.5	65 27.7	−11.1•	28.5	76
77	58 51.0	−18.9	20.9	59 47.0	−18.3	21.5	60 42.7	−17.6	22.1	61 38.1	−16.8	22.8	62 33.3	−16.0	23.6	63 28.1	−15.1•	24.4	64 22.6	−14.3•	25.2	65 16.6	−13.2•	26.1	77
78	58 32.1	−20.5	19.0	59 28.7	−19.9	19.6	60 25.1	−19.2	20.2	61 21.3	−18.6	20.8	62 17.3	−17.9	21.5	63 13.0	−17.1	22.2	64 08.3	−16.2	23.0	65 03.4	−15.3•	23.8	78
79	58 11.6	−22.0	17.3	59 08.8	−21.4	17.7	60 05.9	−20.9	18.3	61 02.7	−20.2	18.8	61 59.4	−19.6	19.4	62 55.9	−18.9	20.1	63 52.1	−18.2	20.8	64 48.1	−17.4•	21.5	79
80	57 49.6	−23.4	15.5	58 47.4	−22.9	15.9	59 45.0	−22.4	16.4	60 42.5	−21.9	16.9	61 39.8	−21.3	17.4	62 37.0	−20.8	18.0	63 33.9	−20.1	18.6	64 30.7	−19.4	19.3	80
81	57 26.2	−24.7	13.8	58 24.5	−24.4	14.2	59 22.6	−23.9	14.6	60 20.6	−23.5	15.0	61 18.5	−23.0	15.5	62 16.2	−22.4	16.0	63 13.8	−21.9	16.5	64 11.3	−21.3	17.1	81
82	57 01.5	−26.1	12.1	58 00.1	−25.7	12.4	58 58.7	−25.4	12.8	59 57.1	−24.9	13.2	60 55.5	−24.6	13.6	61 53.8	−24.1	14.0	62 51.9	−23.6	14.5	63 50.0	−23.2	15.0	82
83	56 35.4	−27.4	10.4	57 34.4	−27.1	10.7	58 33.3	−26.8	11.0	59 32.2	−26.5	11.4	60 30.9	−26.0	11.7	61 29.7	−25.8	12.1	62 28.3	−25.3	12.5	63 26.8	−24.9	12.9	83
84	56 08.0	−28.5	8.8	57 07.3	−28.3	9.1	58 06.5	−28.0	9.3	59 05.7	−27.8	9.6	60 04.9	−27.6	9.8	61 03.9	−27.2	10.2	62 03.0	−27.0	10.5	63 01.9	−26.6	10.9	84
85	55 39.5	−29.8	7.3	56 39.0	−29.6	7.5	57 38.4	−29.3	7.7	58 37.9	−29.2	7.9	59 37.3	−28.9	8.1	60 36.7	−28.7	8.4	61 36.0	−28.4	8.6	62 35.3	−28.2	8.9	85
86	55 09.7	−30.9	5.7	56 09.4	−30.7	5.9	57 09.1	−30.6	6.0	58 08.7	−30.4	6.2	59 08.4	−30.3	6.4	60 08.0	−30.1	6.6	61 07.6	−29.9	6.8	62 07.1	−29.7	7.0	86
87	54 38.8	−31.9	4.2	55 38.7	−31.9	4.4	56 38.5	−31.7	4.5	57 38.3	−31.6	4.6	58 38.1	−31.5	4.7	59 37.9	−31.4	4.9	60 37.7	−31.3	5.0	61 37.4	−31.1	5.2	87
88	54 06.9	−33.0	2.8	55 06.8	−32.9	2.9	56 06.8	−32.9	2.9	57 06.7	−32.8	3.0	58 06.6	−32.7	3.1	59 06.5	−32.7	3.2	60 06.4	−32.6	3.3	61 06.3	−32.5	3.4	88
89	53 33.9	−33.9	1.4	54 33.9	−33.9	1.4	55 33.9	−33.9	1.4	56 33.9	−33.9	1.5	57 33.9	−33.9	1.5	58 33.8	−33.8	1.6	59 33.8	−33.8	1.6	60 33.8	−33.8	1.7	89
90	53 00.0	−34.9	0.0	54 00.0	−34.9	0.0	55 00.0	−34.9	0.0	56 00.0	−34.9	0.0	57 00.0	−34.9	0.0	58 00.0	−35.0	0.0	59 00.0	−35.0	0.0	60 00.0	−35.0	0.0	90

Each latitude cell lists: Hc (° ′)   d (′)   Z (°)

Dec.	53°	54°	55°	56°	57°	58°	59°	60°	Dec.
0	20 11.6 −51.1 119.2	19 42.2 −51.6 119.5	19 12.4 −52.0 119.8	18 42.5 −52.6 120.1	18 12.2 −53.0 120.4	17 41.7 −53.4 120.7	17 10.9 −53.8 121.0	16 39.9 −54.2 121.2	0
1	19 20.5 −51.2 119.8	18 50.6 −51.7 120.1	18 20.4 −52.2 120.4	17 49.9 −52.6 120.6	17 19.2 −53.1 120.9	16 48.3 −53.6 121.2	16 17.1 −53.9 121.4	15 45.7 −54.3 121.7	1
2	18 29.3 −51.3 120.3	17 58.9 −51.8 120.6	17 28.2 −52.3 120.9	16 57.3 −52.7 121.1	16 26.1 −53.1 121.4	15 54.7 −53.5 121.6	15 23.2 −54.0 121.9	14 51.4 −54.4 122.1	2
3	17 38.0 −51.4 120.9	17 07.1 −51.9 121.1	16 35.9 −52.3 121.4	16 04.6 −52.8 121.6	15 33.0 −53.2 121.9	15 01.2 −53.7 122.1	14 29.2 −54.1 122.3	13 57.0 −54.4 122.6	3
4	16 46.6 −51.5 121.4	16 15.2 −51.9 121.7	15 43.6 −52.4 121.9	15 11.8 −52.9 122.1	14 39.8 −53.3 122.4	14 07.5 −53.7 122.6	13 35.1 −54.0 122.8	13 02.6 −54.5 123.0	4
5	15 55.1 −51.6 121.9	15 23.3 −52.1 122.2	14 51.2 −52.5 122.4	14 18.9 −52.9 122.6	13 46.5 −53.3 122.8	13 13.9 −53.8 123.0	12 41.1 −54.2 123.2	12 08.1 −54.5 123.4	5
6	15 03.5 −51.6 122.5	14 31.2 −52.1 122.7	13 58.7 −52.5 122.9	13 26.0 −52.9 123.1	12 53.2 −53.4 123.3	12 20.1 −53.7 123.5	11 46.9 −54.1 123.7	11 13.6 −54.5 123.8	6
7	14 11.9 −51.7 123.0	13 39.1 −52.1 123.2	13 06.2 −52.6 123.4	12 33.1 −53.0 123.6	11 59.8 −53.4 123.8	11 26.4 −53.8 124.0	10 52.8 −54.2 124.1	10 19.1 −54.6 124.3	7
8	13 20.2 −51.7 123.5	12 47.0 −52.2 123.7	12 13.6 −52.6 123.9	11 40.1 −53.1 124.1	11 06.4 −53.5 124.2	10 32.6 −53.9 124.4	9 58.6 −54.2 124.5	9 24.5 −54.6 124.7	8
9	12 28.5 −51.9 124.0	11 54.8 −52.3 124.2	11 21.0 −52.7 124.4	10 47.0 −53.1 124.6	10 12.9 −53.5 124.7	9 38.7 −53.9 124.8	9 04.4 −54.3 125.0	8 29.9 −54.6 125.1	9
10	11 36.6 −51.8 124.6	11 02.5 −52.3 124.7	10 28.3 −52.7 124.9	9 53.9 −53.1 125.0	9 19.4 −53.5 125.2	8 44.8 −53.9 125.3	8 10.1 −54.3 125.4	7 35.3 −54.7 125.5	10
11	10 44.8 −52.0 125.1	10 10.2 −52.3 125.2	9 35.6 −52.8 125.4	9 00.8 −53.2 125.5	8 25.9 −53.6 125.6	7 50.9 −54.0 125.7	7 15.8 −54.3 125.8	6 40.6 −54.6 125.9	11
12	9 52.8 −51.9 125.6	9 17.9 −52.4 125.7	8 42.8 −52.8 125.8	8 07.6 −53.2 126.0	7 32.3 −53.6 126.1	6 56.9 −53.9 126.2	6 21.5 −54.3 126.3	5 46.0 −54.7 126.4	12
13	9 00.9 −52.0 126.1	8 25.5 −52.4 126.2	7 50.0 −52.8 126.3	7 14.4 −53.2 126.4	6 38.7 −53.6 126.5	6 03.0 −54.0 126.6	5 27.2 −54.4 126.7	4 51.3 −54.7 126.8	13
14	8 08.9 −52.1 126.6	7 33.1 −52.5 126.7	6 57.2 −52.9 126.8	6 21.2 −53.3 126.9	5 45.1 −53.6 127.0	5 09.0 −54.0 127.1	4 32.8 −54.4 127.1	3 56.6 −54.8 127.2	14
15	7 16.8 −52.1 127.1	6 40.6 −52.5 127.2	6 04.3 −52.9 127.3	5 27.9 −53.3 127.4	4 51.5 −53.7 127.4	4 15.0 −54.0 127.5	3 38.4 −54.3 127.5	3 01.8 −54.7 127.6	15
16	6 24.7 −52.1 127.6	5 48.1 −52.5 127.7	5 11.4 −52.9 127.8	4 34.6 −53.3 127.8	3 57.8 −53.7 127.9	3 21.0 −54.1 127.9	2 44.1 −54.4 128.0	2 07.1 −54.7 128.0	16
17	5 32.6 −52.1 128.1	4 55.6 −52.6 128.2	4 18.5 −53.0 128.2	3 41.3 −53.3 128.3	3 04.1 −53.6 128.3	2 26.9 −54.0 128.4	1 49.7 −54.4 128.4	1 12.4 −54.7 128.4	17
18	4 40.5 −52.2 128.6	4 03.0 −52.5 128.6	3 25.5 −52.9 128.7	2 48.0 −53.3 128.7	2 10.5 −53.7 128.8	1 32.9 −54.1 128.8	0 55.3 −54.4 128.8	0 17.7 −54.8 128.8	18
19	3 48.3 −52.1 129.1	3 10.5 −52.5 129.1	2 32.6 −53.0 129.2	1 54.7 −53.3 129.2	1 16.8 −53.7 129.2	0 38.8 −54.1 129.2	0 00.9 −54.3 129.2	0 37.1 +54.7 50.8	19
20	2 56.2 −52.2 129.6	2 17.9 −52.6 129.6	1 39.6 −52.9 129.6	1 01.4 −53.4 129.7	0 23.1 −53.7 129.7	0 15.2 +54.1 50.3	0 53.5 +54.4 50.3	1 31.8 +54.7 50.4	20
21	2 04.0 −52.2 130.1	1 25.3 −52.5 130.1	0 46.7 −53.0 130.1	0 08.0 −53.3 130.1	0 30.6 +53.7 49.9	1 09.3 +54.0 49.9	1 47.9 +54.4 49.9	2 26.5 +54.8 49.9	21
22	1 11.8 −52.2 130.6	0 32.8 −52.6 130.6	0 06.3 +52.9 49.4	0 45.3 +53.3 49.4	1 24.3 +53.7 49.4	2 03.3 +54.1 49.5	2 42.3 +54.4 49.5	3 21.3 +54.7 49.5	22
23	0 19.6 −52.2 131.1	0 19.8 +52.6 48.9	0 59.2 +53.0 49.0	1 38.6 +53.4 49.0	2 18.0 +53.7 49.0	2 57.4 +54.0 49.0	3 36.7 +54.4 49.1	4 16.0 +54.7 49.1	23
24	0 32.6 +52.2 48.4	1 12.4 +52.6 48.5	1 52.2 +53.0 48.5	2 32.0 +53.3 48.5	3 11.7 +53.7 48.5	3 51.4 +54.0 48.6	4 31.1 +54.3 48.6	5 10.7 +54.7 48.7	24
25	1 24.8 +52.2 48.0	2 05.0 +52.6 48.0	2 45.2 +52.9 48.1	3 25.3 +53.3 48.1	4 05.4 +53.6 48.1	4 45.4 +54.0 48.2	5 25.4 +54.4 48.2	6 05.4 +54.6 48.3	25
26	2 17.0 +52.2 47.5	2 57.6 +52.5 47.5	3 38.1 +52.9 47.5	4 18.6 +53.3 47.6	4 59.0 +53.6 47.6	5 39.4 +54.0 47.7	6 19.8 +54.3 47.8	7 00.0 +54.7 47.9	26
27	3 09.2 +52.2 47.0	3 50.1 +52.6 47.0	4 31.0 +52.9 47.1	5 11.9 +53.2 47.1	5 52.7 +53.6 47.2	6 33.4 +54.0 47.3	7 14.1 +54.3 47.4	7 54.7 +54.6 47.5	27
28	4 01.4 +52.1 46.5	4 42.7 +52.5 46.5	5 23.9 +52.9 46.6	6 05.1 +53.3 46.7	6 46.3 +53.6 46.7	7 27.4 +53.9 46.8	8 08.4 +54.2 46.9	8 49.3 +54.6 47.0	28
29	4 53.5 +52.2 46.0	5 35.2 +52.5 46.0	6 16.8 +52.9 46.1	6 58.4 +53.2 46.2	7 39.9 +53.5 46.3	8 21.3 +53.9 46.4	9 02.6 +54.3 46.5	9 43.9 +54.5 46.6	29
30	5 45.7 +52.1 45.5	6 27.7 +52.5 45.6	7 09.7 +52.8 45.6	7 51.6 +53.2 45.7	8 33.4 +53.6 45.8	9 15.2 +53.9 46.0	9 56.9 +54.2 46.1	10 38.4 +54.6 46.2	30
31	6 37.8 +52.0 45.0	7 20.2 +52.4 45.1	8 02.5 +52.8 45.2	8 44.8 +53.1 45.3	9 27.0 +53.5 45.4	10 09.1 +53.8 45.5	10 51.1 +54.1 45.6	11 33.0 +54.4 45.8	31
32	7 29.8 +52.1 44.5	8 12.6 +52.4 44.6	8 55.3 +52.8 44.7	9 37.9 +53.1 44.8	10 20.5 +53.4 44.9	11 02.9 +53.8 45.1	11 45.2 +54.1 45.2	12 27.4 +54.5 45.4	32
33	8 21.9 +52.0 44.0	9 05.0 +52.4 44.1	9 48.1 +52.7 44.2	10 31.0 +53.1 44.3	11 13.9 +53.4 44.5	11 56.7 +53.7 44.6	12 39.3 +54.1 44.8	13 21.9 +54.4 44.9	33
34	9 13.9 +51.9 43.5	9 57.4 +52.3 43.6	10 40.8 +52.7 43.7	11 24.1 +53.0 43.9	12 07.3 +53.4 44.0	12 50.4 +53.7 44.1	13 33.4 +54.1 44.3	14 16.3 +54.3 44.5	34
35	10 05.8 +51.9 43.0	10 49.7 +52.3 43.1	11 33.5 +52.6 43.3	12 17.1 +53.0 43.4	13 00.7 +53.3 43.5	13 44.1 +53.6 43.7	14 27.5 +53.9 43.9	15 10.6 +54.3 44.0	35
36	10 57.7 +51.9 42.5	11 42.0 +52.2 42.6	12 26.1 +52.6 42.7	13 10.1 +52.9 42.9	13 54.0 +53.3 43.1	14 37.8 +53.6 43.2	15 21.4 +54.0 43.4	16 04.9 +54.3 43.6	36
37	11 49.6 +51.8 41.9	12 34.2 +52.1 42.1	13 18.7 +52.5 42.2	14 03.0 +52.9 42.4	14 47.3 +53.2 42.6	15 31.4 +53.5 42.8	16 15.4 +53.8 43.0	16 59.2 +54.2 43.2	37
38	12 41.4 +51.8 41.4	13 26.3 +52.1 41.6	14 11.2 +52.4 41.7	14 55.9 +52.8 41.9	15 40.5 +53.1 42.1	16 24.9 +53.5 42.3	17 09.2 +53.8 42.5	17 53.4 +54.1 42.7	38
39	13 33.2 +51.6 40.9	14 18.4 +52.1 41.1	15 03.6 +52.4 41.2	15 48.7 +52.7 41.4	16 33.6 +53.1 41.6	17 18.4 +53.4 41.8	18 03.0 +53.8 42.0	18 47.5 +54.1 42.3	39
40	14 24.8 +51.6 40.4	15 10.5 +51.9 40.6	15 56.0 +52.3 40.7	16 41.4 +52.7 40.9	17 26.7 +53.0 41.1	18 11.8 +53.3 41.3	18 56.8 +53.6 41.6	19 41.6 +54.0 41.8	40
41	15 16.4 +51.6 39.9	16 02.4 +51.9 40.0	16 48.3 +52.3 40.2	17 34.1 +52.5 40.4	18 19.7 +52.9 40.6	19 05.1 +53.3 40.9	19 50.4 +53.6 41.1	20 35.6 +53.9 41.3	41
42	16 08.0 +51.4 39.3	16 54.3 +51.8 39.5	17 40.6 +52.1 39.7	18 26.6 +52.5 39.9	19 12.6 +52.8 40.1	19 58.4 +53.2 40.4	20 44.0 +53.5 40.6	21 29.5 +53.8 40.9	42
43	16 59.4 +51.4 38.8	17 46.1 +51.8 39.0	18 32.7 +52.1 39.2	19 19.1 +52.5 39.4	20 05.4 +52.8 39.6	20 51.6 +53.0 39.9	21 37.5 +53.4 40.1	22 23.3 +53.8 40.4	43
44	17 50.8 +51.3 38.2	18 37.9 +51.6 38.5	19 24.8 +52.0 38.7	20 11.6 +52.3 38.9	20 58.2 +52.6 39.1	21 44.6 +53.0 39.4	22 30.9 +53.4 39.6	23 17.1 +53.6 39.9	44
45	18 42.1 +51.2 37.7	19 29.5 +51.5 37.9	20 16.8 +51.8 38.1	21 03.9 +52.2 38.4	21 50.8 +52.6 38.6	22 37.6 +52.9 38.9	23 24.3 +53.2 39.1	24 10.7 +53.6 39.4	45
46	19 33.3 +51.1 37.1	20 21.0 +51.5 37.4	21 08.6 +51.8 37.6	21 56.1 +52.1 37.8	22 43.4 +52.5 38.1	23 30.5 +52.8 38.4	24 17.5 +53.1 38.6	25 04.3 +53.4 38.9	46
47	20 24.4 +50.9 36.6	21 12.5 +51.3 36.8	22 00.4 +51.7 37.1	22 48.2 +52.0 37.3	23 35.9 +52.3 37.6	24 23.3 +52.7 37.8	25 10.6 +53.1 38.1	25 57.7 +53.4 38.4	47
48	21 15.3 +50.9 36.0	22 03.8 +51.2 36.3	22 52.1 +51.5 36.5	23 40.2 +51.9 36.8	24 28.2 +52.3 37.0	25 16.0 +52.6 37.3	26 03.7 +52.9 37.6	26 51.1 +53.3 37.9	48
49	22 06.2 +50.7 35.5	22 55.0 +51.1 35.7	23 43.6 +51.5 35.9	24 32.1 +51.8 36.2	25 20.5 +52.1 36.5	26 08.6 +52.5 36.8	26 56.6 +52.8 37.1	27 44.4 +53.1 37.4	49
50	22 56.9 +50.6 34.9	23 46.1 +50.9 35.1	24 35.1 +51.3 35.4	25 23.9 +51.7 35.7	26 12.6 +52.0 35.9	27 01.1 +52.3 36.2	27 49.4 +52.6 36.6	28 37.5 +53.0 36.9	50
51	23 47.5 +50.5 34.3	24 37.0 +50.9 34.5	25 26.4 +51.2 34.8	26 15.6 +51.5 35.1	27 04.6 +51.8 35.4	27 53.4 +52.2 35.7	28 42.0 +52.6 36.0	29 30.5 +52.9 36.3	51
52	24 38.0 +50.4 33.7	25 27.9 +50.6 34.0	26 17.6 +51.0 34.2	27 07.1 +51.3 34.5	27 56.4 +51.7 34.8	28 45.6 +52.1 35.1	29 34.6 +52.4 35.4	30 23.4 +52.7 35.8	52
53	25 28.4 +50.1 33.1	26 18.5 +50.6 33.4	27 08.6 +50.9 33.6	27 58.4 +51.3 33.9	28 48.1 +51.6 34.2	29 37.7 +51.9 34.6	30 26.9 +52.2 34.9	31 16.1 +52.6 35.3	53
54	26 18.5 +50.1 32.5	27 09.1 +50.4 32.8	27 59.5 +50.7 33.0	28 49.7 +51.0 33.3	29 39.7 +51.4 33.6	30 29.6 +51.7 34.0	31 19.2 +52.1 34.3	32 08.7 +52.4 34.7	54
55	27 08.6 +49.8 31.9	27 59.5 +50.2 32.1	28 50.2 +50.5 32.4	29 40.7 +50.9 32.7	30 31.1 +51.3 33.1	31 21.3 +51.6 33.4	32 11.3 +51.9 33.7	33 01.1 +52.3 34.1	55
56	27 58.4 +49.7 31.2	28 49.7 +50.0 31.5	29 40.7 +50.4 31.8	30 31.6 +50.8 32.1	31 22.4 +51.0 32.4	32 12.9 +51.4 32.8	33 03.2 +51.8 33.1	33 53.4 +52.1 33.5	56
57	28 48.1 +49.6 30.6	29 39.7 +49.9 30.9	30 31.1 +50.2 31.2	31 22.4 +50.5 31.5	32 13.4 +50.9 31.8	33 04.3 +51.2 32.2	33 55.0 +51.6 32.5	34 45.5 +51.9 32.9	57
58	29 37.7 +49.3 30.0	30 29.6 +49.6 30.2	31 21.3 +50.0 30.6	32 12.9 +50.3 30.9	33 04.3 +50.7 31.2	33 55.5 +51.1 31.5	34 46.6 +51.4 31.9	35 37.4 +51.7 32.3	58
59	30 27.0 +49.3 29.3	31 19.2 +49.5 29.6	32 11.3 +49.8 29.9	33 03.2 +50.2 30.2	33 55.0 +50.5 30.6	34 46.6 +50.8 30.9	35 38.0 +51.1 31.3	36 29.1 +51.6 31.7	59
60	31 16.1 +48.9 28.6	32 08.7 +49.2 28.9	33 01.1 +49.6 29.2	33 53.4 +49.9 29.6	34 45.5 +50.3 29.9	35 37.4 +50.6 30.3	36 29.1 +51.0 30.6	37 20.7 +51.3 31.0	60
61	32 05.0 +48.7 28.0	32 57.9 +49.1 28.3	33 50.7 +49.4 28.6	34 43.3 +49.7 28.9	35 35.8 +50.0 29.2	36 28.0 +50.4 29.6	37 20.1 +50.7 30.0	38 12.0 +51.1 30.4	61
62	32 53.7 +48.4 27.3	33 47.0 +48.7 27.6	34 40.1 +49.1 27.9	35 33.0 +49.5 28.2	36 25.8 +49.8 28.6	37 18.4 +50.2 28.9	38 10.8 +50.6 29.3	39 03.1 +50.8 29.7	62
63	33 42.1 +48.2 26.6	34 35.7 +48.6 26.9	35 29.2 +48.9 27.2	36 22.5 +49.2 27.5	37 15.6 +49.6 27.9	38 08.6 +49.9 28.2	39 01.4 +50.2 28.6	39 53.9 +50.6 29.0	63
64	34 30.3 +48.0 25.8	35 24.3 +48.3 26.1	36 18.1 +48.6 26.5	37 11.7 +49.0 26.8	38 05.2 +49.3 27.1	38 58.5 +49.6 27.5	39 51.6 +50.0 27.9	40 44.5 +50.4 28.3	64
65	35 18.3 +47.7 25.1	36 12.6 +48.0 25.4	37 06.7 +48.3 25.7	38 00.7 +48.6 26.1	38 54.5 +49.0 26.4	39 48.1 +49.4 26.8	40 41.6 +49.7 27.2	41 34.9 +50.0 27.6	65
66	36 06.0 +47.4 24.4	37 00.6 +47.7 24.7	37 55.0 +48.1 25.0	38 49.3 +48.4 25.3	39 43.5 +48.7 25.7	40 37.5 +49.1 26.0	41 31.3 +49.4 26.4	42 24.9 +49.8 26.8	66
67	36 53.4 +47.1 23.6	37 48.3 +47.4 23.9	38 43.1 +47.7 24.2	39 37.7 +48.1 24.6	40 32.2 +48.4 24.9	41 26.6 +48.7 25.3	42 20.7 +49.1 25.7	43 14.7 +49.5 26.1	67
68	37 40.5 +46.7 22.8	38 35.7 +47.1 23.1	39 30.8 +47.4 23.4	40 25.8 +47.7 23.8	41 20.6 +48.1 24.1	42 15.3 +48.4 24.5	43 09.8 +48.8 24.9	44 04.2 +49.1 25.3	68
69	38 27.2 +46.5 22.0	39 22.8 +46.8 22.3	40 18.2 +47.1 22.6	41 13.6 +47.4 23.0	42 08.7 +47.8 23.3	43 03.7 +48.1 23.7	43 58.6 +48.4 24.1	44 53.3 +48.8 24.5	69
70	39 13.7 +46.1 21.2	40 09.6 +46.4 21.5	41 05.3 +46.8 21.8	42 01.0 +47.0 22.2	42 56.5 +47.4 22.5	43 51.8 +47.8 22.9	44 47.0 +48.1 23.2	45 42.1 +48.4 23.7	70
71	39 59.8 +45.7 20.4	40 56.0 +46.0 20.7	41 52.1 +46.3 21.0	42 48.0 +46.7 21.3	43 43.9 +47.0 21.7	44 39.6 +47.3 22.0	45 35.1 +47.7 22.4	46 30.5 +48.0 22.8	71
72	40 45.5 +45.4 19.5	41 42.0 +45.7 19.8	42 38.4 +46.0 20.1	43 34.7 +46.3 20.5	44 30.9 +46.6 20.8	45 26.9 +46.9 21.2	46 22.8 +47.2 21.6	47 18.5 +47.6 21.9	72
73	41 30.9 +45.0 18.7	42 27.7 +45.3 18.9	43 24.4 +45.6 19.2	44 21.0 +45.8 19.6	45 17.5 +46.1 19.9	46 13.8 +46.5 20.3	47 10.0 +46.8 20.6	48 06.1 +47.2 21.0	73
74	42 15.9 +44.5 17.8	43 13.0 +44.8 18.0	44 10.0 +45.1 18.3	45 06.8 +45.5 18.7	46 03.6 +45.8 19.0	47 00.3 +46.1 19.3	47 56.9 +46.3 19.7	48 53.3 +46.7 20.1	74
75	43 00.4 +44.1 16.9	43 57.8 +44.3 17.1	44 55.1 +44.6 17.4	45 52.3 +44.9 17.7	46 49.4 +45.2 18.0	47 46.4 +45.5 18.4	48 43.2 +45.8 18.7	49 40.0 +46.2 19.1	75
76	43 44.5 +43.6 15.9	44 42.1 +43.9 16.2	45 39.7 +44.2 16.5	46 37.2 +44.5 16.8	47 34.6 +44.8 17.1	48 31.9 +45.1 17.4	49 29.1 +45.4 17.8	50 26.2 +45.7 18.1	76
77	44 28.1 +43.1 15.0	45 26.0 +43.4 15.2	46 23.9 +43.7 15.5	47 21.7 +43.9 15.8	48 19.4 +44.2 16.1	49 17.0 +44.5 16.4	50 14.5 +44.8 16.7	51 11.9 +45.1 17.1	77
78	45 11.2 +42.7 14.0	46 09.4 +42.9 14.2	47 07.6 +43.1 14.5	48 05.6 +43.4 14.8	49 03.6 +43.7 15.1	50 01.5 +44.0 15.4	50 59.3 +44.2 15.7	51 57.0 +44.5 16.0	78
79	45 53.9 +42.0 13.0	46 52.3 +42.3 13.2	47 50.7 +42.5 13.5	48 49.0 +42.8 13.7	49 47.2 +43.1 14.0	50 45.4 +43.4 14.3	51 43.5 +43.6 14.6	52 41.5 +43.9 14.9	79
80	46 35.9 +41.5 11.9	47 34.6 +41.7 12.2	48 33.2 +42.0 12.4	49 31.8 +42.2 12.7	50 30.3 +42.5 12.9	51 28.8 +42.7 13.2	52 27.1 +43.0 13.5	53 25.4 +43.3 13.8	80
81	47 17.4 +40.9 10.9	48 16.3 +41.2 11.1	49 15.2 +41.3 11.3	50 14.0 +41.6 11.6	51 12.8 +41.7 11.8	52 11.5 +42.0 12.1	53 10.1 +42.3 12.3	54 08.7 +42.5 12.6	81
82	47 58.3 +40.3 9.8	48 57.5 +40.4 10.0	49 56.5 +40.7 10.2	50 55.6 +40.8 10.4	51 54.5 +41.1 10.6	52 53.5 +41.3 10.9	53 52.4 +41.5 11.1	54 51.2 +41.8 11.4	82
83	48 38.6 +39.6 8.7	49 37.9 +39.8 8.9	50 37.2 +40.0 9.1	51 36.4 +40.2 9.3	52 35.6 +40.4 9.5	53 34.8 +40.5 9.7	54 33.9 +40.8 9.9	55 33.0 +41.0 10.2	83
84	49 18.2 +39.1 7.5	50 17.7 +39.1 7.7	51 17.2 +39.2 7.9	52 16.6 +39.4 8.0	53 16.0 +39.5 8.2	54 15.3 +39.8 8.4	55 14.7 +39.9 8.6	56 14.0 +40.1 8.9	84
85	49 57.2 +38.1 6.4	50 56.8 +38.3 6.5	51 56.4 +38.4 6.7	52 56.0 +38.6 6.8	53 55.5 +38.8 7.0	54 55.1 +38.9 7.1	55 54.6 +39.1 7.3	56 54.1 +39.2 7.5	85
86	50 35.3 +37.5 5.2	51 35.1 +37.5 5.3	52 34.8 +37.7 5.4	53 34.6 +37.7 5.5	54 34.3 +37.8 5.7	55 34.0 +38.0 5.8	56 33.7 +38.1 6.0	57 33.3 +38.3 6.1	86
87	51 12.8 +36.6 3.9	52 12.6 +36.7 4.0	53 12.5 +36.7 4.1	54 12.3 +36.9 4.2	55 12.1 +37.0 4.3	56 12.0 +37.1 4.4	57 11.8 +37.1 4.5	58 11.6 +37.2 4.7	87
88	51 49.4 +35.7 2.7	52 49.3 +35.8 2.7	53 49.2 +35.9 2.8	54 49.2 +35.9 2.8	55 49.1 +36.0 2.9	56 49.0 +36.0 3.0	57 48.9 +36.1 3.1	58 48.8 +36.2 3.2	88
89	52 25.1 +34.9 1.3	53 25.1 +34.9 1.4	54 25.1 +34.9 1.4	55 25.1 +34.9 1.4	56 25.1 +34.9 1.5	57 25.0 +35.0 1.5	58 25.0 +35.0 1.6	59 25.0 +35.0 1.6	89
90	53 00.0 +33.9 0.0	54 00.0 +33.9 0.0	55 00.0 +33.9 0.0	56 00.0 +33.9 0.0	57 00.0 +33.9 0.0	58 00.0 +33.8 0.0	59 00.0 +33.8 0.0	60 00.0 +33.8 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z ; L.H.A. less than 180°............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	19 39.9	+50.9	118.3	19 11.3	+51.4	118.6	18 42.5	+51.8	118.9	18 13.3	+52.3	119.2	17 43.9	+52.8	119.5	17 14.2	+53.3	119.8	16 44.3	+53.7	120.0	16 14.2	+54.1	120.3	0
1	20 30.8	+50.7	117.7	20 02.7	+51.2	118.1	19 34.3	+51.8	118.4	19 05.6	+52.3	118.7	18 36.7	+52.7	119.0	18 07.5	+53.1	119.3	17 38.0	+53.6	119.6	17 08.3	+54.0	119.8	1
2	21 21.5	+50.6	117.2	20 53.9	+51.2	117.5	20 26.1	+51.6	117.9	19 57.9	+52.1	118.2	19 29.4	+52.6	118.5	19 00.6	+53.1	118.8	18 31.6	+53.5	119.1	18 02.3	+54.0	119.4	2
3	22 12.1	+50.5	116.6	21 45.1	+51.0	117.0	21 17.7	+51.5	117.3	20 50.0	+52.1	117.6	20 22.0	+52.6	118.0	19 53.7	+53.0	118.3	19 25.1	+53.5	118.6	18 56.3	+53.8	118.9	3
4	23 02.6	+50.3	116.0	22 36.1	+50.9	116.4	22 09.2	+51.5	116.8	21 42.1	+51.9	117.1	21 14.6	+52.4	117.5	20 46.7	+53.0	117.8	20 18.6	+53.4	118.1	19 50.1	+53.9	118.5	4
5	23 52.9	+50.2	115.4	23 27.0	+50.8	115.8	23 00.7	+51.3	116.2	22 34.0	+51.9	116.6	22 07.0	+52.3	116.9	21 39.7	+52.8	117.3	21 12.0	+53.3	117.6	20 44.0	+53.7	118.0	5
6	24 43.1	+50.1	114.8	24 17.8	+50.6	115.2	23 52.0	+51.2	115.6	23 25.9	+51.7	116.0	22 59.3	+52.3	116.4	22 32.5	+52.7	116.8	22 05.3	+53.2	117.2	21 37.7	+53.7	117.5	6
7	25 33.2	+49.9	114.2	25 08.4	+50.5	114.6	24 43.2	+51.0	115.1	24 17.6	+51.6	115.5	23 51.6	+52.1	115.9	23 25.2	+52.6	116.3	22 58.5	+53.1	116.7	22 31.4	+53.6	117.0	7
8	26 23.1	+49.8	113.6	25 58.9	+50.3	114.0	25 34.2	+50.9	114.5	25 09.2	+51.4	114.9	24 43.7	+52.0	115.3	24 17.8	+52.5	115.7	23 51.6	+53.0	116.1	23 25.0	+53.4	116.5	8
9	27 12.9	+49.5	113.0	26 49.2	+50.2	113.4	26 25.1	+50.8	113.9	26 00.6	+51.4	114.3	25 35.7	+51.9	114.8	25 10.3	+52.4	115.2	24 44.6	+52.9	115.6	24 18.4	+53.4	116.0	9
10	28 02.4	+49.4	112.3	27 39.4	+50.0	112.8	27 15.9	+50.6	113.3	26 52.0	+51.2	113.8	26 27.6	+51.7	114.2	26 02.7	+52.3	114.7	25 37.5	+52.8	115.1	25 11.8	+53.3	115.5	10
11	28 51.8	+49.3	111.7	28 29.4	+49.9	112.2	28 06.5	+50.5	112.7	27 43.2	+51.0	113.2	27 19.3	+51.6	113.7	26 55.0	+52.2	114.1	26 30.3	+52.6	114.6	26 05.1	+53.2	115.0	11
12	29 41.1	+49.0	111.0	29 19.3	+49.6	111.6	28 57.0	+50.3	112.1	28 34.2	+50.9	112.6	28 10.9	+51.5	113.1	27 47.2	+52.0	113.6	27 22.9	+52.6	114.0	26 58.3	+53.0	114.5	12
13	30 30.1	+48.8	110.4	30 08.9	+49.5	110.9	29 47.3	+50.1	111.4	29 25.1	+50.7	112.0	29 02.4	+51.3	112.5	28 39.2	+51.8	113.0	28 15.5	+52.4	113.5	27 51.3	+53.0	114.0	13
14	31 18.9	+48.6	109.7	30 58.4	+49.3	110.2	30 37.4	+49.9	110.8	30 15.8	+50.4	111.4	29 53.7	+51.1	111.9	29 31.0	+51.8	112.4	29 07.9	+52.3	112.9	28 44.3	+52.8	113.4	14
15	32 07.5	+48.4	109.0	31 47.7	+49.0	109.6	31 27.3	+49.7	110.2	31 06.3	+50.4	110.7	30 44.8	+51.0	111.3	30 22.8	+51.5	111.8	30 00.2	+52.1	112.4	29 37.1	+52.6	112.9	15
16	32 55.9	+48.1	108.3	32 36.7	+48.8	108.9	32 17.0	+49.5	109.5	31 56.7	+50.1	110.1	31 35.8	+50.8	110.7	31 14.3	+51.4	111.2	30 52.3	+52.0	111.8	30 29.7	+52.6	112.4	16
17	33 44.0	+47.9	107.6	33 25.5	+48.6	108.2	33 06.5	+49.3	108.8	32 46.8	+50.0	109.4	32 26.6	+50.5	110.0	32 05.7	+51.2	110.6	31 44.3	+51.8	111.2	31 22.3	+52.4	111.8	17
18	34 31.9	+47.6	106.8	34 14.1	+48.4	107.5	33 55.8	+49.0	108.1	33 36.8	+49.7	108.8	33 17.1	+50.4	109.4	32 56.9	+51.0	110.0	32 36.1	+51.6	110.6	32 14.7	+52.2	111.2	18
19	35 19.5	+47.3	106.1	35 02.5	+48.1	106.8	34 44.8	+48.8	107.4	34 26.5	+49.5	108.1	34 07.5	+50.2	108.8	33 47.9	+50.9	109.4	33 27.7	+51.5	110.0	33 06.9	+52.0	110.6	19
20	36 06.8	+47.0	105.3	35 50.6	+47.8	106.0	35 33.6	+48.6	106.7	35 16.0	+49.3	107.4	34 57.7	+50.0	108.1	34 38.8	+50.6	108.7	34 19.2	+51.2	109.4	33 58.9	+51.9	110.0	20
21	36 53.8	+46.8	104.6	36 38.4	+47.5	105.3	36 22.2	+48.3	106.0	36 05.3	+49.0	106.7	35 47.7	+49.7	107.4	35 29.4	+50.4	108.1	35 10.4	+51.1	108.8	34 50.8	+51.7	109.4	21
22	37 40.6	+46.4	103.8	37 25.9	+47.2	104.5	37 10.5	+48.0	105.3	36 54.3	+48.8	106.0	36 37.4	+49.5	106.7	36 19.8	+50.2	107.4	36 01.5	+50.8	108.1	35 42.5	+51.5	108.8	22
23	38 27.0	+46.1	103.0	38 13.1	+46.9	103.8	37 58.5	+47.7	104.5	37 43.1	+48.4	105.3	37 26.9	+49.2	106.0	37 10.0	+49.9	106.7	36 52.3	+50.7	107.5	36 34.0	+51.3	108.2	23
24	39 13.1	+45.7	102.2	39 00.0	+46.6	103.0	38 46.2	+47.4	103.7	38 31.5	+48.2	104.5	38 16.1	+48.9	105.3	37 59.9	+49.7	106.0	37 43.0	+50.3	106.8	37 25.3	+51.0	107.5	24
25	39 58.8	+45.3	101.3	39 46.6	+46.2	102.1	39 33.6	+47.0	102.9	39 19.7	+47.9	103.7	39 05.0	+48.7	104.5	38 49.6	+49.4	105.3	38 33.3	+50.2	106.1	38 16.3	+50.9	106.9	25
26	40 44.1	+45.0	100.5	40 32.8	+45.9	101.3	40 20.6	+46.7	102.1	40 07.6	+47.5	103.0	39 53.7	+48.4	103.8	39 39.0	+49.1	104.6	39 23.5	+49.9	105.4	39 07.2	+50.6	106.2	26
27	41 29.1	+44.5	99.6	41 18.7	+45.4	100.5	41 07.3	+46.4	101.3	40 55.1	+47.2	102.2	40 42.1	+48.0	103.0	40 28.1	+48.9	103.8	40 13.4	+49.6	104.7	39 57.8	+50.3	105.5	27
28	42 13.6	+44.2	98.7	42 04.1	+45.1	99.6	41 53.7	+46.0	100.5	41 42.3	+46.9	101.3	41 30.1	+47.7	102.2	41 17.0	+48.5	103.1	41 03.0	+49.3	103.9	40 48.1	+50.1	104.8	28
29	42 57.8	+43.6	97.8	42 49.2	+44.6	98.7	42 39.7	+45.5	99.6	42 29.2	+46.5	100.5	42 17.8	+47.3	101.4	42 05.5	+48.2	102.3	41 52.3	+49.0	103.2	41 38.2	+49.7	104.0	29
30	43 41.4	+43.2	96.8	43 33.8	+44.2	97.8	43 25.2	+45.2	98.7	43 15.7	+46.0	99.6	43 05.1	+47.0	100.6	42 53.7	+47.8	101.5	42 41.3	+48.6	102.4	42 27.9	+49.5	103.3	30
31	44 24.6	+42.7	95.9	44 18.0	+43.7	96.8	44 10.4	+44.7	97.8	44 01.7	+45.7	98.7	43 52.1	+46.6	99.7	43 41.5	+47.5	100.6	43 29.9	+48.4	101.6	43 17.4	+49.2	102.5	31
32	45 07.3	+42.2	94.9	45 01.7	+43.2	95.9	44 55.0	+44.3	96.9	44 47.4	+45.2	97.8	44 38.7	+46.1	98.8	44 29.0	+47.1	99.8	44 18.3	+47.9	100.8	44 06.6	+48.8	101.7	32
33	45 49.5	+41.6	93.8	45 44.9	+42.7	94.9	45 39.3	+43.7	95.9	45 32.6	+44.7	96.9	45 24.8	+45.8	97.9	45 16.1	+46.6	98.9	45 06.2	+47.6	99.9	44 55.4	+48.5	100.9	33
34	46 31.1	+41.0	92.8	46 27.6	+42.1	93.9	46 23.0	+43.2	94.9	46 17.3	+44.3	96.0	46 10.6	+45.2	97.0	46 02.7	+46.2	98.0	45 53.8	+47.2	99.0	45 43.9	+48.0	100.1	34
35	47 12.1	+40.4	91.7	47 09.7	+41.6	92.8	47 06.2	+42.6	93.9	47 01.6	+43.7	95.0	46 55.8	+44.8	96.0	46 48.9	+45.8	97.1	46 41.0	+46.7	98.1	46 31.9	+47.7	99.2	35
36	47 52.5	+39.8	90.6	47 51.3	+40.9	91.8	47 48.8	+42.1	92.9	47 45.3	+43.2	94.0	47 40.6	+44.2	95.1	47 34.7	+45.3	96.1	47 27.7	+46.3	97.2	47 19.6	+47.3	98.3	36
37	48 32.3	+39.1	89.5	48 32.2	+40.3	90.7	48 30.9	+41.5	91.8	48 28.5	+42.6	92.9	48 24.8	+43.7	94.0	48 20.0	+44.8	95.2	48 14.0	+45.8	96.3	48 06.9	+46.8	97.4	37
38	49 11.4	+38.4	88.4	49 12.5	+39.6	89.5	49 12.4	+40.8	90.7	49 11.1	+41.9	91.8	49 08.5	+43.1	93.0	49 04.8	+44.2	94.2	48 59.8	+45.3	95.3	48 53.7	+46.3	96.4	38
39	49 49.8	+37.6	87.2	49 52.1	+38.9	88.4	49 53.2	+40.1	89.6	49 53.0	+41.4	90.7	49 51.6	+42.6	91.9	49 49.0	+43.6	93.1	49 45.1	+44.8	94.3	49 40.0	+45.8	95.5	39
40	50 27.4	+36.9	86.0	50 31.0	+38.2	87.2	50 33.3	+39.5	88.4	50 34.4	+40.6	89.6	50 34.2	+41.8	90.8	50 32.6	+43.1	92.0	50 29.9	+44.2	93.3	50 25.8	+45.3	94.5	40
41	51 04.3	+36.1	84.7	51 09.2	+37.4	86.0	51 12.8	+38.6	87.2	51 15.0	+40.0	88.4	51 16.0	+41.2	89.7	51 15.7	+42.4	90.9	51 14.1	+43.5	92.2	51 11.1	+44.7	93.4	41
42	51 40.4	+35.2	83.4	51 46.6	+36.5	84.7	51 51.4	+37.9	86.0	51 55.0	+39.2	87.2	51 57.2	+40.5	88.5	51 58.1	+41.7	89.8	51 57.6	+43.0	91.1	51 55.8	+44.1	92.4	42
43	52 15.6	+34.3	82.1	52 23.1	+35.7	83.4	52 29.3	+37.1	84.7	52 34.2	+38.4	86.0	52 37.7	+39.7	87.3	52 39.8	+41.0	88.6	52 40.6	+42.2	89.9	52 39.9	+43.5	91.2	43
44	52 49.9	+33.3	80.8	52 58.8	+34.8	82.1	53 06.4	+36.2	83.4	53 12.6	+37.5	84.7	53 17.4	+38.9	86.1	53 20.8	+40.2	87.4	53 22.8	+41.5	88.8	53 23.4	+42.8	90.1	44
45	53 23.2	+32.4	79.4	53 33.6	+33.8	80.7	53 42.6	+35.2	82.1	53 50.1	+36.7	83.4	53 56.3	+38.1	84.8	54 01.0	+39.5	86.2	54 04.3	+40.8	87.5	54 06.2	+42.1	88.9	45
46	53 55.6	+31.3	78.0	54 07.4	+32.8	79.3	54 17.8	+34.3	80.7	54 26.8	+35.8	82.1	54 34.4	+37.1	83.5	54 40.5	+38.5	84.9	54 45.1	+40.0	86.3	54 48.3	+41.3	87.7	46
47	54 26.9	+30.3	76.5	54 40.2	+31.8	77.9	54 52.1	+33.3	79.3	55 02.6	+34.7	80.7	55 11.5	+36.3	82.1	55 19.0	+37.7	83.5	55 25.1	+39.1	85.0	55 29.6	+40.5	86.4	47
48	54 57.2	+29.1	75.0	55 12.0	+30.7	76.4	55 25.4	+32.2	77.8	55 37.3	+33.7	79.2	55 47.8	+35.2	80.7	55 56.7	+36.7	82.1	56 04.2	+38.1	83.6	56 10.1	+39.6	85.1	48
49	55 26.3	+28.0	73.5	55 42.7	+29.5	74.9	55 57.6	+31.1	76.3	56 11.0	+32.7	77.8	56 23.0	+34.2	79.2	56 33.4	+35.8	80.7	56 42.3	+37.3	82.2	56 49.7	+38.7	83.7	49
50	55 54.3	+26.7	71.9	56 12.2	+28.3	73.3	56 28.7	+29.9	74.8	56 43.7	+31.5	76.3	56 57.2	+33.1	77.7	57 09.2	+34.6	79.3	57 19.6	+36.1	80.8	57 28.4	+37.7	82.3	50
51	56 21.0	+25.5	70.3	56 40.5	+27.1	71.7	56 58.6	+28.7	73.2	57 15.2	+30.3	74.7	57 30.3	+31.9	76.2	57 43.8	+33.5	77.7	57 55.7	+35.2	79.3	58 06.1	+36.7	80.9	51
52	56 46.5	+24.1	68.7	57 07.6	+25.8	70.1	57 27.3	+27.4	71.6	57 45.5	+29.1	73.1	58 02.2	+30.7	74.6	58 17.3	+32.4	76.2	58 30.9	+33.9	77.8	58 42.8	+35.5	79.4	52
53	57 10.6	+22.8	67.0	57 33.4	+24.4	68.4	57 54.7	+26.1	69.9	58 14.6	+27.7	71.4	58 32.9	+29.4	73.0	58 49.7	+31.1	74.6	59 04.8	+32.8	76.2	59 18.3	+34.5	77.8	53
54	57 33.4	+21.3	65.3	57 57.8	+23.0	66.7	58 20.8	+24.6	68.2	58 42.3	+26.4	69.7	59 02.3	+28.1	71.3	59 20.8	+29.7	72.9	59 37.6	+31.5	74.5	59 52.8	+33.2	76.2	54
55	57 54.7	+19.9	63.5	58 20.8	+21.5	65.0	58 45.4	+23.3	66.5	59 08.7	+24.9	68.0	59 30.4	+26.7	69.6	59 50.5	+28.4	71.2	60 09.1	+30.1	72.8	60 26.0	+31.8	74.5	55
56	58 14.6	+18.3	61.7	58 42.3	+20.0	63.2	59 08.7	+21.7	64.7	59 33.6	+23.5	66.2	59 57.1	+25.1	67.8	60 18.9	+27.0	69.4	60 39.2	+28.8	71.1	60 57.8	+30.6	72.8	56
57	58 32.9	+16.8	59.9	59 02.3	+18.5	61.4	59 30.4	+20.1	62.8	59 57.1	+21.8	64.4	60 22.2	+23.7	66.0	60 45.9	+25.4	67.6	61 08.0	+27.2	69.3	61 28.4	+29.0	71.0	57
58	58 49.7	+15.1	58.1	59 20.8	+16.8	59.5	59 50.5	+18.6	61.0	60 18.9	+20.3	62.5	60 45.9	+22.1	64.1	61 11.3	+23.9	65.7	61 35.2	+25.7	67.4	61 57.4	+27.5	69.1	58
59	59 04.8	+13.5	56.2	59 37.6	+15.2	57.6	60 09.1	+16.9	59.1	60 39.2	+18.4	60.6	61 08.0	+20.4	62.2	61 35.2	+22.2	63.8	62 00.9	+24.0	65.5	62 24.9	+25.8	67.2	59
60	59 18.3	+11.9	54.3	59 52.8	+13.4	55.7	60 26.0	+15.1	57.1	60 57.8	+16.9	58.7	61 28.4	+18.6	60.2	61 57.4	+20.5	61.8	62 24.9	+22.4	63.5	62 50.9	+24.2	65.3	60
61	59 30.2	+10.1	52.4	60 06.2	+11.8	53.7	60 41.1	+13.4	55.2	61 14.7	+15.2	56.7	61 47.0	+16.9	58.2	62 17.9	+18.7	59.8	62 47.3	+20.6	61.5	63 15.1	+22.5	63.3	61
62	59 40.3	+8.4	50.4	60 18.0	+9.9	51.8	60 54.5	+11.6	53.2	61 29.9	+13.3	54.6	62 03.9	+15.1	56.2	62 36.6	+16.9	57.8	63 07.9	+18.7	59.4	63 37.6	+20.6	61.2	62
63	59 48.7	+6.6	48.5	60 27.9	+8.2	49.8	61 06.1	+9.8	51.2	61 43.2	+11.4	52.6	62 19.0	+13.2	54.1	62 53.5	+15.0	55.7	63 26.6	+16.8	57.3	63 58.2	+18.8	59.1	63
64	59 55.3	+4.8	46.5	60 36.1	+6.3	47.8	61 15.9	+7.9	49.1	61 54.6	+9.6	50.5	62 32.2	+11.2	52.0	63 08.5	+13.0•	53.6	63 43.4	+14.9•	55.2	64 17.0	+16.7•	56.9	64
65	60 00.1	+3.0	44.5	60 42.4	+4.5	45.7	61 23.8	+6.0	47.0	62 04.2	+7.6•	48.4	62 43.4	+9.3	49.9	63 21.5	+11.0•	51.4	63 58.3	+12.8•	53.0	64 33.7	+14.7	54.7	65
66	60 03.1	+1.1	42.5	60 46.9	+2.6	43.7	61 29.8	+4.1	45.0	62 11.8	+5.6	46.3	62 52.7	+7.3•	47.7	63 32.5	+9.0•	49.2	64 11.1	+10.7•	50.7	64 48.4	+12.6•	52.4	66
67	60 04.2	-0.6	40.5	60 49.5	+0.7	41.6	61 33.9	+2.2	42.9	62 17.4	+3.7•	44.2	63 00.0	+5.2•	45.5	63 41.5	+6.8•	47.0	64 21.8	+8.6•	48.5	65 01.0	+10.4•	50.1	67
68	60 03.6	-2.5	38.5	60 50.2	-1.1	39.6	61 36.1	+0.2	40.8	62 21.1	+1.6•	42.0	63 05.2	+3.2•	43.3	63 48.3	+4.8•	44.7	64 30.4	+6.5•	46.2	65 11.4	+8.2•	47.7	68
69	60 01.1	-4.2	36.5	60 49.1	-3.1	37.5	61 36.3	-1.7	38.7	62 22.7	-0.3	39.9	63 08.4	+1.1•	41.1	63 53.1	+2.7•	42.5	64 36.9	+4.3•	43.9	65 19.6	+6.0•	45.4	69
70	59 56.9	-6.1	34.5	60 46.0	-4.8	35.5	61 34.6	-3.7	36.6	62 22.4	-2.3•	37.7	63 09.5	-0.9•	38.9	63 55.8	+0.5•	40.2	64 41.2	+2.0•	41.5	65 25.6	+3.7•	43.0	70
71	59 50.8	-7.8	32.5	60 41.0	-5.5	33.5	61 30.9	-5.5	34.5	62 20.1	-4.3•	35.5	63 08.6	-3.1•	36.7	63 56.3	-1.6•	37.9	64 43.2	-0.1•	39.2	65 29.3	+1.3•	40.6	71
72	59 43.0	-9.6	30.5	60 34.4	-8.5	31.4	61 25.4	-7.5	32.4	62 15.8	-6.3•	33.4	63 05.5	-5.0•	34.5	63 54.7	-3.8•	35.6	64 43.1	-2.4•	36.9	65 30.6	-0.9•	38.2	72
73	59 33.4	-11.3	28.6	60 25.9	-10.4	29.4	61 17.9	-9.3	30.3	62 09.5	-8.3	31.3	63 00.5	-7.1•	32.3	63 50.9	-5.9•	33.4	64 40.7	-4.6•	34.5	65 29.7	-3.2•	35.8	73
74	59 22.1	-13.0	26.6	60 15.5	-12.1	27.4	61 08.6	-11.2	28.3	62 01.2	-10.2	29.1	62 53.4	-9.1•	30.1	63 45.0	-8.0•	31.1	64 36.1	-6.8•	32.2	65 26.5	-5.4•	33.4	74
75	59 09.1	-14.7	24.7	60 03.4	-13.8	25.5	60 57.4	-13.0	26.2	61 51.0	-11.9	27.1	62 44.3	-11.1	27.9	63 37.0	-10.0•	28.9	64 29.3	-8.9•	29.9	65 21.1	-7.8•	31.0	75
76	58 54.4	-16.3	22.9	59 49.6	-15.6	23.5	60 44.4	-14.7	24.2	61 39.0	-13.9	25.0	62 33.2	-13.0	25.8	63 27.0	-12.1•	26.7	64 20.4	-11.0•	27.6	65 13.3	-9.9•	28.6	76
77	58 38.1	-17.9	21.0	59 34.0	-17.2	21.6	60 29.7	-16.5	22.3	61 25.1	-15.8	22.9	62 20.2	-14.9	23.7	63 14.9	-14.0	24.5	64 09.4	-13.1•	25.3	65 03.4	-12.1•	26.2	77
78	58 20.2	-19.4	19.2	59 16.8	-18.8	19.7	60 13.2	-18.1	20.3	61 09.3	-17.2	20.9	62 05.3	-16.8	21.6	63 00.9	-16.0	22.3	63 56.3	-15.2•	23.1	64 51.3	-14.3•	23.9	78
79	58 00.8	-20.9	17.4	58 58.0	-20.3	17.9	59 55.0	-19.8	18.4	60 51.9	-19.2	19.0	61 48.5	-18.5	19.6	62 44.9	-17.8	20.2	63 41.1	-17.1	20.9	64 37.0	-16.3•	21.7	79
80	57 39.9	-22.3	15.6	58 37.7	-21.9	16.1	59 35.2	-21.3	16.5	60 32.7	-20.8	17.0	61 30.0	-20.3	17.6	62 27.1	-19.6	18.1	63 24.0	-19.0	18.8	64 20.7	-18.3	19.4	80
81	57 17.6	-23.7	13.9	58 15.8	-23.3	14.3	59 13.9	-22.9	14.7	60 11.9	-22.4	15.1	61 09.7	-21.9	15.6	62 07.5	-21.4	16.0	63 05.0	-20.8	16.6	64 02.4	-20.2	17.2	81
82	56 53.9	-25.1	12.2	57 52.5	-24.7	12.5	58 51.0	-24.3	12.9	59 49.5	-24.0	13.3	60 47.8	-23.5	13.7	61 46.1	-23.1	14.1	62 44.2	-22.6	14.6	63 42.2	-22.1	15.1	82
83	56 28.8	-26.3	10.5	57 27.8	-26.1	10.8	58 26.7	-25.8	11.1	59 25.5	-25.4	11.5	60 24.3	-25.1	11.8	61 23.0	-24.7	12.2	62 21.6	-24.3	12.6	63 20.1	-23.9	13.0	83
84	56 02.5	-27.6	8.9	57 01.7	-27.4	9.2	58 00.9	-27.1	9.4	59 00.1	-26.9	9.7	59 59.2	-26.5	10.0	60 58.3	-26.3	10.3	61 57.3	-25.9	10.6	62 56.2	-25.5	11.0	84
85	55 34.9	-28.8	7.3	56 34.4	-28.6	7.5	57 33.8	-28.4	7.7	58 33.3	-28.2	8.0	59 32.7	-28.0	8.2	60 32.0	-27.7	8.4	61 31.4	-27.5	8.7	62 30.7	-27.2	9.0	85
86	55 06.1	-29.9	5.8	56 05.8	-29.8	6.0	57 05.4	-29.6	6.1	58 05.1	-29.5	6.3	59 04.7	-29.3	6.5	60 04.3	-29.1	6.7	61 03.9	-28.9	6.9	62 03.5	-28.8	7.1	86
87	54 36.2	-31.1	4.3	55 36.3	-30.9	4.4	56 35.8	-30.9	4.5	57 35.6	-30.7	4.6	58 35.4	-30.6	4.8	59 35.2	-30.5	4.9	60 35.0	-30.4	5.1	61 34.7	-30.2	5.2	87
88	54 05.1	-32.0	2.8	55 05.1	-32.1	2.9	56 05.0	-32.0	3.0	57 04.9	-31.9	3.1	58 04.8	-31.8	3.1	59 04.7	-31.7	3.2	60 04.6	-31.7	3.3	61 04.5	-31.6	3.4	88
89	53 33.1	-33.1	1.4	54 33.0	-33.0	1.4	55 33.0	-33.0	1.5	56 33.0	-33.0	1.5	57 33.0	-33.0	1.5	58 33.0	-33.0	1.6	59 32.9	-32.9	1.6	60 32.9	-32.9	1.7	89
90	53 00.0	-34.0	0.0	54 00.0	-34.0	0.0	55 00.0	-34.1	0.0	56 00.0	-34.1	0.0	57 00.0	-34.1	0.0	58 00.0	-34.1	0.0	59 00.0	-34.1	0.0	60 00.0	-34.2	0.0	90

| | **53°** | | | **54°** | | | **55°** | | | **56°** | | | **57°** | | | **58°** | | | **59°** | | | **60°** | | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 56°, 304°

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	19 39.9	−50.9	118.3	19 11.3	−51.4	118.6	18 42.5	−52.0	118.9	18 13.3	−52.4	119.2	17 43.9	−52.9	119.5	17 14.2	−53.3	119.8	16 44.3	−53.7	120.0	16 14.2	−54.2	120.3	0
1	18 49.0	−51.0	118.9	18 19.9	−51.5	119.2	17 50.5	−52.0	119.4	17 20.9	−52.5	119.7	16 51.0	−52.9	120.0	16 20.9	−53.4	120.2	15 50.6	−53.8	120.5	15 20.0	−54.2	120.7	1
2	17 58.0	−51.2	119.4	17 28.4	−51.7	119.7	16 58.5	−52.1	120.0	16 28.4	−52.5	120.2	15 58.1	−53.0	120.5	15 27.5	−53.4	120.7	14 56.8	−53.9	121.0	14 25.8	−54.2	121.2	2
3	17 06.8	−51.2	120.0	16 36.7	−51.7	120.2	16 06.4	−52.2	120.5	15 35.9	−52.7	120.7	15 05.1	−53.1	121.0	14 34.1	−53.5	121.2	14 02.9	−53.9	121.4	13 31.6	−54.3	121.6	3
4	16 15.6	−51.3	120.5	15 45.0	−51.7	120.8	15 14.2	−52.2	121.0	14 43.2	−52.7	121.2	14 12.0	−53.1	121.5	13 40.6	−53.5	121.7	13 09.0	−53.9	121.9	12 37.3	−54.4	122.1	4
5	15 24.3	−51.4	121.1	14 53.3	−51.9	121.3	14 22.0	−52.3	121.5	13 50.5	−52.7	121.7	13 18.9	−53.2	121.9	12 47.1	−53.6	122.1	12 15.1	−54.0	122.3	11 42.9	−54.3	122.5	5
6	14 32.9	−51.4	121.6	14 01.4	−51.9	121.8	13 29.7	−52.4	122.0	12 57.8	−52.8	122.2	12 25.7	−53.2	122.4	11 53.5	−53.6	122.6	11 21.1	−54.0	122.8	10 48.6	−54.5	122.9	6
7	13 41.5	−51.5	122.1	13 09.5	−52.0	122.3	12 37.3	−52.4	122.5	12 05.0	−52.9	122.7	11 32.5	−53.3	122.9	10 59.9	−53.7	123.0	10 27.1	−54.1	123.2	9 54.1	−54.4	123.4	7
8	12 50.0	−51.6	122.6	12 17.5	−52.0	122.8	11 44.9	−52.5	123.0	11 12.1	−52.9	123.2	10 39.2	−53.3	123.3	10 06.2	−53.7	123.5	9 33.0	−54.1	123.6	8 59.7	−54.5	123.8	8
9	11 58.4	−51.6	123.2	11 25.5	−52.1	123.3	10 52.4	−52.5	123.5	10 19.2	−52.9	123.7	9 45.9	−53.3	123.8	9 12.5	−53.8	124.0	8 38.9	−54.1	124.1	8 05.2	−54.5	124.2	9
10	11 06.8	−51.7	123.7	10 33.4	−52.1	123.9	9 59.9	−52.6	124.0	9 26.3	−53.0	124.1	8 52.6	−53.4	124.3	8 18.7	−53.8	124.4	7 44.8	−54.2	124.5	7 10.7	−54.5	124.6	10
11	10 15.1	−51.8	124.2	9 41.3	−52.2	124.4	9 07.3	−52.6	124.5	8 33.3	−53.0	124.6	7 59.2	−53.4	124.7	7 24.9	−53.8	124.8	6 50.6	−54.2	125.0	6 16.2	−54.5	125.0	11
12	9 23.3	−51.8	124.7	8 49.1	−52.2	124.9	8 14.7	−52.6	125.0	7 40.3	−53.0	125.1	7 05.8	−53.5	125.2	6 31.1	−53.8	125.3	5 56.4	−54.2	125.4	5 21.7	−54.6	125.5	12
13	8 31.5	−51.8	125.2	7 56.9	−52.3	125.4	7 22.1	−52.7	125.5	6 47.3	−53.1	125.6	6 12.3	−53.5	125.7	5 37.3	−53.8	125.7	5 02.2	−54.2	125.8	4 27.1	−54.6	125.9	13
14	7 39.7	−51.8	125.7	7 04.6	−52.3	125.8	6 29.4	−52.7	125.9	5 54.2	−53.1	126.0	5 18.9	−53.5	126.1	4 43.5	−53.9	126.2	4 08.0	−54.2	126.2	3 32.5	−54.6	126.3	14
15	6 47.9	−51.9	126.2	6 12.3	−52.3	126.3	5 36.7	−52.7	126.4	5 01.1	−53.1	126.5	4 25.4	−53.5	126.6	3 49.6	−53.9	126.6	3 13.8	−54.3	126.7	2 37.9	−54.6	126.7	15
16	5 56.0	−52.0	126.8	5 20.0	−52.3	126.8	4 44.0	−52.7	126.9	4 08.0	−53.2	127.0	3 31.9	−53.5	127.1	2 55.7	−53.9	127.1	2 19.5	−54.2	127.1	1 43.3	−54.6	127.1	16
17	5 04.0	−51.9	127.3	4 27.7	−52.4	127.3	3 51.3	−52.8	127.4	3 14.8	−53.1	127.4	2 38.4	−53.6	127.5	2 01.8	−53.9	127.5	1 25.3	−54.3	127.5	0 48.7	−54.6	127.5	17
18	4 12.1	−52.0	127.8	3 35.3	−52.3	127.8	2 58.5	−52.7	127.9	2 21.7	−53.2	127.9	1 44.8	−53.5	127.9	1 07.9	−53.9	127.9	0 31.0	−54.2	128.0	0 05.9	+54.6	52.0	18
19	3 20.1	−51.9	128.3	2 43.0	−52.4	128.3	2 05.8	−52.8	128.3	1 28.5	−53.1	128.4	0 51.3	−53.5	128.4	0 14.0	−53.9	128.4	0 23.2	+54.3	51.6	1 00.5	+54.6	51.6	19
20	2 28.2	−52.0	128.8	1 50.6	−52.4	128.8	1 13.0	−52.8	128.8	0 35.4	−53.2	128.8	0 02.2	+53.6	51.2	0 39.9	+53.9	51.2	1 17.5	+54.2	51.2	1 55.1	+54.6	51.2	20
21	1 36.2	−52.0	129.3	0 58.2	−52.4	129.3	0 20.2	−52.8	129.3	0 17.8	+53.1	50.7	0 55.8	+53.5	50.7	1 33.8	+53.8	50.7	2 11.7	+54.3	50.8	2 49.7	+54.5	50.8	21
22	0 44.2	−52.0	129.8	0 05.8	−52.1	129.8	0 32.6	+52.8	50.2	1 10.9	+53.2	50.2	1 49.3	+53.5	50.3	2 27.6	+53.9	50.3	3 06.0	+54.2	50.3	3 44.2	+54.6	50.4	22
23	0 07.8	+52.0	49.7	0 46.6	+52.4	49.7	1 25.4	+52.7	49.8	2 04.1	+53.2	49.8	2 42.8	+53.5	49.8	3 21.5	+53.9	49.9	4 00.2	+54.2	49.9	4 38.8	+54.6	50.0	23
24	0 59.8	+52.0	49.2	1 39.0	+52.4	49.3	2 18.1	+52.8	49.3	2 57.3	+53.1	49.3	3 36.3	+53.5	49.4	4 15.4	+53.9	49.4	4 54.4	+54.2	49.5	5 33.4	+54.5	49.5	24
25	1 51.8	+52.0	48.7	2 31.4	+52.3	48.8	3 10.9	+52.7	48.8	3 50.4	+53.1	48.9	4 29.8	+53.5	48.9	5 09.3	+53.8	49.0	5 48.6	+54.2	49.0	6 27.9	+54.5	49.1	25
26	2 43.8	+52.0	48.2	3 23.7	+52.4	48.3	4 03.6	+52.8	48.3	4 43.5	+53.1	48.4	5 23.3	+53.5	48.5	6 03.1	+53.8	48.5	6 42.8	+54.2	48.6	7 22.4	+54.5	48.7	26
27	3 35.8	+51.9	47.7	4 16.1	+52.3	47.8	4 56.4	+52.7	47.9	5 36.6	+53.1	47.9	6 16.8	+53.4	48.0	6 56.9	+53.8	48.1	7 37.0	+54.1	48.2	8 16.9	+54.5	48.3	27
28	4 27.7	+52.0	47.2	5 08.4	+52.3	47.3	5 49.1	+52.7	47.4	6 29.7	+53.0	47.5	7 10.2	+53.4	47.5	7 50.7	+53.8	47.6	8 31.1	+54.1	47.7	9 11.4	+54.4	47.9	28
29	5 19.7	+51.9	46.7	6 00.7	+52.3	46.8	6 41.8	+52.6	46.9	7 22.7	+53.1	47.0	8 03.6	+53.4	47.1	8 44.5	+53.7	47.2	9 25.2	+54.1	47.3	10 05.8	+54.4	47.4	29
30	6 11.6	+51.8	46.2	6 53.0	+52.3	46.3	7 34.4	+52.7	46.4	8 15.8	+53.0	46.5	8 57.0	+53.4	46.6	9 38.2	+53.7	46.7	10 19.3	+54.0	46.9	11 00.2	+54.4	47.0	30
31	7 03.4	+51.9	45.7	7 45.3	+52.2	45.8	8 27.1	+52.6	45.9	9 08.8	+52.9	46.0	9 50.4	+53.3	46.2	10 31.9	+53.6	46.3	11 13.3	+54.0	46.4	11 54.6	+54.3	46.6	31
32	7 55.3	+51.8	45.2	8 37.5	+52.2	45.3	9 19.7	+52.5	45.4	10 01.7	+52.9	45.6	10 43.7	+53.3	45.7	11 25.5	+53.6	45.8	12 07.3	+53.9	46.0	12 48.9	+54.3	46.1	32
33	8 47.1	+51.8	44.7	9 29.7	+52.2	44.8	10 12.2	+52.5	44.9	10 54.6	+52.9	45.1	11 37.0	+53.2	45.2	12 19.2	+53.5	45.4	13 01.2	+54.0	45.5	13 43.2	+54.3	45.7	33
34	9 38.9	+51.7	44.2	10 21.9	+52.0	44.3	11 04.7	+52.5	44.5	11 47.5	+52.8	44.6	12 30.2	+53.1	44.7	13 12.7	+53.5	44.9	13 55.2	+53.8	45.1	14 37.5	+54.1	45.3	34
35	10 30.6	+51.7	43.7	11 13.9	+52.1	43.8	11 57.2	+52.4	44.1	12 40.3	+52.8	44.1	13 23.3	+53.2	44.3	14 06.2	+53.5	44.4	14 49.0	+53.8	44.6	15 31.6	+54.2	44.8	35
36	11 22.3	+51.6	43.2	12 06.0	+52.0	43.3	12 49.6	+52.3	43.5	13 33.1	+52.7	43.6	14 16.5	+53.0	43.8	14 59.7	+53.4	44.0	15 42.8	+53.8	44.2	16 25.8	+54.1	44.4	36
37	12 13.9	+51.6	42.6	12 58.0	+51.9	42.8	13 41.9	+52.3	43.0	14 25.8	+52.6	43.1	15 09.5	+53.0	43.3	15 53.1	+53.4	43.5	16 36.6	+53.6	43.7	17 19.9	+54.0	43.9	37
38	13 05.5	+51.5	42.1	13 49.9	+51.9	42.3	14 34.2	+52.3	42.5	15 18.4	+52.6	42.6	16 02.5	+53.0	42.8	16 46.5	+53.3	43.0	17 30.2	+53.7	43.2	18 13.9	+53.9	43.5	38
39	13 57.0	+51.4	41.6	14 41.8	+51.8	41.8	15 26.5	+52.1	41.9	16 11.0	+52.5	42.1	16 55.5	+52.8	42.3	17 39.7	+53.2	42.5	18 23.9	+53.5	42.8	19 07.8	+53.9	43.0	39
40	14 48.4	+51.3	41.1	15 33.6	+51.7	41.2	16 18.6	+52.1	41.4	17 03.5	+52.5	41.6	17 48.3	+52.8	41.8	18 32.9	+53.2	42.1	19 17.4	+53.5	42.3	20 01.7	+53.8	42.5	40
41	15 39.7	+51.3	40.5	16 25.3	+51.6	40.7	17 10.7	+52.0	40.9	17 56.0	+52.3	41.1	18 41.1	+52.7	41.3	19 26.1	+53.0	41.6	20 10.9	+53.4	41.8	20 55.5	+53.7	42.1	41
42	16 31.0	+51.2	40.0	17 16.9	+51.6	40.2	18 02.7	+51.9	40.4	18 48.3	+52.3	40.6	19 33.8	+52.6	40.8	20 19.1	+53.0	41.1	21 04.3	+53.3	41.3	21 49.2	+53.7	41.6	42
43	17 22.2	+51.1	39.4	18 08.5	+51.4	39.6	18 54.6	+51.8	39.9	19 40.6	+52.2	40.1	20 26.4	+52.5	40.3	21 12.1	+52.9	40.6	21 57.6	+53.2	40.8	22 42.9	+53.5	41.1	43
44	18 13.3	+51.0	38.9	18 59.9	+51.4	39.1	19 46.4	+51.8	39.3	20 32.8	+52.1	39.6	21 18.9	+52.5	39.8	22 05.0	+52.7	40.1	22 50.8	+53.1	40.3	23 36.4	+53.5	40.6	44
45	19 04.3	+50.9	38.3	19 51.3	+51.3	38.6	20 38.2	+51.6	38.8	21 24.9	+51.9	39.0	22 11.4	+52.3	39.3	22 57.7	+52.7	39.5	23 43.9	+53.0	39.8	24 29.9	+53.4	40.1	45
46	19 55.2	+50.8	37.8	20 42.6	+51.1	38.0	21 29.8	+51.5	38.2	22 16.8	+51.9	38.5	23 03.7	+52.2	38.7	23 50.4	+52.6	39.0	24 36.9	+53.0	39.3	25 23.3	+53.2	39.6	46
47	20 46.0	+50.7	37.2	21 33.7	+51.1	37.4	22 21.3	+51.4	37.7	23 08.7	+51.8	37.9	23 55.9	+52.1	38.2	24 43.0	+52.4	38.5	25 29.9	+52.8	38.8	26 16.5	+53.2	39.1	47
48	21 36.7	+50.6	36.6	22 24.8	+50.9	36.9	23 12.7	+51.3	37.1	24 00.5	+51.6	37.4	24 48.0	+52.0	37.7	25 35.4	+52.4	38.0	26 22.7	+52.6	38.3	27 09.7	+53.0	38.6	48
49	22 27.3	+50.4	36.1	23 15.7	+50.8	36.3	24 04.0	+51.2	36.6	24 52.1	+51.5	36.8	25 40.0	+51.9	37.1	26 27.8	+52.2	37.4	27 15.3	+52.6	37.7	28 02.7	+52.9	38.0	49
50	23 17.7	+50.3	35.5	24 06.5	+50.7	35.7	24 55.2	+51.0	36.0	25 43.6	+51.4	36.3	26 31.9	+51.7	36.6	27 20.0	+52.1	36.9	28 07.9	+52.4	37.2	28 55.6	+52.8	37.5	50
51	24 08.0	+50.2	34.9	24 57.2	+50.5	35.1	25 46.2	+50.9	35.4	26 35.0	+51.2	35.7	27 23.6	+51.6	36.0	28 12.1	+51.9	36.3	29 00.3	+52.3	36.6	29 48.4	+52.6	37.0	51
52	24 58.2	+50.0	34.3	25 47.7	+50.4	34.5	26 37.1	+50.7	34.8	27 26.2	+51.1	35.1	28 15.2	+51.5	35.4	29 04.0	+51.8	35.7	29 52.6	+52.2	36.1	30 41.0	+52.5	36.4	52
53	25 48.2	+49.9	33.7	26 38.1	+50.1	33.9	27 27.8	+50.6	34.2	28 17.3	+50.9	34.5	29 06.7	+51.3	34.8	29 55.8	+51.6	35.1	30 45.3	+51.9	35.4	31 33.5	+52.2	35.8	53
54	26 38.1	+49.7	33.0	27 28.3	+50.1	33.3	28 18.4	+50.4	33.6	29 08.2	+50.8	33.9	29 58.0	+51.1	34.2	30 47.5	+51.4	34.6	31 36.8	+51.8	34.9	32 25.9	+52.2	35.3	54
55	27 27.8	+49.5	32.4	28 18.4	+49.8	32.7	29 08.8	+50.2	33.0	29 59.0	+50.6	33.3	30 49.1	+50.9	33.6	31 38.9	+51.3	34.0	32 28.6	+51.7	34.3	33 18.1	+52.0	34.7	55
56	28 17.3	+49.4	31.8	29 08.2	+49.8	32.1	29 59.0	+50.1	32.4	30 49.6	+50.4	32.7	31 40.0	+50.8	33.0	32 30.2	+51.2	33.3	33 20.3	+51.4	33.7	34 10.1	+51.8	34.1	56
57	29 06.7	+49.1	31.1	29 58.0	+49.5	31.4	30 49.1	+49.8	31.7	31 40.0	+50.2	32.0	32 30.8	+50.6	32.4	33 21.4	+50.9	32.7	34 11.7	+51.3	33.1	35 01.9	+51.7	33.5	57
58	29 55.8	+49.0	30.5	30 47.5	+49.3	30.8	31 38.9	+49.7	31.1	32 30.2	+50.1	31.4	33 21.4	+50.3	31.7	34 12.3	+50.7	32.1	35 03.0	+51.1	32.5	35 53.6	+51.4	32.8	58
59	30 44.8	+48.7	29.8	31 36.8	+49.1	30.1	32 28.6	+49.5	30.4	33 20.3	+49.8	30.7	34 11.7	+50.2	31.1	35 03.0	+50.6	31.4	35 54.1	+50.9	31.8	36 45.0	+51.2	32.2	59
60	31 33.5	+48.6	29.1	32 25.9	+48.8	29.4	33 18.1	+49.2	29.7	34 10.1	+49.6	30.1	35 01.9	+49.9	30.4	35 53.6	+50.3	30.8	36 45.0	+50.7	31.2	37 36.2	+51.1	31.5	60
61	32 22.1	+48.3	28.4	33 14.7	+48.7	28.7	34 07.3	+49.0	29.0	34 59.7	+49.3	29.4	35 51.8	+49.8	29.7	36 43.9	+50.0	30.1	37 35.7	+50.4	30.5	38 27.3	+50.8	30.9	61
62	33 10.4	+48.0	27.7	34 03.4	+48.4	28.0	34 56.3	+48.7	28.3	35 49.0	+49.1	28.7	36 41.6	+49.4	29.0	37 33.9	+49.8	29.4	38 26.1	+50.1	29.8	39 18.1	+50.5	30.2	62
63	33 58.4	+47.8	27.0	34 51.8	+48.1	27.3	35 45.0	+48.5	27.6	36 38.1	+48.8	28.0	37 31.0	+49.2	28.3	38 23.7	+49.6	28.7	39 16.3	+49.9	29.1	40 08.6	+50.3	29.5	63
64	34 46.2	+47.5	26.3	35 39.9	+47.9	26.6	36 33.5	+48.2	26.9	37 26.9	+48.6	27.2	38 20.2	+48.9	27.6	39 13.3	+49.3	28.0	40 06.2	+49.6	28.4	40 58.9	+50.0	28.8	64
65	35 33.7	+47.3	25.5	36 27.8	+47.6	25.8	37 21.7	+48.0	26.2	38 15.5	+48.3	26.5	39 09.1	+48.7	26.9	40 02.6	+49.0	27.2	40 55.8	+49.4	27.6	41 48.9	+49.7	28.0	65
66	36 21.0	+46.9	24.8	37 15.4	+47.3	25.1	38 09.7	+47.6	25.4	39 03.8	+48.0	25.7	39 57.8	+48.3	26.1	40 51.6	+48.6	26.5	41 45.2	+49.0	26.9	42 38.6	+49.4	27.3	66
67	37 07.9	+46.7	24.0	38 02.7	+47.0	24.3	38 57.3	+47.3	24.6	39 51.8	+47.6	25.0	40 46.1	+48.0	25.3	41 40.2	+48.4	25.7	42 34.2	+48.7	26.1	43 28.0	+49.1	26.5	67
68	37 54.6	+46.3	23.2	38 49.7	+46.6	23.5	39 44.6	+47.0	23.8	40 39.4	+47.4	24.2	41 34.1	+47.7	24.5	42 28.6	+48.0	24.9	43 22.9	+48.4	25.3	44 17.1	+48.7	25.7	68
69	38 40.9	+46.0	22.4	39 36.3	+46.3	22.7	40 31.6	+46.6	23.0	41 26.8	+46.9	23.4	42 21.8	+47.3	23.7	43 16.6	+47.7	24.1	44 11.3	+48.0	24.5	45 05.8	+48.4	24.9	69
70	39 26.9	+45.6	21.5	40 22.6	+45.9	21.9	41 18.2	+46.3	22.2	42 13.7	+46.6	22.5	43 09.1	+46.9	22.9	44 04.3	+47.3	23.2	44 59.3	+47.7	23.6	45 54.2	+48.0	24.0	70
71	40 12.5	+45.2	20.7	41 08.5	+45.6	21.0	42 04.5	+45.9	21.3	43 00.3	+46.2	21.7	43 56.0	+46.6	22.0	44 51.6	+46.9	22.4	45 47.0	+47.2	22.8	46 42.2	+47.6	23.2	71
72	40 57.7	+44.8	19.8	41 54.1	+45.1	20.1	42 50.4	+45.4	20.4	43 46.5	+45.8	20.8	44 42.6	+46.1	21.1	45 38.5	+46.4	21.5	46 34.2	+46.8	21.9	47 29.8	+47.2	22.3	72
73	41 42.5	+44.5	18.9	42 39.2	+44.8	19.2	43 35.8	+45.1	19.6	44 32.3	+45.4	19.9	45 28.7	+45.7	20.2	46 24.9	+46.0	20.6	47 21.0	+46.4	21.0	48 17.0	+46.7	21.4	73
74	42 27.0	+43.9	18.0	43 24.0	+44.2	18.3	44 20.9	+44.5	18.6	45 17.7	+44.9	19.0	46 14.4	+45.2	19.3	47 10.9	+45.6	19.6	48 07.4	+45.8	20.0	49 03.7	+46.2	20.4	74
75	43 10.9	+43.6	17.1	44 08.2	+43.8	17.4	45 05.4	+44.2	17.7	46 02.6	+44.4	18.0	46 59.6	+44.7	18.3	47 56.5	+45.0	18.7	48 53.2	+45.4	19.0	49 49.9	+45.7	19.4	75
76	43 54.5	+43.0	16.2	44 52.0	+43.4	16.4	45 49.6	+43.6	16.7	46 47.0	+43.9	17.0	47 44.3	+44.2	17.4	48 41.5	+44.5	17.7	49 38.6	+44.8	18.0	50 35.6	+45.2	18.4	76
77	44 37.5	+42.5	15.2	45 35.4	+42.8	15.5	46 33.2	+43.0	15.7	47 30.9	+43.3	16.0	48 28.5	+43.6	16.3	49 26.0	+44.0	16.7	50 23.4	+44.3	17.0	51 20.8	+44.6	17.4	77
78	45 20.0	+42.0	14.2	46 18.2	+42.2	14.7	47 16.2	+42.4	14.7	48 14.2	+42.8	15.0	49 12.1	+43.1	15.3	50 10.0	+43.3	15.6	51 07.7	+43.7	15.9	52 05.4	+43.9	16.3	78
79	46 02.0	+41.5	13.2	47 00.4	+41.7	13.4	47 58.6	+41.9	13.7	48 57.0	+42.2	13.7	49 55.2	+42.5	14.2	50 53.3	+42.8	14.5	51 51.4	+43.0	14.8	52 49.3	+43.4	15.2	79
80	46 43.5	+40.8	12.1	47 42.1	+41.1	12.4	48 40.7	+41.3	12.6	49 39.2	+41.6	12.8	50 37.7	+41.8	13.1	51 36.1	+42.1	13.4	52 34.4	+42.4	13.7	53 32.7	+42.6	14.0	80
81	47 24.3	+40.2	11.0	48 23.2	+40.4	11.5	49 22.0	+40.7	11.5	50 20.8	+40.9	11.7	51 19.5	+41.1	12.0	52 18.2	+41.3	12.2	53 16.8	+41.6	12.5	54 15.3	+41.9	12.8	81
82	48 04.5	+39.6	9.9	49 03.6	+39.8	10.1	50 02.7	+39.9	10.4	51 01.7	+40.2	10.6	52 00.6	+40.4	10.8	52 59.5	+40.7	11.1	53 58.4	+40.9	11.3	54 57.2	+41.1	11.6	82
83	48 44.1	+38.9	8.8	49 43.4	+39.1	9.0	50 42.6	+39.3	9.2	51 41.9	+39.4	9.4	52 41.0	+39.7	9.6	53 40.2	+39.8	9.8	54 39.3	+40.0	10.1	55 38.3	+40.3	10.3	83
84	49 23.0	+38.2	7.8	50 22.5	+38.3	8.0	51 21.9	+38.5	8.0	52 21.3	+38.7	8.2	53 20.7	+38.8	8.3	54 20.0	+39.1	8.5	55 19.3	+39.3	8.7	56 18.6	+39.4	9.0	84
85	50 01.2	+37.4	6.5	51 00.8	+37.6	6.6	52 00.4	+37.7	6.7	53 00.0	+37.8	6.9	53 59.5	+38.0	7.1	54 59.1	+38.1	7.2	55 58.6	+38.3	7.4	56 58.0	+38.5	7.6	85
86	50 38.6	+36.6	5.2	51 38.4	+36.7	5.3	52 38.1	+36.8	5.5	53 37.8	+37.0	5.6	54 37.5	+37.1	5.7	55 37.2	+37.2	5.9	56 36.9	+37.3	6.0	57 36.5	+37.5	6.2	86
87	51 15.2	+35.8	4.0	52 15.1	+35.9	4.1	53 14.9	+36.0	4.2	54 14.8	+36.0	4.3	55 14.6	+36.2	4.4	56 14.4	+36.3	4.5	57 14.2	+36.4	4.5	58 14.0	+36.5	4.7	87
88	51 51.0	+35.0	2.7	52 51.0	+35.0	2.7	53 50.9	+35.0	2.8	54 50.8	+35.1	2.9	55 50.8	+35.1	3.0	56 50.7	+35.2	3.0	57 50.6	+35.3	3.1	58 50.5	+35.3	3.2	88
89	52 26.0	+34.0	1.4	53 26.0	+34.0	1.4	54 25.9	+34.1	1.4	55 25.9	+34.1	1.5	56 25.9	+34.1	1.5	57 25.9	+34.1	1.5	58 25.9	+34.1	1.6	59 25.8	+34.2	1.6	89
90	53 00.0	+33.1	0.0	54 00.0	+33.0	0.0	55 00.0	+33.0	0.0	56 00.0	+33.0	0.0	57 00.0	+33.0	0.0	58 00.0	+33.0	0.0	59 00.0	+32.9	0.0	60 00.0	+32.9	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z { L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 124°, 236°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	19 08.0	+50.7	117.4	18 40.3	+51.1	117.7	18 12.2	+51.7	118.0	17 43.9	+52.2	118.3	17 15.3	+52.7	118.6	16 46.5	+53.1	118.8	16 17.4	+53.6	119.1	15 48.1	+54.0	119.4	0
1	19 58.7	+50.5	116.8	19 31.4	+51.1	117.2	19 03.9	+51.6	117.5	18 36.1	+52.1	117.8	18 08.0	+52.6	118.1	17 39.6	+53.0	118.4	17 11.0	+53.5	118.6	16 42.1	+53.9	118.9	1
2	20 49.2	+50.5	116.3	20 22.5	+51.0	116.6	19 55.5	+51.5	116.9	19 28.2	+52.0	117.3	19 00.6	+52.4	117.6	18 32.6	+53.0	117.9	18 04.5	+53.4	118.2	17 36.0	+53.9	118.4	2
3	21 39.7	+50.3	115.7	21 13.5	+50.9	116.0	20 47.0	+51.4	116.4	20 20.2	+51.9	116.7	19 53.0	+52.4	117.0	19 25.6	+52.9	117.4	18 57.9	+53.3	117.7	18 29.9	+53.8	118.0	3
4	22 30.0	+50.2	115.1	22 04.4	+50.7	115.5	21 38.4	+51.3	115.8	21 12.1	+51.8	116.2	20 45.4	+52.3	116.5	20 18.5	+52.8	116.9	19 51.2	+53.3	117.2	19 23.7	+53.7	117.5	4
5	23 20.2	+50.0	114.5	22 55.1	+50.6	114.9	22 29.7	+51.1	115.3	22 03.9	+51.7	115.6	21 37.8	+52.2	116.0	21 11.3	+52.7	116.4	20 44.5	+53.2	116.7	20 17.4	+53.6	117.0	5
6	24 10.2	+50.0	113.9	23 45.7	+50.5	114.3	23 20.8	+51.1	114.7	22 55.6	+51.6	115.1	22 30.0	+52.1	115.5	22 04.0	+52.6	115.8	21 37.7	+53.0	116.2	21 11.0	+53.5	116.6	6
7	25 00.2	+49.7	113.3	24 36.2	+50.4	113.7	24 11.9	+50.9	114.1	23 47.2	+51.4	114.5	23 22.1	+51.9	114.9	22 56.6	+52.5	115.3	22 30.7	+53.0	115.7	22 04.5	+53.4	116.1	7
8	25 49.9	+49.6	112.7	25 26.6	+50.2	113.1	25 02.8	+50.8	113.5	24 38.6	+51.4	114.0	24 14.0	+51.9	114.4	23 49.1	+52.4	114.8	23 23.7	+52.9	115.2	22 58.0	+53.4	115.6	8
9	26 39.5	+49.4	112.0	26 16.8	+50.0	112.5	25 53.6	+50.6	113.0	25 30.0	+51.1	113.4	25 05.9	+51.8	113.8	24 41.5	+52.2	114.3	24 16.6	+52.8	114.7	23 51.4	+53.2	115.1	9
10	27 28.9	+49.3	111.4	27 06.8	+49.9	111.9	26 44.2	+50.5	112.4	26 21.1	+51.1	112.8	25 57.7	+51.6	113.3	25 33.7	+52.2	113.7	25 09.4	+52.7	114.1	24 44.6	+53.2	114.6	10
11	28 18.2	+49.1	110.8	27 56.7	+49.7	111.3	27 34.7	+50.3	111.8	27 12.2	+50.9	112.2	26 49.3	+51.4	112.7	26 25.9	+52.0	113.2	26 02.1	+52.5	113.6	25 37.8	+53.1	114.1	11
12	29 07.3	+48.8	110.1	28 46.4	+49.5	110.6	28 25.0	+50.1	111.1	28 03.1	+50.8	111.6	27 40.7	+51.4	112.1	27 17.9	+51.9	112.6	26 54.6	+52.4	113.1	26 30.9	+52.9	113.5	12
13	29 56.1	+48.7	109.4	29 35.9	+49.3	110.0	29 15.1	+50.0	110.5	28 53.9	+50.5	111.0	28 32.1	+51.1	111.5	28 09.8	+51.7	112.0	27 47.0	+52.3	112.5	27 23.8	+52.8	113.0	13
14	30 44.8	+48.5	108.8	30 25.2	+49.2	109.3	30 05.1	+49.8	109.9	29 44.4	+50.4	110.4	29 23.2	+51.1	110.9	29 01.5	+51.6	111.5	28 39.3	+52.2	112.0	28 16.6	+52.7	112.5	14
15	31 33.3	+48.2	108.1	31 14.4	+48.9	108.7	30 54.9	+49.6	109.2	30 34.8	+50.3	109.8	30 14.3	+50.8	110.3	29 53.1	+51.5	110.9	29 31.5	+52.0	111.4	29 09.3	+52.6	111.9	15
16	32 21.5	+48.0	107.4	32 03.3	+48.7	108.0	31 44.5	+49.3	108.6	31 25.1	+50.0	109.1	31 05.1	+50.7	109.7	30 44.6	+51.3	110.3	30 23.5	+51.9	110.8	30 01.9	+52.4	111.4	16
17	33 09.5	+47.7	106.7	32 52.0	+48.4	107.3	32 33.8	+49.2	107.9	32 15.1	+49.8	108.5	31 55.8	+50.4	109.1	31 35.9	+51.0	109.7	31 15.4	+51.7	110.2	30 54.3	+52.3	110.8	17
18	33 57.2	+47.5	105.9	33 40.4	+48.2	106.6	33 23.0	+48.9	107.2	33 04.9	+49.6	107.8	32 46.2	+50.3	108.5	32 26.9	+51.0	109.1	32 07.1	+51.5	109.7	31 46.6	+52.1	110.2	18
19	34 44.7	+47.2	105.2	34 28.6	+48.0	105.9	34 11.9	+48.7	106.5	33 54.5	+49.4	107.2	33 36.5	+50.1	107.8	33 17.9	+50.7	108.4	32 58.6	+51.3	109.0	32 38.7	+52.0	109.7	19
20	35 31.9	+46.9	104.4	35 16.6	+47.7	105.1	35 00.6	+48.4	105.8	34 43.9	+49.2	106.5	34 26.6	+49.8	107.1	34 08.6	+50.5	107.8	33 49.9	+51.2	108.4	33 30.7	+51.7	109.1	20
21	36 18.8	+46.6	103.7	36 04.3	+47.4	104.4	35 49.0	+48.2	105.1	35 33.1	+48.9	105.8	35 16.4	+49.6	106.5	34 59.1	+50.3	107.1	34 41.1	+50.9	107.8	34 22.4	+51.6	108.4	21
22	37 05.4	+46.3	102.9	36 51.7	+47.1	103.6	36 37.2	+47.9	104.3	36 22.0	+48.6	105.1	36 06.0	+49.4	105.8	35 49.4	+50.0	106.5	35 32.0	+50.8	107.1	35 14.0	+51.4	107.8	22
23	37 51.7	+46.0	102.1	37 38.8	+46.8	102.8	37 25.1	+47.6	103.6	37 10.6	+48.4	104.3	36 55.4	+49.1	105.1	36 39.4	+49.9	105.8	36 22.8	+50.5	106.5	36 05.4	+51.2	107.2	23
24	38 37.7	+45.6	101.3	38 25.6	+46.5	102.0	38 12.7	+47.3	102.8	37 59.0	+48.1	103.6	37 44.5	+48.9	104.3	37 29.3	+49.6	105.1	37 13.3	+50.3	105.8	36 56.6	+50.9	106.5	24
25	39 23.3	+45.3	100.4	39 12.1	+46.1	101.2	39 00.0	+46.9	102.0	38 47.1	+47.7	102.8	38 33.4	+48.5	103.6	38 18.9	+49.3	104.4	38 03.6	+50.0	105.1	37 47.5	+50.8	105.9	25
26	40 08.6	+44.8	99.6	39 58.2	+45.7	100.4	39 46.9	+46.6	101.2	39 34.8	+47.5	102.0	39 21.9	+48.2	102.8	39 08.2	+49.0	103.6	38 53.6	+49.8	104.4	38 38.3	+50.5	105.2	26
27	40 53.4	+44.5	98.7	40 43.9	+45.4	99.6	40 33.5	+46.3	100.4	40 22.3	+47.1	101.2	40 10.2	+47.9	102.1	39 57.2	+48.7	102.9	39 43.4	+49.5	103.7	39 28.8	+50.2	104.5	27
28	41 37.9	+44.1	97.8	41 29.3	+45.0	98.7	41 19.8	+45.9	99.6	41 09.4	+46.8	100.4	40 58.1	+47.6	101.3	40 45.9	+48.5	102.1	40 32.9	+49.2	103.0	40 19.0	+50.0	103.8	28
29	42 22.0	+43.5	96.9	42 14.3	+44.5	97.8	42 05.7	+45.5	98.7	41 56.2	+46.3	99.6	41 45.7	+47.3	100.5	41 34.4	+48.1	101.3	41 22.1	+48.9	102.2	41 09.0	+49.7	103.1	29
30	43 05.5	+43.2	96.0	42 58.8	+44.1	96.9	42 51.2	+45.0	97.8	42 42.5	+46.0	98.7	42 33.0	+46.9	99.6	42 22.5	+47.7	100.5	42 11.0	+48.6	101.4	41 58.7	+49.4	102.3	30
31	43 48.7	+42.6	95.0	43 42.9	+43.7	96.0	43 36.2	+44.6	96.9	43 28.5	+45.6	97.8	43 19.9	+46.4	98.8	43 10.2	+47.4	99.7	42 59.6	+48.3	100.6	42 48.1	+49.1	101.5	31
32	44 31.3	+42.1	94.0	44 26.6	+43.1	95.0	44 20.8	+44.2	96.0	44 14.1	+45.1	96.9	44 06.3	+46.1	97.9	43 57.6	+47.0	98.9	43 47.9	+47.9	99.8	43 37.2	+48.7	100.8	32
33	45 13.4	+41.6	93.0	45 09.7	+42.7	94.0	45 05.0	+43.7	95.0	44 59.2	+44.7	96.0	44 52.4	+45.7	97.0	44 44.6	+46.6	98.0	44 35.8	+47.5	99.0	44 25.9	+48.4	99.9	33
34	45 55.0	+41.0	92.0	45 52.4	+42.1	93.0	45 48.7	+43.1	94.0	45 43.9	+44.2	95.1	45 38.1	+45.2	96.1	45 31.2	+46.2	97.1	45 23.3	+47.1	98.1	45 14.3	+48.0	99.1	34
35	46 36.0	+40.4	90.9	46 34.5	+41.5	92.0	46 31.8	+42.7	93.0	46 28.1	+43.7	94.1	46 23.3	+44.7	95.1	46 17.4	+45.7	96.2	46 10.4	+46.6	97.2	46 02.3	+47.6	98.2	35
36	47 16.4	+39.8	89.8	47 16.0	+40.9	90.9	47 14.5	+42.0	92.0	47 11.8	+43.1	93.1	47 08.0	+44.2	94.2	47 03.1	+45.2	95.2	46 57.0	+46.3	96.3	46 49.9	+47.2	97.4	36
37	47 56.2	+39.1	88.7	47 56.9	+40.3	89.8	47 56.5	+41.5	91.0	47 54.9	+42.6	92.1	47 52.2	+43.7	93.2	47 48.3	+44.7	94.3	47 43.3	+45.7	95.4	47 37.1	+46.8	96.5	37
38	48 35.3	+38.4	87.6	48 37.2	+39.7	88.7	48 38.0	+40.8	89.9	48 37.5	+42.0	91.0	48 35.9	+43.1	92.1	48 33.0	+44.2	93.3	48 29.0	+45.3	94.4	48 23.9	+46.2	95.5	38
39	49 13.7	+37.7	86.4	49 16.9	+38.9	87.6	49 18.8	+40.1	88.7	49 19.5	+41.3	89.9	49 19.0	+42.5	91.1	49 17.2	+43.7	92.2	49 14.3	+44.7	93.4	49 10.1	+45.8	94.6	39
40	49 51.4	+37.0	85.2	49 55.8	+38.2	86.4	49 58.9	+39.5	87.6	50 00.8	+40.7	88.8	50 01.5	+41.8	90.0	50 00.9	+43.0	91.2	49 59.0	+44.2	92.4	49 55.9	+45.3	93.6	40
41	50 28.4	+36.1	84.0	50 34.0	+37.5	85.2	50 38.4	+38.7	86.4	50 41.5	+40.0	87.6	50 43.3	+41.3	88.9	50 43.9	+42.4	90.1	50 43.2	+43.5	91.3	50 41.2	+44.7	92.5	41
42	51 04.5	+35.3	82.7	51 11.5	+36.6	84.0	51 17.1	+38.0	85.2	51 21.5	+39.2	86.5	51 24.6	+40.5	87.7	51 26.3	+41.7	89.0	51 26.7	+43.0	90.2	51 25.9	+44.1	91.5	42
43	51 39.8	+34.5	81.4	51 48.1	+35.8	82.7	51 55.1	+37.1	84.0	52 00.7	+38.5	85.2	52 05.1	+39.7	86.5	52 08.0	+41.1	87.8	52 09.7	+42.2	89.1	52 10.0	+43.4	90.4	43
44	52 14.3	+33.5	80.1	52 23.9	+34.9	81.4	52 32.2	+36.3	82.7	52 39.2	+37.6	84.0	52 44.8	+39.0	85.3	52 49.1	+40.2	86.6	52 51.9	+41.6	87.9	52 53.4	+42.8	89.2	44
45	52 47.8	+32.5	78.7	52 58.8	+34.0	80.0	53 08.5	+35.4	81.4	53 16.8	+36.8	82.7	53 23.8	+38.1	84.0	53 29.3	+39.5	85.4	53 33.5	+40.8	86.7	53 36.2	+42.1	88.1	45
46	53 20.3	+31.6	77.4	53 32.8	+33.0	78.7	53 43.9	+34.4	80.0	53 53.6	+35.9	81.4	54 01.9	+37.3	82.7	54 08.8	+38.7	84.1	54 14.3	+40.0	85.5	54 18.3	+41.3	86.9	46
47	53 51.9	+30.5	75.9	54 05.8	+32.0	77.3	54 18.3	+33.5	78.6	54 29.5	+34.9	80.0	54 39.2	+36.4	81.4	54 47.5	+37.8	82.8	54 54.3	+39.2	84.2	54 59.6	+40.6	85.6	47
48	54 22.4	+29.4	74.4	54 37.8	+30.9	75.8	54 51.8	+32.4	77.2	55 04.4	+33.9	78.6	55 15.6	+35.3	80.0	55 25.3	+36.8	81.4	55 33.5	+38.2	82.9	55 40.2	+39.7	84.3	48
49	54 51.8	+28.2	72.9	55 08.7	+29.8	74.3	55 24.2	+31.3	75.7	55 38.3	+32.8	77.1	55 50.9	+34.4	78.6	56 02.1	+35.9	80.0	56 11.7	+37.4	81.5	56 19.9	+38.8	83.0	49
50	55 20.0	+27.1	71.4	55 38.5	+28.7	72.8	55 55.5	+30.2	74.2	56 11.1	+31.8	75.6	56 25.3	+33.3	77.1	56 38.0	+34.8	78.6	56 49.1	+36.3	80.1	56 58.7	+37.8	81.6	50
51	55 47.1	+25.8	69.8	56 07.1	+27.4	71.2	56 25.7	+29.0	72.6	56 42.9	+30.6	74.1	56 58.6	+32.1	75.6	57 12.8	+33.7	77.1	57 25.4	+35.3	78.6	57 36.5	+36.8	80.1	51
52	56 12.9	+24.5	68.2	56 34.5	+26.1	69.6	56 54.7	+27.7	71.0	57 13.5	+29.3	72.5	57 30.7	+31.0	74.0	57 46.5	+32.6	75.5	58 00.7	+34.2	77.1	58 13.3	+35.8	78.7	52
53	56 37.4	+23.2	66.6	57 00.6	+24.8	68.0	57 22.4	+26.5	69.4	57 42.8	+28.1	70.9	58 01.7	+29.7	72.4	58 19.1	+31.3	73.9	58 34.9	+33.0	75.5	58 49.1	+34.6	77.1	53
54	57 00.6	+21.8	64.9	57 25.4	+23.5	66.3	57 48.9	+25.0	67.7	58 10.9	+26.7	69.2	58 31.4	+28.4	70.8	58 50.4	+30.1	72.3	59 07.9	+31.7	73.9	59 23.7	+33.4	75.5	54
55	57 22.4	+20.4	63.2	57 48.9	+22.0	64.6	58 13.9	+23.7	66.0	58 37.6	+25.4	67.5	58 59.8	+27.1	69.1	59 20.5	+28.7	70.6	59 39.6	+30.4	72.2	59 57.1	+32.1	73.9	55
56	57 42.8	+18.9	61.4	58 10.9	+20.5	62.8	58 37.6	+22.2	64.3	59 03.0	+23.9	65.8	59 26.9	+25.6	67.3	59 49.2	+27.4	68.9	60 09.9	+29.1	70.5	60 29.2	+30.8	72.2	56
57	58 01.7	+17.4	59.6	58 31.4	+19.0	61.0	58 59.8	+20.7	62.5	59 26.9	+22.3	64.0	59 52.5	+24.1	65.5	60 16.6	+25.8	67.1	60 39.1	+27.6	68.7	61 00.0	+29.4	70.4	57
58	58 19.1	+15.8	57.8	58 50.4	+17.5	59.2	59 20.5	+19.1	60.6	59 49.2	+20.8	62.1	60 16.6	+22.5	63.7	60 42.4	+24.3	65.3	61 06.7	+26.1	66.9	61 29.4	+27.9	68.6	58
59	58 34.9	+14.2	56.0	59 07.9	+15.8	57.3	59 39.6	+17.5	58.8	60 10.0	+19.2	60.3	60 39.1	+20.9	61.8	61 06.7	+22.7	63.4	61 32.8	+24.5	65.0	61 57.3	+26.4	66.7	59
60	58 49.1	+12.5	54.1	59 23.7	+14.1	55.5	59 57.1	+15.8	56.9	60 29.2	+17.6	58.3	61 00.0	+19.3	59.9	61 29.4	+21.1	61.5	61 57.3	+22.9	63.1	62 23.7	+24.7	64.8	60
61	59 01.6	+10.9	52.2	59 37.8	+12.5	53.5	60 12.9	+14.1	54.9	60 46.8	+15.7	56.4	61 19.3	+17.5	57.9	61 50.5	+19.3	59.5	62 20.2	+21.1	61.1	62 48.4	+23.0	62.8	61
62	59 12.5	+9.2	50.3	59 50.3	+10.7	51.6	60 27.0	+12.4	53.0	61 02.5	+14.1	54.4	61 36.8	+15.8	55.9	62 09.8	+17.5	57.5	62 41.3	+19.3	59.1	63 11.4	+21.1	60.8	62
63	59 21.7	+7.4	48.3	60 01.0	+9.0	49.6	60 39.4	+10.5	51.0	61 16.6	+12.2	52.4	61 52.6	+13.9	53.9	62 27.3	+15.6	55.4	63 00.6	+17.5	57.0	63 32.5	+19.4	58.7	63
64	59 29.1	+5.7	46.4	60 10.0	+7.2	47.6	60 49.9	+8.7	49.0	61 28.8	+10.3	50.4	62 06.5	+12.0	51.8	62 42.9	+13.8	53.3	63 18.1	+15.5	54.9	63 51.9	+17.4•	56.6	64
65	59 34.8	+3.9	44.4	60 17.2	+5.3	45.6	60 58.6	+6.9	46.9	61 39.1	+8.4	48.3	62 18.5	+10.0	49.7	62 56.7	+11.8•	51.2	63 33.6	+13.6•	52.8	64 09.3	+15.4•	54.4	65
66	59 38.7	+2.1	42.5	60 22.5	+3.5	43.6	61 05.5	+5.0	44.9	61 47.5	+6.5	46.2	62 28.5	+8.2	47.6	63 08.5	+9.7•	49.2	63 47.2	+11.5•	50.6	64 24.7	+13.3•	52.2	66
67	59 40.8	+0.3	40.5	60 26.0	+1.7	41.6	61 10.5	+3.1	42.8	61 54.0	+4.6	44.1	62 36.7	+6.1•	45.4	63 18.2	+7.8•	46.8	63 58.7	+9.5•	48.3	64 38.0	+11.2•	49.9	67
68	59 41.1	−1.4	38.5	60 27.7	−0.1	39.6	61 13.6	+1.2	40.7	61 58.6	+2.6	42.0	62 42.8	+4.1•	43.3	63 26.0	+5.7•	44.6	64 08.2	+7.3•	46.1	64 49.2	+9.1•	47.6	68
69	59 39.7	−3.3	36.5	60 27.6	−2.0	37.6	61 14.8	−0.7	38.7	62 01.2	+0.7	39.8	62 46.9	+2.1•	41.1	63 31.7	+3.6•	42.4	64 15.5	+5.2•	43.8	64 58.3	+6.8•	45.3	69
70	59 36.4	−5.0	34.5	60 25.6	−3.9	35.5	61 14.1	−2.7	36.6	62 01.9	−1.3•	37.7	62 49.0	0.0•	38.9	63 35.3	+1.5•	40.2	64 20.7	+3.0•	41.5	65 05.1	+4.6•	42.9	70
71	59 31.4	−6.8	32.6	60 21.7	−5.7	33.5	61 11.4	−4.5	34.5	62 00.6	−3.3•	35.6	62 49.0	−2.0•	36.7	63 36.8	−0.7•	37.9	64 23.7	+0.8•	39.2	65 09.7	+2.4•	40.5	71
72	59 24.6	−8.5	30.6	60 16.0	−7.5	31.5	61 06.9	−6.4	32.4	61 57.3	−5.3	33.5	62 47.0	−4.0•	34.5	63 36.1	−2.7•	35.7	64 24.5	−1.3•	36.9	65 12.1	+0.1•	38.2	72
73	59 16.1	−10.2	28.7	60 08.5	−9.2	29.5	61 00.5	−8.2	30.4	61 52.0	−7.2	31.3	62 43.0	−6.0•	32.3	63 33.4	−4.8•	33.4	64 23.2	−3.6•	34.6	65 12.2	−2.2•	35.8	73
74	59 05.9	−12.0	26.8	59 59.3	−11.1	27.5	60 52.3	−10.1	28.4	61 44.8	−9.0	29.2	62 37.0	−8.1•	30.2	63 28.6	−6.9•	31.2	64 19.6	−5.7•	32.2	65 10.0	−4.4•	33.4	74
75	58 53.9	−13.6	24.8	59 48.2	−12.8	25.6	60 42.2	−11.9	26.3	61 35.8	−11.0	27.1	62 28.9	−10.0	28.0	63 21.7	−9.0•	29.0	64 13.9	−7.8•	30.0	65 05.6	−6.6•	31.0	75
76	58 40.3	−15.2	23.0	59 35.4	−14.4	23.6	60 30.3	−13.7	24.3	61 24.8	−12.8	25.1	62 18.9	−11.9	25.9	63 12.7	−11.0	26.8	64 06.1	−10.0•	27.7	64 59.0	−8.9•	28.7	76
77	58 25.1	−16.8	21.1	59 21.0	−16.1	21.7	60 16.6	−15.4	22.4	61 12.0	−14.7	23.1	62 07.0	−13.8	23.8	63 01.7	−12.9	24.6	63 56.1	−12.9	25.4	64 50.1	−11.0•	26.3	77
78	58 08.3	−18.3	19.3	59 04.9	−17.7	19.8	60 01.2	−17.1	20.4	60 57.3	−16.4	21.0	61 53.2	−15.7	21.7	62 48.8	−14.9	22.4	63 44.1	−14.0•	23.2	64 39.1	−13.2•	24.0	78
79	57 50.0	−19.8	17.5	58 47.2	−19.3	18.0	59 44.1	−18.7	18.5	60 40.9	−18.1	19.1	61 37.5	−17.4	19.7	62 33.9	−16.7	20.3	63 30.1	−16.0•	21.0	64 25.9	−15.2•	21.8	79
80	57 30.2	−21.3	15.7	58 27.9	−20.8	16.2	59 25.4	−20.3	16.6	60 22.8	−19.7	17.1	61 20.1	−19.2	17.7	62 17.2	−18.6	18.2	63 14.1	−18.0	18.9	64 10.7	−17.2•	19.5	80
81	57 08.9	−22.7	14.0	58 07.1	−22.3	14.4	59 05.1	−21.8	14.8	60 03.1	−21.4	15.2	61 00.9	−20.8	15.7	61 58.6	−20.3	16.2	62 56.1	−19.7	16.8	63 53.5	−19.2	17.3	81
82	56 46.2	−24.0	12.3	57 44.8	−23.7	12.6	58 43.3	−23.3	13.0	59 41.7	−22.9	13.4	60 40.1	−22.5	13.8	61 38.3	−22.1	14.2	62 36.4	−21.6	14.7	63 34.3	−21.0	15.2	82
83	56 22.2	−25.4	10.6	57 21.1	−25.0	10.9	58 20.0	−24.7	11.2	59 18.8	−24.4	11.6	60 17.6	−24.1	11.9	61 16.2	−23.6	12.3	62 14.8	−23.2	12.7	63 13.3	−22.8	13.1	83
84	55 56.8	−26.6	9.0	56 56.1	−26.4	9.2	57 55.3	−26.1	9.5	58 54.4	−25.8	9.8	59 53.5	−25.5	10.1	60 52.6	−25.3	10.4	61 51.6	−24.9	10.7	62 50.5	−24.6	11.1	84
85	55 30.2	−27.8	7.4	56 29.7	−27.6	7.6	57 29.2	−27.4	7.8	58 28.6	−27.2	8.0	59 28.0	−27.0	8.3	60 27.3	−26.7	8.5	61 26.7	−26.5	8.8	62 25.9	−26.2	9.1	85
86	55 02.4	−29.0	5.9	56 02.1	−28.8	6.0	57 01.8	−28.7	6.2	58 01.4	−28.5	6.3	59 01.0	−28.3	6.5	60 00.6	−28.1	6.7	61 00.2	−28.0	6.9	61 59.7	−27.7	7.2	86
87	54 33.4	−30.1	4.3	55 33.3	−30.0	4.5	56 33.1	−29.9	4.6	57 32.9	−29.8	4.7	58 32.7	−29.6	4.8	59 32.5	−29.5	5.0	60 32.2	−29.4	5.1	61 32.0	−29.3	5.3	87
88	54 03.3	−31.1	2.9	55 03.3	−31.1	2.9	56 03.2	−31.0	3.0	57 03.1	−31.0	3.1	58 03.0	−30.9	3.2	59 02.9	−30.8	3.3	60 02.8	−30.7	3.4	61 02.7	−30.7	3.5	88
89	53 32.2	−32.2	1.4	54 32.2	−32.2	1.4	55 32.1	−32.1	1.5	56 32.1	−32.1	1.5	57 32.1	−32.1	1.6	58 32.1	−32.1	1.6	59 32.1	−32.1	1.7	60 32.0	−32.0	1.7	89
90	53 00.0	−33.2	0.0	54 00.0	−33.2	0.0	55 00.0	−33.2	0.0	56 00.0	−33.2	0.0	57 00.0	−33.2	0.0	58 00.0	−33.3	0.0	59 00.0	−33.3	0.0	60 00.0	−33.3	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	19 08.0	−50.8	117.4	18 40.3	−51.3	117.7	18 12.2	−51.8	118.0	17 43.9	−52.3	118.3	17 15.3	−52.7	118.6	16 46.5	−53.2	118.8	16 17.4	−53.6	119.1	15 48.1	−54.0	119.4	0
1	18 17.2	−50.8	118.0	17 49.0	−51.4	118.3	17 20.4	−51.8	118.5	16 51.6	−52.3	118.8	16 22.6	−52.8	119.1	15 53.3	−53.2	119.3	15 23.8	−53.6	119.6	14 54.1	−54.1	119.8	1
2	17 26.4	−51.0	118.5	16 57.6	−51.5	118.8	16 28.6	−52.0	119.1	15 59.3	−52.4	119.3	15 29.8	−52.9	119.6	15 00.1	−53.3	119.8	14 30.2	−53.8	120.0	14 00.0	−54.1	120.3	2
3	16 35.4	−51.0	119.1	16 06.1	−51.5	119.3	15 36.6	−52.0	119.6	15 06.9	−52.5	119.8	14 36.9	−52.9	120.1	14 06.8	−53.4	120.3	13 36.4	−53.7	120.5	13 05.9	−54.2	120.7	3
4	15 44.4	−51.2	119.6	15 14.6	−51.6	119.9	14 44.6	−52.1	120.1	14 14.4	−52.5	120.3	13 44.0	−53.0	120.5	13 13.4	−53.4	120.7	12 42.7	−53.9	120.9	12 11.7	−54.2	121.1	4
5	14 53.2	−51.2	120.2	14 23.0	−51.7	120.4	13 52.5	−52.1	120.6	13 21.9	−52.6	120.8	12 51.0	−53.0	121.0	12 20.0	−53.4	121.2	11 48.8	−53.8	121.4	11 17.5	−54.3	121.6	5
6	14 02.0	−51.2	120.7	13 31.3	−51.8	120.9	13 00.4	−52.2	121.1	12 29.3	−52.7	121.3	11 58.0	−53.1	121.5	11 26.6	−53.5	121.7	10 55.0	−53.9	121.8	10 23.2	−54.2	122.0	6
7	13 10.8	−51.4	121.2	12 39.5	−51.8	121.4	12 08.2	−52.3	121.6	11 36.6	−52.7	121.8	11 04.9	−53.1	122.0	10 33.1	−53.6	122.1	10 01.1	−54.0	122.3	9 29.0	−54.3	122.4	7
8	12 19.4	−51.4	121.8	11 47.7	−51.8	122.0	11 15.9	−52.3	122.1	10 43.9	−52.7	122.3	10 11.8	−53.2	122.5	9 39.5	−53.5	122.6	9 07.1	−53.9	122.7	8 34.6	−54.3	122.9	8
9	11 28.0	−51.4	122.3	10 55.9	−51.9	122.5	10 23.6	−52.4	122.6	9 51.2	−52.8	122.8	9 18.6	−53.2	122.9	8 46.0	−53.7	123.1	8 13.2	−54.0	123.2	7 40.3	−54.4	123.3	9
10	10 36.6	−51.6	122.8	10 04.0	−52.0	123.0	9 31.2	−52.4	123.1	8 58.4	−52.8	123.3	8 25.4	−53.2	123.4	7 52.3	−53.6	123.5	7 19.2	−54.1	123.6	6 45.9	−54.4	123.7	10
11	9 45.0	−51.6	123.3	9 12.0	−52.0	123.5	8 38.8	−52.4	123.6	8 05.6	−52.9	123.7	7 32.2	−53.3	123.9	6 58.7	−53.7	124.0	6 25.1	−54.0	124.1	5 51.5	−54.4	124.1	11
12	8 53.5	−51.6	123.9	8 20.0	−52.0	124.0	7 46.4	−52.5	124.1	7 12.7	−52.9	124.2	6 38.9	−53.3	124.3	6 05.0	−53.6	124.4	5 31.1	−54.1	124.5	4 57.1	−54.4	124.6	12
13	8 01.9	−51.6	124.4	7 28.0	−52.1	124.5	6 53.9	−52.5	124.6	6 19.8	−52.9	124.7	5 45.6	−53.3	124.8	5 11.4	−53.7	124.9	4 37.0	−54.0	124.9	4 02.7	−54.5	125.0	13
14	7 10.3	−51.7	124.9	6 35.9	−52.1	125.0	6 01.4	−52.5	125.1	5 26.9	−52.9	125.2	4 52.3	−53.3	125.2	4 17.7	−53.8	125.3	3 43.0	−54.1	125.4	3 08.2	−54.5	125.4	14
15	6 18.6	−51.7	125.4	5 43.8	−52.2	125.5	5 08.9	−52.5	125.6	4 34.0	−53.0	125.6	3 59.0	−53.4	125.7	3 23.9	−53.7	125.8	2 48.9	−54.1	125.8	2 13.8	−54.5	125.8	15
16	5 26.9	−51.8	125.9	4 51.6	−52.1	126.0	4 16.4	−52.6	126.1	3 41.0	−53.0	126.1	3 05.6	−53.3	126.2	2 30.2	−53.7	126.2	1 54.8	−54.2	126.2	1 19.3	−54.5	126.3	16
17	4 35.1	−51.7	126.4	3 59.5	−52.2	126.5	3 23.8	−52.6	126.5	2 48.0	−52.9	126.6	2 12.3	−53.4	126.6	1 36.5	−53.8	126.6	1 00.6	−54.1	126.7	0 24.8	−54.5	126.7	17
18	3 43.4	−51.8	126.9	3 07.3	−52.2	127.0	2 31.2	−52.6	127.0	1 55.1	−53.0	127.1	1 18.9	−53.4	127.1	0 42.7	−53.7	127.1	0 06.5	−54.1	127.1	0 29.7	+54.4	52.9	18
19	2 51.6	−51.8	127.4	2 15.1	−52.2	127.5	1 38.6	−52.6	127.5	1 02.1	−53.0	127.5	0 25.5	−53.3	127.5	0 11.0	+53.8	52.5	0 47.6	+54.1	52.5	1 24.1	+54.5	52.5	19
20	1 59.8	−51.7	127.9	1 22.9	−52.2	128.0	0 46.0	−52.6	128.0	0 09.1	−53.0	128.0	0 27.8	+53.4	52.0	1 04.8	+53.8	52.0	1 41.7	+54.1	52.0	2 18.6	+54.4	52.1	20
21	1 08.1	−51.8	128.5	0 30.7	−52.2	128.5	0 06.6	+52.6	51.5	0 43.9	+53.0	51.5	1 21.2	+53.4	51.6	1 58.5	+53.8	51.6	2 35.8	+54.1	51.6	3 13.0	+54.5	51.6	21
22	0 16.3	−51.8	129.0	0 21.5	+52.2	51.0	0 59.2	+52.6	51.1	1 36.9	+53.0	51.1	2 14.6	+53.3	51.1	2 52.3	+53.7	51.1	3 29.9	+54.1	51.2	4 07.5	+54.4	51.2	22
23	0 35.5	+51.8	50.5	1 13.7	+52.2	50.5	1 51.8	+52.6	50.6	2 29.9	+52.9	50.6	3 07.9	+53.4	50.6	3 46.0	+53.7	50.7	4 24.0	+54.0	50.7	5 01.9	+54.4	50.8	23
24	1 27.3	+51.8	50.0	2 05.9	+52.1	50.1	2 44.4	+52.5	50.1	3 22.8	+53.0	50.1	4 01.3	+53.3	50.2	4 39.7	+53.7	50.2	5 18.0	+54.1	50.3	5 56.3	+54.4	50.4	24
25	2 19.1	+51.8	49.5	2 58.0	+52.2	49.6	3 36.9	+52.6	49.6	4 15.8	+52.9	49.7	4 54.6	+53.3	49.7	5 33.4	+53.7	49.8	6 12.1	+54.0	49.9	6 50.7	+54.4	50.0	25
26	3 10.9	+51.8	49.0	3 50.2	+52.2	49.1	4 29.5	+52.6	49.1	5 08.7	+53.0	49.2	5 47.9	+53.3	49.3	6 27.1	+53.6	49.3	7 06.1	+54.0	49.4	7 45.1	+54.4	49.5	26
27	4 02.7	+51.7	48.5	4 42.4	+52.1	48.6	5 22.1	+52.5	48.6	6 01.7	+52.9	48.7	6 41.2	+53.3	48.8	7 20.7	+53.6	48.9	8 00.1	+54.0	49.0	8 39.5	+54.3	49.1	27
28	4 54.4	+51.7	48.0	5 34.5	+52.1	48.1	6 14.6	+52.5	48.2	6 54.6	+52.8	48.2	7 34.5	+53.2	48.3	8 14.3	+53.6	48.4	8 54.1	+53.9	48.5	9 33.8	+54.3	48.7	28
29	5 46.1	+51.7	47.5	6 26.6	+52.1	47.6	7 07.1	+52.4	47.7	7 47.4	+52.9	47.8	8 27.7	+53.2	47.9	9 07.9	+53.6	48.0	9 48.0	+54.0	48.1	10 28.1	+54.2	48.2	29
30	6 37.8	+51.7	47.0	7 18.7	+52.0	47.1	7 59.5	+52.5	47.2	8 40.3	+52.8	47.3	9 20.9	+53.2	47.4	10 01.5	+53.5	47.5	10 42.0	+53.8	47.7	11 22.3	+54.2	47.8	30
31	7 29.5	+51.6	46.5	8 10.7	+52.1	46.7	8 52.0	+52.3	46.7	9 33.1	+52.7	46.8	10 14.1	+53.1	46.9	10 55.0	+53.5	47.1	11 35.8	+53.9	47.2	12 16.5	+54.2	47.4	31
32	8 21.1	+51.6	46.0	9 02.8	+51.9	46.1	9 44.3	+52.4	46.2	10 25.8	+52.7	46.3	11 07.2	+53.1	46.5	11 48.5	+53.4	46.6	12 29.7	+53.7	46.8	13 10.7	+54.1	46.9	32
33	9 12.7	+51.5	45.4	9 54.7	+52.0	45.6	10 36.7	+52.3	45.7	11 18.5	+52.7	45.8	12 00.3	+53.0	46.0	12 41.9	+53.4	46.1	13 23.4	+53.8	46.3	14 04.8	+54.1	46.5	33
34	10 04.2	+51.5	44.9	10 46.7	+51.8	45.1	11 29.0	+52.2	45.2	12 11.2	+52.6	45.3	12 53.3	+53.0	45.5	13 35.3	+53.4	45.7	14 17.2	+53.7	45.8	14 58.9	+54.0	46.0	34
35	10 55.7	+51.4	44.4	11 38.5	+51.8	44.5	12 21.2	+52.2	44.7	13 03.8	+52.6	44.8	13 46.3	+52.9	45.0	14 28.7	+53.3	45.2	15 10.9	+53.6	45.4	15 52.9	+54.0	45.6	35
36	11 47.1	+51.4	43.9	12 30.3	+51.8	44.0	13 13.4	+52.2	44.2	13 56.4	+52.5	44.4	14 39.2	+52.9	44.5	15 21.9	+53.2	44.7	16 04.5	+53.6	44.9	16 46.9	+53.9	45.1	36
37	12 38.5	+51.3	43.3	13 22.1	+51.7	43.5	14 05.6	+52.0	43.7	14 48.9	+52.4	43.9	15 32.1	+52.8	44.0	16 15.1	+53.2	44.2	16 58.1	+53.5	44.4	17 40.8	+53.9	44.7	37
38	13 29.8	+51.3	42.8	14 13.8	+51.6	43.0	14 57.6	+52.0	43.2	15 41.3	+52.4	43.4	16 24.9	+52.7	43.5	17 08.3	+53.1	43.8	17 51.6	+53.4	44.0	18 34.7	+53.7	44.2	38
39	14 21.1	+51.2	42.3	15 05.4	+51.6	42.5	15 49.6	+51.9	42.6	16 33.7	+52.3	42.8	17 17.6	+52.7	43.0	18 01.4	+53.0	43.3	18 45.0	+53.3	43.5	19 28.4	+53.7	43.7	39
40	15 12.3	+51.1	41.7	15 57.0	+51.5	41.9	16 41.5	+51.9	42.1	17 26.0	+52.2	42.3	18 10.3	+52.5	42.5	18 54.4	+52.9	42.8	19 38.3	+53.3	43.0	20 22.1	+53.7	43.3	40
41	16 03.4	+51.0	41.2	16 48.5	+51.3	41.4	17 33.4	+51.6	41.6	18 18.2	+52.1	41.8	19 02.8	+52.5	42.0	19 47.3	+52.9	42.3	20 31.6	+53.2	42.5	21 15.8	+53.6	42.8	41
42	16 54.4	+50.9	40.6	17 39.8	+51.3	40.9	18 25.2	+51.6	41.1	19 10.3	+52.1	41.3	19 55.3	+52.4	41.5	20 40.2	+52.7	41.8	21 24.8	+53.1	42.0	22 09.3	+53.4	42.3	42
43	17 45.3	+50.8	40.1	18 31.1	+51.2	40.3	19 16.8	+51.6	40.5	20 02.4	+51.9	40.8	20 47.7	+52.3	41.0	21 32.9	+52.7	41.3	22 17.9	+53.0	41.5	23 02.7	+53.4	41.8	43
44	18 36.1	+50.8	39.5	19 22.3	+51.2	39.8	20 08.4	+51.5	40.0	20 54.3	+51.8	40.2	21 40.0	+52.2	40.5	22 25.6	+52.5	40.7	23 10.9	+52.9	41.0	23 56.1	+53.3	41.3	44
45	19 26.9	+50.6	39.0	20 13.5	+51.0	39.2	20 59.9	+51.3	39.4	21 46.1	+51.8	39.7	22 32.2	+52.1	39.9	23 18.1	+52.5	40.2	24 03.8	+52.9	40.5	24 49.4	+53.1	40.8	45
46	20 17.5	+50.5	38.4	21 04.5	+50.8	38.6	21 51.2	+51.3	38.9	22 37.9	+51.6	39.1	23 24.3	+52.0	39.4	24 10.6	+52.3	39.7	24 56.7	+52.7	40.0	25 42.5	+53.1	40.3	46
47	21 08.0	+50.4	37.8	21 55.3	+50.8	38.1	22 42.5	+51.1	38.3	23 29.5	+51.5	38.6	24 16.3	+51.9	38.9	25 02.9	+52.2	39.1	25 49.4	+52.5	39.5	26 35.6	+52.9	39.8	47
48	21 58.4	+50.3	37.2	22 46.1	+50.6	37.5	23 33.6	+51.0	37.7	24 21.0	+51.4	38.0	25 08.2	+51.7	38.3	25 55.1	+52.1	38.6	26 41.9	+52.5	38.9	27 28.5	+52.8	39.2	48
49	22 48.7	+50.1	36.6	23 36.7	+50.6	36.9	24 24.6	+50.9	37.2	25 12.4	+51.2	37.5	25 59.9	+51.6	37.7	26 47.2	+52.0	38.1	27 34.4	+52.3	38.4	28 21.3	+52.7	38.7	49
50	23 38.8	+50.0	36.1	24 27.3	+50.3	36.3	25 15.5	+50.8	36.6	26 03.6	+51.1	36.9	26 51.5	+51.5	37.2	27 39.2	+51.8	37.5	28 26.7	+52.2	37.8	29 14.0	+52.6	38.2	50
51	24 28.8	+49.9	35.4	25 17.6	+50.2	35.7	26 06.3	+50.5	36.0	26 54.7	+51.0	36.3	27 43.0	+51.3	36.6	28 31.0	+51.7	36.9	29 18.9	+52.1	37.3	30 06.6	+52.4	37.6	51
52	25 18.7	+49.7	34.8	26 07.8	+50.1	35.1	26 56.8	+50.5	35.4	27 45.7	+50.8	35.7	28 34.3	+51.2	36.0	29 22.7	+51.6	36.3	30 11.0	+51.9	36.7	30 59.0	+52.2	37.0	52
53	26 08.4	+49.5	34.2	26 57.9	+49.9	34.5	27 47.3	+50.3	34.8	28 36.5	+50.6	35.1	29 25.5	+51.0	35.4	30 14.3	+51.3	35.7	31 02.9	+51.7	36.1	31 51.2	+52.1	36.5	53
54	26 57.9	+49.4	33.6	27 47.8	+49.8	33.9	28 37.6	+50.1	34.2	29 27.1	+50.5	34.5	30 16.5	+50.8	34.8	31 05.6	+51.2	35.1	31 54.6	+51.6	35.5	32 43.3	+52.0	35.9	54
55	27 47.3	+49.2	32.9	28 37.6	+49.5	33.2	29 27.7	+49.9	33.5	30 17.6	+50.3	33.9	31 07.3	+50.7	34.2	31 56.8	+51.1	34.5	32 46.2	+51.3	34.9	33 35.3	+51.7	35.3	55
56	28 36.5	+49.0	32.3	29 27.1	+49.4	32.6	30 17.6	+49.7	32.9	31 07.9	+50.1	33.2	31 58.0	+50.4	33.6	32 47.9	+50.8	33.9	33 37.5	+51.2	34.3	34 27.0	+51.6	34.7	56
57	29 25.5	+48.8	31.6	30 16.5	+49.1	31.9	31 07.3	+49.5	32.2	31 58.0	+49.9	32.6	32 48.4	+50.3	32.9	33 38.7	+50.6	33.3	34 28.7	+51.0	33.6	35 18.6	+51.3	34.0	57
58	30 14.3	+48.6	31.0	31 05.6	+49.0	31.3	31 56.8	+49.4	31.6	32 47.9	+49.6	31.9	33 38.7	+50.0	32.3	34 29.3	+50.4	32.6	35 19.7	+50.8	33.0	36 09.9	+51.2	33.4	58
59	31 02.9	+48.3	30.3	31 54.6	+48.7	30.6	32 46.2	+49.1	30.9	33 37.5	+49.5	31.2	34 28.7	+49.8	31.6	35 19.7	+50.2	32.0	36 10.5	+50.6	32.4	37 01.1	+51.0	32.8	59
60	31 51.2	+48.2	29.6	32 43.3	+48.5	29.9	33 35.3	+48.8	30.2	34 27.0	+49.2	30.6	35 18.6	+49.6	30.9	36 09.9	+49.9	31.3	37 01.0	+50.4	31.7	37 52.1	+50.7	32.1	60
61	32 39.4	+47.9	28.9	33 31.8	+48.3	29.2	34 24.1	+48.6	29.5	35 16.2	+49.0	29.9	36 08.2	+49.3	30.2	36 59.9	+49.7	30.6	37 51.5	+50.1	31.0	38 42.8	+50.5	31.4	61
62	33 27.3	+47.6	28.2	34 20.1	+48.0	28.5	35 12.7	+48.4	28.8	36 05.2	+48.8	29.2	36 57.5	+49.1	29.5	37 49.6	+49.5	29.9	38 41.6	+49.8	30.3	39 33.3	+50.2	30.7	62
63	34 14.9	+47.4	27.4	35 08.1	+47.7	27.7	36 01.1	+48.1	28.1	36 54.0	+48.4	28.4	37 46.6	+48.9	28.8	38 39.1	+49.2	29.2	39 31.4	+49.6	29.6	40 23.5	+49.9	30.0	63
64	35 02.3	+47.1	26.7	35 55.8	+47.5	27.0	36 49.2	+47.8	27.3	37 42.4	+48.2	27.7	38 35.5	+48.5	28.1	39 28.3	+48.9	28.4	40 21.0	+49.3	28.8	41 13.4	+49.7	29.3	64
65	35 49.4	+46.8	25.9	36 43.3	+47.1	26.3	37 37.0	+47.5	26.6	38 30.6	+47.9	26.9	39 24.0	+48.2	27.3	40 17.2	+48.6	27.7	41 10.3	+48.9	28.1	42 03.1	+49.4	28.5	65
66	36 36.2	+46.5	25.1	37 30.4	+46.9	25.5	38 24.5	+47.2	25.8	39 18.5	+47.5	26.2	40 12.2	+48.0	26.5	41 05.8	+48.3	26.9	41 59.2	+48.7	27.3	42 52.5	+49.0	27.7	66
67	37 22.7	+46.2	24.4	38 17.3	+46.5	24.7	39 11.7	+46.9	25.0	40 06.0	+47.3	25.4	41 00.2	+47.6	25.7	41 54.1	+48.0	26.1	42 47.9	+48.3	26.5	43 41.5	+48.7	26.9	67
68	38 08.9	+45.8	23.5	39 03.8	+46.2	23.9	39 58.6	+46.6	24.2	40 53.3	+46.9	24.6	41 47.8	+47.2	24.9	42 42.1	+47.6	25.3	43 36.2	+48.0	25.7	44 30.2	+48.4	26.1	68
69	38 54.7	+45.5	22.7	39 50.0	+45.8	23.0	40 45.2	+46.1	23.4	41 40.2	+46.5	23.7	42 35.0	+46.9	24.1	43 29.7	+47.2	24.5	44 24.2	+47.6	24.9	45 18.6	+47.9	25.3	69
70	39 40.2	+45.1	21.9	40 35.8	+45.5	22.2	41 31.3	+45.8	22.5	42 26.7	+46.1	22.9	43 21.9	+46.5	23.2	44 16.9	+46.9	23.6	45 11.8	+47.2	24.0	46 06.5	+47.6	24.4	70
71	40 25.3	+44.7	21.0	41 21.3	+45.0	21.3	42 17.1	+45.4	21.7	43 12.8	+45.7	22.0	44 08.4	+46.0	22.4	45 03.8	+46.4	22.7	45 59.0	+46.8	23.1	46 54.1	+47.2	23.6	71
72	41 10.0	+44.3	20.1	42 06.3	+44.6	20.4	43 02.5	+44.9	20.8	43 58.5	+45.3	21.1	44 54.4	+45.7	21.5	45 50.2	+46.0	21.8	46 45.8	+46.4	22.2	47 41.3	+46.7	22.6	72
73	41 54.3	+43.9	19.2	42 50.9	+44.2	19.5	43 47.4	+44.5	19.9	44 43.8	+44.8	20.2	45 40.1	+45.1	20.5	46 36.2	+45.5	20.9	47 32.2	+45.8	21.3	48 28.0	+46.2	21.7	73
74	42 38.2	+43.4	18.3	43 35.1	+43.8	18.6	44 31.9	+44.1	18.9	45 28.6	+44.4	19.2	46 25.2	+44.7	19.6	47 21.7	+45.0	20.0	48 18.0	+45.4	20.3	49 14.2	+45.7	20.7	74
75	43 21.6	+43.0	17.4	44 18.9	+43.2	17.7	45 16.0	+43.5	18.0	46 13.0	+43.8	18.3	47 09.9	+44.2	18.6	48 06.7	+44.5	19.0	49 03.4	+44.9	19.3	49 59.9	+45.3	19.7	75
76	44 04.6	+42.4	16.4	45 02.1	+42.7	16.7	45 59.5	+43.1	17.0	46 56.9	+43.3	17.3	47 54.1	+43.7	17.6	48 51.2	+44.0	18.0	49 48.3	+44.3	18.3	50 45.2	+44.6	18.7	76
77	44 47.0	+41.9	15.4	45 44.8	+42.2	15.7	46 42.6	+42.4	16.0	47 40.2	+42.8	16.3	48 37.8	+43.0	16.6	49 35.2	+43.4	16.9	50 32.6	+43.7	17.3	51 29.8	+44.0	17.6	77
78	45 28.9	+41.4	14.4	46 27.0	+41.7	14.7	47 25.0	+41.9	14.9	48 23.0	+42.2	15.2	49 20.8	+42.5	15.5	50 18.6	+42.8	15.8	51 16.3	+43.1	16.2	52 13.8	+43.4	16.5	78
79	46 10.3	+40.8	13.4	47 08.7	+41.0	13.6	48 06.9	+41.3	13.9	49 05.2	+41.5	14.1	50 03.3	+41.8	14.4	51 01.4	+42.1	14.7	51 59.4	+42.4	15.1	52 57.2	+42.8	15.4	79
80	46 51.1	+40.2	12.3	47 49.7	+40.4	12.5	48 48.2	+40.7	12.8	49 46.7	+40.9	13.0	50 45.1	+41.2	13.3	51 43.5	+41.4	13.6	52 41.8	+41.7	13.9	53 40.0	+42.0	14.2	80
81	47 31.3	+39.5	11.2	48 30.1	+39.8	11.4	49 28.9	+40.0	11.7	50 27.6	+40.3	11.9	51 26.3	+40.5	12.1	52 24.9	+40.8	12.4	53 23.5	+41.0	12.7	54 22.0	+41.3	13.0	81
82	48 10.8	+38.9	10.1	49 09.9	+39.0	10.3	50 08.9	+39.3	10.5	51 07.9	+39.5	10.7	52 06.8	+39.7	11.0	53 05.7	+39.9	11.2	54 04.5	+40.2	11.5	55 03.3	+40.4	11.8	82
83	48 49.7	+38.1	8.9	49 48.9	+38.4	9.1	50 48.2	+38.5	9.3	51 47.4	+38.7	9.5	52 46.5	+39.0	9.7	53 45.6	+39.2	10.0	54 44.7	+39.4	10.2	55 43.7	+39.6	10.5	83
84	49 27.8	+37.5	7.8	50 27.3	+37.6	7.9	51 26.7	+37.8	8.1	52 26.1	+37.9	8.3	53 25.5	+38.1	8.5	54 24.8	+38.3	8.7	55 24.1	+38.5	8.9	56 23.3	+38.8	9.1	84
85	50 05.3	+36.6	6.5	51 04.9	+36.8	6.7	52 04.5	+36.9	6.8	53 04.0	+37.1	7.0	54 03.6	+37.2	7.2	55 03.1	+37.4	7.3	56 02.6	+37.6	7.5	57 02.1	+37.7	7.7	85
86	50 41.9	+35.9	5.3	51 41.7	+35.9	5.4	52 41.4	+36.1	5.5	53 41.1	+36.2	5.7	54 40.8	+36.3	5.8	55 40.5	+36.4	6.0	56 40.2	+36.5	6.1	57 39.8	+36.7	6.3	86
87	51 17.8	+34.9	4.0	52 17.6	+35.1	4.1	53 17.5	+35.1	4.2	54 17.3	+35.2	4.3	55 17.1	+35.3	4.4	56 16.9	+35.5	4.5	57 16.7	+35.6	4.7	58 16.5	+35.7	4.8	87
88	51 52.7	+34.1	2.7	52 52.7	+34.1	2.8	53 52.6	+34.2	2.8	54 52.5	+34.3	2.9	55 52.4	+34.4	3.0	56 52.4	+34.3	3.1	57 52.3	+34.4	3.2	58 52.2	+34.5	3.2	88
89	52 26.8	+33.2	1.4	53 26.8	+33.2	1.4	54 26.8	+33.2	1.4	55 26.8	+33.2	1.5	56 26.8	+33.2	1.5	57 26.7	+33.3	1.6	58 26.7	+33.3	1.6	59 26.7	+33.3	1.6	89
90	53 00.0	+32.2	0.0	54 00.0	+32.2	0.0	55 00.0	+32.1	0.0	56 00.0	+32.1	0.0	57 00.0	+32.1	0.0	58 00.0	+32.1	0.0	59 00.0	+32.1	0.0	60 00.0	+32.0	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 123°, 237°**

58°, 302° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	18 35.8	+50.5	116.5	18 08.9	+51.0	116.8	17 41.7	+51.5	117.1	17 14.2	+52.1	117.4	16 46.5	+52.5	117.7	16 18.5	+53.0	117.9	15 50.3	+53.4	118.2	15 21.9	+53.8	118.4	0
1	19 26.3	+50.4	116.0	18 59.9	+51.0	116.3	18 33.2	+51.5	116.6	18 06.3	+51.9	116.9	17 39.0	+52.5	117.2	17 11.5	+52.9	117.4	16 43.7	+53.3	117.7	16 15.7	+53.8	118.0	1
2	20 16.7	+50.3	115.4	19 50.9	+50.8	115.7	19 24.7	+51.4	116.0	18 58.2	+51.9	116.3	18 31.5	+52.3	116.6	18 04.4	+52.9	116.9	17 37.1	+53.3	117.2	17 09.5	+53.8	117.5	2
3	21 07.0	+50.2	114.8	20 41.7	+50.7	115.1	20 16.1	+51.2	115.5	19 50.1	+51.8	115.8	19 23.8	+52.3	116.1	18 57.3	+52.7	116.4	18 30.4	+53.2	116.7	18 03.3	+53.6	117.0	3
4	21 57.2	+50.0	114.2	21 32.4	+50.6	114.6	21 07.3	+51.1	114.9	20 41.9	+51.5	115.3	20 16.1	+52.1	115.6	19 50.0	+52.7	115.9	19 23.6	+53.2	116.3	18 56.9	+53.6	116.6	4
5	22 47.2	+49.9	113.6	22 23.0	+50.5	114.0	21 58.4	+51.1	114.4	21 33.5	+51.6	114.7	21 08.3	+52.0	115.1	20 42.7	+52.5	115.4	20 16.8	+53.0	115.8	19 50.5	+53.5	116.1	5
6	23 37.1	+49.8	113.0	23 13.5	+50.3	113.4	22 49.5	+50.9	113.8	22 25.1	+51.4	114.2	22 00.3	+52.0	114.5	21 35.2	+52.5	114.9	21 09.8	+53.0	115.3	20 44.0	+53.5	115.6	6
7	24 26.9	+49.6	112.4	24 03.8	+50.2	112.8	23 40.4	+50.7	113.2	23 16.5	+51.4	113.6	22 52.3	+51.9	114.0	22 27.7	+52.4	114.4	22 02.8	+52.9	114.8	21 37.5	+53.3	115.1	7
8	25 16.5	+49.4	111.8	24 54.0	+50.1	112.2	24 31.1	+50.7	112.6	24 07.9	+51.2	113.0	23 44.2	+51.7	113.5	23 20.1	+52.3	113.9	22 55.7	+52.7	114.2	22 30.8	+53.3	114.6	8
9	26 05.9	+49.3	111.1	25 44.1	+49.9	111.6	25 21.8	+50.5	112.0	24 59.1	+51.0	112.5	24 35.9	+51.6	112.9	24 12.4	+52.1	113.3	23 48.4	+52.7	113.7	23 24.1	+53.2	114.1	9
10	26 55.2	+49.1	110.5	26 34.0	+49.7	111.0	26 12.3	+50.3	111.4	25 50.1	+50.9	111.9	25 27.5	+51.5	112.3	25 04.5	+52.1	112.8	24 41.1	+52.6	113.2	24 17.3	+53.0	113.6	10
11	27 44.3	+49.0	109.9	27 23.7	+49.6	110.3	27 02.6	+50.2	110.8	26 41.0	+50.8	111.3	26 19.0	+51.4	111.8	25 56.6	+51.9	112.2	25 33.7	+52.4	112.7	25 10.3	+53.0	113.1	11
12	28 33.3	+48.7	109.2	28 13.3	+49.4	109.7	27 52.8	+50.0	110.2	27 31.8	+50.6	110.7	27 10.4	+51.2	111.2	26 48.5	+51.7	111.7	26 26.1	+52.3	112.1	26 03.3	+52.8	112.6	12
13	29 22.0	+48.5	108.5	29 02.7	+49.1	109.1	28 42.8	+49.8	109.6	28 22.4	+50.5	110.1	28 01.6	+51.0	110.6	27 40.2	+51.7	111.1	27 18.4	+52.2	111.6	26 56.1	+52.7	112.0	13
14	30 10.5	+48.3	107.9	29 51.8	+49.0	108.4	29 32.6	+49.7	108.9	29 12.9	+50.3	109.5	28 52.6	+50.9	110.0	28 31.9	+51.4	110.5	28 10.6	+52.0	111.0	27 48.8	+52.6	111.5	14
15	30 58.8	+48.1	107.2	30 40.8	+48.8	107.7	30 22.3	+49.4	108.3	30 03.2	+50.1	108.8	29 43.5	+50.8	109.4	29 23.3	+51.4	109.9	29 02.6	+51.9	110.4	28 41.4	+52.5	111.0	15
16	31 46.9	+47.9	106.5	31 29.6	+48.6	107.1	31 11.7	+49.3	107.6	30 53.3	+49.9	108.2	30 34.3	+50.5	108.8	30 14.7	+51.1	109.3	29 54.5	+51.8	109.9	29 33.9	+52.3	110.4	16
17	32 34.8	+47.6	105.8	32 18.2	+48.3	106.4	32 01.0	+49.0	107.0	31 43.2	+49.7	107.6	31 24.8	+50.4	108.1	31 05.8	+51.0	108.7	30 46.3	+51.6	109.3	30 26.2	+52.2	109.8	17
18	33 22.4	+47.4	105.0	33 06.5	+48.1	105.7	32 50.0	+48.8	106.3	32 32.9	+49.5	106.9	32 15.2	+50.1	107.5	31 56.8	+50.8	108.1	31 37.9	+51.4	108.7	31 18.4	+52.0	109.3	18
19	34 09.8	+47.1	104.3	33 54.6	+47.9	104.9	33 38.8	+48.6	105.6	33 22.4	+49.3	106.2	33 05.3	+50.0	106.9	32 47.6	+50.6	107.5	32 29.3	+51.2	108.1	32 10.4	+51.8	108.7	19
20	34 56.9	+46.8	103.5	34 42.5	+47.6	104.2	34 27.4	+48.3	104.9	34 11.7	+49.0	105.5	33 55.3	+49.7	106.2	33 38.2	+50.4	106.8	33 20.5	+51.1	107.5	33 02.2	+51.7	108.1	20
21	35 43.7	+46.5	102.8	35 30.1	+47.3	103.5	35 15.7	+48.1	104.2	35 00.7	+48.8	104.8	34 45.0	+49.5	105.5	34 28.6	+50.2	106.2	34 11.6	+50.8	106.8	33 53.9	+51.5	107.5	21
22	36 30.2	+46.2	102.0	36 17.4	+47.0	102.7	36 03.8	+47.8	103.4	35 49.5	+48.5	104.1	35 34.5	+49.3	104.8	35 18.8	+50.0	105.5	35 02.4	+50.7	106.2	34 45.4	+51.3	106.9	22
23	37 16.4	+45.8	101.2	37 04.4	+46.6	101.9	36 51.6	+47.5	102.7	36 38.0	+48.3	103.4	36 23.8	+49.0	104.1	36 08.8	+49.7	104.8	35 53.1	+50.4	105.5	35 36.7	+51.1	106.2	23
24	38 02.2	+45.6	100.4	37 51.0	+46.4	101.1	37 39.1	+47.1	101.9	37 26.3	+48.0	102.7	37 12.8	+48.7	103.4	36 58.5	+49.5	104.1	36 43.5	+50.2	104.9	36 27.8	+50.8	105.6	24
25	38 47.8	+45.1	99.5	38 37.4	+46.0	100.3	38 26.2	+46.9	101.1	38 14.3	+47.7	101.9	38 01.5	+48.5	102.7	37 48.0	+49.2	103.4	37 33.7	+49.9	104.2	37 18.6	+50.7	104.9	25
26	39 32.9	+44.8	98.7	39 23.4	+45.7	99.5	39 13.1	+46.5	100.3	39 02.0	+47.3	101.1	38 50.0	+48.2	101.9	38 37.2	+48.9	102.7	38 23.6	+49.7	103.5	38 09.3	+50.4	104.2	26
27	40 17.7	+44.4	97.8	40 09.1	+45.3	98.7	39 59.6	+46.2	99.5	39 49.3	+47.0	100.3	39 38.2	+47.8	101.1	39 26.1	+48.7	101.9	39 13.3	+49.4	102.7	38 59.7	+50.1	103.5	27
28	41 02.1	+44.0	96.9	40 54.4	+44.9	97.8	40 45.8	+45.8	98.7	40 36.3	+46.7	99.5	40 26.0	+47.5	100.3	40 14.8	+48.3	101.2	40 02.7	+49.2	102.0	39 49.8	+49.9	102.8	28
29	41 46.1	+43.5	96.0	41 39.3	+44.5	96.9	41 31.6	+45.4	97.8	41 23.0	+46.3	98.7	41 13.5	+47.2	99.5	41 03.1	+48.1	100.4	40 51.9	+48.8	101.3	40 39.7	+49.6	102.1	29
30	42 29.6	+43.1	95.1	42 23.8	+44.0	96.0	42 17.0	+45.0	96.9	42 09.3	+46.0	97.8	42 00.7	+46.8	98.7	41 51.2	+47.6	99.6	41 40.7	+48.5	100.5	41 29.3	+49.3	101.4	30
31	43 12.7	+42.6	94.2	43 07.8	+43.6	95.1	43 02.0	+44.5	96.0	42 55.3	+45.5	96.9	42 47.5	+46.4	97.9	42 38.8	+47.3	98.8	42 29.2	+48.2	99.7	42 18.6	+49.0	100.6	31
32	43 55.3	+42.0	93.2	43 51.4	+43.1	94.1	43 46.6	+44.1	95.1	43 40.8	+45.0	96.1	43 33.9	+46.1	97.0	43 26.1	+47.0	97.9	43 17.4	+47.8	98.9	43 07.6	+48.7	99.8	32
33	44 37.3	+41.6	92.2	44 34.5	+42.6	93.2	44 30.7	+43.6	94.2	44 25.8	+44.7	95.1	44 20.0	+45.6	96.1	44 13.1	+46.5	97.1	44 05.2	+47.4	98.0	43 56.3	+48.3	99.0	33
34	45 18.9	+41.0	91.2	45 17.1	+42.1	92.2	45 14.3	+43.2	93.2	45 10.5	+44.1	94.2	45 05.6	+45.1	95.2	44 59.6	+46.1	96.2	44 52.6	+47.1	97.2	44 44.6	+48.0	98.2	34
35	45 59.9	+40.4	90.1	45 59.2	+41.5	91.2	45 57.5	+42.6	92.2	45 54.6	+43.7	93.2	45 50.7	+44.7	94.3	45 45.7	+45.7	95.3	45 39.7	+46.6	96.3	45 32.6	+47.5	97.3	35
36	46 40.3	+39.8	89.1	46 40.7	+41.0	90.1	46 40.1	+42.0	91.2	46 38.3	+43.1	92.2	46 35.4	+44.2	93.3	46 31.4	+45.2	94.3	46 26.3	+46.2	95.4	46 20.1	+47.2	96.4	36
37	47 20.1	+39.1	88.0	47 21.7	+40.3	89.0	47 22.1	+41.5	90.1	47 21.4	+42.6	91.2	47 19.6	+43.6	92.3	47 16.6	+44.7	93.4	47 12.5	+45.7	94.5	47 07.3	+46.7	95.5	37
38	47 59.2	+38.5	86.8	48 02.0	+39.6	87.9	48 03.6	+40.8	89.1	48 04.0	+41.9	90.2	48 03.2	+43.1	91.3	48 01.3	+44.2	92.4	47 58.2	+45.2	93.5	47 54.0	+46.2	94.6	38
39	48 37.7	+37.8	85.7	48 41.6	+39.0	86.8	48 44.4	+40.2	87.9	48 45.9	+41.4	89.1	48 46.3	+42.5	90.2	48 45.5	+43.6	91.4	48 43.4	+44.7	92.5	48 40.2	+45.8	93.6	39
40	49 15.5	+37.0	84.5	49 20.6	+38.3	85.7	49 24.6	+39.5	86.8	49 27.3	+40.7	88.0	49 28.8	+41.9	89.2	49 29.1	+43.0	90.3	49 28.1	+44.2	91.5	49 26.0	+45.2	92.7	40
41	49 52.5	+36.2	83.3	49 58.9	+37.5	84.5	50 04.1	+38.8	85.6	50 08.0	+40.0	86.8	50 10.7	+41.2	88.0	50 12.1	+42.4	89.2	50 12.3	+43.5	90.4	50 11.2	+44.7	91.6	41
42	50 28.7	+35.5	82.0	50 36.4	+36.8	83.2	50 42.9	+38.0	84.5	50 48.0	+39.3	85.7	50 51.9	+40.5	86.9	50 54.5	+41.8	88.1	50 55.8	+43.0	89.4	50 55.9	+44.1	90.6	42
43	51 04.2	+34.5	80.8	51 13.2	+35.9	82.0	51 20.9	+37.2	83.2	51 27.3	+38.6	84.5	51 32.4	+39.9	85.7	51 36.3	+41.0	87.0	51 38.8	+42.3	88.2	51 40.0	+43.4	89.5	43
44	51 38.7	+33.7	79.4	51 49.1	+35.0	80.7	51 58.1	+36.4	82.0	52 05.9	+37.7	83.2	52 12.3	+39.0	84.5	52 17.3	+40.4	85.8	52 21.1	+41.5	87.1	52 23.4	+42.8	88.4	44
45	52 12.4	+32.7	78.1	52 24.1	+34.2	79.4	52 34.5	+35.5	80.7	52 43.6	+36.9	82.0	52 51.3	+38.2	83.3	52 57.7	+39.5	84.6	53 02.6	+40.9	85.9	53 06.2	+42.2	87.2	45
46	52 45.1	+31.8	76.7	52 58.3	+33.1	78.0	53 10.0	+34.6	79.3	53 20.5	+36.0	80.6	53 29.5	+37.4	82.0	53 37.2	+38.8	83.3	53 43.5	+40.1	84.7	53 48.4	+41.3	86.0	46
47	53 16.9	+30.7	75.3	53 31.4	+32.2	76.6	53 44.6	+33.7	78.0	53 56.5	+35.0	79.3	54 06.9	+36.5	80.7	54 16.0	+37.8	82.0	54 23.6	+39.2	83.4	54 29.7	+40.6	84.8	47
48	53 47.6	+29.7	73.9	54 03.6	+31.2	75.2	54 18.3	+32.6	76.5	54 31.5	+34.1	77.9	54 43.4	+35.5	79.3	54 53.8	+37.0	80.7	55 02.8	+38.4	82.1	55 10.3	+39.8	83.5	48
49	54 17.3	+28.5	72.4	54 34.8	+30.0	73.7	54 50.9	+31.6	75.1	55 05.6	+33.1	76.5	55 18.9	+34.6	77.9	55 30.8	+36.0	79.3	55 41.2	+37.5	80.7	55 50.1	+38.9	82.2	49
50	54 45.8	+27.4	70.9	55 04.8	+29.0	72.2	55 22.5	+30.4	73.6	55 38.7	+32.0	75.0	55 53.5	+33.5	76.4	56 06.8	+35.0	77.8	56 18.7	+36.5	79.3	56 29.0	+38.0	80.8	50
51	55 13.2	+26.2	69.3	55 33.8	+27.7	70.7	55 52.9	+29.3	72.1	56 10.7	+30.8	73.5	56 27.0	+32.4	74.9	56 41.8	+34.0	76.4	56 55.2	+35.4	77.9	57 07.0	+36.9	79.4	51
52	55 39.4	+25.0	67.7	56 01.5	+26.5	69.1	56 22.2	+28.1	70.5	56 41.5	+29.7	71.9	56 59.4	+31.2	73.4	57 15.8	+32.8	74.9	57 30.6	+34.4	76.4	57 43.9	+36.0	77.9	52
53	56 04.4	+23.6	66.1	56 28.0	+25.2	67.5	56 50.3	+26.8	68.9	57 11.2	+28.4	70.4	57 30.6	+30.0	71.8	57 48.6	+31.6	73.3	58 05.0	+33.2	74.9	58 19.9	+34.8	76.4	53
54	56 28.0	+22.3	64.5	56 53.2	+23.9	65.8	57 17.1	+25.5	67.3	57 39.6	+27.1	68.7	58 00.6	+28.7	70.2	58 20.2	+30.4	71.7	58 38.2	+32.0	73.3	58 54.7	+33.6	74.9	54
55	56 50.3	+20.9	62.8	57 17.1	+22.5	64.2	57 42.6	+24.1	65.6	58 06.7	+25.7	67.0	58 29.3	+27.5	68.5	58 50.6	+29.0	70.1	59 10.2	+30.8	71.6	59 28.3	+32.4	73.3	55
56	57 11.2	+19.4	61.1	57 39.6	+21.0	62.4	58 06.7	+22.6	63.9	58 32.4	+24.4	65.3	58 56.8	+26.0	66.8	59 19.6	+27.7	68.4	59 41.0	+29.4	69.9	60 00.7	+31.1	71.6	56
57	57 30.6	+18.0	59.3	58 00.6	+19.6	60.7	58 29.3	+21.3	62.1	58 56.8	+22.8	63.6	59 22.8	+24.5	65.1	59 47.3	+26.3	66.6	60 10.4	+28.0	68.2	60 31.8	+29.8	69.9	57
58	57 48.6	+16.4	57.5	58 20.2	+18.0	58.9	58 50.6	+19.6	60.3	59 19.6	+21.4	61.8	59 47.3	+23.1	63.3	60 13.6	+24.8	64.8	60 38.4	+26.5	66.4	61 01.6	+28.2	68.1	58
59	58 05.0	+14.9	55.7	58 38.2	+16.5	57.1	59 10.2	+18.2	58.5	59 41.0	+19.9	59.9	60 10.4	+21.4	61.4	60 38.4	+23.2	62.9	61 04.9	+24.9	64.6	61 29.8	+26.8	66.2	59
60	58 19.9	+13.2	53.9	58 54.7	+14.8	55.2	59 28.3	+16.5	56.6	60 00.7	+18.2	58.0	60 31.8	+19.9	59.5	61 01.6	+21.5	61.1	61 29.8	+23.4	62.7	61 56.6	+25.1	64.4	60
61	58 33.1	+11.6	52.0	59 09.5	+13.2	53.3	59 44.8	+14.8	54.7	60 18.9	+16.4	56.1	60 51.7	+18.1	57.6	61 23.1	+19.9	59.1	61 53.2	+21.6	60.8	62 21.7	+23.5	62.4	61
62	58 44.7	+10.0	50.1	59 22.7	+11.5	51.4	59 59.6	+13.2	52.8	60 35.3	+14.7	54.2	61 09.8	+16.4	55.6	61 43.0	+18.1	57.1	62 14.8	+20.0	58.7	62 45.2	+21.8	60.4	62
63	58 54.7	+8.3	48.2	59 34.2	+9.8	49.5	60 12.7	+11.3	50.8	60 50.0	+12.9	52.2	61 26.2	+14.6	53.6	62 01.1	+16.4	55.1	62 34.8	+18.1	56.7	63 07.0	+19.9	58.4	63
64	59 03.0	+6.5	46.3	59 44.0	+8.0	47.5	60 24.0	+9.5	48.8	61 02.9	+11.2	50.2	61 40.8	+12.8	51.6	62 17.5	+14.4	53.1	62 52.9	+16.2	54.6	63 26.9	+18.0	56.3	64
65	59 09.5	+4.8	44.4	59 52.0	+6.2	45.6	60 33.5	+7.7	46.8	61 14.1	+9.2	48.1	61 53.6	+10.8	49.5	62 31.9	+12.6	51.0	63 09.1	+14.3	52.5	63 44.9	+16.1	54.1	65
66	59 14.3	+3.1	42.4	59 58.2	+4.4	43.6	60 41.2	+5.9	44.8	61 23.3	+7.4	46.1	62 04.4	+9.0•	47.4	62 44.5	+10.6•	48.9	63 23.4	+12.3•	50.4	64 01.0	+14.1•	51.9	66
67	59 17.4	+1.3	40.5	60 02.6	+2.7	41.6	60 47.1	+4.0	42.8	61 30.7	+5.5	44.0	62 13.4	+7.0•	45.3	62 55.1	+8.6•	46.7	63 35.7	+10.2•	48.2	64 15.1	+12.0•	49.7	67
68	59 18.7	-0.5	38.5	60 05.3	+0.8	39.6	60 51.1	+2.2	40.7	61 36.2	+3.6	41.9	62 20.4	+5.0	43.2	63 03.7	+6.5•	44.5	63 45.9	+8.2•	45.9	64 27.1	+9.9•	47.4	68
69	59 18.2	-2.3	36.5	60 06.1	-1.0	37.6	60 53.3	+0.2	38.7	61 39.8	+1.6•	39.8	62 25.4	+3.1•	41.0	63 10.2	+4.6•	42.3	63 54.1	+6.1•	43.7	64 37.0	+7.7•	45.1	69
70	59 15.9	-3.9	34.6	60 05.1	-2.9	35.6	60 53.5	-1.6	36.6	61 41.4	-0.4	37.7	62 28.5	+1.0•	38.9	63 14.8	+2.4•	40.1	64 00.2	+4.0•	41.4	64 44.7	+5.5•	42.8	70
71	59 12.0	-5.8	32.6	60 02.2	-4.6	33.6	60 51.9	-3.5	34.5	61 41.0	-2.2	35.6	62 29.5	-1.0•	36.7	63 17.2	+0.4•	37.9	64 04.2	+1.8•	39.2	64 50.2	+3.4•	40.5	71
72	59 06.2	-7.4	30.7	59 57.6	-6.5	31.6	60 48.4	-5.3	32.5	61 38.8	-4.2•	33.5	62 28.5	-3.0•	34.5	63 17.6	-1.7•	35.7	64 06.0	-0.4•	36.9	64 53.6	+1.1•	38.1	72
73	58 58.8	-9.2	28.8	59 51.1	-8.2	29.6	60 43.1	-7.2	30.5	61 34.6	-6.2	31.4	62 25.5	-5.0•	32.4	63 15.9	-3.8•	33.4	64 05.6	-2.5•	34.6	64 54.7	-1.2•	35.8	73
74	58 49.6	-10.9	26.8	59 42.9	-9.9	27.6	60 35.9	-9.0	28.4	61 28.4	-8.0	29.3	62 20.5	-6.9•	30.2	63 12.1	-5.8•	31.2	64 03.1	-4.6•	32.3	64 53.5	-3.4•	33.4	74
75	58 38.7	-12.5	25.0	59 33.0	-11.7	25.7	60 26.9	-10.8	26.4	61 20.4	-9.9	27.2	62 13.6	-9.0•	28.1	63 06.3	-7.9•	29.0	63 58.5	-6.8•	30.0	64 50.1	-5.5•	31.1	75
76	58 26.2	-14.1	23.1	59 21.3	-13.4	23.7	60 16.1	-12.6	24.4	61 10.5	-11.7	25.2	62 04.6	-10.8	26.0	62 58.4	-9.9•	26.8	63 51.7	-8.9•	27.8	64 44.6	-7.8•	28.7	76
77	58 12.1	-15.7	21.2	59 07.9	-15.0	21.8	60 03.5	-14.3	22.5	60 58.8	-13.6	23.2	61 53.8	-12.7	23.9	62 48.5	-11.9	24.7	63 42.8	-10.9•	25.5	64 36.8	-10.0•	26.4	77
78	57 56.4	-17.3	19.4	58 52.9	-16.7	19.9	59 49.2	-16.0	20.5	60 45.2	-15.5	21.2	61 41.1	-14.6	21.8	62 36.6	-13.7	22.5	63 31.9	-12.9•	23.3	64 26.8	-12.0•	24.1	78
79	57 39.1	-18.7	17.6	58 36.2	-18.2	18.1	59 33.2	-17.7	18.6	60 29.4	-17.0	19.2	61 26.5	-16.4	19.8	62 22.9	-15.7	20.4	63 19.0	-15.0	21.1	64 14.8	-14.1•	21.9	79
80	57 20.4	-20.3	15.8	58 18.0	-19.7	16.3	59 15.5	-19.2	16.7	60 12.9	-18.7	17.2	61 10.1	-18.1	17.8	62 07.2	-17.5	18.4	63 04.0	-16.8	19.0	64 00.7	-16.2•	19.6	80
81	57 00.1	-21.6	14.1	57 58.3	-21.2	14.5	58 56.3	-20.8	14.9	59 54.2	-20.3	15.3	60 52.0	-19.8	15.8	61 49.7	-19.3	16.3	62 47.2	-18.7	16.9	63 44.5	-18.1	17.4	81
82	56 38.5	-23.0	12.4	57 37.1	-22.7	12.7	58 35.5	-22.2	13.1	59 33.9	-21.8	13.5	60 32.2	-21.4	13.9	61 30.4	-20.9	14.3	62 28.5	-20.5	14.8	63 26.4	-19.9	15.3	82
83	56 15.5	-24.3	10.7	57 14.4	-24.0	11.0	58 13.3	-23.7	11.3	59 12.1	-23.4	11.6	60 10.8	-23.0	12.0	61 09.5	-22.7	12.4	62 08.0	-22.2	12.8	63 06.5	-21.8	13.2	83
84	55 51.2	-25.7	9.1	56 50.4	-25.4	9.3	57 49.6	-25.1	9.6	58 48.7	-24.8	9.9	59 47.8	-24.5	10.1	60 46.8	-24.2	10.5	61 45.8	-23.9	10.8	62 44.7	-23.5	11.2	84
85	55 25.5	-26.8	7.5	56 25.0	-26.6	7.7	57 24.5	-26.5	7.9	58 23.9	-26.2	8.1	59 23.3	-26.0	8.3	60 22.6	-25.7	8.6	61 21.9	-25.5	8.9	62 21.2	-25.2	9.2	85
86	54 58.7	-28.0	5.9	55 58.4	-27.9	6.1	56 58.0	-27.7	6.2	57 57.7	-27.6	6.4	58 57.3	-27.4	6.6	59 56.9	-27.2	6.8	60 56.4	-27.0	7.0	61 56.0	-26.8	7.2	86
87	54 30.7	-29.2	4.4	55 30.5	-29.0	4.5	56 30.3	-28.9	4.6	57 30.1	-28.8	4.7	58 29.9	-28.7	4.9	59 29.7	-28.6	5.0	60 29.4	-28.4	5.2	61 29.2	-28.3	5.3	87
88	54 01.5	-30.2	2.9	55 01.5	-30.2	3.0	56 01.4	-30.2	3.0	57 01.3	-30.1	3.1	58 01.2	-30.0	3.2	59 01.1	-29.9	3.3	60 01.0	-29.8	3.4	61 00.9	-29.8	3.5	88
89	53 31.3	-31.3	1.4	54 31.3	-31.3	1.5	55 31.2	-31.2	1.5	56 31.2	-31.2	1.5	57 31.2	-31.2	1.6	58 31.2	-31.2	1.6	59 31.2	-31.2	1.7	60 31.1	-31.1	1.7	89
90	53 00.0	-32.3	0.0	54 00.0	-32.3	0.0	55 00.0	-32.3	0.0	56 00.0	-32.3	0.0	57 00.0	-32.4	0.0	58 00.0	-32.4	0.0	59 00.0	-32.4	0.0	60 00.0	-32.4	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

58°, 302° L.H.A.   LATITUDE **SAME** NAME AS DECLINATION

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	18 35.8	−50.6	116.5	18 08.9	−51.1	116.8	17 41.7	−51.6	117.1	17 14.2	−52.1	117.4	16 46.5	−52.6	117.7	16 18.5	−53.0	117.9	15 50.3	−53.5	118.2	15 21.9	−53.9	118.4	0
1	17 45.2	−50.7	117.1	17 17.8	−51.2	117.4	16 50.1	−51.7	117.6	16 22.1	−52.2	117.9	15 53.9	−52.7	118.2	15 25.5	−53.1	118.4	14 56.8	−53.5	118.6	14 28.0	−54.0	118.9	1
2	16 54.5	−50.8	117.6	16 26.6	−51.3	117.9	15 58.4	−51.8	118.2	15 29.9	−52.3	118.4	15 01.2	−52.7	118.7	14 32.4	−53.2	118.9	14 03.3	−53.6	119.1	13 34.0	−54.0	119.3	2
3	16 03.7	−50.9	118.2	15 35.3	−51.4	118.5	15 06.6	−51.9	118.7	14 37.6	−52.3	118.9	14 08.5	−52.8	119.1	13 39.2	−53.2	119.4	13 09.7	−53.7	119.6	12 40.0	−54.1	119.8	3
4	15 12.8	−50.9	118.8	14 43.9	−51.5	119.0	14 14.7	−51.9	119.2	13 45.3	−52.4	119.4	13 15.7	−52.8	119.6	12 46.0	−53.3	119.8	12 16.0	−53.7	120.0	11 45.9	−54.1	120.2	4
5	14 21.9	−51.0	119.3	13 52.4	−51.5	119.5	13 22.8	−52.0	119.7	12 52.9	−52.4	119.9	12 22.9	−52.9	120.1	11 52.7	−53.3	120.3	11 22.3	−53.7	120.5	10 51.8	−54.1	120.7	5
6	13 30.9	−51.2	119.8	13 00.9	−51.6	120.0	12 30.8	−52.1	120.2	12 00.5	−52.5	120.4	11 30.0	−52.9	120.6	10 59.4	−53.4	120.8	10 28.6	−53.8	120.9	9 57.7	−54.2	121.1	6
7	12 39.7	−51.1	120.4	12 09.3	−51.6	120.6	11 38.7	−52.1	120.7	11 08.0	−52.6	120.9	10 37.1	−53.0	121.1	10 06.0	−53.4	121.2	9 34.8	−53.8	121.4	9 03.5	−54.2	121.5	7
8	11 48.6	−51.2	120.9	11 17.7	−51.7	121.1	10 46.6	−52.1	121.3	10 15.4	−52.6	121.4	9 44.1	−53.0	121.6	9 12.6	−53.4	121.7	8 41.0	−53.8	121.8	8 09.3	−54.2	122.0	8
9	10 57.4	−51.3	121.4	10 26.0	−51.8	121.6	9 54.5	−52.2	121.8	9 22.8	−52.6	121.9	8 51.1	−53.1	122.0	8 19.2	−53.5	122.2	7 47.2	−53.9	122.3	7 15.1	−54.3	122.4	9
10	10 06.1	−51.4	122.0	9 34.2	−51.8	122.1	9 02.3	−52.3	122.3	8 30.2	−52.7	122.4	7 58.0	−53.1	122.5	7 25.7	−53.5	122.6	6 53.3	−53.9	122.7	6 20.8	−54.3	122.8	10
11	9 14.7	−51.3	122.5	8 42.4	−51.8	122.6	8 10.0	−52.2	122.8	7 37.5	−52.7	122.9	7 04.9	−53.1	123.0	6 32.2	−53.5	123.1	5 59.4	−53.9	123.2	5 26.5	−54.3	123.3	11
12	8 23.4	−51.5	123.0	7 50.6	−51.9	123.1	7 17.8	−52.3	123.2	6 44.8	−52.7	123.4	6 11.8	−53.2	123.4	5 38.7	−53.6	123.5	5 05.5	−53.9	123.6	4 32.3	−54.4	123.7	12
13	7 31.9	−51.4	123.5	6 58.7	−51.9	123.6	6 25.5	−52.3	123.7	5 52.1	−52.8	123.8	5 18.6	−53.1	123.9	4 45.1	−53.5	124.0	4 11.6	−54.0	124.1	3 37.9	−54.3	124.1	13
14	6 40.5	−51.5	124.1	6 06.8	−51.9	124.2	5 33.1	−52.3	124.2	4 59.3	−52.7	124.3	4 25.5	−53.2	124.4	3 51.6	−53.5	124.4	3 17.6	−53.9	124.5	2 43.6	−54.3	124.5	14
15	5 49.0	−51.5	124.6	5 14.9	−51.9	124.7	4 40.8	−52.4	124.7	4 06.6	−52.8	124.8	3 32.3	−53.2	124.8	2 58.0	−53.6	124.9	2 23.7	−54.0	124.9	1 49.3	−54.3	125.0	15
16	4 57.5	−51.6	125.1	4 23.0	−52.0	125.2	3 48.4	−52.4	125.2	3 13.8	−52.8	125.3	2 39.1	−53.2	125.3	2 04.4	−53.6	125.3	1 29.7	−54.0	125.4	0 55.0	−54.3	125.4	16
17	4 05.9	−51.6	125.6	3 31.0	−52.0	125.7	2 56.0	−52.4	125.7	2 21.0	−52.9	125.7	1 45.9	−53.2	125.8	1 10.8	−53.6	125.8	0 35.7	−54.0	125.8	0 00.6	−54.3	125.8	17
18	3 14.4	−51.6	126.1	2 39.0	−52.0	126.2	2 03.6	−52.4	126.2	1 28.1	−52.8	126.2	0 52.7	−53.2	126.2	0 17.2	−53.6	126.2	0 18.3	+53.9	53.8	0 53.7	+54.4	53.8	18
19	2 22.8	−51.6	126.6	1 47.0	−52.0	126.7	1 11.2	−52.5	126.7	0 35.3	−52.8	126.7	0 00.5	+53.2	53.3	0 36.4	+53.6	53.3	1 12.2	+54.0	53.3	1 48.1	+54.3	53.3	19
20	1 31.2	−51.6	127.1	0 55.0	−52.0	127.2	0 18.7	−52.4	127.2	0 17.5	+52.8	52.8	0 53.7	+53.3	52.8	1 30.0	+53.6	52.9	2 06.2	+54.0	52.9	2 42.4	+54.3	52.9	20
21	0 39.6	−51.6	127.6	0 03.0	−52.0	127.7	0 33.7	+52.4	52.4	1 10.3	+52.8	52.4	1 47.0	+53.2	52.4	2 23.6	+53.6	52.4	3 00.2	+53.9	52.4	3 36.7	+54.3	52.5	21
22	0 12.0	+51.6	51.8	0 49.0	+52.1	51.8	1 26.1	+52.4	51.9	2 03.1	+52.9	51.9	2 40.2	+53.2	51.9	3 17.2	+53.5	52.0	3 54.1	+53.9	52.0	4 31.0	+54.3	52.0	22
23	1 03.6	+51.5	51.3	1 41.1	+52.0	51.3	2 18.5	+52.4	51.4	2 56.0	+52.8	51.4	3 33.4	+53.1	51.5	4 10.7	+53.5	51.5	4 48.0	+54.0	51.6	5 25.3	+54.3	51.6	23
24	1 55.2	+51.5	50.8	2 33.1	+51.9	50.9	3 10.9	+52.4	50.9	3 48.8	+52.7	50.9	4 26.5	+53.2	51.0	5 04.3	+53.5	51.1	5 42.0	+53.9	51.1	6 19.6	+54.2	51.2	24
25	2 46.7	+51.6	50.3	3 25.0	+52.0	50.4	4 03.3	+52.4	50.4	4 41.5	+52.8	50.5	5 19.7	+53.1	50.5	5 57.8	+53.5	50.6	6 35.9	+53.8	50.7	7 13.8	+54.3	50.8	25
26	3 38.3	+51.6	49.8	4 17.0	+52.0	49.8	4 55.7	+52.3	49.9	5 34.3	+52.7	50.0	6 12.8	+53.2	50.1	6 51.3	+53.5	50.1	7 29.7	+53.9	50.2	8 08.1	+54.2	50.4	26
27	4 29.9	+51.5	49.3	5 09.0	+51.9	49.3	5 48.0	+52.4	49.4	6 27.0	+52.7	49.5	7 06.0	+53.1	49.6	7 44.8	+53.5	49.7	8 23.6	+53.8	49.8	9 02.3	+54.1	49.9	27
28	5 21.4	+51.5	48.8	6 00.9	+51.9	48.8	6 40.4	+52.3	48.9	7 19.7	+52.7	49.0	7 59.1	+53.0	49.1	8 38.3	+53.4	49.2	9 17.4	+53.8	49.4	9 56.4	+54.2	49.5	28
29	6 12.9	+51.5	48.3	6 52.8	+51.9	48.3	7 32.7	+52.2	48.4	8 12.4	+52.7	48.5	8 52.1	+53.0	48.7	9 31.7	+53.4	48.8	10 11.2	+53.7	48.9	10 50.6	+54.1	49.0	29
30	7 04.4	+51.4	47.7	7 44.7	+51.8	47.8	8 24.9	+52.2	47.9	9 05.1	+52.6	48.1	9 45.1	+53.0	48.2	10 25.1	+53.3	48.3	11 04.9	+53.8	48.5	11 44.7	+54.0	48.6	30
31	7 55.8	+51.4	47.2	8 36.5	+51.8	47.3	9 17.1	+52.2	47.4	9 57.7	+52.5	47.6	10 38.1	+53.0	47.7	11 18.4	+53.3	47.8	11 58.7	+53.6	48.0	12 38.7	+54.1	48.2	31
32	8 47.2	+51.4	46.7	9 28.3	+51.8	46.8	10 09.3	+52.2	46.9	10 50.2	+52.6	47.1	11 31.1	+52.8	47.2	12 11.7	+53.3	47.4	12 52.3	+53.6	47.5	13 32.8	+53.9	47.7	32
33	9 38.6	+51.3	46.2	10 20.1	+51.7	46.3	11 01.5	+52.1	46.4	11 42.8	+52.4	46.6	12 23.9	+52.9	46.7	13 05.0	+53.2	46.9	13 45.9	+53.6	47.1	14 26.7	+53.9	47.3	33
34	10 29.9	+51.2	45.6	11 11.8	+51.6	45.8	11 53.6	+52.0	45.9	12 35.2	+52.4	46.1	13 16.8	+52.8	46.3	13 58.2	+53.2	46.4	14 39.5	+53.5	46.6	15 20.6	+53.9	46.8	34
35	11 21.1	+51.2	45.1	12 03.4	+51.6	45.3	12 45.6	+52.0	45.4	13 27.6	+52.4	45.6	14 09.6	+52.7	45.8	14 51.4	+53.1	45.9	15 33.0	+53.5	46.1	16 14.5	+53.8	46.3	35
36	12 12.3	+51.2	44.6	12 55.0	+51.5	44.7	13 37.6	+51.9	44.9	14 20.0	+52.3	45.1	15 02.3	+52.7	45.3	15 44.5	+53.0	45.5	16 26.5	+53.3	45.7	17 08.3	+53.7	45.9	36
37	13 03.5	+51.0	44.0	13 46.5	+51.5	44.2	14 29.5	+51.8	44.4	15 12.3	+52.2	44.6	15 55.0	+52.5	44.8	16 37.5	+52.9	45.0	17 19.8	+53.4	45.2	18 02.0	+53.7	45.4	37
38	13 54.5	+51.0	43.5	14 38.0	+51.4	43.7	15 21.3	+51.8	43.8	16 04.5	+52.2	44.1	16 47.5	+52.6	44.3	17 30.4	+52.9	44.5	18 13.2	+53.2	44.7	18 55.7	+53.6	44.9	38
39	14 45.5	+51.0	43.0	15 29.4	+51.3	43.1	16 13.1	+51.7	43.3	16 56.7	+52.0	43.5	17 40.1	+52.4	43.8	18 23.3	+52.8	44.0	19 06.4	+53.2	44.2	19 49.3	+53.5	44.5	39
40	15 36.5	+50.8	42.4	16 20.7	+51.2	42.6	17 04.8	+51.6	42.8	17 48.7	+52.0	43.0	18 32.5	+52.4	43.3	19 16.1	+52.7	43.5	19 59.6	+53.0	43.7	20 42.8	+53.5	44.0	40
41	16 27.3	+50.8	41.9	17 11.9	+51.2	42.1	17 56.4	+51.5	42.3	18 40.7	+51.9	42.5	19 24.9	+52.2	42.7	20 08.8	+52.7	43.0	20 52.6	+53.0	43.2	21 36.3	+53.3	43.5	41
42	17 18.1	+50.6	41.3	18 03.1	+51.0	41.5	18 47.9	+51.4	41.7	19 32.6	+51.8	42.0	20 17.1	+52.2	42.2	21 01.5	+52.5	42.5	21 45.6	+52.9	42.7	22 29.6	+53.3	43.0	42
43	18 08.7	+50.6	40.7	18 54.1	+51.0	41.0	19 39.3	+51.4	41.2	20 24.4	+51.7	41.4	21 09.3	+52.1	41.7	21 54.0	+52.5	41.9	22 38.5	+52.9	42.2	23 22.9	+53.1	42.5	43
44	18 59.3	+50.4	40.2	19 45.1	+50.8	40.4	20 30.7	+51.2	40.6	21 16.1	+51.6	40.9	22 01.4	+51.9	41.2	22 46.5	+52.3	41.4	23 31.4	+52.7	41.7	24 16.0	+53.1	42.0	44
45	19 49.7	+50.4	39.6	20 35.9	+50.7	39.8	21 21.9	+51.1	40.1	22 07.7	+51.5	40.3	22 53.3	+51.9	40.6	23 38.8	+52.3	40.9	24 24.1	+52.5	41.2	25 09.1	+53.0	41.5	45
46	20 40.1	+50.2	39.0	21 26.6	+50.6	39.3	22 13.0	+51.0	39.5	22 59.2	+51.4	39.8	23 45.2	+51.7	40.1	24 31.0	+52.1	40.4	25 16.6	+52.5	40.7	26 02.1	+52.8	41.0	46
47	21 30.3	+50.1	38.4	22 17.2	+50.5	38.7	23 04.0	+50.8	38.9	23 50.6	+51.2	39.2	24 36.9	+51.7	39.5	25 23.1	+52.0	39.8	26 09.1	+52.4	40.1	26 54.9	+52.7	40.4	47
48	22 20.4	+50.0	37.8	23 07.7	+50.4	38.1	23 54.8	+50.8	38.4	24 41.8	+51.1	38.7	25 28.6	+51.4	38.9	26 15.1	+51.9	39.3	27 01.5	+52.2	39.6	27 47.6	+52.6	39.9	48
49	23 10.4	+49.8	37.2	23 58.1	+50.2	37.5	24 45.6	+50.6	37.8	25 32.9	+51.0	38.1	26 20.0	+51.4	38.4	27 07.0	+51.7	38.7	27 53.7	+52.1	39.0	28 40.2	+52.5	39.4	49
50	24 00.2	+49.7	36.6	24 48.3	+50.1	36.9	25 36.2	+50.4	37.2	26 23.9	+50.8	37.5	27 11.4	+51.2	37.8	27 58.7	+51.6	38.1	28 45.8	+52.0	38.5	29 32.7	+52.3	38.8	50
51	24 49.9	+49.6	36.0	25 38.4	+49.9	36.3	26 26.6	+50.3	36.6	27 14.7	+50.7	36.9	28 02.6	+51.0	37.2	28 50.3	+51.4	37.5	29 37.8	+51.7	37.9	30 25.0	+52.2	38.2	51
52	25 39.5	+49.3	35.4	26 28.3	+49.7	35.7	27 16.9	+50.2	36.0	28 05.4	+50.5	36.3	28 53.6	+50.9	36.6	29 41.7	+51.3	36.9	30 29.5	+51.7	37.3	31 17.2	+52.0	37.7	52
53	26 28.8	+49.2	34.8	27 18.0	+49.6	35.1	28 07.1	+49.9	35.4	28 55.9	+50.3	35.7	29 44.5	+50.8	36.0	30 33.0	+51.1	36.3	31 21.2	+51.5	36.7	32 09.2	+51.8	37.1	53
54	27 18.0	+49.1	34.1	28 07.6	+49.4	34.4	28 57.0	+49.8	34.7	29 46.2	+50.2	35.0	30 35.3	+50.5	35.4	31 24.1	+50.9	35.7	32 12.7	+51.3	36.1	33 01.0	+51.7	36.5	54
55	28 07.1	+48.8	33.5	28 57.0	+49.2	33.8	29 46.8	+49.6	34.1	30 36.4	+50.0	34.4	31 25.8	+50.4	34.8	32 15.0	+50.7	35.1	33 04.0	+51.1	35.5	33 52.7	+51.5	35.9	55
56	28 55.9	+48.6	32.8	29 46.2	+49.1	33.1	30 36.4	+49.4	33.4	31 26.4	+49.9	33.8	32 16.2	+50.1	34.1	33 05.7	+50.6	34.5	33 55.1	+50.9	34.9	34 44.2	+51.3	35.3	56
57	29 44.5	+48.5	32.1	30 35.3	+48.8	32.4	31 25.8	+49.2	32.8	32 16.2	+49.5	33.1	33 06.3	+50.0	33.5	33 56.3	+50.3	33.8	34 46.0	+50.7	34.2	35 35.5	+51.1	34.6	57
58	30 33.0	+48.2	31.5	31 24.1	+48.6	31.8	32 15.0	+49.0	32.1	33 05.7	+49.4	32.4	33 56.3	+49.7	32.8	34 46.6	+50.1	33.2	35 36.7	+50.5	33.6	36 26.6	+50.9	34.0	58
59	31 21.2	+48.0	30.8	32 12.7	+48.3	31.1	33 04.0	+48.7	31.4	33 55.1	+49.2	31.8	34 46.0	+49.5	32.1	35 36.7	+49.9	32.5	36 27.2	+50.3	32.9	37 17.5	+50.6	33.3	59
60	32 09.2	+47.7	30.1	33 01.0	+48.2	30.4	33 52.7	+48.5	30.7	34 44.2	+48.9	31.1	35 35.5	+49.3	31.4	36 26.6	+49.6	31.8	37 17.5	+50.0	32.2	38 08.1	+50.4	32.6	60
61	32 56.9	+47.5	29.3	33 49.2	+47.8	29.7	34 41.2	+48.3	30.0	35 33.1	+48.6	30.4	36 24.8	+49.0	30.7	37 16.2	+49.4	31.1	38 07.5	+49.8	31.5	38 58.5	+50.2	31.9	61
62	33 44.4	+47.3	28.6	34 37.0	+47.6	28.9	35 29.5	+47.9	29.3	36 21.7	+48.4	29.6	37 13.8	+48.7	30.0	38 05.6	+49.1	30.4	38 57.3	+49.5	30.8	39 48.7	+49.9	31.2	62
63	34 31.7	+46.9	27.9	35 24.6	+47.4	28.2	36 17.4	+47.7	28.5	37 10.1	+48.0	28.9	38 02.5	+48.4	29.3	38 54.7	+48.9	29.7	39 46.8	+49.2	30.1	40 38.6	+49.6	30.5	63
64	35 18.6	+46.7	27.1	36 12.0	+47.0	27.4	37 05.1	+47.4	27.8	37 58.1	+47.8	28.1	38 50.9	+48.2	28.5	39 43.6	+48.5	28.9	40 36.0	+48.9	29.3	41 28.2	+49.3	29.7	64
65	36 05.3	+46.4	26.3	36 59.0	+46.7	26.7	37 52.5	+47.1	27.0	38 45.9	+47.5	27.4	39 39.1	+47.9	27.7	40 32.1	+48.2	28.1	41 24.9	+48.6	28.5	42 17.5	+49.0	29.0	65
66	36 51.7	+46.0	25.5	37 45.7	+46.4	25.9	38 39.6	+46.8	26.2	39 33.4	+47.1	26.6	40 27.0	+47.5	27.0	41 20.3	+47.9	27.3	42 13.5	+48.3	27.8	43 06.5	+48.7	28.2	66
67	37 37.7	+45.7	24.7	38 32.1	+46.1	25.1	39 26.4	+46.4	25.4	40 20.5	+46.8	25.8	41 14.5	+47.1	26.1	42 08.2	+47.6	26.5	43 01.8	+48.0	27.0	43 55.2	+48.3	27.4	67
68	38 23.4	+45.4	23.9	39 18.2	+45.7	24.2	40 12.8	+46.1	24.6	41 07.3	+46.5	24.9	42 01.6	+46.8	25.3	42 55.8	+47.2	25.7	43 49.8	+47.5	26.1	44 43.5	+48.0	26.6	68
69	39 08.8	+45.0	23.1	40 03.9	+45.3	23.4	40 58.9	+45.7	23.7	41 53.8	+46.0	24.1	42 48.4	+46.5	24.5	43 43.0	+46.8	24.9	44 37.3	+47.2	25.3	45 31.5	+47.5	25.7	69
70	39 53.8	+44.6	22.2	40 49.2	+45.0	22.5	41 44.6	+45.3	22.9	42 39.8	+45.7	23.2	43 34.9	+46.0	23.6	44 29.8	+46.4	24.0	45 24.5	+46.8	24.4	46 19.0	+47.2	24.8	70
71	40 38.4	+44.2	21.3	41 34.2	+44.5	21.7	42 29.9	+44.9	22.0	43 25.5	+45.2	22.3	44 20.9	+45.6	22.7	45 16.2	+45.9	23.1	46 11.3	+46.3	23.5	47 06.2	+46.7	23.9	71
72	41 22.6	+43.7	20.4	42 18.7	+44.1	20.8	43 14.8	+44.4	21.1	44 10.7	+44.8	21.4	45 06.5	+45.1	21.8	46 02.1	+45.5	22.2	46 57.6	+45.9	22.6	47 52.9	+46.3	23.0	72
73	42 06.3	+43.3	19.5	43 02.8	+43.7	19.8	43 59.2	+44.0	20.2	44 55.5	+44.3	20.5	45 51.6	+44.7	20.9	46 47.6	+45.0	21.2	47 43.5	+45.3	21.6	48 39.2	+45.7	22.0	73
74	42 49.6	+42.9	18.6	43 46.5	+43.1	18.9	44 43.2	+43.5	19.2	45 39.8	+43.9	19.5	46 36.3	+44.1	19.9	47 32.6	+44.5	20.3	48 28.8	+44.9	20.6	49 24.9	+45.3	21.1	74
75	43 32.5	+42.4	17.6	44 29.6	+42.7	17.9	45 26.7	+43.0	18.2	46 23.6	+43.3	18.6	47 20.4	+43.7	18.9	48 17.1	+44.0	19.3	49 13.7	+44.3	19.6	50 10.2	+44.6	20.0	75
76	44 14.9	+41.8	16.6	45 12.3	+42.1	16.9	46 09.7	+42.4	17.2	47 06.9	+42.8	17.5	48 04.1	+43.0	17.9	49 01.1	+43.4	18.2	49 58.0	+43.8	18.6	50 54.8	+44.2	19.0	76
77	44 56.7	+41.3	15.6	45 54.4	+41.6	15.9	46 52.1	+41.9	16.2	47 49.7	+42.1	16.5	48 47.1	+42.5	16.8	49 44.5	+42.8	17.2	50 41.8	+43.1	17.5	51 39.0	+43.4	17.9	77
78	45 38.0	+40.7	14.6	46 36.0	+41.0	14.9	47 34.0	+41.2	15.1	48 31.8	+41.6	15.4	49 29.6	+41.9	15.8	50 27.3	+42.2	16.1	51 24.9	+42.5	16.4	52 22.4	+42.9	16.8	78
79	46 18.7	+40.1	13.5	47 17.0	+40.4	13.8	48 15.2	+40.7	14.1	49 13.4	+40.9	14.3	50 11.5	+41.2	14.6	51 09.5	+41.5	15.0	52 07.4	+41.9	15.3	53 05.3	+42.1	15.6	79
80	46 58.8	+39.5	12.5	47 57.4	+39.7	12.7	48 55.9	+40.0	13.0	49 54.3	+40.3	13.2	50 52.7	+40.5	13.5	51 51.0	+40.8	13.8	52 49.3	+41.1	14.1	53 47.4	+41.4	14.4	80
81	47 38.3	+38.9	11.4	48 37.1	+39.1	11.6	49 35.9	+39.3	11.8	50 34.6	+39.5	12.1	51 33.2	+39.8	12.3	52 31.8	+40.1	12.6	53 30.4	+40.3	12.9	54 28.8	+40.6	13.2	81
82	48 17.2	+38.1	10.2	49 16.2	+38.4	10.4	50 15.2	+38.6	10.6	51 14.1	+38.8	10.9	52 13.0	+39.1	11.1	53 11.9	+39.3	11.4	54 10.7	+39.5	11.6	55 09.4	+39.8	11.9	82
83	48 55.3	+37.4	9.0	49 54.6	+37.6	9.2	50 53.8	+37.8	9.4	51 52.9	+38.0	9.6	52 52.1	+38.2	9.9	53 51.2	+38.4	10.1	54 50.2	+38.7	10.3	55 49.2	+38.9	10.6	83
84	49 32.7	+36.7	7.9	50 32.2	+36.8	8.0	51 31.6	+37.0	8.2	52 30.9	+37.2	8.4	53 30.3	+37.4	8.6	54 29.6	+37.6	8.8	55 28.9	+37.8	9.0	56 28.1	+38.0	9.2	84
85	50 09.4	+35.9	6.6	51 09.0	+36.0	6.8	52 08.6	+36.1	6.9	53 08.1	+36.3	7.1	54 07.7	+36.4	7.2	55 07.2	+36.6	7.4	56 06.7	+36.8	7.6	57 06.1	+37.0	7.8	85
86	50 45.3	+35.0	5.4	51 45.0	+35.2	5.5	52 44.7	+35.3	5.6	53 44.4	+35.4	5.7	54 44.1	+35.5	5.9	55 43.8	+35.7	6.0	56 43.5	+35.8	6.2	57 43.1	+36.0	6.4	86
87	51 20.3	+34.2	4.1	52 20.2	+34.2	4.2	53 20.0	+34.3	4.3	54 19.8	+34.4	4.4	55 19.6	+34.6	4.5	56 19.5	+34.6	4.6	57 19.3	+34.7	4.7	58 19.1	+34.8	4.8	87
88	51 54.5	+33.2	2.7	52 54.4	+33.3	2.8	53 54.3	+33.4	2.9	54 54.2	+33.5	3.0	55 54.2	+33.4	3.0	56 54.1	+33.5	3.1	57 54.0	+33.6	3.2	58 53.9	+33.7	3.3	88
89	52 27.7	+32.3	1.4	53 27.7	+32.3	1.4	54 27.7	+32.3	1.5	55 27.7	+32.3	1.5	56 27.6	+32.4	1.5	57 27.6	+32.4	1.6	58 27.6	+32.4	1.6	59 27.6	+32.4	1.7	89
90	53 00.0	+31.3	0.0	54 00.0	+31.3	0.0	55 00.0	+31.2	0.0	56 00.0	+31.2	0.0	57 00.0	+31.2	0.0	58 00.0	+31.2	0.0	59 00.0	+31.2	0.0	60 00.0	+31.1	0.0	90

	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 122°, 238°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.		53°			54°			55°			56°			57°			58°			59°			60°		Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	
0	18 03.4	+50.3	115.6	17 37.3	+50.9	115.9	17 10.9	+51.4	116.2	16 44.3	+51.9	116.5	16 17.4	+52.4	116.7	15 50.3	+52.9	117.0	15 23.0	+53.3	117.3	14 55.4	+53.7	117.5	0
1	18 53.7	+50.3	115.1	18 28.2	+50.8	115.4	18 02.3	+51.4	115.7	17 36.2	+51.8	116.0	17 09.8	+52.3	116.2	16 43.2	+52.8	116.5	16 16.3	+53.2	116.8	15 49.1	+53.7	117.0	1
2	19 44.0	+50.1	114.5	19 19.0	+50.7	114.8	18 53.7	+51.2	115.1	18 28.0	+51.8	115.4	18 02.1	+52.3	115.7	17 36.0	+52.7	116.0	17 09.5	+53.2	116.3	16 42.8	+53.6	116.6	2
3	20 34.1	+50.0	113.9	20 09.7	+50.5	114.2	19 44.9	+51.1	114.6	19 19.8	+51.6	114.9	18 54.4	+52.1	115.2	18 28.7	+52.6	115.5	18 02.7	+53.1	115.8	17 36.4	+53.6	116.1	3
4	21 24.1	+49.9	113.3	21 00.2	+50.5	113.7	20 36.0	+51.0	114.0	20 11.4	+51.5	114.3	19 46.5	+52.1	114.7	19 21.3	+52.6	115.0	18 55.8	+53.0	115.3	18 30.0	+53.5	115.6	4
5	22 14.0	+49.8	112.7	21 50.7	+50.3	113.1	21 27.0	+50.9	113.4	21 02.9	+51.5	113.8	20 38.6	+51.9	114.1	20 13.8	+52.5	114.5	19 48.8	+53.0	114.8	19 23.5	+53.4	115.1	5
6	23 03.8	+49.6	112.1	22 41.0	+50.2	112.5	22 17.9	+50.7	112.9	21 54.4	+51.3	113.2	21 30.5	+51.9	113.6	21 06.3	+52.4	114.0	20 41.8	+52.8	114.3	20 16.9	+53.3	114.7	6
7	23 53.4	+49.4	111.5	23 31.2	+50.1	111.9	23 08.6	+50.7	112.3	22 45.7	+51.2	112.7	22 22.4	+51.7	113.1	21 58.7	+52.3	113.4	21 34.6	+52.8	113.8	21 10.2	+53.3	114.2	7
8	24 42.8	+49.4	110.9	24 21.3	+49.9	111.3	23 59.3	+50.5	111.7	23 36.9	+51.0	112.1	23 14.1	+51.6	112.5	22 50.9	+52.2	112.9	22 27.4	+52.6	113.3	22 03.5	+53.1	113.7	8
9	25 32.2	+49.1	110.2	25 11.2	+49.7	110.7	24 49.8	+50.3	111.1	24 27.9	+51.0	111.5	24 05.7	+51.5	112.0	23 43.1	+52.0	112.4	23 20.0	+52.6	112.8	22 56.6	+53.1	113.2	9
10	26 21.3	+49.0	109.6	26 00.9	+49.6	110.1	25 40.1	+50.2	110.5	25 18.9	+50.8	111.0	24 57.2	+51.4	111.4	24 35.1	+51.9	111.8	24 12.6	+52.4	112.2	23 49.7	+52.9	112.7	10
11	27 10.3	+48.8	109.0	26 50.5	+49.5	109.4	26 30.3	+50.1	109.9	26 09.7	+50.6	110.4	25 48.6	+51.2	110.8	25 27.0	+51.8	111.3	25 05.0	+52.4	111.7	24 42.6	+52.9	112.1	11
12	27 59.1	+48.6	108.3	27 40.0	+49.2	108.8	27 20.4	+49.9	109.3	27 00.3	+50.5	109.8	26 39.8	+51.1	110.2	26 18.8	+51.7	110.7	25 57.4	+52.2	111.2	25 35.5	+52.7	111.6	12
13	28 47.7	+48.4	107.6	28 29.2	+49.1	108.1	28 10.3	+49.7	108.7	27 50.8	+50.4	109.2	27 30.9	+50.9	109.7	27 10.5	+51.5	110.1	26 49.6	+52.1	110.6	26 28.2	+52.6	111.1	13
14	29 36.1	+48.2	107.0	29 18.3	+48.9	107.5	29 00.0	+49.5	108.0	28 41.2	+50.1	108.5	28 21.8	+50.8	109.1	28 02.0	+51.4	109.6	27 41.7	+51.9	110.1	27 20.8	+52.5	110.6	14
15	30 24.3	+47.9	106.3	30 07.2	+48.6	106.8	29 49.5	+49.4	107.4	29 31.3	+50.0	107.9	29 12.6	+50.6	108.5	28 53.4	+51.2	109.0	28 33.6	+51.8	109.5	28 13.3	+52.4	110.0	15
16	31 12.2	+47.8	105.6	30 55.8	+48.5	106.1	30 38.9	+49.1	106.7	30 21.3	+49.8	107.3	30 03.2	+50.5	107.8	29 44.6	+51.0	108.4	29 25.4	+51.6	108.9	29 05.7	+52.2	109.4	16
17	32 00.0	+47.5	104.9	31 44.3	+48.2	105.5	31 28.0	+48.9	106.0	31 11.1	+49.6	106.6	30 53.7	+50.2	107.2	30 35.6	+50.9	107.8	30 17.0	+51.5	108.3	29 57.9	+52.1	108.9	17
18	32 47.5	+47.2	104.1	32 32.5	+48.0	104.8	32 16.9	+48.7	105.4	32 00.7	+49.4	106.0	31 43.9	+50.1	106.6	31 26.5	+50.7	107.2	31 08.5	+51.3	107.7	30 50.0	+51.9	108.3	18
19	33 34.7	+47.0	103.4	33 20.5	+47.7	104.0	33 05.6	+48.5	104.7	32 50.1	+49.2	105.3	32 34.0	+49.8	105.9	32 17.2	+50.5	106.5	31 59.8	+51.2	107.1	31 41.9	+51.7	107.7	19
20	34 21.7	+46.7	102.6	34 08.2	+47.5	103.3	33 54.1	+48.3	104.0	33 39.3	+48.9	104.6	33 23.8	+49.6	105.3	33 07.7	+50.3	105.9	32 51.0	+50.9	106.5	32 33.6	+51.6	107.1	20
21	35 08.4	+46.4	101.9	34 55.7	+47.2	102.6	34 42.3	+48.0	103.2	34 28.2	+48.7	103.9	34 13.4	+49.5	104.6	33 58.0	+50.1	105.2	33 41.9	+50.8	105.9	33 25.2	+51.4	106.5	21
22	35 54.8	+46.1	101.1	35 42.9	+46.9	101.8	35 30.3	+47.6	102.5	35 16.9	+48.4	103.2	35 02.9	+49.1	103.9	34 48.1	+49.9	104.6	34 32.7	+50.5	105.2	34 16.6	+51.2	105.9	22
23	36 40.9	+45.8	100.3	36 29.8	+46.6	101.0	36 17.9	+47.4	101.8	36 05.3	+48.2	102.5	35 52.0	+48.9	103.2	35 38.0	+49.6	103.9	35 23.2	+50.4	104.6	35 07.8	+51.0	105.3	23
24	37 26.7	+45.4	99.5	37 16.4	+46.3	100.2	37 05.3	+47.1	101.0	36 53.5	+47.9	101.7	36 40.9	+48.7	102.5	36 27.6	+49.4	103.2	36 13.6	+50.1	103.9	35 58.8	+50.8	104.6	24
25	38 12.1	+45.1	98.7	38 02.7	+45.9	99.4	37 52.4	+46.8	100.2	37 41.4	+47.6	101.0	37 29.6	+48.4	101.7	37 17.0	+49.1	102.5	37 03.7	+49.8	103.2	36 49.6	+50.5	103.9	25
26	38 57.2	+44.7	97.8	38 48.6	+45.6	98.6	38 39.2	+46.5	99.4	38 29.0	+47.3	100.2	38 18.0	+48.1	101.0	38 06.1	+48.9	101.8	37 53.5	+49.6	102.5	37 40.1	+50.4	103.3	26
27	39 41.9	+44.3	97.0	39 34.2	+45.2	97.8	39 25.7	+46.1	98.6	39 16.3	+46.9	99.4	39 06.0	+47.8	100.2	38 55.0	+48.6	101.0	38 43.1	+49.4	101.8	38 30.5	+50.0	102.6	27
28	40 26.2	+43.9	96.1	40 19.4	+44.9	96.9	40 11.8	+45.7	97.8	40 03.2	+46.6	98.6	39 53.8	+47.5	99.4	39 43.6	+48.2	100.3	39 32.5	+49.0	101.1	39 20.5	+49.8	101.9	28
29	41 10.1	+43.5	95.2	41 04.3	+44.4	96.1	40 57.5	+45.3	96.9	40 49.8	+46.3	97.8	40 41.3	+47.1	98.6	40 31.8	+48.0	99.5	40 21.5	+48.8	100.3	40 10.3	+49.6	101.1	29
30	41 53.6	+43.0	94.3	41 48.7	+44.0	95.2	41 42.8	+45.0	96.0	41 36.1	+45.8	96.9	41 28.4	+46.7	97.8	41 19.8	+47.6	98.7	41 10.3	+48.4	99.5	40 59.9	+49.2	100.4	30
31	42 36.6	+42.6	93.3	42 32.7	+43.5	94.2	42 27.8	+44.5	95.2	42 21.9	+45.5	96.1	42 15.1	+46.4	97.0	42 07.4	+47.2	97.9	41 58.7	+48.1	98.8	41 49.1	+49.0	99.6	31
32	43 19.2	+42.1	92.4	43 16.2	+43.1	93.3	43 12.3	+44.1	94.2	43 07.4	+45.0	95.2	43 01.5	+46.0	96.1	42 54.6	+46.9	97.0	42 46.8	+47.8	97.9	42 38.0	+48.6	98.9	32
33	44 01.3	+41.5	91.4	43 59.3	+42.6	92.3	43 56.4	+43.6	93.3	43 52.4	+44.6	94.3	43 47.5	+45.5	95.2	43 41.5	+46.5	96.2	43 34.6	+47.3	97.1	43 26.6	+48.3	98.1	33
34	44 42.8	+41.0	90.4	44 41.9	+42.1	91.4	44 40.0	+43.1	92.3	44 37.0	+44.1	93.3	44 33.0	+45.1	94.3	44 28.0	+46.0	95.3	44 21.9	+47.0	96.3	44 14.9	+47.9	97.2	34
35	45 23.8	+40.4	89.3	45 24.0	+41.5	90.3	45 23.1	+42.5	91.4	45 21.1	+43.6	92.4	45 18.1	+44.7	93.4	45 14.0	+45.7	94.4	45 08.9	+46.6	95.4	45 02.8	+47.5	96.4	35
36	46 04.2	+39.8	88.3	46 05.5	+40.9	89.3	46 05.6	+42.1	90.3	46 04.7	+43.2	91.4	46 02.8	+44.1	92.4	45 59.7	+45.1	93.5	45 55.5	+46.2	94.5	45 50.3	+47.1	95.5	36
37	46 44.0	+39.2	87.2	46 46.4	+40.3	88.2	46 47.7	+41.4	89.3	46 47.9	+42.5	90.4	46 46.9	+43.6	91.4	46 44.8	+44.7	92.5	46 41.7	+45.6	93.6	46 37.4	+46.6	94.6	37
38	47 23.2	+38.5	86.1	47 26.7	+39.7	87.2	47 29.1	+40.9	88.2	47 30.4	+42.0	89.3	47 30.5	+43.1	90.4	47 29.5	+44.2	91.5	47 27.3	+45.2	92.6	47 24.0	+46.3	93.7	38
39	48 01.7	+37.9	84.9	48 06.4	+39.1	86.0	48 10.0	+40.2	87.2	48 12.4	+41.4	88.3	48 13.6	+42.5	89.4	48 13.7	+43.6	90.5	48 12.5	+44.7	91.6	48 10.3	+45.7	92.7	39
40	48 39.6	+37.1	83.8	48 45.5	+38.3	84.9	48 50.2	+39.6	86.0	48 53.8	+40.7	87.2	48 56.1	+41.9	88.3	48 57.3	+43.0	89.5	48 57.2	+44.2	90.6	48 56.0	+45.2	91.8	40
41	49 16.7	+36.3	82.6	49 23.8	+37.6	83.7	49 29.8	+38.8	84.9	49 34.5	+40.1	86.1	49 38.0	+41.3	87.2	49 40.3	+42.4	88.4	49 41.4	+43.5	89.6	49 41.2	+44.7	90.8	41
42	49 53.0	+35.6	81.3	50 01.4	+36.9	82.5	50 08.6	+38.1	83.7	50 14.6	+39.3	84.9	50 19.3	+40.6	86.1	50 22.7	+41.8	87.3	50 24.9	+43.0	88.5	50 25.9	+44.1	89.7	42
43	50 28.6	+34.7	80.1	50 38.3	+36.0	81.3	50 46.7	+37.4	82.5	50 53.9	+38.7	83.7	50 59.9	+39.9	84.9	51 04.5	+41.1	86.2	51 07.9	+42.3	87.4	51 10.0	+43.4	88.6	43
44	51 03.3	+33.8	78.8	51 14.3	+35.2	80.0	51 24.1	+36.5	81.2	51 32.6	+37.8	82.5	51 39.8	+39.1	83.7	51 45.6	+40.4	85.0	51 50.2	+41.6	86.3	51 53.4	+42.9	87.5	44
45	51 37.1	+32.9	77.5	51 49.5	+34.3	78.7	52 00.6	+35.7	80.0	52 10.4	+37.0	81.2	52 18.9	+38.3	82.5	52 26.0	+39.7	83.8	52 31.8	+41.0	85.1	52 36.3	+42.2	86.4	45
46	52 10.0	+32.0	76.1	52 23.8	+33.4	77.4	52 36.3	+34.7	78.6	52 47.4	+36.1	79.9	52 57.2	+37.5	81.2	53 05.7	+38.8	82.6	53 12.8	+40.1	83.9	53 18.5	+41.4	85.2	46
47	52 42.0	+31.0	74.7	52 57.2	+32.4	76.0	53 11.0	+33.9	77.3	53 23.5	+35.3	78.6	53 34.7	+36.6	79.9	53 44.5	+38.0	81.3	53 52.9	+39.2	82.6	53 59.9	+40.7	84.0	47
48	53 13.0	+29.9	73.3	53 29.6	+31.4	74.6	53 44.9	+32.8	75.9	53 58.8	+34.3	77.2	54 11.3	+35.7	78.6	54 22.5	+37.1	80.0	54 32.3	+38.4	81.3	54 40.6	+39.8	82.7	48
49	53 42.9	+28.9	71.9	54 01.0	+30.3	73.2	54 17.7	+31.8	74.5	54 33.1	+33.2	75.8	54 47.0	+34.8	77.2	54 59.6	+36.2	78.6	55 10.7	+37.6	80.0	55 20.4	+39.0	81.4	49
50	54 11.8	+27.7	70.4	54 31.3	+29.2	71.7	54 49.5	+30.7	73.0	55 06.3	+32.2	74.4	55 21.8	+33.7	75.8	55 35.8	+35.2	77.2	55 48.3	+36.7	78.6	55 59.4	+38.1	80.1	50
51	54 39.5	+26.6	68.8	55 00.5	+28.1	70.2	55 20.2	+29.6	71.5	55 38.5	+31.2	72.9	55 55.5	+32.6	74.3	56 11.0	+34.1	75.8	56 25.0	+35.6	77.2	56 37.5	+37.1	78.7	51
52	55 06.1	+25.3	67.3	55 28.6	+26.9	68.6	55 49.8	+28.4	70.0	56 09.7	+29.9	71.4	56 28.1	+31.5	72.8	56 45.1	+33.0	74.3	57 00.6	+34.6	75.7	57 14.6	+36.1	77.3	52
53	55 31.4	+24.1	65.7	55 55.5	+25.6	67.0	56 18.2	+27.2	68.4	56 39.6	+28.7	69.8	56 59.6	+30.3	71.3	57 18.1	+31.9	72.7	57 35.2	+33.5	74.2	57 50.7	+35.1	75.8	53
54	55 55.5	+22.7	64.1	56 21.1	+24.3	65.4	56 45.4	+25.9	66.8	57 08.3	+27.5	68.2	57 29.9	+29.1	69.7	57 50.0	+30.7	71.2	58 08.7	+32.2	72.7	58 25.8	+33.8	74.2	54
55	56 18.2	+21.4	62.4	56 45.4	+22.9	63.7	57 11.3	+24.5	65.1	57 35.8	+26.2	66.6	57 59.0	+27.8	68.0	58 20.7	+29.4	69.5	58 40.9	+31.1	71.1	58 59.6	+32.7	72.6	55
56	56 39.6	+20.0	60.7	57 08.3	+21.6	62.1	57 35.8	+23.2	63.4	58 02.0	+24.8	64.9	58 26.8	+26.4	66.3	58 50.1	+28.1	67.9	59 12.0	+29.7	69.4	59 32.3	+31.4	71.0	56
57	56 59.6	+18.5	59.0	57 29.9	+20.1	60.3	57 59.0	+21.7	61.7	58 26.8	+23.3	63.1	58 53.2	+25.0	64.6	59 18.2	+26.7	66.1	59 41.7	+28.4	67.7	60 03.7	+30.1	69.3	57
58	57 18.1	+17.1	57.2	57 50.0	+18.7	58.6	58 20.7	+20.2	59.9	58 50.1	+21.9	61.4	59 18.2	+23.5	62.8	59 44.9	+25.2	64.4	60 10.1	+26.9	65.9	60 33.8	+28.6	67.6	58
59	57 35.2	+15.5	55.4	58 08.7	+17.1	56.8	58 40.9	+18.7	58.1	59 12.0	+20.3	59.6	59 41.7	+22.0	61.0	60 10.1	+23.7	62.6	60 37.0	+25.4	64.1	61 02.4	+27.2	65.8	59
60	57 50.7	+14.0	53.6	58 25.8	+15.5	54.9	58 59.6	+17.1	56.3	59 32.3	+18.7	57.7	60 03.7	+20.4	59.2	60 33.8	+22.1	60.7	61 02.4	+23.9	62.3	61 29.6	+25.6	63.9	60
61	58 04.7	+12.4	51.8	58 41.3	+13.9	53.1	59 16.7	+15.5	54.4	59 51.0	+17.1	55.8	60 24.1	+18.8	57.3	60 55.9	+20.4	58.8	61 26.3	+22.2	60.4	61 55.2	+24.0	62.0	61
62	58 17.1	+10.7	50.0	58 55.2	+12.2	51.2	59 32.2	+13.8	52.5	60 08.1	+15.4	53.9	60 42.9	+17.0	55.4	61 16.3	+18.8	56.8	61 48.5	+20.5	58.4	62 19.2	+22.3	60.0	62
63	58 27.8	+9.1	48.1	59 07.4	+10.6	49.3	59 46.0	+12.1	50.6	60 23.5	+13.7	52.0	60 59.9	+15.3	53.4	61 35.1	+17.0	54.9	62 09.0	+18.7	56.4	62 41.5	+20.5	58.0	63
64	58 36.9	+7.4	46.2	59 18.0	+8.8	47.4	59 58.1	+10.3	48.7	60 37.2	+11.9	50.0	61 15.2	+13.5	51.4	61 52.1	+15.2	52.8	62 27.7	+16.9	54.4	63 02.0	+18.7	56.0	64
65	58 44.3	+5.7	44.3	59 26.8	+7.1	45.4	60 08.4	+8.6	46.7	60 49.1	+10.1	48.0	61 28.7	+11.7	49.3	62 07.3	+13.3	50.8	62 44.6	+15.0	52.3	63 20.7	+16.7	53.8	65
66	58 50.0	+3.9	42.3	59 33.9	+5.3	43.5	60 17.0	+6.8	44.7	60 59.2	+8.2	46.0	61 40.4	+9.8	47.3	62 20.6	+11.4	48.7	62 59.6	+13.1 •	50.2	63 37.4	+14.8	51.7	66
67	58 53.9	+2.3	40.4	59 39.2	+3.6	41.5	60 23.8	+4.9	42.7	61 07.4	+6.4	43.9	61 50.2	+7.9	45.2	62 32.0	+9.4	46.6	63 12.7	+11.0 •	48.0	63 52.2	+12.8 •	49.5	67
68	58 56.2	+0.5	38.5	59 42.8	+1.8	39.5	60 28.7	+3.1	40.7	61 13.8	+4.5	41.8	61 58.1	+5.9	43.1	62 41.4	+7.5 •	44.4	63 23.7	+9.1 •	45.8	64 05.0	+10.7	47.3	68
69	58 56.7	−1.3	36.5	59 44.6	−0.1	37.6	60 31.8	+1.2	38.6	61 18.3	+2.6	39.8	62 04.0	+4.0	41.0	62 48.9	+5.4 •	42.2	63 32.8	+7.0 •	43.6	64 15.7	+8.6 •	45.0	69
70	58 55.4	−2.9	34.6	59 44.5	−1.8	35.6	60 33.0	−0.6	36.6	61 20.9	+0.6	37.7	62 08.0	+2.0 •	38.8	62 54.3	+3.4 •	40.1	63 39.8	+4.9 •	41.4	64 24.3	+6.5 •	42.7	70
71	58 52.5	−4.7	32.7	59 42.7	−3.6	33.6	60 32.4	−2.5	34.6	61 21.5	−1.3	35.6	62 10.0	0.0 •	36.7	62 57.7	+1.4 •	37.9	63 44.7	+2.7 •	39.1	64 30.8	+4.3 •	40.4	71
72	58 47.8	−6.4	30.7	59 39.1	−5.4	31.6	60 29.9	−4.3	32.5	61 20.2	−3.1	33.5	62 10.0	−2.0	34.5	62 59.1	−0.7 •	35.7	63 47.4	+0.7 •	36.9	64 35.1	+2.0 •	38.1	72
73	58 41.4	−8.2	28.8	59 33.7	−7.1	29.6	60 25.6	−6.1	30.5	61 17.1	−5.1	31.4	62 08.0	−3.9	32.4	62 58.4	−2.8 •	33.5	63 48.1	−1.5 •	34.6	64 37.1	−0.1 •	35.8	73
74	58 33.2	−9.7	26.9	59 26.6	−8.9	27.7	60 19.5	−8.0	28.5	61 12.0	−7.0	29.4	62 04.1	−5.9 •	30.3	62 55.6	−4.8 •	31.3	63 46.6	−3.6 •	32.3	64 37.0	−2.3 •	33.4	74
75	58 23.5	−11.5	25.0	59 17.7	−10.6	25.8	60 11.5	−9.7	26.5	61 05.0	−8.7	27.3	61 58.2	−7.9	28.2	62 50.8	−6.8 •	29.1	63 43.0	−5.7 •	30.1	64 34.7	−4.6 •	31.1	75
76	58 12.0	−13.0	23.2	59 07.1	−12.3	23.8	60 01.8	−11.5	24.5	60 56.2	−10.6	25.3	61 50.3	−9.8	26.1	62 44.0	−8.8 •	26.9	63 37.3	−7.8 •	27.8	64 30.1	−6.7 •	28.8	76
77	57 59.0	−14.6	21.3	58 54.8	−14.0	21.9	59 50.3	−13.2	22.6	60 45.6	−12.5	23.2	61 40.5	−11.6	24.0	62 35.2	−10.8	24.8	63 29.5	−9.8 •	25.6	64 23.4	−8.8 •	26.5	77
78	57 44.4	−16.2	19.5	58 40.8	−15.6	20.1	59 37.1	−14.9	20.6	60 33.1	−14.2	21.3	61 28.9	−13.5	21.9	62 24.4	−12.7	22.8	63 19.7	−11.9 •	23.4	64 14.6	−11.0 •	24.2	78
79	57 28.2	−17.7	17.7	58 25.2	−17.1	18.2	59 22.2	−16.6	18.7	60 18.9	−15.9	19.3	61 15.4	−15.3	19.9	62 11.7	−14.6	20.5	63 07.8	−13.8	21.2	64 03.6	−13.0 •	22.0	79
80	57 10.5	−19.2	15.9	58 08.1	−18.7	16.4	59 05.6	−18.2	16.8	60 03.0	−17.7	17.3	61 00.1	−17.0	17.9	61 57.1	−16.4	18.5	62 54.0	−15.8	19.1	63 50.6	−15.1 •	19.7	80
81	56 51.3	−20.6	14.2	57 49.4	−20.1	14.6	58 47.4	−19.7	15.0	59 45.3	−19.2	15.4	60 43.1	−18.7	15.9	61 40.7	−18.2	16.4	62 38.2	−17.6	17.0	63 35.5	−17.0	17.5	81
82	56 30.7	−22.0	12.5	57 29.3	−21.7	12.8	58 27.7	−21.2	13.2	59 26.1	−20.8	13.6	60 24.4	−20.4	14.0	62 22.5	−19.9	14.4	62 20.6	−19.4	14.9	63 18.5	−18.9	15.4	82
83	56 08.7	−23.3	10.8	57 07.6	−23.0	11.1	58 06.5	−22.7	11.4	59 05.3	−22.4	11.7	60 04.0	−22.0	12.1	61 02.6	−21.6	12.5	62 01.2	−21.2	12.9	62 59.6	−20.7	13.3	83
84	55 45.4	−24.6	9.2	56 44.6	−24.3	9.4	57 43.8	−24.1	9.7	58 42.9	−23.8	9.9	59 42.0	−23.5	10.2	60 41.0	−23.2	10.5	61 40.0	−22.9	10.9	62 38.9	−22.5	11.2	84
85	55 20.8	−25.8	7.5	56 20.3	−25.7	7.7	57 19.7	−25.4	8.0	58 19.1	−25.2	8.2	59 18.5	−25.0	8.4	60 17.8	−24.7	8.7	61 17.1	−24.4	8.9	62 16.4	−24.2	9.2	85
86	54 55.0	−27.1	6.0	55 54.6	−26.9	6.1	56 54.3	−26.8	6.3	57 53.9	−26.6	6.5	58 53.5	−26.4	6.6	59 53.1	−26.2	6.8	60 52.7	−26.0	7.1	61 52.2	−25.8	7.3	86
87	54 27.9	−28.2	4.4	55 27.7	−28.1	4.5	56 27.5	−28.0	4.7	57 27.3	−27.8	4.8	58 27.1	−27.7	4.9	59 26.9	−27.6	5.1	59 59.3	−27.6	5.2	61 26.4	−27.4	5.4	87
88	53 59.7	−29.3	2.9	54 59.6	−29.2	3.0	55 59.5	−29.2	3.1	56 59.5	−29.2	3.1	57 59.4	−29.1	3.2	59 53.9	−29.0	3.3	59 59.2	−28.9	3.4	60 59.0	−28.8	3.5	88
89	53 30.4	−30.4	1.4	54 30.4	−30.4	1.5	55 30.3	−30.3	1.5	56 30.3	−30.3	1.6	57 30.3	−30.3	1.6	58 30.3	−30.3	1.6	59 30.3	−30.3	1.7	60 30.2	−30.2	1.7	89
90	53 00.0	−31.4	0.0	54 00.0	−31.4	0.0	55 00.0	−31.4	0.0	56 00.0	−31.5	0.0	57 00.0	−31.5	0.0	58 00.0	−31.5	0.0	59 00.0	−31.5	0.0	60 00.0	−31.6	0.0	90
		53°			54°			55°			56°			57°			58°			59°			60°		

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 59°, 301°

Dec.	53° (Hc / d / Z)	54°	55°	56°	57°	58°	59°	60°	Dec.
0	18 03.4 −50.4 115.6	17 37.3 −51.0 115.9	17 10.9 −51.4 116.2	16 44.3 −52.0 116.5	16 17.4 −52.4 116.7	15 50.3 −52.9 117.0	15 23.0 −53.4 117.3	14 55.4 −53.8 117.5	0
1	17 13.0 −50.6 116.2	16 46.3 −51.0 116.5	16 19.5 −51.6 116.7	15 52.3 −52.0 117.0	15 25.0 −52.6 117.2	14 57.4 −53.0 117.5	14 29.6 −53.4 117.7	14 01.6 −53.9 117.9	1
2	16 22.4 −50.6 116.8	15 55.3 −51.2 117.0	15 27.9 −51.7 117.3	15 00.3 −52.1 117.5	14 32.4 −52.5 117.7	14 04.4 −53.0 118.0	13 36.2 −53.5 118.2	13 07.7 −53.9 118.4	2
3	15 31.8 −50.7 117.3	15 04.1 −51.2 117.6	14 36.2 −51.7 117.8	14 08.2 −52.2 118.0	13 39.7 −52.7 118.2	13 11.4 −53.1 118.5	12 42.7 −53.5 118.7	12 13.8 −53.9 118.9	3
4	14 41.1 −50.8 117.9	14 12.9 −51.3 118.1	13 44.5 −51.7 118.3	13 16.0 −52.3 118.5	12 47.2 −52.7 118.7	12 18.3 −53.2 118.9	11 49.2 −53.6 119.1	11 19.9 −54.0 119.3	4
5	13 50.3 −50.9 118.4	13 21.6 −51.4 118.6	12 52.8 −51.9 118.8	12 23.7 −52.3 119.0	11 54.5 −52.8 119.2	11 25.1 −53.2 119.4	10 55.6 −53.6 119.6	10 25.9 −54.0 119.7	5
6	12 59.4 −50.9 119.0	12 30.2 −51.4 119.2	12 00.9 −51.9 119.4	11 31.4 −52.3 119.5	11 01.7 −52.8 119.7	10 31.9 −53.2 119.9	10 02.0 −53.7 120.0	9 31.9 −54.1 120.2	6
7	12 08.5 −51.0 119.5	11 38.8 −51.5 119.7	11 09.0 −51.9 119.9	10 39.1 −52.4 120.0	10 08.9 −52.8 120.2	9 38.7 −53.3 120.3	9 08.3 −53.7 120.5	8 37.8 −54.1 120.6	7
8	11 17.5 −51.1 120.1	10 47.3 −51.5 120.2	10 17.1 −52.0 120.4	9 46.7 −52.5 120.5	9 16.1 −52.9 120.7	8 45.4 −53.3 120.8	8 14.6 −53.7 120.9	7 43.7 −54.1 121.1	8
9	10 26.4 −51.1 120.6	9 55.8 −51.6 120.7	9 25.1 −52.1 120.9	8 54.2 −52.5 121.0	8 23.2 −52.9 121.2	7 52.1 −53.3 121.3	7 20.9 −53.7 121.4	6 49.6 −54.1 121.5	9
10	9 35.3 −51.2 121.1	9 04.2 −51.6 121.3	8 33.0 −52.0 121.4	8 01.7 −52.5 121.5	7 30.3 −52.9 121.7	6 58.8 −53.4 121.7	6 27.2 −53.8 121.8	5 55.5 −54.2 121.9	10
11	8 44.1 −51.2 121.6	8 12.6 −51.7 121.8	7 41.0 −52.2 121.9	7 09.2 −52.5 122.0	6 37.4 −53.0 122.1	6 05.4 −53.4 122.2	5 33.4 −53.8 122.3	5 01.3 −54.1 122.4	11
12	7 52.9 −51.2 122.2	7 20.9 −51.7 122.3	6 48.8 −52.1 122.4	6 16.7 −52.6 122.5	5 44.4 −53.0 122.6	5 12.0 −53.4 122.7	4 39.6 −53.8 122.7	4 07.2 −54.2 122.8	12
13	7 01.7 −51.3 122.7	6 29.2 −51.7 122.8	5 56.7 −52.2 122.9	5 24.1 −52.6 123.0	4 51.4 −53.0 123.0	4 18.6 −53.4 123.1	3 45.8 −53.8 123.2	3 13.0 −54.2 123.2	13
14	6 10.4 −51.4 123.2	5 37.5 −51.7 123.3	5 04.5 −52.2 123.4	4 31.5 −52.6 123.5	3 58.4 −53.1 123.5	3 25.2 −53.4 123.6	2 52.0 −53.8 123.6	2 18.8 −54.2 123.7	14
15	5 19.1 −51.3 123.7	4 45.8 −51.8 123.8	4 12.3 −52.2 123.9	3 38.9 −52.7 123.9	3 05.3 −53.0 124.0	2 31.8 −53.5 124.0	1 58.2 −53.8 124.1	1 24.6 −54.2 124.1	15
16	4 27.8 −51.4 124.3	3 54.0 −51.8 124.3	3 20.1 −52.2 124.4	2 46.2 −52.6 124.4	2 12.3 −53.1 124.5	1 38.3 −53.4 124.5	1 04.4 −53.9 124.5	0 30.4 −54.2 124.5	16
17	3 36.4 −51.4 124.8	3 02.2 −51.8 124.8	2 27.9 −52.2 124.9	1 53.6 −52.7 124.9	1 19.2 −53.0 124.9	0 44.9 −53.5 124.9	0 10.5 −53.8 124.9	0 23.8 +54.2 55.1	17
18	2 45.1 −51.4 125.3	2 10.4 −51.8 125.3	1 35.7 −52.3 125.4	1 00.9 −52.6 125.4	0 26.2 −53.1 125.4	0 08.6 +53.4 54.6	0 43.3 +53.8 54.6	1 18.0 +54.3 54.6	18
19	1 53.7 −51.4 125.8	1 18.6 −51.8 125.8	0 43.4 −52.2 125.9	0 08.3 −52.7 125.9	0 26.9 +53.0 54.1	1 02.0 +53.5 54.2	1 37.1 +53.9 54.2	2 12.3 +54.1 54.2	19
20	1 02.3 −51.4 126.3	0 26.7 −51.8 126.3	0 08.8 +52.3 53.7	0 44.4 +52.6 53.7	1 19.9 +53.1 53.7	1 55.5 +53.4 53.7	2 31.0 +53.8 53.7	3 06.4 +54.2 53.8	20
21	0 10.9 −51.4 126.8	0 25.1 +51.8 53.2	1 01.1 +52.2 53.2	1 37.0 +52.7 53.2	2 13.0 +53.0 53.2	2 48.9 +53.4 53.2	3 24.8 +53.8 53.3	4 00.6 +54.2 53.3	21
22	0 40.5 +51.4 52.6	1 16.9 +51.8 52.7	1 53.3 +52.3 52.7	2 29.7 +52.6 52.7	3 06.0 +53.1 52.7	3 42.3 +53.5 52.8	4 18.6 +53.8 52.8	4 54.8 +54.2 52.9	22
23	1 31.9 +51.4 52.1	2 08.7 +51.9 52.1	2 45.6 +52.2 52.2	3 22.3 +52.6 52.2	3 59.1 +53.0 52.3	4 35.8 +53.5 52.3	5 12.4 +53.8 52.4	5 49.0 +54.1 52.5	23
24	2 23.3 +51.4 51.6	3 00.6 +51.8 51.6	3 37.8 +52.2 51.7	4 14.9 +52.7 51.7	4 52.1 +53.0 51.8	5 29.1 +53.4 51.9	6 06.2 +53.7 52.0	6 43.1 +54.1 52.0	24
25	3 14.7 +51.3 51.1	3 52.4 +51.7 51.1	4 30.0 +52.2 51.2	5 07.6 +52.5 51.3	5 45.1 +52.9 51.3	6 22.5 +53.4 51.4	6 59.9 +53.7 51.5	7 37.2 +54.1 51.6	25
26	4 06.0 +51.4 50.6	4 44.1 +51.8 50.6	5 22.2 +52.1 50.7	6 00.1 +52.6 50.8	6 38.0 +53.0 50.9	7 15.9 +53.3 51.0	7 53.6 +53.7 51.1	8 31.3 +54.1 51.2	26
27	4 57.4 +51.3 50.1	5 35.9 +51.7 50.1	6 14.3 +52.2 50.2	6 52.7 +52.5 50.3	7 31.0 +52.9 50.4	8 09.2 +53.3 50.5	8 47.3 +53.7 50.6	9 25.4 +54.0 50.7	27
28	5 48.7 +51.3 49.5	6 27.6 +51.7 49.6	7 06.5 +52.1 49.7	7 45.2 +52.5 49.8	8 23.9 +52.9 49.9	9 02.5 +53.3 50.0	9 41.0 +53.6 50.2	10 19.4 +54.0 50.2	28
29	6 40.0 +51.2 49.0	7 19.3 +51.7 49.1	7 58.6 +52.0 49.2	8 37.7 +52.5 49.3	9 16.8 +52.8 49.4	9 55.8 +53.2 49.6	10 34.6 +53.6 49.7	11 13.4 +53.9 49.8	29
30	7 31.2 +51.1 48.5	8 11.0 +51.6 48.6	8 50.6 +52.0 48.7	9 30.2 +52.4 48.8	10 09.6 +52.8 49.0	10 49.0 +53.2 49.1	11 28.2 +53.6 49.2	12 07.3 +53.9 49.4	30
31	8 22.5 +51.1 48.0	9 02.6 +51.6 48.1	9 42.6 +52.0 48.3	10 22.6 +52.4 48.3	11 02.4 +52.8 48.5	11 42.2 +53.1 48.6	12 21.8 +53.5 48.8	13 01.2 +53.9 48.9	31
32	9 13.6 +51.2 47.4	9 54.2 +51.5 47.6	10 34.6 +52.0 47.7	11 15.0 +52.3 47.8	11 55.2 +52.7 48.0	12 35.3 +53.1 48.1	13 15.3 +53.4 48.3	13 55.1 +53.8 48.5	32
33	10 04.8 +51.1 46.9	10 45.7 +51.5 47.0	11 26.6 +51.8 47.2	12 07.3 +52.3 47.3	12 47.9 +52.6 47.5	13 28.4 +53.0 47.7	14 08.7 +53.4 47.8	14 48.9 +53.7 48.0	33
34	10 55.9 +51.0 46.4	11 37.2 +51.4 46.5	12 18.4 +51.9 46.7	12 59.6 +52.2 46.8	13 40.5 +52.6 47.0	14 21.4 +53.0 47.2	15 02.1 +53.3 47.4	15 42.6 +53.7 47.6	34
35	11 46.9 +50.9 45.8	12 28.6 +51.4 46.0	13 10.3 +51.7 46.1	13 51.8 +52.1 46.3	14 33.1 +52.4 46.5	15 14.4 +52.9 46.7	15 54.4 +53.3 46.9	16 36.3 +53.7 47.1	35
36	12 37.8 +50.9 45.3	13 20.0 +51.3 45.5	14 02.0 +51.7 45.6	14 43.9 +52.1 45.8	15 25.7 +52.4 46.0	16 07.3 +52.8 46.2	16 48.7 +53.2 46.4	17 30.0 +53.5 46.6	36
37	13 28.7 +50.9 44.7	14 11.3 +51.2 44.9	14 53.7 +51.6 45.1	15 36.0 +52.0 45.3	16 18.1 +52.4 45.5	17 00.1 +52.8 45.7	17 41.9 +53.1 45.9	18 23.5 +53.5 46.2	37
38	14 19.6 +50.7 44.2	15 02.5 +51.2 44.4	15 45.3 +51.6 44.6	16 28.0 +51.9 44.8	17 10.5 +52.3 45.0	17 52.9 +52.6 45.2	18 35.0 +53.1 45.4	19 17.0 +53.5 45.7	38
39	15 10.3 +50.7 43.6	15 53.7 +51.0 43.8	16 36.9 +51.4 44.0	17 19.9 +51.9 44.3	18 02.8 +52.2 44.5	18 45.5 +52.6 44.7	19 28.1 +53.0 45.0	20 10.5 +53.3 45.2	39
40	16 01.0 +50.6 43.1	16 44.7 +51.0 43.3	17 28.3 +51.4 43.5	18 11.8 +51.7 43.7	18 55.0 +52.2 44.0	19 38.1 +52.6 44.2	20 21.1 +52.9 44.5	21 03.8 +53.3 44.7	40
41	16 51.6 +50.5 42.5	17 35.7 +50.9 42.7	18 19.7 +51.3 43.0	19 03.5 +51.7 43.2	19 47.2 +52.0 43.4	20 30.7 +52.4 43.7	21 14.0 +52.8 43.9	21 57.1 +53.1 44.2	41
42	17 42.1 +50.4 42.0	18 26.6 +50.8 42.2	19 11.0 +51.2 42.4	19 55.2 +51.6 42.7	20 39.2 +52.0 42.9	21 23.1 +52.3 43.2	22 06.8 +52.7 43.4	22 50.2 +53.1 43.7	42
43	18 32.4 +50.3 41.4	19 17.4 +50.7 41.6	20 02.2 +51.0 41.9	20 46.8 +51.4 42.1	21 31.2 +51.8 42.4	22 15.4 +52.2 42.6	22 59.5 +52.6 42.9	23 43.3 +53.0 43.2	43
44	19 22.7 +50.2 40.8	20 08.1 +50.5 41.1	20 53.2 +51.0 41.3	21 38.2 +51.4 41.6	22 23.0 +51.8 41.8	23 07.6 +52.2 42.1	23 52.1 +52.4 42.4	24 36.3 +52.8 42.7	44
45	20 12.9 +50.1 40.2	20 58.6 +50.5 40.5	21 44.2 +50.8 40.7	22 29.6 +51.2 41.0	23 14.8 +51.6 41.3	23 59.8 +52.0 41.6	24 44.5 +52.4 41.9	25 29.1 +52.8 42.2	45
46	21 03.0 +49.9 39.6	21 49.1 +50.3 39.9	22 35.0 +50.8 40.2	23 20.8 +51.1 40.4	24 06.4 +51.5 40.7	24 51.8 +51.8 41.0	25 36.9 +52.3 41.3	26 21.9 +52.6 41.6	46
47	21 52.9 +49.8 39.0	22 39.4 +50.2 39.3	23 25.8 +50.6 39.6	24 11.9 +51.0 39.9	24 57.9 +51.3 40.2	25 43.6 +51.8 40.5	26 29.2 +52.1 40.8	27 14.5 +52.5 41.1	47
48	22 42.7 +49.7 38.4	23 29.6 +50.1 38.7	24 16.4 +50.4 39.0	25 02.9 +50.8 39.3	25 49.2 +51.3 39.6	26 35.4 +51.6 39.9	27 21.3 +52.0 40.2	28 07.0 +52.4 40.6	48
49	23 32.4 +49.5 37.8	24 19.7 +49.9 38.1	25 06.8 +50.3 38.4	25 53.7 +50.7 38.7	26 40.5 +51.1 39.0	27 27.0 +51.5 39.3	28 13.3 +51.9 39.7	28 59.4 +52.2 40.0	49
50	24 21.9 +49.4 37.2	25 09.6 +49.8 37.5	25 57.1 +50.2 37.8	26 44.4 +50.6 38.1	27 31.6 +50.9 38.4	28 18.5 +51.3 38.7	29 05.2 +51.7 39.1	29 51.6 +52.1 39.4	50
51	25 11.3 +49.2 36.6	25 59.4 +49.6 36.9	26 47.3 +50.0 37.2	27 35.0 +50.4 37.5	28 22.5 +50.8 37.8	29 09.8 +51.2 38.2	29 56.9 +51.5 38.5	30 43.7 +51.9 38.9	51
52	26 00.5 +49.1 36.0	26 49.0 +49.4 36.3	27 37.3 +49.8 36.6	28 25.4 +50.2 36.9	29 13.3 +50.6 37.2	30 01.0 +50.9 37.6	30 48.4 +51.4 37.9	31 35.6 +51.8 38.3	52
53	26 49.6 +48.8 35.4	27 38.4 +49.3 35.7	28 27.1 +49.7 35.9	29 15.6 +50.0 36.2	30 03.9 +50.4 36.6	30 51.9 +50.9 36.9	31 39.8 +51.2 37.3	32 27.4 +51.6 37.7	53
54	27 38.4 +48.7 34.7	28 27.7 +49.1 35.0	29 16.8 +49.4 35.3	30 05.6 +49.9 35.6	30 54.3 +50.3 36.0	31 42.8 +50.6 36.3	32 31.0 +51.0 36.7	33 19.0 +51.4 37.1	54
55	28 27.1 +48.5 34.0	29 16.8 +48.8 34.3	30 06.2 +49.3 34.6	30 55.5 +49.7 35.0	31 44.6 +50.0 35.3	32 33.4 +50.4 35.7	33 22.0 +50.9 36.1	34 10.4 +51.2 36.5	55
56	29 15.6 +48.3 33.3	30 05.6 +48.7 33.6	30 55.5 +49.1 34.0	31 45.2 +49.4 34.3	32 34.6 +49.9 34.7	33 23.8 +50.3 35.0	34 12.9 +50.6 35.4	35 01.6 +51.1 35.8	56
57	30 03.9 +48.0 32.6	30 54.3 +48.5 33.0	31 44.6 +48.8 33.3	32 34.6 +49.2 33.6	33 24.5 +49.6 34.0	34 14.1 +50.0 34.4	35 03.5 +50.4 34.8	35 52.7 +50.8 35.2	57
58	30 51.9 +47.9 31.9	31 42.8 +48.2 32.3	32 33.4 +48.6 32.6	33 23.8 +49.1 33.0	34 14.1 +49.4 33.3	35 04.1 +49.8 33.7	35 53.9 +50.2 34.1	36 43.5 +50.6 34.5	58
59	31 39.8 +47.6 31.2	32 31.0 +48.0 31.6	33 22.0 +48.4 31.9	34 12.9 +48.7 32.3	35 03.5 +49.2 32.6	35 53.9 +49.6 33.0	36 44.1 +50.0 33.4	37 34.1 +50.3 33.8	59
60	32 27.4 +47.3 30.5	33 19.0 +47.7 30.9	34 10.4 +48.1 31.2	35 01.6 +48.5 31.6	35 52.7 +48.9 31.9	36 43.5 +49.3 32.3	37 34.1 +49.7 32.7	38 24.4 +50.1 33.2	60
61	33 14.7 +47.1 29.8	34 06.7 +47.5 30.1	34 58.5 +47.9 30.5	35 50.1 +48.3 30.8	36 41.6 +48.6 31.2	37 32.8 +49.0 31.6	38 23.8 +49.4 32.0	39 14.5 +49.9 32.5	61
62	34 01.8 +46.9 29.1	34 54.2 +47.2 29.4	35 46.4 +47.6 29.7	36 38.4 +48.0 30.1	37 30.2 +48.4 30.5	38 21.8 +48.8 30.9	39 13.2 +49.2 31.3	40 04.4 +49.5 31.7	62
63	34 48.7 +46.5 28.3	35 41.4 +46.9 28.6	36 34.0 +47.3 29.0	37 26.4 +47.7 29.3	38 18.6 +48.1 29.7	39 10.6 +48.5 30.1	40 02.4 +48.8 30.5	40 53.9 +49.3 31.0	63
64	35 35.2 +46.2 27.5	36 28.3 +46.6 27.9	37 21.3 +47.0 28.2	38 14.1 +47.3 28.6	39 06.7 +47.7 29.0	39 59.1 +48.1 29.4	40 51.2 +48.6 29.8	41 43.2 +49.0 30.2	64
65	36 21.4 +45.9 26.7	37 14.9 +46.3 27.1	38 08.3 +46.6 27.4	39 01.4 +47.1 27.8	39 54.4 +47.5 28.2	40 47.2 +47.9 28.6	41 39.8 +48.2 29.0	42 32.2 +48.6 29.4	65
66	37 07.3 +45.6 25.9	38 01.2 +46.0 26.3	38 54.9 +46.4 26.6	39 48.5 +46.7 27.0	40 41.9 +47.1 27.4	41 35.1 +47.4 27.8	42 28.0 +47.9 28.2	43 20.8 +48.3 28.6	66
67	37 52.9 +45.3 25.1	38 47.2 +45.6 25.4	39 41.3 +46.0 25.8	40 35.2 +46.4 26.2	41 29.0 +46.7 26.6	42 22.5 +47.2 27.0	43 15.9 +47.6 27.4	44 09.1 +47.9 27.8	67
68	38 38.2 +44.8 24.3	39 32.8 +45.2 24.6	40 27.3 +45.6 25.0	41 21.6 +45.9 25.3	42 15.7 +46.4 25.7	43 09.7 +46.7 26.1	44 03.5 +47.1 26.5	44 57.0 +47.6 27.0	68
69	39 23.0 +44.5 23.4	40 18.0 +44.9 23.8	41 12.9 +45.2 24.1	42 07.6 +45.5 24.5	43 02.1 +45.9 24.9	43 56.4 +46.4 25.3	44 50.6 +46.8 25.7	45 44.6 +47.1 26.1	69
70	40 07.5 +44.1 22.5	41 02.9 +44.4 22.9	41 58.1 +44.8 23.2	42 53.1 +45.2 23.6	43 48.0 +45.6 24.0	44 42.8 +45.9 24.4	45 37.4 +46.3 24.8	46 31.7 +46.7 25.2	70
71	40 51.6 +43.7 21.7	41 47.3 +44.0 22.0	42 42.9 +44.3 22.3	43 38.3 +44.7 22.7	44 33.6 +45.1 23.1	45 28.7 +45.5 23.5	46 23.7 +45.8 23.9	47 18.4 +46.3 24.3	71
72	41 35.3 +43.2 20.7	42 31.3 +43.6 21.1	43 27.2 +44.0 21.4	44 23.0 +44.3 21.8	45 18.7 +44.6 22.1	46 14.2 +45.0 22.5	47 09.5 +45.4 22.9	48 04.7 +45.8 23.4	72
73	42 18.5 +42.7 19.8	43 14.9 +43.1 20.1	44 11.2 +43.4 20.5	45 07.3 +43.8 20.8	46 03.3 +44.2 21.2	46 59.2 +44.5 21.6	47 54.9 +44.9 22.0	48 50.5 +45.3 22.4	73
74	43 01.2 +42.3 18.9	43 58.0 +42.6 19.2	44 54.6 +42.9 19.5	45 51.1 +43.3 19.8	46 47.5 +43.6 20.2	47 43.7 +44.0 20.6	48 39.8 +44.4 21.0	49 35.8 +44.7 21.4	74
75	43 43.5 +41.8 17.9	44 40.6 +42.0 18.2	45 37.5 +42.4 18.5	46 34.4 +42.7 18.8	47 31.1 +43.1 19.2	48 27.7 +43.5 19.5	49 24.2 +43.8 19.9	50 20.5 +44.2 20.3	75
76	44 25.3 +41.2 16.9	45 22.6 +41.6 17.2	46 19.9 +41.9 17.5	47 17.1 +42.2 17.8	48 14.2 +42.5 18.1	49 11.1 +42.9 18.5	50 08.0 +43.2 18.9	51 04.7 +43.5 19.3	76
77	45 06.5 +40.7 15.9	46 04.2 +40.9 16.1	47 01.8 +41.2 16.4	47 59.3 +41.5 16.7	48 56.7 +41.9 17.1	49 54.0 +42.2 17.4	50 51.2 +42.5 17.8	51 48.2 +43.0 18.2	77
78	45 47.2 +40.0 14.8	46 45.1 +40.3 15.1	47 43.0 +40.7 15.4	48 40.8 +41.0 15.7	49 38.6 +41.2 16.0	50 36.2 +41.6 16.3	51 33.7 +41.9 16.7	52 31.2 +42.2 17.0	78
79	46 27.2 +39.5 13.7	47 25.5 +39.7 14.0	48 23.7 +40.0 14.3	49 21.8 +40.3 14.5	50 19.8 +40.6 14.8	51 17.8 +40.9 15.2	52 15.6 +41.2 15.5	53 13.4 +41.5 15.9	79
80	47 06.7 +38.8 12.6	48 05.2 +39.1 12.9	49 03.7 +39.3 13.1	50 02.1 +39.6 13.4	51 00.4 +39.9 13.7	51 58.7 +40.1 14.0	52 56.8 +40.5 14.3	53 54.9 +40.8 14.6	80
81	47 45.5 +38.1 11.5	48 44.3 +38.3 11.7	49 43.0 +38.6 12.0	50 41.7 +38.8 12.2	51 40.3 +39.1 12.5	52 38.8 +39.4 12.8	53 37.3 +39.7 13.1	54 35.7 +40.0 13.4	81
82	48 23.6 +37.4 10.3	49 22.6 +37.7 10.6	50 21.6 +37.8 10.8	51 20.5 +38.1 11.0	52 19.4 +38.3 11.3	53 18.2 +38.6 11.5	54 17.0 +38.8 11.8	55 15.7 +39.1 12.1	82
83	49 01.0 +36.7 9.2	50 00.3 +36.8 9.4	50 59.4 +37.1 9.6	51 58.6 +37.3 9.8	52 57.7 +37.5 10.0	53 56.8 +37.7 10.2	54 55.8 +38.0 10.5	55 54.8 +38.2 10.7	83
84	49 37.7 +35.9 8.0	50 37.1 +36.1 8.1	51 36.5 +36.2 8.3	52 35.9 +36.4 8.5	53 35.2 +36.6 8.7	54 34.5 +36.8 8.9	55 33.8 +37.0 9.1	56 33.0 +37.2 9.4	84
85	50 13.6 +35.1 6.7	51 13.2 +35.2 6.9	52 12.7 +35.4 7.0	53 12.3 +35.5 7.2	54 11.8 +35.7 7.3	55 11.3 +35.9 7.5	56 10.8 +36.0 7.7	57 10.2 +36.2 7.9	85
86	50 48.7 +34.2 5.4	51 48.4 +34.3 5.5	52 48.1 +34.5 5.7	53 47.8 +34.6 5.8	54 47.5 +34.7 6.0	55 47.2 +34.8 6.1	56 46.8 +35.0 6.3	57 46.4 +35.2 6.4	86
87	51 22.9 +33.3 4.1	52 22.7 +33.4 4.2	53 22.6 +33.5 4.3	54 22.4 +33.6 4.4	55 22.2 +33.7 4.5	56 22.0 +33.8 4.6	57 21.8 +33.9 4.8	58 21.6 +34.0 4.9	87
88	51 56.2 +32.4 2.8	52 56.1 +32.5 2.8	53 56.1 +32.5 2.9	54 56.0 +32.5 3.0	55 55.9 +32.6 3.1	56 55.8 +32.7 3.1	57 55.7 +32.8 3.2	58 55.6 +32.8 3.3	88
89	52 28.6 +31.4 1.4	53 28.6 +31.4 1.4	54 28.6 +31.4 1.5	55 28.5 +31.5 1.5	56 28.5 +31.5 1.6	57 28.5 +31.5 1.6	58 28.5 +31.5 1.6	59 28.4 +31.6 1.7	89
90	53 00.0 +30.4 0.0	54 00.0 +30.4 0.0	55 00.0 +30.3 0.0	56 00.0 +30.3 0.0	57 00.0 +30.3 0.0	58 00.0 +30.3 0.0	59 00.0 +30.3 0.0	60 00.0 +30.2 0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 121°, 239°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	17 30.7	+50.2	114.8	17 05.5	+50.7	115.0	16 39.9	+51.3	115.3	16 14.2	+51.7	115.6	15 48.1	+52.3	115.8	15 21.9	+52.7	116.1	14 55.4	+53.2	116.3	14 28.7	+53.6	116.6	0
1	18 20.9	+50.1	114.2	17 56.2	+50.6	114.5	17 31.2	+51.2	114.8	17 05.9	+51.7	115.1	16 40.4	+52.2	115.3	16 14.6	+52.7	115.6	15 48.6	+53.1	115.9	15 22.3	+53.6	116.1	1
2	19 11.0	+50.0	113.6	18 46.8	+50.6	113.9	18 22.4	+51.1	114.2	17 57.6	+51.6	114.5	17 32.6	+52.1	114.8	17 07.3	+52.6	115.1	16 41.7	+53.1	115.4	16 15.9	+53.5	115.6	2
3	20 01.0	+49.9	113.0	19 37.4	+50.4	113.3	19 13.5	+50.9	113.7	18 49.2	+51.5	114.0	18 24.7	+52.0	114.3	17 59.9	+52.5	114.6	17 34.8	+53.0	114.9	17 09.4	+53.4	115.2	3
4	20 50.9	+49.7	112.4	20 27.8	+50.3	112.8	20 04.4	+50.9	113.1	19 40.7	+51.4	113.4	19 16.7	+51.9	113.8	18 52.4	+52.4	114.1	18 27.8	+52.9	114.4	18 02.8	+53.4	114.7	4
5	21 40.6	+49.6	111.8	21 18.1	+50.2	112.2	20 55.3	+50.8	112.5	20 32.1	+51.3	112.9	20 08.6	+51.9	113.2	19 44.8	+52.3	113.6	19 20.7	+52.8	113.9	18 56.2	+53.3	114.2	5
6	22 30.2	+49.5	111.2	22 08.3	+50.1	111.6	21 46.1	+50.6	112.0	21 23.4	+51.2	112.3	21 00.5	+51.7	112.7	20 37.1	+52.3	113.0	20 13.5	+52.7	113.4	19 49.5	+53.2	113.7	6
7	23 19.7	+49.3	110.6	22 58.4	+49.9	111.0	22 36.7	+50.5	111.4	22 14.6	+51.1	111.8	21 52.2	+51.6	112.1	21 29.4	+52.1	112.5	21 06.2	+52.7	112.9	20 42.7	+53.2	113.2	7
8	24 09.0	+49.2	110.0	23 48.3	+49.8	110.4	23 27.2	+50.4	110.8	23 05.7	+50.9	111.2	22 43.8	+51.5	111.6	22 21.5	+52.1	112.0	21 58.9	+52.5	112.4	21 35.9	+53.0	112.7	8
9	24 58.2	+49.0	109.3	24 38.1	+49.6	109.8	24 17.6	+50.2	110.2	23 56.6	+50.9	110.6	23 35.3	+51.4	111.0	23 13.6	+51.9	111.4	22 51.4	+52.5	111.8	22 28.9	+53.0	112.2	9
10	25 47.2	+48.8	108.7	25 27.7	+49.5	109.2	25 07.8	+50.1	109.6	24 47.5	+50.6	110.0	24 26.7	+51.2	110.5	24 05.5	+51.8	110.9	23 43.9	+52.3	111.3	23 21.9	+52.8	111.7	10
11	26 36.0	+48.7	108.1	26 17.2	+49.3	108.5	25 57.9	+49.9	109.0	25 38.1	+50.6	109.4	25 17.9	+51.2	109.9	24 57.3	+51.7	110.3	24 36.2	+52.3	110.8	24 14.7	+52.8	111.2	11
12	27 24.7	+48.5	107.4	27 06.5	+49.1	107.9	26 47.8	+49.8	108.4	26 28.7	+50.4	108.8	26 09.1	+50.9	109.3	25 49.0	+51.5	109.8	25 28.5	+52.1	110.2	25 07.5	+52.6	110.7	12
13	28 13.2	+48.2	106.7	27 55.6	+49.0	107.2	27 37.6	+49.6	107.7	27 19.1	+50.2	108.2	27 00.0	+50.9	108.7	26 40.5	+51.4	109.2	26 20.6	+51.9	109.7	26 00.1	+52.5	110.1	13
14	29 01.4	+48.1	106.1	28 44.6	+48.7	106.6	28 27.2	+49.4	107.1	28 09.3	+50.0	107.6	27 50.9	+50.6	108.1	27 31.9	+51.3	108.6	27 12.5	+51.9	109.1	26 52.6	+52.4	109.6	14
15	29 49.5	+47.9	105.4	29 33.3	+48.6	105.9	29 16.6	+49.2	106.5	28 59.3	+49.9	107.0	28 41.5	+50.5	107.5	28 23.2	+51.1	108.0	28 04.4	+51.7	108.5	27 45.0	+52.3	109.0	15
16	30 37.4	+47.6	104.7	30 21.9	+48.3	105.2	30 05.8	+49.1	105.8	29 49.2	+49.7	106.4	29 32.0	+50.4	106.9	29 14.3	+51.0	107.4	28 56.1	+51.5	108.0	28 37.3	+52.1	108.5	16
17	31 25.0	+47.4	104.0	31 10.2	+48.1	104.6	30 54.9	+48.8	105.1	30 38.9	+49.5	105.7	30 22.4	+50.1	106.3	30 05.3	+50.8	106.8	29 47.6	+51.4	107.4	29 29.4	+52.0	107.9	17
18	32 12.4	+47.1	103.2	31 58.3	+47.9	103.9	31 43.7	+48.6	104.5	31 28.4	+49.3	105.0	31 12.5	+50.0	105.6	30 56.1	+50.5	106.2	30 39.0	+51.2	106.8	30 21.4	+51.8	107.3	18
19	32 59.5	+46.9	102.5	32 46.2	+47.6	103.1	32 32.3	+48.3	103.8	32 17.7	+49.0	104.4	32 02.5	+49.7	105.0	31 46.6	+50.5	105.5	31 30.2	+51.1	106.2	31 13.2	+51.7	106.8	19
20	33 46.4	+46.6	101.8	33 33.8	+47.4	102.4	33 20.6	+48.1	103.1	33 06.7	+48.9	103.7	32 52.2	+49.6	104.3	32 37.1	+50.2	104.9	32 21.3	+50.8	105.5	32 04.9	+51.5	106.2	20
21	34 33.0	+46.3	101.0	34 21.2	+47.1	101.7	34 08.7	+47.9	102.3	33 55.6	+48.6	103.0	33 41.8	+49.3	103.6	33 27.3	+50.0	104.3	33 12.1	+50.7	104.9	32 56.4	+51.3	105.6	21
22	35 19.3	+46.0	100.2	35 08.3	+46.8	100.9	34 56.6	+47.6	101.6	34 44.2	+48.3	102.3	34 31.1	+49.0	103.0	34 17.3	+49.8	103.6	34 02.8	+50.5	104.3	33 47.7	+51.1	104.9	22
23	36 05.3	+45.7	99.4	35 55.1	+46.5	100.1	35 44.2	+47.3	100.9	35 32.5	+48.1	101.6	35 20.1	+48.9	102.3	35 07.1	+49.5	102.9	34 53.3	+50.2	103.6	34 38.8	+50.9	104.3	23
24	36 51.0	+45.4	98.6	36 41.6	+46.2	99.4	36 31.5	+47.0	100.1	36 20.6	+47.8	100.8	36 09.0	+48.5	101.5	35 56.6	+49.3	102.3	35 43.5	+50.0	103.0	35 29.7	+50.7	103.7	24
25	37 36.4	+45.0	97.8	37 27.8	+45.9	98.6	37 18.5	+46.7	99.3	37 08.4	+47.5	100.1	36 57.5	+48.3	100.8	36 45.9	+49.1	101.5	36 33.5	+49.8	102.3	36 20.4	+50.5	103.0	25
26	38 21.4	+44.6	97.0	38 13.7	+45.5	97.7	38 05.2	+46.4	98.5	37 55.9	+47.2	99.3	37 45.8	+48.0	100.1	37 35.0	+48.7	100.8	37 23.3	+49.5	101.6	37 10.9	+50.2	102.3	26
27	39 06.0	+44.3	96.1	38 59.2	+45.2	96.9	38 51.6	+46.0	97.7	38 43.1	+46.9	98.5	38 33.8	+47.7	99.3	38 23.7	+48.5	100.1	38 12.8	+49.3	100.9	38 01.1	+50.0	101.6	27
28	39 50.3	+43.9	95.2	39 44.4	+44.8	96.1	39 37.6	+45.7	96.9	39 30.0	+46.5	97.7	39 21.5	+47.4	98.5	39 12.2	+48.2	99.3	39 02.1	+49.0	100.1	38 51.1	+49.8	100.9	28
29	40 34.2	+43.4	94.3	40 29.2	+44.3	95.2	40 23.3	+45.3	96.0	40 16.5	+46.2	96.9	40 08.9	+47.1	97.7	40 00.4	+47.9	98.6	39 51.1	+48.6	99.4	39 40.9	+49.4	100.2	29
30	41 17.6	+43.0	93.4	41 13.5	+44.0	94.3	41 08.6	+44.9	95.2	41 02.7	+45.8	96.0	40 56.0	+46.6	96.9	40 48.3	+47.5	97.8	40 39.7	+48.4	98.6	40 30.3	+49.2	99.5	30
31	42 00.6	+42.5	92.5	41 57.5	+43.5	93.4	41 53.5	+44.5	94.3	41 48.5	+45.4	95.2	41 42.6	+46.4	96.1	41 35.8	+47.2	97.0	41 28.1	+48.1	97.8	41 19.5	+48.9	98.7	31
32	42 43.1	+42.0	91.5	42 41.0	+43.1	92.5	42 38.0	+44.0	93.4	42 33.9	+45.0	94.3	42 29.0	+45.9	95.2	42 23.0	+46.9	96.1	42 16.2	+47.7	97.0	42 08.4	+48.5	97.9	32
33	43 25.1	+41.6	90.6	43 24.1	+42.5	91.5	43 22.0	+43.6	92.5	43 18.9	+44.6	93.4	43 14.9	+45.5	94.3	43 09.9	+46.4	95.3	43 03.9	+47.3	96.2	42 56.9	+48.2	97.1	33
34	44 06.7	+41.0	89.6	44 06.6	+42.1	90.5	44 05.6	+43.1	91.5	44 03.5	+44.1	92.5	44 00.4	+45.1	93.4	43 56.3	+46.0	94.4	43 51.2	+46.9	95.4	43 45.1	+47.9	96.3	34
35	44 47.7	+40.4	88.5	44 48.7	+41.5	89.5	44 48.7	+42.5	90.5	44 47.6	+43.6	91.5	44 45.5	+44.6	92.5	44 42.3	+45.6	93.5	44 38.1	+46.6	94.5	44 32.9	+47.5	95.5	35
36	45 28.1	+39.9	87.5	45 30.2	+41.0	88.5	45 31.2	+42.1	89.5	45 31.2	+43.1	90.5	45 30.1	+44.1	91.6	45 27.9	+45.2	92.6	45 24.7	+46.1	93.6	45 20.4	+47.1	94.6	36
37	46 08.0	+39.2	86.4	46 11.2	+40.3	87.5	46 13.3	+41.5	88.5	46 14.3	+42.6	89.5	46 14.2	+43.7	90.6	46 13.1	+44.6	91.6	46 10.8	+45.7	92.7	46 07.5	+46.6	93.7	37
38	46 47.2	+38.6	85.3	46 51.5	+39.8	86.4	46 54.8	+40.8	87.5	46 56.9	+42.0	88.5	46 57.9	+43.0	89.6	46 57.7	+44.2	90.7	46 56.5	+45.2	91.7	46 54.1	+46.2	92.8	38
39	47 25.8	+37.9	84.2	47 31.3	+39.1	85.3	47 35.6	+40.3	86.4	47 38.9	+41.4	87.5	47 40.9	+42.6	88.6	47 41.9	+43.6	89.7	47 41.7	+44.6	90.8	47 40.3	+45.7	91.9	39
40	48 03.7	+37.2	83.0	48 10.4	+38.4	84.2	48 15.9	+39.6	85.3	48 20.3	+40.8	86.4	48 23.5	+41.9	87.5	48 25.5	+43.0	88.6	48 26.3	+44.2	89.8	48 26.0	+45.2	90.9	40
41	48 40.9	+36.4	81.9	48 48.8	+37.7	83.0	48 55.5	+38.9	84.1	49 01.1	+40.1	85.3	49 05.4	+41.3	86.4	49 08.5	+42.5	87.6	49 10.5	+43.6	88.7	49 11.2	+44.7	89.9	41
42	49 17.3	+35.7	80.7	49 26.5	+36.9	81.8	49 34.4	+38.2	83.0	49 41.2	+39.4	84.1	49 46.7	+40.6	85.3	49 51.0	+41.8	86.5	49 54.1	+42.9	87.7	49 55.9	+44.1	88.9	42
43	49 53.0	+34.9	79.4	50 03.4	+36.2	80.6	50 12.6	+37.5	81.8	50 20.6	+38.7	83.0	50 27.3	+40.0	84.2	50 32.8	+41.2	85.4	50 37.0	+42.4	86.6	50 40.0	+43.5	87.8	43
44	50 27.9	+34.0	78.1	50 39.6	+35.3	79.3	50 50.1	+36.6	80.5	50 59.3	+38.0	81.8	51 07.3	+39.2	83.0	51 14.0	+40.4	84.2	51 19.4	+41.7	85.5	51 23.5	+42.9	86.7	44
45	51 01.9	+33.1	76.8	51 14.9	+34.5	78.1	51 26.7	+35.9	79.3	51 37.3	+37.1	80.5	51 46.5	+38.4	81.8	51 54.4	+39.8	83.0	52 01.1	+41.0	84.3	52 06.4	+42.2	85.6	45
46	51 35.0	+32.2	75.5	51 49.4	+33.6	76.7	52 02.6	+34.9	78.0	52 14.4	+36.3	79.2	52 24.9	+37.7	80.5	52 34.2	+38.9	81.8	52 42.1	+40.2	83.1	52 48.6	+41.5	84.4	46
47	52 07.2	+31.3	74.1	52 23.0	+32.6	75.4	52 37.5	+34.0	76.7	52 50.7	+35.4	77.9	53 02.6	+36.7	79.2	53 13.1	+38.1	80.5	53 22.3	+39.4	81.9	53 30.1	+40.7	83.2	47
48	52 38.5	+30.2	72.7	52 55.6	+31.7	74.0	53 11.5	+33.1	75.3	53 26.1	+34.5	76.6	53 39.3	+35.9	77.9	53 51.2	+37.3	79.2	54 01.7	+38.6	80.6	54 10.8	+40.0	82.0	48
49	53 08.7	+29.1	71.3	53 27.3	+30.6	72.6	53 44.6	+32.0	73.9	54 00.6	+33.5	75.2	54 15.2	+34.9	76.5	54 28.5	+36.3	77.9	54 40.3	+37.8	79.3	54 50.8	+39.1	80.7	49
50	53 37.8	+28.1	69.8	53 57.9	+29.5	71.1	54 16.6	+31.0	72.4	54 34.1	+32.4	73.8	54 50.1	+34.0	75.1	55 04.8	+35.4	76.5	55 18.1	+36.8	77.9	55 29.9	+38.2	79.3	50
51	54 05.9	+26.9	68.3	54 27.4	+28.4	69.6	54 47.6	+29.9	71.0	55 06.5	+31.4	72.3	55 24.1	+32.9	73.7	55 40.2	+34.3	75.1	55 54.9	+35.8	76.5	56 08.1	+37.3	78.0	51
52	54 32.8	+25.7	66.8	54 55.8	+27.2	68.1	55 17.5	+28.8	69.5	55 37.9	+30.3	70.8	55 56.9	+31.8	72.2	56 14.5	+33.3	73.6	56 30.7	+34.8	75.1	56 45.4	+36.3	76.6	52
53	54 58.5	+24.5	65.2	55 23.0	+26.1	66.6	55 46.3	+27.6	67.9	56 08.2	+29.1	69.3	56 28.7	+30.6	70.7	56 47.8	+32.2	72.1	57 05.5	+33.7	73.6	57 21.7	+35.2	75.1	53
54	55 23.0	+23.3	63.6	55 49.1	+24.7	65.0	56 13.8	+26.3	66.3	56 37.3	+27.8	67.7	56 59.3	+29.4	69.1	57 20.0	+31.0	70.6	57 39.2	+32.6	72.1	57 56.9	+34.2	73.6	54
55	55 46.3	+21.9	62.0	56 13.8	+23.5	63.3	56 40.1	+25.0	64.7	57 05.1	+26.6	66.1	57 28.7	+28.2	67.5	57 51.0	+29.7	69.0	58 11.8	+31.3	70.5	58 31.1	+32.9	72.0	55
56	56 08.2	+20.5	60.4	56 37.3	+22.0	61.7	57 05.1	+23.6	63.0	57 31.7	+25.2	64.4	57 56.9	+26.8	65.9	58 20.7	+28.5	67.3	58 43.1	+30.1	68.9	59 04.0	+31.7	70.4	56
57	56 28.7	+19.1	58.7	56 59.3	+20.7	60.0	57 28.7	+22.3	61.3	57 56.9	+23.8	62.7	58 23.7	+25.5	64.2	58 49.2	+27.1	65.6	59 13.2	+28.7	67.2	59 35.7	+30.4	68.7	57
58	56 47.8	+17.7	56.9	57 20.0	+19.2	58.2	57 51.0	+20.8	59.6	58 20.7	+22.4	61.0	58 49.2	+24.0	62.4	59 16.3	+25.6	63.9	59 41.9	+27.4	65.4	60 06.1	+29.0	67.0	58
59	57 05.5	+16.2	55.2	57 39.2	+17.7	56.5	58 11.8	+19.3	57.8	58 43.1	+20.9	59.2	59 13.2	+22.5	60.6	59 41.9	+24.2	62.1	60 09.3	+25.8	63.7	60 35.1	+27.6	65.3	59
60	57 21.7	+14.7	53.4	57 56.9	+16.2	54.7	58 31.1	+17.7	56.0	59 04.0	+19.3	57.4	59 35.7	+21.0	58.8	60 06.1	+22.6	60.3	60 35.1	+24.4	61.8	61 02.7	+26.1	63.4	60
61	57 36.4	+13.1	51.6	58 13.1	+14.6	52.9	58 48.8	+16.1	54.2	59 23.3	+17.8	55.5	59 56.7	+19.3	57.0	60 28.7	+21.1	58.4	60 59.5	+22.7	60.0	61 28.8	+24.4	61.6	61
62	57 49.5	+11.5	49.8	58 27.7	+13.0	51.0	59 04.9	+14.5	52.3	59 41.1	+16.1	53.7	60 16.0	+17.7	55.1	60 49.8	+19.3	56.5	61 22.2	+21.1	58.2	61 53.2	+22.9	59.6	62
63	58 01.0	+9.9	47.9	58 40.7	+11.3	49.1	59 19.5	+12.8	50.4	59 57.2	+14.4	51.7	60 33.7	+16.0	53.1	61 09.1	+17.7	54.6	61 43.3	+19.3	56.1	62 16.1	+21.1	57.7	63
64	58 10.9	+8.2	46.1	58 52.0	+9.7	47.2	59 32.3	+11.1	48.5	60 11.6	+12.6	49.8	60 49.7	+14.3	51.2	61 26.8	+15.9	52.6	62 02.6	+17.6	54.1	62 37.2	+19.3	55.6	64
65	58 19.1	+6.6	44.2	59 01.7	+8.0	45.3	59 43.4	+9.4	46.5	60 24.2	+10.9	47.8	61 04.0	+12.4	49.2	61 42.7	+14.0	50.6	62 20.2	+15.7	52.0	62 56.5	+17.4	53.6	65
66	58 25.7	+4.8	42.3	59 09.7	+6.2	43.4	59 52.8	+7.6	44.6	60 35.1	+9.1	45.8	61 16.4	+10.6	47.1	61 56.7	+12.2	48.5	62 35.9	+13.8	49.9	63 13.9	+15.6	51.5	66
67	58 30.5	+3.2	40.4	59 15.9	+4.5	41.5	60 00.4	+5.9	42.6	60 44.2	+7.2	43.8	61 27.0	+8.8	45.1	62 08.9	+10.3	46.4	62 49.7	+11.9	47.8	63 29.5	+13.5•	49.3	67
68	58 33.7	+1.5	38.5	59 20.4	+2.7	39.5	60 06.3	+4.0	40.6	60 51.4	+5.4	41.8	61 35.8	+6.8	43.0	62 19.2	+8.3•	44.3	63 01.6	+9.9•	45.7	63 43.0	+11.5	47.1	68
69	58 35.2	−0.3	36.5	59 23.1	+0.9	37.5	60 10.3	+2.2	38.6	60 56.8	+3.5	39.7	61 42.6	+4.9	40.9	62 27.5	+6.3	42.2	63 11.5	+7.9•	43.5	63 54.5	+9.5•	44.9	69
70	58 34.9	−1.9	34.6	59 24.0	−0.8	35.6	60 12.5	+0.4	36.6	61 00.3	+1.7	37.7	61 47.5	+2.9	38.8	62 33.8	+4.4•	40.0	63 19.4	+5.8•	41.3	64 04.0	+7.3•	42.6	70
71	58 33.0	−3.7	32.7	59 23.2	−2.6	33.6	60 12.9	−1.5	34.6	61 02.0	−0.3	35.6	61 50.4	+1.0	36.7	62 38.2	+2.3•	37.8	63 25.2	+3.7•	39.1	64 11.3	+5.2•	40.4	71
72	58 29.3	−5.4	30.8	59 20.6	−4.3	31.7	60 11.4	−3.3	32.6	61 01.7	−2.1	33.5	61 51.4	−0.9	34.6	62 40.5	+0.3•	35.7	63 28.9	+1.6•	36.8	64 16.5	+3.1•	38.1	72
73	58 23.9	−7.0	28.9	59 16.3	−6.1	29.7	60 08.1	−5.0	30.6	60 59.6	−4.1	31.5	61 50.5	−2.9•	32.4	62 40.8	−1.7	33.5	63 30.5	−0.4•	34.6	64 19.6	+0.9•	35.8	73
74	58 16.9	−8.7	27.0	59 10.2	−7.9	27.8	60 03.1	−6.9	28.6	60 55.5	−5.9	29.4	61 47.6	−4.9	30.3	62 39.1	−3.8•	31.3	63 30.1	−2.6•	32.3	64 20.5	−1.4•	33.5	74
75	58 08.2	−10.4	25.1	59 02.3	−9.5	25.8	59 56.2	−8.7	26.6	60 49.6	−7.7	27.4	61 42.7	−6.8	28.2	62 35.3	−5.7	29.1	63 27.5	−4.6•	30.1	64 19.1	−3.4•	31.1	75
76	57 57.8	−12.0	23.3	58 52.8	−11.2	23.9	59 47.5	−10.4	24.6	60 41.9	−9.6	25.3	61 35.9	−8.7	26.1	62 29.6	−7.7•	27.0	63 22.9	−6.8•	27.9	64 15.7	−5.7•	28.8	76
77	57 45.8	−13.5	21.4	58 41.6	−12.9	22.0	59 37.1	−12.2	22.7	60 32.3	−11.4	23.3	61 27.2	−10.5	24.1	62 21.9	−9.7	24.8	63 16.1	−8.7•	25.7	64 10.0	−7.8•	26.6	77
78	57 32.3	−15.1	19.6	58 28.7	−14.5	20.1	59 24.9	−13.8	20.7	60 20.9	−13.1	21.3	61 16.7	−12.4	22.0	62 12.2	−11.6	22.7	63 07.4	−10.8•	23.5	64 02.4	−9.8•	24.3	78
79	57 17.2	−16.7	17.8	58 14.2	−16.1	18.3	59 11.1	−15.5	18.8	60 07.8	−14.9	19.4	61 04.3	−14.2	20.0	62 00.6	−13.5	20.6	62 56.6	−12.8	21.3	63 52.4	−12.0•	22.0	79
80	57 00.5	−18.1	16.0	57 58.1	−17.6	16.5	58 55.6	−17.1	16.9	59 52.9	−16.5	17.4	60 50.1	−16.0	18.0	61 47.1	−15.4	18.5	62 43.8	−14.6	19.2	63 40.4	−14.0	19.8	80
81	56 42.4	−19.4	14.3	57 40.5	−19.1	14.7	58 38.5	−18.7	15.1	59 36.4	−18.2	15.5	60 34.1	−17.6	16.0	61 31.7	−17.1	16.5	62 29.2	−16.6	17.1	63 26.4	−15.9	17.6	81
82	56 22.9	−21.0	12.6	57 21.4	−20.6	12.9	58 19.8	−20.1	13.3	59 18.2	−19.8	13.7	60 16.5	−19.4	14.1	61 14.6	−18.9	14.5	62 12.6	−18.3	15.0	63 10.5	−17.8	15.5	82
83	56 01.9	−22.2	10.9	57 00.8	−21.9	11.2	57 59.7	−21.7	11.5	58 58.4	−21.3	11.8	59 57.1	−20.9	12.2	60 55.7	−20.5	12.5	61 54.3	−20.2	13.0	62 52.7	−19.7	13.4	83
84	55 39.7	−23.6	9.2	56 38.9	−23.4	9.5	57 38.0	−23.1	9.7	58 37.1	−22.8	10.0	59 36.2	−22.5	10.3	60 35.2	−22.2	10.6	61 34.1	−21.8	11.0	62 33.0	−21.5	11.3	84
85	55 16.1	−24.9	7.6	56 15.5	−24.6	7.8	57 14.9	−24.4	8.0	58 14.3	−24.2	8.2	59 13.7	−24.0	8.5	60 13.0	−23.7	8.7	61 12.3	−23.4	9.0	62 11.5	−23.1	9.3	85
86	54 51.2	−26.1	6.0	55 50.9	−26.0	6.2	56 50.5	−25.8	6.3	57 50.1	−25.6	6.5	58 49.7	−25.4	6.7	59 49.3	−25.2	6.9	60 48.9	−25.1	7.1	61 48.4	−24.8	7.3	86
87	54 25.1	−27.2	4.5	55 24.9	−27.1	4.6	56 24.7	−27.0	4.7	57 24.5	−26.9	4.8	58 24.3	−26.6	4.9	59 24.1	−26.7	5.1	60 23.8	−26.5	5.3	61 23.6	−26.4	5.4	87
88	53 57.9	−28.4	2.9	54 57.8	−28.3	3.0	55 57.7	−28.3	3.1	56 57.6	−28.2	3.2	57 57.5	−28.1	3.3	58 57.4	−28.0	3.4	59 57.3	−28.0	3.5	60 57.2	−27.9	3.6	88
89	53 29.5	−29.5	1.5	54 29.5	−29.5	1.5	55 29.4	−29.4	1.5	56 29.4	−29.4	1.6	57 29.4	−29.4	1.6	58 29.4	−29.4	1.7	59 29.3	−29.3	1.7	60 29.3	−29.3	1.8	89
90	53 00.0	−30.5	0.0	54 00.0	−30.5	0.0	55 00.0	−30.6	0.0	56 00.0	−30.6	0.0	57 00.0	−30.6	0.0	58 00.0	−30.6	0.0	59 00.0	−30.6	0.0	60 00.0	−30.7	0.0	90

53°	54°	55°	56°	57°	58°	59°	60°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	17 30.7	−50.3	114.8	17 05.5	−50.9	115.0	16 39.9	−51.3	115.3	16 14.2	−51.9	115.6	15 48.1	−52.3	115.8	15 21.9	−52.8	116.1	14 55.4	−53.3	116.3	14 28.7	−53.7	116.6	0
1	16 40.4	−50.4	115.3	16 14.6	−50.9	115.6	15 48.6	−51.4	115.9	15 22.3	−51.9	116.1	14 55.8	−52.4	116.3	14 29.1	−52.9	116.6	14 02.1	−53.3	116.8	13 35.0	−53.8	117.0	1
2	15 50.0	−50.4	115.9	15 23.7	−51.0	116.1	14 57.2	−51.5	116.4	14 30.4	−52.0	116.6	14 03.4	−52.4	116.8	13 36.2	−52.9	117.1	13 08.8	−53.4	117.3	12 41.2	−53.8	117.5	2
3	14 59.6	−50.6	116.5	14 32.7	−51.0	116.7	14 05.7	−51.6	116.9	13 38.4	−52.0	117.1	13 11.0	−52.6	117.3	12 43.3	−53.0	117.6	12 15.4	−53.4	117.7	11 47.4	−53.8	117.9	3
4	14 09.0	−50.6	117.0	13 41.7	−51.2	117.2	13 14.1	−51.6	117.4	12 46.4	−52.1	117.6	12 18.4	−52.5	117.8	11 50.3	−53.0	118.0	11 22.0	−53.4	118.2	10 53.6	−53.9	118.4	4
5	13 18.4	−50.7	117.6	12 50.5	−51.2	117.8	12 22.5	−51.7	118.0	11 54.3	−52.2	118.2	11 25.9	−52.7	118.3	10 57.3	−53.1	118.5	10 28.6	−53.5	118.7	9 59.7	−53.9	118.8	5
6	12 27.7	−50.8	118.1	11 59.3	−51.2	118.3	11 30.8	−51.8	118.5	11 02.1	−52.2	118.7	10 33.2	−52.6	118.8	10 04.2	−53.1	119.0	9 35.1	−53.5	119.1	9 05.8	−53.9	119.3	6
7	11 36.9	−50.8	118.7	11 08.1	−51.4	118.8	10 39.0	−51.8	119.0	10 09.9	−52.3	119.2	9 40.6	−52.7	119.3	9 11.1	−53.1	119.5	8 41.6	−53.6	119.6	8 11.9	−54.0	119.7	7
8	10 46.1	−50.9	119.2	10 16.7	−51.3	119.4	9 47.2	−51.8	119.5	9 17.6	−52.3	119.7	8 47.9	−52.8	119.8	8 18.0	−53.2	119.9	7 48.0	−53.6	120.0	7 17.9	−54.0	120.2	8
9	9 55.2	−51.0	119.7	9 25.4	−51.5	119.9	8 55.4	−51.9	120.0	8 25.3	−52.3	120.2	7 55.1	−52.7	120.3	7 24.8	−53.2	120.4	6 54.4	−53.6	120.5	6 23.9	−54.0	120.6	9
10	9 04.2	−50.9	120.3	8 33.9	−51.4	120.4	8 03.5	−51.9	120.5	7 33.0	−52.4	120.6	7 02.4	−52.9	120.8	6 31.6	−53.2	120.9	6 00.8	−53.6	121.0	5 29.9	−54.0	121.1	10
11	8 13.3	−51.1	120.8	7 42.5	−51.5	120.9	7 11.6	−52.0	121.0	6 40.6	−52.4	121.1	6 09.5	−52.8	121.2	5 38.4	−53.3	121.3	5 07.2	−53.7	121.4	4 35.9	−54.1	121.5	11
12	7 22.2	−51.0	121.3	6 51.0	−51.5	121.4	6 19.6	−51.9	121.5	5 48.2	−52.4	121.6	5 16.7	−52.8	121.7	4 45.1	−53.2	121.8	4 13.5	−53.7	121.9	3 41.8	−54.0	121.9	12
13	6 31.2	−51.1	121.9	5 59.5	−51.6	122.0	5 27.7	−52.0	122.0	4 55.8	−52.4	122.1	4 23.9	−52.9	122.2	3 51.9	−53.3	122.3	3 19.8	−53.6	122.3	2 47.8	−54.1	122.3	13
14	5 40.1	−51.2	122.4	5 07.9	−51.6	122.5	4 35.7	−52.1	122.5	4 03.4	−52.5	122.6	3 31.0	−52.9	122.7	2 58.6	−53.3	122.7	2 26.2	−53.7	122.7	1 53.7	−54.1	122.8	14
15	4 48.9	−51.1	122.9	4 16.3	−51.6	123.0	3 43.6	−52.0	123.0	3 10.9	−52.5	123.1	2 38.1	−52.9	123.1	2 05.3	−53.3	123.2	1 32.5	−53.7	123.2	0 59.6	−54.1	123.2	15
16	3 57.8	−51.2	123.4	3 24.7	−51.6	123.5	2 51.6	−52.1	123.5	2 18.4	−52.5	123.5	1 45.2	−52.9	123.6	1 12.0	−53.3	123.6	0 38.8	−53.7	123.6	0 05.5	−54.1	123.6	16
17	3 06.6	−51.2	124.0	2 33.1	−51.6	124.0	1 59.5	−52.0	124.0	1 25.9	−52.5	124.1	0 52.3	−52.9	124.1	0 18.7	−53.3	124.1	0 14.9	+53.7	55.9	0 48.6	+54.0	55.9	17
18	2 15.4	−51.2	124.5	1 41.5	−51.7	124.5	1 07.5	−52.1	124.5	0 33.4	−52.5	124.5	0 00.6	+52.9	55.5	0 34.6	+53.3	55.5	1 08.6	+53.7	55.5	1 42.6	+54.1	55.5	18
19	1 24.2	−51.2	125.0	0 49.8	−51.6	125.0	0 15.4	−52.1	125.0	0 19.1	+52.5	55.0	0 53.5	+52.9	55.0	1 27.9	+53.3	55.0	2 02.3	+53.7	55.1	2 36.7	+54.1	55.1	19
20	0 33.0	−51.2	125.5	0 01.8	+51.7	54.5	0 36.7	+52.1	54.5	1 11.6	+52.4	54.5	1 46.4	+52.9	54.5	2 21.2	+53.3	54.5	2 56.0	+53.7	54.6	3 30.8	+54.0	54.6	20
21	0 18.2	+51.2	54.0	0 53.5	+51.6	54.0	1 28.8	+52.0	54.0	2 04.0	+52.5	54.0	2 39.3	+52.9	54.0	3 14.5	+53.3	54.1	3 49.7	+53.7	54.1	4 24.8	+54.1	54.2	21
22	1 09.4	+51.2	53.5	1 45.1	+51.6	53.5	2 20.8	+52.1	53.5	2 56.5	+52.5	53.5	3 32.2	+52.8	53.6	4 07.8	+53.3	53.6	4 43.4	+53.6	53.7	5 18.9	+54.0	53.7	22
23	2 00.6	+51.2	52.9	2 36.7	+51.7	52.9	3 12.9	+52.0	53.0	3 49.0	+52.4	53.0	4 25.0	+52.9	53.1	5 01.1	+53.2	53.2	5 37.0	+53.6	53.2	6 12.9	+54.0	53.3	23
24	2 51.8	+51.1	52.4	3 28.4	+51.6	52.4	4 04.9	+52.0	52.5	4 41.4	+52.5	52.5	5 17.9	+52.8	52.6	5 54.3	+53.2	52.7	6 30.6	+53.6	52.8	7 06.9	+54.0	52.9	24
25	3 42.9	+51.2	51.9	4 20.0	+51.5	51.9	4 56.9	+52.0	52.1	5 33.9	+52.4	52.1	6 10.7	+52.8	52.1	6 47.5	+53.2	52.2	7 24.2	+53.6	52.3	8 00.9	+53.9	52.4	25
26	4 34.1	+51.1	51.3	5 11.5	+51.6	51.4	5 48.9	+52.0	51.5	6 26.3	+52.4	51.6	7 03.5	+52.8	51.7	7 40.7	+53.1	51.8	8 17.8	+53.6	51.9	8 54.8	+53.9	52.0	26
27	5 25.2	+51.1	50.8	6 03.1	+51.5	50.9	6 40.9	+52.0	51.0	7 18.7	+52.3	51.1	7 56.3	+52.8	51.2	8 33.9	+53.1	51.3	9 11.4	+53.5	51.4	9 48.7	+53.9	51.5	27
28	6 16.3	+51.1	50.3	6 54.6	+51.5	50.4	7 32.9	+51.9	50.5	8 11.0	+52.3	50.6	8 49.1	+52.7	50.7	9 27.0	+53.1	50.8	10 04.9	+53.4	50.9	10 42.6	+53.8	51.1	28
29	7 07.4	+51.0	49.8	7 46.1	+51.5	49.9	8 24.8	+51.8	50.0	9 03.3	+52.3	50.1	9 41.8	+52.6	50.2	10 20.1	+53.0	50.3	10 58.3	+53.5	50.5	11 36.4	+53.8	50.6	29
30	7 58.4	+51.0	49.2	8 37.6	+51.4	49.3	9 16.6	+51.9	49.5	9 55.6	+52.2	49.6	10 34.4	+52.6	49.7	11 13.1	+53.1	49.9	11 51.8	+53.3	50.0	12 30.2	+53.8	50.2	30
31	8 49.4	+51.0	48.7	9 29.0	+51.4	48.9	10 08.5	+51.7	48.9	10 47.8	+52.2	49.1	11 27.0	+52.6	49.2	12 06.2	+52.9	49.4	12 45.1	+53.4	49.6	13 24.0	+53.7	49.7	31
32	9 40.4	+50.9	48.2	10 20.4	+51.3	48.3	11 00.2	+51.8	48.4	11 40.0	+52.1	48.6	12 19.6	+52.5	48.7	12 59.1	+52.9	48.9	13 38.5	+53.3	49.1	14 17.7	+53.6	49.3	32
33	10 31.3	+50.8	47.6	11 11.7	+51.2	47.8	11 52.0	+51.6	47.9	12 32.1	+52.1	48.1	13 12.1	+52.5	48.2	13 52.0	+52.9	48.4	14 31.8	+53.2	48.6	15 11.3	+53.6	48.8	33
34	11 22.1	+50.8	47.1	12 02.9	+51.2	47.2	12 43.6	+51.6	47.4	13 24.2	+52.0	47.6	14 04.6	+52.4	47.7	14 44.9	+52.7	47.9	15 25.0	+53.1	48.1	16 04.9	+53.6	48.3	34
35	12 12.9	+50.8	46.5	12 54.1	+51.2	46.7	13 35.2	+51.6	46.9	14 16.2	+51.9	47.1	14 57.0	+52.3	47.2	15 37.6	+52.8	47.4	16 18.1	+53.1	47.7	16 58.5	+53.4	47.9	35
36	13 03.7	+50.6	46.0	13 45.3	+51.0	46.2	14 26.8	+51.4	46.3	15 08.1	+51.9	46.5	15 49.3	+52.3	46.7	16 30.4	+52.6	46.9	17 11.2	+53.0	47.2	17 51.9	+53.4	47.4	36
37	13 54.3	+50.6	45.4	14 36.3	+51.0	45.6	15 18.2	+51.4	45.8	16 00.0	+51.8	46.0	16 41.6	+52.2	46.2	17 23.0	+52.6	46.4	18 04.2	+53.0	46.7	18 45.3	+53.3	46.9	37
38	14 44.9	+50.4	44.9	15 27.3	+50.9	45.1	16 09.6	+51.3	45.3	16 51.8	+51.7	45.5	17 33.8	+52.1	45.7	18 15.6	+52.5	45.9	18 57.2	+52.9	46.2	19 38.6	+53.3	46.4	38
39	15 35.4	+50.4	44.3	16 18.2	+50.9	44.5	17 00.9	+51.3	44.7	17 43.5	+51.6	45.0	18 25.9	+52.0	45.2	19 08.1	+52.4	45.4	19 50.1	+52.7	45.7	20 31.9	+53.1	45.9	39
40	16 25.8	+50.3	43.8	17 09.1	+50.7	44.0	17 52.2	+51.1	44.2	18 35.1	+51.5	44.4	19 17.9	+51.9	44.7	20 00.5	+52.3	44.9	20 42.8	+52.7	45.2	21 25.0	+53.1	45.4	40
41	17 16.1	+50.3	43.2	17 59.8	+50.6	43.4	18 43.3	+51.0	43.6	19 26.6	+51.5	43.9	20 09.8	+51.8	44.1	20 52.8	+52.2	44.4	21 35.5	+52.6	44.7	22 18.1	+53.0	44.9	41
42	18 06.4	+50.1	42.6	18 50.4	+50.6	42.8	19 34.3	+51.0	43.1	20 18.1	+51.3	43.3	21 01.6	+51.7	43.6	21 45.0	+52.1	43.9	22 28.1	+52.5	44.1	23 11.1	+52.9	44.4	42
43	18 56.5	+50.0	42.0	19 41.0	+50.4	42.3	20 25.3	+50.8	42.5	21 09.4	+51.2	42.8	21 53.3	+51.7	43.0	22 37.1	+52.0	43.3	23 20.6	+52.4	43.6	24 04.0	+52.7	43.9	43
44	19 46.5	+49.9	41.5	20 31.4	+50.3	41.7	21 16.1	+50.7	42.0	22 00.6	+51.1	42.2	22 45.0	+51.5	42.5	23 29.1	+51.9	42.8	24 13.0	+52.3	43.1	24 56.7	+52.7	43.4	44
45	20 36.4	+49.8	40.9	21 21.7	+50.2	41.1	22 06.8	+50.6	41.4	22 51.7	+51.0	41.7	23 36.5	+51.3	41.9	24 21.0	+51.8	42.2	25 05.3	+52.2	42.5	25 49.4	+52.5	42.9	45
46	21 26.2	+49.6	40.3	22 11.9	+50.0	40.5	22 57.4	+50.4	40.8	23 42.7	+50.9	41.1	24 27.8	+51.3	41.4	25 12.8	+51.6	41.7	25 57.5	+52.0	42.0	26 41.9	+52.5	42.3	46
47	22 15.8	+49.5	39.7	23 01.9	+49.9	39.9	23 47.8	+50.4	40.2	24 33.6	+50.7	40.5	25 19.1	+51.1	40.8	26 04.4	+51.5	41.1	26 49.5	+51.9	41.4	27 34.4	+52.2	41.8	47
48	23 05.3	+49.4	39.0	23 51.8	+49.8	39.3	24 38.2	+50.1	39.6	25 24.3	+50.6	39.9	26 10.2	+51.0	40.2	26 55.9	+51.4	40.5	27 41.4	+51.8	40.9	28 26.6	+52.2	41.2	48
49	23 54.7	+49.2	38.4	24 41.6	+49.6	38.7	25 28.3	+50.1	39.0	26 14.9	+50.4	39.3	27 01.2	+50.8	39.6	27 47.3	+51.2	40.0	28 33.2	+51.6	40.3	29 18.8	+52.0	40.7	49
50	24 43.9	+49.1	37.8	25 31.2	+49.5	38.1	26 18.4	+49.8	38.4	27 05.3	+50.2	38.7	27 52.0	+50.7	39.0	28 38.5	+51.1	39.4	29 24.8	+51.4	39.7	30 10.8	+51.8	40.1	50
51	25 33.0	+48.9	37.2	26 20.7	+49.3	37.5	27 08.2	+49.7	37.8	27 55.5	+50.1	38.1	28 42.7	+50.5	38.4	29 29.6	+50.9	38.8	30 16.2	+51.3	39.1	31 02.6	+51.7	39.5	51
52	26 21.9	+48.7	36.5	27 10.0	+49.1	36.8	27 57.9	+49.5	37.1	28 45.6	+50.0	37.5	29 33.2	+50.3	37.8	30 20.5	+50.7	38.2	31 07.5	+51.1	38.5	31 54.3	+51.6	38.9	52
53	27 10.6	+48.5	35.9	27 59.1	+48.9	36.2	28 47.4	+49.4	36.5	29 35.6	+49.7	36.8	30 23.5	+50.1	37.2	31 11.2	+50.5	37.5	31 58.6	+51.0	37.9	32 45.9	+51.3	38.3	53
54	27 59.1	+48.3	35.2	28 48.0	+48.8	35.5	29 36.8	+49.1	35.8	30 25.3	+49.6	36.2	31 13.6	+50.0	36.5	32 01.7	+50.4	36.9	32 49.6	+50.7	37.3	33 37.2	+51.2	37.7	54
55	28 47.4	+48.2	34.5	29 36.8	+48.5	34.8	30 25.9	+49.0	35.2	31 14.9	+49.3	35.5	32 03.6	+49.7	35.9	32 52.1	+50.1	36.3	33 40.3	+50.6	36.6	34 28.4	+50.9	37.1	55
56	29 35.6	+47.9	33.8	30 25.3	+48.3	34.2	31 14.9	+48.7	34.5	32 04.2	+49.1	34.9	32 53.3	+49.6	35.2	33 42.2	+50.0	35.6	34 30.9	+50.3	36.0	35 19.3	+50.8	36.4	56
57	30 23.5	+47.7	33.1	31 13.6	+48.1	33.5	32 03.6	+48.5	33.8	32 53.3	+48.9	34.2	33 42.9	+49.3	34.5	34 32.2	+49.7	34.9	35 21.2	+50.2	35.3	36 10.1	+50.5	35.8	57
58	31 11.2	+47.4	32.4	32 01.7	+47.9	32.8	32 52.1	+48.2	33.1	33 42.2	+48.7	33.5	34 32.2	+49.0	33.9	35 21.9	+49.5	34.2	36 11.4	+49.8	34.7	37 00.6	+50.3	35.1	58
59	31 58.6	+47.3	31.7	32 49.6	+47.6	32.1	33 40.3	+48.1	32.4	34 30.9	+48.4	32.8	35 21.2	+48.8	33.2	36 11.4	+49.2	33.5	37 01.2	+49.7	34.0	37 50.9	+50.0	34.4	59
60	32 45.9	+46.9	31.0	33 37.2	+47.4	31.3	34 28.4	+47.7	31.7	35 19.3	+48.2	32.1	36 10.1	+48.5	32.4	37 00.6	+49.0	32.8	37 50.9	+49.4	33.3	38 40.9	+49.8	33.7	60
61	33 32.8	+46.7	30.2	34 24.6	+47.0	30.6	35 16.1	+47.5	30.9	36 07.5	+47.8	31.3	36 58.6	+48.3	31.7	37 49.6	+48.7	32.1	38 40.3	+49.1	32.5	39 30.7	+49.5	33.0	61
62	34 19.5	+46.4	29.5	35 11.6	+46.8	29.8	36 03.6	+47.2	30.2	36 55.3	+47.6	30.6	37 46.9	+48.0	31.0	38 38.3	+48.4	31.4	39 29.4	+48.8	31.8	40 20.2	+49.3	32.2	62
63	35 05.9	+46.1	28.7	35 58.4	+46.5	29.1	36 50.8	+46.9	29.4	37 42.9	+47.3	29.8	38 34.9	+47.7	30.2	39 26.7	+48.1	30.6	40 18.2	+48.5	31.0	41 09.5	+48.9	31.5	63
64	35 52.0	+45.8	27.9	36 44.9	+46.2	28.3	37 37.7	+46.5	28.6	38 30.2	+47.0	29.0	39 22.6	+47.4	29.4	40 14.8	+47.7	29.8	41 06.7	+48.2	30.3	41 58.4	+48.6	30.7	64
65	36 37.8	+45.4	27.1	37 31.1	+45.8	27.5	38 24.2	+46.3	27.8	39 17.2	+46.6	28.2	40 10.0	+47.0	28.6	41 02.5	+47.5	29.0	41 54.9	+47.8	29.5	42 47.0	+48.3	29.9	65
66	37 23.2	+45.2	26.3	38 16.9	+45.5	26.7	39 10.5	+45.9	27.0	40 03.8	+46.3	27.4	40 57.0	+46.7	27.8	41 50.0	+47.1	28.2	42 42.7	+47.5	28.6	43 35.3	+47.9	29.1	66
67	38 08.4	+44.7	25.5	39 02.4	+45.2	25.8	39 56.4	+45.5	26.2	40 50.1	+45.9	26.6	41 43.7	+46.3	27.0	42 37.1	+46.7	27.4	43 30.2	+47.2	27.8	44 23.2	+47.5	28.3	67
68	38 53.1	+44.4	24.6	39 47.6	+44.7	25.0	40 41.9	+45.1	25.3	41 36.0	+45.5	25.7	42 30.0	+45.9	26.1	43 23.8	+46.3	26.5	44 17.4	+46.7	26.9	45 10.7	+47.2	27.4	68
69	39 37.5	+44.0	23.8	40 32.3	+44.4	24.1	41 27.0	+44.7	24.5	42 21.5	+45.2	24.8	43 15.9	+45.5	25.2	44 10.1	+45.9	25.6	45 04.1	+46.3	26.1	45 57.9	+46.7	26.5	69
70	40 21.5	+43.5	22.9	41 16.7	+43.9	23.2	42 11.7	+44.3	23.6	43 06.7	+44.6	23.9	44 01.4	+45.1	24.3	44 56.0	+45.5	24.7	45 50.4	+45.9	25.2	46 44.6	+46.3	25.6	70
71	41 05.0	+43.1	22.0	42 00.6	+43.5	22.3	42 56.0	+43.9	22.7	43 51.3	+44.3	23.0	44 46.5	+44.6	23.4	45 41.5	+45.0	23.8	46 36.3	+45.4	24.2	47 30.9	+45.8	24.7	71
72	41 48.1	+42.7	21.0	42 44.1	+43.0	21.4	43 39.9	+43.4	21.7	44 35.6	+43.7	22.1	45 31.1	+44.1	22.5	46 26.5	+44.5	22.9	47 21.7	+44.9	23.3	48 16.7	+45.3	23.7	72
73	42 30.8	+42.2	20.1	43 27.1	+42.5	20.4	44 23.3	+42.8	20.8	45 19.3	+43.2	21.1	46 15.2	+43.6	21.5	47 11.0	+44.0	21.9	48 06.6	+44.2	22.3	49 02.0	+44.8	22.7	73
74	43 13.0	+41.7	19.1	44 09.6	+42.0	19.4	45 06.1	+42.4	19.8	46 02.5	+42.8	20.1	46 58.8	+43.1	20.5	47 55.0	+43.4	20.9	48 51.0	+43.8	21.3	49 46.8	+44.2	21.7	74
75	43 54.7	+41.1	18.1	44 51.6	+41.5	18.4	45 48.5	+41.8	18.8	46 45.3	+42.1	19.1	47 41.9	+42.5	19.5	48 38.4	+42.9	19.9	49 34.8	+43.2	20.2	50 31.0	+43.6	20.6	75
76	44 35.8	+40.6	17.1	45 33.1	+40.9	17.4	46 30.3	+41.3	17.7	47 27.4	+41.6	18.1	48 24.4	+41.9	18.4	49 21.3	+42.3	18.8	50 18.0	+42.7	19.1	51 14.6	+43.1	19.6	76
77	45 16.4	+40.0	16.1	46 14.0	+40.4	16.4	47 11.6	+40.6	16.7	48 09.0	+41.0	17.0	49 06.3	+41.3	17.3	50 03.6	+41.6	17.7	51 00.7	+42.0	18.0	51 57.7	+42.3	18.4	77
78	45 56.4	+39.5	15.0	46 54.4	+39.7	15.3	47 52.2	+40.0	15.6	48 50.0	+40.3	15.9	49 47.6	+40.7	16.2	50 45.2	+40.9	16.5	51 42.7	+41.3	16.9	52 40.0	+41.7	17.3	78
79	46 35.9	+38.7	13.9	47 34.1	+39.0	14.2	48 32.2	+39.3	14.5	49 30.3	+39.6	14.7	50 28.3	+39.9	15.0	51 26.1	+40.3	15.4	52 24.0	+40.5	15.7	53 21.7	+40.9	16.1	79
80	47 14.6	+38.1	12.8	48 13.1	+38.4	13.0	49 11.5	+38.7	13.3	50 09.9	+38.9	13.6	51 08.2	+39.2	13.9	52 06.4	+39.5	14.2	53 04.5	+39.8	14.5	54 02.6	+40.1	14.8	80
81	47 52.7	+37.5	11.7	48 51.5	+37.6	11.9	49 50.2	+37.9	12.1	50 48.8	+38.2	12.4	51 47.4	+38.6	12.7	52 45.9	+38.7	12.9	53 44.3	+39.0	13.2	54 42.7	+39.3	13.6	81
82	48 30.2	+36.6	10.5	49 29.1	+36.9	10.7	50 28.1	+37.1	10.9	51 27.0	+37.3	11.2	52 25.8	+37.6	11.4	53 24.6	+37.9	11.7	54 23.3	+38.2	11.9	55 22.0	+38.4	12.2	82
83	49 06.8	+35.9	9.3	50 06.0	+36.1	9.5	51 05.2	+36.3	9.7	52 04.3	+36.5	9.9	53 03.4	+36.8	10.1	54 02.5	+36.9	10.4	55 01.5	+37.2	10.6	56 00.4	+37.5	10.9	83
84	49 42.7	+35.1	8.0	50 42.1	+35.3	8.2	51 41.5	+35.5	8.4	52 40.8	+35.7	8.6	53 40.2	+35.8	8.8	54 39.4	+36.1	9.0	55 38.7	+36.2	9.2	56 37.9	+36.5	9.5	84
85	50 17.8	+34.3	6.8	51 17.4	+34.4	6.9	52 17.0	+34.5	7.1	53 16.5	+34.7	7.3	54 16.0	+34.9	7.4	55 15.5	+35.1	7.6	56 14.9	+35.3	7.8	57 14.4	+35.4	8.0	85
86	50 52.1	+33.4	5.5	51 51.8	+33.5	5.6	52 51.5	+33.7	5.7	53 51.2	+33.8	5.9	54 50.9	+33.9	6.0	55 50.6	+34.0	6.2	56 50.2	+34.2	6.3	57 49.8	+34.4	6.5	86
87	51 25.5	+32.5	4.2	52 25.3	+32.6	4.3	53 25.2	+32.6	4.4	54 25.0	+32.7	4.5	55 24.8	+32.9	4.6	56 24.6	+33.0	4.7	57 24.4	+33.1	4.8	58 24.2	+33.2	5.0	87
88	51 58.0	+31.5	2.8	52 57.9	+31.6	2.9	53 57.8	+31.6	2.9	54 57.7	+31.7	3.0	55 57.7	+31.7	3.1	56 57.6	+31.8	3.2	57 57.5	+31.9	3.3	58 57.4	+31.9	3.4	88
89	52 29.5	+30.5	1.4	53 29.5	+30.5	1.5	54 29.4	+30.6	1.5	55 29.4	+30.6	1.5	56 29.4	+30.6	1.6	57 29.4	+30.6	1.6	58 29.4	+30.6	1.7	59 29.3	+30.7	1.7	89
90	53 00.0	+29.5	0.0	54 00.0	+29.5	0.0	55 00.0	+29.4	0.0	56 00.0	+29.4	0.0	57 00.0	+29.4	0.0	58 00.0	+29.4	0.0	59 00.0	+29.3	0.0	60 00.0	+29.3	0.0	90

53°	54°	55°	56°	57°	58°	59°	60°

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION　　**L.H.A. 120°, 240°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	16 57.8	+50.1	113.9	16 33.4	+50.6	114.2	16 08.7	+51.1	114.4	15 43.8	+51.6	114.7	15 18.6	+52.2	114.9	14 53.2	+52.6	115.2	14 27.6	+53.1	115.4	14 01.7	+53.5	115.6	0
1	17 47.9	+49.9	113.3	17 24.0	+50.5	113.6	16 59.8	+51.1	113.9	16 35.4	+51.6	114.2	16 10.8	+52.0	114.4	15 45.8	+52.6	114.7	15 20.7	+53.0	114.9	14 55.2	+53.5	115.2	1
2	18 37.8	+49.9	112.7	18 14.5	+50.4	113.0	17 50.9	+50.9	113.3	17 27.0	+51.5	113.6	17 02.8	+51.9	113.9	16 38.4	+52.4	114.2	16 13.7	+52.9	114.4	15 48.7	+53.4	114.7	2
3	19 27.7	+49.7	112.1	19 04.9	+50.3	112.5	18 41.8	+50.7	112.8	18 18.5	+51.3	113.1	17 54.8	+51.9	113.4	17 30.8	+52.4	113.7	17 06.6	+52.9	114.0	16 42.1	+53.4	114.2	3
4	20 17.4	+49.6	111.5	19 55.2	+50.2	111.9	19 32.7	+50.7	112.2	19 09.8	+51.3	112.5	18 46.7	+51.8	112.8	18 23.2	+52.4	113.2	17 59.5	+52.8	113.5	17 35.5	+53.3	113.8	4
5	21 07.0	+49.4	110.9	20 45.4	+50.0	111.3	20 23.4	+50.6	111.6	20 01.1	+51.2	112.0	19 38.5	+51.7	112.3	19 15.6	+52.2	112.6	18 52.3	+52.7	113.0	18 28.8	+53.2	113.3	5
6	21 56.4	+49.4	110.3	21 35.4	+50.0	110.7	21 14.0	+50.5	111.1	20 52.3	+51.1	111.4	20 30.2	+51.6	111.8	20 07.8	+52.1	112.1	19 45.0	+52.7	112.5	19 22.0	+53.1	112.8	6
7	22 45.8	+49.2	109.7	22 25.4	+49.8	110.1	22 04.5	+50.4	110.5	21 43.4	+50.9	110.9	21 21.8	+51.5	111.2	20 59.9	+52.1	111.6	20 37.7	+52.5	111.9	20 15.1	+53.0	112.3	7
8	23 35.0	+49.0	109.1	23 15.2	+49.6	109.5	22 54.9	+50.3	109.9	22 34.3	+50.8	110.3	22 13.3	+51.4	110.7	21 52.0	+51.9	111.1	21 30.2	+52.5	111.4	21 08.1	+53.0	111.8	8
9	24 24.0	+48.9	108.5	24 04.8	+49.5	108.9	23 45.2	+50.1	109.3	23 25.1	+50.8	109.7	23 04.7	+51.3	110.1	22 43.9	+51.8	110.5	22 22.7	+52.3	110.9	22 01.1	+52.8	111.3	9
10	25 12.9	+48.7	107.8	24 54.3	+49.4	108.3	24 35.3	+50.0	108.7	24 15.9	+50.5	109.1	23 56.0	+51.1	109.5	23 35.7	+51.7	110.0	23 15.0	+52.3	110.4	22 53.9	+52.8	110.8	10
11	26 01.6	+48.5	107.2	25 43.7	+49.2	107.6	25 25.3	+49.8	108.1	25 06.4	+50.4	108.5	24 47.1	+51.0	109.0	24 27.4	+51.6	109.4	24 07.3	+52.1	109.8	23 46.7	+52.6	110.3	11
12	26 50.1	+48.4	106.5	26 32.9	+49.0	107.0	26 15.1	+49.6	107.5	25 56.8	+50.3	107.9	25 38.1	+50.9	108.4	25 19.0	+51.4	108.8	24 59.4	+52.0	109.3	24 39.3	+52.6	109.7	12
13	27 38.5	+48.2	105.8	27 21.9	+48.8	106.3	27 04.7	+49.5	106.8	26 47.1	+50.1	107.3	26 29.0	+50.7	107.8	26 10.4	+51.3	108.3	25 51.4	+51.9	108.7	25 31.9	+52.4	109.2	13
14	28 26.7	+47.9	105.2	28 10.7	+48.6	105.7	27 54.2	+49.3	106.2	27 37.2	+50.0	106.7	27 19.7	+50.6	107.2	27 01.7	+51.2	107.7	26 43.3	+51.7	108.2	26 24.3	+52.3	108.7	14
15	29 14.6	+47.8	104.5	28 59.3	+48.5	105.0	28 43.5	+49.1	105.6	28 27.2	+49.7	106.1	28 10.3	+50.4	106.6	27 52.9	+51.0	107.1	27 35.0	+51.6	107.6	27 16.6	+52.2	108.1	15
16	30 02.4	+47.5	103.8	29 47.8	+48.2	104.4	29 32.6	+48.9	104.9	29 16.9	+49.6	105.4	29 00.7	+50.2	106.0	28 43.9	+50.9	106.5	28 26.6	+51.5	107.0	28 08.8	+52.0	107.5	16
17	30 49.9	+47.3	103.1	30 36.0	+48.0	103.7	30 21.6	+48.7	104.2	30 06.5	+49.4	104.8	29 50.9	+50.1	105.3	29 34.8	+50.6	105.9	29 18.1	+51.3	106.4	29 00.8	+51.9	107.0	17
18	31 37.2	+47.0	102.4	31 24.0	+47.8	103.0	31 10.3	+48.5	103.5	30 55.9	+49.2	104.1	30 41.0	+49.8	104.7	30 25.4	+50.6	105.3	30 09.4	+51.1	105.8	29 52.7	+51.7	106.4	18
19	32 24.2	+46.8	101.6	32 11.8	+47.5	102.3	31 58.8	+48.2	102.9	31 45.1	+49.0	103.5	31 30.8	+49.7	104.1	31 16.0	+50.3	104.7	31 00.5	+50.9	105.3	30 44.4	+51.6	105.8	19
20	33 11.0	+46.5	100.9	32 59.3	+47.3	101.5	32 47.0	+48.1	102.2	32 34.1	+48.7	102.8	32 20.5	+49.3	103.4	32 06.3	+50.1	104.0	31 51.4	+50.8	104.6	31 36.0	+51.4	105.2	20
21	33 57.5	+46.2	100.1	33 46.6	+47.0	100.8	33 35.1	+47.7	101.4	33 22.8	+48.5	102.1	33 09.9	+49.3	102.7	32 56.4	+49.9	103.4	32 42.2	+50.6	104.0	32 27.4	+51.2	104.6	21
22	34 43.7	+46.0	99.4	34 33.6	+46.8	100.0	34 22.8	+47.5	100.7	34 11.3	+48.3	101.4	33 59.2	+49.0	102.0	33 46.3	+49.7	102.7	33 32.8	+50.4	103.3	33 18.6	+51.1	104.0	22
23	35 29.7	+45.6	98.6	35 20.4	+46.4	99.3	35 10.3	+47.3	100.0	34 59.6	+48.0	100.7	34 48.2	+48.7	101.3	34 36.0	+49.5	102.0	34 23.2	+50.1	102.7	34 09.7	+50.8	103.4	23
24	36 15.3	+45.3	97.8	36 06.8	+46.1	98.5	35 57.6	+46.9	99.2	35 47.6	+47.7	99.9	35 36.9	+48.5	100.6	35 25.5	+49.2	101.3	35 13.3	+50.0	102.0	35 00.5	+50.6	102.7	24
25	37 00.6	+44.9	96.9	36 52.9	+45.8	97.7	36 44.5	+46.6	98.4	36 35.3	+47.5	99.2	36 25.4	+48.2	99.9	36 14.7	+49.0	100.6	36 03.3	+49.7	101.3	35 51.1	+50.4	102.0	25
26	37 45.5	+44.6	96.1	37 38.7	+45.5	96.9	37 31.1	+46.4	97.6	37 22.8	+47.1	98.4	37 13.6	+47.9	99.2	37 03.7	+48.7	99.9	36 53.0	+49.4	100.6	36 41.5	+50.2	101.4	26
27	38 30.1	+44.2	95.3	38 24.2	+45.1	96.1	38 17.5	+45.9	96.8	38 09.9	+46.8	97.6	38 01.5	+47.7	98.4	37 52.4	+48.4	99.2	37 42.4	+49.2	99.9	37 31.7	+49.9	100.7	27
28	39 14.3	+43.8	94.4	39 09.3	+44.7	95.2	39 03.4	+45.6	96.0	38 56.7	+46.5	96.8	38 49.2	+47.3	97.6	38 40.8	+48.1	98.4	38 31.6	+48.9	99.2	38 21.6	+49.7	100.0	28
29	39 58.1	+43.4	93.5	39 54.0	+44.4	94.3	39 49.0	+45.3	95.2	39 43.2	+46.1	96.0	39 36.5	+47.0	96.8	39 28.9	+47.9	97.6	39 20.5	+48.7	98.5	39 11.3	+49.4	99.3	29
30	40 41.5	+43.0	92.6	40 38.4	+43.9	93.5	40 34.3	+44.8	94.3	40 29.3	+45.8	95.2	40 23.5	+46.6	96.0	40 16.8	+47.5	96.9	40 09.2	+48.3	97.7	40 00.7	+49.1	98.5	30
31	41 24.5	+42.5	91.7	41 22.3	+43.5	92.6	41 19.1	+44.5	93.4	41 15.1	+45.4	94.3	41 10.1	+46.3	95.2	41 04.3	+47.1	96.1	40 57.5	+48.0	96.9	40 49.8	+48.8	97.8	31
32	42 07.0	+42.0	90.7	42 05.8	+43.0	91.6	42 03.6	+44.0	92.5	42 00.5	+44.9	93.4	41 56.4	+45.9	94.3	41 51.4	+46.8	95.2	41 45.5	+47.6	96.1	41 38.6	+48.5	97.0	32
33	42 49.0	+41.6	89.8	42 48.8	+42.6	90.7	42 47.6	+43.6	91.6	42 45.4	+44.6	92.5	42 42.3	+45.5	93.5	42 38.2	+46.4	94.4	42 33.1	+47.3	95.3	42 27.1	+48.2	96.2	33
34	43 30.6	+41.0	88.8	43 31.4	+42.0	89.7	43 31.2	+43.0	90.7	43 30.0	+44.0	91.6	43 27.8	+44.9	92.6	43 24.6	+46.0	93.5	43 20.4	+46.9	94.5	43 15.3	+47.8	95.4	34
35	44 11.6	+40.4	87.8	44 13.4	+41.6	88.7	44 14.2	+42.6	89.7	44 14.0	+43.6	90.7	44 12.8	+44.6	91.7	44 10.6	+45.6	92.6	44 07.3	+46.5	93.6	44 03.1	+47.4	94.6	35
36	44 52.0	+39.9	86.7	44 55.0	+40.9	87.7	44 56.8	+42.1	88.7	44 57.6	+43.2	89.7	44 57.4	+44.1	90.7	44 56.2	+45.1	91.7	44 53.8	+46.1	92.7	44 50.5	+47.0	93.7	36
37	45 31.9	+39.3	85.7	45 35.9	+40.4	86.7	45 38.9	+41.5	87.7	45 40.8	+42.5	88.7	45 41.5	+43.7	89.7	45 41.3	+44.6	90.8	45 39.9	+45.7	91.8	45 37.5	+46.6	92.8	37
38	46 11.2	+38.7	84.6	46 16.3	+39.9	85.6	46 20.4	+40.9	86.7	46 23.3	+42.1	87.7	46 25.2	+43.1	88.8	46 25.9	+44.2	89.8	46 25.6	+45.1	90.9	46 24.1	+46.2	91.9	38
39	46 49.9	+38.0	83.5	46 56.2	+39.1	84.5	47 01.3	+40.3	85.6	47 05.4	+41.4	86.7	47 08.3	+42.5	87.7	47 10.1	+43.6	88.8	47 10.7	+44.7	89.9	47 10.3	+45.7	91.0	39
40	47 27.9	+37.3	82.3	47 35.3	+38.5	83.4	47 41.6	+39.7	84.5	47 46.8	+40.8	85.6	47 50.8	+42.0	86.7	47 53.7	+43.1	87.8	47 55.4	+44.2	88.9	47 56.0	+45.2	90.0	40
41	48 05.2	+36.5	81.2	48 13.8	+37.8	82.3	48 21.3	+39.0	83.4	48 27.6	+40.2	84.5	48 32.8	+41.4	85.6	48 36.8	+42.5	86.8	48 39.6	+43.6	87.9	48 41.2	+44.7	89.0	41
42	48 41.7	+35.9	80.0	48 51.6	+37.1	81.1	49 00.3	+38.3	82.2	49 07.8	+39.5	83.4	49 14.2	+40.7	84.5	49 19.3	+41.9	85.7	49 23.2	+43.0	86.8	49 25.9	+44.1	88.0	42
43	49 17.6	+35.0	78.7	49 28.7	+36.3	79.9	49 38.6	+37.6	81.1	49 47.3	+38.9	82.2	49 54.9	+40.0	83.4	50 01.2	+41.2	84.6	50 06.2	+42.4	85.8	50 10.0	+43.5	87.0	43
44	49 52.6	+34.2	77.5	50 05.0	+35.5	78.7	50 16.2	+36.8	79.8	50 26.2	+38.0	81.0	50 34.9	+39.3	82.2	50 42.4	+40.5	83.4	50 48.6	+41.7	84.7	50 53.5	+43.0	85.9	44
45	50 26.8	+33.3	76.2	50 40.5	+34.6	77.4	50 53.0	+35.9	78.6	51 04.2	+37.3	79.8	51 14.2	+38.6	81.0	51 22.9	+39.8	82.3	51 30.3	+41.1	83.5	51 36.5	+42.2	84.8	45
46	51 00.1	+32.4	74.9	51 15.1	+33.8	76.1	51 28.9	+35.2	77.3	51 41.5	+36.4	78.6	51 52.8	+37.7	79.8	52 02.7	+39.1	81.1	52 11.4	+40.3	82.3	52 18.7	+41.6	83.6	46
47	51 32.5	+31.5	73.6	51 48.9	+32.9	74.8	52 04.1	+34.2	76.0	52 17.9	+35.6	77.3	52 30.5	+36.9	78.5	52 41.8	+38.2	79.8	52 51.7	+39.6	81.1	53 00.3	+40.9	82.4	47
48	52 04.0	+30.5	72.2	52 21.8	+31.9	73.4	52 38.3	+33.3	74.7	52 53.5	+34.7	75.9	53 07.4	+36.1	77.2	53 20.0	+37.4	78.5	53 31.3	+38.7	79.9	53 41.2	+40.0	81.2	48
49	52 34.5	+29.5	70.8	52 53.7	+30.9	72.0	53 11.6	+32.3	73.3	53 28.2	+33.7	74.6	53 43.5	+35.1	75.9	53 57.4	+36.5	77.2	54 10.0	+37.9	78.6	54 21.2	+39.3	79.9	49
50	53 04.0	+28.4	69.3	53 24.6	+29.8	70.6	53 43.9	+31.2	71.9	54 01.9	+32.7	73.2	54 18.6	+34.1	74.5	54 33.9	+35.6	75.9	54 47.9	+37.0	77.2	55 00.5	+38.3	78.6	50
51	53 32.4	+27.3	67.9	53 54.4	+28.7	69.1	54 15.1	+30.3	70.4	54 34.6	+31.7	71.7	54 52.7	+33.2	73.1	55 09.5	+34.6	74.5	55 24.9	+36.0	75.9	55 38.8	+37.5	77.3	51
52	53 59.7	+26.1	66.3	54 23.1	+27.6	67.6	54 45.4	+29.0	68.9	55 06.3	+30.5	70.3	55 25.9	+32.0	71.6	55 44.1	+33.5	73.0	56 00.9	+35.0	74.4	56 16.3	+36.5	75.9	52
53	54 25.8	+24.9	64.8	54 50.7	+26.5	66.1	55 14.4	+28.0	67.4	55 36.8	+29.5	68.7	55 57.9	+31.0	70.1	56 17.6	+32.5	71.5	56 35.9	+34.0	73.0	56 52.8	+35.4	74.4	53
54	54 50.7	+23.7	63.2	55 17.2	+25.2	64.5	55 42.4	+26.7	65.8	56 06.3	+28.2	67.2	56 28.9	+29.7	68.6	56 50.1	+31.3	70.0	57 09.9	+32.8	71.5	57 28.2	+34.4	72.9	54
55	55 14.4	+22.4	61.6	55 42.4	+23.9	62.9	56 09.1	+25.4	64.2	56 34.5	+27.0	65.6	56 58.6	+28.5	67.0	57 21.4	+30.0	68.4	57 42.7	+31.6	69.9	58 02.6	+33.2	71.4	55
56	55 36.8	+21.1	60.0	56 06.3	+22.6	61.3	56 34.5	+24.1	62.6	57 01.5	+25.6	64.0	57 27.1	+27.3	65.4	57 51.4	+28.9	66.8	58 14.3	+30.5	68.3	58 35.8	+32.0	69.8	56
57	55 57.9	+19.7	58.3	56 28.9	+21.2	59.6	56 58.6	+22.8	60.9	57 27.1	+24.3	62.3	57 54.4	+25.9	63.7	58 20.3	+27.5	65.2	58 44.8	+29.1	66.7	59 07.8	+30.7	68.2	57
58	56 17.6	+18.3	56.6	56 50.1	+19.8	57.9	57 21.4	+21.3	59.2	57 51.4	+22.9	60.6	58 20.3	+24.5	62.0	58 47.8	+26.1	63.5	59 13.9	+27.7	65.0	59 38.5	+29.4	66.5	58
59	56 35.9	+16.9	54.9	57 09.9	+18.3	56.2	57 42.7	+19.9	57.5	58 14.3	+21.5	58.8	58 44.8	+23.0	60.3	59 13.9	+24.6	61.7	59 41.6	+26.3	63.2	60 07.9	+28.0	64.8	59
60	56 52.8	+15.3	53.2	57 28.2	+16.8	54.4	58 02.6	+18.3	55.7	58 35.8	+19.9	57.1	59 07.8	+21.5	58.5	59 38.5	+23.2	59.9	60 07.9	+24.9	61.4	60 35.9	+26.5	63.0	60
61	57 08.1	+13.8	51.4	57 45.0	+15.4	52.6	58 20.9	+16.9	53.9	58 55.7	+18.4	55.2	59 29.3	+20.0	56.6	60 01.7	+21.6	58.1	60 32.8	+23.2	59.6	61 02.4	+25.0	61.1	61
62	57 21.9	+12.3	49.6	58 00.4	+13.7	50.8	58 37.8	+15.2	52.1	59 14.1	+16.8	53.4	59 49.3	+18.3	54.8	60 23.3	+20.0	56.2	60 56.0	+21.7	57.7	61 27.4	+23.4	59.2	62
63	57 34.2	+10.7	47.8	58 14.1	+12.1	49.0	58 53.0	+13.6	50.2	59 30.9	+15.1	51.5	60 07.6	+16.7	52.9	60 43.3	+18.3	54.3	61 17.7	+19.9	55.8	61 50.8	+21.6	57.3	63
64	57 44.9	+9.1	45.9	58 26.2	+10.5	47.1	59 06.6	+11.9	48.3	59 46.0	+13.4	49.6	60 24.3	+15.0	50.9	61 01.6	+16.6	52.3	61 37.6	+18.3	53.8	62 12.4	+20.0	55.3	64
65	57 54.0	+7.4	44.1	58 36.7	+8.7	45.2	59 18.5	+10.2	46.4	59 59.4	+11.7	47.6	60 39.3	+13.2	49.0	61 18.2	+14.7	50.3	61 55.9	+16.4	51.8	62 32.4	+18.1	53.3	65
66	58 01.4	+5.8	42.2	58 45.4	+7.1	43.3	59 28.7	+8.5	44.5	60 11.1	+9.9	45.7	60 52.5	+11.4	47.0	61 32.9	+13.0	48.3	62 12.3	+14.6	49.7	62 50.5	+16.2	51.2	66
67	58 07.2	+4.1	40.3	58 52.5	+5.4	41.4	59 37.2	+6.7	42.5	60 21.0	+8.1	43.7	61 03.9	+9.6	44.9	61 45.9	+11.1	46.2	62 26.9	+12.6	47.6	63 06.7	+14.4	49.1	67
68	58 11.3	+2.4	38.4	58 57.9	+3.7	39.5	59 43.9	+5.0	40.5	60 29.1	+6.3	41.7	61 13.5	+7.7	42.9	61 57.0	+9.2	44.2	62 39.5	+10.8	45.5	63 21.1	+12.3•	46.9	68
69	58 13.7	+0.7	36.5	59 01.6	+1.9	37.5	59 48.8	+3.2	38.6	60 35.4	+4.4	39.7	61 21.2	+5.8	40.8	62 06.2	+7.2	42.1	62 50.3	+8.7•	43.4	63 33.4	+10.3•	44.7	69
70	58 14.4	−1.0	34.6	59 03.5	+0.2	35.6	59 52.0	+1.3	36.6	60 39.8	+2.6	37.6	61 27.0	+3.9	38.7	62 13.4	+5.3	39.9	62 59.0	+6.7•	41.2	63 43.7	+8.2•	42.5	70
71	58 13.4	−2.6	32.7	59 03.7	−1.6	33.6	59 53.3	−0.4	34.6	60 42.4	+0.8	35.6	61 30.9	+2.0	36.7	62 18.7	+3.3•	37.8	63 05.7	+4.7•	39.0	63 51.9	+6.2•	40.3	71
72	58 10.8	−4.3	30.8	59 02.1	−3.3	31.7	59 52.9	−2.3	32.6	60 43.2	−1.2	33.5	61 32.9	0.0	34.6	62 22.0	+1.3•	35.6	63 10.4	+2.6•	36.8	63 58.1	+4.0•	38.0	72
73	58 06.5	−6.0	28.9	58 58.8	−5.1	29.7	59 50.6	−4.0	30.6	60 42.0	−3.0	31.5	61 32.9	−1.8	32.5	62 23.3	−0.7•	33.5	63 13.0	+0.5•	34.6	64 02.1	+1.8•	35.7	73
74	58 00.5	−7.7	27.1	58 53.7	−6.8	27.8	59 46.6	−5.9	28.6	60 39.0	−4.8	29.5	61 31.1	−3.9	30.4	62 22.6	−2.7•	31.3	63 13.5	−1.5•	32.4	64 03.9	−0.3•	33.5	74
75	57 52.8	−9.3	25.2	58 46.9	−8.4	25.9	59 40.7	−7.6	26.6	60 34.2	−6.7	27.4	61 27.2	−5.7	28.3	62 19.9	−4.7•	29.2	63 12.0	−3.6•	30.1	64 03.6	−2.4•	31.2	75
76	57 43.5	−10.9	23.3	58 38.5	−10.2	24.0	59 33.1	−9.3	24.7	60 27.5	−8.5	25.4	61 21.5	−7.6	26.2	62 15.2	−6.7	27.0	63 08.4	−5.7•	27.9	64 01.2	−4.6•	28.9	76
77	57 32.6	−12.5	21.5	58 28.3	−11.8	22.1	59 23.8	−11.1	22.7	60 19.0	−10.3	23.4	61 13.9	−9.5	24.1	62 08.5	−8.6	24.9	63 02.7	−7.7•	25.7	63 56.6	−6.7•	26.6	77
78	57 20.1	−14.0	19.7	58 16.5	−13.4	20.2	59 12.7	−12.7	20.8	60 08.7	−12.1	21.4	61 04.4	−11.3	22.1	61 59.9	−10.6	22.8	62 55.0	−9.8	23.6	63 49.9	−8.8•	24.4	78
79	57 06.1	−15.6	17.9	58 03.1	−15.0	18.4	59 00.0	−14.5	18.9	59 56.6	−13.8	19.5	60 53.1	−13.1	20.1	61 49.3	−12.4	20.7	62 45.3	−11.6	21.4	63 41.1	−10.9•	22.1	79
80	56 50.5	−17.0	16.1	57 48.1	−16.5	16.6	58 45.5	−16.0	17.0	59 42.8	−15.4	17.5	60 40.0	−14.9	18.1	61 36.9	−14.2	18.6	62 33.7	−13.6	19.2	63 30.2	−12.9	19.9	80
81	56 33.5	−18.5	14.4	57 31.6	−18.1	14.8	58 29.5	−17.6	15.2	59 27.4	−17.1	15.6	60 25.1	−16.6	16.1	61 22.7	−16.1	16.6	62 20.1	−15.5	17.1	63 17.3	−14.8	17.7	81
82	56 15.0	−19.9	12.7	57 13.5	−19.5	13.0	58 11.9	−19.1	13.4	59 10.3	−18.8	13.7	60 08.5	−18.3	14.2	61 06.6	−17.8	14.6	62 04.6	−17.3	15.1	63 02.5	−16.8	15.6	82
83	55 55.1	−21.3	11.0	56 54.0	−21.0	11.3	57 52.8	−20.6	11.6	58 51.5	−20.2	11.9	59 50.2	−19.9	12.2	60 48.8	−19.5	12.6	61 47.3	−19.1	13.0	62 45.7	−18.6	13.5	83
84	55 33.8	−22.5	9.3	56 33.0	−22.3	9.5	57 32.2	−22.0	9.8	58 31.3	−21.8	10.1	59 30.3	−21.4	10.4	60 29.3	−21.1	10.7	61 28.2	−20.8	11.0	62 27.1	−20.4	11.4	84
85	55 11.3	−23.9	7.7	56 10.7	−23.7	7.9	57 10.1	−23.4	8.1	58 09.5	−23.2	8.3	59 08.9	−23.0	8.5	60 08.2	−22.7	8.8	61 07.4	−22.4	9.1	62 06.7	−22.2	9.4	85
86	54 47.4	−25.1	6.1	55 47.0	−24.9	6.2	56 46.7	−24.8	6.4	57 46.3	−24.6	6.6	58 45.9	−24.4	6.8	59 45.5	−24.3	7.0	60 45.0	−24.0	7.2	61 44.5	−23.8	7.4	86
87	54 22.3	−26.3	4.5	55 22.1	−26.2	4.6	56 21.9	−26.1	4.7	57 21.7	−26.0	4.9	58 21.5	−25.9	5.0	59 21.2	−25.7	5.2	60 21.0	−25.6	5.3	61 20.7	−25.4	5.5	87
88	53 56.0	−27.5	3.0	54 55.9	−27.4	3.0	55 55.8	−27.3	3.1	56 55.7	−27.2	3.2	57 55.6	−27.1	3.3	58 55.5	−27.1	3.4	59 55.4	−27.0	3.5	60 55.3	−26.9	3.6	88
89	53 28.5	−28.5	1.5	54 28.5	−28.5	1.5	55 28.5	−28.5	1.5	56 28.5	−28.5	1.6	57 28.5	−28.5	1.6	58 28.4	−28.4	1.7	59 28.4	−28.4	1.7	60 28.4	−28.4	1.8	89
90	53 00.0	−29.6	0.0	54 00.0	−29.6	0.0	55 00.0	−29.7	0.0	56 00.0	−29.7	0.0	57 00.0	−29.7	0.0	58 00.0	−29.7	0.0	59 00.0	−29.7	0.0	60 00.0	−29.8	0.0	90

| 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 61°, 299°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	16 57.8	−50.1	113.9	16 33.4	−50.7	114.2	16 08.7	−51.2	114.4	15 43.8	−51.7	114.7	15 18.6	−52.2	114.9	14 53.2	−52.7	115.2	14 27.6	−53.2	115.4	14 01.7	−53.6	115.6	0
1	16 07.7	−50.3	114.5	15 42.7	−50.8	114.7	15 17.5	−51.3	115.0	14 52.1	−51.8	115.2	14 26.4	−52.3	115.4	14 00.5	−52.7	115.7	13 34.4	−53.2	115.9	13 08.1	−53.6	116.1	1
2	15 17.4	−50.3	115.0	14 51.9	−50.8	115.3	14 26.2	−51.3	115.5	14 00.3	−51.9	115.7	13 34.1	−52.3	115.9	13 07.8	−52.8	116.2	12 41.2	−53.2	116.4	12 14.5	−53.7	116.6	2
3	14 27.1	−50.4	115.6	14 01.1	−50.9	115.8	13 34.9	−51.5	116.0	13 08.4	−51.9	116.2	12 41.8	−52.4	116.5	12 15.0	−52.9	116.6	11 48.0	−53.3	116.8	11 20.8	−53.7	117.0	3
4	13 36.7	−50.5	116.1	13 10.2	−51.0	116.4	12 43.4	−51.4	116.6	12 16.5	−51.9	116.8	11 49.4	−52.4	117.0	11 22.1	−52.9	117.1	10 54.7	−53.3	117.3	10 27.1	−53.8	117.5	4
5	12 46.2	−50.5	116.7	12 19.2	−51.1	116.9	11 52.0	−51.6	117.1	11 24.6	−52.1	117.3	10 57.0	−52.5	117.4	10 29.2	−52.9	117.6	10 01.4	−53.4	117.8	9 33.3	−53.8	117.9	5
6	11 55.7	−50.6	117.2	11 28.1	−51.1	117.4	11 00.4	−51.6	117.6	10 32.5	−52.0	117.8	10 04.5	−52.5	117.9	9 36.3	−53.0	118.1	9 08.0	−53.4	118.2	8 39.5	−53.8	118.4	6
7	11 05.1	−50.7	117.8	10 37.0	−51.1	118.0	10 08.8	−51.6	118.1	9 40.5	−52.2	118.3	9 12.0	−52.6	118.4	8 43.3	−53.0	118.6	8 14.6	−53.5	118.7	7 45.7	−53.8	118.9	7
8	10 14.4	−50.7	118.3	9 45.9	−51.2	118.5	9 17.2	−51.7	118.6	8 48.3	−52.1	118.8	8 19.4	−52.6	118.9	7 50.3	−53.0	119.0	7 21.1	−53.4	119.2	6 51.9	−53.9	119.3	8
9	9 23.7	−50.8	118.9	8 54.7	−51.3	119.0	8 25.5	−51.8	119.2	7 56.2	−52.2	119.3	7 26.8	−52.7	119.4	6 57.3	−53.1	119.5	6 27.7	−53.5	119.6	5 58.0	−53.9	119.7	9
10	8 32.9	−50.8	119.4	8 03.4	−51.3	119.6	7 33.7	−51.7	119.7	7 04.0	−52.2	119.8	6 34.1	−52.6	119.9	6 04.2	−53.1	120.0	5 34.2	−53.5	120.1	5 04.1	−53.9	120.2	10
11	7 42.1	−50.8	120.0	7 12.1	−51.3	120.1	6 42.0	−51.8	120.2	6 11.8	−52.3	120.3	5 41.5	−52.7	120.4	5 11.1	−53.1	120.4	4 40.7	−53.6	120.5	4 10.2	−54.0	120.6	11
12	6 51.3	−50.9	120.5	6 20.8	−51.4	120.6	5 50.2	−51.8	120.7	5 19.5	−52.3	120.8	4 48.8	−52.7	120.8	4 18.0	−53.1	120.9	3 47.1	−53.5	121.0	3 16.2	−53.9	121.0	12
13	6 00.4	−51.0	121.0	5 29.4	−51.4	121.1	4 58.4	−51.9	121.2	4 27.2	−52.2	121.3	3 56.1	−52.7	121.3	3 24.9	−53.2	121.4	2 53.6	−53.6	121.4	2 22.3	−54.0	121.5	13
14	5 09.4	−50.9	121.6	4 38.0	−51.4	121.6	4 06.5	−51.9	121.7	3 35.0	−52.4	121.8	3 03.4	−52.8	121.8	2 31.7	−53.1	121.8	2 00.0	−53.5	121.9	1 28.3	−53.9	121.9	14
15	4 18.5	−51.0	122.1	3 46.6	−51.4	122.2	3 14.6	−51.8	122.2	2 42.6	−52.3	122.2	2 10.6	−52.7	122.3	1 38.6	−53.2	122.3	1 06.5	−53.6	122.3	0 34.4	−54.0	122.3	15
16	3 27.5	−51.0	122.6	2 55.2	−51.5	122.7	2 22.8	−51.9	122.7	1 50.3	−52.3	122.7	1 17.9	−52.8	122.8	0 45.4	−53.2	122.8	0 12.9	−53.6	122.8	0 19.6	+53.9	57.2	16
17	2 36.5	−51.0	123.1	2 03.7	−51.4	123.2	1 30.9	−51.9	123.2	0 58.0	−52.3	123.2	0 25.1	−52.7	123.2	0 07.8	+53.1	56.8	0 40.7	+53.5	56.8	1 13.5	+54.0	56.8	17
18	1 45.5	−51.0	123.7	1 12.3	−51.5	123.7	0 39.0	−51.9	123.7	0 05.7	−52.4	123.7	0 27.6	+52.8	56.3	1 00.9	+53.2	56.3	1 34.2	+53.6	56.3	2 07.5	+53.9	56.3	18
19	0 54.5	−51.0	124.2	0 20.8	−51.5	124.2	0 12.9	+51.9	55.8	0 46.7	+52.3	55.8	1 20.4	+52.7	55.8	1 54.1	+53.2	55.8	2 27.8	+53.5	55.8	3 01.4	+54.0	55.8	19
20	0 03.5	−51.0	124.7	0 30.7	+51.4	55.3	1 04.8	+51.9	55.3	1 39.0	+52.3	55.3	2 13.1	+52.8	55.3	2 47.3	+53.1	55.4	3 21.3	+53.6	55.4	3 55.4	+54.0	55.5	20
21	0 47.5	+51.0	54.7	1 22.1	+51.5	54.8	1 56.7	+51.9	54.8	2 31.3	+52.3	54.8	3 05.9	+52.7	54.9	3 40.4	+53.1	54.9	4 14.9	+53.5	55.0	4 49.3	+53.9	55.0	21
22	1 38.5	+51.0	54.2	2 13.6	+51.4	54.2	2 48.6	+51.9	54.3	3 23.6	+52.3	54.3	3 58.6	+52.7	54.4	4 33.5	+53.1	54.4	5 08.4	+53.5	54.5	5 43.2	+53.9	54.6	22
23	2 29.5	+51.0	53.7	3 05.0	+51.4	53.7	3 40.5	+51.9	53.8	4 15.9	+52.3	53.8	4 51.3	+52.7	53.9	5 26.6	+53.1	54.0	6 01.9	+53.5	54.1	6 37.1	+53.8	54.1	23
24	3 20.5	+51.0	53.2	3 56.5	+51.4	53.2	4 32.4	+51.8	53.3	5 08.2	+52.3	53.3	5 44.0	+52.7	53.4	6 19.7	+53.1	53.5	6 55.4	+53.4	53.6	7 30.9	+53.9	53.7	24
25	4 11.5	+50.9	52.6	4 47.9	+51.4	52.8	5 24.2	+51.8	52.8	6 00.5	+52.2	52.8	6 36.7	+52.6	52.9	7 12.8	+53.0	53.0	7 48.8	+53.4	53.1	8 24.8	+53.8	53.3	25
26	5 02.4	+51.0	52.1	5 39.3	+51.3	52.2	6 16.0	+51.8	52.3	6 52.7	+52.2	52.4	7 29.3	+52.6	52.5	8 05.8	+53.0	52.6	8 42.2	+53.4	52.7	9 18.6	+53.7	52.8	26
27	5 53.4	+50.9	51.6	6 30.6	+51.3	51.7	7 07.8	+51.7	51.8	7 44.9	+52.2	51.9	8 21.9	+52.6	52.0	8 58.8	+53.0	52.1	9 35.6	+53.4	52.2	10 12.3	+53.8	52.4	27
28	6 44.3	+50.8	51.0	7 21.9	+51.3	51.2	7 59.5	+51.8	51.2	8 37.1	+52.1	51.4	9 14.5	+52.5	51.5	9 51.8	+52.9	51.6	10 29.0	+53.3	51.8	11 06.1	+53.7	51.9	28
29	7 35.1	+50.8	50.5	8 13.2	+51.3	50.6	8 51.3	+51.6	50.7	9 29.2	+52.1	50.9	10 07.0	+52.5	51.0	10 44.7	+52.9	51.1	11 22.3	+53.3	51.3	11 59.8	+53.6	51.4	29
30	8 25.9	+50.8	50.0	9 04.5	+51.2	50.1	9 42.9	+51.7	50.2	10 21.3	+52.0	50.4	10 59.5	+52.4	50.5	11 37.6	+52.8	50.7	12 15.6	+53.2	50.8	12 53.4	+53.6	51.0	30
31	9 16.7	+50.7	49.4	9 55.7	+51.1	49.7	10 34.6	+51.5	49.7	11 13.3	+52.0	49.8	11 51.9	+52.4	50.0	12 30.4	+52.8	50.2	13 08.8	+53.2	50.3	13 47.0	+53.6	50.5	31
32	10 07.4	+50.7	48.9	10 46.8	+51.1	49.0	11 26.1	+51.5	49.3	12 05.3	+51.9	49.3	12 44.3	+52.3	49.5	13 23.2	+52.7	49.7	14 02.0	+53.1	49.9	14 40.6	+53.5	50.1	32
33	10 58.1	+50.6	48.3	11 37.9	+51.1	48.5	12 17.6	+51.5	48.7	12 57.2	+51.9	48.8	13 36.6	+52.3	49.0	14 15.9	+52.7	49.2	14 55.1	+53.0	49.4	15 34.1	+53.4	49.6	33
34	11 48.7	+50.6	47.8	12 29.0	+51.0	48.0	13 09.1	+51.4	48.1	13 49.1	+51.8	48.3	14 28.9	+52.2	48.5	15 08.6	+52.6	48.7	15 48.1	+53.0	48.9	16 27.5	+53.3	49.1	34
35	12 39.3	+50.5	47.2	13 20.0	+50.9	47.4	14 00.5	+51.3	47.6	14 40.9	+51.7	47.8	15 21.1	+52.2	48.0	16 01.2	+52.5	48.2	16 41.1	+52.9	48.4	17 20.8	+53.3	48.6	35
36	13 29.8	+50.4	46.7	14 10.9	+50.8	46.9	14 51.8	+51.3	47.1	15 32.6	+51.7	47.3	16 13.3	+52.0	47.5	16 53.7	+52.5	47.7	17 34.0	+52.9	47.9	18 14.1	+53.3	48.2	36
37	14 20.2	+50.3	46.1	15 01.7	+50.8	46.3	15 43.1	+51.1	46.5	16 24.3	+51.5	46.7	17 05.3	+52.0	47.0	17 46.2	+52.4	47.2	18 26.9	+52.7	47.4	19 07.4	+53.1	47.7	37
38	15 10.5	+50.3	45.6	15 52.5	+50.6	45.8	16 34.2	+51.1	46.0	17 15.8	+51.5	46.2	17 57.3	+51.9	46.4	18 38.6	+52.3	46.7	19 19.6	+52.7	46.9	20 00.5	+53.1	47.2	38
39	16 00.8	+50.1	45.0	16 43.1	+50.6	45.2	17 25.3	+51.0	45.4	18 07.3	+51.4	45.7	18 49.2	+51.8	45.9	19 30.8	+52.2	46.1	20 12.3	+52.6	46.4	20 53.6	+53.0	46.7	39
40	16 50.9	+50.1	44.4	17 33.7	+50.5	44.6	18 16.3	+50.9	44.9	18 58.7	+51.3	45.1	19 41.0	+51.7	45.4	20 23.0	+52.1	45.6	21 04.9	+52.5	45.9	21 46.6	+52.8	46.2	40
41	17 41.0	+50.0	43.9	18 24.2	+50.4	44.1	19 07.2	+50.8	44.3	19 50.0	+51.2	44.6	20 32.7	+51.6	44.8	21 15.1	+52.0	45.1	21 57.4	+52.4	45.4	22 39.4	+52.8	45.7	41
42	18 31.0	+49.8	43.3	19 14.6	+50.2	43.5	19 58.0	+50.7	43.8	20 41.2	+51.1	44.0	21 24.3	+51.5	44.3	22 07.1	+51.9	44.6	22 49.8	+52.3	44.8	23 32.2	+52.7	45.1	42
43	19 20.8	+49.7	42.7	20 04.8	+50.2	42.9	20 48.7	+50.5	43.2	21 32.3	+51.0	43.4	22 15.8	+51.4	43.7	22 59.0	+51.8	44.0	23 42.1	+52.2	44.3	24 24.9	+52.6	44.6	43
44	20 10.5	+49.7	42.1	20 55.0	+50.0	42.3	21 39.2	+50.5	42.6	22 23.3	+50.9	42.9	23 07.2	+51.2	43.2	23 50.8	+51.7	43.5	24 34.3	+52.0	43.8	25 17.5	+52.4	44.1	44
45	21 00.2	+49.4	41.5	21 45.0	+49.9	41.7	22 29.7	+50.3	42.0	23 14.2	+50.7	42.3	23 58.4	+51.2	42.6	24 42.5	+51.5	42.9	25 26.3	+52.0	43.2	26 09.9	+52.4	43.6	45
46	21 49.6	+49.4	40.9	22 34.9	+49.8	41.1	23 20.0	+50.2	41.4	24 04.9	+50.6	41.7	24 49.6	+51.0	42.0	25 34.0	+51.4	42.3	26 18.3	+51.8	42.7	27 02.3	+52.2	43.0	46
47	22 39.0	+49.2	40.3	23 24.7	+49.6	40.5	24 10.2	+50.0	40.8	24 55.5	+50.4	41.1	25 40.6	+50.8	41.4	26 25.4	+51.3	41.8	27 10.1	+51.6	42.1	27 54.5	+52.0	42.5	47
48	23 28.2	+49.1	39.6	24 14.3	+49.5	39.9	25 00.2	+49.9	40.2	25 45.9	+50.3	40.5	26 31.4	+50.8	40.8	27 16.7	+51.1	41.2	28 01.7	+51.6	41.5	28 46.5	+52.0	41.9	48
49	24 17.3	+48.9	39.0	25 03.8	+49.3	39.3	25 50.1	+49.8	39.6	26 36.2	+50.2	39.9	27 22.2	+50.5	40.3	28 07.8	+51.0	40.6	28 53.3	+51.3	40.9	29 38.5	+51.7	41.3	49
50	25 06.2	+48.7	38.4	25 53.1	+49.2	38.7	26 39.9	+49.5	39.0	27 26.4	+50.0	39.3	28 12.7	+50.4	39.6	28 58.8	+50.8	40.0	29 44.6	+51.3	40.4	30 30.2	+51.7	40.7	50
51	25 54.9	+48.6	37.7	26 42.3	+49.0	38.0	27 29.4	+49.4	38.4	28 16.4	+49.8	38.7	29 03.1	+50.2	39.0	29 49.6	+50.6	39.4	30 35.9	+51.0	39.8	31 21.9	+51.4	40.1	51
52	26 43.5	+48.4	37.1	27 31.3	+48.8	37.4	28 18.8	+49.2	37.7	29 06.2	+49.6	38.0	29 53.3	+50.1	38.4	30 40.2	+50.5	38.8	31 26.9	+50.9	39.1	32 13.3	+51.3	39.5	52
53	27 31.9	+48.2	36.4	28 20.1	+48.6	36.7	29 08.0	+49.1	37.1	29 55.8	+49.5	37.4	30 43.4	+49.8	37.8	31 30.7	+50.2	38.1	32 17.8	+50.6	38.5	33 04.6	+51.1	38.9	53
54	28 20.1	+47.9	35.7	29 08.7	+48.4	36.1	29 57.1	+48.8	36.4	30 45.3	+49.2	36.7	31 33.2	+49.7	37.1	32 20.9	+50.1	37.5	33 08.4	+50.5	37.9	33 55.7	+50.9	38.3	54
55	29 08.0	+47.8	35.1	29 57.1	+48.2	35.4	30 45.9	+48.6	35.7	31 34.5	+49.0	36.1	32 22.9	+49.4	36.4	33 11.0	+49.9	36.8	33 58.9	+50.3	37.2	34 46.6	+50.6	37.6	55
56	29 55.8	+47.6	34.4	30 45.3	+47.9	34.7	31 34.5	+48.4	35.0	32 23.5	+48.8	35.4	33 12.3	+49.2	35.8	34 00.9	+49.6	36.2	34 49.2	+50.0	36.6	35 37.2	+50.5	37.0	56
57	30 43.4	+47.3	33.7	31 33.2	+47.7	34.0	32 22.9	+48.1	34.3	33 12.3	+48.6	34.7	34 01.5	+49.0	35.1	34 50.5	+49.4	35.5	35 39.2	+49.9	35.9	36 27.7	+50.2	36.3	57
58	31 30.7	+47.1	32.9	32 20.9	+47.5	33.3	33 11.0	+47.9	33.6	34 00.9	+48.3	34.0	34 50.5	+48.7	34.4	35 39.9	+49.2	34.8	36 29.1	+49.5	35.2	37 17.9	+50.0	35.6	58
59	32 17.8	+46.8	32.2	33 08.4	+47.3	32.5	33 58.9	+47.7	32.9	34 49.2	+48.1	33.3	35 39.2	+48.5	33.7	36 29.1	+48.8	34.1	37 18.6	+49.4	34.5	38 07.9	+49.8	34.9	59
60	33 04.6	+46.5	31.5	33 55.7	+46.9	31.8	34 46.6	+47.3	32.2	35 37.2	+47.8	32.5	36 27.7	+48.2	32.9	37 17.9	+48.7	33.3	38 07.9	+49.1	33.8	38 57.7	+49.5	34.2	60
61	33 51.1	+46.3	30.7	34 42.6	+46.7	31.1	35 33.9	+47.1	31.4	36 25.0	+47.5	31.8	37 15.9	+47.9	32.2	38 06.6	+48.3	32.6	38 57.0	+48.8	33.0	39 47.2	+49.2	33.5	61
62	34 37.4	+46.0	29.9	35 29.3	+46.4	30.3	36 21.0	+46.8	30.7	37 12.5	+47.2	31.0	38 03.8	+47.7	31.4	38 54.9	+48.1	31.8	39 45.8	+48.4	32.3	40 36.4	+48.9	32.7	62
63	35 23.4	+45.6	29.1	36 15.7	+46.0	29.5	37 07.8	+46.5	29.9	37 59.7	+46.9	30.3	38 51.5	+47.3	30.7	39 43.0	+47.7	31.1	40 34.2	+48.2	31.5	41 25.3	+48.5	32.0	63
64	36 09.0	+45.4	28.3	37 01.7	+45.8	28.7	37 54.3	+46.1	29.1	38 46.6	+46.6	29.5	39 38.8	+46.9	29.9	40 30.7	+47.4	30.3	41 22.4	+47.8	30.7	42 13.8	+48.3	31.2	64
65	36 54.4	+45.0	27.5	37 47.5	+45.4	27.9	38 40.4	+45.8	28.3	39 33.2	+46.2	28.6	40 25.7	+46.7	29.1	41 18.1	+47.0	29.5	42 10.2	+47.5	29.9	43 02.1	+47.9	30.4	65
66	37 39.4	+44.6	26.7	38 32.9	+45.0	27.1	39 26.2	+45.5	27.4	40 19.4	+45.8	27.8	41 12.4	+46.2	28.2	42 05.1	+46.7	28.6	42 57.7	+47.1	29.1	43 50.0	+47.5	29.5	66
67	38 24.0	+44.3	25.9	39 17.9	+44.7	26.2	40 11.7	+45.0	26.6	41 05.2	+45.5	27.0	41 58.6	+45.9	27.4	42 51.8	+46.3	27.8	43 44.8	+46.7	28.2	44 37.5	+47.1	28.7	67
68	39 08.3	+43.8	25.0	40 02.6	+44.2	25.4	40 56.7	+44.7	25.7	41 50.7	+45.0	26.1	42 44.5	+45.5	26.5	43 38.1	+45.8	26.9	44 31.5	+46.3	27.3	45 24.6	+46.8	27.8	68
69	39 52.1	+43.5	24.1	40 46.8	+43.9	24.5	41 41.4	+44.2	24.8	42 35.7	+44.7	25.2	43 30.0	+45.1	25.6	44 23.9	+45.5	26.0	45 17.8	+45.8	26.5	46 11.4	+46.3	26.9	69
70	40 35.6	+43.0	23.2	41 30.7	+43.4	23.5	42 25.6	+43.8	23.9	43 20.4	+44.1	24.3	44 15.1	+44.5	24.7	45 09.4	+45.0	25.1	46 03.6	+45.4	25.5	46 57.7	+45.8	26.0	70
71	41 18.6	+42.6	22.3	42 14.1	+42.9	22.6	43 09.4	+43.3	23.0	44 04.5	+43.7	23.4	44 59.6	+44.1	23.7	45 54.4	+44.5	24.2	46 49.0	+45.0	24.6	47 43.5	+45.3	25.0	71
72	42 01.2	+42.1	21.3	42 57.0	+42.5	21.7	43 52.7	+42.8	22.0	44 48.2	+43.3	22.4	45 43.7	+43.6	22.8	46 38.9	+44.0	23.2	47 34.0	+44.4	23.6	48 28.8	+44.9	24.1	72
73	42 43.3	+41.6	20.4	43 39.5	+41.9	20.7	44 35.5	+42.4	21.0	45 31.5	+42.7	21.4	46 27.3	+43.0	21.8	47 22.9	+43.5	22.2	48 18.4	+43.8	22.6	49 13.7	+44.3	23.1	73
74	43 24.9	+41.1	19.4	44 21.4	+41.5	19.7	45 17.9	+41.7	20.0	46 14.2	+42.1	20.4	47 10.3	+42.6	20.8	48 06.4	+42.9	21.2	49 02.2	+43.3	21.6	49 58.0	+43.7	22.0	74
75	44 06.0	+40.5	18.4	45 02.9	+40.8	18.7	45 59.6	+41.3	19.0	46 56.3	+41.6	19.4	47 52.9	+41.9	19.7	48 49.3	+42.3	20.1	49 45.5	+42.7	20.5	50 41.7	+43.1	20.9	75
76	44 46.5	+40.0	17.3	45 43.7	+40.3	17.6	46 40.9	+40.6	18.0	47 37.9	+41.0	18.3	48 34.8	+41.3	18.7	49 31.6	+41.7	19.0	50 28.2	+42.1	19.4	51 24.8	+42.4	19.8	76
77	45 26.5	+39.4	16.3	46 24.0	+39.7	16.6	47 21.5	+40.0	16.9	48 18.9	+40.3	17.2	49 16.1	+40.7	17.5	50 13.3	+41.0	17.9	51 10.3	+41.4	18.3	52 07.2	+41.8	18.7	77
78	46 05.9	+38.7	15.2	47 03.7	+39.1	15.5	48 01.5	+39.3	15.8	48 59.2	+39.7	16.1	49 56.8	+40.0	16.5	50 54.3	+40.3	16.9	51 51.7	+40.7	17.1	52 49.0	+41.0	17.5	78
79	46 44.6	+38.1	14.1	47 42.8	+38.3	14.4	48 40.8	+38.7	14.6	49 38.9	+38.9	14.9	50 36.8	+39.3	15.2	51 34.6	+39.6	15.6	52 32.4	+39.9	15.9	53 30.0	+40.3	16.3	79
80	47 22.7	+37.4	13.0	48 21.1	+37.7	13.2	49 19.5	+37.9	13.5	50 17.8	+38.2	13.8	51 16.1	+38.5	14.0	52 14.2	+38.9	14.4	53 12.3	+39.2	14.7	54 10.3	+39.5	15.0	80
81	48 00.1	+36.7	11.8	48 58.8	+36.9	12.0	49 57.4	+37.2	12.3	50 56.0	+37.4	12.5	51 54.6	+37.7	12.8	52 53.1	+38.0	13.1	53 51.5	+38.3	13.4	54 49.8	+38.6	13.6	81
82	48 36.8	+35.9	10.6	49 35.7	+36.2	10.8	50 34.6	+36.4	11.1	51 33.5	+36.6	11.3	52 32.3	+36.9	11.5	53 31.1	+37.1	11.8	54 29.8	+37.4	12.1	55 28.4	+37.7	12.4	82
83	49 12.7	+35.1	9.4	50 11.9	+35.3	9.6	51 11.0	+35.6	9.8	52 10.1	+35.8	10.0	53 09.2	+36.0	10.2	54 08.2	+36.2	10.5	55 07.2	+36.5	10.7	56 06.1	+36.7	11.0	83
84	49 47.8	+34.3	8.3	50 47.2	+34.5	8.3	51 46.6	+34.6	8.5	52 45.9	+34.9	8.7	53 45.2	+35.1	8.9	54 44.4	+35.3	9.1	55 43.7	+35.5	9.3	56 42.8	+35.8	9.6	84
85	50 22.1	+33.5	6.9	51 21.7	+33.6	7.0	52 21.2	+33.8	7.2	53 20.8	+33.9	7.3	54 20.3	+34.1	7.5	55 19.7	+34.3	7.7	56 19.2	+34.4	7.9	57 18.6	+34.7	8.1	85
86	50 55.6	+32.5	5.6	51 55.3	+32.7	5.7	52 55.0	+32.8	5.8	53 54.7	+32.9	5.9	54 54.4	+33.0	6.1	55 54.0	+33.2	6.2	56 53.6	+33.4	6.4	57 53.3	+33.5	6.6	86
87	51 28.1	+31.7	4.2	52 28.0	+31.7	4.3	53 27.8	+31.8	4.4	54 27.6	+31.9	4.5	55 27.4	+32.0	4.6	56 27.2	+32.1	4.8	57 27.0	+32.2	4.9	58 26.8	+32.3	5.0	87
88	51 59.8	+30.6	2.8	52 59.7	+30.7	2.9	53 59.6	+30.7	3.0	54 59.5	+30.8	3.0	55 59.4	+30.9	3.1	56 59.3	+31.0	3.2	57 59.2	+31.1	3.3	58 59.1	+31.1	3.4	88
89	52 30.4	+29.6	1.4	53 30.4	+29.6	1.5	54 30.3	+29.7	1.5	55 30.3	+29.7	1.5	56 30.3	+29.7	1.6	57 30.3	+29.7	1.6	58 30.3	+29.7	1.6	59 30.2	+29.8	1.7	89
90	53 00.0	+28.5	0.0	54 00.0	+28.5	0.0	55 00.0	+28.5	0.0	56 00.0	+28.5	0.0	57 00.0	+28.5	0.0	58 00.0	+28.4	0.0	59 00.0	+28.4	0.0	60 00.0	+28.4	0.0	90

| | **53°** | | | **54°** | | | **55°** | | | **56°** | | | **57°** | | | **58°** | | | **59°** | | | **60°** | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 119°, 241°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	16 24.7	+49.9	113.0	16 01.1	+50.5	113.3	15 37.3	+51.0	113.5	15 13.2	+51.5	113.8	14 48.9	+52.0	114.0	14 24.3	+52.5	114.3	13 59.6	+52.9	114.5	13 34.6	+53.4	114.7	0
1	17 14.6	+49.8	112.4	16 51.6	+50.3	112.7	16 28.3	+50.9	113.0	16 04.7	+51.4	113.3	15 40.9	+51.9	113.5	15 16.8	+52.5	113.8	14 52.5	+52.9	114.0	14 28.0	+53.4	114.3	1
2	18 04.4	+49.7	111.8	17 41.9	+50.3	112.1	17 19.2	+50.8	112.4	16 56.1	+51.4	112.7	16 32.8	+51.9	113.0	16 09.3	+52.3	113.3	15 45.4	+52.9	113.5	15 21.4	+53.3	113.8	2
3	18 54.1	+49.6	111.3	18 32.2	+50.2	111.6	18 10.0	+50.7	111.9	17 47.5	+51.2	112.2	17 24.7	+51.8	112.5	17 01.6	+52.3	112.8	16 38.3	+52.8	113.0	16 14.7	+53.2	113.3	3
4	19 43.7	+49.5	110.7	19 22.4	+50.0	111.0	19 00.7	+50.6	111.3	18 38.7	+51.2	111.6	18 16.5	+51.7	111.9	17 53.9	+52.2	112.2	17 31.1	+52.7	112.5	17 07.9	+53.2	112.8	4
5	20 33.2	+49.3	110.1	20 12.4	+49.9	110.4	19 51.3	+50.5	110.7	19 29.9	+51.1	111.1	19 08.2	+51.6	111.4	18 46.1	+52.1	111.7	18 23.8	+52.6	112.0	18 01.1	+53.1	112.3	5
6	21 22.5	+49.2	109.4	21 02.3	+49.8	109.8	20 41.8	+50.4	110.2	20 21.0	+50.9	110.5	19 59.8	+51.5	110.9	19 38.2	+52.1	111.2	19 16.4	+52.5	111.5	18 54.2	+53.0	111.8	6
7	22 11.7	+49.1	108.8	21 52.1	+49.7	109.2	21 32.2	+50.3	109.6	21 11.9	+50.9	110.0	20 51.3	+51.4	110.3	20 30.3	+51.9	110.7	20 08.9	+52.5	111.0	19 47.2	+53.0	111.3	7
8	23 00.8	+48.9	108.2	22 41.8	+49.6	108.6	22 22.5	+50.1	109.0	22 02.8	+50.7	109.4	21 42.7	+51.2	109.8	21 22.2	+51.8	110.1	21 01.4	+52.3	110.5	20 40.2	+52.8	110.9	8
9	23 49.7	+48.7	107.6	23 31.4	+49.3	108.0	23 12.6	+50.0	108.4	22 53.5	+50.6	108.8	22 33.9	+51.2	109.2	22 14.0	+51.7	109.6	21 53.7	+52.3	110.0	21 33.0	+52.8	110.3	9
10	24 38.4	+48.6	106.9	24 20.7	+49.3	107.4	24 02.6	+49.7	107.8	23 44.1	+50.4	108.2	23 25.1	+51.0	108.6	23 05.7	+51.6	109.0	22 46.0	+52.1	109.4	22 25.8	+52.7	109.8	10
11	25 27.0	+48.5	106.3	25 10.0	+49.0	106.7	24 52.5	+49.7	107.2	24 34.5	+50.3	107.6	24 16.1	+50.9	108.1	23 57.3	+51.5	108.5	23 38.1	+52.0	108.9	23 18.5	+52.5	109.3	11
12	26 15.5	+48.2	105.6	25 59.0	+49.0	106.1	25 42.2	+49.5	106.6	25 24.8	+50.2	107.0	25 07.0	+50.8	107.5	24 48.8	+51.4	107.9	24 30.1	+51.9	108.4	24 11.0	+52.5	108.8	12
13	27 03.7	+48.0	105.0	26 48.0	+48.7	105.5	26 31.7	+49.4	105.9	26 15.0	+50.0	106.4	25 57.8	+50.6	106.9	25 40.2	+51.2	107.3	25 22.0	+51.8	107.8	25 03.5	+52.3	108.2	13
14	27 51.7	+47.9	104.3	27 36.7	+48.5	104.8	27 21.1	+49.2	105.3	27 05.0	+49.9	105.8	26 48.4	+50.5	106.3	26 31.4	+51.0	106.8	26 13.8	+51.7	107.2	25 55.8	+52.2	107.7	14
15	28 39.6	+47.6	103.6	28 25.2	+48.4	104.1	28 10.3	+49.0	104.7	27 54.9	+49.6	105.2	27 38.9	+50.3	105.7	27 22.4	+51.0	106.2	27 05.5	+51.5	106.7	26 48.0	+52.1	107.2	15
16	29 27.2	+47.5	102.9	29 13.6	+48.1	103.5	28 59.3	+48.8	104.0	28 44.5	+49.5	104.5	28 29.2	+50.1	105.1	28 13.4	+50.7	105.6	27 57.0	+51.3	106.1	27 40.1	+51.9	106.6	16
17	30 14.7	+47.1	102.2	30 01.7	+47.9	102.8	29 48.1	+48.7	103.3	29 34.0	+49.3	103.9	29 19.3	+50.0	104.4	29 04.1	+50.6	105.0	28 48.3	+51.3	105.5	28 32.0	+51.8	106.0	17
18	31 01.8	+47.0	101.5	30 49.6	+47.7	102.1	30 36.8	+48.4	102.7	30 23.3	+49.1	103.2	30 09.3	+49.8	103.8	29 54.7	+50.4	104.4	29 39.6	+51.0	104.9	29 23.8	+51.7	105.5	18
19	31 48.8	+46.7	100.8	31 37.3	+47.4	101.4	31 25.2	+48.1	102.0	31 12.4	+48.9	102.6	30 59.1	+49.5	103.1	30 45.1	+50.3	103.7	30 30.6	+50.9	104.3	30 15.5	+51.5	104.9	19
20	32 35.5	+46.4	100.0	32 24.7	+47.2	100.6	32 13.3	+48.0	101.3	32 01.3	+48.7	101.9	31 48.6	+49.4	102.5	31 35.4	+50.0	103.1	31 21.5	+50.7	103.7	31 07.0	+51.3	104.3	20
21	33 21.9	+46.2	99.3	33 11.9	+47.0	99.9	33 01.3	+47.7	100.5	32 50.0	+48.4	101.2	32 38.0	+49.2	101.8	32 25.4	+49.8	102.4	32 12.2	+50.5	103.1	31 58.3	+51.1	103.7	21
22	34 08.1	+45.8	98.5	33 58.9	+46.6	99.2	33 49.0	+47.4	99.8	33 38.4	+48.2	100.5	33 27.2	+48.9	101.1	33 15.2	+49.7	101.8	33 02.7	+50.3	102.4	32 49.4	+51.0	103.0	22
23	34 53.9	+45.6	97.7	34 45.5	+46.4	98.4	34 36.4	+47.2	99.1	34 26.6	+47.9	99.8	34 16.1	+48.6	100.4	34 04.9	+49.4	101.1	33 53.0	+50.1	101.8	33 40.4	+50.8	102.4	23
24	35 39.5	+45.2	96.9	35 31.9	+46.0	97.6	35 23.6	+46.8	98.3	35 14.5	+47.7	99.0	35 04.7	+48.5	99.7	34 54.3	+49.1	100.4	34 43.1	+49.8	101.1	34 31.2	+50.5	101.8	24
25	36 24.7	+44.9	96.1	36 17.9	+45.8	96.8	36 10.4	+46.6	97.6	36 02.2	+47.3	98.3	35 53.2	+48.1	99.0	35 43.4	+48.9	99.7	35 32.9	+49.7	100.4	35 21.7	+50.4	101.1	25
26	37 09.6	+44.5	95.3	37 03.7	+45.4	96.0	36 57.0	+46.3	96.8	36 49.5	+47.1	97.5	36 41.3	+47.9	98.3	36 32.3	+48.7	99.0	36 22.6	+49.3	99.7	36 12.1	+50.1	100.4	26
27	37 54.1	+44.2	94.4	37 49.1	+45.0	95.2	37 43.3	+45.9	96.0	37 36.6	+46.8	96.7	37 29.2	+47.6	97.5	37 21.0	+48.3	98.3	37 11.9	+49.2	99.0	37 02.2	+49.8	99.8	27
28	38 38.3	+43.8	93.6	38 34.1	+44.7	94.4	38 29.2	+45.5	95.2	38 23.4	+46.4	95.9	38 16.8	+47.2	96.7	38 09.3	+48.1	97.5	38 01.1	+48.8	98.3	37 52.0	+49.6	99.1	28
29	39 22.1	+43.3	92.7	39 18.8	+44.3	93.5	39 14.7	+45.3	94.3	39 09.8	+46.1	95.1	39 04.0	+47.0	95.9	38 57.4	+47.8	96.7	38 49.9	+48.6	97.5	38 41.6	+49.4	98.3	29
30	40 05.4	+43.0	91.8	40 03.1	+43.9	92.6	40 00.0	+44.8	93.5	39 55.9	+45.7	94.3	39 51.0	+46.6	95.1	39 45.2	+47.4	96.0	39 38.5	+48.3	96.8	39 31.0	+49.0	97.6	30
31	40 48.4	+42.5	90.9	40 47.0	+43.5	91.7	40 44.8	+44.5	92.6	40 41.6	+45.4	93.4	40 37.6	+46.2	94.3	40 32.6	+47.1	95.2	40 26.8	+47.9	96.0	40 20.0	+48.8	96.9	31
32	41 30.9	+42.0	89.9	41 30.5	+43.0	90.8	41 29.3	+44.0	91.7	41 27.0	+44.9	92.6	41 23.8	+45.9	93.5	41 19.7	+46.8	94.3	41 14.7	+47.6	95.2	41 08.8	+48.5	96.1	32
33	42 12.9	+41.6	89.0	42 13.5	+42.6	89.9	42 13.3	+43.5	90.8	42 11.9	+44.5	91.7	42 09.7	+45.4	92.6	42 06.5	+46.3	93.5	42 02.3	+47.3	94.4	41 57.3	+48.1	95.3	33
34	42 54.5	+41.0	88.0	42 56.1	+42.1	88.9	42 56.8	+43.1	89.8	42 56.4	+44.1	90.8	42 55.1	+45.0	91.7	42 52.8	+46.0	92.6	42 49.6	+47.0	93.6	42 45.4	+47.7	94.5	34
35	43 35.5	+40.5	87.0	43 38.2	+41.5	87.9	43 39.8	+42.6	88.9	43 40.5	+43.6	89.8	43 40.1	+44.6	90.8	43 38.8	+45.6	91.8	43 36.5	+46.5	92.7	43 33.1	+47.4	93.7	35
36	44 16.0	+40.0	86.0	44 19.7	+41.0	86.9	44 22.4	+42.1	87.9	44 24.1	+43.1	88.9	44 24.7	+44.2	89.9	44 24.4	+45.1	90.9	44 23.0	+46.0	91.8	44 20.5	+47.0	92.8	36
37	44 56.0	+39.3	84.9	45 00.7	+40.5	85.9	45 04.5	+41.5	86.9	45 07.2	+42.6	87.9	45 08.9	+43.6	88.9	45 09.5	+44.6	89.9	45 09.0	+45.7	90.9	45 07.5	+46.6	91.9	37
38	45 35.3	+38.7	83.8	45 41.2	+39.9	84.9	45 46.0	+41.0	85.9	45 49.8	+42.1	86.9	45 52.5	+43.1	87.9	45 54.1	+44.2	89.0	45 54.7	+45.1	90.0	45 54.1	+46.2	91.0	38
39	46 14.0	+38.1	82.7	46 21.1	+39.2	83.8	46 27.0	+40.4	84.8	46 31.9	+41.5	85.9	46 35.6	+42.6	86.9	46 38.3	+43.6	88.0	46 39.8	+44.7	89.0	46 40.3	+45.7	90.1	39
40	46 52.1	+37.4	81.6	47 00.3	+38.6	82.7	47 07.4	+39.8	83.7	47 13.4	+40.9	84.8	47 18.2	+42.0	85.9	47 21.9	+43.2	87.0	47 24.5	+44.2	88.1	47 26.0	+45.2	89.2	40
41	47 29.5	+36.7	80.5	47 38.9	+37.9	81.6	47 47.2	+39.0	82.6	47 54.3	+40.2	83.7	48 00.2	+41.4	84.8	48 05.1	+42.5	85.9	48 08.7	+43.6	87.1	48 11.2	+44.7	88.2	41
42	48 06.2	+36.0	79.3	48 16.8	+37.2	80.4	48 26.2	+38.5	81.5	48 34.5	+39.6	82.6	48 41.6	+40.8	83.8	48 47.6	+41.9	84.9	48 52.3	+43.1	86.0	48 55.9	+44.2	87.2	42
43	48 42.2	+35.2	78.1	48 54.0	+36.5	79.2	49 04.7	+37.6	80.3	49 14.1	+38.9	81.5	49 22.4	+40.1	82.6	49 29.5	+41.3	83.8	49 35.4	+42.5	85.0	49 40.1	+43.5	86.1	43
44	49 17.4	+34.4	76.9	49 30.5	+35.6	78.0	49 42.3	+37.0	79.1	49 53.0	+38.2	80.3	50 02.5	+39.5	81.5	50 10.8	+40.6	82.7	50 17.9	+41.8	83.9	50 23.6	+43.0	85.1	44
45	49 51.8	+33.5	75.6	50 06.1	+34.9	76.7	50 19.3	+36.1	77.9	50 31.2	+37.4	79.1	50 42.0	+38.6	80.3	50 51.4	+40.0	81.5	50 59.7	+41.1	82.7	51 06.6	+42.3	84.0	45
46	50 25.3	+32.7	74.3	50 41.0	+33.9	75.5	50 55.4	+35.3	76.7	51 08.6	+36.6	77.9	51 20.6	+37.9	79.1	51 31.4	+39.1	80.3	51 40.8	+40.4	81.6	51 48.9	+41.7	82.8	46
47	50 58.0	+31.7	73.0	51 14.9	+33.1	74.2	51 30.7	+34.4	75.4	51 45.2	+35.8	76.6	51 58.5	+37.1	77.8	52 10.5	+38.4	79.1	52 21.2	+39.7	80.4	52 30.6	+40.9	81.6	47
48	51 29.7	+30.8	71.6	51 48.0	+32.2	72.8	52 05.1	+33.6	74.0	52 21.0	+34.9	75.3	52 35.6	+36.2	76.6	52 48.9	+37.6	77.8	53 00.9	+38.9	79.1	53 11.5	+40.2	80.4	48
49	52 00.5	+29.8	70.2	52 20.2	+31.2	71.4	52 38.7	+32.5	72.7	52 55.9	+33.9	73.9	53 11.8	+35.4	75.2	53 26.5	+36.7	76.5	53 39.8	+38.0	77.9	53 51.7	+39.4	79.2	49
50	52 30.3	+28.7	68.8	52 51.4	+30.1	70.0	53 11.2	+34.6	71.3	53 29.8	+33.0	72.6	53 47.2	+34.3	73.9	54 03.2	+35.7	75.2	54 17.8	+37.2	76.5	54 31.1	+38.5	77.9	50
51	52 59.0	+27.7	67.4	53 21.5	+29.1	68.6	53 42.8	+30.5	69.9	54 02.8	+32.0	71.2	54 21.5	+33.4	72.5	54 38.9	+34.8	73.8	54 55.0	+36.2	75.2	55 09.6	+37.6	76.6	51
52	53 26.7	+26.5	65.9	53 50.6	+28.0	67.1	54 13.3	+29.4	68.4	54 34.8	+30.8	69.7	54 54.9	+32.3	71.0	55 13.7	+33.8	72.4	55 31.2	+35.2	73.8	55 47.2	+36.7	75.2	52
53	53 53.2	+25.4	64.4	54 18.6	+26.8	65.6	54 42.7	+28.3	66.9	55 05.6	+29.8	68.2	55 27.2	+31.3	69.6	55 47.5	+32.7	71.0	56 06.4	+34.2	72.3	56 23.9	+35.7	73.8	53
54	54 18.6	+24.1	62.8	54 45.4	+25.6	64.1	55 11.0	+27.1	65.4	55 35.4	+28.6	66.7	55 58.5	+30.1	68.0	56 20.2	+31.6	69.4	56 40.6	+33.1	70.9	56 59.6	+34.6	72.3	54
55	54 42.7	+22.9	61.2	55 11.0	+24.4	62.5	55 38.1	+25.9	63.8	56 04.0	+27.4	65.1	56 28.6	+28.9	66.5	56 51.8	+30.5	67.9	57 13.7	+32.0	69.3	57 34.2	+33.5	70.8	55
56	55 05.6	+21.6	59.6	55 35.4	+23.1	60.9	56 04.0	+24.6	62.2	56 31.4	+26.1	63.5	56 57.5	+27.6	64.9	57 22.3	+29.2	66.3	57 45.7	+30.7	67.8	58 07.7	+32.3	69.2	56
57	55 27.2	+20.3	58.0	55 58.5	+21.7	59.2	56 28.6	+23.2	60.5	56 57.5	+24.8	61.9	57 25.1	+26.4	63.3	57 51.5	+27.9	64.7	58 16.4	+29.5	66.1	58 40.0	+31.1	67.6	57
58	55 47.5	+18.9	56.3	56 20.2	+20.4	57.6	56 51.8	+21.9	58.9	57 22.3	+23.4	60.2	57 51.5	+24.9	61.6	58 19.4	+26.5	63.0	58 45.9	+28.2	64.5	59 11.1	+29.7	66.0	58
59	56 06.4	+17.5	54.6	56 40.6	+19.0	55.9	57 13.7	+20.5	57.2	57 45.7	+22.0	58.5	58 16.4	+23.6	59.9	58 45.9	+25.2	61.3	59 14.1	+26.7	62.7	59 40.8	+28.3	64.3	59
60	56 23.9	+16.0	52.9	56 59.6	+17.5	54.1	57 34.2	+19.0	55.4	58 07.7	+20.5	56.7	58 40.0	+22.1	58.1	59 11.1	+23.7	59.5	59 40.8	+25.4	61.0	60 09.3	+26.9	62.5	60
61	56 39.9	+14.6	51.2	57 17.1	+16.0	52.4	57 53.2	+17.5	53.6	58 28.2	+19.0	54.9	59 02.1	+20.6	56.3	59 34.8	+22.1	57.7	60 06.2	+23.8	59.2	60 36.2	+25.5	60.7	61
62	56 54.5	+13.0	49.4	57 33.1	+14.4	50.6	58 10.7	+15.9	51.8	58 47.2	+17.4	53.1	59 22.7	+18.9	54.5	59 56.9	+20.6	55.9	60 30.0	+22.2	57.3	61 01.7	+23.9	58.8	62
63	57 07.5	+11.5	47.6	57 47.5	+12.9	48.8	58 26.6	+14.3	50.0	59 04.6	+15.9	51.3	59 41.6	+17.4	52.6	60 17.5	+19.0	54.0	60 52.2	+20.6	55.4	61 25.6	+22.2	56.9	63
64	57 19.0	+9.9	45.8	58 00.4	+11.3	46.9	58 40.9	+12.7	48.1	59 20.5	+14.1	49.4	59 59.0	+15.7	50.7	60 36.5	+17.2	52.1	61 12.8	+18.8	53.5	61 47.8	+20.6	55.0	64
65	57 28.9	+8.3	44.0	58 11.7	+9.6	45.1	58 53.6	+11.0	46.2	59 34.6	+12.5	47.5	60 14.7	+14.0	48.8	60 53.7	+15.5	50.1	61 31.6	+17.2	51.5	62 08.4	+18.8	53.0	65
66	57 37.2	+6.6	42.1	58 21.3	+7.9	43.2	59 04.6	+9.3	44.3	59 47.1	+10.7	45.5	60 28.7	+12.2	46.8	61 09.2	+13.8	48.1	61 48.8	+15.3	49.5	62 27.2	+16.9	50.9	66
67	57 43.8	+5.0	40.3	58 29.2	+6.3	41.3	59 13.9	+7.6	42.4	59 57.8	+9.0	43.6	60 40.9	+10.4	44.8	61 23.0	+11.9	46.1	62 04.1	+13.4	47.4	62 44.1	+15.1	48.9	67
68	57 48.8	+3.4	38.4	58 35.5	+4.6	39.4	59 21.5	+5.9	40.5	60 06.8	+7.2	41.6	60 51.3	+8.5	42.8	61 34.9	+10.0	44.0	62 17.5	+11.6	45.3	62 59.2	+13.1	46.7	68
69	57 52.2	+1.7	36.5	58 40.1	+2.9	37.5	59 27.4	+4.1	38.5	60 14.0	+5.4	39.6	60 59.8	+6.8	40.7	61 44.9	+8.1	41.9	62 29.1	+9.6 •	43.2	63 12.3	+11.1	44.6	69
70	57 53.9	0.0	34.6	58 43.0	+1.1	35.6	59 31.5	+2.3	36.5	60 19.4	+3.5	37.6	61 06.6	+4.8	38.7	61 53.0	+6.2	39.9	62 38.7	+7.6 •	41.1	63 23.4	+9.2 •	42.4	70
71	57 53.9	–1.6	32.7	58 44.1	–0.5	33.6	59 33.8	+0.6	34.6	60 22.9	+1.7	35.6	61 11.4	+3.0	36.6	61 59.2	+4.3 •	37.7	62 46.3	+5.6 •	38.9	63 32.6	+7.0 •	40.2	71
72	57 52.3	–3.3	30.9	58 43.6	–2.3	31.7	59 34.4	–1.3	32.6	60 24.6	–0.1	33.5	61 14.4	+1.0	34.5	62 03.5	+2.2 •	35.6	62 51.9	+3.6 •	36.7	63 39.6	+4.9 •	37.9	72
73	57 49.0	–5.0	29.0	58 41.3	–4.1	29.8	59 33.1	–3.0	30.6	60 24.5	–2.0	31.5	61 15.4	–0.9	32.5	62 05.7	+0.3	33.5	62 55.5	+1.5 •	34.6	63 44.5	+2.9 •	35.7	73
74	57 44.0	–6.6	27.1	58 37.2	–5.7	27.9	59 30.1	–4.8	28.7	60 22.5	–3.8	29.5	61 14.5	–2.7	30.4	62 06.0	–1.6 •	31.3	62 57.0	–0.5 •	32.4	63 47.4	+0.7 •	33.4	74
75	57 37.4	–8.2	25.3	58 31.5	–7.4	26.0	59 25.3	–6.5	26.7	60 18.7	–5.6	27.5	61 11.8	–4.7	28.3	62 04.4	–3.7 •	29.2	62 56.5	–2.6 •	30.2	63 48.1	–1.4 •	31.2	75
76	57 29.2	–9.8	23.4	58 24.1	–9.1	24.1	59 18.8	–8.3	24.7	60 13.1	–7.5	25.5	61 07.1	–6.6	26.2	62 00.7	–5.6	27.1	62 53.9	–4.6 •	28.0	63 46.7	–3.6 •	28.9	76
77	57 19.4	–11.5	21.6	58 15.0	–10.7	22.2	59 10.5	–10.0	22.8	60 05.6	–9.2	23.5	61 00.5	–8.4	24.2	61 55.1	–7.6	25.0	62 49.3	–6.6 •	25.8	63 43.1	–5.6 •	26.7	77
78	57 07.9	–12.9	19.8	58 04.3	–12.3	20.3	59 00.5	–11.7	20.9	59 56.4	–11.0	21.5	60 52.1	–10.2	22.1	61 47.5	–9.4	22.9	62 42.7	–8.6	23.6	63 37.5	–7.7 •	24.4	78
79	56 55.0	–14.5	18.0	57 52.0	–14.0	18.5	58 48.8	–13.4	19.0	59 45.4	–12.7	19.5	60 41.9	–12.1	20.1	61 38.1	–11.4	20.8	62 34.1	–10.6	21.5	63 29.8	–9.8 •	22.2	79
80	56 40.5	–16.0	16.2	57 38.0	–15.5	16.6	58 35.4	–14.9	17.1	59 32.7	–14.4	17.6	60 29.8	–13.8	18.1	61 26.7	–13.1	18.7	62 23.5	–12.5	19.3	63 20.0	–11.8 •	20.0	80
81	56 24.5	–17.4	14.5	57 22.5	–17.0	14.8	58 20.5	–16.5	15.3	59 18.3	–16.1	15.7	60 16.0	–15.5	16.2	61 13.6	–15.0	16.7	62 11.0	–14.4	17.2	63 08.2	–13.8 •	17.8	81
82	56 07.1	–18.9	12.7	57 05.5	–18.4	13.1	58 03.9	–18.0	13.4	59 02.3	–17.7	13.8	60 00.5	–17.1	14.2	60 58.6	–16.8	14.7	61 56.6	–16.3	15.1	62 54.4	–15.7	15.7	82
83	55 48.2	–20.2	11.0	56 47.1	–19.9	11.3	57 45.9	–19.6	11.6	58 44.6	–19.2	12.0	59 43.3	–18.9	12.3	60 41.8	–18.4	12.7	61 40.3	–18.0	13.1	62 38.7	–17.6	13.5	83
84	55 28.0	–21.6	9.4	56 27.2	–21.3	9.6	57 26.3	–21.0	9.9	58 25.4	–20.8	10.2	59 24.4	–20.4	10.4	60 23.4	–20.1	10.8	61 22.3	–19.7	11.1	62 21.1	–19.3	11.5	84
85	55 06.4	–22.8	7.7	56 05.9	–22.7	7.9	57 05.3	–22.5	8.1	58 04.6	–22.2	8.4	59 04.0	–22.0	8.6	60 03.3	–21.7	8.9	61 02.6	–21.5	9.1	62 01.8	–21.2	9.4	85
86	54 43.6	–24.2	6.1	55 43.2	–24.0	6.3	56 42.8	–23.8	6.4	57 42.4	–23.6	6.6	58 42.0	–23.4	6.8	59 41.6	–23.2	7.0	60 41.1	–23.0	7.2	61 40.6	–22.8	7.5	86
87	54 19.4	–25.3	4.5	55 19.2	–25.2	4.7	56 19.0	–25.1	4.8	57 18.8	–25.0	4.9	58 18.6	–24.9	5.0	59 18.4	–24.8	5.2	60 18.1	–24.6	5.4	61 17.8	–24.4	5.5	87
88	53 54.1	–26.5	3.0	54 54.0	–26.4	3.1	55 53.9	–26.3	3.2	56 53.8	–26.2	3.2	57 53.7	–26.2	3.3	58 53.6	–26.1	3.4	59 53.5	–26.0	3.5	60 53.4	–25.9	3.6	88
89	53 27.6	–27.6	1.5	54 27.6	–27.6	1.5	55 27.6	–27.6	1.6	56 27.6	–27.6	1.6	57 27.5	–27.5	1.6	58 27.5	–27.5	1.7	59 27.5	–27.5	1.7	60 27.5	–27.5	1.8	89
90	53 00.0	–28.7	0.0	54 00.0	–28.7	0.0	55 00.0	–28.7	0.0	56 00.0	–28.8	0.0	57 00.0	–28.8	0.0	58 00.0	–28.8	0.0	59 00.0	–28.8	0.0	60 00.0	–28.9	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	16 24.7	−50.0	113.0	16 01.1	−50.5	113.3	15 37.3	−51.1	113.5	15 13.2	−51.6	113.8	14 48.9	−52.1	114.0	14 24.3	−52.5	114.3	13 59.6	−53.1	114.5	13 34.6	−53.5	114.7	0
1	15 34.7	−50.1	113.6	15 10.6	−50.7	113.8	14 46.2	−51.1	114.1	14 21.6	−51.6	114.3	13 56.8	−52.2	114.5	13 31.8	−52.7	114.8	13 06.5	−53.1	115.0	12 41.1	−53.5	115.2	1
2	14 44.6	−50.2	114.2	14 19.9	−50.7	114.4	13 55.1	−51.3	114.6	13 30.0	−51.8	114.8	13 04.6	−52.2	115.0	12 39.1	−52.6	115.3	12 13.4	−53.1	115.5	11 47.6	−53.6	115.7	2
3	13 54.4	−50.2	114.7	13 29.2	−50.7	114.9	13 03.8	−51.3	115.2	12 38.2	−51.7	115.4	12 12.4	−52.3	115.6	11 46.5	−52.8	115.8	11 20.3	−53.2	115.9	10 54.0	−53.6	116.1	3
4	13 04.2	−50.3	115.3	12 38.5	−50.9	115.5	12 12.5	−51.3	115.7	11 46.5	−51.9	115.9	11 20.2	−52.3	116.1	10 53.7	−52.7	116.2	10 27.1	−53.2	116.4	10 00.4	−53.7	116.6	4
5	12 13.9	−50.4	115.8	11 47.6	−50.9	116.0	11 21.2	−51.4	116.2	10 54.6	−51.9	116.4	10 27.9	−52.4	116.6	10 01.0	−52.9	116.7	9 33.9	−53.2	116.9	9 06.7	−53.7	117.0	5
6	11 23.5	−50.5	116.4	10 56.7	−50.9	116.6	10 29.8	−51.5	116.7	10 02.7	−51.9	116.9	9 35.5	−52.4	117.1	9 08.1	−52.8	117.2	8 40.7	−53.3	117.3	8 13.0	−53.7	117.5	6
7	10 33.0	−50.5	116.9	10 05.8	−51.1	117.1	9 38.3	−51.5	117.3	9 10.8	−52.0	117.4	8 43.1	−52.4	117.5	8 15.3	−52.9	117.7	7 47.4	−53.4	117.8	7 19.3	−53.7	117.9	7
8	9 42.5	−50.5	117.5	9 14.7	−51.0	117.6	8 46.8	−51.5	117.8	8 18.8	−52.0	117.9	7 50.7	−52.5	118.0	7 22.4	−52.9	118.2	6 54.0	−53.3	118.3	6 25.6	−53.8	118.4	8
9	8 52.0	−50.7	118.0	8 23.7	−51.1	118.2	7 55.3	−51.6	118.3	7 26.8	−52.0	118.4	6 58.2	−52.5	118.5	6 29.5	−53.0	118.6	6 00.7	−53.4	118.7	5 31.8	−53.8	118.8	9
10	8 01.3	−50.6	118.6	7 32.6	−51.2	118.7	7 03.7	−51.6	118.9	6 34.8	−52.1	118.9	6 05.7	−52.5	119.0	5 36.5	−52.9	119.1	5 07.3	−53.4	119.2	4 38.0	−53.9	119.3	10
11	7 10.7	−50.7	119.1	6 41.4	−51.1	119.2	6 12.1	−51.6	119.3	5 42.7	−52.1	119.4	5 13.2	−52.6	119.5	4 43.6	−53.0	119.6	4 13.9	−53.4	119.6	3 44.2	−53.8	119.7	11
12	6 20.0	−50.7	119.7	5 50.3	−51.2	119.8	5 20.5	−51.7	119.8	4 50.6	−52.2	119.9	4 20.6	−52.6	120.0	3 50.6	−53.0	120.0	3 20.5	−53.4	120.1	2 50.4	−53.8	120.1	12
13	5 29.3	−50.7	120.2	4 59.1	−51.3	120.3	4 28.8	−51.7	120.3	3 58.4	−52.1	120.4	3 28.0	−52.5	120.5	2 57.6	−53.0	120.5	2 27.1	−53.4	120.6	1 56.6	−53.8	120.6	13
14	4 38.5	−50.7	120.7	4 07.8	−51.2	120.8	3 37.1	−51.7	120.9	3 06.3	−52.2	120.9	2 35.5	−52.6	121.0	2 04.6	−53.0	121.0	1 33.7	−53.5	121.0	1 02.8	−53.9	121.0	14
15	3 47.8	−50.8	121.3	3 16.6	−51.3	121.3	2 45.4	−51.7	121.4	2 14.1	−52.1	121.4	1 42.9	−52.6	121.4	1 11.6	−53.1	121.5	0 40.2	−53.4	121.5	0 08.9	−53.8	121.5	15
16	2 57.0	−50.8	121.8	2 25.3	−51.2	121.8	1 53.7	−51.8	121.9	1 22.0	−52.2	121.9	0 50.3	−52.6	121.9	0 18.5	−53.0	121.9	0 13.2	+53.4	58.1	0 44.9	+53.9	58.1	16
17	2 06.2	−50.9	122.3	1 34.1	−51.3	122.4	1 01.9	−51.7	122.4	0 29.8	−52.2	122.4	0 02.3	+52.7	57.6	0 34.5	+53.0	57.6	1 06.6	+53.5	57.6	1 38.8	+53.8	57.6	17
18	1 15.3	−50.8	122.9	0 42.8	−51.3	122.9	0 10.2	−51.7	122.9	0 22.4	+52.2	57.1	0 55.0	+52.6	57.1	1 27.5	+53.0	57.1	2 00.1	+53.4	57.2	2 32.6	+53.8	57.2	18
19	0 24.5	−50.8	123.4	0 08.5	+51.3	56.6	0 41.5	+51.8	56.6	1 14.6	+52.1	56.6	1 47.6	+52.6	56.6	2 20.5	+53.0	56.7	2 53.5	+53.4	56.7	3 26.4	+53.8	56.7	19
20	0 26.3	+50.8	56.1	0 59.8	+51.3	56.1	1 33.3	+51.7	56.1	2 06.7	+52.2	56.1	2 40.2	+52.5	56.2	3 13.5	+53.0	56.2	3 46.9	+53.4	56.3	4 20.2	+53.8	56.3	20
21	1 17.1	+50.9	55.5	1 51.1	+51.2	55.6	2 25.0	+51.7	55.6	2 58.9	+52.1	55.6	3 32.7	+52.6	55.7	4 06.5	+53.0	55.7	4 40.3	+53.4	55.8	5 14.0	+53.8	55.9	21
22	2 08.0	+50.8	55.0	2 42.3	+51.3	55.0	3 16.7	+51.7	55.1	3 51.0	+52.2	55.1	4 25.3	+52.6	55.2	4 59.5	+53.0	55.3	5 33.7	+53.3	55.3	6 07.8	+53.7	55.4	22
23	2 58.8	+50.8	54.5	3 33.6	+51.2	54.5	4 08.4	+51.7	54.6	4 43.2	+52.1	54.6	5 17.9	+52.5	54.7	5 52.5	+52.9	54.8	6 27.0	+53.4	54.9	7 01.5	+53.7	55.0	23
24	3 49.6	+50.7	53.9	4 24.8	+51.3	54.0	5 00.1	+51.6	54.1	5 35.3	+52.1	54.1	6 10.4	+52.5	54.2	6 45.4	+52.9	54.3	7 20.4	+53.3	54.4	7 55.2	+53.7	54.5	24
25	4 40.3	+50.8	53.4	5 16.1	+51.2	53.5	5 51.7	+51.7	53.6	6 27.4	+52.0	53.6	7 02.9	+52.5	53.7	7 38.3	+52.9	53.8	8 13.7	+53.3	54.0	8 48.9	+53.7	54.1	25
26	5 31.1	+50.7	52.9	6 07.3	+51.1	53.0	6 43.4	+51.6	53.0	7 19.4	+52.0	53.1	7 55.4	+52.4	53.2	8 31.2	+52.8	53.4	9 07.0	+53.2	53.5	9 42.6	+53.6	53.6	26
27	6 21.8	+50.7	52.3	6 58.4	+51.2	52.4	7 35.0	+51.5	52.5	8 11.4	+52.0	52.6	8 47.8	+52.4	52.8	9 24.0	+52.8	52.9	10 00.2	+53.2	53.0	10 36.2	+53.6	53.2	27
28	7 12.5	+50.6	51.8	7 49.6	+51.0	51.9	8 26.5	+51.5	52.0	9 03.4	+51.9	52.1	9 40.2	+52.3	52.3	10 16.8	+52.8	52.4	10 53.4	+53.2	52.7	11 29.8	+53.6	52.7	28
29	8 03.1	+50.6	51.3	8 40.6	+51.1	51.4	9 18.0	+51.5	51.5	9 55.3	+51.9	51.6	10 32.5	+52.3	51.8	11 09.6	+52.7	51.9	11 46.6	+53.1	52.1	12 23.4	+53.5	52.2	29
30	8 53.7	+50.6	50.7	9 31.7	+51.0	50.8	10 09.5	+51.4	51.0	10 47.2	+51.9	51.1	11 24.8	+52.3	51.3	12 02.3	+52.7	51.4	12 39.7	+53.0	51.6	13 16.9	+53.4	51.8	30
31	9 44.3	+50.5	50.2	10 22.7	+50.9	50.3	11 00.9	+51.4	50.4	11 39.1	+51.8	50.6	12 17.1	+52.2	50.8	12 55.0	+52.6	50.9	13 32.7	+53.0	51.1	14 10.3	+53.4	51.3	31
32	10 34.8	+50.5	49.6	11 13.6	+50.9	49.8	11 52.3	+51.3	49.9	12 30.9	+51.7	50.1	13 09.3	+52.1	50.3	13 47.6	+52.5	50.4	14 25.7	+53.0	50.6	15 03.7	+53.3	50.8	32
33	11 25.3	+50.3	49.1	12 04.5	+50.8	49.2	12 43.6	+51.3	49.4	13 22.6	+51.7	49.6	14 01.4	+52.1	49.8	14 40.1	+52.5	49.9	15 18.7	+52.8	50.2	15 57.0	+53.3	50.4	33
34	12 15.6	+50.4	48.5	12 55.3	+50.8	48.7	13 34.9	+51.1	48.9	14 14.3	+51.6	49.0	14 53.5	+52.0	49.2	15 32.6	+52.4	49.4	16 11.5	+52.9	49.7	16 50.3	+53.2	49.9	34
35	13 06.0	+50.2	48.0	13 46.1	+50.7	48.1	14 26.0	+51.0	48.3	15 05.9	+51.5	48.5	15 45.5	+52.0	48.7	16 25.0	+52.4	48.9	17 04.4	+52.7	49.2	17 43.5	+53.1	49.4	35
36	13 56.2	+50.2	47.4	14 36.8	+50.6	47.6	15 17.2	+51.0	47.8	15 57.4	+51.4	48.0	16 37.5	+51.8	48.2	17 17.4	+52.2	48.4	17 57.1	+52.7	48.7	18 36.6	+53.1	48.9	36
37	14 46.4	+50.1	46.8	15 27.4	+50.5	47.0	16 08.2	+50.9	47.2	16 48.8	+51.4	47.4	17 29.3	+51.8	47.7	18 09.6	+52.2	47.9	18 49.8	+52.5	48.2	19 29.7	+53.0	48.4	37
38	15 36.5	+50.0	46.3	16 17.9	+50.4	46.5	16 59.1	+50.9	46.7	17 40.2	+51.3	46.9	18 21.1	+51.7	47.1	19 01.8	+52.1	47.4	19 42.3	+52.5	47.7	20 22.7	+52.8	47.9	38
39	16 26.5	+49.9	45.7	17 08.3	+50.3	45.9	17 50.0	+50.7	46.1	18 31.5	+51.1	46.4	19 12.8	+51.6	46.6	19 53.9	+52.0	46.9	20 34.8	+52.4	47.1	21 15.5	+52.8	47.4	39
40	17 16.4	+49.8	45.1	17 58.6	+50.3	45.3	18 40.7	+50.7	45.6	19 22.6	+51.1	45.8	20 04.4	+51.5	46.1	20 45.9	+51.9	46.3	21 27.2	+52.3	46.6	22 08.3	+52.7	46.9	40
41	18 06.2	+49.7	44.5	18 48.9	+50.1	44.7	19 31.4	+50.5	45.0	20 13.7	+51.0	45.2	20 55.9	+51.3	45.5	21 37.8	+51.8	45.8	22 19.5	+52.2	46.1	23 01.0	+52.6	46.4	41
42	18 55.9	+49.5	43.9	19 39.0	+50.0	44.2	20 21.9	+50.5	44.4	21 04.7	+50.8	44.7	21 47.2	+51.3	45.0	22 29.6	+51.7	45.2	23 11.7	+52.1	45.5	23 53.6	+52.5	45.9	42
43	19 45.4	+49.5	43.3	20 29.0	+49.9	43.6	21 12.4	+50.3	43.8	21 55.5	+50.8	44.1	22 38.5	+51.2	44.4	23 21.3	+51.5	44.7	24 03.8	+52.0	45.0	24 46.1	+52.4	45.3	43
44	20 34.9	+49.3	42.7	21 18.9	+49.7	43.0	22 02.7	+50.2	43.3	22 46.3	+50.6	43.5	23 29.7	+51.0	43.8	24 12.8	+51.5	44.1	24 55.8	+51.8	44.5	25 38.5	+52.2	44.8	44
45	21 24.2	+49.2	42.1	22 08.6	+49.7	42.4	22 52.9	+50.0	42.7	23 36.9	+50.5	43.0	24 20.7	+50.9	43.3	25 04.3	+51.3	43.6	25 47.6	+51.7	43.9	26 30.7	+52.2	44.2	45
46	22 13.4	+49.1	41.5	22 58.3	+49.5	41.8	23 42.9	+49.9	42.1	24 27.4	+50.3	42.4	25 11.6	+50.7	42.7	25 55.6	+51.2	43.0	26 39.3	+51.6	43.3	27 22.9	+52.0	43.7	46
47	23 02.5	+48.9	40.9	23 47.8	+49.3	41.2	24 32.8	+49.8	41.5	25 17.7	+50.2	41.8	26 02.3	+50.6	42.1	26 46.8	+51.0	42.4	27 30.9	+51.5	42.8	28 14.9	+51.8	43.1	47
48	23 51.4	+48.8	40.2	24 37.1	+49.2	40.5	25 22.6	+49.6	40.8	26 07.9	+50.0	41.2	26 52.9	+50.5	41.5	27 37.8	+50.9	41.8	28 22.4	+51.3	42.2	29 06.7	+51.7	42.6	48
49	24 40.2	+48.5	39.6	25 26.3	+49.0	39.9	26 12.2	+49.5	40.2	26 57.9	+49.9	40.5	27 43.4	+50.3	40.9	28 28.7	+50.7	41.2	29 13.7	+51.1	41.6	29 58.4	+51.5	42.0	49
50	25 28.7	+48.5	39.0	26 15.3	+48.8	39.3	27 01.7	+49.2	39.6	27 47.8	+49.7	39.9	28 33.7	+50.1	40.3	29 19.4	+50.5	40.6	30 04.8	+50.9	41.0	30 49.9	+51.4	41.4	50
51	26 17.2	+48.2	38.3	27 04.1	+48.7	38.6	27 50.9	+49.1	38.9	28 37.5	+49.5	39.3	29 23.8	+50.0	39.6	30 09.9	+50.4	40.0	30 55.7	+50.8	40.4	31 41.3	+51.2	40.8	51
52	27 05.4	+48.0	37.6	27 52.8	+48.5	38.0	28 40.0	+48.9	38.3	29 27.0	+49.3	38.6	30 13.8	+49.7	39.0	31 00.3	+50.1	39.4	31 46.5	+50.6	39.7	32 32.5	+51.0	40.2	52
53	27 53.4	+47.9	37.0	28 41.3	+48.3	37.3	29 28.9	+48.7	37.6	30 16.3	+49.2	38.0	31 03.5	+49.6	38.3	31 50.4	+50.0	38.7	32 37.1	+50.4	39.1	33 23.5	+50.9	39.5	53
54	28 41.3	+47.6	36.3	29 29.6	+48.0	36.6	30 17.6	+48.5	37.0	31 05.5	+48.9	37.3	31 53.1	+49.3	37.7	32 40.4	+49.8	38.1	33 27.5	+50.2	38.5	34 14.4	+50.6	38.9	54
55	29 28.9	+47.4	35.6	30 17.6	+47.9	35.9	31 06.1	+48.3	36.3	31 54.4	+48.7	36.6	32 42.4	+49.1	37.0	33 30.2	+49.6	37.4	34 17.7	+50.0	37.8	35 05.0	+50.4	38.2	55
56	30 16.3	+47.2	34.9	31 05.5	+47.6	35.2	31 54.4	+48.0	35.9	32 43.1	+48.4	35.9	33 31.5	+48.9	36.3	34 19.8	+49.3	36.7	35 07.7	+49.8	37.1	35 55.4	+50.2	37.6	56
57	31 03.5	+46.9	34.2	31 53.1	+47.3	34.5	32 42.4	+47.8	34.9	33 31.5	+48.3	35.2	34 20.4	+48.7	35.6	35 09.1	+49.1	36.0	35 57.5	+49.5	36.4	36 45.6	+49.9	36.9	57
58	31 50.4	+46.7	33.4	32 40.4	+47.1	33.8	33 30.2	+47.5	34.1	34 19.8	+47.9	34.5	35 09.1	+48.4	34.9	35 58.2	+48.8	35.3	36 47.0	+49.2	35.7	37 35.5	+49.7	36.2	58
59	32 37.1	+46.4	32.7	33 27.5	+46.9	33.0	34 17.7	+47.3	33.4	35 07.7	+47.7	33.8	35 57.5	+48.1	34.2	36 47.0	+48.6	34.6	37 36.2	+49.0	35.0	38 25.2	+49.5	35.5	59
60	33 23.5	+46.2	31.9	34 14.4	+46.5	32.3	35 05.0	+47.0	32.6	35 55.4	+47.4	33.0	36 45.6	+47.8	33.4	37 35.5	+48.3	33.9	38 25.2	+48.8	34.3	39 14.7	+49.1	34.8	60
61	34 09.7	+45.8	31.2	35 00.9	+46.3	31.5	35 52.0	+46.7	31.9	36 42.8	+47.1	32.3	37 33.4	+47.6	32.7	38 23.8	+48.0	33.1	39 14.0	+48.4	33.5	40 03.8	+48.9	34.0	61
62	34 55.5	+45.6	30.4	35 47.2	+46.0	30.7	36 38.7	+46.4	31.1	37 29.9	+46.9	31.5	38 21.0	+47.2	31.9	39 11.8	+47.7	32.3	40 02.4	+48.1	32.8	40 52.7	+48.5	33.2	62
63	35 41.1	+45.2	29.6	36 33.2	+45.6	29.9	37 25.1	+46.0	30.3	38 16.8	+46.4	30.7	39 08.2	+46.9	31.1	39 59.5	+47.3	31.5	40 50.5	+47.8	32.0	41 41.2	+48.3	32.5	63
64	36 26.3	+44.9	28.8	37 18.8	+45.3	29.1	38 11.1	+45.7	29.5	39 03.2	+46.2	29.9	39 55.1	+46.6	30.3	40 46.8	+47.0	30.7	41 38.3	+47.4	31.2	42 29.5	+47.9	31.7	64
65	37 11.2	+44.5	27.9	38 04.1	+44.9	28.3	38 56.8	+45.4	28.7	39 49.4	+45.7	29.1	40 41.7	+46.2	29.5	41 33.8	+46.7	29.9	42 25.7	+47.1	30.4	43 17.4	+47.5	30.8	65
66	37 55.7	+44.1	27.1	38 49.0	+44.6	27.4	39 42.2	+45.0	27.8	40 35.1	+45.4	28.2	41 27.9	+45.8	28.6	42 20.5	+46.3	29.1	43 12.8	+46.7	29.5	44 04.9	+47.1	30.0	66
67	38 39.8	+43.8	26.2	39 33.6	+44.2	26.6	40 27.2	+44.5	27.0	41 20.5	+45.0	27.4	42 13.7	+45.5	27.8	43 06.7	+45.9	28.2	43 59.5	+46.3	28.7	44 52.0	+46.7	29.1	67
68	39 23.6	+43.4	25.3	40 17.8	+43.7	25.7	41 11.7	+44.2	26.1	42 05.5	+44.6	26.5	42 59.2	+44.9	26.9	43 52.6	+45.3	27.3	44 45.8	+45.8	27.8	45 38.7	+46.4	28.2	68
69	40 07.0	+42.9	24.4	41 01.5	+43.3	24.8	41 55.9	+43.7	25.2	42 50.1	+44.2	25.6	43 44.1	+44.6	26.0	44 38.0	+45.0	26.4	45 31.6	+45.4	26.9	46 25.1	+45.8	27.3	69
70	40 49.9	+42.5	23.5	41 44.8	+42.9	23.9	42 39.6	+43.3	24.2	43 34.3	+43.6	24.6	44 28.7	+44.1	25.0	45 23.0	+44.5	25.5	46 17.0	+45.0	25.9	47 10.9	+45.4	26.4	70
71	41 32.4	+42.0	22.6	42 27.7	+42.4	22.9	43 22.9	+42.8	23.3	44 17.9	+43.2	23.7	45 12.8	+43.6	24.1	46 07.5	+44.0	24.5	47 02.0	+44.4	24.9	47 56.3	+44.9	25.4	71
72	42 14.4	+41.5	21.6	43 10.1	+41.9	22.0	44 05.7	+42.3	22.3	45 01.1	+42.7	22.7	45 56.4	+43.1	23.1	46 51.5	+43.5	23.5	47 46.4	+43.9	24.0	48 41.2	+44.3	24.4	72
73	42 55.9	+41.1	20.6	43 52.0	+41.4	21.0	44 48.0	+41.7	21.3	45 43.8	+42.1	21.7	46 39.5	+42.5	22.1	47 35.0	+42.9	22.5	48 30.3	+43.4	22.9	49 25.5	+43.8	23.4	73
74	43 37.0	+40.4	19.6	44 33.4	+40.8	20.0	45 29.7	+41.2	20.3	46 25.9	+41.6	20.7	47 22.0	+42.0	21.1	48 17.9	+42.4	21.5	49 13.7	+42.7	21.9	50 09.3	+43.2	22.3	74
75	44 17.4	+39.9	18.6	45 14.2	+40.3	18.9	46 10.9	+40.7	19.3	47 07.5	+41.0	19.6	48 04.0	+41.3	20.0	49 00.3	+41.7	20.4	49 56.4	+42.2	20.8	50 52.5	+42.5	21.2	75
76	44 57.3	+39.4	17.6	45 54.5	+39.7	17.9	46 51.6	+40.0	18.2	47 48.5	+40.4	18.5	48 45.3	+40.7	18.9	49 42.0	+41.1	19.3	50 38.6	+41.5	19.7	51 35.0	+41.9	20.1	76
77	45 36.7	+38.7	16.5	46 34.2	+39.0	16.8	47 31.6	+39.3	17.1	48 28.9	+39.7	17.4	49 26.0	+40.1	17.8	50 23.1	+40.4	18.1	51 20.1	+40.8	18.5	52 16.9	+41.2	18.9	77
78	46 15.4	+38.1	15.4	47 13.2	+38.4	15.7	48 10.9	+38.7	16.0	49 08.6	+39.0	16.3	50 06.1	+39.3	16.6	51 03.5	+39.7	17.0	52 00.9	+40.0	17.4	52 58.1	+40.4	17.7	78
79	46 53.5	+37.4	14.3	47 51.6	+37.6	14.5	48 49.6	+38.0	14.8	49 47.6	+38.2	15.1	50 45.4	+38.6	15.4	51 43.2	+39.0	15.8	52 40.9	+39.3	16.1	53 38.5	+39.6	16.5	79
80	47 30.8	+36.7	13.1	48 29.2	+37.0	13.4	49 27.6	+37.2	13.6	50 25.8	+37.6	13.9	51 24.0	+37.9	14.2	52 22.2	+38.1	14.5	53 20.2	+38.5	14.9	54 18.1	+38.8	15.2	80
81	48 07.5	+35.9	11.9	49 06.2	+36.2	12.2	50 04.8	+36.5	12.4	51 03.4	+36.7	12.7	52 01.9	+37.0	13.0	53 00.3	+37.3	13.3	53 58.7	+37.6	13.6	54 56.9	+38.0	13.9	81
82	48 43.4	+35.2	10.7	49 42.4	+35.4	11.0	50 41.3	+35.6	11.2	51 40.1	+35.9	11.4	52 38.9	+36.1	11.7	53 37.6	+36.4	12.0	54 36.3	+36.7	12.2	55 34.9	+37.0	12.6	82
83	49 18.6	+34.4	9.5	50 17.8	+34.5	9.7	51 16.9	+34.8	9.9	52 16.0	+35.0	10.1	53 15.0	+35.3	10.4	54 14.0	+35.5	10.6	55 13.0	+35.7	10.9	56 11.9	+36.0	11.2	83
84	49 53.0	+33.5	8.2	50 52.3	+33.7	8.4	51 51.7	+33.9	8.6	52 51.0	+34.1	8.8	53 50.3	+34.3	9.0	54 49.5	+34.5	9.2	55 48.7	+34.7	9.7	56 47.9	+34.9	9.7	84
85	50 26.5	+32.6	6.9	51 26.0	+32.8	7.1	52 25.6	+32.9	7.2	53 25.1	+33.1	7.4	54 24.6	+33.2	7.6	55 24.0	+33.5	7.8	56 23.4	+33.7	8.0	57 22.8	+33.9	8.2	85
86	50 59.1	+31.7	5.6	51 58.8	+31.8	5.7	52 58.5	+32.0	5.9	53 58.2	+32.1	6.0	54 57.8	+32.3	6.2	55 57.5	+32.4	6.3	56 57.1	+32.6	6.5	57 56.7	+32.7	6.7	86
87	51 30.8	+30.8	4.3	52 30.6	+30.9	4.4	53 30.5	+30.9	4.5	54 30.3	+31.0	4.6	55 30.1	+31.1	4.7	56 29.9	+31.2	4.8	57 29.7	+31.3	4.9	58 29.4	+31.5	5.1	87
88	52 01.6	+29.7	2.9	53 01.5	+29.8	2.9	54 01.4	+29.9	3.0	55 01.3	+29.9	3.1	56 01.2	+30.0	3.2	57 01.1	+30.1	3.2	58 01.0	+30.2	3.3	59 00.9	+30.2	3.4	88
89	52 31.3	+28.7	1.5	53 31.3	+28.7	1.5	54 31.3	+28.7	1.5	55 31.2	+28.8	1.6	56 31.2	+28.8	1.6	57 31.2	+28.8	1.6	58 31.2	+28.8	1.7	59 31.1	+28.9	1.7	89
90	53 00.0	+27.6	0.0	54 00.0	+27.6	0.0	55 00.0	+27.6	0.0	56 00.0	+27.6	0.0	57 00.0	+27.5	0.0	58 00.0	+27.5	0.0	59 00.0	+27.5	0.0	60 00.0	+27.5	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z **LATITUDE SAME NAME AS DECLINATION** **L.H.A. 118°, 242°**

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LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	15 51.4	+49.7	112.1	15 28.6	+50.3	112.4	15 05.6	+50.9	112.7	14 42.4	+51.4	112.9	14 18.9	+51.9	113.1	13 55.2	+52.4	113.4	13 31.3	+52.9	113.6	13 07.2	+53.3	113.8	0
1	16 41.1	+49.7	111.6	16 18.9	+50.3	111.8	15 56.5	+50.8	112.1	15 33.8	+51.3	112.4	15 10.8	+51.9	112.6	14 47.6	+52.4	112.9	14 24.2	+52.8	113.1	14 00.5	+53.3	113.3	1
2	17 30.8	+49.5	111.0	17 09.2	+50.1	111.3	16 47.3	+50.7	111.5	16 25.1	+51.2	111.8	16 02.7	+51.7	112.1	15 40.0	+52.2	112.4	15 17.0	+52.8	112.6	14 53.8	+53.2	112.9	2
3	18 20.3	+49.5	110.4	17 59.3	+50.0	110.7	17 38.0	+50.6	111.0	17 16.3	+51.2	111.3	16 54.4	+51.7	111.6	16 32.2	+52.2	111.8	16 09.8	+52.6	112.1	15 47.0	+53.2	112.4	3
4	19 09.8	+49.3	109.8	18 49.3	+50.0	110.1	18 28.6	+50.4	110.4	18 07.5	+51.0	110.7	17 46.1	+51.6	111.0	17 24.4	+52.1	111.3	17 02.4	+52.6	111.6	16 40.2	+53.1	111.9	4
5	19 59.1	+49.2	109.2	19 39.3	+49.8	109.5	19 19.0	+50.4	109.9	18 58.5	+51.0	110.2	18 37.7	+51.4	110.5	18 16.5	+52.0	110.8	17 55.0	+52.5	111.1	17 33.3	+53.0	111.4	5
6	20 48.3	+49.1	108.6	20 29.1	+49.6	108.9	20 09.4	+50.3	109.3	19 49.5	+50.8	109.6	19 29.1	+51.4	110.0	19 08.5	+51.9	110.3	18 47.5	+52.5	110.6	18 26.3	+52.9	110.9	6
7	21 37.4	+49.0	108.0	21 18.7	+49.6	108.3	20 59.7	+50.2	108.7	20 40.3	+50.7	109.1	20 20.5	+51.3	109.4	20 00.4	+51.9	109.8	19 40.0	+52.3	110.1	19 19.2	+52.9	110.4	7
8	22 26.4	+48.8	107.3	22 08.3	+49.4	107.7	21 49.9	+50.0	108.1	21 31.0	+50.6	108.5	21 11.8	+51.2	108.9	20 52.3	+51.7	109.2	20 32.3	+52.3	109.6	20 12.1	+52.7	109.9	8
9	23 15.2	+48.6	106.7	22 57.7	+49.3	107.1	22 39.9	+49.9	107.5	22 21.6	+50.5	107.9	22 03.0	+51.1	108.3	21 44.0	+51.6	108.7	21 24.6	+52.1	109.0	21 04.8	+52.7	109.4	9
10	24 03.8	+48.5	106.1	23 47.0	+49.1	106.5	23 29.8	+49.7	106.9	23 12.1	+50.4	107.3	22 54.1	+50.9	107.7	22 35.6	+51.5	108.1	22 16.7	+52.1	108.5	21 57.5	+52.6	108.9	10
11	24 52.3	+48.3	105.4	24 36.1	+49.0	105.9	24 19.5	+49.6	106.3	24 02.5	+50.2	106.7	23 45.0	+50.8	107.1	23 27.1	+51.4	107.6	23 08.8	+51.9	108.0	22 50.1	+52.4	108.4	11
12	25 40.6	+48.1	104.8	25 25.1	+48.8	105.2	25 09.1	+49.5	105.7	24 52.7	+50.0	106.1	24 35.8	+50.7	106.6	24 18.5	+51.2	107.0	24 00.7	+51.8	107.4	23 42.5	+52.4	107.8	12
13	26 28.7	+48.0	104.1	26 13.9	+48.6	104.6	25 58.6	+49.2	105.0	25 42.7	+50.0	105.5	25 26.5	+50.5	106.0	25 09.7	+51.2	106.4	24 52.5	+51.7	106.9	24 34.9	+52.3	107.3	13
14	27 16.7	+47.7	103.4	27 02.5	+48.4	103.9	26 47.8	+49.1	104.4	26 32.7	+49.7	104.9	26 17.0	+50.4	105.4	26 00.9	+50.9	105.8	25 44.2	+51.6	106.3	25 27.2	+52.1	106.8	14
15	28 04.4	+47.6	102.7	27 50.9	+48.3	103.2	27 36.9	+49.0	103.8	27 22.4	+49.6	104.3	27 07.4	+50.2	104.8	26 51.8	+50.9	105.3	26 35.8	+51.4	105.7	26 19.3	+52.0	106.2	15
16	28 52.0	+47.3	102.0	28 39.2	+48.0	102.6	28 25.9	+48.7	103.1	28 12.0	+49.3	103.6	27 57.6	+50.0	104.1	27 42.7	+50.6	104.7	27 27.2	+51.3	105.2	27 11.3	+51.8	105.7	16
17	29 39.3	+47.1	101.3	29 27.2	+47.9	101.9	29 14.6	+48.5	102.4	29 01.4	+49.2	103.0	28 47.6	+49.9	103.5	28 33.3	+50.5	104.1	28 18.5	+51.1	104.6	28 03.1	+51.7	105.1	17
18	30 26.4	+46.9	100.6	30 15.1	+47.6	101.2	30 03.1	+48.3	101.8	29 50.6	+49.0	102.3	29 37.5	+49.7	102.9	29 23.8	+50.4	103.4	29 09.6	+51.0	104.0	28 54.9	+51.5	104.5	18
19	31 13.3	+46.6	99.9	31 02.7	+47.3	100.5	30 51.4	+48.1	101.1	30 39.6	+48.8	101.7	30 27.2	+49.5	102.2	30 14.2	+50.1	102.8	30 00.6	+50.8	103.4	29 46.4	+51.4	103.9	19
20	31 59.9	+46.3	99.2	31 50.0	+47.1	99.8	31 39.5	+47.9	100.4	31 28.4	+48.6	101.0	31 16.7	+49.3	101.6	31 04.3	+50.0	102.2	30 51.4	+50.6	102.8	30 37.8	+51.3	103.3	20
21	32 46.2	+46.1	98.4	32 37.1	+46.9	99.0	32 27.4	+47.6	99.7	32 17.0	+48.4	100.3	32 06.0	+49.0	100.9	31 54.3	+49.8	101.5	31 42.0	+50.4	102.1	31 29.1	+51.1	102.7	21
22	33 32.3	+45.8	97.6	33 24.0	+46.6	98.3	33 15.0	+47.4	98.9	33 05.4	+48.1	99.6	32 55.0	+48.9	100.2	32 44.1	+49.5	100.9	32 32.4	+50.3	101.5	32 20.2	+50.9	102.1	22
23	34 18.1	+45.5	96.9	34 10.6	+46.3	97.5	34 02.4	+47.1	98.2	33 53.5	+47.8	98.9	33 43.9	+48.6	99.5	33 33.6	+49.3	100.2	33 22.7	+50.0	100.8	33 11.1	+50.6	101.5	23
24	35 03.6	+45.2	96.1	34 56.9	+46.0	96.8	34 49.5	+46.8	97.5	34 41.3	+47.6	98.1	34 32.5	+48.3	98.8	34 22.9	+49.1	99.5	34 12.7	+49.8	100.2	34 01.7	+50.5	100.8	24
25	35 48.8	+44.8	95.3	35 42.9	+45.7	96.0	35 36.3	+46.5	96.7	35 28.9	+47.3	97.4	35 20.8	+48.1	98.1	35 12.0	+48.9	98.8	35 02.5	+49.6	99.5	34 52.2	+50.3	100.2	25
26	36 33.6	+44.5	94.4	36 28.6	+45.3	95.2	36 22.8	+46.2	95.9	36 16.2	+47.1	96.6	36 08.9	+47.8	97.4	36 00.9	+48.6	98.1	35 52.1	+49.3	98.8	35 42.5	+50.1	99.5	26
27	37 18.1	+44.1	93.6	37 13.9	+45.1	94.4	37 09.0	+45.9	95.1	37 03.3	+46.7	95.9	36 56.7	+47.6	96.6	36 49.5	+48.3	97.4	36 41.4	+49.1	98.1	36 32.6	+49.8	98.8	27
28	38 02.2	+43.8	92.7	37 59.0	+44.6	93.5	37 54.9	+45.5	94.3	37 50.0	+46.4	95.1	37 44.3	+47.2	95.9	37 37.8	+48.0	96.6	37 30.5	+48.8	97.4	37 22.4	+49.5	98.1	28
29	38 46.0	+43.3	91.9	38 43.6	+44.3	92.7	38 40.4	+45.2	93.5	38 36.4	+46.0	94.3	38 31.5	+46.9	95.1	38 25.8	+47.7	95.8	38 19.3	+48.5	96.6	38 11.9	+49.3	97.4	29
30	39 29.3	+43.0	91.0	39 27.9	+43.9	91.8	39 25.6	+44.8	92.6	39 22.4	+45.7	93.4	39 18.4	+46.6	94.3	39 13.5	+47.4	95.1	39 07.8	+48.2	95.9	39 01.2	+49.0	96.7	30
31	40 12.3	+42.5	90.1	40 11.8	+43.4	90.9	40 10.4	+44.4	91.8	40 08.1	+45.3	92.6	40 05.0	+46.2	93.4	40 00.9	+47.1	94.3	39 56.0	+47.9	95.1	39 50.2	+48.8	95.9	31
32	40 54.8	+42.0	89.1	40 55.2	+43.1	90.0	40 54.8	+44.0	90.9	40 53.4	+45.0	91.7	40 51.2	+45.8	92.6	40 48.0	+46.7	93.5	40 43.9	+47.6	94.3	40 39.0	+48.4	95.2	32
33	41 36.8	+41.6	88.2	41 38.3	+42.5	89.1	41 38.8	+43.5	90.0	41 38.4	+44.5	90.9	41 37.0	+45.4	91.7	41 34.7	+46.4	92.6	41 31.5	+47.2	93.5	41 27.4	+48.0	94.4	33
34	42 18.4	+41.1	87.2	42 20.8	+42.1	88.1	42 22.3	+43.1	89.0	42 22.9	+44.0	89.9	42 22.4	+45.1	90.8	42 21.1	+45.9	91.8	42 18.7	+46.9	92.7	42 15.4	+47.8	93.6	34
35	42 59.5	+40.5	86.2	43 02.9	+41.6	87.2	43 05.4	+42.6	88.1	43 06.9	+43.7	89.0	43 07.5	+44.6	90.0	43 07.0	+45.6	90.9	43 05.6	+46.5	91.8	43 03.2	+47.4	92.8	35
36	43 40.0	+40.0	85.2	43 44.5	+41.1	86.2	43 48.0	+42.2	87.1	43 50.6	+43.1	88.1	43 52.1	+44.1	89.0	43 52.6	+45.1	90.0	43 52.1	+46.0	91.0	43 50.6	+46.9	91.9	36
37	44 20.0	+39.4	84.2	44 25.6	+40.5	85.1	44 30.2	+41.6	86.1	44 33.7	+42.6	87.1	44 36.2	+43.7	88.1	44 37.7	+44.6	89.1	44 38.1	+45.7	90.1	44 37.5	+46.6	91.1	37
38	44 59.4	+38.8	83.1	45 06.1	+39.9	84.1	45 11.7	+41.1	85.1	45 16.3	+42.1	86.1	45 19.9	+43.1	87.1	45 22.3	+44.2	88.1	45 23.8	+45.2	89.1	45 24.1	+46.2	90.2	38
39	45 38.2	+38.2	82.0	45 46.0	+39.4	83.0	45 52.8	+40.4	84.1	45 58.4	+41.6	85.1	46 03.0	+42.6	86.1	46 06.5	+43.7	87.2	46 09.0	+44.7	88.2	46 10.3	+45.7	89.2	39
40	46 16.4	+37.6	80.9	46 25.4	+38.6	82.0	46 33.2	+39.8	83.0	46 40.0	+40.9	84.1	46 45.6	+42.1	85.1	46 50.2	+43.2	86.2	46 53.7	+44.2	87.2	46 56.0	+45.2	88.3	40
41	46 54.0	+36.8	79.8	47 04.0	+38.1	80.8	47 13.0	+39.2	81.9	47 20.9	+40.4	83.0	47 27.7	+41.5	84.1	47 33.4	+42.5	85.1	47 37.9	+43.6	86.2	47 41.2	+44.7	87.3	41
42	47 30.8	+36.1	78.6	47 42.1	+37.3	79.7	47 52.2	+38.6	80.8	48 01.3	+39.7	81.9	48 09.2	+40.8	83.0	48 15.9	+42.0	84.1	48 21.5	+43.1	85.2	48 25.9	+44.2	86.3	42
43	48 06.9	+35.4	77.4	48 19.4	+36.6	78.5	48 30.8	+37.8	79.6	48 41.0	+39.0	80.8	48 50.0	+40.3	81.9	48 57.9	+41.4	83.0	49 04.6	+42.5	84.2	49 10.1	+43.7	85.3	43
44	48 42.3	+34.5	76.2	48 56.0	+35.8	77.3	49 08.6	+37.1	78.5	49 20.0	+38.3	79.6	49 30.3	+39.5	80.7	49 39.3	+40.7	81.9	49 47.1	+41.9	83.1	49 53.8	+43.0	84.3	44
45	49 16.8	+33.8	75.0	49 31.8	+35.1	76.1	49 45.7	+36.3	77.2	49 58.3	+37.6	78.4	50 09.8	+38.8	79.6	50 20.0	+40.0	80.8	50 29.0	+41.3	82.0	50 36.8	+42.4	83.2	45
46	49 50.6	+32.9	73.7	50 06.9	+34.2	74.8	50 22.0	+35.5	76.0	50 35.9	+36.8	77.2	50 48.6	+38.0	78.4	51 00.0	+39.3	79.6	51 10.3	+40.5	80.8	51 19.2	+41.8	82.0	46
47	50 23.5	+32.0	72.4	50 41.1	+33.3	73.6	50 57.5	+34.7	74.7	51 12.7	+35.9	75.9	51 26.6	+37.3	77.1	51 39.3	+38.6	78.4	51 50.8	+39.8	79.6	52 01.0	+41.0	80.9	47
48	50 55.5	+31.1	71.1	51 14.4	+32.4	72.2	51 32.1	+33.8	73.4	51 48.6	+35.1	74.6	52 03.9	+36.4	75.9	52 17.9	+37.7	77.1	52 30.6	+39.0	78.4	52 42.0	+40.3	79.7	48
49	51 26.6	+30.1	69.7	51 46.8	+31.5	70.9	52 05.9	+32.8	72.1	52 23.7	+34.2	73.3	52 40.3	+35.5	74.6	52 55.6	+36.9	75.9	53 09.6	+38.2	77.1	53 22.3	+39.5	78.5	49
50	51 56.7	+29.0	68.3	52 18.3	+30.4	69.5	52 38.7	+31.8	70.7	52 57.9	+33.2	72.0	53 15.8	+34.6	73.2	53 32.5	+35.9	74.5	53 47.8	+37.3	75.8	54 01.8	+38.7	77.2	50
51	52 25.7	+28.1	66.9	52 48.7	+29.5	68.1	53 10.5	+30.9	69.3	53 31.1	+32.2	70.6	53 50.4	+33.7	71.9	54 08.4	+35.1	73.2	54 25.1	+36.5	74.5	54 40.5	+37.8	75.9	51
52	52 53.8	+26.9	65.4	53 18.2	+28.3	66.6	53 41.4	+29.7	67.9	54 03.3	+31.2	69.1	54 24.1	+32.6	70.5	54 43.5	+34.0	71.8	55 01.6	+35.4	73.1	55 18.3	+36.8	74.5	52
53	53 20.7	+25.8	63.9	53 46.5	+27.2	65.1	54 11.1	+28.7	66.4	54 34.5	+30.1	67.7	54 56.7	+31.5	69.0	55 17.5	+33.0	70.3	55 37.0	+34.5	71.7	55 55.1	+35.9	73.1	53
54	53 46.5	+24.6	62.4	54 13.7	+26.1	63.6	54 39.8	+27.5	64.9	55 04.6	+29.0	66.2	55 28.2	+30.5	67.5	55 50.5	+31.9	68.9	56 11.5	+33.4	70.3	56 31.0	+34.9	71.7	54
55	54 11.1	+23.4	60.9	54 39.8	+24.8	62.1	55 07.3	+26.3	63.3	55 33.6	+27.8	64.6	55 58.7	+29.2	66.0	56 22.4	+30.8	67.4	56 44.9	+32.2	68.8	57 05.9	+33.8	70.2	55
56	54 34.5	+22.2	59.3	55 04.6	+23.6	60.5	55 33.6	+25.1	61.8	56 01.4	+26.5	63.1	56 27.9	+28.1	64.4	56 53.2	+29.6	65.8	57 17.1	+31.1	67.2	57 39.7	+32.6	68.7	56
57	54 56.7	+20.8	57.7	55 28.2	+22.3	58.9	55 58.7	+23.7	60.1	56 27.9	+25.3	61.5	56 56.0	+26.8	62.8	57 22.8	+28.3	64.2	57 48.2	+29.9	65.6	58 12.3	+31.4	67.1	57
58	55 17.5	+19.5	56.0	55 50.5	+21.0	57.2	56 22.4	+22.5	58.5	56 53.2	+23.9	59.8	57 22.8	+25.4	61.1	57 51.1	+27.0	62.5	58 18.1	+28.6	64.0	58 43.7	+30.2	65.4	58
59	55 37.0	+18.1	54.4	56 11.5	+19.5	55.6	56 44.9	+21.0	56.8	57 17.1	+22.6	58.1	57 48.2	+24.1	59.5	58 18.1	+25.6	60.9	58 46.7	+27.2	62.3	59 13.9	+28.8	63.8	59
60	55 55.1	+16.8	52.7	56 31.0	+18.2	53.9	57 05.9	+19.6	55.1	57 39.7	+21.1	56.4	58 12.3	+22.7	57.7	58 43.7	+24.2	59.1	59 13.9	+25.8	60.6	59 42.7	+27.4	62.0	60
61	56 11.9	+15.2	50.9	56 49.2	+16.7	52.1	57 25.5	+18.1	53.4	58 00.8	+19.6	54.6	58 35.0	+21.1	56.0	59 07.9	+22.8	57.3	59 39.7	+24.3	58.8	60 10.1	+26.0	60.3	61
62	56 27.1	+13.8	49.2	57 05.9	+15.1	50.4	57 43.6	+16.7	51.6	58 20.4	+18.1	52.8	58 56.1	+19.6	54.2	59 30.7	+21.1	55.6	60 04.0	+22.8	57.0	60 36.1	+24.4	58.4	62
63	56 40.9	+12.2	47.4	57 21.0	+13.7	48.6	58 00.3	+15.0	49.8	58 38.5	+16.5	51.0	59 15.7	+18.1	52.3	59 51.8	+19.6	53.7	60 26.8	+21.2	55.1	61 00.5	+22.8	56.6	63
64	56 53.1	+10.7	45.6	57 34.7	+12.0	46.8	58 15.3	+13.5	47.9	58 55.0	+14.9	49.2	59 33.8	+16.4	50.4	60 11.4	+18.0	51.8	60 48.0	+19.5	53.2	61 23.3	+21.2	54.7	64
65	57 03.8	+9.2	43.8	57 46.7	+10.5	44.9	58 28.8	+11.8	46.1	59 09.9	+13.3	47.3	59 50.2	+14.7	48.5	60 29.4	+16.2	49.9	61 07.5	+17.8	51.2	61 44.5	+19.4	52.7	65
66	57 13.0	+7.5	42.0	57 57.2	+8.8	43.1	58 40.6	+10.2	44.2	59 23.2	+11.5	45.4	60 04.9	+13.0	46.6	60 45.6	+14.5	47.9	61 25.3	+16.1	49.3	62 03.9	+17.7	50.7	66
67	57 20.5	+5.9	40.2	58 06.0	+7.2	41.2	58 50.8	+8.4	42.3	59 34.7	+9.9	43.4	60 17.9	+11.2	44.6	61 00.1	+12.7	45.9	61 41.4	+14.2	47.2	62 21.6	+15.8	48.6	67
68	57 26.4	+4.3	38.3	58 13.2	+5.5	39.3	58 59.2	+6.8	40.4	59 44.6	+8.0	41.5	60 29.1	+9.4	42.6	61 12.8	+10.9	43.9	61 55.6	+12.3	45.2	62 37.4	+13.9	46.5	68
69	57 30.7	+2.7	36.5	58 18.7	+3.8	37.4	59 06.0	+5.0	38.4	59 52.6	+6.3	39.5	60 38.5	+7.7	40.6	61 23.7	+9.0	41.8	62 07.9	+10.5	43.1	62 51.3	+11.9	44.4	69
70	57 33.4	+1.0	34.6	58 22.5	+2.1	35.5	59 11.0	+3.3	36.5	59 58.9	+4.5	37.5	60 46.2	+5.7	38.6	61 32.7	+7.1	39.8	62 18.4	+8.5•	41.0	63 03.2	+10.0	42.3	70
71	57 34.4	-0.7	32.8	58 24.6	+0.4	33.6	59 14.3	+1.5	34.6	60 03.4	+2.7	35.5	60 51.9	+3.9	36.6	61 39.8	+5.2	37.7	62 26.9	+6.5•	38.8	63 13.2	+8.0•	40.1	71
72	57 33.7	-2.2	30.9	58 25.0	-1.3	31.7	59 15.8	-0.2	32.6	60 06.1	+0.9	33.5	60 55.8	+2.1	34.5	61 45.0	+3.2	35.6	62 33.4	+4.5	36.7	63 21.2	+5.9•	37.9	72
73	57 31.5	-4.0	29.0	58 23.7	-3.0	29.8	59 15.6	-2.0	30.6	60 07.0	-1.0	31.5	60 57.9	+0.1	32.5	61 48.2	+1.3	33.5	62 37.9	+2.6•	34.5	63 27.1	+3.8•	35.6	73
74	57 27.5	-5.5	27.2	58 20.7	-4.6	27.9	59 13.6	-3.8	28.7	60 06.0	-2.8	29.5	60 58.0	-1.8	30.4	61 49.5	-0.7	31.3	62 40.5	+0.5•	32.3	63 30.9	+1.7•	33.4	74
75	57 22.0	-7.2	25.3	58 16.1	-6.4	26.0	59 09.8	-5.5	26.7	60 03.2	-4.6	27.5	60 56.2	-3.6	28.3	61 48.8	-2.6	29.2	62 41.0	-1.6•	30.2	63 32.6	-0.4•	31.2	75
76	57 14.8	-8.8	23.5	58 09.7	-8.0	24.1	59 04.3	-7.2	24.8	59 58.6	-6.3	25.5	60 52.6	-5.5	26.3	61 46.2	-4.5	27.1	62 39.4	-3.5•	28.0	63 32.2	-2.5•	28.9	76
77	57 06.0	-10.3	21.7	58 01.7	-9.7	22.2	58 57.1	-8.9	22.9	59 52.3	-8.2	23.5	60 47.1	-7.3	24.2	61 41.7	-6.5	25.0	62 35.9	-5.6•	25.8	63 29.7	-4.6•	26.7	77
78	56 55.7	-11.9	19.8	57 52.0	-11.2	20.4	58 48.2	-10.6	21.0	59 44.1	-9.9	21.6	60 39.8	-9.2	22.2	61 35.2	-8.4	22.9	62 30.3	-7.6	23.7	63 25.1	-6.7•	24.5	78
79	56 43.8	-13.4	18.1	57 40.8	-12.9	18.5	58 37.6	-12.3	19.1	59 34.2	-11.7	19.6	60 30.6	-11.0	20.2	61 26.8	-10.3	20.8	62 22.7	-9.5	21.5	63 18.4	-8.7•	22.2	79
80	56 30.4	-14.9	16.3	57 27.9	-14.4	16.7	58 25.3	-13.9	17.2	59 22.5	-13.3	17.7	60 19.6	-12.7	18.2	61 16.5	-12.1	18.8	62 13.2	-11.4	19.4	63 09.7	-10.7•	20.0	80
81	56 15.5	-16.4	14.5	57 13.5	-16.0	14.9	58 11.4	-15.5	15.3	59 09.2	-15.0	15.8	60 06.9	-14.5	16.2	61 04.4	-13.9	16.7	62 01.8	-13.3	17.3	62 59.0	-12.7	17.9	81
82	55 59.1	-17.8	12.8	56 57.5	-17.4	13.1	57 55.9	-17.0	13.5	58 54.2	-16.6	13.9	59 52.4	-16.1	14.3	60 50.5	-15.7	14.7	61 48.5	-15.2	15.2	62 46.3	-14.6	15.7	82
83	55 41.3	-19.2	11.1	56 40.1	-18.8	11.4	57 38.9	-18.5	11.7	58 37.6	-18.2	12.0	59 36.3	-17.8	12.4	60 34.8	-17.4	12.8	61 33.3	-17.0	13.2	62 31.7	-16.5	13.6	83
84	55 22.1	-20.6	9.4	56 21.3	-20.3	9.7	57 20.4	-20.0	9.9	58 19.4	-19.7	10.2	59 18.5	-19.4	10.5	60 17.4	-19.0	10.8	61 16.3	-18.7	11.2	62 15.2	-18.4	11.5	84
85	55 01.5	-21.8	7.8	56 01.0	-21.7	8.0	57 00.4	-21.4	8.2	57 59.7	-21.1	8.4	58 59.1	-21.0	8.7	59 58.4	-20.7	8.9	60 57.6	-20.4	9.2	61 56.8	-20.1	9.5	85
86	54 39.7	-23.1	6.2	55 39.3	-22.9	6.3	56 39.0	-22.8	6.5	57 38.6	-22.7	6.7	58 38.1	-22.4	6.9	59 37.7	-22.2	7.1	60 37.2	-22.0	7.3	61 36.7	-21.8	7.5	86
87	54 16.6	-24.4	4.6	55 16.4	-24.3	4.7	56 16.2	-24.2	4.8	57 15.9	-24.0	4.9	58 15.7	-23.9	5.1	59 15.5	-23.8	5.2	60 15.2	-23.6	5.4	61 14.9	-23.4	5.6	87
88	53 52.2	-25.5	3.0	54 52.1	-25.4	3.1	55 52.0	-25.4	3.2	56 51.9	-25.3	3.3	57 51.8	-25.2	3.4	58 51.7	-25.1	3.4	59 51.6	-25.1	3.6	60 51.5	-25.0	3.7	88
89	53 26.7	-26.7	1.5	54 26.7	-26.7	1.5	55 26.6	-26.6	1.6	56 26.6	-26.6	1.6	57 26.6	-26.6	1.7	58 26.6	-26.6	1.7	59 26.5	-26.5	1.8	60 26.5	-26.5	1.8	89
90	53 00.0	-27.8	0.0	54 00.0	-27.8	0.0	55 00.0	-27.8	0.0	56 00.0	-27.8	0.0	57 00.0	-27.9	0.0	58 00.0	-27.9	0.0	59 00.0	-27.9	0.0	60 00.0	-27.9	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

LATITUDE CONTRARY NAME TO DECLINATION — L.H.A. 63°, 297°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	15 51.4	−49.9	112.1	15 28.6	−50.4	112.4	15 05.6	−50.9	112.7	14 42.4	−51.5	112.9	14 18.9	−51.9	113.1	13 55.2	−52.4	113.4	13 31.3	−52.9	113.6	13 07.2	−53.4	113.8	0
1	15 01.5	−50.0	112.7	14 38.2	−50.5	113.0	14 14.7	−51.0	113.2	13 50.9	−51.5	113.4	13 27.0	−52.1	113.7	13 02.8	−52.5	113.9	12 38.4	−53.0	114.1	12 13.8	−53.4	114.4	1
2	14 11.5	−50.0	113.3	13 47.7	−50.6	113.5	13 23.7	−51.1	113.7	12 59.4	−51.6	114.0	12 34.9	−52.0	114.2	12 10.3	−52.6	114.4	11 45.4	−53.0	114.6	11 20.4	−53.5	114.7	2
3	13 21.5	−50.1	113.9	12 57.1	−50.6	114.1	12 32.6	−51.2	114.3	12 07.8	−51.6	114.5	11 42.9	−52.2	114.7	11 17.7	−52.6	114.9	10 52.4	−53.1	115.2	10 26.9	−53.5	115.2	3
4	12 31.4	−50.2	114.4	12 06.5	−50.7	114.6	11 41.4	−51.2	114.8	11 16.2	−51.5	115.0	10 50.7	−52.2	115.2	10 25.1	−52.6	115.3	9 59.3	−53.1	115.5	9 33.4	−53.5	115.7	4
5	11 41.2	−50.2	115.0	11 15.8	−50.7	115.2	10 50.2	−51.3	115.3	10 24.4	−51.7	115.5	9 58.5	−52.2	115.7	9 32.5	−52.7	115.8	9 06.2	−53.1	116.0	8 39.9	−53.6	116.1	5
6	10 51.0	−50.3	115.5	10 25.1	−50.9	115.7	9 58.9	−51.3	115.9	9 32.7	−51.8	116.0	9 06.3	−52.3	116.2	8 39.8	−52.8	116.3	8 13.1	−53.2	116.5	7 46.3	−53.6	116.6	6
7	10 00.7	−50.3	116.1	9 34.2	−50.8	116.3	9 07.6	−51.3	116.4	8 40.9	−51.9	116.5	8 14.0	−52.3	116.7	7 47.0	−52.7	116.8	7 19.9	−53.2	116.9	6 52.7	−53.6	116.9	7
8	9 10.4	−50.4	116.6	8 43.4	−50.9	116.8	8 16.3	−51.4	116.9	7 49.0	−51.8	117.0	7 21.7	−52.3	117.2	6 54.3	−52.8	117.3	6 26.7	−53.2	117.4	5 59.1	−53.7	117.5	8
9	8 20.0	−50.5	117.2	7 52.5	−51.0	117.3	7 24.9	−51.5	117.4	6 57.2	−51.9	117.6	6 29.4	−52.4	117.7	6 01.5	−52.9	117.8	5 33.5	−53.3	117.8	5 05.4	−53.7	117.9	9
10	7 29.5	−50.5	117.7	7 01.5	−51.0	117.9	6 33.4	−51.4	118.0	6 05.3	−52.0	118.1	5 37.0	−52.4	118.2	5 08.6	−52.8	118.2	4 40.2	−53.2	118.3	4 11.7	−53.6	118.4	10
11	6 39.0	−50.5	118.3	6 10.5	−51.0	118.4	5 42.0	−51.4	118.5	5 13.3	−51.9	118.6	4 44.6	−52.4	118.6	4 15.8	−52.8	118.7	3 47.0	−53.3	118.8	3 18.1	−53.7	118.8	11
12	5 48.5	−50.5	118.8	5 19.5	−51.0	118.9	4 50.5	−51.5	119.0	4 21.4	−52.0	119.1	3 52.2	−52.4	119.1	3 23.0	−52.9	119.2	2 53.7	−53.3	119.2	2 24.4	−53.8	119.3	12
13	4 58.0	−50.6	119.4	4 28.5	−51.1	119.4	3 59.0	−51.6	119.5	3 29.4	−52.0	119.6	2 59.8	−52.5	119.6	2 30.1	−52.9	119.7	2 00.4	−53.3	119.7	1 30.6	−53.7	119.7	13
14	4 07.4	−50.6	119.9	3 37.4	−51.1	120.0	3 07.4	−51.5	120.0	2 37.4	−52.0	120.1	2 07.3	−52.4	120.1	1 37.2	−52.9	120.1	1 07.1	−53.3	120.2	0 36.9	−53.7	120.2	14
15	3 16.8	−50.6	120.5	2 46.3	−51.1	120.5	2 15.9	−51.6	120.5	1 45.4	−52.0	120.6	1 14.9	−52.5	120.6	0 44.3	−52.9	120.6	0 13.8	−53.3	120.6	0 16.8	+53.7	59.4	15
16	2 26.2	−50.7	121.0	1 55.2	−51.1	121.0	1 24.3	−51.6	121.0	0 53.4	−52.1	121.1	0 24.4	−52.5	121.1	0 08.6	+52.9	58.9	0 39.5	+53.4	58.9	1 10.5	+53.7	58.9	16
17	1 35.5	−50.7	121.5	1 04.1	−51.1	121.5	0 32.7	−51.5	121.6	0 01.3	−52.0	121.6	0 30.1	+52.4	58.4	1 01.5	+52.9	58.5	1 32.9	+53.3	58.5	2 04.2	+53.7	58.5	17
18	0 44.9	−50.7	122.1	0 13.0	−51.1	122.1	0 18.8	+51.6	57.9	0 50.7	+52.0	57.9	1 22.5	+52.5	58.0	1 54.4	+52.8	58.0	2 26.2	+53.2	58.0	2 57.9	+53.7	58.1	18
19	0 05.8	+50.6	57.4	0 38.1	+51.1	57.4	1 10.4	+51.6	57.4	1 42.7	+52.0	57.4	2 15.0	+52.4	57.5	2 47.2	+52.9	57.5	3 19.4	+53.3	57.6	3 51.6	+53.7	57.6	19
20	0 56.4	+50.6	56.9	1 29.2	+51.1	56.9	2 02.0	+51.6	56.9	2 34.7	+52.0	56.9	3 07.4	+52.5	57.0	3 40.1	+52.9	57.0	4 12.7	+53.3	57.1	4 45.3	+53.7	57.2	20
21	1 47.0	+50.7	56.3	2 20.3	+51.1	56.4	2 53.5	+51.6	56.4	3 26.7	+52.0	56.4	3 59.9	+52.4	56.5	4 32.9	+52.9	56.6	5 06.0	+53.2	56.6	5 39.0	+53.6	56.7	21
22	2 37.7	+50.6	55.8	3 11.4	+51.1	55.8	3 45.1	+51.5	55.9	4 18.7	+52.0	55.9	4 52.3	+52.4	56.0	5 25.8	+52.8	56.1	5 59.2	+53.2	56.2	6 32.6	+53.6	56.3	22
23	3 28.3	+50.6	55.3	4 02.5	+51.0	55.3	4 36.6	+51.5	55.4	5 10.7	+51.9	55.4	5 44.7	+52.3	55.5	6 18.6	+52.8	55.6	6 52.4	+53.2	55.7	7 26.2	+53.6	55.8	23
24	4 18.9	+50.6	54.7	4 53.5	+51.1	54.8	5 28.1	+51.5	54.9	6 02.6	+51.9	54.9	6 37.0	+52.4	55.0	7 11.4	+52.7	55.1	7 45.6	+53.2	55.2	8 19.8	+53.6	55.4	24
25	5 09.5	+50.5	54.2	5 44.6	+51.0	54.3	6 19.6	+51.4	54.3	6 54.5	+51.9	54.4	7 29.4	+52.3	54.5	8 04.1	+52.8	54.6	8 38.8	+53.1	54.8	9 13.4	+53.5	54.9	25
26	6 00.0	+50.5	53.6	6 35.6	+50.9	53.7	7 11.0	+51.4	53.8	7 46.4	+51.8	53.9	8 21.7	+52.2	54.0	8 56.9	+52.6	54.2	9 31.9	+53.1	54.3	10 06.9	+53.5	54.4	26
27	6 50.5	+50.5	53.1	7 26.5	+50.9	53.2	8 02.4	+51.4	53.3	8 38.2	+51.8	53.4	9 13.9	+52.3	53.5	9 49.5	+52.7	53.7	10 25.0	+53.1	53.8	11 00.4	+53.4	54.0	27
28	7 41.0	+50.4	52.5	8 17.4	+50.9	52.7	8 53.8	+51.3	52.8	9 30.0	+51.8	52.9	10 06.2	+52.2	53.0	10 42.2	+52.6	53.2	11 18.1	+53.0	53.3	11 53.8	+53.4	53.5	28
29	8 31.4	+50.4	52.0	9 08.3	+50.9	52.1	9 45.1	+51.3	52.3	10 21.8	+51.7	52.4	10 58.3	+52.2	52.5	11 34.8	+52.5	52.7	12 11.1	+52.9	52.9	12 47.2	+53.4	53.0	29
30	9 21.8	+50.4	51.4	9 59.2	+50.8	51.6	10 36.4	+51.2	51.7	11 13.5	+51.7	51.9	11 50.5	+52.1	52.0	12 27.3	+52.5	52.2	13 04.0	+52.9	52.4	13 40.6	+53.2	52.6	30
31	10 12.2	+50.3	50.9	10 50.0	+50.7	51.0	11 27.6	+51.2	51.2	12 05.2	+51.6	51.4	12 42.6	+52.0	51.5	13 19.8	+52.4	51.7	13 56.9	+52.8	51.9	14 33.8	+53.3	52.1	31
32	11 02.5	+50.2	50.3	11 40.7	+50.7	50.5	12 18.8	+51.1	50.7	12 56.8	+51.6	50.8	13 34.6	+51.9	51.0	14 12.2	+52.4	51.2	14 49.7	+52.8	51.4	15 27.1	+53.2	51.6	32
33	11 52.7	+50.1	49.8	12 31.4	+50.6	49.9	13 09.9	+51.0	50.1	13 48.3	+51.5	50.3	14 26.5	+51.9	50.5	15 04.6	+52.3	50.7	15 42.5	+52.7	50.9	16 20.3	+53.1	51.1	33
34	12 42.8	+50.1	49.2	13 22.0	+50.5	49.4	14 00.9	+51.0	49.6	14 39.8	+51.3	49.8	15 18.4	+51.8	50.0	15 56.9	+52.2	50.2	16 35.2	+52.7	50.4	17 13.4	+53.0	50.7	34
35	13 32.9	+50.0	48.7	14 12.5	+50.4	48.8	14 51.9	+50.9	49.0	15 31.1	+51.4	49.2	16 10.2	+51.8	49.5	16 49.1	+52.2	49.7	17 27.9	+52.5	49.9	18 06.4	+53.0	50.2	35
36	14 22.9	+50.0	48.1	15 02.9	+50.4	48.3	15 42.8	+50.8	48.5	16 22.5	+51.2	48.7	17 02.0	+51.6	48.9	17 41.3	+52.1	49.2	18 20.4	+52.5	49.4	18 59.4	+52.8	49.7	36
37	15 12.9	+49.8	47.5	15 53.3	+50.3	47.7	16 33.6	+50.7	47.9	17 13.7	+51.1	48.2	17 53.6	+51.6	48.4	18 33.4	+52.0	48.6	19 12.9	+52.4	48.9	19 52.2	+52.8	49.2	37
38	16 02.7	+49.7	46.9	16 43.6	+50.2	47.2	17 24.3	+50.6	47.4	18 04.8	+51.1	47.6	18 45.2	+51.5	47.9	19 25.4	+51.8	48.1	20 05.3	+52.3	48.4	20 45.0	+52.8	48.7	38
39	16 52.4	+49.7	46.4	17 33.8	+50.1	46.6	18 14.9	+50.6	46.8	18 55.9	+50.9	47.1	19 36.7	+51.3	47.3	20 17.2	+51.8	47.6	20 57.6	+52.2	47.9	21 37.8	+52.6	48.1	39
40	17 42.1	+49.5	45.8	18 23.9	+49.9	46.0	19 05.4	+50.5	46.2	19 46.8	+50.9	46.5	20 28.0	+51.3	46.8	21 09.0	+51.7	47.0	21 49.8	+52.1	47.3	22 30.4	+52.5	47.6	40
41	18 31.6	+49.4	45.2	19 13.8	+49.9	45.4	19 55.9	+50.3	45.7	20 37.7	+50.7	45.9	21 19.3	+51.2	46.2	22 00.7	+51.6	46.5	22 41.9	+52.0	46.8	23 22.9	+52.4	47.1	41
42	19 21.0	+49.4	44.6	20 03.7	+49.7	44.8	20 46.2	+50.1	45.1	21 28.4	+50.6	45.4	22 10.5	+51.0	45.6	22 52.3	+51.5	45.9	23 33.9	+51.9	46.3	24 15.3	+52.3	46.6	42
43	20 10.4	+49.1	44.0	20 53.4	+49.7	44.2	21 36.3	+50.1	44.5	22 19.0	+50.5	44.8	23 01.5	+50.9	45.1	23 43.8	+51.3	45.4	24 25.8	+51.8	45.7	25 07.6	+52.1	46.0	43
44	20 59.5	+49.1	43.4	21 43.1	+49.5	43.6	22 26.4	+49.9	43.9	23 09.5	+50.4	44.2	23 52.4	+50.8	44.5	24 35.1	+51.2	44.8	25 17.6	+51.6	45.1	25 59.7	+52.1	45.5	44
45	21 48.6	+48.9	42.7	22 32.6	+49.3	43.0	23 16.3	+49.8	43.3	23 59.9	+50.2	43.6	24 43.2	+50.7	43.9	25 26.3	+51.1	44.2	26 09.2	+51.5	44.6	26 51.8	+51.9	44.9	45
46	22 37.5	+48.8	42.1	23 21.9	+49.2	42.4	24 06.1	+49.7	42.7	24 50.1	+50.1	43.0	25 33.9	+50.5	43.3	26 17.4	+50.9	43.7	27 00.7	+51.3	44.0	27 43.7	+51.8	44.4	46
47	23 26.3	+48.6	41.5	24 11.1	+49.1	41.8	24 55.8	+49.4	42.1	25 40.2	+49.9	42.4	26 24.4	+50.3	42.7	27 08.3	+50.8	43.1	27 52.0	+51.2	43.4	28 35.5	+51.6	43.8	47
48	24 14.9	+48.4	40.8	25 00.2	+48.8	41.1	25 45.2	+49.4	41.4	26 30.1	+49.8	41.8	27 14.7	+50.2	42.1	27 59.1	+50.6	42.5	28 43.2	+51.1	42.8	29 27.1	+51.5	43.2	48
49	25 03.3	+48.3	40.2	25 49.0	+48.8	40.5	26 34.6	+49.1	40.8	27 19.9	+49.5	41.1	28 04.9	+50.0	41.5	28 49.7	+50.5	41.9	29 34.3	+50.9	42.2	30 18.6	+51.3	42.6	49
50	25 51.6	+48.1	39.5	26 37.8	+48.5	39.8	27 23.7	+49.0	40.1	28 09.4	+49.5	40.5	28 54.9	+49.6	40.9	29 40.2	+50.0	41.2	30 25.2	+50.7	41.5	31 09.9	+51.1	42.0	50
51	26 39.7	+47.9	38.9	27 26.3	+48.3	39.2	28 12.7	+48.8	39.5	28 58.9	+49.2	39.9	29 44.8	+49.6	40.2	30 30.5	+50.1	40.6	31 15.9	+50.5	41.0	32 01.0	+51.0	41.4	51
52	27 27.6	+47.7	38.2	28 14.6	+48.2	38.5	29 01.5	+48.6	38.9	29 48.1	+49.0	39.2	30 34.4	+49.5	39.6	31 20.6	+49.9	40.0	32 06.4	+50.4	40.4	32 52.0	+50.8	40.8	52
53	28 15.3	+47.5	37.5	29 02.8	+47.9	37.8	29 50.1	+48.3	38.2	30 37.1	+48.8	38.5	31 23.9	+49.3	38.9	32 10.5	+49.7	39.3	32 56.8	+50.1	39.7	33 42.8	+50.5	40.1	53
54	29 02.8	+47.3	36.8	29 50.7	+47.7	37.1	30 38.4	+48.2	37.5	31 25.9	+48.6	37.9	32 13.2	+49.0	38.2	33 00.2	+49.4	38.6	33 46.9	+49.9	39.1	34 33.3	+50.4	39.5	54
55	29 50.1	+47.0	36.1	30 38.4	+47.5	36.4	31 26.6	+47.9	36.8	32 14.5	+48.4	37.2	33 02.2	+48.8	37.6	33 49.6	+49.3	38.0	34 36.8	+49.7	38.4	35 23.7	+50.1	38.8	55
56	30 37.1	+46.8	35.4	31 25.9	+47.3	35.7	32 14.5	+47.7	36.1	33 02.9	+48.1	36.5	33 51.0	+48.6	36.9	34 38.9	+49.0	37.3	35 26.5	+49.4	37.7	36 13.8	+49.9	38.1	56
57	31 23.9	+46.6	34.6	32 13.2	+47.0	35.0	33 02.2	+47.4	35.4	33 51.0	+47.9	35.8	34 39.6	+48.3	36.2	35 27.9	+48.8	36.6	36 15.9	+49.3	37.0	37 03.7	+49.7	37.5	57
58	32 10.5	+46.3	33.9	33 00.2	+46.7	34.3	33 49.6	+47.2	34.6	34 38.9	+47.6	35.0	35 27.9	+48.0	35.4	36 16.7	+48.5	35.9	37 05.2	+48.9	36.3	37 53.4	+49.4	36.7	58
59	32 56.8	+46.0	33.2	33 46.9	+46.4	33.5	34 36.8	+46.9	33.9	35 26.5	+47.3	34.3	36 15.9	+47.8	34.7	37 05.2	+48.2	35.1	37 54.1	+48.7	35.5	38 42.8	+49.1	35.9	59
60	33 42.8	+45.7	32.4	34 33.3	+46.2	32.7	35 23.7	+46.6	33.1	36 13.8	+47.1	33.5	37 03.7	+47.5	33.9	37 53.4	+47.9	34.4	38 42.8	+48.3	34.8	39 31.9	+48.8	35.3	60
61	34 28.5	+45.4	31.6	35 19.5	+45.8	32.0	36 10.3	+46.3	32.4	37 00.9	+46.7	32.8	37 51.2	+47.2	33.2	38 41.3	+47.6	33.6	39 31.1	+48.1	34.1	40 20.7	+48.5	34.5	61
62	35 13.9	+45.1	30.8	36 05.3	+45.6	31.2	36 56.6	+45.9	31.6	37 47.6	+46.4	32.0	38 38.4	+46.8	32.4	39 28.9	+47.3	32.8	40 19.2	+47.8	33.3	41 09.2	+48.3	33.7	62
63	35 59.0	+44.8	30.0	36 50.9	+45.2	30.4	37 42.5	+45.7	30.8	38 34.0	+46.1	31.2	39 25.2	+46.5	31.6	40 16.2	+47.0	32.0	41 07.0	+47.4	32.5	41 57.5	+47.8	33.0	63
64	36 43.8	+44.4	29.2	37 36.1	+44.8	29.5	38 28.2	+45.2	29.9	39 20.1	+45.7	30.3	40 11.7	+46.2	30.8	41 03.2	+46.6	31.2	41 54.4	+47.0	31.7	42 45.3	+47.5	32.1	64
65	37 28.2	+44.0	28.3	38 20.9	+44.5	28.7	39 13.4	+44.9	29.1	40 05.8	+45.3	29.5	40 57.9	+45.8	29.9	41 49.8	+46.2	30.4	42 41.4	+46.7	30.8	43 32.8	+47.2	31.3	65
66	38 12.2	+43.7	27.5	39 05.4	+44.1	27.8	39 58.3	+44.6	28.2	40 51.1	+45.0	28.6	41 43.7	+45.4	29.1	42 36.0	+45.9	29.5	43 28.1	+46.3	30.0	44 20.0	+46.7	30.4	66
67	38 55.9	+43.3	26.6	39 49.5	+43.6	27.0	40 42.9	+44.1	27.3	41 36.1	+44.5	27.7	42 29.1	+44.9	28.2	43 21.8	+45.5	28.6	44 14.4	+45.9	29.1	45 06.7	+46.3	29.6	67
68	39 39.2	+42.8	25.7	40 33.1	+43.3	26.1	41 27.0	+43.6	26.4	42 20.6	+44.1	26.8	43 14.0	+44.6	27.3	44 07.3	+44.9	27.7	45 00.3	+45.4	28.2	45 53.0	+45.9	28.7	68
69	40 22.0	+42.4	24.8	41 16.4	+42.8	25.1	42 10.6	+43.3	25.5	43 04.7	+43.6	25.9	43 58.6	+44.0	26.3	44 52.2	+44.5	26.8	45 45.7	+44.9	27.2	46 38.9	+45.4	27.7	69
70	41 04.4	+41.9	23.8	41 59.2	+42.3	24.2	42 53.9	+42.7	24.6	43 48.3	+43.2	25.0	44 42.6	+43.6	25.4	45 36.7	+44.1	25.8	46 30.6	+44.5	26.3	47 24.3	+44.9	26.8	70
71	41 46.3	+41.5	22.9	42 41.5	+41.9	23.2	43 36.6	+42.3	23.6	44 31.5	+42.7	24.0	45 26.2	+43.1	24.4	46 20.8	+43.5	24.8	47 15.1	+43.9	25.3	48 09.2	+44.4	25.8	71
72	42 27.8	+41.0	21.9	43 23.4	+41.3	22.3	44 18.9	+41.7	22.6	45 14.2	+42.1	23.0	46 09.3	+42.5	23.4	47 04.3	+42.9	23.8	47 59.0	+43.4	24.3	48 53.6	+43.9	24.8	72
73	43 08.8	+40.4	20.9	44 04.7	+40.8	21.3	45 00.6	+41.2	21.6	45 56.3	+41.6	22.0	46 51.8	+42.0	22.4	47 47.2	+42.4	22.8	48 42.4	+42.9	23.3	49 37.5	+43.2	23.7	73
74	43 49.2	+39.8	19.9	44 45.5	+40.3	20.2	45 41.8	+40.6	20.6	46 37.9	+41.0	21.0	47 33.8	+41.4	21.3	48 29.6	+41.8	21.8	49 25.3	+42.2	22.2	50 20.7	+42.7	22.6	74
75	44 29.0	+39.3	18.9	45 25.8	+39.6	19.2	46 22.4	+40.0	19.5	47 18.9	+40.3	19.9	48 15.2	+40.8	20.3	49 11.4	+41.2	20.7	50 07.5	+41.6	21.1	51 03.4	+42.0	21.5	75
76	45 08.3	+38.7	17.8	46 05.4	+39.0	18.1	47 02.4	+39.3	18.4	47 59.2	+39.8	18.8	48 56.0	+40.1	19.2	49 52.6	+40.5	19.5	50 49.1	+40.9	19.9	51 45.4	+41.3	20.4	76
77	45 47.0	+38.0	16.7	46 44.4	+38.4	17.0	47 41.7	+38.7	17.3	48 39.0	+39.0	17.7	49 36.1	+39.4	18.0	50 33.1	+39.8	18.4	51 30.0	+40.1	18.8	52 26.7	+40.6	19.2	77
78	46 25.0	+37.4	15.7	47 22.8	+37.7	15.9	48 20.4	+38.1	16.2	49 18.0	+38.4	16.5	50 15.5	+38.7	16.8	51 12.9	+39.1	17.2	52 10.1	+39.5	17.6	53 07.3	+39.8	18.0	78
79	47 02.4	+36.7	14.4	48 00.5	+36.9	14.7	48 58.5	+37.2	15.0	49 56.4	+37.6	15.3	50 54.2	+37.9	15.6	51 51.9	+38.3	16.0	52 49.6	+38.6	16.3	53 47.1	+39.0	16.7	79
80	47 39.1	+35.9	13.3	48 37.4	+36.3	13.5	49 35.7	+36.6	13.8	50 34.0	+36.8	14.1	51 32.1	+37.2	14.4	52 30.2	+37.4	14.7	53 28.2	+37.8	15.1	54 26.1	+38.1	15.4	80
81	48 15.0	+35.2	12.1	49 13.7	+35.4	12.3	50 12.3	+35.7	12.6	51 10.8	+36.0	12.8	52 09.3	+36.2	13.1	53 07.6	+36.6	13.4	54 06.0	+36.9	13.8	55 04.2	+37.2	14.1	81
82	48 50.2	+34.4	10.9	49 49.1	+34.6	11.1	50 48.0	+34.8	11.3	51 46.8	+35.1	11.6	52 45.5	+35.4	11.8	53 44.2	+35.7	12.1	54 42.9	+35.9	12.4	55 41.4	+36.3	12.7	82
83	49 24.6	+33.6	9.6	50 23.7	+33.8	9.8	51 22.8	+34.0	10.0	52 21.9	+34.2	10.2	53 20.9	+34.5	10.5	54 19.9	+34.7	10.7	55 18.8	+35.0	11.0	56 17.7	+35.3	11.3	83
84	49 58.2	+32.7	8.3	50 57.5	+32.9	8.5	51 56.8	+33.1	8.7	52 56.1	+33.3	8.9	53 55.4	+33.5	9.1	54 54.6	+33.7	9.3	55 53.8	+34.0	9.6	56 53.0	+34.2	9.8	84
85	50 30.9	+31.8	7.0	51 30.4	+32.0	7.2	52 29.9	+32.1	7.3	53 29.4	+32.3	7.5	54 28.9	+32.5	7.7	55 28.3	+32.7	7.9	56 27.8	+32.8	8.1	57 27.2	+33.0	8.3	85
86	51 02.7	+30.8	5.7	52 02.4	+30.9	5.8	53 02.0	+31.1	5.9	54 01.7	+31.3	6.1	55 01.4	+31.4	6.2	56 01.0	+31.5	6.4	57 00.6	+31.7	6.6	58 00.2	+31.9	6.7	86
87	51 33.5	+29.9	4.3	52 33.3	+30.0	4.4	53 33.1	+30.1	4.5	54 33.0	+30.1	4.6	55 32.8	+30.2	4.7	56 32.5	+30.4	4.8	57 32.3	+30.5	5.0	58 32.1	+30.6	5.1	87
88	52 03.4	+28.8	2.9	53 03.3	+28.9	3.0	54 03.2	+29.0	3.0	55 03.1	+29.1	3.1	56 03.0	+29.1	3.2	57 02.9	+29.2	3.3	58 02.8	+29.3	3.4	59 02.7	+29.4	3.5	88
89	52 32.2	+27.8	1.5	53 32.2	+27.8	1.5	54 32.2	+27.8	1.5	55 32.2	+27.8	1.6	56 32.1	+27.9	1.6	57 32.1	+27.9	1.7	58 32.1	+27.9	1.7	59 32.1	+27.9	1.8	89
90	53 00.0	+26.7	0.0	54 00.0	+26.7	0.0	55 00.0	+26.6	0.0	56 00.0	+26.6	0.0	57 00.0	+26.6	0.0	58 00.0	+26.6	0.0	59 00.0	+26.5	0.0	60 00.0	+26.5	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 117°, 243°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	15 17.8	+49.6	111.3	14 55.9	+50.2	111.5	14 33.8	+50.7	111.8	14 11.4	+51.3	112.0	13 48.8	+51.8	112.2	13 26.0	+52.2	112.5	13 02.9	+52.8	112.7	12 39.7	+53.2	112.9	0
1	16 07.4	+49.6	110.7	15 46.1	+50.1	111.0	15 24.5	+50.7	111.2	15 02.7	+51.2	111.5	14 40.6	+51.7	111.7	14 18.2	+52.3	112.0	13 55.7	+52.7	112.2	13 32.9	+53.2	112.4	1
2	16 57.0	+49.4	110.1	16 36.2	+50.0	110.4	16 15.2	+50.5	110.7	15 53.9	+51.1	110.9	15 32.3	+51.6	111.2	15 10.5	+52.1	111.5	14 48.4	+52.6	111.7	14 26.1	+53.1	111.9	2
3	17 46.4	+49.3	109.5	17 26.2	+49.9	109.8	17 05.7	+50.5	110.1	16 45.0	+51.0	110.4	16 23.9	+51.6	110.7	16 02.6	+52.1	110.9	15 41.0	+52.6	111.2	15 19.2	+53.1	111.5	3
4	18 35.7	+49.2	108.9	18 16.1	+49.8	109.2	17 56.2	+50.4	109.5	17 36.0	+50.9	109.8	17 15.5	+51.5	110.1	16 54.7	+52.0	110.4	16 33.6	+52.5	110.7	16 12.3	+52.9	111.0	4
5	19 24.9	+49.1	108.3	19 05.9	+49.7	108.6	18 46.6	+50.3	109.0	18 26.9	+50.9	109.3	18 07.0	+51.3	109.6	17 46.7	+51.9	109.9	17 26.1	+52.4	110.2	17 05.2	+53.0	110.5	5
6	20 14.0	+49.0	107.7	19 55.6	+49.6	108.0	19 36.9	+50.1	108.4	19 17.8	+50.7	108.7	18 58.3	+51.3	109.1	18 38.6	+51.8	109.4	18 18.5	+52.4	109.7	17 58.2	+52.8	110.0	6
7	21 03.0	+48.8	107.1	20 45.2	+49.4	107.4	20 27.0	+50.1	107.8	20 08.5	+50.6	108.2	19 49.6	+51.2	108.5	19 30.4	+51.7	108.8	19 10.9	+52.2	109.2	18 51.0	+52.8	109.5	7
8	21 51.8	+48.7	106.5	21 34.6	+49.3	106.8	21 17.1	+49.9	107.2	20 59.1	+50.5	107.6	20 40.8	+51.1	107.9	20 22.1	+51.7	108.3	20 03.1	+52.2	108.7	19 43.8	+52.6	109.0	8
9	22 40.5	+48.5	105.8	22 23.9	+49.2	106.2	22 07.0	+49.8	106.6	21 49.6	+50.4	107.0	21 31.9	+50.9	107.4	21 13.8	+51.5	107.8	20 55.3	+52.1	108.1	20 36.4	+52.6	108.5	9
10	23 29.0	+48.4	105.2	23 13.1	+49.0	105.6	22 56.8	+49.6	106.0	22 40.0	+50.3	106.4	22 22.8	+50.9	106.8	22 05.3	+51.4	107.2	21 47.4	+51.9	107.6	21 29.0	+52.5	108.0	10
11	24 17.4	+48.2	104.5	24 02.1	+48.9	105.0	23 46.4	+49.5	105.4	23 30.3	+50.1	105.8	23 13.7	+50.7	106.2	22 56.7	+51.3	106.6	22 39.3	+51.9	107.0	22 21.5	+52.4	107.4	11
12	25 05.6	+48.1	103.9	24 51.0	+48.7	104.3	24 35.9	+49.4	104.8	24 20.4	+49.9	105.2	24 04.4	+50.6	105.7	23 48.0	+51.2	106.1	23 31.2	+51.7	106.5	23 13.9	+52.3	106.9	12
13	25 53.7	+47.8	103.2	25 39.7	+48.5	103.7	25 25.3	+49.1	104.2	25 10.3	+49.9	104.6	24 55.0	+50.4	105.1	24 39.2	+51.0	105.5	24 22.9	+51.6	105.9	24 06.2	+52.2	106.4	13
14	26 41.5	+47.7	102.5	26 28.2	+48.4	103.0	26 14.4	+49.0	103.5	26 00.2	+49.6	104.0	25 45.4	+50.3	104.5	25 30.2	+50.9	104.9	25 14.5	+51.5	105.4	24 58.4	+52.0	105.8	14
15	27 29.2	+47.4	101.9	27 16.6	+48.1	102.4	27 03.4	+48.9	102.9	26 49.8	+49.5	103.4	26 35.7	+50.1	103.9	26 21.1	+50.7	104.3	26 06.0	+51.3	104.8	25 50.4	+51.9	105.3	15
16	28 16.6	+47.3	101.2	28 04.7	+48.0	101.7	27 52.3	+48.6	102.2	27 39.3	+49.3	102.7	27 25.8	+50.0	103.2	27 11.8	+50.6	103.7	26 57.3	+51.2	104.2	26 42.3	+51.8	104.7	16
17	29 03.9	+47.0	100.5	28 52.7	+47.7	101.0	28 40.9	+48.5	101.6	28 28.6	+49.2	102.1	28 15.8	+49.8	102.6	28 02.4	+50.5	103.1	27 48.5	+51.1	103.7	27 34.1	+51.7	104.2	17
18	29 50.9	+46.8	99.8	29 40.4	+47.5	100.3	29 29.4	+48.2	100.9	29 17.8	+48.9	101.4	29 05.6	+49.6	102.0	28 52.9	+50.2	102.5	28 39.6	+50.9	103.1	28 25.8	+51.5	103.6	18
19	30 37.7	+46.5	99.0	30 27.9	+47.3	99.6	30 17.6	+48.0	100.2	30 06.7	+48.7	100.8	29 55.2	+49.4	101.3	29 43.1	+50.1	101.9	29 30.5	+50.7	102.4	29 17.3	+51.3	103.0	19
20	31 24.2	+46.3	98.3	31 15.2	+47.1	98.9	31 05.6	+47.8	99.5	30 55.4	+48.5	100.1	30 44.6	+49.2	100.7	30 33.2	+49.9	101.3	30 21.2	+50.5	101.8	30 08.6	+51.2	102.4	20
21	32 10.5	+46.0	97.5	32 02.3	+46.8	98.2	31 53.4	+47.6	98.8	31 43.9	+48.3	99.4	31 33.8	+49.0	100.0	31 23.1	+49.7	100.6	31 11.7	+50.4	101.2	30 59.8	+51.0	101.8	21
22	32 56.5	+45.7	96.8	32 49.1	+46.5	97.4	32 41.0	+47.3	98.1	32 32.2	+48.1	98.7	32 22.8	+48.8	99.3	32 12.8	+49.5	99.9	32 02.1	+50.2	100.6	31 50.8	+50.8	101.2	22
23	33 42.2	+45.5	96.0	33 35.6	+46.2	96.7	33 28.3	+47.0	97.3	33 20.3	+47.8	98.0	33 11.6	+48.5	98.6	33 02.3	+49.2	99.3	32 52.3	+49.9	99.9	32 41.6	+50.6	100.6	23
24	34 27.7	+45.1	95.2	34 21.8	+46.0	95.9	34 15.3	+46.8	96.6	34 08.1	+47.5	97.3	34 00.2	+48.3	97.9	33 51.5	+49.1	98.6	33 42.2	+49.8	99.3	33 32.2	+50.5	99.9	24
25	35 12.8	+44.8	94.4	35 07.8	+45.6	95.1	35 02.1	+46.4	95.8	34 55.6	+47.3	96.5	34 48.5	+48.0	97.2	34 40.6	+48.8	97.9	34 32.0	+49.5	98.6	34 22.7	+50.2	99.3	25
26	35 57.6	+44.4	93.6	35 53.4	+45.4	94.3	35 48.5	+46.2	95.0	35 42.9	+47.0	95.8	35 36.5	+47.8	96.5	35 29.4	+48.5	97.2	35 21.5	+49.3	97.9	35 12.9	+50.0	98.6	26
27	36 42.0	+44.2	92.8	36 38.8	+44.9	93.5	36 34.7	+45.8	94.3	36 29.9	+46.6	95.0	36 24.3	+47.4	95.7	36 17.9	+48.3	96.5	36 10.8	+49.0	97.2	36 02.9	+49.7	97.9	27
28	37 26.2	+43.7	91.9	37 23.7	+44.7	92.7	37 20.5	+45.5	93.4	37 16.5	+46.4	94.2	37 11.7	+47.2	95.0	37 06.2	+47.9	95.7	36 59.8	+48.7	96.5	36 52.6	+49.5	97.2	28
29	38 09.9	+43.3	91.1	38 08.4	+44.2	91.8	38 06.0	+45.2	92.6	38 02.9	+46.0	93.4	37 58.9	+46.9	94.2	37 54.1	+47.7	95.0	37 48.5	+48.5	95.7	37 42.1	+49.3	96.5	29
30	38 53.2	+43.0	90.2	38 52.6	+43.9	91.0	38 51.2	+44.8	91.8	38 48.9	+45.7	92.6	38 45.8	+46.5	93.4	38 41.8	+47.4	94.2	38 37.0	+48.2	95.0	38 31.4	+49.0	95.8	30
31	39 36.2	+42.5	89.3	39 36.5	+43.5	90.1	39 36.0	+44.4	90.9	39 34.6	+45.3	91.7	39 32.3	+46.2	92.6	39 29.2	+47.0	93.4	39 25.2	+47.9	94.2	39 20.4	+48.7	95.0	31
32	40 18.7	+42.1	88.3	40 20.0	+43.0	89.2	40 20.4	+44.0	90.0	40 19.9	+44.9	90.9	40 18.5	+45.8	91.7	40 16.2	+46.7	92.6	40 13.1	+47.5	93.4	40 09.1	+48.3	94.3	32
33	41 00.8	+41.6	87.4	41 03.0	+42.6	88.3	41 04.4	+43.5	89.1	41 04.8	+44.5	90.0	41 04.3	+45.5	90.9	41 02.9	+46.4	91.8	41 00.6	+47.3	92.6	40 57.4	+48.1	93.5	33
34	41 42.4	+41.1	86.4	41 45.6	+42.1	87.3	41 47.9	+43.1	88.2	41 49.3	+44.1	89.1	41 49.8	+45.0	90.0	41 49.3	+45.9	90.9	41 47.9	+46.8	91.8	41 45.5	+47.7	92.7	34
35	42 23.5	+40.6	85.5	42 27.7	+41.7	86.4	42 31.0	+42.7	87.3	42 33.4	+43.6	88.2	42 34.8	+44.6	89.1	42 35.2	+45.6	90.0	42 34.7	+46.5	91.0	42 33.2	+47.4	91.9	35
36	43 04.1	+40.0	84.5	43 09.4	+41.1	85.4	43 13.7	+42.1	86.3	43 17.0	+43.2	87.3	43 19.4	+44.2	88.2	43 20.8	+45.1	89.2	43 21.2	+46.0	90.1	43 20.6	+46.9	91.0	36
37	43 44.1	+39.5	83.4	43 50.5	+40.5	84.4	43 55.8	+41.7	85.3	44 00.2	+42.7	86.3	44 03.6	+43.6	87.3	44 05.9	+44.7	88.2	44 07.2	+45.7	89.2	44 07.5	+46.6	90.2	37
38	44 23.6	+38.9	82.4	44 31.0	+40.1	83.4	44 37.5	+41.1	84.3	44 42.9	+42.1	85.3	44 47.2	+43.2	86.3	44 50.6	+44.2	87.3	44 52.9	+45.2	88.3	44 54.1	+46.2	89.3	38
39	45 02.5	+38.3	81.3	45 11.1	+39.4	82.3	45 18.6	+40.5	83.3	45 25.0	+41.6	84.3	45 30.4	+42.7	85.3	45 34.8	+43.7	86.3	45 38.1	+44.7	87.4	45 40.3	+45.7	88.4	39
40	45 40.8	+37.7	80.2	45 50.5	+38.8	81.2	45 59.1	+39.9	82.3	46 06.6	+41.1	83.3	46 13.1	+42.1	84.3	46 18.5	+43.2	85.4	46 22.8	+44.2	86.4	46 26.0	+45.3	87.5	40
41	46 18.5	+36.9	79.1	46 29.3	+38.1	80.1	46 39.0	+39.3	81.2	46 47.7	+40.4	82.2	46 55.2	+41.6	83.3	47 01.7	+42.6	84.4	47 07.0	+43.8	85.4	47 11.3	+44.7	86.5	41
42	46 55.4	+36.3	78.0	47 07.4	+37.5	79.0	47 18.3	+38.7	80.1	47 28.1	+39.8	81.1	47 36.8	+40.9	82.2	47 44.3	+42.1	83.3	47 50.8	+43.1	84.4	47 56.0	+44.3	85.5	42
43	47 31.7	+35.5	76.8	47 44.9	+36.7	77.9	47 57.0	+37.9	78.9	48 07.9	+39.1	80.0	48 17.7	+40.3	81.1	48 26.4	+41.5	82.2	48 33.9	+42.6	83.4	48 40.3	+43.6	84.5	43
44	48 07.2	+34.8	75.6	48 21.6	+36.0	76.7	48 34.9	+37.2	77.8	48 47.0	+38.5	78.9	48 58.0	+39.7	80.0	49 07.9	+40.8	81.1	49 16.5	+42.0	82.3	49 23.9	+43.1	83.4	44
45	48 42.0	+34.0	74.4	48 57.6	+35.3	75.5	49 12.1	+36.5	76.6	49 25.5	+37.7	77.7	49 37.7	+38.9	78.9	49 48.7	+40.1	80.0	49 58.5	+41.3	81.2	50 07.0	+42.5	82.4	45
46	49 16.0	+33.1	73.1	49 32.9	+34.4	74.2	49 48.6	+35.7	75.4	50 03.2	+37.0	76.5	50 16.6	+38.2	77.7	50 28.8	+39.4	78.9	50 39.8	+40.6	80.1	50 49.5	+41.9	81.3	46
47	49 49.1	+32.3	71.8	50 07.3	+33.6	72.9	50 24.3	+34.9	74.1	50 40.2	+36.1	75.3	50 54.8	+37.4	76.5	51 08.2	+38.7	77.7	51 20.4	+40.0	78.9	51 31.4	+41.1	80.1	47
48	50 21.4	+31.4	70.5	50 40.9	+32.6	71.6	50 59.2	+34.0	72.8	51 16.3	+35.3	74.0	51 32.2	+36.6	75.2	51 46.9	+37.9	76.4	52 00.4	+39.1	77.7	52 12.5	+40.4	78.9	48
49	50 52.8	+30.4	69.2	51 13.5	+31.8	70.3	51 33.2	+33.1	71.5	51 51.6	+34.4	72.7	52 08.8	+35.8	73.9	52 24.8	+37.1	75.2	52 39.5	+38.4	76.4	52 52.9	+39.7	77.7	49
50	51 23.2	+29.4	67.8	51 45.3	+30.8	69.0	52 06.3	+32.1	70.2	52 26.0	+33.5	71.4	52 44.4	+34.8	72.6	53 01.9	+36.2	73.9	53 17.9	+37.5	75.2	53 32.6	+38.8	76.5	50
51	51 52.6	+28.4	66.4	52 16.1	+29.7	67.6	52 38.4	+31.1	68.8	52 59.5	+32.5	70.0	53 19.4	+33.9	71.3	53 38.1	+35.2	72.5	53 55.4	+36.6	73.9	54 11.4	+38.0	75.2	51
52	52 21.0	+27.3	64.9	52 45.8	+28.8	66.1	53 09.5	+30.2	67.4	53 32.0	+31.6	68.6	53 53.3	+32.9	69.9	54 13.3	+34.3	71.2	54 32.0	+35.7	72.5	54 49.4	+37.1	73.8	52
53	52 48.3	+26.3	63.5	53 14.6	+27.6	64.7	53 39.7	+29.0	65.9	54 03.6	+30.4	67.2	54 26.2	+31.9	68.4	54 47.6	+33.3	69.8	55 07.7	+34.7	71.1	55 26.5	+36.1	72.5	53
54	53 14.6	+25.1	62.0	53 42.2	+26.5	63.2	54 08.7	+27.9	64.4	54 34.0	+29.4	65.7	54 58.1	+30.8	67.0	55 20.9	+32.3	68.3	55 42.4	+33.7	69.7	56 02.6	+35.1	71.1	54
55	53 39.7	+23.9	60.5	54 08.7	+25.3	61.7	54 36.6	+26.8	62.9	55 03.4	+28.1	64.2	55 28.9	+29.6	65.5	55 53.2	+31.1	66.8	56 16.1	+32.6	68.2	56 37.7	+34.1	69.6	55
56	54 03.6	+22.6	58.9	54 34.0	+24.1	60.1	55 03.4	+25.5	61.3	55 31.5	+27.0	62.6	55 58.5	+28.5	63.9	56 24.3	+29.9	65.3	56 48.7	+31.4	66.7	57 11.8	+32.9	68.1	56
57	54 26.2	+21.4	57.3	54 58.1	+22.8	58.5	55 28.9	+24.3	59.8	55 58.5	+25.8	61.0	56 27.0	+27.2	62.3	56 54.2	+28.7	63.7	57 20.1	+30.3	65.1	57 44.7	+31.8	66.5	57
58	54 47.6	+20.1	55.7	55 20.9	+21.5	56.9	55 53.2	+22.9	58.1	56 24.3	+24.4	59.4	56 54.2	+25.9	60.7	57 22.9	+27.5	62.1	57 50.4	+29.0	63.5	58 16.5	+30.5	64.9	58
59	55 07.7	+18.8	54.1	55 42.4	+20.2	55.2	56 16.1	+21.6	56.5	56 48.7	+23.1	57.7	57 20.1	+24.6	59.1	57 50.4	+26.1	60.4	58 19.4	+27.6	61.8	58 47.0	+29.3	63.3	59
60	55 26.5	+17.4	52.4	56 02.6	+18.8	53.6	56 37.7	+20.3	54.8	57 11.8	+21.7	56.0	57 44.7	+23.2	57.4	58 16.5	+24.7	58.7	58 47.0	+26.3	60.1	59 16.3	+27.8	61.6	60
61	55 43.9	+15.9	50.7	56 21.4	+17.3	51.9	56 58.0	+18.7	53.1	57 33.5	+20.2	54.3	58 07.9	+21.8	55.6	58 41.2	+23.3	57.0	59 13.3	+24.9	58.4	59 44.1	+26.5	59.8	61
62	55 59.8	+14.5	49.0	56 38.7	+15.9	50.1	57 16.7	+17.3	51.3	57 53.7	+18.8	52.6	58 29.7	+20.2	53.8	59 04.5	+21.8	55.2	59 38.2	+23.3	56.6	60 10.6	+24.9	58.0	62
63	56 14.3	+13.0	47.2	56 54.6	+14.4	48.3	57 34.0	+15.8	49.5	58 12.5	+17.2	50.8	58 49.9	+18.7	52.0	59 26.3	+20.2	53.4	60 01.5	+21.8	54.8	60 35.5	+23.4	56.2	63
64	56 27.3	+11.6	45.5	57 09.0	+12.8	46.6	57 49.8	+14.2	47.7	58 29.7	+15.6	48.9	59 08.6	+17.1	50.2	59 46.5	+18.6	51.5	60 23.3	+20.1	52.9	60 58.9	+21.8	54.3	64
65	56 38.9	+9.9	43.7	57 21.8	+11.3	44.8	58 04.0	+12.6	45.9	58 45.3	+14.0	47.1	59 25.7	+15.5	48.3	60 05.1	+17.0	49.6	60 43.4	+18.5	51.0	61 20.7	+20.0	52.4	65
66	56 48.8	+8.4	41.9	57 33.1	+9.7	42.9	58 16.6	+11.0	44.0	58 59.3	+12.4	45.2	59 41.2	+13.7	46.4	60 22.1	+15.2	47.7	61 01.9	+16.8	49.0	61 40.7	+18.4	50.4	66
67	56 57.2	+6.8	40.1	57 42.8	+8.0	41.1	58 27.6	+9.4	42.2	59 11.7	+10.7	43.3	59 54.9	+12.1	44.5	60 37.3	+13.5	45.7	61 18.7	+15.0	47.0	61 59.1	+16.5	48.4	67
68	57 04.0	+5.3	38.3	57 50.8	+6.4	39.2	58 37.0	+7.7	40.3	59 22.4	+8.9	41.4	60 07.0	+10.3	42.5	60 50.8	+11.7	43.7	61 33.7	+13.2	45.0	62 15.6	+14.7	46.3	68
69	57 09.3	+3.6	36.4	57 57.2	+4.8	37.4	58 44.6	+6.0	38.4	59 31.3	+7.2	39.4	60 17.3	+8.5	40.5	61 02.5	+9.9	41.7	61 46.9	+11.2	42.9	62 30.3	+12.6	44.2	69
70	57 12.9	+2.0	34.6	58 02.0	+3.1	35.5	58 50.6	+4.2	36.5	59 38.5	+5.4	37.5	60 25.8	+6.7	38.5	61 12.4	+8.0	39.7	61 58.1	+9.4	40.9	62 43.1	+10.8	42.1	70
71	57 14.9	+0.3	32.7	58 05.1	+1.4	33.6	58 54.8	+2.5	34.5	59 43.9	+3.7	35.5	60 32.5	+4.8	36.5	61 20.4	+6.1	37.6	62 07.5	+7.5*	38.7	62 53.9	+8.9*	40.0	71
72	57 15.2	−1.3	30.9	58 06.5	−0.3	31.7	58 57.3	+0.7	32.6	59 47.6	+1.8	33.5	60 37.3	+3.0	34.5	61 26.5	+4.2	35.5	62 15.0	+5.4*	36.6	63 02.8	+6.7*	37.8	72
73	57 13.9	−2.9	29.0	58 06.2	−2.0	29.8	58 58.0	−0.9	30.6	59 49.4	+0.1	31.5	60 40.3	+1.2	32.4	61 30.7	+2.3	33.4	62 20.4	+3.5	34.5	63 09.6	+4.7*	35.6	73
74	57 11.0	−4.5	27.2	58 04.2	−3.6	27.9	58 57.1	−2.8	28.7	59 49.5	−1.8	29.5	60 41.5	−0.8	30.4	61 33.0	+0.3	31.3	62 23.9	+1.5*	32.3	63 14.3	+2.7*	33.4	74
75	57 06.5	−6.1	25.4	58 00.6	−5.3	26.0	58 54.3	−4.4	26.8	59 47.7	−3.5	27.5	60 40.7	−2.6	28.4	61 33.3	−1.6	29.2	62 25.4	−0.5*	30.2	63 17.0	+0.7*	31.2	75
76	57 00.4	−7.7	23.5	57 55.3	−7.0	24.2	58 49.9	−6.2	24.8	59 44.2	−5.4	25.6	60 38.1	−4.4	26.3	61 31.7	−3.5	27.1	62 24.9	−2.5*	28.0	63 17.7	−1.5*	28.9	76
77	56 52.7	−9.3	21.7	57 48.3	−8.6	22.3	58 43.7	−7.8	22.9	59 38.8	−7.1	23.6	60 33.7	−6.3	24.3	61 28.2	−5.4	25.0	62 22.4	−4.5*	25.8	63 16.2	−3.5*	26.7	77
78	56 43.4	−10.8	19.9	57 39.7	−10.2	20.4	58 35.9	−9.6	21.0	59 31.7	−8.8	21.6	60 27.4	−8.1	22.3	61 22.8	−7.3	23.0	62 17.9	−6.5	23.7	63 12.7	−5.6*	24.5	78
79	56 32.6	−12.4	18.1	57 29.5	−11.8	18.6	58 26.3	−11.2	19.1	59 22.9	−10.6	19.7	60 19.3	−9.9	20.3	61 15.5	−9.2	20.9	62 11.4	−8.4	21.6	63 07.1	−7.7*	22.3	79
80	56 20.2	−13.8	16.4	57 17.7	−13.3	16.8	58 15.1	−12.8	17.3	59 12.3	−12.2	17.7	60 09.4	−11.7	18.3	61 06.3	−11.1	18.8	62 03.0	−10.4	19.5	62 59.4	−9.6*	20.1	80
81	56 06.4	−15.3	14.6	57 04.4	−14.9	15.0	58 02.3	−14.4	15.4	59 00.1	−13.9	15.8	59 57.7	−13.4	16.3	60 55.2	−12.8	16.8	61 52.6	−12.3	17.4	62 49.8	−11.7	17.9	81
82	55 51.1	−16.8	12.9	56 49.5	−16.4	13.2	57 47.9	−16.0	13.6	58 46.2	−15.6	14.0	59 44.3	−15.1	14.4	60 42.4	−14.6	14.8	61 40.3	−14.1	15.3	62 38.1	−13.5	15.8	82
83	55 34.3	−18.2	11.2	56 33.1	−17.8	11.5	57 31.9	−17.5	11.8	58 30.6	−17.1	12.1	59 29.2	−16.7	12.5	60 27.8	−16.4	12.8	61 26.2	−15.9	13.2	62 24.6	−15.5	13.7	83
84	55 16.1	−19.5	9.5	56 15.3	−19.2	9.7	57 14.4	−18.9	10.0	58 13.5	−18.7	10.3	59 12.5	−18.3	10.6	60 11.4	−18.0	10.9	61 10.3	−17.6	11.2	62 09.1	−17.2	11.6	84
85	54 56.6	−20.8	7.8	55 56.1	−20.7	8.0	56 55.5	−20.4	8.3	57 54.8	−20.1	8.5	58 54.1	−19.9	8.7	59 53.4	−19.6	9.0	60 52.7	−19.4	9.3	61 51.9	−19.1	9.6	85
86	54 35.8	−22.1	6.2	55 35.4	−21.9	6.4	56 35.1	−21.8	6.5	57 34.7	−21.7	6.7	58 34.2	−21.4	6.9	59 33.8	−21.2	7.1	60 33.3	−21.0	7.3	61 32.8	−20.8	7.6	86
87	54 13.7	−23.4	4.6	55 13.5	−23.3	4.7	56 13.3	−23.2	4.9	57 13.0	−23.0	5.0	58 12.8	−22.9	5.1	59 12.6	−22.8	5.3	60 12.3	−22.6	5.4	61 12.0	−22.4	5.6	87
88	53 50.3	−24.6	3.0	54 50.2	−24.5	3.1	55 50.1	−24.4	3.2	56 50.0	−24.3	3.3	57 49.9	−24.3	3.4	58 49.8	−24.2	3.5	59 49.7	−24.1	3.6	60 49.6	−24.0	3.7	88
89	53 25.7	−25.7	1.5	54 25.7	−25.7	1.5	55 25.7	−25.7	1.6	56 25.7	−25.7	1.6	57 25.6	−25.6	1.7	58 25.6	−25.6	1.7	59 25.6	−25.6	1.8	60 25.6	−25.6	1.8	89
90	53 00.0	−26.9	0.0	54 00.0	−26.9	0.0	55 00.0	−26.9	0.0	56 00.0	−26.9	0.0	57 00.0	−26.9	0.0	58 00.0	−27.0	0.0	59 00.0	−27.0	0.0	60 00.0	−27.0	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

LATITUDE **CONTRARY** NAME TO DECLINATION L.H.A. 64°, 296°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	15 17.8	−49.7	111.3	14 55.9	−50.3	111.5	14 33.8	−50.9	111.8	14 11.4	−51.4	112.0	13 48.8	−51.9	112.2	13 26.0	−52.4	112.5	13 02.9	−52.8	112.7	12 39.7	−53.3	112.9	0
1	14 28.1	−49.8	111.9	14 05.6	−50.3	112.1	13 42.9	−50.8	112.3	13 20.0	−51.4	112.5	12 56.9	−51.9	112.8	12 33.6	−52.3	113.0	12 10.1	−52.9	113.2	11 46.4	−53.3	113.4	1
2	13 38.3	−49.9	112.4	13 15.3	−50.5	112.7	12 52.1	−51.0	112.9	12 28.6	−51.4	113.1	12 05.0	−51.9	113.3	11 41.2	−52.4	113.5	11 17.2	−52.9	113.7	10 53.1	−53.4	113.8	2
3	12 48.4	−50.0	113.0	12 24.8	−50.5	113.2	12 01.1	−51.0	113.4	11 37.2	−51.6	113.6	11 13.1	−52.1	113.8	10 48.8	−52.5	114.0	10 24.3	−53.0	114.1	9 59.7	−53.4	114.3	3
4	11 58.4	−50.0	113.6	11 34.3	−50.5	113.8	11 10.1	−51.1	113.9	10 45.6	−51.5	114.1	10 21.0	−52.0	114.3	9 56.3	−52.6	114.5	9 31.3	−52.9	114.6	9 06.3	−53.5	114.8	4
5	11 08.4	−50.1	114.1	10 43.8	−50.6	114.3	10 19.0	−51.1	114.5	9 54.1	−51.7	114.6	9 29.0	−52.1	114.8	9 03.7	−52.6	114.9	8 38.4	−53.1	115.1	8 12.8	−53.4	115.2	5
6	10 18.3	−50.1	114.7	9 53.2	−50.7	114.9	9 27.9	−51.2	115.0	9 02.4	−51.6	115.2	8 36.9	−52.2	115.3	8 11.1	−52.6	115.4	7 45.3	−53.0	115.6	7 19.4	−53.5	115.7	6
7	9 28.2	−50.2	115.3	9 02.5	−50.7	115.4	8 36.7	−51.2	115.5	8 10.8	−51.7	115.7	7 44.7	−52.2	115.8	7 18.5	−52.6	115.9	6 52.3	−53.1	116.0	6 25.9	−53.6	116.1	7
8	8 38.0	−50.3	115.8	8 11.8	−50.8	115.9	7 45.5	−51.3	116.1	7 19.1	−51.8	116.2	6 52.5	−52.2	116.3	6 25.9	−52.7	116.4	5 59.2	−53.2	116.5	5 32.3	−53.6	116.6	8
9	7 47.7	−50.3	116.4	7 21.0	−50.8	116.5	6 54.2	−51.3	116.6	6 27.3	−51.8	116.7	6 00.3	−52.2	116.8	5 33.2	−52.7	116.9	5 06.0	−53.1	117.0	4 38.8	−53.6	117.0	9
10	6 57.4	−50.3	117.0	6 30.2	−50.8	117.0	6 02.9	−51.3	117.1	5 35.5	−51.8	117.2	5 08.1	−52.3	117.3	4 40.5	−52.7	117.4	4 12.9	−53.1	117.4	3 45.2	−53.5	117.5	10
11	6 07.1	−50.4	117.5	5 39.4	−50.9	117.6	5 11.6	−51.3	117.6	4 43.7	−51.8	117.7	4 15.8	−52.3	117.8	3 47.8	−52.7	117.8	3 19.8	−53.2	117.9	2 51.7	−53.6	117.9	11
12	5 16.7	−50.3	118.0	4 48.5	−50.8	118.1	4 20.3	−51.4	118.2	3 51.9	−51.8	118.2	3 23.5	−52.3	118.3	2 55.1	−52.8	118.3	2 26.6	−53.2	118.4	1 58.1	−53.6	118.4	12
13	4 26.4	−50.5	118.6	3 57.7	−51.0	118.6	3 28.9	−51.4	118.7	3 00.1	−51.9	118.7	2 31.2	−52.3	118.8	2 02.3	−52.7	118.8	1 33.4	−53.2	118.8	1 04.5	−53.6	118.8	13
14	3 35.9	−50.4	119.1	3 06.7	−50.9	119.1	2 37.5	−51.4	119.2	2 08.2	−51.8	119.2	1 38.9	−52.3	119.3	1 09.6	−52.8	119.3	0 40.2	−53.1	119.3	0 10.9	−53.6	119.3	14
15	2 45.5	−50.4	119.6	2 15.8	−50.9	119.7	1 46.1	−51.4	119.7	1 16.4	−51.9	119.7	0 46.6	−52.3	119.7	0 16.8	−52.7	119.8	0 12.9	+53.2	60.2	0 42.7	+53.6	60.3	15
16	1 55.1	−50.5	120.2	1 24.9	−50.9	120.2	0 54.7	−51.4	120.2	0 24.5	−51.9	120.2	0 05.7	+52.3	59.8	0 35.9	+52.8	59.8	1 06.1	+53.2	59.8	1 36.3	+53.6	59.8	16
17	1 04.6	−50.5	120.7	0 34.0	−51.0	120.7	0 03.3	−51.4	120.7	0 27.4	+51.8	59.3	0 58.0	+52.4	59.3	1 28.7	+52.7	59.3	1 59.3	+53.2	59.3	2 29.9	+53.6	59.4	17
18	0 14.1	−50.4	121.3	0 17.0	+50.9	58.7	0 48.1	+51.4	58.7	1 19.2	+51.9	58.8	1 50.4	+52.3	58.8	2 21.4	+52.8	58.8	2 52.5	+53.1	58.9	3 23.5	+53.6	58.9	18
19	0 36.3	+50.5	58.2	1 07.9	+51.0	58.2	1 39.5	+51.4	58.2	2 11.1	+51.9	58.3	2 42.7	+52.3	58.3	3 14.2	+52.7	58.3	3 45.6	+53.2	58.4	4 17.1	+53.5	58.5	19
20	1 26.8	+50.4	57.7	1 58.9	+50.9	57.7	2 30.9	+51.4	57.7	3 03.0	+51.8	57.8	3 35.0	+52.2	57.8	4 06.9	+52.7	57.9	4 38.8	+53.1	57.9	5 10.6	+53.5	58.0	20
21	2 17.2	+50.5	57.1	2 49.8	+50.9	57.2	3 22.3	+51.4	57.2	3 54.8	+51.8	57.3	4 27.2	+52.3	57.3	4 59.6	+52.7	57.4	5 31.9	+53.1	57.5	6 04.1	+53.6	57.5	21
22	3 07.7	+50.4	56.6	3 40.7	+50.9	56.6	4 13.7	+51.3	56.7	4 46.6	+51.8	56.7	5 19.5	+52.2	56.8	5 52.3	+52.7	56.8	6 25.0	+53.1	57.0	6 57.7	+53.4	57.1	22
23	3 58.1	+50.4	56.0	4 31.6	+50.9	56.1	5 05.0	+51.4	56.2	5 38.4	+51.8	56.2	6 11.7	+52.2	56.3	6 45.0	+52.6	56.4	7 18.1	+53.0	56.5	7 51.1	+53.5	56.6	23
24	4 48.5	+50.4	55.5	5 22.5	+50.8	55.6	5 56.4	+51.3	55.6	6 30.2	+51.7	55.7	7 03.9	+52.2	55.8	7 37.6	+52.6	55.9	8 11.1	+53.1	56.1	8 44.6	+53.4	56.2	24
25	5 38.9	+50.3	54.9	6 13.3	+50.8	55.0	6 47.7	+51.2	55.1	7 21.9	+51.7	55.2	7 56.1	+52.2	55.5	8 30.2	+52.6	55.5	9 04.2	+52.9	55.6	9 38.0	+53.4	55.3	25
26	6 29.2	+50.3	54.4	7 04.1	+50.8	54.5	7 38.9	+51.3	54.6	8 13.6	+51.7	54.7	8 48.3	+52.1	54.8	9 22.8	+52.5	55.0	9 57.1	+53.0	55.1	10 31.4	+53.4	55.3	26
27	7 19.5	+50.3	53.8	7 54.9	+50.7	54.0	8 30.2	+51.1	54.1	9 05.3	+51.6	54.2	9 40.4	+52.0	54.3	10 15.3	+52.5	54.5	10 50.1	+52.9	54.6	11 24.8	+53.3	54.8	27
28	8 09.8	+50.2	53.3	8 45.6	+50.7	53.4	9 21.3	+51.2	53.5	9 56.9	+51.6	53.7	10 32.4	+52.0	53.8	11 07.8	+52.4	54.0	11 43.0	+52.8	54.1	12 18.1	+53.2	54.3	28
29	9 00.0	+50.2	52.7	9 36.3	+50.6	52.9	10 12.5	+51.1	53.0	10 48.5	+51.5	53.2	11 24.4	+52.0	53.3	12 00.2	+52.4	53.5	12 35.8	+52.8	53.7	13 11.3	+53.2	53.8	29
30	9 50.2	+50.1	52.2	10 26.9	+50.6	52.3	11 03.6	+51.0	52.5	11 40.0	+51.5	52.6	12 16.4	+51.9	52.8	12 52.6	+52.3	53.0	13 28.6	+52.8	53.2	14 04.5	+53.1	53.4	30
31	10 40.3	+50.1	51.6	11 17.5	+50.5	51.9	11 54.6	+50.9	51.9	12 31.5	+51.4	52.1	13 08.3	+51.8	52.3	13 44.9	+52.3	52.5	14 21.4	+52.6	52.7	14 57.6	+53.1	52.9	31
32	11 30.4	+50.0	51.1	12 08.0	+50.5	51.2	12 45.5	+50.9	51.4	13 22.9	+51.3	51.6	14 00.1	+51.8	51.8	14 37.2	+52.1	52.0	15 14.0	+52.6	52.2	15 50.7	+53.0	52.4	32
33	12 20.4	+49.9	50.5	12 58.5	+50.4	50.7	13 36.4	+50.9	50.9	14 14.2	+51.3	51.0	14 51.9	+51.7	51.3	15 29.3	+52.2	51.5	16 06.6	+52.6	51.7	16 43.7	+53.0	51.9	33
34	13 10.3	+49.9	49.9	13 48.9	+50.3	50.1	14 27.3	+50.7	50.3	15 05.5	+51.2	50.5	15 43.6	+51.6	50.7	16 21.5	+52.0	50.9	16 59.2	+52.4	51.2	17 36.7	+52.9	51.4	34
35	14 00.2	+49.7	49.4	14 39.2	+50.2	49.6	15 18.0	+50.7	49.8	15 56.7	+51.1	50.0	16 35.2	+51.5	50.2	17 13.5	+52.0	50.4	17 51.6	+52.4	50.7	18 29.6	+52.8	50.9	35
36	14 49.9	+49.7	48.8	15 29.4	+50.1	49.0	16 08.7	+50.6	49.2	16 47.8	+51.0	49.4	17 26.7	+51.5	49.7	18 05.5	+51.9	49.9	18 44.0	+52.3	50.2	19 22.4	+52.7	50.4	36
37	15 39.6	+49.6	48.2	16 19.5	+50.1	48.4	16 59.3	+50.5	48.6	17 38.8	+51.0	48.9	18 18.2	+51.4	49.1	18 57.4	+51.8	49.4	19 36.3	+52.2	49.6	20 15.1	+52.6	49.9	37
38	16 29.2	+49.5	47.6	17 09.6	+49.9	47.8	17 49.8	+50.5	48.1	18 29.8	+50.8	48.3	19 09.6	+51.2	48.6	19 49.2	+51.7	48.8	20 28.5	+52.2	49.1	21 07.7	+52.5	49.4	38
39	17 18.7	+49.4	47.0	17 59.5	+49.9	47.3	18 40.2	+50.2	47.5	19 20.6	+50.7	47.8	20 00.8	+51.2	48.0	20 40.9	+51.5	48.3	21 20.7	+52.0	48.6	22 00.2	+52.5	48.9	39
40	18 08.1	+49.3	46.4	18 49.4	+49.7	46.7	19 30.4	+50.2	46.9	20 11.3	+50.6	47.2	20 52.0	+51.0	47.5	21 32.4	+51.5	47.7	22 12.7	+51.9	48.0	22 52.7	+52.3	48.4	40
41	18 57.4	+49.1	45.8	19 39.1	+49.6	46.1	20 20.6	+50.1	46.3	21 01.9	+50.5	46.6	21 43.0	+51.0	46.9	22 23.9	+51.4	47.2	23 04.6	+51.8	47.5	23 45.0	+52.2	47.8	41
42	19 46.5	+49.1	45.2	20 28.7	+49.5	45.5	21 10.7	+49.9	45.8	21 52.4	+50.4	46.0	22 34.0	+50.8	46.3	23 15.3	+51.2	46.6	23 56.4	+51.6	47.0	24 37.2	+52.1	47.3	42
43	20 35.6	+48.9	44.6	21 18.2	+49.3	44.9	22 00.6	+49.8	45.2	22 42.8	+50.3	45.4	23 24.8	+50.7	45.8	24 06.5	+51.2	46.1	24 48.0	+51.6	46.4	25 29.3	+52.0	46.7	43
44	21 24.5	+48.7	44.0	22 07.5	+49.3	44.3	22 50.4	+49.7	44.6	23 33.1	+50.1	44.9	24 15.5	+50.5	45.2	24 57.7	+50.9	45.5	25 39.6	+51.4	45.9	26 21.3	+51.8	46.2	44
45	22 13.2	+48.7	43.4	22 56.8	+49.0	43.6	23 40.1	+49.5	43.9	24 23.2	+49.9	44.3	25 06.0	+50.4	44.6	25 48.6	+50.9	44.9	26 31.0	+51.3	45.3	27 13.1	+51.7	45.6	45
46	23 01.9	+48.4	42.7	23 45.8	+48.9	43.0	24 29.6	+49.4	43.3	25 13.1	+49.8	43.6	25 56.4	+50.3	44.0	26 39.5	+50.7	44.3	27 22.3	+51.1	44.7	28 04.8	+51.6	45.0	46
47	23 50.3	+48.3	42.1	24 34.7	+48.8	42.4	25 19.0	+49.2	42.7	26 02.9	+49.7	43.0	26 46.7	+50.1	43.4	27 30.2	+50.5	43.7	28 13.4	+51.0	44.1	28 56.4	+51.4	44.5	47
48	24 38.6	+48.1	41.4	25 23.5	+48.6	41.7	26 08.2	+49.0	42.1	26 52.6	+49.5	42.4	27 36.8	+49.9	42.7	28 20.7	+50.4	43.1	29 04.4	+50.8	43.5	29 47.8	+51.2	43.9	48
49	25 26.7	+48.0	40.8	26 12.1	+48.4	41.1	26 57.2	+48.8	41.4	27 42.1	+49.3	41.8	28 26.7	+49.8	42.1	29 11.1	+50.2	42.5	29 55.2	+50.6	42.9	30 39.0	+51.1	43.3	49
50	26 14.7	+47.8	40.1	27 00.5	+48.2	40.4	27 46.0	+48.7	40.8	28 31.4	+49.1	41.1	29 16.5	+49.5	41.5	30 01.3	+50.0	41.9	30 45.8	+50.5	42.2	31 30.1	+50.9	42.7	50
51	27 02.5	+47.5	39.4	27 48.7	+48.0	39.8	28 34.7	+48.5	40.1	29 20.5	+48.9	40.5	30 06.0	+49.4	40.8	30 51.3	+49.8	41.2	31 36.3	+50.3	41.6	32 21.0	+50.7	42.0	51
52	27 50.0	+47.4	38.7	28 36.7	+47.8	39.1	29 23.2	+48.3	39.4	30 09.4	+48.7	39.8	30 55.4	+49.2	40.2	31 41.1	+49.6	40.6	32 26.6	+50.0	41.0	33 11.7	+50.5	41.4	52
53	28 37.4	+47.1	38.0	29 24.5	+47.6	38.4	30 11.5	+48.0	38.7	30 58.1	+48.5	39.1	31 44.6	+48.9	39.5	32 30.7	+49.4	39.9	33 16.6	+49.9	40.3	34 02.2	+50.3	40.7	53
54	29 24.5	+47.0	37.3	30 12.1	+47.4	37.7	30 59.5	+47.8	38.0	31 46.6	+48.3	38.4	32 33.5	+48.7	38.8	33 20.1	+49.2	39.2	34 06.5	+49.6	39.6	34 52.5	+50.1	40.1	54
55	30 11.5	+46.6	36.6	30 59.5	+47.1	37.0	31 47.3	+47.6	37.3	32 34.9	+48.1	37.7	33 22.2	+48.5	38.1	34 09.3	+49.0	38.5	34 56.1	+49.4	39.0	35 42.6	+49.9	39.4	55
56	30 58.1	+46.5	35.9	31 46.6	+46.9	36.2	32 34.9	+47.3	36.6	33 23.0	+47.7	37.0	34 10.7	+48.3	37.4	34 58.3	+48.7	37.8	35 45.5	+49.2	38.3	36 32.5	+49.6	38.7	56
57	31 44.6	+46.1	35.1	32 33.5	+46.6	35.5	33 22.2	+47.1	35.9	34 10.7	+47.6	36.3	34 59.0	+48.0	36.7	35 47.0	+48.4	37.1	36 34.7	+48.9	37.6	37 22.1	+49.3	38.0	57
58	32 30.7	+45.9	34.4	33 20.1	+46.4	34.8	34 09.3	+46.8	35.1	34 58.3	+47.2	35.5	35 47.0	+47.7	36.0	36 35.4	+48.2	36.4	37 23.6	+48.6	36.8	38 11.4	+49.1	37.3	58
59	33 16.6	+45.6	33.6	34 06.5	+46.0	34.0	34 56.1	+46.5	34.4	35 45.5	+47.0	34.8	36 34.7	+47.4	35.2	37 23.6	+47.8	35.7	38 12.2	+48.3	36.1	39 00.5	+48.8	36.6	59
60	34 02.2	+45.3	32.8	34 52.5	+45.8	33.2	35 42.6	+46.2	33.6	36 32.5	+46.6	34.0	37 22.1	+47.1	34.4	38 11.4	+47.6	34.9	39 00.5	+48.1	35.3	39 49.3	+48.5	35.8	60
61	34 47.5	+45.0	32.0	35 38.3	+45.4	32.4	36 28.8	+45.9	32.8	37 19.1	+46.4	33.2	38 09.2	+46.8	33.7	38 59.0	+47.3	34.1	39 48.6	+47.7	34.6	40 37.8	+48.2	35.0	61
62	35 32.5	+44.7	31.2	36 23.7	+45.1	31.6	37 14.7	+45.5	32.0	38 05.5	+46.0	32.4	38 56.0	+46.5	32.9	39 46.3	+46.9	33.3	40 36.3	+47.4	33.8	41 26.0	+47.9	34.3	62
63	36 17.2	+44.3	30.4	37 08.8	+44.8	30.8	38 00.2	+45.2	31.2	38 51.5	+45.6	31.6	39 42.5	+46.1	32.0	40 33.2	+46.6	32.5	41 23.7	+47.0	33.0	42 13.9	+47.5	33.4	63
64	37 01.5	+43.9	29.6	37 53.6	+44.4	30.0	38 45.4	+44.9	30.3	39 37.1	+45.3	30.8	40 28.6	+45.7	31.2	41 19.8	+46.2	31.6	42 10.7	+46.7	32.1	43 01.4	+47.1	32.6	64
65	37 45.4	+43.6	28.7	38 38.0	+44.0	29.1	39 30.3	+44.4	29.5	40 22.4	+44.9	29.9	41 14.3	+45.3	30.3	42 06.0	+45.8	30.8	42 57.4	+46.2	31.3	43 48.5	+46.7	31.8	65
66	38 29.0	+43.2	27.8	39 22.0	+43.6	28.2	40 14.7	+44.1	28.6	41 07.3	+44.5	29.0	41 59.6	+45.0	29.5	42 51.8	+45.3	29.9	43 43.6	+45.9	30.4	44 35.3	+46.3	30.9	66
67	39 12.2	+42.7	26.9	40 05.6	+43.1	27.3	40 58.8	+43.6	27.7	41 51.8	+44.0	28.1	42 44.6	+44.5	28.6	43 37.2	+44.9	29.0	44 29.5	+45.4	29.5	45 21.6	+45.9	30.0	67
68	39 54.9	+42.3	26.0	40 48.7	+42.8	26.4	41 42.4	+43.2	26.8	42 35.8	+43.6	27.2	43 29.1	+44.0	27.6	44 22.1	+44.5	28.1	45 14.9	+45.0	28.6	46 07.5	+45.5	29.1	68
69	40 37.2	+41.9	25.1	41 31.5	+42.3	25.5	42 25.6	+42.7	25.9	43 19.4	+43.2	26.3	44 13.1	+43.6	26.7	45 06.6	+44.1	27.2	45 59.9	+44.5	27.6	46 53.0	+44.9	28.1	69
70	41 19.1	+41.4	24.2	42 13.8	+41.8	24.5	43 08.3	+42.2	24.9	44 02.6	+42.6	25.3	44 56.7	+43.1	25.7	45 50.7	+43.5	26.2	46 44.4	+44.0	26.7	47 37.9	+44.5	27.1	70
71	42 00.5	+40.9	23.2	42 55.6	+41.2	23.6	43 50.5	+41.7	23.9	44 45.2	+42.1	24.3	45 39.8	+42.6	24.8	46 34.2	+43.0	25.2	47 28.4	+43.4	25.7	48 22.4	+43.9	26.1	71
72	42 41.4	+40.3	22.2	43 36.8	+40.8	22.6	44 32.2	+41.1	22.9	45 27.4	+41.5	23.3	46 22.4	+42.0	23.7	47 17.2	+42.4	24.2	48 11.8	+42.9	24.6	49 06.3	+43.3	25.1	72
73	43 21.7	+39.8	21.2	44 17.6	+40.2	21.5	45 13.3	+40.6	21.9	46 08.9	+41.0	22.3	47 04.4	+41.4	22.7	47 59.6	+41.9	23.1	48 54.7	+42.3	23.6	49 49.6	+42.8	24.0	73
74	44 01.5	+39.3	20.2	44 57.8	+39.6	20.5	45 53.9	+40.0	20.9	46 49.9	+40.4	21.2	47 45.8	+40.8	21.6	48 41.5	+41.2	22.0	49 37.0	+41.7	22.5	50 32.4	+42.1	22.9	74
75	44 40.8	+38.6	19.1	45 37.4	+39.0	19.4	46 33.9	+39.4	19.8	47 30.3	+39.8	20.1	48 26.6	+40.2	20.5	49 22.7	+40.6	20.9	50 18.7	+41.0	21.4	51 14.5	+41.4	21.8	75
76	45 19.4	+38.0	18.0	46 16.4	+38.4	18.3	47 13.3	+38.8	18.7	48 10.1	+39.1	19.0	49 06.8	+39.5	19.4	50 03.3	+39.9	19.8	50 59.7	+40.3	20.2	51 55.9	+40.7	20.6	76
77	45 57.4	+37.4	16.9	46 54.8	+37.7	17.2	47 52.1	+38.0	17.5	48 49.2	+38.4	17.9	49 46.3	+38.7	18.2	50 43.2	+39.1	18.6	51 40.0	+39.5	19.0	52 36.6	+40.0	19.4	77
78	46 34.8	+36.7	15.8	47 32.5	+37.0	16.1	48 30.1	+37.3	16.4	49 27.6	+37.7	16.7	50 25.0	+38.1	17.1	51 22.3	+38.4	17.4	52 19.5	+38.8	17.8	53 16.6	+39.2	18.2	78
79	47 11.5	+35.9	14.6	48 09.5	+36.2	14.9	49 07.4	+36.6	15.2	50 05.3	+36.9	15.5	51 03.1	+37.2	15.8	52 00.7	+37.6	16.2	52 58.3	+38.0	16.5	53 55.8	+38.3	16.9	79
80	47 47.4	+35.2	13.4	48 45.7	+35.5	13.7	49 44.0	+35.8	14.0	50 42.2	+36.1	14.3	51 40.3	+36.4	14.6	52 38.3	+36.8	14.9	53 36.3	+37.1	15.3	54 34.1	+37.5	15.6	80
81	48 22.6	+34.5	12.2	49 21.2	+34.7	12.5	50 19.8	+35.0	12.7	51 18.3	+35.2	13.0	52 16.7	+35.6	13.3	53 15.1	+35.8	13.6	54 13.4	+36.1	13.9	55 11.6	+36.5	14.3	81
82	48 57.1	+33.6	11.0	49 55.9	+33.9	11.2	50 54.8	+34.1	11.4	51 53.5	+34.4	11.7	52 52.3	+34.6	12.0	53 50.9	+35.0	12.2	54 49.5	+35.3	12.5	55 48.1	+35.5	12.9	82
83	49 30.7	+32.7	9.7	50 29.8	+33.0	9.9	51 28.9	+33.2	10.1	52 27.9	+33.5	10.4	53 26.9	+33.7	10.6	54 25.9	+33.9	10.9	55 24.8	+34.2	11.1	56 23.6	+34.5	11.4	83
84	50 03.4	+31.9	8.6	51 02.8	+32.0	8.6	52 02.1	+32.2	8.8	53 01.4	+32.4	9.0	54 00.6	+32.7	9.2	54 59.8	+32.9	9.4	55 59.0	+33.1	9.7	56 58.1	+33.4	9.9	84
85	50 35.3	+30.9	7.1	51 34.8	+31.1	7.2	52 34.3	+31.3	7.4	53 33.8	+31.5	7.6	54 33.3	+31.6	7.8	55 32.7	+31.9	8.0	56 32.1	+32.1	8.2	57 31.5	+32.3	8.4	85
86	51 06.2	+30.0	5.7	52 05.9	+30.1	5.9	53 05.6	+30.3	6.0	54 05.3	+30.4	6.1	55 04.9	+30.6	6.3	56 04.6	+30.7	6.5	57 04.2	+30.8	6.6	58 03.8	+31.0	6.8	86
87	51 36.2	+29.0	4.3	52 36.0	+29.1	4.4	53 35.9	+29.1	4.5	54 35.7	+29.3	4.7	55 35.5	+29.4	4.8	56 35.3	+29.5	4.9	57 35.0	+29.7	5.0	58 34.8	+29.8	5.2	87
88	52 05.2	+27.9	2.9	53 05.1	+28.0	3.0	54 05.0	+28.1	3.1	55 05.0	+28.1	3.1	56 04.9	+28.2	3.2	57 04.8	+28.2	3.3	58 04.7	+28.3	3.4	59 04.6	+28.4	3.5	88
89	52 33.1	+26.9	1.5	53 33.1	+26.9	1.5	54 33.1	+26.9	1.5	55 33.1	+26.9	1.6	56 33.1	+26.9	1.6	57 33.0	+27.0	1.7	58 33.0	+27.0	1.7	59 33.0	+27.0	1.8	89
90	53 00.0	+25.7	0.0	54 00.0	+25.7	0.0	55 00.0	+25.7	0.0	56 00.0	+25.7	0.0	57 00.0	+25.6	0.0	58 00.0	+25.6	0.0	59 00.0	+25.6	0.0	60 00.0	+25.6	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION **L.H.A. 116°, 244°**

	53°			54°			55°			56°			57°			58°			59°			60°			
Dec.	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	14 44.1	+49.5	110.4	14 23.0	+50.1	110.7	14 01.7	+50.6	110.9	13 40.2	+51.1	111.1	13 18.4	+51.7	111.4	12 56.5	+52.2	111.6	12 34.3	+52.7	111.8	12 11.9	+53.2	112.0	0
1	15 33.6	+49.4	109.8	15 13.1	+50.0	110.1	14 52.3	+50.6	110.4	14 31.3	+51.1	110.6	14 10.1	+51.6	110.8	13 48.7	+52.1	111.1	13 27.0	+52.6	111.3	13 05.1	+53.1	111.5	1
2	16 23.0	+49.3	109.3	16 03.1	+49.8	109.5	15 42.9	+50.4	109.8	15 22.4	+51.0	110.1	15 01.7	+51.6	110.3	14 40.8	+52.0	110.6	14 19.6	+52.5	110.8	13 58.2	+53.0	111.0	2
3	17 12.3	+49.2	108.7	16 52.9	+49.8	108.9	16 33.3	+50.4	109.2	16 13.4	+50.9	109.5	15 53.3	+51.4	109.8	15 32.8	+52.0	110.0	15 12.1	+52.5	110.3	14 51.2	+53.0	110.6	3
4	18 01.5	+49.1	108.1	17 42.7	+49.7	108.4	17 23.7	+50.3	108.7	17 04.3	+50.9	109.0	16 44.7	+51.4	109.2	16 24.8	+51.9	109.5	16 04.6	+52.4	109.8	15 44.2	+52.9	110.1	4
5	18 50.6	+49.0	107.4	18 32.4	+49.6	107.8	18 14.0	+50.1	108.1	17 55.2	+50.7	108.4	17 36.1	+51.3	108.7	17 16.7	+51.8	109.0	16 57.0	+52.4	109.3	16 37.1	+52.8	109.6	5
6	19 39.6	+48.8	106.8	19 22.0	+49.5	107.2	19 04.1	+50.1	107.5	18 45.9	+50.6	107.8	18 27.4	+51.2	108.2	18 08.5	+51.7	108.5	17 49.4	+52.2	108.8	17 29.9	+52.7	109.1	6
7	20 28.4	+48.7	106.2	20 11.5	+49.3	106.6	19 54.2	+49.9	106.9	19 36.5	+50.5	107.3	19 18.6	+51.0	107.6	19 00.2	+51.7	107.9	18 41.6	+52.2	108.3	18 22.6	+52.7	108.6	7
8	21 17.1	+48.6	105.6	21 00.8	+49.2	106.0	20 44.1	+49.8	106.3	20 27.1	+50.4	106.7	20 09.6	+51.0	107.0	19 51.9	+51.5	107.4	19 33.8	+52.0	107.7	19 15.3	+52.6	108.1	8
9	22 05.7	+48.4	105.0	21 50.0	+49.1	105.4	21 33.9	+49.7	105.7	21 17.5	+50.2	106.1	21 00.6	+50.9	106.5	20 43.4	+51.4	106.8	20 25.8	+52.0	107.2	20 07.9	+52.5	107.6	9
10	22 54.1	+48.3	104.3	22 39.1	+48.9	104.7	22 23.6	+49.5	105.1	22 07.7	+50.2	105.5	21 51.5	+50.7	105.9	21 34.8	+51.4	106.3	21 17.8	+51.9	106.7	21 00.4	+52.4	107.0	10
11	23 42.4	+48.1	103.7	23 28.0	+48.8	104.1	23 13.2	+49.4	104.5	22 57.9	+50.0	104.9	22 42.2	+50.7	105.3	22 26.2	+51.2	105.7	22 09.7	+51.8	106.1	21 52.8	+52.3	106.5	11
12	24 30.5	+47.9	103.0	24 16.8	+48.6	103.5	24 02.6	+49.2	103.9	23 47.9	+49.9	104.3	23 32.9	+50.5	104.8	23 17.4	+51.1	105.2	23 01.5	+51.6	105.6	22 45.1	+52.2	106.0	12
13	25 18.4	+47.8	102.4	25 05.4	+48.4	102.8	24 51.8	+49.1	103.3	24 37.8	+49.7	103.7	24 23.4	+50.3	104.2	24 08.5	+50.9	104.6	23 53.1	+51.5	105.0	23 37.3	+52.1	105.5	13
14	26 06.2	+47.6	101.7	25 53.8	+48.3	102.2	25 40.9	+48.9	102.6	25 27.5	+49.6	103.1	25 13.7	+50.2	103.6	24 59.4	+50.8	104.0	24 44.6	+51.5	104.5	24 29.4	+52.0	104.9	14
15	26 53.8	+47.3	101.0	26 42.1	+48.0	101.5	26 29.8	+48.8	102.0	26 17.1	+49.4	102.5	26 03.9	+50.1	103.0	25 50.2	+50.7	103.4	25 36.1	+51.2	103.9	25 21.4	+51.9	104.4	15
16	27 41.1	+47.2	100.3	27 30.1	+47.9	100.8	27 18.6	+48.6	101.3	27 06.5	+49.3	101.8	26 54.0	+49.9	102.3	26 40.9	+50.5	102.8	26 27.3	+51.1	103.3	26 13.3	+51.7	103.8	16
17	28 28.3	+46.9	99.6	28 18.0	+47.7	100.1	28 07.2	+48.3	100.7	27 55.8	+49.0	101.2	27 43.9	+49.7	101.7	27 31.4	+50.4	102.2	27 18.4	+51.0	102.7	27 05.0	+51.5	103.2	17
18	29 15.2	+46.8	98.9	29 05.7	+47.4	99.5	28 55.5	+48.2	100.0	28 44.8	+48.9	100.5	28 33.6	+49.5	101.1	28 21.8	+50.2	101.6	28 09.4	+50.8	102.1	27 56.5	+51.5	102.7	18
19	30 02.0	+46.4	98.2	29 53.1	+47.2	98.8	29 43.7	+47.9	99.3	29 33.7	+48.7	99.9	29 23.1	+49.4	100.4	29 12.0	+50.0	101.0	29 00.2	+50.7	101.5	28 48.0	+51.3	102.1	19
20	30 48.4	+46.2	97.4	30 40.3	+47.0	98.0	30 31.6	+47.8	98.6	30 22.4	+48.4	99.2	30 12.5	+49.1	99.8	30 02.0	+49.8	100.4	29 50.9	+50.5	100.9	29 39.3	+51.1	101.5	20
21	31 34.6	+46.0	96.7	31 27.3	+46.8	97.3	31 19.4	+47.5	97.9	31 10.8	+48.2	98.5	31 01.6	+48.9	99.1	30 51.8	+49.6	99.7	30 41.4	+50.3	100.3	30 30.4	+50.9	100.9	21
22	32 20.6	+45.7	95.9	32 14.1	+46.4	96.6	32 06.9	+47.2	97.2	31 59.0	+48.0	97.8	31 50.5	+48.8	98.4	31 41.4	+49.5	99.0	31 31.7	+50.1	99.7	31 21.3	+50.8	100.3	22
23	33 06.3	+45.4	95.2	33 00.5	+46.2	95.8	32 54.1	+47.0	96.5	32 47.0	+47.8	97.1	32 39.3	+48.5	97.7	32 30.9	+49.2	98.4	32 21.8	+49.9	99.0	32 12.1	+50.5	99.6	23
24	33 51.7	+45.1	94.4	33 46.7	+45.9	95.1	33 41.1	+46.7	95.7	33 34.8	+47.5	96.4	33 27.8	+48.2	97.0	33 20.1	+48.9	97.7	33 11.7	+49.7	98.3	33 02.6	+50.4	99.0	24
25	34 36.8	+44.7	93.6	34 32.6	+45.7	94.3	34 27.8	+46.4	95.0	34 22.3	+47.2	95.6	34 16.0	+48.0	96.3	34 09.0	+48.8	97.0	34 01.4	+49.4	97.7	33 53.0	+50.2	98.3	25
26	35 21.5	+44.5	92.8	35 18.3	+45.2	93.5	35 14.2	+46.2	94.2	35 09.5	+46.9	94.9	35 04.0	+47.7	95.6	34 57.8	+48.5	96.3	34 50.8	+49.3	97.0	34 43.2	+49.9	97.7	26
27	36 06.0	+44.1	92.0	36 03.5	+45.0	92.7	36 00.4	+45.8	93.4	35 56.4	+46.7	94.1	35 51.7	+47.5	94.9	35 46.3	+48.2	95.6	35 40.1	+49.0	96.3	35 33.1	+49.7	97.0	27
28	36 50.1	+43.7	91.1	36 48.5	+44.6	91.9	36 46.2	+45.5	92.6	36 43.1	+46.3	93.3	36 39.2	+47.1	94.1	36 34.5	+47.9	94.8	36 29.1	+48.7	95.6	36 22.8	+49.5	96.3	28
29	37 33.8	+43.3	90.2	37 33.1	+44.3	91.0	37 31.7	+45.1	91.8	37 29.4	+46.0	92.6	37 26.3	+46.9	93.3	37 22.4	+47.7	94.1	37 17.8	+48.4	94.8	37 12.3	+49.2	95.6	29
30	38 17.1	+43.0	89.4	38 17.4	+43.8	90.2	38 16.8	+44.8	91.0	38 15.4	+45.6	91.7	38 13.2	+46.5	92.5	38 10.1	+47.3	93.3	38 06.2	+48.2	94.1	38 01.5	+49.0	94.9	30
31	39 00.1	+42.5	88.5	39 01.2	+43.5	89.3	39 01.6	+44.4	90.1	39 01.0	+45.3	90.9	38 59.7	+46.1	91.7	38 57.4	+47.1	92.5	38 54.4	+47.8	93.3	38 50.5	+48.6	94.1	31
32	39 42.6	+42.1	87.6	39 44.7	+43.1	88.4	39 46.0	+44.0	89.2	39 46.3	+45.0	90.1	39 45.8	+45.9	90.9	39 44.5	+46.7	91.7	39 42.2	+47.6	92.6	39 39.1	+48.4	93.4	32
33	40 24.7	+41.6	86.6	40 27.8	+42.6	87.5	40 30.0	+43.5	88.3	40 31.3	+44.5	89.2	40 31.7	+45.4	90.0	40 31.2	+46.3	90.9	40 29.8	+47.2	91.8	40 27.5	+48.0	92.6	33
34	41 06.3	+41.2	85.7	41 10.4	+42.1	86.6	41 13.5	+43.2	87.4	41 15.8	+44.1	88.3	41 17.1	+45.0	89.2	41 17.5	+45.9	90.1	41 17.0	+46.8	90.9	41 15.5	+47.7	91.8	34
35	41 47.5	+40.6	84.7	41 52.5	+41.7	85.6	41 56.7	+42.7	86.5	41 59.9	+43.6	87.4	42 02.1	+44.6	88.3	42 03.4	+45.6	89.2	42 03.8	+46.5	90.1	42 03.2	+47.4	91.0	35
36	42 28.1	+40.2	83.7	42 34.2	+41.2	84.6	42 39.4	+42.2	85.5	42 43.5	+43.2	86.5	42 46.7	+44.2	87.4	42 49.0	+45.1	88.3	42 50.3	+46.0	89.2	42 50.6	+47.0	90.2	36
37	43 08.3	+39.5	82.7	43 15.4	+40.6	83.6	43 21.6	+41.6	84.6	43 26.7	+42.8	85.5	43 30.9	+43.7	86.5	43 34.1	+44.7	87.4	43 36.3	+45.7	88.4	43 37.6	+46.6	89.3	37
38	43 47.8	+39.0	81.7	43 56.0	+40.1	82.6	44 03.2	+41.2	83.6	44 09.5	+42.2	84.5	44 14.6	+43.3	85.5	44 18.8	+44.3	86.5	44 22.0	+45.2	87.5	44 24.1	+46.2	88.4	38
39	44 26.8	+38.5	80.6	44 36.1	+39.5	81.6	44 44.4	+40.6	82.6	44 51.7	+41.6	83.6	44 57.9	+42.7	84.5	45 03.1	+43.7	85.5	45 07.2	+44.8	86.5	45 10.3	+45.8	87.5	39
40	45 05.3	+37.7	79.5	45 15.6	+39.0	80.5	45 25.0	+40.0	81.5	45 33.3	+41.2	82.5	45 40.6	+42.2	83.5	45 46.8	+43.3	84.6	45 52.0	+44.3	85.6	45 56.1	+45.2	86.6	40
41	45 43.0	+37.2	78.4	45 54.6	+38.2	79.4	46 05.0	+39.4	80.5	46 14.5	+40.5	81.5	46 22.8	+41.6	82.5	46 30.1	+42.7	83.6	46 36.3	+43.7	84.6	46 41.3	+44.8	85.7	41
42	46 20.2	+36.4	77.3	46 32.8	+37.6	78.3	46 44.4	+38.8	79.4	46 55.0	+39.9	80.4	47 04.4	+41.1	81.5	47 12.8	+42.1	82.5	47 20.0	+43.2	83.6	47 26.1	+44.3	84.7	42
43	46 56.6	+35.7	76.1	47 10.4	+37.0	77.2	47 23.2	+38.1	78.2	47 34.9	+39.3	79.3	47 45.5	+40.4	80.4	47 54.9	+41.6	81.5	48 03.2	+42.7	82.6	48 10.4	+43.8	83.7	43
44	47 32.3	+35.0	75.0	47 47.4	+36.2	76.0	48 01.3	+37.4	77.1	48 14.2	+38.6	78.2	48 25.9	+39.8	79.3	48 36.5	+40.9	80.4	48 45.9	+42.1	81.5	48 54.2	+43.1	82.7	44
45	48 07.3	+34.2	73.7	48 23.6	+35.4	74.8	48 38.7	+36.7	75.9	48 52.8	+37.8	77.0	49 05.7	+39.0	78.1	49 17.4	+40.3	79.3	49 28.0	+41.4	80.4	49 37.3	+42.6	81.6	45
46	48 41.5	+33.4	72.5	48 59.0	+34.6	73.6	49 15.4	+35.9	74.7	49 30.6	+37.2	75.8	49 44.7	+38.4	77.0	49 57.7	+39.5	78.1	50 09.4	+40.7	79.3	50 19.9	+41.9	80.5	46
47	49 14.9	+32.5	71.2	49 33.6	+33.8	72.3	49 51.3	+35.0	73.5	50 07.8	+36.3	74.6	50 23.1	+37.6	75.8	50 37.2	+38.9	77.0	50 50.1	+40.1	78.2	51 01.8	+41.3	79.4	47
48	49 47.4	+31.7	69.9	50 07.4	+33.0	71.1	50 26.3	+34.3	72.2	50 44.1	+35.5	73.4	51 00.7	+36.8	74.6	51 16.1	+38.0	75.8	51 30.2	+39.3	77.0	51 43.1	+40.6	78.2	48
49	50 19.1	+30.7	68.6	50 40.4	+32.0	69.8	51 00.6	+33.3	70.9	51 19.6	+34.7	72.1	51 37.5	+35.9	73.3	51 54.1	+37.3	74.5	52 09.5	+38.6	75.7	52 23.7	+39.8	77.0	49
50	50 49.8	+29.8	67.3	51 12.4	+31.1	68.4	51 33.9	+32.5	69.6	51 54.3	+33.7	70.8	52 13.4	+35.1	72.0	52 31.4	+36.4	73.2	52 48.1	+37.7	74.5	53 03.5	+39.0	75.8	50
51	51 19.6	+28.7	65.9	51 43.5	+30.2	67.0	52 06.4	+31.4	68.2	52 28.0	+32.9	69.4	52 48.5	+34.2	70.7	53 07.8	+35.5	71.9	53 25.8	+36.8	73.2	53 42.5	+38.1	74.5	51
52	51 48.3	+27.8	64.5	52 13.7	+29.1	65.6	52 37.8	+30.5	66.8	53 00.9	+31.8	68.0	53 22.7	+33.2	69.3	53 43.3	+34.6	70.6	54 02.6	+36.0	71.9	54 20.6	+37.3	73.2	52
53	52 16.1	+26.7	63.0	52 42.8	+28.0	64.2	53 08.3	+29.4	65.4	53 32.7	+30.8	66.6	53 55.9	+32.2	67.9	54 17.9	+33.5	69.2	54 38.6	+34.9	70.5	54 57.9	+36.4	71.8	53
54	52 42.8	+25.5	61.6	53 10.8	+26.9	62.7	53 37.7	+28.3	63.9	54 03.5	+29.7	65.2	54 28.1	+31.1	66.4	54 51.4	+32.6	67.7	55 13.5	+34.0	69.1	55 34.3	+35.4	70.4	54
55	53 08.3	+24.4	60.1	53 37.7	+25.8	61.2	54 06.0	+27.2	62.4	54 33.2	+28.6	63.7	54 59.2	+30.0	65.0	55 24.0	+31.5	66.3	55 47.5	+32.9	67.6	56 09.7	+34.3	69.0	55
56	53 32.7	+23.2	58.5	54 03.5	+24.6	59.7	54 33.2	+26.0	60.9	55 01.8	+27.4	62.2	55 29.2	+28.9	63.5	55 55.5	+30.3	64.8	56 20.4	+31.8	66.1	56 44.0	+33.2	67.5	56
57	53 55.9	+22.0	57.0	54 28.1	+23.3	58.1	54 59.2	+24.8	59.4	55 29.2	+26.3	60.6	55 58.1	+27.7	61.9	56 25.8	+29.1	63.2	56 52.2	+30.6	64.6	57 17.3	+32.1	66.0	57
58	54 17.9	+20.7	55.4	54 51.4	+22.1	56.5	55 24.0	+23.5	57.8	55 55.5	+24.9	59.0	56 25.8	+26.4	60.3	56 54.9	+27.9	61.6	57 22.8	+29.4	63.0	57 49.4	+30.9	64.4	58
59	54 38.6	+19.3	53.8	55 13.5	+20.8	54.9	55 47.5	+22.2	56.1	56 20.4	+23.6	57.4	56 52.2	+25.1	58.7	57 22.8	+26.6	60.0	57 52.2	+28.1	61.4	58 20.3	+29.6	62.8	59
60	54 57.9	+18.1	52.1	55 34.3	+19.4	53.3	56 09.7	+20.8	54.5	56 44.0	+22.3	55.7	57 17.3	+23.7	57.0	57 49.4	+25.2	58.3	58 20.3	+26.8	59.7	58 49.9	+28.3	61.1	60
61	55 16.0	+16.6	50.5	55 53.7	+18.0	51.6	56 30.5	+19.4	52.8	57 06.3	+20.8	54.0	57 41.0	+22.3	55.3	58 14.6	+23.8	56.6	58 47.1	+25.3	58.0	59 18.2	+27.0	59.4	61
62	55 32.6	+15.3	48.8	56 11.7	+16.6	49.9	56 49.9	+18.0	51.1	57 27.1	+19.4	52.3	58 03.3	+20.9	53.5	58 38.4	+22.4	54.8	59 12.4	+23.9	56.2	59 45.2	+25.4	57.6	62
63	55 47.9	+13.7	47.1	56 28.3	+15.1	48.2	57 07.9	+16.5	49.3	57 46.5	+17.9	50.5	58 24.2	+19.4	51.7	59 00.8	+20.9	53.1	59 36.3	+22.4	54.4	60 10.6	+24.0	55.8	63
64	56 01.6	+12.3	45.3	56 43.4	+13.6	46.4	57 24.4	+14.9	47.5	58 04.4	+16.4	48.7	58 43.6	+17.8	49.9	59 21.7	+19.2	51.2	59 58.7	+20.8	52.6	60 34.6	+22.3	54.0	64
65	56 13.9	+10.8	43.6	56 57.0	+12.1	44.6	57 39.3	+13.4	45.7	58 20.8	+14.8	46.9	59 01.4	+16.1	48.1	59 40.9	+17.7	49.4	60 19.5	+19.2	50.7	60 56.9	+20.8	52.1	65
66	56 24.7	+9.3	41.8	57 09.1	+10.5	42.8	57 52.7	+11.8	43.9	58 35.6	+13.1	45.0	59 17.5	+14.6	46.2	59 58.6	+16.0	47.5	60 38.7	+17.4	48.8	61 17.7	+19.0	50.1	66
67	56 34.0	+7.7	40.0	57 19.6	+8.9	41.0	58 04.5	+10.2	42.0	58 48.7	+11.5	43.1	59 32.1	+12.8	44.3	60 14.6	+14.3	45.5	60 56.1	+15.8	46.8	61 36.7	+17.3	48.1	67
68	56 41.7	+6.1	38.2	57 28.5	+7.3	39.2	58 14.7	+8.6	40.2	59 00.2	+9.8	41.2	59 44.9	+11.2	42.4	60 28.9	+12.5	43.6	61 11.9	+13.9	44.8	61 54.0	+15.4	46.1	68
69	56 47.8	+4.6	36.4	57 35.8	+5.7	37.3	58 23.3	+6.8	38.3	59 10.0	+8.1	39.3	59 56.1	+9.3	40.4	60 41.4	+10.7	41.6	61 25.8	+12.2	42.8	62 09.4	+13.6	44.1	69
70	56 52.4	+2.9	34.6	57 41.5	+4.1	35.4	58 30.1	+5.2	36.4	59 18.1	+6.4	37.4	60 05.4	+7.6	38.4	60 52.1	+8.9	39.5	61 38.0	+10.2	40.7	62 23.0	+11.7	42.0	70
71	56 55.3	+1.4	32.7	57 45.6	+2.3	33.6	58 35.3	+3.4	34.5	59 24.5	+4.6	35.4	60 13.0	+5.8	36.4	61 01.0	+7.0	37.5	61 48.2	+8.4	38.6	62 34.7	+9.7•	39.8	71
72	56 56.7	−0.3	30.9	57 47.9	+0.8	31.7	58 38.7	+1.8	32.6	59 29.1	+2.8	33.5	60 18.8	+4.0	34.4	61 08.0	+5.2	35.5	61 56.6	+6.4•	36.5	62 44.4	+7.7•	37.7	72
73	56 56.4	−1.9	29.1	57 48.7	−1.0	29.8	58 40.5	0.0	30.6	59 31.9	+1.0	31.5	60 22.8	+2.1	32.4	61 13.2	+3.2	33.4	62 03.0	+4.4•	34.4	62 52.1	+5.7•	35.5	73
74	56 54.5	−3.4	27.2	57 47.7	−2.6	28.0	58 40.5	−1.7	28.7	59 32.9	−0.7	29.5	60 24.9	+0.3	30.4	61 16.4	+1.4	31.3	62 07.4	+2.5	32.3	62 57.8	+3.7•	33.3	74
75	56 51.1	−5.1	25.4	57 45.1	−4.3	26.1	58 38.8	−3.4	26.8	59 32.2	−2.5	27.6	60 25.2	−1.6	28.4	61 17.8	−0.6	29.2	62 09.9	+0.5•	30.2	63 01.5	+1.6•	31.1	75
76	56 46.0	−6.7	23.6	57 40.8	−5.9	24.2	58 35.4	−5.1	24.9	59 29.7	−4.3	25.6	60 23.6	−3.4	26.3	61 17.2	−2.5	27.2	62 10.4	−1.5	28.0	63 03.1	−0.4•	28.9	76
77	56 39.3	−8.2	21.8	57 34.9	−7.5	22.4	58 30.3	−6.8	23.0	59 25.4	−6.0	23.6	60 20.2	−5.2	24.3	61 14.7	−4.3	25.1	62 08.9	−3.4•	25.9	63 02.7	−2.5•	26.7	77
78	56 31.1	−9.8	20.0	57 27.4	−9.1	20.5	58 23.5	−8.5	21.1	59 19.4	−7.8	21.7	60 15.0	−7.0	22.3	61 10.4	−6.3	23.0	62 05.5	−5.5	23.7	63 00.2	−4.5•	24.5	78
79	56 21.3	−11.3	18.2	57 18.3	−10.8	18.7	58 15.0	−10.1	19.2	59 11.6	−9.5	19.7	60 08.0	−8.9	20.3	61 04.1	−8.1	20.9	62 00.0	−7.3	21.6	62 55.7	−6.6•	22.3	79
80	56 10.0	−12.7	16.4	57 07.5	−12.3	16.9	58 04.9	−11.8	17.3	59 02.1	−11.2	17.8	59 59.1	−10.6	18.3	60 56.0	−10.0	18.9	61 52.7	−9.3	19.5	62 49.1	−8.6	20.2	80
81	55 57.3	−14.3	14.7	56 55.2	−13.8	15.1	57 53.1	−13.3	15.5	58 50.9	−12.9	15.9	59 48.5	−12.3	16.4	60 46.0	−11.8	16.9	61 43.4	−11.2	17.4	62 40.5	−10.5	18.0	81
82	55 43.0	−15.7	12.9	56 41.4	−15.3	13.3	57 39.8	−14.9	13.6	58 38.0	−14.4	14.0	59 36.2	−14.0	14.4	60 34.2	−13.5	14.9	61 32.2	−13.1	15.3	62 30.0	−12.5	15.9	82
83	55 27.3	−17.1	11.2	56 26.1	−16.8	11.5	57 24.9	−16.5	11.8	58 23.6	−16.1	12.2	59 22.2	−15.7	12.5	60 20.7	−15.3	12.9	61 19.1	−14.8	13.3	62 17.5	−14.4	13.7	83
84	55 10.2	−18.5	9.5	56 09.3	−18.2	9.8	57 08.4	−17.9	10.1	58 07.5	−17.6	10.3	59 06.5	−17.0	10.6	60 05.4	−17.0	11.0	61 04.3	−16.6	11.3	62 03.1	−16.2	11.7	84
85	54 51.7	−19.8	7.9	55 51.1	−19.6	8.1	56 50.5	−19.4	8.3	57 49.9	−19.2	8.5	58 49.2	−18.9	8.8	59 48.4	−18.6	9.0	60 47.7	−18.3	9.3	61 46.9	−18.1	9.6	85
86	54 31.9	−21.1	6.3	55 31.5	−20.9	6.4	56 31.1	−20.8	6.6	57 30.7	−20.6	6.8	58 30.3	−20.4	7.0	59 29.8	−20.2	7.2	60 29.4	−20.0	7.4	61 28.8	−19.7	7.6	86
87	54 10.8	−22.4	4.6	55 10.6	−22.3	4.8	56 10.3	−22.1	4.9	57 10.1	−22.0	5.0	58 09.9	−21.9	5.2	59 09.6	−21.7	5.3	60 09.4	−21.6	5.5	61 09.1	−21.4	5.6	87
88	53 48.4	−23.6	3.1	54 48.3	−23.5	3.1	55 48.2	−23.5	3.2	56 48.1	−23.4	3.3	57 48.0	−23.3	3.4	58 47.9	−23.2	3.5	59 47.8	−23.2	3.6	60 47.7	−23.1	3.7	88
89	53 24.8	−24.8	1.5	54 24.8	−24.8	1.6	55 24.7	−24.7	1.6	56 24.7	−24.7	1.6	57 24.7	−24.7	1.7	58 24.7	−24.7	1.7	59 24.6	−24.6	1.8	60 24.6	−24.6	1.8	89
90	53 00.0	−25.9	0.0	54 00.0	−25.9	0.0	55 00.0	−26.0	0.0	56 00.0	−26.0	0.0	57 00.0	−26.0	0.0	58 00.0	−26.0	0.0	59 00.0	−26.1	0.0	60 00.0	−26.1	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	14 44.1	−49.6	110.4	14 23.0	−50.1	110.7	14 01.7	−50.7	110.9	13 40.2	−51.2	111.1	13 18.4	−51.7	111.4	12 56.5	−52.3	111.6	12 34.3	−52.7	111.8	12 11.9	−53.1	112.0	0
1	13 54.5	−49.7	111.0	13 32.9	−50.3	111.2	13 11.0	−50.8	111.5	12 49.0	−51.3	111.7	12 26.7	−51.8	111.9	12 04.2	−52.2	112.1	11 41.6	−52.8	112.3	11 18.8	−53.3	112.5	1
2	13 04.8	−49.7	111.6	12 42.6	−50.3	111.8	12 20.2	−50.8	112.0	11 57.7	−51.4	112.2	11 34.9	−51.9	112.4	11 12.0	−52.4	112.6	10 48.8	−52.8	112.8	10 25.5	−53.2	112.9	2
3	12 15.1	−49.9	112.2	11 52.3	−50.3	112.4	11 29.4	−50.9	112.5	11 06.3	−51.4	112.7	10 43.0	−51.9	112.9	10 19.6	−52.4	113.1	9 56.0	−52.8	113.2	9 32.3	−53.3	113.4	3
4	11 25.2	−49.9	112.7	11 02.0	−50.5	112.9	10 38.5	−50.9	113.1	10 14.9	−51.4	113.3	9 51.1	−51.9	113.4	9 27.2	−52.4	113.6	9 03.2	−52.9	113.7	8 38.9	−53.3	113.9	4
5	10 35.3	−49.9	113.3	10 11.5	−50.4	113.5	9 47.6	−51.0	113.6	9 23.5	−51.5	113.8	8 59.2	−52.0	113.9	8 34.8	−52.5	114.1	8 10.3	−53.0	114.2	7 45.6	−53.4	114.3	5
6	9 45.4	−50.0	113.9	9 21.1	−50.6	114.0	8 56.6	−51.1	114.2	8 32.0	−51.6	114.3	8 07.2	−52.0	114.4	7 42.3	−52.5	114.6	7 17.3	−52.9	114.7	6 52.2	−53.4	114.8	6
7	8 55.4	−50.0	114.4	8 30.5	−50.5	114.6	8 05.5	−51.1	114.7	7 40.4	−51.6	114.8	7 15.2	−52.1	114.9	6 49.8	−52.5	115.0	6 24.4	−53.0	115.1	5 58.8	−53.4	115.2	7
8	8 05.4	−50.1	115.0	7 40.0	−50.7	115.1	7 14.5	−51.2	115.2	6 48.8	−51.6	115.3	6 23.1	−52.1	115.4	5 57.3	−52.5	115.5	5 31.4	−53.0	115.6	5 05.4	−53.4	115.7	8
9	7 15.3	−50.2	115.5	6 49.3	−50.6	115.6	6 23.3	−51.1	115.7	5 57.2	−51.6	115.8	5 31.0	−52.1	115.9	5 04.8	−52.6	116.0	4 38.4	−53.0	116.1	4 12.0	−53.5	116.2	9
10	6 25.1	−50.2	116.1	5 58.7	−50.7	116.2	5 32.2	−51.1	116.3	5 05.6	−51.7	116.4	4 38.9	−52.1	116.4	4 12.2	−52.6	116.5	3 45.4	−53.1	116.6	3 18.5	−53.4	116.6	10
11	5 34.9	−50.2	116.6	5 08.0	−50.7	116.7	4 41.0	−51.2	116.8	4 13.9	−51.7	116.9	3 46.8	−52.2	116.9	3 19.6	−52.6	117.0	2 52.3	−53.0	117.0	2 25.1	−53.5	117.1	11
12	4 44.7	−50.2	117.2	4 17.3	−50.7	117.3	3 49.8	−51.2	117.3	3 22.2	−51.7	117.4	2 54.6	−52.1	117.4	2 27.0	−52.6	117.5	1 59.3	−53.1	117.5	1 31.6	−53.5	117.5	12
13	3 54.5	−50.2	117.7	3 26.6	−50.8	117.8	2 58.6	−51.3	117.8	2 30.5	−51.7	117.9	2 02.5	−52.2	117.9	1 34.4	−52.7	117.9	1 06.2	−53.0	118.0	0 38.1	−53.5	118.0	13
14	3 04.3	−50.3	118.3	2 35.8	−50.7	118.3	2 07.3	−51.2	118.4	1 38.8	−51.7	118.4	1 10.3	−52.2	118.4	0 41.7	−52.6	118.4	0 13.2	−53.1	118.4	0 15.4	−53.5	61.6	14
15	2 14.0	−50.3	118.8	1 45.1	−50.8	118.9	1 16.1	−51.3	118.9	0 47.1	−51.7	118.9	0 18.1	−52.2	118.9	0 10.9	+52.6	61.1	0 39.9	+53.1	61.1	1 08.9	+53.5	61.1	15
16	1 23.7	−50.3	119.4	0 54.3	−50.8	119.4	0 24.8	−51.2	119.4	0 04.6	+51.7	60.6	0 34.1	+52.2	60.6	1 03.5	+52.6	60.6	1 33.0	+53.0	60.6	2 02.4	+53.4	60.7	16
17	0 33.4	−50.3	119.9	0 03.5	−50.8	119.9	0 26.4	+51.3	60.1	0 56.3	+51.8	60.1	1 26.3	+52.1	60.1	1 56.1	+52.7	60.1	2 26.0	+53.0	60.2	2 55.8	+53.5	60.2	17
18	0 16.9	+50.2	59.5	0 47.3	+50.7	59.5	1 17.7	+51.2	59.6	1 48.1	+51.7	59.6	2 18.4	+52.2	59.6	2 48.8	+52.6	59.7	3 19.0	+53.1	59.7	3 49.3	+53.4	59.8	18
19	1 07.1	+50.3	59.0	1 38.0	+50.8	59.0	2 08.9	+51.3	59.0	2 39.8	+51.7	59.1	3 10.6	+52.1	59.1	3 41.4	+52.5	59.2	4 12.1	+53.0	59.2	4 42.7	+53.5	59.3	19
20	1 57.4	+50.3	58.4	2 28.8	+50.8	58.5	3 00.2	+51.2	58.5	3 31.5	+51.6	58.6	4 02.7	+52.2	58.6	4 33.9	+52.6	58.7	5 05.1	+53.0	58.8	5 36.2	+53.4	58.8	20
21	2 47.7	+50.2	57.9	3 19.6	+50.7	57.9	3 51.4	+51.2	58.0	4 23.1	+51.7	58.1	4 54.9	+52.1	58.1	5 26.5	+52.6	58.2	5 58.1	+53.0	58.3	6 29.6	+53.4	58.4	21
22	3 37.9	+50.3	57.4	4 10.3	+50.7	57.4	4 42.6	+51.2	57.5	5 14.8	+51.6	57.5	5 47.0	+52.0	57.6	6 19.1	+52.5	57.7	6 51.1	+52.9	57.7	7 23.0	+53.3	57.9	22
23	4 28.2	+50.2	56.8	5 01.0	+50.7	56.9	5 33.8	+51.1	57.0	6 06.4	+51.6	57.0	6 39.0	+52.1	57.1	7 11.6	+52.5	57.2	7 44.0	+52.9	57.3	8 16.3	+53.3	57.5	23
24	5 18.4	+50.2	56.3	5 51.7	+50.6	56.3	6 24.9	+51.1	56.4	6 58.0	+51.6	56.5	7 31.1	+52.0	56.6	8 04.1	+52.4	56.7	8 36.9	+52.9	56.9	9 09.6	+53.3	57.0	24
25	6 08.6	+50.1	55.7	6 42.3	+50.7	55.8	7 16.0	+51.1	55.9	7 49.6	+51.6	56.0	8 23.1	+52.0	56.1	8 56.5	+52.4	56.3	9 29.8	+52.8	56.3	10 02.9	+53.3	56.5	25
26	6 58.7	+50.1	55.2	7 33.0	+50.5	55.3	8 07.1	+51.1	55.4	8 41.2	+51.5	55.5	9 15.1	+51.9	55.6	9 48.9	+52.4	55.8	10 22.6	+52.8	55.9	10 56.2	+53.2	56.1	26
27	7 48.8	+50.1	54.6	8 23.5	+50.6	54.7	8 58.2	+50.9	54.8	9 32.7	+51.4	55.0	10 07.0	+51.9	55.1	10 41.3	+52.3	55.3	11 15.4	+52.7	55.4	11 49.4	+53.1	55.6	27
28	8 38.9	+50.0	54.0	9 14.1	+50.5	54.2	9 49.1	+51.0	54.3	10 24.1	+51.4	54.4	10 58.9	+51.9	54.6	11 33.6	+52.3	54.8	12 08.1	+52.7	54.9	12 42.5	+53.1	55.1	28
29	9 28.9	+50.0	53.5	10 04.6	+50.4	53.6	10 40.1	+50.9	53.8	11 15.5	+51.3	53.9	11 50.8	+51.7	54.1	12 25.9	+52.2	54.3	13 00.8	+52.7	54.4	13 35.6	+53.1	54.6	29
30	10 18.9	+49.9	52.9	10 55.0	+50.4	53.1	11 31.0	+50.8	53.2	12 06.8	+51.3	53.4	12 42.5	+51.8	53.6	13 18.1	+52.1	53.8	13 53.5	+52.6	54.0	14 28.7	+53.0	54.2	30
31	11 08.8	+49.8	52.4	11 45.4	+50.3	52.5	12 21.8	+50.8	52.7	12 58.1	+51.2	52.9	13 34.3	+51.6	53.1	14 10.2	+52.1	53.2	14 46.1	+52.5	53.5	15 21.7	+52.9	53.7	31
32	11 58.6	+49.8	51.8	12 35.7	+50.2	52.0	13 12.6	+50.7	52.1	13 49.3	+51.2	52.3	14 25.9	+51.6	52.5	15 02.3	+52.0	52.7	15 38.6	+52.4	53.0	16 14.6	+52.9	53.2	32
33	12 48.4	+49.7	51.2	13 25.9	+50.2	51.4	14 03.3	+50.6	51.6	14 40.5	+51.0	51.8	15 17.5	+51.5	52.0	15 54.3	+52.0	52.2	16 31.0	+52.4	52.4	17 07.5	+52.8	52.7	33
34	13 38.1	+49.6	50.6	14 16.1	+50.1	50.8	14 53.9	+50.5	51.0	15 31.5	+51.0	51.2	16 09.0	+51.4	51.5	16 46.3	+51.9	51.7	17 23.4	+52.3	51.9	18 00.3	+52.7	52.2	34
35	14 27.7	+49.5	50.1	15 06.2	+50.0	50.3	15 44.4	+50.5	50.5	16 22.5	+50.9	50.7	17 00.4	+51.4	50.9	17 38.2	+51.7	51.2	18 15.7	+52.2	51.4	18 53.0	+52.6	51.7	35
36	15 17.2	+49.5	49.5	15 56.2	+49.9	49.7	16 34.9	+50.3	49.9	17 13.4	+50.8	50.1	17 51.8	+51.2	50.4	18 29.9	+51.7	50.6	19 07.9	+52.1	50.9	19 45.6	+52.6	51.2	36
37	16 06.7	+49.3	48.9	16 46.1	+49.8	49.1	17 25.2	+50.3	49.3	18 04.2	+50.8	49.6	18 43.0	+51.2	49.8	19 21.6	+51.6	50.1	20 00.0	+52.0	50.4	20 38.2	+52.4	50.7	37
38	16 56.0	+49.3	48.3	17 35.9	+49.7	48.5	18 15.5	+50.2	48.8	18 55.0	+50.6	49.0	19 34.2	+51.1	49.3	20 13.2	+51.5	49.6	20 52.0	+52.0	49.8	21 30.6	+52.4	50.1	38
39	17 45.3	+49.1	47.7	18 25.6	+49.6	47.9	19 05.7	+50.0	48.2	19 45.6	+50.5	48.5	20 25.3	+50.9	48.7	21 04.7	+51.4	49.0	21 44.0	+51.8	49.3	22 23.0	+52.2	49.6	39
40	18 34.4	+49.0	47.1	19 15.2	+49.4	47.3	19 55.7	+49.9	47.6	20 36.1	+50.4	47.9	21 16.2	+50.8	48.2	21 56.1	+51.3	48.5	22 35.8	+51.7	48.8	23 15.2	+52.1	49.1	40
41	19 23.4	+48.9	46.5	20 04.6	+49.4	46.7	20 45.6	+49.9	47.0	21 26.5	+50.2	47.3	22 07.0	+50.7	47.6	22 47.4	+51.1	47.9	23 27.5	+51.6	48.2	24 07.3	+52.1	48.5	41
42	20 12.3	+48.8	45.9	20 54.0	+49.2	46.1	21 35.5	+49.6	46.4	22 16.7	+50.2	46.7	22 57.7	+50.6	47.0	23 38.5	+51.1	47.3	24 19.1	+51.4	47.7	24 59.4	+51.9	48.0	42
43	21 01.1	+48.6	45.2	21 43.2	+49.1	45.5	22 25.1	+49.6	45.8	23 06.9	+50.0	46.1	23 48.3	+50.5	46.4	24 29.6	+50.9	46.8	25 10.5	+51.4	47.1	25 51.3	+51.7	47.4	43
44	21 49.7	+48.5	44.6	22 32.3	+48.9	44.9	23 14.7	+49.4	45.2	23 56.9	+49.8	45.5	24 38.8	+50.3	45.8	25 20.5	+50.7	46.2	26 01.9	+51.2	46.5	26 43.0	+51.7	46.9	44
45	22 38.2	+48.3	44.0	23 21.2	+48.8	44.3	24 04.1	+49.2	44.6	24 46.7	+49.7	44.9	25 29.1	+50.1	45.2	26 11.2	+50.6	45.6	26 53.1	+51.0	45.9	27 34.7	+51.5	46.3	45
46	23 26.5	+48.2	43.3	24 10.0	+48.7	43.6	24 53.3	+49.1	44.0	25 36.4	+49.6	44.3	26 19.2	+50.0	44.6	27 01.8	+50.5	45.0	27 44.1	+50.9	45.3	28 26.2	+51.3	45.7	46
47	24 14.7	+47.9	42.7	24 58.7	+48.4	43.0	25 42.4	+48.9	43.3	26 26.0	+49.3	43.7	27 09.2	+49.9	44.0	27 52.3	+50.3	44.4	28 35.0	+50.8	44.7	29 17.5	+51.2	45.1	47
48	25 02.6	+47.9	42.0	25 47.1	+48.3	42.3	26 31.3	+48.8	42.7	27 15.3	+49.2	43.0	27 59.1	+49.6	43.4	28 42.6	+50.1	43.7	29 25.8	+50.5	44.1	30 08.7	+51.0	44.5	48
49	25 50.5	+47.6	41.3	26 35.4	+48.1	41.7	27 20.1	+48.6	42.0	28 04.5	+49.1	42.4	28 48.7	+49.5	42.7	29 32.7	+49.9	43.1	30 16.3	+50.4	43.5	30 59.7	+50.9	43.9	49
50	26 38.1	+47.4	40.7	27 23.5	+47.9	41.0	28 08.7	+48.3	41.4	28 53.6	+48.8	41.7	29 38.2	+49.2	42.1	30 22.6	+49.8	42.5	31 06.7	+50.2	42.9	31 50.6	+50.6	43.3	50
51	27 25.5	+47.3	40.0	28 11.4	+47.7	40.3	28 57.0	+48.2	40.7	29 42.4	+48.6	41.0	30 27.5	+49.1	41.4	31 12.4	+49.5	41.8	31 56.9	+50.0	42.2	32 41.2	+50.5	42.7	51
52	28 12.8	+47.0	39.3	28 59.1	+47.5	39.6	29 45.2	+47.9	40.0	30 31.0	+48.4	40.4	31 16.6	+48.9	40.8	32 01.9	+49.4	41.2	32 46.9	+49.8	41.6	33 31.7	+50.2	42.0	52
53	28 59.8	+46.8	38.6	29 46.6	+47.2	38.9	30 33.1	+47.7	39.3	31 19.4	+48.0	39.7	32 05.5	+48.6	40.1	32 51.3	+49.1	40.5	33 36.7	+49.6	40.9	34 21.9	+50.1	41.4	53
54	29 46.6	+46.5	37.9	30 33.8	+47.0	38.2	31 20.8	+47.5	38.6	32 07.6	+48.0	39.0	32 54.1	+48.4	39.4	33 40.4	+48.8	39.8	34 26.3	+49.4	40.2	35 12.0	+49.8	40.7	54
55	30 33.1	+46.3	37.1	31 20.8	+46.8	37.5	32 08.3	+47.3	37.9	32 55.6	+47.7	38.3	33 42.5	+48.2	38.7	34 29.2	+48.7	39.1	35 15.7	+49.1	39.5	36 01.8	+49.6	40.0	55
56	31 19.4	+46.1	36.4	32 07.6	+46.5	36.8	32 55.6	+46.9	37.1	33 43.3	+47.4	37.5	34 30.7	+47.9	38.0	35 17.9	+48.4	38.4	36 04.8	+48.8	38.8	36 51.4	+49.3	39.3	56
57	32 05.5	+45.8	35.6	32 54.1	+46.3	36.0	33 42.5	+46.7	36.4	34 30.7	+47.2	36.8	35 18.6	+47.7	37.2	36 06.3	+48.1	37.7	36 53.6	+48.6	38.1	37 40.7	+49.0	38.6	57
58	32 51.3	+45.4	34.9	33 40.4	+45.9	35.2	34 29.2	+46.5	35.6	35 17.9	+46.9	36.0	36 06.3	+47.3	36.5	36 54.4	+47.8	36.9	37 42.2	+48.3	37.4	38 29.7	+48.8	37.9	58
59	33 36.7	+45.2	34.1	34 26.3	+45.7	34.5	35 15.7	+46.1	34.9	36 04.8	+46.6	35.3	36 53.6	+47.1	35.7	37 42.2	+47.5	36.2	38 30.5	+48.0	36.6	39 18.5	+48.5	37.1	59
60	34 21.9	+44.9	33.3	35 12.0	+45.3	33.7	36 01.8	+45.8	34.1	36 51.4	+46.2	34.5	37 40.7	+46.7	34.9	38 29.7	+47.3	35.4	39 18.5	+47.7	35.8	40 07.0	+48.2	36.3	60
61	35 06.8	+44.6	32.5	35 57.3	+45.0	32.9	36 47.6	+45.5	33.3	37 37.6	+46.0	33.7	38 27.4	+46.4	34.1	39 17.0	+46.8	34.6	40 06.2	+47.4	35.1	40 55.2	+47.8	35.6	61
62	35 51.4	+44.2	31.7	36 42.3	+44.7	32.1	37 33.1	+45.1	32.5	38 23.6	+45.6	32.9	39 13.8	+46.1	33.3	40 03.8	+46.6	33.8	40 53.6	+47.0	34.3	41 43.0	+47.5	34.8	62
63	36 35.6	+43.8	30.8	37 27.0	+44.3	31.2	38 18.2	+44.7	31.6	39 09.2	+45.2	32.0	39 59.9	+45.7	32.5	40 50.4	+46.1	32.9	41 40.6	+46.6	33.4	42 30.5	+47.2	33.9	63
64	37 19.4	+43.5	30.0	38 11.3	+43.9	30.4	39 02.9	+44.4	30.8	39 54.4	+44.8	31.2	40 45.6	+45.3	31.6	41 36.5	+45.8	32.1	42 27.2	+46.3	32.6	43 17.7	+46.7	33.1	64
65	38 02.9	+43.1	29.1	38 55.2	+43.5	29.5	39 47.3	+44.0	29.9	40 39.2	+44.5	30.3	41 30.9	+44.9	30.8	42 22.3	+45.4	31.2	43 13.5	+45.9	31.7	44 04.4	+46.4	32.2	65
66	38 46.0	+42.6	28.2	39 38.7	+43.1	28.6	40 31.3	+43.6	29.0	41 23.7	+44.0	29.4	42 15.8	+44.5	29.9	43 07.7	+45.0	30.3	43 59.4	+45.5	30.8	44 50.8	+45.9	31.3	66
67	39 28.6	+42.3	27.3	40 21.8	+42.7	27.7	41 14.9	+43.1	28.1	42 07.7	+43.6	28.5	43 00.3	+44.1	29.0	43 52.7	+44.5	29.4	44 44.8	+45.0	29.9	45 36.7	+45.5	30.4	67
68	40 10.9	+41.7	26.4	41 04.5	+42.2	26.8	41 58.0	+42.7	27.2	42 51.3	+43.1	27.6	43 44.4	+43.5	28.0	44 37.2	+44.0	28.5	45 29.8	+44.5	29.0	46 22.2	+45.0	29.5	68
69	40 52.6	+41.4	25.4	41 46.7	+41.8	25.8	42 40.7	+42.1	26.2	43 34.4	+42.6	26.6	44 27.9	+43.1	27.1	45 21.2	+43.6	27.5	46 14.3	+44.1	28.0	47 07.2	+44.5	28.5	69
70	41 34.0	+40.8	24.5	42 28.5	+41.2	24.9	43 22.8	+41.7	25.2	44 17.0	+42.1	25.7	45 11.0	+42.6	26.1	46 04.8	+43.0	26.5	46 58.4	+43.5	27.0	47 51.7	+44.0	27.5	70
71	42 14.8	+40.3	23.5	43 09.7	+40.8	23.9	44 04.5	+41.2	24.2	44 59.1	+41.6	24.7	45 53.6	+42.0	25.1	46 47.8	+42.5	25.5	47 41.9	+42.9	26.0	48 35.7	+43.4	26.5	71
72	42 55.1	+39.8	22.5	43 50.5	+40.1	22.8	44 45.7	+40.6	23.2	45 40.7	+41.0	23.6	46 35.6	+41.5	24.1	47 30.3	+41.9	24.5	48 24.8	+42.4	25.0	49 19.1	+42.8	25.4	72
73	43 34.9	+39.2	21.5	44 30.6	+39.6	21.8	45 26.3	+40.0	22.2	46 21.7	+40.5	22.6	47 17.1	+40.8	23.0	48 12.2	+41.3	23.4	49 07.2	+41.7	23.9	50 01.9	+42.2	24.4	73
74	44 14.1	+38.6	20.4	45 10.2	+39.0	20.8	46 06.3	+39.4	21.1	47 02.2	+39.8	21.5	47 57.9	+40.2	21.9	48 53.5	+40.6	22.3	49 48.9	+41.1	22.8	50 44.1	+41.6	23.2	74
75	44 52.7	+37.9	19.3	45 49.2	+38.4	19.7	46 45.7	+38.7	20.0	47 42.0	+39.1	20.4	48 38.1	+39.6	20.8	49 34.1	+40.0	21.2	50 30.0	+40.4	21.6	51 25.7	+40.8	22.1	75
76	45 30.6	+37.4	18.2	46 27.6	+37.7	18.6	47 24.4	+38.1	18.9	48 21.1	+38.5	19.3	49 17.7	+38.8	19.6	50 14.1	+39.3	20.0	51 10.4	+39.7	20.5	52 06.5	+40.2	20.9	76
77	46 08.0	+36.7	17.1	47 05.3	+37.0	17.4	48 02.5	+37.4	17.8	48 59.6	+37.7	18.1	49 56.5	+38.2	18.5	50 53.4	+38.5	18.9	51 50.1	+38.9	19.3	52 46.7	+39.3	19.7	77
78	46 44.7	+35.9	16.0	47 42.3	+36.3	16.3	48 39.9	+36.6	16.6	49 37.3	+37.0	16.9	50 34.7	+37.3	17.3	51 31.9	+37.7	17.6	52 29.0	+38.2	18.0	53 26.0	+38.6	18.4	78
79	47 20.6	+35.3	14.8	48 18.6	+35.5	15.1	49 16.5	+35.9	15.4	50 14.3	+36.2	15.7	51 12.0	+36.6	16.0	52 09.6	+37.0	16.4	53 07.2	+37.2	16.7	54 04.6	+37.6	17.1	79
80	47 55.9	+34.4	13.6	48 54.1	+34.8	13.9	49 52.4	+35.0	14.1	50 50.5	+35.4	14.4	51 48.6	+35.7	14.7	52 46.6	+36.0	15.1	53 44.4	+36.4	15.4	54 42.2	+36.8	15.8	80
81	48 30.3	+33.7	12.4	49 28.9	+33.9	12.6	50 27.4	+34.2	12.9	51 25.9	+34.5	13.1	52 24.3	+34.8	13.4	53 22.6	+35.1	13.7	54 20.8	+35.5	14.1	55 19.0	+35.8	14.4	81
82	49 04.0	+32.8	11.1	50 02.8	+33.1	11.3	51 01.6	+33.4	11.6	52 00.4	+33.6	11.8	52 59.1	+33.9	12.1	53 57.7	+34.2	12.4	54 56.3	+34.5	12.7	55 54.8	+34.8	13.0	82
83	49 36.8	+31.9	9.8	50 35.9	+32.2	10.0	51 35.0	+32.4	10.2	52 34.0	+32.6	10.5	53 33.0	+32.9	10.7	54 31.9	+33.1	11.0	55 30.8	+33.4	11.2	56 29.6	+33.7	11.5	83
84	50 08.7	+31.1	8.5	51 08.1	+31.2	8.7	52 07.4	+31.4	8.9	53 06.6	+31.7	9.1	54 05.9	+31.8	9.3	55 05.0	+32.1	9.5	56 04.2	+32.3	9.8	57 03.3	+32.6	10.0	84
85	50 39.8	+30.1	7.2	51 39.3	+30.3	7.3	52 38.8	+30.4	7.5	53 38.3	+30.6	7.7	54 37.7	+30.8	7.8	55 37.1	+31.0	8.0	56 36.5	+31.2	8.3	57 35.9	+31.4	8.5	85
86	51 09.9	+29.1	5.8	52 09.6	+29.2	5.9	53 09.2	+29.4	6.1	54 08.9	+29.5	6.2	55 08.5	+29.7	6.4	56 08.1	+29.9	6.5	57 07.7	+30.1	6.7	58 07.3	+30.2	6.9	86
87	51 39.0	+28.1	4.4	52 38.8	+28.2	4.5	53 38.6	+28.3	4.6	54 38.4	+28.4	4.7	55 38.2	+28.5	4.8	56 38.0	+28.6	4.9	57 37.8	+28.7	5.1	58 37.5	+28.9	5.2	87
88	52 07.1	+27.0	3.0	53 07.0	+27.1	3.0	54 06.9	+27.1	3.1	55 06.8	+27.2	3.2	56 06.7	+27.3	3.3	57 06.6	+27.4	3.3	58 06.5	+27.4	3.4	59 06.4	+27.5	3.5	88
89	52 34.1	+25.9	1.5	53 34.1	+25.9	1.5	54 34.0	+26.0	1.6	55 34.0	+26.0	1.6	56 34.0	+26.0	1.6	57 34.0	+26.0	1.6	58 33.9	+26.1	1.7	59 33.9	+26.1	1.8	89
90	53 00.0	+24.8	0.0	54 00.0	+24.8	0.0	55 00.0	+24.7	0.0	56 00.0	+24.7	0.0	57 00.0	+24.7	0.0	58 00.0	+24.7	0.0	59 00.0	+24.6	0.0	60 00.0	+24.6	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z / L.H.A. less than 180° .... Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION   L.H.A. 115°, 245°**

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Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	14 10.1	+49.4	109.6	13 49.9	+50.0	109.8	13 29.5	+50.5	110.0	13 08.8	+51.0	110.3	12 47.9	+51.6	110.5	12 26.8	+52.1	110.7	12 05.5	+52.6	110.9	11 44.0	+53.1	111.1	0
1	14 59.5	+49.3	109.0	14 39.9	+49.8	109.2	14 20.0	+50.4	109.5	13 59.8	+51.0	109.7	13 39.5	+51.5	110.0	13 18.9	+52.0	110.2	12 58.1	+52.5	110.4	12 37.1	+53.0	110.6	1
2	15 48.8	+49.2	108.4	15 29.7	+49.8	108.7	15 10.4	+50.3	108.9	14 50.8	+50.9	109.2	14 31.0	+51.4	109.4	14 10.9	+52.0	109.7	13 50.6	+52.5	109.9	13 30.1	+52.9	110.1	2
3	16 38.0	+49.1	107.8	16 19.5	+49.7	108.1	16 00.7	+50.3	108.4	15 41.7	+50.8	108.6	15 22.4	+51.4	108.9	15 02.9	+51.9	109.1	14 43.1	+52.4	109.4	14 23.0	+52.9	109.6	3
4	17 27.1	+49.0	107.2	17 09.2	+49.6	107.5	16 51.0	+50.2	107.8	16 32.5	+50.8	108.1	16 13.8	+51.3	108.4	15 54.8	+51.8	108.6	15 35.5	+52.3	108.9	15 15.9	+52.8	109.2	4
5	18 16.1	+48.8	106.6	17 58.8	+49.4	106.9	17 41.2	+50.0	107.2	17 23.3	+50.6	107.5	17 05.1	+51.1	107.8	16 46.6	+51.7	108.1	16 27.8	+52.2	108.4	16 08.7	+52.8	108.7	5
6	19 04.9	+48.8	106.0	18 48.2	+49.4	106.3	18 31.2	+50.0	106.6	18 13.9	+50.5	106.9	17 56.2	+51.1	107.3	17 38.3	+51.6	107.6	17 20.0	+52.2	107.9	17 01.5	+52.6	108.2	6
7	19 53.7	+48.6	105.4	19 37.6	+49.2	105.7	19 21.2	+49.8	106.0	19 04.4	+50.4	106.4	18 47.3	+51.0	106.7	18 29.9	+51.6	107.0	18 12.2	+52.1	107.3	17 54.1	+52.6	107.7	7
8	20 42.3	+48.4	104.7	20 26.8	+49.1	105.1	20 11.0	+49.7	105.5	19 54.8	+50.4	105.8	19 38.3	+50.9	106.2	19 21.5	+51.4	106.5	19 04.3	+52.0	106.8	18 46.7	+52.5	107.2	8
9	21 30.7	+48.4	104.1	21 15.9	+49.0	104.5	21 00.7	+49.6	104.9	20 45.2	+50.2	105.2	20 29.2	+50.8	105.6	20 12.9	+51.4	105.9	19 56.3	+51.9	106.3	19 39.2	+52.5	106.6	9
10	22 19.1	+48.1	103.5	22 04.9	+48.8	103.9	21 50.3	+49.5	104.3	21 35.4	+50.0	104.6	21 20.0	+50.7	105.0	21 04.3	+51.2	105.4	20 48.2	+51.7	105.8	20 31.7	+52.3	106.1	10
11	23 07.2	+48.1	102.8	22 53.7	+48.7	103.2	22 39.8	+49.3	103.6	22 25.4	+50.0	104.0	22 10.7	+50.5	104.4	21 55.5	+51.1	104.8	21 39.9	+51.7	105.2	21 24.0	+52.2	105.6	11
12	23 55.3	+47.8	102.2	23 42.4	+48.5	102.6	23 29.1	+49.2	103.0	23 15.4	+49.8	103.4	23 01.2	+50.4	103.9	22 46.6	+51.0	104.3	22 31.6	+51.6	104.7	22 16.2	+52.2	105.1	12
13	24 43.1	+47.7	101.5	24 30.9	+48.4	102.0	24 18.3	+49.0	102.4	24 05.2	+49.6	102.8	23 51.6	+50.3	103.3	23 37.6	+50.9	103.7	23 23.2	+51.5	104.1	23 08.4	+52.0	104.5	13
14	25 30.8	+47.5	100.8	25 19.3	+48.1	101.3	25 07.3	+48.8	101.8	24 54.8	+49.5	102.2	24 41.9	+50.1	102.7	24 28.5	+50.7	103.1	24 14.7	+51.3	103.6	24 00.4	+51.9	104.0	14
15	26 18.3	+47.3	100.2	26 07.4	+48.0	100.6	25 56.1	+48.7	101.1	25 44.3	+49.3	101.6	25 32.0	+50.0	102.1	25 19.2	+50.6	102.5	25 06.0	+51.2	103.0	24 52.3	+51.8	103.4	15
16	27 05.6	+47.1	99.5	26 55.4	+47.8	100.0	26 44.8	+48.5	100.5	26 33.6	+49.2	101.0	26 22.0	+49.8	101.4	26 09.8	+50.5	101.9	25 57.2	+51.1	102.4	25 44.1	+51.6	102.9	16
17	27 52.7	+46.8	98.8	27 43.2	+47.6	99.3	27 33.3	+48.3	99.8	27 22.8	+49.0	100.3	27 11.8	+49.7	100.8	27 00.3	+50.3	101.3	26 48.3	+50.9	101.8	26 35.7	+51.5	102.3	17
18	28 39.5	+46.7	98.1	28 30.8	+47.4	98.6	28 21.6	+48.1	99.1	28 11.8	+48.8	99.7	28 01.5	+49.4	100.2	27 50.6	+50.1	100.7	27 39.2	+50.7	101.2	27 27.2	+51.4	101.7	18
19	29 26.2	+46.4	97.3	29 18.2	+47.2	97.9	29 09.7	+47.9	98.4	29 00.6	+48.6	99.0	28 50.9	+49.3	99.5	28 40.7	+50.0	100.1	28 29.9	+50.6	100.6	28 18.6	+51.2	101.2	19
20	30 12.6	+46.2	96.6	30 05.4	+46.9	97.2	29 57.6	+47.7	97.8	29 49.2	+48.4	98.3	29 40.2	+49.1	98.9	29 30.7	+49.7	99.5	29 20.5	+50.4	100.0	29 09.8	+51.1	100.6	20
21	30 58.8	+45.9	95.9	30 52.3	+46.7	96.5	30 45.3	+47.4	97.1	30 37.6	+48.2	97.6	30 29.3	+48.9	98.2	30 20.4	+49.6	98.8	30 10.9	+50.3	99.4	30 00.9	+50.8	100.0	21
22	31 44.7	+45.6	95.1	31 39.0	+46.4	95.7	31 32.7	+47.2	96.3	31 25.8	+47.9	96.9	31 18.2	+48.7	97.5	31 10.0	+49.4	98.2	31 01.2	+50.0	98.7	30 51.7	+50.8	99.3	22
23	32 30.3	+45.4	94.3	32 25.4	+46.2	95.0	32 19.9	+46.9	95.6	32 13.7	+47.7	96.2	32 06.9	+48.4	96.9	31 59.4	+49.1	97.5	31 51.2	+49.9	98.1	31 42.5	+50.5	98.7	23
24	33 15.7	+45.0	93.6	33 11.6	+45.9	94.2	33 06.8	+46.7	94.9	33 01.4	+47.4	95.5	32 55.3	+48.2	96.2	32 48.5	+49.0	96.8	32 41.1	+49.6	97.4	32 33.0	+50.3	98.1	24
25	34 00.7	+44.8	92.8	33 57.5	+45.5	93.4	33 53.5	+46.4	94.1	33 48.8	+47.2	94.8	33 43.5	+48.0	95.4	33 37.5	+48.7	96.1	33 30.7	+49.4	96.8	33 23.3	+50.1	97.4	25
26	34 45.5	+44.4	92.0	34 43.0	+45.3	92.7	34 39.9	+46.1	93.3	34 36.0	+46.9	94.0	34 31.5	+47.6	94.7	34 26.2	+48.4	95.3	34 20.1	+49.2	96.1	34 13.4	+49.9	96.8	26
27	35 29.9	+44.1	91.1	35 28.3	+45.0	91.9	35 26.0	+45.8	92.6	35 22.9	+46.7	93.3	35 19.1	+47.5	94.0	35 14.6	+48.2	94.7	35 09.3	+49.0	95.4	35 03.3	+49.7	96.1	27
28	36 14.0	+43.7	90.3	36 13.3	+44.6	91.0	36 11.8	+45.5	91.8	36 09.6	+46.3	92.5	36 06.6	+47.1	93.2	36 02.8	+47.9	94.0	35 58.3	+48.7	94.7	35 53.0	+49.4	95.4	28
29	36 57.7	+43.3	89.5	36 57.9	+44.2	90.2	36 57.3	+45.1	91.0	36 55.9	+45.9	91.7	36 53.7	+46.8	92.5	36 50.7	+47.6	93.2	36 47.0	+48.4	94.0	36 42.4	+49.2	94.7	29
30	37 41.0	+43.0	88.6	37 42.1	+43.9	89.4	37 42.4	+44.8	90.1	37 41.8	+45.7	90.9	37 40.5	+46.5	91.7	37 38.3	+47.4	92.4	37 35.4	+48.1	93.2	37 31.6	+48.9	94.0	30
31	38 24.0	+42.5	87.7	38 26.0	+43.5	88.5	38 27.2	+44.4	89.3	38 27.5	+45.3	90.1	38 27.0	+46.2	90.9	38 25.7	+47.0	91.7	38 23.5	+47.8	92.5	38 20.5	+48.7	93.2	31
32	39 06.5	+42.2	86.8	39 09.5	+43.1	87.6	39 11.6	+44.0	88.4	39 12.8	+44.9	89.2	39 13.2	+45.8	90.0	39 12.7	+46.7	90.8	39 11.3	+47.6	91.7	39 09.2	+48.3	92.5	32
33	39 48.7	+41.6	85.9	39 52.6	+42.6	86.7	39 55.6	+43.6	87.5	39 57.7	+44.5	88.4	39 59.0	+45.4	89.2	39 59.4	+46.3	90.1	39 58.9	+47.2	90.9	39 57.5	+48.0	91.7	33
34	40 30.3	+41.2	84.9	40 35.2	+42.2	85.8	40 39.2	+43.1	86.6	40 42.2	+44.2	87.5	40 44.4	+45.1	88.4	40 45.7	+45.9	89.2	40 46.1	+46.8	90.1	40 45.5	+47.7	90.9	34
35	41 11.5	+40.8	84.0	41 17.4	+41.7	84.8	41 22.3	+42.8	85.7	41 26.4	+43.7	86.6	41 29.5	+44.6	87.5	41 31.6	+45.6	88.4	41 32.9	+46.5	89.2	41 33.2	+47.4	90.1	35
36	41 52.3	+40.2	83.0	41 59.1	+41.3	83.9	42 05.1	+42.2	84.8	42 10.1	+43.2	85.7	42 14.1	+44.2	86.6	42 17.2	+45.2	87.5	42 19.4	+46.1	88.4	42 20.6	+47.0	89.3	36
37	42 32.5	+39.6	82.0	42 40.4	+40.7	82.9	42 47.3	+41.8	83.8	42 53.3	+42.8	84.7	42 58.3	+43.8	85.7	43 02.4	+44.7	86.6	43 05.5	+45.6	87.5	43 07.6	+46.6	88.5	37
38	43 12.1	+39.2	81.0	43 21.1	+40.2	81.9	43 29.1	+41.2	82.8	43 36.1	+42.2	83.8	43 42.1	+43.2	84.7	43 47.1	+44.3	85.7	43 51.1	+45.3	86.6	43 54.2	+46.2	87.6	38
39	43 51.3	+38.5	79.9	44 01.3	+39.6	80.9	44 10.3	+40.7	81.8	44 18.3	+41.8	82.8	44 25.4	+42.8	83.8	44 31.4	+43.8	84.7	44 36.4	+44.8	85.7	44 40.4	+45.7	86.7	39
40	44 29.8	+37.9	78.8	44 40.9	+39.0	79.8	44 51.0	+40.1	80.8	45 00.1	+41.2	81.8	45 08.2	+42.2	82.8	45 15.2	+43.3	83.8	45 21.2	+44.3	84.8	45 26.1	+45.3	85.8	40
41	45 07.7	+37.3	77.8	45 19.9	+38.4	78.7	45 31.1	+39.6	79.7	45 41.3	+40.6	80.7	45 50.4	+41.8	81.8	45 58.5	+42.8	82.8	46 05.5	+43.8	83.8	46 11.4	+44.9	84.8	41
42	45 45.0	+36.6	76.6	45 58.3	+37.8	77.6	46 10.7	+38.9	78.7	46 21.9	+40.1	79.7	46 32.2	+41.1	80.7	46 41.3	+42.2	81.8	46 49.3	+43.3	82.8	46 56.3	+44.3	83.9	42
43	46 21.6	+35.9	75.5	46 36.1	+37.1	76.5	46 49.6	+38.2	77.6	47 02.0	+39.4	78.6	47 13.3	+40.5	79.7	47 23.5	+41.7	80.7	47 32.6	+42.8	81.8	47 40.6	+43.8	82.9	43
44	46 57.5	+35.2	74.3	47 13.2	+36.4	75.4	47 27.8	+37.6	76.4	47 41.4	+38.7	77.5	47 53.8	+39.9	78.6	48 05.2	+41.0	79.7	48 15.4	+42.1	80.8	48 24.4	+43.3	81.9	44
45	47 32.7	+34.4	73.1	47 49.6	+35.6	74.2	48 05.4	+36.8	75.3	48 20.1	+38.0	76.3	48 33.7	+39.2	77.4	48 46.2	+40.4	78.6	48 57.5	+41.6	79.7	49 07.7	+42.7	80.8	45
46	48 07.1	+33.7	71.9	48 25.2	+34.9	73.0	48 42.2	+36.1	74.1	48 58.1	+37.4	75.2	49 12.9	+38.6	76.3	49 26.6	+39.7	77.4	49 39.1	+40.8	78.6	49 50.4	+42.0	79.7	46
47	48 40.8	+32.8	70.7	49 00.1	+34.0	71.7	49 18.3	+35.3	72.9	49 35.5	+36.5	74.0	49 51.5	+37.7	75.1	50 06.3	+39.0	76.3	50 19.9	+40.2	77.4	50 32.4	+41.4	78.6	47
48	49 13.6	+31.9	69.4	49 34.1	+33.3	70.5	49 53.6	+34.5	71.6	50 12.0	+35.8	72.7	50 29.2	+37.0	73.9	50 45.3	+38.2	75.1	51 00.1	+39.5	76.3	51 13.8	+40.7	77.5	48
49	49 45.5	+31.1	68.1	50 07.4	+32.3	69.2	50 28.1	+33.6	70.3	50 47.8	+34.9	71.5	51 06.2	+36.2	72.6	51 23.5	+37.5	73.8	51 39.6	+38.7	75.1	51 54.5	+39.9	76.3	49
50	50 16.6	+30.1	66.8	50 39.7	+31.4	67.9	51 01.7	+32.8	69.0	51 22.7	+34.0	70.2	51 42.4	+35.4	71.4	52 01.0	+36.6	72.6	52 18.3	+37.9	73.8	52 34.4	+39.2	75.1	50
51	50 46.7	+29.1	65.4	51 11.1	+30.5	66.5	51 34.5	+31.8	67.7	51 56.7	+33.1	68.9	52 17.8	+34.4	70.1	52 37.6	+35.8	71.3	52 56.2	+37.1	72.5	53 13.6	+38.4	73.8	51
52	51 15.8	+28.2	64.0	51 41.6	+29.5	65.1	52 06.3	+30.8	66.3	52 29.8	+32.2	67.5	52 52.2	+33.5	68.7	53 13.4	+34.8	70.0	53 33.3	+36.2	71.2	53 52.0	+37.5	72.5	52
53	51 44.0	+27.1	62.6	52 11.1	+28.4	63.7	52 37.1	+29.7	64.9	53 02.0	+31.1	66.1	53 25.7	+32.5	67.3	53 48.2	+33.9	68.6	54 09.5	+35.2	69.9	54 29.5	+36.7	71.2	53
54	52 11.1	+26.0	61.1	52 39.5	+27.4	62.3	53 06.9	+28.7	63.5	53 33.1	+30.1	64.7	53 58.2	+31.5	65.9	54 22.1	+32.8	67.2	54 44.7	+34.3	68.5	55 06.1	+35.6	69.8	54
55	52 37.1	+24.9	59.7	53 06.9	+26.2	60.8	53 35.6	+27.6	62.0	54 03.2	+29.0	63.2	54 29.7	+30.4	64.5	54 54.9	+31.9	65.7	55 19.0	+33.2	67.0	55 41.7	+34.7	68.4	55
56	53 02.0	+23.7	58.2	53 33.1	+25.1	59.3	54 03.2	+26.5	60.5	54 32.2	+27.9	61.7	55 00.1	+29.3	63.0	55 26.8	+30.7	64.2	55 52.2	+32.1	65.6	56 16.4	+33.5	66.9	56
57	53 25.7	+22.5	56.6	53 58.2	+23.9	57.8	54 29.7	+25.2	58.9	55 00.1	+26.7	60.2	55 29.4	+28.1	61.4	55 57.5	+29.5	62.7	56 24.3	+31.0	64.1	56 49.9	+32.5	65.4	57
58	53 48.2	+21.3	55.1	54 22.1	+22.6	56.2	54 54.9	+24.1	57.4	55 26.8	+25.4	58.6	55 57.5	+26.8	59.9	56 27.0	+28.3	61.2	56 55.3	+29.8	62.5	57 22.4	+31.3	63.9	58
59	54 09.5	+20.0	53.5	54 44.7	+21.4	54.6	55 19.0	+22.8	55.8	55 52.2	+24.2	57.0	56 24.3	+25.6	58.3	56 55.3	+27.1	59.6	57 25.1	+28.6	60.9	57 53.7	+30.0	62.3	59
60	54 29.5	+18.7	51.9	55 06.1	+20.0	53.0	55 41.7	+21.5	54.1	56 16.4	+22.8	55.4	56 49.9	+24.3	56.6	57 22.4	+25.7	57.9	57 53.7	+27.2	59.3	58 23.7	+28.8	60.6	60
61	54 48.2	+17.3	50.2	55 26.1	+18.7	51.3	56 03.2	+20.0	52.5	56 39.2	+21.5	53.7	57 14.2	+22.9	54.9	57 48.1	+24.4	56.2	58 20.9	+25.9	57.6	58 52.5	+27.4	59.0	61
62	55 05.5	+16.0	48.5	55 44.8	+17.3	49.6	56 23.2	+18.7	50.8	57 00.7	+20.0	52.0	57 37.1	+21.5	53.2	58 12.5	+23.0	54.5	58 46.8	+24.4	55.8	59 19.9	+26.0	57.2	62
63	55 21.5	+14.5	46.9	56 02.1	+15.8	47.9	56 41.8	+17.2	49.1	57 20.7	+18.6	50.2	57 58.6	+20.0	51.5	58 35.5	+21.4	52.7	59 11.2	+23.0	54.1	59 45.9	+24.5	55.4	63
64	55 36.0	+13.1	45.1	56 17.9	+14.4	46.2	56 59.0	+15.7	47.3	57 39.3	+17.1	48.5	58 18.6	+18.5	49.7	58 56.9	+20.0	50.9	59 34.2	+21.4	52.2	60 10.4	+22.9	53.6	64
65	55 49.1	+11.6	43.4	56 32.3	+12.9	44.4	57 14.7	+14.2	45.5	57 56.4	+15.5	46.7	58 37.1	+16.9	47.9	59 16.9	+18.3	49.1	59 55.6	+19.9	50.4	60 33.3	+21.4	51.8	65
66	56 00.7	+10.1	41.7	56 45.2	+11.3	42.7	57 28.9	+12.6	43.7	58 11.9	+13.9	44.8	58 54.0	+15.3	46.0	59 35.2	+16.7	47.2	60 15.5	+18.2	48.5	60 54.7	+19.7	49.8	66
67	56 10.8	+8.6	39.9	56 56.5	+9.8	40.9	57 41.5	+11.1	41.9	58 25.8	+12.3	43.0	59 09.3	+13.6	44.1	59 51.9	+15.1	45.3	60 33.7	+16.4	46.6	61 14.4	+18.0	47.9	67
68	56 19.4	+7.0	38.1	57 06.3	+8.2	39.1	57 52.6	+9.4	40.1	58 38.1	+10.7	41.1	59 22.9	+12.0	42.2	60 07.0	+13.3	43.4	60 50.1	+14.8	44.6	61 32.4	+16.2	45.9	68
69	56 26.4	+5.5	36.3	57 14.5	+6.6	37.2	58 02.0	+7.7	38.2	58 48.8	+9.0	39.2	59 34.9	+10.3	40.3	60 20.3	+11.6	41.4	61 04.9	+12.9	42.6	61 48.6	+14.4	43.9	69
70	56 31.9	+3.9	34.5	57 21.1	+5.0	35.4	58 09.7	+6.1	36.3	58 57.8	+7.2	37.3	59 45.2	+8.4	38.3	60 31.9	+9.7	39.4	61 17.8	+11.1	40.6	62 03.0	+12.5	41.8	70
71	56 35.8	+2.3	32.7	57 26.1	+3.3	33.5	58 15.8	+4.4	34.4	59 05.0	+5.6	35.4	59 53.6	+6.8	36.4	60 41.6	+8.0	37.4	61 28.9	+9.3	38.5	62 15.5	+10.6	39.7	71
72	56 38.1	+0.8	30.9	57 29.4	+1.7	31.7	58 20.2	+2.8	32.5	59 10.6	+3.8	33.4	60 00.4	+4.9	34.4	60 49.6	+6.1	35.4	61 38.2	+7.3	36.5	62 26.1	+8.6	37.6	72
73	56 38.9	−0.9	29.1	57 31.1	+0.1	29.8	58 23.0	+1.0	30.6	59 14.4	+2.0	31.5	60 05.3	+3.1	32.4	60 55.7	+4.2	33.3	61 45.5	+5.4	34.4	62 34.7	+6.7•	35.4	73
74	56 38.0	−2.4	27.2	57 31.2	−1.6	28.0	58 24.0	−0.7	28.7	59 16.4	+0.3	29.5	60 08.4	+1.3	30.4	60 59.9	+2.3	31.3	61 50.9	+3.5	32.3	62 41.4	+4.6•	33.3	74
75	56 35.6	−4.1	25.4	57 29.6	−3.2	26.1	58 23.3	−2.4	26.8	59 16.7	−1.5	27.6	60 09.7	−0.6	28.4	61 02.2	+0.5	29.2	61 54.4	+1.5•	30.1	62 46.0	+2.6•	31.1	75
76	56 31.5	−5.6	23.6	57 26.4	−4.9	24.2	58 20.9	−4.0	24.9	59 15.2	−3.2	25.6	60 09.1	−2.3	26.4	61 02.7	−1.4	27.2	61 55.9	−0.5	28.0	62 48.6	+0.6•	28.9	76
77	56 25.9	−7.1	21.8	57 21.5	−6.5	22.4	58 16.9	−5.8	23.0	59 12.0	−5.0	23.7	60 06.8	−4.2	24.4	61 01.3	−3.4	25.1	61 55.4	−2.4	25.9	62 49.2	−1.4•	26.7	77
78	56 18.8	−8.7	20.0	57 15.0	−8.0	20.6	58 11.1	−7.4	21.1	59 07.0	−6.8	21.7	60 02.6	−6.0	22.4	60 57.9	−5.2	23.0	61 53.0	−4.4	23.8	62 47.8	−3.5•	24.5	78
79	56 10.0	−10.2	18.2	57 07.0	−9.7	18.7	58 03.7	−9.1	19.2	59 00.2	−8.4	19.8	59 56.6	−7.8	20.4	60 52.7	−7.0	21.0	61 48.6	−6.3	21.7	62 44.3	−5.6•	22.4	79
80	55 59.8	−11.7	16.5	56 57.3	−11.2	16.9	57 54.6	−10.7	17.4	58 51.8	−10.1	17.9	59 48.8	−9.5	18.4	60 45.7	−8.9	19.0	61 42.3	−8.2	19.6	62 38.7	−7.5	20.2	80
81	55 48.1	−13.2	14.7	56 46.1	−12.8	15.1	57 43.9	−12.3	15.5	58 41.7	−11.8	16.0	59 39.3	−11.3	16.6	60 36.8	−10.7	16.9	61 34.1	−10.1	17.5	62 31.2	−9.4•	18.0	81
82	55 34.9	−14.7	13.0	56 33.3	−14.3	13.3	57 31.6	−13.8	13.7	58 29.9	−13.4	14.1	59 28.0	−12.9	14.5	60 26.1	−12.5	14.9	61 24.0	−12.0	15.4	62 21.8	−11.5	15.9	82
83	55 20.2	−16.0	11.3	56 19.0	−15.7	11.6	57 17.8	−15.4	11.9	58 16.5	−15.1	12.2	59 15.1	−14.7	12.6	60 13.6	−14.2	13.0	61 12.0	−13.8	13.4	62 10.3	−13.3	13.8	83
84	55 04.2	−17.5	9.6	56 03.3	−17.2	9.8	57 02.4	−16.9	10.1	58 01.4	−16.6	10.4	59 00.4	−16.2	10.7	59 59.4	−16.0	11.0	60 58.2	−15.5	11.3	61 57.0	−15.2	11.7	84
85	54 46.7	−18.8	7.9	55 46.1	−18.5	8.1	56 45.5	−18.3	8.4	57 44.9	−18.1	8.6	58 44.2	−17.9	8.8	59 43.4	−17.5	9.1	60 42.7	−17.3	9.4	61 41.8	−16.9	9.7	85
86	54 27.9	−20.1	6.3	55 27.6	−20.0	6.5	56 27.2	−19.8	6.6	57 26.8	−19.6	6.8	58 26.3	−19.4	7.0	59 25.9	−19.2	7.2	60 25.4	−19.0	7.4	61 24.9	−18.8	7.7	86
87	54 07.8	−21.4	4.7	55 07.6	−21.3	4.8	56 07.4	−21.1	4.9	57 07.2	−21.0	5.1	58 06.9	−20.9	5.2	59 06.7	−20.8	5.3	60 06.4	−20.6	5.5	61 06.1	−20.4	5.7	87
88	53 46.4	−22.6	3.1	54 46.3	−22.5	3.2	55 46.3	−22.5	3.2	56 46.2	−22.5	3.3	57 46.0	−22.3	3.4	58 45.9	−22.2	3.5	59 45.8	−22.1	3.6	60 45.7	−22.1	3.7	88
89	53 23.8	−23.8	1.5	54 23.8	−23.8	1.6	55 23.8	−23.8	1.6	56 23.7	−23.7	1.7	57 23.7	−23.7	1.7	58 23.7	−23.7	1.7	59 23.7	−23.7	1.8	60 23.6	−23.6	1.8	89
90	53 00.0	−25.0	0.0	54 00.0	−25.0	0.0	55 00.0	−25.0	0.0	56 00.0	−25.0	0.0	57 00.0	−25.1	0.0	58 00.0	−25.1	0.0	59 00.0	−25.1	0.0	60 00.0	−25.2	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	14 10.1	−49.4	109.6	13 49.9	−50.0	109.8	13 29.5	−50.6	110.0	13 08.8	−51.1	110.3	12 47.9	−51.6	110.5	12 26.8	−52.1	110.7	12 05.5	−52.6	110.9	11 44.0	−53.1	111.1	0
1	13 20.7	−49.6	110.2	12 59.9	−50.1	110.4	12 38.9	−50.7	110.6	12 17.7	−51.2	110.8	11 56.3	−51.7	111.0	11 34.7	−52.2	111.2	11 12.9	−52.7	111.4	10 50.9	−53.1	111.6	1
2	12 31.1	−49.6	110.7	12 09.8	−50.2	110.9	11 48.2	−50.7	111.1	11 26.5	−51.2	111.3	11 04.6	−51.7	111.5	10 42.5	−52.2	111.7	10 20.2	−52.7	111.9	9 57.8	−53.2	112.0	2
3	11 41.5	−49.7	111.3	11 19.6	−50.2	111.5	10 57.5	−50.7	111.7	10 35.3	−51.3	111.9	10 12.9	−51.8	112.0	9 50.3	−52.3	112.2	9 27.5	−52.7	112.4	9 04.6	−53.2	112.5	3
4	10 51.8	−49.7	111.9	10 29.4	−50.3	112.1	10 06.8	−50.9	112.2	9 44.0	−51.3	112.4	9 21.1	−51.9	112.5	8 58.0	−52.3	112.7	8 34.8	−52.8	112.8	8 11.4	−53.2	113.0	4
5	10 02.1	−49.8	112.5	9 39.1	−50.4	112.6	9 15.9	−50.8	112.8	8 52.7	−51.4	112.9	8 29.2	−51.8	113.1	8 05.7	−52.4	113.2	7 42.0	−52.8	113.3	7 18.2	−53.3	113.4	5
6	9 12.3	−49.9	113.0	8 48.7	−50.4	113.2	8 25.1	−50.9	113.3	8 01.3	−51.4	113.4	7 37.4	−52.0	113.6	7 13.3	−52.4	113.7	6 49.2	−52.9	113.8	6 24.9	−53.3	113.9	6
7	8 22.4	−49.9	113.6	7 58.3	−50.4	113.7	7 34.2	−51.0	113.8	7 09.9	−51.5	114.1	6 45.4	−51.9	114.1	6 20.9	−52.4	114.2	5 56.3	−52.9	114.3	5 31.6	−53.3	114.4	7
8	7 32.5	−49.9	114.1	7 07.9	−50.5	114.3	6 43.2	−51.0	114.4	6 18.4	−51.5	114.5	5 53.5	−52.0	114.6	5 28.5	−52.4	114.7	5 03.4	−52.9	114.7	4 38.3	−53.4	114.8	8
9	6 42.6	−50.0	114.7	6 17.4	−50.5	114.8	5 52.2	−51.0	114.9	5 26.9	−51.5	115.0	5 01.5	−52.0	115.1	4 36.1	−52.5	115.1	4 10.5	−52.9	115.2	3 44.9	−53.3	115.3	9
10	5 52.6	−50.0	115.3	5 26.9	−50.5	115.3	5 01.2	−51.0	115.5	4 35.4	−51.5	115.5	4 09.5	−52.0	115.6	3 43.6	−52.5	115.6	3 17.6	−52.9	115.7	2 51.6	−53.4	115.7	10
11	5 02.6	−50.1	115.8	4 36.4	−50.6	115.9	4 10.2	−51.1	116.0	3 43.9	−51.6	116.0	3 17.5	−52.0	116.1	2 51.1	−52.4	116.1	2 24.7	−52.9	116.2	1 58.2	−53.3	116.2	11
12	4 12.5	−50.1	116.4	3 45.8	−50.5	116.4	3 19.1	−51.1	116.5	2 52.3	−51.5	116.5	2 25.5	−52.0	116.6	1 58.7	−52.5	116.6	1 31.8	−53.0	116.6	1 04.9	−53.4	116.7	12
13	3 22.4	−50.1	116.9	2 55.3	−50.6	117.0	2 28.0	−51.1	117.0	2 00.8	−51.6	117.0	1 33.5	−52.1	117.1	1 06.2	−52.5	117.1	0 38.8	−53.0	117.1	0 11.5	−53.4	117.1	13
14	2 32.3	−50.1	117.5	2 04.7	−50.7	117.5	1 36.9	−51.1	117.5	1 09.2	−51.6	117.6	0 41.4	−52.0	117.6	0 13.7	−52.5	117.6	0 14.1	+53.0	62.4	0 41.9	+53.4	62.4	14
15	1 42.2	−50.1	118.0	1 14.0	−50.6	118.0	0 45.8	−51.1	118.1	0 17.6	−51.6	118.1	0 10.6	+52.1	61.9	0 38.8	+52.5	61.9	1 07.1	+52.9	62.0	1 35.3	+53.3	62.0	15
16	0 52.1	−50.1	118.6	0 23.4	−50.6	118.6	0 05.3	+51.1	61.4	0 34.0	+51.5	61.4	1 02.7	+52.0	61.4	1 31.3	+52.5	61.5	2 00.0	+52.9	61.5	2 28.6	+53.4	61.5	16
17	0 02.0	−50.1	119.1	0 27.2	+50.6	60.9	0 56.4	+51.1	60.9	1 25.5	+51.6	60.9	1 54.7	+52.0	60.9	2 23.8	+52.5	61.0	2 52.9	+52.9	61.0	3 22.0	+53.3	61.1	17
18	0 48.1	+50.1	60.3	1 17.8	+50.6	60.3	1 47.5	+51.1	60.4	2 17.1	+51.6	60.4	2 46.7	+52.0	60.4	3 16.3	+52.5	60.5	3 45.8	+52.9	60.5	4 15.3	+53.3	60.6	18
19	1 38.2	+50.1	59.8	2 08.4	+50.6	59.8	2 38.6	+51.0	59.8	3 08.7	+51.5	59.9	3 38.7	+52.1	59.9	4 08.8	+52.4	60.0	4 38.7	+52.9	60.1	5 08.6	+53.4	60.1	19
20	2 28.3	+50.1	59.2	2 59.0	+50.6	59.3	3 29.6	+51.1	59.3	4 00.2	+51.5	59.4	4 30.8	+51.9	59.4	5 01.2	+52.5	59.5	5 31.6	+52.9	59.6	6 02.0	+53.2	59.7	20
21	3 18.4	+50.1	58.7	3 49.6	+50.5	58.7	4 20.7	+51.0	58.8	4 51.7	+51.5	58.9	5 22.7	+52.0	58.9	5 53.7	+52.4	59.0	6 24.5	+52.8	59.1	6 55.2	+53.3	59.2	21
22	4 08.5	+50.0	58.1	4 40.1	+50.6	58.2	5 11.7	+51.0	58.3	5 43.2	+51.5	58.3	6 14.7	+51.9	58.4	6 46.1	+52.3	58.5	7 17.3	+52.8	58.6	7 48.5	+53.2	58.8	22
23	4 58.5	+50.1	57.6	5 30.7	+50.5	57.7	6 02.7	+51.0	57.7	6 34.7	+51.5	57.8	7 06.6	+51.9	57.9	7 38.4	+52.4	58.0	8 10.1	+52.8	58.2	8 41.7	+53.2	58.3	23
24	5 48.6	+49.9	57.0	6 21.2	+50.4	57.1	6 53.7	+51.0	57.2	7 26.2	+51.4	57.3	7 58.5	+51.9	57.4	8 30.8	+52.3	57.6	9 02.9	+52.7	57.7	9 34.9	+53.2	57.8	24
25	6 38.5	+50.0	56.5	7 11.6	+50.5	56.6	7 44.7	+50.9	56.7	8 17.6	+51.3	56.8	8 50.4	+51.8	56.9	9 23.1	+52.2	57.1	9 55.6	+52.7	57.2	10 28.1	+53.1	57.3	25
26	7 28.5	+49.9	55.9	8 02.1	+50.4	56.0	8 35.6	+50.8	56.1	9 08.9	+51.4	56.3	9 42.2	+51.8	56.4	10 15.3	+52.2	56.6	10 48.3	+52.7	56.7	11 21.2	+53.1	56.9	26
27	8 18.4	+49.9	55.3	8 52.5	+50.3	55.5	9 26.4	+50.8	55.6	10 00.3	+51.2	55.7	10 34.0	+51.7	55.9	11 07.5	+52.2	56.1	11 41.0	+52.6	56.2	12 14.3	+53.0	56.4	27
28	9 08.3	+49.8	54.8	9 42.8	+50.3	54.9	10 17.2	+50.8	55.1	10 51.5	+51.2	55.2	11 25.7	+51.5	55.4	11 59.7	+52.1	55.5	12 33.6	+52.5	55.7	13 07.3	+52.9	55.9	28
29	9 58.1	+49.7	54.2	10 33.1	+50.2	54.4	11 08.0	+50.7	54.5	11 42.7	+51.2	54.7	12 17.4	+51.6	54.9	12 51.8	+52.1	55.0	13 26.1	+52.5	55.2	14 00.2	+52.9	55.4	29
30	10 47.8	+49.7	53.7	11 23.3	+50.2	53.8	11 58.7	+50.6	54.0	12 33.9	+51.1	54.2	13 09.0	+51.5	54.3	13 43.9	+51.9	54.5	14 18.6	+52.4	54.7	14 53.1	+52.9	54.9	30
31	11 37.5	+49.6	53.1	12 13.5	+50.1	53.3	12 49.3	+50.6	53.4	13 25.0	+51.0	53.6	14 00.5	+51.5	53.8	14 35.8	+52.0	54.0	15 11.0	+52.4	54.2	15 46.0	+52.8	54.5	31
32	12 27.1	+49.6	52.5	13 03.6	+50.0	52.7	13 39.9	+50.5	52.9	14 16.0	+51.0	53.1	14 52.0	+51.4	53.3	15 27.8	+51.8	53.5	16 03.4	+52.2	53.7	16 38.8	+52.7	54.0	32
33	13 16.7	+49.5	51.9	13 53.6	+50.0	52.1	14 30.4	+50.4	52.3	15 07.0	+50.8	52.5	15 43.4	+51.3	52.7	16 19.6	+51.8	53.0	16 55.6	+52.2	53.2	17 31.5	+52.6	53.5	33
34	14 06.2	+49.3	51.3	14 43.6	+49.8	51.5	15 20.8	+50.3	51.8	15 58.8	+50.7	52.0	16 34.7	+51.2	52.2	17 11.4	+51.7	52.4	17 47.8	+52.2	52.7	18 24.1	+52.5	53.0	34
35	14 55.5	+49.3	50.8	15 33.4	+49.8	51.0	16 11.1	+50.2	51.2	16 48.6	+50.7	51.4	17 25.9	+51.2	51.7	18 03.1	+51.6	51.9	18 40.0	+52.0	52.2	19 16.6	+52.5	52.4	35
36	15 44.8	+49.2	50.2	16 23.2	+49.7	50.4	17 01.3	+50.2	50.6	17 39.3	+50.6	50.9	18 17.1	+51.0	51.1	18 54.7	+51.5	51.4	19 32.0	+51.9	51.6	20 09.1	+52.4	51.9	36
37	16 34.0	+49.1	49.6	17 12.9	+49.5	49.8	17 51.5	+50.0	50.0	18 29.9	+50.5	50.3	19 08.1	+51.0	50.6	19 46.2	+51.4	50.8	20 23.9	+51.9	51.1	21 01.5	+52.3	51.4	37
38	17 23.1	+49.0	49.0	18 02.4	+49.5	49.2	18 41.5	+50.0	49.5	19 20.4	+50.4	49.7	19 59.1	+50.8	50.0	20 37.6	+51.2	50.3	21 15.8	+51.7	50.6	21 53.8	+52.1	50.9	38
39	18 12.1	+48.9	48.4	18 51.9	+49.3	48.6	19 31.5	+49.8	48.9	20 10.8	+50.3	49.1	20 49.9	+50.8	49.4	21 28.8	+51.2	49.7	22 07.5	+51.6	50.0	22 45.9	+52.1	50.3	39
40	19 01.0	+48.7	47.7	19 41.2	+49.3	48.0	20 21.3	+49.7	48.3	21 01.1	+50.1	48.6	21 40.7	+50.6	48.9	22 20.0	+51.1	49.2	22 59.1	+51.6	49.5	23 38.0	+51.9	49.8	40
41	19 49.7	+48.7	47.1	20 30.5	+49.1	47.4	21 11.0	+49.5	47.7	21 51.2	+50.1	48.0	22 31.3	+50.5	48.3	23 11.1	+50.9	48.6	23 50.7	+51.3	48.9	24 29.9	+51.9	49.3	41
42	20 38.4	+48.4	46.5	21 19.6	+48.9	46.8	22 00.5	+49.5	47.1	22 41.3	+49.9	47.4	23 21.8	+50.3	47.7	24 02.0	+50.8	48.0	24 42.0	+51.3	48.4	25 21.8	+51.7	48.7	42
43	21 26.8	+48.4	45.9	22 08.5	+48.8	46.2	22 50.0	+49.2	46.5	23 31.2	+49.7	46.8	24 12.1	+50.3	47.1	24 52.9	+50.6	47.4	25 33.3	+51.1	47.7	26 13.5	+51.6	48.1	43
44	22 15.2	+48.2	45.2	22 57.3	+48.7	45.5	23 39.2	+49.2	45.8	24 20.9	+49.6	46.2	25 02.4	+50.0	46.5	25 43.5	+50.6	46.8	26 24.4	+51.0	47.2	27 05.1	+51.4	47.6	44
45	23 03.4	+48.0	44.6	23 46.0	+48.5	44.9	24 28.4	+49.0	45.2	25 10.5	+49.5	45.5	25 52.4	+49.9	45.9	26 34.1	+50.3	46.2	27 15.4	+50.8	46.6	27 56.5	+51.3	47.0	45
46	23 51.4	+47.9	43.9	24 34.5	+48.3	44.3	25 17.4	+48.8	44.6	26 00.0	+49.3	44.9	26 42.3	+49.8	45.3	27 24.4	+50.2	45.6	28 06.2	+50.7	46.0	28 47.8	+51.1	46.4	46
47	24 39.3	+47.7	43.3	25 22.8	+48.2	43.6	26 06.2	+48.6	43.9	26 49.3	+49.1	44.3	27 32.1	+49.6	44.6	28 14.6	+50.1	45.0	28 56.9	+50.5	45.4	29 38.9	+51.0	45.8	47
48	25 27.0	+47.5	42.6	26 11.0	+48.0	42.9	26 54.8	+48.5	43.3	27 38.4	+49.0	43.6	28 21.7	+49.4	44.0	29 04.7	+49.8	44.4	29 47.4	+50.3	44.8	30 29.9	+50.7	45.2	48
49	26 14.5	+47.3	41.9	26 59.0	+47.8	42.3	27 43.3	+48.2	42.6	28 27.3	+48.7	43.0	29 11.1	+49.2	43.4	29 54.5	+49.7	43.7	30 37.7	+50.2	44.1	31 20.6	+50.6	44.6	49
50	27 01.8	+47.1	41.2	27 46.8	+47.5	41.6	28 31.5	+48.1	41.9	29 16.0	+48.6	42.3	30 00.3	+49.0	42.7	30 44.2	+49.5	43.1	31 27.9	+49.9	43.5	32 11.2	+50.5	43.9	50
51	27 48.9	+46.9	40.5	28 34.3	+47.4	40.9	29 19.6	+47.8	41.3	30 04.6	+48.3	41.6	30 49.3	+48.8	42.0	31 33.7	+49.3	42.4	32 17.8	+49.8	42.9	33 01.7	+50.2	43.3	51
52	28 35.8	+46.6	39.8	29 21.7	+47.2	40.2	30 07.4	+47.7	40.6	30 52.9	+48.1	40.9	31 38.1	+48.5	41.3	32 23.0	+49.0	41.8	33 07.6	+49.5	42.2	33 51.9	+50.0	42.6	52
53	29 22.4	+46.5	39.1	30 08.9	+46.9	39.5	30 55.1	+47.3	39.9	31 41.0	+47.8	40.2	32 26.6	+48.4	40.7	33 12.0	+48.8	41.1	33 57.1	+49.3	41.5	34 41.9	+49.7	42.0	53
54	30 08.9	+46.2	38.4	30 55.8	+46.6	38.8	31 42.4	+47.2	39.1	32 28.8	+47.7	39.5	33 15.0	+48.1	39.9	34 00.8	+48.6	40.4	34 46.4	+49.1	40.8	35 31.6	+49.6	41.3	54
55	30 55.1	+45.9	37.6	31 42.4	+46.4	38.0	32 29.6	+46.9	38.4	33 16.5	+47.3	38.8	34 03.1	+47.8	39.2	34 49.4	+48.3	39.7	35 35.5	+48.8	40.1	36 21.2	+49.3	40.6	55
56	31 41.0	+45.6	36.9	32 28.8	+46.2	37.3	33 16.5	+46.6	37.7	34 03.8	+47.1	38.1	34 50.9	+47.6	38.5	35 37.7	+48.1	38.9	36 24.3	+48.5	39.4	37 10.5	+49.0	39.9	56
57	32 26.6	+45.4	36.1	33 15.0	+45.8	36.5	34 03.1	+46.3	36.9	34 50.9	+46.8	37.3	35 38.5	+47.3	37.8	36 25.8	+47.8	38.2	37 12.8	+48.3	38.7	37 59.5	+48.8	39.1	57
58	33 12.0	+45.1	35.3	34 00.8	+45.6	35.7	34 49.4	+46.1	36.1	35 37.7	+46.6	36.6	36 25.8	+47.0	37.0	37 13.6	+47.5	37.4	38 01.1	+48.0	37.9	38 48.3	+48.4	38.4	58
59	33 57.1	+44.8	34.6	34 46.4	+45.2	34.9	35 35.5	+45.7	35.3	36 24.3	+46.2	35.8	37 12.8	+46.7	36.2	38 01.1	+47.1	36.7	38 49.1	+47.6	37.1	39 36.7	+48.2	37.6	59
60	34 41.9	+44.4	33.8	35 31.6	+45.0	34.1	36 21.2	+45.4	34.6	37 10.5	+45.9	35.0	37 59.5	+46.4	35.4	38 48.3	+46.8	35.9	39 36.7	+47.4	36.4	40 24.9	+47.8	36.9	60
61	35 26.3	+44.1	32.9	36 16.6	+44.5	33.3	37 06.6	+45.0	33.7	37 56.4	+45.5	34.2	38 45.9	+46.0	34.6	39 35.1	+46.5	35.1	40 24.1	+47.0	35.6	41 12.7	+47.5	36.1	61
62	36 10.4	+43.8	32.1	37 01.1	+44.3	32.5	37 51.6	+44.7	32.9	38 41.9	+45.2	33.3	39 31.9	+45.7	33.8	40 21.6	+46.2	34.3	41 11.1	+46.6	34.8	42 00.2	+47.2	35.3	62
63	36 54.2	+43.4	31.2	37 45.4	+43.8	31.6	38 36.3	+44.4	32.1	39 27.1	+44.8	32.5	40 17.6	+45.2	32.9	41 07.8	+45.8	33.4	41 57.7	+46.3	33.9	42 47.4	+46.7	34.4	63
64	37 37.6	+42.9	30.4	38 29.2	+43.5	30.8	39 20.7	+43.9	31.2	40 11.9	+44.4	31.6	41 02.8	+44.9	32.1	41 53.6	+45.3	32.5	42 44.0	+45.9	33.0	43 34.1	+46.4	33.6	64
65	38 20.5	+42.6	29.5	39 12.7	+43.0	29.9	40 04.6	+43.5	30.3	40 56.3	+44.0	30.7	41 47.7	+44.5	31.2	42 38.9	+45.0	31.7	43 29.9	+45.4	32.2	44 20.5	+46.0	32.7	65
66	39 03.1	+42.2	28.6	39 55.7	+42.6	29.0	40 48.1	+43.1	29.4	41 40.3	+43.5	29.8	42 32.2	+44.0	30.3	43 23.9	+44.5	30.8	44 15.3	+45.0	31.3	45 06.5	+45.5	31.8	66
67	39 45.3	+41.7	27.7	40 38.3	+42.2	28.1	41 31.2	+42.6	28.5	42 23.8	+43.1	28.9	43 16.2	+43.6	29.4	44 08.4	+44.1	29.8	45 00.3	+44.6	30.3	45 52.0	+45.0	30.8	67
68	40 27.0	+41.3	26.7	41 20.5	+41.7	27.1	42 13.8	+42.2	27.5	43 06.9	+42.6	28.0	43 59.8	+43.1	28.4	44 52.5	+43.5	28.9	45 44.9	+44.0	29.4	46 37.0	+44.6	29.9	68
69	41 08.3	+40.7	25.8	42 02.2	+41.2	26.2	42 56.0	+41.6	26.6	43 49.5	+42.1	27.0	44 42.9	+42.6	27.4	45 36.0	+43.1	27.9	46 28.9	+43.6	28.4	47 21.6	+44.0	28.9	69
70	41 49.0	+40.3	24.8	42 43.4	+40.7	25.2	43 37.6	+41.1	25.6	44 31.6	+41.6	26.0	45 25.5	+42.0	26.4	46 19.1	+42.5	26.9	47 12.5	+43.0	27.4	48 05.6	+43.5	27.9	70
71	42 29.3	+39.7	23.8	43 24.1	+40.1	24.2	44 18.7	+40.6	24.6	45 13.2	+41.1	25.0	46 07.5	+41.5	25.4	47 01.6	+42.0	25.9	47 55.5	+42.4	26.3	48 49.1	+43.0	26.9	71
72	43 09.0	+39.1	22.8	44 04.2	+39.6	23.1	44 59.3	+40.0	23.5	45 54.3	+40.4	23.9	46 49.0	+40.9	24.4	47 43.6	+41.4	24.8	48 37.9	+41.8	25.3	49 32.1	+42.3	25.8	72
73	43 48.1	+38.6	21.7	44 43.8	+39.0	22.1	45 39.3	+39.4	22.5	46 34.7	+39.8	22.9	47 29.9	+40.3	23.3	48 24.9	+40.7	23.7	49 19.7	+41.2	24.2	50 14.4	+41.6	24.7	73
74	44 26.7	+38.0	20.7	45 22.8	+38.4	21.0	46 18.7	+38.8	21.4	47 14.5	+39.2	21.8	48 10.2	+39.6	22.2	49 05.6	+40.1	22.6	50 00.9	+40.6	23.1	50 56.0	+41.0	23.6	74
75	45 04.7	+37.3	19.6	46 01.2	+37.7	19.9	46 57.5	+38.1	20.3	47 53.7	+38.5	20.6	48 49.8	+38.9	21.0	49 45.7	+39.4	21.5	50 41.5	+39.8	21.9	51 37.0	+40.3	22.4	75
76	45 42.0	+36.7	18.4	46 38.9	+37.0	18.8	47 35.6	+37.4	19.1	48 32.2	+37.9	19.5	49 28.7	+38.3	19.9	50 25.1	+38.6	20.3	51 21.3	+39.1	20.7	52 17.3	+39.5	21.2	76
77	46 18.7	+35.9	17.3	47 15.9	+36.3	17.6	48 13.0	+36.7	18.0	49 10.1	+37.0	18.3	50 07.0	+37.4	18.7	51 03.7	+37.9	19.1	52 00.4	+38.2	19.5	52 56.8	+38.8	19.9	77
78	46 54.6	+35.3	16.1	47 52.2	+35.6	16.4	48 49.7	+36.0	16.8	49 47.1	+36.3	17.1	50 44.4	+36.7	17.5	51 41.6	+37.1	17.8	52 38.6	+37.5	18.2	53 35.6	+37.8	18.7	78
79	47 29.9	+34.5	15.0	48 27.8	+34.8	15.2	49 25.7	+35.1	15.5	50 23.4	+35.5	15.9	51 21.1	+35.8	16.2	52 18.7	+36.2	16.6	53 16.1	+36.6	16.9	54 13.4	+37.0	17.3	79
80	48 04.4	+33.7	13.7	49 02.6	+34.0	14.0	50 00.8	+34.3	14.3	50 58.9	+34.7	14.6	51 56.9	+35.0	14.9	52 54.9	+35.3	15.3	53 52.7	+35.7	15.6	54 50.4	+36.1	16.0	80
81	48 38.1	+32.9	12.5	49 36.6	+33.2	12.7	50 35.1	+33.5	13.0	51 33.6	+34.1	13.3	52 31.9	+34.1	13.6	53 30.2	+34.4	13.9	54 28.4	+34.7	14.2	55 26.5	+35.1	14.6	81
82	49 11.0	+32.0	11.2	50 09.8	+32.3	11.4	51 08.6	+32.5	11.7	52 07.3	+32.8	12.0	53 06.0	+33.1	12.2	54 04.6	+33.4	12.5	55 03.1	+33.7	12.8	56 01.6	+34.0	13.2	82
83	49 43.0	+31.1	9.9	50 42.1	+31.3	10.1	51 41.1	+31.6	10.3	52 40.1	+31.8	10.6	53 39.1	+32.1	10.8	54 38.0	+32.3	11.1	55 36.8	+32.7	11.4	56 35.6	+33.0	11.7	83
84	50 14.1	+30.2	8.8	51 13.4	+30.4	8.8	52 12.7	+30.6	9.0	53 11.9	+30.9	9.2	54 11.2	+31.0	9.4	55 10.3	+31.3	9.6	56 09.5	+31.5	9.9	57 08.6	+31.7	10.1	84
85	50 44.3	+29.2	7.2	51 43.8	+29.4	7.4	52 43.3	+29.6	7.6	53 42.8	+29.7	7.7	54 42.2	+30.0	7.9	55 41.6	+30.2	8.1	56 41.0	+30.4	8.3	57 40.3	+30.6	8.6	85
86	51 13.5	+28.2	5.8	52 13.2	+28.4	6.0	53 12.9	+28.5	6.1	54 12.5	+28.7	6.3	55 12.2	+28.8	6.4	56 11.8	+28.9	6.6	57 11.4	+29.1	6.8	58 10.9	+29.4	6.9	86
87	51 41.7	+27.2	4.4	52 41.6	+27.2	4.5	53 41.4	+27.4	4.6	54 41.2	+27.5	4.7	55 41.0	+27.6	4.9	56 40.7	+27.8	5.0	57 40.5	+27.9	5.1	58 40.3	+28.0	5.3	87
88	52 08.9	+26.1	3.0	53 08.8	+26.2	3.0	54 08.8	+26.2	3.1	55 08.7	+26.3	3.2	56 08.6	+26.3	3.3	57 08.5	+26.4	3.4	58 08.4	+26.5	3.5	59 08.2	+26.6	3.6	88
89	52 35.0	+25.0	1.5	53 35.0	+25.0	1.5	54 35.0	+25.0	1.6	55 35.0	+25.0	1.6	56 34.9	+25.1	1.7	57 34.9	+25.1	1.7	58 34.9	+25.1	1.8	59 34.8	+25.2	1.8	89
90	53 00.0	+23.8	0.0	54 00.0	+23.8	0.0	55 00.0	+23.8	0.0	56 00.0	+23.7	0.0	57 00.0	+23.7	0.0	58 00.0	+23.7	0.0	59 00.0	+23.7	0.0	60 00.0	+23.6	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z }   LATITUDE **SAME** NAME AS DECLINATION   **L.H.A. 114°, 246°**

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Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	13 36.0	+49.3	108.7	13 16.6	+49.9	109.0	12 57.0	+50.4	109.2	12 37.2	+51.0	109.4	12 17.2	+51.5	109.6	11 57.0	+52.0	109.8	11 36.6	+52.5	110.0	11 16.0	+52.9	110.2	0
1	14 25.3	+49.1	108.1	14 06.5	+49.7	108.4	13 47.4	+50.4	108.6	13 28.2	+50.8	108.8	13 08.7	+51.4	109.1	12 49.0	+51.9	109.3	12 29.1	+52.4	109.5	12 08.9	+52.9	109.7	1
2	15 14.4	+49.1	107.5	14 56.2	+49.7	107.8	14 37.8	+50.2	108.1	14 19.0	+50.8	108.3	14 00.1	+51.3	108.5	13 40.9	+51.9	108.8	13 21.5	+52.3	109.0	13 01.8	+52.9	109.2	2
3	16 03.5	+49.0	106.9	15 45.9	+49.6	107.2	15 28.0	+50.2	107.5	15 09.8	+50.8	107.7	14 51.4	+51.3	108.0	14 32.8	+51.7	108.3	14 13.8	+52.3	108.5	13 54.7	+52.8	108.7	3
4	16 52.5	+48.9	106.3	16 35.5	+49.4	106.6	16 18.2	+50.0	106.9	16 00.6	+50.6	107.2	15 42.7	+51.3	107.5	15 24.5	+51.8	107.7	15 06.1	+52.3	108.0	14 47.5	+52.7	108.2	4
5	17 41.4	+48.7	105.7	17 24.9	+49.4	106.0	17 08.2	+50.0	106.3	16 51.2	+50.5	106.6	16 33.9	+51.1	106.9	16 16.3	+51.6	107.2	15 58.4	+52.1	107.5	15 40.2	+52.7	107.7	5
6	18 30.1	+48.7	105.1	18 14.3	+49.3	105.4	17 58.2	+49.8	105.8	17 41.7	+50.5	106.1	17 25.0	+51.0	106.4	17 07.9	+51.5	106.7	16 50.5	+52.1	107.0	16 32.9	+52.6	107.3	6
7	19 18.8	+48.5	104.5	19 03.6	+49.1	104.8	18 48.0	+49.8	105.2	18 32.2	+50.3	105.5	18 16.0	+50.9	105.8	17 59.4	+51.5	106.1	17 42.6	+52.0	106.4	17 25.5	+52.5	106.7	7
8	20 07.3	+48.4	103.9	19 52.7	+49.0	104.2	19 37.8	+49.6	104.6	19 22.5	+50.2	104.9	19 06.9	+50.8	105.3	18 50.9	+51.4	105.6	18 34.6	+51.9	105.9	18 18.0	+52.4	106.2	8
9	20 55.7	+48.2	103.2	20 41.7	+48.9	103.6	20 27.4	+49.5	104.0	20 12.7	+50.1	104.3	19 57.7	+50.7	104.7	19 42.3	+51.2	105.0	19 26.5	+51.8	105.4	19 10.4	+52.4	105.7	9
10	21 43.9	+48.1	102.6	21 30.6	+48.7	103.0	21 16.9	+49.4	103.4	21 02.8	+50.0	103.8	20 48.4	+50.6	104.1	20 33.5	+51.2	104.5	20 18.3	+51.8	104.9	20 02.8	+52.2	105.2	10
11	22 32.0	+47.9	102.0	22 19.3	+48.6	102.4	22 06.3	+49.2	102.8	21 52.8	+49.9	103.2	21 39.0	+50.4	103.5	21 24.7	+51.0	103.9	21 10.1	+51.6	104.3	20 55.0	+52.2	104.7	11
12	23 19.9	+47.8	101.3	23 07.9	+48.5	101.7	22 55.5	+49.1	102.1	22 42.7	+49.7	102.6	22 29.4	+50.4	103.0	22 15.7	+51.0	103.4	22 01.7	+51.5	103.8	21 47.2	+52.1	104.2	12
13	24 07.7	+47.6	100.7	23 56.4	+48.2	101.1	23 44.6	+48.9	101.5	23 32.4	+49.6	102.0	23 19.8	+50.1	102.4	23 06.7	+50.8	102.8	22 53.2	+51.4	103.2	22 39.3	+51.9	103.6	13
14	24 55.3	+47.4	100.0	24 44.6	+48.1	100.4	24 33.5	+48.8	100.9	24 22.0	+49.4	101.3	24 09.9	+50.1	101.8	23 57.5	+50.7	102.2	23 44.6	+51.2	102.6	23 31.2	+51.8	103.1	14
15	25 42.7	+47.2	99.3	25 32.7	+48.0	99.8	25 22.3	+48.6	100.2	25 11.4	+49.3	100.7	25 00.0	+49.9	101.2	24 48.2	+50.5	101.6	24 35.8	+51.2	102.1	24 23.0	+51.8	102.5	15
16	26 29.9	+47.0	98.6	26 20.7	+47.7	99.1	26 10.9	+48.4	99.6	26 00.7	+49.1	100.1	25 49.9	+49.8	100.6	25 38.7	+50.4	101.0	25 27.0	+51.0	101.5	25 14.8	+51.5	102.0	16
17	27 16.9	+46.8	97.9	27 08.4	+47.5	98.4	26 59.3	+48.3	98.9	26 49.8	+48.9	99.4	26 39.7	+49.6	99.9	26 29.1	+50.2	100.4	26 18.0	+50.8	100.9	26 06.3	+51.5	101.4	17
18	28 03.7	+46.6	97.2	27 55.9	+47.4	97.7	27 47.6	+48.0	98.3	27 38.7	+48.7	98.8	27 29.3	+49.4	99.3	27 19.3	+50.1	99.8	27 08.8	+50.7	100.3	26 57.8	+51.3	100.8	18
19	28 50.3	+46.4	96.5	28 43.3	+47.1	97.0	28 35.6	+47.9	97.6	28 27.4	+48.6	98.1	28 18.7	+49.2	98.7	28 09.4	+49.8	99.2	27 59.5	+50.5	99.7	27 49.1	+51.2	100.2	19
20	29 36.7	+46.1	95.8	29 30.4	+46.8	96.3	29 23.5	+47.6	96.9	29 16.0	+48.3	97.5	29 07.9	+49.0	98.0	28 59.2	+49.8	98.6	28 50.0	+50.4	99.1	28 40.3	+51.0	99.6	20
21	30 22.8	+45.9	95.0	30 17.2	+46.7	95.6	30 11.1	+47.4	96.2	30 04.3	+48.1	96.8	29 56.9	+48.9	97.3	29 49.0	+49.5	97.9	29 40.4	+50.2	98.5	29 31.3	+50.8	99.0	21
22	31 08.7	+45.6	94.3	31 03.9	+46.4	94.9	30 58.5	+47.1	95.5	30 52.4	+47.9	96.1	30 45.8	+48.6	96.7	30 38.5	+49.3	97.3	30 30.6	+50.0	97.8	30 22.1	+50.7	98.4	22
23	31 54.3	+45.3	93.5	31 50.3	+46.1	94.1	31 45.6	+46.9	94.8	31 40.3	+47.7	95.4	31 34.4	+48.4	96.0	31 27.8	+49.1	96.6	31 20.6	+49.8	97.2	31 12.8	+50.4	97.8	23
24	32 39.6	+45.0	92.7	32 36.4	+45.8	93.4	32 32.5	+46.7	94.0	32 28.0	+47.4	94.7	32 22.8	+48.1	95.3	32 16.9	+48.9	95.9	32 10.4	+49.6	96.5	32 03.2	+50.3	97.2	24
25	33 24.6	+44.8	92.0	33 22.2	+45.6	92.6	33 19.2	+46.3	93.3	33 15.4	+47.1	93.9	33 10.9	+48.0	94.6	33 05.8	+48.7	95.2	33 00.0	+49.4	95.9	32 53.5	+50.1	96.5	25
26	34 09.4	+44.4	91.2	34 07.8	+45.3	91.8	34 05.5	+46.1	92.5	34 02.5	+46.9	93.2	33 58.9	+47.6	93.9	33 54.5	+48.4	94.5	33 49.4	+49.1	95.2	33 43.6	+49.9	95.9	26
27	34 53.8	+44.0	90.3	34 53.1	+44.9	91.0	34 51.6	+45.8	91.7	34 49.4	+46.6	92.4	34 46.5	+47.4	93.1	34 42.9	+48.2	93.8	34 38.5	+49.0	94.5	34 33.5	+49.6	95.2	27
28	35 37.8	+43.8	89.5	35 38.0	+44.6	90.2	35 37.4	+45.4	90.9	35 36.0	+46.3	91.7	35 33.9	+47.1	92.4	35 31.1	+47.9	93.1	35 27.5	+48.6	93.8	35 23.1	+49.4	94.5	28
29	36 21.6	+43.3	88.7	36 22.6	+44.2	89.4	36 22.8	+45.2	90.1	36 22.3	+46.0	90.9	36 21.0	+46.8	91.6	36 19.0	+47.6	92.3	36 16.1	+48.4	93.1	36 12.5	+49.2	93.8	29
30	37 04.9	+43.0	87.8	37 06.8	+43.9	88.6	37 08.0	+44.7	89.3	37 08.3	+45.6	90.1	37 07.8	+46.5	90.8	37 06.6	+47.3	91.6	37 04.5	+48.1	92.3	37 01.7	+48.9	93.1	30
31	37 47.9	+42.6	86.9	37 50.7	+43.5	87.7	37 52.7	+44.5	88.5	37 53.9	+45.3	89.2	37 54.3	+46.2	90.0	37 53.9	+47.0	90.8	37 52.6	+47.9	91.6	37 50.6	+48.6	92.4	31
32	38 30.5	+42.2	86.0	38 34.2	+43.2	86.8	38 37.2	+44.0	87.6	38 39.2	+45.0	88.4	38 40.5	+45.8	89.2	38 40.9	+46.7	90.0	38 40.5	+47.5	90.8	38 39.2	+48.3	91.6	32
33	39 12.7	+41.7	85.1	39 17.4	+42.6	85.9	39 21.2	+43.6	86.7	39 24.2	+44.5	87.6	39 26.3	+45.5	88.4	39 27.6	+46.3	89.2	39 28.0	+47.2	90.0	39 27.5	+48.0	90.9	33
34	39 54.4	+41.3	84.2	40 00.0	+42.3	85.0	40 04.8	+43.2	85.8	40 08.7	+44.2	86.7	40 11.8	+45.0	87.5	40 13.9	+46.0	88.4	40 15.2	+46.8	89.2	40 15.5	+47.7	90.1	34
35	40 35.7	+40.8	83.2	40 42.3	+41.8	84.1	40 48.0	+42.8	84.9	40 52.9	+43.7	85.8	40 56.8	+44.7	86.7	40 59.9	+45.6	87.5	41 02.0	+46.5	88.4	41 03.2	+47.4	89.3	35
36	41 16.5	+40.3	82.3	41 24.1	+41.3	83.1	41 30.8	+42.3	84.0	41 36.6	+43.3	84.9	41 41.5	+44.3	85.8	41 45.5	+45.2	86.7	41 48.5	+46.1	87.6	41 50.6	+47.0	88.5	36
37	41 56.8	+39.7	81.3	42 05.4	+40.8	82.2	42 13.1	+41.9	83.1	42 19.9	+42.8	84.0	42 25.8	+43.8	84.9	42 30.7	+44.7	85.8	42 34.6	+45.7	86.7	42 37.6	+46.6	87.6	37
38	42 36.5	+39.2	80.3	42 46.2	+40.3	81.2	42 55.0	+41.3	82.1	43 02.7	+42.4	83.0	43 09.6	+43.3	83.9	43 15.4	+44.4	84.9	43 20.3	+45.3	85.8	43 24.2	+46.2	86.8	38
39	43 15.7	+38.7	79.2	43 26.5	+39.7	80.1	43 36.3	+40.8	81.1	43 45.1	+41.8	82.0	43 52.9	+42.9	83.0	43 59.8	+43.8	83.9	44 05.6	+44.8	84.9	44 10.4	+45.8	85.9	39
40	43 54.4	+38.1	78.2	44 06.2	+39.2	79.1	44 17.1	+40.2	80.1	44 26.9	+41.3	81.0	44 35.8	+42.3	82.0	44 43.6	+43.4	83.0	44 50.4	+44.4	84.0	44 56.2	+45.4	85.0	40
41	44 32.5	+37.4	77.1	44 45.4	+38.5	78.0	44 57.3	+39.7	79.0	45 08.2	+40.8	80.0	45 18.1	+41.8	81.0	45 27.0	+42.9	82.0	45 34.8	+43.9	83.0	45 41.6	+44.9	84.0	41
42	45 09.9	+36.8	76.0	45 23.9	+38.0	77.0	45 37.0	+39.0	78.0	45 49.0	+40.1	79.0	45 59.9	+41.3	80.0	46 09.9	+42.3	81.0	46 18.7	+43.4	82.0	46 26.5	+44.4	83.1	42
43	45 46.7	+36.1	74.9	46 01.9	+37.2	75.9	46 16.0	+38.4	76.9	46 29.1	+39.6	77.9	46 41.2	+40.6	78.9	46 52.2	+41.7	80.0	47 02.1	+42.8	81.0	47 10.9	+43.9	82.1	43
44	46 22.8	+35.4	73.7	46 39.1	+36.6	74.7	46 54.4	+37.8	75.7	47 08.7	+38.9	76.8	47 21.8	+40.1	77.8	47 33.9	+41.2	78.9	47 44.9	+42.3	80.0	47 54.8	+43.3	81.1	44
45	46 58.2	+34.7	72.5	47 15.7	+35.8	73.6	47 32.2	+37.0	74.6	47 47.6	+38.2	75.7	48 01.9	+39.3	76.7	48 15.1	+40.5	77.8	48 27.2	+41.6	78.9	48 38.1	+42.8	80.0	45
46	47 32.9	+33.8	71.3	47 51.5	+35.1	72.4	48 09.2	+36.3	73.4	48 25.8	+37.5	74.5	48 41.2	+38.7	75.6	48 55.6	+39.9	76.7	49 08.8	+41.0	77.8	49 20.9	+42.1	79.0	46
47	48 06.7	+33.1	70.1	48 26.6	+34.4	71.2	48 45.5	+35.5	72.2	49 03.3	+36.7	73.3	49 19.9	+38.0	74.4	49 35.5	+39.1	75.6	49 49.8	+40.4	76.7	50 03.0	+41.5	77.9	47
48	48 39.8	+32.3	68.8	49 01.0	+33.5	69.9	49 21.0	+34.8	71.0	49 40.0	+36.0	72.1	49 57.9	+37.2	73.2	50 14.6	+38.4	74.4	50 30.2	+39.6	75.6	50 44.5	+40.7	76.7	48
49	49 12.1	+31.3	67.6	49 34.5	+32.6	68.6	49 55.8	+33.9	69.7	50 16.0	+35.2	70.9	50 35.1	+36.4	72.0	50 53.0	+37.7	73.2	51 09.8	+38.9	74.4	51 25.4	+40.1	75.6	49
50	49 43.4	+30.5	66.2	50 07.1	+31.7	67.3	50 29.7	+33.0	68.5	50 51.2	+34.3	69.6	51 11.5	+35.6	70.8	51 30.7	+36.9	71.9	51 48.7	+38.1	73.1	52 05.5	+39.4	74.4	50
51	50 13.9	+29.5	64.9	50 38.8	+30.9	66.0	51 02.7	+32.1	67.1	51 25.5	+33.4	68.3	51 47.1	+34.7	69.5	52 07.6	+36.0	70.7	52 26.8	+37.3	71.9	52 44.9	+38.5	73.1	51
52	50 43.4	+28.6	63.5	51 09.7	+29.8	64.6	51 34.8	+31.2	65.8	51 58.9	+32.4	66.9	52 21.8	+33.8	68.1	52 43.6	+35.1	69.4	53 04.1	+36.4	70.6	53 23.4	+37.7	71.9	52
53	51 12.0	+27.5	62.1	51 39.5	+28.8	63.3	52 06.0	+30.1	64.4	52 31.3	+31.5	65.6	52 55.6	+32.8	66.9	53 18.7	+34.1	68.1	53 40.5	+35.5	69.3	54 01.1	+36.9	70.5	53
54	51 39.5	+26.5	60.7	52 08.3	+27.8	61.8	52 36.1	+29.2	63.0	53 02.8	+30.5	64.2	53 28.4	+31.9	65.4	53 52.8	+33.2	66.6	54 16.0	+34.6	67.9	54 38.0	+35.9	69.2	54
55	52 06.0	+25.3	59.3	52 36.1	+26.7	60.4	53 05.3	+28.0	61.5	53 33.3	+29.4	62.7	54 00.3	+30.7	63.9	54 26.0	+32.2	65.2	54 50.6	+33.5	66.5	55 13.9	+34.9	67.8	55
56	52 31.3	+24.3	57.8	53 02.8	+25.6	58.9	53 33.3	+27.0	60.1	54 02.7	+28.3	61.2	54 31.0	+29.7	62.5	54 58.2	+31.1	63.7	55 24.1	+32.5	65.0	55 48.8	+33.9	66.4	56
57	52 55.6	+23.1	56.3	53 28.4	+24.4	57.3	54 00.3	+25.7	58.5	54 31.0	+27.2	59.7	55 00.7	+28.6	61.0	55 29.3	+29.9	62.2	55 56.6	+31.4	63.5	56 22.7	+32.8	64.9	57
58	53 18.7	+21.8	54.7	53 52.8	+23.2	55.8	54 26.0	+24.6	57.0	54 58.2	+25.9	58.2	55 29.3	+27.3	59.4	55 59.2	+28.8	60.7	56 28.0	+30.2	62.0	56 55.5	+31.7	63.4	58
59	53 40.5	+20.6	53.2	54 16.0	+22.0	54.3	54 50.6	+23.3	55.4	55 24.1	+24.7	56.6	55 56.6	+26.1	57.8	56 28.0	+27.5	59.1	56 58.2	+29.0	60.4	57 27.2	+30.4	61.8	59
60	54 01.1	+19.4	51.6	54 38.0	+20.6	52.7	55 13.9	+22.0	53.8	55 48.8	+23.4	55.0	56 22.7	+24.8	56.2	56 55.5	+26.3	57.5	57 27.2	+27.7	58.8	57 57.6	+29.2	60.2	60
61	54 20.5	+18.0	50.0	54 58.6	+19.4	51.0	55 35.9	+20.7	52.2	56 12.2	+22.1	53.3	56 47.5	+23.5	54.6	57 21.8	+24.9	55.8	57 54.9	+26.4	57.2	58 26.8	+27.9	58.5	61
62	54 38.5	+16.7	48.3	55 18.0	+18.0	49.4	55 56.6	+19.3	50.5	56 34.3	+20.7	51.7	57 11.0	+22.1	52.9	57 46.7	+23.5	54.1	58 21.3	+25.0	55.5	58 54.7	+26.5	56.8	62
63	54 55.2	+15.2	46.6	55 36.0	+16.5	47.7	56 15.9	+17.9	48.8	56 55.0	+19.2	50.0	57 33.1	+20.6	51.2	58 10.2	+22.1	52.4	58 46.3	+23.5	53.7	59 21.2	+25.1	55.1	63
64	55 10.4	+13.9	45.0	55 52.5	+15.1	46.0	56 33.8	+16.4	47.1	57 14.2	+17.8	48.2	57 53.7	+19.2	49.4	58 32.3	+20.6	50.6	59 09.8	+22.1	51.9	59 46.3	+23.5	53.3	64
65	55 24.3	+12.4	43.2	56 07.6	+13.7	44.3	56 50.2	+15.0	45.3	57 32.0	+16.3	46.4	58 12.9	+17.6	47.6	58 52.9	+19.0	48.8	59 31.9	+20.5	50.1	60 09.8	+22.0	51.4	65
66	55 36.7	+11.0	41.5	56 21.3	+12.2	42.5	57 05.2	+13.4	43.6	57 48.3	+14.7	44.6	58 30.5	+16.1	45.8	59 11.9	+17.5	47.0	59 52.4	+18.9	48.2	60 31.8	+20.4	49.6	66
67	55 47.7	+9.4	39.8	56 33.5	+10.6	40.7	57 18.6	+11.8	41.8	58 03.0	+13.1	42.8	58 46.6	+14.4	43.9	59 29.4	+15.8	45.1	60 11.3	+17.2	46.3	60 52.2	+18.7	47.6	67
68	55 57.1	+8.0	38.0	56 44.1	+9.1	39.0	57 30.4	+10.3	39.9	58 16.1	+11.5	41.0	59 01.0	+12.8	42.1	59 44.1	+14.1	43.2	60 28.5	+15.4	44.6	61 10.9	+16.9	45.7	68
69	56 05.1	+6.4	36.2	56 53.2	+7.5	37.1	57 40.7	+8.7	38.1	58 27.6	+9.8	39.1	59 13.8	+11.1	40.2	59 59.3	+12.4	41.3	60 44.0	+13.8	42.4	61 27.8	+15.2	43.7	69
70	56 11.5	+4.8	34.5	57 00.7	+5.9	35.3	57 49.4	+7.0	36.2	58 37.4	+8.2	37.2	59 24.9	+9.4	38.2	60 11.7	+10.6	39.3	60 57.8	+11.9	40.4	61 43.0	+13.3	41.6	70
71	56 16.3	+3.3	32.7	57 06.6	+4.3	33.5	57 56.4	+5.5	34.4	58 45.6	+6.5	35.3	59 34.3	+7.6	36.3	60 22.3	+8.9	37.3	61 09.7	+10.1	38.4	61 56.3	+11.5	39.6	71
72	56 19.6	+1.7	30.9	57 10.9	+2.7	31.7	58 01.7	+3.7	32.5	58 52.1	+4.7	33.4	59 41.9	+5.9	34.3	60 31.2	+7.0	35.3	61 19.8	+8.3	36.4	62 07.8	+9.7	37.5	72
73	56 21.3	+0.2	29.1	57 13.6	+1.0	29.8	58 05.4	+2.0	30.6	58 56.8	+3.1	31.4	59 47.8	+4.1	32.3	60 38.2	+5.2	33.3	61 28.1	+6.3	34.3	62 17.5	+7.6	35.4	73
74	56 21.5	−1.5	27.3	57 14.6	−0.5	28.0	58 07.4	+0.4	28.7	58 59.9	+1.2	29.5	59 51.9	+2.2	30.4	60 43.4	+3.3	31.3	61 34.4	+4.5	32.7	62 24.9	+5.6•	33.2	74
75	56 20.0	−3.0	25.5	57 14.1	−2.2	26.1	58 07.8	−1.4	26.8	59 01.1	−0.4	27.6	59 54.1	+0.5	28.4	60 46.7	+1.5	29.2	61 38.9	+2.5•	30.1	62 30.5	+3.6•	31.1	75
76	56 17.0	−4.5	23.7	57 11.9	−3.8	24.3	58 06.4	−3.0	24.9	59 00.7	−2.2	25.6	59 54.6	−1.3	26.4	60 48.2	−0.4	27.2	61 41.4	+0.5	28.0	62 34.1	+1.6•	28.9	76
77	56 12.5	−6.1	21.9	57 08.1	−5.5	22.4	58 03.4	−4.7	23.0	58 58.5	−4.0	23.7	59 53.3	−3.2	24.4	60 47.8	−2.3	25.1	61 41.9	−1.4	25.9	62 35.7	−0.4•	26.7	77
78	56 06.4	−7.7	20.1	57 02.6	−7.0	20.6	57 58.7	−6.4	21.2	58 54.5	−5.6	21.8	59 50.1	−4.9	22.4	60 45.5	−4.2	23.1	61 40.5	−3.3	23.8	62 35.3	−2.5•	24.6	78
79	55 58.7	−9.1	18.3	56 55.6	−8.6	18.8	57 52.3	−8.0	19.3	58 48.9	−7.4	19.8	59 45.2	−6.7	20.4	60 41.3	−6.0	21.0	61 37.2	−5.2	21.7	62 32.8	−4.4•	22.4	79
80	55 49.6	−10.7	16.5	56 47.0	−10.1	17.0	57 44.3	−9.6	17.4	58 41.5	−9.1	17.9	59 38.5	−8.5	18.4	60 35.3	−7.8	19.0	61 32.0	−7.2	19.6	62 28.4	−6.5•	20.2	80
81	55 38.9	−12.2	14.8	56 36.9	−11.7	15.2	57 34.7	−11.2	15.6	58 32.4	−10.7	16.0	59 30.0	−10.2	16.5	60 27.5	−9.6	17.0	61 24.8	−9.0	17.5	62 21.9	−8.4	18.1	81
82	55 26.7	−13.6	13.1	56 25.2	−13.3	13.4	57 23.5	−12.8	13.8	58 21.7	−12.4	14.1	59 19.8	−11.9	14.5	60 17.9	−11.5	15.0	61 15.8	−10.9	15.5	62 13.5	−10.3	16.0	82
83	55 13.1	−15.0	11.3	56 11.9	−14.6	11.6	57 10.7	−14.4	11.9	58 09.3	−13.9	12.3	59 07.9	−13.5	12.6	60 06.4	−13.1	13.0	61 04.9	−12.8	13.4	62 03.2	−12.3	13.8	83
84	54 58.1	−16.4	9.6	55 57.3	−16.2	9.9	56 56.3	−15.8	10.2	57 55.4	−15.6	10.4	58 54.4	−15.3	10.7	59 53.3	−14.9	11.1	60 52.1	−14.5	11.4	61 50.9	−14.1	11.8	84
85	54 41.7	−17.7	8.0	55 41.1	−17.5	8.2	56 40.5	−17.3	8.4	57 39.8	−17.0	8.6	58 39.1	−16.8	8.9	59 38.4	−16.5	9.1	60 37.6	−16.2	9.4	61 36.8	−16.0	9.7	85
86	54 24.0	−19.1	6.3	55 23.6	−18.9	6.5	56 23.2	−18.8	6.7	57 22.8	−18.6	6.8	58 22.3	−18.3	7.0	59 21.9	−18.2	7.2	60 21.4	−18.0	7.5	61 20.8	−17.7	7.7	86
87	54 04.9	−20.4	4.7	55 04.7	−20.3	4.8	56 04.4	−20.1	5.0	57 04.2	−20.0	5.1	58 04.0	−19.9	5.2	59 03.7	−19.7	5.4	60 03.4	−19.5	5.5	61 03.1	−19.3	5.7	87
88	53 44.5	−21.7	3.1	54 44.4	−21.6	3.2	55 44.3	−21.5	3.3	56 44.2	−21.4	3.4	57 44.1	−21.3	3.5	58 44.0	−21.3	3.5	59 43.9	−21.2	3.7	60 43.7	−21.0	3.8	88
89	53 22.8	−22.8	1.5	54 22.8	−22.8	1.6	55 22.8	−22.8	1.6	56 22.8	−22.8	1.7	57 22.8	−22.8	1.7	58 22.7	−22.7	1.8	59 22.7	−22.7	1.8	60 22.7	−22.7	1.9	89
90	53 00.0	−24.0	0.0	54 00.0	−24.0	0.0	55 00.0	−24.1	0.0	56 00.0	−24.1	0.0	57 00.0	−24.1	0.0	58 00.0	−24.1	0.0	59 00.0	−24.2	0.0	60 00.0	−24.2	0.0	90

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 67°, 293°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	13 36.0	−49.3	108.7	13 16.6	−49.9	109.0	12 57.0	−50.4	109.2	12 37.2	−51.0	109.4	12 17.2	−51.5	109.6	11 57.0	−52.0	109.8	11 36.6	−52.6	110.0	11 16.0	−53.0	110.2	0
1	12 46.7	−49.4	109.3	12 26.7	−49.9	109.5	12 06.6	−50.5	109.7	11 46.2	−51.0	109.9	11 25.7	−51.6	110.1	11 05.0	−52.1	110.3	10 44.0	−52.5	110.5	10 23.0	−53.1	110.7	1
2	11 57.3	−49.5	109.9	11 36.8	−50.1	110.1	11 16.0	−50.5	110.3	10 55.2	−51.2	110.5	10 34.1	−51.6	110.6	10 12.9	−52.2	110.8	9 51.5	−52.6	111.0	9 29.9	−53.1	111.1	2
3	11 07.8	−49.6	110.5	10 46.7	−50.1	110.7	10 25.5	−50.7	110.8	10 04.0	−51.1	111.0	9 42.5	−51.7	111.2	9 20.7	−52.1	111.3	8 58.9	−52.7	111.5	8 36.8	−53.1	111.6	3
4	10 18.2	−49.6	111.0	9 56.6	−50.2	111.2	9 34.8	−50.7	111.4	9 12.9	−51.2	111.5	8 50.8	−51.7	111.7	8 28.6	−52.3	111.8	8 06.2	−52.7	111.9	7 43.7	−53.1	112.1	4
5	9 28.6	−49.7	111.6	9 06.4	−50.2	111.8	8 44.1	−50.7	111.9	8 21.7	−51.3	112.1	7 59.1	−51.8	112.2	7 36.3	−52.2	112.3	7 13.5	−52.7	112.4	6 50.6	−53.2	112.5	5
6	8 38.9	−49.7	112.2	8 16.2	−50.2	112.3	7 53.4	−50.8	112.5	7 30.4	−51.3	112.6	7 07.3	−51.8	112.7	6 44.1	−52.3	112.8	6 20.8	−52.8	112.9	5 57.4	−53.2	113.0	6
7	7 49.2	−49.7	112.7	7 26.0	−50.3	112.9	7 02.6	−50.8	113.1	6 39.1	−51.3	113.1	6 15.5	−51.8	113.2	5 51.8	−52.3	113.3	5 28.0	−52.7	113.4	5 04.2	−53.2	113.5	7
8	6 59.5	−49.9	113.3	6 35.7	−50.4	113.4	6 11.8	−50.9	113.5	5 47.8	−51.4	113.6	5 23.7	−51.9	113.7	4 59.5	−52.3	113.8	4 35.3	−52.8	113.9	4 11.0	−53.3	113.9	8
9	6 09.6	−49.8	113.9	5 45.3	−50.3	114.0	5 20.9	−50.9	114.1	4 56.4	−51.4	114.1	4 31.8	−51.8	114.2	4 07.2	−52.4	114.3	3 42.5	−52.8	114.3	3 17.7	−53.2	114.4	9
10	5 19.8	−49.9	114.4	4 55.0	−50.4	114.6	4 30.0	−50.9	114.6	4 05.0	−51.4	114.7	3 40.0	−51.9	114.7	3 14.8	−52.3	114.8	2 49.7	−52.8	114.8	2 24.5	−53.3	114.9	10
11	4 29.9	−49.9	115.0	4 04.6	−50.5	115.1	3 39.1	−50.9	115.1	3 13.6	−51.4	115.2	2 48.1	−51.9	115.2	2 22.5	−52.4	115.3	1 56.9	−52.9	115.3	1 31.2	−53.2	115.3	11
12	3 40.0	−49.9	115.5	3 14.1	−50.4	115.6	2 48.2	−50.9	115.6	2 22.2	−51.4	115.7	1 56.2	−51.9	115.7	1 30.1	−52.4	115.7	1 04.0	−52.8	115.8	0 38.0	−53.3	115.8	12
13	2 50.1	−49.9	116.1	2 23.7	−50.5	116.1	1 57.3	−51.0	116.2	1 30.8	−51.5	116.2	1 04.3	−51.9	116.2	0 37.7	−52.3	116.2	0 11.2	−52.8	116.2	0 15.3	+53.3	63.8	13
14	2 00.2	−50.0	116.7	1 33.3	−50.5	116.7	1 06.3	−50.9	116.7	0 39.3	−51.4	116.7	0 12.4	−52.0	116.7	0 14.6	+52.4	63.3	0 41.6	+52.8	63.3	1 08.6	+53.2	63.3	14
15	1 10.2	−49.9	117.2	0 42.8	−50.5	117.2	0 15.4	−51.0	117.2	0 12.1	+51.4	62.8	0 39.6	+51.9	62.8	1 07.0	+52.4	62.8	1 34.4	+52.9	62.8	2 01.8	+53.3	62.8	15
16	0 20.3	−50.0	117.8	0 07.7	+50.4	62.2	0 35.6	+51.0	62.3	1 03.5	+51.5	62.3	1 31.5	+51.9	62.3	1 59.4	+52.3	62.3	2 27.3	+52.8	62.3	2 55.1	+53.2	62.3	16
17	0 29.7	+49.9	61.7	0 58.1	+50.5	61.7	1 26.6	+50.9	61.7	1 55.0	+51.4	61.7	2 23.4	+51.9	61.8	2 51.7	+52.4	61.8	3 20.1	+52.8	61.9	3 48.3	+53.3	61.9	17
18	1 19.6	+49.9	61.1	1 48.6	+50.4	61.2	2 17.5	+50.9	61.2	2 46.4	+51.4	61.2	3 15.3	+51.8	61.3	3 44.1	+52.3	61.3	4 12.9	+52.7	61.4	4 41.6	+53.2	61.4	18
19	2 09.5	+50.0	60.6	2 39.0	+50.4	60.6	3 08.4	+51.0	60.7	3 37.8	+51.4	60.7	4 07.1	+51.9	60.8	4 36.4	+52.3	60.8	5 05.6	+52.8	60.9	5 34.8	+53.2	61.0	19
20	2 59.5	+49.9	60.0	3 29.4	+50.4	60.1	3 59.4	+50.8	60.1	4 29.2	+51.4	60.2	4 59.0	+51.8	60.3	5 28.7	+52.3	60.3	5 58.4	+52.7	60.4	6 28.0	+53.1	60.5	20
21	3 49.4	+49.9	59.5	4 19.8	+50.4	59.5	4 50.2	+50.9	59.6	5 20.6	+51.3	59.7	5 50.8	+51.9	59.8	6 21.0	+52.3	59.8	6 51.1	+52.7	59.9	7 21.1	+53.2	60.1	21
22	4 39.3	+49.8	58.9	5 10.2	+50.4	59.0	5 41.1	+50.9	59.1	6 11.9	+51.3	59.1	6 42.7	+51.7	59.2	7 13.3	+52.2	59.4	7 43.8	+52.7	59.5	8 14.3	+53.1	59.6	22
23	5 29.1	+49.8	58.3	6 00.6	+50.3	58.4	6 32.0	+50.8	58.5	7 03.2	+51.3	58.6	7 34.4	+51.8	58.7	8 05.5	+52.2	58.9	8 36.5	+52.6	59.0	9 07.4	+53.0	59.1	23
24	6 19.0	+49.8	57.8	6 50.9	+50.3	57.9	7 22.8	+50.7	58.0	7 54.5	+51.3	58.1	8 26.2	+51.7	58.2	8 57.7	+52.2	58.4	9 29.1	+52.6	58.5	10 00.4	+53.0	58.6	24
25	7 08.8	+49.7	57.2	7 41.2	+50.3	57.3	8 13.5	+50.8	57.5	8 45.8	+51.2	57.6	9 17.9	+51.6	57.7	9 49.9	+52.1	57.9	10 21.7	+52.6	58.0	10 53.4	+53.0	58.2	25
26	7 58.5	+49.7	56.7	8 31.5	+50.2	56.8	9 04.3	+50.6	56.9	9 37.0	+51.1	57.0	10 09.5	+51.6	57.2	10 42.0	+52.0	57.4	11 14.3	+52.5	57.5	11 46.4	+53.0	57.7	26
27	8 48.2	+49.7	56.1	9 21.7	+50.1	56.2	9 54.9	+50.7	56.4	10 28.1	+51.1	56.5	11 01.1	+51.6	56.7	11 34.0	+52.0	56.8	12 06.8	+52.4	57.0	12 39.4	+52.8	57.2	27
28	9 37.9	+49.6	55.5	10 11.8	+50.1	55.7	10 45.6	+50.5	55.8	11 19.2	+51.0	56.0	11 52.7	+51.5	56.2	12 26.0	+52.0	56.4	12 59.2	+52.4	56.5	13 32.2	+52.9	56.7	28
29	10 27.5	+49.5	55.0	11 01.9	+50.0	55.1	11 36.1	+50.5	55.3	12 10.2	+51.0	55.4	12 44.2	+51.4	55.6	13 18.0	+51.9	55.8	13 51.6	+52.3	56.0	14 25.1	+52.7	56.2	29
30	11 17.0	+49.5	54.4	11 51.9	+50.0	54.5	12 26.6	+50.5	54.7	13 01.2	+50.9	54.9	13 35.6	+51.4	55.1	14 09.9	+51.8	55.3	14 43.9	+52.3	55.5	15 17.8	+52.7	55.7	30
31	12 06.5	+49.4	53.8	12 41.9	+49.9	54.0	13 17.1	+50.4	54.2	13 52.1	+50.9	54.4	14 27.0	+51.3	54.6	15 01.7	+51.7	54.8	15 36.2	+52.2	55.0	16 10.5	+52.6	55.2	31
32	12 55.9	+49.3	53.2	13 31.8	+49.8	53.4	14 07.5	+50.2	53.6	14 43.0	+50.7	53.8	15 18.3	+51.2	54.0	15 53.4	+51.7	54.3	16 28.4	+52.1	54.5	17 03.1	+52.6	54.7	32
33	13 45.2	+49.3	52.6	14 21.6	+49.7	52.8	14 57.7	+50.2	53.0	15 33.7	+50.7	53.3	16 09.5	+51.2	53.5	16 45.1	+51.6	53.7	17 20.5	+52.0	54.0	17 55.7	+52.5	54.2	33
34	14 34.5	+49.1	52.0	15 11.3	+49.6	52.3	15 47.9	+50.2	52.5	16 24.4	+50.6	52.7	17 00.7	+51.0	52.9	17 36.7	+51.5	53.2	18 12.5	+52.0	53.5	18 48.2	+52.3	53.7	34
35	15 23.6	+49.1	51.5	16 00.9	+49.6	51.7	16 38.1	+50.0	51.9	17 15.0	+50.5	52.1	17 51.7	+51.0	52.4	18 28.2	+51.4	52.7	19 04.5	+51.9	52.9	19 40.5	+52.3	53.2	35
36	16 12.7	+49.0	50.9	16 50.5	+49.4	51.1	17 28.1	+49.9	51.3	18 05.5	+50.4	51.6	18 42.7	+50.8	51.8	19 19.6	+51.3	52.1	19 56.4	+51.7	52.4	20 32.8	+52.3	52.7	36
37	17 01.7	+48.8	50.3	17 39.9	+49.4	50.5	18 18.0	+49.8	50.7	18 55.9	+50.2	51.0	19 33.5	+50.8	51.3	20 10.9	+51.2	51.6	20 48.1	+51.7	51.9	21 25.1	+52.1	52.2	37
38	17 50.5	+48.7	49.6	18 29.3	+49.2	49.9	19 07.8	+49.7	50.2	19 46.1	+50.2	50.4	20 24.3	+50.6	50.7	21 02.1	+51.1	51.0	21 39.8	+51.5	51.3	22 17.2	+52.0	51.6	38
39	18 39.2	+48.7	49.0	19 18.5	+49.1	49.3	19 57.5	+49.6	49.6	20 36.3	+50.1	49.8	21 14.9	+50.5	50.1	21 53.2	+51.0	50.4	22 31.3	+51.5	50.8	23 09.2	+51.8	51.1	39
40	19 27.9	+48.4	48.4	20 07.6	+49.0	48.7	20 47.1	+49.4	49.0	21 26.4	+49.9	49.3	22 05.4	+50.4	49.6	22 44.2	+50.9	49.9	23 22.8	+51.3	50.2	24 01.0	+51.8	50.5	40
41	20 16.3	+48.4	47.8	20 56.6	+48.8	48.1	21 36.5	+49.4	48.4	22 16.3	+49.8	48.7	22 55.8	+50.3	49.0	23 35.1	+50.7	49.3	24 14.1	+51.2	49.6	24 52.8	+51.6	50.0	41
42	21 04.7	+48.2	47.1	21 45.4	+48.7	47.4	22 25.9	+49.1	47.7	23 06.1	+49.6	48.0	23 46.1	+50.1	48.4	24 25.8	+50.6	48.7	25 05.3	+51.0	49.1	25 44.4	+51.6	49.4	42
43	21 52.9	+48.1	46.5	22 34.1	+48.5	46.8	23 15.0	+49.1	47.1	23 55.7	+49.6	47.4	24 36.2	+50.0	47.8	25 16.4	+50.4	48.1	25 56.3	+50.9	48.5	26 36.0	+51.3	48.8	43
44	22 41.0	+47.9	45.9	23 22.6	+48.4	46.2	24 04.1	+48.8	46.5	24 45.3	+49.3	46.8	25 26.2	+49.8	47.2	26 06.8	+50.3	47.5	26 47.2	+50.8	47.9	27 27.3	+51.2	48.3	44
45	23 28.9	+47.7	45.2	24 11.0	+48.2	45.5	24 52.9	+48.7	45.8	25 34.6	+49.2	46.2	26 16.0	+49.7	46.5	26 57.1	+50.2	46.9	27 38.0	+50.6	47.3	28 18.5	+51.1	47.7	45
46	24 16.6	+47.6	44.5	24 59.2	+48.1	44.9	25 41.6	+48.6	45.2	26 23.8	+49.0	45.6	27 05.7	+49.5	45.9	27 47.3	+50.0	46.3	28 28.6	+50.4	46.7	29 09.6	+50.9	47.1	46
47	25 04.2	+47.4	43.9	25 47.3	+47.9	44.2	26 30.2	+48.3	44.5	27 12.8	+48.8	44.9	27 55.2	+49.3	45.3	28 37.3	+49.7	45.6	29 19.0	+50.3	46.1	30 00.5	+50.8	46.5	47
48	25 51.5	+47.2	43.2	26 35.2	+47.6	43.5	27 18.5	+48.2	43.9	28 01.6	+48.7	44.2	28 44.5	+49.1	44.6	29 27.0	+49.7	45.0	30 09.3	+50.1	45.4	30 51.3	+50.5	45.8	48
49	26 38.7	+47.0	42.5	27 22.8	+47.5	42.9	28 06.7	+48.0	43.2	28 50.3	+48.4	43.6	29 33.6	+48.9	44.0	30 16.7	+49.4	44.4	30 59.4	+49.9	44.8	31 41.8	+50.4	45.2	49
50	27 25.7	+46.8	41.8	28 10.3	+47.3	42.2	28 54.7	+47.7	42.5	29 38.7	+48.3	42.9	30 22.5	+48.8	43.3	31 06.1	+49.2	43.7	31 49.3	+49.7	44.1	32 32.2	+50.2	44.6	50
51	28 12.5	+46.5	41.1	28 57.6	+47.0	41.5	29 42.4	+47.5	41.8	30 27.0	+48.0	42.2	31 11.3	+48.5	42.6	31 55.3	+49.0	43.0	32 39.0	+49.4	43.5	33 22.4	+49.9	43.9	51
52	28 59.0	+46.3	40.4	29 44.6	+46.8	40.7	30 29.9	+47.3	41.1	31 15.0	+47.8	41.5	31 59.8	+48.3	41.9	32 44.3	+48.7	42.4	33 28.4	+49.3	42.8	34 12.3	+49.7	43.3	52
53	29 45.3	+46.1	39.7	30 31.4	+46.6	40.0	31 17.2	+47.1	40.4	32 02.8	+47.5	40.8	32 48.1	+48.0	41.2	33 33.0	+48.1	41.7	34 17.0	+49.0	42.1	35 01.4	+49.6	42.6	53
54	30 31.4	+45.8	38.9	31 18.0	+46.3	39.3	32 04.3	+46.8	39.7	32 50.3	+47.3	40.1	33 36.1	+47.8	40.5	34 21.6	+48.2	41.0	35 06.7	+48.8	41.4	35 51.6	+49.2	41.9	54
55	31 17.2	+45.6	38.2	32 04.3	+46.0	38.5	32 51.1	+46.5	38.9	33 37.6	+47.0	39.4	34 23.9	+47.5	39.8	35 09.8	+48.1	40.2	35 55.5	+48.5	40.7	36 40.8	+49.0	41.2	55
56	32 02.8	+45.4	37.4	32 50.3	+45.8	37.8	33 37.6	+46.3	38.2	34 24.6	+46.8	38.6	35 11.4	+47.2	39.0	35 57.9	+47.7	39.5	36 44.0	+48.2	40.0	37 29.8	+48.8	40.5	56
57	32 48.1	+44.9	36.6	33 36.1	+45.5	37.0	34 23.9	+45.9	37.4	35 11.4	+46.5	37.8	35 58.6	+47.0	38.3	36 45.6	+47.4	38.7	37 32.2	+48.0	39.2	38 18.6	+48.4	39.7	57
58	33 33.0	+44.7	35.8	34 21.6	+45.1	36.2	35 09.8	+45.7	36.6	35 57.9	+46.1	37.1	36 45.6	+46.6	37.5	37 33.0	+47.2	38.0	38 20.2	+47.6	38.5	39 07.0	+48.2	39.0	58
59	34 17.7	+44.4	35.0	35 06.7	+44.9	35.4	35 55.5	+45.3	35.8	36 44.0	+45.8	36.3	37 32.2	+46.4	36.7	38 20.2	+46.8	37.2	39 07.8	+47.4	37.7	39 55.2	+47.8	38.2	59
60	35 02.0	+44.1	34.2	35 51.6	+44.5	34.6	36 40.8	+45.0	35.0	37 29.8	+45.5	35.5	38 18.6	+45.9	35.9	39 07.0	+46.5	36.4	39 55.2	+47.0	36.9	40 43.0	+47.5	37.4	60
61	35 46.1	+43.6	33.4	36 36.1	+44.1	33.8	37 25.8	+44.6	34.2	38 15.3	+45.1	34.6	39 04.5	+45.7	35.1	39 53.5	+46.1	35.6	40 42.2	+46.6	36.1	41 30.5	+47.1	36.6	61
62	36 29.7	+43.3	32.5	37 20.2	+43.8	32.9	38 10.4	+44.3	33.3	39 00.4	+44.8	33.8	39 50.2	+45.2	34.2	40 39.6	+45.8	34.7	41 28.8	+46.3	35.2	42 17.6	+46.8	35.7	62
63	37 13.0	+42.9	31.7	38 04.0	+43.4	32.1	38 54.7	+43.9	32.5	39 45.2	+44.4	32.9	40 35.4	+44.9	33.4	41 25.4	+45.4	33.9	42 15.1	+45.8	34.4	43 04.4	+46.4	34.9	63
64	37 55.9	+42.5	30.8	38 47.4	+43.0	31.2	39 38.6	+43.5	31.6	40 29.6	+43.9	32.0	41 20.3	+44.5	32.5	42 10.8	+44.9	33.0	43 00.9	+45.5	33.5	43 50.8	+46.0	34.0	64
65	38 38.4	+42.1	29.9	39 30.4	+42.5	30.3	40 22.1	+43.0	30.7	41 13.5	+43.6	31.1	42 04.8	+44.0	31.6	42 55.7	+44.5	32.1	43 46.4	+45.0	32.6	44 36.8	+45.6	33.1	65
66	39 20.5	+41.7	29.0	40 12.9	+42.1	29.4	41 05.1	+42.6	29.8	41 57.1	+43.0	30.2	42 48.8	+43.5	30.7	43 40.2	+44.1	31.2	44 31.4	+44.6	31.7	45 22.4	+45.1	32.2	66
67	40 02.2	+41.1	28.0	40 55.0	+41.7	28.4	41 47.7	+42.1	28.8	42 40.1	+42.6	29.3	43 32.3	+43.1	29.7	44 24.3	+43.6	30.2	45 16.0	+44.1	30.7	46 07.5	+44.6	31.3	67
68	40 43.3	+40.7	27.1	41 36.7	+41.1	27.5	42 29.8	+41.6	27.9	43 22.7	+42.1	28.3	44 15.4	+42.6	28.8	45 07.9	+43.1	29.3	46 00.1	+43.6	29.8	46 52.1	+44.1	30.3	68
69	41 24.0	+40.2	26.1	42 17.8	+40.7	26.5	43 11.4	+41.2	26.9	44 04.8	+41.6	27.3	44 58.0	+42.1	27.8	45 51.0	+42.6	28.3	46 43.7	+43.1	28.8	47 36.2	+43.6	29.3	69
70	42 04.2	+39.7	25.1	42 58.5	+40.1	25.5	43 52.6	+40.5	25.9	44 46.4	+41.1	26.3	45 40.1	+41.5	26.8	46 33.6	+42.0	27.2	47 26.8	+42.5	27.7	48 19.8	+43.0	28.3	70
71	42 43.9	+39.1	24.1	43 38.6	+39.6	24.5	44 33.1	+40.0	24.9	45 27.5	+40.4	25.3	46 21.6	+41.0	25.7	47 15.6	+41.4	26.2	48 09.3	+41.9	26.7	49 02.8	+42.4	27.2	71
72	43 23.0	+38.6	23.0	44 18.2	+38.9	23.4	45 13.1	+39.5	23.8	46 07.9	+39.9	24.2	47 02.6	+40.3	24.7	47 57.0	+40.8	25.1	48 51.2	+41.3	25.6	49 45.2	+41.8	26.1	72
73	44 01.6	+37.9	22.0	44 57.1	+38.4	22.4	45 52.6	+38.8	22.7	46 47.8	+39.2	23.1	47 42.9	+39.7	23.6	48 37.8	+40.1	24.0	49 32.5	+40.6	24.5	50 27.0	+41.1	25.0	73
74	44 39.5	+37.3	20.9	45 35.5	+37.7	21.3	46 31.4	+38.1	21.6	47 27.0	+38.6	22.0	48 22.6	+39.0	22.5	49 17.9	+39.5	22.9	50 13.1	+40.0	23.4	51 08.1	+40.4	23.9	74
75	45 16.8	+36.7	19.8	46 13.2	+37.1	20.1	47 09.5	+37.5	20.5	48 05.6	+37.9	20.9	49 01.6	+38.3	21.3	49 57.4	+38.8	21.7	50 53.1	+39.2	22.2	51 48.5	+39.7	22.7	75
76	45 53.5	+36.0	18.7	46 50.3	+36.3	19.0	47 47.0	+36.7	19.4	48 43.5	+37.2	19.7	49 39.9	+37.6	20.1	50 36.2	+38.0	20.5	51 32.3	+38.4	21.0	52 28.2	+38.9	21.4	76
77	46 29.5	+35.2	17.5	47 26.6	+35.7	17.8	48 23.7	+36.0	18.2	49 20.7	+36.4	18.5	50 17.5	+36.8	18.9	51 14.2	+37.2	19.3	52 10.7	+37.7	19.7	53 07.1	+38.1	20.2	77
78	47 04.7	+34.6	16.6	48 02.3	+34.8	16.6	48 59.7	+35.2	17.0	49 57.1	+35.6	17.3	50 54.3	+36.0	17.7	51 51.4	+36.4	18.1	52 48.4	+36.8	18.5	53 45.2	+37.2	18.9	78
79	47 39.3	+33.7	15.1	48 37.1	+34.1	15.4	49 34.9	+34.5	15.7	50 32.7	+34.7	16.0	51 30.3	+35.1	16.4	52 27.8	+35.5	16.8	53 25.2	+35.9	17.1	54 22.4	+36.4	17.5	79
80	48 13.0	+32.9	13.9	49 11.2	+33.2	14.2	50 09.4	+33.5	14.4	51 07.4	+33.9	14.8	52 05.4	+34.2	15.1	53 03.3	+34.6	15.4	54 01.1	+34.9	15.8	54 58.8	+35.3	16.2	80
81	48 45.9	+32.1	12.6	49 44.4	+32.4	12.9	50 42.9	+32.7	13.1	51 41.3	+33.0	13.4	52 39.6	+33.3	13.7	53 37.9	+33.6	14.1	54 36.0	+34.0	14.4	55 34.1	+34.3	14.8	81
82	49 18.0	+31.2	11.3	50 16.8	+31.5	11.6	51 15.6	+31.7	11.8	52 14.3	+32.0	12.1	53 12.9	+32.3	12.4	54 11.5	+32.6	12.6	55 10.0	+32.9	13.0	56 08.4	+33.3	13.3	82
83	49 49.2	+30.3	10.0	50 48.3	+30.5	10.2	51 47.3	+30.8	10.4	52 46.3	+31.0	10.7	53 45.2	+31.3	10.9	54 44.1	+31.6	11.2	55 42.9	+31.9	11.5	56 41.7	+32.2	11.8	83
84	50 19.5	+29.4	8.7	51 18.8	+29.6	8.9	52 18.1	+29.7	9.1	53 17.3	+30.0	9.3	54 16.5	+30.2	9.5	55 15.7	+30.4	9.7	56 14.8	+30.7	10.0	57 13.9	+30.9	10.2	84
85	50 48.9	+28.3	7.3	51 48.4	+28.5	7.5	52 47.8	+28.7	7.6	53 47.3	+28.9	7.8	54 46.7	+29.1	8.0	55 46.1	+29.3	8.2	56 45.5	+29.5	8.4	57 44.8	+29.8	8.6	85
86	51 17.2	+27.3	5.9	52 16.9	+27.5	6.0	53 16.5	+27.7	6.2	54 16.2	+27.8	6.3	55 15.8	+27.9	6.5	56 15.4	+28.1	6.6	57 15.0	+28.3	6.8	58 14.6	+28.4	7.0	86
87	51 44.5	+26.3	4.5	52 44.4	+26.4	4.6	53 44.2	+26.4	4.7	54 44.0	+26.5	4.8	55 44.0	+26.5	4.9	56 43.5	+26.8	5.0	57 43.3	+26.9	5.2	58 43.0	+27.1	5.3	87
88	52 10.8	+25.2	3.0	53 10.7	+25.3	3.1	54 10.6	+25.3	3.1	55 10.5	+25.4	3.2	56 10.4	+25.5	3.3	57 10.3	+25.6	3.4	58 10.2	+25.6	3.5	59 10.1	+25.7	3.6	88
89	52 36.0	+24.0	1.5	53 36.0	+24.0	1.6	54 35.9	+24.1	1.6	55 35.9	+24.1	1.6	56 35.9	+24.1	1.7	57 35.9	+24.1	1.7	58 35.8	+24.2	1.8	59 35.8	+24.2	1.8	89
90	53 00.0	+22.8	0.0	54 00.0	+22.8	0.0	55 00.0	+22.8	0.0	56 00.0	+22.8	0.0	57 00.0	+22.8	0.0	58 00.0	+22.7	0.0	59 00.0	+22.7	0.0	60 00.0	+22.7	0.0	90
	53°			**54°**			**55°**			**56°**			**57°**			**58°**			**59°**			**60°**			

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 113°, 247°

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	13 01.7	+49.2	107.9	12 43.2	+49.7	108.1	12 24.5	+50.2	108.3	12 05.5	+50.8	108.5	11 46.3	+51.4	108.7	11 27.0	+51.9	108.9	11 07.5	+52.3	109.1	10 47.7	+52.9	109.3	0
1	13 50.9	+49.0	107.3	13 32.9	+49.7	107.5	13 14.7	+50.3	107.8	12 56.3	+50.8	108.0	12 37.7	+51.3	108.2	12 18.9	+51.8	108.4	11 59.8	+52.3	108.6	11 40.6	+52.8	108.8	1
2	14 39.9	+49.0	106.7	14 22.6	+49.5	106.9	14 05.0	+50.1	107.2	13 47.1	+50.7	107.4	13 29.0	+51.1	107.7	13 10.7	+51.8	107.9	12 52.2	+52.3	108.1	12 33.4	+52.8	108.3	2
3	15 28.9	+48.9	106.1	15 12.1	+49.5	106.4	14 55.1	+50.1	106.6	14 37.8	+50.6	106.9	14 20.3	+51.1	107.1	14 02.5	+51.7	107.4	13 44.5	+52.2	107.6	13 26.2	+52.7	107.8	3
4	16 17.8	+48.7	105.5	16 01.6	+49.4	105.8	15 45.2	+49.9	106.1	15 28.4	+50.6	106.3	15 11.4	+51.1	106.6	14 54.2	+51.6	106.8	14 36.7	+52.1	107.1	14 18.9	+52.7	107.3	4
5	17 06.5	+48.7	104.9	16 51.0	+49.2	105.2	16 35.1	+49.9	105.5	16 19.0	+50.4	105.8	16 02.5	+51.0	106.0	15 45.8	+51.6	106.3	15 28.8	+52.1	106.6	15 11.6	+52.6	106.8	5
6	17 55.2	+48.5	104.3	17 40.2	+49.2	104.6	17 25.0	+49.7	104.9	17 09.4	+50.4	105.2	16 53.5	+51.0	105.5	16 37.4	+51.4	105.8	16 20.9	+52.0	106.1	16 04.2	+52.5	106.3	6
7	18 43.7	+48.5	103.7	18 29.4	+49.1	104.0	18 14.7	+49.7	104.3	17 59.8	+50.2	104.6	17 44.5	+50.8	104.9	17 28.8	+51.4	105.2	17 12.9	+51.9	105.5	16 56.7	+52.4	105.8	7
8	19 32.2	+48.2	103.0	19 18.5	+48.9	103.4	19 04.4	+49.5	103.7	18 50.0	+50.1	104.0	18 35.3	+50.7	104.4	18 20.2	+51.3	104.7	18 04.8	+51.9	105.0	17 49.1	+52.4	105.3	8
9	20 20.4	+48.2	102.4	20 07.4	+48.8	102.8	19 53.9	+49.5	103.1	19 40.1	+50.1	103.5	19 26.0	+50.6	103.8	19 11.5	+51.2	104.2	18 56.7	+51.7	104.5	18 41.5	+52.3	104.8	9
10	21 08.6	+48.0	101.7	20 56.2	+48.6	102.1	20 43.4	+49.3	102.5	20 30.2	+49.9	102.9	20 16.6	+50.5	103.2	20 02.7	+51.1	103.6	19 48.4	+51.7	103.9	19 33.8	+52.2	104.3	10
11	21 56.6	+47.8	101.1	21 44.8	+48.5	101.5	21 32.7	+49.1	101.9	21 20.1	+49.8	102.3	21 07.1	+50.4	102.7	20 53.8	+51.0	103.0	20 40.1	+51.5	103.4	20 26.0	+52.1	103.8	11
12	22 44.4	+47.7	100.5	22 33.3	+48.4	100.9	22 21.8	+49.0	101.3	22 09.9	+49.6	101.7	21 57.5	+50.3	102.1	21 44.8	+50.8	102.5	21 31.6	+51.4	102.9	21 18.1	+52.0	103.2	12
13	23 32.1	+47.6	99.8	23 21.7	+48.2	100.2	23 10.8	+48.9	100.7	22 59.5	+49.5	101.1	22 47.8	+50.1	101.5	22 35.6	+50.8	101.9	22 23.0	+51.4	102.3	22 10.1	+51.8	102.7	13
14	24 19.7	+47.3	99.1	24 09.9	+48.0	99.6	23 59.7	+48.7	100.0	23 49.0	+49.4	100.5	23 37.9	+50.0	100.9	23 26.4	+50.6	101.3	23 14.4	+51.2	101.7	23 01.9	+51.8	102.2	14
15	25 07.0	+47.2	98.5	24 57.9	+47.9	98.9	24 48.4	+48.5	99.4	24 38.4	+49.2	99.8	24 27.9	+49.8	100.3	24 17.0	+50.4	100.7	24 05.6	+51.0	101.2	23 53.7	+51.7	101.6	15
16	25 54.2	+46.9	97.8	25 45.8	+47.7	98.3	25 36.9	+48.4	98.7	25 27.6	+49.0	99.2	25 17.7	+49.7	99.7	25 07.4	+50.3	100.1	24 56.6	+51.0	100.6	24 45.4	+51.5	101.0	16
17	26 41.1	+46.8	97.1	26 33.5	+47.4	97.6	26 25.3	+48.2	98.1	26 16.6	+48.9	98.6	26 07.4	+49.5	99.0	25 57.7	+50.2	99.5	25 47.6	+50.8	100.0	25 36.9	+51.4	100.5	17
18	27 27.9	+46.5	96.4	27 20.9	+47.3	96.9	27 13.5	+48.0	97.4	27 05.5	+48.7	97.9	26 57.0	+49.3	98.4	26 47.9	+50.0	98.9	26 38.4	+50.6	99.4	26 28.3	+51.2	99.9	18
19	28 14.4	+46.3	95.7	28 08.2	+47.1	96.2	28 01.5	+47.8	96.7	27 54.2	+48.5	97.3	27 46.3	+49.2	97.8	27 37.9	+49.9	98.3	27 29.0	+50.5	98.8	27 19.5	+51.2	99.3	19
20	29 00.7	+46.1	94.9	28 55.3	+46.8	95.5	28 49.3	+47.5	96.0	28 42.7	+48.3	96.6	28 35.5	+49.0	97.1	28 27.8	+49.6	97.7	28 19.5	+50.3	98.2	28 10.7	+50.9	98.7	20
21	29 46.8	+45.8	94.2	29 42.1	+46.6	94.8	29 36.8	+47.4	95.3	29 31.0	+48.0	95.9	29 24.5	+48.8	96.5	29 17.4	+49.5	97.0	29 09.8	+50.2	97.6	29 01.6	+50.8	98.1	21
22	30 32.6	+45.6	93.5	30 28.7	+46.4	94.0	30 24.2	+47.1	94.6	30 19.0	+47.9	95.2	30 13.3	+48.6	95.8	30 06.9	+49.3	96.4	30 00.0	+49.9	96.9	29 52.4	+50.6	97.5	22
23	31 18.2	+45.3	92.7	31 15.1	+46.1	93.3	31 11.3	+46.9	93.9	31 06.9	+47.6	94.5	31 01.9	+48.3	95.1	30 56.2	+49.1	95.7	30 49.9	+49.8	96.3	30 43.0	+50.5	96.9	23
24	32 03.5	+45.0	91.9	32 01.2	+45.8	92.6	31 58.2	+46.6	93.2	31 54.5	+47.4	93.8	31 50.2	+48.2	94.4	31 45.3	+48.8	95.0	31 39.7	+49.5	95.7	31 33.5	+50.2	96.3	24
25	32 48.5	+44.8	91.1	32 47.0	+45.5	91.8	32 44.8	+46.3	92.4	32 41.9	+47.1	93.1	32 38.4	+47.8	93.7	32 34.1	+48.7	94.3	32 29.2	+49.4	95.0	32 23.7	+50.0	95.6	25
26	33 33.3	+44.4	90.3	33 32.5	+45.3	91.0	33 31.1	+46.1	91.7	33 29.0	+46.9	92.3	33 26.2	+47.7	93.0	33 22.8	+48.4	93.7	33 18.6	+49.1	94.3	33 13.7	+49.9	95.0	26
27	34 17.7	+44.0	89.5	34 17.8	+44.9	90.2	34 17.2	+45.8	90.9	34 15.9	+46.6	91.6	34 13.9	+47.4	92.3	34 11.2	+48.1	92.9	34 07.7	+48.9	93.6	34 03.6	+49.6	94.3	27
28	35 01.7	+43.8	88.7	35 02.7	+44.6	89.4	35 03.0	+45.4	90.1	35 02.5	+46.3	90.8	35 01.3	+47.0	91.5	34 59.3	+47.9	92.2	34 56.6	+48.7	92.9	34 53.2	+49.4	93.6	28
29	35 45.5	+43.4	87.9	35 47.3	+44.3	88.6	35 48.4	+45.2	89.3	35 48.8	+45.9	90.0	35 48.3	+46.9	90.8	35 47.2	+47.6	91.5	35 45.3	+48.3	92.2	35 42.6	+49.1	92.9	29
30	36 28.9	+43.0	87.0	36 31.6	+43.9	87.8	36 33.6	+44.8	88.5	36 34.7	+45.7	89.2	36 35.2	+46.4	90.0	36 34.8	+47.3	90.7	36 33.6	+48.1	91.5	36 31.7	+48.9	92.2	30
31	37 11.9	+42.6	86.1	37 15.5	+43.6	86.9	37 18.4	+44.5	87.7	37 20.4	+45.3	88.4	37 21.6	+46.2	89.2	37 22.1	+47.0	90.0	37 21.7	+47.9	90.7	37 20.6	+48.6	91.5	31
32	37 54.5	+42.2	85.3	37 59.1	+43.1	86.0	38 02.8	+44.1	86.8	38 05.7	+45.0	87.6	38 07.8	+45.8	88.4	38 09.1	+46.7	89.2	38 09.6	+47.5	90.0	38 09.2	+48.3	90.7	32
33	38 36.7	+41.8	84.4	38 42.2	+42.7	85.2	38 46.9	+43.6	86.0	38 50.7	+44.6	86.8	38 53.6	+45.5	87.6	38 55.8	+46.3	88.4	38 57.1	+47.2	89.2	38 57.5	+48.0	90.0	33
34	39 18.5	+41.3	83.4	39 24.9	+42.3	84.2	39 30.5	+43.3	85.1	39 35.3	+44.1	85.9	39 39.1	+45.1	86.7	39 42.1	+46.0	87.5	39 44.3	+46.8	88.4	39 45.5	+47.7	89.2	34
35	39 59.8	+40.9	82.5	40 07.2	+41.9	83.3	40 13.8	+42.8	84.2	40 19.4	+43.8	85.0	40 24.2	+44.7	85.9	40 28.1	+45.6	86.7	40 31.1	+46.5	87.6	40 33.2	+47.4	88.4	35
36	40 40.7	+40.4	81.5	40 49.1	+41.4	82.4	40 56.6	+42.4	83.2	41 03.2	+43.4	84.1	41 08.9	+44.3	85.0	41 13.7	+45.3	85.8	41 17.6	+46.2	86.7	41 20.6	+47.0	87.6	36
37	41 21.1	+39.9	80.5	41 30.5	+40.9	81.4	41 39.0	+41.9	82.3	41 46.6	+42.9	83.2	41 53.2	+43.9	84.1	41 59.0	+44.8	85.0	42 03.8	+45.7	85.9	42 07.6	+46.7	86.8	37
38	42 01.0	+39.3	79.5	42 11.4	+40.4	80.4	42 20.9	+41.4	81.3	42 29.5	+42.4	82.2	42 37.1	+43.4	83.2	42 43.8	+44.4	84.1	42 49.5	+45.3	85.0	42 54.3	+46.2	85.9	38
39	42 40.3	+38.8	78.5	42 51.8	+39.8	79.4	43 02.3	+40.9	80.4	43 11.9	+41.9	81.3	43 20.5	+42.9	82.2	43 28.2	+43.9	83.1	43 34.8	+44.9	84.1	43 40.5	+45.9	85.0	39
40	43 19.1	+38.2	77.5	43 31.6	+39.3	78.4	43 43.2	+40.4	79.3	43 53.8	+41.4	80.3	44 03.4	+42.5	81.2	44 12.1	+43.4	82.2	44 19.7	+44.5	83.2	44 26.4	+45.4	84.1	40
41	43 57.3	+37.6	76.4	44 10.9	+38.7	77.4	44 23.6	+39.8	78.3	44 35.2	+40.9	79.3	44 45.9	+41.9	80.3	44 55.5	+43.0	81.3	45 04.2	+43.9	82.2	45 11.8	+44.9	83.2	41
42	44 34.9	+37.0	75.3	44 49.6	+38.1	76.3	45 03.4	+39.1	77.3	45 16.1	+40.3	78.2	45 27.8	+41.4	79.2	45 38.5	+42.4	80.2	45 48.1	+43.5	81.3	45 56.7	+44.5	82.3	42
43	45 11.9	+36.3	74.2	45 27.7	+37.5	75.2	45 42.5	+38.6	76.2	45 56.4	+39.6	77.2	46 09.2	+40.7	78.2	46 20.9	+41.9	79.2	46 31.6	+42.9	80.3	46 41.2	+44.0	81.3	43
44	45 48.2	+35.6	73.1	46 05.2	+36.7	74.1	46 21.1	+37.9	75.1	46 36.0	+39.1	76.1	46 49.9	+40.2	77.1	47 02.8	+41.2	78.2	47 14.5	+42.4	79.2	47 25.2	+43.4	80.3	44
45	46 23.8	+34.9	71.9	46 41.9	+36.1	72.9	46 59.0	+37.3	74.0	47 15.1	+38.4	75.0	47 30.1	+39.5	76.0	47 44.0	+40.7	77.1	47 56.9	+41.7	78.2	48 08.6	+42.9	79.3	45
46	46 58.7	+34.2	70.7	47 18.0	+35.3	71.8	47 36.3	+36.5	72.8	47 53.5	+37.7	73.8	48 09.6	+38.9	74.9	48 24.7	+40.0	76.0	48 38.6	+41.2	77.1	48 51.5	+42.2	78.2	46
47	47 32.9	+33.3	69.5	47 53.3	+34.6	70.6	48 12.8	+35.8	71.6	48 31.2	+36.9	72.7	48 48.5	+38.2	73.8	49 04.7	+39.3	74.9	49 19.8	+40.5	76.0	49 33.7	+41.7	77.1	47
48	48 06.2	+32.6	68.3	48 27.9	+33.8	69.3	48 48.6	+35.0	70.4	49 08.1	+36.3	71.5	49 26.7	+37.4	72.6	49 44.0	+38.7	73.7	50 00.3	+39.8	74.9	50 15.4	+41.0	76.0	48
49	48 38.8	+31.7	67.0	49 01.7	+32.9	68.1	49 23.6	+34.1	69.2	49 44.4	+35.4	70.3	50 04.1	+36.6	71.4	50 22.7	+37.8	72.5	50 40.1	+39.1	73.7	50 56.4	+40.2	74.9	49
50	49 10.5	+30.8	65.7	49 34.6	+32.1	66.8	49 57.7	+33.4	67.9	50 19.8	+34.6	69.0	50 40.7	+35.9	70.1	51 00.5	+37.1	71.3	51 19.2	+38.3	72.5	51 36.6	+39.6	73.7	50
51	49 41.3	+29.9	64.4	50 06.7	+31.2	65.5	50 31.1	+32.4	66.6	50 54.4	+33.7	67.7	51 16.6	+34.9	68.9	51 37.6	+36.3	70.0	51 57.5	+37.5	71.2	52 16.2	+38.8	72.5	51
52	50 11.2	+28.9	63.1	50 37.9	+30.2	64.1	51 03.5	+31.5	65.3	51 28.1	+32.8	66.4	51 51.5	+34.1	67.6	52 13.9	+35.3	68.7	52 35.0	+36.7	70.0	52 55.0	+37.9	71.2	52
53	50 40.1	+28.0	61.7	51 08.1	+29.2	62.8	51 35.0	+30.5	63.9	52 00.9	+31.8	65.0	52 25.6	+33.2	66.2	52 49.2	+34.5	67.4	53 11.7	+35.8	68.7	53 32.9	+37.1	69.9	53
54	51 08.1	+26.9	60.3	51 37.3	+28.2	61.4	52 05.5	+29.6	62.5	52 32.7	+30.9	63.7	52 58.8	+32.2	64.8	53 23.7	+33.5	66.1	53 47.5	+34.8	67.3	54 10.0	+36.2	68.6	54
55	51 35.0	+25.9	58.9	52 05.5	+27.2	60.0	52 35.1	+28.5	61.1	53 03.6	+29.8	62.2	53 31.0	+31.1	63.4	53 57.2	+32.5	64.7	54 22.3	+33.9	65.9	54 46.2	+35.2	67.2	55
56	52 00.9	+24.7	57.4	52 32.7	+26.1	58.5	53 03.6	+27.4	59.6	53 33.4	+28.7	60.8	54 02.1	+30.1	62.0	54 29.7	+31.5	63.3	54 56.2	+32.8	64.5	55 21.4	+34.2	65.8	56
57	52 25.6	+23.6	55.9	52 58.8	+24.9	57.0	53 31.0	+26.2	58.1	54 02.1	+27.6	59.3	54 32.2	+29.0	60.5	55 01.2	+30.3	61.7	55 29.0	+31.8	63.0	55 55.6	+33.2	64.3	57
58	52 49.2	+22.5	54.4	53 23.7	+23.8	55.5	53 57.2	+25.1	56.6	54 29.7	+26.5	57.8	55 01.2	+27.8	59.0	55 31.5	+29.3	60.2	56 00.8	+30.6	61.5	56 28.8	+32.0	62.8	58
59	53 11.7	+21.2	52.9	53 47.5	+22.3	53.9	54 22.3	+23.8	55.1	54 56.2	+25.2	56.2	55 29.0	+26.6	57.4	56 00.8	+28.0	58.7	56 31.4	+29.4	60.0	57 00.8	+30.9	61.3	59
60	53 32.9	+20.0	51.3	54 10.0	+21.3	52.4	54 46.2	+22.6	53.5	55 21.4	+24.0	54.6	55 55.6	+25.4	55.8	56 28.8	+26.7	57.1	57 00.8	+28.2	58.4	57 31.7	+29.6	59.7	60
61	53 52.9	+18.7	49.7	54 31.3	+20.0	50.8	55 08.8	+21.3	51.9	55 45.4	+22.6	53.0	56 21.0	+24.0	54.2	56 55.5	+25.5	55.5	57 29.0	+26.9	56.7	58 01.3	+28.4	58.1	61
62	54 11.6	+17.4	48.1	54 51.3	+18.6	49.1	55 30.1	+20.0	50.2	56 08.0	+21.3	51.4	56 45.0	+22.7	52.6	57 21.0	+24.1	53.8	57 55.9	+25.5	55.1	58 29.7	+27.0	56.4	62
63	54 29.0	+16.0	46.4	55 09.9	+17.3	47.5	55 50.1	+18.5	48.6	56 29.3	+19.9	49.7	57 07.7	+21.3	50.9	57 45.1	+22.7	52.1	58 21.4	+24.1	53.4	58 56.7	+25.6	54.7	63
64	54 45.0	+14.6	44.8	55 27.2	+15.9	45.8	56 08.6	+17.2	46.9	56 49.2	+18.5	48.0	57 29.0	+19.8	49.1	58 07.8	+21.2	50.3	58 45.5	+22.7	51.6	59 22.3	+24.1	52.9	64
65	54 59.6	+13.2	43.1	55 43.1	+14.4	44.1	56 25.8	+15.7	45.1	57 07.7	+17.0	46.2	57 48.8	+18.3	47.4	58 29.0	+19.7	48.6	59 08.2	+21.2	49.8	59 46.4	+22.6	51.1	65
66	55 12.8	+11.8	41.4	55 57.5	+13.0	42.4	56 41.5	+14.2	43.4	57 24.7	+15.5	44.4	58 07.1	+16.9	45.6	58 48.7	+18.2	46.7	59 29.4	+19.5	48.0	60 09.0	+21.1	49.3	66
67	55 24.6	+10.3	39.7	56 10.5	+11.5	40.6	56 55.7	+12.7	41.6	57 40.2	+13.9	42.6	58 24.0	+15.2	43.7	59 06.9	+16.5	44.9	59 48.9	+18.0	46.1	60 30.1	+19.4	47.4	67
68	55 34.9	+8.8	38.0	56 22.0	+9.9	38.8	57 08.4	+11.1	39.8	57 54.1	+12.4	40.8	58 39.2	+13.6	41.9	59 23.4	+15.0	43.0	60 06.9	+16.3	44.2	60 49.5	+17.7	45.4	68
69	55 43.7	+7.3	36.2	56 31.9	+8.4	37.1	57 19.5	+9.5	38.0	58 06.5	+10.7	39.0	58 52.8	+11.9	40.0	59 38.4	+13.2	41.1	60 23.2	+14.5	42.3	61 07.2	+15.9	43.5	69
70	55 51.0	+5.8	34.4	56 40.3	+6.8	35.3	57 29.0	+8.0	36.2	58 17.2	+9.0	37.1	59 04.7	+10.3	38.1	59 51.6	+11.5	39.2	60 37.7	+12.8	40.3	61 23.1	+14.2	41.5	70
71	55 56.8	+4.3	32.6	56 47.1	+5.3	33.4	57 37.0	+6.3	34.3	58 26.2	+7.4	35.2	59 15.0	+8.5	36.2	60 03.1	+9.7	37.2	60 50.5	+11.0	38.3	61 37.3	+12.3	39.4	71
72	56 01.1	+2.7	30.8	56 52.4	+3.6	31.6	57 43.3	+4.6	32.4	58 33.6	+5.7	33.3	59 23.5	+6.8	34.2	60 12.8	+8.0	35.2	61 01.5	+9.2	36.3	61 49.6	+10.4	37.4	72
73	56 03.8	+1.1	29.0	56 56.0	+2.1	29.8	57 47.9	+3.0	30.6	58 39.3	+4.0	31.4	59 30.3	+5.1	32.3	60 20.8	+6.1	33.2	61 10.7	+7.3	34.2	62 00.0	+8.5	35.3	73
74	56 04.9	-0.4	27.3	56 58.1	+0.4	28.0	57 50.9	+1.4	28.7	58 43.3	+2.3	29.5	59 35.4	+3.2	30.3	60 26.9	+4.3	31.2	61 18.0	+5.4	32.2	62 08.5	+6.5	33.2	74
75	56 04.5	-1.9	25.5	56 58.5	-1.1	26.1	57 52.3	-0.4	26.8	58 45.6	+0.6	27.6	59 38.6	+1.5	28.3	60 31.2	+2.5	29.2	61 23.4	+3.5	30.1	62 15.0	+4.6	31.0	75
76	56 02.6	-3.6	23.7	56 57.4	-2.8	24.3	57 51.9	-2.0	24.9	58 46.2	-1.2	25.6	59 40.1	-0.3	26.4	60 33.7	+0.6	27.2	61 26.9	+1.5	28.0	62 19.6	+2.6•	28.9	76
77	55 59.0	-5.0	21.9	56 54.6	-4.4	22.5	57 49.9	-3.6	23.1	58 45.0	-2.9	23.7	59 39.8	-2.1	24.4	60 34.3	-1.3	25.1	61 28.4	-0.3	25.9	62 22.2	+0.6•	26.7	77
78	55 54.0	-6.6	20.1	56 50.2	-5.9	20.6	57 46.3	-5.3	21.2	58 42.1	-4.6	21.8	59 37.7	-3.9	22.4	60 33.0	-3.1	23.1	61 28.1	-2.3	23.8	62 22.8	-1.4•	24.6	78
79	55 47.4	-8.1	18.3	56 44.3	-7.6	18.8	57 41.0	-7.0	19.3	58 37.5	-6.3	19.9	59 33.8	-5.6	20.4	60 29.9	-4.9	21.1	61 25.8	-4.2	21.7	62 21.4	-3.4•	22.4	79
80	55 39.3	-9.6	16.6	56 36.7	-9.1	17.0	57 34.0	-8.6	17.5	58 31.2	-8.0	18.0	59 28.2	-7.4	18.5	60 25.0	-6.8	19.0	61 21.6	-6.1	19.6	62 18.0	-5.4	20.3	80
81	55 29.7	-11.1	14.8	56 27.6	-10.6	15.2	57 25.4	-10.1	15.6	58 23.2	-9.7	16.1	59 20.8	-9.2	16.5	60 18.2	-8.6	17.0	61 15.5	-8.0	17.6	62 12.6	-7.3	18.1	81
82	55 18.6	-12.6	13.1	56 17.0	-12.2	13.4	57 15.3	-11.8	13.8	58 13.5	-11.3	14.2	59 11.6	-10.8	14.6	60 09.6	-10.3	15.0	61 07.5	-9.8	15.5	62 05.3	-9.3	16.0	82
83	55 06.0	-13.9	11.4	56 04.8	-13.6	11.7	57 03.5	-13.2	12.0	58 02.2	-12.9	12.3	59 00.8	-12.5	12.7	59 59.3	-12.1	13.1	60 57.7	-11.7	13.5	61 56.0	-11.2	13.9	83
84	54 52.1	-15.4	9.7	55 51.2	-15.1	9.9	56 50.3	-14.8	10.2	57 49.3	-14.5	10.5	58 48.3	-14.2	10.8	59 47.2	-13.9	11.1	60 46.0	-13.4	11.4	61 44.8	-13.1	11.8	84
85	54 36.7	-16.7	8.0	55 36.1	-16.5	8.2	56 35.5	-16.3	8.4	57 34.8	-16.0	8.7	58 34.1	-15.8	8.9	59 33.3	-15.5	9.2	60 32.6	-15.2	9.5	61 31.7	-14.9	9.8	85
86	54 20.0	-18.1	6.4	55 19.6	-17.9	6.5	56 19.2	-17.7	6.7	57 18.8	-17.6	6.9	58 18.3	-17.3	7.1	59 17.8	-17.1	7.3	60 17.4	-17.0	7.5	61 16.8	-16.6	7.7	86
87	54 01.9	-19.4	4.7	55 01.7	-19.3	4.9	56 01.5	-19.2	5.0	57 01.2	-19.0	5.1	58 01.0	-18.9	5.3	59 00.7	-18.7	5.4	60 00.4	-18.5	5.6	61 00.1	-18.4	5.8	87
88	53 42.5	-20.6	3.1	54 42.4	-20.5	3.2	55 42.3	-20.5	3.3	56 42.2	-20.4	3.4	57 42.1	-20.3	3.5	58 42.0	-20.3	3.6	59 41.9	-20.2	3.7	60 41.8	-20.1	3.8	88
89	53 21.9	-21.9	1.6	54 21.9	-21.9	1.6	55 21.8	-21.8	1.6	56 21.8	-21.8	1.7	57 21.8	-21.8	1.7	58 21.7	-21.7	1.8	59 21.7	-21.7	1.8	60 21.7	-21.7	1.9	89
90	53 00.0	-23.1	0.0	54 00.0	-23.1	0.0	55 00.0	-23.1	0.0	56 00.0	-23.1	0.0	57 00.0	-23.2	0.0	58 00.0	-23.2	0.0	59 00.0	-23.2	0.0	60 00.0	-23.2	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	13 01.7	−49.2	107.9	12 43.2	−49.8	108.1	12 24.5	−50.4	108.3	12 05.5	−50.9	108.5	11 46.3	−51.4	108.7	11 27.0	−51.9	108.9	11 07.5	−52.5	109.1	10 47.7	−52.9	109.3	0
1	12 12.5	−49.3	108.5	11 53.4	−49.9	108.7	11 34.1	−50.4	108.9	11 14.6	−51.0	109.1	10 54.9	−51.5	109.3	10 35.1	−52.0	109.4	10 15.0	−52.5	109.6	9 54.8	−53.0	109.8	1
2	11 23.2	−49.3	109.1	11 03.5	−49.9	109.2	10 43.7	−50.5	109.4	10 23.6	−51.0	109.6	10 03.4	−51.5	109.9	9 43.1	−52.1	109.9	9 22.5	−52.5	110.1	9 01.8	−52.9	110.2	2
3	10 33.9	−49.5	109.6	10 13.6	−50.0	109.8	9 53.2	−50.5	110.0	9 32.6	−51.0	110.1	9 11.9	−51.6	110.3	8 51.0	−52.0	110.4	8 30.0	−52.6	110.6	8 08.9	−53.1	110.7	3
4	9 44.4	−49.5	110.2	9 23.6	−50.0	110.4	9 02.7	−50.6	110.5	8 41.6	−51.1	110.7	8 20.3	−51.6	110.8	7 59.0	−52.2	110.9	7 37.4	−52.5	111.1	7 15.8	−53.0	111.2	4
5	8 54.9	−49.5	110.8	8 33.6	−50.1	110.9	8 12.1	−50.6	111.1	7 50.5	−51.2	111.2	7 28.7	−51.6	111.3	7 06.8	−52.1	111.4	6 44.9	−52.7	111.5	6 22.8	−53.1	111.7	5
6	8 05.4	−49.6	111.4	7 43.5	−50.1	111.5	7 21.5	−50.7	111.6	6 59.3	−51.2	111.7	6 37.1	−51.7	111.8	6 14.7	−52.2	111.9	5 52.2	−52.6	112.0	5 29.7	−53.1	112.1	6
7	7 15.8	−49.6	111.9	6 53.4	−50.2	112.0	6 30.8	−50.7	112.1	6 08.1	−51.2	112.2	5 45.4	−51.7	112.3	5 22.5	−52.2	112.4	4 59.6	−52.7	112.5	4 36.6	−53.2	112.6	7
8	6 26.2	−49.7	112.5	6 03.2	−50.2	112.6	5 40.1	−50.7	112.7	5 16.9	−51.2	112.8	4 53.7	−51.8	112.9	4 30.3	−52.2	112.9	4 06.9	−52.7	113.0	3 43.4	−53.1	113.1	8
9	5 36.5	−49.7	113.0	5 13.0	−50.2	113.1	4 49.4	−50.8	113.2	4 25.7	−51.3	113.3	4 01.9	−51.7	113.4	3 38.1	−52.2	113.4	3 14.2	−52.7	113.5	2 50.3	−53.1	113.5	9
10	4 46.8	−49.7	113.6	4 22.8	−50.3	113.7	3 58.6	−50.7	113.8	3 34.4	−51.3	113.8	3 10.2	−51.8	113.9	2 45.9	−52.3	113.9	2 21.5	−52.7	114.0	1 57.2	−53.2	114.0	10
11	3 57.1	−49.7	114.2	3 32.5	−50.3	114.2	3 07.9	−50.8	114.3	2 43.2	−51.3	114.3	2 18.4	−51.8	114.4	1 53.6	−52.2	114.4	1 28.8	−52.7	114.4	1 04.0	−53.2	114.5	11
12	3 07.4	−49.8	114.7	2 42.2	−50.3	114.8	2 17.1	−50.8	114.8	1 51.9	−51.3	114.9	1 26.6	−51.8	114.9	1 01.4	−52.3	114.9	0 36.1	−52.7	114.9	0 10.8	−53.1	114.9	12
13	2 17.6	−49.8	115.3	1 51.9	−50.3	115.3	1 26.3	−50.8	115.4	1 00.6	−51.3	115.4	0 34.8	−51.7	115.4	0 09.1	−52.3	115.4	0 16.6	+52.7	64.6	0 42.3	+53.2	64.6	13
14	1 27.8	−49.8	115.9	1 01.6	−50.3	115.9	0 35.5	−50.9	115.9	0 09.3	−51.3	115.9	0 16.9	+51.8	64.1	0 43.1	+52.3	64.1	1 09.3	+52.7	64.1	1 35.5	+53.1	64.2	14
15	0 38.0	−49.8	116.4	0 11.3	−50.3	116.4	0 15.4	+50.8	63.6	0 42.0	+51.4	63.6	1 08.7	+51.8	63.6	1 35.4	+52.2	63.6	2 02.0	+52.7	63.7	2 28.6	+53.2	63.7	15
16	0 11.8	+49.8	63.0	0 39.0	+50.3	63.0	1 06.2	+50.8	63.1	1 33.4	+51.2	63.1	2 00.5	+51.8	63.1	2 27.6	+52.3	63.1	2 54.7	+52.7	63.2	3 21.8	+53.1	63.2	16
17	1 01.6	+49.7	62.5	1 29.3	+50.3	62.5	1 57.0	+50.8	62.5	2 24.6	+51.3	62.6	2 52.3	+51.7	62.6	3 19.9	+52.2	62.6	3 47.4	+52.7	62.7	4 14.9	+53.1	62.8	17
18	1 51.3	+49.8	61.9	2 19.6	+50.3	61.9	2 47.8	+50.7	62.0	3 15.9	+51.3	62.0	3 44.0	+51.8	62.1	4 12.1	+52.2	62.2	4 40.1	+52.6	62.2	5 08.0	+53.1	62.3	18
19	2 41.1	+49.8	61.4	3 09.9	+50.2	61.4	3 38.5	+50.8	61.5	4 07.2	+51.2	61.5	4 35.8	+51.7	61.6	5 04.3	+52.2	61.7	5 32.7	+52.7	61.7	6 01.1	+53.1	61.8	19
20	3 30.9	+49.7	60.8	4 00.1	+50.3	60.9	4 29.3	+50.7	60.9	4 58.4	+51.3	61.0	5 27.5	+51.7	61.1	5 56.5	+52.1	61.2	6 25.4	+52.6	61.3	6 54.2	+53.0	61.4	20
21	4 20.6	+49.7	60.2	4 50.4	+50.2	60.3	5 20.0	+50.8	60.4	5 49.7	+51.2	60.5	6 19.2	+51.7	60.6	6 48.6	+52.2	60.7	7 18.0	+52.6	60.8	7 47.2	+53.0	60.9	21
22	5 10.3	+49.7	59.7	5 40.6	+50.2	59.7	6 10.8	+50.6	59.8	6 40.9	+51.1	59.9	7 10.9	+51.6	60.1	7 40.8	+52.0	60.2	8 10.6	+52.5	60.3	8 40.2	+53.0	60.4	22
23	6 00.0	+49.7	59.1	6 30.8	+50.1	59.2	7 01.4	+50.7	59.3	7 32.0	+51.1	59.4	8 02.5	+51.6	59.5	8 32.8	+52.1	59.7	9 03.1	+52.5	59.8	9 33.2	+52.9	59.9	23
24	6 49.7	+49.6	58.5	7 20.9	+50.1	58.7	7 52.1	+50.6	58.8	8 23.1	+51.1	58.9	8 54.1	+51.5	59.0	9 24.9	+52.0	59.2	9 55.6	+52.4	59.3	10 26.1	+52.9	59.5	24
25	7 39.3	+49.5	58.0	8 11.0	+50.1	58.1	8 42.7	+50.5	58.2	9 14.2	+51.0	58.4	9 45.6	+51.5	58.5	10 16.9	+52.0	58.7	10 48.0	+52.5	58.7	11 19.0	+52.9	59.0	25
26	8 28.8	+49.5	57.4	9 01.1	+50.0	57.5	9 33.2	+50.5	57.7	10 05.2	+51.0	57.8	10 37.1	+51.5	58.0	11 08.9	+51.9	58.1	11 40.5	+52.3	58.3	12 11.9	+52.8	58.5	26
27	9 18.3	+49.5	56.8	9 51.1	+50.0	57.0	10 23.7	+50.5	57.1	10 56.2	+50.9	57.3	11 28.6	+51.4	57.5	12 00.8	+51.8	57.6	12 32.8	+52.3	57.8	13 04.7	+52.7	58.0	27
28	10 07.8	+49.4	56.3	10 41.1	+49.8	56.6	11 14.2	+50.4	56.6	11 47.1	+50.9	56.7	12 20.0	+51.3	56.9	12 52.6	+51.8	57.1	13 25.1	+52.3	57.3	13 57.4	+52.7	57.5	28
29	10 57.2	+49.3	55.7	11 30.9	+49.9	55.9	12 04.6	+50.3	56.0	12 38.0	+50.8	56.2	13 11.3	+51.3	56.4	13 44.4	+51.7	56.6	14 17.4	+52.1	56.8	14 50.1	+52.6	57.0	29
30	11 46.5	+49.3	55.1	12 20.8	+49.7	55.3	12 54.9	+50.2	55.5	13 28.8	+50.7	55.7	14 02.6	+51.2	55.9	14 36.1	+51.7	56.1	15 09.5	+52.1	56.3	15 42.7	+52.6	56.5	30
31	12 35.8	+49.2	54.5	13 10.5	+49.7	54.7	13 45.1	+50.2	54.9	14 19.5	+50.7	55.1	14 53.8	+51.1	55.3	15 27.8	+51.6	55.5	16 01.6	+52.1	55.8	16 35.3	+52.4	56.0	31
32	13 25.0	+49.1	53.9	14 00.2	+49.6	54.1	14 35.3	+50.1	54.3	15 10.2	+50.5	54.6	15 44.9	+51.0	54.8	16 19.4	+51.5	55.0	16 53.7	+51.9	55.3	17 27.7	+52.4	55.5	32
33	14 14.1	+49.0	53.3	14 49.8	+49.5	53.6	15 25.4	+50.0	53.8	16 00.7	+50.5	54.0	16 35.9	+51.0	54.2	17 10.9	+51.4	54.5	17 45.6	+51.9	54.7	18 20.1	+52.4	55.0	33
34	15 03.1	+48.9	52.7	15 39.3	+49.4	52.9	16 15.4	+49.9	53.2	16 51.2	+50.3	53.4	17 26.9	+50.8	53.7	18 02.3	+51.3	53.9	18 37.5	+51.8	54.2	19 12.5	+52.2	54.5	34
35	15 52.0	+48.8	52.1	16 28.7	+49.4	52.4	17 05.3	+49.8	52.6	17 41.6	+50.3	52.9	18 17.7	+50.8	53.1	18 53.6	+51.2	53.4	19 29.3	+51.7	53.7	20 04.7	+52.1	54.0	35
36	16 40.8	+48.8	51.5	17 18.1	+49.2	51.8	17 55.1	+49.7	52.0	18 31.9	+50.2	52.3	19 08.5	+50.6	52.6	19 44.8	+51.2	52.8	20 21.0	+51.5	53.1	20 56.8	+52.1	53.4	36
37	17 29.6	+48.6	50.9	18 07.3	+49.1	51.2	18 44.8	+49.6	51.4	19 22.1	+50.0	51.7	19 59.1	+50.6	52.0	20 36.0	+51.0	52.3	21 12.5	+51.5	52.6	21 48.9	+51.9	52.9	37
38	18 18.2	+48.4	50.3	18 56.4	+48.9	50.6	19 34.4	+49.4	50.8	20 12.1	+50.0	51.1	20 49.7	+50.4	51.4	21 27.0	+50.9	51.7	22 04.0	+51.4	52.0	22 40.8	+51.8	52.4	38
39	19 06.6	+48.4	49.7	19 45.3	+48.9	50.0	20 23.8	+49.4	50.2	21 02.1	+49.8	50.5	21 40.1	+50.3	50.8	22 17.9	+50.8	51.2	22 55.4	+51.2	51.5	23 32.6	+51.7	51.8	39
40	19 55.0	+48.2	49.1	20 34.2	+48.7	49.3	21 13.2	+49.2	49.6	21 51.9	+49.7	49.9	22 30.4	+50.2	50.2	23 08.7	+50.6	50.6	23 46.6	+51.1	50.9	24 24.3	+51.6	51.3	40
41	20 43.2	+48.1	48.4	21 22.9	+48.6	48.7	22 02.4	+49.1	49.0	22 41.6	+49.6	49.3	23 20.6	+50.0	49.7	23 59.3	+50.5	50.0	24 37.7	+51.0	50.3	25 15.9	+51.4	50.7	41
42	21 31.3	+47.9	47.8	22 11.5	+48.4	48.1	22 51.5	+48.9	48.4	23 31.2	+49.4	48.7	24 10.6	+49.9	49.1	24 49.8	+50.4	49.4	25 28.7	+50.9	49.8	26 07.3	+51.4	50.1	42
43	22 19.2	+47.8	47.1	22 59.9	+48.3	47.4	23 40.4	+48.8	47.8	24 20.6	+49.2	48.1	25 00.5	+49.8	48.4	25 40.2	+50.2	48.8	26 19.6	+50.7	49.2	26 58.7	+51.1	49.5	43
44	23 07.0	+47.6	46.5	23 48.2	+48.1	46.8	24 29.2	+48.6	47.1	25 09.8	+49.1	47.5	25 50.3	+49.6	47.8	26 30.4	+50.1	48.2	27 10.3	+50.5	48.6	27 49.8	+51.0	49.0	44
45	23 54.6	+47.5	45.8	24 36.3	+48.0	46.1	25 17.8	+48.4	46.5	25 58.9	+49.0	46.8	26 39.9	+49.4	47.2	27 20.5	+49.9	47.6	28 00.8	+50.4	48.0	28 40.8	+50.9	48.4	45
46	24 42.1	+47.2	45.1	25 24.3	+47.7	45.5	26 06.2	+48.3	45.8	26 47.9	+48.7	46.2	27 29.3	+49.2	46.6	28 10.4	+49.7	46.9	28 51.2	+50.2	47.3	29 31.7	+50.7	47.8	46
47	25 29.3	+47.1	44.4	26 12.0	+47.6	44.8	26 54.5	+48.0	45.2	27 36.6	+48.6	45.5	28 18.5	+49.1	45.9	29 00.1	+49.6	46.3	29 41.4	+50.0	46.7	30 22.4	+50.5	47.1	47
48	26 16.4	+46.9	43.8	26 59.6	+47.3	44.1	27 42.5	+47.9	44.5	28 25.2	+48.3	44.9	29 07.6	+48.8	45.3	29 49.7	+49.3	45.7	30 31.4	+49.9	46.1	31 12.9	+50.3	46.5	48
49	27 03.3	+46.6	43.1	27 46.9	+47.2	43.4	28 30.4	+47.6	43.8	29 13.5	+48.2	44.2	29 56.4	+48.7	44.6	30 39.0	+49.2	45.0	31 21.3	+49.6	45.4	32 03.2	+50.2	45.9	49
50	27 49.9	+46.4	42.4	28 34.1	+46.9	42.7	29 18.0	+47.5	43.1	30 01.7	+47.9	43.5	30 45.1	+48.4	43.9	31 28.2	+48.9	44.3	32 10.9	+49.5	44.8	32 53.4	+49.9	45.2	50
51	28 36.3	+46.3	41.7	29 21.0	+46.8	42.0	30 05.5	+47.2	42.4	30 49.6	+47.8	42.8	31 33.5	+48.2	43.2	32 17.1	+48.7	43.6	33 00.4	+49.2	44.1	33 43.3	+49.7	44.5	51
52	29 22.6	+45.9	40.9	30 07.8	+46.4	41.3	30 52.7	+47.0	41.7	31 37.4	+47.4	42.1	32 21.7	+48.0	42.5	33 05.8	+48.5	43.0	33 49.6	+48.9	43.4	34 33.0	+49.5	43.9	52
53	30 08.5	+45.7	40.2	30 54.2	+46.2	40.6	31 39.7	+46.7	41.0	32 24.8	+47.3	41.4	33 09.7	+47.7	41.8	33 54.3	+48.2	42.2	34 38.5	+48.8	42.7	35 22.5	+49.2	43.2	53
54	30 54.2	+45.5	39.4	31 40.4	+46.0	39.8	32 26.4	+46.4	40.2	33 12.1	+46.9	40.6	33 57.4	+47.5	41.1	34 42.5	+48.0	41.5	35 27.3	+48.5	42.0	36 11.7	+49.0	42.5	54
55	31 39.7	+45.1	38.7	32 26.4	+45.7	39.1	33 12.8	+46.2	39.5	33 59.0	+46.7	39.9	34 44.9	+47.2	40.3	35 30.5	+47.7	40.8	36 15.8	+48.2	41.3	37 00.7	+48.7	41.8	55
56	32 24.8	+44.9	37.9	33 12.1	+45.3	38.3	33 59.0	+45.9	38.7	34 45.7	+46.4	39.1	35 32.1	+46.9	39.6	36 18.2	+47.4	40.0	37 04.0	+47.9	40.5	37 49.4	+48.4	41.0	56
57	33 09.7	+44.6	37.1	33 57.4	+45.1	37.5	34 44.9	+45.6	37.9	35 32.1	+46.1	38.4	36 19.0	+46.6	38.8	37 05.6	+47.1	39.3	37 51.9	+47.6	39.8	38 37.8	+48.2	40.3	57
58	33 54.3	+44.2	36.3	34 42.5	+44.8	36.7	35 30.5	+45.3	37.1	36 18.2	+45.8	37.6	37 05.6	+46.3	38.0	37 52.7	+46.8	38.5	38 39.5	+47.3	39.0	39 26.0	+47.8	39.5	58
59	34 38.5	+44.0	35.5	35 27.3	+44.4	35.9	36 15.8	+44.9	36.3	37 04.0	+45.4	36.8	37 51.9	+45.9	37.2	38 39.5	+46.5	37.7	39 26.8	+47.0	38.2	40 13.8	+47.5	38.7	59
60	35 22.5	+43.5	34.6	36 11.7	+44.1	35.1	37 00.7	+44.6	35.5	37 49.4	+45.1	35.9	38 37.8	+45.6	36.4	39 26.0	+46.1	36.9	40 13.8	+46.7	37.4	41 01.3	+47.2	37.9	60
61	36 06.0	+43.2	33.8	36 55.8	+43.7	34.2	37 45.3	+44.2	34.6	38 34.5	+44.7	35.1	39 23.4	+45.3	35.6	40 12.1	+45.7	36.1	41 00.5	+46.2	36.6	41 48.5	+46.8	37.1	61
62	36 49.2	+42.9	32.9	37 39.5	+43.3	33.4	38 29.5	+43.8	33.8	39 19.2	+44.3	34.2	40 08.7	+44.8	34.7	40 57.8	+45.5	35.2	41 46.7	+45.9	35.7	42 35.3	+46.4	36.2	62
63	37 32.1	+42.4	32.1	38 22.8	+42.9	32.5	39 13.3	+43.4	32.9	40 03.5	+44.0	33.4	40 53.5	+44.5	33.8	41 43.2	+45.0	34.3	42 32.6	+45.5	34.8	43 21.7	+46.0	35.4	63
64	38 14.5	+42.0	31.2	39 05.7	+42.5	31.6	39 56.7	+43.0	32.0	40 47.5	+43.5	32.5	41 38.0	+44.0	32.9	42 28.2	+44.5	33.4	43 18.1	+45.1	34.0	44 07.7	+45.6	34.5	64
65	38 56.5	+41.6	30.3	39 48.2	+42.1	30.7	40 39.7	+42.6	31.1	41 31.0	+43.0	31.6	42 22.0	+43.6	32.0	43 12.7	+44.1	32.5	44 03.2	+44.6	33.0	44 53.3	+45.1	33.6	65
66	39 38.1	+41.1	29.3	40 30.3	+41.6	29.7	41 22.3	+42.1	30.2	42 14.0	+42.6	30.6	43 05.6	+43.1	31.1	43 56.8	+43.6	31.6	44 47.8	+44.1	32.1	45 38.4	+44.7	32.6	66
67	40 19.2	+40.7	28.4	41 11.9	+41.1	28.8	42 04.4	+41.6	29.2	42 56.6	+42.2	29.7	43 48.7	+42.6	30.1	44 40.4	+43.1	30.6	45 31.9	+43.7	31.1	46 23.1	+44.2	31.7	67
68	40 59.9	+40.1	27.4	41 53.0	+40.7	27.8	42 46.0	+41.1	28.2	43 38.8	+41.5	28.7	44 31.3	+42.1	29.2	45 23.5	+42.6	29.6	46 15.6	+43.1	30.2	47 07.3	+43.7	30.7	68
69	41 40.0	+39.6	26.4	42 33.7	+40.1	26.8	43 27.1	+40.6	27.2	44 20.3	+41.1	27.7	45 13.4	+41.5	28.1	46 06.1	+42.1	28.6	46 58.7	+42.6	29.1	47 51.0	+43.1	29.7	69
70	42 19.6	+39.1	25.4	43 13.8	+39.5	25.8	44 07.7	+40.0	26.2	45 01.4	+40.5	26.7	45 54.9	+41.0	27.1	46 48.2	+41.5	27.6	47 41.3	+42.0	28.1	48 34.1	+42.5	28.6	70
71	42 58.7	+38.5	24.4	43 53.3	+39.0	24.8	44 47.7	+39.4	25.2	45 41.9	+39.9	25.6	46 35.9	+40.4	26.1	47 29.7	+40.9	26.5	48 23.3	+41.3	27.0	49 16.6	+41.9	27.6	71
72	43 37.2	+38.0	23.3	44 32.3	+38.3	23.7	45 27.1	+38.8	24.1	46 21.8	+39.3	24.5	47 16.3	+39.7	25.0	48 10.6	+40.2	25.4	49 04.6	+40.8	25.9	49 58.5	+41.2	26.5	72
73	44 15.2	+37.3	22.2	45 10.6	+37.8	22.6	46 05.9	+38.2	23.0	47 01.1	+38.6	23.4	47 56.0	+39.1	23.9	48 50.8	+39.6	24.3	49 45.4	+40.0	24.8	50 39.7	+40.6	25.3	73
74	44 52.5	+36.6	21.1	45 48.4	+37.0	21.5	46 44.1	+37.5	21.9	47 39.7	+38.0	22.3	48 35.1	+38.4	22.7	49 30.4	+38.9	23.2	50 25.4	+39.4	23.6	51 20.3	+39.9	24.1	74
75	45 29.1	+36.0	20.0	46 25.4	+36.4	20.4	47 21.6	+36.8	20.7	48 17.7	+37.2	21.1	49 13.5	+37.7	21.6	50 09.3	+38.1	22.0	51 04.8	+38.6	22.5	52 00.2	+39.0	22.9	75
76	46 05.1	+35.3	18.9	47 01.8	+35.7	19.2	47 58.4	+36.1	19.6	48 54.9	+36.5	20.0	49 51.2	+36.9	20.4	50 47.4	+37.4	20.8	51 43.4	+37.8	21.2	52 39.2	+38.3	21.7	76
77	46 40.4	+34.5	17.7	47 37.5	+34.9	18.0	48 34.5	+35.3	18.4	49 31.4	+35.7	18.7	50 28.1	+36.2	19.1	51 24.8	+36.5	19.5	52 21.2	+37.0	20.0	53 17.5	+37.5	20.4	77
78	47 14.9	+33.8	16.5	48 12.4	+34.2	16.8	49 09.8	+34.5	17.1	50 07.1	+34.9	17.5	51 04.3	+35.2	17.9	52 01.3	+35.8	18.3	52 58.2	+36.1	18.7	53 54.8	+36.6	19.1	78
79	47 48.7	+33.0	15.3	48 46.6	+33.3	15.6	49 44.3	+33.7	15.9	50 42.0	+34.0	16.2	51 39.5	+34.4	16.6	52 37.0	+34.8	16.9	53 34.3	+35.2	17.3	54 31.5	+35.7	17.7	79
80	48 21.7	+32.2	14.0	49 19.9	+32.4	14.3	50 18.0	+32.8	14.6	51 16.0	+33.1	14.9	52 13.9	+33.5	15.2	53 11.8	+33.8	15.6	54 09.5	+34.3	16.0	55 07.2	+34.6	16.4	80
81	48 53.9	+31.2	12.7	49 52.3	+31.6	13.0	50 50.8	+31.9	13.3	51 49.1	+32.2	13.6	52 47.4	+32.5	13.9	53 45.6	+32.9	14.2	54 43.8	+33.2	14.5	55 41.8	+33.6	14.9	81
82	49 25.1	+30.4	11.4	50 23.9	+30.7	11.7	51 22.7	+30.9	11.9	52 21.3	+31.2	12.2	53 19.9	+31.6	12.5	54 18.5	+31.8	12.8	55 17.0	+32.1	13.1	56 15.4	+32.5	13.4	82
83	49 55.5	+29.5	10.1	50 54.6	+29.7	10.3	51 53.6	+29.9	10.6	52 52.5	+30.2	10.8	53 51.5	+30.4	11.0	54 50.3	+30.8	11.3	55 49.1	+31.1	11.6	56 47.9	+31.3	11.9	83
84	50 25.0	+28.5	8.7	51 24.3	+28.7	8.9	52 23.5	+28.9	9.1	53 22.7	+29.2	9.4	54 21.9	+29.4	9.6	55 21.1	+29.6	9.8	56 20.2	+29.8	10.1	57 19.2	+30.2	10.3	84
85	50 53.5	+27.4	7.4	51 53.0	+27.6	7.5	52 52.4	+27.9	7.7	53 51.9	+28.0	7.9	54 51.3	+28.2	8.1	55 50.7	+28.4	8.3	56 50.0	+28.7	8.5	57 49.4	+28.9	8.7	85
86	51 20.9	+26.5	5.9	52 20.6	+26.6	6.1	53 20.3	+26.7	6.2	54 19.9	+26.9	6.4	55 19.5	+27.0	6.5	56 19.1	+27.2	6.7	57 18.7	+27.4	6.9	58 18.3	+27.5	7.1	86
87	51 47.4	+25.3	4.5	52 47.2	+25.4	4.6	53 47.0	+25.5	4.7	54 46.8	+25.6	4.8	55 46.5	+25.8	4.9	56 46.3	+25.9	5.0	57 46.1	+26.0	5.2	58 45.8	+26.2	5.4	87
88	52 12.7	+24.2	3.0	53 12.6	+24.3	3.1	54 12.5	+24.4	3.2	55 12.4	+24.5	3.3	56 12.3	+24.5	3.3	57 12.2	+24.6	3.4	58 12.1	+24.7	3.5	59 12.0	+24.8	3.6	88
89	52 36.9	+23.1	1.5	53 36.9	+23.1	1.6	54 36.9	+23.1	1.6	55 36.9	+23.1	1.6	56 36.8	+23.2	1.7	57 36.8	+23.2	1.7	58 36.8	+23.2	1.8	59 36.8	+23.2	1.8	89
90	53 00.0	+21.9	0.0	54 00.0	+21.9	0.0	55 00.0	+21.8	0.0	56 00.0	+21.8	0.0	57 00.0	+21.8	0.0	58 00.0	+21.7	0.0	59 00.0	+21.7	0.0	60 00.0	+21.7	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc d Z	54° Hc d Z	55° Hc d Z	56° Hc d Z	57° Hc d Z	58° Hc d Z	59° Hc d Z	60° Hc d Z	Dec.
0	12 27.3 +49.0 107.0	12 09.6 +49.6 107.3	11 51.7 +50.2 107.5	11 33.6 +50.8 107.7	11 15.3 +51.3 107.8	10 56.8 +51.8 108.0	10 38.2 +52.3 108.2	10 19.3 +52.8 108.4	0
1	13 16.3 +49.0 106.5	12 59.2 +49.6 106.7	12 41.9 +50.1 106.9	12 24.4 +50.6 107.1	12 06.6 +51.2 107.3	11 48.6 +51.8 107.5	11 30.5 +52.2 107.7	11 12.1 +52.8 107.9	1
2	14 05.3 +48.8 105.9	13 48.8 +49.4 106.1	13 32.0 +50.1 106.3	13 15.0 +50.6 106.6	12 57.8 +51.2 106.8	12 40.4 +51.7 107.0	12 22.7 +52.2 107.2	12 04.9 +52.7 107.4	2
3	14 54.1 +48.7 105.3	14 38.2 +49.4 105.8	14 22.1 +49.9 105.8	14 05.6 +50.6 106.0	13 49.0 +51.0 106.2	13 32.1 +51.6 106.5	13 14.9 +52.2 106.7	12 57.6 +52.6 106.9	3
4	15 42.9 +48.7 104.7	15 27.6 +49.3 104.9	15 12.0 +49.9 105.2	14 56.2 +50.4 105.4	14 40.0 +51.1 105.7	14 23.7 +51.5 106.0	14 07.1 +52.0 106.2	13 50.2 +52.6 106.4	4
5	16 31.6 +48.5 104.0	16 16.9 +49.2 104.3	16 01.9 +49.8 104.6	15 46.6 +50.4 104.9	15 31.1 +50.9 105.2	15 15.2 +51.5 105.4	14 59.1 +52.0 105.7	14 42.8 +52.5 105.9	5
6	17 20.1 +48.5 103.4	17 06.1 +49.0 103.7	16 51.7 +49.6 104.0	16 37.0 +50.2 104.3	16 22.0 +50.8 104.6	16 06.7 +51.4 104.9	15 51.1 +52.0 105.2	15 35.3 +52.5 105.4	6
7	18 08.6 +48.3 102.8	17 55.1 +49.0 103.1	17 41.3 +49.6 103.4	17 27.2 +50.2 103.7	17 12.8 +50.8 104.1	16 58.1 +51.3 104.4	16 43.1 +51.9 104.7	16 27.8 +52.3 104.9	7
8	18 56.9 +48.2 102.2	18 44.1 +48.8 102.5	18 30.9 +49.5 102.8	18 17.4 +50.1 103.2	18 03.6 +50.6 103.5	17 49.4 +51.2 103.8	17 34.9 +51.8 104.1	17 20.1 +52.3 104.4	8
9	19 45.1 +48.1 101.6	19 32.9 +48.7 101.9	19 20.4 +49.3 102.3	19 07.5 +49.9 102.6	18 54.2 +50.6 102.9	18 40.6 +51.1 103.3	18 26.7 +51.7 103.6	18 12.4 +52.2 103.9	9
10	20 33.2 +47.9 101.0	20 21.6 +48.6 101.3	20 09.7 +49.2 101.6	19 57.4 +49.8 102.0	19 44.8 +50.4 102.4	19 31.7 +51.1 102.7	19 18.4 +51.5 103.0	19 04.6 +52.2 103.4	10
11	21 21.1 +47.8 100.3	21 10.2 +48.5 100.7	20 58.9 +49.1 101.0	20 47.2 +49.8 101.4	20 35.2 +50.3 101.8	20 22.8 +50.9 102.1	20 09.9 +51.5 102.5	19 56.8 +52.0 102.9	11
12	22 08.9 +47.6 99.6	21 58.7 +48.2 100.0	21 48.0 +49.0 100.4	21 37.0 +49.5 100.8	21 25.5 +50.2 101.2	21 13.7 +50.8 101.6	21 01.4 +51.4 102.0	20 48.8 +51.9 102.3	12
13	22 56.5 +47.5 99.0	22 46.9 +48.2 99.4	22 37.0 +48.8 99.8	22 26.5 +49.5 100.2	22 15.7 +50.1 100.6	22 04.5 +50.6 101.0	21 52.8 +51.3 101.4	21 40.7 +51.9 101.8	13
14	23 44.0 +47.3 98.3	23 35.1 +48.0 98.7	23 25.8 +48.6 99.2	23 16.0 +49.3 99.6	23 05.8 +49.9 100.0	22 55.1 +50.6 100.4	22 44.1 +51.1 100.8	22 32.6 +51.7 101.2	14
15	24 31.3 +47.1 97.6	24 23.1 +47.8 98.1	24 14.4 +48.5 98.5	24 05.3 +49.1 99.0	23 55.7 +49.8 99.4	23 45.7 +50.4 99.8	23 35.2 +51.0 100.3	23 24.3 +51.6 100.7	15
16	25 18.4 +46.9 96.9	25 10.9 +47.6 97.4	25 02.9 +48.3 97.9	24 54.4 +49.0 98.3	24 45.5 +49.6 98.8	24 36.1 +50.3 99.2	24 26.2 +50.9 99.7	24 15.9 +51.5 100.1	16
17	26 05.3 +46.7 96.2	25 58.5 +47.4 96.7	25 51.2 +48.1 97.2	25 43.4 +48.8 97.7	25 35.1 +49.5 98.2	25 26.4 +50.1 98.6	25 17.1 +50.7 99.1	25 07.4 +51.3 99.6	17
18	26 52.0 +46.5 95.5	26 45.9 +47.2 96.0	26 39.3 +48.0 96.5	26 32.2 +48.7 97.0	26 24.6 +49.3 97.5	26 16.5 +49.9 98.0	26 07.8 +50.6 98.5	25 58.7 +51.2 99.0	18
19	27 38.5 +46.2 94.8	27 33.1 +47.1 95.4	27 27.3 +47.7 95.9	27 20.9 +48.4 96.4	27 13.9 +49.1 96.9	27 06.4 +49.8 97.4	26 58.4 +50.5 97.9	26 49.9 +51.1 98.4	19
20	28 24.7 +46.1 94.1	28 20.2 +46.8 94.7	28 15.0 +47.5 95.2	28 09.3 +48.3 95.7	28 03.0 +49.0 96.3	27 56.2 +49.7 96.8	27 48.9 +50.2 97.3	27 41.0 +50.9 97.8	20
21	29 10.8 +45.8 93.4	29 07.0 +46.5 93.9	29 02.5 +47.4 94.5	28 57.6 +48.0 95.0	28 52.0 +48.7 95.6	28 45.9 +49.4 96.1	28 39.1 +50.2 96.7	28 31.9 +50.7 97.2	21
22	29 56.6 +45.5 92.6	29 53.5 +46.4 93.2	29 49.9 +47.1 93.8	29 45.6 +47.8 94.4	29 40.7 +48.6 94.9	29 35.3 +49.2 95.5	29 29.3 +49.9 96.1	29 22.6 +50.6 96.6	22
23	30 42.1 +45.3 91.9	30 39.9 +46.0 92.5	30 37.0 +46.8 93.1	30 33.4 +47.6 93.7	30 29.3 +48.3 94.2	30 24.5 +49.1 94.8	30 19.2 +49.7 95.4	30 13.2 +50.4 96.0	23
24	31 27.4 +45.0 91.1	31 25.9 +45.8 91.7	31 23.8 +46.6 92.3	31 21.0 +47.4 93.0	31 17.6 +48.1 93.6	31 13.6 +48.8 94.2	31 08.9 +49.5 94.8	31 03.6 +50.2 95.4	24
25	32 12.4 +44.7 90.3	32 11.7 +45.6 91.0	32 10.4 +46.3 91.6	32 08.4 +47.1 92.2	32 05.7 +47.9 92.9	32 02.4 +48.6 93.5	31 58.4 +49.4 94.1	31 53.8 +50.0 94.7	25
26	32 57.1 +44.5 89.6	32 57.3 +45.2 90.2	32 56.7 +46.1 90.8	32 55.5 +46.9 91.5	32 53.6 +47.6 92.1	32 51.0 +48.4 92.8	32 47.8 +49.1 93.4	32 43.8 +49.8 94.1	26
27	33 41.6 +44.1 88.7	33 42.5 +45.0 89.4	33 42.8 +45.8 90.1	33 42.4 +46.5 90.7	33 41.2 +47.4 91.4	33 39.4 +48.1 92.1	33 36.9 +48.8 92.7	33 33.6 +49.6 93.4	27
28	34 25.7 +43.7 87.9	34 27.5 +44.6 88.6	34 28.6 +45.4 89.3	34 28.9 +46.3 90.0	34 28.6 +47.0 90.7	34 27.5 +47.9 91.4	34 25.7 +48.7 92.0	34 23.2 +49.4 92.7	28
29	35 09.4 +43.4 87.1	35 12.1 +44.3 87.8	35 14.0 +45.2 88.5	35 15.2 +46.0 89.2	35 15.7 +46.8 89.9	35 15.4 +47.6 90.6	35 14.4 +48.3 91.3	35 12.6 +49.1 92.0	29
30	35 52.8 +43.1 86.2	35 56.4 +43.9 87.0	35 59.2 +44.8 87.7	36 01.2 +45.7 88.4	36 02.5 +46.5 89.1	36 03.0 +47.3 89.9	36 02.7 +48.1 90.6	36 01.7 +48.9 91.3	30
31	36 35.9 +42.6 85.4	36 40.3 +43.6 86.1	36 44.0 +44.4 86.9	36 46.9 +45.3 87.6	36 49.0 +46.2 88.4	36 50.3 +47.0 89.1	36 50.8 +47.9 89.9	36 50.6 +48.6 90.6	31
32	37 18.5 +42.3 84.5	37 23.9 +43.2 85.3	37 28.4 +44.1 86.0	37 32.2 +45.0 86.8	37 35.2 +45.8 87.6	37 37.3 +46.7 88.3	37 38.7 +47.5 89.1	37 39.2 +48.3 89.9	32
33	38 00.8 +41.9 83.6	38 07.1 +42.8 84.4	38 12.5 +43.8 85.2	38 17.2 +44.6 86.0	38 21.0 +45.5 86.7	38 24.0 +46.4 87.5	38 26.2 +47.2 88.3	38 27.5 +48.0 89.1	33
34	38 42.7 +41.4 82.7	38 49.9 +42.3 83.5	38 56.3 +43.3 84.3	39 01.8 +44.2 85.1	39 06.5 +45.1 85.9	39 10.4 +46.0 86.7	39 13.4 +46.9 87.5	39 15.5 +47.7 88.3	34
35	39 24.1 +40.9 81.8	39 32.2 +42.0 82.6	39 39.6 +42.9 83.4	39 46.0 +43.9 84.2	39 51.6 +44.8 85.1	39 56.4 +45.6 85.9	40 00.3 +46.5 86.7	40 03.2 +47.4 87.6	35
36	40 05.0 +40.5 80.8	40 14.2 +41.5 81.6	40 22.5 +42.4 82.5	40 29.9 +43.4 83.3	40 36.4 +44.4 84.2	40 42.0 +45.3 85.0	40 46.8 +46.2 85.9	40 50.6 +47.1 86.8	36
37	40 45.5 +40.0 79.8	40 55.7 +41.0 80.7	41 04.9 +42.0 81.6	41 13.3 +43.0 82.4	41 20.8 +43.9 83.3	41 27.3 +44.9 84.2	41 33.0 +45.7 85.0	41 37.7 +46.6 85.9	37
38	41 25.5 +39.5 78.9	41 36.7 +40.5 79.7	41 46.9 +41.5 80.6	41 56.3 +42.5 81.5	42 04.7 +43.5 82.4	42 12.2 +44.4 83.3	42 18.7 +45.4 84.2	42 24.3 +46.3 85.1	38
39	42 05.0 +38.9 77.8	42 17.2 +39.9 78.7	42 28.4 +41.0 79.6	42 38.8 +42.0 80.5	42 48.2 +43.0 81.4	42 56.6 +44.0 82.4	43 04.1 +45.0 83.3	43 10.6 +45.9 84.2	39
40	42 43.9 +38.4 76.8	42 57.1 +39.5 77.7	43 09.4 +40.5 78.6	43 20.8 +41.5 79.6	43 31.2 +42.5 80.5	43 40.6 +43.5 81.4	43 49.1 +44.5 82.4	43 56.5 +45.5 83.3	40
41	43 22.3 +37.7 75.8	43 36.6 +38.8 76.7	43 49.9 +39.9 77.6	44 02.3 +41.0 78.6	44 13.7 +42.0 79.5	44 24.1 +43.1 80.5	44 33.6 +44.0 81.4	44 42.0 +45.0 82.4	41
42	44 00.0 +37.2 74.7	44 15.4 +38.3 75.6	44 29.8 +39.4 76.6	44 43.3 +40.4 77.5	44 55.7 +41.5 78.5	45 07.2 +42.5 79.5	45 17.6 +43.6 80.5	45 27.0 +44.6 81.5	42
43	44 37.2 +36.5 73.6	44 53.7 +37.6 74.5	45 09.2 +38.7 75.5	45 23.7 +39.8 76.5	45 37.2 +40.9 77.5	45 49.7 +42.0 78.5	46 01.2 +43.0 79.5	46 11.6 +44.0 80.5	43
44	45 13.7 +35.8 72.5	45 31.3 +37.0 73.4	45 47.9 +38.1 74.4	46 03.5 +39.2 75.4	46 18.1 +40.3 76.4	46 31.7 +41.4 77.5	46 44.2 +42.5 78.5	46 55.6 +43.6 79.5	44
45	45 49.5 +35.2 71.3	46 08.3 +36.3 72.3	46 26.0 +37.4 73.3	46 42.7 +38.6 74.3	46 58.4 +39.7 75.3	47 13.1 +40.8 76.4	47 26.7 +41.9 77.4	47 39.2 +42.9 78.5	45
46	46 24.7 +34.4 70.2	46 44.6 +35.5 71.1	47 03.4 +36.8 72.2	47 21.3 +37.9 73.2	47 38.1 +39.1 74.2	47 53.9 +40.2 75.3	48 08.6 +41.3 76.4	48 22.1 +42.4 77.5	46
47	46 59.1 +33.6 69.0	47 20.1 +34.9 70.0	47 40.2 +36.0 71.0	47 59.2 +37.2 72.0	48 17.2 +38.3 73.1	48 34.1 +39.5 74.2	48 49.9 +40.6 75.3	49 04.5 +41.8 76.4	47
48	47 32.7 +32.9 67.7	47 55.0 +34.0 68.8	48 16.2 +35.3 69.8	48 36.4 +36.4 70.9	48 55.5 +37.7 71.9	49 13.6 +38.8 73.0	49 30.5 +40.0 74.2	49 46.3 +41.2 75.3	48
49	48 05.6 +32.0 66.5	48 29.0 +33.3 67.5	48 51.5 +34.4 68.6	49 12.8 +35.7 69.7	49 33.2 +36.8 70.8	49 52.4 +38.1 71.9	50 10.5 +39.3 73.0	50 27.5 +40.4 74.2	49
50	48 37.6 +31.2 65.2	49 02.3 +32.4 66.3	49 25.9 +33.6 67.3	49 48.5 +34.9 68.4	50 10.0 +36.1 69.5	50 30.5 +37.3 70.7	50 49.8 +38.5 71.8	51 07.9 +39.7 73.0	50
51	49 08.8 +30.3 63.9	49 34.7 +31.5 65.0	49 59.5 +32.8 66.0	50 23.4 +34.0 67.1	50 46.1 +35.3 68.3	51 07.8 +36.5 69.4	51 28.3 +37.7 70.6	51 47.6 +39.0 71.8	51
52	49 39.1 +29.3 62.6	50 06.2 +30.6 63.7	50 32.3 +31.9 64.7	50 57.4 +33.1 65.8	51 21.4 +34.4 67.0	51 44.3 +35.6 68.1	52 06.0 +37.0 69.3	52 26.6 +38.2 70.6	52
53	50 08.4 +28.4 61.2	50 36.8 +29.6 62.3	51 04.2 +30.9 63.4	51 30.5 +32.2 64.5	51 55.8 +33.5 65.7	52 19.9 +34.8 66.8	52 43.0 +36.0 68.0	53 04.8 +37.3 69.3	53
54	50 36.8 +27.4 59.9	51 06.4 +28.7 60.9	51 35.1 +29.9 62.0	52 02.7 +31.2 63.2	52 29.3 +32.5 64.3	52 54.7 +33.9 65.5	53 19.0 +35.2 66.7	53 42.1 +36.5 68.0	54
55	51 04.2 +26.3 58.4	51 35.1 +27.6 59.5	52 05.0 +28.9 60.6	52 33.9 +30.3 61.8	53 01.8 +31.5 62.9	53 28.6 +32.8 64.1	53 54.2 +34.1 65.4	54 18.6 +35.5 66.6	55
56	51 30.5 +25.3 57.0	52 02.7 +26.6 58.1	52 33.9 +27.9 59.2	53 04.2 +29.1 60.3	53 33.3 +30.5 61.5	54 01.4 +31.8 62.7	54 28.3 +33.2 63.9	54 54.1 +34.5 65.2	56
57	51 55.8 +24.1 55.5	52 29.3 +25.4 56.6	53 01.8 +26.8 57.7	53 33.3 +28.1 58.9	54 03.8 +29.4 60.0	54 33.2 +30.8 61.3	55 01.5 +32.2 62.5	55 28.6 +33.5 63.8	57
58	52 19.9 +23.1 54.1	52 54.7 +24.3 55.1	53 28.6 +25.6 56.2	54 01.4 +26.9 57.4	54 33.2 +28.3 58.5	55 04.0 +29.7 59.8	55 33.7 +31.0 61.0	56 02.1 +32.4 62.3	58
59	52 43.0 +21.8 52.5	53 19.0 +23.1 53.6	53 54.2 +24.4 54.7	54 28.3 +25.8 55.8	55 01.5 +27.1 57.0	55 33.7 +28.4 58.2	56 04.7 +29.8 59.5	56 34.5 +31.2 60.8	59
60	53 04.8 +20.6 51.0	53 42.1 +21.9 52.0	54 18.6 +23.2 53.1	54 54.1 +24.5 54.3	55 28.6 +25.9 55.5	56 02.1 +27.3 56.7	56 34.5 +28.7 57.9	57 05.8 +30.1 59.2	60
61	53 25.4 +19.4 49.4	54 04.0 +20.6 50.5	54 41.8 +21.9 51.6	55 18.6 +23.3 52.7	55 54.5 +24.6 53.9	56 29.4 +26.0 55.1	57 03.2 +27.4 56.3	57 35.9 +28.8 57.6	61
62	53 44.8 +18.0 47.8	54 24.6 +19.4 48.9	55 03.7 +20.6 49.9	55 41.9 +21.9 51.1	56 19.1 +23.3 52.2	56 55.4 +24.6 53.4	57 30.6 +26.1 54.7	58 04.7 +27.6 56.0	62
63	54 02.8 +16.8 46.2	54 44.0 +18.0 47.2	55 24.3 +19.3 48.3	56 03.8 +20.6 49.4	56 42.4 +21.9 50.5	57 20.0 +23.3 51.7	57 56.7 +24.7 53.0	58 32.3 +26.1 54.3	63
64	54 19.6 +15.4 44.6	55 02.0 +16.6 45.6	55 43.6 +17.9 46.6	56 24.4 +19.1 47.7	57 04.3 +20.5 48.8	57 43.3 +21.9 50.0	58 21.4 +23.3 51.3	58 58.4 +24.7 52.6	64
65	54 35.0 +14.0 42.9	55 18.6 +15.2 43.9	56 01.5 +16.4 44.9	56 43.5 +17.8 46.0	57 24.8 +19.1 47.1	58 05.2 +20.4 48.3	58 44.7 +21.8 49.5	59 23.1 +23.3 50.8	65
66	54 49.0 +12.6 41.2	55 33.8 +13.8 42.2	56 17.9 +15.0 43.2	57 01.3 +16.2 44.2	57 43.9 +17.5 45.3	58 25.6 +18.9 46.5	59 06.5 +20.2 47.7	59 46.4 +21.6 49.0	66
67	55 01.6 +11.2 39.5	55 47.6 +12.3 40.5	56 32.9 +13.5 41.4	57 17.5 +14.7 42.5	58 01.4 +16.0 43.5	58 44.5 +17.3 44.7	59 26.7 +18.7 45.9	60 08.0 +20.1 47.1	67
68	55 12.8 +9.7 37.8	55 59.9 +10.8 38.7	56 46.4 +11.9 39.7	57 32.2 +13.2 40.7	58 17.4 +14.4 41.7	59 01.8 +15.7 42.8	59 45.4 +17.0 44.0	60 28.1 +18.3 45.2	68
69	55 22.4 +8.3 36.1	56 10.7 +9.3 36.9	56 58.3 +10.4 37.9	57 45.4 +11.6 38.8	58 31.8 +12.8 39.9	59 17.5 +14.0 40.9	60 02.4 +15.4 42.1	60 46.6 +16.7 43.3	69
70	55 30.7 +6.7 34.3	56 20.0 +7.7 35.2	57 08.7 +8.9 36.1	57 57.0 +9.9 37.0	58 44.6 +11.1 38.0	59 31.5 +12.4 39.0	60 17.8 +13.6 40.1	61 03.3 +14.9 41.3	70
71	55 37.4 +5.2 32.6	56 27.7 +6.2 33.4	57 17.6 +7.2 34.2	58 06.9 +8.3 35.1	58 55.7 +9.4 36.1	59 43.9 +10.6 37.1	60 31.4 +11.9 38.1	61 18.2 +13.1 39.3	71
72	55 42.6 +3.7 30.8	56 33.9 +4.6 31.6	57 24.8 +5.6 32.4	58 15.2 +6.7 33.3	59 05.1 +7.8 34.2	59 54.5 +8.9 35.1	60 43.3 +10.0 36.1	61 31.4 +11.3 37.2	72
73	55 46.3 +2.1 29.0	56 38.5 +3.1 29.8	57 30.4 +4.0 30.5	58 21.9 +4.9 31.4	59 12.9 +6.0 32.2	60 03.4 +7.1 33.2	60 53.3 +8.2 34.1	61 42.7 +9.4 35.2	73
74	55 48.4 +0.6 27.3	56 41.6 +1.4 27.9	57 34.4 +2.3 28.7	58 26.8 +3.3 29.5	59 18.9 +4.2 30.3	60 10.5 +5.2 31.2	61 01.5 +6.4 32.1	61 52.1 +7.5 33.1	74
75	55 49.0 −1.0 25.5	56 43.0 −0.1 26.1	57 36.7 +0.7 26.8	58 30.1 +1.6 27.5	59 23.1 +2.5 28.3	60 15.7 +3.5 29.2	61 07.9 +4.5 30.0	61 59.6 +5.5 31.0	75
76	55 48.0 −2.4 23.7	56 42.9 −1.8 24.3	57 37.4 −1.0 24.9	58 31.7 −0.2 25.6	59 25.6 +0.7 26.4	60 19.2 +1.6 27.1	61 12.4 +2.5 28.0	62 05.1 +3.6 28.8	76
77	55 45.6 −4.1 21.9	56 41.1 −3.3 22.5	57 36.4 −2.6 23.1	58 31.5 −1.9 23.7	59 26.3 −1.1 24.4	60 20.8 −0.2 25.1	61 14.9 +0.7 25.9	62 08.7 +1.6 26.7	77
78	55 41.5 −5.5 20.1	56 37.8 −4.9 20.7	57 33.8 −4.2 21.2	58 29.6 −3.5 21.8	59 25.2 −2.8 22.4	60 20.6 −2.1 23.1	61 15.6 −1.2 23.8	62 10.3 −0.3• 24.6	78
79	55 36.0 −7.0 18.4	56 32.9 −6.5 18.9	57 29.6 −5.9 19.4	58 26.1 −5.3 19.9	59 22.4 −4.6 20.5	60 18.5 −3.9 21.1	61 14.4 −3.2 21.7	62 10.0 −2.4• 22.4	79
80	55 29.0 −8.6 16.6	56 26.4 −8.1 17.1	57 23.7 −7.5 17.5	58 20.8 −6.9 18.0	59 17.8 −6.3 18.5	60 14.6 −5.7 19.1	61 11.2 −5.0 19.7	62 07.6 −4.3 20.3	80
81	55 20.4 −10.0 14.9	56 18.3 −9.5 15.3	57 16.2 −9.0 15.7	58 13.9 −8.6 16.1	59 11.5 −8.1 16.6	60 08.9 −7.5 17.1	61 06.2 −7.0 17.6	62 03.3 −6.3 18.2	81
82	55 10.4 −11.5 13.2	56 08.8 −11.1 13.5	57 07.1 −10.7 13.8	58 05.3 −10.3 14.2	59 03.4 −9.8 14.6	60 01.4 −9.3 15.1	60 59.2 −8.7 15.5	61 57.0 −8.2 16.0	82
83	54 58.9 −12.9 11.4	55 57.7 −12.6 11.7	56 56.4 −12.2 12.0	57 55.0 −11.8 12.4	58 53.6 −11.5 12.7	59 52.1 −11.1 13.1	60 50.5 −10.6 13.5	61 48.8 −10.2 13.9	83
84	54 46.0 −14.4 9.7	55 45.1 −14.0 10.0	56 44.2 −13.8 10.2	57 43.2 −13.5 10.5	58 42.1 −13.1 10.8	59 41.0 −12.7 11.1	60 39.9 −12.4 11.5	61 38.6 −12.0 11.9	84
85	54 31.6 −15.7 8.1	55 31.0 −15.4 8.3	56 30.4 −15.2 8.5	57 29.7 −15.0 8.7	58 29.0 −14.7 9.0	59 28.3 −14.5 9.2	60 27.5 −14.2 9.5	61 26.6 −13.8 9.8	85
86	54 15.9 −17.0 6.4	55 15.6 −16.9 6.6	56 15.2 −16.7 6.7	57 14.7 −16.5 6.9	58 14.3 −16.3 7.1	59 13.8 −16.1 7.3	60 13.3 −15.9 7.5	61 12.8 −15.7 7.8	86
87	53 58.9 −18.4 4.8	54 58.7 −18.3 4.9	55 58.5 −18.2 5.0	56 58.2 −18.1 5.1	57 58.0 −17.9 5.2	58 57.7 −17.7 5.4	59 57.4 −17.5 5.6	60 57.1 −17.3 5.8	87
88	53 40.5 −19.6 3.2	54 40.4 −19.5 3.2	55 40.3 −19.5 3.3	56 40.2 −19.4 3.4	57 40.1 −19.3 3.5	58 40.0 −19.2 3.6	59 39.9 −19.2 3.7	60 39.8 −19.1 3.8	88
89	53 20.9 −20.9 1.6	54 20.9 −20.9 1.6	55 20.8 −20.8 1.6	56 20.8 −20.8 1.7	57 20.8 −20.8 1.7	58 20.8 −20.8 1.8	59 20.7 −20.7 1.8	60 20.7 −20.7 1.9	89
90	53 00.0 −22.1 0.0	54 00.0 −22.1 0.0	55 00.0 −22.1 0.0	56 00.0 −22.2 0.0	57 00.0 −22.2 0.0	58 00.0 −22.2 0.0	59 00.0 −22.3 0.0	60 00.0 −22.3 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	12 27.3	−49.1	107.0	12 09.6	−49.7	107.3	11 51.7	−50.2	107.5	11 33.6	−50.8	107.7	11 15.3	−51.3	107.8	10 56.8	−51.8	108.0	10 38.2	−52.4	108.2	10 19.3	−52.8	108.4	0
1	11 38.2	−49.2	107.6	11 19.9	−49.7	107.8	11 01.5	−50.3	108.0	10 42.8	−50.8	108.2	10 24.0	−51.4	108.4	10 05.0	−51.9	108.5	9 45.8	−52.4	108.7	9 26.5	−52.9	108.9	1
2	10 49.0	−49.2	108.2	10 30.2	−49.9	108.4	10 11.1	−50.3	108.6	9 52.0	−51.0	108.7	9 32.6	−51.4	108.9	9 13.1	−52.0	109.1	8 53.4	−52.4	109.2	8 33.6	−52.9	109.3	2
3	9 59.8	−49.4	108.8	9 40.3	−49.8	109.0	9 20.8	−50.5	109.1	9 01.0	−50.9	109.3	8 41.2	−51.5	109.4	8 21.1	−51.9	109.6	8 01.0	−52.5	109.7	7 40.7	−52.9	109.8	3
4	9 10.4	−49.3	109.4	8 50.5	−50.0	109.5	8 30.3	−50.4	109.7	8 10.1	−51.0	109.8	7 49.7	−51.5	109.9	7 29.2	−52.0	110.1	7 08.5	−52.5	110.2	6 47.8	−53.0	110.3	4
5	8 21.1	−49.4	109.9	8 00.5	−49.9	110.1	7 39.9	−50.5	110.2	7 19.1	−51.0	110.3	6 58.2	−51.6	110.5	6 37.2	−52.1	110.6	6 16.0	−52.5	110.7	5 54.8	−53.0	110.8	5
6	7 31.7	−49.5	110.5	7 10.6	−50.0	110.6	6 49.4	−50.6	110.8	6 28.1	−51.1	110.9	6 06.6	−51.5	111.0	5 45.1	−52.1	111.1	5 23.5	−52.5	111.2	5 01.8	−53.0	111.2	6
7	6 42.2	−49.5	111.1	6 20.6	−50.1	111.2	5 58.8	−50.5	111.3	5 37.0	−51.1	111.4	5 15.1	−51.6	111.5	4 53.0	−52.0	111.6	4 31.0	−52.6	111.6	4 08.8	−53.1	111.7	7
8	5 52.7	−49.5	111.7	5 30.5	−50.0	111.8	5 08.3	−50.7	111.8	4 45.9	−51.1	111.9	4 23.5	−51.7	112.0	4 01.0	−52.2	112.1	3 38.4	−52.6	112.1	3 15.8	−53.1	112.2	8
9	5 03.2	−49.6	112.2	4 40.5	−50.1	112.3	4 17.6	−50.6	112.4	3 54.8	−51.2	112.4	3 31.8	−51.6	112.5	3 08.8	−52.1	112.6	2 45.8	−52.6	112.6	2 22.7	−53.0	112.6	9
10	4 13.6	−49.5	112.8	3 50.4	−50.2	112.9	3 27.0	−50.6	112.9	3 03.6	−51.1	113.0	2 40.2	−51.7	113.0	2 16.7	−52.1	113.1	1 53.2	−52.6	113.1	1 29.7	−53.1	113.1	10
11	3 24.1	−49.6	113.4	3 00.2	−50.1	113.4	2 36.4	−50.7	113.5	2 12.5	−51.2	113.5	1 48.5	−51.6	113.5	1 24.6	−52.2	113.6	1 00.6	−52.6	113.6	0 36.6	−53.1	113.6	11
12	2 34.5	−49.7	113.9	2 10.1	−50.1	114.0	1 45.7	−50.6	114.0	1 21.3	−51.2	114.0	0 56.9	−51.7	114.0	0 32.4	−52.1	114.0	0 08.0	−52.6	114.1	0 16.5	+53.0	65.9	12
13	1 44.8	−49.6	114.5	1 20.0	−50.2	114.5	0 55.1	−50.7	114.5	0 30.1	−51.1	114.5	0 05.2	−51.6	114.5	0 19.7	+52.1	65.5	0 44.6	+52.6	65.5	1 09.5	+53.1	65.5	13
14	0 55.2	−49.6	115.0	0 29.8	−50.2	115.1	0 04.4	−50.7	115.1	0 21.0	+51.2	64.9	0 46.4	+51.7	64.9	1 11.8	+52.2	65.0	1 37.2	+52.6	65.0	2 02.6	+53.0	65.0	14
15	0 05.6	−49.7	115.6	0 20.4	+50.1	64.4	0 46.3	+50.7	64.4	1 12.2	+51.2	64.4	1 38.1	+51.7	64.4	2 04.0	+52.1	64.5	2 29.8	+52.6	64.5	2 55.6	+53.1	64.5	15
16	0 44.1	+49.6	63.8	1 10.5	+50.2	63.9	1 37.0	+50.6	63.9	2 03.4	+51.1	63.9	2 29.8	+51.6	63.9	2 56.1	+52.1	64.0	3 22.4	+52.6	64.0	3 48.7	+53.0	64.1	16
17	1 33.7	+49.6	63.3	2 00.7	+50.1	63.3	2 27.6	+50.7	63.3	2 54.5	+51.2	63.4	3 21.4	+51.6	63.4	3 48.2	+52.1	63.5	4 15.0	+52.5	63.5	4 41.7	+53.0	63.6	17
18	2 23.3	+49.6	62.7	2 50.8	+50.1	62.7	3 18.3	+50.6	62.8	3 45.7	+51.1	62.8	4 13.0	+51.6	62.9	4 40.3	+52.1	63.0	5 07.5	+52.6	63.1	5 34.7	+53.0	63.1	18
19	3 12.9	+49.6	62.1	3 40.9	+50.1	62.2	4 08.9	+50.6	62.3	4 36.8	+51.1	62.3	5 04.6	+51.6	62.4	5 32.4	+52.0	62.5	6 00.1	+52.5	62.6	6 27.7	+52.9	62.7	19
20	4 02.5	+49.6	61.6	4 31.0	+50.1	61.6	4 59.5	+50.6	61.7	5 27.9	+51.1	61.8	5 56.2	+51.6	61.9	6 24.4	+52.1	62.0	6 52.6	+52.5	62.1	7 20.6	+52.9	62.2	20
21	4 52.1	+49.5	61.0	5 21.1	+50.1	61.1	5 50.1	+50.5	61.2	6 19.0	+51.0	61.3	6 47.8	+51.5	61.4	7 16.5	+51.9	61.5	7 45.1	+52.4	61.6	8 13.5	+52.9	61.7	21
22	5 41.6	+49.5	60.4	6 11.2	+50.0	60.5	6 40.6	+50.5	60.7	7 10.0	+51.0	60.7	7 39.3	+51.5	60.9	8 08.4	+52.0	61.0	8 37.5	+52.4	61.1	9 06.4	+52.9	61.2	22
23	6 31.1	+49.5	59.9	7 01.2	+50.0	60.0	7 31.1	+50.5	60.1	8 01.0	+51.0	60.2	8 30.8	+51.4	60.3	9 00.4	+51.9	60.5	9 29.9	+52.4	60.6	9 59.3	+52.8	60.8	23
24	7 20.6	+49.4	59.3	7 51.2	+49.9	59.4	8 21.6	+50.5	59.5	8 52.0	+50.9	59.7	9 22.2	+51.4	59.8	9 52.3	+51.9	60.0	10 22.3	+52.3	60.1	10 52.1	+52.8	60.3	24
25	8 10.0	+49.4	58.7	8 41.1	+49.9	58.9	9 12.1	+50.3	59.0	9 42.9	+50.9	59.1	10 13.6	+51.3	59.3	10 44.2	+51.8	59.5	11 14.6	+52.3	59.6	11 44.9	+52.7	59.8	25
26	8 59.4	+49.3	58.2	9 31.0	+49.8	58.3	10 02.4	+50.4	58.4	10 33.8	+50.8	58.6	11 04.9	+51.3	58.8	11 36.0	+51.7	58.9	12 06.9	+52.2	59.1	12 37.6	+52.6	59.3	26
27	9 48.7	+49.3	57.6	10 20.8	+49.8	57.7	10 52.8	+50.2	57.9	11 24.6	+50.7	58.1	11 56.2	+51.3	58.2	12 27.7	+51.7	58.4	12 59.1	+52.1	58.6	13 30.2	+52.6	58.8	27
28	10 38.0	+49.2	57.0	11 10.6	+49.7	57.2	11 43.0	+50.2	57.5	12 15.3	+50.7	57.5	12 47.5	+51.1	57.7	13 19.4	+51.7	57.9	13 51.2	+52.1	58.1	14 22.8	+52.6	58.3	28
29	11 27.2	+49.1	56.4	12 00.3	+49.6	56.6	12 33.2	+50.1	56.8	13 06.0	+50.6	57.0	13 38.6	+51.1	57.2	14 11.1	+51.5	57.4	14 43.3	+52.1	57.6	15 15.4	+52.5	57.8	29
30	12 16.3	+49.0	55.8	12 49.9	+49.6	56.0	13 23.3	+50.1	56.2	13 56.6	+50.6	56.4	14 29.7	+51.0	56.6	15 02.6	+51.5	56.8	15 35.4	+51.9	57.1	16 07.9	+52.4	57.3	30
31	13 05.3	+48.9	55.2	13 39.5	+49.4	55.4	14 13.4	+50.0	55.6	14 47.2	+50.4	55.9	15 20.7	+51.0	56.1	15 54.1	+51.4	56.3	16 27.3	+51.9	56.6	17 00.3	+52.3	56.8	31
32	13 54.3	+48.9	54.6	14 28.9	+49.4	54.9	15 03.4	+49.9	55.1	15 37.6	+50.4	55.3	16 11.7	+50.8	55.5	16 45.5	+51.4	55.8	17 19.2	+51.8	56.0	17 52.6	+52.2	56.3	32
33	14 43.2	+48.8	54.1	15 18.3	+49.3	54.3	15 53.3	+49.8	54.5	16 28.0	+50.3	54.7	17 02.5	+50.8	55.0	17 36.9	+51.2	55.2	18 11.0	+51.7	55.5	18 44.8	+52.2	55.8	33
34	15 32.0	+48.7	53.4	16 07.6	+49.2	53.7	16 43.1	+49.6	53.9	17 18.3	+50.2	54.2	17 53.3	+50.7	54.4	18 28.1	+51.2	54.7	19 02.7	+51.6	55.0	19 37.0	+52.1	55.3	34
35	16 20.7	+48.6	52.8	16 56.8	+49.1	53.1	17 32.7	+49.6	53.3	18 08.5	+50.1	53.6	18 44.0	+50.6	53.9	19 19.3	+51.0	54.1	19 54.3	+51.5	54.4	20 29.1	+51.9	54.7	35
36	17 09.3	+48.4	52.2	17 45.9	+49.0	52.5	18 22.3	+49.5	52.7	18 58.6	+49.9	53.0	19 34.5	+50.5	53.3	20 10.3	+50.9	53.6	20 45.8	+51.4	53.9	21 21.0	+51.9	54.2	36
37	17 57.7	+48.4	51.6	18 34.9	+48.8	51.9	19 11.8	+49.4	52.1	19 48.5	+49.9	52.4	20 25.0	+50.3	52.7	21 01.2	+50.9	53.0	21 37.2	+51.3	53.3	22 12.9	+51.8	53.6	37
38	18 46.1	+48.2	51.0	19 23.7	+48.8	51.3	20 01.2	+49.2	51.5	20 38.4	+49.7	51.8	21 15.3	+50.3	52.1	21 52.1	+50.7	52.4	22 28.5	+51.2	52.8	23 04.7	+51.6	53.1	38
39	19 34.3	+48.1	50.4	20 12.5	+48.6	50.6	20 50.4	+49.1	50.9	21 28.1	+49.6	51.2	22 05.6	+50.1	51.5	22 42.8	+50.5	51.9	23 19.7	+51.0	52.2	23 56.3	+51.5	52.5	39
40	20 22.4	+48.0	49.7	21 01.1	+48.5	50.0	21 39.5	+49.0	50.3	22 17.7	+49.5	50.6	22 55.7	+49.9	50.9	23 33.3	+50.5	51.3	24 10.7	+51.0	51.6	24 47.8	+51.4	52.0	40
41	21 10.4	+47.8	49.1	21 49.6	+48.3	49.4	22 28.5	+48.8	49.7	23 07.2	+49.3	50.0	23 45.6	+49.8	50.3	24 23.8	+50.3	50.7	25 01.7	+50.7	51.0	25 39.2	+51.3	51.4	41
42	21 58.2	+47.6	48.4	22 37.9	+48.1	48.7	23 17.3	+48.7	49.1	23 56.5	+49.2	49.4	24 35.4	+49.7	49.7	25 14.1	+50.1	50.1	25 52.4	+50.7	50.5	26 30.5	+51.1	50.8	42
43	22 45.8	+47.5	47.8	23 26.0	+48.0	48.1	24 06.0	+48.5	48.4	24 45.7	+49.0	48.8	25 25.1	+49.5	49.1	26 04.2	+50.0	49.5	26 43.1	+50.5	49.9	27 21.6	+51.0	50.2	43
44	23 33.3	+47.4	47.1	24 14.0	+47.9	47.4	24 54.5	+48.3	47.8	25 34.7	+48.8	48.1	26 14.6	+49.4	48.5	26 54.2	+49.9	48.9	27 33.6	+50.3	49.2	28 12.6	+50.8	49.6	44
45	24 20.7	+47.1	46.4	25 01.9	+47.6	46.8	25 42.8	+48.2	47.1	26 23.5	+48.7	47.5	27 04.0	+49.1	47.8	27 44.1	+49.6	48.2	28 23.9	+50.1	48.6	29 03.4	+50.6	49.0	45
46	25 07.8	+46.9	45.8	25 49.5	+47.5	46.1	26 31.0	+48.0	46.4	27 12.2	+48.5	46.8	27 53.1	+49.0	47.2	28 33.7	+49.5	47.6	29 14.0	+50.0	48.0	29 54.0	+50.5	48.4	46
47	25 54.7	+46.8	45.1	26 37.0	+47.3	45.4	27 19.0	+47.8	45.8	28 00.7	+48.3	46.2	28 42.1	+48.8	46.5	29 23.2	+49.3	46.9	30 04.0	+49.8	47.4	30 44.5	+50.3	47.8	47
48	26 41.5	+46.5	44.4	27 24.3	+47.0	44.7	28 06.8	+47.5	45.1	28 49.0	+48.1	45.5	29 30.9	+48.6	45.9	30 12.5	+49.1	46.3	30 53.8	+49.6	46.7	31 34.8	+50.1	47.2	48
49	27 28.0	+46.4	43.7	28 11.3	+46.9	44.0	28 54.3	+47.4	44.4	29 37.1	+47.8	44.8	30 19.5	+48.4	45.2	31 01.6	+48.9	45.6	31 43.4	+49.4	46.1	32 24.9	+49.9	46.5	49
50	28 14.4	+46.1	42.9	28 58.2	+46.6	43.3	29 41.7	+47.1	43.7	30 24.9	+47.7	44.1	31 07.9	+48.1	44.5	31 50.5	+48.7	44.9	32 32.8	+49.2	45.4	33 14.8	+49.6	45.9	50
51	29 00.5	+45.8	42.2	29 44.8	+46.4	42.6	30 28.8	+46.9	43.0	31 12.6	+47.4	43.4	31 56.0	+47.9	43.8	32 39.2	+48.4	44.3	33 22.0	+48.9	44.7	34 04.4	+49.5	45.2	51
52	29 46.3	+45.6	41.5	30 31.2	+46.1	41.9	31 15.7	+46.7	42.3	32 00.0	+47.1	42.7	32 43.9	+47.7	43.1	33 27.6	+48.2	43.5	34 10.9	+48.7	44.0	34 53.9	+49.2	44.5	52
53	30 31.9	+45.4	40.7	31 17.3	+45.8	41.1	32 02.4	+46.3	41.5	32 47.1	+46.9	41.9	33 31.6	+47.4	42.4	34 15.8	+47.9	42.8	34 59.6	+48.5	43.3	35 43.1	+49.0	43.8	53
54	31 17.3	+45.1	40.0	32 03.1	+45.6	40.3	32 48.7	+46.1	40.8	33 34.0	+46.7	41.2	34 19.0	+47.2	41.6	35 03.7	+47.7	42.1	35 48.1	+48.2	42.6	36 32.1	+48.7	43.1	54
55	32 02.4	+44.7	39.2	32 48.7	+45.3	39.6	33 34.8	+45.9	40.0	34 20.7	+46.3	40.4	35 06.2	+46.8	40.9	35 51.4	+47.4	41.4	36 36.3	+47.9	41.8	37 20.8	+48.4	42.3	55
56	32 47.1	+44.5	38.4	33 34.0	+45.0	38.8	34 20.7	+45.5	39.2	35 07.0	+46.0	39.7	35 53.0	+46.6	40.1	36 38.8	+47.0	40.6	37 24.2	+47.6	41.1	38 09.2	+48.1	41.6	56
57	33 31.6	+44.2	37.6	34 19.0	+44.7	38.0	35 06.2	+45.2	38.4	35 53.0	+45.8	38.9	36 39.6	+46.2	39.3	37 25.8	+46.8	39.8	38 11.8	+47.3	40.3	38 57.3	+47.9	40.8	57
58	34 15.8	+43.8	36.8	35 03.7	+44.4	37.2	35 51.4	+44.9	37.6	36 38.8	+45.4	38.1	37 25.8	+46.0	38.5	38 12.6	+46.5	39.0	38 59.1	+46.9	39.5	39 45.2	+47.5	40.1	58
59	34 59.6	+43.5	35.9	35 48.1	+44.0	36.4	36 36.3	+44.5	36.8	37 24.2	+45.0	37.2	38 11.8	+45.6	37.7	38 59.1	+46.1	38.2	39 46.0	+46.7	38.8	40 32.7	+47.2	39.3	59
60	35 43.1	+43.1	35.1	36 32.1	+43.6	35.5	37 20.8	+44.1	36.0	38 09.2	+44.7	36.4	38 57.3	+45.3	36.9	39 45.2	+45.7	37.4	40 32.7	+46.3	37.9	41 19.9	+46.8	38.4	60
61	36 26.2	+42.8	34.2	37 15.7	+43.3	34.7	38 04.9	+43.8	35.1	38 53.9	+44.3	35.6	39 42.6	+44.8	36.0	40 30.9	+45.4	36.5	41 19.0	+45.9	37.1	42 06.7	+46.4	37.6	61
62	37 09.0	+42.4	33.4	37 59.0	+42.9	33.8	38 48.7	+43.4	34.2	39 38.2	+43.9	34.7	40 27.4	+44.4	35.2	41 16.3	+45.0	35.7	42 04.9	+45.5	36.2	42 53.1	+46.1	36.7	62
63	37 51.4	+41.9	32.5	38 41.9	+42.4	32.9	39 32.1	+43.0	33.3	40 22.1	+43.5	33.8	41 11.8	+44.0	34.3	42 01.3	+44.5	34.8	42 50.4	+45.1	35.3	43 39.2	+45.6	35.9	63
64	38 33.3	+41.5	31.6	39 24.3	+42.0	32.0	40 15.1	+42.5	32.4	41 05.6	+43.0	32.9	41 55.8	+43.6	33.4	42 45.8	+44.1	33.9	43 35.5	+44.6	34.4	44 24.8	+45.2	35.0	64
65	39 14.8	+41.1	30.8	40 06.3	+41.6	31.1	40 57.6	+42.1	31.5	41 48.6	+42.6	32.0	42 39.4	+43.1	32.4	43 29.9	+43.7	33.0	44 20.1	+44.2	33.5	45 10.0	+44.7	34.0	65
66	39 55.9	+40.6	29.7	40 47.9	+41.1	30.1	41 39.7	+41.6	30.5	42 31.2	+42.1	31.0	43 22.5	+42.7	31.5	44 13.6	+43.1	32.0	45 04.3	+43.7	32.5	45 54.7	+44.3	33.1	66
67	40 36.5	+40.1	28.7	41 29.0	+40.6	29.1	42 21.3	+41.1	29.6	43 13.3	+41.6	30.0	44 05.2	+42.1	30.5	44 56.7	+42.7	31.0	45 48.0	+43.2	31.5	46 39.0	+43.7	32.1	67
68	41 16.6	+39.6	27.7	42 09.6	+40.1	28.2	43 02.4	+40.5	28.6	43 54.9	+41.1	29.0	44 47.3	+41.6	29.5	45 39.4	+42.1	30.0	46 31.2	+42.6	30.5	47 22.7	+43.2	31.1	68
69	41 56.2	+39.0	26.7	42 49.7	+39.5	27.1	43 42.9	+40.1	27.6	44 36.0	+40.5	28.0	45 28.9	+41.0	28.5	46 21.5	+41.5	29.0	47 13.8	+42.1	29.5	48 05.9	+42.6	30.1	69
70	42 35.2	+38.5	25.7	43 29.2	+39.0	26.1	44 23.0	+39.4	26.5	45 16.5	+40.0	27.0	46 09.9	+40.4	27.5	47 03.0	+41.0	27.9	47 55.9	+41.5	28.5	48 48.5	+42.0	29.0	70
71	43 13.7	+37.9	24.7	44 08.2	+38.3	25.1	45 02.4	+38.9	25.5	45 56.5	+39.3	25.9	46 50.3	+39.9	26.4	47 44.0	+40.3	26.9	48 37.4	+40.8	27.4	49 30.5	+41.4	27.9	71
72	43 51.6	+37.3	23.6	44 46.5	+37.8	24.0	45 41.3	+38.2	24.4	46 35.8	+38.7	24.8	47 30.2	+39.1	25.3	48 24.3	+39.7	25.8	49 18.2	+40.2	26.3	50 11.9	+40.7	26.8	72
73	44 28.9	+36.7	22.5	45 24.3	+37.1	22.9	46 19.5	+37.5	23.3	47 14.5	+38.0	23.7	48 09.3	+38.5	24.2	49 04.0	+39.0	24.6	49 58.4	+39.5	25.1	50 52.6	+40.0	25.6	73
74	45 05.6	+36.0	21.4	46 01.4	+36.4	21.8	46 57.0	+36.9	22.1	47 52.5	+37.3	22.6	48 47.8	+37.8	23.0	49 43.0	+38.2	23.5	50 37.9	+38.8	23.9	51 32.6	+39.3	24.4	74
75	45 41.6	+35.3	20.2	46 37.8	+35.7	20.6	47 33.9	+36.1	21.0	48 29.8	+36.6	21.4	49 25.6	+37.1	21.8	50 21.2	+37.5	22.3	51 16.7	+38.0	22.7	52 11.9	+38.5	23.2	75
76	46 16.9	+34.5	19.1	47 13.5	+35.0	19.4	48 10.0	+35.4	19.8	49 06.4	+35.8	20.2	50 02.7	+36.2	20.6	50 58.7	+36.7	21.0	51 54.7	+37.1	21.5	52 50.4	+37.7	22.0	76
77	46 51.4	+33.8	17.9	47 48.5	+34.2	18.2	48 45.4	+34.6	18.6	49 42.2	+35.0	18.9	50 38.9	+35.4	19.3	51 35.4	+35.9	19.8	52 31.8	+36.4	20.2	53 28.1	+36.8	20.7	77
78	47 25.2	+33.1	16.7	48 22.7	+33.4	17.0	49 20.0	+33.8	17.3	50 17.2	+34.2	17.7	51 14.3	+34.6	18.1	52 11.3	+35.1	18.5	53 08.2	+35.4	18.9	54 04.9	+35.8	19.3	78
79	47 58.3	+32.2	15.4	48 56.1	+32.5	15.7	49 53.8	+32.9	16.1	50 51.4	+33.3	16.4	51 48.9	+33.7	16.7	52 46.3	+34.1	17.1	53 43.6	+34.5	17.5	54 40.7	+34.9	17.9	79
80	48 30.5	+31.4	14.2	49 28.6	+31.7	14.4	50 26.7	+32.0	14.7	51 24.7	+32.3	15.1	52 22.6	+32.7	15.4	53 20.4	+33.1	15.8	54 18.1	+33.5	16.1	55 15.6	+33.9	16.5	80
81	49 01.9	+30.4	12.9	50 00.3	+30.8	13.1	50 58.7	+31.1	13.4	51 57.0	+31.5	13.7	52 55.3	+31.7	14.0	53 53.5	+32.1	14.3	54 51.6	+32.4	14.7	55 49.5	+32.9	15.1	81
82	49 32.3	+29.6	11.5	50 31.1	+29.8	11.8	51 29.8	+30.1	12.0	52 28.5	+30.4	12.3	53 27.0	+30.8	12.6	54 25.6	+31.0	12.9	55 24.0	+31.4	13.2	56 22.4	+31.7	13.6	82
83	50 01.9	+28.6	10.2	51 00.9	+28.9	10.4	51 59.9	+29.1	10.6	52 58.9	+29.3	10.9	53 57.8	+29.6	11.2	54 56.6	+29.9	11.4	55 55.4	+30.2	11.7	56 54.1	+30.5	12.0	83
84	50 30.5	+27.6	9.0	51 29.8	+27.8	9.2	52 29.0	+28.1	9.2	53 28.2	+28.3	9.4	54 27.4	+28.5	9.7	55 26.5	+28.8	9.9	56 25.6	+29.0	10.2	57 24.6	+29.3	10.4	84
85	50 58.1	+26.6	7.4	51 57.6	+26.8	7.6	52 57.1	+26.9	7.8	53 56.5	+27.1	7.9	54 55.9	+27.3	8.1	55 55.3	+27.5	8.3	56 54.6	+27.8	8.6	57 53.9	+28.1	8.8	85
86	51 24.7	+25.5	6.0	52 24.4	+25.6	6.1	53 24.0	+25.8	6.3	54 23.6	+26.0	6.4	55 23.2	+26.2	6.6	56 22.8	+26.3	6.8	57 22.4	+26.5	6.9	58 22.0	+26.6	7.1	86
87	51 50.2	+24.4	4.5	52 50.0	+24.5	4.6	53 49.8	+24.6	4.7	54 49.6	+24.7	4.9	55 49.4	+24.8	5.0	56 49.1	+25.0	5.1	57 48.9	+25.1	5.3	58 48.6	+25.3	5.4	87
88	52 14.6	+23.3	3.1	53 14.5	+23.4	3.1	54 14.4	+23.5	3.2	55 14.3	+23.5	3.3	56 14.2	+23.6	3.4	57 14.1	+23.7	3.5	58 14.0	+23.7	3.5	59 13.9	+23.8	3.7	88
89	52 37.9	+22.1	1.5	53 37.9	+22.1	1.6	54 37.9	+22.1	1.6	55 37.8	+22.2	1.7	56 37.8	+22.2	1.7	57 37.8	+22.2	1.7	58 37.7	+22.3	1.8	59 37.7	+22.3	1.8	89
90	53 00.0	+20.9	0.0	54 00.0	+20.9	0.0	55 00.0	+20.8	0.0	56 00.0	+20.8	0.0	57 00.0	+20.8	0.0	58 00.0	+20.8	0.0	59 00.0	+20.7	0.0	60 00.0	+20.7	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	11 52.7	+48.9	106.2	11 35.8	+49.6	106.4	11 18.8	+50.1	106.6	11 01.6	+50.6	106.8	10 44.1	+51.2	107.0	10 26.5	+51.7	107.2	10 08.7	+52.3	107.3	9 50.8	+52.7	107.5	0
1	12 41.6	+48.9	105.6	12 25.4	+49.4	105.6	12 08.9	+50.0	106.0	11 52.2	+50.6	106.2	11 35.3	+51.2	106.4	11 18.2	+51.7	106.6	11 01.0	+52.1	106.8	10 43.5	+52.7	107.0	1
2	13 30.5	+48.7	105.0	13 14.8	+49.4	105.2	12 58.9	+50.0	105.5	12 42.8	+50.5	105.7	12 26.5	+51.0	105.9	12 09.9	+51.6	106.1	11 53.1	+52.2	106.3	11 36.2	+52.6	106.5	2
3	14 19.2	+48.7	104.4	14 04.2	+49.3	104.7	13 48.9	+49.8	104.9	13 33.3	+50.5	105.1	13 17.5	+51.0	105.4	13 01.5	+51.5	105.6	12 45.3	+52.0	105.8	12 28.8	+52.6	106.0	3
4	15 07.9	+48.6	103.8	14 53.5	+49.1	104.1	14 38.7	+49.8	104.3	14 23.8	+50.3	104.6	14 08.5	+50.9	104.8	13 53.0	+51.5	105.1	13 37.3	+52.0	105.3	13 21.4	+52.5	105.5	4
5	15 56.5	+48.5	103.2	15 42.6	+49.1	103.5	15 28.5	+49.7	103.8	15 14.1	+50.3	104.0	14 59.4	+50.9	104.3	14 44.5	+51.4	104.5	14 29.3	+52.0	104.8	14 13.9	+52.4	105.0	5
6	16 45.0	+48.3	102.6	16 31.7	+49.0	102.9	16 18.2	+49.6	103.2	16 04.4	+50.2	103.5	15 50.3	+50.8	103.7	15 35.9	+51.3	104.0	15 21.3	+51.8	104.3	15 06.3	+52.4	104.5	6
7	17 33.3	+48.3	102.3	17 20.7	+48.9	102.3	17 07.8	+49.5	102.6	16 54.6	+50.1	102.9	16 41.1	+50.6	103.2	16 27.2	+51.3	103.5	16 13.1	+51.8	103.7	15 58.7	+52.3	104.0	7
8	18 21.6	+48.1	101.3	18 09.6	+48.8	101.7	17 57.3	+49.4	102.0	17 44.7	+50.0	102.3	17 31.7	+50.6	102.6	17 18.5	+51.1	102.9	17 04.9	+51.7	103.2	16 51.0	+52.3	103.5	8
9	19 09.7	+48.0	100.7	18 58.4	+48.6	101.1	18 46.7	+49.3	101.4	18 34.7	+49.8	101.7	18 22.3	+50.5	102.0	18 09.6	+51.1	102.4	17 56.6	+51.6	102.7	17 43.3	+52.1	103.0	9
10	19 57.7	+47.8	100.1	19 47.0	+48.5	100.4	19 36.0	+49.1	100.8	19 24.5	+49.8	101.1	19 12.8	+50.3	101.5	19 00.7	+50.9	101.8	18 48.2	+51.5	102.2	18 35.4	+52.1	102.5	10
11	20 45.5	+47.7	99.4	20 35.5	+48.4	99.8	20 25.1	+49.0	100.2	20 14.3	+49.7	100.5	20 03.1	+50.3	100.9	19 51.6	+50.9	101.3	19 39.7	+51.4	101.6	19 27.5	+51.9	102.0	11
12	21 33.2	+47.6	98.8	21 23.9	+48.2	99.2	21 14.1	+48.9	99.6	21 04.0	+49.5	99.9	20 53.4	+50.1	100.3	20 42.5	+50.7	100.7	20 31.1	+51.4	101.1	20 19.4	+51.9	101.4	12
13	22 20.8	+47.4	98.1	22 12.1	+48.1	98.5	22 03.0	+48.7	98.9	21 53.5	+49.4	99.3	21 43.5	+50.0	99.7	21 33.2	+50.6	100.1	21 22.5	+51.2	100.5	21 11.3	+51.8	100.9	13
14	23 08.2	+47.2	97.5	23 00.2	+47.9	97.9	22 51.7	+48.6	98.3	22 42.9	+49.2	98.7	22 33.5	+49.9	99.1	22 23.8	+50.5	99.5	22 13.7	+51.0	99.9	22 03.1	+51.7	100.3	14
15	23 55.4	+47.1	96.8	23 48.1	+47.8	97.2	23 40.3	+48.5	97.7	23 32.1	+49.1	98.1	23 23.4	+49.8	98.5	23 14.3	+50.4	99.0	23 04.7	+51.0	99.4	22 54.8	+51.5	99.8	15
16	24 42.5	+46.8	96.1	24 35.9	+47.5	96.6	24 28.8	+48.2	97.0	24 21.2	+48.9	97.5	24 13.2	+49.5	97.9	24 04.7	+50.2	98.4	23 55.7	+50.8	98.8	23 46.3	+51.4	99.2	16
17	25 29.3	+46.7	95.4	25 23.4	+47.4	95.9	25 17.0	+48.1	96.4	25 10.1	+48.8	96.8	25 02.7	+49.5	97.3	24 54.9	+50.1	97.8	24 46.5	+50.7	98.2	24 37.7	+51.3	98.7	17
18	26 16.0	+46.5	94.7	26 10.8	+47.2	95.2	26 05.1	+47.9	95.7	25 58.9	+48.6	96.2	25 52.2	+49.2	96.7	25 45.0	+49.9	97.1	25 37.2	+50.6	97.6	25 29.0	+51.2	98.1	18
19	27 02.5	+46.2	94.0	26 58.0	+47.0	94.5	26 53.0	+47.7	95.0	26 47.5	+48.4	95.5	26 41.4	+49.1	96.0	26 34.9	+49.7	96.5	26 27.8	+50.4	97.0	26 20.2	+51.0	97.5	19
20	27 48.7	+46.0	93.3	27 45.0	+46.8	93.8	27 40.7	+47.5	94.3	27 35.9	+48.2	94.9	27 30.5	+48.9	95.4	27 24.6	+49.6	95.9	27 18.2	+50.2	96.4	27 11.2	+50.9	96.9	20
21	28 34.7	+45.8	92.6	28 31.8	+46.5	93.1	28 28.2	+47.3	93.7	28 24.1	+48.0	94.2	28 19.4	+48.7	94.7	28 14.2	+49.4	95.3	28 08.4	+50.1	95.8	28 02.1	+50.7	96.3	21
22	29 20.5	+45.5	91.8	29 18.3	+46.3	92.4	29 15.5	+47.1	93.0	29 12.1	+47.8	93.5	29 08.2	+48.5	94.1	29 03.6	+49.2	94.6	28 58.5	+49.9	95.2	28 52.8	+50.5	95.7	22
23	30 06.0	+45.3	91.1	30 04.6	+46.1	91.7	30 02.6	+46.8	92.2	29 59.9	+47.6	92.8	29 56.7	+48.3	93.4	29 52.8	+49.1	94.0	29 48.4	+49.7	94.5	29 43.3	+50.4	95.1	23
24	30 51.3	+45.0	90.3	30 50.7	+45.8	90.9	30 49.4	+46.6	91.5	30 47.5	+47.4	92.1	30 45.0	+48.1	92.7	30 41.9	+48.8	93.3	30 38.1	+49.5	93.9	30 33.7	+50.2	94.5	24
25	31 36.3	+44.7	89.5	31 36.5	+45.5	90.2	31 36.0	+46.3	90.8	31 34.9	+47.1	91.4	31 33.1	+47.8	92.0	31 30.7	+48.6	92.6	31 27.6	+49.3	93.2	31 23.9	+50.0	93.8	25
26	32 21.0	+44.5	88.8	32 22.0	+45.3	89.4	32 22.3	+46.1	90.0	32 22.0	+46.8	90.7	32 20.9	+47.6	91.3	32 19.3	+48.3	91.9	32 16.9	+49.1	92.6	32 13.9	+49.8	93.2	26
27	33 05.5	+44.1	88.0	33 07.3	+44.9	88.6	33 08.4	+45.7	89.3	33 08.8	+46.6	89.9	33 08.5	+47.4	90.6	33 07.6	+48.1	91.2	33 06.0	+48.8	91.9	33 03.7	+49.6	92.5	27
28	33 49.6	+43.8	87.1	33 52.2	+44.7	87.8	33 54.1	+45.5	88.5	33 55.4	+46.3	89.2	33 55.9	+47.1	89.8	33 55.7	+47.9	90.5	33 54.8	+48.7	91.2	33 53.3	+49.3	91.8	28
29	34 33.4	+43.4	86.3	34 36.9	+44.3	87.0	34 39.6	+45.2	87.7	34 41.7	+46.0	88.4	34 43.0	+46.8	89.1	34 43.6	+47.6	89.8	34 43.5	+48.3	90.5	34 42.6	+49.1	91.2	29
30	35 16.8	+43.1	85.5	35 21.2	+43.9	86.2	35 24.8	+44.8	86.9	35 27.7	+45.7	87.6	35 29.8	+46.5	88.3	35 31.2	+47.3	89.0	35 31.8	+48.1	89.7	35 31.7	+48.9	90.5	30
31	35 59.9	+42.7	84.6	36 05.1	+43.7	85.3	36 09.6	+44.5	86.1	36 13.4	+45.3	86.8	36 16.3	+46.2	87.5	36 18.5	+47.0	88.3	36 19.9	+47.9	89.0	36 20.6	+48.6	89.7	31
32	36 42.6	+42.3	83.8	36 48.8	+43.2	84.5	36 54.1	+44.2	85.2	36 58.7	+45.0	86.0	37 02.5	+45.9	86.7	37 05.5	+46.7	87.5	37 07.8	+47.5	88.3	37 09.2	+48.3	89.0	32
33	37 24.9	+42.0	82.9	37 32.0	+42.9	83.6	37 38.3	+43.7	84.4	37 43.7	+44.7	85.2	37 48.4	+45.5	85.9	37 52.2	+46.4	86.7	37 55.3	+47.2	87.5	37 57.5	+48.1	88.3	33
34	38 06.9	+41.5	82.0	38 14.9	+42.4	82.7	38 22.0	+43.4	83.5	38 28.4	+44.3	84.3	38 33.9	+45.2	85.1	38 38.6	+46.1	85.9	38 42.5	+46.9	86.7	38 45.6	+47.7	87.5	34
35	38 48.4	+41.0	81.0	38 57.3	+42.0	81.8	39 05.4	+43.0	82.6	39 12.7	+43.9	83.4	39 19.1	+44.8	84.3	39 24.7	+45.7	85.1	39 29.4	+46.6	85.9	39 33.3	+47.4	86.7	35
36	39 29.4	+40.6	80.1	39 39.3	+41.6	80.9	39 48.4	+42.5	81.7	39 56.6	+43.5	82.6	40 03.9	+44.4	83.4	40 10.4	+45.3	84.2	40 16.0	+46.2	85.1	40 20.7	+47.1	85.9	36
37	40 10.0	+40.1	79.1	40 20.9	+41.1	80.0	40 30.9	+42.1	80.8	40 40.1	+43.0	81.7	40 48.3	+44.0	82.5	40 55.7	+44.9	83.4	41 02.2	+45.8	84.2	41 07.8	+46.7	85.1	37
38	40 50.1	+39.6	78.2	41 02.0	+40.6	79.0	41 13.0	+41.6	79.9	41 23.1	+42.6	80.7	41 32.3	+43.6	81.6	41 40.6	+44.5	82.5	41 48.0	+45.4	83.4	41 54.5	+46.3	84.3	38
39	41 29.7	+39.1	77.2	41 42.6	+40.1	78.0	41 54.6	+41.1	78.9	42 05.7	+42.1	79.8	42 15.9	+43.1	80.7	42 25.1	+44.1	81.6	42 33.4	+45.1	82.5	42 40.8	+46.0	83.4	39
40	42 08.8	+38.5	76.1	42 22.7	+39.6	77.0	42 35.7	+40.6	77.9	42 47.8	+41.7	78.8	42 59.0	+42.6	79.7	43 09.2	+43.6	80.7	43 18.5	+44.6	81.6	43 26.8	+45.5	82.5	40
41	42 47.3	+38.0	75.1	43 02.3	+39.0	76.0	43 16.3	+40.1	76.9	43 29.5	+41.1	77.8	43 41.6	+42.1	78.8	43 52.8	+43.2	79.7	44 03.1	+44.1	80.7	44 12.3	+45.1	81.6	41
42	43 25.3	+37.3	74.0	43 41.3	+38.4	75.0	43 56.4	+39.5	75.9	44 10.6	+40.5	76.8	44 23.7	+41.7	77.8	44 36.0	+42.6	78.7	44 47.2	+43.6	79.7	44 57.4	+44.6	80.7	42
43	44 02.6	+36.7	73.0	44 19.7	+37.8	73.9	44 35.9	+38.9	74.8	44 51.1	+40.0	75.8	45 05.4	+41.0	76.8	45 18.6	+42.1	77.7	45 30.8	+43.1	78.7	45 42.0	+44.2	79.7	43
44	44 39.3	+36.1	71.9	44 57.5	+37.2	72.8	45 14.8	+38.3	73.8	45 31.1	+39.4	74.7	45 46.4	+40.5	75.7	46 00.7	+41.5	76.7	46 13.9	+42.6	77.7	46 26.2	+43.6	78.8	44
45	45 15.4	+35.4	70.7	45 34.7	+36.5	71.7	45 53.1	+37.6	72.7	46 10.5	+38.7	73.7	46 26.9	+39.8	74.7	46 42.2	+41.0	75.7	46 56.5	+42.1	76.7	47 09.8	+43.1	77.8	45
46	45 50.8	+34.7	69.6	46 11.2	+35.9	70.5	46 30.7	+37.0	71.5	46 49.2	+38.1	72.5	47 06.7	+39.3	73.6	47 23.2	+40.3	74.6	47 38.6	+41.4	75.7	47 52.9	+42.5	76.7	46
47	46 25.5	+33.9	68.4	46 47.1	+35.1	69.4	47 07.7	+36.3	70.4	47 27.3	+37.5	71.4	47 46.0	+38.5	72.4	48 03.5	+39.7	73.5	48 20.0	+40.8	74.6	48 35.4	+41.9	75.7	47
48	46 59.4	+33.1	67.2	47 22.2	+34.3	68.2	47 44.0	+35.5	69.2	48 04.8	+36.6	70.2	48 24.5	+37.9	71.3	48 43.2	+39.0	72.4	49 00.8	+40.2	73.5	49 17.3	+41.3	74.6	48
49	47 32.5	+32.4	66.0	47 56.5	+33.6	67.0	48 19.5	+34.7	68.0	48 41.4	+36.0	69.1	49 02.4	+37.1	70.1	49 22.2	+38.3	71.2	49 41.0	+39.5	72.3	49 58.6	+40.7	73.5	49
50	48 04.9	+31.5	64.7	48 30.1	+32.7	65.7	48 54.2	+33.9	66.8	49 17.4	+35.1	67.8	49 39.5	+36.3	68.9	50 00.5	+37.6	70.0	50 20.5	+38.7	71.2	50 39.3	+39.9	72.3	50
51	48 36.4	+30.7	63.4	49 02.8	+31.8	64.5	49 28.2	+33.0	65.5	49 52.5	+34.3	66.6	50 15.8	+35.6	67.7	50 38.1	+36.7	68.8	50 59.2	+38.0	70.0	51 19.2	+39.2	71.1	51
52	49 07.1	+29.7	62.1	49 34.6	+31.0	63.2	50 01.2	+32.3	64.2	50 26.8	+33.5	65.3	50 51.4	+34.7	66.4	51 14.8	+36.0	67.6	51 37.2	+37.2	68.7	51 58.4	+38.4	69.9	52
53	49 36.8	+28.8	60.8	50 05.6	+30.1	61.8	50 33.5	+31.3	62.9	51 00.3	+32.5	64.0	51 26.1	+33.8	65.1	51 50.8	+35.0	66.3	52 14.4	+36.3	67.4	52 36.8	+37.6	68.6	53
54	50 05.6	+27.9	59.4	50 35.7	+29.1	60.5	51 04.8	+30.3	61.5	51 32.8	+31.7	62.6	51 59.9	+32.9	63.8	52 25.8	+34.2	64.9	52 50.7	+35.4	66.1	53 14.4	+36.7	67.4	54
55	50 33.5	+26.8	58.0	51 04.8	+28.0	59.1	51 35.1	+29.4	60.2	52 04.5	+30.6	61.3	52 32.8	+31.9	62.4	53 00.0	+33.2	63.6	53 26.1	+34.5	64.8	53 51.1	+35.8	66.0	55
56	51 00.3	+25.8	56.6	51 32.8	+27.1	57.7	52 04.5	+28.3	58.8	52 35.1	+29.6	59.9	53 04.7	+30.9	61.0	53 33.2	+32.2	62.2	54 00.6	+33.6	63.4	54 26.9	+34.9	64.7	56
57	51 26.1	+24.7	55.2	51 59.9	+25.9	56.2	52 32.8	+27.2	57.3	53 04.7	+28.5	58.4	53 35.6	+29.8	59.6	54 05.4	+31.2	60.8	54 34.2	+32.5	62.0	55 01.8	+33.8	63.2	57
58	51 50.8	+23.6	53.7	52 25.8	+24.9	54.8	53 00.0	+26.1	55.8	53 33.2	+27.4	57.0	54 05.4	+28.8	58.1	54 36.6	+30.1	59.3	55 06.7	+31.4	60.5	55 35.6	+32.8	61.8	58
59	52 14.4	+22.4	52.2	52 50.7	+23.7	53.3	53 26.1	+24.9	54.3	54 00.6	+26.3	55.4	54 34.2	+27.6	56.6	55 06.7	+28.9	57.8	55 38.1	+30.3	59.0	56 08.4	+31.7	60.3	59
60	52 36.8	+21.2	50.7	53 14.4	+22.5	51.7	53 51.1	+23.8	52.8	54 26.9	+25.1	53.9	55 01.8	+26.4	55.1	55 35.6	+27.8	56.3	56 08.4	+29.2	57.5	56 40.1	+30.5	58.8	60
61	52 58.0	+20.1	49.1	53 36.9	+21.2	50.2	54 14.9	+22.5	51.2	54 52.0	+23.8	52.3	55 28.2	+25.1	53.5	56 03.4	+26.5	54.7	56 37.6	+27.8	55.9	57 10.6	+29.3	57.2	61
62	53 18.1	+18.7	47.6	53 58.1	+20.0	48.6	54 37.4	+21.3	49.6	55 15.8	+22.6	50.7	55 53.3	+23.9	51.9	56 29.9	+25.2	53.1	57 05.4	+26.7	54.3	57 39.9	+28.0	55.6	62
63	53 36.8	+17.5	46.0	54 18.1	+18.7	47.0	54 58.7	+19.9	48.0	55 38.4	+21.2	49.1	56 17.2	+22.6	50.2	56 55.1	+23.9	51.4	57 32.1	+25.2	52.6	58 07.9	+26.7	53.9	63
64	53 54.3	+16.1	44.4	54 36.8	+17.4	45.3	55 18.6	+18.6	46.4	55 59.6	+19.9	47.4	56 39.8	+21.1	48.6	57 19.0	+22.5	49.7	57 57.3	+23.9	50.9	58 34.6	+25.3	52.2	64
65	54 10.4	+14.8	42.7	54 54.2	+15.9	43.7	55 37.2	+17.2	44.7	56 19.5	+18.4	45.7	57 00.9	+19.8	46.8	57 41.5	+21.1	48.0	58 21.2	+22.5	49.2	58 59.9	+23.9	50.4	65
66	54 25.2	+13.4	41.1	55 10.1	+14.6	42.0	55 54.4	+15.8	43.0	56 37.9	+17.0	44.0	57 20.7	+18.2	45.1	58 02.6	+19.6	46.2	58 43.7	+20.9	47.4	59 23.8	+22.3	48.7	66
67	54 38.6	+12.0	39.4	55 24.7	+13.1	40.3	56 10.2	+14.2	41.3	56 54.9	+15.5	42.3	57 38.9	+16.8	43.3	58 22.2	+18.0	44.4	59 04.6	+19.4	45.6	59 46.1	+20.8	46.8	67
68	54 50.6	+10.6	37.7	55 37.8	+11.7	38.6	56 24.4	+12.8	39.5	57 10.4	+14.0	40.5	57 55.7	+15.2	41.5	58 40.2	+16.5	42.6	59 23.4	+17.8	43.8	60 06.9	+19.1	44.9	68
69	55 01.2	+9.1	36.0	55 49.5	+10.2	36.8	56 37.2	+11.3	37.7	57 24.4	+12.4	38.7	58 10.9	+13.6	39.7	58 56.7	+14.9	40.8	59 41.8	+16.1	41.9	60 26.0	+17.5	43.0	69
70	55 10.3	+7.7	34.2	55 59.7	+8.6	35.1	56 48.5	+9.7	36.0	57 36.8	+10.8	36.9	58 24.5	+12.0	37.8	59 11.6	+13.1	38.9	59 57.9	+14.5	39.9	60 43.5	+15.8	41.1	70
71	55 18.0	+6.1	32.5	56 08.3	+7.2	33.3	56 58.2	+8.2	34.1	57 47.6	+9.3	35.0	58 36.5	+10.3	36.0	59 24.7	+11.5	37.0	60 12.4	+12.7	38.0	60 59.3	+14.0	39.1	71
72	55 24.1	+4.6	30.8	56 15.5	+5.5	31.5	57 06.4	+6.5	32.3	57 56.9	+7.5	33.2	58 46.8	+8.7	34.1	59 36.2	+9.8	35.0	60 25.1	+10.9	36.0	61 13.3	+12.1	37.1	72
73	55 28.7	+3.2	29.0	56 21.0	+4.0	29.7	57 12.9	+5.0	30.5	58 04.4	+6.0	31.3	58 55.5	+6.9	32.2	59 46.0	+8.0	33.1	60 36.0	+9.1	34.0	61 25.4	+10.3	35.1	73
74	55 31.9	+1.6	27.2	56 25.0	+2.5	27.9	57 17.9	+3.3	28.6	58 10.3	+4.3	29.4	59 02.4	+5.2	30.2	59 54.0	+6.2	31.1	60 45.1	+7.3	32.0	61 35.7	+8.5	33.0	74
75	55 33.5	0.0	25.5	56 27.5	+0.8	26.1	57 21.2	+1.7	26.8	58 14.6	+2.5	27.5	59 07.6	+3.5	28.3	60 00.2	+4.5	29.1	60 52.4	+5.5	30.0	61 44.2	+6.6	30.9	75
76	55 33.5	−1.4	23.7	56 28.3	−0.7	24.3	57 22.9	0.0	24.9	58 17.1	+0.9	25.6	59 11.1	+1.7	26.3	60 04.7	+2.6	27.1	60 57.9	+3.5	27.9	61 50.7	+4.6	28.8	76
77	55 32.1	−3.0	21.9	56 27.6	−2.3	22.5	57 22.9	−1.5	23.1	58 18.0	−0.8	23.7	59 12.8	0.0	24.4	60 07.3	+0.8	25.1	61 01.4	+1.7	25.9	61 55.3	+2.6•	26.7	77
78	55 29.1	−4.5	20.2	56 25.3	−3.8	20.7	57 21.4	−3.2	21.2	58 17.2	−2.5	21.8	59 12.8	−1.8	22.4	60 08.1	−1.0	23.1	61 03.1	−0.2	23.8	61 57.9	+0.6	24.6	78
79	55 24.6	−6.0	18.4	56 21.5	−5.5	18.9	57 18.1	−4.8	19.4	58 14.7	−4.3	19.9	59 11.0	−3.6	20.5	60 07.1	−2.9	21.1	61 02.9	−2.1	21.7	61 58.5	−1.3	22.4	79
80	55 18.6	−7.5	16.7	56 16.0	−7.0	17.1	57 13.3	−6.4	17.5	58 10.4	−5.8	18.0	59 07.4	−5.3	18.5	60 04.2	−4.7	19.1	61 00.8	−4.0	19.7	61 57.2	−3.3	20.3	80
81	55 11.1	−9.0	14.9	56 09.0	−8.5	15.3	57 06.9	−8.1	15.7	58 04.6	−7.6	16.1	59 02.1	−7.0	16.6	59 59.5	−6.4	17.1	60 56.8	−5.8	17.6	61 53.9	−5.2	18.2	81
82	55 02.1	−10.4	13.2	56 00.5	−10.0	13.5	56 58.8	−9.6	13.9	57 57.0	−9.1	14.3	58 55.1	−8.7	14.7	59 53.1	−8.2	15.1	60 51.0	−7.8	15.6	61 48.7	−7.2	16.1	82
83	54 51.7	−11.9	11.5	55 50.5	−11.5	11.8	56 49.2	−11.2	12.1	57 47.8	−10.8	12.4	58 46.4	−10.4	12.8	59 44.9	−10.0	13.1	60 43.2	−9.5	13.5	61 41.5	−9.1	14.0	83
84	54 39.8	−13.2	9.8	55 39.0	−13.0	10.0	56 38.0	−12.7	10.3	57 37.0	−12.4	10.6	58 36.0	−12.1	10.8	59 34.9	−11.7	11.2	60 33.7	−11.3	11.5	61 32.4	−11.0	11.9	84
85	54 26.6	−14.7	8.1	55 26.0	−14.5	8.3	56 25.3	−14.2	8.5	57 24.6	−13.9	8.7	58 23.9	−13.7	9.0	59 23.2	−13.4	9.3	60 22.4	−13.2	9.5	61 21.5	−12.8	9.8	85
86	54 11.9	−16.0	6.4	55 11.5	−15.8	6.6	56 11.1	−15.7	6.8	57 10.7	−15.5	6.9	58 10.2	−15.2	7.1	59 09.8	−15.1	7.3	60 09.2	−14.8	7.6	61 08.7	−14.6	7.8	86
87	53 55.9	−17.4	4.8	54 55.7	−17.3	4.9	55 55.4	−17.1	5.0	56 55.2	−17.0	5.2	57 55.0	−16.9	5.3	58 54.7	−16.7	5.5	59 54.4	−16.5	5.6	60 54.1	−16.3	5.8	87
88	53 38.5	−18.6	3.2	54 38.4	−18.5	3.2	55 38.3	−18.4	3.3	56 38.2	−18.4	3.4	57 38.1	−18.3	3.5	58 38.0	−18.2	3.6	59 37.9	−18.2	3.7	60 37.8	−18.1	3.8	88
89	53 19.9	−19.9	1.6	54 19.9	−19.9	1.6	55 19.9	−19.9	1.7	56 19.8	−19.8	1.7	57 19.8	−19.8	1.7	58 19.8	−19.8	1.8	59 19.7	−19.7	1.8	60 19.7	−19.7	1.9	89
90	53 00.0	−21.1	0.0	54 00.0	−21.2	0.0	55 00.0	−21.2	0.0	56 00.0	−21.2	0.0	57 00.0	−21.2	0.0	58 00.0	−21.3	0.0	59 00.0	−21.3	0.0	60 00.0	−21.3	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 70°, 290°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	11 52.7	−49.0	106.2	11 35.8	−49.5	106.4	11 18.8	−50.2	106.6	11 01.6	−50.7	106.8	10 44.1	−51.2	107.0	10 26.5	−51.7	107.2	10 08.7	−52.2	107.3	9 50.8	−52.8	107.5	0
1	11 03.7	−49.1	106.8	10 46.3	−49.7	107.0	10 28.6	−50.2	107.2	10 10.9	−50.8	107.3	9 52.9	−51.3	107.5	9 34.8	−51.8	107.7	9 16.5	−52.3	107.8	8 58.0	−52.8	108.0	1
2	10 14.6	−49.1	107.4	9 56.6	−49.7	107.6	9 38.4	−50.2	107.7	9 20.1	−50.8	107.9	9 01.6	−51.3	108.0	8 43.0	−51.9	108.2	8 24.2	−52.4	108.3	8 05.2	−52.8	108.5	2
3	9 25.5	−49.2	108.0	9 06.9	−49.8	108.1	8 48.2	−50.3	108.3	8 29.3	−50.9	108.4	8 10.3	−51.4	108.6	7 51.1	−51.9	108.7	7 31.8	−52.4	108.8	7 12.4	−52.8	108.9	3
4	8 36.3	−49.2	108.5	8 17.1	−49.8	108.7	7 57.9	−50.4	108.8	7 38.4	−50.9	109.0	7 18.9	−51.4	109.1	6 59.2	−51.9	109.2	6 39.4	−52.4	109.3	6 19.6	−52.9	109.4	4
5	7 47.1	−49.3	109.1	7 27.3	−49.8	109.2	7 07.5	−50.4	109.4	6 47.5	−50.9	109.5	6 27.5	−51.5	109.6	6 07.3	−51.9	109.7	5 47.0	−52.4	109.8	5 26.7	−52.9	109.9	5
6	6 57.8	−49.4	109.7	6 37.5	−49.9	109.8	6 17.1	−50.4	109.9	5 56.6	−50.9	110.0	5 36.0	−51.4	110.1	5 15.4	−52.0	110.2	4 54.6	−52.5	110.3	4 33.8	−53.0	110.4	6
7	6 08.4	−49.3	110.3	5 47.6	−49.9	110.5	5 26.7	−50.5	110.5	5 05.7	−51.0	110.6	4 44.6	−51.5	110.6	4 23.4	−52.0	110.7	4 02.1	−52.4	110.8	3 40.8	−52.9	110.9	7
8	5 19.1	−49.4	110.8	4 57.7	−50.0	110.9	4 36.2	−50.5	111.0	4 14.7	−51.0	111.1	3 53.1	−51.5	111.1	3 31.4	−52.0	111.2	3 09.7	−52.5	111.3	2 47.9	−53.0	111.3	8
9	4 29.7	−49.5	111.4	4 07.7	−49.9	111.5	3 45.7	−50.5	111.5	3 23.7	−51.1	111.6	3 01.6	−51.6	111.7	2 39.4	−52.0	111.7	2 17.2	−52.5	111.7	1 54.9	−52.9	111.8	9
10	3 40.2	−49.4	112.0	3 17.8	−50.0	112.0	2 55.2	−50.5	112.1	2 32.6	−51.0	112.1	2 10.0	−51.5	112.2	1 47.4	−52.1	112.2	1 24.7	−52.5	112.2	1 02.0	−53.0	112.2	10
11	2 50.8	−49.5	112.5	2 27.8	−50.0	112.6	2 04.7	−50.5	112.6	1 41.6	−51.0	112.7	1 18.5	−51.6	112.7	0 55.3	−52.0	112.7	0 32.2	−52.5	112.7	0 09.0	−52.9	112.7	11
12	2 01.3	−49.4	113.1	1 37.8	−50.0	113.1	1 14.2	−50.6	113.2	0 50.6	−51.1	113.2	0 26.9	−51.5	113.2	0 03.3	−52.0	113.2	0 20.3	+52.5	66.8	0 43.9	+53.0	66.8	12
13	1 11.9	−49.5	113.7	0 47.8	−50.1	113.7	0 23.6	−50.5	113.7	0 00.5	+51.0	66.3	0 24.6	+51.5	66.3	0 48.7	+52.0	66.3	1 12.8	+52.5	66.3	1 36.9	+53.0	66.3	13
14	0 22.4	−49.5	114.2	0 02.3	+50.0	65.8	0 26.9	+50.5	65.8	0 51.5	+51.1	65.8	1 16.1	+51.6	65.8	1 40.7	+52.1	65.8	2 05.3	+52.5	65.8	2 29.4	+52.9	65.9	14
15	0 27.1	+49.5	65.2	0 52.3	+50.0	65.2	1 17.4	+50.6	65.2	1 42.6	+51.0	65.2	2 07.7	+51.5	65.3	2 32.8	+52.0	65.3	2 57.8	+52.5	65.4	3 22.8	+52.9	65.4	15
16	1 16.6	+49.5	64.6	1 42.3	+50.0	64.6	2 08.0	+50.5	64.7	2 33.6	+51.0	64.7	2 59.2	+51.5	64.8	3 24.8	+52.0	64.8	3 50.3	+52.4	64.9	4 15.7	+53.0	64.9	16
17	2 06.1	+49.4	64.1	2 32.3	+50.0	64.1	2 58.5	+50.5	64.1	3 24.6	+51.0	64.2	3 50.7	+51.5	64.2	4 16.8	+51.9	64.3	4 42.7	+52.5	64.4	5 08.7	+52.8	64.5	17
18	2 55.5	+49.5	63.5	3 22.3	+49.9	63.5	3 49.0	+50.5	63.6	4 15.6	+51.0	63.7	4 42.2	+51.5	63.7	5 08.7	+52.0	63.8	5 35.2	+52.4	63.9	6 01.5	+52.9	64.0	18
19	3 45.0	+49.4	62.9	4 12.2	+50.0	63.0	4 39.5	+50.4	63.1	5 06.6	+51.0	63.1	5 33.7	+51.4	63.2	6 00.7	+51.9	63.3	6 27.6	+52.4	63.4	6 54.4	+52.9	63.5	19
20	4 34.4	+49.4	62.4	5 02.2	+49.9	62.4	5 29.9	+50.4	62.5	5 57.6	+50.9	62.6	6 25.1	+51.5	62.7	6 52.6	+51.9	62.8	7 20.0	+52.3	62.9	7 47.3	+52.8	63.0	20
21	5 23.8	+49.3	61.8	5 52.1	+49.9	61.9	6 20.3	+50.4	62.0	6 48.5	+50.9	62.1	7 16.6	+51.3	62.2	7 44.5	+51.9	62.3	8 12.3	+52.4	62.4	8 40.1	+52.7	62.6	21
22	6 13.1	+49.4	61.2	6 42.0	+49.8	61.3	7 10.7	+50.4	61.4	7 39.4	+50.8	61.5	8 07.9	+51.4	61.7	8 36.4	+51.8	61.8	9 04.7	+52.2	61.9	9 32.8	+52.8	62.1	22
23	7 02.5	+49.3	60.6	7 31.8	+49.8	60.8	8 01.1	+50.3	60.9	8 30.2	+50.9	61.0	8 59.3	+51.3	61.1	9 28.2	+51.7	61.3	9 56.9	+52.3	61.4	10 25.6	+52.7	61.6	23
24	7 51.8	+49.2	60.1	8 21.6	+49.8	60.2	8 51.4	+50.3	60.3	9 21.1	+50.7	60.5	9 50.6	+51.2	60.6	10 19.9	+51.8	60.8	10 49.2	+52.2	60.9	11 18.3	+52.6	61.1	24
25	8 41.0	+49.2	59.5	9 11.4	+49.7	59.6	9 41.7	+50.2	59.8	10 11.8	+50.7	59.9	10 41.8	+51.2	60.1	11 11.7	+51.6	60.2	11 41.4	+52.1	60.4	12 10.9	+52.6	60.6	25
26	9 30.2	+49.1	58.9	10 01.1	+49.6	59.1	10 31.9	+50.1	59.2	11 02.5	+50.7	59.4	11 33.0	+51.1	59.5	12 03.3	+51.6	59.7	12 33.5	+52.1	59.9	13 03.5	+52.5	60.1	26
27	10 19.3	+49.1	58.3	10 50.7	+49.6	58.5	11 22.0	+50.1	58.7	11 53.2	+50.5	58.8	12 24.1	+51.1	59.0	12 54.9	+51.6	59.2	13 25.6	+52.0	59.4	13 56.0	+52.5	59.6	27
28	11 08.4	+49.0	57.7	11 40.3	+49.5	57.9	12 12.1	+50.0	58.1	12 43.7	+50.6	58.3	13 15.2	+51.0	58.5	13 46.5	+51.5	58.7	14 17.6	+51.9	58.9	14 48.5	+52.4	59.1	28
29	11 57.4	+48.9	57.2	12 29.8	+49.5	57.3	13 02.1	+50.0	57.5	13 34.3	+50.4	57.7	14 06.2	+50.9	57.9	14 38.0	+51.4	58.1	15 09.5	+51.9	58.4	15 40.9	+52.3	58.6	29
30	12 46.3	+48.8	56.6	13 19.3	+49.3	56.8	13 52.1	+49.8	57.0	14 24.7	+50.4	57.2	14 57.1	+50.9	57.4	15 29.4	+51.3	57.6	16 01.4	+51.8	57.9	16 33.2	+52.3	58.1	30
31	13 35.1	+48.8	56.0	14 08.6	+49.3	56.2	14 41.9	+49.8	56.4	15 15.1	+50.2	56.6	15 48.0	+50.8	56.8	16 20.7	+51.3	57.1	16 53.2	+51.7	57.3	17 25.5	+52.2	57.6	31
32	14 23.9	+48.6	55.4	14 57.9	+49.2	55.6	15 31.7	+49.7	55.8	16 05.3	+50.2	56.0	16 38.8	+50.6	56.3	17 12.0	+51.1	56.5	17 44.9	+51.7	56.8	18 17.7	+52.1	57.1	32
33	15 12.5	+48.6	54.8	15 47.1	+49.1	55.0	16 21.4	+49.6	55.2	16 55.5	+50.1	55.5	17 29.4	+50.6	55.7	18 03.1	+51.1	56.0	18 36.6	+51.5	56.3	19 09.8	+52.0	56.5	33
34	16 01.1	+48.5	54.1	16 36.2	+48.9	54.4	17 11.0	+49.5	54.6	17 45.6	+50.0	54.9	18 20.0	+50.5	55.2	18 54.2	+50.9	55.4	19 28.1	+51.4	55.7	20 01.8	+51.9	56.0	34
35	16 49.6	+48.3	53.5	17 25.1	+48.9	53.8	18 00.5	+49.4	54.0	18 35.6	+49.9	54.3	19 10.5	+50.4	54.6	19 45.1	+50.9	54.9	20 19.5	+51.4	55.2	20 53.7	+51.8	55.5	35
36	17 37.9	+48.3	52.9	18 14.0	+48.8	53.2	18 49.9	+49.2	53.4	19 25.5	+49.7	53.7	20 00.9	+50.2	54.0	20 36.0	+50.7	54.3	21 10.9	+51.2	54.6	21 45.5	+51.7	54.9	36
37	18 26.2	+48.1	52.3	19 02.8	+48.6	52.5	19 39.1	+49.2	52.8	20 15.2	+49.7	53.1	20 51.1	+50.2	53.4	21 26.7	+50.7	53.7	22 02.1	+51.1	54.1	22 37.2	+51.6	54.4	37
38	19 14.3	+48.0	51.7	19 51.4	+48.5	51.9	20 28.3	+49.0	52.2	21 04.9	+49.5	52.5	21 41.3	+50.0	52.8	22 17.4	+50.5	53.2	22 53.2	+51.0	53.5	23 28.8	+51.4	53.8	38
39	20 02.3	+47.8	51.0	20 39.9	+48.3	51.3	21 17.3	+48.8	51.6	21 54.4	+49.4	51.9	22 31.3	+49.9	52.2	23 07.9	+50.4	52.6	23 44.2	+50.9	52.9	24 20.2	+51.4	53.3	39
40	20 50.1	+47.7	50.4	21 28.2	+48.3	50.7	22 06.1	+48.8	51.0	22 43.8	+49.2	51.3	23 21.2	+49.7	51.6	23 58.3	+50.2	52.0	24 35.1	+50.7	52.3	25 11.6	+51.2	52.7	40
41	21 37.8	+47.5	49.7	22 16.5	+48.0	50.0	22 54.9	+48.5	50.3	23 33.0	+49.1	50.7	24 10.9	+49.6	51.0	24 48.5	+50.1	51.4	25 25.8	+50.6	51.7	26 02.8	+51.1	52.1	41
42	22 25.3	+47.4	49.1	23 04.5	+47.9	49.4	23 43.4	+48.5	49.7	24 22.1	+48.9	50.1	25 00.5	+49.4	50.4	25 38.6	+49.9	50.8	26 16.4	+50.4	51.1	26 53.9	+50.9	51.5	42
43	23 12.7	+47.2	48.4	23 52.4	+47.8	48.7	24 31.9	+48.2	49.1	25 11.0	+48.8	49.4	25 49.9	+49.3	49.8	26 28.5	+49.8	50.2	27 06.8	+50.3	50.5	27 44.8	+50.8	50.9	43
44	23 59.9	+47.0	47.7	24 40.2	+47.5	48.1	25 20.1	+48.1	48.4	25 59.8	+48.6	48.8	26 39.2	+49.1	49.1	27 18.3	+49.6	49.5	27 57.1	+50.1	49.9	28 35.6	+50.6	50.3	44
45	24 46.9	+46.9	47.0	25 27.7	+47.4	47.4	26 08.2	+47.9	47.7	26 48.4	+48.4	48.1	27 28.3	+48.9	48.5	28 07.9	+49.4	48.9	28 47.2	+49.9	49.3	29 26.2	+50.4	49.7	45
46	25 33.8	+46.6	46.4	26 15.1	+47.1	46.7	26 56.1	+47.7	47.1	27 36.8	+48.2	47.4	28 17.2	+48.8	47.8	28 57.3	+49.3	48.2	29 37.1	+49.8	48.7	30 16.6	+50.2	49.1	46
47	26 20.4	+46.5	45.7	27 02.2	+47.0	46.0	27 43.8	+47.5	46.4	28 25.0	+48.0	46.8	29 06.0	+48.5	47.2	29 46.6	+49.0	47.6	30 26.9	+49.5	48.0	31 06.8	+50.1	48.5	47
48	27 06.9	+46.2	44.9	27 49.2	+46.8	45.3	28 31.3	+47.2	45.7	29 13.0	+47.8	46.1	29 54.5	+48.3	46.5	30 35.6	+48.9	46.9	31 16.4	+49.4	47.4	31 56.9	+49.9	47.8	48
49	27 53.1	+46.0	44.2	28 36.0	+46.5	44.6	29 18.5	+47.1	45.0	30 00.8	+47.6	45.4	30 42.8	+48.1	45.8	31 24.5	+48.6	46.2	32 05.8	+49.1	46.7	32 46.8	+49.6	47.2	49
50	28 39.1	+45.8	43.5	29 22.5	+46.3	43.9	30 05.6	+46.8	44.3	30 48.4	+47.3	44.7	31 30.9	+47.9	45.1	32 13.1	+48.4	45.6	32 54.9	+48.9	46.0	33 36.4	+49.4	46.5	50
51	29 24.9	+45.5	42.8	30 08.8	+46.0	43.1	30 52.4	+46.6	43.6	31 35.7	+47.1	44.0	32 18.8	+47.6	44.4	33 01.5	+48.1	44.9	33 43.8	+48.7	45.3	34 25.8	+49.2	45.8	51
52	30 10.4	+45.2	42.0	30 54.8	+45.8	42.4	31 39.0	+46.3	42.8	32 22.8	+46.9	43.2	33 06.4	+47.4	43.7	33 49.6	+47.9	44.1	34 32.5	+48.4	44.6	35 15.0	+49.0	45.1	52
53	30 55.6	+45.0	41.2	31 40.6	+45.5	41.6	32 25.3	+46.0	42.1	33 09.7	+46.6	42.5	33 53.8	+47.1	42.9	34 37.5	+47.6	43.4	35 20.9	+48.2	43.9	36 04.0	+48.7	44.4	53
54	31 40.6	+44.7	40.5	32 26.1	+45.2	40.9	33 11.3	+45.8	41.3	33 56.3	+46.2	41.7	34 40.9	+46.8	42.2	35 25.1	+47.4	42.7	36 09.1	+47.9	43.2	36 52.7	+48.4	43.7	54
55	32 25.3	+44.4	39.7	33 11.3	+45.0	40.1	33 57.1	+45.4	40.5	34 42.5	+46.0	41.0	35 27.7	+46.5	41.4	36 12.5	+47.1	41.9	36 57.0	+47.6	42.4	37 41.1	+48.1	42.9	55
56	33 09.7	+44.1	38.9	33 56.3	+44.6	39.3	34 42.5	+45.2	39.7	35 28.5	+45.7	40.2	36 14.2	+46.2	40.7	36 59.6	+46.7	41.1	37 44.6	+47.3	41.6	38 29.2	+47.9	42.2	56
57	33 53.8	+43.7	38.1	34 40.9	+44.2	38.5	35 27.7	+44.8	38.9	36 14.2	+45.4	39.4	37 00.4	+45.9	39.9	37 46.3	+46.5	40.4	38 31.9	+46.9	40.9	39 17.1	+47.5	41.4	57
58	34 37.5	+43.4	37.2	35 25.1	+44.0	37.7	36 12.5	+44.5	38.1	36 59.6	+45.0	38.6	37 46.3	+45.6	39.0	38 32.8	+46.0	39.5	39 18.8	+46.7	40.1	40 04.6	+47.2	40.6	58
59	35 20.9	+43.1	36.4	36 09.1	+43.6	36.8	36 57.0	+44.1	37.3	37 44.6	+44.6	37.7	38 31.9	+45.2	38.2	39 18.8	+45.8	38.7	40 05.5	+46.3	39.2	40 51.8	+46.8	39.8	59
60	36 04.0	+42.7	35.5	36 52.7	+43.2	36.0	37 41.1	+43.7	36.4	38 29.2	+44.3	36.9	39 17.1	+44.8	37.4	40 04.6	+45.4	37.9	40 51.8	+45.9	38.4	41 38.6	+46.5	39.0	60
61	36 46.7	+42.3	34.7	37 35.9	+42.8	35.1	38 24.8	+43.4	35.6	39 13.5	+43.9	36.0	40 01.9	+44.4	36.5	40 50.0	+44.9	37.0	41 37.7	+45.5	37.6	42 25.1	+46.1	38.1	61
62	37 29.0	+41.8	33.8	38 18.7	+42.4	34.2	39 08.2	+42.9	34.7	39 57.4	+43.5	35.1	40 46.3	+44.0	35.6	41 34.9	+44.6	36.1	42 23.2	+45.1	36.7	43 11.2	+45.6	37.2	62
63	38 10.8	+41.5	32.9	39 01.1	+42.0	33.3	39 51.1	+42.5	33.8	40 40.9	+43.0	34.2	41 30.3	+43.6	34.7	42 19.5	+44.1	35.2	43 08.3	+44.7	35.8	43 56.8	+45.3	36.3	63
64	38 52.3	+41.0	31.9	39 43.1	+41.5	32.4	40 33.6	+42.1	32.8	41 23.9	+42.6	33.3	42 13.9	+43.1	33.8	43 03.6	+43.7	34.3	43 53.0	+44.2	34.9	44 42.1	+44.8	35.4	64
65	39 33.3	+40.6	31.0	40 24.6	+41.1	31.4	41 15.7	+41.6	31.9	42 06.5	+42.1	32.4	42 57.0	+42.7	32.9	43 47.3	+43.2	33.4	44 37.2	+43.8	33.9	45 26.9	+44.3	34.5	65
66	40 13.9	+40.0	30.0	41 05.7	+40.6	30.5	41 57.3	+41.1	30.9	42 48.6	+41.6	31.4	43 39.7	+42.1	31.9	44 30.5	+42.7	32.4	45 21.0	+43.3	32.9	46 11.2	+43.8	33.5	66
67	40 53.9	+39.6	29.1	41 46.3	+40.0	29.5	42 38.4	+40.5	29.9	43 30.2	+41.1	30.4	44 21.8	+41.7	30.9	45 13.2	+42.2	31.4	46 04.3	+42.7	32.0	46 55.0	+43.3	32.5	67
68	41 33.5	+39.0	28.1	42 26.3	+39.5	28.5	43 18.9	+40.1	28.9	44 11.3	+40.6	29.4	45 03.5	+41.0	29.9	45 55.4	+41.6	30.4	46 47.0	+42.1	30.9	47 38.3	+42.7	31.5	68
69	42 12.5	+38.5	27.0	43 05.8	+39.0	27.5	43 59.0	+39.4	27.9	44 51.9	+39.9	28.4	45 44.5	+40.5	28.9	46 37.0	+41.0	29.4	47 29.1	+41.6	29.9	48 21.0	+42.1	30.4	69
70	42 51.0	+37.9	26.0	43 44.8	+38.4	26.4	44 38.4	+38.9	26.9	45 31.8	+39.4	27.3	46 25.0	+39.9	27.8	47 18.0	+40.4	28.3	48 10.7	+41.0	28.8	49 03.1	+41.6	29.4	70
71	43 28.9	+37.2	24.9	44 23.2	+37.7	25.3	45 17.3	+38.2	25.8	46 11.2	+38.7	26.2	47 04.9	+39.3	26.7	47 58.4	+39.8	27.2	48 51.7	+40.3	27.7	49 44.7	+40.8	28.3	71
72	44 06.1	+36.7	23.9	45 00.9	+37.2	24.3	45 55.5	+37.6	24.7	46 50.0	+38.1	25.1	47 44.2	+38.6	25.6	48 38.2	+39.1	26.1	49 32.0	+39.6	26.6	50 25.5	+40.2	27.1	72
73	44 42.8	+36.0	22.7	45 38.1	+36.4	23.1	46 33.1	+37.0	23.5	47 28.1	+37.4	24.0	48 22.8	+37.9	24.4	49 17.3	+38.4	24.9	50 11.6	+38.9	25.4	51 05.7	+39.4	25.9	73
74	45 18.8	+35.3	21.6	46 14.5	+35.8	22.0	47 10.1	+36.2	22.4	48 05.5	+36.7	22.8	49 00.7	+37.1	23.3	49 55.7	+37.6	23.7	50 50.5	+38.2	24.2	51 45.1	+38.7	24.7	74
75	45 54.1	+34.6	20.5	46 50.3	+35.0	20.8	47 46.3	+35.4	21.2	48 42.1	+35.9	21.6	49 37.8	+36.4	22.1	50 33.3	+36.9	22.5	51 28.7	+37.3	23.0	52 23.8	+37.9	23.5	75
76	46 28.7	+33.9	19.3	47 25.3	+34.3	19.6	48 21.7	+34.7	20.0	49 18.0	+35.2	20.4	50 14.2	+35.6	20.8	51 10.2	+36.0	21.3	52 06.0	+36.6	21.7	53 01.7	+37.0	22.2	76
77	47 02.6	+33.1	18.1	47 59.6	+33.4	18.4	48 56.4	+33.9	18.8	49 53.2	+34.3	19.2	50 49.8	+34.7	19.6	51 46.2	+35.2	20.0	52 42.6	+35.6	20.4	53 38.7	+36.1	20.9	77
78	47 35.7	+32.2	16.8	48 33.0	+32.7	17.2	49 30.3	+33.0	17.5	50 27.5	+33.4	17.9	51 24.5	+33.9	18.3	52 21.4	+34.3	18.7	53 18.2	+34.7	19.1	54 14.8	+35.2	19.5	78
79	48 07.9	+31.5	15.6	49 05.7	+31.8	15.9	50 03.3	+32.2	16.2	51 00.9	+32.5	16.6	51 58.4	+32.9	16.9	52 55.7	+33.3	17.3	53 52.9	+33.8	17.7	54 50.0	+34.2	18.1	79
80	48 39.4	+30.5	14.3	49 37.5	+30.9	14.6	50 35.5	+31.2	14.9	51 33.4	+31.6	15.2	52 31.3	+32.0	15.6	53 29.0	+32.4	15.9	54 26.7	+32.7	16.3	55 24.2	+33.2	16.7	80
81	49 09.9	+29.7	13.0	50 08.4	+29.9	13.3	51 06.7	+30.3	13.5	52 05.0	+30.6	13.8	53 03.3	+30.9	14.2	54 01.4	+31.3	14.5	54 59.4	+31.7	14.8	55 57.4	+32.0	15.2	81
82	49 39.6	+28.7	11.7	50 38.3	+29.0	11.9	51 37.0	+29.3	12.2	52 35.6	+29.6	12.4	53 34.2	+29.9	12.7	54 32.7	+30.2	13.0	55 31.1	+30.6	13.4	56 29.4	+31.0	13.7	82
83	50 08.3	+27.8	10.3	51 07.3	+28.0	10.5	52 06.3	+28.3	10.7	53 05.2	+28.5	11.0	54 04.1	+28.8	11.3	55 02.9	+29.1	11.5	56 01.7	+29.4	11.8	57 00.4	+29.7	12.1	83
84	50 36.1	+26.7	9.0	51 35.3	+27.0	9.1	52 34.6	+27.1	9.3	53 33.7	+27.5	9.5	54 32.9	+27.7	9.7	55 32.0	+27.9	9.9	56 31.1	+28.2	10.2	57 30.1	+28.5	10.5	84
85	51 02.8	+25.7	7.5	52 02.3	+25.8	7.7	53 01.7	+26.1	7.8	54 01.2	+26.2	8.0	55 00.6	+26.4	8.2	56 00.0	+26.7	8.4	56 59.3	+26.9	8.6	57 58.6	+27.1	8.9	85
86	51 28.5	+24.6	6.0	52 28.1	+24.8	6.2	53 27.8	+24.9	6.3	54 27.4	+25.1	6.5	55 27.0	+25.2	6.6	56 26.6	+25.4	6.8	57 26.2	+25.5	7.0	58 25.7	+25.8	7.2	86
87	51 53.1	+23.4	4.6	52 52.9	+23.6	4.7	53 52.7	+23.7	4.8	54 52.5	+23.8	4.9	55 52.2	+24.0	5.0	56 51.7	+24.2	5.2	57 51.7	+24.2	5.3	58 51.5	+24.3	5.5	87
88	52 16.5	+22.4	3.1	53 16.5	+22.3	3.1	54 16.4	+22.4	3.2	55 16.3	+22.5	3.3	56 16.2	+22.6	3.4	57 16.1	+22.6	3.5	58 15.9	+22.8	3.6	59 15.8	+22.9	3.7	88
89	52 38.9	+21.1	1.5	53 38.8	+21.2	1.6	54 38.8	+21.2	1.6	55 38.8	+21.2	1.7	56 38.8	+21.2	1.7	57 38.7	+21.3	1.8	58 38.7	+21.3	1.8	59 38.7	+21.3	1.9	89
90	53 00.0	+19.9	0.0	54 00.0	+19.9	0.0	55 00.0	+19.9	0.0	56 00.0	+19.8	0.0	57 00.0	+19.8	0.0	58 00.0	+19.8	0.0	59 00.0	+19.7	0.0	60 00.0	+19.7	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 110°, 250°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	11 17.9	+48.9	105.4	11 01.9	+49.5	105.6	10 45.7	+50.0	105.8	10 29.4	+50.5	105.9	10 12.8	+51.1	106.1	9 56.1	+51.6	106.3	9 39.2	+52.1	106.4	9 22.1	+52.7	106.6	0
1	12 06.8	+48.7	104.8	11 51.4	+49.3	105.0	11 35.7	+50.0	105.2	11 19.9	+50.5	105.4	11 03.9	+51.1	105.6	10 47.7	+51.6	105.8	10 31.3	+52.1	105.9	10 14.8	+52.6	106.1	1
2	12 55.5	+48.7	104.2	12 40.7	+49.3	104.4	12 25.7	+49.8	104.6	12 10.4	+50.5	104.8	11 55.0	+50.9	105.0	11 39.3	+51.5	105.2	11 23.4	+52.1	105.4	11 07.4	+52.5	105.6	2
3	13 44.2	+48.6	103.6	13 30.0	+49.2	103.8	13 15.5	+49.8	104.1	13 00.9	+50.3	104.3	12 45.9	+51.0	104.5	12 30.8	+51.5	104.7	12 15.5	+52.0	104.9	11 59.9	+52.5	105.1	3
4	14 32.8	+48.5	103.0	14 19.2	+49.1	103.2	14 05.3	+49.7	103.5	13 51.2	+50.3	103.7	13 36.9	+50.8	104.0	13 22.3	+51.4	104.2	13 07.5	+51.9	104.4	12 52.4	+52.5	104.6	4
5	15 21.3	+48.4	102.4	15 08.3	+49.0	102.6	14 55.0	+49.6	102.9	14 41.5	+50.2	103.2	14 27.7	+50.8	103.4	14 13.7	+51.3	103.7	13 59.4	+51.9	103.9	13 44.9	+52.3	104.1	5
6	16 09.7	+48.2	101.8	15 57.3	+48.9	102.0	15 44.6	+49.6	102.3	15 31.7	+50.1	102.6	15 18.5	+50.7	102.9	15 05.0	+51.3	103.1	14 51.3	+51.7	103.4	14 37.2	+52.4	103.6	6
7	16 57.9	+48.3	101.1	16 46.2	+48.7	101.4	16 34.2	+49.4	101.7	16 21.8	+50.0	102.0	16 09.2	+50.6	102.3	15 56.3	+51.1	102.6	15 43.0	+51.8	102.9	15 29.6	+52.2	103.1	7
8	17 46.1	+48.1	100.5	17 35.0	+48.7	100.8	17 23.6	+49.3	101.1	17 11.8	+50.0	101.4	16 59.8	+50.5	101.7	16 47.4	+51.1	102.0	16 34.8	+51.6	102.3	16 21.8	+52.2	102.6	8
9	18 34.2	+47.9	99.9	18 23.7	+48.6	100.2	18 12.9	+49.2	100.5	18 01.8	+49.8	100.9	17 50.3	+50.4	101.2	17 38.5	+51.0	101.5	17 26.4	+51.5	101.8	17 14.0	+52.1	102.1	9
10	19 22.1	+47.8	99.2	19 12.3	+48.4	99.6	19 02.1	+49.1	99.9	18 51.6	+49.7	100.3	18 40.7	+50.3	100.6	18 29.5	+50.9	100.9	18 17.9	+51.5	101.3	18 06.1	+52.0	101.6	10
11	20 09.9	+47.6	98.6	20 00.7	+48.3	99.0	19 51.2	+48.9	99.3	19 41.3	+49.6	99.7	19 31.0	+50.2	100.0	19 20.4	+50.8	100.4	19 09.4	+51.4	100.7	18 58.1	+51.9	101.1	11
12	20 57.5	+47.5	98.0	20 49.0	+48.2	98.3	20 40.1	+48.9	98.7	20 30.9	+49.4	99.1	20 21.2	+50.1	99.4	20 11.2	+50.7	99.8	20 00.8	+51.2	100.2	19 50.0	+51.8	100.5	12
13	21 45.0	+47.4	97.3	21 37.2	+48.0	97.7	21 29.0	+48.7	98.1	21 20.3	+49.4	98.5	21 11.3	+49.9	98.9	21 01.9	+50.5	99.2	20 52.0	+51.2	99.6	20 41.8	+51.7	100.0	13
14	22 32.4	+47.1	96.6	22 25.2	+47.9	97.0	22 17.7	+48.5	97.5	22 09.7	+49.1	97.9	22 01.2	+49.9	98.3	21 52.4	+50.5	98.7	21 43.2	+51.0	99.1	21 33.5	+51.7	99.4	14
15	23 19.5	+47.0	96.0	23 13.1	+47.7	96.4	23 06.2	+48.4	96.8	22 58.8	+49.1	97.2	22 51.1	+49.7	97.7	22 42.9	+50.3	98.1	22 34.2	+50.9	98.5	22 25.2	+51.5	98.9	15
16	24 06.5	+46.9	95.3	24 00.8	+47.5	95.7	23 54.6	+48.2	96.2	23 47.9	+48.9	96.6	23 40.8	+49.5	97.0	23 33.2	+50.1	97.5	23 25.1	+50.8	97.9	23 16.7	+51.3	98.3	16
17	24 53.4	+46.6	94.6	24 48.3	+47.4	95.1	24 42.8	+48.0	95.5	24 36.8	+48.7	96.0	24 30.3	+49.4	96.4	24 23.3	+50.1	96.9	24 15.9	+50.7	97.3	24 08.0	+51.3	97.8	17
18	25 40.0	+46.4	93.9	25 35.7	+47.1	94.4	25 30.8	+47.9	94.9	25 25.5	+48.6	95.3	25 19.7	+49.2	95.8	25 13.4	+49.9	96.3	25 06.6	+50.5	96.7	24 59.3	+51.1	97.2	18
19	26 26.4	+46.2	93.2	26 22.8	+47.0	93.7	26 18.7	+47.7	94.2	26 14.1	+48.3	94.7	26 08.9	+49.1	95.2	26 03.3	+49.7	95.7	25 57.1	+50.4	96.1	25 50.4	+51.0	96.6	19
20	27 12.6	+46.0	92.5	27 09.8	+46.7	93.0	27 06.4	+47.5	93.5	27 02.4	+48.2	94.0	26 58.0	+48.9	94.5	26 53.0	+49.5	95.0	26 47.5	+50.2	95.5	26 41.4	+50.8	96.0	20
21	27 58.6	+45.8	91.8	27 56.5	+46.6	92.3	27 53.9	+47.2	92.8	27 50.6	+48.0	93.3	27 46.9	+48.7	93.9	27 42.5	+49.4	94.4	27 37.7	+50.0	94.9	27 32.2	+50.7	95.4	21
22	28 44.4	+45.5	91.0	28 43.1	+46.3	91.6	28 41.1	+47.1	92.1	28 38.6	+47.8	92.7	28 35.6	+48.4	93.2	28 31.9	+49.2	93.8	28 27.7	+49.9	94.3	28 22.9	+50.5	94.8	22
23	29 29.9	+45.3	90.3	29 29.4	+46.0	90.8	29 28.2	+46.8	91.4	29 26.4	+47.6	92.0	29 24.0	+48.3	92.5	29 21.1	+49.0	93.1	29 17.6	+49.6	93.7	29 13.4	+50.4	94.2	23
24	30 15.2	+45.0	89.5	30 15.4	+45.8	90.1	30 15.0	+46.6	90.7	30 14.0	+47.3	91.3	30 12.3	+48.1	91.9	30 10.1	+48.8	92.4	30 07.2	+49.5	93.0	30 03.8	+50.2	93.6	24
25	31 00.2	+44.7	88.8	31 01.2	+45.5	89.4	31 01.6	+46.3	90.0	31 01.3	+47.1	90.6	31 00.4	+47.9	91.2	30 58.9	+48.6	91.8	30 56.7	+49.3	92.4	30 54.0	+49.9	93.0	25
26	31 44.9	+44.5	88.0	31 46.7	+45.3	88.6	31 47.9	+46.1	89.2	31 48.4	+46.9	89.8	31 48.3	+47.6	90.4	31 47.5	+48.3	91.1	31 46.0	+49.1	91.7	31 43.9	+49.8	92.3	26
27	32 29.4	+44.1	87.2	32 32.0	+45.0	87.8	32 34.0	+45.8	88.5	32 35.3	+46.5	89.1	32 35.9	+47.3	89.7	32 35.8	+48.1	90.4	32 35.1	+48.8	91.0	32 33.7	+49.6	91.6	27
28	33 13.5	+43.8	86.4	33 17.0	+44.6	87.0	33 19.8	+45.4	87.7	33 21.8	+46.3	88.3	33 23.2	+47.1	89.0	33 23.9	+47.9	89.7	33 23.9	+48.7	90.3	33 23.5	+49.3	91.0	28
29	33 57.3	+43.5	85.6	34 01.6	+44.4	86.2	34 05.2	+45.2	86.9	34 08.1	+46.1	87.6	34 10.3	+46.8	88.3	34 11.8	+47.6	88.9	34 12.6	+48.3	89.6	34 12.8	+49.1	90.3	29
30	34 40.8	+43.2	84.7	34 46.0	+44.0	85.4	34 50.4	+44.9	86.1	34 54.2	+45.7	86.8	34 57.1	+46.6	87.5	34 59.4	+47.3	88.2	35 00.9	+48.1	88.9	35 01.7	+48.9	89.6	30
31	35 24.0	+42.7	83.9	35 30.0	+43.7	84.6	35 35.3	+44.6	85.3	35 39.9	+45.4	86.0	35 43.7	+46.2	86.7	35 46.7	+47.1	87.4	35 49.0	+47.9	88.2	35 50.6	+48.6	88.9	31
32	36 06.7	+42.4	83.0	36 13.7	+43.3	83.7	36 19.9	+44.1	84.5	36 25.3	+45.0	85.2	36 29.9	+45.9	85.9	36 33.8	+46.7	86.7	36 36.9	+47.5	87.4	36 39.2	+48.3	88.2	32
33	36 49.1	+42.0	82.1	36 57.0	+42.9	82.9	37 04.0	+43.9	83.6	37 10.3	+44.7	84.4	37 15.8	+45.6	85.1	37 20.5	+46.4	85.9	37 24.4	+47.3	86.6	37 27.5	+48.1	87.4	33
34	37 31.1	+41.6	81.2	37 39.9	+42.5	82.0	37 47.9	+43.4	82.8	37 55.0	+44.4	83.5	38 01.4	+45.2	84.3	38 06.9	+46.1	85.1	38 11.7	+46.9	85.9	38 15.6	+47.7	86.7	34
35	38 12.7	+41.2	80.3	38 22.4	+42.1	81.1	38 31.3	+43.1	81.9	38 39.4	+43.9	82.7	38 46.6	+44.9	83.5	38 53.0	+45.8	84.3	38 58.6	+46.6	85.1	39 03.3	+47.5	85.9	35
36	38 53.9	+40.7	79.4	39 04.5	+41.7	80.2	39 14.4	+42.6	81.0	39 23.3	+43.6	81.8	39 31.5	+44.5	82.6	39 38.8	+45.3	83.4	39 45.2	+46.3	84.3	39 50.8	+47.1	85.1	36
37	39 34.6	+40.2	78.4	39 46.2	+41.2	79.2	39 57.0	+42.2	80.1	40 06.9	+43.1	80.9	40 16.0	+44.0	81.7	40 24.1	+45.0	82.6	40 31.5	+45.8	83.4	40 37.9	+46.8	84.3	37
38	40 14.8	+39.8	77.5	40 27.4	+40.8	78.3	40 39.2	+41.7	79.1	40 50.0	+42.7	80.0	41 00.0	+43.7	80.8	41 09.1	+44.6	81.7	41 17.3	+45.5	82.6	41 24.7	+46.3	83.4	38
39	40 54.6	+39.2	76.5	41 08.2	+40.2	77.3	41 20.9	+41.2	78.2	41 32.7	+42.3	79.1	41 43.7	+43.2	79.9	41 53.7	+44.2	80.8	42 02.8	+45.1	81.7	42 11.0	+46.0	82.6	39
40	41 33.8	+38.7	75.5	41 48.4	+39.7	76.3	42 02.1	+40.8	77.2	42 15.0	+41.7	78.1	42 26.9	+42.7	79.0	42 37.9	+43.7	79.9	42 47.9	+44.7	80.8	42 57.0	+45.6	81.7	40
41	42 12.5	+38.1	74.4	42 28.1	+39.2	75.3	42 42.9	+40.2	76.2	42 56.7	+41.2	77.1	43 09.6	+42.3	78.0	43 21.6	+43.2	78.9	43 32.6	+44.2	79.9	43 42.6	+45.2	80.8	41
42	42 50.6	+37.5	73.4	43 07.3	+38.6	74.3	43 23.1	+39.6	75.2	43 37.9	+40.7	76.1	43 51.9	+41.7	77.1	44 04.8	+42.8	78.0	44 16.8	+43.8	78.9	44 27.8	+44.7	79.9	42
43	43 28.1	+37.0	72.3	43 45.9	+38.0	73.2	44 02.7	+39.1	74.2	44 18.6	+40.2	75.1	44 33.6	+41.2	76.1	44 47.6	+42.2	77.0	45 00.6	+43.2	78.0	45 12.5	+44.3	79.0	43
44	44 05.1	+36.3	71.2	44 23.9	+37.4	72.2	44 41.8	+38.5	73.1	44 58.8	+39.5	74.1	45 14.8	+40.6	75.0	45 29.8	+41.7	76.0	45 43.8	+42.7	77.0	45 56.8	+43.7	78.0	44
45	44 41.4	+35.6	70.1	45 01.3	+36.8	71.1	45 20.3	+37.9	72.0	45 38.3	+39.0	73.0	45 55.4	+40.0	74.0	46 11.5	+41.1	75.0	46 26.5	+42.2	76.0	46 40.5	+43.2	77.0	45
46	45 17.0	+34.9	69.0	45 38.1	+36.0	69.9	45 58.2	+37.2	70.9	46 17.3	+38.3	71.9	46 35.4	+39.5	72.9	46 52.6	+40.5	73.9	47 08.7	+41.6	74.9	47 23.7	+42.7	76.0	46
47	45 51.9	+34.3	67.8	46 14.1	+35.4	68.8	46 35.4	+36.5	69.8	46 55.6	+37.6	70.8	47 14.9	+38.7	71.8	47 33.1	+39.9	72.8	47 50.3	+41.0	73.9	48 06.4	+42.1	75.0	47
48	46 26.2	+33.4	66.6	46 49.5	+34.6	67.6	47 11.9	+35.7	68.6	47 33.2	+37.0	69.6	47 53.6	+38.1	70.7	48 13.0	+39.2	71.7	48 31.3	+40.3	72.8	48 48.5	+41.4	73.9	48
49	46 59.6	+32.7	65.4	47 24.1	+33.9	66.4	47 47.6	+35.1	67.4	48 10.2	+36.2	68.5	48 31.7	+37.4	69.5	48 52.2	+38.5	70.6	49 11.6	+39.7	71.7	49 29.9	+40.8	72.8	49
50	47 32.3	+31.9	64.2	47 58.0	+33.0	65.2	48 22.7	+34.2	66.2	48 46.4	+35.4	67.2	49 09.1	+36.6	68.3	49 30.7	+37.8	69.4	49 51.3	+38.9	70.5	50 10.7	+40.2	71.6	50
51	48 04.2	+31.0	62.9	48 31.0	+32.3	63.9	48 56.9	+33.4	65.0	49 21.8	+34.6	66.0	49 45.7	+35.8	67.1	50 08.5	+37.0	68.2	50 30.2	+38.3	69.3	50 50.9	+39.4	70.5	51
52	48 35.2	+30.2	61.6	49 03.3	+31.3	62.7	49 30.3	+32.6	63.7	49 56.4	+33.8	64.8	50 21.5	+35.0	65.8	50 45.5	+36.2	67.0	51 08.5	+37.4	68.1	51 30.3	+38.6	69.3	52
53	49 05.4	+29.2	60.3	49 34.6	+30.5	61.3	50 02.9	+31.7	62.4	50 30.2	+32.9	63.5	50 56.5	+34.1	64.7	51 21.7	+35.4	65.8	51 45.9	+36.6	66.8	52 08.9	+37.9	68.0	53
54	49 34.6	+28.3	59.0	50 05.1	+29.5	60.0	50 34.6	+30.7	61.1	51 03.1	+32.0	62.1	51 30.6	+33.3	63.2	51 57.1	+34.5	64.4	52 22.5	+35.7	65.6	52 46.8	+37.0	66.7	54
55	50 02.9	+27.3	57.6	50 34.6	+28.5	58.6	51 05.3	+29.8	59.7	51 35.1	+31.0	60.8	52 03.9	+32.3	61.9	52 31.6	+33.6	63.1	52 58.2	+34.9	64.2	53 23.8	+36.1	65.4	55
56	50 30.2	+26.3	56.2	51 03.1	+27.5	57.3	51 35.1	+28.8	58.3	52 06.1	+30.1	59.4	52 36.2	+31.3	60.5	53 05.2	+32.6	61.7	53 33.1	+33.9	62.9	53 59.9	+35.2	64.1	56
57	50 56.5	+25.2	54.8	51 30.6	+26.5	55.8	52 03.9	+27.7	56.9	52 36.2	+29.0	58.0	53 07.5	+30.3	59.1	53 37.8	+31.5	60.3	54 07.0	+32.8	61.5	54 35.1	+34.2	62.7	57
58	51 21.7	+24.2	53.4	51 57.1	+25.4	54.4	52 31.6	+26.6	55.4	53 05.2	+27.9	56.5	53 37.8	+29.2	57.7	54 09.3	+30.5	58.8	54 39.8	+31.9	60.0	55 09.3	+33.1	61.3	58
59	51 45.9	+23.0	51.9	52 22.5	+24.3	52.9	53 03.1	+25.6	54.0	53 33.1	+26.8	55.1	54 07.0	+28.1	56.2	54 39.8	+29.5	57.4	55 11.7	+30.7	58.6	55 42.4	+32.1	59.8	59
60	52 08.9	+21.9	50.4	52 46.8	+23.1	51.4	53 23.8	+24.3	52.5	53 59.9	+25.6	53.5	54 35.1	+26.9	54.7	55 09.3	+28.2	55.8	55 42.4	+29.6	57.0	56 14.5	+31.0	58.3	60
61	52 30.8	+20.7	48.9	53 09.9	+21.9	49.9	53 48.1	+23.2	50.9	54 25.5	+24.4	52.0	55 02.0	+25.7	53.1	55 37.5	+27.1	54.3	56 12.0	+28.4	55.5	56 45.5	+29.7	56.7	61
62	52 51.5	+19.4	47.3	53 31.8	+20.6	48.3	54 11.3	+21.9	49.3	54 49.9	+23.2	50.4	55 27.7	+24.5	51.5	56 04.6	+25.7	52.7	56 40.4	+27.2	53.9	57 15.2	+28.6	55.1	62
63	53 10.9	+18.2	45.7	53 52.4	+19.4	46.7	54 33.1	+20.7	47.7	55 13.1	+21.9	48.8	55 52.2	+23.1	49.9	56 30.3	+24.5	51.1	57 07.6	+25.8	52.3	57 43.8	+27.2	53.5	63
64	53 29.1	+16.9	44.2	54 11.8	+18.1	45.1	54 53.8	+19.2	46.1	55 35.0	+20.5	47.2	56 15.3	+21.8	48.3	56 54.8	+23.2	49.4	57 33.4	+24.5	50.6	58 11.0	+25.9	51.8	64
65	53 46.0	+15.6	42.5	54 29.9	+16.7	43.5	55 13.0	+18.0	44.5	55 55.5	+19.1	45.5	56 37.1	+20.5	46.6	57 18.0	+21.7	47.7	57 57.9	+23.1	48.9	58 36.9	+24.4	50.1	65
66	54 01.6	+14.2	40.9	54 46.6	+15.3	41.8	55 31.0	+16.5	42.8	56 14.6	+17.8	43.8	56 57.6	+19.0	44.9	57 39.7	+20.3	46.0	58 21.0	+21.6	47.1	59 01.3	+23.0	48.3	66
67	54 15.8	+12.8	39.2	55 01.9	+14.0	40.1	55 47.5	+15.1	41.1	56 32.4	+16.3	42.1	57 16.6	+17.5	43.1	58 00.0	+18.7	44.2	58 42.6	+20.1	45.3	59 24.3	+21.4	46.5	67
68	54 28.6	+11.4	37.6	55 15.9	+12.5	38.4	56 02.6	+13.6	39.4	56 48.7	+14.7	40.3	57 34.1	+16.0	41.3	58 18.7	+17.3	42.4	59 02.7	+18.5	43.5	59 45.7	+19.9	44.7	68
69	54 40.0	+10.0	35.9	55 28.4	+11.0	36.7	56 16.2	+12.1	37.6	57 03.4	+13.3	38.5	57 50.1	+14.4	39.5	58 36.0	+15.6	40.6	59 21.2	+16.9	41.7	60 05.6	+18.2	42.8	69
70	54 50.0	+8.6	34.2	55 39.4	+9.6	35.0	56 28.3	+10.6	35.8	57 16.7	+11.7	36.7	58 04.5	+12.8	37.7	58 51.6	+14.1	38.7	59 38.1	+15.3	39.8	60 23.8	+16.6	40.9	70
71	54 58.6	+7.1	32.4	55 49.0	+8.0	33.2	56 38.9	+9.1	34.1	57 28.4	+10.1	34.9	58 17.3	+11.2	35.8	59 05.7	+12.3	36.8	59 53.4	+13.5	37.9	60 40.4	+14.8	38.9	71
72	55 05.7	+5.5	30.7	55 57.0	+6.6	31.5	56 48.0	+7.5	32.2	57 38.5	+8.5	33.1	58 28.5	+9.6	34.0	59 18.0	+10.7	34.9	60 06.9	+11.8	35.9	60 55.2	+13.0	37.0	72
73	55 11.2	+4.1	29.0	56 03.6	+4.9	29.7	56 55.5	+5.9	30.4	57 47.0	+6.9	31.2	58 38.1	+7.9	32.1	59 28.7	+8.9	33.0	60 18.7	+10.1	33.9	61 08.2	+11.2	34.9	73
74	55 15.3	+2.6	27.2	56 08.5	+3.5	27.9	57 01.4	+4.3	28.6	57 53.9	+5.2	29.4	58 46.0	+6.1	30.2	59 37.6	+7.2	31.0	60 28.8	+8.2	31.9	61 19.4	+9.4	32.9	74
75	55 17.9	+1.1	25.5	56 12.0	+1.8	26.1	57 05.7	+2.7	26.8	57 59.1	+3.5	27.5	58 52.1	+4.5	28.3	59 44.8	+5.4	29.1	60 37.0	+6.4	29.9	61 28.8	+7.4	30.8	75
76	55 19.0	−0.4	23.7	56 13.8	+0.3	24.3	57 08.4	+1.0	24.9	58 02.6	+1.9	25.6	58 56.6	+2.7	26.3	59 50.2	+3.6	27.1	60 43.4	+4.6	27.9	61 36.2	+5.6	28.8	76
77	55 18.6	−2.0	21.9	56 14.1	−1.2	22.5	57 09.4	−0.5	23.1	58 04.5	+0.2	23.7	58 59.3	+1.0	24.4	59 53.8	+1.8	25.1	60 48.0	+2.7	25.8	61 41.8	+3.6	26.7	77
78	55 16.6	−3.4	20.2	56 12.9	−2.9	20.7	57 08.9	−2.2	21.2	58 04.7	−1.5	21.8	59 00.3	−0.8	22.4	59 55.6	0.0	23.1	60 50.7	+0.8	23.8	61 45.4	+1.7	24.5	78
79	55 13.2	−5.0	18.4	56 10.0	−4.3	18.9	57 06.7	−3.8	19.4	58 03.2	−3.1	19.9	58 59.5	−2.5	20.5	59 55.6	−1.8	21.1	60 51.5	−1.1	21.7	61 47.1	−0.3 •	22.4	79
80	55 08.2	−6.4	16.7	56 05.7	−6.0	17.1	57 02.9	−5.4	17.6	58 00.1	−4.9	18.0	58 57.0	−4.2	18.6	59 53.8	−3.6	19.1	60 50.4	−2.9	19.7	61 46.8	−2.3	20.3	80
81	55 01.8	−7.9	15.0	55 59.7	−7.4	15.3	56 57.5	−7.0	15.7	57 55.2	−6.5	16.2	58 52.8	−6.0	16.6	59 50.2	−5.4	17.1	60 47.5	−4.8	17.6	61 44.5	−4.1	18.2	81
82	54 53.9	−9.4	13.2	55 52.3	−9.0	13.6	56 50.5	−8.5	13.9	57 48.7	−8.1	14.3	58 46.8	−7.6	14.7	59 44.8	−7.2	15.1	60 42.7	−6.7	15.6	61 40.4	−6.1	16.1	82
83	54 44.5	−10.8	11.5	55 43.3	−10.5	11.8	56 42.0	−10.1	12.1	57 40.6	−9.7	12.4	58 39.2	−9.4	12.8	59 37.6	−8.9	13.2	60 36.0	−8.5	13.6	61 34.3	−8.0	14.0	83
84	54 33.7	−12.2	9.8	55 32.8	−11.9	10.1	56 31.9	−11.7	10.3	57 30.9	−11.4	10.6	58 29.8	−11.0	10.9	59 28.7	−10.7	11.2	60 27.5	−10.3	11.6	61 26.3	−9.9	11.9	84
85	54 21.5	−13.6	8.1	55 20.9	−13.4	8.3	56 20.2	−13.1	8.5	57 19.5	−12.9	8.8	58 18.8	−12.6	9.0	59 18.0	−12.3	9.3	60 17.2	−12.0	9.6	61 16.4	−11.8	9.9	85
86	54 07.9	−15.0	6.5	55 07.5	−14.9	6.6	56 07.1	−14.7	6.8	57 06.6	−14.4	7.0	58 06.2	−14.3	7.2	59 05.7	−14.0	7.4	60 05.2	−13.8	7.6	61 04.6	−13.5	7.8	86
87	53 52.9	−16.4	4.8	54 52.6	−16.2	4.9	55 52.4	−16.1	5.1	56 52.2	−16.0	5.2	57 51.9	−15.8	5.3	58 51.7	−15.7	5.5	59 51.4	−15.5	5.7	60 51.1	−15.3	5.8	87
88	53 36.5	−17.6	3.2	54 36.4	−17.5	3.3	55 36.3	−17.4	3.3	56 36.2	−17.4	3.4	57 36.1	−17.3	3.5	58 36.0	−17.2	3.6	59 35.9	−17.2	3.7	60 35.8	−17.1	3.9	88
89	53 18.9	−18.9	1.6	54 18.9	−18.9	1.6	55 18.9	−18.9	1.7	56 18.8	−18.8	1.7	57 18.8	−18.8	1.8	58 18.8	−18.8	1.8	59 18.7	−18.7	1.9	60 18.7	−18.7	1.9	89
90	53 00.0	−20.1	0.0	54 00.0	−20.2	0.0	55 00.0	−20.2	0.0	56 00.0	−20.2	0.0	57 00.0	−20.2	0.0	58 00.0	−20.3	0.0	59 00.0	−20.3	0.0	60 00.0	−20.3	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	11 17.9	−48.8	105.4	11 01.9	−49.4	105.6	10 45.7	−50.0	105.8	10 29.4	−50.6	105.9	10 12.8	−51.1	106.1	9 56.1	−51.7	106.3	9 39.2	−52.2	106.4	9 22.1	−52.7	106.6	0
1	10 29.1	−49.0	106.0	10 12.5	−49.6	106.1	9 55.7	−50.1	106.3	9 38.8	−50.7	106.5	9 21.7	−51.2	106.6	9 04.4	−51.7	106.8	8 47.0	−52.2	106.9	8 29.4	−52.7	107.1	1
2	9 40.1	−49.0	106.6	9 22.9	−49.6	106.7	9 05.6	−50.2	106.9	8 48.1	−50.7	107.0	8 30.5	−51.3	107.2	8 12.7	−51.8	107.3	7 54.8	−52.3	107.4	7 36.7	−52.7	107.6	2
3	8 51.1	−49.1	107.1	8 33.3	−49.6	107.3	8 15.4	−50.2	107.4	7 57.4	−50.8	107.6	7 39.2	−51.3	107.7	7 20.9	−51.8	107.8	7 02.5	−52.3	107.9	6 44.0	−52.8	108.1	3
4	8 02.0	−49.1	107.7	7 43.7	−49.7	107.9	7 25.2	−50.2	108.0	7 06.6	−50.8	108.1	6 47.9	−51.3	108.3	6 29.1	−51.8	108.3	6 10.2	−52.3	108.4	5 51.2	−52.8	108.5	4
5	7 12.9	−49.2	108.3	6 54.0	−49.8	108.4	6 35.0	−50.3	108.5	6 15.8	−50.8	108.6	5 56.6	−51.3	108.7	5 37.3	−51.9	108.8	5 17.9	−52.4	108.9	4 58.4	−52.8	109.0	5
6	6 23.7	−49.2	108.9	6 04.2	−49.7	109.0	5 44.7	−50.4	109.1	5 25.0	−50.8	109.2	5 05.3	−51.4	109.3	4 45.4	−51.8	109.3	4 25.5	−52.4	109.4	4 05.6	−52.9	109.5	6
7	5 34.5	−49.3	109.5	5 14.5	−49.8	109.5	4 54.3	−50.3	109.6	4 34.2	−50.9	109.7	4 13.9	−51.4	109.8	3 53.6	−51.9	109.8	3 33.2	−52.4	109.9	3 12.7	−52.8	110.0	7
8	4 45.2	−49.2	110.0	4 24.7	−49.9	110.1	4 04.0	−50.4	110.2	3 43.3	−50.9	110.2	3 22.5	−51.4	110.3	3 01.7	−51.9	110.3	2 40.8	−52.4	110.4	2 19.9	−52.9	110.4	8
9	3 56.0	−49.3	110.6	3 34.8	−49.8	110.7	3 13.6	−50.4	110.7	2 52.4	−50.9	110.8	2 31.1	−51.4	110.8	2 09.8	−52.0	110.8	1 48.4	−52.4	110.9	1 27.0	−52.9	110.9	9
10	3 06.7	−49.3	111.2	2 45.0	−49.9	111.2	2 23.2	−50.3	111.3	2 01.5	−50.9	111.3	1 39.7	−51.5	111.3	1 17.8	−51.9	111.3	0 56.0	−52.4	111.4	0 34.1	−52.8	111.4	10
11	2 17.4	−49.4	111.7	1 55.1	−49.9	111.8	1 32.9	−50.5	111.8	1 10.6	−51.0	111.8	0 48.2	−51.4	111.8	0 25.9	−51.9	111.8	0 03.6	−52.4	111.9	0 18.7	+52.9	68.1	11
12	1 28.0	−49.3	112.3	1 05.2	−49.8	112.3	0 42.4	−50.4	112.3	0 19.6	−50.9	112.4	0 03.2	+51.4	67.6	0 26.0	+51.9	67.7	0 48.8	+52.4	67.7	1 11.6	+52.9	67.7	12
13	0 38.7	−49.3	112.9	0 15.4	−49.9	112.9	0 08.0	+50.4	67.1	0 31.3	+50.9	67.1	0 54.6	+51.4	67.1	1 17.9	+51.9	67.1	1 41.2	+52.4	67.2	2 04.5	+52.9	67.2	13
14	0 10.6	+49.4	66.6	0 34.5	+49.9	66.6	0 58.4	+50.4	66.6	1 22.2	+50.9	66.6	1 46.0	+51.5	66.6	2 09.8	+52.0	66.6	2 33.6	+52.4	66.7	2 57.3	+52.9	66.7	14
15	1 00.0	+49.3	66.0	1 24.4	+49.9	66.0	1 48.8	+50.4	66.0	2 13.1	+50.9	66.1	2 37.5	+51.4	66.1	3 01.8	+51.8	66.1	3 26.0	+52.4	66.2	3 50.2	+52.8	66.3	15
16	1 49.3	+49.3	65.4	2 14.3	+49.8	65.4	2 39.2	+50.4	65.5	3 04.0	+50.9	65.5	3 28.9	+51.4	65.6	3 53.6	+51.9	65.6	4 18.4	+52.3	65.7	4 43.0	+52.8	65.8	16
17	2 38.6	+49.3	64.8	3 04.1	+49.9	64.9	3 29.6	+50.3	64.9	3 54.9	+50.9	65.0	4 20.3	+51.3	65.1	4 45.5	+51.9	65.1	5 10.7	+52.3	65.2	5 35.8	+52.8	65.3	17
18	3 27.9	+49.3	64.3	3 54.0	+49.8	64.3	4 19.9	+50.3	64.4	4 45.8	+50.9	64.5	5 11.6	+51.4	64.5	5 37.4	+51.8	64.6	6 03.0	+52.3	64.7	6 28.6	+52.8	64.8	18
19	4 17.2	+49.3	63.7	4 43.8	+49.8	63.8	5 10.2	+50.4	63.9	5 36.7	+50.8	63.9	6 03.0	+51.3	64.0	6 29.2	+51.8	64.1	6 55.3	+52.3	64.2	7 21.4	+52.7	64.3	19
20	5 06.5	+49.2	63.1	5 33.6	+49.7	63.2	6 00.6	+50.2	63.3	6 27.5	+50.8	63.4	6 54.3	+51.3	63.5	7 21.0	+51.8	63.6	7 47.6	+52.2	63.7	8 14.1	+52.7	63.9	20
21	5 55.7	+49.2	62.6	6 23.3	+49.7	62.7	6 50.8	+50.3	62.8	7 18.3	+50.7	62.9	7 45.6	+51.2	63.0	8 12.8	+51.7	63.1	8 39.8	+52.2	63.2	9 06.8	+52.6	63.4	21
22	6 44.9	+49.2	62.0	7 13.0	+49.7	62.1	7 41.1	+50.2	62.3	8 09.0	+50.7	62.3	8 36.8	+51.2	62.5	9 04.5	+51.7	62.6	9 32.0	+52.2	62.7	9 59.4	+52.7	62.9	22
23	7 34.1	+49.1	61.4	8 02.7	+49.7	61.5	8 31.3	+50.1	61.7	8 59.7	+50.7	61.8	9 28.0	+51.1	61.9	9 56.2	+51.6	62.1	10 24.2	+52.1	62.2	10 52.1	+52.5	62.4	23
24	8 23.2	+49.0	60.8	8 52.4	+49.5	61.0	9 21.4	+50.1	61.1	9 50.4	+50.6	61.2	10 19.1	+51.1	61.4	10 47.8	+51.6	61.6	11 16.3	+52.0	61.7	11 44.6	+52.5	61.9	24
25	9 12.2	+49.0	60.2	9 41.9	+49.6	60.4	10 11.5	+50.1	60.5	10 41.0	+50.5	60.7	11 10.2	+51.1	60.9	11 39.4	+51.5	61.0	12 08.3	+52.0	61.2	12 37.1	+52.5	61.4	25
26	10 01.2	+49.0	59.7	10 31.5	+49.4	59.8	11 01.6	+49.9	60.0	11 31.5	+50.5	60.1	12 01.3	+51.0	60.3	12 30.9	+51.5	60.5	13 00.3	+52.0	60.7	13 29.6	+52.4	60.9	26
27	10 50.2	+48.8	59.1	11 20.9	+49.4	59.2	11 51.5	+49.9	59.4	12 22.0	+50.4	59.6	12 52.3	+50.9	59.8	13 22.4	+51.4	60.0	13 52.3	+51.9	60.2	14 22.0	+52.3	60.4	27
28	11 39.0	+48.8	58.5	12 10.3	+49.3	58.7	12 41.4	+49.9	58.8	13 12.4	+50.3	59.0	13 43.2	+50.8	59.2	14 13.8	+51.3	59.5	14 44.2	+51.8	59.7	15 14.3	+52.3	59.9	28
29	12 27.8	+48.7	57.9	12 59.6	+49.3	58.1	13 31.3	+49.7	58.3	14 02.7	+50.3	58.5	14 34.0	+50.8	58.7	15 05.1	+51.2	58.9	15 36.0	+51.7	59.2	16 06.6	+52.2	59.4	29
30	13 16.5	+48.7	57.3	13 48.9	+49.1	57.5	14 21.0	+49.7	57.7	14 53.0	+50.2	57.9	15 24.8	+50.7	58.1	15 56.3	+51.2	58.4	16 27.7	+51.6	58.6	16 58.8	+52.1	58.9	30
31	14 05.2	+48.5	56.7	14 38.0	+49.1	56.9	15 10.7	+49.6	57.1	15 43.2	+50.1	57.3	16 15.5	+50.5	57.6	16 47.5	+51.1	57.8	17 19.3	+51.6	58.1	17 50.9	+52.1	58.4	31
32	14 53.7	+48.5	56.1	15 27.1	+49.0	56.3	16 00.3	+49.5	56.5	16 33.3	+50.0	56.8	17 06.1	+50.4	57.0	17 38.6	+51.0	57.3	18 10.9	+51.5	57.6	18 43.0	+51.9	57.8	32
33	15 42.2	+48.3	55.5	16 16.1	+48.9	55.7	16 49.8	+49.4	55.9	17 23.3	+49.9	56.2	17 56.5	+50.4	56.5	18 29.6	+50.9	56.7	19 02.4	+51.3	57.0	19 34.9	+51.8	57.3	33
34	16 30.5	+48.2	54.8	17 05.0	+48.7	55.1	17 39.2	+49.3	55.3	18 13.2	+49.8	55.6	18 46.9	+50.3	55.9	19 20.5	+50.8	56.2	19 53.7	+51.3	56.5	20 26.7	+51.8	56.8	34
35	17 18.7	+48.2	54.2	17 53.7	+48.7	54.5	18 28.5	+49.1	54.7	19 03.0	+49.6	55.0	19 37.2	+50.2	55.3	20 11.3	+50.6	55.6	20 45.0	+51.2	55.9	21 18.5	+51.6	56.2	35
36	18 06.9	+48.0	53.6	18 42.4	+48.5	53.9	19 17.6	+49.1	54.1	19 52.6	+49.6	54.4	20 27.4	+50.1	54.7	21 01.9	+50.6	55.0	21 36.2	+51.0	55.4	22 10.1	+51.6	55.7	36
37	18 54.9	+47.8	53.0	19 30.9	+48.4	53.2	20 06.7	+48.9	53.5	20 42.2	+49.4	53.8	21 17.5	+49.9	54.1	21 52.5	+50.4	54.5	22 27.2	+51.0	54.8	23 01.7	+51.4	55.1	37
38	19 42.7	+47.8	52.3	20 19.3	+48.2	52.6	20 55.6	+48.8	52.9	21 31.6	+49.3	53.2	22 07.4	+49.8	53.5	22 42.9	+50.4	53.9	23 18.2	+50.8	54.2	23 53.1	+51.3	54.6	38
39	20 30.5	+47.5	51.7	21 07.5	+48.1	52.0	21 44.4	+48.6	52.3	22 20.9	+49.2	52.6	22 57.2	+49.7	52.9	23 33.3	+50.1	53.3	24 09.0	+50.7	53.6	24 44.4	+51.2	54.0	39
40	21 18.0	+47.5	51.0	21 55.6	+48.0	51.3	22 33.0	+48.5	51.7	23 10.1	+49.0	52.0	23 46.9	+49.5	52.3	24 23.4	+50.1	52.7	24 59.7	+50.5	53.0	25 35.6	+51.0	53.4	40
41	22 05.5	+47.2	50.4	22 43.6	+47.8	50.7	23 21.5	+48.3	51.0	23 59.1	+48.9	51.4	24 36.4	+49.4	51.7	25 13.5	+49.9	52.1	25 50.2	+50.4	52.5	26 26.6	+50.9	52.8	41
42	22 52.7	+47.1	49.7	23 31.4	+47.7	50.0	24 09.8	+48.2	50.4	24 48.0	+48.6	50.7	25 25.8	+49.2	51.1	26 03.3	+49.8	51.5	26 40.6	+50.2	51.8	27 17.5	+50.7	52.2	42
43	23 39.8	+47.0	49.0	24 19.1	+47.4	49.4	24 58.0	+48.0	49.7	25 36.6	+48.6	50.1	26 15.0	+49.0	50.4	26 53.1	+49.5	50.8	27 30.8	+50.1	51.2	28 08.2	+50.6	51.6	43
44	24 26.8	+46.7	48.3	25 06.5	+47.3	48.7	25 46.0	+47.8	49.0	26 25.2	+48.3	49.4	27 04.0	+48.9	49.8	27 42.6	+49.4	50.2	28 20.9	+49.8	50.6	28 58.8	+50.4	51.0	44
45	25 13.5	+46.6	47.7	25 53.8	+47.1	48.0	26 33.8	+47.6	48.4	27 13.5	+48.1	48.8	27 52.9	+48.7	49.1	28 32.0	+49.2	49.6	29 10.7	+49.8	50.0	29 49.2	+50.2	50.4	45
46	26 00.1	+46.3	47.0	26 40.9	+46.8	47.3	27 21.4	+47.4	47.7	28 01.6	+48.0	48.1	28 41.6	+48.4	48.5	29 21.2	+49.0	48.9	30 00.5	+49.5	49.3	30 39.4	+50.0	49.8	46
47	26 46.4	+46.1	46.2	27 27.7	+46.7	46.6	28 08.8	+47.2	47.0	28 49.6	+47.7	47.4	29 30.0	+48.3	47.8	30 10.2	+48.8	48.2	30 50.0	+49.3	48.7	31 29.4	+49.8	49.1	47
48	27 32.5	+45.9	45.5	28 14.4	+46.5	45.9	28 56.0	+47.0	46.3	29 37.3	+47.5	46.7	30 18.3	+48.1	47.1	30 59.0	+48.5	47.6	31 39.3	+49.1	48.0	32 19.2	+49.7	48.5	48
49	28 18.4	+45.7	44.8	29 00.9	+46.2	45.2	29 43.0	+46.7	45.6	30 24.8	+47.3	46.0	31 06.4	+47.8	46.4	31 47.5	+48.4	46.9	32 28.4	+48.9	47.3	33 08.9	+49.4	47.8	49
50	29 04.1	+45.4	44.1	29 47.1	+45.9	44.4	30 29.7	+46.5	44.9	31 12.1	+47.1	45.3	31 54.2	+47.6	45.7	32 35.9	+48.1	46.1	33 17.3	+48.6	46.6	33 58.3	+49.2	47.1	50
51	29 49.5	+45.2	43.3	30 33.0	+45.7	43.7	31 16.2	+46.3	44.1	31 59.2	+46.7	44.6	32 41.8	+47.3	45.0	33 24.0	+47.9	45.5	34 05.9	+48.4	45.9	34 47.5	+48.9	46.4	51
52	30 34.7	+44.8	42.5	31 18.7	+45.5	42.9	32 02.5	+46.0	43.4	32 45.9	+46.6	43.8	33 29.1	+47.0	44.3	34 11.9	+47.6	44.7	34 54.3	+48.2	45.2	35 36.4	+48.7	45.7	52
53	31 19.5	+44.7	41.8	32 04.2	+45.1	42.2	32 48.5	+45.7	42.6	33 32.5	+46.2	43.1	34 16.1	+46.8	43.5	34 59.5	+47.3	44.0	35 42.5	+47.8	44.5	36 25.1	+48.4	45.0	53
54	32 04.2	+44.3	41.0	32 49.3	+44.9	41.4	33 34.2	+45.4	41.8	34 18.7	+46.0	42.3	35 02.9	+46.5	42.8	35 46.8	+47.1	43.2	36 30.3	+47.6	43.7	37 13.5	+48.1	44.3	54
55	32 48.5	+44.0	40.2	33 34.2	+44.5	40.6	34 19.6	+45.1	41.0	35 04.7	+45.6	41.5	35 49.4	+46.2	42.0	36 33.9	+46.7	42.5	37 17.9	+47.3	43.0	38 01.6	+47.9	43.5	55
56	33 32.5	+43.6	39.4	34 18.7	+44.2	39.8	35 04.7	+44.7	40.2	35 50.3	+45.3	40.7	36 35.6	+45.9	41.2	37 20.6	+46.4	41.7	38 05.2	+47.0	42.2	38 49.5	+47.5	42.7	56
57	34 16.1	+43.4	38.5	35 02.9	+43.9	39.0	35 49.4	+44.5	39.4	36 35.6	+45.0	39.9	37 21.5	+45.5	40.4	38 07.0	+46.1	40.9	38 52.2	+46.6	41.4	39 37.0	+47.2	42.0	57
58	34 59.5	+43.0	37.7	35 46.8	+43.5	38.1	36 33.9	+44.0	38.6	37 20.6	+44.6	39.1	38 07.0	+45.2	39.6	38 53.1	+45.7	40.1	39 38.8	+46.3	40.6	40 24.2	+46.9	41.1	58
59	35 42.5	+42.6	36.9	36 30.3	+43.2	37.3	37 17.9	+43.7	37.7	38 05.2	+44.3	38.2	38 52.2	+44.8	38.7	39 38.8	+45.4	39.2	40 25.1	+46.0	39.7	41 11.1	+46.5	40.3	59
60	36 25.1	+42.2	36.0	37 13.5	+42.8	36.4	38 01.6	+43.4	36.9	38 49.5	+43.9	37.4	39 37.0	+44.4	37.9	40 24.2	+45.0	38.4	41 11.1	+45.5	38.9	41 57.6	+46.1	39.5	60
61	37 07.3	+41.8	35.1	37 56.3	+42.3	35.5	38 45.0	+42.9	36.0	39 33.4	+43.4	36.5	40 21.4	+44.1	37.0	41 09.2	+44.6	37.5	41 56.6	+45.2	38.0	42 43.7	+45.7	38.6	61
62	37 49.1	+41.4	34.2	38 38.6	+42.0	34.6	39 27.9	+42.5	35.1	40 16.8	+43.1	35.6	41 05.5	+43.6	36.1	41 53.8	+44.1	36.6	42 41.8	+44.7	37.2	43 29.4	+45.3	37.7	62
63	38 30.5	+41.0	33.3	39 20.6	+41.5	33.7	40 10.4	+42.0	34.2	40 59.9	+42.5	34.7	41 49.1	+43.1	35.2	42 37.9	+43.8	35.7	43 26.5	+44.3	36.2	44 14.7	+44.9	36.8	63
64	39 11.5	+40.5	32.3	40 02.1	+41.0	32.8	40 52.4	+41.6	33.2	41 42.4	+42.2	33.7	42 32.2	+42.7	34.2	43 21.7	+43.2	34.8	44 10.8	+43.8	35.3	44 59.6	+44.4	35.9	64
65	39 52.0	+40.0	31.4	40 43.1	+40.6	31.8	41 34.0	+41.1	32.3	42 24.6	+41.6	32.8	43 14.9	+42.2	33.3	44 04.9	+42.7	33.8	44 54.6	+43.3	34.3	45 44.0	+43.8	34.9	65
66	40 32.0	+39.6	30.4	41 23.7	+40.0	30.8	42 15.1	+40.5	31.3	43 06.2	+41.1	31.8	43 57.1	+41.6	32.3	44 47.6	+42.3	32.8	45 37.9	+42.8	33.4	46 27.8	+43.4	33.9	66
67	41 11.6	+38.9	29.4	42 03.7	+39.5	29.8	42 55.6	+40.1	30.3	43 47.3	+40.6	30.8	44 38.7	+41.1	31.3	45 29.9	+41.6	31.8	46 20.7	+42.2	32.4	47 11.2	+42.8	32.9	67
68	41 50.5	+38.5	28.4	42 43.2	+39.0	28.8	43 35.7	+39.5	29.3	44 27.9	+40.0	29.8	45 19.8	+40.6	30.3	46 11.5	+41.1	30.8	47 02.9	+41.7	31.3	47 54.0	+42.3	31.9	68
69	42 29.0	+37.9	27.4	43 22.2	+38.4	27.8	44 15.2	+38.9	28.2	45 07.9	+39.4	28.7	46 00.4	+40.0	29.2	46 52.6	+40.6	29.7	47 44.6	+41.1	30.3	48 36.3	+41.6	30.8	69
70	43 06.9	+37.3	26.3	44 00.6	+37.7	26.7	44 54.1	+38.2	27.2	45 47.3	+38.8	27.6	46 40.4	+39.3	28.1	47 33.2	+39.8	28.6	48 25.7	+40.4	29.2	49 17.9	+41.0	29.7	70
71	43 44.2	+36.6	25.2	44 38.3	+37.2	25.6	45 32.3	+37.7	26.1	46 26.1	+38.2	26.5	47 19.7	+38.7	27.0	48 13.0	+39.2	27.5	49 06.1	+39.8	28.0	49 58.9	+40.4	28.6	71
72	44 20.8	+36.0	24.1	45 15.5	+36.5	24.5	46 10.0	+37.0	25.0	47 04.3	+37.5	25.4	47 58.4	+38.0	25.9	48 52.2	+38.6	26.4	49 45.9	+39.0	26.9	50 39.3	+39.6	27.4	72
73	44 56.8	+35.4	23.0	45 52.0	+35.8	23.4	46 47.0	+36.2	23.8	47 41.8	+36.7	24.3	48 36.4	+37.2	24.7	49 30.8	+37.8	25.2	50 24.9	+38.4	25.7	51 18.9	+38.9	26.2	73
74	45 32.2	+34.6	21.8	46 27.8	+35.1	22.2	47 23.2	+35.6	22.6	48 18.5	+36.1	23.1	49 13.6	+36.6	23.5	50 08.6	+37.0	24.0	51 03.3	+37.5	24.5	51 57.8	+38.0	25.0	74
75	46 06.8	+33.9	20.7	47 02.9	+34.3	21.0	47 58.8	+34.9	21.4	48 54.6	+35.2	21.9	49 50.2	+35.7	22.3	50 45.6	+36.2	22.8	51 40.8	+36.7	23.2	52 35.8	+37.3	23.8	75
76	46 40.7	+33.1	19.5	47 37.2	+33.6	19.8	48 33.6	+34.0	20.2	49 29.8	+34.4	20.6	50 25.9	+34.9	21.0	51 21.8	+35.4	21.5	52 17.5	+35.9	22.0	53 13.1	+36.4	22.5	76
77	47 13.8	+32.4	18.3	48 10.8	+32.7	18.6	49 07.6	+33.1	19.0	50 04.2	+33.6	19.4	51 00.8	+34.0	19.8	51 57.2	+34.5	20.2	52 53.4	+35.0	20.6	53 49.5	+35.4	21.1	77
78	47 46.2	+31.5	17.2	48 43.5	+31.9	17.3	49 40.7	+32.3	17.7	50 37.8	+32.7	18.1	51 34.8	+33.1	18.4	52 31.7	+33.5	18.9	53 28.4	+34.0	19.3	54 24.9	+34.5	19.7	78
79	48 17.7	+30.6	15.7	49 15.4	+31.0	16.0	50 13.0	+31.4	16.4	51 10.5	+31.8	16.7	52 07.9	+32.2	17.1	53 05.2	+32.6	17.5	54 02.4	+33.0	17.9	54 59.4	+33.5	18.3	79
80	48 48.3	+29.8	14.4	49 46.4	+30.1	14.7	50 44.4	+30.4	15.0	51 42.3	+30.8	15.4	52 40.1	+31.2	15.7	53 37.8	+31.6	16.1	54 35.4	+32.0	16.5	55 32.9	+32.4	16.9	80
81	49 18.1	+28.8	13.1	50 16.5	+29.1	13.4	51 14.8	+29.5	13.7	52 13.1	+29.8	14.0	53 11.3	+30.1	14.3	54 09.4	+30.5	14.6	55 07.4	+30.9	15.0	56 05.3	+31.3	15.4	81
82	49 46.9	+27.9	11.8	50 45.6	+28.2	12.0	51 44.3	+28.4	12.3	52 42.9	+28.8	12.5	53 41.4	+29.1	12.8	54 39.9	+29.4	13.2	55 38.3	+29.7	13.5	56 36.6	+30.1	13.8	82
83	50 14.8	+26.9	10.4	51 13.8	+27.1	10.6	52 12.7	+27.4	10.8	53 11.7	+27.6	11.1	54 10.5	+28.0	11.4	55 09.3	+28.3	11.6	56 08.0	+28.6	11.9	57 06.7	+28.9	12.3	83
84	50 41.7	+25.8	9.2	51 40.9	+26.1	9.2	52 40.1	+26.3	9.4	53 39.3	+26.5	9.6	54 38.5	+26.7	9.8	55 37.6	+27.0	10.1	56 36.6	+27.3	10.3	57 35.6	+27.6	10.6	84
85	51 07.5	+24.8	7.5	52 07.0	+24.9	7.7	53 06.4	+25.2	7.9	54 05.8	+25.4	8.1	55 05.2	+25.6	8.3	56 04.6	+25.8	8.5	57 03.9	+26.0	8.7	58 03.2	+26.3	9.0	85
86	51 32.3	+23.7	6.1	52 31.9	+23.9	6.2	53 31.6	+24.0	6.4	54 31.2	+24.1	6.5	55 30.8	+24.3	6.7	56 30.4	+24.5	6.9	57 29.9	+24.7	7.1	58 29.5	+24.8	7.3	86
87	51 56.0	+22.5	4.6	52 55.8	+22.6	4.7	53 55.6	+22.7	4.8	54 55.3	+22.9	4.9	55 55.1	+23.0	5.1	56 54.9	+23.1	5.3	57 54.6	+23.3	5.5	58 54.3	+23.5	5.5	87
88	52 18.5	+21.4	3.1	53 18.4	+21.4	3.2	54 18.3	+21.5	3.2	55 18.2	+21.6	3.3	56 18.1	+21.7	3.4	57 18.0	+21.7	3.5	58 17.9	+21.8	3.6	59 17.8	+21.9	3.7	88
89	52 39.9	+20.1	1.6	53 39.8	+20.2	1.6	54 39.8	+20.2	1.6	55 39.8	+20.2	1.7	56 39.8	+20.2	1.7	57 39.7	+20.3	1.8	58 39.7	+20.3	1.8	59 39.7	+20.3	1.9	89
90	53 00.0	+18.9	0.0	54 00.0	+18.9	0.0	55 00.0	+18.9	0.0	56 00.0	+18.8	0.0	57 00.0	+18.8	0.0	58 00.0	+18.8	0.0	59 00.0	+18.7	0.0	60 00.0	+18.7	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION **L.H.A. 109°, 251°**

72°, 288° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
{ L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	10 43.1	+48.7	104.5	10 27.9	+49.3	104.7	10 12.6	+49.9	104.9	9 57.0	+50.5	105.1	9 41.3	+51.1	105.2	9 25.5	+51.5	105.4	9 09.5	+52.0	105.6	8 53.3	+52.6	105.7	0
1	11 31.8	+48.7	104.0	11 17.2	+49.3	104.1	11 02.5	+49.8	104.3	10 47.5	+50.4	104.5	10 32.4	+50.9	104.7	10 17.0	+51.6	104.9	10 01.5	+52.1	105.1	9 45.9	+52.5	105.2	1
2	12 20.5	+48.5	103.4	12 06.5	+49.2	103.6	11 52.3	+49.8	103.8	11 37.9	+50.4	104.0	11 23.3	+51.0	104.2	11 08.6	+51.4	104.4	10 53.6	+51.9	104.6	10 38.4	+52.5	104.7	2
3	13 09.0	+48.5	102.8	12 55.7	+49.1	103.0	12 42.1	+49.7	103.2	12 28.3	+50.3	103.4	12 14.3	+50.8	103.6	12 00.0	+51.4	103.8	11 45.5	+52.0	104.0	11 30.9	+52.4	104.2	3
4	13 57.5	+48.4	102.1	13 44.8	+49.0	102.4	13 31.8	+49.6	102.6	13 18.6	+50.2	102.9	13 05.1	+50.8	103.1	12 51.4	+51.3	103.3	12 37.5	+51.8	103.5	12 23.3	+52.4	103.7	4
5	14 45.9	+48.4	101.5	14 33.8	+49.0	101.8	14 21.4	+49.6	102.0	14 08.8	+50.1	102.3	13 55.9	+50.7	102.5	13 42.7	+51.3	102.8	13 29.3	+51.8	103.0	13 15.7	+52.3	103.2	5
6	15 34.3	+48.2	100.9	15 22.8	+48.8	101.2	15 11.0	+49.4	101.5	14 58.9	+50.1	101.7	14 46.6	+50.6	102.0	14 34.0	+51.2	102.2	14 21.1	+51.8	102.5	14 08.0	+52.3	102.7	6
7	16 22.5	+48.1	100.3	16 11.6	+48.7	100.6	16 00.4	+49.4	100.9	15 49.0	+49.9	101.2	15 37.2	+50.5	101.4	15 25.2	+51.1	101.7	15 12.9	+51.6	102.0	15 00.3	+52.2	102.2	7
8	17 10.6	+47.9	99.7	17 00.3	+48.6	100.0	16 49.8	+49.2	100.3	16 38.9	+49.9	100.6	16 27.7	+50.5	100.9	16 16.3	+51.0	101.2	16 04.5	+51.6	101.4	15 52.5	+52.1	101.7	8
9	17 58.5	+47.9	99.0	17 48.9	+48.6	99.4	17 39.0	+49.2	99.7	17 28.8	+49.7	100.0	17 18.2	+50.3	100.3	17 07.3	+50.9	100.6	16 56.1	+51.5	100.9	16 44.6	+52.0	101.2	9
10	18 46.4	+47.7	98.4	18 37.5	+48.3	98.7	18 28.2	+49.0	99.1	18 18.5	+49.7	99.4	18 08.5	+50.3	99.7	17 58.2	+50.9	100.1	17 47.6	+51.4	100.4	17 36.6	+52.0	100.7	10
11	19 34.1	+47.6	97.8	19 25.8	+48.3	98.1	19 17.2	+48.9	98.5	19 08.2	+49.5	98.8	18 58.8	+50.1	99.2	18 49.1	+50.7	99.5	18 39.0	+51.3	99.8	18 28.6	+51.9	100.2	11
12	20 21.7	+47.5	97.1	20 14.1	+48.1	97.5	20 06.1	+48.8	97.9	19 57.7	+49.4	98.2	19 48.9	+50.1	98.6	19 39.8	+50.6	98.9	19 30.3	+51.2	99.3	19 20.5	+51.7	99.6	12
13	21 09.2	+47.3	96.5	21 02.2	+48.0	96.9	20 54.9	+48.6	97.2	20 47.1	+49.3	97.6	20 39.0	+49.9	98.0	20 30.4	+50.6	98.4	20 21.5	+51.1	98.7	20 12.2	+51.7	99.1	13
14	21 56.5	+47.1	95.8	21 50.2	+47.8	96.2	21 43.5	+48.5	96.6	21 36.4	+49.1	97.0	21 28.9	+49.8	97.4	21 21.0	+50.3	97.8	21 12.6	+51.0	98.2	21 03.9	+51.6	98.5	14
15	22 43.6	+47.0	95.1	22 38.0	+47.7	95.6	22 32.0	+48.3	96.0	22 25.5	+49.0	96.4	22 18.7	+49.6	96.8	22 11.3	+50.3	97.2	22 03.6	+50.9	97.6	21 55.5	+51.4	98.0	15
16	23 30.6	+46.8	94.5	23 25.7	+47.5	94.9	23 20.3	+48.2	95.3	23 14.5	+48.9	95.8	23 08.3	+49.5	96.2	23 01.6	+50.2	96.6	22 54.5	+50.7	97.0	22 46.9	+51.4	97.4	16
17	24 17.4	+46.6	93.8	24 13.2	+47.3	94.2	24 08.5	+48.0	94.7	24 03.4	+48.7	95.1	23 57.8	+49.4	95.6	23 51.8	+49.9	96.0	23 45.2	+50.7	96.4	23 38.3	+51.2	96.9	17
18	25 04.0	+46.4	93.1	25 00.5	+47.1	93.6	24 56.5	+47.9	94.0	24 52.1	+48.5	94.5	24 47.2	+49.2	94.9	24 41.7	+49.9	95.4	24 35.9	+50.4	95.9	24 29.5	+51.1	96.3	18
19	25 50.4	+46.2	92.4	25 47.6	+46.9	92.9	25 44.4	+47.6	93.3	25 40.6	+48.4	93.8	25 36.4	+49.0	94.3	25 31.6	+49.7	94.8	25 26.3	+50.4	95.3	25 20.6	+51.0	95.7	19
20	26 36.6	+45.9	91.7	26 34.5	+46.8	92.2	26 32.0	+47.5	92.7	26 29.0	+48.1	93.2	26 25.4	+48.9	93.7	26 21.3	+49.5	94.2	26 16.7	+50.2	94.7	26 11.6	+50.8	95.1	20
21	27 22.5	+45.8	91.0	27 21.3	+46.5	91.5	27 19.5	+47.2	92.0	27 17.1	+48.0	92.5	27 14.2	+48.7	93.0	27 10.8	+49.4	93.5	27 06.9	+50.0	94.0	27 02.4	+50.6	94.5	21
22	28 08.3	+45.5	90.2	28 07.8	+46.3	90.8	28 06.7	+47.1	91.3	28 05.1	+47.8	91.8	28 02.9	+48.5	92.4	28 00.2	+49.1	92.9	27 56.9	+49.8	93.4	27 53.0	+50.5	93.9	22
23	28 53.8	+45.3	89.5	28 54.1	+46.0	90.0	28 53.8	+46.8	90.6	28 52.9	+47.5	91.1	28 51.4	+48.3	91.7	28 49.3	+49.0	92.2	28 46.7	+49.7	92.8	28 43.5	+50.3	93.3	23
24	29 39.1	+45.0	88.7	29 40.1	+45.9	89.3	29 40.6	+46.6	89.9	29 40.4	+47.4	90.4	29 39.7	+48.0	91.0	29 38.3	+48.8	91.6	29 36.4	+49.5	92.1	29 33.8	+50.2	92.7	24
25	30 24.1	+44.8	88.0	30 26.0	+45.5	88.5	30 27.2	+46.3	89.1	30 27.8	+47.1	89.7	30 27.7	+47.9	90.3	30 27.1	+48.6	90.9	30 25.9	+49.2	91.5	30 24.0	+49.9	92.1	25
26	31 08.9	+44.4	87.2	31 11.5	+45.3	87.8	31 13.5	+46.1	88.4	31 14.9	+46.8	89.0	31 15.6	+47.6	89.6	31 15.7	+48.3	90.2	31 15.1	+49.1	90.8	31 13.9	+49.8	91.4	26
27	31 53.3	+44.2	86.4	31 56.8	+45.0	87.0	31 59.6	+45.8	87.6	32 01.7	+46.6	88.3	32 03.2	+47.4	88.9	32 04.0	+48.1	89.5	32 04.2	+48.8	90.1	32 03.7	+49.6	90.8	27
28	32 37.5	+43.9	85.6	32 41.8	+44.7	86.2	32 45.4	+45.5	86.9	32 48.3	+46.3	87.5	32 50.6	+47.1	88.2	32 52.1	+47.9	88.8	32 53.0	+48.7	89.5	32 53.3	+49.3	90.1	28
29	33 21.4	+43.5	84.8	33 26.5	+44.4	85.4	33 30.9	+45.2	86.1	33 34.6	+46.1	86.8	33 37.7	+46.8	87.4	33 40.0	+47.6	88.1	33 41.7	+48.3	88.8	33 42.6	+49.1	89.4	29
30	34 04.9	+43.2	84.0	34 10.9	+44.0	84.6	34 16.1	+44.9	85.3	34 20.7	+45.7	86.0	34 24.5	+46.6	86.7	34 27.6	+47.4	87.4	34 30.0	+48.2	88.0	34 31.7	+48.9	88.7	30
31	34 48.1	+42.8	83.1	34 54.9	+43.7	83.8	35 01.0	+44.6	84.5	35 06.4	+45.5	85.2	35 11.1	+46.2	85.9	35 15.0	+47.1	86.6	35 18.2	+47.8	87.3	35 20.6	+48.6	88.0	31
32	35 30.9	+42.5	82.3	35 38.6	+43.4	83.0	35 45.6	+44.3	83.7	35 51.9	+45.1	84.4	35 57.3	+46.0	85.1	36 02.1	+46.7	85.8	36 06.0	+47.6	86.6	36 09.2	+48.4	87.3	32
33	36 13.4	+42.1	81.4	36 22.0	+43.0	82.1	36 29.9	+43.9	82.8	36 37.0	+44.7	83.6	36 43.3	+45.6	84.3	36 48.8	+46.5	85.1	36 53.6	+47.3	85.8	36 57.6	+48.1	86.6	33
34	36 55.5	+41.7	80.5	37 05.0	+42.6	81.2	37 13.8	+43.5	82.0	37 21.7	+44.4	82.7	37 28.9	+45.3	83.5	37 35.3	+46.1	84.3	37 40.9	+46.9	85.0	37 45.7	+47.7	85.8	34
35	37 37.2	+41.2	79.6	37 47.6	+42.2	80.4	37 57.3	+43.1	81.1	38 06.1	+44.1	81.9	38 14.2	+44.9	82.7	38 21.4	+45.8	83.5	38 27.8	+46.7	84.3	38 33.4	+47.5	85.0	35
36	38 18.4	+40.7	78.7	38 29.8	+41.8	79.5	38 40.4	+42.7	80.2	38 50.2	+43.6	81.0	38 59.1	+44.6	81.8	39 07.2	+45.4	82.6	39 14.5	+46.3	83.4	39 20.9	+47.2	84.3	36
37	38 59.3	+40.3	77.7	39 11.6	+41.3	78.5	39 23.1	+42.3	79.3	39 33.8	+43.2	80.1	39 43.7	+44.1	81.0	39 52.6	+45.1	81.8	40 00.8	+45.9	82.6	40 08.1	+46.8	83.5	37
38	39 39.6	+39.9	76.8	39 52.9	+40.9	77.6	40 05.4	+41.8	78.4	40 17.0	+42.8	79.2	40 27.8	+43.7	80.1	40 37.7	+44.7	80.9	40 46.7	+45.6	81.8	40 54.9	+46.4	82.6	38
39	40 19.5	+39.4	75.8	40 33.8	+40.4	76.6	40 47.2	+41.4	77.5	40 59.8	+42.4	78.3	41 11.5	+43.3	79.2	41 22.4	+44.2	80.0	41 32.3	+45.2	80.9	41 41.3	+46.1	81.8	39
40	40 58.9	+38.8	74.8	41 14.2	+39.9	75.7	41 28.6	+40.9	76.5	41 42.2	+41.8	77.4	41 54.8	+42.9	78.2	42 06.6	+43.8	79.1	42 17.5	+44.7	80.0	42 27.4	+45.7	80.9	40
41	41 37.7	+38.4	73.8	41 54.1	+39.3	74.7	42 09.5	+40.4	75.5	42 24.0	+41.4	76.4	42 37.7	+42.4	77.3	42 50.4	+43.4	78.2	43 02.2	+44.3	79.1	43 13.1	+45.2	80.0	41
42	42 16.1	+37.7	72.8	42 33.4	+38.8	73.6	42 49.9	+39.8	74.5	43 05.4	+40.9	75.4	43 20.1	+41.8	76.3	43 33.8	+42.8	77.3	43 46.5	+43.9	78.2	43 58.3	+44.8	79.1	42
43	42 53.8	+37.2	71.7	43 12.2	+38.2	72.6	43 29.7	+39.3	73.5	43 46.3	+40.3	74.4	44 01.9	+41.4	75.3	44 16.6	+42.4	76.3	44 30.4	+43.3	77.2	44 43.1	+44.4	78.2	43
44	43 31.0	+36.5	70.6	43 50.4	+37.6	71.5	44 09.0	+38.6	72.5	44 26.6	+39.7	73.4	44 43.3	+40.8	74.3	44 59.0	+41.8	75.3	45 13.7	+42.9	76.3	45 27.5	+43.8	77.2	44
45	44 07.5	+35.9	69.5	44 28.0	+37.0	70.4	44 47.6	+38.1	71.4	45 06.3	+39.2	72.3	45 24.1	+40.2	73.3	45 40.8	+41.3	74.3	45 56.6	+42.3	75.3	46 11.3	+43.4	76.3	45
46	44 43.4	+35.2	68.4	45 05.0	+36.3	69.3	45 25.7	+37.4	70.3	45 45.5	+38.5	71.2	46 04.3	+39.6	72.2	46 22.1	+40.7	73.2	46 38.9	+41.7	74.2	46 54.7	+42.8	75.3	46
47	45 18.6	+34.5	67.3	45 41.3	+35.6	68.2	46 03.1	+36.8	69.2	46 24.0	+37.9	70.1	46 43.9	+38.9	71.1	47 02.8	+40.0	72.2	47 20.6	+41.2	73.2	47 37.5	+42.2	74.2	47
48	45 53.1	+33.8	66.1	46 16.9	+35.0	67.0	46 39.9	+36.0	68.0	47 01.9	+37.1	69.0	47 22.8	+38.4	70.0	47 42.8	+39.5	71.1	48 01.8	+40.5	72.1	48 19.7	+41.6	73.2	48
49	46 26.9	+33.0	64.9	46 51.9	+34.1	65.9	47 15.9	+35.3	66.8	47 39.0	+36.5	67.9	48 01.2	+37.6	68.9	48 22.3	+38.7	69.9	48 42.3	+39.9	71.0	49 01.3	+41.0	72.1	49
50	46 59.9	+32.2	63.7	47 26.0	+33.4	64.7	47 51.2	+34.6	65.6	48 15.5	+35.7	66.7	48 38.8	+36.8	67.7	49 01.0	+38.0	68.8	49 22.2	+39.2	69.9	49 42.3	+40.4	71.0	50
51	47 32.1	+31.4	62.4	47 59.4	+32.6	63.4	48 25.8	+33.7	64.4	48 51.2	+34.9	65.5	49 15.6	+36.1	66.5	49 39.0	+37.3	67.6	50 01.4	+38.4	68.7	50 22.7	+39.6	69.8	51
52	48 03.5	+30.6	61.2	48 32.0	+31.7	62.2	48 59.5	+33.0	63.2	49 26.1	+34.2	64.2	49 51.7	+35.4	65.3	50 16.3	+36.5	66.4	50 39.8	+37.7	67.5	51 02.3	+38.9	68.6	52
53	48 34.1	+29.6	59.9	49 03.7	+30.9	60.9	49 32.5	+32.0	61.9	50 00.3	+33.2	62.9	50 27.1	+34.4	64.0	50 52.8	+35.7	65.1	51 17.5	+36.9	66.2	51 41.2	+38.1	67.4	53
54	49 03.7	+28.8	58.6	49 34.6	+29.9	59.6	50 04.5	+31.2	60.6	50 33.5	+32.4	61.6	51 01.5	+33.6	62.7	51 28.5	+34.8	63.8	51 54.4	+36.1	65.0	52 19.3	+37.2	66.1	54
55	49 32.5	+27.8	57.2	50 04.5	+29.0	58.2	50 35.7	+30.2	59.2	51 05.9	+31.4	60.3	51 35.1	+32.7	61.4	52 03.3	+33.9	62.5	52 30.5	+35.1	63.7	52 56.5	+36.5	64.9	55
56	50 00.3	+26.8	55.8	50 33.5	+28.0	56.8	51 05.9	+29.2	57.9	51 37.3	+30.5	58.9	52 07.8	+31.7	60.0	52 37.2	+33.0	61.2	53 05.6	+34.3	62.3	53 33.0	+35.5	63.5	56
57	50 27.1	+25.7	54.4	51 01.5	+27.0	55.5	51 35.1	+28.2	56.5	52 07.8	+29.4	57.5	52 39.5	+30.7	58.6	53 10.2	+32.0	59.8	53 39.9	+33.2	61.0	54 08.5	+34.5	62.2	57
58	50 52.8	+24.7	53.0	51 28.5	+25.9	54.0	52 03.3	+27.2	55.0	52 37.2	+28.4	56.1	53 10.2	+29.7	57.2	53 42.2	+30.9	58.4	54 13.1	+32.3	59.5	54 43.0	+33.6	60.8	58
59	51 17.5	+23.7	51.6	51 54.4	+24.9	52.6	52 30.5	+26.0	53.6	53 05.6	+27.4	54.6	53 39.9	+28.6	55.8	54 13.1	+29.9	56.9	54 45.4	+31.2	58.1	55 16.6	+32.5	59.3	59
60	51 41.2	+22.4	50.1	52 19.3	+23.7	51.1	52 56.5	+25.0	52.1	53 33.0	+26.1	53.2	54 08.5	+27.4	54.3	54 43.0	+28.8	55.4	55 16.6	+30.0	56.6	55 49.1	+31.4	57.8	60
61	52 03.6	+21.4	48.6	52 43.0	+22.5	49.6	53 21.5	+23.7	50.6	53 59.1	+25.0	51.6	54 35.9	+26.3	52.7	55 11.8	+27.5	53.9	55 46.6	+28.9	55.1	56 20.5	+30.2	56.3	61
62	52 25.0	+20.1	47.1	53 05.5	+21.3	48.0	53 45.2	+22.5	49.0	54 24.1	+23.8	50.1	55 02.2	+25.0	51.2	55 39.3	+26.4	52.3	56 15.5	+27.7	53.5	56 50.7	+29.0	54.7	62
63	52 45.1	+18.9	45.5	53 26.8	+20.1	46.5	54 07.7	+21.3	47.5	54 47.9	+22.5	48.5	55 27.2	+23.8	49.6	56 05.7	+25.0	50.7	56 43.2	+26.4	51.9	57 19.7	+27.8	53.1	63
64	53 04.0	+17.6	43.9	53 46.9	+18.7	44.9	54 29.0	+20.0	45.9	55 10.4	+21.2	46.9	55 51.0	+22.5	48.0	56 30.7	+23.8	49.1	57 09.6	+25.1	50.2	57 47.5	+26.4	51.5	64
65	53 21.6	+16.4	42.3	54 05.6	+17.5	43.3	54 49.0	+18.6	44.2	55 31.6	+19.9	45.2	56 13.5	+21.1	46.3	56 54.5	+22.4	47.4	57 34.7	+23.7	48.6	58 13.9	+25.1	49.8	65
66	53 38.0	+15.0	40.7	54 23.1	+16.1	41.6	55 07.6	+17.3	42.6	55 51.5	+18.4	43.6	56 34.6	+19.7	44.6	57 16.9	+21.0	45.7	57 58.4	+22.2	46.8	58 39.0	+23.6	48.0	66
67	53 53.0	+13.6	39.1	54 39.2	+14.8	40.0	55 24.9	+15.9	40.9	56 09.9	+17.1	41.9	56 54.3	+18.2	42.9	57 37.9	+19.5	44.0	58 20.6	+20.8	45.1	59 02.6	+22.1	46.3	67
68	54 06.6	+12.3	37.4	54 54.0	+13.3	38.3	55 40.8	+14.5	39.2	56 27.0	+15.6	40.1	57 12.5	+16.8	41.1	57 57.4	+17.9	42.1	58 41.4	+19.3	43.3	59 24.7	+20.6	44.4	68
69	54 18.9	+10.9	35.8	55 07.3	+11.9	36.6	55 55.2	+13.0	37.5	56 42.6	+14.1	38.4	57 29.3	+15.2	39.4	58 15.3	+16.5	40.4	59 00.7	+17.7	41.5	59 45.3	+18.9	42.6	69
70	54 29.8	+9.4	34.1	55 19.2	+10.5	34.9	56 08.2	+11.5	35.7	56 56.7	+12.5	36.6	57 44.5	+13.7	37.5	58 31.8	+14.8	38.5	59 18.4	+16.0	39.6	60 04.2	+17.4	40.7	70
71	54 39.2	+8.0	32.4	55 29.7	+9.0	33.1	56 19.7	+10.0	34.0	57 09.2	+11.0	34.8	57 58.2	+12.1	35.7	58 46.6	+13.2	36.7	59 34.4	+14.4	37.7	60 21.6	+15.6	38.8	71
72	54 47.2	+6.6	30.6	55 38.7	+7.4	31.4	56 29.7	+8.4	32.2	57 20.2	+9.4	33.0	58 10.3	+10.5	33.9	58 59.8	+11.6	34.8	59 48.8	+12.7	35.8	60 37.2	+13.9	36.8	72
73	54 53.8	+5.0	28.9	55 46.1	+6.0	29.6	56 38.1	+6.8	30.4	57 29.6	+7.8	31.2	58 20.8	+8.8	32.0	59 11.4	+9.8	32.9	60 01.5	+11.0	33.8	60 51.1	+12.1	34.8	73
74	54 58.8	+3.6	27.2	55 52.1	+4.4	27.9	56 44.9	+5.3	28.6	57 37.4	+6.2	29.3	58 29.6	+7.1	30.1	59 21.2	+8.2	30.9	60 12.5	+9.2	31.8	61 03.2	+10.2	32.8	74
75	55 02.4	+2.1	25.4	55 56.5	+2.8	26.1	56 50.2	+3.7	26.7	57 43.6	+4.5	27.5	58 36.7	+5.4	28.2	59 29.4	+6.3	29.0	60 21.6	+7.4	29.9	61 13.4	+8.4	30.8	75
76	55 04.5	+0.6	23.7	55 59.3	+1.3	24.3	56 53.9	+2.1	24.9	57 48.1	+2.9	25.6	58 42.1	+3.7	26.3	59 35.7	+4.6	27.0	60 29.0	+5.5	27.9	61 21.8	+6.5	28.7	76
77	55 05.1	–0.9	21.9	56 00.6	–0.2	22.5	56 56.0	+0.4	23.1	57 51.0	+1.2	23.7	58 45.8	+2.0	24.4	59 40.3	+2.8	25.1	60 34.5	+3.7	25.8	61 28.3	+4.6	26.6	77
78	55 04.2	–2.4	20.2	56 00.4	–1.8	20.7	56 56.4	–1.1	21.3	57 52.2	–0.4	21.8	58 47.8	+0.3	22.4	59 43.1	+1.1	23.1	60 38.2	+1.8	23.8	61 32.9	+2.7	24.5	78
79	55 01.8	–3.9	18.5	55 58.6	–3.3	18.9	56 55.3	–2.8	19.4	57 51.8	–2.1	19.9	58 48.1	–1.5	20.5	59 44.2	–0.8	21.1	60 40.0	0.0	21.7	61 35.6	+0.8	22.4	79
80	54 57.9	–5.4	16.7	55 55.3	–4.9	17.1	56 52.5	–4.3	17.6	57 49.7	–3.8	18.1	58 46.6	–3.2	18.6	59 43.4	–2.6	19.1	60 40.0	–1.9	19.7	61 36.4	–1.2•	20.3	80
81	54 52.5	–6.9	15.0	55 50.4	–6.4	15.4	56 48.2	–5.9	15.8	57 45.9	–5.5	16.2	58 43.4	–4.9	16.7	59 40.8	–4.3	17.1	60 38.1	–3.8	17.7	61 35.2	–3.0	18.2	81
82	54 45.6	–8.3	13.3	55 44.0	–7.9	13.6	56 42.3	–7.6	14.0	57 40.4	–7.0	14.3	58 38.5	–6.6	14.7	59 36.5	–6.1	15.2	60 34.3	–5.6	15.6	61 32.2	–5.0	16.1	82
83	54 37.3	–9.8	11.5	55 36.1	–9.5	11.8	56 34.7	–9.0	12.1	57 33.4	–8.7	12.5	58 31.9	–8.3	12.8	59 30.4	–7.9	13.2	60 28.7	–7.4	13.6	61 27.0	–7.0	14.0	83
84	54 27.5	–11.1	9.8	55 26.6	–10.9	10.1	56 25.7	–10.3	10.4	57 24.7	–10.3	10.6	58 23.6	–9.6	11.3	59 22.5	–9.6	11.3	60 21.3	–9.2	11.6	61 20.0	–8.8	12.0	84
85	54 16.4	–12.6	8.2	55 15.7	–12.3	8.4	56 15.1	–12.1	8.6	57 14.4	–11.9	8.8	58 13.7	–11.6	9.1	59 12.9	–11.3	9.3	60 12.1	–11.0	9.6	61 11.2	–10.7	9.9	85
86	54 03.8	–14.0	6.5	55 03.4	–13.8	6.7	56 03.0	–13.6	6.8	57 02.5	–13.4	7.0	58 02.1	–13.2	7.2	59 01.6	–13.0	7.4	60 01.1	–12.8	7.6	61 00.5	–12.5	7.9	86
87	53 49.8	–15.3	4.8	54 49.6	–15.2	5.0	55 49.4	–15.0	5.1	56 49.1	–14.8	5.2	57 48.9	–14.8	5.3	58 48.6	–14.6	5.5	59 48.3	–14.5	5.7	60 48.0	–14.3	5.9	87
88	53 34.5	–16.6	3.2	54 34.4	–16.5	3.3	55 34.3	–16.4	3.4	56 34.2	–16.4	3.5	57 34.1	–16.3	3.5	58 34.0	–16.2	3.6	59 33.9	–16.2	3.8	60 33.7	–16.0	3.9	88
89	53 17.9	–17.9	1.6	54 17.9	–17.9	1.6	55 17.9	–17.9	1.7	56 17.8	–17.8	1.7	57 17.8	–17.8	1.8	58 17.8	–17.8	1.8	59 17.7	–17.7	1.9	60 17.7	–17.7	1.9	89
90	53 00.0	–19.2	0.0	54 00.0	–19.2	0.0	55 00.0	–19.2	0.0	56 00.0	–19.2	0.0	57 00.0	–19.3	0.0	58 00.0	–19.3	0.0	59 00.0	–19.3	0.0	60 00.0	–19.4	0.0	90

53° 54° 55° 56° 57° 58° 59° 60°

72°, 288° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

Each latitude cell below is formatted as `Hc  d  Z`.

Dec.	53°	54°	55°	56°	57°	58°	59°	60°	Dec.
0	10 43.1 −48.8 104.5	10 27.9 −49.4 104.7	10 12.6 −50.0 104.9	9 57.0 −50.5 105.1	9 41.3 −51.0 105.2	9 25.5 −51.6 105.4	9 09.5 −52.1 105.6	8 53.3 −52.6 105.7	0
1	9 54.3 −48.9 105.1	9 38.5 −49.4 105.3	9 22.6 −50.0 105.5	9 06.5 −50.6 105.6	8 50.3 −51.1 105.8	8 33.9 −51.7 105.9	8 17.4 −52.2 106.1	8 00.7 −52.7 106.2	1
2	9 05.4 −48.9 105.7	8 49.1 −49.5 105.9	8 32.6 −50.1 106.0	8 15.9 −50.6 106.2	7 59.2 −51.2 106.4	7 42.2 −51.6 106.4	7 25.2 −52.2 106.6	7 08.0 −52.6 106.7	2
3	8 16.5 −49.0 106.3	7 59.6 −49.6 106.4	7 42.5 −50.1 106.7	7 25.3 −50.6 106.7	7 08.0 −51.2 106.8	6 50.6 −51.7 106.9	6 33.0 −52.2 107.1	6 15.4 −52.7 107.2	3
4	7 27.5 −49.0 106.9	7 10.0 −49.6 107.0	6 52.4 −50.2 107.1	6 34.7 −50.7 107.2	6 16.8 −51.2 107.4	5 58.9 −51.8 107.5	5 40.8 −52.2 107.6	5 22.7 −52.8 107.6	4
5	6 38.5 −49.1 107.5	6 20.4 −49.6 107.6	6 02.2 −50.1 107.7	5 44.0 −50.8 107.8	5 25.6 −51.3 107.9	5 07.1 −51.7 108.0	4 48.6 −52.3 108.1	4 29.9 −52.7 108.1	5
6	5 49.4 −49.1 108.1	5 30.8 −49.7 108.2	5 12.1 −50.3 108.2	4 53.2 −50.7 108.3	4 34.3 −51.2 108.4	4 15.4 −51.8 108.5	3 56.3 −52.3 108.5	3 37.2 −52.8 108.6	6
7	5 00.3 −49.1 108.6	4 41.1 −49.7 108.7	4 21.8 −50.2 108.8	4 02.5 −50.8 108.9	3 43.1 −51.3 108.9	3 23.6 −51.8 109.0	3 04.0 −52.3 109.0	2 44.4 −52.7 109.1	7
8	4 11.2 −49.1 109.2	3 51.4 −49.7 109.3	3 31.6 −50.2 109.3	3 11.7 −50.8 109.4	2 51.8 −51.3 109.4	2 31.8 −51.8 109.5	2 11.7 −52.3 109.5	1 51.7 −52.8 109.6	8
9	3 22.1 −49.2 109.8	3 01.7 −49.7 109.8	2 41.4 −50.3 109.9	2 20.9 −50.8 109.9	2 00.5 −51.4 110.0	1 40.0 −51.9 110.0	1 19.4 −52.3 110.0	0 58.9 −52.8 110.0	9
10	2 32.9 −49.2 110.4	2 12.0 −49.7 110.4	1 51.1 −50.3 110.4	1 30.1 −50.8 110.5	1 09.1 −51.3 110.5	0 48.1 −51.8 110.5	0 27.1 −52.3 110.5	0 06.1 −52.8 110.5	10
11	1 43.7 −49.2 110.9	1 22.3 −49.8 111.0	1 00.8 −50.3 111.0	0 39.3 −50.8 111.0	0 17.8 −51.3 111.0	0 03.7 +51.8 69.0	0 25.2 +52.3 69.0	0 46.7 +52.7 69.0	11
12	0 54.5 −49.2 111.5	0 32.5 −49.7 111.5	0 10.5 −50.3 111.5	0 11.5 +50.8 68.5	0 33.5 +51.3 68.5	0 55.5 +51.8 68.5	1 17.5 +52.3 68.5	1 39.4 +52.8 68.5	12
13	0 05.3 −49.2 112.1	0 17.2 +49.8 67.9	0 39.8 +50.2 67.9	1 02.3 +50.8 67.9	1 24.8 +51.3 68.0	1 47.3 +51.8 68.0	2 09.8 +52.3 68.0	2 32.2 +52.8 68.1	13
14	0 43.9 +49.2 67.4	1 07.0 +49.7 67.4	1 30.0 +50.2 67.4	1 53.1 +50.8 67.4	2 16.1 +51.3 67.4	2 39.1 +51.8 67.5	3 02.1 +52.3 67.5	3 25.0 +52.7 67.6	14
15	1 33.1 +49.1 66.8	1 56.7 +49.7 66.8	2 20.3 +50.3 66.8	2 43.9 +50.8 66.9	3 07.4 +51.3 66.9	3 30.9 +51.8 67.0	3 54.4 +52.2 67.0	4 17.7 +52.8 67.1	15
16	2 22.2 +49.2 66.2	2 46.4 +49.8 66.2	3 10.6 +50.2 66.3	3 34.7 +50.7 66.3	3 58.7 +51.3 66.4	4 22.7 +51.8 66.5	4 46.6 +52.3 66.5	5 10.5 +52.7 66.6	16
17	3 11.4 +49.1 65.6	3 36.2 +49.6 65.7	4 00.8 +50.3 65.7	4 25.4 +50.8 65.8	4 50.0 +51.2 65.9	5 14.5 +51.7 66.0	5 38.9 +52.2 66.1	6 03.2 +52.6 66.1	17
18	4 00.6 +49.1 65.1	4 25.8 +49.7 65.1	4 51.1 +50.1 65.2	5 16.2 +50.7 65.3	5 41.2 +51.2 65.4	6 06.2 +51.7 65.5	6 31.1 +52.2 65.6	6 55.8 +52.7 65.7	18
19	4 49.7 +49.1 64.5	5 15.5 +49.7 64.6	5 41.2 +50.2 64.6	6 06.9 +50.7 64.7	6 32.4 +51.2 64.8	6 57.9 +51.7 64.9	7 23.3 +52.1 65.1	7 48.5 +52.6 65.2	19
20	5 38.8 +49.1 63.9	6 05.2 +49.6 64.0	6 31.4 +50.1 64.1	6 57.6 +50.6 64.2	7 23.6 +51.2 64.3	7 49.6 +51.6 64.4	8 15.4 +52.1 64.6	8 41.1 +52.6 64.7	20
21	6 27.9 +49.0 63.3	6 54.8 +49.5 63.4	7 21.5 +50.1 63.5	7 48.2 +50.6 63.7	8 14.8 +51.1 63.8	8 41.2 +51.6 63.9	9 07.5 +52.1 64.1	9 33.7 +52.5 64.2	21
22	7 16.9 +49.0 62.7	7 44.3 +49.5 62.9	8 11.6 +50.1 63.0	8 38.8 +50.6 63.1	9 05.9 +51.0 63.3	9 32.8 +51.6 63.4	9 59.6 +52.0 63.6	10 26.2 +52.5 63.7	22
23	8 05.9 +48.9 62.2	8 33.8 +49.5 62.3	9 01.7 +50.0 62.4	9 29.4 +50.5 62.6	9 56.9 +51.0 62.7	10 24.4 +51.5 62.9	10 51.6 +52.0 63.1	11 18.7 +52.5 63.2	23
24	8 54.8 +48.9 61.6	9 23.3 +49.4 61.7	9 51.7 +49.9 61.9	10 19.9 +50.4 62.0	10 47.9 +51.0 62.2	11 15.9 +51.4 62.4	11 43.6 +51.9 62.5	12 11.2 +52.4 62.7	24
25	9 43.7 +48.8 61.1	10 12.7 +49.4 61.1	10 41.6 +49.9 61.3	11 10.3 +50.4 61.5	11 38.9 +50.9 61.7	12 07.3 +51.4 61.8	12 35.5 +51.9 62.0	13 03.6 +52.3 62.2	25
26	10 32.5 +48.7 60.4	11 02.1 +49.2 60.6	11 31.5 +49.8 60.7	12 00.7 +50.3 60.9	12 29.8 +50.8 61.1	12 58.7 +51.3 61.3	13 27.4 +51.8 61.5	13 55.9 +52.3 61.7	26
27	11 21.2 +48.7 59.8	11 51.3 +49.3 60.0	12 21.3 +49.7 60.2	12 51.0 +50.3 60.4	13 20.6 +50.8 60.6	13 50.0 +51.3 60.8	14 19.2 +51.7 61.0	14 48.2 +52.2 61.2	27
28	12 09.9 +48.6 59.2	12 40.6 +49.1 59.3	13 11.0 +49.7 59.6	13 41.3 +50.2 59.8	14 11.4 +50.6 60.0	14 41.3 +51.1 60.2	15 10.9 +51.7 60.5	15 40.4 +52.1 60.7	28
29	12 58.5 +48.5 58.6	13 29.7 +49.0 58.8	14 00.7 +49.5 59.0	14 31.5 +50.1 59.2	15 02.0 +50.6 59.5	15 32.4 +51.1 59.7	16 02.6 +51.6 59.9	16 32.5 +52.1 60.2	29
30	13 47.0 +48.5 58.0	14 18.7 +49.0 58.2	14 50.2 +49.5 58.4	15 21.6 +50.0 58.7	15 52.6 +50.6 58.9	16 23.5 +51.0 59.2	16 54.2 +51.5 59.4	17 24.6 +52.0 59.7	30
31	14 35.5 +48.3 57.4	15 07.7 +48.9 57.6	15 39.7 +49.4 57.8	16 11.6 +49.9 58.1	16 43.2 +50.4 58.3	17 14.5 +51.0 58.6	17 45.7 +51.4 58.9	18 16.6 +51.9 59.2	31
32	15 23.8 +48.2 56.8	15 56.6 +48.7 57.0	16 29.1 +49.3 57.3	17 01.5 +49.8 57.5	17 33.6 +50.3 57.8	18 05.5 +50.8 58.0	18 37.1 +51.3 58.3	19 08.5 +51.8 58.6	32
33	16 12.0 +48.2 56.2	16 45.3 +48.7 56.4	17 18.4 +49.2 56.7	17 51.3 +49.7 56.9	18 23.9 +50.2 57.2	18 56.3 +50.7 57.5	19 28.4 +51.2 57.8	20 00.3 +51.7 58.1	33
34	17 00.2 +48.0 55.5	17 34.0 +48.5 55.8	18 07.6 +49.1 56.1	18 40.9 +49.6 56.3	19 14.1 +50.1 56.6	19 46.7 +50.6 56.9	20 19.6 +51.1 57.2	20 52.0 +51.6 57.5	34
35	17 48.2 +47.8 54.9	18 22.5 +48.5 55.2	18 56.7 +48.9 55.5	19 30.6 +49.5 55.7	20 04.2 +50.0 56.0	20 37.6 +50.5 56.3	21 10.7 +51.0 56.7	21 43.6 +51.4 57.0	35
36	18 36.0 +47.8 54.3	19 11.0 +48.3 54.6	19 45.6 +48.9 54.8	20 20.1 +49.3 55.1	20 54.2 +49.9 55.4	21 28.1 +50.4 55.8	22 01.7 +50.9 56.1	22 35.0 +51.4 56.4	36
37	19 23.8 +47.6 53.6	19 59.3 +48.1 53.9	20 34.5 +48.7 54.2	21 09.4 +49.2 54.5	21 44.1 +49.7 54.9	22 18.5 +50.2 55.2	22 52.6 +50.8 55.5	23 26.4 +51.3 55.9	37
38	20 11.4 +47.5 53.0	20 47.4 +48.0 53.3	21 23.2 +48.5 53.6	21 58.6 +49.1 53.9	22 33.8 +49.6 54.2	23 08.7 +50.2 54.6	23 43.4 +50.6 54.9	24 17.7 +51.1 55.3	38
39	20 58.9 +47.3 52.3	21 35.4 +47.9 52.6	22 11.7 +48.4 53.0	22 47.7 +49.0 53.3	23 23.4 +49.5 53.6	23 58.9 +49.9 54.0	24 34.0 +50.5 54.4	25 08.8 +51.0 54.7	39
40	21 46.2 +47.2 51.7	22 23.3 +47.7 52.0	23 00.1 +48.3 52.3	23 36.7 +48.7 52.7	24 12.9 +49.3 53.0	24 48.8 +49.9 53.4	25 24.5 +50.3 53.8	25 59.8 +50.8 54.2	40
41	22 33.4 +47.0 51.0	23 11.0 +47.6 51.3	23 48.4 +48.1 51.7	24 25.4 +48.7 52.0	25 02.2 +49.1 52.4	25 38.7 +49.6 52.8	26 14.8 +50.2 53.2	26 50.6 +50.7 53.6	41
42	23 20.4 +46.8 50.3	23 58.6 +47.3 50.7	24 36.5 +47.9 51.0	25 14.1 +48.4 51.4	25 51.3 +49.0 51.8	26 28.3 +49.5 52.1	27 05.0 +50.0 52.5	27 41.3 +50.5 53.0	42
43	24 07.2 +46.7 49.6	24 45.9 +47.2 50.0	25 24.4 +47.7 50.4	26 02.5 +48.3 50.7	26 40.3 +48.8 51.1	27 17.8 +49.4 51.5	27 55.0 +49.9 51.9	28 31.8 +50.4 52.3	43
44	24 53.9 +46.4 49.0	25 33.1 +47.0 49.3	26 12.1 +47.5 49.7	26 50.8 +48.0 50.1	27 29.1 +48.6 50.5	28 07.2 +49.1 50.9	28 44.9 +49.6 51.3	29 22.2 +50.2 51.7	44
45	25 40.3 +46.3 48.3	26 20.1 +46.8 48.6	26 59.6 +47.4 49.0	27 38.8 +47.9 49.4	28 17.7 +48.5 49.8	28 56.3 +49.0 50.2	29 34.5 +49.5 50.6	30 12.4 +50.0 51.1	45
46	26 26.6 +46.0 47.5	27 06.9 +46.6 47.9	27 47.0 +47.1 48.3	28 26.7 +47.7 48.7	29 06.2 +48.2 49.1	29 45.3 +48.7 49.6	30 24.0 +49.3 50.0	31 02.4 +49.8 50.5	46
47	27 12.6 +45.8 46.8	27 53.5 +46.4 47.2	28 34.1 +46.9 47.6	29 14.4 +47.5 48.0	29 54.4 +48.0 48.4	30 34.0 +48.6 48.9	31 13.3 +49.1 49.3	31 52.2 +49.6 49.8	47
48	27 58.4 +45.6 46.1	28 39.9 +46.1 46.5	29 21.0 +46.7 46.9	30 01.9 +47.2 47.3	30 42.4 +47.8 47.7	31 22.6 +48.3 48.2	32 02.4 +48.8 48.7	32 41.8 +49.4 49.1	48
49	28 44.0 +45.3 45.4	29 26.0 +45.9 45.8	30 07.7 +46.4 46.2	30 49.1 +47.0 46.6	31 30.2 +47.5 47.0	32 10.9 +48.1 47.5	32 51.2 +48.7 48.0	33 31.2 +49.2 48.5	49
50	29 29.3 +45.1 44.6	30 11.9 +45.6 45.0	30 54.1 +46.2 45.4	31 36.1 +46.7 45.9	32 17.7 +47.3 46.3	32 59.0 +47.8 46.8	33 39.9 +48.3 47.3	34 20.4 +48.9 47.8	50
51	30 14.4 +44.8 43.9	30 57.5 +45.4 44.3	31 40.3 +45.9 44.7	32 22.8 +46.5 45.1	33 05.0 +47.0 45.6	33 46.8 +47.6 46.1	34 28.2 +48.2 46.6	35 09.3 +48.7 47.1	51
52	30 59.2 +44.5 43.1	31 42.9 +45.1 43.5	32 26.2 +45.7 43.9	33 09.3 +46.2 44.4	33 52.0 +46.8 44.8	34 34.4 +47.3 45.3	35 16.4 +47.8 45.8	35 58.0 +48.4 46.3	52
53	31 43.7 +44.3 42.3	32 28.0 +44.7 42.7	33 11.9 +45.4 43.2	33 55.5 +45.9 43.6	34 38.8 +46.4 44.1	35 21.7 +47.0 44.6	36 04.2 +47.6 45.1	36 46.4 +48.2 45.6	53
54	32 28.0 +43.9 41.5	33 12.7 +44.5 41.9	33 57.2 +45.1 42.4	34 41.4 +45.6 42.8	35 25.2 +46.2 43.3	36 08.7 +46.7 43.8	36 51.8 +47.3 44.3	37 34.6 +47.8 44.9	54
55	33 11.9 +43.6 40.7	33 57.2 +44.2 41.1	34 42.3 +44.7 41.6	35 27.0 +45.3 42.0	36 11.4 +45.8 42.5	36 55.4 +46.5 43.0	37 39.1 +47.0 43.6	38 22.4 +47.6 44.1	55
56	33 55.5 +43.3 39.9	34 41.4 +43.8 40.3	35 27.0 +44.4 40.8	36 12.3 +44.9 41.2	36 57.2 +45.5 41.7	37 41.9 +46.0 42.2	38 26.1 +46.7 42.8	39 10.0 +47.2 43.3	56
57	34 38.8 +42.9 39.0	35 25.2 +43.5 39.5	36 11.4 +44.0 39.9	36 57.2 +44.7 40.4	37 42.8 +45.1 40.9	38 27.9 +45.8 41.4	39 12.8 +46.3 42.0	39 57.2 +46.9 42.5	57
58	35 21.7 +42.5 38.2	36 08.7 +43.1 38.6	36 55.4 +43.7 39.1	37 41.9 +44.2 39.6	38 27.9 +44.9 40.1	39 13.7 +45.4 40.6	39 59.1 +45.9 41.1	40 44.1 +46.5 41.7	58
59	36 04.2 +42.2 37.3	36 51.8 +42.8 37.7	37 39.1 +43.3 38.2	38 26.1 +43.9 38.7	39 12.8 +44.4 39.2	39 59.1 +45.0 39.7	40 45.0 +45.6 40.3	41 30.6 +46.2 40.9	59
60	36 46.4 +41.8 36.4	37 34.6 +42.3 36.9	38 22.4 +42.9 37.3	39 10.0 +43.4 37.8	39 57.2 +44.0 38.3	40 44.1 +44.6 38.9	41 30.6 +45.2 39.4	42 16.8 +45.7 40.0	60
61	37 28.2 +41.3 35.5	38 16.9 +41.9 36.0	39 05.3 +42.5 36.4	39 53.4 +43.0 36.9	40 41.2 +43.6 37.4	41 28.7 +44.2 38.0	42 15.8 +44.7 38.5	43 02.5 +45.4 39.1	61
62	38 09.5 +41.0 34.6	38 58.8 +41.5 35.1	39 47.8 +42.0 35.5	40 36.4 +42.6 36.0	41 24.8 +43.2 36.5	42 12.9 +43.7 37.1	43 00.5 +44.4 37.6	43 47.9 +44.9 38.2	62
63	38 50.5 +40.4 33.7	39 40.3 +41.0 34.1	40 29.8 +41.6 34.6	41 19.0 +42.2 35.1	42 08.0 +42.7 35.6	42 56.6 +43.3 36.1	43 44.9 +43.8 36.7	44 32.8 +44.5 37.3	63
64	39 30.9 +40.0 32.7	40 21.3 +40.5 33.2	41 11.4 +41.1 33.6	42 01.2 +41.6 34.1	42 50.7 +42.2 34.7	43 39.9 +42.8 35.2	44 28.7 +43.4 35.8	45 17.3 +43.9 36.3	64
65	40 10.9 +39.5 31.7	41 01.8 +40.0 32.2	41 52.5 +40.5 32.7	42 42.8 +41.2 33.2	43 32.9 +41.7 33.7	44 22.7 +42.3 34.3	45 12.1 +42.9 34.8	46 01.2 +43.5 35.4	65
66	40 50.4 +39.0 30.8	41 41.8 +39.6 31.2	42 33.0 +40.1 31.7	43 24.0 +40.6 32.2	44 14.6 +41.2 32.7	45 05.0 +41.7 33.2	45 55.0 +42.3 33.8	46 44.7 +42.9 34.4	66
67	41 29.4 +38.4 29.7	42 21.4 +38.9 30.2	43 13.1 +39.5 30.7	44 04.6 +40.0 31.1	44 55.8 +40.6 31.7	45 46.7 +41.2 32.2	46 37.3 +41.8 32.8	47 27.6 +42.4 33.3	67
68	42 07.8 +37.9 28.7	43 00.3 +38.4 29.2	43 52.6 +38.9 29.6	44 44.6 +39.5 30.1	45 36.4 +40.0 30.6	46 27.9 +40.6 31.1	47 19.1 +41.2 31.7	48 10.0 +41.8 32.2	68
69	42 45.7 +37.3 27.7	43 38.7 +37.8 28.1	44 31.5 +38.3 28.6	45 24.1 +38.9 29.0	46 16.4 +39.4 29.5	47 08.5 +40.0 30.1	48 00.3 +40.5 30.6	48 51.8 +41.1 31.2	69
70	43 23.0 +36.6 26.6	44 16.5 +37.2 27.0	45 09.8 +37.7 27.5	46 03.0 +38.2 27.9	46 55.9 +38.8 28.4	47 48.5 +39.3 29.0	48 40.8 +39.9 29.5	49 32.9 +40.5 30.1	70
71	43 59.6 +36.0 25.5	44 53.7 +36.5 25.9	45 47.5 +37.1 26.4	46 41.2 +37.6 26.8	47 34.6 +38.1 27.3	48 27.8 +38.6 27.8	49 20.7 +39.2 28.4	50 13.4 +39.8 28.9	71
72	44 35.6 +35.4 24.4	45 30.2 +35.9 24.8	46 24.6 +36.3 25.2	47 18.8 +36.8 25.7	48 12.7 +37.4 26.2	49 06.4 +38.0 26.7	49 59.9 +38.5 27.2	50 53.2 +39.0 27.8	72
73	45 11.0 +34.7 23.2	46 06.1 +35.1 23.6	47 00.9 +35.7 24.1	47 55.6 +36.1 24.5	48 50.1 +36.6 25.0	49 44.4 +37.2 25.5	50 38.4 +37.7 26.0	51 32.2 +38.3 26.6	73
74	45 45.7 +33.9 22.1	46 41.2 +34.4 22.5	47 36.6 +34.8 22.9	48 31.7 +35.4 23.3	49 26.7 +35.9 23.8	50 21.6 +36.3 24.3	51 16.1 +37.0 24.8	52 10.5 +37.5 25.3	74
75	46 19.6 +33.2 20.9	47 15.6 +33.6 21.3	48 11.4 +34.1 21.7	49 07.1 +34.6 22.1	50 02.6 +35.1 22.5	50 57.9 +35.6 23.0	51 53.1 +36.0 23.5	52 48.0 +36.6 24.0	75
76	46 52.8 +32.4 19.7	47 49.2 +32.9 20.0	48 45.5 +33.3 20.4	49 41.7 +33.7 20.8	50 37.7 +34.2 21.3	51 33.5 +34.7 21.7	52 29.1 +35.2 22.2	53 24.6 +35.7 22.7	76
77	47 25.2 +31.6 18.4	48 22.1 +32.0 18.8	49 18.8 +32.4 19.2	50 15.4 +32.9 19.5	51 11.9 +33.3 20.0	52 08.2 +33.8 20.4	53 04.3 +34.3 20.9	54 00.3 +34.8 21.3	77
78	47 56.8 +30.7 17.2	48 54.1 +31.1 17.5	49 51.2 +31.6 17.9	50 48.3 +31.9 18.2	51 45.2 +32.4 18.6	52 42.0 +32.8 19.0	53 38.6 +33.3 19.5	54 35.1 +33.8 20.0	78
79	48 27.5 +29.9 15.9	49 25.2 +30.2 16.2	50 22.8 +30.6 16.5	51 20.2 +31.0 16.9	52 17.6 +31.4 17.3	53 14.8 +31.9 17.7	54 11.9 +32.3 18.1	55 08.9 +32.7 18.5	79
80	48 57.4 +28.9 14.6	49 55.4 +29.3 14.9	50 53.4 +29.6 15.2	51 51.2 +30.0 15.5	52 49.0 +30.4 15.9	53 46.7 +30.8 16.2	54 44.2 +31.2 16.6	55 41.6 +31.7 17.0	80
81	49 26.3 +28.0 13.2	50 24.7 +28.3 13.5	51 23.0 +28.6 13.8	52 21.2 +29.0 14.1	53 19.4 +29.3 14.4	54 17.5 +29.7 14.8	55 15.4 +30.1 15.1	56 13.3 +30.5 15.5	81
82	49 54.3 +27.0 11.9	50 53.0 +27.3 12.1	51 51.6 +27.6 12.4	52 50.2 +27.9 12.7	53 48.7 +28.3 13.0	54 47.2 +28.5 13.3	55 45.5 +29.0 13.6	56 43.8 +29.3 14.0	82
83	50 21.3 +26.0 10.5	51 20.3 +26.3 10.7	52 19.2 +26.6 10.9	53 18.1 +26.8 11.2	54 17.0 +27.1 11.5	55 15.7 +27.4 11.7	56 14.5 +27.7 12.0	57 13.1 +28.1 12.4	83
84	50 47.3 +25.0 9.2	51 46.6 +25.1 9.4	52 45.8 +25.4 9.5	53 44.9 +25.7 9.7	54 44.1 +25.9 9.9	55 43.1 +26.2 10.2	56 42.2 +26.4 10.4	57 41.2 +26.7 10.7	84
85	51 12.3 +23.8 7.6	52 11.7 +24.1 7.8	53 11.2 +24.2 8.0	54 10.6 +24.4 8.1	55 10.0 +24.6 8.3	56 09.3 +24.9 8.6	57 08.6 +25.2 8.8	58 07.9 +25.4 9.0	85
86	51 36.1 +22.8 6.1	52 35.8 +22.9 6.3	53 35.4 +23.1 6.4	54 35.0 +23.2 6.6	55 34.6 +23.4 6.7	56 34.2 +23.6 6.9	57 33.8 +23.7 7.1	58 33.3 +23.9 7.3	86
87	51 58.9 +21.5 4.6	52 58.7 +21.7 4.7	53 58.5 +21.8 4.9	54 58.2 +22.0 5.0	55 58.0 +22.1 5.1	56 57.8 +22.3 5.3	57 57.5 +22.3 5.4	58 57.2 +22.5 5.5	87
88	52 20.4 +20.4 3.1	53 20.4 +20.4 3.2	54 20.3 +20.5 3.3	55 20.2 +20.6 3.3	56 20.1 +20.6 3.4	57 19.9 +20.8 3.5	58 19.8 +20.9 3.6	59 19.7 +20.9 3.7	88
89	52 40.8 +19.2 1.6	53 40.8 +19.2 1.6	54 40.8 +19.2 1.6	55 40.8 +19.2 1.7	56 40.7 +19.3 1.7	57 40.7 +19.3 1.8	58 40.7 +19.3 1.8	59 40.6 +19.4 1.9	89
90	53 00.0 +17.9 0.0	54 00.0 +17.9 0.0	55 00.0 +17.9 0.0	56 00.0 +17.8 0.0	57 00.0 +17.8 0.0	58 00.0 +17.8 0.0	59 00.0 +17.7 0.0	60 00.0 +17.7 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°............Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 108°, 252°**

73°, 287° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	10 08.0	+48.7	103.7	9 53.7	+49.3	103.9	9 39.2	+49.9	104.1	9 24.6	+50.4	104.2	9 09.8	+50.9	104.4	8 54.8	+51.5	104.5	8 39.6	+52.0	104.7	8 24.4	+52.5	104.8	0
1	10 56.7	+48.6	103.1	10 43.0	+49.2	103.3	10 29.1	+49.7	103.5	10 15.0	+50.3	103.7	10 00.7	+50.9	103.8	9 46.3	+51.4	104.0	9 31.6	+52.0	104.2	9 16.9	+52.4	104.3	1
2	11 45.3	+48.5	102.5	11 32.2	+49.1	102.7	11 18.8	+49.7	102.9	11 05.3	+50.3	103.1	10 51.6	+50.8	103.3	10 37.7	+51.4	103.5	10 23.6	+51.9	103.7	10 09.3	+52.5	103.8	2
3	12 33.8	+48.4	101.9	12 21.3	+49.0	102.1	12 08.5	+49.7	102.4	11 55.6	+50.2	102.6	11 42.4	+50.8	102.8	11 29.1	+51.3	103.0	11 15.5	+51.9	103.2	11 01.8	+52.3	103.4	3
4	13 22.2	+48.3	101.3	13 10.3	+48.9	101.6	12 58.2	+49.5	101.8	12 45.8	+50.1	102.0	12 33.2	+50.7	102.2	12 20.4	+51.3	102.4	12 07.4	+51.8	102.6	11 54.1	+52.3	102.9	4
5	14 10.5	+48.3	100.7	13 59.2	+48.9	101.0	13 47.7	+49.5	101.2	13 35.9	+50.1	101.4	13 23.9	+50.7	101.7	13 11.7	+51.2	101.9	12 59.2	+51.7	102.1	12 46.4	+52.3	102.4	5
6	14 58.8	+48.1	100.1	14 48.1	+48.8	100.4	14 37.2	+49.4	100.6	14 26.0	+50.0	100.9	14 14.6	+50.5	101.1	14 02.9	+51.1	101.4	13 50.9	+51.7	101.6	13 38.7	+52.2	101.8	6
7	15 46.9	+48.0	99.5	15 36.9	+48.6	99.8	15 26.6	+49.3	100.0	15 16.0	+49.9	100.3	15 05.1	+50.5	100.6	14 54.0	+51.0	100.8	14 42.6	+51.6	101.1	14 30.9	+52.2	101.3	7
8	16 34.9	+47.9	98.9	16 25.5	+48.6	99.1	16 15.9	+49.2	99.4	16 05.9	+49.8	99.7	15 55.6	+50.4	100.0	15 45.0	+51.0	100.3	15 34.2	+51.5	100.6	15 23.1	+52.0	100.8	8
9	17 22.8	+47.9	98.2	17 14.1	+48.5	98.5	17 05.1	+49.0	98.8	16 55.7	+49.7	99.1	16 46.0	+50.3	99.4	16 36.0	+50.9	99.7	16 25.7	+51.5	100.0	16 15.1	+52.0	100.3	9
10	18 10.7	+47.6	97.6	18 02.6	+48.3	97.9	17 54.1	+49.0	98.2	17 45.4	+49.6	98.6	17 36.3	+50.2	98.9	17 26.9	+50.8	99.2	17 17.2	+51.3	99.5	17 07.1	+51.9	99.8	10
11	18 58.3	+47.6	96.9	18 50.9	+48.2	97.3	18 43.1	+48.9	97.6	18 35.0	+49.5	98.0	18 26.5	+50.1	98.3	18 17.7	+50.7	98.6	18 08.5	+51.3	98.9	17 59.0	+51.8	99.3	11
12	19 45.9	+47.4	96.3	19 39.1	+48.1	96.7	19 32.0	+48.7	97.0	19 24.5	+49.3	97.4	19 16.6	+50.0	97.7	19 08.4	+50.5	98.1	18 59.8	+51.1	98.4	18 50.8	+51.8	98.7	12
13	20 33.3	+47.2	95.6	20 27.2	+47.9	96.0	20 20.7	+48.6	96.4	20 13.8	+49.3	96.8	20 06.6	+49.8	97.1	19 58.9	+50.5	97.5	19 50.9	+51.1	97.8	19 42.6	+51.6	98.2	13
14	21 20.5	+47.1	95.0	21 15.1	+47.8	95.4	21 09.3	+48.4	95.8	21 03.1	+49.1	96.1	20 56.4	+49.8	96.5	20 49.4	+50.4	96.9	20 42.0	+51.0	97.3	20 34.2	+51.5	97.7	14
15	22 07.6	+46.9	94.3	22 02.9	+47.6	94.7	21 57.7	+48.3	95.1	21 52.2	+48.9	95.5	21 46.2	+49.6	95.9	21 39.8	+50.2	96.3	21 33.0	+50.8	96.7	21 25.7	+51.5	97.1	15
16	22 54.5	+46.8	93.6	22 50.5	+47.5	94.1	22 46.0	+48.2	94.5	22 41.1	+48.8	94.9	22 35.8	+49.5	95.3	22 30.0	+50.1	95.7	22 23.8	+50.7	96.1	22 17.2	+51.3	96.6	16
17	23 41.3	+46.6	93.0	23 38.0	+47.3	93.4	23 34.2	+48.0	93.8	23 29.9	+48.7	94.3	23 25.3	+49.3	94.7	23 20.1	+50.0	95.1	23 14.5	+50.6	95.6	23 08.5	+51.2	96.0	17
18	24 27.9	+46.4	92.3	24 25.3	+47.1	92.7	24 22.2	+47.8	93.2	24 18.6	+48.5	93.6	24 14.6	+49.1	94.1	24 10.1	+49.8	94.5	24 05.1	+50.5	95.0	23 59.7	+51.0	95.4	18
19	25 14.3	+46.2	91.6	25 12.4	+46.9	92.0	25 10.0	+47.6	92.5	25 07.1	+48.3	93.0	25 03.7	+49.1	93.5	24 59.9	+49.7	93.9	24 55.6	+50.3	94.4	24 50.7	+51.0	94.8	19
20	26 00.5	+45.9	90.9	25 59.3	+46.7	91.4	25 57.6	+47.5	91.8	25 55.4	+48.2	92.3	25 52.8	+48.9	92.8	25 49.6	+49.5	93.3	25 45.9	+50.1	93.8	25 41.7	+50.7	94.3	20
21	26 46.4	+45.8	90.1	26 46.0	+46.5	90.7	26 45.1	+47.2	91.2	26 43.6	+48.0	91.7	26 41.6	+48.7	92.2	26 39.1	+49.3	92.7	26 36.0	+50.0	93.2	26 32.4	+50.7	93.7	21
22	27 32.2	+45.5	89.4	27 32.5	+46.3	89.9	27 32.3	+47.1	90.5	27 31.6	+47.7	91.0	27 30.3	+48.4	91.5	27 28.4	+49.2	92.0	27 26.0	+49.8	92.5	27 23.1	+50.4	93.1	22
23	28 17.7	+45.3	88.7	28 18.8	+46.1	89.2	28 19.4	+46.8	89.8	28 19.3	+47.6	90.3	28 18.7	+48.3	90.8	28 17.6	+48.9	91.4	28 15.8	+49.7	91.9	28 13.5	+50.4	92.5	23
24	29 03.0	+45.0	87.9	29 04.9	+45.8	88.5	29 06.2	+46.6	89.0	29 06.9	+47.3	89.6	29 07.0	+48.1	90.2	29 06.5	+48.8	90.7	29 05.5	+49.5	91.3	29 03.9	+50.1	91.8	24
25	29 48.0	+44.8	87.2	29 50.7	+45.6	87.8	29 52.8	+46.3	88.3	29 54.2	+47.1	88.9	29 55.1	+47.8	89.5	29 55.3	+48.6	90.1	29 55.0	+49.2	90.6	29 54.0	+50.0	91.2	25
26	30 32.8	+44.5	86.4	30 36.3	+45.3	87.0	30 39.1	+46.1	87.6	30 41.3	+46.9	88.2	30 42.9	+47.6	88.8	30 43.9	+48.3	89.4	30 44.2	+49.1	90.0	30 44.0	+49.7	90.6	26
27	31 17.3	+44.2	85.6	31 21.6	+45.0	86.2	31 25.2	+45.8	86.8	31 28.2	+46.6	87.5	31 30.5	+47.4	88.1	31 32.2	+48.2	88.7	31 33.3	+48.8	89.3	31 33.7	+49.6	89.9	27
28	32 01.5	+43.9	84.8	32 06.6	+44.7	85.5	32 11.0	+45.6	86.1	32 14.8	+46.3	86.7	32 17.9	+47.1	87.3	32 20.4	+47.8	88.0	32 22.1	+48.7	88.6	32 23.3	+49.3	89.2	28
29	32 45.4	+43.6	84.0	32 51.3	+44.5	84.7	32 56.6	+45.2	85.3	33 01.1	+46.1	86.0	33 05.0	+46.9	86.6	33 08.2	+47.7	87.3	33 10.8	+48.4	87.9	33 12.6	+49.1	88.6	29
30	33 29.0	+43.3	83.2	33 35.8	+44.1	83.9	33 41.8	+45.0	84.5	33 47.2	+45.8	85.2	33 51.9	+46.6	85.9	33 55.9	+47.4	86.5	33 59.2	+48.1	87.2	34 01.7	+48.9	87.9	30
31	34 12.3	+42.9	82.4	34 19.9	+43.8	83.0	34 26.8	+44.4	83.7	34 33.0	+45.1	84.4	34 38.5	+46.3	85.1	34 43.3	+47.1	85.8	34 47.3	+47.9	86.5	34 50.6	+48.7	87.2	31
32	34 55.2	+42.5	81.5	35 03.7	+43.4	82.2	35 11.4	+44.4	82.9	35 18.5	+45.1	83.6	35 24.8	+46.0	84.3	35 30.4	+46.8	85.0	35 35.2	+47.6	85.7	35 39.3	+48.3	86.5	32
33	35 37.7	+42.2	80.7	35 47.1	+43.1	81.4	35 55.8	+43.9	82.1	36 03.6	+44.9	82.8	36 10.8	+45.7	83.5	36 17.2	+46.5	84.3	36 22.8	+47.3	85.0	36 27.6	+48.2	85.7	33
34	36 19.9	+41.8	79.8	36 30.2	+42.7	80.5	36 39.7	+43.6	81.2	36 48.5	+44.4	82.0	36 56.5	+45.3	82.7	37 03.7	+46.2	83.5	37 10.1	+47.0	84.2	37 15.8	+47.8	85.0	34
35	37 01.7	+41.4	78.9	37 12.9	+42.3	79.6	37 23.3	+43.2	80.4	37 32.9	+44.2	81.1	37 41.8	+45.0	81.9	37 49.9	+45.8	82.7	37 57.1	+46.7	83.4	38 03.6	+47.5	84.2	35
36	37 43.1	+40.9	78.0	37 55.2	+41.9	78.7	38 06.5	+42.8	79.5	38 17.1	+43.7	80.3	38 26.8	+44.6	81.1	38 35.7	+45.5	81.8	38 43.8	+46.4	82.6	38 51.1	+47.2	83.4	36
37	38 24.0	+40.5	77.0	38 37.1	+41.4	77.8	38 49.3	+42.4	78.6	39 00.8	+43.3	79.4	39 11.4	+44.2	80.2	39 21.2	+45.1	81.0	39 30.2	+46.0	81.8	39 38.3	+46.8	82.6	37
38	39 04.5	+40.1	76.1	39 18.5	+41.0	76.9	39 31.7	+42.0	77.7	39 44.1	+42.9	78.5	39 55.6	+43.9	79.3	40 06.3	+44.8	80.1	40 16.2	+45.6	81.0	40 25.1	+46.6	81.8	38
39	39 44.6	+39.5	75.1	39 59.5	+40.6	75.9	40 13.7	+41.5	76.8	40 27.0	+42.5	77.6	40 39.5	+43.4	78.4	40 51.1	+44.3	79.3	41 01.8	+45.3	80.1	41 11.7	+46.1	81.0	39
40	40 24.1	+39.0	74.2	40 40.1	+40.0	75.0	40 55.2	+41.0	75.8	41 09.5	+42.0	76.7	41 22.9	+43.0	77.5	41 35.4	+43.9	78.4	41 47.1	+44.8	79.3	41 57.8	+45.8	80.1	40
41	41 03.1	+38.5	73.1	41 20.1	+39.5	74.0	41 36.2	+40.5	74.8	41 51.5	+41.5	75.7	42 05.9	+42.5	76.6	42 19.3	+43.5	77.5	42 31.9	+44.4	78.4	42 43.6	+45.3	79.3	41
42	41 41.6	+38.0	72.1	41 59.6	+39.0	73.0	42 16.7	+40.0	73.8	42 33.0	+41.0	74.7	42 48.4	+42.0	75.6	43 02.8	+43.0	76.5	43 16.3	+44.0	77.4	43 28.9	+44.9	78.4	42
43	42 19.6	+37.4	71.1	42 38.6	+38.4	72.0	42 56.7	+39.5	72.8	43 14.0	+40.5	73.7	43 30.4	+41.5	74.6	43 45.8	+42.5	75.6	44 00.3	+43.5	76.5	44 13.8	+44.5	77.4	43
44	42 57.0	+36.7	70.0	43 17.0	+37.8	70.9	43 36.2	+38.9	71.8	43 54.5	+39.9	72.7	44 11.9	+40.9	73.6	44 28.3	+42.0	74.6	44 43.8	+42.9	75.5	44 58.3	+43.9	76.5	44
45	43 33.7	+36.2	68.9	43 54.8	+37.3	69.8	44 15.1	+38.3	70.7	44 34.4	+39.4	71.7	44 52.8	+40.4	72.6	45 10.3	+41.4	73.6	45 26.7	+42.5	74.5	45 42.2	+43.5	75.5	45
46	44 09.9	+35.4	67.8	44 32.1	+36.5	68.7	44 53.4	+37.6	69.7	45 13.8	+38.7	70.6	45 33.2	+39.8	71.6	45 51.7	+40.9	72.5	46 09.2	+41.9	73.5	46 25.7	+43.0	74.5	46
47	44 45.3	+34.6	66.7	45 08.6	+35.9	67.6	45 31.0	+37.0	68.6	45 52.5	+38.1	69.5	46 13.0	+39.2	70.5	46 32.6	+40.2	71.5	46 51.1	+41.4	72.5	47 08.7	+42.3	73.5	47
48	45 20.1	+34.1	65.5	45 44.5	+35.2	66.5	46 08.0	+36.3	67.4	46 30.6	+37.4	68.4	46 52.2	+38.5	69.4	47 12.8	+39.7	70.4	47 32.5	+40.7	71.4	47 51.0	+41.8	72.5	48
49	45 54.2	+33.4	64.4	46 19.7	+34.5	65.3	46 44.3	+35.7	66.3	47 08.0	+36.8	67.3	47 30.7	+37.9	68.3	47 52.5	+38.9	69.3	48 13.2	+40.1	70.3	48 32.8	+41.2	71.4	49
50	46 27.6	+32.6	63.2	46 54.2	+33.7	64.1	47 20.0	+34.8	65.1	47 44.8	+36.0	66.1	48 08.6	+37.1	67.1	48 31.4	+38.3	68.1	48 53.3	+39.4	69.2	49 14.0	+40.6	70.3	50
51	47 00.2	+31.8	61.9	47 27.9	+33.0	62.9	47 54.8	+34.1	63.9	48 20.8	+35.2	64.9	48 45.7	+36.4	65.9	49 09.7	+37.6	67.0	49 32.7	+38.7	68.0	49 54.6	+39.8	69.1	51
52	47 32.0	+30.9	60.7	48 00.9	+32.1	61.7	48 28.9	+33.3	62.6	48 56.0	+34.4	63.7	49 22.1	+35.6	64.7	49 47.3	+36.8	65.8	50 11.4	+37.9	66.9	50 34.4	+39.1	68.0	52
53	48 02.9	+30.1	59.4	48 33.0	+31.3	60.4	49 02.2	+32.4	61.4	49 30.4	+33.7	62.4	49 57.7	+34.8	63.5	50 24.1	+35.9	64.5	50 49.3	+37.2	65.6	51 13.5	+38.4	66.8	53
54	48 33.0	+29.2	58.1	49 04.3	+30.3	59.1	49 34.6	+31.6	60.1	50 04.1	+32.7	61.1	50 32.5	+34.0	62.2	51 00.0	+35.2	63.3	51 26.5	+36.4	64.4	51 51.9	+37.5	65.5	54
55	49 02.2	+28.2	56.8	49 34.6	+29.5	57.8	50 06.2	+30.6	58.8	50 36.8	+31.8	59.8	51 06.5	+33.0	60.9	51 35.2	+34.3	62.0	52 02.9	+35.4	63.1	52 29.4	+36.8	64.3	55
56	49 30.4	+27.3	55.4	50 04.1	+28.4	56.4	50 36.8	+29.7	57.4	51 08.6	+30.9	58.5	51 39.5	+32.2	59.5	52 09.5	+33.3	60.7	52 38.3	+34.6	61.8	53 06.2	+35.8	63.0	56
57	49 57.7	+26.4	54.1	50 32.5	+27.5	55.1	51 06.5	+28.7	56.1	51 39.5	+30.0	57.1	52 11.7	+31.1	58.2	52 42.8	+32.4	59.3	53 12.9	+33.7	60.4	53 42.0	+34.9	61.6	57
58	50 24.1	+25.2	52.7	51 00.0	+26.5	53.6	51 35.2	+27.7	54.6	52 09.5	+28.8	55.7	52 42.8	+30.1	56.8	53 15.2	+31.4	57.9	53 46.6	+32.6	59.0	54 16.9	+33.9	60.2	58
59	50 49.3	+24.2	51.2	51 26.5	+25.4	52.2	52 02.9	+26.6	53.2	52 38.3	+27.9	54.3	53 12.9	+29.1	55.3	53 46.6	+30.3	56.5	54 19.2	+31.6	57.6	54 50.8	+32.8	58.8	59
60	51 13.5	+23.1	49.8	51 51.9	+24.3	50.7	52 29.4	+25.5	51.7	53 06.2	+26.7	52.8	53 42.0	+28.0	53.9	54 16.9	+29.2	55.0	54 50.8	+30.6	56.1	55 23.7	+31.9	57.3	60
61	51 36.6	+22.0	48.3	52 16.2	+23.1	49.3	52 54.9	+24.4	50.3	53 32.9	+25.5	51.3	54 10.0	+26.8	52.4	54 46.1	+28.1	53.5	55 21.4	+29.3	54.6	55 55.6	+30.7	55.8	61
62	51 58.6	+20.8	46.8	52 39.3	+22.0	47.7	53 19.3	+23.1	48.7	53 58.4	+24.4	49.8	54 36.8	+25.6	50.8	55 14.2	+26.9	51.9	55 50.7	+28.2	53.1	56 26.3	+29.5	54.3	62
63	52 19.4	+19.6	45.3	53 01.3	+20.7	46.2	53 42.4	+22.0	47.2	54 22.8	+23.2	48.2	55 02.4	+24.4	49.3	55 41.1	+25.7	50.4	56 18.9	+27.0	51.5	56 55.8	+28.3	52.7	63
64	52 39.0	+18.3	43.7	53 22.0	+19.5	44.6	54 04.4	+20.6	45.6	54 46.0	+21.8	46.6	55 26.8	+23.1	47.7	56 06.8	+24.3	48.8	56 45.9	+25.7	49.9	57 24.1	+27.0	51.1	64
65	52 57.3	+17.1	42.1	53 41.5	+18.2	43.0	54 25.0	+19.4	44.0	55 07.8	+20.6	45.0	55 49.9	+21.8	46.0	56 31.1	+23.1	47.1	57 11.6	+24.3	48.2	57 51.1	+25.6	49.4	65
66	53 14.4	+15.8	40.5	53 59.7	+16.9	41.4	54 44.4	+18.0	42.4	55 28.4	+19.2	43.3	56 11.7	+20.4	44.4	56 54.2	+21.6	45.4	57 35.9	+22.9	46.5	58 16.7	+24.2	47.7	66
67	53 30.2	+14.5	38.9	54 16.6	+15.6	39.8	55 02.4	+16.7	40.7	55 47.6	+17.8	41.7	56 32.1	+19.0	42.7	57 15.8	+20.2	43.7	57 58.8	+21.5	44.8	58 40.9	+22.8	46.0	67
68	53 44.7	+13.1	37.3	54 32.2	+14.2	38.1	55 19.1	+15.2	39.0	56 05.4	+16.4	40.0	56 51.1	+17.5	40.9	57 36.0	+18.8	42.0	58 20.3	+20.0	43.0	59 03.7	+21.3	44.2	68
69	53 57.8	+11.8	35.6	54 46.4	+12.7	36.5	55 34.3	+13.9	37.3	56 21.8	+14.9	38.2	57 08.6	+16.1	39.2	57 54.8	+17.2	40.2	58 40.3	+18.4	41.2	59 25.0	+19.7	42.3	69
70	54 09.6	+10.3	34.0	54 59.1	+11.3	34.8	55 48.2	+12.3	35.6	56 36.7	+13.4	36.5	57 24.7	+14.5	37.4	58 12.0	+15.7	38.4	58 58.7	+16.9	39.4	59 44.7	+18.1	40.5	70
71	54 19.9	+8.9	32.3	55 10.4	+9.9	33.0	56 00.5	+10.9	33.8	56 50.1	+11.9	34.7	57 39.2	+12.9	35.6	58 27.7	+14.0	36.5	59 15.6	+15.2	37.5	60 02.8	+16.5	38.6	71
72	54 28.8	+7.5	30.6	55 20.3	+8.4	31.3	56 11.4	+9.3	32.1	57 02.0	+10.3	32.9	57 52.1	+11.4	33.8	58 41.7	+12.5	34.7	59 30.8	+13.5	35.6	60 19.3	+14.7	36.6	72
73	54 36.3	+6.1	28.9	55 28.7	+6.9	29.6	56 20.7	+7.8	30.3	57 12.3	+8.7	31.1	58 03.5	+9.7	31.9	58 54.2	+10.7	32.8	59 44.3	+11.9	33.7	60 34.0	+12.9	34.7	73
74	54 42.4	+4.5	27.1	55 35.6	+5.4	27.8	56 28.5	+6.2	28.5	57 21.0	+7.2	29.2	58 13.2	+8.0	30.0	59 04.9	+9.1	30.9	59 56.2	+10.1	31.7	60 46.9	+11.2	32.7	74
75	54 46.9	+3.1	25.4	55 41.0	+3.8	26.0	56 34.7	+4.7	26.7	57 28.2	+5.5	27.4	58 21.2	+6.4	28.1	59 14.0	+7.3	28.9	60 06.3	+8.3	29.8	60 58.1	+9.3	30.7	75
76	54 50.0	+1.6	23.7	55 44.8	+2.3	24.3	56 39.4	+3.1	24.9	57 33.7	+3.8	25.6	58 27.6	+4.7	26.2	59 21.3	+5.6	27.0	60 14.6	+6.5	27.8	61 07.4	+7.5	28.6	76
77	54 51.6	+0.1	21.9	55 47.1	+0.8	22.5	56 42.5	+1.4	23.1	57 37.5	+2.3	23.7	58 32.3	+3.0	24.3	59 26.9	+3.8	25.0	60 21.1	+4.6	25.8	61 14.9	+5.6	26.6	77
78	54 51.7	−1.4	20.2	55 47.9	−0.7	20.7	56 43.9	−0.1	21.3	57 39.8	+0.5	21.8	58 35.3	+1.3	22.4	59 30.7	+2.0	23.1	60 25.7	+2.9	23.8	61 20.5	+3.7	24.5	78
79	54 50.3	−2.8	18.5	55 47.2	−2.3	18.9	56 43.8	−1.7	19.4	57 40.3	−1.1	20.0	58 36.6	−0.4	20.5	59 32.7	+0.3	21.1	60 28.6	+1.0	21.7	61 24.2	+1.7	22.4	79
80	54 47.5	−4.4	16.7	55 44.9	−3.9	17.2	56 42.1	−3.3	17.6	57 39.2	−2.7	18.1	58 36.2	−2.1	18.6	59 33.0	−1.5	19.1	60 29.6	−0.9	19.7	61 25.9	−0.1	20.3	80
81	54 43.1	−5.8	15.0	55 41.0	−5.3	15.4	56 38.8	−4.9	15.8	57 36.5	−4.4	16.2	58 34.1	−3.9	16.7	59 31.5	−3.3	17.2	60 28.7	−2.7	17.7	61 25.8	−2.1	18.2	81
82	54 37.3	−7.2	13.3	55 35.7	−6.9	13.6	56 33.9	−6.4	14.0	57 32.1	−6.0	14.4	58 30.2	−5.6	14.8	59 28.2	−5.1	15.2	60 26.0	−4.5	15.6	61 23.7	−4.0	16.1	82
83	54 30.1	−8.7	11.6	55 28.8	−8.4	11.9	56 27.5	−8.0	12.2	57 26.1	−7.6	12.5	58 24.6	−7.2	12.9	59 23.1	−6.8	13.2	60 21.5	−6.4	13.6	61 19.7	−5.9	14.1	83
84	54 21.4	−10.2	9.9	55 20.4	−9.8	10.1	56 19.5	−9.6	10.4	57 18.5	−9.2	10.7	58 17.4	−8.9	11.0	59 16.3	−8.6	11.3	60 15.1	−8.2	11.6	61 13.8	−7.8	12.0	84
85	54 11.2	−11.5	8.2	55 10.6	−11.3	8.4	56 09.9	−11.0	8.6	57 09.2	−10.8	8.8	58 08.5	−10.5	9.1	59 07.7	−10.2	9.3	60 06.9	−9.9	9.6	61 06.0	−9.6	9.9	85
86	53 59.7	−12.9	6.5	54 59.3	−12.7	6.7	55 58.9	−12.6	6.8	56 58.4	−12.3	7.0	57 58.0	−12.2	7.2	58 57.5	−12.0	7.4	59 57.0	−11.7	7.7	60 56.4	−11.4	7.9	86
87	53 46.8	−14.3	4.9	54 46.6	−14.2	5.0	55 46.3	−14.0	5.1	56 46.1	−13.9	5.2	57 45.8	−13.7	5.4	58 45.5	−13.5	5.5	59 45.3	−13.5	5.7	60 45.0	−13.3	5.9	87
88	53 32.5	−15.6	3.2	54 32.4	−15.5	3.3	55 32.3	−15.4	3.4	56 32.2	−15.4	3.5	57 32.1	−15.3	3.6	58 32.0	−15.2	3.7	59 31.8	−15.1	3.8	60 31.7	−15.0	3.9	88
89	53 16.9	−16.9	1.6	54 16.9	−16.9	1.6	55 16.9	−16.9	1.7	56 16.8	−16.8	1.7	57 16.8	−16.8	1.8	58 16.8	−16.8	1.8	59 16.7	−16.7	1.9	60 16.7	−16.7	1.9	89
90	53 00.0	−18.2	0.0	54 00.0	−18.2	0.0	55 00.0	−18.2	0.0	56 00.0	−18.2	0.0	57 00.0	−18.3	0.0	58 00.0	−18.3	0.0	59 00.0	−18.3	0.0	60 00.0	−18.4	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

73°, 287° L.H.A. LATITUDE **SAME** NAME AS DECLINATION

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	10 08.0	−48.7	103.7	9 53.7	−49.3	103.9	9 39.2	−49.8	104.1	9 24.6	−50.5	104.2	9 09.8	−51.0	104.4	8 54.8	−51.5	104.5	8 39.6	−52.0	104.7	8 24.4	−52.6	104.8	0
1	9 19.3	−48.7	104.3	9 04.4	−49.3	104.5	8 49.4	−50.0	104.6	8 34.1	−50.5	104.8	8 18.8	−51.1	104.9	8 03.3	−51.6	105.1	7 47.6	−52.1	105.2	7 31.8	−52.6	105.3	1
2	8 30.6	−48.8	104.9	8 15.1	−49.4	105.0	7 59.4	−50.0	105.2	7 43.6	−50.5	105.3	7 27.7	−51.0	105.4	7 11.7	−51.6	105.6	6 55.5	−52.1	105.7	6 39.2	−52.6	105.8	2
3	7 41.8	−48.9	105.5	7 25.7	−49.5	105.6	7 09.4	−50.0	105.7	6 53.1	−50.6	105.9	6 36.7	−51.2	106.0	6 20.1	−51.6	106.1	6 03.4	−52.1	106.3	5 46.6	−52.6	106.3	3
4	6 52.9	−48.9	106.1	6 36.2	−49.5	106.2	6 19.4	−50.0	106.3	6 02.5	−50.6	106.4	5 45.5	−51.1	106.5	5 28.5	−51.7	106.6	5 11.3	−52.2	106.7	4 54.0	−52.6	106.8	4
5	6 04.0	−49.0	106.7	5 46.7	−49.5	106.8	5 29.4	−50.1	106.9	5 11.9	−50.6	106.9	4 54.4	−51.1	107.0	4 36.8	−51.7	107.1	4 19.1	−52.2	107.2	4 01.4	−52.7	107.3	5
6	5 15.0	−49.0	107.2	4 57.2	−49.5	107.3	4 39.3	−50.1	107.4	4 21.3	−50.6	107.5	4 03.3	−51.2	107.6	3 45.1	−51.7	107.6	3 26.9	−52.2	107.7	3 08.7	−52.7	107.7	6
7	4 26.0	−49.0	107.8	4 07.7	−49.6	107.9	3 49.2	−50.1	108.0	3 30.7	−50.7	108.0	3 12.1	−51.2	108.1	2 53.4	−51.7	108.1	2 34.7	−52.2	108.2	2 16.0	−52.7	108.2	7
8	3 37.0	−49.0	108.4	3 18.1	−49.6	108.5	2 59.1	−50.2	108.5	2 40.0	−50.7	108.6	2 20.9	−51.2	108.6	2 01.7	−51.7	108.6	1 42.5	−52.2	108.7	1 23.3	−52.7	108.7	8
9	2 48.0	−49.0	109.0	2 28.5	−49.6	109.0	2 08.9	−50.1	109.1	1 49.3	−50.7	109.1	1 29.7	−51.3	109.1	1 10.0	−51.7	109.1	0 50.3	−52.2	109.2	0 30.6	−52.7	109.2	9
10	1 59.0	−49.1	109.6	1 38.9	−49.6	109.6	1 18.8	−50.2	109.6	0 58.6	−50.7	109.6	0 38.4	−51.2	109.6	0 18.3	−51.7	109.6	0 01.9	+52.2	70.4	0 22.1	+52.7	70.4	10
11	1 09.9	−49.1	110.1	0 49.3	−49.7	110.1	0 28.6	−50.2	110.2	0 07.9	−50.7	110.2	0 12.8	+51.2	69.8	0 33.4	+51.8	69.8	0 54.1	+52.2	69.9	1 14.8	+52.7	69.9	11
12	0 20.8	−49.0	110.7	0 00.4	+49.6	69.3	0 21.6	+50.1	69.3	0 42.8	+50.7	69.3	1 04.0	+51.2	69.3	1 25.2	+51.7	69.3	1 46.3	+52.2	69.4	2 07.5	+52.6	69.4	12
13	0 28.2	+49.1	68.7	0 50.0	+49.6	68.7	1 11.7	+50.2	68.7	1 33.5	+50.7	68.8	1 55.2	+51.2	68.8	2 16.9	+51.7	68.8	2 38.5	+52.2	68.8	3 00.1	+52.7	68.9	13
14	1 17.3	+49.0	68.1	1 39.6	+49.6	68.2	2 01.9	+50.2	68.2	2 24.2	+50.7	68.2	2 46.4	+51.2	68.3	3 08.6	+51.7	68.3	3 30.7	+52.2	68.4	3 52.8	+52.7	68.4	14
15	2 06.3	+49.1	67.6	2 29.2	+49.6	67.6	2 52.1	+50.1	67.6	3 14.9	+50.6	67.7	3 37.6	+51.2	67.8	4 00.3	+51.6	67.8	4 22.9	+52.2	67.9	4 45.5	+52.6	68.0	15
16	2 55.4	+49.0	67.0	3 18.8	+49.6	67.0	3 42.2	+50.1	67.1	4 05.5	+50.6	67.2	4 28.8	+51.1	67.2	4 51.9	+51.7	67.3	5 15.1	+52.1	67.4	5 38.1	+52.6	67.5	16
17	3 44.4	+49.0	66.4	4 08.4	+49.6	66.5	4 32.3	+50.1	66.5	4 56.1	+50.7	66.6	5 19.9	+51.1	66.7	5 43.6	+51.6	66.8	6 07.2	+52.1	66.9	6 30.7	+52.6	67.0	17
18	4 33.4	+49.0	65.8	4 57.9	+49.6	65.9	5 22.4	+50.0	66.0	5 46.8	+50.5	66.1	6 11.0	+51.1	66.2	6 35.2	+51.6	66.3	6 59.3	+52.1	66.4	7 23.3	+52.5	66.5	18
19	5 22.4	+48.9	65.3	5 47.5	+49.5	65.3	6 12.4	+50.1	65.5	6 37.3	+50.6	65.5	7 02.1	+51.1	65.7	7 26.8	+51.6	65.8	7 51.4	+52.0	65.9	8 15.8	+52.5	66.0	19
20	6 11.3	+48.9	64.7	6 37.0	+49.4	64.8	7 02.5	+50.0	64.9	7 27.9	+50.5	65.0	7 53.2	+51.0	65.1	8 18.4	+51.5	65.3	8 43.4	+52.0	65.4	9 08.3	+52.5	65.5	20
21	7 00.2	+48.9	64.1	7 26.4	+49.4	64.2	7 52.5	+49.9	64.3	8 18.4	+50.4	64.5	8 44.2	+51.0	64.6	9 09.9	+51.4	64.7	9 35.4	+52.0	64.9	10 00.8	+52.4	65.0	21
22	7 49.1	+48.8	63.5	8 15.8	+49.4	63.6	8 42.4	+49.9	63.8	9 08.8	+50.5	63.9	9 35.2	+50.9	64.1	10 01.3	+51.5	64.2	10 27.4	+51.9	64.4	10 53.2	+52.4	64.5	22
23	8 37.9	+48.8	62.9	9 05.2	+49.3	63.1	9 32.3	+49.8	63.2	9 59.3	+50.3	63.4	10 26.1	+50.9	63.5	10 52.8	+51.3	63.7	11 19.3	+51.8	63.9	11 45.6	+52.4	64.0	23
24	9 26.7	+48.7	62.3	9 54.5	+49.2	62.5	10 22.1	+49.8	62.6	10 49.6	+50.3	62.8	11 17.0	+50.8	63.0	11 44.1	+51.3	63.2	12 11.1	+51.8	63.4	12 38.0	+52.2	63.5	24
25	10 15.4	+48.6	61.7	10 43.7	+49.2	61.9	11 11.9	+49.7	62.1	11 39.9	+50.2	62.2	12 07.8	+50.7	62.4	12 35.4	+51.3	62.6	13 02.9	+51.6	62.8	13 30.2	+52.2	63.0	25
26	11 04.0	+48.6	61.1	11 32.9	+49.1	61.3	12 01.6	+49.6	61.5	12 30.1	+50.2	61.7	12 58.5	+50.7	61.9	13 26.7	+51.2	62.1	13 54.7	+51.6	62.3	14 22.4	+52.2	62.5	26
27	11 52.6	+48.5	60.5	12 22.0	+49.0	60.7	12 51.2	+49.6	60.9	13 20.3	+50.1	61.1	13 49.2	+50.6	61.3	14 17.9	+51.1	61.6	14 46.3	+51.6	61.8	15 14.6	+52.1	62.0	27
28	12 41.1	+48.4	59.9	13 11.0	+49.0	60.1	13 40.8	+49.5	60.3	14 10.4	+50.0	60.6	14 39.8	+50.5	60.8	15 09.0	+51.0	61.0	15 37.9	+51.5	61.3	16 06.7	+52.0	61.5	28
29	13 29.5	+48.3	59.3	14 00.0	+48.8	59.5	14 30.3	+49.4	59.8	15 00.4	+49.9	60.0	15 30.3	+50.4	60.2	16 00.0	+50.9	60.5	16 29.4	+51.5	60.7	16 58.7	+51.9	61.0	29
30	14 17.8	+48.2	58.7	14 48.8	+48.8	58.9	15 19.7	+49.3	59.2	15 50.3	+49.9	59.4	16 20.7	+50.4	59.7	16 50.9	+50.9	59.9	17 20.9	+51.3	60.2	17 50.6	+51.8	60.5	30
31	15 06.0	+48.1	58.1	15 37.6	+48.7	58.3	16 09.0	+49.2	58.6	16 40.2	+49.7	58.8	17 11.1	+50.2	59.1	17 41.8	+50.7	59.4	18 12.2	+51.3	59.6	18 42.4	+51.8	59.9	31
32	15 54.1	+48.0	57.5	16 26.3	+48.5	57.7	16 58.2	+49.1	58.0	17 29.9	+49.6	58.2	18 01.3	+50.2	58.5	18 32.5	+50.7	58.8	19 03.5	+51.2	59.1	19 34.2	+51.6	59.4	32
33	16 42.1	+47.9	56.9	17 14.8	+48.5	57.1	17 47.3	+49.0	57.4	18 19.5	+49.5	57.7	18 51.5	+50.0	57.9	19 23.2	+50.6	58.2	19 54.7	+51.0	58.5	20 25.8	+51.6	58.9	33
34	17 30.0	+47.8	56.2	18 03.3	+48.3	56.5	18 36.3	+48.8	56.8	19 09.0	+49.4	57.1	19 41.5	+49.9	57.4	20 13.8	+50.4	57.7	20 45.7	+51.0	58.0	21 17.4	+51.4	58.4	34
35	18 17.8	+47.7	55.6	18 51.6	+48.2	55.9	19 25.1	+48.8	56.2	19 58.4	+49.3	56.5	20 31.4	+49.9	56.8	21 04.2	+50.3	57.1	21 36.7	+50.8	57.4	22 08.8	+51.3	57.8	35
36	19 05.5	+47.5	55.0	19 39.8	+48.1	55.2	20 13.9	+48.6	55.5	20 47.7	+49.2	55.9	21 21.3	+49.6	56.2	21 54.5	+50.2	56.5	22 27.5	+50.7	56.8	23 00.1	+51.3	57.2	36
37	19 53.0	+47.4	54.3	20 27.9	+47.9	54.6	21 02.5	+48.5	54.9	21 36.9	+49.0	55.2	22 10.9	+49.6	55.6	22 44.7	+50.1	55.9	23 18.2	+50.6	56.3	23 51.4	+51.0	56.6	37
38	20 40.4	+47.2	53.7	21 15.8	+47.8	54.0	21 51.0	+48.3	54.3	22 25.9	+48.8	54.6	23 00.5	+49.4	55.0	23 34.8	+49.9	55.3	24 08.8	+50.4	55.7	24 42.4	+51.0	56.0	38
39	21 27.6	+47.1	53.0	22 03.6	+47.6	53.3	22 39.3	+48.2	53.6	23 14.7	+48.7	54.0	23 49.9	+49.2	54.3	24 24.7	+49.8	54.7	24 59.2	+50.3	55.1	25 33.4	+50.8	55.5	39
40	22 14.7	+46.9	52.3	22 51.2	+47.5	52.7	23 27.5	+48.0	53.0	24 03.4	+48.6	53.3	24 39.1	+49.1	53.7	25 14.5	+49.6	54.1	25 49.5	+50.1	54.5	26 24.2	+50.7	54.9	40
41	23 01.6	+46.7	51.6	23 38.7	+47.3	52.0	24 15.5	+47.8	52.3	24 52.0	+48.4	52.7	25 28.2	+48.9	53.1	26 04.1	+49.4	53.5	26 39.6	+50.0	53.9	27 14.9	+50.5	54.3	41
42	23 48.3	+46.6	51.0	24 26.0	+47.1	51.3	25 03.3	+47.7	51.7	25 40.4	+48.2	52.0	26 17.1	+48.8	52.4	26 53.5	+49.3	52.8	27 29.6	+49.8	53.2	28 05.4	+50.3	53.7	42
43	24 34.9	+46.3	50.3	25 13.1	+46.9	50.6	25 51.0	+47.5	51.0	26 28.6	+48.0	51.4	27 05.9	+48.5	51.8	27 42.8	+49.1	52.2	28 19.4	+49.7	52.6	28 55.7	+50.2	53.0	43
44	25 21.2	+46.2	49.6	26 00.0	+46.7	49.9	26 38.5	+47.2	50.3	27 16.6	+47.8	50.7	27 54.4	+48.3	51.1	28 31.9	+49.0	51.5	29 09.1	+49.4	52.0	29 45.9	+49.9	52.4	44
45	26 07.4	+45.9	48.9	26 46.7	+46.5	49.2	27 25.7	+47.1	49.6	28 04.4	+47.7	50.0	28 42.8	+48.2	50.4	29 20.9	+48.7	50.9	29 58.5	+49.3	51.3	30 35.8	+49.8	51.8	45
46	26 53.3	+45.8	48.1	27 33.2	+46.3	48.5	28 12.8	+46.8	48.9	28 52.1	+47.4	49.3	29 31.0	+47.9	49.8	30 09.6	+48.5	50.2	30 47.8	+49.0	50.7	31 25.6	+49.6	51.1	46
47	27 39.1	+45.5	47.4	28 19.5	+46.1	47.8	28 59.6	+46.7	48.2	29 39.5	+47.1	48.6	30 18.9	+47.8	49.1	30 58.1	+48.3	49.5	31 36.8	+48.9	50.0	32 15.2	+49.4	50.5	47
48	28 24.6	+45.2	46.7	29 05.6	+45.8	47.1	29 46.3	+46.4	47.5	30 26.6	+47.0	47.9	31 06.7	+47.5	48.4	31 46.4	+48.0	48.8	32 25.7	+48.6	49.3	33 04.6	+49.2	49.8	48
49	29 09.8	+45.0	45.9	29 51.4	+45.5	46.3	30 32.7	+46.1	46.8	31 13.6	+46.7	47.2	31 54.2	+47.2	47.6	32 34.4	+47.8	48.1	33 14.3	+48.4	48.6	33 53.8	+48.9	49.1	49
50	29 54.8	+44.7	45.2	30 36.9	+45.3	45.6	31 18.8	+45.8	46.0	32 00.3	+46.4	46.5	32 41.4	+47.0	46.9	33 22.2	+47.6	47.4	34 02.7	+48.1	47.9	34 42.7	+48.7	48.4	50
51	30 39.5	+44.5	44.4	31 22.2	+45.1	44.8	32 04.6	+45.6	45.3	32 46.7	+46.2	45.7	33 28.4	+46.8	46.2	34 09.8	+47.3	46.7	34 50.8	+47.8	47.2	35 31.4	+48.4	47.7	51
52	31 24.0	+44.1	43.6	32 07.3	+44.7	44.0	32 50.2	+45.3	44.5	33 32.9	+45.9	44.9	34 15.2	+46.4	45.4	34 57.1	+47.0	45.9	35 38.6	+47.6	46.4	36 19.8	+48.2	47.0	52
53	32 08.1	+43.9	42.8	32 52.0	+44.4	43.3	33 35.5	+45.0	43.7	34 18.8	+45.5	44.2	35 01.6	+46.2	44.7	35 44.1	+46.7	45.2	36 26.2	+47.3	45.7	37 08.0	+47.8	46.2	53
54	32 52.0	+43.5	42.0	33 36.4	+44.1	42.4	34 20.5	+44.7	42.9	35 04.3	+45.3	43.4	35 47.8	+45.8	43.9	36 30.8	+46.4	44.4	37 13.5	+47.0	44.9	37 55.8	+47.6	45.5	54
55	33 35.5	+43.3	41.2	34 20.5	+43.8	41.6	35 05.2	+44.4	42.1	35 49.6	+44.9	42.6	36 33.6	+45.5	43.1	37 17.2	+46.1	43.6	38 00.5	+46.7	44.1	38 43.4	+47.2	44.7	55
56	34 18.8	+42.8	40.3	35 04.3	+43.5	40.8	35 49.6	+44.0	41.3	36 34.5	+44.6	41.8	37 19.1	+45.2	42.3	38 03.3	+45.8	42.8	38 47.2	+46.3	43.3	39 30.6	+47.0	43.9	56
57	35 01.6	+42.5	39.5	35 47.8	+43.0	40.0	36 33.6	+43.6	40.4	37 19.1	+44.2	40.9	38 04.3	+44.8	41.4	38 49.1	+45.4	42.0	39 33.5	+46.0	42.5	40 17.6	+46.5	43.1	57
58	35 44.1	+42.1	38.6	36 30.8	+42.7	39.1	37 17.2	+43.3	39.6	38 03.3	+43.9	40.1	38 49.1	+44.4	40.6	39 34.5	+45.0	41.1	40 19.5	+45.6	41.7	41 04.1	+46.2	42.2	58
59	36 26.2	+41.8	37.7	37 13.5	+42.3	38.2	38 00.5	+42.9	38.7	38 47.2	+43.4	39.2	39 33.5	+44.1	39.7	40 19.5	+44.6	40.3	41 05.1	+45.2	40.8	41 50.3	+45.8	41.4	59
60	37 08.0	+41.3	36.9	37 55.8	+41.9	37.3	38 43.4	+42.4	37.8	39 30.6	+43.1	38.3	40 17.6	+43.6	38.8	41 04.1	+44.2	39.4	41 50.3	+44.8	39.9	42 36.1	+45.5	40.5	60
61	37 49.3	+40.8	35.9	38 37.7	+41.5	36.4	39 25.8	+42.1	36.9	40 13.7	+42.6	37.4	41 01.2	+43.2	37.9	41 48.3	+43.8	38.5	42 35.1	+44.4	39.0	43 21.6	+44.9	39.6	61
62	38 30.1	+40.5	35.0	39 19.2	+40.9	35.5	40 07.9	+41.5	36.0	40 56.3	+42.1	36.5	41 44.4	+42.7	37.0	42 32.1	+43.3	37.6	43 19.5	+43.9	38.1	44 06.5	+44.6	38.7	62
63	39 10.6	+39.9	34.1	40 00.1	+40.6	34.5	40 49.4	+41.1	35.0	41 38.4	+41.7	35.5	42 27.1	+42.3	36.0	43 15.4	+42.9	36.6	44 03.4	+43.5	37.2	44 51.1	+44.0	37.8	63
64	39 50.5	+39.5	33.1	40 40.7	+40.0	33.6	41 30.5	+40.6	34.0	42 20.1	+41.2	34.5	43 09.4	+41.7	35.1	43 58.3	+42.3	35.6	44 46.9	+42.9	36.2	45 35.1	+43.6	36.8	64
65	40 30.0	+39.0	32.1	41 20.7	+39.5	32.6	42 11.1	+40.1	33.1	43 01.3	+40.6	33.6	43 51.1	+41.2	34.1	44 40.6	+41.9	34.6	45 29.8	+42.5	35.2	46 18.7	+43.0	35.8	65
66	41 09.0	+38.4	31.1	42 00.2	+39.0	31.6	42 51.2	+39.5	32.0	43 41.9	+40.1	32.5	44 32.3	+40.7	33.1	45 22.5	+41.2	33.6	46 12.3	+41.8	34.2	47 01.7	+42.5	34.8	66
67	41 47.4	+37.8	30.1	42 39.2	+38.4	30.5	43 30.7	+39.0	31.0	44 22.0	+39.5	31.5	45 13.0	+40.1	32.0	46 03.7	+40.7	32.6	46 54.1	+41.3	33.2	47 44.2	+41.9	33.8	67
68	42 25.2	+37.3	29.0	43 17.6	+37.8	29.5	44 09.7	+38.4	30.0	45 01.5	+39.0	30.5	45 53.1	+39.5	31.0	46 44.4	+40.1	31.6	47 35.4	+40.7	32.1	48 26.1	+41.3	32.7	68
69	43 02.5	+36.7	28.0	43 55.4	+37.2	28.4	44 48.1	+37.7	28.9	45 40.5	+38.3	29.4	46 32.6	+38.9	29.9	47 24.5	+39.5	30.4	48 16.1	+40.0	31.0	49 07.4	+40.6	31.6	69
70	43 39.2	+36.0	26.9	44 32.6	+36.6	27.3	45 25.8	+37.1	27.8	46 18.8	+37.6	28.3	47 11.5	+38.2	28.8	48 04.0	+38.7	29.3	48 56.1	+39.4	29.9	49 48.0	+40.0	30.4	70
71	44 15.2	+35.4	25.8	45 09.2	+35.9	26.2	46 02.9	+36.4	26.7	46 56.4	+37.0	27.1	47 49.7	+37.5	27.6	48 42.7	+38.1	28.2	49 35.5	+38.6	28.7	50 28.0	+39.2	29.3	71
72	44 50.6	+34.7	24.6	45 45.1	+35.2	25.1	46 39.3	+35.7	25.5	47 33.4	+36.2	26.0	48 27.2	+36.8	26.5	49 20.8	+37.3	27.0	50 14.1	+37.9	27.5	51 07.2	+38.5	28.1	72
73	45 25.3	+34.0	23.5	46 20.3	+34.4	23.9	47 15.0	+35.0	24.3	48 09.6	+35.5	24.8	49 04.0	+36.0	25.3	49 58.1	+36.6	25.8	50 52.0	+37.2	26.3	51 45.7	+37.7	26.9	73
74	45 59.3	+33.2	22.3	46 54.7	+33.7	22.7	47 50.0	+34.2	23.1	48 45.1	+34.7	23.6	49 39.8	+35.3	24.0	50 34.7	+35.7	24.5	51 29.2	+36.3	25.0	52 23.4	+36.9	25.6	74
75	46 32.5	+32.5	21.1	47 28.4	+33.0	21.5	48 24.2	+33.4	21.9	49 19.8	+33.9	22.3	50 15.2	+34.4	22.8	51 10.4	+34.9	23.3	52 05.5	+35.4	23.8	53 00.3	+35.9	24.3	75
76	47 05.0	+31.7	19.9	48 01.4	+32.1	20.2	48 57.6	+32.5	20.6	49 53.7	+33.0	21.0	50 49.6	+33.5	21.5	51 45.3	+34.0	21.9	52 40.9	+34.5	22.4	53 36.2	+35.1	22.9	76
77	47 36.7	+30.8	18.6	48 33.5	+31.2	19.0	49 30.1	+31.7	19.3	50 26.7	+32.1	19.7	51 23.1	+32.6	20.2	52 19.3	+33.1	20.6	53 15.4	+33.6	21.1	54 11.3	+34.1	21.6	77
78	48 07.5	+29.9	17.3	49 04.7	+30.4	17.7	50 01.8	+30.8	18.0	50 58.8	+31.2	18.4	51 55.7	+31.6	18.8	52 52.4	+32.1	19.2	53 49.0	+32.6	19.7	54 45.4	+33.1	20.2	78
79	48 37.4	+29.1	16.0	49 35.1	+29.4	16.3	50 32.6	+29.8	16.7	51 30.0	+30.2	17.0	52 27.3	+30.7	17.4	53 24.5	+31.1	17.8	54 21.6	+31.5	18.2	55 18.5	+32.0	18.7	79
80	49 06.5	+28.1	14.7	50 04.5	+28.5	15.0	51 02.4	+28.8	15.3	52 00.2	+29.2	15.6	52 58.0	+29.6	16.0	53 55.6	+30.0	16.4	54 53.1	+30.4	16.8	55 50.5	+30.9	17.2	80
81	49 34.6	+27.2	13.3	50 33.0	+27.4	13.6	51 31.2	+27.9	13.9	52 29.4	+28.2	14.2	53 27.6	+28.5	14.6	54 25.6	+28.8	14.9	55 23.5	+29.3	15.3	56 21.4	+29.7	15.7	81
82	50 01.8	+26.1	12.0	51 00.4	+26.5	12.2	51 59.1	+26.7	12.5	52 57.6	+27.1	12.8	53 56.1	+27.4	13.1	54 54.5	+27.7	13.4	55 52.8	+28.1	13.7	56 51.1	+28.5	14.1	82
83	50 27.9	+25.1	10.5	51 26.9	+25.4	10.8	52 25.8	+25.6	11.0	53 24.7	+25.9	11.3	54 23.5	+26.2	11.5	55 22.2	+26.6	11.8	56 20.9	+26.9	12.1	57 19.6	+27.2	12.5	83
84	50 53.0	+24.1	9.4	51 52.3	+24.2	9.5	52 51.4	+24.5	9.5	53 50.6	+24.8	9.8	54 49.7	+25.0	10.0	55 48.8	+25.3	10.2	56 47.8	+25.6	10.5	57 46.8	+25.8	10.8	84
85	51 17.1	+22.9	7.7	52 16.5	+23.1	7.8	53 15.9	+23.4	8.0	54 15.4	+23.5	8.2	55 14.7	+23.8	8.4	56 14.1	+23.9	8.6	57 13.4	+24.2	8.9	58 12.6	+24.5	9.1	85
86	51 40.0	+21.8	6.2	52 39.6	+22.0	6.3	53 39.3	+22.1	6.5	54 38.9	+22.3	6.6	55 38.5	+22.4	6.8	56 38.0	+22.7	7.0	57 37.6	+22.8	7.2	58 37.1	+23.0	7.4	86
87	52 01.8	+20.6	4.7	53 01.6	+20.7	4.8	54 01.4	+20.8	4.9	55 01.2	+20.9	5.0	56 00.9	+21.1	5.1	57 00.7	+21.2	5.3	58 00.4	+21.4	5.4	59 00.1	+21.6	5.6	87
88	52 22.4	+19.4	3.1	53 22.3	+19.5	3.2	54 22.2	+19.6	3.3	55 22.1	+19.7	3.4	56 22.0	+19.7	3.5	57 21.9	+19.8	3.5	58 21.8	+19.9	3.6	59 21.7	+19.9	3.8	88
89	52 41.8	+18.2	1.6	53 41.8	+18.2	1.6	54 41.8	+18.2	1.7	55 41.8	+18.2	1.7	56 41.7	+18.3	1.7	57 41.7	+18.3	1.8	58 41.7	+18.3	1.8	59 41.6	+18.4	1.9	89
90	53 00.0	+16.9	0.0	54 00.0	+16.9	0.0	55 00.0	+16.9	0.0	56 00.0	+16.8	0.0	57 00.0	+16.8	0.0	58 00.0	+16.8	0.0	59 00.0	+16.7	0.0	60 00.0	+16.7	0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION · **L.H.A. 107°, 253°**

74°, 286° L.H.A.　LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	9 32.9	+48.6	102.9	9 19.4	+49.2	103.1	9 05.8	+49.7	103.2	8 52.0	+50.3	103.4	8 38.0	+50.9	103.5	8 23.9	+51.5	103.7	8 09.7	+51.9	103.8	7 55.3	+52.4	103.9	0
1	10 21.5	+48.5	102.3	10 08.6	+49.1	102.5	9 55.5	+49.7	102.7	9 42.3	+50.3	102.8	9 28.9	+50.8	103.0	9 15.4	+51.3	103.1	9 01.6	+51.9	103.3	8 47.7	+52.4	103.5	1
2	11 10.0	+48.4	101.7	10 57.7	+49.0	101.9	10 45.2	+49.7	102.1	10 32.6	+50.2	102.3	10 19.7	+50.8	102.4	10 06.7	+51.3	102.6	9 53.5	+51.9	102.8	9 40.1	+52.4	103.0	2
3	11 58.4	+48.3	101.1	11 46.7	+49.0	101.3	11 34.9	+49.5	101.5	11 22.8	+50.1	101.7	11 10.5	+50.7	101.9	10 58.0	+51.3	102.1	10 45.4	+51.8	102.3	10 32.5	+52.3	102.5	3
4	12 46.7	+48.3	100.5	12 35.7	+48.9	100.7	12 24.4	+49.5	100.9	12 12.9	+50.1	101.1	12 01.2	+50.7	101.4	11 49.3	+51.2	101.6	11 37.2	+51.7	101.8	11 24.8	+52.3	102.0	4
5	13 35.0	+48.2	99.9	13 24.6	+48.8	100.1	13 13.9	+49.4	100.4	13 03.0	+50.0	100.6	12 51.9	+50.6	100.8	12 40.5	+51.1	101.0	12 28.9	+51.7	101.3	12 17.1	+52.2	101.5	5
6	14 23.2	+48.0	99.3	14 13.4	+48.7	99.5	14 03.3	+49.3	99.8	13 53.0	+49.9	100.0	13 42.5	+50.5	100.3	13 31.6	+51.1	100.5	13 20.6	+51.6	100.7	13 09.3	+52.2	101.0	6
7	15 11.2	+48.0	98.7	15 02.1	+48.6	98.9	14 52.6	+49.3	99.2	14 42.9	+49.9	99.4	14 33.0	+50.4	99.7	14 22.7	+51.0	100.0	14 12.2	+51.6	100.2	14 01.5	+52.0	100.5	7
8	15 59.2	+47.9	98.0	15 50.7	+48.5	98.3	15 41.9	+49.1	98.6	15 32.8	+49.7	98.9	15 23.4	+50.3	99.1	15 13.7	+50.9	99.4	15 03.8	+51.4	99.7	14 53.5	+52.1	99.9	8
9	16 47.1	+47.7	97.4	16 39.2	+48.4	97.7	16 31.0	+49.0	98.0	16 22.5	+49.7	98.3	16 13.7	+50.3	98.6	16 04.6	+50.9	98.9	15 55.2	+51.4	99.1	15 45.6	+51.9	99.4	9
10	17 34.8	+47.6	96.7	17 27.6	+48.3	97.1	17 20.0	+49.0	97.4	17 12.2	+49.5	97.7	17 04.0	+50.1	98.0	16 55.5	+50.7	98.3	16 46.6	+51.4	98.6	16 37.5	+51.9	98.9	10
11	18 22.5	+47.4	96.1	18 15.9	+48.1	96.5	18 09.0	+48.8	96.8	18 01.7	+49.4	97.1	17 54.1	+50.1	97.4	17 46.2	+50.6	97.7	17 38.0	+51.2	98.1	17 29.4	+51.8	98.4	11
12	19 09.9	+47.4	95.5	19 04.0	+48.1	95.8	18 57.8	+48.7	96.2	18 51.1	+49.4	96.5	18 44.2	+49.9	96.8	18 36.8	+50.6	97.2	18 29.2	+51.1	97.5	18 21.2	+51.6	97.8	12
13	19 57.3	+47.2	94.8	19 52.1	+47.9	95.2	19 46.5	+48.5	95.5	19 40.5	+49.2	95.9	19 34.1	+49.8	96.3	19 27.4	+50.4	96.6	19 20.3	+51.0	97.0	19 12.8	+51.6	97.3	13
14	20 44.5	+47.1	94.2	20 40.0	+47.7	94.5	20 35.0	+48.4	94.9	20 29.7	+49.0	95.3	20 23.9	+49.7	95.7	20 17.8	+50.3	96.0	20 11.3	+50.9	96.4	20 04.4	+51.5	96.8	14
15	21 31.6	+46.9	93.5	21 27.7	+47.6	93.9	21 23.4	+48.3	94.3	21 18.7	+49.0	94.7	21 13.6	+49.6	95.1	21 08.1	+50.2	95.5	21 02.2	+50.9	95.8	20 55.9	+51.4	96.2	15
16	22 18.5	+46.7	92.8	22 15.3	+47.5	93.2	22 11.7	+48.1	93.6	22 07.7	+48.8	94.1	22 03.2	+49.5	94.5	21 58.3	+50.1	94.9	21 53.1	+50.6	95.3	21 47.3	+51.3	95.7	16
17	23 05.2	+46.6	92.2	23 02.8	+47.2	92.6	22 59.8	+48.0	93.0	22 56.5	+48.6	93.4	22 52.7	+49.3	93.8	22 48.4	+50.0	94.3	22 43.7	+50.6	94.7	22 38.6	+51.2	95.1	17
18	23 51.8	+46.4	91.5	23 50.0	+47.1	91.9	23 47.8	+47.8	92.3	23 45.1	+48.5	92.8	23 42.0	+49.1	93.2	23 38.4	+49.8	93.7	23 34.3	+50.4	94.1	23 29.8	+51.0	94.5	18
19	24 38.2	+46.2	90.8	24 37.1	+46.9	91.2	24 35.6	+47.6	91.7	24 33.6	+48.3	92.1	24 31.1	+49.0	92.6	24 28.2	+49.6	93.1	24 24.7	+50.3	93.5	24 20.8	+50.9	94.0	19
20	25 24.4	+45.9	90.1	25 24.0	+46.8	90.5	25 23.2	+47.5	91.0	25 21.9	+48.2	91.5	25 20.1	+48.9	92.0	25 17.8	+49.5	92.4	25 15.0	+50.1	92.9	25 11.7	+50.8	93.4	20
21	26 10.3	+45.8	89.4	26 10.8	+46.5	89.8	26 10.7	+47.2	90.3	26 10.1	+47.9	90.8	26 08.9	+48.7	91.3	26 07.3	+49.3	91.8	26 05.1	+50.0	92.3	26 02.5	+50.6	92.8	21
22	26 56.1	+45.5	88.6	26 57.3	+46.3	89.1	26 57.9	+47.0	89.6	26 58.0	+47.8	90.2	26 57.6	+48.4	90.7	26 56.6	+49.2	91.2	26 55.1	+49.8	91.7	26 53.1	+50.5	92.2	22
23	27 41.6	+45.3	87.9	27 43.6	+46.0	88.4	27 44.9	+46.9	88.9	27 45.8	+47.5	89.5	27 46.0	+48.3	90.0	27 45.8	+48.9	90.5	27 44.9	+49.7	91.1	27 43.6	+50.3	91.6	23
24	28 26.9	+45.1	87.2	28 29.6	+45.9	87.7	28 31.8	+46.6	88.2	28 33.3	+47.4	88.8	28 34.3	+48.1	89.3	28 34.7	+48.8	89.9	28 34.6	+49.5	90.4	28 33.9	+50.1	91.0	24
25	29 12.0	+44.8	86.4	29 15.5	+45.6	87.0	29 18.4	+46.3	87.5	29 20.7	+47.1	88.1	29 22.4	+47.8	88.6	29 23.5	+48.6	89.2	29 24.1	+49.2	89.8	29 24.0	+50.0	90.3	25
26	29 56.8	+44.5	85.6	30 01.1	+45.3	86.2	30 04.7	+46.1	86.8	30 07.8	+46.9	87.4	30 10.2	+47.7	87.9	30 12.1	+48.4	88.5	30 13.3	+49.1	89.1	30 14.0	+49.7	89.7	26
27	30 41.3	+44.3	84.9	30 46.4	+45.1	85.5	30 50.8	+45.9	86.0	30 54.7	+46.6	86.6	30 57.9	+47.4	87.2	31 00.5	+48.1	87.8	31 02.4	+48.9	88.4	31 03.7	+49.6	89.0	27
28	31 25.6	+43.9	84.1	31 31.5	+44.7	84.7	31 36.7	+45.6	85.3	31 41.3	+46.4	85.9	31 45.3	+47.1	86.5	31 48.6	+47.9	87.1	31 51.3	+48.6	87.7	31 53.3	+49.3	88.4	28
29	32 09.5	+43.7	83.3	32 16.2	+44.5	83.9	32 22.3	+45.3	84.5	32 27.7	+46.1	85.2	32 32.4	+46.9	85.8	32 36.5	+47.7	86.4	32 39.9	+48.4	87.1	32 42.6	+49.2	87.7	29
30	32 53.2	+43.3	82.5	33 00.7	+44.2	83.1	33 07.6	+45.0	83.7	33 13.8	+45.8	84.4	33 19.3	+46.7	85.0	33 24.2	+47.4	85.7	33 28.3	+48.2	86.4	33 31.8	+48.9	87.0	30
31	33 36.5	+43.0	81.6	33 44.9	+43.9	82.3	33 52.6	+44.7	83.0	33 59.6	+45.5	83.6	34 06.0	+46.3	84.3	34 11.6	+47.1	85.0	34 16.5	+47.9	85.6	34 20.7	+48.6	86.3	31
32	34 19.5	+42.7	80.8	34 28.8	+43.5	81.5	34 37.3	+44.4	82.1	34 45.2	+45.2	82.8	34 52.3	+46.0	83.5	34 58.7	+46.9	84.2	35 04.4	+47.6	84.9	35 09.3	+48.5	85.6	32
33	35 02.2	+42.2	79.9	35 12.3	+43.1	80.6	35 21.7	+44.0	81.3	35 30.4	+44.9	82.0	35 38.3	+45.8	82.7	35 45.6	+46.5	83.4	35 52.0	+47.4	84.2	35 57.8	+48.1	84.9	33
34	35 44.4	+41.9	79.1	35 55.4	+42.8	79.8	36 05.7	+43.7	80.5	36 15.3	+44.6	81.2	36 24.1	+45.4	81.9	36 32.1	+46.3	82.7	36 39.4	+47.0	83.4	36 45.9	+47.8	84.1	34
35	36 26.3	+41.5	78.2	36 38.2	+42.5	78.9	36 49.4	+43.3	79.6	36 59.8	+44.2	80.4	37 09.5	+45.1	81.1	37 18.4	+45.9	81.9	37 26.4	+46.8	82.6	37 33.7	+47.6	83.4	35
36	37 07.8	+41.1	77.3	37 20.7	+42.0	78.0	37 32.7	+42.9	78.8	37 44.0	+43.8	79.5	37 54.5	+44.7	80.3	38 04.3	+45.5	81.1	38 13.2	+46.4	81.8	38 21.3	+47.3	82.6	36
37	37 48.9	+40.6	76.4	38 02.7	+41.5	77.1	38 15.6	+42.6	77.9	38 27.8	+43.5	78.7	38 39.2	+44.4	79.4	38 49.8	+45.3	80.2	38 59.6	+46.1	81.0	39 08.6	+46.9	81.8	37
38	38 29.5	+40.2	75.4	38 44.2	+41.2	76.2	38 58.2	+42.0	77.0	39 11.3	+43.0	77.8	39 23.6	+43.9	78.6	39 35.1	+44.8	79.4	39 45.7	+45.7	80.2	39 55.5	+46.6	81.0	38
39	39 09.7	+39.7	74.5	39 25.4	+40.7	75.3	39 40.2	+41.7	76.1	39 54.3	+42.6	76.9	40 07.5	+43.5	77.7	40 19.9	+44.4	78.5	40 31.4	+45.3	79.3	40 42.1	+46.2	80.2	39
40	39 49.4	+39.2	73.5	40 06.1	+40.2	74.3	40 21.9	+41.2	75.1	40 36.9	+42.1	75.9	40 51.0	+43.1	76.8	41 04.3	+44.0	77.6	41 16.7	+45.0	78.5	41 28.3	+45.8	79.3	40
41	40 28.6	+38.7	72.5	40 46.3	+39.7	73.3	41 03.1	+40.6	74.2	41 19.0	+41.7	75.0	41 34.1	+42.6	75.9	41 48.3	+43.6	76.7	42 01.7	+44.5	77.6	42 14.1	+45.5	78.5	41
42	41 07.3	+38.2	71.5	41 26.0	+39.1	72.3	41 43.7	+40.2	73.2	42 00.7	+41.2	74.0	42 16.7	+42.2	74.9	42 31.9	+43.1	75.8	42 46.2	+44.1	76.7	42 59.6	+45.0	77.6	42
43	41 45.5	+37.6	70.5	42 05.1	+38.7	71.3	42 23.9	+39.7	72.2	42 41.9	+40.6	73.1	42 58.9	+41.7	73.9	43 15.0	+42.7	74.8	43 30.3	+43.6	75.8	43 44.6	+44.5	76.7	43
44	42 23.1	+37.0	69.4	42 43.8	+38.0	70.3	43 03.6	+39.1	71.2	43 22.5	+40.1	72.0	43 40.6	+41.1	73.0	43 57.7	+42.1	73.9	44 13.9	+43.1	74.8	44 29.1	+44.1	75.7	44
45	43 00.1	+36.4	68.3	43 21.8	+37.5	69.2	43 42.7	+38.5	70.1	44 02.6	+39.6	71.0	44 21.7	+40.6	71.9	44 39.8	+41.6	72.9	44 57.0	+42.6	73.8	45 13.2	+43.7	74.8	45
46	43 36.5	+35.7	67.3	43 59.3	+36.8	68.1	44 21.2	+37.9	69.0	44 42.2	+38.9	70.0	45 02.3	+40.0	70.9	45 21.4	+41.1	71.9	45 39.6	+42.1	72.8	45 56.9	+43.0	73.8	46
47	44 12.2	+35.1	66.1	44 36.1	+36.2	67.0	44 59.1	+37.2	68.0	45 21.1	+38.4	68.9	45 42.3	+39.4	69.8	46 02.5	+40.4	70.8	46 21.7	+41.5	71.8	46 39.9	+42.6	72.8	47
48	44 47.3	+34.5	65.0	45 12.3	+35.5	65.9	45 36.3	+36.6	66.8	45 59.5	+37.6	67.8	46 21.7	+38.7	68.8	46 42.9	+39.9	69.7	47 03.2	+40.9	70.7	47 22.5	+42.0	71.8	48
49	45 21.8	+33.6	63.8	45 47.8	+34.8	64.8	46 12.9	+35.9	65.7	46 37.1	+37.1	66.7	47 00.4	+38.2	67.6	47 22.8	+39.2	68.6	47 44.1	+40.3	69.7	48 04.5	+41.3	70.7	49
50	45 55.4	+33.0	62.7	46 22.6	+34.0	63.6	46 48.8	+35.2	64.5	47 14.2	+36.3	65.5	47 38.6	+37.4	66.5	48 02.0	+38.5	67.5	48 24.4	+39.7	68.6	48 46.0	+40.8	69.6	50
51	46 28.4	+32.1	61.4	46 56.6	+33.3	62.4	47 24.0	+34.4	63.3	47 50.5	+35.5	64.3	48 16.0	+36.7	65.3	48 40.5	+37.8	66.4	49 04.1	+38.9	67.4	49 26.6	+40.1	68.5	51
52	47 00.5	+31.4	60.2	47 29.9	+32.5	61.2	47 58.4	+33.6	62.1	48 26.0	+34.8	63.1	48 52.7	+35.9	64.1	49 18.3	+37.1	65.2	49 43.0	+38.2	66.3	50 06.7	+39.3	67.3	52
53	47 31.9	+30.5	59.0	48 02.4	+31.7	59.9	48 32.0	+32.9	60.9	49 00.8	+34.0	61.9	49 28.6	+35.1	62.9	49 55.4	+36.3	64.0	50 21.2	+37.5	65.1	50 46.0	+38.6	66.2	53
54	48 02.4	+29.6	57.7	48 34.1	+30.8	58.6	49 04.9	+31.9	59.6	49 34.8	+33.1	60.6	50 03.7	+34.3	61.7	50 31.7	+35.5	62.7	50 58.7	+36.7	63.8	51 24.6	+37.8	64.9	54
55	48 32.0	+28.8	56.4	49 04.9	+29.9	57.3	49 36.8	+31.1	58.3	50 07.9	+32.2	59.3	50 38.0	+33.4	60.4	51 07.2	+34.6	61.4	51 35.4	+35.8	62.6	52 02.5	+37.0	63.7	55
56	49 00.8	+27.8	55.0	49 34.8	+28.9	56.0	50 07.9	+30.1	57.0	50 40.1	+31.3	58.0	51 11.4	+32.6	59.1	51 41.8	+33.7	60.1	52 11.2	+34.9	61.3	52 39.5	+36.2	62.4	56
57	49 28.6	+26.8	53.7	50 03.7	+28.0	54.6	50 38.0	+29.2	55.6	51 11.4	+30.4	56.7	51 44.0	+31.5	57.7	52 15.5	+32.8	58.8	52 46.1	+34.0	59.9	53 15.7	+35.2	61.1	57
58	49 55.4	+25.8	52.3	50 31.7	+27.0	53.3	51 07.2	+28.2	54.2	51 41.8	+29.4	55.3	52 15.5	+30.6	56.3	52 48.3	+31.8	57.4	53 20.1	+33.1	58.5	53 50.9	+34.3	59.7	58
59	50 21.2	+24.8	50.9	50 58.7	+25.9	51.8	51 35.4	+27.2	52.8	52 11.2	+28.3	53.9	52 46.1	+29.6	54.9	53 20.1	+30.8	56.0	53 53.2	+32.0	57.1	54 25.2	+33.3	58.3	59
60	50 46.0	+23.7	49.5	51 24.6	+24.9	50.4	52 02.5	+26.0	51.4	52 39.5	+27.3	52.4	53 15.7	+28.5	53.5	53 50.9	+29.8	54.6	54 25.2	+31.0	55.7	54 58.5	+32.3	56.9	60
61	51 09.7	+22.6	48.0	51 49.5	+23.8	48.9	52 28.5	+25.0	49.9	53 06.8	+26.1	50.9	53 44.2	+27.3	52.0	54 20.7	+28.6	53.1	54 56.2	+29.9	54.2	55 30.8	+31.2	55.4	61
62	51 32.3	+21.5	46.5	52 13.3	+22.6	47.4	52 53.5	+23.8	48.4	53 32.9	+25.0	49.4	54 11.5	+26.2	50.5	54 49.3	+27.4	51.6	55 26.1	+28.7	52.7	56 02.0	+30.0	53.9	62
63	51 53.8	+20.3	45.0	52 35.9	+21.4	45.9	53 17.3	+22.5	46.9	53 57.9	+23.7	47.9	54 37.7	+25.0	48.9	55 16.7	+26.2	50.0	55 54.8	+27.5	51.1	56 32.0	+28.8	52.3	63
64	52 14.1	+19.1	43.5	52 57.3	+20.2	44.4	53 39.8	+21.4	45.3	54 21.6	+22.6	46.3	55 02.7	+23.7	47.3	55 42.9	+25.0	48.4	56 22.3	+26.3	49.5	57 00.8	+27.5	50.7	64
65	52 33.2	+17.8	41.9	53 17.5	+19.0	42.8	54 01.2	+20.1	43.7	54 44.2	+21.2	44.7	55 26.4	+22.5	45.7	56 07.9	+23.7	46.8	56 48.6	+24.9	47.9	57 28.3	+26.3	49.1	65
66	52 51.0	+16.6	40.3	53 36.5	+17.6	41.2	54 21.3	+18.7	42.1	55 05.4	+19.9	43.1	55 48.9	+21.1	44.1	56 31.6	+22.3	45.1	57 13.5	+23.6	46.2	57 54.6	+24.8	47.4	66
67	53 07.6	+15.3	38.8	53 54.1	+16.3	39.6	54 40.0	+17.5	40.5	55 25.3	+18.6	41.4	56 10.0	+19.7	42.4	56 53.9	+20.9	43.5	57 37.1	+22.1	44.5	58 19.4	+23.5	45.7	67
68	53 22.9	+13.9	37.1	54 10.4	+15.0	38.0	54 57.5	+16.0	38.8	55 43.9	+17.2	39.8	56 29.7	+18.3	40.7	57 14.8	+19.5	41.7	57 59.2	+20.8	42.8	58 42.9	+22.0	43.9	68
69	53 36.8	+12.6	35.5	54 25.4	+13.6	36.3	55 13.5	+14.7	37.2	56 01.1	+15.7	38.0	56 48.0	+16.8	39.0	57 34.3	+18.0	40.0	58 20.0	+19.2	41.0	59 04.9	+20.4	42.1	69
70	53 49.4	+11.3	33.8	54 39.0	+12.2	34.6	55 28.2	+13.2	35.5	56 16.8	+14.2	36.3	57 04.8	+15.4	37.2	57 52.3	+16.5	38.2	58 39.2	+17.6	39.2	59 25.3	+18.9	40.3	70
71	54 00.7	+9.8	32.2	54 51.2	+10.8	32.9	55 41.4	+11.7	33.7	56 31.0	+12.8	34.6	57 20.2	+13.8	35.4	58 08.8	+14.9	36.4	58 56.8	+16.0	37.4	59 44.2	+17.2	38.4	71
72	54 10.5	+8.4	30.5	55 02.0	+9.3	31.2	55 53.1	+10.3	32.0	56 43.8	+11.2	32.8	57 34.0	+12.2	33.6	58 23.7	+13.3	34.5	59 12.8	+14.4	35.5	60 01.4	+15.5	36.5	72
73	54 18.9	+7.0	28.8	55 11.3	+7.9	29.5	56 03.4	+8.7	30.2	56 55.0	+9.7	31.0	57 46.2	+10.6	31.8	58 37.0	+11.6	32.7	59 27.2	+12.7	33.6	60 16.9	+13.9	34.5	73
74	54 25.9	+5.5	27.1	55 19.2	+6.3	27.8	56 12.1	+7.2	28.4	57 04.7	+8.0	29.2	57 56.8	+9.0	30.0	58 48.6	+10.0	30.8	59 39.9	+11.0	31.6	60 30.8	+12.0	32.6	74
75	54 31.4	+4.1	25.4	55 25.5	+4.8	26.0	56 19.3	+5.6	26.7	57 12.7	+6.5	27.4	58 05.8	+7.4	28.1	58 58.6	+8.3	28.9	59 50.9	+9.3	29.7	60 42.8	+10.3	30.6	75
76	54 35.5	+2.6	23.7	55 30.3	+3.4	24.2	56 24.9	+4.1	24.9	57 19.2	+4.9	25.5	58 13.2	+5.7	26.2	59 06.9	+6.5	26.9	60 00.2	+7.4	27.7	60 53.1	+8.4	28.6	76
77	54 38.1	+1.1	21.9	55 33.7	+1.7	22.5	56 29.0	+2.5	23.1	57 24.1	+3.2	23.7	58 18.9	+4.0	24.3	59 13.4	+4.8	25.0	60 07.6	+5.7	25.7	61 01.5	+6.6	26.5	77
78	54 39.2	-0.3	20.2	55 35.4	+0.3	20.7	56 31.5	+0.9	21.2	57 27.3	+1.6	21.8	58 22.9	+2.3	22.4	59 18.2	+3.1	23.0	60 13.3	+4.0	23.7	61 08.1	+4.6	24.5	78
79	54 38.9	-1.8	18.5	55 35.7	-1.2	18.9	56 32.4	-0.7	19.4	57 28.9	-0.1	19.9	58 25.2	+0.6	20.5	59 21.3	+1.3	21.1	60 17.1	+2.0	21.7	61 12.7	+2.8	22.4	79
80	54 37.1	-3.3	16.8	55 34.5	-2.8	17.2	56 31.7	-2.2	17.6	57 28.8	-1.7	18.1	58 25.8	-1.1	18.6	59 22.6	-0.5	19.1	60 19.1	+0.2	19.7	61 15.5	+0.9	20.3	80
81	54 33.8	-4.8	15.0	55 31.7	-4.3	15.4	56 29.5	-3.9	15.8	57 27.1	-3.4	16.2	58 24.7	-2.8	16.7	59 22.1	-2.3	17.2	60 19.3	-1.6	17.7	61 16.4	-1.0	18.2	81
82	54 29.0	-6.2	13.3	55 27.4	-5.9	13.6	56 25.6	-5.4	14.0	57 23.8	-5.0	14.4	58 21.9	-4.5	14.8	59 19.8	-4.0	15.2	60 17.7	-3.5	15.7	61 15.4	-3.0	16.2	82
83	54 22.8	-7.6	11.6	55 21.5	-7.3	11.9	56 20.2	-6.9	12.2	57 18.8	-6.5	12.5	58 17.4	-6.2	12.9	59 15.8	-5.7	13.3	60 14.2	-5.3	13.6	61 12.4	-4.8	14.1	83
84	54 15.2	-9.1	9.9	55 13.9	-8.8	10.1	56 13.3	-8.5	10.4	57 12.3	-8.2	10.7	58 11.2	-7.9	11.0	59 10.1	-7.5	11.3	60 08.9	-7.1	11.6	61 07.6	-6.7	12.0	84
85	54 06.1	-10.5	8.2	55 05.4	-10.2	8.4	56 04.8	-10.0	8.6	57 04.1	-9.8	8.9	58 03.5	-9.4	9.1	59 02.6	-9.2	9.4	60 01.7	-8.9	9.7	61 00.9	-8.6	10.0	85
86	53 55.6	-11.9	6.5	54 55.2	-11.7	6.7	55 54.8	-11.5	6.9	56 54.3	-11.3	7.1	57 53.9	-11.2	7.2	58 53.4	-10.9	7.5	59 52.8	-10.6	7.7	60 52.3	-10.4	7.9	86
87	53 43.7	-13.3	4.9	54 43.5	-13.1	5.0	55 43.3	-13.0	5.1	56 43.0	-12.8	5.2	57 42.7	-12.7	5.4	58 42.5	-12.6	5.6	59 42.2	-12.4	5.7	60 41.9	-12.2	5.9	87
88	53 30.5	-14.6	3.2	54 30.4	-14.5	3.3	55 30.3	-14.5	3.4	56 30.2	-14.4	3.5	57 30.0	-14.2	3.6	58 29.9	-14.1	3.7	59 29.8	-14.1	3.8	60 29.7	-14.0	3.9	88
89	53 15.9	-15.9	1.6	54 15.9	-15.9	1.6	55 15.8	-15.8	1.7	56 15.8	-15.8	1.7	57 15.8	-15.8	1.8	58 15.8	-15.8	1.8	59 15.7	-15.7	1.9	60 15.7	-15.7	1.9	89
90	53 00.0	-17.2	0.0	54 00.0	-17.2	0.0	55 00.0	-17.2	0.0	56 00.0	-17.2	0.0	57 00.0	-17.3	0.0	58 00.0	-17.3	0.0	59 00.0	-17.3	0.0	60 00.0	-17.4	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	9 32.9	−48.6	102.9	9 19.4	−49.2	103.1	9 05.8	−49.8	103.2	8 52.0	−50.4	103.4	8 38.0	−50.9	103.5	8 23.9	−51.4	103.7	8 09.7	−52.0	103.8	7 55.3	−52.5	103.9	0
1	8 44.3	−48.7	103.5	8 30.2	−49.3	103.6	8 16.0	−49.8	103.8	8 01.6	−50.4	103.9	7 47.1	−50.9	104.1	7 32.5	−51.5	104.2	7 17.7	−52.0	104.3	7 02.8	−52.5	104.4	1
2	7 55.6	−48.7	104.1	7 40.9	−49.3	104.2	7 26.1	−49.8	104.3	7 11.2	−50.4	104.5	6 56.2	−51.0	104.6	6 41.0	−51.5	104.7	6 25.7	−52.0	104.8	6 10.3	−52.5	104.9	2
3	7 06.9	−48.8	104.7	6 51.6	−49.3	104.8	6 36.3	−50.0	104.9	6 20.8	−50.5	105.0	6 05.2	−51.1	105.1	5 49.5	−51.6	105.2	5 33.7	−52.1	105.3	5 17.8	−52.6	105.4	3
4	6 18.1	−48.8	105.3	6 02.3	−49.4	105.4	5 46.3	−49.9	105.5	5 30.3	−50.5	105.6	5 14.1	−51.0	105.6	4 57.9	−51.6	105.7	4 41.6	−52.1	105.8	4 25.2	−52.6	105.9	4
5	5 29.3	−48.8	105.8	5 12.9	−49.4	105.9	4 56.4	−50.0	106.0	4 39.8	−50.6	106.1	4 23.1	−51.1	106.2	4 06.3	−51.5	106.2	3 49.5	−52.1	106.3	3 32.6	−52.6	106.4	5
6	4 40.5	−48.9	106.4	4 23.5	−49.5	106.5	4 06.4	−50.0	106.6	3 49.2	−50.5	106.6	3 32.0	−51.1	106.7	3 14.8	−51.7	106.8	2 57.4	−52.1	106.8	2 40.0	−52.6	106.9	6
7	3 51.6	−48.9	107.0	3 34.0	−49.5	107.1	3 16.4	−50.1	107.1	2 58.7	−50.6	107.2	2 40.9	−51.1	107.2	2 23.1	−51.6	107.3	2 05.3	−52.1	107.3	1 47.4	−52.6	107.3	7
8	3 02.7	−48.9	107.6	2 44.5	−49.5	107.6	2 26.3	−50.0	107.7	2 08.1	−50.6	107.7	1 49.8	−51.1	107.8	1 31.5	−51.6	107.8	1 13.2	−52.1	107.8	0 54.8	−52.6	107.8	8
9	2 13.8	−48.9	108.2	1 55.1	−49.5	108.2	1 36.3	−50.0	108.2	1 17.5	−50.6	108.3	0 58.7	−51.1	108.3	0 39.9	−51.6	108.3	0 21.1	−52.2	108.3	0 02.2	−52.6	108.3	9
10	1 24.9	−49.0	108.7	1 05.6	−49.6	108.8	0 46.2	−50.0	108.8	0 26.9	−50.6	108.8	0 07.6	−51.1	108.8	0 11.7	+51.7	71.2	0 31.1	+52.1	71.2	0 50.4	+52.6	71.2	10
11	0 35.9	−48.9	109.3	0 16.1	−49.5	109.3	0 03.8	+50.1	70.7	0 23.7	+50.6	70.7	0 43.5	+51.1	70.7	1 03.4	+51.6	70.7	1 23.2	+52.1	70.7	1 43.0	+52.6	70.7	11
12	0 13.0	+49.0	70.1	0 33.4	+49.5	70.1	0 53.9	+50.0	70.1	1 14.3	+50.5	70.1	1 34.6	+51.2	70.2	1 55.0	+51.6	70.2	2 15.3	+52.1	70.2	2 35.6	+52.6	70.3	12
13	1 02.0	+48.9	69.5	1 22.9	+49.5	69.5	1 43.9	+50.1	69.6	2 04.8	+50.6	69.6	2 25.8	+51.0	69.6	2 46.6	+51.6	69.7	3 07.4	+52.1	69.7	3 28.2	+52.6	69.8	13
14	1 50.9	+48.9	68.9	2 12.4	+49.5	69.0	2 34.0	+50.0	69.0	2 55.4	+50.6	69.1	3 16.8	+51.1	69.1	3 38.2	+51.6	69.2	3 59.5	+52.1	69.2	4 20.8	+52.6	69.3	14
15	2 39.8	+48.9	68.4	3 01.9	+49.5	68.4	3 24.0	+50.0	68.5	3 46.0	+50.5	68.5	4 07.9	+51.1	68.6	4 29.8	+51.6	68.7	4 51.6	+52.1	68.7	5 13.3	+52.6	68.8	15
16	3 28.7	+48.9	67.8	3 51.4	+49.4	67.8	4 14.0	+50.0	67.9	4 36.5	+50.5	68.0	4 59.0	+51.0	68.1	5 21.4	+51.5	68.1	5 43.7	+52.0	68.2	6 05.9	+52.5	68.3	16
17	4 17.6	+48.9	67.2	4 40.8	+49.4	67.3	5 04.0	+49.9	67.3	5 27.0	+50.5	67.4	5 50.0	+51.0	67.5	6 12.9	+51.5	67.6	6 35.7	+52.0	67.7	6 58.4	+52.5	67.8	17
18	5 06.5	+48.8	66.6	5 30.2	+49.4	66.7	5 53.9	+49.9	66.8	6 17.5	+50.5	66.9	6 41.0	+51.0	67.0	7 04.4	+51.5	67.1	7 27.7	+52.0	67.2	7 50.9	+52.4	67.3	18
19	5 55.3	+48.8	66.0	6 19.6	+49.4	66.1	6 43.8	+49.9	66.2	7 08.0	+50.4	66.3	7 32.0	+50.9	66.5	7 55.9	+51.4	66.6	8 19.7	+51.9	66.7	8 43.3	+52.4	66.8	19
20	6 44.1	+48.7	65.4	7 09.0	+49.3	65.6	7 33.7	+49.9	65.7	7 58.4	+50.4	65.8	8 22.9	+50.9	65.9	8 47.3	+51.4	66.1	9 11.6	+51.9	66.2	9 35.7	+52.4	66.4	20
21	7 32.8	+48.7	64.9	7 58.3	+49.2	65.0	8 23.6	+49.8	65.1	8 48.8	+50.3	65.2	9 13.8	+50.8	65.4	9 38.7	+51.4	65.5	10 03.5	+51.8	65.7	10 28.1	+52.3	65.9	21
22	8 21.5	+48.6	64.3	8 47.5	+49.2	64.4	9 13.4	+49.7	64.5	9 39.1	+50.2	64.7	10 04.6	+50.8	64.9	10 30.1	+51.3	65.0	10 55.3	+51.8	65.2	11 20.4	+52.3	65.4	22
23	9 10.2	+48.6	63.7	9 36.7	+49.1	63.8	10 03.1	+49.7	64.0	10 29.3	+50.3	64.1	10 55.4	+50.8	64.3	11 21.4	+51.2	64.5	11 47.1	+51.7	64.7	12 12.7	+52.2	64.9	23
24	9 58.8	+48.5	63.1	10 25.8	+49.1	63.2	10 52.8	+49.6	63.4	11 19.6	+50.1	63.6	11 46.2	+50.6	63.8	12 12.6	+51.2	64.0	12 38.8	+51.7	64.2	13 04.9	+52.2	64.4	24
25	10 47.3	+48.4	62.5	11 14.9	+49.0	62.8	11 42.4	+49.6	62.8	12 09.7	+50.1	63.0	12 36.8	+50.6	63.2	13 03.8	+51.1	63.4	13 30.5	+51.6	63.6	13 57.1	+52.1	63.9	25
26	11 35.7	+48.4	61.9	12 03.9	+49.0	62.1	12 32.0	+49.4	62.3	12 59.8	+50.0	62.5	13 27.4	+50.6	62.7	13 54.9	+51.0	62.9	14 22.1	+51.6	63.1	14 49.2	+52.0	63.3	26
27	12 24.1	+48.3	61.3	12 52.9	+48.8	61.5	13 21.4	+49.4	61.7	13 49.8	+49.9	61.9	14 18.0	+50.4	62.1	14 45.9	+51.0	62.3	15 13.7	+51.4	62.6	15 41.2	+51.9	62.8	27
28	13 12.4	+48.2	60.7	13 41.7	+48.8	60.9	14 10.8	+49.3	61.1	14 39.7	+49.9	61.3	15 08.4	+50.4	61.6	15 36.9	+50.9	61.8	16 05.1	+51.4	62.0	16 33.1	+51.9	62.3	28
29	14 00.6	+48.2	60.1	14 30.5	+48.7	60.3	15 00.1	+49.3	60.5	15 29.6	+49.7	60.7	15 58.8	+50.3	61.0	16 27.8	+50.7	61.2	16 56.5	+51.3	61.5	17 25.0	+51.8	61.8	29
30	14 48.8	+48.0	59.4	15 19.2	+48.5	59.7	15 49.4	+49.1	59.9	16 19.3	+49.7	60.2	16 49.1	+50.1	60.4	17 18.5	+50.7	60.7	17 47.8	+51.2	61.0	18 16.8	+51.7	61.2	30
31	15 36.8	+47.9	58.8	16 07.7	+48.5	59.1	16 38.5	+49.0	59.3	17 09.0	+49.5	59.6	17 39.2	+50.1	59.8	18 09.2	+50.6	60.1	18 39.0	+51.1	60.4	19 08.5	+51.6	60.7	31
32	16 24.7	+47.8	58.2	16 56.2	+48.4	58.4	17 27.5	+48.9	58.7	17 58.5	+49.5	59.0	18 29.3	+50.0	59.3	18 59.8	+50.5	59.6	19 30.1	+51.0	59.9	20 00.1	+51.5	60.2	32
33	17 12.5	+47.7	57.6	17 44.6	+48.2	57.8	18 16.4	+48.8	58.1	18 48.0	+49.3	58.4	19 19.3	+49.9	58.7	19 50.3	+50.4	59.0	20 21.1	+50.9	59.3	20 51.6	+51.4	59.6	33
34	18 00.2	+47.5	56.9	18 32.8	+48.1	57.2	19 05.2	+48.7	57.5	19 37.3	+49.2	57.8	20 09.2	+49.7	58.1	20 40.7	+50.3	58.4	21 12.0	+50.8	58.7	21 43.0	+51.3	59.1	34
35	18 47.7	+47.5	56.3	19 20.9	+48.0	56.6	19 53.9	+48.5	56.9	20 26.5	+49.1	57.2	20 58.9	+49.6	57.5	21 31.0	+50.1	57.8	22 02.8	+50.7	58.2	22 34.3	+51.2	58.5	35
36	19 35.2	+47.3	55.6	20 08.9	+47.9	55.9	20 42.4	+48.4	56.2	21 15.6	+48.9	56.6	21 48.5	+49.5	56.9	22 21.1	+50.1	57.2	22 53.5	+50.5	57.6	23 25.5	+51.0	57.9	36
37	20 22.5	+47.1	55.0	20 56.8	+47.7	55.3	21 30.8	+48.2	55.6	22 04.5	+48.8	55.9	22 38.0	+49.3	56.3	23 11.2	+49.8	56.6	23 44.0	+50.4	57.0	24 16.5	+50.9	57.4	37
38	21 09.6	+47.0	54.3	21 44.5	+47.5	54.6	22 19.0	+48.1	55.0	22 53.3	+48.7	55.3	23 27.3	+49.2	55.7	24 01.0	+49.8	56.0	24 34.4	+50.3	56.4	25 07.4	+50.8	56.8	38
39	21 56.6	+46.8	53.6	22 32.0	+47.4	54.0	23 07.1	+48.0	54.3	23 42.0	+48.5	54.7	24 16.5	+49.1	55.0	24 50.8	+49.5	55.4	25 24.7	+50.1	55.8	25 58.2	+50.6	56.2	39
40	22 43.4	+46.6	53.0	23 19.4	+47.2	53.3	23 55.1	+47.8	53.7	24 30.5	+48.3	54.0	25 05.6	+48.8	54.4	25 40.3	+49.4	54.8	26 14.8	+49.9	55.2	26 48.8	+50.5	55.6	40
41	23 30.0	+46.5	52.3	24 06.6	+47.0	52.6	24 42.9	+47.5	53.0	25 18.8	+48.2	53.4	25 54.4	+48.7	53.8	26 29.7	+49.3	54.2	27 04.7	+49.8	54.6	27 39.3	+50.3	55.0	41
42	24 16.5	+46.3	51.6	24 53.6	+46.9	52.0	25 30.4	+47.5	52.3	26 07.0	+47.9	52.7	26 43.1	+48.6	53.1	27 19.0	+49.1	53.5	27 54.5	+49.6	53.9	28 29.6	+50.2	54.4	42
43	25 02.8	+46.0	50.9	25 40.5	+46.6	51.3	26 17.9	+47.2	51.6	26 54.9	+47.8	52.0	27 31.7	+48.3	52.4	28 08.1	+48.8	52.8	28 44.1	+49.4	53.3	29 19.8	+49.9	53.7	43
44	25 48.8	+45.9	50.2	26 27.1	+46.5	50.6	27 05.1	+47.0	51.0	27 42.7	+47.6	51.4	28 20.0	+48.1	51.8	28 56.9	+48.7	52.2	29 33.5	+49.3	52.6	30 09.7	+49.8	53.1	44
45	26 34.7	+45.7	49.5	27 13.6	+46.2	49.9	27 52.1	+46.8	50.3	28 30.3	+47.3	50.7	29 08.1	+48.0	51.1	29 45.6	+48.5	51.5	30 22.8	+49.0	52.0	30 59.5	+49.6	52.5	45
46	27 20.4	+45.4	48.7	27 59.8	+46.0	49.1	28 38.9	+46.5	49.5	29 17.6	+47.2	50.0	29 56.1	+47.7	50.4	30 34.1	+48.3	50.9	31 11.8	+48.8	51.3	31 49.1	+49.4	51.8	46
47	28 05.8	+45.1	48.0	28 45.8	+45.7	48.4	29 25.4	+46.4	48.8	30 04.8	+46.9	49.3	30 43.8	+47.4	49.7	31 22.4	+48.0	50.2	32 00.6	+48.6	50.6	32 38.5	+49.1	51.1	47
48	28 50.9	+44.9	47.3	29 31.5	+45.5	47.7	30 11.8	+46.0	48.1	30 51.7	+46.6	48.5	31 31.2	+47.3	49.0	32 10.4	+47.8	49.5	32 49.2	+48.4	49.9	33 27.6	+49.0	50.4	48
49	29 35.9	+44.6	46.5	30 17.0	+45.3	46.9	30 57.8	+45.9	47.3	31 38.3	+46.4	47.8	32 18.5	+46.9	48.3	32 58.2	+47.6	48.7	33 37.6	+48.1	49.2	34 16.6	+48.6	49.7	49
50	30 20.5	+44.4	45.7	31 02.3	+44.9	46.1	31 43.7	+45.5	46.6	32 24.7	+46.1	47.0	33 05.4	+46.7	47.5	33 45.8	+47.2	48.0	34 25.7	+47.9	48.5	35 05.2	+48.5	49.0	50
51	31 04.9	+44.1	44.9	31 47.2	+44.7	45.4	32 29.2	+45.3	45.8	33 10.8	+45.9	46.3	33 52.1	+46.5	46.8	34 33.0	+47.0	47.3	35 13.6	+47.5	47.8	35 53.7	+48.1	48.3	51
52	31 49.0	+43.8	44.1	32 31.9	+44.4	44.6	33 14.5	+44.9	45.0	33 56.7	+45.5	45.5	34 38.6	+46.1	46.0	35 20.0	+46.8	46.5	36 01.1	+47.3	47.0	36 41.8	+47.9	47.6	52
53	32 32.8	+43.5	43.3	33 16.3	+44.1	43.8	33 59.4	+44.7	44.2	34 42.2	+45.3	44.7	35 24.7	+45.8	45.2	36 06.8	+46.4	45.7	36 48.4	+47.1	46.3	37 29.7	+47.6	46.8	53
54	33 16.3	+43.1	42.5	34 00.4	+43.7	43.0	34 44.1	+44.3	43.4	35 27.5	+44.9	43.9	36 10.5	+45.5	44.4	36 53.2	+46.1	44.9	37 35.5	+46.6	45.5	38 17.3	+47.3	46.0	54
55	33 59.4	+42.8	41.7	34 44.1	+43.4	42.1	35 28.4	+44.0	42.6	36 12.4	+44.6	43.1	36 56.0	+45.2	43.6	37 39.3	+45.7	44.1	38 22.1	+46.4	44.7	39 04.6	+46.9	45.3	55
56	34 42.2	+42.5	40.9	35 27.5	+43.0	41.3	36 12.4	+43.6	41.8	36 57.0	+44.2	42.3	37 41.2	+44.8	42.8	38 25.0	+45.5	43.3	39 08.5	+46.0	43.9	39 51.5	+46.6	44.4	56
57	35 24.7	+42.1	40.0	36 10.5	+42.7	40.4	36 56.0	+43.3	40.9	37 41.2	+43.8	41.4	38 26.0	+44.5	41.9	39 10.5	+45.0	42.5	39 54.5	+45.6	43.0	40 38.1	+46.3	43.6	57
58	36 06.8	+41.6	39.1	36 53.2	+42.3	39.6	37 39.3	+42.8	40.0	38 25.0	+43.5	40.6	39 10.5	+44.0	41.1	39 55.5	+44.6	41.6	40 40.1	+45.3	42.2	41 24.4	+45.9	42.8	58
59	36 48.4	+41.3	38.2	37 35.5	+41.8	38.7	38 22.1	+42.5	39.2	39 08.5	+43.0	39.7	39 54.5	+43.6	40.2	40 40.1	+44.2	40.7	41 25.4	+44.9	41.3	42 10.3	+45.4	41.9	59
60	37 29.7	+40.9	37.3	38 17.3	+41.4	37.8	39 04.6	+42.0	38.3	39 51.5	+42.7	38.8	40 38.7	+43.3	39.3	41 24.4	+43.8	39.9	42 10.3	+44.4	40.4	42 55.7	+45.1	41.0	60
61	38 10.6	+40.4	36.4	38 58.7	+41.0	36.8	39 46.6	+41.6	37.3	40 34.2	+42.1	37.8	41 21.4	+42.7	38.4	42 08.2	+43.4	38.9	42 54.7	+44.0	39.5	43 40.8	+44.6	40.1	61
62	38 51.0	+39.9	35.4	39 39.7	+40.5	35.9	40 28.2	+41.1	36.4	41 16.3	+41.7	36.9	42 04.1	+42.3	37.4	42 51.6	+42.9	38.0	43 38.7	+43.5	38.6	44 25.4	+44.1	39.2	62
63	39 30.9	+39.4	34.5	40 20.2	+40.1	34.9	41 09.3	+40.6	35.4	41 58.0	+41.2	35.9	42 46.4	+41.8	36.5	43 34.5	+42.4	37.0	44 22.2	+43.0	37.6	45 09.5	+43.7	38.2	63
64	40 10.3	+39.0	33.5	41 00.3	+39.5	33.9	41 49.9	+40.1	34.4	42 39.2	+40.7	35.0	43 28.2	+41.3	35.5	44 16.9	+41.9	36.1	45 05.2	+42.6	36.6	45 53.2	+43.1	37.3	64
65	40 49.3	+38.4	32.5	41 39.8	+39.0	32.9	42 30.0	+39.6	33.4	43 19.9	+40.2	34.0	44 09.5	+40.8	34.5	44 58.8	+41.4	35.1	45 47.8	+41.9	35.6	46 36.3	+42.6	36.2	65
66	41 27.7	+37.9	31.4	42 18.8	+38.4	31.9	43 09.6	+39.0	32.4	44 00.1	+39.5	32.9	44 50.3	+40.2	33.5	45 40.2	+40.8	34.0	46 29.7	+41.4	34.6	47 18.9	+42.1	35.2	66
67	42 05.6	+37.2	30.4	42 57.2	+37.8	30.9	43 48.6	+38.4	31.4	44 39.6	+39.0	31.9	45 30.5	+39.5	32.4	46 21.0	+40.1	33.0	47 11.1	+40.8	33.5	48 01.0	+41.4	34.2	67
68	42 42.8	+36.7	29.3	43 35.0	+37.3	29.8	44 27.0	+37.8	30.3	45 18.6	+38.4	30.8	46 10.0	+39.0	31.3	47 01.1	+39.6	31.9	47 51.9	+40.2	32.5	48 42.4	+40.8	33.1	68
69	43 19.5	+36.1	28.3	44 12.3	+36.6	28.7	45 04.8	+37.1	29.2	45 57.0	+37.7	29.7	46 49.0	+38.3	30.2	47 40.7	+38.9	30.8	48 32.1	+39.5	31.3	49 23.2	+40.1	32.0	69
70	43 55.6	+35.4	27.2	44 48.9	+35.9	27.6	45 41.9	+36.5	28.1	46 34.7	+37.1	28.6	47 27.3	+37.6	29.1	48 19.6	+38.2	29.6	49 11.6	+38.8	30.2	50 03.3	+39.4	30.8	70
71	44 31.0	+34.7	26.0	45 24.8	+35.3	26.5	46 18.4	+35.8	26.9	47 11.8	+36.3	27.4	48 04.9	+36.9	27.9	48 57.8	+37.5	28.5	49 50.4	+38.1	29.0	50 42.7	+38.7	29.6	71
72	45 05.7	+34.1	24.9	46 00.1	+34.5	25.3	46 54.2	+35.1	25.8	47 48.1	+35.6	26.2	48 41.8	+36.2	26.7	49 35.3	+36.7	27.3	50 28.5	+37.3	27.8	51 21.4	+37.9	28.4	72
73	45 39.8	+33.3	23.7	46 34.6	+33.8	24.1	47 29.3	+34.3	24.6	48 23.7	+34.9	25.0	49 18.0	+35.4	25.5	50 12.0	+35.9	26.0	51 05.8	+36.5	26.6	51 59.3	+37.1	27.2	73
74	46 13.1	+32.5	22.5	47 08.4	+33.0	22.9	48 03.6	+33.5	23.4	48 58.6	+34.0	23.8	49 53.4	+34.5	24.3	50 47.9	+35.1	24.8	51 42.3	+35.7	25.3	52 36.4	+36.3	25.9	74
75	46 45.6	+31.7	21.3	47 41.4	+32.2	21.7	48 37.1	+32.7	22.1	49 32.6	+33.2	22.5	50 27.9	+33.7	23.0	51 23.0	+34.3	23.5	52 18.0	+34.7	24.0	53 12.7	+35.3	24.5	75
76	47 17.3	+30.9	20.1	48 13.6	+31.4	20.4	49 09.8	+31.8	20.8	50 05.8	+32.3	21.3	51 01.6	+32.8	21.7	51 57.3	+33.3	22.2	52 52.7	+33.9	22.7	53 48.0	+34.4	23.2	76
77	47 48.2	+30.1	18.8	48 45.0	+30.5	19.1	49 41.6	+30.9	19.5	50 38.1	+31.4	19.9	51 34.4	+31.9	20.4	52 30.6	+32.3	20.8	53 26.6	+32.8	21.3	54 22.4	+33.4	21.8	77
78	48 18.3	+29.2	17.5	49 15.5	+29.5	17.8	50 12.5	+30.0	18.2	51 09.5	+30.4	18.6	52 06.3	+30.8	19.0	53 02.9	+31.4	19.4	53 59.4	+31.9	19.9	54 55.8	+32.3	20.4	78
79	48 47.5	+28.2	16.2	49 45.0	+28.7	16.5	50 42.5	+29.0	16.8	51 39.9	+29.4	17.2	52 37.1	+29.9	17.6	53 34.3	+30.3	18.0	54 31.3	+30.7	18.4	55 28.1	+31.3	18.9	79
80	49 15.7	+27.3	14.8	50 13.7	+27.6	15.1	51 11.5	+28.1	15.4	52 09.3	+28.4	15.8	53 07.0	+28.8	16.1	54 04.6	+29.2	16.5	55 02.0	+29.7	16.9	55 59.4	+30.1	17.4	80
81	49 43.0	+26.3	13.4	50 41.3	+26.6	13.7	51 39.6	+26.9	14.0	52 37.7	+27.3	14.3	53 35.8	+27.7	14.7	54 33.8	+28.1	15.0	55 31.7	+28.5	15.4	56 29.5	+28.9	15.8	81
82	50 09.3	+25.3	12.1	51 07.9	+25.6	12.3	52 06.5	+25.9	12.6	53 05.0	+26.3	12.9	54 03.5	+26.5	13.2	55 01.9	+26.9	13.5	56 00.2	+27.3	13.8	56 58.4	+27.7	14.2	82
83	50 34.6	+24.2	10.6	51 33.5	+24.5	10.9	52 32.4	+24.8	11.1	53 31.3	+25.0	11.4	54 30.0	+25.4	11.6	55 28.8	+25.7	11.9	56 27.5	+26.0	12.2	57 26.1	+26.3	12.6	83
84	50 58.8	+23.1	9.2	51 58.0	+23.3	9.4	52 57.2	+23.6	9.6	53 56.3	+23.9	9.8	54 55.4	+24.1	10.1	55 54.5	+24.3	10.3	56 53.5	+24.6	10.6	57 52.4	+25.0	10.9	84
85	51 21.9	+22.0	7.7	52 21.3	+22.2	7.9	53 20.8	+22.4	8.1	54 20.2	+22.6	8.3	55 19.5	+22.8	8.5	56 18.8	+23.1	8.7	57 18.1	+23.4	8.9	58 17.4	+23.6	9.2	85
86	51 43.9	+20.8	6.2	52 43.5	+21.0	6.4	53 43.2	+21.1	6.5	54 42.8	+21.3	6.7	55 42.3	+21.6	6.8	56 41.9	+21.7	7.0	57 41.5	+21.8	7.2	58 41.0	+22.1	7.4	86
87	52 04.7	+19.7	4.7	53 04.5	+19.8	4.8	54 04.3	+19.9	4.9	55 04.1	+20.0	5.0	56 03.9	+20.1	5.2	57 03.6	+20.3	5.3	58 03.3	+20.5	5.6	59 03.1	+20.5	5.6	87
88	52 24.4	+18.4	3.2	53 24.3	+18.5	3.2	54 24.2	+18.6	3.3	55 24.1	+18.7	3.4	56 24.0	+18.7	3.5	57 23.9	+18.8	3.6	58 23.8	+18.9	3.7	59 23.6	+19.0	3.8	88
89	52 42.8	+17.2	1.6	53 42.8	+17.2	1.6	54 42.8	+17.2	1.7	55 42.8	+17.2	1.7	56 42.7	+17.3	1.8	57 42.7	+17.3	1.8	58 42.7	+17.3	1.9	59 42.6	+17.4	1.9	89
90	53 00.0	+15.9	0.0	54 00.0	+15.9	0.0	55 00.0	+15.8	0.0	56 00.0	+15.8	0.0	57 00.0	+15.8	0.0	58 00.0	+15.8	0.0	59 00.0	+15.7	0.0	60 00.0	+15.7	0.0	90

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	8 57.7	+48.4	102.1	8 45.0	+49.1	102.2	8 32.2	+49.7	102.4	8 19.3	+50.2	102.5	8 06.2	+50.8	102.7	7 53.0	+51.3	102.8	7 39.6	+51.9	102.9	7 26.1	+52.4	103.1	0
1	9 46.1	+48.5	101.5	9 34.1	+49.0	101.6	9 21.9	+49.6	101.8	9 09.5	+50.2	102.0	8 57.0	+50.8	102.1	8 44.3	+51.3	102.3	8 31.5	+51.9	102.4	8 18.5	+52.4	102.6	1
2	10 34.6	+48.3	100.9	10 23.1	+49.0	101.1	10 11.5	+49.6	101.2	9 59.7	+50.2	101.4	9 47.8	+50.7	101.6	9 35.6	+51.3	101.8	9 23.3	+51.8	101.9	9 10.9	+52.3	102.1	2
3	11 22.9	+48.3	100.3	11 12.1	+48.9	100.5	11 01.1	+49.5	100.7	10 49.9	+50.1	100.9	10 38.5	+50.6	101.0	10 26.9	+51.2	101.2	10 15.1	+51.8	101.4	10 03.2	+52.2	101.6	3
4	12 11.2	+48.2	99.7	12 01.0	+48.8	99.9	11 50.6	+49.4	100.1	11 40.0	+50.0	100.3	11 29.1	+50.6	100.5	11 18.1	+51.2	100.7	11 06.9	+51.7	100.9	10 55.4	+52.2	101.1	4
5	12 59.4	+48.1	99.1	12 49.8	+48.7	99.3	12 40.0	+49.4	99.5	12 30.0	+49.9	99.7	12 19.7	+50.6	99.9	12 09.3	+51.0	100.2	11 58.6	+51.6	100.4	11 47.6	+52.2	100.6	5
6	13 47.5	+48.0	98.4	13 38.5	+48.7	98.7	13 29.4	+49.2	98.9	13 19.9	+49.9	99.2	13 10.3	+50.4	99.4	13 00.3	+51.1	99.6	12 50.2	+51.6	99.9	12 39.8	+52.1	100.1	6
7	14 35.5	+47.9	97.8	14 27.2	+48.6	98.1	14 18.6	+49.2	98.3	14 09.8	+49.8	98.6	14 00.7	+50.4	98.8	13 51.4	+50.9	99.1	13 41.8	+51.5	99.3	13 31.9	+52.1	99.6	7
8	15 23.4	+47.8	97.2	15 15.8	+48.4	97.5	15 07.8	+49.1	97.7	14 59.6	+49.7	98.0	14 51.1	+50.3	98.3	14 42.3	+50.9	98.5	14 33.3	+51.4	98.8	14 24.0	+51.9	99.1	8
9	16 11.2	+47.7	96.6	16 04.2	+48.4	96.9	15 56.9	+49.0	97.1	15 49.3	+49.6	97.4	15 41.4	+50.2	97.7	15 33.2	+50.8	98.0	15 24.7	+51.3	98.3	15 15.9	+51.9	98.5	9
10	16 58.9	+47.6	95.9	16 52.6	+48.2	96.2	16 45.9	+48.9	96.5	16 38.9	+49.5	96.8	16 31.6	+50.1	97.1	16 24.0	+50.7	97.4	16 16.0	+51.3	97.7	16 07.8	+51.9	98.0	10
11	17 46.5	+47.5	95.3	17 40.8	+48.1	95.6	17 34.8	+48.7	95.9	17 28.4	+49.4	96.3	17 21.7	+50.0	96.6	17 14.7	+50.6	96.9	17 07.3	+51.2	97.2	16 59.7	+51.7	97.5	11
12	18 34.0	+47.3	94.7	18 28.9	+48.0	95.0	18 23.5	+48.7	95.3	18 17.8	+49.3	95.7	18 11.7	+49.9	96.0	18 05.3	+50.5	96.3	17 58.5	+51.1	96.6	17 51.4	+51.7	97.0	12
13	19 21.3	+47.2	94.0	19 16.9	+47.9	94.4	19 12.2	+48.5	94.7	19 07.1	+49.1	95.1	19 01.6	+49.8	95.4	18 55.8	+50.4	95.7	18 49.6	+51.0	96.1	18 43.1	+51.5	96.4	13
14	20 08.5	+47.0	93.4	20 04.8	+47.7	93.7	20 00.7	+48.4	94.1	19 56.2	+49.1	94.4	19 51.4	+49.7	94.8	19 46.2	+50.3	95.2	19 40.6	+50.9	95.5	19 34.6	+51.5	95.9	14
15	20 55.5	+46.9	92.7	20 52.5	+47.6	93.1	20 49.1	+48.3	93.5	20 45.3	+48.9	93.8	20 41.1	+49.5	94.2	20 36.5	+50.1	94.6	20 31.5	+50.8	95.0	20 26.1	+51.4	95.3	15
16	21 42.4	+46.7	92.0	21 40.1	+47.4	92.4	21 37.4	+48.1	92.8	21 34.2	+48.8	93.2	21 30.6	+49.4	93.6	21 26.6	+50.1	94.0	21 22.3	+50.6	94.4	21 17.5	+51.2	94.8	16
17	22 29.1	+46.6	91.3	22 27.5	+47.3	91.8	22 25.5	+47.9	92.2	22 23.0	+48.6	92.6	22 20.0	+49.3	93.0	22 16.7	+49.9	93.4	22 12.9	+50.6	93.8	22 08.7	+51.2	94.2	17
18	23 15.7	+46.4	90.7	23 14.8	+47.1	91.1	23 13.4	+47.8	91.5	23 11.6	+48.5	91.9	23 09.3	+49.2	92.4	23 06.6	+49.8	92.8	23 03.5	+50.4	93.2	22 59.9	+51.0	93.7	18
19	24 02.1	+46.1	90.0	24 01.9	+46.9	90.4	24 01.2	+47.6	90.9	24 00.1	+48.3	91.3	23 58.5	+48.9	91.8	23 56.4	+49.6	92.2	23 53.9	+50.2	92.6	23 50.9	+50.9	93.1	19
20	24 48.2	+46.0	89.3	24 48.8	+46.7	89.7	24 48.8	+47.4	90.2	24 48.4	+48.1	90.7	24 47.4	+48.9	91.1	24 46.0	+49.5	91.6	24 44.1	+50.2	92.0	24 41.8	+50.7	92.5	20
21	25 34.2	+45.8	88.6	25 35.5	+46.5	89.0	25 36.2	+47.3	89.5	25 36.5	+48.0	90.0	25 36.3	+48.6	90.5	25 35.5	+49.3	91.0	25 34.3	+49.9	91.4	25 32.5	+50.6	91.9	21
22	26 20.0	+45.6	87.8	26 22.0	+46.3	88.3	26 23.5	+47.0	88.8	26 24.5	+47.7	89.3	26 24.9	+48.5	89.8	26 24.8	+49.2	90.3	26 24.2	+49.8	90.8	26 23.1	+50.5	91.3	22
23	27 05.6	+45.3	87.1	27 08.3	+46.1	87.6	27 10.5	+46.9	88.1	27 12.2	+47.6	88.6	27 13.4	+48.2	89.2	27 14.0	+48.9	89.7	27 14.0	+49.7	90.2	27 13.6	+50.3	90.7	23
24	27 50.9	+45.1	86.4	27 54.4	+45.9	86.9	27 57.4	+46.6	87.4	27 59.8	+47.3	88.0	28 01.6	+48.1	88.5	28 02.9	+48.8	89.0	28 03.7	+49.5	89.6	28 03.9	+50.1	90.1	24
25	28 36.0	+44.8	85.6	28 40.3	+45.6	86.2	28 44.0	+46.4	86.7	28 47.1	+47.2	87.3	28 49.7	+47.9	87.8	28 51.7	+48.6	88.4	28 53.2	+49.2	88.9	28 54.0	+50.0	89.5	25
26	29 20.8	+44.6	84.9	29 25.9	+45.4	85.4	29 30.4	+46.1	86.0	29 34.3	+46.9	86.6	29 37.6	+47.7	87.1	29 40.3	+48.4	87.7	29 42.4	+49.1	88.3	29 44.0	+49.7	88.8	26
27	30 05.4	+44.3	84.1	30 11.3	+45.1	84.7	30 16.5	+45.9	85.3	30 21.2	+46.7	85.8	30 25.3	+47.4	86.4	30 28.7	+48.2	87.0	30 31.5	+48.9	87.6	30 33.7	+49.6	88.2	27
28	30 49.7	+44.0	83.3	30 56.4	+44.8	83.9	31 02.4	+45.7	84.5	31 07.9	+46.4	85.1	31 12.7	+47.2	85.7	31 16.9	+47.9	86.3	31 20.4	+48.7	86.9	31 23.3	+49.4	87.5	28
29	31 33.7	+43.7	82.5	31 41.2	+44.6	83.1	31 48.1	+45.3	83.7	31 54.3	+46.1	84.4	31 59.9	+46.9	85.0	32 04.8	+47.7	85.6	32 09.1	+48.4	86.2	32 12.7	+49.1	86.9	29
30	32 17.4	+43.4	81.7	32 25.8	+44.2	82.3	32 33.4	+45.1	83.0	32 40.4	+45.9	83.6	32 46.8	+46.7	84.2	32 52.5	+47.4	84.9	32 57.5	+48.2	85.5	33 01.8	+49.0	86.2	30
31	33 00.8	+43.1	80.9	33 10.0	+43.9	81.5	33 18.5	+44.8	82.2	33 26.3	+45.6	82.8	33 33.5	+46.4	83.5	33 39.9	+47.2	84.2	33 45.7	+47.9	84.8	33 50.8	+48.6	85.5	31
32	33 43.9	+42.7	80.1	33 53.9	+43.6	80.7	34 03.3	+44.4	81.4	34 11.9	+45.3	82.1	34 19.9	+46.1	82.7	34 27.1	+46.9	83.4	34 33.6	+47.7	84.1	34 39.4	+48.5	84.8	32
33	34 26.6	+42.4	79.2	34 37.5	+43.3	79.9	34 47.7	+44.1	80.6	34 57.2	+45.0	81.3	35 06.0	+45.8	81.9	35 14.0	+46.6	82.6	35 21.3	+47.4	83.3	35 27.9	+48.2	84.1	33
34	35 09.0	+42.0	78.3	35 20.8	+42.9	79.0	35 31.8	+43.8	79.7	35 42.2	+44.6	80.4	35 51.8	+45.4	81.2	36 00.6	+46.3	81.9	36 08.7	+47.1	82.6	36 16.1	+47.9	83.3	34
35	35 51.0	+41.6	77.5	36 03.7	+42.5	78.2	36 15.6	+43.4	78.9	36 26.8	+44.3	79.6	36 37.2	+45.2	80.3	36 46.9	+46.0	81.1	36 55.8	+46.8	81.8	37 04.0	+47.6	82.6	35
36	36 32.6	+41.2	76.6	36 46.2	+42.1	77.3	36 59.0	+43.0	78.0	37 11.1	+43.9	78.8	37 22.4	+44.8	79.5	37 32.9	+45.6	80.3	37 42.6	+46.5	81.0	37 51.6	+47.3	81.8	36
37	37 13.8	+40.8	75.7	37 28.3	+41.7	76.4	37 42.0	+42.7	77.2	37 55.0	+43.5	77.9	38 07.2	+44.4	78.7	38 18.5	+45.3	79.5	38 29.1	+46.2	80.2	38 38.9	+47.0	81.0	37
38	37 54.6	+40.4	74.7	38 10.0	+41.3	75.5	38 24.7	+42.2	76.3	38 38.5	+43.2	77.0	38 51.6	+44.0	77.8	39 03.8	+45.0	78.6	39 15.3	+45.8	79.4	39 25.9	+46.6	80.2	38
39	38 35.0	+39.9	73.8	38 51.3	+40.9	74.6	39 06.9	+41.8	75.4	39 21.7	+42.7	76.1	39 35.6	+43.7	76.9	39 48.8	+44.5	77.8	40 01.1	+45.4	78.6	40 12.5	+46.3	79.4	39
40	39 14.9	+39.4	72.8	39 32.2	+40.3	73.6	39 48.7	+41.3	74.4	40 04.4	+42.3	75.2	40 19.3	+43.2	76.0	40 33.3	+44.1	76.9	40 46.5	+45.0	77.7	40 58.8	+46.0	78.6	40
41	39 54.3	+38.9	71.9	40 12.5	+39.9	72.7	40 30.0	+40.9	73.5	40 46.7	+41.8	74.3	41 02.5	+42.8	75.1	41 17.4	+43.8	76.0	41 31.5	+44.7	76.8	41 44.8	+45.5	77.7	41
42	40 33.2	+38.3	70.9	40 52.4	+39.4	71.7	41 10.9	+40.3	72.5	41 28.5	+41.3	73.3	41 45.3	+42.3	74.2	42 01.2	+43.2	75.1	42 16.2	+44.2	75.9	42 30.3	+45.1	76.8	42
43	41 11.5	+37.8	69.8	41 31.8	+38.8	70.7	41 51.2	+39.9	71.5	42 09.8	+40.9	72.4	42 27.6	+41.8	73.2	42 44.4	+42.8	74.1	43 00.4	+43.7	75.0	43 15.4	+44.7	75.9	43
44	41 49.3	+37.3	68.8	42 10.6	+38.3	69.7	42 31.1	+39.3	70.5	42 50.7	+40.3	71.4	43 09.4	+41.3	72.3	43 27.2	+42.3	73.2	43 44.1	+43.3	74.1	44 00.1	+44.2	75.0	44
45	42 26.6	+36.7	67.8	42 48.9	+37.7	68.6	43 10.4	+38.7	69.5	43 31.0	+39.7	70.4	43 50.7	+40.8	71.3	44 09.5	+41.8	72.2	44 27.4	+42.8	73.1	44 44.3	+43.8	74.1	45
46	43 03.3	+36.0	66.7	43 26.6	+37.1	67.5	43 49.1	+38.1	68.4	44 10.7	+39.2	69.3	44 31.5	+40.2	70.2	44 51.3	+41.2	71.2	45 10.2	+42.2	72.1	45 28.1	+43.2	73.1	46
47	43 39.3	+35.4	65.6	44 03.7	+36.4	66.5	44 27.2	+37.5	67.3	44 49.9	+38.6	68.3	45 11.7	+39.6	69.2	45 32.5	+40.7	70.1	45 52.4	+41.7	71.1	46 11.3	+42.8	72.1	47
48	44 14.7	+34.7	64.5	44 40.1	+35.8	65.3	45 04.7	+36.9	66.3	45 28.5	+37.9	67.2	45 51.3	+39.0	68.1	46 13.2	+40.0	69.1	46 34.1	+41.1	70.1	46 54.1	+42.1	71.1	48
49	44 49.4	+34.0	63.3	45 15.9	+35.2	64.2	45 41.6	+36.2	65.1	46 06.4	+37.3	66.1	46 30.3	+38.4	67.0	46 53.2	+39.5	68.0	47 15.2	+40.5	69.0	47 36.2	+41.6	70.0	49
50	45 23.4	+33.3	62.1	45 51.1	+34.4	63.0	46 17.8	+35.5	64.0	46 43.7	+36.6	64.9	47 08.7	+37.6	65.9	47 32.7	+38.8	66.9	47 55.7	+39.9	67.9	48 17.8	+40.9	69.0	50
51	45 56.7	+32.6	61.0	46 25.5	+33.6	61.9	46 53.3	+34.8	62.8	47 20.3	+35.9	63.8	47 46.3	+37.0	64.8	48 11.5	+38.0	65.8	48 35.6	+39.2	66.8	48 58.7	+40.3	67.8	51
52	46 29.3	+31.7	59.7	46 59.1	+32.9	60.7	47 28.1	+34.0	61.6	47 56.2	+35.1	62.6	48 23.3	+36.3	63.6	48 49.5	+37.4	64.6	49 14.8	+38.5	65.6	49 39.0	+39.6	66.7	52
53	47 01.0	+31.0	58.5	47 32.0	+32.0	59.4	48 02.1	+33.1	60.4	48 31.3	+34.3	61.4	48 59.6	+35.4	62.4	49 26.9	+36.6	63.4	49 53.3	+37.7	64.5	50 18.6	+38.9	65.5	53
54	47 32.0	+30.1	57.2	48 04.0	+31.2	58.2	48 35.2	+32.4	59.1	49 05.6	+33.5	60.1	49 35.0	+34.7	61.1	50 03.5	+35.8	62.2	50 31.0	+37.0	63.2	50 57.5	+38.2	64.3	54
55	48 02.1	+29.2	55.9	48 35.2	+30.4	56.9	49 07.6	+31.5	57.8	49 39.1	+32.6	58.8	50 09.7	+33.8	59.9	50 39.3	+35.0	60.9	51 08.0	+36.2	62.0	51 35.7	+37.3	63.1	55
56	48 31.3	+28.3	54.6	49 05.6	+29.4	55.6	49 39.1	+30.6	56.5	50 11.7	+31.8	57.5	50 43.5	+32.9	58.6	51 14.3	+34.1	59.7	51 44.2	+35.3	60.7	52 13.0	+36.5	61.8	56
57	48 59.6	+27.3	53.3	49 35.0	+28.5	54.2	50 09.7	+29.6	55.2	50 43.5	+30.8	56.2	51 16.4	+32.0	57.2	51 48.4	+33.2	58.3	52 19.5	+34.4	59.4	52 49.5	+35.6	60.5	57
58	49 26.9	+26.4	51.9	50 03.5	+27.5	52.9	50 39.3	+28.7	53.8	51 14.3	+29.9	54.8	51 48.4	+31.1	55.9	52 21.6	+32.3	56.9	52 53.9	+33.4	58.1	53 25.1	+34.7	59.2	58
59	49 53.3	+25.3	50.5	50 31.0	+26.5	51.5	51 08.0	+27.7	52.4	51 44.2	+28.8	53.4	52 19.5	+30.0	54.5	52 53.9	+31.2	55.6	53 27.3	+32.5	56.7	53 59.8	+33.7	57.8	59
60	50 18.6	+24.4	49.1	50 57.5	+25.5	50.1	51 35.7	+26.6	51.0	52 13.0	+27.8	52.0	52 49.5	+29.0	53.1	53 25.1	+30.2	54.1	53 59.8	+31.4	55.2	54 33.5	+32.7	56.4	60
61	50 43.0	+23.2	47.7	51 23.0	+24.4	48.6	52 02.3	+25.5	49.6	52 40.8	+26.7	50.6	53 18.5	+27.9	51.6	53 55.3	+29.1	52.7	54 31.2	+30.4	53.8	55 06.2	+31.6	54.9	61
62	51 06.2	+22.1	46.2	51 47.4	+23.2	47.1	52 27.8	+24.4	48.1	53 07.5	+25.5	49.1	53 46.4	+26.7	50.1	54 24.4	+28.0	51.2	55 01.6	+29.2	52.3	55 37.8	+30.5	53.4	62
63	51 28.3	+21.0	44.7	52 10.6	+22.1	45.7	52 52.2	+23.2	46.6	53 33.0	+24.4	47.6	54 13.1	+25.6	48.6	54 52.4	+26.8	49.7	55 30.8	+28.1	50.8	56 08.3	+29.3	51.9	63
64	51 49.3	+19.8	43.2	52 32.7	+20.9	44.1	53 15.4	+22.0	45.1	53 57.4	+23.2	46.0	54 38.7	+24.4	47.0	55 19.2	+25.6	48.1	55 58.9	+26.8	49.2	56 37.6	+28.1	50.3	64
65	52 09.1	+18.6	41.7	52 53.6	+19.7	42.6	53 37.4	+20.8	43.5	54 20.6	+22.0	44.5	55 03.1	+23.1	45.4	55 44.8	+24.3	46.5	56 25.7	+25.5	47.6	57 05.7	+26.8	48.7	65
66	52 27.7	+17.3	40.2	53 13.3	+18.4	41.0	53 58.2	+19.5	41.9	54 42.6	+20.6	42.8	55 26.2	+21.8	43.8	56 09.1	+23.0	44.9	56 51.2	+24.3	45.9	57 32.5	+25.5	47.1	66
67	52 45.0	+16.1	38.6	53 31.7	+17.1	39.4	54 17.7	+18.2	40.3	55 03.2	+19.3	41.2	55 48.0	+20.4	42.2	56 32.1	+21.6	43.2	57 15.5	+22.8	44.3	57 58.0	+24.1	45.4	67
68	53 01.1	+14.8	37.0	53 48.8	+15.8	37.8	54 35.9	+16.9	38.7	55 22.5	+17.9	39.6	56 08.4	+19.1	40.5	56 53.7	+20.2	41.5	57 38.3	+21.4	42.5	58 22.1	+22.7	43.6	68
69	53 15.9	+13.5	35.4	54 04.6	+14.4	36.2	54 52.8	+15.4	37.0	55 40.4	+16.5	37.9	56 27.5	+17.6	38.8	57 13.9	+18.8	39.8	57 59.7	+20.0	40.8	58 44.8	+21.2	41.9	69
70	53 29.4	+12.1	33.7	54 19.0	+13.1	34.5	55 08.2	+14.1	35.3	55 56.9	+15.1	36.2	56 45.1	+16.2	37.1	57 32.7	+17.3	38.0	58 19.7	+18.4	39.0	59 06.0	+19.6	40.0	70
71	53 41.5	+10.7	32.1	54 32.1	+11.6	32.8	55 22.3	+12.6	33.6	56 12.0	+13.6	34.4	57 01.3	+14.6	35.3	57 50.0	+15.7	36.2	58 38.1	+16.8	37.2	59 25.6	+18.0	38.2	71
72	53 52.2	+9.3	30.4	54 43.7	+10.3	31.1	55 34.9	+11.2	31.9	56 25.6	+12.1	32.7	57 15.9	+13.1	33.5	58 05.7	+14.1	34.4	58 54.9	+15.3	35.3	59 43.6	+16.4	36.3	72
73	54 01.5	+8.0	28.7	54 54.0	+8.7	29.4	55 46.1	+9.6	30.1	56 37.7	+10.6	30.9	57 29.0	+11.6	31.7	58 19.8	+12.6	32.5	59 10.2	+13.6	33.4	60 00.0	+14.6	34.4	73
74	54 09.5	+6.5	27.0	55 02.7	+7.3	27.7	55 55.7	+8.1	28.4	56 48.3	+9.0	29.1	57 40.6	+9.9	29.8	58 32.4	+10.9	30.7	59 23.8	+11.8	31.5	60 14.6	+13.0	32.4	74
75	54 16.0	+5.0	25.3	55 10.0	+5.9	26.0	56 03.8	+6.7	26.6	56 57.3	+7.5	27.3	57 50.5	+8.3	28.0	58 43.3	+9.2	28.8	59 35.6	+10.2	29.6	60 27.6	+11.2	30.5	75
76	54 21.0	+3.6	23.6	55 15.9	+4.3	24.2	56 10.5	+5.0	24.8	57 04.8	+5.8	25.5	57 58.8	+6.6	26.1	58 52.5	+7.5	26.9	59 45.8	+8.4	27.6	60 38.8	+9.3	28.5	76
77	54 24.6	+2.2	21.9	55 20.2	+2.8	22.5	56 15.5	+3.5	23.0	57 10.6	+4.2	23.6	58 05.4	+5.0	24.3	59 00.0	+5.8	25.0	59 54.2	+6.7	25.7	60 48.1	+7.6	26.4	77
78	54 26.8	+0.6	20.2	55 23.0	+1.3	20.7	56 19.0	+1.9	21.2	57 14.8	+2.6	21.8	58 10.4	+3.3	22.4	59 05.8	+4.0	23.0	60 00.9	+4.8	23.7	60 55.7	+5.6	24.4	78
79	54 27.4	−0.7	18.5	55 24.3	−0.3	18.9	56 20.9	+0.4	19.4	57 17.4	+1.0	19.9	58 13.7	+1.7	20.5	59 09.8	+2.3	21.1	60 05.7	+3.0	21.7	61 01.3	+3.8	22.4	79
80	54 26.7	−2.3	16.8	55 24.0	−1.7	17.2	56 21.3	−1.2	17.6	57 18.4	−0.6	18.1	58 15.4	−0.1	18.6	59 12.1	+0.6	19.1	60 08.7	+1.2	19.7	61 05.1	+1.9	20.3	80
81	54 24.4	−3.7	15.0	55 22.3	−3.3	15.4	56 20.1	−2.8	15.8	57 17.8	−2.3	16.2	58 15.3	−1.8	16.7	59 12.7	−1.2	17.2	60 09.9	−0.6	17.7	61 07.0	0.0	18.2	81
82	54 20.7	−5.2	13.3	55 19.0	−4.7	13.7	56 17.3	−4.4	14.0	57 15.5	−3.9	14.4	58 13.5	−3.4	14.8	59 11.5	−3.0	15.2	60 09.3	−2.4	15.7	61 07.0	−1.9	16.2	82
83	54 15.5	−6.6	11.6	55 14.3	−6.3	11.9	56 12.9	−5.9	12.2	57 11.6	−5.6	12.5	58 10.1	−5.1	12.9	59 08.5	−4.7	13.3	60 06.9	−4.3	13.7	61 05.1	−3.8	14.1	83
84	54 08.9	−8.0	9.9	55 08.0	−7.7	10.2	56 07.0	−7.4	10.4	57 06.0	−7.1	10.7	58 05.0	−6.8	11.0	59 03.8	−6.4	11.3	60 02.6	−6.1	11.7	61 01.3	−5.7	12.0	84
85	54 00.9	−9.4	8.2	55 00.3	−9.2	8.4	55 59.6	−9.0	8.7	56 58.9	−8.7	8.9	57 58.2	−8.5	9.1	58 57.4	−8.2	9.4	59 56.6	−7.9	9.7	60 55.7	−7.6	10.0	85
86	53 51.5	−10.9	6.6	54 51.1	−10.7	6.7	55 50.6	−10.4	6.9	56 50.2	−10.3	7.1	57 49.7	−10.0	7.3	58 49.2	−9.8	7.5	59 48.7	−9.6	7.7	60 48.1	−9.3	7.9	86
87	53 40.6	−12.2	4.9	54 40.4	−12.1	5.0	55 40.2	−11.9	5.1	56 39.9	−11.7	5.3	57 39.7	−11.5	5.4	58 39.4	−11.5	5.6	59 39.1	−11.3	5.7	60 38.8	−11.2	5.9	87
88	53 28.4	−13.5	3.2	54 28.3	−13.4	3.3	55 28.2	−13.4	3.4	56 28.1	−13.3	3.5	57 28.0	−13.2	3.6	58 27.9	−13.2	3.7	59 27.8	−13.1	3.8	60 27.6	−12.9	3.9	88
89	53 14.9	−14.9	1.6	54 14.9	−14.9	1.7	55 14.8	−14.8	1.7	56 14.8	−14.8	1.7	57 14.8	−14.8	1.8	58 14.7	−14.7	1.8	59 14.7	−14.7	1.9	60 14.7	−14.7	1.9	89
90	53 00.0	−16.2	0.0	54 00.0	−16.2	0.0	55 00.0	−16.2	0.0	56 00.0	−16.2	0.0	57 00.0	−16.3	0.0	58 00.0	−16.3	0.0	59 00.0	−16.3	0.0	60 00.0	−16.4	0.0	90

	53°	54°	55°	56°	57°	58°	59°	60°	

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	8 57.7 −48.6 102.1			8 45.0 −49.1 102.2			8 32.2 −49.7 102.4			8 19.3 −50.3 102.5			8 06.2 −50.8 102.7			7 53.0 −51.4 102.8			7 39.6 −51.9 102.9			7 26.1 −52.4 103.1			0
1	8 09.1 −48.6 102.7			7 55.9 −49.2 102.8			7 42.5 −49.8 102.9			7 29.0 −50.3 103.1			7 15.4 −50.9 103.2			7 01.6 −51.4 103.3			6 47.7 −51.9 103.4			6 33.7 −52.4 103.5			1
2	7 20.5 −48.6 103.3			7 06.7 −49.2 103.4			6 52.7 −49.8 103.5			6 38.7 −50.4 103.6			6 24.5 −50.9 103.8			6 10.2 −51.5 103.8			5 55.8 −52.0 103.9			5 41.3 −52.5 104.0			2
3	6 31.9 −48.7 103.9			6 17.5 −49.3 104.0			6 02.9 −49.8 104.1			5 48.3 −50.4 104.2			5 33.6 −51.0 104.3			5 18.7 −51.4 104.4			5 03.8 −52.0 104.4			4 48.8 −52.5 104.5			3
4	5 43.2 −48.7 104.4			5 28.2 −49.3 104.5			5 13.1 −49.9 104.6			4 57.9 −50.4 104.7			4 42.6 −51.0 104.8			4 27.3 −51.5 104.9			4 11.8 −52.0 104.9			3 56.3 −52.5 105.0			4
5	4 54.5 −48.7 105.0			4 38.9 −49.3 105.1			4 23.2 −49.9 105.2			4 07.5 −50.5 105.3			3 51.6 −50.9 105.3			3 35.8 −51.6 105.4			3 19.8 −52.0 105.4			3 03.8 −52.5 105.5			5
6	4 05.8 −48.8 105.6			3 49.6 −49.4 105.7			3 33.3 −49.9 105.7			3 17.0 −50.5 105.8			3 00.7 −51.1 105.9			2 44.2 −51.5 105.9			2 27.8 −52.1 105.9			2 11.3 −52.6 106.0			6
7	3 17.0 −48.8 106.2			3 00.2 −49.3 106.3			2 43.4 −49.9 106.3			2 26.5 −50.4 106.3			2 09.6 −51.0 106.4			1 52.7 −51.5 106.4			1 35.7 −52.0 106.4			1 18.7 −52.5 106.5			7
8	2 28.2 −48.8 106.8			2 10.9 −49.4 106.8			1 53.5 −50.0 106.9			1 36.1 −50.5 106.9			1 18.6 −51.0 106.9			1 01.2 −51.6 106.9			0 43.7 −52.1 106.9			0 26.2 −52.5 107.0			8
9	1 39.4 −48.8 107.4			1 21.5 −49.4 107.4			1 03.5 −49.9 107.4			0 45.6 −50.5 107.4			0 27.6 −51.0 107.4			0 09.6 −51.5 107.4			0 08.4 +52.0 72.6			0 26.3 +52.6 72.6			9
10	0 50.6 −48.7 107.9			0 32.1 −49.4 108.0			0 13.6 −50.0 108.0			0 04.9 +50.5 72.0			0 23.4 +51.0 72.0			0 41.9 +51.6 72.0			1 00.4 +52.0 72.1			1 18.9 +52.5 72.1			10
11	0 01.8 −48.9 108.5			0 17.3 +49.4 71.5			0 36.4 +49.9 71.5			0 55.4 +50.5 71.5			1 14.4 +51.1 71.5			1 33.5 +51.5 71.5			1 52.4 +52.1 71.6			2 11.4 +52.5 71.6			11
12	0 47.1 +48.8 70.9			1 06.7 +49.4 70.9			1 26.3 +49.9 70.9			1 45.9 +50.5 71.0			2 05.5 +51.0 71.0			2 25.0 +51.5 71.0			2 44.5 +52.0 71.1			3 03.9 +52.5 71.1			12
13	1 35.9 +48.9 70.3			1 56.1 +49.3 70.3			2 16.2 +50.0 70.4			2 36.4 +50.4 70.4			2 56.5 +51.0 70.5			3 16.5 +51.5 70.5			3 36.5 +52.0 70.6			3 56.4 +52.5 70.6			13
14	2 24.7 +48.8 69.7			2 45.4 +49.4 69.8			3 06.2 +49.9 69.8			3 26.8 +50.5 69.9			3 47.5 +50.9 69.9			4 08.0 +51.5 70.0			4 28.5 +52.0 70.1			4 48.9 +52.5 70.1			14
15	3 13.5 +48.7 69.1			3 34.8 +49.3 69.2			3 56.1 +49.9 69.3			4 17.3 +50.4 69.3			4 38.4 +51.0 69.4			4 59.5 +51.5 69.5			5 20.5 +52.0 69.6			5 41.4 +52.4 69.7			15
16	4 02.2 +48.8 68.6			4 24.1 +49.3 68.6			4 46.0 +49.8 68.7			5 07.7 +50.4 68.8			5 29.4 +50.9 68.9			5 51.0 +51.4 69.0			6 12.5 +51.9 69.1			6 33.8 +52.5 69.2			16
17	4 51.0 +48.8 68.0			5 13.4 +49.3 68.1			5 35.8 +49.8 68.1			5 58.1 +50.4 68.2			6 20.3 +50.9 68.3			6 42.4 +51.4 68.4			7 04.4 +51.9 68.6			7 26.3 +52.3 68.7			17
18	5 39.7 +48.7 67.4			6 02.7 +49.3 67.5			6 25.6 +49.8 67.6			6 48.5 +50.3 67.7			7 11.2 +50.8 67.8			7 33.8 +51.4 67.9			7 56.3 +51.8 68.1			8 18.6 +52.4 68.2			18
19	6 28.4 +48.6 66.8			6 52.0 +49.2 66.9			7 15.4 +49.8 67.0			7 38.8 +50.3 67.1			8 02.0 +50.9 67.3			8 25.2 +51.3 67.4			8 48.1 +51.9 67.5			9 11.0 +52.3 67.7			19
20	7 17.0 +48.6 66.2			7 41.2 +49.1 66.3			8 05.2 +49.7 66.5			8 29.1 +50.2 66.6			8 52.9 +50.7 66.7			9 16.5 +51.3 66.9			9 40.0 +51.7 67.0			10 03.3 +52.3 67.2			20
21	8 05.6 +48.6 65.6			8 30.3 +49.1 65.8			8 54.9 +49.6 65.9			9 19.3 +50.2 66.0			9 43.6 +50.7 66.2			10 07.8 +51.2 66.4			10 31.7 +51.8 66.5			10 55.6 +52.2 66.7			21
22	8 54.2 +48.4 65.0			9 19.4 +49.1 65.2			9 44.5 +49.6 65.3			10 09.5 +50.1 65.5			10 34.3 +50.7 65.7			10 59.0 +51.2 65.8			11 23.5 +51.6 66.0			11 47.8 +52.1 66.2			22
23	9 42.6 +48.5 64.4			10 08.5 +48.9 64.6			10 34.1 +49.6 64.8			10 59.6 +50.1 64.9			11 25.0 +50.6 65.1			11 50.2 +51.1 65.3			12 15.1 +51.7 65.5			12 39.9 +52.1 65.7			23
24	10 31.1 +48.3 63.8			10 57.4 +49.0 64.0			11 23.7 +49.4 64.2			11 49.7 +50.0 64.4			12 15.6 +50.5 64.6			12 41.3 +51.0 64.8			13 06.8 +51.5 65.0			13 32.0 +52.1 65.2			24
25	11 19.4 +48.3 63.2			11 46.4 +48.8 63.4			12 13.1 +49.4 63.6			12 39.7 +49.9 63.8			13 06.1 +50.5 64.0			13 32.3 +51.0 64.2			13 58.3 +51.5 64.4			14 24.1 +52.0 64.7			25
26	12 07.7 +48.2 62.6			12 35.2 +48.8 62.8			13 02.5 +49.3 63.0			13 29.6 +49.9 63.2			13 56.6 +50.3 63.4			14 23.3 +50.9 63.7			14 49.8 +51.4 63.9			15 16.1 +51.9 64.1			26
27	12 55.9 +48.1 62.0			13 24.0 +48.6 62.2			13 51.8 +49.3 62.4			14 19.5 +49.8 62.7			14 46.9 +50.3 62.9			15 14.2 +50.8 63.1			15 41.2 +51.3 63.4			16 08.0 +51.8 63.6			27
28	13 44.0 +48.0 61.4			14 12.6 +48.6 61.6			14 41.1 +49.1 61.8			15 09.3 +49.6 62.1			15 37.2 +50.3 62.3			16 05.0 +50.7 62.6			16 32.5 +51.3 62.8			16 59.8 +51.7 63.1			28
29	14 32.0 +48.0 60.8			15 01.2 +48.5 61.0			15 30.2 +49.0 61.2			15 58.9 +49.6 61.5			16 27.5 +50.1 61.8			16 55.7 +50.7 62.0			17 23.8 +51.1 62.3			17 51.5 +51.7 62.6			29
30	15 20.0 +47.8 60.2			15 49.7 +48.4 60.4			16 19.2 +49.0 60.6			16 48.5 +49.5 60.9			17 17.6 +50.0 61.2			17 46.4 +50.5 61.5			18 14.9 +51.1 61.7			18 43.2 +51.6 62.0			30
31	16 07.8 +47.7 59.5			16 38.1 +48.3 59.8			17 08.2 +48.8 60.0			17 38.0 +49.4 60.3			18 07.6 +49.9 60.6			18 36.9 +50.5 60.9			19 06.0 +50.9 61.2			19 34.8 +51.4 61.5			31
32	16 55.5 +47.6 58.9			17 26.4 +48.1 59.2			17 57.0 +48.7 59.4			18 27.4 +49.3 59.7			18 57.5 +49.8 60.0			19 27.4 +50.3 60.3			19 56.9 +50.9 60.6			20 26.2 +51.4 60.9			32
33	17 43.1 +47.5 58.3			18 14.5 +48.1 58.5			18 45.7 +48.6 58.8			19 16.7 +49.1 59.1			19 47.3 +49.7 59.4			20 17.7 +50.2 59.7			20 47.8 +50.7 60.1			21 17.6 +51.2 60.4			33
34	18 30.6 +47.3 57.6			19 02.6 +47.9 57.9			19 34.3 +48.5 58.2			20 05.8 +49.0 58.5			20 37.0 +49.6 58.8			21 07.9 +50.1 59.2			21 38.5 +50.7 59.5			22 08.8 +51.2 59.8			34
35	19 17.9 +47.2 57.0			19 50.5 +47.7 57.3			20 22.8 +48.3 57.6			20 54.8 +48.9 57.9			21 26.6 +49.4 58.2			21 58.0 +50.0 58.6			22 29.2 +50.5 58.9			23 00.0 +51.0 59.3			35
36	20 05.1 +47.0 56.3			20 38.2 +47.7 56.6			21 11.1 +48.2 56.9			21 43.7 +48.7 57.3			22 16.0 +49.3 57.6			22 48.0 +49.8 58.0			23 19.7 +50.3 58.3			23 51.0 +50.9 58.7			36
37	20 52.1 +46.9 55.6			21 25.9 +47.4 56.0			21 59.3 +48.0 56.3			22 32.4 +48.6 56.6			23 05.3 +49.1 57.0			23 37.8 +49.7 57.4			24 10.0 +50.2 57.7			24 41.9 +50.7 58.1			37
38	21 39.0 +46.8 55.0			22 13.3 +47.3 55.3			22 47.3 +47.9 55.7			23 21.0 +48.5 56.0			23 54.4 +49.0 56.4			24 27.5 +49.5 56.7			25 00.2 +50.1 57.1			25 32.6 +50.6 57.5			38
39	22 25.8 +46.5 54.3			23 00.6 +47.2 54.6			23 35.2 +47.7 55.0			24 09.5 +48.3 55.4			24 43.4 +48.9 55.7			25 17.0 +49.4 56.1			25 50.3 +49.9 56.5			26 23.2 +50.5 56.9			39
40	23 12.3 +46.4 53.6			23 47.8 +46.9 54.0			24 22.9 +47.6 54.3			24 57.8 +48.1 54.7			25 32.3 +48.6 55.1			26 06.4 +49.2 55.5			26 40.2 +49.8 55.9			27 13.7 +50.3 56.3			40
41	23 58.7 +46.2 52.9			24 34.7 +46.8 53.3			25 10.5 +47.3 53.7			25 45.9 +47.9 54.0			26 20.9 +48.5 54.4			26 55.6 +49.1 54.8			27 30.0 +49.6 55.3			28 04.0 +50.1 55.7			41
42	24 44.9 +46.0 52.2			25 21.5 +46.6 52.6			25 57.8 +47.2 53.0			26 33.8 +47.7 53.4			27 09.4 +48.3 53.8			27 44.7 +48.8 54.2			28 19.6 +49.4 54.6			28 54.1 +50.0 55.1			42
43	25 30.9 +45.8 51.5			26 08.1 +46.4 51.9			26 45.0 +46.9 52.3			27 21.5 +47.5 52.7			27 57.7 +48.1 53.1			28 33.5 +48.7 53.5			29 09.0 +49.2 54.0			29 44.1 +49.7 54.4			43
44	26 16.7 +45.6 50.8			26 54.5 +46.1 51.2			27 31.9 +46.8 51.6			28 09.0 +47.3 52.0			28 45.8 +47.9 52.4			29 22.2 +48.4 52.9			29 58.2 +49.0 53.3			30 33.8 +49.6 53.8			44
45	27 02.3 +45.3 50.1			27 40.6 +46.0 50.5			28 18.7 +46.5 50.9			28 56.3 +47.1 51.3			29 33.7 +47.6 51.7			30 10.6 +48.3 52.2			30 47.2 +48.8 52.7			31 23.4 +49.4 53.1			45
46	27 47.6 +45.1 49.3			28 26.6 +45.7 49.7			29 05.2 +46.3 50.2			29 43.4 +46.9 50.6			30 21.3 +47.5 51.0			30 58.9 +48.0 51.5			31 36.0 +48.6 52.0			32 12.8 +49.1 52.5			46
47	28 32.7 +44.9 48.6			29 12.3 +45.4 49.0			29 51.5 +46.0 49.4			30 30.3 +46.6 49.9			31 08.8 +47.2 50.3			31 46.9 +47.8 50.8			32 24.6 +48.4 51.3			33 01.9 +49.0 51.8			47
48	29 17.6 +44.6 47.8			29 57.7 +45.2 48.2			30 37.5 +45.8 48.7			31 16.9 +46.4 49.1			31 56.0 +46.9 49.6			32 34.7 +47.5 50.1			33 13.0 +48.1 50.6			33 50.9 +48.7 51.1			48
49	30 02.2 +44.3 47.1			30 42.9 +44.9 47.5			31 23.3 +45.5 47.9			32 03.3 +46.1 48.4			32 42.9 +46.7 48.9			33 22.2 +47.3 49.4			34 01.1 +47.9 49.9			34 39.6 +48.4 50.4			49
50	30 46.5 +44.0 46.3			31 27.8 +44.6 46.7			32 08.8 +45.2 47.2			32 49.4 +45.8 47.6			33 29.6 +46.5 48.1			34 09.5 +47.0 48.6			34 49.0 +47.6 49.1			35 28.0 +48.2 49.7			50
51	31 30.5 +43.8 45.5			32 12.4 +44.4 45.9			32 54.0 +44.9 46.4			33 35.2 +45.5 46.9			34 16.1 +46.1 47.4			34 56.5 +46.7 47.9			35 36.6 +47.3 48.4			36 16.2 +47.9 48.9			51
52	32 14.3 +43.4 44.7			32 56.8 +44.0 45.1			33 38.9 +44.7 45.6			34 20.7 +45.3 46.1			35 02.2 +45.8 46.6			35 43.2 +46.4 47.1			36 23.9 +47.0 47.6			37 04.1 +47.6 48.2			52
53	32 57.7 +43.1 43.9			33 40.8 +43.7 44.3			34 23.6 +44.3 44.8			35 06.0 +44.9 45.3			35 48.0 +45.5 45.8			36 29.6 +46.2 46.3			37 10.9 +46.7 46.9			37 51.7 +47.3 47.4			53
54	33 40.8 +42.8 43.0			34 24.5 +43.4 43.5			35 07.9 +43.9 44.0			35 50.9 +44.5 44.5			36 33.5 +45.2 45.0			37 15.8 +45.7 45.5			37 57.6 +46.4 46.1			38 39.0 +47.0 46.6			54
55	34 23.6 +42.4 42.2			35 07.9 +43.0 42.6			35 51.8 +43.6 43.1			36 35.4 +44.3 43.6			37 18.7 +44.8 44.2			38 01.5 +45.5 44.7			38 44.0 +46.0 45.3			39 26.0 +46.7 45.8			55
56	35 06.0 +42.0 41.3			35 50.9 +42.6 41.8			36 35.4 +43.3 42.3			37 19.7 +43.8 42.8			38 03.5 +44.5 43.3			38 47.0 +45.0 43.9			39 30.0 +45.7 44.4			40 12.7 +46.3 45.0			56
57	35 48.0 +41.6 40.4			36 33.5 +42.3 40.9			37 18.7 +42.8 41.4			38 03.5 +43.5 41.9			38 48.0 +44.0 42.5			39 32.0 +44.7 43.0			40 15.7 +45.3 43.6			40 59.0 +45.9 44.2			57
58	36 29.6 +41.3 39.5			37 15.8 +41.8 40.0			38 01.5 +42.5 40.5			38 47.0 +43.0 41.0			39 32.0 +43.7 41.6			40 16.7 +44.3 42.1			41 01.0 +44.9 42.7			41 44.9 +45.5 43.3			58
59	37 10.9 +40.8 38.6			37 57.6 +41.4 39.1			38 44.0 +42.0 39.6			39 30.0 +42.7 40.1			40 15.7 +43.3 40.7			41 01.0 +43.9 41.3			41 45.9 +44.5 41.8			42 30.4 +45.1 42.4			59
60	37 51.7 +40.4 37.7			38 39.0 +41.0 38.2			39 26.0 +41.6 38.7			40 12.7 +42.1 39.2			40 59.0 +42.8 39.8			41 44.9 +43.4 40.3			42 30.4 +44.1 40.9			43 15.5 +44.7 41.5			60
61	38 32.1 +39.9 36.8			39 20.0 +40.5 37.3			40 07.6 +41.1 37.8			40 54.8 +41.8 38.3			41 41.8 +42.3 38.8			42 28.3 +43.0 39.4			43 14.5 +43.6 40.0			44 00.2 +44.2 40.6			61
62	39 12.0 +39.4 35.8			40 00.5 +40.0 36.3			40 48.7 +40.6 36.8			41 36.6 +41.2 37.3			42 24.1 +41.9 37.9			43 11.3 +42.5 38.5			43 58.1 +43.1 39.1			44 44.4 +43.8 39.7			62
63	39 51.4 +39.0 34.8			40 40.5 +39.6 35.3			41 29.3 +40.2 35.8			42 17.8 +40.7 36.4			43 06.0 +41.3 36.9			43 53.8 +41.9 37.5			44 41.2 +42.6 38.1			45 28.2 +43.2 38.7			63
64	40 30.4 +38.4 33.8			41 20.1 +39.0 34.3			42 09.5 +39.5 34.8			42 58.5 +40.2 35.4			43 47.3 +40.8 35.9			44 35.7 +41.5 36.5			45 23.8 +42.1 37.1			46 11.4 +42.8 37.7			64
65	41 08.8 +37.8 32.8			41 59.1 +38.4 33.3			42 49.0 +39.1 33.8			43 38.7 +39.7 34.3			44 28.1 +40.3 34.9			45 17.2 +40.8 35.5			46 05.9 +41.5 36.1			46 54.2 +42.1 36.7			65
66	41 46.6 +37.3 31.8			42 37.5 +37.9 32.3			43 28.1 +38.5 32.8			44 18.4 +39.1 33.3			45 08.4 +39.7 33.8			45 58.0 +40.3 34.4			46 47.4 +40.9 35.0			47 36.3 +41.5 35.6			66
67	42 23.9 +36.7 30.7			43 15.4 +37.2 31.2			44 06.6 +37.8 31.7			44 57.5 +38.4 32.2			45 48.1 +39.0 32.8			46 38.3 +39.7 33.3			47 28.3 +40.3 33.9			48 17.9 +40.9 34.6			67
68	43 00.6 +36.1 29.7			43 52.6 +36.7 30.1			44 44.4 +37.2 30.6			45 35.9 +37.8 31.1			46 27.1 +38.4 31.7			47 18.0 +39.0 32.2			48 08.6 +39.7 32.8			48 58.8 +40.3 33.5			68
69	43 36.7 +35.5 28.6			44 29.3 +36.0 29.0			45 21.6 +36.6 29.5			46 13.7 +37.2 30.0			47 05.5 +37.8 30.6			47 57.0 +38.4 31.1			48 48.3 +38.9 31.7			49 39.1 +39.6 32.3			69
70	44 12.2 +34.7 27.4			45 05.3 +35.3 27.9			45 58.2 +35.9 28.4			46 50.9 +36.4 28.9			47 43.3 +37.0 29.4			48 35.4 +37.6 30.0			49 27.2 +38.3 30.5			50 18.7 +38.9 31.2			70
71	44 46.9 +34.1 26.3			45 40.6 +34.6 26.7			46 34.1 +35.1 27.2			47 27.3 +35.7 27.7			48 20.3 +36.3 28.2			49 13.0 +36.9 28.8			50 05.5 +37.5 29.4			50 57.6 +38.2 30.0			71
72	45 21.0 +33.4 25.1			46 15.2 +33.9 25.6			47 09.2 +34.5 26.0			48 03.0 +35.0 26.5			48 56.6 +35.5 27.0			49 49.9 +36.1 27.6			50 43.0 +36.7 28.1			51 35.8 +37.3 28.7			72
73	45 54.4 +32.6 23.9			46 49.1 +33.1 24.4			47 43.7 +33.6 24.8			48 38.0 +34.2 25.3			49 32.1 +34.8 25.8			50 26.0 +35.3 26.3			51 19.7 +35.9 26.9			52 13.1 +36.5 27.4			73
74	46 27.0 +31.8 22.7			47 22.2 +32.3 23.1			48 17.3 +32.8 23.6			49 12.2 +33.3 24.0			50 06.9 +33.8 24.5			51 01.3 +34.5 25.0			51 55.6 +35.0 25.6			52 49.6 +35.6 26.1			74
75	46 58.8 +31.0 21.5			47 54.5 +31.5 21.9			48 50.1 +32.0 22.3			49 45.5 +32.5 22.8			50 40.7 +33.0 23.2			51 35.8 +33.5 23.7			52 30.6 +34.1 24.3			53 25.2 +34.7 24.8			75
76	47 29.8 +30.1 20.2			48 26.0 +30.6 20.6			49 22.1 +31.1 21.0			50 18.0 +31.6 21.5			51 13.7 +32.1 21.9			52 09.3 +32.6 22.4			53 04.7 +33.1 22.9			53 59.9 +33.7 23.4			76
77	47 59.9 +29.3 18.9			48 56.6 +29.7 19.3			49 53.2 +30.1 19.7			50 49.6 +30.6 20.1			51 45.8 +31.1 20.6			52 41.9 +31.6 21.0			53 37.8 +32.2 21.5			54 33.6 +32.7 22.0			77
78	48 29.2 +28.3 17.6			49 26.3 +28.8 18.0			50 23.3 +29.2 18.4			51 20.2 +29.7 18.8			52 16.9 +30.2 19.2			53 13.5 +30.6 19.6			54 10.0 +31.1 20.1			55 06.3 +31.6 20.6			78
79	48 57.5 +27.5 16.3			49 55.1 +27.8 16.6			50 52.5 +28.2 17.0			51 49.9 +28.6 17.4			52 47.1 +29.0 17.7			53 44.1 +29.6 18.2			54 41.1 +30.0 18.6			55 37.9 +30.5 19.1			79
80	49 25.0 +26.4 14.9			50 22.9 +26.8 15.3			51 20.7 +27.2 15.6			52 18.5 +27.6 15.9			53 16.1 +28.0 16.3			54 13.7 +28.4 16.7			55 11.1 +28.8 17.1			56 08.4 +29.3 17.5			80
81	49 51.4 +25.4 13.6			50 49.7 +25.8 13.8			51 47.9 +26.1 14.1			52 46.1 +26.4 14.5			53 44.1 +26.9 14.8			54 42.1 +27.2 15.2			55 39.9 +27.7 15.5			56 37.7 +28.1 15.9			81
82	50 16.8 +24.4 12.1			51 15.5 +24.7 12.4			52 14.0 +25.1 12.7			53 12.5 +25.4 13.0			54 11.0 +25.7 13.3			55 09.3 +26.1 13.6			56 07.6 +26.4 14.0			57 05.8 +26.8 14.3			82
83	50 41.2 +23.4 10.7			51 40.2 +23.6 10.9			52 39.1 +23.8 11.2			53 37.9 +24.2 11.5			54 36.7 +24.4 11.7			55 35.4 +24.8 12.0			56 34.0 +25.2 12.3			57 32.6 +25.5 12.7			83
84	51 04.6 +22.2 9.2			52 03.8 +22.4 9.5			53 02.9 +22.7 9.7			54 02.1 +22.9 9.9			55 01.1 +23.2 10.1			56 00.2 +23.5 10.3			56 59.2 +23.7 10.7			57 58.1 +24.1 11.0			84
85	51 26.8 +21.0 7.8			52 26.2 +21.3 7.9			53 25.6 +21.5 8.1			54 25.0 +21.7 8.3			55 24.3 +22.0 8.5			56 23.7 +22.1 8.7			57 22.9 +22.4 9.0			58 22.2 +22.6 9.2			85
86	51 47.8 +19.9 6.3			52 47.5 +20.0 6.4			53 47.1 +20.2 6.5			54 46.7 +20.4 6.7			55 46.3 +20.5 6.9			56 45.8 +20.8 7.1			57 45.3 +21.0 7.3			58 44.8 +21.2 7.5			86
87	52 07.7 +18.7 4.7			53 07.5 +18.8 4.8			54 07.3 +18.9 4.9			55 07.1 +19.0 5.1			56 06.8 +19.2 5.2			57 06.6 +19.3 5.3			58 06.3 +19.4 5.5			59 06.0 +19.6 5.6			87
88	52 26.4 +17.4 3.2			53 26.3 +17.5 3.2			54 26.2 +17.6 3.3			55 26.1 +17.7 3.4			56 26.0 +17.7 3.5			57 25.9 +17.8 3.6			58 25.7 +18.0 3.7			59 25.6 +18.0 3.8			88
89	52 43.8 +16.2 1.6			53 43.8 +16.2 1.6			54 43.8 +16.2 1.7			55 43.8 +16.2 1.7			56 43.7 +16.3 1.7			57 43.7 +16.3 1.8			58 43.7 +16.3 1.9			59 43.6 +16.4 1.9			89
90	53 00.0 +14.9 0.0			54 00.0 +14.9 0.0			55 00.0 +14.8 0.0			56 00.0 +14.8 0.0			57 00.0 +14.8 0.0			58 00.0 +14.7 0.0			59 00.0 +14.7 0.0			60 00.0 +14.7 0.0			90
	53°			54°			55°			56°			57°			58°			59°			60°			

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z { L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 105°, 255°**

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LATITUDE **SAME** NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z
         { L.H.A. less than 180°............Zn=360°–Z

Dec.	53°			54°			55°			56°			57°			58°			59°			60°			Dec.
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	8 22.3	+48.4	101.3	8 10.5	+49.0	101.4	7 58.6	+49.6	101.5	7 46.5	+50.2	101.7	7 34.3	+50.7	101.8	7 21.9	+51.3	101.9	7 09.5	+51.8	102.1	6 56.9	+52.3	102.2	0
1	9 10.7	+48.3	100.7	8 59.5	+49.0	100.8	8 48.2	+49.5	101.0	8 36.7	+50.1	101.1	8 25.0	+50.7	101.3	8 13.2	+51.3	101.4	8 01.3	+51.8	101.6	7 49.2	+52.3	101.7	1
2	9 59.0	+48.3	100.1	9 48.5	+48.9	100.2	9 37.7	+49.5	100.4	9 26.8	+50.1	100.6	9 15.7	+50.7	100.7	9 04.5	+51.2	100.9	8 53.1	+51.7	101.0	8 41.5	+52.2	101.2	2
3	10 47.3	+48.2	99.5	10 37.4	+48.8	99.6	10 27.2	+49.5	99.8	10 16.9	+50.0	100.0	10 06.4	+50.6	100.2	9 55.7	+51.1	100.4	9 44.8	+51.7	100.5	9 33.7	+52.3	100.7	3
4	11 35.5	+48.2	98.9	11 26.2	+48.8	99.1	11 16.7	+49.3	99.3	11 06.9	+50.0	99.4	10 57.0	+50.5	99.6	10 46.8	+51.1	99.8	10 36.5	+51.6	100.0	10 26.0	+52.1	100.2	4
5	12 23.7	+48.0	98.2	12 15.0	+48.6	98.5	12 06.0	+49.3	98.7	11 56.9	+49.9	98.9	11 47.5	+50.5	99.1	11 37.9	+51.1	99.3	11 28.1	+51.6	99.5	11 18.1	+52.1	99.7	5
6	13 11.7	+48.0	97.6	13 03.6	+48.6	97.9	12 55.3	+49.2	98.1	12 46.8	+49.8	98.3	12 38.0	+50.4	98.5	12 29.0	+50.9	98.8	12 19.7	+51.5	99.0	12 10.2	+52.1	99.2	6
7	13 59.7	+47.9	97.0	13 52.2	+48.6	97.3	13 44.5	+49.2	97.5	13 36.6	+49.7	97.7	13 28.4	+50.3	98.0	13 19.9	+50.9	98.2	13 11.2	+51.5	98.4	13 02.3	+52.0	98.7	7
8	14 47.6	+47.7	96.4	14 40.8	+48.4	96.6	14 33.7	+49.0	96.9	14 26.3	+49.7	97.2	14 18.7	+50.3	97.4	14 10.8	+50.9	97.7	14 02.7	+51.4	97.9	13 54.3	+51.9	98.2	8
9	15 35.3	+47.7	95.8	15 29.2	+48.3	96.0	15 22.7	+49.0	96.3	15 16.0	+49.5	96.6	15 09.0	+50.1	96.9	15 01.7	+50.7	97.1	14 54.1	+51.3	97.4	14 46.2	+51.9	97.6	9
10	16 23.0	+47.5	95.2	16 17.5	+48.2	95.4	16 11.7	+48.8	95.7	16 05.5	+49.5	96.0	15 59.1	+50.1	96.3	15 52.4	+50.7	96.6	15 45.4	+51.2	96.8	15 38.1	+51.8	97.1	10
11	17 10.5	+47.5	94.5	17 05.7	+48.1	94.8	17 00.5	+48.7	95.1	16 55.0	+49.4	95.4	16 49.2	+50.0	95.7	16 43.1	+50.5	96.0	16 36.6	+51.2	96.3	16 29.9	+51.7	96.6	11
12	17 58.0	+47.3	93.8	17 53.8	+47.9	94.2	17 49.2	+48.7	94.5	17 44.4	+49.2	94.8	17 39.2	+49.9	95.1	17 33.6	+50.5	95.4	17 27.8	+51.0	95.8	17 21.6	+51.6	96.1	12
13	18 45.3	+47.1	93.2	18 41.7	+47.9	93.5	18 37.9	+48.5	93.9	18 33.6	+49.2	94.2	18 29.1	+49.7	94.5	18 24.1	+50.4	94.9	18 18.8	+51.0	95.2	18 13.2	+51.6	95.5	13
14	19 32.4	+47.1	92.5	19 29.6	+47.7	92.9	19 26.4	+48.3	93.3	19 22.8	+49.0	93.6	19 18.8	+49.7	94.0	19 14.5	+50.3	94.3	19 09.8	+50.9	94.7	19 04.8	+51.4	95.0	14
15	20 19.5	+46.8	91.9	20 17.3	+47.6	92.3	20 14.7	+48.3	92.6	20 11.8	+48.9	93.0	20 08.5	+49.5	93.4	20 04.8	+50.1	93.7	20 00.7	+50.7	94.1	19 56.2	+51.3	94.5	15
16	21 06.3	+46.7	91.2	21 04.9	+47.4	91.6	21 03.0	+48.1	92.0	21 00.7	+48.7	92.4	20 58.0	+49.4	92.8	20 54.9	+50.0	93.1	20 51.4	+50.7	93.5	20 47.5	+51.3	93.9	16
17	21 53.0	+46.6	90.5	21 52.3	+47.2	90.9	21 51.1	+47.9	91.3	21 49.4	+48.7	91.7	21 47.4	+49.3	92.1	21 44.9	+49.9	92.5	21 42.1	+50.5	92.9	21 38.8	+51.1	93.3	17
18	22 39.6	+46.4	89.9	22 39.5	+47.1	90.3	22 39.0	+47.8	90.7	22 38.1	+48.4	91.1	22 36.7	+49.1	91.5	22 34.8	+49.8	91.9	22 32.6	+50.4	92.4	22 29.9	+51.0	92.8	18
19	23 26.0	+46.1	89.2	23 26.6	+46.9	89.6	23 26.8	+47.6	90.0	23 26.5	+48.3	90.5	23 25.8	+49.0	90.9	23 24.6	+49.6	91.3	23 23.0	+50.2	91.8	23 20.9	+50.9	92.2	19
20	24 12.1	+46.0	88.5	24 13.5	+46.7	88.9	24 14.4	+47.4	89.4	24 14.8	+48.2	89.8	24 14.8	+48.8	90.3	24 14.2	+49.5	90.7	24 13.2	+50.2	91.2	24 11.8	+50.7	91.6	20
21	24 58.1	+45.8	87.8	25 00.2	+46.6	88.2	25 01.8	+47.3	88.7	25 03.0	+47.9	89.2	25 03.6	+48.6	89.6	25 03.7	+49.3	90.1	25 03.4	+49.9	90.6	25 02.5	+50.6	91.0	21
22	25 43.9	+45.6	87.1	25 46.8	+46.3	87.5	25 49.1	+47.0	88.0	25 50.9	+47.8	88.5	25 52.2	+48.5	89.0	25 53.0	+49.2	89.5	25 53.3	+49.8	90.0	25 53.1	+50.5	90.4	22
23	26 29.5	+45.4	86.3	26 33.1	+46.1	86.8	26 36.1	+46.9	87.3	26 38.7	+47.6	87.8	26 40.7	+48.3	88.3	26 42.2	+49.0	88.8	26 43.1	+49.7	89.3	26 43.6	+50.3	89.8	23
24	27 14.9	+45.1	85.6	27 19.2	+45.9	86.1	27 23.0	+46.7	86.6	27 26.3	+47.3	87.1	27 29.0	+48.1	87.7	27 31.2	+48.8	88.2	27 32.8	+49.5	88.7	27 33.9	+50.1	89.2	24
25	28 00.0	+44.9	84.9	28 05.1	+45.7	85.4	28 09.7	+46.4	85.9	28 13.6	+47.2	86.5	28 17.1	+47.9	87.0	28 20.0	+48.6	87.5	28 22.3	+49.3	88.1	28 24.0	+50.0	88.6	25
26	28 44.9	+44.6	84.1	28 50.8	+45.4	84.6	28 56.1	+46.2	85.2	29 00.8	+47.0	85.7	29 05.0	+47.7	86.3	29 08.6	+48.4	86.9	29 11.6	+49.1	87.4	29 14.0	+49.7	88.0	26
27	29 29.5	+44.4	83.3	29 36.2	+45.1	83.9	29 42.3	+45.9	84.5	29 47.8	+46.7	85.0	29 52.7	+47.4	85.6	29 57.0	+48.1	86.2	30 00.7	+48.8	86.8	30 03.7	+49.6	87.3	27
28	30 13.9	+44.0	82.6	30 21.3	+44.9	83.1	30 28.2	+45.7	83.7	30 34.5	+46.4	84.3	30 40.1	+47.2	84.9	30 45.1	+48.0	85.5	30 49.5	+48.7	86.1	30 53.3	+49.4	86.7	28
29	30 57.9	+43.8	81.8	31 06.2	+44.6	82.4	31 13.9	+45.4	83.0	31 20.9	+46.2	83.6	31 27.3	+47.0	84.2	31 33.1	+47.7	84.8	31 38.2	+48.5	85.4	31 42.7	+49.2	86.0	29
30	31 41.7	+43.5	81.0	31 50.8	+44.3	81.6	31 59.3	+45.1	82.2	32 07.1	+46.0	82.8	32 14.3	+46.7	83.4	32 20.8	+47.5	84.1	32 26.7	+48.2	84.7	32 31.9	+49.0	85.3	30
31	32 25.2	+43.2	80.2	32 35.1	+44.1	80.8	32 44.4	+44.9	81.4	32 53.1	+45.6	82.1	33 01.0	+46.5	82.7	33 08.3	+47.2	83.3	33 14.9	+48.0	84.0	33 20.9	+48.7	84.6	31
32	33 08.4	+42.8	79.3	33 19.2	+43.6	80.0	33 29.3	+44.5	80.6	33 38.7	+45.3	81.3	33 47.5	+46.1	81.9	33 55.5	+47.0	82.6	34 02.9	+47.7	83.3	34 09.6	+48.5	83.9	32
33	33 51.2	+42.5	78.5	34 02.8	+43.4	79.1	34 13.8	+44.2	79.8	34 24.1	+45.0	80.5	34 33.6	+45.9	81.2	34 42.5	+46.7	81.8	34 50.6	+47.5	82.5	34 58.1	+48.2	83.2	33
34	34 33.7	+42.1	77.6	34 46.2	+43.0	78.3	34 58.0	+43.9	79.0	35 09.1	+44.7	79.7	35 19.5	+45.6	80.4	35 29.2	+46.3	81.1	35 38.1	+47.2	81.8	35 45.6	+48.0	82.5	34
35	35 15.8	+41.8	76.8	35 29.2	+42.6	77.5	35 41.9	+43.5	78.2	35 53.8	+44.4	78.9	36 05.1	+45.2	79.6	36 15.5	+46.1	80.3	36 25.3	+46.8	81.0	36 34.3	+47.6	81.8	35
36	35 57.6	+41.3	75.9	36 11.8	+42.3	76.6	36 25.4	+43.1	77.3	36 38.2	+44.0	78.0	36 50.3	+44.9	78.8	37 01.6	+45.7	79.5	37 12.1	+46.6	80.2	37 21.9	+47.4	81.0	36
37	36 38.9	+41.0	75.0	36 54.1	+41.9	75.7	37 08.5	+42.8	76.4	37 22.2	+43.7	77.2	37 35.3	+44.5	77.9	37 47.3	+45.4	78.7	37 58.7	+46.2	79.4	38 09.3	+47.1	80.2	37
38	37 19.9	+40.5	74.1	37 36.0	+41.4	74.8	37 51.3	+42.4	75.6	38 05.9	+43.2	76.3	38 19.7	+44.1	77.1	38 32.7	+45.0	77.9	38 44.9	+45.9	78.6	38 56.4	+46.7	79.4	38
39	38 00.4	+40.0	73.1	38 17.4	+41.0	73.9	38 33.7	+41.9	74.7	38 49.1	+42.9	75.4	39 03.8	+43.8	76.2	39 17.7	+44.7	77.0	39 30.8	+45.6	77.8	39 43.1	+46.4	78.6	39
40	38 40.4	+39.6	72.2	38 58.4	+40.5	73.0	39 15.6	+41.5	73.7	39 32.0	+42.4	74.5	39 47.6	+43.3	75.3	40 02.4	+44.2	76.1	40 16.4	+45.1	77.0	40 29.5	+46.0	77.8	40
41	39 20.0	+39.1	71.2	39 38.9	+40.1	72.0	39 57.1	+41.0	72.8	40 14.4	+42.0	73.6	40 30.9	+43.0	74.4	40 46.6	+43.9	75.2	41 01.5	+44.7	76.1	41 15.5	+45.6	76.9	41
42	39 59.1	+38.6	70.2	40 19.0	+39.6	71.0	40 38.1	+40.5	71.8	40 56.4	+41.5	72.7	41 13.9	+42.4	73.5	41 30.5	+43.4	74.3	41 46.2	+44.4	75.2	42 01.1	+45.3	76.1	42
43	40 37.7	+38.0	69.2	40 58.6	+39.0	70.0	41 18.6	+40.1	70.9	41 37.9	+41.0	71.7	41 56.3	+42.0	72.6	42 13.9	+42.9	73.4	42 30.6	+43.9	74.3	42 46.4	+44.8	75.2	43
44	41 15.7	+37.5	68.2	41 37.6	+38.5	69.0	41 58.7	+39.5	69.9	42 18.9	+40.5	70.7	42 38.3	+41.5	71.6	42 56.8	+42.5	72.5	43 14.5	+43.3	73.4	43 31.2	+44.3	74.3	44
45	41 53.2	+37.0	67.2	42 16.1	+38.0	68.0	42 38.2	+39.0	68.8	42 59.4	+40.0	69.7	43 19.8	+41.0	70.6	43 39.3	+41.9	71.5	43 57.9	+42.9	72.4	44 15.5	+43.9	73.3	45
46	42 30.2	+36.3	66.1	42 54.1	+37.3	66.9	43 17.2	+38.3	67.8	43 39.4	+39.4	68.7	44 00.8	+40.4	69.6	44 21.2	+41.5	70.5	44 40.8	+42.4	71.4	44 59.4	+43.5	72.4	46
47	43 06.5	+35.7	65.0	43 31.4	+36.8	65.9	43 55.5	+37.8	66.7	44 18.8	+38.9	67.6	44 41.2	+39.8	68.5	45 02.7	+40.8	69.5	45 23.2	+41.9	70.4	45 42.9	+42.8	71.4	47
48	43 42.2	+35.0	63.9	44 08.2	+36.1	64.8	44 33.3	+37.2	65.7	44 57.6	+38.2	66.6	45 21.0	+39.3	67.5	45 43.5	+40.3	68.4	46 05.1	+41.3	69.4	46 25.7	+42.4	70.4	48
49	44 17.2	+34.4	62.8	44 44.3	+35.4	63.7	45 10.5	+36.5	64.6	45 35.8	+37.6	65.5	46 00.3	+38.6	66.4	46 23.8	+39.7	67.4	46 46.4	+40.8	68.4	47 08.1	+41.8	69.4	49
50	44 51.6	+33.6	61.6	45 19.7	+34.7	62.5	45 47.0	+35.8	63.4	46 13.4	+36.9	64.4	46 38.9	+38.0	65.3	47 03.5	+39.0	66.3	47 27.2	+40.1	67.3	47 49.9	+41.1	68.3	50
51	45 25.2	+33.0	60.5	45 54.4	+34.0	61.3	46 22.8	+35.1	62.3	46 50.3	+36.1	63.2	47 16.9	+37.2	64.2	47 42.5	+38.4	65.2	48 07.3	+39.4	66.2	48 31.0	+40.5	67.2	51
52	45 58.2	+32.1	59.3	46 28.4	+33.3	60.2	46 57.9	+34.3	61.1	47 26.4	+35.5	62.0	47 54.1	+36.6	63.0	48 20.9	+37.7	64.0	48 46.7	+38.8	65.0	49 11.5	+39.9	66.1	52
53	46 30.3	+31.4	58.0	47 01.7	+32.4	58.9	47 32.2	+33.6	59.9	48 01.9	+34.7	60.8	48 30.7	+35.8	61.8	48 58.6	+36.9	62.8	49 25.5	+38.0	63.9	49 51.4	+39.2	64.9	53
54	47 01.7	+30.5	56.8	47 34.1	+31.7	57.7	48 05.8	+32.7	58.6	48 36.6	+33.9	59.6	49 06.5	+35.0	60.6	49 35.5	+36.1	61.6	50 03.5	+37.3	62.7	50 30.6	+38.4	63.7	54
55	47 32.2	+29.7	55.5	48 05.8	+30.8	56.4	48 38.5	+32.0	57.4	49 10.5	+33.0	58.4	49 41.5	+34.2	59.4	50 11.6	+35.4	60.4	50 40.8	+36.5	61.4	51 09.0	+37.6	62.5	55
56	48 01.9	+28.8	54.2	48 36.6	+29.9	55.1	49 10.5	+31.0	56.1	49 43.5	+32.2	57.1	50 15.7	+33.3	58.1	50 47.0	+34.4	59.1	51 17.3	+35.6	60.2	51 46.6	+36.8	61.3	56
57	48 30.7	+27.9	52.9	49 06.5	+29.0	53.8	49 41.5	+30.1	54.8	50 15.7	+31.3	55.8	50 49.0	+32.4	56.8	51 21.4	+33.6	57.8	51 52.9	+34.8	58.9	52 23.4	+36.0	60.0	57
58	48 58.6	+26.9	51.6	49 35.5	+28.0	52.5	50 11.6	+29.2	53.4	50 47.0	+30.3	54.4	51 21.4	+31.5	55.4	51 55.0	+32.7	56.5	52 27.7	+33.9	57.6	52 59.4	+35.1	58.7	58
59	49 25.5	+25.9	50.2	50 03.5	+27.1	51.1	50 40.8	+28.2	52.1	51 17.3	+29.4	53.0	51 52.9	+30.5	54.1	52 27.7	+31.7	55.1	53 01.6	+32.9	56.2	53 34.5	+34.1	57.3	59
60	49 51.4	+24.9	48.8	50 30.6	+26.0	49.7	51 09.0	+27.1	50.7	51 46.6	+28.3	51.6	52 23.4	+29.5	52.7	52 59.4	+30.7	53.7	53 34.5	+31.9	54.8	54 08.6	+33.1	55.9	60
61	50 16.3	+23.9	47.4	50 56.6	+25.0	48.3	51 36.1	+26.1	49.2	52 14.9	+27.3	50.2	52 52.9	+28.5	51.2	53 30.1	+29.6	52.3	54 06.4	+30.8	53.4	54 41.7	+32.1	54.5	61
62	50 40.2	+22.8	45.9	51 21.6	+23.8	46.8	52 02.2	+25.0	47.8	52 42.2	+26.1	48.7	53 21.4	+27.3	49.7	53 59.7	+28.5	50.8	54 37.2	+29.7	51.9	55 13.8	+31.0	53.0	62
63	51 03.0	+21.6	44.5	51 45.4	+22.8	45.4	52 27.2	+23.9	46.3	53 08.3	+25.1	47.3	53 48.7	+26.2	48.3	54 28.2	+27.4	49.3	55 06.9	+28.6	50.4	55 44.8	+29.8	51.5	63
64	51 24.6	+20.5	43.0	52 08.2	+21.6	43.9	52 51.1	+22.7	44.8	53 33.4	+23.8	45.7	54 14.9	+25.0	46.7	54 55.6	+26.2	47.8	55 35.5	+27.4	48.8	56 14.6	+28.6	49.9	64
65	51 45.1	+19.4	41.5	52 29.8	+20.4	42.3	53 13.8	+21.5	43.2	53 57.2	+22.6	44.2	54 39.9	+23.7	45.2	55 21.8	+24.9	46.2	56 02.9	+26.2	47.2	56 43.2	+27.4	48.4	65
66	52 04.5	+18.1	39.9	52 50.2	+19.1	40.8	53 35.3	+20.2	41.7	54 19.8	+21.3	42.6	55 03.6	+22.5	43.6	55 46.7	+23.7	44.6	56 29.1	+24.9	45.6	57 10.6	+26.1	46.7	66
67	52 22.6	+16.8	38.4	53 09.3	+17.9	39.2	53 55.5	+19.0	40.1	54 41.1	+20.1	41.0	55 26.1	+21.2	41.9	56 10.4	+22.3	42.9	56 54.0	+23.5	44.0	57 36.7	+24.8	45.1	67
68	52 39.4	+15.6	36.8	53 27.2	+16.6	37.6	54 14.5	+17.8	38.5	55 01.2	+18.7	39.3	55 47.3	+19.8	40.3	56 32.7	+21.0	41.2	57 17.5	+22.1	42.3	58 01.5	+23.3	43.3	68
69	52 55.0	+14.3	35.2	53 43.8	+15.3	36.0	54 32.1	+16.3	36.8	55 19.9	+17.3	37.7	56 07.1	+18.4	38.6	56 53.7	+19.5	39.5	57 39.6	+20.7	40.5	58 24.8	+21.9	41.6	69
70	53 09.3	+13.0	33.6	53 59.1	+13.9	34.4	54 48.4	+14.9	35.2	55 37.2	+15.9	36.0	56 25.5	+16.9	36.9	57 13.2	+18.0	37.8	58 00.3	+19.2	38.8	58 46.7	+20.4	39.8	70
71	53 22.3	+11.6	32.0	54 13.0	+12.5	32.7	55 03.3	+13.5	33.5	55 53.1	+14.5	34.3	56 42.4	+15.5	35.1	57 31.2	+16.6	36.0	58 19.5	+17.6	37.0	59 07.1	+18.8	38.0	71
72	53 33.9	+10.3	30.3	54 25.5	+11.2	31.0	55 16.8	+12.0	31.8	56 07.6	+12.9	32.5	56 57.9	+14.0	33.4	57 47.8	+15.0	34.2	58 37.1	+16.1	35.2	59 25.9	+17.2	36.1	72
73	53 44.2	+8.9	28.7	54 36.7	+9.7	29.3	55 28.8	+10.6	30.0	56 20.5	+11.5	30.8	57 11.9	+12.4	31.6	58 02.8	+13.4	32.4	58 53.2	+14.4	33.3	59 43.1	+15.5	34.2	73
74	53 53.1	+7.4	27.0	54 46.4	+8.2	27.6	55 39.4	+9.0	28.3	56 32.0	+10.0	29.0	57 24.3	+10.9	29.8	58 16.2	+11.8	30.6	59 07.6	+12.8	31.4	59 58.6	+13.8	32.3	74
75	54 00.5	+6.0	25.3	54 54.6	+6.8	25.9	55 48.4	+7.6	26.5	56 42.0	+8.4	27.2	57 35.2	+9.2	27.9	58 28.0	+10.1	28.7	59 20.4	+11.1	29.5	60 12.4	+12.1	30.4	75
76	54 06.5	+4.6	23.6	55 01.4	+5.3	24.2	55 56.0	+6.1	24.8	56 50.4	+6.8	25.4	57 44.4	+7.6	26.1	58 38.1	+8.5	26.8	59 31.5	+9.4	27.6	60 24.5	+10.3	28.4	76
77	54 11.1	+3.2	21.9	55 06.7	+3.8	22.4	56 02.1	+4.5	23.0	56 57.2	+5.2	23.6	57 52.0	+6.0	24.2	58 46.6	+6.8	24.9	59 40.9	+7.6	25.6	60 34.8	+8.5	26.4	77
78	54 14.3	+1.7	20.2	55 10.5	+2.3	20.7	56 06.6	+2.9	21.2	57 02.4	+3.6	21.8	57 58.0	+4.3	22.4	58 53.4	+5.0	23.0	59 48.5	+5.8	23.7	60 43.3	+6.6	24.4	78
79	54 16.0	+0.2	18.5	55 12.8	+0.8	18.9	56 09.5	+1.4	19.4	57 06.0	+2.0	19.9	58 02.3	+2.6	20.5	58 58.4	+3.3	21.1	59 54.3	+4.0	21.7	60 49.9	+4.8	22.3	79
80	54 16.2	−1.2	16.8	55 13.6	−0.7	17.2	56 10.9	−0.2	17.6	57 08.0	+0.4	18.1	58 04.9	+1.0	18.6	59 01.7	+1.6	19.1	59 58.3	+2.3	19.7	60 54.7	+2.9	20.3	80
81	54 15.0	−2.6	15.1	55 12.9	−2.2	15.4	56 10.7	−1.7	15.8	57 08.4	−1.3	16.2	58 05.9	−0.7	16.7	59 03.3	−0.2	17.2	60 00.6	+0.4	17.7	60 57.6	+1.1	18.2	81
82	54 12.4	−4.1	13.3	55 10.7	−3.7	13.7	56 09.0	−3.3	14.0	57 07.1	−2.8	14.4	58 05.2	−2.4	14.8	59 03.1	−1.9	15.2	60 01.0	−1.4	15.7	60 58.7	−0.9	16.2	82
83	54 08.3	−5.6	11.6	55 07.0	−5.2	11.9	56 05.7	−4.9	12.2	57 04.3	−4.5	12.6	58 02.8	−4.1	12.9	59 01.2	−3.6	13.3	59 59.6	−3.2	13.7	60 57.8	−2.7	14.1	83
84	54 02.7	−7.0	9.9	55 01.8	−6.7	10.2	56 00.8	−6.4	10.5	56 59.8	−6.0	10.7	57 58.8	−5.7	11.0	58 57.6	−5.4	11.3	59 56.4	−5.0	11.7	60 55.1	−4.6	12.0	84
85	53 55.7	−8.4	8.3	54 55.1	−8.2	8.5	55 54.4	−7.9	8.7	56 53.7	−7.6	8.9	57 53.0	−7.4	9.2	58 52.2	−7.1	9.4	59 51.4	−6.8	9.7	60 50.5	−6.5	10.0	85
86	53 47.3	−9.8	6.6	54 46.9	−9.6	6.7	55 46.5	−9.4	6.9	56 46.1	−9.3	7.1	57 45.6	−9.0	7.3	58 45.1	−8.8	7.5	59 44.6	−8.6	7.7	60 44.0	−8.3	8.0	86
87	53 37.5	−11.1	4.9	54 37.3	−11.0	5.0	55 37.1	−10.9	5.2	56 36.8	−10.7	5.3	57 36.6	−10.6	5.5	58 36.3	−10.5	5.6	59 36.0	−10.3	5.8	60 35.7	−10.1	5.9	87
88	53 26.4	−12.5	3.3	54 26.3	−12.5	3.3	55 26.2	−12.4	3.4	56 26.1	−12.3	3.5	57 26.0	−12.2	3.6	58 25.8	−12.1	3.7	59 25.7	−12.0	3.8	60 25.6	−11.9	3.9	88
89	53 13.9	−13.9	1.6	54 13.8	−13.8	1.7	55 13.8	−13.8	1.7	56 13.8	−13.8	1.7	57 13.8	−13.8	1.8	58 13.7	−13.7	1.8	59 13.7	−13.7	1.9	60 13.7	−13.7	2.0	89
90	53 00.0	−15.2	0.0	54 00.0	−15.2	0.0	55 00.0	−15.2	0.0	56 00.0	−15.2	0.0	57 00.0	−15.3	0.0	58 00.0	−15.3	0.0	59 00.0	−15.3	0.0	60 00.0	−15.4	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec
0	8 22.3 −48.5 101.3	8 10.5 −49.1 101.4	7 58.6 −49.7 101.5	7 46.5 −50.2 101.7	7 34.3 −50.8 101.8	7 21.9 −51.3 101.9	7 09.5 −51.9 102.1	6 56.9 −52.4 102.2	0
1	7 33.8 −48.5 101.9	7 21.4 −49.1 102.0	7 08.9 −49.7 102.1	6 56.3 −50.3 102.2	6 43.5 −50.8 102.3	6 30.6 −51.3 102.5	6 17.6 −51.9 102.6	6 04.5 −52.4 102.7	1
2	6 45.3 −48.5 102.5	6 32.3 −49.1 102.6	6 19.2 −49.7 102.7	6 06.0 −50.3 102.8	5 52.7 −50.9 102.9	5 39.3 −51.4 103.0	5 25.7 −51.9 103.1	5 12.1 −52.4 103.2	2
3	5 56.8 −48.6 103.0	5 43.2 −49.2 103.1	5 29.5 −49.8 103.2	5 15.7 −50.3 103.3	5 01.8 −50.8 103.4	4 47.9 −51.4 103.5	4 33.8 −51.9 103.6	4 19.7 −52.4 103.7	3
4	5 08.2 −48.6 103.6	4 54.0 −49.2 103.7	4 39.7 −49.8 103.8	4 25.4 −50.4 103.9	4 11.0 −50.9 103.9	3 56.5 −51.5 104.0	3 41.9 −51.9 104.1	3 27.3 −52.5 104.1	4
5	4 19.6 −48.7 104.2	4 04.8 −49.2 104.3	3 49.9 −49.8 104.4	3 35.0 −50.3 104.4	3 20.1 −50.9 104.5	3 05.0 −51.4 104.5	2 50.0 −52.0 104.6	2 34.8 −52.4 104.6	5
6	3 30.9 −48.7 104.8	3 15.6 −49.3 104.9	3 00.1 −49.8 104.9	2 44.7 −50.4 105.0	2 29.2 −51.0 105.0	2 13.6 −51.5 105.0	1 58.0 −52.0 105.1	1 42.4 −52.5 105.1	6
7	2 42.2 −48.6 105.4	2 26.3 −49.3 105.4	2 10.3 −49.8 105.5	1 54.3 −50.4 105.5	1 38.2 −50.9 105.5	1 22.1 −51.4 105.6	1 06.0 −51.9 105.6	0 49.9 −52.5 105.6	7
8	1 53.6 −48.7 106.0	1 37.0 −49.2 106.0	1 20.5 −49.9 106.0	1 03.9 −50.4 106.1	0 47.3 −50.9 106.1	0 30.7 −51.5 106.1	0 14.1 −52.0 106.1	0 02.6 +52.4 73.9	8
9	1 04.9 −48.7 106.6	0 47.7 −49.2 106.6	0 30.6 −49.8 106.6	0 13.5 −50.4 106.6	0 03.6 +51.0 73.4	0 20.8 +51.4 73.4	0 37.9 +52.0 73.4	0 55.0 +52.5 73.4	9
10	0 16.2 −48.8 107.1	0 01.5 +49.3 72.9	0 19.2 +49.9 72.9	0 36.9 +50.4 72.9	0 54.6 +50.9 72.9	1 12.2 +51.5 72.9	1 29.9 +51.9 72.9	1 47.5 +52.4 72.9	10
11	0 32.6 +48.7 72.3	0 50.8 +49.3 72.3	1 09.1 +49.8 72.3	1 27.3 +50.4 72.3	1 45.5 +50.9 72.3	2 03.7 +51.4 72.4	2 21.8 +52.0 72.4	2 39.9 +52.5 72.5	11
12	1 21.3 +48.7 71.7	1 40.1 +49.3 71.7	1 58.9 +49.8 71.7	2 17.7 +50.4 71.8	2 36.4 +50.9 71.8	2 55.1 +51.5 71.9	3 13.8 +51.9 71.9	3 32.4 +52.4 72.0	12
13	2 10.0 +48.7 71.1	2 29.4 +49.2 71.1	2 48.7 +49.9 71.2	3 08.1 +50.3 71.2	3 27.3 +50.9 71.3	3 46.6 +51.4 71.3	4 05.7 +51.9 71.4	4 24.8 +52.4 71.5	13
14	2 58.6 +48.7 70.5	3 18.6 +49.3 70.6	3 38.6 +49.7 70.6	3 58.4 +50.4 70.7	4 18.2 +50.9 70.8	4 38.0 +51.4 70.8	4 57.6 +51.9 70.9	5 17.2 +52.4 71.0	14
15	3 47.3 +48.6 69.9	4 07.9 +49.2 70.0	4 28.3 +49.8 70.1	4 48.8 +50.3 70.1	5 09.1 +50.8 70.2	5 29.4 +51.3 70.3	5 49.5 +51.9 70.4	6 09.6 +52.4 70.5	15
16	4 35.9 +48.7 69.3	4 57.1 +49.1 69.5	5 18.1 +49.8 69.5	5 39.1 +50.3 69.6	5 59.9 +50.9 69.7	6 20.7 +51.4 69.8	6 41.4 +51.8 69.9	7 02.0 +52.3 70.0	16
17	5 24.6 +48.5 68.8	5 46.2 +49.2 68.8	6 07.9 +49.7 68.9	6 29.4 +50.2 69.0	6 50.8 +50.7 69.2	7 12.1 +51.2 69.3	7 33.2 +51.8 69.4	7 54.3 +52.3 69.5	17
18	6 13.1 +48.6 68.2	6 35.4 +49.1 68.3	6 57.6 +49.6 68.4	7 19.6 +50.2 68.5	7 41.5 +50.8 68.6	8 03.3 +51.3 68.7	8 25.0 +51.8 68.9	8 46.6 +52.2 69.0	18
19	7 01.7 +48.5 67.6	7 24.5 +49.1 67.8	7 47.2 +49.6 67.8	8 09.8 +50.2 67.9	8 32.3 +50.7 68.1	8 54.6 +51.2 68.2	9 16.8 +51.7 68.4	9 38.8 +52.2 68.5	19
20	7 50.2 +48.4 67.0	8 13.6 +49.0 67.1	8 36.8 +49.6 67.2	9 00.0 +50.1 67.4	9 23.0 +50.6 67.5	9 45.8 +51.2 67.7	10 08.5 +51.7 67.9	10 31.0 +52.2 68.0	20
21	8 38.6 +48.4 66.4	9 02.6 +48.9 66.5	9 26.4 +49.5 66.7	9 50.1 +50.0 66.8	10 13.6 +50.6 67.0	10 37.0 +51.1 67.2	11 00.2 +51.6 67.3	11 23.2 +52.1 67.5	21
22	9 27.0 +48.3 65.8	9 51.5 +48.9 65.9	10 15.9 +49.5 66.1	10 40.1 +50.0 66.3	11 04.2 +50.5 66.4	11 28.1 +51.0 66.6	11 51.8 +51.5 66.8	12 15.3 +52.1 67.0	22
23	10 15.3 +48.3 65.2	10 40.4 +48.8 65.4	11 05.4 +49.3 65.5	11 30.1 +50.0 65.7	11 54.7 +50.5 65.9	12 19.1 +51.0 66.1	12 43.3 +51.5 66.3	13 07.4 +52.0 66.5	23
24	11 03.6 +48.2 64.6	11 29.2 +48.8 64.8	11 54.7 +49.4 64.9	12 20.1 +49.8 65.1	12 45.2 +50.4 65.3	13 10.1 +50.9 65.6	13 34.8 +51.5 65.8	13 59.4 +51.9 66.0	24
25	11 51.8 +48.1 64.0	12 18.0 +48.7 64.2	12 44.1 +49.2 64.4	13 09.9 +49.8 64.6	13 35.6 +50.3 64.8	14 01.0 +50.9 65.0	14 26.3 +51.3 65.2	14 51.3 +51.8 65.5	25
26	12 39.9 +48.0 63.4	13 06.7 +48.6 63.6	13 33.3 +49.1 63.8	13 59.7 +49.7 64.0	14 25.9 +50.2 64.2	14 51.9 +50.7 64.5	15 17.6 +51.3 64.7	15 43.1 +51.8 65.0	26
27	13 27.9 +47.9 62.7	13 55.3 +48.5 63.0	14 22.4 +49.1 63.2	14 49.4 +49.6 63.4	15 16.1 +50.2 63.7	15 42.6 +50.7 63.9	16 08.9 +51.2 64.2	16 34.9 +51.7 64.4	27
28	14 15.8 +47.9 62.1	14 43.8 +48.4 62.4	15 11.5 +49.0 62.6	15 39.0 +49.5 62.8	16 06.3 +50.0 63.1	16 33.3 +50.6 63.4	17 00.1 +51.1 63.6	17 26.6 +51.7 63.9	28
29	15 03.7 +47.7 61.5	15 32.2 +48.3 61.7	16 00.5 +48.8 62.0	16 28.5 +49.5 62.2	16 56.3 +50.0 62.5	17 23.9 +50.5 62.8	17 51.2 +51.0 63.1	18 18.3 +51.5 63.4	29
30	15 51.4 +47.6 60.9	16 20.5 +48.2 61.1	16 49.3 +48.8 61.4	17 18.0 +49.3 61.7	17 46.3 +49.9 61.9	18 14.4 +50.4 62.2	18 42.2 +51.0 62.5	19 09.8 +51.4 62.8	30
31	16 39.0 +47.5 60.2	17 08.7 +48.1 60.5	17 38.1 +48.7 60.8	18 07.3 +49.2 61.1	18 36.2 +49.7 61.3	19 04.8 +50.3 61.6	19 33.2 +50.8 62.0	20 01.2 +51.3 62.3	31
32	17 26.5 +47.4 59.6	17 56.8 +47.9 59.9	18 26.8 +48.5 60.2	18 56.5 +49.1 60.5	19 25.9 +49.7 60.8	19 55.1 +50.2 61.1	20 24.0 +50.7 61.4	20 52.5 +51.3 61.7	32
33	18 13.9 +47.3 59.0	18 44.7 +47.9 59.2	19 15.3 +48.4 59.5	19 45.6 +48.9 59.8	20 15.6 +49.5 60.2	20 45.3 +50.0 60.5	21 14.7 +50.6 60.8	21 43.8 +51.1 61.2	33
34	19 01.2 +47.1 58.3	19 32.6 +47.7 58.6	20 03.7 +48.2 58.9	20 34.5 +48.8 59.2	21 05.1 +49.4 59.6	21 35.3 +49.9 59.9	22 05.3 +50.4 60.2	22 34.9 +51.0 60.6	34
35	19 48.3 +47.0 57.6	20 20.3 +47.5 58.0	20 51.9 +48.2 58.3	21 23.3 +48.7 58.6	21 54.5 +49.2 58.9	22 25.2 +49.8 59.3	22 55.7 +49.4 59.7	23 25.9 +50.8 60.0	35
36	20 35.3 +46.8 57.0	21 07.8 +47.4 57.3	21 40.1 +47.9 57.6	22 12.0 +48.6 58.0	22 43.7 +49.1 58.3	23 15.0 +49.7 58.7	23 46.1 +50.2 59.1	24 16.7 +50.8 59.4	36
37	21 22.1 +46.6 56.3	21 55.2 +47.3 56.6	22 28.0 +47.9 57.0	23 00.6 +48.4 57.3	23 32.8 +49.0 57.7	24 04.7 +49.5 58.1	24 36.3 +50.0 58.5	25 07.5 +50.5 58.9	37
38	22 08.7 +46.5 55.6	22 42.5 +47.0 56.0	23 15.9 +47.6 56.3	23 49.0 +48.2 56.7	24 21.8 +48.7 57.1	24 54.2 +49.3 57.5	25 26.3 +49.9 57.9	25 58.0 +50.3 58.3	38
39	22 55.2 +46.3 55.0	23 29.5 +46.9 55.3	24 03.5 +47.5 55.7	24 37.2 +48.1 56.0	25 10.5 +48.7 56.4	25 43.5 +49.2 56.8	26 16.2 +49.7 57.2	26 48.5 +50.3 57.7	39
40	23 41.5 +46.2 54.3	24 16.4 +46.7 54.6	24 51.0 +47.3 55.0	25 25.3 +47.8 55.4	25 59.2 +48.4 55.8	26 32.7 +49.0 56.2	27 05.9 +49.6 56.6	27 38.8 +50.1 57.0	40
41	24 27.7 +45.9 53.6	25 03.1 +46.6 53.9	25 38.3 +47.1 54.3	26 13.1 +47.7 54.7	26 47.6 +48.3 55.1	27 21.7 +48.9 55.5	27 55.5 +49.4 56.0	28 28.9 +49.9 56.4	41
42	25 13.6 +45.7 52.9	25 49.7 +46.3 53.2	26 25.4 +46.9 53.6	27 00.8 +47.5 54.0	27 35.9 +48.0 54.5	28 10.6 +48.6 54.9	28 44.9 +49.2 55.3	29 18.8 +49.8 55.8	42
43	25 59.3 +45.5 52.1	26 36.0 +46.1 52.5	27 12.3 +46.7 52.9	27 48.3 +47.3 53.3	28 23.9 +47.9 53.8	28 59.2 +48.4 54.2	29 34.1 +49.0 54.7	30 08.6 +49.6 55.1	43
44	26 44.8 +45.3 51.4	27 22.1 +45.8 51.8	27 59.0 +46.5 52.2	28 35.6 +47.0 52.6	29 11.8 +47.6 53.1	29 47.6 +48.3 53.5	30 23.1 +48.8 54.0	30 58.2 +49.3 54.5	44
45	27 30.1 +45.0 50.7	28 07.9 +45.7 51.1	28 45.5 +46.2 51.5	29 22.6 +46.9 51.9	29 59.4 +47.5 52.4	30 35.9 +48.0 52.9	31 11.9 +48.6 53.3	31 47.5 +49.2 53.8	45
46	28 15.1 +44.8 49.9	28 53.6 +45.4 50.3	29 31.7 +46.0 50.8	30 09.5 +46.6 51.2	30 46.9 +47.2 51.7	31 23.9 +47.8 52.2	32 00.5 +48.4 52.6	32 36.7 +48.9 53.1	46
47	28 59.9 +44.6 49.2	29 39.0 +45.1 49.6	30 17.7 +45.8 50.0	30 56.1 +46.3 50.5	31 34.1 +46.9 51.0	32 11.7 +47.5 51.4	32 48.9 +48.1 51.9	33 25.6 +48.7 52.5	47
48	29 44.5 +44.2 48.4	30 24.1 +44.9 48.8	31 03.5 +45.4 49.3	31 42.4 +46.1 49.7	32 21.0 +46.7 50.2	32 59.2 +47.3 50.7	33 37.0 +47.8 51.2	34 14.3 +48.5 51.8	48
49	30 28.7 +44.0 47.6	31 09.0 +44.6 48.1	31 48.9 +45.2 48.5	32 28.5 +45.8 49.0	33 07.7 +46.4 49.5	33 46.5 +47.0 50.0	34 24.8 +47.6 50.5	35 02.8 +48.2 51.0	49
50	31 12.7 +43.7 46.8	31 53.6 +44.3 47.3	32 34.1 +44.9 47.7	33 14.3 +45.5 48.2	33 54.1 +46.1 48.7	34 33.5 +46.7 49.2	35 12.4 +47.4 49.8	35 51.0 +47.9 50.3	50
51	31 56.4 +43.4 46.0	32 37.9 +44.0 46.5	33 19.0 +44.6 46.9	33 59.8 +45.2 47.4	34 40.2 +45.8 47.9	35 20.2 +46.4 48.5	35 59.8 +47.0 49.0	36 38.9 +47.7 49.6	51
52	32 39.8 +43.0 45.2	33 21.9 +43.7 45.7	34 03.6 +44.3 46.1	34 45.0 +44.9 46.6	35 26.0 +45.5 47.2	36 06.6 +46.1 47.7	36 46.8 +46.7 48.2	37 26.6 +47.3 48.8	52
53	33 22.8 +42.8 44.4	34 05.6 +43.3 44.8	34 47.9 +44.0 45.3	35 29.9 +44.6 45.8	36 11.5 +45.2 46.3	36 52.7 +45.8 46.9	37 33.5 +46.5 47.4	38 13.9 +47.0 48.0	53
54	34 05.6 +42.3 43.5	34 48.9 +43.0 44.0	35 31.9 +43.6 44.5	36 14.5 +44.2 45.0	36 56.7 +44.9 45.5	37 38.5 +45.5 46.1	38 20.0 +46.0 46.6	39 00.9 +46.7 47.2	54
55	34 47.9 +42.0 42.7	35 31.9 +42.6 43.1	36 15.5 +43.2 43.6	36 58.7 +43.9 44.2	37 41.6 +44.4 44.7	38 24.0 +45.1 45.2	39 06.0 +45.8 45.8	39 47.6 +46.4 46.4	55
56	35 29.9 +41.6 41.8	36 14.5 +42.2 42.3	36 58.7 +42.9 42.8	37 42.6 +43.4 43.3	38 26.0 +44.1 43.8	39 09.1 +44.7 44.3	39 51.8 +45.3 45.0	40 34.0 +46.0 45.5	56
57	36 11.5 +41.2 40.9	36 56.7 +41.8 41.4	37 41.6 +42.4 41.9	38 26.0 +43.1 42.4	39 10.1 +43.7 43.0	39 53.8 +44.3 43.5	40 37.1 +45.0 44.1	41 20.0 +45.6 44.7	57
58	36 52.7 +40.8 40.0	37 38.5 +41.5 40.5	38 24.0 +42.0 41.0	39 09.1 +42.7 41.5	39 53.8 +43.3 42.1	40 38.2 +43.9 42.7	41 22.1 +44.5 43.2	42 05.6 +45.2 43.9	58
59	37 33.5 +40.4 39.1	38 20.0 +40.9 39.6	39 06.0 +41.6 40.1	39 51.8 +42.2 40.6	40 37.1 +42.8 41.2	41 22.1 +43.4 41.8	42 06.6 +44.2 42.3	42 50.8 +44.7 43.0	59
60	38 13.9 +39.9 38.1	39 00.9 +40.5 38.6	39 47.6 +41.2 39.2	40 34.0 +41.7 39.7	41 20.0 +42.4 40.2	42 05.6 +43.0 40.8	42 50.8 +43.6 41.4	43 35.5 +44.3 42.1	60
61	38 53.8 +39.4 37.2	39 41.4 +40.1 37.7	40 28.8 +40.6 38.2	41 15.7 +41.3 38.7	42 02.4 +41.9 39.3	42 48.6 +42.5 39.9	43 34.4 +43.2 40.5	44 19.8 +43.9 41.1	61
62	39 33.2 +39.0 36.2	40 21.5 +39.5 36.7	41 09.4 +40.2 37.2	41 57.0 +40.8 37.8	42 44.3 +41.5 38.3	43 31.1 +42.1 38.9	44 17.6 +42.7 39.5	45 03.7 +43.4 40.2	62
63	40 12.2 +38.4 35.2	41 01.0 +39.0 35.7	41 49.6 +39.6 36.3	42 37.8 +40.3 36.8	43 25.7 +40.9 37.3	44 13.2 +41.5 37.9	45 00.3 +42.2 38.5	45 47.1 +42.8 39.2	63
64	40 50.6 +37.8 34.2	41 40.0 +38.5 34.7	42 29.2 +39.1 35.2	43 18.1 +39.7 35.8	44 06.6 +40.3 36.3	44 54.7 +41.0 36.9	45 42.5 +41.6 37.5	46 29.9 +42.3 38.2	64
65	41 28.4 +37.3 33.2	42 18.5 +37.9 33.7	43 08.3 +38.5 34.2	43 57.8 +39.3 34.8	44 46.9 +39.8 35.3	45 35.7 +40.4 35.9	46 24.1 +41.1 36.5	47 12.2 +41.7 37.1	65
66	42 05.7 +36.8 32.1	42 56.4 +37.3 32.6	43 46.8 +37.9 33.1	44 36.9 +38.5 33.7	45 26.7 +39.1 34.2	46 16.1 +39.8 34.8	47 05.2 +40.4 35.4	47 53.9 +41.1 36.1	66
67	42 42.5 +36.1 31.1	43 33.7 +36.7 31.5	44 24.7 +37.3 32.1	45 15.4 +37.9 32.6	46 05.8 +38.6 33.1	46 55.9 +39.2 33.7	47 45.6 +39.8 34.3	48 35.0 +40.5 35.0	67
68	43 18.6 +35.5 30.0	44 10.4 +36.1 30.4	45 02.0 +36.7 31.0	45 53.3 +37.3 31.5	46 44.4 +37.8 32.0	47 35.1 +38.5 32.6	48 25.4 +39.2 33.2	49 15.5 +39.8 33.8	68
69	43 54.1 +34.8 28.9	44 46.5 +35.4 29.3	45 38.7 +35.9 29.8	46 30.6 +36.6 30.3	47 22.2 +37.2 30.9	48 13.6 +37.8 31.5	49 04.6 +38.4 32.1	49 55.3 +39.0 32.7	69
70	44 28.9 +34.1 27.7	45 21.9 +34.7 28.2	46 14.6 +35.3 28.7	47 07.2 +35.8 29.2	47 59.4 +36.4 29.7	48 51.4 +37.0 30.3	49 43.0 +37.7 30.9	50 34.3 +38.4 31.5	70
71	45 03.0 +33.4 26.6	45 56.6 +33.9 27.0	46 49.9 +34.5 27.5	47 43.0 +35.1 28.0	48 35.8 +35.7 28.5	49 28.4 +36.3 29.1	50 20.7 +36.9 29.7	51 12.7 +37.5 30.3	71
72	45 36.4 +32.7 25.4	46 30.5 +33.2 25.8	47 24.4 +33.8 26.3	48 18.1 +34.3 26.8	49 11.5 +34.9 27.3	50 04.7 +35.4 27.9	50 57.6 +36.1 28.5	51 50.2 +36.8 29.0	72
73	46 09.1 +31.9 24.2	47 03.7 +32.4 24.6	47 58.2 +32.9 25.1	48 52.4 +33.5 25.6	49 46.4 +34.1 26.1	50 40.2 +34.7 26.6	51 33.7 +35.3 27.2	52 27.0 +35.9 27.7	73
74	46 41.0 +31.1 23.4	47 36.1 +31.6 23.4	48 31.1 +32.1 23.8	49 25.9 +32.7 24.3	50 20.5 +33.2 24.8	51 14.9 +33.7 25.3	52 09.0 +34.4 25.9	53 02.9 +34.9 26.4	74
75	47 12.1 +30.2 21.7	48 07.7 +30.8 22.1	49 03.2 +31.3 22.5	49 58.6 +31.7 23.0	50 53.7 +32.3 23.5	51 48.6 +32.9 24.0	52 43.4 +33.4 24.5	53 37.8 +34.1 25.1	75
76	47 42.3 +29.4 20.4	48 38.5 +29.8 20.8	49 34.5 +30.3 21.2	50 30.3 +30.9 21.7	51 26.0 +31.3 22.1	52 21.5 +31.9 22.6	53 16.8 +32.4 23.1	54 11.9 +33.1 23.7	76
77	48 11.7 +28.5 19.1	49 08.3 +28.9 19.5	50 04.8 +29.4 19.9	51 01.2 +29.8 20.3	51 57.3 +30.4 20.7	52 53.4 +30.9 21.2	53 49.2 +31.4 21.7	54 44.9 +31.9 22.2	77
78	48 40.2 +27.5 17.8	49 37.2 +28.0 18.1	50 34.2 +28.4 18.5	51 31.0 +28.9 18.9	52 27.7 +29.4 19.3	53 24.3 +29.8 19.8	54 20.6 +30.4 20.2	55 16.8 +30.9 20.7	78
79	49 07.7 +26.6 16.4	50 05.2 +27.0 16.8	51 02.6 +27.4 17.1	51 59.9 +27.8 17.5	52 57.1 +28.2 17.9	53 54.1 +28.7 18.3	54 51.0 +29.2 18.8	55 47.7 +29.7 19.2	79
80	49 34.3 +25.6 15.1	50 32.2 +26.0 15.4	51 30.0 +26.4 15.7	52 27.7 +26.8 16.1	53 25.3 +27.2 16.4	54 22.8 +27.6 16.8	55 20.2 +28.1 17.2	56 17.4 +28.6 17.7	80
81	49 59.9 +24.6 13.7	50 58.2 +24.9 13.9	51 56.4 +25.2 14.3	52 54.5 +25.6 14.6	53 52.5 +26.0 14.9	54 50.4 +26.3 15.3	55 48.3 +26.8 15.6	56 46.0 +27.2 16.1	81
82	50 24.5 +23.5 12.2	51 23.1 +23.8 12.5	52 21.6 +24.2 12.8	53 20.1 +24.5 13.1	54 18.5 +24.8 13.4	55 16.7 +25.2 13.7	56 15.1 +25.6 14.1	57 13.2 +26.0 14.4	82
83	50 48.0 +22.4 10.8	51 46.9 +22.7 11.0	52 45.8 +22.9 11.3	53 44.6 +23.2 11.5	54 43.3 +23.6 11.8	55 42.0 +23.9 12.1	56 40.7 +24.2 12.4	57 39.2 +24.6 12.8	83
84	51 10.4 +21.3 9.5	52 09.6 +21.5 9.5	53 08.7 +21.8 9.7	54 07.8 +21.9 10.0	55 06.9 +22.3 10.2	56 05.9 +22.6 10.5	57 04.9 +22.9 10.5	58 03.8 +23.2 11.1	84
85	51 31.7 +20.1 7.8	52 31.1 +20.3 8.0	53 30.5 +20.5 8.2	54 29.7 +20.7 8.4	55 29.2 +21.0 8.6	56 28.5 +21.2 8.8	57 27.8 +21.5 9.0	58 27.0 +21.8 9.3	85
86	51 51.8 +18.9 6.3	52 51.4 +19.1 6.4	53 51.0 +19.3 6.6	54 50.6 +19.4 6.8	55 50.2 +19.6 6.9	56 49.7 +19.8 7.1	57 49.3 +20.0 7.3	58 48.8 +20.2 7.5	86
87	52 10.7 +17.7 4.8	53 10.5 +17.8 4.9	54 10.3 +17.9 5.0	55 10.0 +18.1 5.1	56 09.8 +18.2 5.2	57 09.5 +18.4 5.4	58 09.3 +18.4 5.4	59 09.0 +18.6 5.7	87
88	52 28.4 +16.4 3.2	53 28.3 +16.5 3.3	54 28.2 +16.6 3.3	55 28.1 +16.7 3.4	56 28.0 +16.7 3.5	57 27.9 +16.8 3.6	58 27.7 +17.0 3.7	59 27.6 +17.0 3.8	88
89	52 44.8 +15.2 1.6	53 44.8 +15.2 1.6	54 44.8 +15.2 1.7	55 44.8 +15.2 1.7	56 44.7 +15.3 1.8	57 44.7 +15.3 1.8	58 44.7 +15.3 1.9	59 44.6 +15.4 1.9	89
90	53 00.0 +13.9 0.0	54 00.0 +13.8 0.0	55 00.0 +13.8 0.0	56 00.0 +13.8 0.0	57 00.0 +13.8 0.0	58 00.0 +13.7 0.0	59 00.0 +13.7 0.0	60 00.0 +13.7 0.0	90

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION — L.H.A. 104°, 256°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	7 46.8	+48.4	100.4	7 35.9	+48.9	100.6	7 24.8	+49.5	100.7	7 13.6	+50.1	100.8	7 02.2	+50.7	101.0	6 50.8	+51.2	101.1	6 39.2	+51.8	101.2	6 27.5	+52.3	101.3	0
1	8 35.2	+48.3	99.8	8 24.8	+48.9	100.0	8 14.3	+49.5	100.1	8 03.7	+50.1	100.3	7 52.9	+50.7	100.4	7 42.0	+51.2	100.6	7 31.0	+51.7	100.7	7 19.8	+52.2	100.8	1
2	9 23.5	+48.2	99.2	9 13.7	+48.9	99.4	9 03.8	+49.5	99.6	8 53.8	+50.0	99.7	8 43.6	+50.6	99.9	8 33.2	+51.1	100.0	8 22.7	+51.7	100.2	8 12.0	+52.2	100.3	2
3	10 11.7	+48.1	98.6	10 02.6	+48.7	98.8	9 53.3	+49.4	99.0	9 43.8	+50.0	99.2	9 34.2	+50.5	99.3	9 24.3	+51.2	99.5	9 14.4	+51.6	99.7	9 04.2	+52.2	99.8	3
4	10 59.8	+48.1	98.0	10 51.3	+48.7	98.2	10 42.7	+49.3	98.4	10 33.8	+49.9	98.6	10 24.7	+50.5	98.8	10 15.5	+51.0	99.0	10 06.0	+51.6	99.1	9 56.4	+52.1	99.3	4
5	11 47.9	+48.0	97.4	11 40.0	+48.7	97.6	11 32.0	+49.2	97.8	11 23.7	+49.8	98.0	11 15.2	+50.4	98.2	11 06.5	+51.0	98.4	10 57.6	+51.5	98.6	10 48.5	+52.1	98.8	5
6	12 35.9	+47.9	96.8	12 28.7	+48.5	97.0	12 21.2	+49.2	97.3	12 13.5	+49.8	97.5	12 05.6	+50.4	97.7	11 57.5	+50.9	97.9	11 49.1	+51.5	98.1	11 40.6	+52.0	98.3	6
7	13 23.8	+47.7	96.2	13 17.2	+48.5	96.4	13 10.4	+49.1	96.7	13 03.3	+49.7	96.9	12 56.0	+50.3	97.1	12 48.4	+50.9	97.3	12 40.6	+51.5	97.5	12 32.6	+52.0	97.8	7
8	14 11.7	+47.7	95.6	14 05.7	+48.4	95.8	13 59.5	+49.0	96.1	13 53.0	+49.6	96.3	13 46.3	+50.2	96.6	13 39.3	+50.8	96.8	13 32.1	+51.3	97.0	13 24.6	+51.9	97.3	8
9	14 59.4	+47.6	94.9	14 54.1	+48.3	95.2	14 48.5	+48.9	95.5	14 42.6	+49.5	95.7	14 36.5	+50.1	96.0	14 30.1	+50.7	96.3	14 23.4	+51.3	96.5	14 16.5	+51.8	96.8	9
10	15 47.0	+47.5	94.3	15 42.4	+48.1	94.6	15 37.4	+48.8	94.9	15 32.1	+49.5	95.2	15 26.6	+50.1	95.4	15 20.8	+50.6	95.7	15 14.7	+51.2	96.0	15 08.3	+51.8	96.2	10
11	16 34.5	+47.4	93.7	16 30.5	+48.1	94.0	16 26.2	+48.7	94.3	16 21.6	+49.3	94.6	16 16.7	+49.9	94.9	16 11.4	+50.6	95.1	16 05.9	+51.1	95.4	16 00.1	+51.6	95.7	11
12	17 21.9	+47.3	93.0	17 18.6	+47.9	93.4	17 14.9	+48.6	93.7	17 10.9	+49.3	94.0	17 06.6	+49.9	94.3	17 02.0	+50.4	94.6	16 57.0	+51.1	94.9	16 51.7	+51.6	95.2	12
13	18 09.2	+47.2	92.4	18 06.5	+47.9	92.7	18 03.5	+48.5	93.0	18 00.2	+49.1	93.4	17 56.5	+49.7	93.7	17 52.4	+50.4	94.0	17 48.1	+50.9	94.3	17 43.3	+51.6	94.7	13
14	18 56.4	+47.0	91.7	18 54.4	+47.6	92.1	18 52.0	+48.3	92.4	18 49.3	+49.0	92.8	18 46.2	+49.6	93.1	18 42.8	+50.2	93.4	18 39.0	+50.8	93.8	18 34.9	+51.4	94.1	14
15	19 43.4	+46.8	91.1	19 42.0	+47.6	91.4	19 40.3	+48.3	91.8	19 38.3	+48.9	92.2	19 35.8	+49.5	92.5	19 33.0	+50.2	92.9	19 29.8	+50.8	93.2	19 26.3	+51.3	93.6	15
16	20 30.2	+46.7	90.4	20 29.6	+47.4	90.8	20 28.6	+48.1	91.2	20 27.2	+48.7	91.5	20 25.3	+49.4	91.9	20 23.2	+50.0	92.3	20 20.6	+50.6	92.7	20 17.6	+51.2	93.0	16
17	21 16.9	+46.6	89.7	21 17.0	+47.2	90.1	21 16.7	+47.9	90.5	21 15.9	+48.6	90.9	21 14.7	+49.3	91.3	21 13.2	+49.9	91.7	21 11.2	+50.5	92.1	21 08.8	+51.1	92.5	17
18	22 03.5	+46.4	89.1	22 04.2	+47.1	89.5	22 04.6	+47.8	89.9	22 04.5	+48.5	90.3	22 04.0	+49.1	90.7	22 03.1	+49.7	91.1	22 01.7	+50.4	91.5	21 59.9	+51.0	91.9	18
19	22 49.9	+46.2	88.4	22 51.3	+47.0	88.8	22 52.4	+47.6	89.2	22 53.0	+48.3	89.6	22 53.1	+49.0	90.1	22 52.8	+49.6	90.5	22 52.1	+50.2	90.9	22 50.9	+50.9	91.3	19
20	23 36.1	+46.0	87.7	23 38.3	+46.7	88.1	23 40.0	+47.4	88.6	23 41.3	+48.1	89.0	23 42.1	+48.8	89.4	23 42.4	+49.5	89.9	23 42.3	+50.2	90.3	23 41.8	+50.7	90.8	20
21	24 22.1	+45.8	87.0	24 25.0	+46.5	87.4	24 27.4	+47.3	87.9	24 29.4	+48.0	88.3	24 30.9	+48.7	88.8	24 31.9	+49.3	89.3	24 32.5	+49.9	89.7	24 32.5	+50.6	90.2	21
22	25 07.9	+45.6	86.3	25 11.5	+46.4	86.7	25 14.7	+47.1	87.2	25 17.4	+47.8	87.7	25 19.6	+48.4	88.2	25 21.2	+49.2	88.6	25 22.4	+49.8	89.1	25 23.1	+50.5	89.6	22
23	25 53.5	+45.4	85.6	25 57.9	+46.1	86.0	26 01.8	+46.9	86.5	26 05.2	+47.6	87.0	26 08.0	+48.3	87.5	26 10.4	+49.0	88.0	26 12.2	+49.7	88.5	26 13.6	+50.3	89.0	23
24	26 38.9	+45.2	84.8	26 44.0	+46.0	85.3	26 48.7	+46.6	85.8	26 52.8	+47.4	86.3	26 56.3	+48.2	86.8	26 59.4	+48.8	87.3	27 01.9	+49.5	87.9	27 03.9	+50.1	88.4	24
25	27 24.1	+44.9	84.1	27 30.0	+45.7	84.6	27 35.3	+46.5	85.1	27 40.2	+47.2	85.6	27 44.5	+47.9	86.2	27 48.2	+48.6	86.7	27 51.4	+49.3	87.2	27 54.0	+50.0	87.7	25
26	28 09.0	+44.7	83.3	28 15.7	+45.4	83.9	28 21.8	+46.2	84.4	28 27.4	+46.9	84.9	28 32.4	+47.7	85.5	28 36.8	+48.4	86.0	28 40.7	+49.1	86.6	28 44.0	+49.8	87.1	26
27	28 53.7	+44.4	82.6	29 01.1	+45.2	83.1	29 08.0	+46.0	83.7	29 14.3	+46.8	84.2	29 20.1	+47.5	84.8	29 25.2	+48.3	85.4	29 29.8	+48.9	85.9	29 33.8	+49.6	86.5	27
28	29 38.1	+44.1	81.8	29 46.3	+45.0	82.4	29 54.0	+45.8	82.9	30 01.1	+46.5	83.5	30 07.6	+47.2	84.1	30 13.5	+48.0	84.7	30 18.7	+48.8	85.2	30 23.4	+49.4	85.8	28
29	30 22.2	+43.9	81.0	30 31.3	+44.7	81.6	30 39.8	+45.4	82.2	30 47.6	+46.3	82.8	30 54.8	+47.1	83.4	31 01.5	+47.7	84.0	31 07.5	+48.5	84.6	31 12.8	+49.2	85.2	29
30	31 06.1	+43.6	80.2	31 16.0	+44.4	80.8	31 25.2	+45.2	81.4	31 33.9	+46.0	82.0	31 41.9	+46.7	82.6	31 49.2	+47.6	83.3	31 56.0	+48.3	83.9	32 02.0	+49.0	84.5	30
31	31 49.7	+43.2	79.4	32 00.4	+44.1	80.0	32 10.4	+45.0	80.7	32 19.9	+45.7	81.3	32 28.6	+46.5	81.9	32 36.8	+47.2	82.5	32 44.2	+48.1	83.2	32 51.0	+48.8	83.8	31
32	32 32.9	+43.0	78.6	32 44.5	+43.8	79.2	32 55.4	+44.6	79.9	33 05.6	+45.4	80.5	33 15.1	+46.3	81.2	33 24.0	+47.0	81.8	33 32.3	+47.7	82.5	33 39.8	+48.5	83.1	32
33	33 15.9	+42.6	77.8	33 28.3	+43.4	78.4	33 40.0	+44.3	79.1	33 51.0	+45.1	79.7	34 01.4	+45.9	80.4	34 11.0	+46.8	81.1	34 20.0	+47.5	81.7	34 28.3	+48.3	82.4	33
34	33 58.5	+42.2	76.9	34 11.7	+43.1	77.6	34 24.3	+43.9	78.3	34 36.1	+44.4	78.9	34 47.3	+45.7	79.6	34 57.8	+46.4	80.3	35 07.5	+47.3	81.0	35 16.6	+48.0	81.7	34
35	34 40.7	+41.9	76.1	34 54.8	+42.8	76.7	35 08.2	+43.7	77.4	35 21.0	+44.4	78.1	35 33.0	+45.3	78.8	35 44.2	+46.2	79.5	35 54.8	+46.9	80.2	36 04.6	+47.7	80.9	35
36	35 22.6	+41.5	75.2	35 37.6	+42.4	75.9	35 51.9	+43.2	76.6	36 05.4	+44.2	77.3	36 18.3	+45.0	78.0	36 30.4	+45.8	78.7	36 41.7	+46.7	79.5	36 52.3	+47.5	80.2	36
37	36 04.1	+41.1	74.3	36 20.0	+42.0	75.0	36 35.1	+42.9	75.7	36 49.6	+43.7	76.4	37 03.3	+44.6	77.2	37 16.2	+45.5	77.9	37 28.4	+46.3	78.7	37 39.8	+47.1	79.4	37
38	36 45.2	+40.7	73.4	37 02.0	+41.6	74.1	37 18.0	+42.5	74.8	37 33.3	+43.4	75.6	37 47.9	+44.3	76.3	38 01.7	+45.1	77.1	38 14.7	+46.0	77.9	38 26.9	+46.8	78.6	38
39	37 25.9	+40.2	72.5	37 43.6	+41.1	73.2	38 00.5	+42.1	74.0	38 16.7	+43.0	74.7	38 32.2	+43.8	75.5	38 46.8	+44.8	76.3	39 00.7	+45.6	77.0	39 13.7	+46.5	77.8	39
40	38 06.1	+39.8	71.5	38 24.7	+40.8	72.3	38 42.6	+41.7	73.0	38 59.7	+42.6	73.8	39 16.0	+43.5	74.6	39 31.6	+44.4	75.4	39 46.3	+45.3	76.2	40 00.2	+46.1	77.0	40
41	38 45.9	+39.3	70.6	39 05.5	+40.2	71.3	39 24.3	+41.2	72.1	39 42.3	+42.1	72.9	39 59.5	+43.1	73.7	40 16.0	+43.9	74.5	40 31.6	+44.8	75.3	40 46.3	+45.8	76.2	41
42	39 25.2	+38.8	69.6	39 45.7	+39.8	70.4	40 05.5	+40.7	71.2	40 24.4	+41.7	72.0	40 42.6	+42.6	72.8	40 59.9	+43.6	73.6	41 16.4	+44.5	74.5	41 32.1	+45.3	75.3	42
43	40 04.0	+38.3	68.6	40 25.5	+39.3	69.4	40 46.2	+40.2	70.2	41 06.1	+41.2	71.0	41 25.2	+42.2	71.9	41 43.5	+43.1	72.7	42 00.9	+44.0	73.6	42 17.4	+45.0	74.4	43
44	40 42.3	+37.7	67.6	41 04.8	+38.7	68.4	41 26.4	+39.8	69.2	41 47.3	+40.7	70.1	42 07.4	+41.6	70.9	42 26.6	+42.6	71.8	42 44.9	+43.6	72.6	43 02.4	+44.5	73.5	44
45	41 20.0	+37.2	66.6	41 43.5	+38.2	67.4	42 06.2	+39.2	68.2	42 28.0	+40.2	69.1	42 49.0	+41.2	69.9	43 09.2	+42.1	70.8	43 28.5	+43.1	71.7	43 46.9	+44.0	72.6	45
46	41 57.2	+36.6	65.5	42 21.7	+37.6	66.4	42 45.4	+38.6	67.2	43 08.2	+39.6	68.1	43 30.2	+40.6	68.9	43 51.3	+41.7	69.8	44 11.6	+42.6	70.7	44 30.9	+43.6	71.7	46
47	42 33.8	+36.0	64.5	42 59.3	+37.0	65.3	43 24.0	+38.0	66.1	43 47.8	+39.1	67.0	44 10.8	+40.1	67.9	44 33.0	+41.0	68.8	44 54.2	+42.1	69.7	45 14.5	+43.0	70.7	47
48	43 09.8	+35.4	63.4	43 36.3	+36.4	64.2	44 02.0	+37.5	65.1	44 26.9	+38.5	66.0	44 50.9	+39.5	66.9	45 14.0	+40.5	67.8	45 36.3	+41.5	68.7	45 57.5	+42.6	69.7	48
49	43 45.2	+34.7	62.2	44 12.7	+35.8	63.1	44 39.5	+36.8	64.0	45 05.4	+37.8	64.9	45 30.4	+38.9	65.8	45 54.5	+40.0	66.7	46 17.8	+40.9	67.7	46 40.1	+41.9	68.7	49
50	44 19.9	+34.0	61.1	44 48.5	+35.1	62.0	45 16.3	+36.1	62.9	45 43.2	+37.2	63.8	46 09.3	+38.2	64.7	46 34.5	+39.3	65.7	46 58.7	+40.4	66.6	47 22.0	+41.4	67.6	50
51	44 53.9	+33.3	60.0	45 23.6	+34.3	60.8	45 52.4	+35.4	61.7	46 20.4	+36.5	62.6	46 47.5	+37.6	63.6	47 13.8	+38.6	64.6	47 39.1	+39.7	65.5	48 03.4	+40.8	66.6	51
52	45 27.2	+32.6	58.8	45 57.9	+33.6	59.7	46 27.8	+34.7	60.6	46 56.9	+35.8	61.5	47 25.1	+36.9	62.4	47 52.4	+37.9	63.4	48 18.8	+39.0	64.4	48 44.2	+40.1	65.4	52
53	45 59.8	+31.7	57.6	46 31.5	+32.9	58.5	47 02.5	+34.0	59.4	47 32.7	+35.0	60.3	48 02.0	+36.1	61.3	48 30.3	+37.3	62.3	48 57.8	+38.3	63.3	49 24.3	+39.4	64.3	53
54	46 31.5	+31.0	56.3	47 04.4	+32.1	57.2	47 36.5	+33.1	58.2	48 07.7	+34.3	59.1	48 38.1	+35.4	60.1	49 07.6	+36.5	61.1	49 36.1	+37.6	62.1	50 03.7	+38.7	63.1	54
55	47 02.5	+30.2	55.1	47 36.5	+31.2	56.0	48 09.6	+32.4	56.9	48 42.0	+33.4	57.9	49 13.5	+34.5	58.8	49 44.1	+35.6	59.8	50 13.7	+36.8	60.9	50 42.4	+38.0	61.9	55
56	47 32.7	+29.3	53.8	48 07.7	+30.4	54.7	48 42.0	+31.5	55.6	49 15.4	+32.6	56.6	49 48.0	+33.8	57.6	50 19.7	+34.9	58.6	50 50.5	+36.0	59.6	51 20.4	+37.1	60.7	56
57	48 02.0	+28.3	52.5	48 38.1	+29.5	53.4	49 13.5	+30.6	54.3	49 48.0	+31.7	55.3	50 21.8	+32.8	56.3	50 54.6	+34.0	57.3	51 26.5	+35.2	58.4	51 57.5	+36.3	59.4	57
58	48 30.3	+27.5	51.2	49 07.6	+28.5	52.1	49 44.1	+29.6	53.0	50 19.7	+30.8	54.0	50 54.6	+31.9	55.0	51 28.6	+33.1	56.0	52 01.7	+34.3	57.1	52 33.8	+35.5	58.1	58
59	48 57.8	+26.5	49.9	49 36.1	+27.6	50.7	50 13.7	+28.7	51.7	50 50.5	+29.9	52.6	51 26.5	+31.0	53.6	52 01.7	+32.1	54.7	52 36.0	+33.3	55.7	53 09.3	+34.5	56.8	59
60	49 24.3	+25.5	48.5	50 03.7	+26.6	49.4	50 42.4	+27.7	50.3	51 20.4	+28.8	51.2	51 57.5	+30.0	52.2	52 33.8	+31.2	53.3	53 09.3	+32.3	54.3	53 43.8	+33.5	55.4	60
61	49 49.8	+24.5	47.1	50 30.3	+25.6	48.0	51 10.1	+26.7	48.9	51 49.2	+27.8	49.8	52 27.5	+29.0	50.8	53 05.0	+30.1	51.9	53 41.6	+31.4	52.9	54 17.3	+32.6	54.0	61
62	50 14.3	+23.4	45.7	50 55.9	+24.5	46.5	51 36.8	+25.6	47.4	52 17.0	+26.8	48.4	52 56.5	+27.9	49.4	53 35.1	+29.1	50.4	54 13.0	+30.2	51.5	54 49.9	+31.4	52.6	62
63	50 37.7	+22.3	44.2	51 20.4	+23.4	45.1	52 02.4	+24.5	46.0	52 43.8	+25.6	46.9	53 24.4	+26.7	47.9	54 04.2	+27.9	48.9	54 43.2	+29.1	50.0	55 21.3	+30.4	51.1	63
64	51 00.0	+21.3	42.7	51 43.8	+22.3	43.6	52 26.9	+23.4	44.5	53 09.4	+24.5	45.4	53 51.1	+25.7	46.4	54 32.1	+26.8	47.4	55 12.3	+28.0	48.5	55 51.7	+29.2	49.6	64
65	51 21.3	+20.0	41.3	52 06.1	+21.1	42.1	52 50.3	+22.2	43.0	53 33.9	+23.2	43.9	54 16.8	+24.4	44.9	54 58.9	+25.6	45.9	55 40.3	+26.9	46.9	56 20.9	+28.0	48.0	65
66	51 41.3	+18.9	39.7	52 27.2	+19.9	40.6	53 12.5	+20.9	41.4	53 57.1	+22.1	42.3	54 41.2	+23.1	43.3	55 24.5	+24.3	44.3	56 07.1	+25.5	45.3	56 48.9	+26.7	46.4	66
67	52 00.2	+17.6	38.2	52 47.1	+18.6	39.0	53 33.4	+19.7	39.9	54 19.2	+20.7	40.7	55 04.3	+21.9	41.7	55 48.8	+23.0	42.7	56 32.6	+24.1	43.7	57 15.6	+25.4	44.7	67
68	52 17.8	+16.5	36.6	53 05.7	+17.4	37.4	53 53.1	+18.5	38.3	54 39.9	+19.5	39.1	55 26.2	+20.5	40.0	56 11.8	+21.7	41.0	56 56.7	+22.9	42.0	57 41.0	+24.0	43.1	68
69	52 34.3	+15.1	35.1	53 23.1	+16.1	35.8	54 11.5	+17.1	36.6	54 59.4	+18.1	37.5	55 46.7	+19.2	38.4	56 33.5	+20.2	39.3	57 19.6	+21.4	40.3	58 05.0	+22.5	41.3	69
70	52 49.4	+13.8	33.5	53 39.2	+14.8	34.2	54 28.6	+15.7	35.0	55 17.5	+16.7	35.8	56 05.9	+17.8	36.7	56 53.7	+18.9	37.6	57 41.0	+19.9	38.6	58 27.5	+21.1	39.6	70
71	53 03.2	+12.5	31.9	53 54.0	+13.4	32.6	54 44.3	+14.4	33.3	55 34.2	+15.3	34.1	56 23.7	+16.3	35.0	57 12.6	+17.3	35.9	58 00.9	+18.4	36.8	58 48.6	+19.6	37.8	71
72	53 15.7	+11.2	30.2	54 07.4	+12.0	30.9	54 58.7	+12.9	31.6	55 49.5	+13.9	32.4	56 40.0	+14.8	33.2	57 29.9	+15.9	34.1	58 19.3	+16.9	35.0	59 08.2	+18.0	35.9	72
73	53 26.9	+9.8	28.6	54 19.4	+10.6	29.2	55 11.6	+11.5	29.9	56 03.4	+12.4	30.7	56 54.8	+13.3	31.5	57 45.8	+14.2	32.3	58 36.2	+15.3	33.2	59 26.2	+16.4	34.1	73
74	53 36.7	+8.4	26.9	54 30.0	+9.2	27.5	55 23.1	+10.1	28.2	56 15.8	+10.8	28.9	57 08.1	+11.8	29.7	58 00.0	+12.7	30.5	58 51.5	+13.7	31.3	59 42.6	+14.7	32.2	74
75	53 45.1	+7.0	25.2	54 39.2	+7.8	25.8	55 33.1	+8.5	26.5	56 26.6	+9.4	27.1	57 19.9	+10.1	27.9	58 12.7	+11.1	28.6	59 05.2	+12.0	29.4	59 57.3	+12.9	30.2	75
76	53 52.1	+5.6	23.6	54 47.0	+6.3	24.1	55 41.6	+7.0	24.7	56 36.0	+7.7	25.4	57 30.0	+8.6	26.0	58 23.8	+9.4	26.7	59 17.2	+10.3	27.5	60 10.2	+11.3	28.3	76
77	53 57.7	+4.1	21.9	54 53.3	+4.8	22.4	55 48.6	+5.5	23.0	56 43.7	+6.2	23.5	57 38.6	+7.0	24.2	58 33.2	+7.8	24.8	59 27.5	+8.6	25.6	60 21.5	+9.4	26.3	77
78	54 01.8	+2.7	20.2	54 58.1	+3.3	20.7	55 54.1	+3.9	21.2	56 49.9	+4.7	21.7	57 45.6	+5.3	22.3	58 41.0	+6.0	22.9	59 36.1	+6.8	23.6	60 30.9	+7.6	24.3	78
79	54 04.5	+1.3	18.5	55 01.4	+1.8	18.9	55 58.1	+2.4	19.4	56 54.6	+3.0	19.9	57 50.9	+3.6	20.4	58 47.0	+4.3	21.0	59 42.9	+5.0	21.6	60 38.5	+5.8	22.3	79
80	54 05.8	−0.2	16.8	55 03.2	+0.3	17.2	56 00.5	+0.8	17.6	56 57.6	+1.4	18.1	57 54.5	+2.0	18.6	58 51.3	+2.6	19.1	59 47.9	+3.3	19.7	60 44.3	+4.0	20.3	80
81	54 05.6	−1.6	15.1	55 03.5	−1.1	15.4	56 01.3	−0.7	15.8	56 59.0	−0.2	16.2	57 56.5	+0.5	16.7	58 53.9	+0.9	17.2	59 51.2	+1.6	17.7	60 48.3	+2.0	18.2	81
82	54 04.0	−3.0	13.4	55 02.4	−2.7	13.7	56 00.6	−2.2	14.0	56 58.8	−1.8	14.4	57 56.8	−1.3	14.8	58 54.8	−0.9	15.2	59 52.6	−0.3	15.7	60 50.3	+0.2	16.2	82
83	54 01.0	−4.5	11.7	54 59.7	−4.2	11.9	55 58.4	−3.8	12.3	56 57.0	−3.5	12.6	57 55.5	−3.0	12.9	58 53.9	−2.6	13.3	59 52.3	−2.2	13.7	60 50.5	−1.7	14.1	83
84	53 56.5	−6.0	10.0	54 55.5	−5.6	10.2	55 54.6	−5.4	10.5	56 53.5	−5.0	10.7	57 52.5	−4.7	11.0	58 51.3	−4.3	11.4	59 50.1	−4.0	11.7	60 48.8	−3.5	12.1	84
85	53 50.5	−7.3	8.3	54 49.9	−7.1	8.5	55 49.2	−6.8	8.7	56 48.5	−6.6	8.9	57 47.8	−6.4	9.2	58 47.0	−6.1	9.4	59 46.1	−5.7	9.7	60 45.3	−5.5	10.0	85
86	53 43.2	−8.7	6.6	54 42.8	−8.6	6.8	55 42.4	−8.4	6.9	56 41.9	−8.2	7.1	57 41.4	−7.9	7.3	58 40.9	−7.7	7.5	59 40.4	−7.5	7.7	60 39.8	−7.2	8.0	86
87	53 34.5	−10.2	4.9	54 34.2	−10.0	5.0	55 34.0	−9.9	5.2	56 33.7	−9.7	5.3	57 33.5	−9.6	5.5	58 33.2	−9.4	5.6	59 32.9	−9.3	5.8	60 32.6	−9.1	6.0	87
88	54 24.3	−11.5	3.3	54 24.2	−11.4	3.3	55 24.1	−11.3	3.4	56 24.0	−11.2	3.5	57 23.9	−11.2	3.6	58 23.8	−11.1	3.7	59 23.6	−10.9	3.8	60 23.5	−10.9	3.9	88
89	53 12.8	−12.8	1.6	54 12.8	−12.8	1.7	55 12.8	−12.8	1.7	56 12.8	−12.8	1.8	57 12.7	−12.7	1.8	58 12.7	−12.7	1.8	59 12.7	−12.7	1.9	60 12.6	−12.6	2.0	89
90	53 00.0	−14.2	0.0	54 00.0	−14.2	0.0	55 00.0	−14.2	0.0	56 00.0	−14.2	0.0	57 00.0	−14.3	0.0	58 00.0	−14.3	0.0	59 00.0	−14.3	0.0	60 00.0	−14.4	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

LATITUDE CONTRARY NAME TO DECLINATION L.H.A. 77°, 283°

Each column gives Hc, d, Z.

Dec.	53°	54°	55°	56°	57°	58°	59°	60°	Dec.
0	7 46.8 −48.4 100.4	7 35.9 −49.0 100.6	7 24.8 −49.6 100.7	7 13.6 −50.2 100.8	7 02.2 −50.7 101.0	6 50.8 −51.3 101.1	6 39.2 −51.8 101.2	6 27.5 −52.3 101.3	0
1	6 58.4 −48.4 101.0	6 46.9 −49.0 101.2	6 35.2 −49.6 101.3	6 23.4 −50.2 101.4	6 11.5 −50.7 101.5	5 59.5 −51.3 101.6	5 47.4 −51.8 101.7	5 35.2 −52.4 101.8	1
2	6 10.0 −48.5 101.6	5 57.9 −49.1 101.7	5 45.6 −49.7 101.8	5 33.2 −50.2 101.9	5 20.8 −50.8 102.0	5 08.2 −51.3 102.1	4 55.6 −51.9 102.2	4 42.8 −52.3 102.3	2
3	5 21.5 −48.5 102.2	5 08.8 −49.1 102.3	4 55.9 −49.6 102.4	4 43.0 −50.2 102.5	4 30.0 −50.8 102.6	4 16.9 −51.3 102.6	4 03.7 −51.8 102.7	3 50.5 −52.4 102.8	3
4	4 33.0 −48.5 102.8	4 19.7 −49.1 102.9	4 06.3 −49.8 103.0	3 52.8 −50.3 103.0	3 39.2 −50.8 103.1	3 25.6 −51.4 103.2	3 11.9 −51.9 103.2	2 58.1 −52.4 103.3	4
5	3 44.5 −48.6 103.4	3 30.6 −49.2 103.5	3 16.5 −49.7 103.5	3 02.5 −50.3 103.6	2 48.4 −50.9 103.6	2 34.2 −51.4 103.7	2 20.0 −51.9 103.7	2 05.7 −52.3 103.8	5
6	2 55.9 −48.5 104.0	2 41.4 −49.2 104.0	2 26.8 −49.7 104.1	2 12.2 −50.3 104.1	1 57.5 −50.8 104.2	1 42.8 −51.3 104.2	1 28.1 −51.9 104.2	1 13.4 −52.4 104.2	6
7	2 07.4 −48.6 104.6	1 52.2 −49.1 104.6	1 37.1 −49.7 104.6	1 21.9 −50.3 104.7	1 06.7 −50.9 104.7	0 51.5 −51.4 104.7	0 36.2 −51.9 104.7	0 21.0 −52.4 104.7	7
8	1 18.8 −48.6 105.2	1 03.1 −49.2 105.2	0 47.3 −49.7 105.2	0 31.6 −50.3 105.2	0 15.8 −50.8 105.2	0 00.1 −51.4 105.2	0 15.7 +51.9 74.8	0 31.4 +52.4 74.8	8
9	0 30.2 −48.6 105.8	0 13.9 −49.2 105.8	0 02.4 +49.8 74.2	0 18.7 +50.3 74.2	0 35.0 +50.9 74.2	0 51.3 +51.4 74.3	1 07.6 +51.9 74.3	1 23.8 +52.4 74.3	9
10	0 18.4 +48.6 73.7	0 35.3 +49.2 73.7	0 52.2 +49.7 73.7	1 09.0 +50.3 73.7	1 25.9 +50.8 73.7	1 42.7 +51.4 73.7	1 59.5 +51.9 73.8	2 16.2 +52.4 73.8	10
11	1 07.0 +48.6 73.1	1 24.5 +49.2 73.1	1 41.9 +49.8 73.1	1 59.3 +50.3 73.1	2 16.7 +50.9 73.2	2 34.1 +51.3 73.2	2 51.4 +51.8 73.3	3 08.6 +52.4 73.3	11
12	1 55.6 +48.6 72.5	2 13.7 +49.1 72.5	2 31.7 +49.7 72.6	2 49.6 +50.3 72.6	3 07.6 +50.8 72.6	3 25.4 +51.4 72.7	3 43.2 +51.9 72.8	4 01.0 +52.3 72.8	12
13	2 44.2 +48.6 71.9	3 02.8 +49.2 71.9	3 21.4 +49.7 72.0	3 39.9 +50.3 72.1	3 58.4 +50.8 72.1	4 16.8 +51.3 72.2	4 35.1 +51.8 72.3	4 53.3 +52.3 72.3	13
14	3 32.8 +48.5 71.3	3 52.0 +49.1 71.4	4 11.1 +49.7 71.4	4 30.2 +50.2 71.5	4 49.2 +50.7 71.6	5 08.1 +51.3 71.7	5 26.9 +51.8 71.8	5 45.6 +52.4 71.8	14
15	4 21.3 +48.5 70.7	4 41.1 +49.1 70.8	5 00.8 +49.6 70.9	5 20.4 +50.2 71.0	5 39.9 +50.8 71.0	5 59.4 +51.2 71.1	6 18.7 +51.8 71.2	6 38.0 +52.2 71.4	15
16	5 09.8 +48.5 70.1	5 30.2 +49.0 70.2	5 50.4 +49.7 70.4	6 10.6 +50.2 70.4	6 30.7 +50.7 70.5	6 50.6 +51.3 70.6	7 10.5 +51.7 70.7	7 30.2 +52.3 70.9	16
17	5 58.3 +48.4 69.5	6 19.2 +49.0 69.6	6 40.1 +49.5 69.7	7 00.8 +50.1 69.9	7 21.4 +50.6 70.0	7 41.9 +51.2 70.1	8 02.2 +51.7 70.2	8 22.5 +52.2 70.4	17
18	6 46.7 +48.4 68.9	7 08.2 +49.0 69.1	7 29.6 +49.6 69.2	7 50.9 +50.1 69.3	8 12.0 +50.7 69.4	8 33.1 +51.1 69.6	8 53.9 +51.7 69.7	9 14.7 +52.1 69.9	18
19	7 35.1 +48.4 68.3	7 57.2 +48.9 68.6	8 19.2 +49.5 68.6	8 41.0 +50.0 68.7	9 02.7 +50.5 68.9	9 24.2 +51.1 69.0	9 45.6 +51.6 69.2	10 06.8 +52.1 69.4	19
20	8 23.5 +48.3 67.7	8 46.1 +48.9 67.9	9 08.7 +49.4 68.0	9 31.0 +50.0 68.2	9 53.2 +50.6 68.3	10 15.3 +51.1 68.5	10 37.2 +51.6 68.7	10 58.9 +52.1 68.9	20
21	9 11.8 +48.2 67.1	9 35.0 +48.8 67.3	9 58.1 +49.4 67.5	10 21.0 +49.9 67.6	10 43.8 +50.4 67.8	11 06.4 +51.0 68.0	11 28.8 +51.5 68.2	11 51.0 +52.0 68.4	21
22	10 00.0 +48.2 66.5	10 23.8 +48.8 66.7	10 47.5 +49.3 66.9	11 10.9 +49.9 67.1	11 34.2 +50.4 67.2	11 57.4 +50.9 67.4	12 20.3 +51.4 67.6	12 43.0 +52.0 67.8	22
23	10 48.2 +48.1 65.9	11 12.6 +48.6 66.1	11 36.8 +49.2 66.3	12 00.8 +49.8 66.5	12 24.6 +50.4 66.7	12 48.3 +50.8 66.9	13 11.7 +51.4 67.1	13 35.0 +51.8 67.3	23
24	11 36.3 +48.0 65.3	12 01.2 +48.6 65.5	12 26.0 +49.2 65.7	12 50.6 +49.7 65.9	13 15.0 +50.2 66.1	13 39.1 +50.8 66.4	14 03.1 +51.3 66.6	14 26.8 +51.9 66.8	24
25	12 24.3 +47.9 64.7	12 49.8 +48.6 64.9	13 15.2 +49.1 65.1	13 40.3 +49.6 65.3	14 05.2 +50.2 65.6	14 29.9 +50.8 65.8	14 54.4 +51.3 66.0	15 18.7 +51.7 66.3	25
26	13 12.2 +47.9 64.1	13 38.4 +48.4 64.3	14 04.3 +49.0 64.5	14 29.9 +49.6 64.8	14 55.4 +50.1 65.0	15 20.7 +50.6 65.2	15 45.7 +51.1 65.5	16 10.4 +51.7 65.8	26
27	14 00.1 +47.8 63.5	14 26.8 +48.3 63.7	14 53.3 +48.9 63.9	15 19.5 +49.5 64.2	15 45.5 +50.0 64.4	16 11.3 +50.5 64.7	16 36.8 +51.1 65.0	17 02.1 +51.6 65.2	27
28	14 47.9 +47.6 62.9	15 15.1 +48.3 63.1	15 42.2 +48.8 63.3	16 09.0 +49.3 63.6	16 35.5 +49.9 63.9	17 01.8 +50.5 64.1	17 27.9 +51.0 64.4	17 53.7 +51.5 64.7	28
29	15 35.5 +47.5 62.2	16 03.4 +48.1 62.5	16 31.0 +48.7 62.7	16 58.3 +49.3 63.0	17 25.4 +49.8 63.3	17 52.3 +50.3 63.6	18 18.9 +50.8 63.9	18 45.2 +51.4 64.2	29
30	16 23.0 +47.5 61.6	16 51.5 +48.0 61.9	17 19.7 +48.5 62.1	17 47.6 +49.1 62.4	18 15.2 +49.8 62.7	18 42.6 +50.3 63.0	19 09.7 +50.8 63.3	19 36.6 +51.3 63.6	30
31	17 10.5 +47.3 60.9	17 39.5 +47.9 61.2	18 08.2 +48.5 61.5	18 36.7 +49.1 61.8	19 05.0 +49.5 62.1	19 32.9 +50.1 62.4	20 00.5 +50.7 62.7	20 27.9 +51.2 63.1	31
32	17 57.8 +47.2 60.3	18 27.4 +47.7 60.6	18 56.7 +48.4 60.9	19 25.8 +48.9 61.2	19 54.5 +49.5 61.5	20 23.0 +50.0 61.8	20 51.2 +50.6 62.2	21 19.1 +51.0 62.5	32
33	18 45.0 +47.0 59.7	19 15.1 +47.7 59.9	19 45.1 +48.2 60.3	20 14.7 +48.8 60.6	20 44.0 +49.3 60.9	21 13.0 +49.9 61.2	21 41.8 +50.4 61.6	22 10.1 +51.0 61.9	33
34	19 32.0 +46.9 59.0	20 02.8 +47.5 59.3	20 33.3 +48.0 59.6	21 03.5 +48.6 60.0	21 33.3 +49.3 60.3	22 02.9 +49.8 60.6	22 32.2 +50.3 61.0	23 01.1 +50.9 61.4	34
35	20 18.9 +46.8 58.3	20 50.3 +47.3 58.7	21 21.3 +48.0 59.0	21 52.1 +48.5 59.3	22 22.6 +49.0 59.7	22 52.7 +49.6 60.0	23 22.5 +50.2 60.4	23 52.0 +50.7 60.8	35
36	21 05.7 +46.5 57.7	21 37.6 +47.2 58.0	22 09.3 +47.7 58.3	22 40.6 +48.3 58.7	23 11.6 +48.9 59.0	23 42.3 +49.5 59.4	24 12.7 +50.0 59.8	24 42.7 +50.5 60.2	36
37	21 52.2 +46.5 57.0	22 24.8 +47.0 57.3	22 57.0 +47.6 57.7	23 28.9 +48.2 58.0	24 00.5 +48.8 58.4	24 31.8 +49.3 58.8	25 02.7 +49.9 59.2	25 33.2 +50.5 59.6	37
38	22 38.7 +46.2 56.3	23 11.8 +46.8 56.7	23 44.6 +47.5 57.0	24 17.1 +48.0 57.4	24 49.3 +48.6 57.8	25 21.1 +49.2 58.2	25 52.6 +49.7 58.6	26 23.7 +50.2 59.0	38
39	23 24.9 +46.1 55.6	23 58.6 +46.7 56.0	24 32.1 +47.2 56.3	25 05.1 +47.9 56.7	25 37.9 +48.4 57.1	26 10.3 +49.0 57.5	26 42.3 +49.5 58.0	27 13.9 +50.1 58.4	39
40	24 11.0 +45.8 54.9	24 45.3 +46.5 55.3	25 19.3 +47.1 55.7	25 53.0 +47.6 56.1	26 26.3 +48.2 56.5	26 59.3 +48.8 56.9	27 31.8 +49.4 57.3	28 04.0 +50.0 57.8	40
41	24 56.8 +45.7 54.2	25 31.8 +46.2 54.6	26 06.4 +46.8 55.0	26 40.6 +47.5 55.4	27 14.5 +48.1 55.8	27 48.1 +48.6 56.2	28 21.2 +49.2 56.7	28 54.0 +49.7 57.1	41
42	25 42.5 +45.5 53.5	26 18.0 +46.1 53.9	26 53.2 +46.7 54.3	27 28.1 +47.2 54.7	28 02.6 +47.8 55.1	28 36.7 +48.4 55.6	29 10.4 +49.0 56.0	29 43.7 +49.6 56.5	42
43	26 27.9 +45.2 52.8	27 04.1 +45.8 53.2	27 39.9 +46.4 53.6	28 15.3 +47.1 54.0	28 50.4 +47.6 54.4	29 25.1 +48.2 54.9	29 59.4 +48.8 55.3	30 33.3 +49.4 55.8	43
44	27 13.1 +45.0 52.0	27 49.9 +45.6 52.4	28 26.3 +46.2 52.9	29 02.4 +46.8 53.3	29 38.0 +47.4 53.7	30 13.3 +48.0 54.2	30 48.2 +48.6 54.7	31 22.7 +49.2 55.2	44
45	27 58.1 +44.8 51.3	28 35.5 +45.4 51.7	29 12.5 +46.0 52.1	29 49.2 +46.5 52.6	30 25.4 +47.2 53.0	31 01.3 +47.8 53.5	31 36.8 +48.4 54.0	32 11.9 +48.9 54.5	45
46	28 42.9 +44.5 50.5	29 20.9 +45.1 50.9	29 58.5 +45.7 51.4	30 35.7 +46.4 51.8	31 12.6 +47.0 52.3	31 49.1 +47.5 52.8	32 25.2 +48.1 53.3	33 00.8 +48.7 53.8	46
47	29 27.4 +44.2 49.7	30 06.0 +44.8 50.2	30 44.2 +45.5 50.6	31 22.1 +46.0 51.1	31 59.6 +46.6 51.6	32 36.6 +47.3 52.1	33 13.3 +47.9 52.6	33 49.5 +48.5 53.1	47
48	30 11.6 +43.9 49.0	30 50.8 +44.6 49.4	31 29.7 +45.1 49.9	32 08.1 +45.8 50.3	32 46.2 +46.4 50.8	33 23.9 +47.0 51.3	34 01.2 +47.6 51.9	34 38.0 +48.2 52.4	48
49	30 55.5 +43.7 48.2	31 35.4 +44.2 48.6	32 14.8 +44.9 49.1	32 53.9 +45.5 49.6	33 32.6 +46.2 50.1	34 10.9 +46.8 50.6	34 48.8 +47.3 51.1	35 26.2 +48.0 51.7	49
50	31 39.2 +43.3 47.4	32 19.6 +44.0 47.8	32 59.7 +44.6 48.3	33 39.4 +45.2 48.8	34 18.8 +45.8 49.3	34 57.7 +46.4 49.8	35 36.1 +47.1 50.4	36 14.2 +47.7 50.9	50
51	32 22.5 +43.0 46.6	33 03.6 +43.6 47.0	33 44.3 +44.3 47.5	34 24.6 +44.9 48.0	35 04.6 +45.5 48.5	35 44.1 +46.1 49.1	36 23.2 +46.8 49.6	37 01.9 +47.3 50.2	51
52	33 05.5 +42.7 45.7	33 47.2 +43.3 46.2	34 28.6 +43.9 46.7	35 09.5 +44.6 47.2	35 50.1 +45.2 47.7	36 30.2 +45.9 48.3	37 10.0 +46.4 48.8	37 49.2 +47.1 49.4	52
53	33 48.2 +42.3 44.9	34 30.5 +43.0 45.4	35 12.5 +43.6 45.9	35 54.1 +44.2 46.4	36 35.3 +44.8 46.9	37 16.1 +45.5 47.4	37 56.4 +46.1 48.0	38 36.3 +46.8 48.6	53
54	34 30.5 +42.0 44.0	35 13.5 +42.6 44.5	35 56.1 +43.2 45.0	36 38.3 +43.9 45.5	37 20.1 +44.5 46.1	38 01.6 +45.1 46.6	38 42.5 +45.8 47.2	39 23.1 +46.4 47.8	54
55	35 12.5 +41.6 43.2	35 56.1 +42.2 43.6	36 39.3 +42.9 44.2	37 22.2 +43.5 44.7	38 04.6 +44.2 45.2	38 46.7 +44.8 45.8	39 28.3 +45.4 46.4	40 09.5 +46.0 47.0	55
56	35 54.1 +41.2 42.3	36 38.3 +41.8 42.8	37 22.2 +42.4 43.3	38 05.7 +43.1 43.8	38 48.8 +43.7 44.4	39 31.5 +44.4 44.9	40 13.7 +45.0 45.5	40 55.5 +45.7 46.1	56
57	36 35.3 +40.8 41.4	37 20.1 +41.5 41.9	38 04.6 +42.1 42.4	38 48.8 +42.7 42.9	39 32.5 +43.3 43.5	40 15.8 +44.0 44.1	40 58.7 +44.7 44.7	41 41.2 +45.2 45.3	57
58	37 16.1 +40.3 40.5	38 01.6 +40.9 41.0	38 46.7 +41.6 41.5	39 31.5 +42.2 42.0	40 15.8 +42.9 42.6	40 59.8 +43.6 43.2	41 43.4 +44.1 43.8	42 26.4 +44.9 44.4	58
59	37 56.4 +39.9 39.5	38 42.5 +40.6 40.0	39 28.3 +41.2 40.5	40 13.7 +41.8 41.1	40 58.7 +42.5 41.7	41 43.4 +43.2 42.3	42 27.5 +43.8 42.9	43 11.3 +44.4 43.5	59
60	38 36.3 +39.4 38.6	39 23.1 +40.0 39.1	40 09.5 +40.6 39.6	40 55.4 +41.3 40.2	41 41.2 +42.0 40.7	42 26.4 +42.7 41.3	43 11.3 +43.3 41.9	43 55.7 +44.0 42.6	60
61	39 15.7 +39.0 37.6	40 03.1 +39.6 38.1	40 50.1 +40.2 38.6	41 36.8 +40.9 39.2	42 23.2 +41.4 39.8	43 09.1 +42.1 40.4	43 54.6 +42.8 41.0	44 39.7 +43.4 41.6	61
62	39 54.7 +38.4 36.6	40 42.7 +39.0 37.1	41 30.3 +39.7 37.6	42 17.7 +40.3 38.2	43 04.6 +41.0 38.8	43 51.2 +41.6 39.4	44 37.4 +42.3 40.0	45 23.1 +43.0 40.6	62
63	40 33.1 +37.9 35.6	41 21.7 +38.5 36.1	42 10.0 +39.2 36.6	42 58.0 +39.8 37.2	43 45.6 +40.4 37.8	44 32.8 +41.1 38.4	45 19.7 +41.7 39.0	46 06.1 +42.4 39.6	63
64	41 11.0 +37.3 34.6	42 00.2 +38.0 35.1	42 49.2 +38.5 35.6	43 37.8 +39.2 36.2	44 26.0 +39.9 36.7	45 13.9 +40.5 37.3	46 01.4 +41.2 38.0	46 48.5 +41.9 38.6	64
65	41 48.3 +36.7 33.5	42 38.2 +37.3 34.0	43 27.7 +38.0 34.6	44 17.0 +38.6 35.1	45 05.9 +39.2 35.7	45 54.4 +40.0 36.3	46 42.6 +40.6 36.9	47 30.4 +41.2 37.6	65
66	42 25.0 +36.2 32.5	43 15.5 +36.8 33.0	44 05.7 +37.4 33.5	44 55.6 +38.0 34.0	45 45.1 +38.7 34.6	46 34.4 +39.2 35.2	47 23.2 +39.9 35.8	48 11.6 +40.7 36.5	66
67	43 01.2 +35.5 31.4	43 52.3 +36.1 31.9	44 43.1 +36.7 32.4	45 33.6 +37.3 32.9	46 23.8 +38.0 33.5	47 13.6 +38.7 34.1	48 03.1 +39.3 34.7	48 52.3 +39.9 35.4	67
68	43 36.7 +34.9 30.3	44 28.4 +35.4 30.8	45 19.8 +36.1 31.3	46 10.9 +36.7 31.8	47 01.8 +37.3 32.4	47 52.3 +37.9 33.0	48 42.4 +38.7 33.6	49 32.2 +39.3 34.2	68
69	44 11.6 +34.1 29.1	45 03.8 +34.8 29.6	45 55.9 +35.3 30.1	46 47.6 +36.0 30.7	47 39.1 +36.6 31.2	48 30.2 +37.3 31.8	49 21.1 +37.8 32.4	50 11.5 +38.6 33.1	69
70	44 45.7 +33.5 28.0	45 38.6 +34.1 28.5	46 31.2 +34.7 29.0	47 23.6 +35.2 29.5	48 15.7 +35.8 30.0	49 07.5 +36.5 30.6	49 58.9 +37.2 31.2	50 50.1 +37.8 31.8	70
71	45 19.2 +32.8 26.8	46 12.7 +33.3 27.3	47 05.9 +33.8 27.8	47 58.8 +34.5 28.3	48 51.5 +35.1 28.8	49 44.0 +35.6 29.4	50 36.1 +36.3 30.0	51 27.9 +37.0 30.6	71
72	45 52.0 +31.9 25.6	46 46.0 +32.5 26.1	47 39.7 +33.1 26.6	48 33.3 +33.7 27.1	49 26.6 +34.3 27.6	50 19.6 +34.9 28.1	51 12.4 +35.5 28.7	52 04.9 +36.1 29.3	72
73	46 23.9 +31.2 24.4	47 18.5 +31.7 24.8	48 12.8 +32.3 25.3	49 07.0 +32.8 25.8	50 00.9 +33.4 26.3	50 54.5 +34.0 26.9	51 47.9 +34.6 27.4	52 41.0 +35.3 28.0	73
74	46 55.1 +30.4 23.2	47 50.2 +30.9 23.6	48 45.1 +31.4 24.0	49 39.8 +31.9 24.5	50 34.3 +32.5 25.0	51 28.5 +33.1 25.5	52 22.5 +33.7 26.1	53 16.3 +34.3 26.7	74
75	47 25.5 +29.5 21.9	48 21.1 +29.9 22.3	49 16.5 +30.5 22.7	50 11.7 +31.1 23.2	51 06.8 +31.6 23.7	52 01.6 +32.2 24.2	52 56.2 +32.8 24.7	53 50.6 +33.3 25.3	75
76	47 55.0 +28.6 20.6	48 51.0 +29.1 21.0	49 47.0 +29.6 21.4	50 42.8 +30.0 21.9	51 38.4 +30.6 22.3	52 33.8 +31.1 22.8	53 29.0 +31.7 23.3	54 23.9 +32.4 23.9	76
77	48 23.6 +27.6 19.3	49 20.1 +28.2 19.7	50 16.6 +28.6 20.1	51 12.8 +29.2 20.5	52 09.0 +29.6 20.9	53 04.9 +30.2 21.4	54 00.7 +30.7 21.9	54 56.3 +31.2 22.4	77
78	48 51.2 +26.8 18.0	49 48.3 +27.1 18.3	50 45.2 +27.6 18.7	51 42.0 +28.0 19.1	52 38.6 +28.5 19.5	53 35.1 +29.0 20.0	54 31.4 +29.6 20.4	55 27.5 +30.1 20.9	78
79	49 18.0 +25.7 16.6	50 15.4 +26.2 16.9	51 12.8 +26.6 17.3	52 10.0 +27.0 17.6	53 07.1 +27.5 18.0	54 04.1 +28.0 18.5	55 01.0 +28.4 18.9	55 57.6 +29.0 19.4	79
80	49 43.7 +24.8 15.2	50 41.6 +25.1 15.5	51 39.4 +25.5 15.8	52 37.0 +26.0 16.2	53 34.6 +26.3 16.6	54 32.1 +26.7 17.0	55 29.4 +27.2 17.4	56 26.6 +27.7 17.8	80
81	50 08.5 +23.6 13.8	51 06.7 +24.0 14.1	52 04.9 +24.4 14.4	53 03.0 +24.7 14.7	54 00.9 +25.2 15.0	54 58.8 +25.6 15.4	55 56.6 +26.0 15.8	56 54.3 +26.5 16.2	81
82	50 32.1 +22.7 12.3	51 30.7 +23.0 12.6	52 29.3 +23.2 12.9	53 27.7 +23.6 13.2	54 26.1 +23.9 13.5	55 24.4 +24.3 13.8	56 22.6 +24.7 14.2	57 20.8 +25.1 14.6	82
83	50 54.8 +21.4 10.9	51 53.7 +21.7 11.1	52 52.5 +22.1 11.3	53 51.3 +22.4 11.6	54 50.0 +22.7 11.9	55 48.7 +23.0 12.2	56 47.3 +23.4 12.5	57 45.9 +23.7 12.9	83
84	51 16.2 +20.4 9.4	52 15.4 +20.6 9.6	53 14.6 +20.8 9.8	54 13.7 +21.1 10.0	55 12.7 +21.4 10.3	56 11.7 +21.7 10.5	57 10.7 +22.0 10.8	58 09.6 +22.3 11.1	84
85	51 36.6 +19.1 7.9	52 36.0 +19.4 8.0	53 35.4 +19.6 8.2	54 34.8 +19.8 8.4	55 34.1 +20.0 8.6	56 33.4 +20.3 8.9	57 32.7 +20.5 9.1	58 31.9 +20.8 9.4	85
86	51 55.7 +18.0 6.3	52 55.4 +18.1 6.5	53 55.0 +18.3 6.6	54 54.6 +18.4 6.8	55 54.1 +18.7 7.0	56 53.7 +18.8 7.1	57 53.2 +19.0 7.3	58 52.7 +19.2 7.6	86
87	52 13.7 +16.7 4.8	53 13.5 +16.8 4.9	54 13.3 +16.9 5.0	55 13.0 +17.1 5.1	56 12.8 +17.2 5.3	57 12.5 +17.4 5.4	58 12.2 +17.5 5.5	59 11.9 +17.7 5.7	87
88	52 30.4 +15.4 3.2	53 30.3 +15.5 3.3	54 30.2 +15.6 3.4	55 30.1 +15.7 3.4	56 30.0 +15.7 3.5	57 29.9 +16.0 3.6	58 29.7 +16.0 3.7	59 29.6 +16.0 3.8	88
89	52 45.8 +14.2 1.6	53 45.8 +14.2 1.6	54 45.8 +14.2 1.7	55 45.8 +14.2 1.7	56 45.7 +14.3 1.8	57 45.7 +14.3 1.8	58 45.7 +14.3 1.9	59 45.6 +14.4 1.9	89
90	53 00.0 +12.8 0.0	54 00.0 +12.8 0.0	55 00.0 +12.8 0.0	56 00.0 +12.8 0.0	57 00.0 +12.7 0.0	58 00.0 +12.7 0.0	59 00.0 +12.7 0.0	60 00.0 +12.6 0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION L.H.A. 103°, 257°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	7 11.3	+48.2	99.6	7 01.2	+48.9	99.8	6 50.9	+49.5	99.9	6 40.6	+50.1	100.0	6 30.1	+50.6	100.1	6 19.5	+51.2	100.2	6 08.8	+51.7	100.3	5 58.0	+52.3	100.4	0
1	7 59.5	+48.3	99.0	7 50.1	+48.8	99.2	7 40.4	+49.5	99.3	7 30.7	+50.0	99.4	7 20.7	+50.6	99.6	7 10.7	+51.1	99.7	7 00.5	+51.7	99.8	6 50.3	+52.2	99.9	1
2	8 47.8	+48.1	98.4	8 38.9	+48.8	98.6	8 29.9	+49.3	98.7	8 20.7	+49.9	98.9	8 11.3	+50.6	99.0	8 01.8	+51.2	99.2	7 52.2	+51.7	99.3	7 42.5	+52.1	99.4	2
3	9 35.9	+48.1	97.8	9 27.7	+48.7	98.0	9 19.2	+49.4	98.2	9 10.6	+50.0	98.3	9 01.9	+50.5	98.5	8 53.0	+51.0	98.6	8 43.9	+51.6	98.8	8 34.6	+52.1	98.9	3
4	10 24.0	+48.1	97.2	10 16.4	+48.7	97.4	10 08.6	+49.2	97.6	10 00.6	+49.8	97.8	9 52.4	+50.4	97.9	9 44.0	+51.0	98.1	9 35.5	+51.5	98.3	9 26.7	+52.1	98.4	4
5	11 12.1	+47.9	96.6	11 05.1	+48.5	96.8	10 57.8	+49.2	97.0	10 50.4	+49.8	97.2	10 42.8	+50.4	97.4	10 35.0	+51.0	97.6	10 27.0	+51.5	97.8	10 18.8	+52.1	97.9	5
6	12 00.0	+47.9	96.0	11 53.6	+48.6	96.2	11 47.0	+49.2	96.4	11 40.2	+49.8	96.6	11 33.2	+50.3	96.8	11 26.0	+50.9	97.0	11 18.5	+51.5	97.2	11 10.9	+52.0	97.4	6
7	12 47.9	+47.8	95.4	12 42.2	+48.4	95.6	12 36.2	+49.0	95.8	12 30.0	+49.6	96.1	12 23.5	+50.3	96.3	12 16.9	+50.8	96.5	12 10.0	+51.4	96.7	12 02.9	+51.9	96.9	7
8	13 35.7	+47.7	94.8	13 30.6	+48.3	95.0	13 25.2	+49.0	95.2	13 19.6	+49.6	95.5	13 13.8	+50.2	95.7	13 07.7	+50.7	95.9	13 01.4	+51.3	96.2	12 54.8	+51.9	96.4	8
9	14 23.4	+47.6	94.1	14 18.9	+48.3	94.4	14 14.2	+48.9	94.6	14 09.2	+49.5	94.9	14 04.0	+50.1	95.1	13 58.4	+50.7	95.4	13 52.7	+51.2	95.6	13 46.7	+51.8	95.9	9
10	15 11.0	+47.5	93.5	15 07.2	+48.1	93.8	15 03.1	+48.8	94.0	14 58.7	+49.4	94.3	14 54.1	+50.0	94.6	14 49.1	+50.6	94.8	14 43.9	+51.2	95.1	14 38.5	+51.7	95.4	10
11	15 58.5	+47.4	92.9	15 55.3	+48.1	93.2	15 51.9	+48.7	93.4	15 48.1	+49.3	93.7	15 44.1	+49.9	94.0	15 39.7	+50.6	94.3	15 35.1	+51.1	94.6	15 30.2	+51.6	94.8	11
12	16 45.9	+47.2	92.2	16 43.4	+47.9	92.5	16 40.6	+48.5	92.8	16 37.4	+49.2	93.1	16 34.0	+49.8	93.4	16 30.3	+50.4	93.7	16 26.2	+51.0	94.0	16 21.8	+51.6	94.3	12
13	17 33.1	+47.2	91.6	17 31.3	+47.8	91.9	17 29.1	+48.5	92.2	17 26.6	+49.2	92.5	17 23.8	+49.8	92.8	17 20.7	+50.3	93.2	17 17.2	+50.9	93.5	17 13.4	+51.5	93.8	13
14	18 20.3	+47.0	90.9	18 19.1	+47.7	91.3	18 17.6	+48.3	91.6	18 15.8	+48.9	91.9	18 13.6	+49.6	92.3	18 11.0	+50.3	92.6	18 08.1	+50.9	92.9	18 04.9	+51.4	93.2	14
15	19 07.3	+46.8	90.3	19 06.8	+47.5	90.6	19 05.9	+48.3	91.0	19 04.7	+48.9	91.3	19 03.2	+49.5	91.7	19 01.3	+50.1	92.0	18 59.0	+50.7	92.4	18 56.3	+51.3	92.7	15
16	19 54.1	+46.7	89.6	19 54.3	+47.4	90.0	19 54.2	+48.0	90.3	19 53.6	+48.7	90.7	19 52.7	+49.4	91.1	19 51.4	+50.0	91.4	19 49.7	+50.6	91.8	19 47.6	+51.2	92.1	16
17	20 40.8	+46.6	88.9	20 41.7	+47.3	89.3	20 42.2	+48.0	89.7	20 42.3	+48.7	90.1	20 42.1	+49.3	90.5	20 41.4	+49.9	90.8	20 40.3	+50.5	91.2	20 38.8	+51.1	91.6	17
18	21 27.4	+46.4	88.3	21 29.0	+47.1	88.7	21 30.2	+47.8	89.1	21 31.0	+48.4	89.5	21 31.3	+49.1	89.8	21 31.3	+49.7	90.2	21 30.8	+50.4	90.6	21 29.9	+51.0	91.0	18
19	22 13.8	+46.2	87.6	22 16.1	+46.9	88.0	22 18.0	+47.6	88.4	22 19.4	+48.3	88.8	22 20.4	+49.0	89.2	22 21.0	+49.7	89.6	22 21.2	+50.2	90.1	22 20.9	+50.9	90.5	19
20	23 00.0	+46.0	86.9	23 03.0	+46.8	87.3	23 05.6	+47.5	87.7	23 07.7	+48.2	88.2	23 09.4	+48.8	88.6	23 10.7	+49.4	89.0	23 11.4	+50.2	89.5	23 11.8	+50.7	89.9	20
21	23 46.0	+45.9	86.2	23 49.8	+46.5	86.6	23 53.1	+47.2	87.1	23 55.9	+48.0	87.5	23 58.2	+48.7	88.0	24 00.1	+49.4	88.4	24 01.6	+49.9	88.9	24 02.5	+50.6	89.3	21
22	24 31.9	+45.6	85.5	24 36.3	+46.4	85.9	24 40.3	+47.1	86.4	24 43.9	+47.8	86.9	24 46.9	+48.5	87.3	24 49.5	+49.1	87.8	24 51.5	+49.9	88.3	24 53.1	+50.5	88.7	22
23	25 17.5	+45.4	84.8	25 22.7	+46.2	85.2	25 27.4	+47.0	85.7	25 31.7	+47.6	86.2	25 35.4	+48.3	86.7	25 38.6	+49.0	87.2	25 41.4	+49.6	87.6	25 43.6	+50.3	88.1	23
24	26 02.9	+45.3	84.1	26 08.9	+46.0	84.5	26 14.4	+46.7	85.0	26 19.3	+47.4	85.5	26 23.7	+48.2	86.0	26 27.6	+48.9	86.5	26 31.0	+49.5	87.0	26 33.9	+50.2	87.5	24
25	26 48.2	+44.9	83.3	26 54.9	+45.7	83.8	27 01.1	+46.5	84.3	27 06.7	+47.3	84.8	27 11.9	+47.9	85.3	27 16.5	+48.6	85.9	27 20.5	+49.4	86.4	27 24.1	+49.9	86.9	25
26	27 33.1	+44.8	82.6	27 40.6	+45.5	83.1	27 47.6	+46.3	83.6	27 54.0	+47.0	84.1	27 59.8	+47.8	84.7	28 05.1	+48.5	85.2	28 09.9	+49.1	85.7	28 14.0	+49.9	86.3	26
27	28 17.9	+44.5	81.8	28 26.1	+45.3	82.4	28 33.9	+46.0	82.9	28 41.0	+46.8	83.4	28 47.6	+47.5	84.0	28 53.6	+48.2	84.5	28 59.0	+49.0	85.1	29 03.9	+49.6	85.6	27
28	29 02.4	+44.2	81.1	29 11.4	+45.0	81.6	29 19.9	+45.8	82.2	29 27.8	+46.6	82.7	29 35.1	+47.3	83.2	29 41.8	+48.1	83.8	29 48.0	+48.7	84.4	29 53.5	+49.4	85.0	28
29	29 46.6	+44.0	80.3	29 56.4	+44.8	80.8	30 05.7	+45.5	81.4	30 14.4	+46.3	82.0	30 22.4	+47.1	82.6	30 29.9	+47.8	83.2	30 36.7	+48.5	83.7	30 42.9	+49.3	84.3	29
30	30 30.6	+43.6	79.5	30 41.2	+44.5	80.1	30 51.2	+45.3	80.7	31 00.7	+46.0	81.3	31 09.5	+46.8	81.9	31 17.7	+47.6	82.5	31 25.2	+48.3	83.1	31 32.2	+49.0	83.7	30
31	31 14.2	+43.4	78.7	31 25.7	+44.2	79.3	31 36.5	+45.0	79.9	31 46.7	+45.8	80.5	31 56.3	+46.6	81.1	32 05.3	+47.3	81.7	32 13.6	+48.0	82.4	32 21.2	+48.8	83.0	31
32	31 57.6	+43.0	77.9	32 09.9	+43.9	78.5	32 21.5	+44.7	79.1	32 32.5	+45.5	79.7	32 42.9	+46.3	80.4	32 52.6	+47.1	81.0	33 01.6	+47.9	81.6	33 10.0	+48.6	82.3	32
33	32 40.6	+42.8	77.1	32 53.8	+43.5	77.7	33 06.2	+44.4	78.3	33 18.0	+45.3	79.0	33 29.2	+46.0	79.6	33 39.7	+46.8	80.3	33 49.5	+47.6	80.9	33 58.6	+48.3	81.6	33
34	33 23.4	+42.3	76.2	33 37.3	+43.3	76.9	33 50.6	+44.1	77.5	34 03.3	+44.9	78.2	34 15.2	+45.7	78.8	34 26.5	+46.5	79.5	34 37.1	+47.3	80.2	34 46.9	+48.1	80.9	34
35	34 05.7	+42.1	75.4	34 20.6	+42.8	76.0	34 34.7	+43.7	76.7	34 48.2	+44.6	77.4	35 00.9	+45.5	78.1	35 13.0	+46.2	78.7	35 24.4	+47.0	79.4	35 35.0	+47.8	80.1	35
36	34 47.8	+41.6	74.5	35 03.4	+42.6	75.2	35 18.4	+43.4	75.9	35 32.8	+44.2	76.6	35 46.4	+45.0	77.2	35 59.2	+45.9	78.0	36 11.4	+46.7	78.7	36 22.8	+47.5	79.4	36
37	35 29.4	+41.2	73.6	35 46.0	+42.1	74.3	36 01.8	+43.0	75.0	36 17.0	+43.9	75.7	36 31.4	+44.8	76.4	36 45.1	+45.6	77.2	36 58.1	+46.4	77.9	37 10.3	+47.2	78.6	37
38	36 10.6	+40.9	72.7	36 28.1	+41.8	73.4	36 44.9	+42.6	74.1	37 00.9	+43.5	74.9	37 16.2	+44.4	75.6	37 30.7	+45.3	76.3	37 44.5	+46.1	77.1	37 57.5	+46.9	77.9	38
39	36 51.5	+40.4	71.8	37 09.9	+41.3	72.5	37 27.5	+42.3	73.3	37 44.4	+43.2	74.0	38 00.6	+44.0	74.8	38 16.0	+44.9	75.5	38 30.6	+45.7	76.3	38 44.4	+46.6	77.1	39
40	37 31.9	+40.0	70.9	37 51.2	+40.9	71.6	38 09.8	+41.8	72.4	38 27.6	+42.7	73.1	38 44.6	+43.6	73.9	39 00.9	+44.5	74.7	39 16.3	+45.4	75.4	39 31.0	+46.2	76.2	40
41	38 11.9	+39.5	69.9	38 32.1	+40.5	70.7	38 51.6	+41.4	71.4	39 10.3	+42.3	72.2	39 28.2	+43.2	73.0	39 45.4	+44.1	73.8	40 01.7	+45.0	74.6	40 17.2	+45.9	75.4	41
42	38 51.4	+39.0	69.0	39 12.6	+39.9	69.7	39 33.0	+40.9	70.5	39 52.6	+41.8	71.3	40 11.4	+42.8	72.1	40 29.5	+43.7	72.9	40 46.7	+44.6	73.7	41 03.1	+45.5	74.6	42
43	39 30.4	+38.6	68.0	39 52.5	+39.5	68.8	40 13.9	+40.4	69.6	40 34.4	+41.4	70.4	40 54.2	+42.3	71.2	41 13.2	+43.2	72.0	41 31.3	+44.2	72.8	41 48.6	+45.0	73.7	43
44	40 09.0	+38.0	67.0	40 32.0	+39.0	67.8	40 54.3	+40.0	68.6	41 15.8	+41.0	69.4	41 36.5	+41.9	70.2	41 56.4	+42.8	71.1	42 15.5	+43.7	71.9	42 33.6	+44.7	72.8	44
45	40 47.0	+37.4	66.0	41 11.0	+38.5	66.8	41 34.3	+39.4	67.6	41 56.8	+40.4	68.4	42 18.4	+41.4	69.3	42 39.2	+42.4	70.1	42 59.2	+43.3	71.0	43 18.3	+44.2	71.9	45
46	41 24.4	+36.9	65.0	41 49.5	+37.9	65.8	42 13.7	+38.9	66.6	42 37.2	+39.8	67.4	42 59.8	+40.8	68.3	43 21.6	+41.8	69.2	43 42.5	+42.7	70.0	44 02.5	+43.7	71.0	46
47	42 01.3	+36.3	63.9	42 27.4	+37.3	64.7	42 52.6	+38.3	65.5	43 17.0	+39.3	66.4	43 40.6	+40.3	67.3	44 03.4	+41.3	68.2	44 25.2	+42.3	69.1	44 46.2	+43.3	70.0	47
48	42 37.6	+35.7	62.8	43 04.7	+36.7	63.6	43 30.9	+37.7	64.5	43 56.3	+38.8	65.4	44 20.9	+39.8	66.2	44 44.7	+40.7	67.1	45 07.5	+41.8	68.1	45 29.5	+42.7	69.0	48
49	43 13.3	+35.1	61.7	43 41.4	+36.0	62.6	44 08.6	+37.1	63.4	44 35.1	+38.1	64.3	45 00.7	+39.1	65.2	45 25.4	+40.2	66.1	45 49.3	+41.1	67.0	46 12.2	+42.2	68.0	49
50	43 48.4	+34.3	60.6	44 17.4	+35.4	61.4	44 45.7	+36.5	62.3	45 13.2	+37.5	63.2	45 39.8	+38.5	64.1	46 05.6	+39.5	65.0	46 30.4	+40.6	66.0	46 54.4	+41.6	67.0	50
51	44 22.7	+33.7	59.5	44 52.8	+34.8	60.3	45 22.2	+35.7	61.2	45 50.7	+36.8	62.1	46 18.3	+37.9	63.0	46 45.1	+38.9	64.0	47 11.0	+40.0	64.9	47 36.0	+41.0	65.9	51
52	44 56.4	+33.0	58.3	45 27.6	+34.0	59.2	45 57.9	+35.1	60.0	46 27.5	+36.1	60.9	46 56.2	+37.2	61.9	47 24.0	+38.3	62.8	47 51.0	+39.3	63.8	48 17.0	+40.3	64.8	52
53	45 29.4	+32.2	57.1	46 01.6	+33.2	58.0	46 33.0	+34.3	58.9	47 03.6	+35.4	59.8	47 33.4	+36.4	60.7	48 02.3	+37.5	61.7	48 30.3	+38.6	62.7	48 57.3	+39.7	63.7	53
54	46 01.6	+31.4	55.9	46 34.8	+32.5	56.8	47 07.3	+33.6	57.7	47 39.0	+34.6	58.6	48 09.8	+35.8	59.5	48 39.8	+36.8	60.5	49 08.9	+37.9	61.5	49 37.0	+39.0	62.5	54
55	46 33.0	+30.6	54.7	47 07.3	+31.7	55.5	47 40.9	+32.7	56.4	48 13.6	+33.9	57.4	48 45.6	+34.9	58.3	49 16.6	+36.1	59.3	49 46.8	+37.1	60.3	50 16.0	+38.3	61.4	55
56	47 03.6	+29.8	53.4	47 39.0	+30.8	54.3	48 13.6	+32.0	55.2	48 47.5	+33.0	56.1	49 20.5	+34.1	57.1	49 52.7	+35.2	58.1	50 23.9	+36.4	59.1	50 54.3	+37.5	60.2	56
57	47 33.4	+28.9	52.1	48 09.8	+30.0	53.0	48 45.6	+31.0	53.9	49 20.5	+32.2	54.9	49 54.6	+33.3	55.8	50 27.9	+34.4	56.8	51 00.3	+35.5	57.9	51 31.8	+36.6	58.9	57
58	48 02.3	+28.0	50.8	48 39.8	+29.1	51.7	49 16.6	+30.2	52.6	49 52.7	+31.2	53.5	50 27.9	+32.4	54.5	51 02.3	+33.5	55.5	51 35.8	+34.7	56.6	52 08.4	+35.8	57.6	58
59	48 30.3	+27.0	49.5	49 08.9	+28.1	50.4	49 46.8	+29.2	51.3	50 23.9	+30.4	52.2	51 00.3	+31.5	53.2	51 35.8	+32.6	54.2	52 10.5	+33.7	55.2	52 44.2	+35.0	56.3	59
60	48 57.3	+26.1	48.1	49 37.0	+27.2	49.0	50 16.0	+28.3	49.9	50 54.3	+29.4	50.9	51 31.8	+30.5	51.8	52 08.4	+31.7	52.8	52 44.2	+32.8	53.9	53 19.2	+33.9	55.0	60
61	49 23.4	+25.1	46.8	50 04.2	+26.2	47.6	50 44.3	+27.2	48.5	51 23.7	+28.3	49.5	52 02.3	+29.5	50.4	52 40.1	+30.6	51.4	53 17.0	+31.8	52.5	53 53.1	+33.0	53.6	61
62	49 48.5	+24.1	45.4	50 30.4	+25.1	46.2	51 11.5	+26.3	47.1	51 52.0	+27.3	48.0	52 31.8	+28.4	49.0	53 10.7	+29.6	50.0	53 48.8	+30.8	51.1	54 26.1	+32.0	52.1	62
63	50 12.6	+23.0	43.9	50 55.5	+24.0	44.8	51 37.8	+25.1	45.7	52 19.3	+26.3	46.6	53 00.2	+27.3	47.6	53 40.3	+28.5	48.6	54 19.6	+29.7	49.6	54 58.1	+30.8	50.7	63
64	50 35.6	+21.9	42.5	51 19.5	+23.0	43.3	52 02.9	+24.0	44.2	52 45.6	+25.1	45.1	53 27.5	+26.3	46.1	54 08.8	+27.4	47.1	54 49.3	+28.5	48.1	55 28.9	+29.8	49.2	64
65	50 57.5	+20.8	41.0	51 42.5	+21.8	41.8	52 26.9	+22.8	42.7	53 10.7	+23.9	43.6	53 53.8	+25.0	44.6	54 36.2	+26.1	45.5	55 17.8	+27.4	46.6	55 58.7	+28.5	47.6	65
66	51 18.3	+19.6	39.5	52 04.3	+20.6	40.3	52 49.7	+21.7	41.2	53 34.6	+22.7	42.1	54 18.8	+23.8	43.0	55 02.3	+25.0	44.0	55 45.2	+26.1	45.0	56 27.2	+27.3	46.0	66
67	51 37.9	+18.4	38.0	52 24.9	+19.4	38.8	53 11.4	+20.5	39.6	53 57.3	+21.5	40.5	54 42.6	+22.6	41.4	55 27.3	+23.7	42.4	56 11.3	+24.8	43.4	56 54.5	+26.0	44.4	67
68	51 56.3	+17.2	36.5	52 44.3	+18.2	37.2	53 31.9	+19.1	38.1	54 18.8	+20.2	38.9	55 05.2	+21.3	39.8	55 51.0	+22.4	40.7	56 36.1	+23.5	41.7	57 20.5	+24.7	42.8	68
69	52 13.5	+16.0	34.9	53 02.5	+16.9	35.7	53 51.0	+17.9	36.5	54 39.0	+18.9	37.3	55 26.5	+19.9	38.2	56 13.4	+21.0	39.1	56 59.6	+22.1	40.1	57 45.2	+23.3	41.1	69
70	52 29.5	+14.7	33.3	53 19.4	+15.6	34.1	54 08.9	+16.6	34.8	54 57.9	+17.6	35.6	55 46.4	+18.6	36.5	56 34.4	+19.6	37.4	57 21.7	+20.7	38.3	58 08.5	+21.8	39.3	70
71	52 44.2	+13.4	31.7	53 35.0	+14.3	32.4	54 25.5	+15.2	33.2	55 15.5	+16.1	34.0	56 05.0	+17.1	34.8	56 54.0	+18.1	35.7	57 42.4	+19.3	36.6	58 30.3	+20.3	37.6	71
72	52 57.6	+12.1	30.1	53 49.3	+12.9	30.8	54 40.7	+13.8	31.5	55 31.6	+14.7	32.3	56 22.1	+15.7	33.1	57 12.1	+16.7	33.9	58 01.7	+17.7	34.8	58 50.6	+18.8	35.7	72
73	53 09.7	+10.7	28.5	54 02.2	+11.6	29.1	54 54.5	+12.3	29.8	55 46.3	+13.3	30.6	56 37.8	+14.2	31.3	57 28.8	+15.2	32.1	58 19.4	+16.1	33.0	59 09.4	+17.2	33.9	73
74	53 20.4	+9.3	26.8	54 13.8	+10.1	27.5	55 06.8	+11.0	28.1	55 59.6	+11.8	28.8	56 52.0	+12.6	29.6	57 44.0	+13.5	30.3	58 35.5	+14.6	31.2	59 26.6	+15.6	32.0	74
75	53 29.7	+8.0	25.2	54 23.9	+8.7	25.8	55 17.8	+9.4	26.4	56 11.4	+10.2	27.1	57 04.6	+11.1	27.8	57 57.5	+12.0	28.5	58 50.1	+12.9	29.3	59 42.2	+13.8	30.1	75
76	53 37.7	+6.5	23.5	54 32.6	+7.2	24.1	55 27.2	+8.0	24.7	56 21.6	+8.8	25.3	57 15.7	+9.6	25.9	58 09.5	+10.4	26.6	59 03.0	+11.2	27.3	59 56.0	+12.2	28.2	76
77	53 44.2	+5.2	21.8	54 39.8	+5.8	22.4	55 35.2	+6.5	22.9	56 30.4	+7.1	23.5	57 25.3	+7.9	24.1	58 19.9	+8.7	24.8	59 14.2	+9.5	25.5	60 08.2	+10.4	26.2	77
78	53 49.4	+3.7	20.2	54 45.6	+4.3	20.6	55 41.7	+4.9	21.2	56 37.5	+5.6	21.7	57 33.2	+6.3	22.3	58 28.6	+7.0	22.9	59 23.7	+7.8	23.6	60 18.6	+8.6	24.2	78
79	53 53.1	+2.3	18.5	54 49.9	+2.9	18.9	55 46.6	+3.4	19.4	56 43.1	+4.1	19.9	57 39.5	+4.6	20.4	58 35.6	+5.3	21.0	59 31.5	+6.0	21.6	60 27.2	+6.7	22.2	79
80	53 55.4	+0.9	16.8	54 52.8	+1.3	17.2	55 50.0	+1.9	17.6	56 47.2	+2.4	18.1	57 44.1	+3.0	18.6	58 40.9	+3.6	19.1	59 37.5	+4.3	19.6	60 33.9	+5.0	20.2	80
81	53 56.3	–0.6	15.1	54 54.1	–0.1	15.4	55 51.9	+0.4	15.8	56 49.6	+0.8	16.2	57 47.1	+1.4	16.7	58 44.5	+1.9	17.2	59 41.8	+2.6	17.7	60 38.9	+3.1	18.2	81
82	53 55.7	–2.0	13.4	54 54.0	–1.6	13.7	55 52.3	–1.2	14.0	56 50.4	–0.8	14.4	57 48.5	–0.3	14.8	58 46.4	+0.2	15.2	59 44.3	+0.6	15.7	60 42.0	+1.2	16.2	82
83	53 53.7	–3.5	11.7	54 52.4	–3.1	12.0	55 51.1	–2.8	12.3	56 49.6	–2.3	12.6	57 48.2	–2.0	12.9	58 46.6	–1.6	13.3	59 44.9	–1.1	13.7	60 43.2	–0.7	14.1	83
84	53 50.2	–4.9	10.0	54 49.3	–4.7	10.2	55 48.3	–4.3	10.5	56 47.3	–4.0	10.8	57 46.2	–3.6	11.1	58 45.0	–3.2	11.4	59 43.8	–2.9	11.7	60 42.5	–2.5	12.1	84
85	53 45.3	–6.3	8.3	54 44.7	–6.1	8.5	55 44.0	–5.8	8.7	56 43.3	–5.5	8.9	57 42.6	–5.3	9.2	58 41.8	–5.0	9.4	59 40.9	–4.7	9.7	60 40.0	–4.3	10.0	85
86	53 39.0	–7.7	6.6	54 38.6	–7.5	6.8	55 38.2	–7.3	6.9	56 37.8	–7.2	7.1	57 37.3	–6.9	7.3	58 36.8	–6.7	7.5	59 36.2	–6.4	7.8	60 35.7	–6.2	8.0	86
87	53 31.3	–9.0	4.9	54 31.1	–8.9	5.1	55 30.9	–8.7	5.2	56 30.6	–8.7	5.3	57 30.4	–8.4	5.5	58 30.1	–8.4	5.6	59 29.8	–8.1	5.8	60 29.5	–8.1	6.0	87
88	53 22.3	–10.5	3.3	54 22.2	–10.4	3.4	55 22.1	–10.3	3.4	56 21.9	–10.2	3.5	57 21.8	–10.1	3.6	58 21.7	–10.0	3.7	59 21.6	–10.0	3.8	60 21.4	–9.8	4.0	88
89	53 11.8	–11.8	1.6	54 11.8	–11.8	1.7	55 11.8	–11.8	1.7	56 11.7	–11.7	1.8	57 11.7	–11.7	1.8	58 11.7	–11.7	1.9	59 11.6	–11.6	1.9	60 11.6	–11.6	2.0	89
90	53 00.0	–13.1	0.0	54 00.0	–13.2	0.0	55 00.0	–13.2	0.0	56 00.0	–13.2	0.0	57 00.0	–13.2	0.0	58 00.0	–13.3	0.0	59 00.0	–13.3	0.0	60 00.0	–13.3	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 78°, 282°

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	7 11.3	−48.3	99.6	7 01.2	−49.0	99.8	6 50.9	−49.5	99.9	6 40.6	−50.1	100.0	6 30.1	−50.6	100.1	6 19.5	−51.2	100.2	6 08.8	−51.7	100.3	5 58.0	−52.2	100.4	0
1	6 23.0	−48.4	100.2	6 12.2	−48.9	100.3	6 01.4	−49.5	100.4	5 50.5	−50.1	100.5	5 39.5	−50.7	100.6	5 28.3	−51.2	100.7	5 17.1	−51.8	100.8	5 05.8	−52.3	100.9	1
2	5 34.6	−48.4	100.8	5 23.3	−49.0	100.9	5 11.9	−49.6	101.0	5 00.4	−50.2	101.1	4 48.8	−50.8	101.2	4 37.1	−51.3	101.3	4 25.3	−51.8	101.3	4 13.5	−52.3	101.4	2
3	4 46.2	−48.4	101.4	4 34.3	−49.1	101.5	4 22.3	−49.6	101.6	4 10.2	−50.2	101.6	3 58.0	−50.7	101.7	3 45.8	−51.3	101.8	3 33.5	−51.8	101.8	3 21.2	−52.3	101.9	3
4	3 57.8	−48.5	102.0	3 45.2	−49.0	102.1	3 32.7	−49.7	102.1	3 20.0	−50.2	102.2	3 07.3	−50.7	102.3	2 54.5	−51.2	102.3	2 41.7	−51.8	102.4	2 28.9	−52.4	102.4	4
5	3 09.3	−48.5	102.6	2 56.2	−49.1	102.7	2 43.0	−49.6	102.7	2 29.8	−50.2	102.7	2 16.6	−50.8	102.8	2 03.3	−51.4	102.8	1 49.9	−51.8	102.9	1 36.5	−52.3	102.9	5
6	2 20.8	−48.4	103.2	2 07.1	−49.0	103.2	1 53.4	−49.7	103.3	1 39.6	−50.2	103.3	1 25.8	−50.8	103.3	1 11.9	−51.3	103.3	0 58.1	−51.8	103.4	0 44.2	−52.3	103.4	6
7	1 32.4	−48.5	103.8	1 18.1	−49.1	103.8	1 03.7	−49.6	103.8	0 49.4	−50.2	103.8	0 35.0	−50.8	103.9	0 20.6	−51.3	103.9	0 06.3	−51.9	103.9	0 08.1	+52.4	76.1	7
8	0 43.9	−48.5	104.4	0 29.0	−49.1	104.4	0 14.1	−49.7	104.4	0 00.9	+50.2	75.6	0 15.8	+50.7	75.6	0 30.7	+51.3	75.6	0 45.6	+51.8	75.6	1 00.5	+52.3	75.6	8
9	0 04.6	+48.5	75.0	0 20.1	+49.1	75.0	0 35.6	+49.7	75.1	0 51.1	+50.2	75.1	1 06.5	+50.8	75.1	1 22.0	+51.3	75.1	1 37.4	+51.8	75.1	1 52.8	+52.3	75.2	9
10	0 53.1	+48.5	74.5	1 09.2	+49.1	74.5	1 25.3	+49.6	74.5	1 41.3	+50.2	74.5	1 57.3	+50.8	74.5	2 13.3	+51.3	74.6	2 29.2	+51.8	74.6	2 45.1	+52.3	74.7	10
11	1 41.6	+48.5	73.9	1 58.3	+49.1	73.9	2 14.9	+49.7	73.9	2 31.5	+50.2	74.0	2 48.1	+50.7	74.0	3 04.6	+51.2	74.1	3 21.0	+51.8	74.1	3 37.4	+52.3	74.2	11
12	2 30.1	+48.5	73.3	2 47.4	+49.0	73.3	3 04.6	+49.6	73.4	3 21.7	+50.2	73.4	3 38.8	+50.7	73.5	3 55.8	+51.3	73.5	4 12.8	+51.8	73.6	4 29.7	+52.3	73.7	12
13	3 18.6	+48.5	72.7	3 36.4	+49.1	72.7	3 54.2	+49.6	72.8	4 11.9	+50.2	72.9	4 29.5	+50.7	72.9	4 47.1	+51.2	73.0	5 04.6	+51.7	73.1	5 22.0	+52.2	73.2	13
14	4 07.0	+48.5	72.1	4 25.5	+49.0	72.2	4 43.8	+49.6	72.2	5 02.1	+50.1	72.3	5 20.2	+50.7	72.4	5 38.3	+51.2	72.5	5 56.3	+51.7	72.6	6 14.2	+52.2	72.7	14
15	4 55.5	+48.4	71.5	5 14.5	+48.9	71.6	5 33.4	+49.5	71.7	5 52.2	+50.1	71.8	6 10.9	+50.7	71.9	6 29.5	+51.2	72.0	6 48.0	+51.7	72.1	7 06.4	+52.2	72.2	15
16	5 43.9	+48.3	70.9	6 03.4	+49.0	71.0	6 22.9	+49.5	71.1	6 42.3	+50.1	71.2	7 01.6	+50.6	71.3	7 20.7	+51.1	71.4	7 39.7	+51.7	71.6	7 58.6	+52.2	71.7	16
17	6 32.2	+48.3	70.3	6 52.4	+48.9	70.4	7 12.4	+49.5	70.5	7 32.4	+50.0	70.7	7 52.2	+50.6	70.8	8 11.8	+51.1	70.9	8 31.4	+51.6	71.1	8 50.8	+52.1	71.2	17
18	7 20.5	+48.3	69.7	7 41.3	+48.8	69.8	8 01.9	+49.4	70.0	8 22.4	+49.9	70.1	8 42.7	+50.5	70.2	9 02.9	+51.1	70.4	9 23.0	+51.6	70.5	9 42.9	+52.1	70.7	18
19	8 08.8	+48.2	69.1	8 30.1	+48.8	69.2	8 51.3	+49.4	69.4	9 12.3	+50.0	69.5	9 33.2	+50.5	69.7	9 54.0	+51.0	69.9	10 14.6	+51.5	70.0	10 35.0	+52.0	70.2	19
20	8 57.0	+48.1	68.5	9 18.9	+48.7	68.7	9 40.7	+49.3	68.8	10 02.3	+49.8	69.0	10 23.7	+50.4	69.1	10 45.0	+50.9	69.3	11 06.1	+51.4	69.5	11 27.0	+52.0	69.7	20
21	9 45.1	+48.1	67.9	10 07.6	+48.7	68.1	10 30.0	+49.2	68.2	10 52.1	+49.8	68.4	11 14.1	+50.4	68.6	11 35.9	+50.9	68.8	11 57.5	+51.4	69.0	12 19.0	+51.9	69.2	21
22	10 33.2	+48.1	67.3	10 56.3	+48.6	67.5	11 19.2	+49.2	67.7	11 41.9	+49.8	67.8	12 04.5	+50.2	68.0	12 26.8	+50.8	68.2	12 48.9	+51.4	68.4	13 10.9	+51.8	68.7	22
23	11 21.3	+47.9	66.7	11 44.9	+48.5	66.9	12 08.4	+49.1	67.1	12 31.7	+49.6	67.3	12 54.7	+50.2	67.5	13 17.6	+50.8	67.7	13 40.3	+51.3	67.9	14 02.7	+51.8	68.1	23
24	12 09.2	+47.9	66.1	12 33.4	+48.5	66.3	12 57.5	+49.0	66.5	13 21.3	+49.6	66.7	13 44.9	+50.2	66.9	14 08.4	+50.6	67.1	14 31.6	+51.1	67.4	14 54.5	+51.7	67.6	24
25	12 57.1	+47.7	65.5	13 21.9	+48.3	65.7	13 46.5	+48.9	65.9	14 10.9	+49.5	66.1	14 35.1	+50.0	66.4	14 59.0	+50.6	66.6	15 22.7	+51.2	66.8	15 46.2	+51.7	67.1	25
26	13 44.8	+47.7	64.8	14 10.2	+48.3	65.1	14 35.4	+48.9	65.3	15 00.4	+49.4	65.5	15 25.1	+50.0	65.8	15 49.6	+50.5	66.0	16 13.9	+51.0	66.3	16 37.9	+51.5	66.6	26
27	14 32.5	+47.6	64.2	14 58.5	+48.2	64.4	15 24.3	+48.7	64.7	15 49.8	+49.3	64.9	16 15.1	+49.9	65.2	16 40.1	+50.4	65.5	17 04.9	+50.9	65.7	17 29.4	+51.5	66.0	27
28	15 20.1	+47.5	63.6	15 46.7	+48.0	63.8	16 13.0	+48.7	64.1	16 39.1	+49.2	64.4	17 04.9	+49.7	64.6	17 30.5	+50.3	64.9	17 55.8	+50.9	65.2	18 20.9	+51.4	65.5	28
29	16 07.6	+47.3	62.9	16 34.7	+48.0	63.2	17 01.7	+48.5	63.5	17 28.3	+49.1	63.8	17 54.7	+49.7	64.0	18 20.8	+50.3	64.3	18 46.7	+50.7	64.6	19 12.3	+51.2	64.9	29
30	16 54.9	+47.3	62.3	17 22.7	+47.8	62.6	17 50.2	+48.4	62.9	18 17.4	+49.0	63.1	18 44.4	+49.5	63.4	19 11.1	+50.1	63.8	19 37.4	+50.7	64.1	20 03.5	+51.2	64.4	30
31	17 42.2	+47.1	61.7	18 10.5	+47.7	61.9	18 38.6	+48.3	62.2	19 06.4	+48.9	62.5	19 33.9	+49.5	62.8	20 01.2	+49.9	63.2	20 28.1	+50.5	63.5	20 54.7	+51.1	63.8	31
32	18 29.3	+46.9	61.0	18 58.2	+47.6	61.3	19 26.9	+48.1	61.6	19 55.3	+48.7	61.9	20 23.4	+49.3	62.2	20 51.1	+49.9	62.6	21 18.6	+50.4	62.9	21 45.8	+50.9	63.3	32
33	19 16.2	+46.9	60.3	19 45.8	+47.4	60.7	20 15.0	+48.1	61.0	20 44.0	+48.6	61.3	21 12.7	+49.1	61.6	21 41.0	+49.7	62.0	22 09.0	+50.3	62.3	22 36.7	+50.8	62.7	33
34	20 03.1	+46.6	59.7	20 33.2	+47.3	60.0	21 03.1	+47.8	60.3	21 32.6	+48.5	60.7	22 01.8	+49.1	61.0	22 30.7	+49.6	61.4	22 59.3	+50.2	61.7	23 27.5	+50.7	62.1	34
35	20 49.7	+46.6	59.0	21 20.5	+47.1	59.3	21 50.9	+47.8	59.7	22 21.1	+48.3	60.0	22 50.9	+48.8	60.4	23 20.3	+49.3	60.8	23 49.5	+50.0	61.2	24 18.2	+50.6	61.5	35
36	21 36.3	+46.3	58.3	22 07.6	+47.0	58.7	22 38.7	+47.5	59.0	23 09.4	+48.1	59.4	23 39.7	+48.8	59.8	24 09.8	+49.3	60.1	24 39.5	+49.8	60.5	25 08.8	+50.4	60.9	36
37	22 22.6	+46.2	57.7	22 54.6	+46.8	58.0	23 26.2	+47.4	58.4	23 57.5	+48.0	58.7	24 28.5	+48.5	59.1	24 59.1	+49.1	59.5	25 29.3	+49.7	59.9	25 59.2	+50.3	60.3	37
38	23 08.8	+46.0	57.0	23 41.4	+46.6	57.3	24 13.6	+47.2	57.7	24 45.5	+47.8	58.1	25 17.0	+48.4	58.5	25 48.2	+49.0	58.9	26 19.0	+49.6	59.3	26 49.5	+50.1	59.7	38
39	23 54.8	+45.8	56.3	24 28.0	+46.4	56.6	25 00.8	+47.0	57.0	25 33.3	+47.6	57.4	26 05.4	+48.2	57.8	26 37.2	+48.8	58.2	27 08.6	+49.4	58.7	27 39.6	+49.9	59.1	39
40	24 40.6	+45.6	55.5	25 14.4	+46.2	55.9	25 47.8	+46.9	56.3	26 20.9	+47.4	56.7	26 53.6	+48.1	57.2	27 26.0	+48.6	57.6	27 58.0	+49.1	58.0	28 29.5	+49.8	58.5	40
41	25 26.2	+45.4	54.8	26 00.6	+46.0	55.2	26 34.7	+46.6	55.6	27 08.3	+47.3	56.1	27 41.7	+47.8	56.5	28 14.6	+48.4	56.9	28 47.1	+49.0	57.4	29 19.3	+49.6	57.9	41
42	26 11.6	+45.2	54.1	26 46.6	+45.8	54.5	27 21.3	+46.4	54.9	27 55.6	+47.0	55.4	28 29.5	+47.6	55.8	29 03.0	+48.2	56.3	29 36.1	+48.8	56.7	30 08.9	+49.3	57.2	42
43	26 56.8	+44.9	53.4	27 32.4	+45.6	53.8	28 07.7	+46.2	54.2	28 42.6	+46.8	54.7	29 17.1	+47.4	55.1	29 51.2	+48.0	55.6	30 24.9	+48.6	56.1	30 58.2	+49.2	56.5	43
44	27 41.7	+44.7	52.6	28 18.0	+45.3	53.0	28 53.9	+45.9	53.5	29 29.4	+46.5	53.9	30 04.5	+47.2	54.4	30 39.2	+47.8	54.9	31 13.5	+48.4	55.4	31 47.4	+49.0	55.9	44
45	28 26.4	+44.5	51.9	29 03.3	+45.1	52.3	29 39.8	+45.7	52.7	30 15.9	+46.3	53.2	30 51.7	+46.9	53.7	31 27.0	+47.5	54.2	32 01.9	+48.1	54.7	32 36.4	+48.7	55.2	45
46	29 10.9	+44.1	51.1	29 48.4	+44.8	51.5	30 25.5	+45.4	52.0	31 02.2	+46.1	52.5	31 38.6	+46.7	53.0	32 14.5	+47.3	53.5	32 50.0	+47.9	54.0	33 25.1	+48.5	54.5	46
47	29 55.0	+43.9	50.3	30 33.2	+44.5	50.8	31 10.9	+45.2	51.2	31 48.3	+45.8	51.7	32 25.3	+46.4	52.2	33 01.8	+47.0	52.7	33 37.9	+47.7	53.2	34 13.6	+48.3	53.8	47
48	30 38.9	+43.6	49.5	31 17.7	+44.2	50.0	31 56.1	+44.9	50.5	32 34.1	+45.5	51.0	33 11.7	+46.1	51.5	33 48.8	+46.8	52.0	34 25.6	+47.4	52.5	35 01.9	+48.0	53.1	48
49	31 22.5	+43.4	48.7	32 01.9	+44.0	49.2	32 41.0	+44.5	49.7	33 19.6	+45.2	50.2	33 57.8	+45.8	50.7	34 35.6	+46.5	51.2	35 13.0	+47.0	51.8	35 49.9	+47.7	52.3	49
50	32 05.9	+42.9	47.9	32 45.9	+43.6	48.4	33 25.5	+44.3	48.9	34 04.8	+44.9	49.4	34 43.6	+45.6	49.9	35 22.1	+46.1	50.4	36 00.0	+46.8	51.0	36 37.6	+47.4	51.6	50
51	32 48.8	+42.7	47.1	33 29.5	+43.3	47.6	34 09.8	+43.9	48.1	34 49.7	+44.6	48.6	35 29.2	+45.2	49.1	36 08.2	+45.9	49.7	36 46.8	+46.5	50.2	37 25.0	+47.1	50.8	51
52	33 31.5	+42.3	46.3	34 12.8	+43.0	46.7	34 53.7	+43.6	47.2	35 34.3	+44.2	47.8	36 14.4	+44.9	48.3	36 54.1	+45.5	48.9	37 33.3	+46.2	49.4	38 12.1	+46.8	50.0	52
53	34 13.8	+42.0	45.4	34 55.8	+42.5	45.9	35 37.3	+43.3	46.4	36 18.5	+43.9	46.9	36 59.3	+44.5	47.5	37 39.6	+45.2	48.0	38 19.5	+45.8	48.6	38 58.9	+46.5	49.2	53
54	34 55.8	+41.5	44.5	35 38.3	+42.3	45.0	36 20.6	+42.8	45.5	37 02.4	+43.5	46.1	37 43.8	+44.2	46.6	38 24.8	+44.8	47.2	39 05.3	+45.5	47.8	39 45.4	+46.1	48.4	54
55	35 37.3	+41.2	43.6	36 20.6	+41.8	44.1	37 03.4	+42.5	44.7	37 45.9	+43.1	45.2	38 28.0	+43.7	45.8	39 09.6	+44.4	46.3	39 50.8	+45.1	46.9	40 31.5	+45.7	47.6	55
56	36 18.5	+40.8	42.7	37 02.4	+41.4	43.3	37 45.9	+42.1	43.8	38 29.0	+42.7	44.3	39 11.7	+43.4	44.9	39 54.0	+44.0	45.5	40 35.9	+44.7	46.1	41 17.2	+45.4	46.7	56
57	36 59.3	+40.3	41.8	37 43.8	+41.0	42.3	38 28.0	+41.6	42.9	39 11.7	+42.3	43.4	39 55.1	+42.9	44.0	40 38.0	+43.7	44.6	41 20.6	+44.2	45.2	42 02.6	+44.9	45.8	57
58	37 39.6	+39.9	40.9	38 24.8	+40.5	41.4	39 09.6	+41.2	42.0	39 54.0	+41.9	42.5	40 38.0	+42.6	43.1	41 21.7	+43.1	43.7	42 04.8	+43.9	44.3	42 47.5	+44.6	44.9	58
59	38 19.5	+39.4	40.0	39 05.3	+40.1	40.5	39 50.8	+40.7	41.0	40 35.9	+41.4	41.6	41 20.6	+42.1	42.1	42 04.8	+42.8	42.7	42 48.7	+43.4	43.3	43 32.1	+44.0	44.0	59
60	38 58.9	+39.0	39.0	39 45.4	+39.6	39.5	40 31.5	+40.2	40.0	41 17.2	+40.9	40.6	42 02.6	+41.6	41.2	42 47.5	+42.3	41.8	43 32.1	+42.9	42.4	44 16.1	+43.6	43.1	60
61	39 37.9	+38.4	38.0	40 25.0	+39.0	38.5	41 11.7	+39.8	39.1	41 58.1	+40.4	39.6	42 44.2	+41.0	40.2	43 29.8	+41.7	40.8	44 15.0	+42.4	41.5	44 59.7	+43.1	42.1	61
62	40 16.3	+37.9	37.0	41 04.0	+38.6	37.5	41 51.5	+39.2	38.1	42 38.5	+39.9	38.6	43 25.2	+40.5	39.2	44 11.5	+41.2	39.8	44 57.4	+41.8	40.5	45 42.8	+42.5	41.1	62
63	40 54.2	+37.4	36.0	41 42.6	+38.0	36.5	42 30.7	+38.6	37.0	43 18.4	+39.3	37.6	44 05.7	+40.0	38.2	44 52.7	+40.6	38.8	45 39.2	+41.3	39.4	46 25.3	+42.0	40.1	63
64	41 31.6	+36.7	34.9	42 20.6	+37.4	35.5	43 09.3	+38.0	36.0	43 57.7	+38.7	36.6	44 45.7	+39.3	37.1	45 33.3	+40.0	37.8	46 20.5	+40.8	38.4	47 07.3	+41.5	39.1	64
65	42 08.3	+36.2	33.9	42 58.0	+36.8	34.4	43 47.3	+37.5	34.9	44 36.4	+38.1	35.5	45 25.0	+38.8	36.1	46 13.3	+39.5	36.7	47 01.3	+40.1	37.3	47 48.8	+40.8	38.0	65
66	42 44.5	+35.6	32.8	43 34.8	+36.2	33.3	44 24.8	+36.8	33.8	45 14.5	+37.4	34.4	46 03.8	+38.1	35.0	46 52.8	+38.8	35.6	47 41.4	+39.4	36.2	48 29.6	+40.1	36.9	66
67	43 20.1	+34.9	31.7	44 11.0	+35.5	32.2	45 01.6	+36.2	32.7	45 51.9	+36.8	33.3	46 41.9	+37.5	33.9	47 31.6	+38.1	34.5	48 20.8	+38.8	35.1	49 09.7	+39.5	35.8	67
68	43 55.0	+34.2	30.6	44 46.5	+34.9	31.1	45 37.8	+35.4	31.6	46 28.7	+36.1	32.1	47 19.4	+36.7	32.7	48 09.7	+37.4	33.3	48 59.6	+38.1	33.9	49 49.2	+38.8	34.6	68
69	44 29.2	+33.6	29.4	45 21.4	+34.1	29.9	46 13.2	+34.8	30.4	47 04.8	+35.4	31.0	47 56.1	+36.0	31.5	48 47.1	+36.6	32.1	49 37.7	+37.3	32.8	50 28.0	+38.0	33.4	69
70	45 02.8	+32.8	28.3	45 55.5	+33.4	28.7	46 48.0	+34.0	29.3	47 40.2	+34.6	29.8	48 32.1	+35.3	30.3	49 23.7	+35.9	30.9	50 15.0	+36.6	31.5	51 06.0	+37.2	32.2	70
71	45 35.6	+32.0	27.1	46 28.9	+32.6	27.5	47 22.0	+33.2	28.0	48 14.8	+33.8	28.6	49 07.4	+34.4	29.1	49 59.6	+35.1	29.7	50 51.6	+35.7	30.3	51 43.2	+36.4	30.9	71
72	46 07.6	+31.3	25.9	47 01.5	+31.9	26.3	47 55.2	+32.4	26.8	48 48.6	+33.0	27.3	49 41.8	+33.6	27.9	50 34.7	+34.2	28.4	51 27.3	+34.9	29.0	52 19.6	+35.6	29.6	72
73	46 38.9	+30.5	24.6	47 33.4	+31.0	25.1	48 27.6	+31.6	25.5	49 21.6	+32.2	26.0	50 15.4	+32.7	26.6	51 08.9	+33.4	27.1	52 02.2	+34.0	27.7	52 55.2	+34.6	28.3	73
74	47 09.4	+29.6	23.4	48 04.4	+30.1	23.8	48 59.2	+30.6	24.3	49 53.8	+31.2	24.7	50 48.1	+31.9	25.3	51 42.3	+32.4	25.8	52 36.2	+33.0	26.4	53 29.8	+33.7	27.0	74
75	47 39.0	+28.7	22.1	48 34.5	+29.2	22.5	49 29.8	+29.8	22.9	50 25.0	+30.3	23.4	51 20.0	+30.8	23.9	52 14.7	+31.4	24.4	53 09.2	+32.1	25.0	54 03.5	+32.6	25.6	75
76	48 07.7	+27.8	20.8	49 03.7	+28.3	21.2	49 59.6	+28.8	21.6	50 55.3	+29.3	22.0	51 50.8	+29.9	22.5	52 46.1	+30.5	23.0	53 41.3	+31.0	23.6	54 36.1	+31.7	24.1	76
77	48 35.5	+26.9	19.4	49 32.0	+27.4	19.8	50 28.4	+27.8	20.2	51 24.6	+28.4	20.7	52 20.7	+28.8	21.1	53 16.6	+29.4	21.6	54 12.3	+29.9	22.1	55 07.8	+30.5	22.6	77
78	49 02.4	+25.9	18.1	49 59.4	+26.3	18.4	50 56.2	+26.8	18.8	51 53.0	+27.2	19.2	52 49.5	+27.8	19.7	53 46.0	+28.2	20.1	54 42.2	+28.8	20.6	55 38.3	+29.3	21.0	78
79	49 28.3	+24.9	16.7	50 25.7	+25.4	17.0	51 23.0	+25.8	17.4	52 20.2	+26.2	17.8	53 17.3	+26.7	18.2	54 14.2	+27.2	18.6	55 11.0	+27.7	19.1	56 07.6	+28.2	19.6	79
80	49 53.2	+23.9	15.3	50 51.1	+24.2	15.6	51 48.8	+24.6	15.9	52 46.4	+25.1	16.3	53 44.0	+25.5	16.7	54 41.4	+25.9	17.1	55 38.7	+26.4	17.5	56 35.8	+26.9	18.0	80
81	50 17.1	+22.8	13.9	51 15.3	+23.1	14.2	52 13.4	+23.6	14.5	53 11.5	+23.9	14.8	54 09.5	+24.3	15.1	55 07.3	+24.7	15.5	56 05.1	+25.1	15.9	57 02.7	+25.6	16.3	81
82	50 39.9	+21.7	12.4	51 38.4	+22.1	12.7	52 37.0	+22.3	13.0	53 35.4	+22.7	13.3	54 33.8	+23.0	13.6	55 32.0	+23.5	13.9	56 30.2	+23.9	14.3	57 28.3	+24.3	14.7	82
83	51 01.6	+20.5	10.9	52 00.5	+20.8	11.2	52 59.3	+21.1	11.4	53 58.1	+21.4	11.7	54 56.8	+21.8	12.0	55 55.5	+22.1	12.3	56 54.1	+22.4	12.6	57 52.6	+22.8	13.0	83
84	51 22.1	+19.4	9.6	52 21.3	+19.6	9.8	53 20.4	+19.9	9.9	54 19.5	+20.2	10.1	55 18.6	+20.4	10.3	56 17.6	+20.7	10.6	57 16.5	+21.1	10.8	58 15.4	+21.4	11.2	84
85	51 41.5	+18.2	7.9	52 40.9	+18.4	8.1	53 40.3	+18.7	8.3	54 39.7	+18.8	8.5	55 39.0	+19.1	8.7	56 38.3	+19.3	8.9	57 37.6	+19.6	9.2	58 36.8	+19.8	9.4	85
86	51 59.7	+17.0	6.4	52 59.3	+17.2	6.5	53 59.0	+17.3	6.7	54 58.5	+17.5	6.8	55 58.1	+17.7	7.0	56 57.6	+17.9	7.2	57 57.2	+18.0	7.4	58 56.6	+18.3	7.6	86
87	52 16.7	+15.7	4.8	53 16.5	+15.8	4.9	54 16.3	+15.9	5.0	55 16.0	+16.1	5.2	56 15.8	+16.2	5.3	57 15.5	+16.4	5.4	58 15.2	+16.5	5.7	59 14.9	+16.7	5.7	87
88	52 32.4	+14.5	3.2	53 32.3	+14.5	3.3	54 32.2	+14.6	3.4	55 31.9	+14.7	3.5	56 32.0	+14.8	3.5	57 31.9	+14.8	3.6	58 31.8	+14.9	3.7	59 31.6	+15.1	3.9	88
89	52 46.9	+13.1	1.6	53 46.8	+13.2	1.7	54 46.8	+13.2	1.7	55 46.8	+13.2	1.7	56 46.8	+13.2	1.8	57 46.7	+13.3	1.8	58 46.7	+13.3	1.9	59 46.7	+13.3	1.9	89
90	53 00.0	+11.8	0.0	54 00.0	+11.8	0.0	55 00.0	+11.8	0.0	56 00.0	+11.7	0.0	57 00.0	+11.7	0.0	58 00.0	+11.7	0.0	59 00.0	+11.6	0.0	60 00.0	+11.6	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z }

LATITUDE SAME NAME AS DECLINATION   L.H.A. 102°, 258°

LATITUDE **SAME** NAME AS DECLINATION   N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z }

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	6 35.6	+48.3	98.8	6 26.4	+48.8	98.9	6 17.0	+49.4	99.0	6 07.5	+50.0	99.2	5 57.9	+50.6	99.3	5 48.2	+51.1	99.4	5 38.4	+51.7	99.5	5 28.5	+52.2	99.6	0
1	7 23.9	+48.1	98.2	7 15.2	+48.8	98.4	7 06.4	+49.4	98.5	6 57.5	+50.0	98.6	6 48.5	+50.5	98.7	6 39.3	+51.1	98.8	6 30.1	+51.6	98.9	6 20.7	+52.1	99.1	1
2	8 12.0	+48.1	97.6	8 04.0	+48.7	97.8	7 55.8	+49.3	97.9	7 47.5	+49.9	98.0	7 39.0	+50.5	98.2	7 30.4	+51.1	98.3	7 21.7	+51.6	98.4	7 12.8	+52.1	98.6	2
3	9 00.1	+48.1	97.0	8 52.7	+48.7	97.2	8 45.1	+49.3	97.3	8 37.4	+49.9	97.5	8 29.5	+50.5	97.6	8 21.5	+51.0	97.8	8 13.3	+51.5	97.9	8 04.9	+52.1	98.1	3
4	9 48.2	+48.0	96.4	9 41.4	+48.6	96.6	9 34.4	+49.3	96.8	9 27.3	+49.8	96.9	9 20.0	+50.4	97.1	9 12.5	+51.0	97.2	9 04.8	+51.6	97.4	8 57.0	+52.1	97.6	4
5	10 36.2	+47.9	95.8	10 30.0	+48.6	96.0	10 23.7	+49.1	96.2	10 17.1	+49.8	96.4	10 10.4	+50.3	96.5	10 03.5	+50.9	96.7	9 56.4	+51.4	96.9	9 49.1	+52.0	97.1	5
6	11 24.1	+47.8	95.2	11 18.6	+48.4	95.4	11 12.8	+49.1	95.6	11 06.9	+49.7	95.8	11 00.7	+50.3	96.0	10 54.4	+50.8	96.2	10 47.8	+51.4	96.4	10 41.1	+51.9	96.5	6
7	12 11.9	+47.8	94.6	12 07.0	+48.4	94.8	12 01.9	+49.0	95.0	11 56.6	+49.6	95.2	11 51.0	+50.2	95.4	11 45.2	+50.8	95.6	11 39.2	+51.4	95.8	11 33.0	+51.9	96.0	7
8	12 59.7	+47.7	94.0	12 55.4	+48.3	94.2	12 50.9	+49.0	94.4	12 46.2	+49.6	94.6	12 41.2	+50.2	94.9	12 36.0	+50.8	95.1	12 30.6	+51.3	95.3	12 24.9	+51.9	95.5	8
9	13 47.4	+47.5	93.3	13 43.7	+48.3	93.6	13 39.9	+48.8	93.8	13 35.8	+49.4	94.1	13 31.4	+50.1	94.3	13 26.8	+50.6	94.5	13 21.9	+51.2	94.8	13 16.8	+51.8	95.0	9
10	14 34.9	+47.5	92.7	14 32.0	+48.1	93.0	14 28.7	+48.8	93.2	14 25.2	+49.4	93.5	14 21.5	+50.0	93.7	14 17.4	+50.6	94.0	14 13.1	+51.2	94.2	14 08.6	+51.7	94.5	10
11	15 22.4	+47.4	92.1	15 20.1	+48.0	92.3	15 17.5	+48.7	92.6	15 14.6	+49.3	92.9	15 11.5	+49.9	93.2	15 08.0	+50.5	93.4	15 04.3	+51.1	93.7	15 00.3	+51.6	94.0	11
12	16 09.8	+47.2	91.4	16 08.1	+47.9	91.7	16 06.2	+48.5	92.0	16 03.9	+49.2	92.3	16 01.4	+49.8	92.6	15 58.5	+50.4	92.9	15 55.4	+51.0	93.2	15 51.9	+51.6	93.4	12
13	16 57.0	+47.1	90.8	16 56.0	+47.8	91.1	16 54.7	+48.5	91.4	16 53.1	+49.1	91.7	16 51.2	+49.7	92.0	16 48.9	+50.4	92.3	16 46.4	+50.9	92.6	16 43.5	+51.5	92.9	13
14	17 44.1	+47.0	90.1	17 43.8	+47.7	90.5	17 43.2	+48.3	90.8	17 42.2	+49.0	91.1	17 40.9	+49.6	91.4	17 39.3	+50.2	91.7	17 37.3	+50.8	92.1	17 35.0	+51.3	92.4	14
15	18 31.1	+46.9	89.5	18 31.5	+47.6	89.8	18 31.5	+48.2	90.2	18 31.2	+48.9	90.5	18 30.5	+49.5	90.8	18 29.5	+50.1	91.2	18 28.1	+50.7	91.5	18 26.3	+51.3	91.8	15
16	19 18.0	+46.7	88.8	19 19.1	+47.4	89.2	19 19.7	+48.1	89.5	19 20.1	+48.7	89.9	19 20.0	+49.4	90.2	19 19.6	+50.0	90.6	19 18.8	+50.6	90.9	19 17.6	+51.2	91.3	16
17	20 04.7	+46.6	88.2	20 06.5	+47.2	88.5	20 07.8	+48.0	88.9	20 08.8	+48.6	89.3	20 09.4	+49.2	89.6	20 09.6	+49.9	90.0	20 09.4	+50.5	90.4	20 08.8	+51.1	90.7	17
18	20 51.3	+46.4	87.5	20 53.7	+47.1	87.9	20 55.8	+47.8	88.2	20 57.4	+48.5	88.6	20 58.6	+49.2	89.0	20 59.5	+49.7	89.4	20 59.9	+50.4	89.8	20 59.9	+51.0	90.2	18
19	21 37.7	+46.2	86.8	21 40.8	+47.0	87.2	21 43.6	+47.6	87.6	21 45.9	+48.3	88.0	21 47.8	+49.0	88.4	21 49.2	+49.7	88.8	21 50.3	+50.2	89.2	21 50.9	+50.9	89.6	19
20	22 23.9	+46.1	86.1	22 27.8	+46.8	86.5	22 31.2	+47.5	86.9	22 34.2	+48.2	87.4	22 36.8	+48.9	87.8	22 38.9	+49.5	88.2	22 40.5	+50.2	88.6	22 41.8	+50.7	89.0	20
21	23 10.0	+45.9	85.4	23 14.6	+46.6	85.8	23 18.7	+47.3	86.3	23 22.4	+48.0	86.7	23 25.6	+48.7	87.1	23 28.4	+49.3	87.6	23 30.7	+50.0	88.0	23 32.5	+50.6	88.4	21
22	23 55.9	+45.7	84.7	24 01.2	+46.4	85.2	24 06.0	+47.1	85.6	24 10.4	+47.8	86.1	24 14.3	+48.5	86.5	24 17.7	+49.2	87.0	24 20.7	+49.8	87.4	24 23.1	+50.5	87.9	22
23	24 41.6	+45.5	84.0	24 47.6	+46.2	84.5	24 53.1	+47.0	84.9	24 58.2	+47.7	85.4	25 02.8	+48.3	85.9	25 06.9	+49.0	86.3	25 10.5	+49.7	86.8	25 13.6	+50.3	87.3	23
24	25 27.1	+45.2	83.3	25 33.8	+46.0	83.8	25 40.1	+46.8	84.2	25 45.9	+47.4	84.7	25 51.1	+48.2	85.2	25 55.9	+48.9	85.7	26 00.2	+49.5	86.2	26 03.9	+50.2	86.7	24
25	26 12.3	+45.1	82.6	26 19.8	+45.8	83.0	26 26.9	+46.5	83.5	26 33.3	+47.3	84.0	26 39.3	+48.0	84.5	26 44.8	+48.7	85.0	26 49.7	+49.4	85.5	26 54.1	+50.0	86.0	25
26	26 57.4	+44.8	81.8	27 05.6	+45.6	82.3	27 13.4	+46.3	82.8	27 20.6	+47.1	83.3	27 27.3	+47.8	83.9	27 33.5	+48.4	84.4	27 39.1	+49.1	84.9	27 44.1	+49.9	85.4	26
27	27 42.2	+44.5	81.1	27 51.2	+45.4	81.6	27 59.7	+46.1	82.1	28 07.7	+46.8	82.6	28 15.1	+47.6	83.2	28 21.9	+48.3	83.7	28 28.2	+49.0	84.2	28 34.0	+49.6	84.8	27
28	28 26.7	+44.4	80.3	28 36.6	+45.1	80.8	28 45.8	+45.9	81.4	28 54.5	+46.7	81.9	29 02.7	+47.3	82.5	29 10.2	+48.1	83.0	29 17.2	+48.8	83.6	29 23.6	+49.5	84.1	28
29	29 11.1	+44.0	79.5	29 21.7	+44.8	80.1	29 31.7	+45.6	80.6	29 41.2	+46.3	81.2	29 50.0	+47.2	81.8	29 58.3	+47.9	82.3	30 06.0	+48.6	82.9	30 13.1	+49.3	83.5	29
30	29 55.1	+43.8	78.8	30 06.5	+44.6	79.3	30 17.3	+45.4	79.9	30 27.5	+46.2	80.5	30 37.2	+46.9	81.1	30 46.2	+47.6	81.6	30 54.6	+48.4	82.2	31 02.4	+49.1	82.8	30
31	30 38.9	+43.4	78.0	30 51.1	+44.3	78.6	31 02.7	+45.0	79.1	31 13.7	+45.9	79.7	31 24.1	+46.6	80.3	31 33.8	+47.4	80.9	31 43.0	+48.1	81.5	31 51.5	+48.8	82.2	31
32	31 22.3	+43.2	77.2	31 35.4	+43.9	77.8	31 47.8	+44.8	78.4	31 59.6	+45.6	79.0	32 10.7	+46.4	79.6	32 21.2	+47.2	80.2	32 31.1	+47.9	80.8	32 40.3	+48.7	81.5	32
33	32 05.5	+42.8	76.3	32 19.3	+43.7	77.0	32 32.6	+44.5	77.6	32 45.2	+45.3	78.2	32 57.1	+46.1	78.8	33 08.4	+46.9	79.5	33 19.0	+47.6	80.1	33 29.0	+48.3	80.8	33
34	32 48.3	+42.5	75.5	33 03.0	+43.4	76.1	33 17.1	+44.2	76.8	33 30.5	+45.0	77.4	33 43.2	+45.8	78.1	33 55.3	+46.6	78.7	34 06.6	+47.4	79.4	34 17.3	+48.2	80.1	34
35	33 30.9	+42.1	74.7	33 46.4	+43.0	75.3	34 01.3	+43.8	76.0	34 15.5	+44.7	76.6	34 29.0	+45.5	77.3	34 41.9	+46.3	78.0	34 54.0	+47.1	78.6	35 05.5	+47.9	79.3	35
36	34 13.0	+41.8	73.8	34 29.4	+42.7	74.5	34 45.1	+43.6	75.1	35 00.2	+44.3	75.8	35 14.5	+45.2	76.5	35 28.2	+46.0	77.2	35 41.1	+46.8	77.9	35 53.4	+47.6	78.6	36
37	34 54.8	+41.4	72.9	35 12.1	+42.3	73.6	35 28.7	+43.2	74.3	35 44.5	+44.1	75.0	35 59.7	+44.9	75.7	36 14.2	+45.7	76.4	36 27.9	+46.5	77.1	36 41.0	+47.3	77.8	37
38	35 36.2	+41.1	72.1	35 54.4	+41.9	72.7	36 11.8	+42.8	73.4	36 28.6	+43.6	74.1	36 44.6	+44.5	74.9	36 59.9	+45.3	75.6	37 14.4	+46.2	76.3	37 28.3	+46.9	77.1	38
39	36 17.3	+40.6	71.2	36 36.3	+41.5	71.9	36 54.6	+42.4	72.6	37 12.2	+43.3	73.3	37 29.1	+44.2	74.0	37 45.2	+45.1	74.8	38 00.6	+45.9	75.5	38 15.2	+46.7	76.3	39
40	36 57.9	+40.1	70.2	37 17.8	+41.1	71.0	37 37.0	+42.0	71.7	37 55.5	+42.9	72.4	38 13.3	+43.7	73.2	38 30.3	+44.6	73.9	38 46.5	+45.5	74.7	39 01.9	+46.4	75.5	40
41	37 38.0	+39.8	69.3	37 58.9	+40.6	70.0	38 19.0	+41.6	70.8	38 38.4	+42.5	71.5	38 57.0	+43.4	72.3	39 14.9	+44.2	73.1	39 32.0	+45.1	73.9	39 48.3	+45.9	74.7	41
42	38 17.8	+39.2	68.4	38 39.5	+40.2	69.1	39 00.6	+41.1	69.9	39 20.9	+42.0	70.6	39 40.4	+42.9	71.4	39 59.1	+43.9	72.2	40 17.1	+44.7	73.0	40 34.2	+45.6	73.8	42
43	38 57.0	+38.8	67.4	39 19.7	+39.8	68.1	39 41.7	+40.7	68.9	40 02.9	+41.6	69.7	40 23.3	+42.6	70.5	40 43.0	+43.4	71.3	41 01.8	+44.3	72.1	41 19.8	+45.2	73.0	43
44	39 35.8	+38.3	66.4	39 59.5	+39.2	67.2	40 22.4	+40.1	68.0	40 44.5	+41.1	68.7	41 05.9	+42.0	69.6	41 26.4	+43.0	70.4	41 46.1	+43.9	71.2	42 05.0	+44.8	72.1	44
45	40 14.1	+37.7	65.4	40 38.7	+38.7	66.2	41 02.5	+39.7	67.0	41 25.6	+40.6	67.8	41 47.9	+41.6	68.6	42 09.4	+42.5	69.4	42 30.0	+43.5	70.3	42 49.8	+44.4	71.2	45
46	40 51.8	+37.2	64.4	41 17.4	+38.1	65.2	41 42.2	+39.1	66.0	42 06.2	+40.1	66.8	42 29.5	+41.0	67.6	42 51.9	+42.0	68.5	43 13.5	+42.9	69.4	43 34.2	+43.9	70.2	46
47	41 29.0	+36.6	63.3	41 55.5	+37.6	64.1	42 21.3	+38.6	64.9	42 46.3	+39.6	65.8	43 10.5	+40.6	66.6	43 33.9	+41.5	67.5	43 56.4	+42.5	68.4	44 18.1	+43.4	69.3	47
48	42 05.6	+36.0	62.3	42 33.1	+37.0	63.1	42 59.9	+38.0	63.9	43 25.9	+39.0	64.8	43 51.1	+40.0	65.6	44 15.4	+41.0	66.5	44 38.9	+42.0	67.4	45 01.5	+42.9	68.3	48
49	42 41.6	+35.4	61.2	43 10.1	+36.4	62.0	43 37.9	+37.4	62.8	44 04.9	+38.4	63.7	44 31.1	+39.4	64.6	44 56.4	+40.4	65.5	45 20.9	+41.4	66.4	45 44.4	+42.4	67.3	49
50	43 17.0	+34.7	60.1	43 46.5	+35.8	60.9	44 15.3	+36.8	61.8	44 43.3	+37.8	62.6	45 10.5	+38.8	63.5	45 36.8	+39.8	64.4	46 02.3	+40.8	65.4	46 26.8	+41.9	66.3	50
51	43 51.7	+34.1	59.0	44 22.3	+35.1	59.8	44 52.1	+36.1	60.6	45 21.1	+37.1	61.5	45 49.3	+38.1	62.4	46 16.6	+39.2	63.4	46 43.1	+40.2	64.3	47 08.7	+41.2	65.3	51
52	44 25.8	+33.3	57.8	44 57.4	+34.3	58.7	45 28.2	+35.4	59.5	45 58.2	+36.5	60.4	46 27.4	+37.5	61.3	46 55.8	+38.6	62.3	47 23.3	+39.6	63.2	47 49.9	+40.6	64.2	52
53	44 59.1	+32.6	56.6	45 31.7	+33.7	57.5	46 03.6	+34.7	58.4	46 34.7	+35.7	59.3	47 04.9	+36.9	60.2	47 34.4	+37.8	61.1	48 02.9	+38.9	62.1	48 30.5	+40.0	63.1	53
54	45 31.7	+31.9	55.4	46 05.4	+32.9	56.3	46 38.3	+34.0	57.2	47 10.4	+35.1	58.1	47 41.8	+36.1	59.0	48 12.2	+37.2	60.0	48 41.8	+38.2	60.9	49 10.5	+39.3	62.0	54
55	46 03.6	+31.1	54.2	46 38.3	+32.1	55.1	47 12.3	+33.2	56.0	47 45.5	+34.2	56.9	48 17.8	+35.4	57.8	48 49.4	+36.4	58.8	49 20.0	+37.5	59.8	49 49.8	+38.5	60.8	55
56	46 34.7	+30.2	53.0	47 10.4	+31.4	53.9	47 45.5	+32.3	54.7	48 19.7	+33.5	55.7	48 53.2	+34.5	56.6	49 25.8	+35.6	57.6	49 57.5	+36.7	58.6	50 28.3	+37.9	59.6	56
57	47 04.9	+29.5	51.7	47 41.8	+30.4	52.6	48 17.8	+31.6	53.5	48 53.2	+32.6	54.4	49 27.7	+33.7	55.3	50 01.4	+34.8	56.3	50 34.2	+35.9	57.3	51 06.2	+37.0	58.4	57
58	47 34.4	+28.5	50.4	48 12.2	+29.6	51.3	48 49.4	+30.6	52.2	49 25.8	+31.7	53.1	50 01.4	+32.8	54.1	50 36.2	+33.9	55.0	51 10.1	+35.1	56.1	51 43.2	+36.2	57.1	58
59	48 02.9	+27.6	49.1	48 41.8	+28.7	50.0	49 20.0	+29.8	50.9	49 57.5	+30.8	51.8	50 34.2	+32.0	52.8	51 10.1	+33.1	53.7	51 45.2	+34.2	54.8	52 19.4	+35.3	55.8	59
60	48 30.5	+26.7	47.8	49 10.5	+27.7	48.7	49 49.8	+28.8	49.5	50 28.3	+29.9	50.5	51 06.2	+30.9	51.4	51 43.2	+32.1	52.4	52 19.4	+33.2	53.4	52 54.7	+34.4	54.5	60
61	48 57.2	+25.7	46.4	49 38.2	+26.8	47.3	50 18.6	+27.8	48.2	50 58.2	+28.9	49.1	51 37.1	+30.1	50.0	52 15.3	+31.1	51.0	52 52.6	+32.3	52.0	53 29.1	+33.4	53.1	61
62	49 22.9	+24.7	45.1	50 05.0	+25.7	45.9	50 46.4	+26.8	46.8	51 27.1	+27.9	47.7	52 07.2	+28.9	48.6	52 46.4	+30.1	49.6	53 24.9	+31.2	50.6	54 02.5	+32.4	51.7	62
63	49 47.6	+23.7	43.7	50 30.7	+24.7	44.5	51 13.2	+25.7	45.4	51 55.0	+26.8	46.3	52 36.1	+28.0	47.2	53 16.5	+29.1	48.2	53 56.1	+30.2	49.2	54 34.9	+31.4	50.3	63
64	50 11.3	+22.6	42.2	50 55.4	+23.6	43.1	51 38.9	+24.7	43.9	52 21.8	+25.8	44.8	53 04.1	+26.8	45.7	53 45.6	+27.9	46.7	54 26.3	+29.1	47.7	55 06.3	+30.3	48.8	64
65	50 33.9	+21.5	40.8	51 19.0	+22.5	41.6	52 03.6	+23.5	42.4	52 47.6	+24.6	43.3	53 30.9	+25.7	44.2	54 13.5	+26.8	45.2	54 55.4	+28.0	46.2	55 36.6	+29.1	47.3	65
66	50 55.4	+20.3	39.3	51 41.5	+21.4	40.1	52 27.1	+22.4	40.9	53 12.2	+23.4	41.8	53 56.6	+24.5	42.7	54 40.3	+25.6	43.7	55 23.4	+26.7	44.7	56 05.7	+27.9	45.7	66
67	51 15.7	+19.2	37.8	52 02.9	+20.2	38.6	52 49.5	+21.2	39.4	53 35.6	+22.2	40.3	54 21.1	+23.2	41.2	55 05.9	+24.4	42.1	55 50.1	+25.5	43.1	56 33.6	+26.6	44.1	67
68	51 34.9	+18.0	36.3	52 23.1	+18.9	37.0	53 10.7	+19.9	37.8	53 57.8	+20.9	38.7	54 44.3	+22.0	39.6	55 30.3	+23.1	40.5	56 15.6	+24.2	41.5	57 00.2	+25.3	42.5	68
69	51 52.9	+16.8	34.7	52 42.0	+17.7	35.5	53 30.6	+18.7	36.3	54 18.7	+19.7	37.1	55 06.3	+20.7	37.9	55 53.4	+21.7	38.9	56 39.8	+22.8	39.8	57 25.5	+24.0	40.8	69
70	52 09.7	+15.5	33.2	52 59.7	+16.5	33.9	53 49.3	+17.4	34.7	54 38.4	+18.3	35.5	55 27.0	+19.4	36.3	56 15.1	+20.4	37.2	57 02.6	+21.5	38.1	57 49.5	+22.6	39.1	70
71	52 25.2	+14.3	31.6	53 16.2	+15.1	32.3	54 06.7	+16.0	33.0	54 56.7	+17.0	33.8	55 46.4	+17.9	34.6	56 35.5	+18.9	35.5	57 24.1	+20.0	36.4	58 12.1	+21.1	37.3	71
72	52 39.5	+13.0	30.0	53 31.3	+13.8	30.7	54 22.7	+14.7	31.4	55 13.7	+15.6	32.1	56 04.3	+16.5	32.9	56 54.4	+17.5	33.8	57 44.1	+18.5	34.6	58 33.2	+19.6	35.6	72
73	52 52.5	+11.6	28.4	53 45.1	+12.4	29.0	54 37.4	+13.2	29.7	55 29.3	+14.1	30.4	56 20.8	+15.1	31.2	57 11.9	+16.0	32.0	58 02.6	+17.0	32.8	58 52.7	+18.1	33.7	73
74	53 04.1	+10.3	26.8	53 57.5	+11.1	27.4	54 50.6	+11.9	28.0	55 43.4	+12.7	28.7	56 35.9	+13.5	29.4	57 27.9	+14.5	30.2	58 19.6	+15.4	31.0	59 10.8	+16.4	31.9	74
75	53 14.4	+8.9	25.1	54 08.6	+9.6	25.7	55 02.5	+10.4	26.3	55 56.1	+11.2	27.0	56 49.4	+12.0	27.7	57 42.4	+12.9	28.4	58 35.0	+13.8	29.2	59 27.2	+14.7	30.0	75
76	53 23.3	+7.5	23.5	54 18.2	+8.2	24.0	55 12.9	+8.9	24.6	56 07.3	+9.7	25.2	57 01.4	+10.5	25.9	57 55.3	+11.3	26.6	58 48.8	+12.1	27.3	59 41.9	+13.1	28.1	76
77	53 30.8	+6.2	21.8	54 26.4	+6.8	22.3	55 21.8	+7.5	22.9	56 17.0	+8.1	23.4	57 11.9	+8.9	24.1	58 06.6	+9.6	24.7	59 00.9	+10.5	25.4	59 55.0	+11.3	26.1	77
78	53 37.0	+4.7	20.1	54 33.2	+5.3	20.6	55 29.3	+5.9	21.1	56 25.1	+6.6	21.7	57 20.8	+7.3	22.2	58 16.2	+8.0	22.8	59 11.4	+8.7	23.5	60 06.3	+9.5	24.2	78
79	53 41.7	+3.3	18.4	54 38.5	+3.9	18.9	55 35.2	+4.4	19.4	56 31.7	+5.1	19.9	57 28.1	+5.6	20.4	58 24.2	+6.3	20.9	59 20.1	+7.1	21.5	60 15.8	+7.8	22.2	79
80	53 45.0	+1.9	16.8	54 42.4	+2.4	17.2	55 39.6	+2.9	17.6	56 36.8	+3.4	18.0	57 33.7	+4.1	18.5	58 30.5	+4.7	19.0	59 27.2	+5.2	19.6	60 23.6	+5.9	20.2	80
81	53 46.9	+0.4	15.1	54 44.8	+0.9	15.4	55 42.5	+1.4	15.8	56 40.2	+1.9	16.2	57 37.8	+2.3	16.7	58 35.2	+2.9	17.1	59 32.4	+3.4	17.6	60 29.5	+4.1	18.2	81
82	53 47.3	−0.9	13.4	54 45.7	−0.6	13.7	55 43.9	−0.2	14.0	56 42.1	+0.2	14.4	57 40.1	+0.8	14.8	58 38.1	+1.2	15.2	59 35.9	+1.7	15.7	60 33.6	+2.3	16.1	82
83	53 46.4	−2.5	11.7	54 45.1	−2.1	12.0	55 43.7	−1.7	12.3	56 42.3	−1.3	12.6	57 40.9	−1.0	12.9	58 39.3	−0.5	13.3	59 37.6	0.0	13.7	60 35.9	+0.4	14.1	83
84	53 43.9	−3.8	10.0	54 43.0	−3.6	10.2	55 42.0	−3.2	10.5	56 41.0	−2.9	10.8	57 39.9	−2.6	11.1	58 38.8	−2.3	11.4	59 37.6	−1.8	11.7	60 36.3	−1.6	12.1	84
85	53 40.1	−5.2	8.3	54 39.5	−5.0	8.5	55 38.8	−4.8	8.7	56 38.1	−4.5	8.9	57 37.3	−4.2	9.2	58 36.5	−3.9	9.4	59 35.7	−3.6	9.7	60 34.8	−3.3	10.0	85
86	53 34.9	−6.7	6.6	54 34.5	−6.5	6.8	55 34.0	−6.2	7.0	56 33.6	−6.1	7.1	57 33.1	−5.9	7.3	58 32.6	−5.6	7.5	59 32.1	−5.4	7.8	60 31.5	−5.2	8.0	86
87	53 28.2	−8.0	5.0	54 28.0	−7.9	5.1	55 27.8	−7.6	5.2	56 27.5	−7.6	5.3	57 27.2	−7.4	5.5	58 27.0	−7.4	5.6	59 26.7	−7.2	5.8	60 26.3	−6.9	6.0	87
88	53 20.2	−9.4	3.3	54 20.1	−9.3	3.4	55 20.0	−9.3	3.5	56 19.9	−9.2	3.5	57 19.8	−9.1	3.6	58 19.6	−9.0	3.7	59 19.5	−8.9	3.9	60 19.4	−8.8	4.0	88
89	53 10.8	−10.8	1.6	54 10.8	−10.8	1.7	55 10.7	−10.7	1.7	56 10.7	−10.7	1.8	57 10.7	−10.7	1.8	58 10.6	−10.6	1.9	59 10.6	−10.6	1.9	60 10.6	−10.6	2.0	89
90	53 00.0	−12.1	0.0	54 00.0	−12.1	0.0	55 00.0	−12.2	0.0	56 00.0	−12.2	0.0	57 00.0	−12.2	0.0	58 00.0	−12.3	0.0	59 00.0	−12.3	0.0	60 00.0	−12.3	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	6 35.6	−48.2	98.8	6 26.4	−48.9	98.9	6 17.0	−49.5	99.0	6 07.5	−50.0	99.2	5 57.9	−50.6	99.3	5 48.2	−51.2	99.4	5 38.4	−51.7	99.5	5 28.5	−52.2	99.6	0
1	5 47.4	−48.3	99.4	5 37.5	−48.9	99.5	5 27.5	−49.5	99.6	5 17.5	−50.1	99.7	5 07.3	−50.6	99.8	4 57.0	−51.1	99.9	4 46.7	−51.7	100.0	4 36.3	−52.3	100.1	1
2	4 59.1	−48.3	100.0	4 48.6	−48.9	100.1	4 38.0	−49.5	100.2	4 27.4	−50.1	100.3	4 16.7	−50.7	100.3	4 05.9	−51.2	100.4	3 55.0	−51.8	100.5	3 44.0	−52.2	100.5	2
3	4 10.8	−48.4	100.6	3 59.7	−49.0	100.7	3 48.5	−49.5	100.7	3 37.3	−50.1	100.8	3 26.0	−50.7	100.9	3 14.7	−51.3	100.9	3 03.2	−51.7	101.0	2 51.8	−52.3	101.0	3
4	3 22.4	−48.4	101.2	3 10.7	−49.0	101.3	2 59.0	−49.6	101.3	2 47.2	−50.2	101.4	2 35.3	−50.7	101.4	2 23.4	−51.2	101.5	2 11.5	−51.8	101.5	1 59.5	−52.2	101.5	4
5	2 34.0	−48.4	101.8	2 21.7	−49.0	101.8	2 09.4	−49.6	101.9	1 57.0	−50.1	101.9	1 44.6	−50.7	101.9	1 32.2	−51.2	102.0	1 19.7	−51.7	102.0	1 07.3	−52.3	102.0	5
6	1 45.6	−48.4	102.4	1 32.7	−49.0	102.4	1 19.8	−49.6	102.4	1 06.9	−50.2	102.5	0 53.9	−50.7	102.5	0 41.0	−51.3	102.5	0 28.0	−51.8	102.5	0 15.0	−52.3	102.5	6
7	0 57.2	−48.4	103.0	0 43.7	−49.0	103.0	0 30.2	−49.5	103.0	0 16.7	−50.1	103.0	0 03.2	−50.7	103.0	0 10.3	−51.2	77.0	0 23.8	+51.8	77.0	0 37.3	+52.3	77.0	7
8	0 08.8	−48.4	103.6	0 05.3	+49.0	76.4	0 19.3	+49.6	76.4	0 33.4	+50.2	76.4	0 47.5	+50.7	76.5	1 01.5	+51.3	76.5	1 15.6	+51.7	76.5	1 29.6	+52.2	76.5	8
9	0 39.6	+48.4	75.8	0 54.3	+49.0	75.9	1 08.9	+49.6	75.9	1 23.6	+50.1	75.9	1 38.2	+50.7	75.9	1 52.8	+51.2	75.9	2 07.3	+51.8	76.0	2 21.8	+52.3	76.0	9
10	1 28.0	+48.4	75.2	1 43.3	+49.0	75.3	1 58.5	+49.5	75.3	2 13.7	+50.1	75.3	2 28.9	+50.6	75.4	2 44.0	+51.2	75.4	2 59.1	+51.7	75.5	3 14.1	+52.2	75.5	10
11	2 16.4	+48.4	74.7	2 32.3	+49.0	74.7	2 48.1	+49.5	74.7	3 03.8	+50.1	74.8	3 19.5	+50.7	74.8	3 35.2	+51.2	74.9	3 50.8	+51.7	75.0	4 06.3	+52.2	75.0	11
12	3 04.8	+48.3	74.1	3 21.2	+49.0	74.1	3 37.6	+49.5	74.2	3 53.9	+50.1	74.2	4 10.2	+50.6	74.3	4 26.4	+51.2	74.4	4 42.5	+51.7	74.5	4 58.6	+52.2	74.5	12
13	3 53.1	+48.3	73.5	4 10.2	+48.9	73.5	4 27.1	+49.5	73.6	4 44.0	+50.1	73.7	5 00.8	+50.5	73.8	5 17.6	+51.1	73.9	5 34.2	+51.7	73.9	5 50.8	+52.1	74.0	13
14	4 41.5	+48.3	72.9	4 59.1	+48.9	73.0	5 16.6	+49.5	73.0	5 34.1	+50.0	73.1	5 51.5	+50.5	73.2	6 08.7	+51.1	73.3	6 25.9	+51.6	73.4	6 42.9	+52.2	73.5	14
15	5 29.8	+48.3	72.3	5 48.0	+48.9	72.4	6 06.1	+49.5	72.5	6 24.1	+50.0	72.6	6 42.0	+50.6	72.7	6 59.8	+51.1	72.8	7 17.5	+51.6	72.9	7 35.1	+52.1	73.0	15
16	6 18.1	+48.2	71.7	6 36.9	+48.8	71.8	6 55.6	+49.3	71.9	7 14.1	+50.0	72.0	7 32.6	+50.5	72.1	7 50.9	+51.1	72.3	8 09.1	+51.6	72.4	8 27.2	+52.1	72.5	16
17	7 06.3	+48.2	71.1	7 25.7	+48.8	71.2	7 44.9	+49.4	71.3	8 04.1	+49.9	71.5	8 23.1	+50.5	71.6	8 42.0	+51.0	71.7	9 00.7	+51.5	71.9	9 19.3	+52.0	72.0	17
18	7 54.5	+48.1	70.5	8 14.5	+48.7	70.6	8 34.3	+49.3	70.8	8 54.0	+49.9	70.9	9 13.6	+50.4	71.1	9 33.0	+50.9	71.2	9 52.2	+51.5	71.4	10 11.3	+52.0	71.5	18
19	8 42.6	+48.1	69.9	9 03.2	+48.6	70.0	9 23.6	+49.2	70.2	9 43.9	+49.8	70.3	10 04.0	+50.3	70.5	10 23.9	+50.9	70.7	10 43.7	+51.4	70.8	11 03.3	+51.9	71.0	19
20	9 30.7	+48.0	69.3	9 51.8	+48.6	69.4	10 12.8	+49.2	69.6	10 33.7	+49.7	69.8	10 54.3	+50.3	69.9	11 14.8	+50.8	70.1	11 35.1	+51.4	70.3	11 55.2	+51.9	70.5	20
21	10 18.7	+47.9	68.7	10 40.4	+48.6	68.8	11 02.0	+49.1	69.0	11 23.4	+49.7	69.2	11 44.6	+50.2	69.4	12 05.6	+50.8	69.6	12 26.5	+51.3	69.8	12 47.1	+51.8	70.0	21
22	11 06.6	+47.9	68.1	11 29.0	+48.4	68.2	11 51.1	+49.1	68.4	12 13.1	+49.6	68.6	12 34.8	+50.2	68.8	12 56.4	+50.7	69.0	13 17.8	+51.2	69.3	13 38.9	+51.7	69.5	22
23	11 54.5	+47.8	67.4	12 17.4	+48.4	67.6	12 40.2	+48.9	67.8	13 02.7	+49.5	68.1	13 25.0	+50.1	68.3	13 47.1	+50.6	68.5	14 09.0	+51.2	68.7	14 30.6	+51.7	69.0	23
24	12 42.3	+47.7	66.8	13 05.8	+48.3	67.0	13 29.1	+48.9	67.2	13 52.2	+49.5	67.5	14 15.1	+50.0	67.7	14 37.7	+50.6	67.9	15 00.2	+51.0	68.2	15 22.3	+51.6	68.4	24
25	13 30.0	+47.6	66.2	13 54.1	+48.2	66.4	14 18.0	+48.8	66.7	14 41.7	+49.3	66.9	15 05.1	+49.9	67.1	15 28.3	+50.5	67.4	15 51.2	+51.0	67.6	16 13.9	+51.6	67.9	25
26	14 17.6	+47.5	65.6	14 42.3	+48.1	65.8	15 06.8	+48.7	66.0	15 31.0	+49.3	66.3	15 55.0	+49.8	66.6	16 18.8	+50.3	66.8	16 42.2	+51.0	67.1	17 05.5	+51.4	67.4	26
27	15 05.1	+47.4	64.9	15 30.4	+48.0	65.2	15 55.5	+48.6	65.4	16 20.3	+49.2	65.7	16 44.8	+49.8	66.0	17 09.1	+50.3	66.3	17 33.2	+50.8	66.5	17 56.9	+51.4	66.8	27
28	15 52.5	+47.3	64.3	16 18.4	+47.9	64.6	16 44.1	+48.4	64.8	17 09.5	+49.0	65.1	17 34.6	+49.6	65.4	17 59.4	+50.2	65.7	18 24.0	+50.7	66.0	18 48.3	+51.2	66.3	28
29	16 39.8	+47.2	63.7	17 06.3	+47.8	63.9	17 32.5	+48.4	64.2	17 58.5	+49.0	64.5	18 24.2	+49.5	64.8	18 49.6	+50.1	65.1	19 14.7	+50.6	65.4	19 39.5	+51.2	65.7	29
30	17 27.0	+47.0	63.0	17 54.1	+47.6	63.3	18 20.9	+48.2	63.6	18 47.5	+48.8	63.9	19 13.7	+49.4	64.2	19 39.7	+49.9	64.5	20 05.3	+50.5	64.8	20 30.7	+51.0	65.2	30
31	18 14.0	+47.0	62.4	18 41.7	+47.5	62.7	19 09.1	+48.2	63.0	19 36.3	+48.7	63.3	20 03.1	+49.3	63.6	20 29.6	+49.9	63.9	20 55.8	+50.4	64.3	21 21.7	+51.0	64.6	31
32	19 01.0	+46.7	61.7	19 29.2	+47.4	62.0	19 57.3	+47.9	62.3	20 25.0	+48.5	62.7	20 52.4	+49.1	63.0	21 19.5	+49.7	63.3	21 46.2	+50.3	63.7	22 12.7	+50.8	64.1	32
33	19 47.7	+46.6	61.0	20 16.6	+47.3	61.4	20 45.2	+47.9	61.7	21 13.5	+48.5	62.0	21 41.5	+49.0	62.4	22 09.2	+49.5	62.7	22 36.5	+50.1	63.1	23 03.5	+50.6	63.5	33
34	20 34.3	+46.5	60.4	21 03.9	+47.0	60.7	21 33.1	+47.6	61.0	22 02.0	+48.1	61.4	22 30.5	+48.9	61.8	22 58.7	+49.5	62.1	23 26.6	+50.0	62.5	23 54.1	+50.6	62.9	34
35	21 20.8	+46.3	59.7	21 50.9	+47.0	60.0	22 20.7	+47.6	60.4	22 50.2	+48.1	60.7	23 19.4	+48.7	61.1	23 48.2	+49.3	61.5	24 16.6	+49.9	61.9	24 44.7	+50.4	62.3	35
36	22 07.1	+46.1	59.0	22 37.9	+46.7	59.4	23 08.3	+47.3	59.7	23 38.3	+48.0	60.1	24 08.1	+48.5	60.5	24 37.5	+49.1	60.9	25 06.5	+49.7	61.3	25 35.1	+50.3	61.7	36
37	22 53.2	+46.0	58.3	23 24.6	+46.6	58.7	23 55.6	+47.2	59.1	24 26.3	+47.8	59.4	24 56.6	+48.4	59.8	25 26.6	+48.9	60.2	25 56.2	+49.5	60.7	26 25.4	+50.1	61.1	37
38	23 39.2	+45.8	57.6	24 11.2	+46.3	58.0	24 42.8	+47.0	58.4	25 14.1	+47.6	58.8	25 45.0	+48.2	59.2	26 15.5	+48.8	59.6	26 45.7	+49.4	60.0	27 15.5	+49.9	60.5	38
39	24 25.0	+45.5	56.9	24 57.5	+46.2	57.3	25 29.8	+46.8	57.7	26 01.7	+47.4	58.1	26 33.2	+48.0	58.5	27 04.3	+48.6	59.0	27 35.1	+49.2	59.4	28 05.4	+49.8	59.9	39
40	25 10.5	+45.4	56.2	25 43.7	+46.0	56.6	26 16.6	+46.6	57.0	26 49.1	+47.2	57.4	27 21.2	+47.8	57.8	27 52.9	+48.5	58.3	28 24.3	+49.0	58.7	28 55.2	+49.6	59.2	40
41	25 55.9	+45.1	55.5	26 29.7	+45.8	55.9	27 03.2	+46.4	56.3	27 36.3	+47.0	56.7	28 09.0	+47.6	57.2	28 41.4	+48.2	57.6	29 13.3	+48.8	58.1	29 44.8	+49.4	58.6	41
42	26 41.0	+44.9	54.7	27 15.5	+45.5	55.1	27 49.6	+46.1	55.6	28 23.3	+46.8	56.0	28 56.6	+47.4	56.5	29 29.6	+48.0	56.9	30 02.1	+48.6	57.4	30 34.2	+49.2	57.9	42
43	27 25.9	+44.6	54.0	28 01.0	+45.3	54.4	28 35.7	+45.9	54.9	29 10.1	+46.5	55.3	29 44.0	+47.2	55.8	30 17.6	+47.7	56.2	30 50.7	+48.4	56.7	31 23.4	+49.0	57.2	43
44	28 10.5	+44.4	53.2	28 46.3	+45.0	53.7	29 21.6	+45.7	54.1	29 56.6	+46.3	54.6	30 31.2	+46.9	55.1	31 05.3	+47.6	55.5	31 39.1	+48.1	56.0	32 12.4	+48.7	56.6	44
45	28 54.9	+44.2	52.5	29 31.3	+44.8	52.9	30 07.3	+45.4	53.4	30 42.9	+46.1	53.8	31 18.1	+46.7	54.3	31 52.9	+47.3	54.8	32 27.2	+47.9	55.3	33 01.1	+48.5	55.9	45
46	29 39.1	+43.8	51.7	30 16.1	+44.5	52.1	30 52.7	+45.2	52.6	31 29.0	+45.7	53.1	32 04.8	+46.4	53.6	32 40.2	+47.0	54.1	33 15.1	+47.7	54.6	33 49.6	+48.3	55.2	46
47	30 22.9	+43.6	50.9	31 00.6	+44.2	51.4	31 37.9	+44.8	51.8	32 14.7	+45.5	52.3	32 51.2	+46.1	52.8	33 27.2	+46.8	53.4	34 02.8	+47.4	53.9	34 37.9	+48.1	54.5	47
48	31 06.5	+43.3	50.1	31 44.8	+43.9	50.6	32 22.7	+44.6	51.1	33 00.2	+45.3	51.6	33 37.3	+45.9	52.1	34 14.0	+46.5	52.6	34 50.2	+47.1	53.2	35 26.0	+47.7	53.7	48
49	31 49.8	+43.0	49.3	32 28.7	+43.7	49.8	33 07.3	+44.3	50.3	33 45.5	+44.9	50.8	34 23.2	+45.5	51.3	35 00.5	+46.2	51.8	35 37.3	+46.9	52.4	36 13.7	+47.5	53.0	49
50	32 32.8	+42.6	48.5	33 12.4	+43.2	48.9	33 51.6	+43.9	49.5	34 30.4	+44.6	50.0	35 08.7	+45.3	50.5	35 46.7	+45.9	51.1	36 24.2	+46.5	51.6	37 01.2	+47.2	52.2	50
51	33 15.4	+42.3	47.6	33 55.6	+43.0	48.1	34 35.5	+43.6	48.6	35 15.0	+44.2	49.2	35 54.0	+44.9	49.7	36 32.6	+45.5	50.3	37 10.7	+46.2	50.8	37 48.4	+46.8	51.4	51
52	33 57.7	+41.9	46.8	34 38.6	+42.6	47.3	35 19.1	+43.3	47.8	35 59.2	+43.9	48.3	36 38.9	+44.6	48.9	37 18.1	+45.3	49.4	37 56.9	+45.9	50.0	38 35.2	+46.5	50.6	52
53	34 39.6	+41.6	45.9	35 21.2	+42.2	46.4	36 02.4	+42.8	46.9	36 43.1	+43.6	47.5	37 23.5	+44.2	48.0	38 03.4	+44.8	48.6	38 42.8	+45.5	49.2	39 21.7	+46.2	49.8	53
54	35 21.2	+41.2	45.0	36 03.4	+41.8	45.5	36 45.2	+42.5	46.1	37 26.7	+43.1	46.6	38 07.7	+43.8	47.2	38 48.2	+44.5	47.8	39 28.3	+45.2	48.4	40 07.9	+45.8	49.0	54
55	36 02.4	+40.7	44.1	36 45.2	+41.5	44.6	37 27.7	+42.1	45.2	38 09.8	+42.8	45.7	38 51.5	+43.4	46.3	39 32.7	+44.1	46.9	40 13.5	+44.7	47.5	40 53.7	+45.5	48.1	55
56	36 43.1	+40.4	43.2	37 26.7	+41.0	43.7	38 09.8	+41.7	44.3	38 52.6	+42.3	44.8	39 34.9	+43.0	45.4	40 16.8	+43.7	46.0	40 58.2	+44.4	46.6	41 39.2	+45.0	47.3	56
57	37 23.5	+39.9	42.3	38 07.7	+40.5	42.8	38 51.5	+41.2	43.4	39 34.9	+41.9	43.9	40 17.9	+42.6	44.5	41 00.5	+43.2	45.1	41 42.6	+43.9	45.7	42 24.2	+44.6	46.4	57
58	38 03.4	+39.4	41.3	38 48.2	+40.1	41.9	39 32.7	+40.8	42.4	40 16.8	+41.4	43.0	41 00.5	+42.1	43.6	41 43.7	+42.8	44.2	42 26.5	+43.5	44.8	43 08.8	+44.2	45.5	58
59	38 42.8	+39.0	40.4	39 28.3	+39.6	40.9	40 13.5	+40.2	41.5	40 58.2	+41.0	42.0	41 42.6	+41.6	42.6	42 26.5	+42.3	43.2	43 10.0	+43.0	43.9	43 53.0	+43.7	44.5	59
60	39 21.7	+38.5	39.4	40 07.9	+39.1	39.9	40 53.7	+39.8	40.5	41 39.2	+40.4	41.1	42 24.2	+41.1	41.7	43 08.8	+41.8	42.3	43 53.0	+42.5	42.9	44 36.7	+43.2	43.6	60
61	40 00.2	+37.9	38.4	40 47.0	+38.6	38.9	41 33.5	+39.3	39.5	42 19.6	+40.0	40.1	43 05.3	+40.7	40.7	43 50.6	+41.3	41.3	44 35.5	+42.0	41.9	45 19.9	+42.7	42.6	61
62	40 38.1	+37.4	37.4	41 25.6	+38.1	37.9	42 12.8	+38.7	38.5	42 59.6	+39.3	39.1	43 46.0	+40.0	39.7	44 31.9	+40.7	40.3	45 17.5	+41.4	40.9	46 02.6	+42.2	41.6	62
63	41 15.5	+36.8	36.4	42 03.7	+37.4	36.9	42 51.5	+38.1	37.4	43 38.9	+38.8	38.0	44 26.0	+39.5	38.6	45 12.7	+40.2	39.2	45 58.9	+40.9	39.9	46 44.8	+41.5	40.6	63
64	41 52.3	+36.3	35.3	42 41.1	+36.9	35.8	43 29.6	+37.5	36.4	44 17.7	+38.2	37.0	45 05.5	+38.9	37.6	45 52.9	+39.5	38.2	46 39.8	+40.3	38.8	47 26.3	+41.0	39.5	64
65	42 28.6	+35.6	34.2	43 18.0	+36.3	34.8	44 07.1	+36.9	35.3	44 55.9	+37.6	35.9	45 44.4	+38.2	36.5	46 32.4	+39.0	37.1	47 20.1	+39.6	37.7	48 07.3	+40.4	38.4	65
66	43 04.2	+34.9	33.1	43 54.3	+35.6	33.7	44 44.0	+36.3	34.2	45 33.5	+36.9	34.8	46 22.6	+37.6	35.4	47 11.4	+38.3	36.0	47 59.7	+39.0	36.6	48 47.7	+39.6	37.3	66
67	43 39.1	+34.3	32.0	44 29.9	+34.9	32.5	45 20.3	+35.6	33.1	46 10.4	+36.3	33.6	47 00.2	+36.9	34.2	47 49.6	+37.6	34.8	48 38.7	+38.3	35.5	49 27.3	+39.0	36.2	67
68	44 13.4	+33.7	30.9	45 04.8	+34.2	31.4	45 55.9	+34.8	31.9	46 46.7	+35.5	32.5	47 37.1	+36.2	33.1	48 27.2	+36.8	33.7	49 17.0	+37.5	34.3	50 06.3	+38.3	35.0	68
69	44 47.1	+32.8	29.7	45 39.0	+33.5	30.2	46 30.7	+34.2	30.7	47 22.2	+34.7	31.3	48 13.3	+35.4	31.9	49 04.1	+36.1	32.5	49 54.5	+36.8	33.1	50 44.6	+37.5	33.8	69
70	45 19.9	+32.2	28.5	46 12.5	+32.8	29.0	47 04.9	+33.3	29.5	47 56.9	+34.0	30.1	48 48.7	+34.6	30.7	49 40.2	+35.3	31.2	50 31.3	+36.0	31.9	51 22.1	+36.6	32.5	70
71	45 52.1	+31.4	27.3	46 45.3	+31.9	27.8	47 38.2	+32.6	28.3	48 30.9	+33.2	28.8	49 23.3	+33.8	29.4	50 15.5	+34.4	30.0	51 07.3	+35.1	30.6	51 58.7	+35.8	31.3	71
72	46 23.5	+30.5	26.1	47 17.2	+31.2	26.6	48 10.8	+31.7	27.1	49 04.1	+32.3	27.6	49 57.1	+33.0	28.1	50 49.9	+33.6	28.7	51 42.4	+34.2	29.3	52 34.5	+35.0	29.9	72
73	46 54.0	+29.7	24.8	47 48.4	+30.2	25.3	48 42.5	+30.9	25.8	49 36.4	+31.5	26.3	50 30.1	+32.0	26.8	51 23.5	+32.7	27.4	52 16.6	+33.4	28.0	53 09.5	+34.0	28.6	73
74	47 23.7	+28.9	23.6	48 18.6	+29.4	24.0	49 13.4	+29.9	24.5	50 07.9	+30.5	25.0	51 02.1	+31.2	25.5	51 56.2	+31.7	26.0	52 50.0	+32.3	26.6	53 43.5	+33.0	27.2	74
75	47 52.6	+28.0	22.3	48 48.0	+28.5	22.7	49 43.3	+29.0	23.1	50 38.4	+29.5	23.6	51 33.3	+30.1	24.1	52 27.9	+30.7	24.6	53 22.3	+31.4	25.2	54 16.5	+31.9	25.8	75
76	48 20.6	+27.0	20.9	49 16.5	+27.5	21.3	50 12.3	+28.1	21.8	51 07.9	+28.6	22.2	52 03.4	+29.1	22.7	52 58.6	+29.7	23.2	53 53.7	+30.2	23.8	54 48.4	+31.0	24.3	76
77	48 47.6	+26.0	19.6	49 44.0	+26.6	20.0	50 40.4	+27.0	20.4	51 36.5	+27.6	20.8	52 32.5	+28.1	21.3	53 28.3	+28.6	21.8	54 23.9	+29.2	22.3	55 19.4	+29.7	22.8	77
78	49 13.6	+25.1	18.2	50 10.6	+25.5	18.6	51 07.4	+26.0	19.0	52 04.1	+26.4	19.4	53 00.6	+26.9	19.8	53 56.9	+27.5	20.3	54 53.1	+28.1	20.8	55 49.1	+28.6	21.3	78
79	49 38.7	+24.1	16.8	50 36.1	+24.5	17.2	51 33.4	+24.9	17.5	52 30.5	+25.4	17.9	53 27.5	+25.9	18.3	54 24.4	+26.4	18.8	55 21.2	+26.8	19.2	56 17.7	+27.4	19.7	79
80	50 02.8	+23.0	15.4	51 00.6	+23.4	15.7	51 58.3	+23.8	16.1	52 55.9	+24.2	16.4	53 53.4	+24.6	16.8	54 50.8	+25.1	17.2	55 48.0	+25.6	17.7	56 45.1	+26.1	18.1	80
81	50 25.8	+21.9	13.9	51 24.0	+22.2	14.2	52 22.1	+22.6	14.6	53 20.1	+23.0	14.9	54 18.0	+23.5	15.3	55 15.9	+23.8	15.6	56 13.6	+24.3	16.0	57 11.2	+24.7	16.5	81
82	50 47.7	+20.7	12.5	51 46.2	+21.1	12.8	52 44.7	+21.4	13.0	53 43.1	+21.8	13.3	54 41.5	+22.1	13.7	55 39.7	+22.6	14.0	56 37.9	+22.9	14.4	57 35.9	+23.4	14.8	82
83	51 08.4	+19.7	11.0	52 07.3	+19.9	11.2	53 06.1	+20.2	11.5	54 04.9	+20.5	11.8	55 03.6	+20.9	12.1	56 02.3	+21.2	12.4	57 00.8	+21.6	12.7	57 59.3	+22.0	13.0	83
84	51 28.1	+18.4	9.5	52 27.2	+18.7	9.7	53 26.3	+19.0	9.9	54 25.4	+19.2	10.2	55 24.5	+19.5	10.4	56 23.5	+19.8	10.7	57 22.4	+20.1	11.0	58 21.3	+20.4	11.3	84
85	51 46.5	+17.2	7.9	52 45.9	+17.5	8.1	53 45.3	+17.7	8.3	54 44.7	+17.8	8.5	55 44.0	+18.1	8.7	56 43.3	+18.3	9.0	57 42.5	+18.6	9.2	58 41.7	+18.9	9.5	85
86	52 03.7	+16.0	6.4	53 03.4	+16.1	6.5	54 03.0	+16.3	6.7	55 02.5	+16.5	6.9	56 02.1	+16.7	7.0	57 01.6	+16.9	7.2	58 01.1	+17.2	7.4	59 00.6	+17.4	7.6	86
87	52 19.7	+14.8	4.8	53 19.5	+14.9	4.9	54 19.3	+15.0	5.1	55 19.0	+15.1	5.2	56 18.8	+15.2	5.3	57 18.5	+15.4	5.5	58 18.3	+15.5	5.6	59 18.0	+15.7	5.8	87
88	52 34.5	+13.4	3.2	53 34.4	+13.5	3.3	54 34.3	+13.5	3.4	55 34.1	+13.7	3.5	56 34.0	+13.8	3.6	57 33.9	+13.8	3.7	58 33.8	+13.9	3.8	59 33.7	+14.0	3.9	88
89	52 47.9	+12.1	1.6	53 47.9	+12.1	1.7	54 47.8	+12.2	1.7	55 47.8	+12.2	1.7	56 47.8	+12.2	1.8	57 47.7	+12.3	1.8	58 47.7	+12.3	1.9	59 47.7	+12.3	2.0	89
90	53 00.0	+10.8	0.0	54 00.0	+10.8	0.0	55 00.0	+10.7	0.0	56 00.0	+10.7	0.0	57 00.0	+10.7	0.0	58 00.0	+10.6	0.0	59 00.0	+10.6	0.0	60 00.0	+10.6	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	5 59.9	+48.2	98.0	5 51.5	+48.8	98.1	5 43.0	+49.3	98.2	5 34.3	+50.0	98.3	5 25.6	+50.5	98.4	5 16.8	+51.1	98.5	5 07.9	+51.6	98.6	4 58.9	+52.1	98.7	0
1	6 48.1	+48.1	97.4	6 40.3	+48.7	97.5	6 32.3	+49.4	97.6	6 24.3	+49.9	97.8	6 16.1	+50.5	97.9	6 07.9	+51.0	98.0	5 59.5	+51.6	98.1	5 51.0	+52.1	98.2	1
2	7 36.2	+48.1	96.8	7 29.0	+48.7	96.9	7 21.7	+49.3	97.1	7 14.2	+49.9	97.2	7 06.6	+50.5	97.3	6 58.9	+51.0	97.4	6 51.1	+51.5	97.6	6 43.1	+52.1	97.7	2
3	8 24.3	+48.0	96.2	8 17.7	+48.6	96.4	8 11.0	+49.2	96.5	8 04.1	+49.9	96.6	7 57.1	+50.4	96.8	7 49.9	+51.0	96.9	7 42.6	+51.6	97.1	7 35.2	+52.1	97.2	3
4	9 12.3	+47.9	95.6	9 06.3	+48.6	95.8	9 00.2	+49.2	95.9	8 54.0	+49.7	96.1	8 47.5	+50.4	96.2	8 40.9	+51.0	96.4	8 34.2	+51.5	96.5	8 27.3	+52.0	96.7	4
5	10 00.2	+47.9	95.0	9 54.9	+48.5	95.2	9 49.4	+49.1	95.3	9 43.7	+49.8	95.5	9 37.9	+50.3	95.7	9 31.9	+50.8	95.8	9 25.7	+51.4	96.0	9 19.3	+52.0	96.2	5
6	10 48.1	+47.8	94.4	10 43.4	+48.5	94.6	10 38.5	+49.1	94.8	10 33.5	+49.6	94.9	10 28.2	+50.3	95.1	10 22.7	+50.9	95.3	10 17.1	+51.4	95.5	10 11.3	+51.9	95.7	6
7	11 35.9	+47.7	93.8	11 31.9	+48.3	94.0	11 27.6	+49.0	94.2	11 23.1	+49.6	94.4	11 18.5	+50.2	94.6	11 13.6	+50.8	94.8	11 08.5	+51.3	95.0	11 03.2	+51.9	95.2	7
8	12 23.6	+47.7	93.1	12 20.2	+48.3	93.4	12 16.6	+48.9	93.6	12 12.7	+49.6	93.8	12 08.7	+50.1	94.0	12 04.4	+50.7	94.2	11 59.8	+51.3	94.4	11 55.1	+51.8	94.7	8
9	13 11.3	+47.6	92.5	13 08.5	+48.2	92.8	13 05.5	+48.9	93.0	13 02.3	+49.4	93.2	12 58.8	+50.0	93.5	12 55.1	+50.6	93.7	12 51.1	+51.2	93.9	12 46.9	+51.7	94.1	9
10	13 58.9	+47.4	91.9	13 56.7	+48.2	92.1	13 54.4	+48.7	92.4	13 51.7	+49.4	92.6	13 48.8	+50.0	92.9	13 45.7	+50.6	93.1	13 42.3	+51.1	93.4	13 38.6	+51.7	93.6	10
11	14 46.3	+47.4	91.3	14 44.9	+48.0	91.5	14 43.1	+48.7	91.8	14 41.1	+49.3	92.1	14 38.8	+49.9	92.3	14 36.3	+50.5	92.6	14 33.4	+51.1	92.8	14 30.3	+51.7	93.1	11
12	15 33.7	+47.2	90.6	15 32.9	+47.9	90.9	15 31.8	+48.5	91.2	15 30.4	+49.2	91.5	15 28.7	+49.8	91.7	15 26.8	+50.4	92.0	15 24.5	+51.0	92.3	15 22.0	+51.5	92.6	12
13	16 20.9	+47.1	90.0	16 20.8	+47.8	90.3	16 20.3	+48.5	90.6	16 19.6	+49.1	90.9	16 18.5	+49.7	91.2	16 17.2	+50.3	91.4	16 15.5	+50.9	91.7	16 13.5	+51.5	92.0	13
14	17 08.0	+47.0	89.3	17 08.6	+47.6	89.6	17 08.8	+48.3	90.0	17 08.7	+48.9	90.3	17 08.2	+49.6	90.6	17 07.5	+50.2	90.9	17 06.4	+50.8	91.2	17 05.0	+51.4	91.5	14
15	17 55.0	+46.9	88.7	17 56.2	+47.6	89.0	17 57.1	+48.2	89.3	17 57.6	+48.9	89.7	17 57.8	+49.5	90.0	17 57.7	+50.1	90.3	17 57.2	+50.7	90.6	17 56.4	+51.3	91.0	15
16	18 41.9	+46.7	88.0	18 43.8	+47.4	88.4	18 45.3	+48.1	88.7	18 46.5	+48.8	89.0	18 47.3	+49.4	89.4	18 47.8	+50.0	89.7	18 47.9	+50.6	90.1	18 47.7	+51.1	90.4	16
17	19 28.6	+46.6	87.4	19 31.2	+47.3	87.7	19 33.4	+48.0	88.1	19 35.3	+48.6	88.4	19 36.7	+49.3	88.8	19 37.8	+49.9	89.1	19 38.5	+50.5	89.5	19 38.8	+51.1	89.9	17
18	20 15.2	+46.5	86.7	20 18.5	+47.1	87.1	20 21.4	+47.8	87.4	20 23.9	+48.5	87.8	20 26.0	+49.1	88.2	20 27.7	+49.8	88.6	20 29.0	+50.4	88.9	20 29.9	+51.0	89.3	18
19	21 01.7	+46.2	86.0	21 05.6	+47.0	86.4	21 09.2	+47.7	86.8	21 12.4	+48.3	87.2	21 15.1	+49.0	87.6	21 17.5	+49.6	88.0	21 19.4	+50.3	88.3	21 20.9	+50.9	88.7	19
20	21 47.9	+46.1	85.3	21 52.6	+46.8	85.7	21 56.9	+47.5	86.1	22 00.7	+48.2	86.5	22 04.1	+48.9	86.9	22 07.1	+49.5	87.3	22 09.7	+50.1	87.8	22 11.8	+50.7	88.2	20
21	22 34.0	+46.0	84.6	22 39.4	+46.7	85.1	22 44.4	+47.3	85.5	22 48.9	+48.0	85.9	22 53.0	+48.7	86.3	22 56.6	+49.4	86.7	22 59.8	+50.0	87.2	23 02.5	+50.7	87.6	21
22	23 20.0	+45.7	83.9	23 26.1	+46.4	84.4	23 31.7	+47.2	84.8	23 36.9	+47.9	85.2	23 41.7	+48.5	85.7	23 46.0	+49.2	86.1	23 49.8	+49.9	86.6	23 53.2	+50.5	87.0	22
23	24 05.7	+45.5	83.2	24 12.5	+46.3	83.7	24 18.9	+47.0	84.1	24 24.8	+47.7	84.6	24 30.2	+48.4	85.0	24 35.2	+49.0	85.5	24 39.7	+49.7	85.9	24 43.7	+50.3	86.4	23
24	24 51.2	+45.4	82.5	24 58.8	+46.1	83.0	25 05.9	+46.8	83.4	25 12.5	+47.5	83.9	25 18.6	+48.2	84.4	25 24.2	+48.9	84.9	25 29.4	+49.5	85.3	25 34.0	+50.2	85.8	24
25	25 36.6	+45.1	81.8	25 44.9	+45.8	82.3	25 52.7	+46.6	82.8	26 00.0	+47.3	83.2	26 06.8	+48.0	83.7	26 13.1	+48.7	84.2	26 18.9	+49.4	84.7	26 24.2	+50.0	85.2	25
26	26 21.7	+44.8	81.1	26 30.7	+45.7	81.6	26 39.3	+46.4	82.1	26 47.3	+47.1	82.6	26 54.8	+47.9	83.1	27 01.8	+48.6	83.6	27 08.3	+49.2	84.1	27 14.2	+49.9	84.6	26
27	27 06.5	+44.7	80.3	27 16.4	+45.4	80.8	27 25.7	+46.1	81.3	27 34.4	+47.0	81.9	27 42.7	+47.6	82.4	27 50.4	+48.3	82.9	27 57.5	+49.0	83.4	28 04.1	+49.7	83.9	27
28	27 51.2	+44.4	79.6	28 01.8	+45.2	80.1	28 11.8	+46.0	80.6	28 21.4	+46.6	81.1	28 30.3	+47.4	81.7	28 38.7	+48.1	82.2	28 46.5	+48.9	82.8	28 53.8	+49.5	83.3	28
29	28 35.6	+44.1	78.8	28 47.0	+44.9	79.3	28 57.8	+45.7	79.9	29 08.0	+46.5	80.4	29 17.7	+47.2	81.0	29 26.8	+48.0	81.5	29 35.4	+48.6	82.1	29 43.3	+49.4	82.7	29
30	29 19.7	+43.9	78.0	29 31.9	+44.7	78.6	29 43.5	+45.4	79.1	29 54.5	+46.2	79.7	30 04.9	+47.0	80.3	30 14.8	+47.7	80.8	30 24.0	+48.4	81.4	30 32.7	+49.1	82.0	30
31	30 03.6	+43.6	77.2	30 16.6	+44.3	77.8	30 28.9	+45.2	78.4	30 40.7	+46.0	79.0	30 51.9	+46.7	79.6	31 02.5	+47.4	80.1	31 12.4	+48.2	80.7	31 21.8	+48.9	81.3	31
32	30 47.2	+43.3	76.4	31 00.9	+44.1	77.0	31 14.1	+44.9	77.6	31 26.7	+45.7	78.2	31 38.6	+46.5	78.8	31 49.9	+47.3	79.4	32 00.6	+48.0	80.0	32 10.7	+48.7	80.7	32
33	31 30.5	+42.9	75.6	31 45.0	+43.8	76.2	31 59.0	+44.6	76.8	32 12.4	+45.4	77.5	32 25.1	+46.2	78.1	32 37.2	+46.9	78.7	32 48.6	+47.7	79.3	32 59.4	+48.4	80.0	33
34	32 13.4	+42.7	74.8	32 28.8	+43.5	75.4	32 43.6	+44.3	76.0	32 57.8	+45.1	76.7	33 11.3	+45.9	77.3	33 24.1	+46.7	78.0	33 36.3	+47.5	78.6	33 47.8	+48.2	79.3	34
35	32 56.1	+42.3	74.0	33 12.3	+43.2	74.6	33 27.9	+44.0	75.2	33 42.9	+44.8	75.9	33 57.2	+45.6	76.5	34 10.8	+46.4	77.2	34 23.8	+47.2	77.9	34 36.0	+48.0	78.5	35
36	33 38.4	+42.0	73.1	33 55.5	+42.8	73.8	34 11.9	+43.7	74.4	34 27.7	+44.5	75.1	34 42.8	+45.3	75.8	34 57.2	+46.1	76.4	35 11.0	+46.9	77.1	35 24.0	+47.7	77.8	36
37	34 20.4	+41.5	72.3	34 38.3	+42.5	72.9	34 55.6	+43.3	73.6	35 12.2	+44.1	74.3	35 28.1	+45.0	75.0	35 43.3	+45.8	75.6	35 57.9	+46.6	76.3	36 11.7	+47.4	77.1	37
38	35 01.9	+41.2	71.4	35 20.8	+42.0	72.1	35 38.9	+42.9	72.7	35 56.3	+43.8	73.4	36 13.1	+44.6	74.1	36 29.1	+45.5	74.8	36 44.5	+46.3	75.6	36 59.1	+47.1	76.3	38
39	35 43.1	+40.9	70.5	36 02.8	+41.7	71.2	36 21.8	+42.6	71.9	36 40.1	+43.5	72.6	36 57.7	+44.3	73.3	37 14.6	+45.2	74.0	37 30.8	+45.9	74.8	37 46.2	+46.7	75.5	39
40	36 24.0	+40.3	69.6	36 44.5	+41.3	70.3	37 04.4	+42.2	71.0	37 23.6	+43.0	71.7	37 42.0	+44.0	72.5	37 59.8	+44.7	73.2	38 16.7	+45.6	73.9	38 32.9	+46.5	74.7	40
41	37 04.3	+40.0	68.7	37 25.8	+40.9	69.4	37 46.6	+41.7	70.1	38 06.6	+42.7	70.8	38 26.0	+43.5	71.6	38 44.5	+44.4	72.3	39 02.3	+45.3	73.1	39 19.4	+46.1	73.9	41
42	37 44.3	+39.5	67.7	38 06.7	+40.4	68.5	38 28.3	+41.4	69.2	38 49.3	+42.2	69.9	39 09.5	+43.1	70.7	39 28.9	+44.0	71.5	39 47.6	+44.9	72.3	40 05.5	+45.7	73.1	42
43	38 23.8	+39.0	66.8	38 47.1	+39.9	67.5	39 09.7	+40.8	68.3	39 31.5	+41.8	69.0	39 52.6	+42.7	69.8	40 12.9	+43.6	70.6	40 32.5	+44.5	71.4	40 51.2	+45.3	72.2	43
44	39 02.8	+38.5	65.8	39 27.0	+39.5	66.6	39 50.5	+40.4	67.3	40 13.3	+41.3	68.1	40 35.3	+42.3	68.9	40 56.5	+43.2	69.7	41 17.0	+44.0	70.5	41 36.6	+44.9	71.3	44
45	39 41.3	+38.0	64.8	40 06.5	+39.0	65.6	40 30.9	+39.9	66.3	40 54.6	+40.9	67.1	41 17.6	+41.7	67.9	41 39.7	+42.7	68.8	42 01.0	+43.6	69.6	42 21.5	+44.5	70.5	45
46	40 19.3	+37.5	63.8	40 45.5	+38.4	64.6	41 10.8	+39.4	65.4	41 35.5	+40.3	66.2	41 59.3	+41.3	67.0	42 22.4	+42.2	67.8	42 44.6	+43.2	68.7	43 06.0	+44.1	69.5	46
47	40 56.8	+36.9	62.8	41 23.9	+37.9	63.6	41 50.2	+38.9	64.4	42 15.8	+39.8	65.2	42 40.6	+40.8	66.0	43 04.6	+41.7	66.9	43 27.8	+42.7	67.7	43 50.1	+43.6	68.6	47
48	41 33.7	+36.3	61.7	42 01.8	+37.3	62.5	42 29.1	+38.3	63.3	42 55.6	+39.3	64.2	43 21.4	+40.2	65.0	43 46.3	+41.2	65.9	44 10.5	+42.1	66.7	44 33.7	+43.1	67.6	48
49	42 10.0	+35.8	60.7	42 39.1	+36.7	61.5	43 07.4	+37.7	62.3	43 34.9	+38.7	63.1	44 01.6	+39.7	64.0	44 27.5	+40.7	64.9	44 52.6	+41.6	65.7	45 16.8	+42.6	66.7	49
50	42 45.8	+35.1	59.6	43 15.8	+36.1	60.4	43 45.1	+37.1	61.2	44 13.6	+38.1	62.1	44 41.3	+39.1	62.9	45 08.2	+40.1	63.8	45 34.2	+41.1	64.7	45 59.4	+42.1	65.7	50
51	43 20.9	+34.4	58.5	43 51.9	+35.4	59.3	44 22.2	+36.4	60.1	44 51.7	+37.4	61.0	45 20.4	+38.5	61.9	45 48.3	+39.5	62.8	46 15.3	+40.5	63.7	46 41.5	+41.5	64.6	51
52	43 55.3	+33.7	57.3	44 27.3	+34.8	58.1	44 58.6	+35.8	59.0	45 29.1	+36.8	59.9	45 58.9	+37.8	60.8	46 27.8	+38.8	61.7	46 55.8	+39.9	62.6	47 23.0	+40.8	63.6	52
53	44 29.0	+33.1	56.2	45 02.1	+34.0	57.0	45 34.4	+35.1	57.9	46 05.9	+36.1	58.7	46 36.7	+37.1	59.6	47 06.6	+38.2	60.5	47 35.7	+39.2	61.5	48 03.8	+40.3	62.5	53
54	45 02.1	+32.3	55.0	45 36.1	+33.4	55.8	46 09.5	+34.3	56.7	46 42.0	+35.4	57.6	47 13.8	+36.5	58.5	47 44.8	+37.5	59.4	48 14.9	+38.5	60.4	48 44.1	+39.6	61.4	54
55	45 34.4	+31.5	53.8	46 09.5	+32.5	54.6	46 43.8	+33.6	55.5	47 17.4	+34.7	56.4	47 50.3	+35.7	57.3	48 22.3	+36.7	58.2	48 53.4	+37.8	59.2	49 23.7	+38.8	60.2	55
56	46 05.9	+30.8	52.6	46 42.0	+31.8	53.4	47 17.4	+32.9	54.3	47 52.1	+33.9	55.2	48 26.0	+34.9	56.1	48 59.0	+36.0	57.0	49 31.2	+37.1	58.0	50 02.5	+38.2	59.0	56
57	46 36.7	+29.9	51.3	47 13.8	+31.0	52.2	47 50.3	+32.0	53.0	48 26.0	+33.0	53.9	49 00.9	+34.1	54.9	49 35.0	+35.2	55.8	50 08.3	+36.3	56.8	50 40.7	+37.4	57.8	57
58	47 06.6	+29.1	50.1	47 44.8	+30.1	50.9	48 22.3	+31.1	51.8	48 59.0	+32.2	52.7	49 35.0	+33.3	53.6	50 10.2	+34.4	54.6	50 44.6	+35.4	55.6	51 18.1	+36.5	56.6	58
59	47 35.7	+28.1	48.8	48 14.9	+29.2	49.6	48 53.4	+30.3	50.5	49 31.2	+31.3	51.4	50 08.3	+32.4	52.3	50 44.6	+33.5	53.3	51 20.0	+34.6	54.3	51 54.6	+35.7	55.3	59
60	48 03.8	+27.3	47.5	48 44.1	+28.3	48.3	49 23.7	+29.3	49.2	50 02.5	+30.4	50.1	50 40.7	+31.5	51.0	51 18.1	+32.5	52.0	51 54.6	+33.7	53.0	52 30.3	+34.8	54.0	60
61	48 31.1	+26.3	46.1	49 12.4	+27.3	47.0	49 53.0	+28.4	47.8	50 32.9	+29.5	48.7	51 12.2	+30.5	49.6	51 50.6	+31.7	50.6	52 28.3	+32.8	51.6	53 05.1	+33.9	52.6	61
62	48 57.4	+25.3	44.8	49 39.7	+26.4	45.6	50 21.4	+27.4	46.4	51 02.4	+28.4	47.3	51 42.7	+29.5	48.3	52 22.3	+30.6	49.2	53 01.1	+31.7	50.2	53 39.0	+32.9	51.3	62
63	49 22.7	+24.4	43.4	50 06.1	+25.3	44.2	50 48.8	+26.3	45.0	51 30.8	+27.5	45.9	52 12.2	+28.5	46.8	52 52.9	+29.6	47.8	53 32.8	+30.7	48.8	54 11.9	+31.9	49.8	63
64	49 47.1	+23.2	42.0	50 31.4	+24.3	42.8	51 15.1	+25.4	43.6	51 58.3	+26.3	44.5	52 40.7	+27.5	45.4	53 22.5	+28.5	46.4	54 03.5	+29.7	47.4	54 43.8	+30.8	48.4	64
65	50 10.3	+22.2	40.5	50 55.7	+23.2	41.3	51 40.5	+24.2	42.2	52 24.6	+25.3	43.0	53 08.2	+26.3	43.9	53 51.0	+27.4	44.9	54 33.2	+28.5	45.9	55 14.6	+29.7	46.9	65
66	50 32.5	+21.1	39.1	51 18.9	+22.0	39.9	52 04.7	+23.0	40.7	52 49.9	+24.1	41.5	53 34.5	+25.1	42.4	54 18.4	+26.3	43.4	55 01.7	+27.4	44.3	55 44.3	+28.4	45.4	66
67	50 53.6	+20.0	37.6	51 40.9	+21.0	38.4	52 27.7	+21.9	39.2	53 14.0	+22.9	40.0	53 59.6	+24.0	40.9	54 44.7	+25.0	41.8	55 29.1	+26.1	42.8	56 12.7	+27.3	43.8	67
68	51 13.6	+18.8	36.1	52 01.9	+19.7	36.8	52 49.6	+20.7	37.6	53 36.9	+21.7	38.5	54 23.6	+22.7	39.3	55 09.7	+23.8	40.2	55 55.2	+24.9	41.2	56 40.0	+26.0	42.2	68
69	51 32.4	+17.6	34.6	52 21.6	+18.5	35.3	53 10.3	+19.5	36.1	53 58.6	+20.4	36.9	54 46.3	+21.4	37.7	55 33.5	+22.4	38.6	56 20.1	+23.5	39.5	57 06.0	+24.7	40.5	69
70	51 50.0	+16.4	33.0	52 40.1	+17.2	33.7	53 29.8	+18.1	34.5	54 19.0	+19.1	35.3	55 07.7	+20.1	36.1	55 55.9	+21.2	37.0	56 43.6	+22.2	37.9	57 30.7	+23.2	38.8	70
71	52 06.4	+15.1	31.5	52 57.3	+16.0	32.2	53 47.9	+16.9	32.9	54 38.1	+17.8	33.6	55 27.8	+18.8	34.4	56 17.1	+19.7	35.3	57 05.8	+20.7	36.2	57 53.9	+21.9	37.1	71
72	52 21.5	+13.8	29.9	53 13.3	+14.7	30.6	54 04.8	+15.5	31.2	54 55.9	+16.4	32.0	55 46.6	+17.3	32.8	56 36.8	+18.3	33.6	57 26.5	+19.4	34.4	58 15.8	+20.3	35.3	72
73	52 35.3	+12.5	28.3	53 28.0	+13.3	28.9	54 20.3	+14.2	29.6	55 12.3	+15.0	30.3	56 03.9	+15.9	31.0	56 55.1	+16.9	31.8	57 45.9	+17.8	32.7	58 36.1	+18.8	33.6	73
74	52 47.8	+11.3	26.7	53 41.3	+12.0	27.3	54 34.5	+12.7	27.9	55 27.3	+13.6	28.6	56 19.8	+14.5	29.3	57 12.0	+15.3	30.1	58 03.7	+16.2	30.9	58 54.9	+17.3	31.7	74
75	52 59.1	+9.8	25.0	53 53.3	+10.6	25.6	54 47.2	+11.4	26.2	55 40.9	+12.1	26.9	56 34.3	+12.9	27.6	57 27.3	+13.8	28.3	58 19.9	+14.7	29.0	59 12.2	+15.6	29.9	75
76	53 08.9	+8.5	23.4	54 03.9	+9.1	24.0	54 58.6	+9.9	24.5	55 53.0	+10.7	25.1	56 47.2	+11.4	25.8	57 41.1	+12.2	26.5	58 34.6	+13.1	27.2	59 27.8	+14.0	28.0	76
77	53 17.4	+7.1	21.8	54 13.0	+7.8	22.3	55 08.5	+8.4	22.8	56 03.7	+9.1	23.4	56 58.6	+9.9	24.0	57 53.3	+10.6	24.6	58 47.7	+11.4	25.3	59 41.8	+12.2	26.0	77
78	53 24.5	+5.8	20.1	54 20.8	+6.3	20.6	55 16.9	+6.9	21.1	56 12.8	+7.6	21.6	57 08.5	+8.2	22.2	58 03.9	+9.0	22.8	58 59.1	+9.7	23.4	59 54.0	+10.5	24.1	78
79	53 30.3	+4.3	18.4	54 27.1	+4.9	18.9	55 23.8	+5.5	19.3	56 20.4	+6.0	19.8	57 16.7	+6.7	20.3	58 12.9	+7.3	20.9	59 08.8	+8.0	21.5	60 04.5	+8.7	22.1	79
80	53 34.6	+2.9	16.7	54 32.0	+3.4	17.1	55 29.3	+3.9	17.6	56 26.4	+4.4	18.0	57 23.4	+5.0	18.5	58 20.2	+5.6	19.0	59 16.8	+6.3	19.6	60 13.2	+7.0	20.1	80
81	53 37.5	+1.5	15.1	54 35.4	+1.9	15.4	55 33.2	+2.4	15.8	56 30.8	+2.9	16.2	57 28.4	+3.4	16.6	58 25.8	+3.9	17.1	59 23.1	+4.5	17.6	60 20.2	+5.1	18.1	81
82	53 39.0	0.0	13.4	54 37.3	+0.5	13.7	55 35.6	+0.8	14.0	56 33.7	+1.3	14.4	57 31.8	+1.7	14.8	58 29.7	+2.3	15.2	59 27.6	+2.7	15.6	60 25.3	+3.3	16.1	82
83	53 39.0	−1.3	11.7	54 37.8	−1.1	12.0	55 36.4	−0.6	12.3	56 35.0	−0.3	12.6	57 33.5	+0.2	12.9	58 32.0	+0.5	13.3	59 30.3	+1.0	13.7	60 28.6	+1.4	14.1	83
84	53 37.7	−2.8	10.0	54 36.7	−2.4	10.2	55 35.8	−2.2	10.5	56 34.7	−1.8	10.8	57 33.7	−1.6	11.1	58 32.5	−1.2	11.4	59 31.3	−0.8	11.7	60 30.0	−0.4	12.1	84
85	53 34.9	−4.2	8.3	54 34.3	−4.0	8.5	55 33.6	−3.7	8.7	56 32.9	−3.5	9.0	57 32.1	−3.2	9.2	58 31.3	−2.9	9.5	59 30.5	−2.6	9.7	60 29.6	−2.3	10.0	85
86	53 30.7	−5.6	6.6	54 30.3	−5.4	6.8	55 29.9	−5.3	7.0	56 29.4	−5.0	7.1	57 28.9	−4.8	7.3	58 28.4	−4.6	7.5	59 27.9	−4.4	7.8	60 27.3	−4.1	8.0	86
87	53 25.1	−7.0	5.0	54 24.9	−6.9	5.1	55 24.6	−6.6	5.2	56 24.4	−6.6	5.3	57 24.1	−6.4	5.5	58 23.8	−6.2	5.6	59 23.5	−5.9	5.8	60 23.2	−5.9	6.0	87
88	53 18.1	−8.4	3.3	54 18.0	−8.3	3.4	55 17.9	−8.2	3.5	56 17.8	−8.1	3.6	57 17.7	−8.1	3.6	58 17.6	−8.0	3.7	59 17.4	−7.8	3.9	60 17.3	−7.8	4.0	88
89	53 09.7	−9.7	1.6	54 09.7	−9.7	1.7	55 09.7	−9.7	1.7	56 09.7	−9.6	1.8	57 09.6	−9.6	1.8	58 09.6	−9.6	1.9	59 09.6	−9.6	1.9	60 09.5	−9.5	2.0	89
90	53 00.0	−11.1	0.0	54 00.0	−11.1	0.0	55 00.0	−11.1	0.0	56 00.0	−11.2	0.0	57 00.0	−11.2	0.0	58 00.0	−11.2	0.0	59 00.0	−11.3	0.0	60 00.0	−11.3	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° (Hc d Z)	54° (Hc d Z)	55° (Hc d Z)	56° (Hc d Z)	57° (Hc d Z)	58° (Hc d Z)	59° (Hc d Z)	60° (Hc d Z)	Dec.
0	5 59.9 −48.2 98.0	5 51.5 −48.8 98.1	5 43.0 −49.4 98.2	5 34.3 −50.0 98.3	5 25.6 −50.5 98.4	5 16.8 −51.1 98.5	5 07.9 −51.7 98.6	4 58.9 −52.2 98.7	0
1	5 11.7 −48.2 98.6	5 02.7 −48.9 98.7	4 53.6 −49.5 98.8	4 44.3 −50.0 98.9	4 35.1 −50.6 99.0	4 25.7 −51.2 99.0	4 16.2 −51.6 99.1	4 06.7 −52.2 99.2	1
2	4 23.5 −48.3 99.2	4 13.8 −48.8 99.3	4 04.1 −49.4 99.4	3 54.3 −50.0 99.4	3 44.5 −50.6 99.5	3 34.5 −51.1 99.6	3 24.6 −51.7 99.6	3 14.5 −52.2 99.7	2
3	3 35.2 −48.3 99.8	3 25.0 −48.9 99.9	3 14.7 −49.5 99.9	3 04.8 −50.1 100.0	2 53.9 −50.7 100.0	2 43.4 −51.2 100.1	2 32.9 −51.7 100.1	2 22.3 −52.2 100.2	3
4	2 46.9 −48.3 100.4	2 36.1 −48.9 100.4	2 25.2 −49.5 100.5	2 14.2 −50.0 100.5	2 03.2 −50.6 100.6	1 52.2 −51.2 100.6	1 41.2 −51.7 100.6	1 30.1 −52.2 100.7	4
5	1 58.6 −48.3 101.0	1 47.2 −49.0 101.0	1 35.7 −49.5 101.1	1 24.2 −50.1 101.1	1 12.6 −50.6 101.1	1 01.0 −51.1 101.1	0 49.5 −51.7 101.1	0 37.9 −52.3 101.2	5
6	1 10.3 −48.3 101.6	0 58.2 −48.9 101.6	0 46.2 −49.5 101.6	0 34.1 −50.1 101.6	0 22.0 −50.7 101.6	0 09.9 −51.2 101.6	0 02.2 +51.8 78.4	0 14.4 +52.2 78.4	6
7	0 22.0 −48.3 102.2	0 09.3 −48.9 102.2	0 03.3 +49.5 77.8	0 16.0 +50.1 77.8	0 28.7 +50.6 77.8	0 41.3 +51.2 77.8	0 54.0 +51.7 77.8	1 06.6 +52.2 77.9	7
8	0 26.3 +48.4 77.2	0 39.6 +48.9 77.2	0 52.8 +49.6 77.2	1 06.1 +50.1 77.3	1 19.3 +50.6 77.3	1 32.5 +51.2 77.3	1 45.7 +51.7 77.3	1 58.8 +52.2 77.4	8
9	1 14.7 +48.3 76.6	1 28.5 +48.9 76.7	1 42.4 +49.4 76.7	1 56.2 +50.0 76.7	2 09.9 +50.6 76.7	2 23.7 +51.1 76.8	2 37.4 +51.6 76.8	2 51.0 +52.2 76.9	9
10	2 03.0 +48.3 76.0	2 17.4 +48.9 76.1	2 31.8 +49.5 76.1	2 46.2 +50.1 76.2	3 00.5 +50.6 76.2	3 14.8 +51.2 76.3	3 29.0 +51.7 76.3	3 43.2 +52.2 76.4	10
11	2 51.3 +48.3 75.4	3 06.3 +48.9 75.5	3 21.3 +49.5 75.6	3 36.3 +50.0 75.6	3 51.1 +50.6 75.7	4 06.0 +51.1 75.7	4 20.7 +51.7 75.8	4 35.4 +52.1 75.9	11
12	3 39.6 +48.2 74.9	3 55.2 +48.9 74.9	4 10.8 +49.4 75.0	4 26.3 +50.0 75.1	4 41.7 +50.6 75.1	4 57.1 +51.1 75.2	5 12.4 +51.6 75.3	5 27.5 +52.2 75.4	12
13	4 27.8 +48.3 74.3	4 44.1 +48.8 74.3	5 00.2 +49.4 74.4	5 16.3 +50.0 74.5	5 32.3 +50.5 74.6	5 48.2 +51.0 74.7	6 04.0 +51.6 74.8	6 19.7 +52.1 74.9	13
14	5 16.1 +48.2 73.7	5 32.9 +48.8 73.8	5 49.6 +49.4 73.8	6 06.3 +49.9 73.9	6 22.8 +50.5 74.1	6 39.2 +51.1 74.2	6 55.6 +51.6 74.3	7 11.8 +52.0 74.4	14
15	6 04.3 +48.1 73.1	6 21.7 +48.7 73.2	6 39.0 +49.3 73.3	6 56.2 +49.9 73.4	7 13.3 +50.5 73.5	7 30.3 +51.0 73.6	7 47.1 +51.5 73.8	8 03.8 +52.1 73.9	15
16	6 52.4 +48.1 72.5	7 10.4 +48.7 72.6	7 28.3 +49.3 72.7	7 46.1 +49.9 72.8	8 03.8 +50.4 73.0	8 21.3 +50.9 73.1	8 38.6 +51.5 73.2	8 55.9 +52.0 73.4	16
17	7 40.5 +48.1 71.9	7 59.1 +48.7 72.0	8 17.6 +49.3 72.1	8 36.0 +49.8 72.3	8 54.2 +50.3 72.4	9 12.2 +50.9 72.6	9 30.1 +51.5 72.7	9 47.9 +51.9 72.9	17
18	8 28.6 +48.0 71.3	8 47.8 +48.6 71.4	9 06.9 +49.1 71.5	9 25.8 +49.7 71.7	9 44.5 +50.3 71.9	10 03.1 +50.9 72.0	10 21.6 +51.3 72.2	10 39.8 +51.9 72.4	18
19	9 16.6 +47.9 70.6	9 36.4 +48.5 70.8	9 56.0 +49.2 71.0	10 15.5 +49.7 71.1	10 34.8 +50.3 71.3	10 54.0 +50.8 71.5	11 12.9 +51.4 71.7	11 31.7 +51.9 71.9	19
20	10 04.5 +47.9 70.0	10 24.9 +48.5 70.2	10 45.2 +49.0 70.4	11 05.2 +49.7 70.6	11 25.1 +50.2 70.8	11 44.8 +50.7 70.9	12 04.3 +51.2 71.1	12 23.6 +51.7 71.4	20
21	10 52.4 +47.8 69.4	11 13.4 +48.4 69.6	11 34.2 +49.0 69.8	11 54.9 +49.5 70.0	12 15.3 +50.1 70.2	12 35.5 +50.7 70.4	12 55.5 +51.2 70.6	13 15.3 +51.8 70.8	21
22	11 40.2 +47.7 68.8	12 01.8 +48.3 69.0	12 23.2 +48.9 69.2	12 44.4 +49.5 69.4	13 05.4 +50.0 69.6	13 26.2 +50.6 69.9	13 46.7 +51.2 70.1	14 07.1 +51.6 70.3	22
23	12 27.9 +47.7 68.2	12 50.1 +48.3 68.4	13 12.1 +48.8 68.6	13 33.9 +49.4 68.8	13 55.4 +50.0 69.1	14 16.8 +50.5 69.3	14 37.9 +51.0 69.5	14 58.7 +51.6 69.8	23
24	13 15.6 +47.5 67.6	13 38.4 +48.1 67.8	14 00.9 +48.8 68.0	14 23.3 +49.3 68.2	14 45.4 +49.9 68.5	15 07.3 +50.4 68.7	15 28.9 +51.0 69.0	15 50.3 +51.5 69.3	24
25	14 03.1 +47.5 66.9	14 26.5 +48.1 67.2	14 49.7 +48.6 67.4	15 12.6 +49.2 67.7	15 35.3 +49.8 67.9	15 57.7 +50.4 68.2	16 19.9 +50.9 68.4	16 41.8 +51.4 68.7	25
26	14 50.6 +47.3 66.3	15 14.6 +47.9 66.6	15 38.3 +48.6 66.8	16 01.8 +49.2 67.1	16 25.1 +49.7 67.3	16 48.1 +50.2 67.6	17 10.8 +50.8 67.9	17 33.2 +51.4 68.2	26
27	15 37.9 +47.3 65.7	16 02.5 +47.9 65.9	16 26.9 +48.4 66.2	16 51.0 +49.0 66.5	17 14.8 +49.6 66.7	17 38.3 +50.2 67.0	18 01.6 +50.7 67.3	18 24.6 +51.2 67.6	27
28	16 25.2 +47.1 65.0	16 50.4 +47.7 65.3	17 15.3 +48.3 65.6	17 40.0 +48.9 65.9	18 04.4 +49.5 66.2	18 28.5 +50.0 66.5	18 52.3 +50.6 66.8	19 15.8 +51.2 67.1	28
29	17 12.3 +47.0 64.4	17 38.1 +47.6 64.7	18 03.6 +48.2 65.0	18 28.9 +48.8 65.3	18 53.9 +49.3 65.6	19 18.5 +50.0 65.9	19 42.9 +50.5 66.2	20 07.0 +51.0 66.5	29
30	17 59.3 +46.8 63.7	18 25.7 +47.5 64.0	18 51.8 +48.1 64.3	19 17.7 +48.6 64.6	19 43.2 +49.3 65.0	20 08.5 +49.8 65.3	20 33.4 +50.4 65.6	20 58.0 +50.9 66.0	30
31	18 46.1 +46.7 63.1	19 13.2 +47.3 63.4	19 39.9 +47.9 63.7	20 06.3 +48.6 64.0	20 32.5 +49.1 64.4	20 58.3 +49.7 64.7	21 23.8 +50.2 65.0	21 48.9 +50.8 65.4	31
32	19 32.8 +46.6 62.4	20 00.5 +47.2 62.7	20 27.8 +47.8 63.1	20 54.9 +48.4 63.4	21 21.6 +49.0 63.7	21 48.0 +49.5 64.1	22 14.0 +50.1 64.5	22 39.7 +50.7 64.8	32
33	20 19.4 +46.4 61.7	20 47.7 +47.0 62.1	21 15.6 +47.7 62.4	21 43.3 +48.2 62.8	22 10.6 +48.8 63.1	22 37.5 +49.4 63.5	23 04.1 +50.0 63.9	23 30.4 +50.5 64.2	33
34	21 05.8 +46.3 61.1	21 34.7 +46.9 61.4	22 03.3 +47.5 61.8	22 31.5 +48.1 62.1	22 59.4 +48.7 62.5	23 26.9 +49.3 62.9	23 54.1 +49.9 63.3	24 20.9 +50.5 63.7	34
35	21 52.1 +46.1 60.4	22 21.6 +46.7 60.7	22 50.8 +47.3 61.1	23 19.6 +47.9 61.5	23 48.1 +48.5 61.8	24 16.2 +49.1 62.2	24 44.0 +49.7 62.6	25 11.4 +50.2 63.1	35
36	22 38.2 +45.9 59.7	23 08.3 +46.5 60.0	23 38.1 +47.1 60.4	24 07.5 +47.8 60.8	24 36.6 +48.4 61.2	25 05.3 +49.0 61.6	25 33.7 +49.5 62.0	26 01.6 +50.1 62.5	36
37	23 24.1 +45.7 59.0	23 54.8 +46.4 59.4	24 25.2 +47.0 59.7	24 55.3 +47.6 60.1	25 25.0 +48.2 60.5	25 54.3 +48.8 61.0	26 23.2 +49.4 61.4	26 51.7 +50.0 61.8	37
38	24 09.8 +45.5 58.3	24 41.2 +46.1 58.7	25 12.2 +46.8 59.1	25 42.9 +47.4 59.5	26 13.2 +48.0 59.9	26 43.1 +48.6 60.3	27 12.6 +49.2 60.8	27 41.7 +49.8 61.2	38
39	24 55.3 +45.3 57.6	25 27.3 +46.0 58.0	25 59.0 +46.6 58.4	26 30.3 +47.2 58.8	27 01.2 +47.8 59.2	27 31.7 +48.4 59.7	28 01.8 +49.0 60.1	28 31.5 +49.6 60.6	39
40	25 40.6 +45.1 56.8	26 13.3 +45.7 57.2	26 45.6 +46.3 57.7	27 17.5 +46.9 58.1	27 49.0 +47.6 58.5	28 20.1 +48.2 59.0	28 50.8 +48.8 59.5	29 21.1 +49.4 59.9	40
41	26 25.7 +44.9 56.1	26 59.0 +45.5 56.5	27 31.9 +46.2 56.9	28 04.4 +46.8 57.4	28 36.6 +47.4 57.8	29 08.3 +48.0 58.3	29 39.6 +48.6 58.8	30 10.5 +49.2 59.3	41
42	27 10.6 +44.6 55.4	27 44.5 +45.3 55.8	28 18.1 +45.9 56.2	28 51.2 +46.6 56.7	29 24.0 +47.1 57.1	29 56.3 +47.8 57.6	30 28.2 +48.4 58.1	30 59.7 +49.0 58.6	42
43	27 55.2 +44.4 54.6	28 29.8 +45.0 55.0	29 04.0 +45.6 55.5	29 37.8 +46.3 56.0	30 11.1 +46.9 56.4	30 44.1 +47.6 56.9	31 16.6 +48.2 57.4	31 48.7 +48.8 57.9	43
44	28 39.6 +44.1 53.8	29 14.8 +44.8 54.3	29 49.6 +45.4 54.7	30 24.1 +46.0 55.2	30 58.1 +46.7 55.7	31 31.7 +47.3 56.2	32 04.8 +47.9 56.7	32 37.5 +48.6 57.3	44
45	29 23.7 +43.8 53.1	29 59.6 +44.5 53.5	30 35.0 +45.2 54.0	31 10.1 +45.8 54.5	31 44.8 +46.4 55.0	32 19.0 +47.0 55.5	32 52.7 +47.7 56.0	33 26.1 +48.3 56.6	45
46	30 07.5 +43.6 52.3	30 44.1 +44.2 52.7	31 20.2 +44.8 53.2	31 55.9 +45.5 53.7	32 31.2 +46.1 54.2	33 06.0 +46.8 54.7	33 40.4 +47.5 55.3	34 14.4 +48.0 55.8	46
47	30 51.1 +43.2 51.5	31 28.3 +43.9 51.9	32 05.0 +44.6 52.4	32 41.4 +45.2 52.9	33 17.3 +45.9 53.5	33 52.8 +46.6 54.0	34 27.9 +47.1 54.6	35 02.4 +47.8 55.1	47
48	31 34.3 +43.0 50.7	32 12.2 +43.6 51.1	32 49.6 +44.3 51.6	33 26.6 +45.0 52.2	34 03.2 +45.6 52.7	34 39.4 +46.2 53.2	35 15.0 +46.9 53.8	35 50.2 +47.6 54.4	48
49	32 17.3 +42.6 49.8	32 55.8 +43.3 50.3	33 33.9 +43.9 50.8	34 11.6 +44.6 51.4	34 48.8 +45.3 51.9	35 25.6 +45.9 52.5	36 01.9 +46.6 53.0	36 37.8 +47.2 53.6	49
50	32 59.9 +42.3 49.0	33 39.1 +42.9 49.5	34 17.8 +43.6 50.0	34 56.2 +44.2 50.5	35 34.1 +44.9 51.1	36 11.5 +45.5 51.7	36 48.5 +46.3 52.2	37 25.0 +46.9 52.8	50
51	33 42.2 +41.9 48.2	34 22.0 +42.6 48.7	35 01.4 +43.3 49.2	35 40.4 +44.0 49.7	36 19.0 +44.6 50.3	36 57.1 +45.3 50.9	37 34.8 +45.9 51.4	38 11.9 +46.6 52.1	51
52	34 24.1 +41.6 47.3	35 04.6 +42.2 47.8	35 44.7 +42.9 48.3	36 24.4 +43.6 48.9	37 03.6 +44.3 49.4	37 42.4 +44.9 50.0	38 20.7 +45.6 50.6	38 58.5 +46.3 51.3	52
53	35 05.7 +41.1 46.4	35 46.8 +41.9 46.9	36 27.6 +42.5 47.5	37 08.0 +43.1 48.0	37 47.9 +43.8 48.6	38 27.3 +44.5 49.2	39 06.3 +45.2 49.8	39 44.8 +45.9 50.6	53
54	35 46.8 +40.8 45.5	36 28.7 +41.4 46.0	37 10.1 +42.1 46.6	37 51.1 +42.8 47.1	38 31.7 +43.5 47.7	39 11.9 +44.1 48.3	39 51.5 +44.9 48.9	40 30.7 +45.5 49.6	54
55	36 27.6 +40.4 44.6	37 10.1 +41.0 45.1	37 52.2 +41.7 45.7	38 33.9 +42.4 46.3	39 15.2 +43.1 46.8	39 56.0 +43.8 47.4	40 36.4 +44.4 48.1	41 16.2 +45.1 48.7	55
56	37 08.0 +39.9 43.7	37 51.1 +40.6 44.2	38 33.9 +41.3 44.8	39 16.3 +42.0 45.3	39 58.3 +42.6 45.9	40 39.8 +43.3 46.6	41 20.8 +44.0 47.2	42 01.3 +44.7 47.8	56
57	37 47.9 +39.4 42.7	38 31.7 +40.2 43.3	39 15.2 +40.8 43.8	39 58.3 +41.5 44.4	40 40.9 +42.2 45.0	41 23.1 +42.9 45.6	42 04.8 +43.6 46.3	42 46.0 +44.3 46.9	57
58	38 27.3 +39.0 41.8	39 11.9 +39.6 42.3	39 56.0 +40.4 42.9	40 39.8 +41.0 43.5	41 23.1 +41.7 44.1	42 06.0 +42.4 44.7	42 48.4 +43.1 45.3	43 30.3 +43.8 46.0	58
59	39 06.3 +38.5 40.8	39 51.5 +39.2 41.4	40 36.4 +39.8 41.9	41 20.8 +40.5 42.5	42 04.8 +41.2 43.1	42 48.4 +41.9 43.7	43 31.5 +42.6 44.4	44 14.1 +43.4 45.1	59
60	39 44.8 +37.9 39.8	40 30.7 +38.6 40.4	41 16.2 +39.3 40.9	42 01.3 +40.0 41.5	42 46.0 +40.7 42.1	43 30.3 +41.4 42.8	44 14.1 +42.2 43.4	44 57.5 +42.8 44.1	60
61	40 22.7 +37.4 38.8	41 09.3 +38.1 39.4	41 55.5 +38.8 39.9	42 41.3 +39.5 40.5	43 26.7 +40.2 41.1	44 11.7 +40.9 41.8	44 56.3 +41.5 42.4	45 40.3 +42.3 43.1	61
62	41 00.1 +36.9 37.8	41 47.4 +37.5 38.3	42 34.3 +38.2 38.9	43 20.8 +38.9 39.5	44 06.9 +39.6 40.1	44 52.6 +40.3 40.7	45 37.8 +41.1 41.4	46 22.6 +41.8 42.1	62
63	41 37.0 +36.3 36.7	42 24.9 +37.0 37.3	43 12.5 +37.6 37.8	43 59.7 +38.3 38.4	44 46.5 +39.0 39.0	45 32.9 +39.7 39.7	46 18.9 +40.4 40.3	47 04.4 +41.1 41.0	63
64	42 13.3 +35.7 35.7	43 01.9 +36.3 36.2	43 50.1 +37.0 36.8	44 38.0 +37.7 37.3	45 25.5 +38.4 38.0	46 12.6 +39.1 38.6	46 59.3 +39.8 39.3	47 45.5 +40.5 40.0	64
65	42 49.0 +35.0 34.6	43 38.2 +35.7 35.1	44 27.1 +36.4 35.7	45 15.7 +37.0 36.2	46 03.9 +37.7 36.9	46 51.7 +38.4 37.5	47 39.1 +39.1 38.2	48 26.0 +39.9 38.9	65
66	43 24.0 +34.4 33.5	44 13.9 +35.0 34.0	45 03.5 +35.7 34.5	45 52.7 +36.4 35.1	46 41.6 +37.1 35.7	47 30.1 +37.8 36.4	48 18.2 +38.5 37.0	49 05.9 +39.2 37.7	66
67	43 58.4 +33.6 32.3	44 48.9 +34.3 32.8	45 39.2 +35.0 33.4	46 29.1 +35.6 34.0	47 18.7 +36.3 34.6	48 07.9 +37.0 35.2	48 56.7 +37.8 35.9	49 45.1 +38.5 36.6	67
68	44 32.0 +33.0 31.2	45 23.2 +33.7 31.7	46 14.2 +34.2 32.3	47 04.7 +35.0 32.8	47 55.0 +35.6 33.4	48 44.9 +36.3 34.0	49 34.5 +37.0 34.7	50 23.6 +37.7 35.3	68
69	45 05.0 +32.3 30.0	45 56.9 +32.8 30.5	46 48.4 +33.5 31.0	47 39.7 +34.1 31.6	48 30.6 +34.8 32.2	49 21.2 +35.5 32.8	50 11.5 +36.2 33.5	51 01.3 +37.0 34.1	69
70	45 37.3 +31.4 28.8	46 29.7 +32.1 29.3	47 21.9 +32.7 29.8	48 13.8 +33.4 30.4	49 05.4 +34.0 31.0	49 56.7 +34.7 31.6	50 47.7 +35.4 32.2	51 38.3 +36.1 32.9	70
71	46 08.7 +30.7 27.6	47 01.8 +31.3 28.1	47 54.6 +31.9 28.6	48 47.2 +32.5 29.1	49 39.4 +33.2 29.7	50 31.4 +33.8 30.3	51 23.1 +34.5 30.9	52 14.4 +35.2 31.6	71
72	46 39.4 +29.8 26.3	47 33.1 +30.4 26.8	48 26.5 +31.0 27.3	49 19.7 +31.6 27.8	50 12.6 +32.3 28.4	51 05.2 +33.0 29.0	51 57.6 +33.6 29.6	52 49.6 +34.3 30.2	72
73	47 09.2 +29.0 25.0	48 03.5 +29.6 25.5	48 57.5 +30.2 26.0	49 51.3 +30.8 26.5	50 44.9 +31.4 27.1	51 38.2 +32.0 27.6	52 31.2 +32.7 28.2	53 23.9 +33.3 28.9	73
74	47 38.2 +28.1 23.8	48 33.1 +28.6 24.2	49 27.7 +29.2 24.7	50 22.1 +29.8 25.2	51 16.3 +30.4 25.7	52 10.2 +31.0 26.3	53 03.9 +31.6 26.9	53 57.2 +32.4 27.5	74
75	48 06.3 +27.2 22.4	49 01.7 +27.7 22.9	49 56.9 +28.2 23.3	50 51.9 +28.8 23.8	51 46.7 +29.4 24.3	52 41.2 +30.0 24.9	53 35.5 +30.7 25.4	54 29.6 +31.3 26.0	75
76	48 33.5 +26.2 21.1	49 29.4 +26.7 21.5	50 25.1 +27.3 22.0	51 20.7 +27.8 22.4	52 16.1 +28.3 22.9	53 11.2 +29.0 23.4	54 06.2 +29.5 24.0	55 00.9 +30.1 24.6	76
77	48 59.7 +25.3 19.7	49 56.1 +25.8 20.1	50 52.4 +26.2 20.6	51 48.5 +26.7 21.0	52 44.4 +27.3 21.5	53 40.2 +27.8 22.0	54 35.7 +28.4 22.5	55 31.0 +29.1 23.0	77
78	49 25.0 +24.2 18.3	50 21.9 +24.6 18.7	51 18.6 +25.2 19.1	52 15.2 +25.7 19.5	53 11.7 +26.2 20.0	54 08.0 +26.7 20.5	55 04.1 +27.3 20.9	56 00.1 +27.8 21.5	78
79	49 49.2 +23.2 16.9	50 46.5 +23.7 17.3	51 43.8 +24.0 17.7	52 40.9 +24.5 18.1	53 37.9 +25.0 18.5	54 34.7 +25.5 18.9	55 31.4 +26.0 19.4	56 27.9 +26.6 19.9	79
80	50 12.4 +22.1 15.5	51 10.2 +22.5 15.8	52 07.8 +22.9 16.2	53 05.4 +23.3 16.5	54 02.9 +23.8 16.9	55 00.2 +24.3 17.3	55 57.4 +24.8 17.8	56 54.5 +25.2 18.3	80
81	50 34.5 +21.0 14.0	51 32.7 +21.3 14.3	52 30.7 +21.8 14.7	53 28.7 +22.2 15.0	54 26.7 +22.5 15.4	55 24.5 +22.9 15.7	56 22.2 +23.4 16.2	57 19.7 +23.9 16.6	81
82	50 55.5 +19.8 12.6	51 54.0 +20.2 12.8	52 52.5 +20.5 13.1	53 50.9 +20.9 13.4	54 49.2 +21.3 13.8	55 47.4 +21.7 14.1	56 45.6 +22.0 14.5	57 43.6 +22.5 14.9	82
83	51 15.3 +18.7 11.1	52 14.2 +19.0 11.3	53 13.0 +19.3 11.6	54 11.8 +19.6 11.8	55 10.5 +19.9 12.1	56 09.1 +20.3 12.4	57 07.6 +20.7 12.8	58 06.1 +21.0 13.1	83
84	51 34.0 +17.5 9.7	52 33.2 +17.7 9.9	53 32.3 +18.0 10.0	54 31.4 +18.3 10.2	55 30.4 +18.6 10.5	56 29.4 +18.8 10.8	57 28.3 +19.2 11.1	58 27.1 +19.6 11.3	84
85	51 51.5 +16.3 8.0	52 50.9 +16.5 8.2	53 50.3 +16.7 8.4	54 49.6 +17.0 8.6	55 49.0 +17.1 8.8	56 48.2 +17.4 9.0	57 47.5 +17.6 9.3	58 46.7 +17.9 9.5	85
86	52 07.8 +15.0 6.4	53 07.4 +15.2 6.6	54 07.0 +15.3 6.7	55 06.6 +15.5 6.9	56 06.1 +15.7 7.1	57 05.6 +16.0 7.3	58 05.1 +16.2 7.5	59 04.6 +16.4 7.7	86
87	52 22.8 +13.7 4.8	53 22.6 +13.8 5.0	54 22.3 +14.0 5.1	55 22.1 +14.1 5.2	56 21.8 +14.3 5.3	57 21.6 +14.3 5.5	58 21.3 +14.5 5.6	59 21.0 +14.7 5.8	87
88	52 36.5 +12.4 3.2	53 36.4 +12.5 3.3	54 36.3 +12.6 3.4	55 36.2 +12.6 3.5	56 36.1 +12.7 3.6	57 35.9 +12.9 3.7	58 35.8 +12.9 3.8	59 35.7 +13.0 3.9	88
89	52 48.9 +11.1 1.6	53 48.9 +11.1 1.7	54 48.9 +11.1 1.7	55 48.8 +11.2 1.8	56 48.8 +11.2 1.8	57 48.8 +11.2 1.8	58 48.7 +11.3 1.9	59 48.7 +11.3 2.0	89
90	53 00.0 +9.7 0.0	54 00.0 +9.7 0.0	55 00.0 +9.7 0.0	56 00.0 +9.7 0.0	57 00.0 +9.6 0.0	58 00.0 +9.6 0.0	59 00.0 +9.6 0.0	60 00.0 +9.5 0.0	90
	53°	54°	55°	56°	57°	58°	59°	60°	

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 100°, 260°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	5 24.1	+48.1	97.2	5 16.5	+48.8	97.3	5 08.9	+49.3	97.4	5 01.1	+49.9	97.5	4 53.3	+50.4	97.6	4 45.3	+51.1	97.7	4 37.3	+51.6	97.7	4 29.2	+52.1	97.8	0
1	6 12.2	+48.1	96.6	6 05.3	+48.7	96.7	5 58.2	+49.3	96.8	5 51.0	+49.9	96.9	5 43.7	+50.5	97.0	5 36.4	+51.0	97.1	5 28.9	+51.5	97.2	5 21.3	+52.1	97.3	1
2	7 00.3	+48.0	96.0	6 54.0	+48.6	96.1	6 47.5	+49.3	96.2	6 40.9	+49.9	96.4	6 34.2	+50.4	96.5	6 27.4	+51.0	96.6	6 20.4	+51.6	96.7	6 13.4	+52.0	96.8	2
3	7 48.3	+48.0	95.4	7 42.6	+48.6	95.5	7 36.8	+49.2	95.7	7 30.8	+49.8	95.8	7 24.6	+50.4	95.9	7 18.4	+50.9	96.1	7 12.0	+51.6	96.2	7 05.4	+52.0	96.3	3
4	8 36.3	+47.9	94.8	8 31.2	+48.6	94.9	8 26.0	+49.1	95.1	8 20.6	+49.7	95.2	8 15.0	+50.3	95.4	8 09.3	+50.9	95.5	8 03.4	+51.5	95.7	7 57.4	+52.0	95.8	4
5	9 24.2	+47.9	94.2	9 19.8	+48.5	94.4	9 15.1	+49.1	94.5	9 10.3	+49.7	94.7	9 05.3	+50.3	94.8	9 00.2	+50.9	95.0	8 54.9	+51.4	95.2	8 49.4	+52.0	95.3	5
6	10 12.1	+47.8	93.6	10 08.3	+48.4	93.8	10 04.2	+49.1	93.9	10 00.0	+49.7	94.1	9 55.6	+50.3	94.3	9 51.1	+50.8	94.5	9 46.3	+51.4	94.6	9 41.4	+51.9	94.8	6
7	10 59.9	+47.7	93.0	10 56.7	+48.3	93.2	10 53.3	+48.9	93.3	10 49.7	+49.6	93.5	10 45.9	+50.1	93.7	10 41.9	+50.7	93.9	10 37.7	+51.3	94.1	10 33.3	+51.8	94.3	7
8	11 47.6	+47.6	92.3	11 45.0	+48.3	92.5	11 42.2	+48.9	92.8	11 39.3	+49.5	93.0	11 36.0	+50.2	93.2	11 32.6	+50.7	93.4	11 29.0	+51.2	93.6	11 25.1	+51.8	93.8	8
9	12 35.2	+47.6	91.7	12 33.3	+48.2	91.9	12 31.1	+48.9	92.2	12 28.8	+49.4	92.4	12 26.2	+50.0	92.6	12 23.3	+50.6	92.8	12 20.2	+51.2	93.0	12 16.9	+51.8	93.3	9
10	13 22.8	+47.4	91.1	13 21.5	+48.1	91.3	13 20.0	+48.7	91.6	13 18.2	+49.4	91.8	13 16.2	+50.0	92.0	13 13.9	+50.6	92.3	13 11.4	+51.2	92.5	13 08.7	+51.7	92.7	10
11	14 10.2	+47.4	90.5	14 09.6	+48.0	90.7	14 08.7	+48.7	91.0	14 07.6	+49.2	91.2	14 06.2	+49.8	91.5	14 04.5	+50.5	91.7	14 02.6	+51.0	92.0	14 00.4	+51.6	92.2	11
12	14 57.6	+47.2	89.8	14 57.6	+47.9	90.1	14 57.4	+48.5	90.4	14 56.8	+49.2	90.6	14 56.0	+49.8	90.9	14 55.0	+50.4	91.2	14 53.6	+51.0	91.4	14 52.0	+51.5	91.7	12
13	15 44.8	+47.1	89.2	15 45.5	+47.8	89.5	15 45.9	+48.5	89.8	15 46.0	+49.1	90.0	15 45.8	+49.7	90.3	15 45.4	+50.3	90.6	15 44.6	+50.9	90.9	15 43.5	+51.5	91.2	13
14	16 31.9	+47.1	88.5	16 33.3	+47.7	88.8	16 34.4	+48.3	89.1	16 35.1	+49.0	89.4	16 35.5	+49.5	89.7	16 35.7	+50.2	90.0	16 35.5	+50.8	90.3	16 35.0	+51.4	90.6	14
15	17 19.0	+46.8	87.9	17 21.0	+47.6	88.2	17 22.7	+48.2	88.5	17 24.1	+48.9	88.8	17 25.2	+49.5	89.1	17 25.9	+50.1	89.5	17 26.3	+50.7	89.8	17 26.4	+51.3	90.1	15
16	18 05.8	+46.8	87.2	18 08.6	+47.4	87.6	18 10.9	+48.1	87.9	18 13.0	+48.7	88.2	18 14.7	+49.3	88.6	18 16.0	+50.0	88.9	18 17.0	+50.6	89.2	18 17.7	+51.1	89.5	16
17	18 52.6	+46.6	86.6	18 56.0	+47.3	86.9	18 59.0	+48.0	87.3	19 01.7	+48.7	87.6	19 04.0	+49.3	88.0	19 06.0	+49.9	88.3	19 07.6	+50.5	88.6	19 08.8	+51.1	89.0	17
18	19 39.2	+46.5	85.9	19 43.3	+47.2	86.3	19 47.0	+47.8	86.6	19 50.4	+48.5	87.0	19 53.3	+49.2	87.3	19 55.9	+49.8	87.7	19 58.1	+50.4	88.1	19 59.9	+51.0	88.4	18
19	20 25.7	+46.3	85.2	20 30.5	+47.0	85.6	20 34.8	+47.7	86.0	20 38.9	+48.3	86.4	20 42.5	+49.0	86.7	20 45.7	+49.6	87.1	20 48.5	+50.3	87.5	20 50.9	+50.9	87.9	19
20	21 12.0	+46.1	84.6	21 17.5	+46.8	84.9	21 22.5	+47.6	85.3	21 27.2	+48.2	85.7	21 31.5	+48.9	86.1	21 35.3	+49.6	86.5	21 38.8	+50.1	86.9	21 41.8	+50.8	87.3	20
21	21 58.1	+46.0	83.9	22 04.3	+46.7	84.3	22 10.1	+47.4	84.7	22 15.4	+48.1	85.1	22 20.4	+48.7	85.5	22 24.9	+49.4	85.9	22 28.9	+50.1	86.3	22 32.6	+50.6	86.7	21
22	22 44.1	+45.8	83.2	22 51.0	+46.5	83.6	22 57.5	+47.2	84.0	23 03.5	+47.9	84.4	23 09.1	+48.6	84.9	23 14.3	+49.2	85.3	23 19.0	+49.8	85.7	23 23.2	+50.5	86.1	22
23	23 29.9	+45.6	82.5	23 37.5	+46.3	82.9	23 44.7	+47.0	83.3	23 51.4	+47.8	83.8	23 57.7	+48.4	84.2	24 03.5	+49.1	84.7	24 08.8	+49.8	85.1	24 13.7	+50.4	85.6	23
24	24 15.5	+45.3	81.8	24 23.8	+46.2	82.2	24 31.7	+46.9	82.7	24 39.2	+47.5	83.1	24 46.1	+48.3	83.6	24 52.6	+48.9	84.0	24 58.6	+49.6	84.5	25 04.1	+50.2	85.0	24
25	25 00.8	+45.2	81.0	25 10.0	+45.9	81.5	25 18.6	+46.6	82.0	25 26.7	+47.4	82.4	25 34.4	+48.0	82.9	25 41.5	+48.8	83.3	25 48.2	+49.4	83.9	25 53.8	+50.1	84.4	25
26	25 46.0	+45.0	80.3	25 55.9	+45.7	80.8	26 05.2	+46.5	81.3	26 14.1	+47.2	81.8	26 22.4	+47.9	82.2	26 30.3	+48.5	82.7	26 37.6	+49.2	83.2	26 44.4	+49.9	83.7	26
27	26 31.0	+44.7	79.6	26 41.6	+45.5	80.1	26 51.7	+46.2	80.6	27 01.3	+46.9	81.1	27 10.3	+47.7	81.6	27 18.8	+48.4	82.1	27 26.8	+49.1	82.6	27 34.3	+49.7	83.1	27
28	27 15.7	+44.5	78.8	27 27.1	+45.2	79.3	27 37.9	+46.0	79.8	27 48.2	+46.8	80.4	27 58.0	+47.5	80.9	28 07.2	+48.2	81.4	28 15.9	+48.9	81.9	28 24.0	+49.6	82.5	28
29	28 00.2	+44.3	78.1	28 12.3	+45.1	78.6	28 23.9	+45.8	79.1	28 35.0	+46.5	79.7	28 45.5	+47.3	80.2	28 55.4	+48.0	80.7	29 04.8	+48.7	81.3	29 13.6	+49.4	81.8	29
30	28 44.5	+43.9	77.3	28 57.4	+44.7	77.8	29 09.7	+45.6	78.4	29 21.5	+46.3	78.9	29 32.8	+47.0	79.5	29 43.4	+47.8	80.0	29 53.5	+48.5	80.6	30 03.0	+49.2	81.2	30
31	29 28.4	+43.7	76.5	29 42.1	+44.5	77.1	29 55.3	+45.2	77.6	30 07.8	+46.1	78.2	30 19.8	+46.8	78.8	30 31.2	+47.5	79.3	30 42.0	+48.2	79.9	30 52.2	+48.9	80.5	31
32	30 12.1	+43.4	75.7	30 26.6	+44.2	76.3	30 40.5	+45.0	76.9	30 53.9	+45.8	77.5	31 06.6	+46.5	78.0	31 18.7	+47.3	78.6	31 30.2	+48.1	79.2	31 41.1	+48.8	79.8	32
33	30 55.5	+43.1	74.9	31 10.8	+44.0	75.5	31 25.5	+44.8	76.1	31 39.7	+45.5	76.7	31 53.1	+46.3	77.3	32 06.0	+47.1	77.9	32 18.3	+47.8	78.5	32 29.9	+48.5	79.2	33
34	31 38.6	+42.8	74.1	31 54.8	+43.6	74.7	32 10.3	+44.4	75.3	32 25.2	+45.2	75.9	32 39.4	+46.1	76.6	32 53.1	+46.8	77.2	33 06.1	+47.5	77.8	33 18.4	+48.3	78.5	34
35	32 21.4	+42.5	73.3	32 38.4	+43.3	73.9	32 54.7	+44.1	74.5	33 10.4	+44.9	75.2	33 25.5	+45.7	75.8	33 39.9	+46.5	76.4	33 53.6	+47.3	77.1	34 06.7	+48.0	77.7	35
36	33 03.9	+42.1	72.5	33 21.7	+42.9	73.1	33 38.8	+43.8	73.7	33 55.3	+44.7	74.4	34 11.2	+45.4	75.0	34 26.4	+46.2	75.7	34 40.9	+47.0	76.3	34 54.7	+47.8	77.0	36
37	33 46.0	+41.8	71.6	34 04.6	+42.7	72.2	34 22.6	+43.5	72.9	34 40.0	+44.2	73.5	34 56.6	+45.1	74.2	35 12.6	+45.9	74.9	35 27.9	+46.7	75.6	35 42.5	+47.5	76.3	37
38	34 27.8	+41.4	70.7	34 47.3	+42.2	71.4	35 06.1	+43.1	72.0	35 24.2	+44.0	72.7	35 41.7	+44.8	73.4	35 58.5	+45.6	74.1	36 14.6	+46.4	74.8	36 30.0	+47.2	75.5	38
39	35 09.2	+41.0	69.9	35 29.5	+41.9	70.5	35 49.2	+42.7	71.2	36 08.2	+43.6	71.9	36 26.5	+44.4	72.6	36 44.1	+45.3	73.3	37 01.0	+46.1	74.0	37 17.2	+46.8	74.7	39
40	35 50.2	+40.6	69.0	36 11.4	+41.5	69.6	36 31.9	+42.4	70.3	36 51.8	+43.2	71.0	37 10.9	+44.1	71.7	37 29.4	+44.9	72.5	37 47.1	+45.7	73.2	38 04.0	+46.6	74.0	40
41	36 30.8	+40.1	68.0	36 52.9	+41.0	68.7	37 14.3	+41.9	69.4	37 35.0	+42.8	70.2	37 55.0	+43.7	70.9	38 14.3	+44.5	71.6	38 32.8	+45.4	72.4	38 50.6	+46.2	73.1	41
42	37 10.9	+39.8	67.1	37 33.9	+40.7	67.8	37 56.2	+41.6	68.5	38 17.8	+42.5	69.3	38 38.7	+43.3	70.0	38 58.8	+44.2	70.8	39 18.2	+45.1	71.5	39 36.8	+45.9	72.3	42
43	37 50.7	+39.2	66.2	38 14.6	+40.2	66.9	38 37.8	+41.1	67.6	39 00.3	+41.9	68.4	39 22.0	+42.9	69.1	39 43.0	+43.8	69.9	40 03.3	+44.6	70.7	40 22.7	+45.5	71.5	43
44	38 29.9	+38.8	65.2	38 54.8	+39.7	65.9	39 18.9	+40.6	66.7	39 42.2	+41.6	67.4	40 04.9	+42.4	68.2	40 26.8	+43.3	69.0	40 47.9	+44.2	69.8	41 08.2	+45.1	70.6	44
45	39 08.7	+38.3	64.2	39 34.5	+39.2	65.0	39 59.5	+40.1	65.7	40 23.8	+41.1	66.5	40 47.3	+42.0	67.3	41 10.1	+42.9	68.1	41 32.1	+43.8	68.9	41 53.3	+44.7	69.7	45
46	39 47.0	+37.8	63.2	40 13.7	+38.7	64.0	40 39.6	+39.7	64.8	41 04.9	+40.5	65.5	41 29.3	+41.5	66.3	41 53.0	+42.5	67.2	42 15.9	+43.4	68.0	42 38.0	+44.2	68.8	46
47	40 24.8	+37.2	62.2	40 52.4	+38.2	63.0	41 19.3	+39.1	63.8	41 45.4	+40.1	64.6	42 10.8	+41.1	65.4	42 35.5	+41.9	66.2	42 59.3	+42.8	67.1	43 22.2	+43.8	67.9	47
48	41 02.0	+36.6	61.2	41 30.6	+37.6	62.0	41 58.4	+38.6	62.7	42 25.5	+39.6	63.6	42 51.9	+40.4	64.4	43 17.4	+41.4	65.2	43 42.1	+42.4	66.1	44 06.0	+43.3	67.0	48
49	41 38.6	+36.1	60.1	42 08.2	+37.0	60.9	42 37.0	+38.0	61.7	43 05.1	+38.9	62.5	43 32.3	+40.0	63.4	43 58.8	+40.9	64.2	44 24.5	+41.9	65.1	44 49.3	+42.9	66.0	49
50	42 14.7	+35.5	59.1	42 45.2	+36.4	59.8	43 15.0	+37.4	60.6	43 44.0	+38.4	61.5	44 12.3	+39.4	62.3	44 39.7	+40.4	63.2	45 06.4	+41.3	64.1	45 32.2	+42.2	65.0	50
51	42 50.2	+34.8	58.0	43 21.6	+35.8	58.8	43 52.4	+36.8	59.6	44 22.4	+37.8	60.4	44 51.7	+38.7	61.3	45 20.1	+39.7	62.2	45 47.7	+40.7	63.1	46 14.4	+41.8	64.0	51
52	43 25.0	+34.1	56.8	43 57.4	+35.2	57.6	44 29.2	+36.1	58.5	45 00.2	+37.1	59.3	45 30.4	+38.2	60.2	45 59.8	+39.2	61.1	46 28.4	+40.2	62.0	46 56.2	+41.1	62.9	52
53	43 59.1	+33.5	55.7	44 32.6	+34.4	56.5	45 05.3	+35.5	57.3	45 37.3	+36.5	58.2	46 08.6	+37.4	59.1	46 39.0	+38.5	60.0	47 08.6	+39.5	60.9	47 37.3	+40.5	61.9	53
54	44 32.6	+32.7	54.5	45 07.0	+33.8	55.3	45 40.8	+34.8	56.2	46 13.8	+35.8	57.1	46 46.0	+36.8	57.9	47 17.5	+37.8	58.9	47 48.1	+38.8	59.8	48 17.8	+39.9	60.8	54
55	45 05.3	+32.0	53.4	45 40.8	+33.0	54.2	46 15.6	+34.0	55.0	46 49.6	+35.0	55.9	47 22.8	+36.1	56.8	47 55.3	+37.1	57.7	48 26.9	+38.2	58.7	48 57.7	+39.2	59.6	55
56	45 37.3	+31.3	52.2	46 13.8	+32.3	53.0	46 49.6	+33.3	53.8	47 24.6	+34.3	54.7	47 58.9	+35.3	55.6	48 32.4	+36.4	56.5	49 05.1	+37.4	57.5	49 36.9	+38.5	58.5	56
57	46 08.6	+30.4	50.9	46 46.0	+31.5	51.8	47 22.8	+32.5	52.6	47 58.9	+33.5	53.5	48 34.2	+34.6	54.4	49 08.8	+35.6	55.3	49 42.5	+36.7	56.3	50 15.4	+37.7	57.3	57
58	46 39.0	+29.6	49.7	47 17.5	+30.6	50.5	47 55.3	+31.6	51.4	48 32.4	+32.7	52.2	49 08.8	+33.7	53.1	49 44.4	+34.8	54.1	50 19.2	+35.8	55.1	50 53.1	+36.9	56.1	58
59	47 08.6	+28.7	48.4	47 48.1	+29.7	49.2	48 26.9	+30.8	50.1	49 05.1	+31.8	51.0	49 42.5	+32.9	51.9	50 19.2	+33.9	52.9	50 55.0	+35.0	53.8	51 30.0	+36.1	54.8	59
60	47 37.3	+27.8	47.1	48 17.8	+28.9	47.9	48 57.7	+29.9	48.8	49 36.9	+30.9	49.7	50 15.4	+31.9	50.6	50 53.1	+33.0	51.5	51 30.0	+34.2	52.5	52 06.1	+35.3	53.5	60
61	48 05.1	+27.0	45.8	48 46.7	+27.9	46.6	49 27.6	+28.9	47.5	50 07.8	+30.0	48.3	50 47.3	+31.1	49.2	51 26.1	+32.2	50.2	52 04.2	+33.2	51.2	52 41.4	+34.3	52.2	61
62	48 32.1	+25.9	44.4	49 14.6	+27.0	45.3	49 56.5	+28.0	46.1	50 37.8	+29.0	47.0	51 18.4	+30.1	47.9	51 58.3	+31.1	48.9	52 37.4	+32.2	49.8	53 15.7	+33.3	50.8	62
63	48 58.0	+25.0	43.1	49 41.6	+25.9	43.9	50 24.5	+27.0	44.7	51 06.8	+28.0	45.6	51 48.5	+29.0	46.5	52 29.4	+30.2	47.4	53 09.6	+31.3	48.4	53 49.1	+32.3	49.4	63
64	49 23.0	+23.9	41.7	50 07.5	+25.0	42.5	50 51.5	+25.9	43.3	51 34.8	+27.0	44.2	52 17.5	+28.1	45.1	52 59.6	+29.1	46.0	53 40.9	+30.2	47.0	54 21.4	+31.4	48.0	64
65	49 46.9	+22.9	40.3	50 32.5	+23.8	41.1	51 17.4	+24.9	41.9	52 01.8	+25.9	42.7	52 45.6	+26.9	43.6	53 28.7	+28.0	44.5	54 11.1	+29.1	45.5	54 52.8	+30.2	46.5	65
66	50 09.8	+21.9	38.8	50 56.3	+22.8	39.6	51 42.3	+23.7	40.4	52 27.7	+24.8	41.2	53 12.5	+25.8	42.1	53 56.7	+26.8	43.0	54 40.2	+27.9	44.0	55 23.0	+29.1	45.0	66
67	50 31.7	+20.7	37.4	51 19.1	+21.7	38.1	52 06.0	+22.7	38.9	52 52.5	+23.6	39.7	53 38.3	+24.6	40.6	54 23.5	+25.7	41.5	55 08.1	+26.8	42.5	55 52.1	+27.8	43.5	67
68	50 52.4	+19.6	35.9	51 40.8	+20.4	36.6	52 28.7	+21.4	37.4	53 16.1	+22.4	38.2	54 02.9	+23.5	39.1	54 49.2	+24.5	40.0	55 34.9	+25.5	40.9	56 19.5	+26.7	41.9	68
69	51 12.0	+18.3	34.4	52 01.2	+19.3	35.1	52 50.1	+20.2	35.9	53 38.5	+21.2	36.7	54 26.4	+22.1	37.5	55 13.7	+23.2	38.4	56 00.4	+24.3	39.3	56 46.6	+25.3	40.2	69
70	51 30.3	+17.2	32.9	52 20.5	+18.1	33.6	53 10.3	+19.0	34.3	53 59.7	+19.9	35.1	54 48.5	+20.9	35.9	55 36.9	+21.8	36.7	56 24.7	+22.9	37.6	57 11.9	+24.0	38.6	70
71	51 47.5	+16.0	31.3	52 38.6	+16.8	32.0	53 29.3	+17.7	32.7	54 19.6	+18.6	33.5	55 09.4	+19.5	34.3	55 58.7	+20.6	35.1	56 47.6	+21.5	36.0	57 35.9	+22.6	36.9	71
72	52 03.5	+14.7	29.8	52 55.4	+15.6	30.4	53 47.0	+16.4	31.1	54 38.2	+17.2	31.8	55 28.9	+18.2	32.6	56 19.3	+19.1	33.4	57 09.1	+20.1	34.2	57 58.5	+21.1	35.1	72
73	52 18.2	+13.5	28.2	53 11.0	+14.2	28.8	54 03.4	+15.0	29.5	54 55.4	+15.9	30.2	55 47.1	+16.8	30.9	56 38.4	+17.7	31.7	57 29.2	+18.7	32.5	58 19.6	+19.6	33.4	73
74	52 31.7	+12.1	26.6	53 25.2	+12.9	27.2	54 18.4	+13.7	27.8	55 11.3	+14.5	28.5	56 03.9	+15.3	29.2	56 56.1	+16.2	29.9	57 47.9	+17.1	30.7	58 39.2	+18.1	31.6	74
75	52 43.8	+10.8	25.0	53 38.1	+11.6	25.5	54 32.1	+12.2	26.1	55 25.8	+13.0	26.8	56 19.2	+13.8	27.4	57 12.3	+14.6	28.1	58 05.0	+15.5	28.9	58 57.3	+16.5	29.7	75
76	52 54.6	+9.5	23.3	53 49.6	+10.1	23.9	54 44.3	+10.8	24.4	55 38.8	+11.6	25.1	56 33.0	+12.3	25.7	57 26.9	+13.2	26.4	58 20.5	+14.0	27.1	59 13.8	+14.8	27.8	76
77	53 04.1	+8.0	21.7	53 59.7	+8.7	22.2	54 55.1	+9.4	22.7	55 50.4	+10.0	23.3	56 45.3	+10.8	23.9	57 40.1	+11.5	24.5	58 34.5	+12.3	25.2	59 28.6	+13.2	25.9	77
78	53 12.1	+6.8	20.0	54 08.4	+7.3	20.5	55 04.5	+7.9	21.0	56 00.4	+8.6	21.5	56 56.1	+9.3	22.1	57 51.6	+9.9	22.7	58 46.8	+10.7	23.3	59 41.8	+11.4	24.0	78
79	53 18.9	+5.3	18.4	54 15.7	+5.9	18.8	55 12.4	+6.5	19.3	56 09.0	+7.0	19.8	57 05.4	+7.6	20.3	58 01.5	+8.3	20.8	58 57.5	+9.0	21.4	59 53.2	+9.7	22.1	79
80	53 24.2	+3.9	16.7	54 21.6	+4.4	17.1	55 18.9	+4.9	17.5	56 16.0	+5.5	18.0	57 13.0	+6.0	18.5	58 09.8	+6.7	19.0	59 06.5	+7.2	19.5	60 02.9	+7.9	20.1	80
81	53 28.1	+2.5	15.0	54 26.0	+3.0	15.4	55 23.8	+3.4	15.8	56 21.5	+3.9	16.2	57 19.0	+4.5	16.6	58 16.5	+4.9	17.1	59 13.7	+5.6	17.6	60 10.8	+6.2	18.1	81
82	53 30.6	+1.1	13.4	54 29.0	+1.5	13.7	55 27.2	+1.9	14.0	56 25.4	+2.3	14.4	57 23.5	+2.7	14.8	58 21.4	+3.3	15.2	59 19.3	+3.7	15.6	60 17.0	+4.3	16.1	82
83	53 31.7	−0.3	11.7	54 30.5	0.0	12.0	55 29.1	+0.4	12.3	56 27.7	+0.8	12.6	57 26.2	+1.2	12.9	58 24.7	+1.5	13.3	59 23.0	+2.0	13.7	60 21.3	+2.4	14.1	83
84	53 31.4	−1.7	10.0	54 30.5	−1.5	10.2	55 29.5	−1.1	10.5	56 28.5	−0.9	10.8	57 27.4	−0.5	11.1	58 26.2	−0.1	11.4	59 25.0	+0.3	11.7	60 23.7	+0.7	12.1	84
85	53 29.7	−3.2	8.3	54 29.0	−2.9	8.5	55 28.4	−2.7	8.7	56 27.6	−2.4	9.0	57 26.9	−2.1	9.2	58 26.1	−1.9	9.5	59 25.3	−1.6	9.7	60 24.4	−1.3	10.0	85
86	53 26.5	−4.5	6.6	54 26.1	−4.3	6.8	55 25.7	−4.2	7.0	56 25.2	−3.9	7.2	57 24.8	−3.8	7.3	58 24.2	−3.5	7.6	59 23.7	−3.3	7.8	60 23.1	−3.0	8.0	86
87	53 22.0	−6.0	5.0	54 21.8	−5.9	5.1	55 21.5	−5.7	5.2	56 21.3	−5.6	5.4	57 21.0	−5.4	5.5	58 20.7	−5.2	5.7	59 20.4	−5.1	5.8	60 20.1	−4.9	6.0	87
88	53 16.0	−7.3	3.3	54 15.9	−7.2	3.4	55 15.8	−7.1	3.5	56 15.7	−7.1	3.6	57 15.6	−7.0	3.7	58 15.5	−6.9	3.8	59 15.3	−6.8	3.9	60 15.2	−6.7	4.0	88
89	53 08.7	−8.7	1.6	54 08.7	−8.7	1.7	55 08.7	−8.7	1.7	56 08.6	−8.6	1.8	57 08.6	−8.6	1.8	58 08.6	−8.6	1.9	59 08.5	−8.5	1.9	60 08.5	−8.5	2.0	89
90	53 00.0	−10.1	0.0	54 00.0	−10.1	0.0	55 00.0	−10.1	0.0	56 00.0	−10.1	0.0	57 00.0	−10.2	0.0	58 00.0	−10.2	0.0	59 00.0	−10.2	0.0	60 00.0	−10.3	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	5 24.1	−48.1	97.2	5 16.5	−48.7	97.3	5 08.9	−49.4	97.4	5 01.1	−49.9	97.5	4 53.3	−50.6	97.6	4 45.3	−51.1	97.7	4 37.3	−51.6	97.7	4 29.2	−52.2	97.8	0
1	4 36.0	−48.2	97.8	4 27.8	−48.8	97.9	4 19.5	−49.4	98.0	4 11.2	−50.0	98.0	4 02.7	−50.5	98.1	3 54.2	−51.1	98.2	3 45.7	−51.7	98.2	3 37.0	−52.1	98.3	1
2	3 47.8	−48.2	98.4	3 39.0	−48.8	98.5	3 30.1	−49.4	98.5	3 21.2	−50.0	98.6	3 12.2	−50.6	98.6	3 03.1	−51.1	98.7	2 54.0	−51.6	98.8	2 44.9	−52.2	98.8	2
3	2 59.6	−48.2	99.0	2 50.2	−48.9	99.1	2 40.7	−49.4	99.1	2 31.2	−50.0	99.1	2 21.6	−50.5	99.2	2 12.0	−51.1	99.2	2 02.4	−51.6	99.3	1 52.7	−52.1	99.3	3
4	2 11.4	−48.3	99.6	2 01.3	−48.8	99.6	1 51.3	−49.4	99.7	1 41.2	−50.0	99.7	1 31.1	−50.6	99.7	1 20.9	−51.1	99.8	1 10.8	−51.7	99.8	1 00.6	−52.2	99.8	4
5	1 23.1	−48.2	100.2	1 12.5	−48.8	100.2	1 01.9	−49.5	100.2	0 51.2	−50.0	100.3	0 40.5	−50.6	100.3	0 29.8	−51.1	100.3	0 19.1	−51.7	100.3	0 08.4	−52.2	100.3	5
6	0 34.9	−48.3	100.8	0 23.7	−48.9	100.8	0 12.4	−49.4	100.8	0 01.2	−50.0	100.8	0 10.1	+50.6	79.2	0 21.3	+51.1	79.2	0 32.6	+51.6	79.2	0 43.8	+52.2	79.2	6
7	0 13.4	+48.2	78.6	0 25.2	+48.8	78.6	0 37.0	+49.5	78.6	0 48.8	+50.1	78.6	1 00.7	+50.5	78.7	1 12.4	+51.2	78.7	1 24.2	+51.7	78.7	1 36.0	+52.1	78.7	7
8	1 01.6	+48.2	78.0	1 14.0	+48.9	78.0	1 26.5	+49.4	78.1	1 38.9	+50.0	78.1	1 51.2	+50.6	78.1	2 03.6	+51.1	78.2	2 15.9	+51.6	78.2	2 28.1	+52.2	78.2	8
9	1 49.8	+48.3	77.4	2 02.9	+48.8	77.5	2 15.9	+49.4	77.5	2 28.9	+50.0	77.5	2 41.8	+50.5	77.6	2 54.7	+51.1	77.6	3 07.5	+51.6	77.7	3 20.3	+52.1	77.7	9
10	2 38.1	+48.2	76.8	2 51.7	+48.8	76.9	3 05.3	+49.4	76.9	3 18.9	+49.9	77.0	3 32.3	+50.6	77.0	3 45.8	+51.0	77.1	3 59.1	+51.6	77.2	4 12.4	+52.1	77.2	10
11	3 26.3	+48.2	76.2	3 40.5	+48.8	76.3	3 54.7	+49.4	76.4	4 08.8	+50.0	76.4	4 22.9	+50.6	76.5	4 36.8	+51.0	76.6	4 50.7	+51.6	76.7	5 04.5	+52.1	76.7	11
12	4 14.5	+48.1	75.6	4 29.3	+48.8	75.7	4 44.1	+49.3	75.8	4 58.8	+49.9	75.9	5 13.4	+50.5	76.0	5 27.9	+51.0	76.1	5 42.3	+51.6	76.1	5 56.8	+52.1	76.2	12
13	5 02.6	+48.2	75.0	5 18.1	+48.7	75.1	5 33.4	+49.4	75.2	5 48.7	+49.9	75.3	6 03.9	+50.4	75.4	6 18.9	+51.0	75.5	6 33.9	+51.5	75.6	6 48.7	+52.0	75.7	13
14	5 50.8	+48.1	74.4	6 06.8	+48.7	74.5	6 22.8	+49.2	74.6	6 38.6	+49.8	74.8	6 54.3	+50.4	74.9	7 09.9	+51.0	75.0	7 25.4	+51.5	75.1	7 40.7	+52.0	75.2	14
15	6 38.9	+48.0	73.8	6 55.5	+48.7	74.0	7 12.0	+49.3	74.1	7 28.4	+49.8	74.2	7 44.7	+50.4	74.3	8 00.9	+50.9	74.5	8 16.9	+51.4	74.6	8 32.7	+52.0	74.7	15
16	7 26.9	+48.0	73.2	7 44.2	+48.6	73.4	8 01.3	+49.2	73.5	8 18.2	+49.8	73.6	8 35.1	+50.3	73.8	8 51.8	+50.8	73.9	9 08.3	+51.4	74.1	9 24.7	+51.9	74.2	16
17	8 14.9	+48.0	72.6	8 32.8	+48.5	72.8	8 50.5	+49.1	72.9	9 08.0	+49.7	73.1	9 25.4	+50.3	73.2	9 42.6	+50.8	73.4	9 59.7	+51.3	73.6	10 16.6	+51.9	73.7	17
18	9 02.9	+47.8	72.0	9 21.3	+48.5	72.2	9 39.6	+49.1	72.3	9 57.7	+49.7	72.5	10 15.7	+50.2	72.7	10 33.4	+50.8	72.8	10 51.1	+51.2	73.0	11 08.5	+51.8	73.2	18
19	9 50.7	+47.9	71.4	10 09.8	+48.4	71.6	10 28.7	+49.0	71.8	10 47.4	+49.5	71.9	11 05.9	+50.1	72.1	11 24.2	+50.7	72.3	11 42.3	+51.3	72.5	12 00.3	+51.8	72.7	19
20	10 38.6	+47.7	70.8	10 58.2	+48.4	71.0	11 17.7	+48.9	71.2	11 36.9	+49.6	71.4	11 56.0	+50.1	71.6	12 14.9	+50.6	71.8	12 33.6	+51.2	72.0	12 52.1	+51.7	72.2	20
21	11 26.3	+47.7	70.2	11 46.6	+48.2	70.4	12 06.6	+48.9	70.6	12 26.5	+49.4	70.8	12 46.1	+50.0	71.0	13 05.5	+50.6	71.2	13 24.8	+51.1	71.4	13 43.8	+51.6	71.7	21
22	12 14.0	+47.6	69.6	12 34.8	+48.2	69.8	12 55.5	+48.7	70.0	13 15.9	+49.4	70.2	13 36.1	+49.9	70.4	13 56.1	+50.5	70.7	14 15.9	+51.0	70.9	14 35.4	+51.6	71.1	22
23	13 01.6	+47.4	68.9	13 23.0	+48.1	69.2	13 44.2	+48.7	69.4	14 05.3	+49.2	69.6	14 26.0	+49.9	69.9	14 46.6	+50.4	70.1	15 06.9	+51.0	70.3	15 27.0	+51.4	70.6	23
24	13 49.0	+47.4	68.3	14 11.1	+48.0	68.5	14 32.9	+48.6	68.8	14 54.5	+49.2	69.0	15 15.9	+49.8	69.3	15 37.0	+50.3	69.5	15 57.9	+50.8	69.8	16 18.4	+51.4	70.1	24
25	14 36.4	+47.3	67.7	14 59.1	+47.9	67.9	15 21.5	+48.6	68.2	15 43.7	+49.1	68.4	16 05.7	+49.6	68.7	16 27.3	+50.3	69.0	16 48.7	+50.8	69.2	17 09.8	+51.4	69.5	25
26	15 23.7	+47.2	67.0	15 47.0	+47.8	67.3	16 10.1	+48.3	67.6	16 32.8	+49.0	67.8	16 55.3	+49.6	68.1	17 17.6	+50.1	68.4	17 39.5	+50.7	68.7	18 01.2	+51.2	69.0	26
27	16 10.9	+47.1	66.4	16 34.8	+47.7	66.7	16 58.4	+48.3	66.9	17 21.8	+48.9	67.2	17 44.9	+49.5	67.5	18 07.7	+50.0	67.8	18 30.2	+50.6	68.1	18 52.4	+51.1	68.4	27
28	16 58.0	+46.9	65.7	17 22.5	+47.6	66.0	17 46.7	+48.2	66.3	18 10.7	+48.7	66.6	18 34.4	+49.3	66.9	18 57.7	+49.9	67.2	19 20.8	+50.5	67.6	19 43.5	+51.1	67.9	28
29	17 44.9	+46.8	65.1	18 10.1	+47.4	65.4	18 34.9	+48.0	65.7	18 59.4	+48.7	66.0	19 23.7	+49.2	66.3	19 47.6	+49.8	66.6	20 11.3	+50.3	67.0	20 34.6	+50.9	67.3	29
30	18 31.7	+46.7	64.4	18 57.5	+47.3	64.7	19 22.9	+47.9	65.1	19 48.1	+48.5	65.4	20 12.9	+49.1	65.7	20 37.4	+49.7	66.1	21 01.6	+50.3	66.4	21 25.5	+50.8	66.8	30
31	19 18.4	+46.6	63.8	19 44.8	+47.1	64.1	20 10.8	+47.8	64.4	20 36.6	+48.4	64.8	21 02.0	+49.0	65.1	21 27.1	+49.6	65.5	21 51.9	+50.1	65.8	22 16.3	+50.7	66.2	31
32	20 05.0	+46.3	63.1	20 31.9	+47.0	63.4	20 58.6	+47.6	63.8	21 25.0	+48.2	64.1	21 51.0	+48.8	64.5	22 16.7	+49.4	64.8	22 42.0	+50.0	65.2	23 07.0	+50.5	65.6	32
33	20 51.3	+46.2	62.4	21 18.9	+46.9	62.8	21 46.2	+47.5	63.1	22 13.2	+48.1	63.5	22 39.8	+48.7	63.9	23 06.1	+49.2	64.2	23 32.0	+49.8	64.6	23 57.5	+50.4	65.0	33
34	21 37.5	+46.1	61.7	22 05.8	+46.7	62.1	22 33.7	+47.3	62.5	23 01.3	+47.9	62.8	23 28.5	+48.5	63.2	23 55.3	+49.2	63.6	24 21.8	+49.7	64.0	24 47.9	+50.3	64.4	34
35	22 23.6	+45.9	61.1	22 52.5	+46.5	61.4	23 21.0	+47.1	61.8	23 49.2	+47.7	62.2	24 17.0	+48.4	62.6	24 44.5	+48.9	63.0	25 11.5	+49.6	63.4	25 38.2	+50.1	63.8	35
36	23 09.5	+45.6	60.4	23 39.0	+46.3	60.7	24 08.1	+47.0	61.1	24 36.9	+47.6	61.5	25 05.4	+48.1	61.9	25 33.4	+48.8	62.3	26 01.1	+49.3	62.8	26 28.3	+50.0	63.2	36
37	23 55.1	+45.5	59.6	24 25.3	+46.1	60.0	24 55.1	+46.7	60.4	25 24.5	+47.4	60.8	25 53.5	+48.0	61.3	26 22.2	+48.6	61.7	26 50.4	+49.2	62.1	27 18.3	+49.8	62.6	37
38	24 40.6	+45.3	58.9	25 11.4	+45.9	59.3	25 41.8	+46.6	59.7	26 11.9	+47.2	60.2	26 41.5	+47.8	60.6	27 10.8	+48.4	61.0	27 39.6	+49.1	61.5	28 08.1	+49.6	62.0	38
39	25 25.9	+45.1	58.2	25 57.3	+45.7	58.6	26 28.4	+46.3	59.0	26 59.1	+46.9	59.5	27 29.3	+47.7	59.9	27 59.2	+48.2	60.4	28 28.7	+48.8	60.8	28 57.7	+49.4	61.3	39
40	26 11.0	+44.8	57.5	26 43.0	+45.5	57.9	27 14.7	+46.2	58.3	27 46.0	+46.8	58.8	28 17.0	+47.3	59.2	28 47.4	+48.1	59.7	29 17.5	+48.6	60.2	29 47.1	+49.3	60.7	40
41	26 55.8	+44.6	56.7	27 28.5	+45.3	57.2	28 00.9	+45.9	57.6	28 32.8	+46.6	58.1	29 04.3	+47.2	58.5	29 35.5	+47.8	59.0	30 06.1	+48.5	59.5	30 36.4	+49.0	60.0	41
42	27 40.4	+44.5	56.0	28 13.8	+45.0	56.4	28 46.8	+45.6	56.9	29 19.4	+46.3	57.3	29 51.5	+47.0	57.8	30 23.3	+47.5	58.3	30 54.6	+48.2	58.8	31 25.4	+48.8	59.3	42
43	28 24.7	+44.1	55.2	28 58.8	+44.7	55.7	29 32.4	+45.4	56.1	30 05.7	+46.0	56.6	30 38.5	+46.7	57.1	31 10.8	+47.4	57.6	31 42.8	+47.9	58.1	32 14.2	+48.6	58.6	43
44	29 08.8	+43.9	54.4	29 43.5	+44.5	54.9	30 17.8	+45.2	55.4	30 51.7	+45.8	55.9	31 25.2	+46.4	56.4	31 58.2	+47.1	56.9	32 30.7	+47.8	57.4	33 02.8	+48.4	58.0	44
45	29 52.7	+43.5	53.7	30 28.0	+44.2	54.1	31 03.0	+44.9	54.6	31 37.5	+45.5	55.1	32 11.6	+46.2	55.6	32 45.3	+46.8	56.1	33 18.5	+47.4	56.7	33 51.2	+48.1	57.2	45
46	30 36.2	+43.2	52.9	31 12.2	+43.9	53.3	31 47.9	+44.5	53.8	32 23.0	+45.3	54.3	32 57.8	+45.9	54.9	33 32.1	+46.6	55.4	34 05.9	+47.3	56.0	34 39.3	+47.8	56.5	46
47	31 19.4	+43.0	52.1	31 56.1	+43.7	52.5	32 32.4	+44.3	53.0	33 08.3	+44.9	53.6	33 43.7	+45.6	54.1	34 18.7	+46.2	54.6	34 53.2	+46.9	55.2	35 27.1	+47.6	55.8	47
48	32 02.4	+42.6	51.2	32 39.8	+43.2	51.7	33 16.7	+44.0	52.2	33 53.2	+44.7	52.8	34 29.3	+45.3	53.3	35 04.9	+46.0	53.9	35 40.1	+46.6	54.4	36 14.7	+47.3	55.0	48
49	32 45.0	+42.3	50.4	33 23.0	+43.0	50.9	34 00.7	+43.6	51.4	34 37.9	+44.3	52.0	35 14.6	+45.0	52.5	35 50.9	+45.7	53.1	36 26.7	+46.3	53.7	37 02.0	+47.0	54.3	49
50	33 27.3	+41.9	49.5	34 06.0	+42.6	50.1	34 44.3	+43.3	50.6	35 22.2	+44.0	51.1	35 59.6	+44.7	51.7	36 36.6	+45.3	52.3	37 13.0	+46.0	52.9	37 49.0	+46.7	53.5	50
51	34 09.2	+41.6	48.7	34 48.6	+42.2	49.2	35 27.6	+42.9	49.7	36 06.2	+43.6	50.3	36 44.3	+44.3	50.9	37 21.9	+45.0	51.4	37 59.0	+45.7	52.1	38 35.7	+46.3	52.7	51
52	34 50.8	+41.1	47.8	35 30.8	+41.9	48.3	36 10.5	+42.6	48.9	36 49.8	+43.2	49.4	37 28.6	+43.9	50.0	38 06.9	+44.6	50.6	38 44.7	+45.3	51.2	39 22.0	+46.0	51.9	52
53	35 31.9	+40.8	46.9	36 12.7	+41.5	47.5	36 53.1	+42.1	48.0	37 33.0	+42.8	48.6	38 12.5	+43.5	49.2	38 51.5	+44.2	49.8	39 30.0	+44.9	50.4	40 08.0	+45.6	51.0	53
54	36 12.7	+40.4	46.0	36 54.2	+41.0	46.6	37 35.2	+41.8	47.1	38 15.8	+42.5	47.7	38 56.0	+43.2	48.3	39 35.7	+43.8	48.9	40 14.9	+44.5	49.5	40 53.6	+45.2	50.2	54
55	36 53.1	+39.9	45.1	37 35.2	+40.6	45.6	38 17.0	+41.3	46.2	38 58.3	+42.0	46.8	39 39.2	+42.7	47.4	40 19.5	+43.5	48.0	40 59.4	+44.2	48.6	41 38.8	+44.9	49.3	55
56	37 33.0	+39.5	44.2	38 15.8	+40.2	44.7	38 58.3	+40.9	45.3	39 40.3	+41.6	45.9	40 21.9	+42.3	46.5	41 03.0	+42.9	47.1	41 43.6	+43.6	47.7	42 23.7	+44.4	48.4	56
57	38 12.5	+39.3	43.2	38 56.0	+39.7	43.8	39 39.2	+40.3	44.3	40 21.9	+41.1	44.9	41 04.1	+41.8	45.5	41 45.9	+42.5	46.2	42 27.2	+43.3	46.8	43 08.1	+43.9	47.5	57
58	38 51.5	+38.5	42.2	39 35.7	+39.2	42.8	40 19.5	+39.9	43.4	41 03.0	+40.6	43.9	41 45.9	+41.3	44.6	42 28.4	+42.1	45.2	43 10.5	+42.7	45.9	43 52.0	+43.5	46.6	58
59	39 30.0	+38.0	41.2	40 14.9	+38.7	41.8	40 59.4	+39.4	42.4	41 43.6	+40.1	43.0	42 27.2	+40.8	43.6	43 10.5	+41.5	44.3	43 53.2	+42.3	44.9	44 35.5	+42.9	45.6	59
60	40 08.0	+37.5	40.2	40 53.6	+38.2	40.8	41 38.8	+38.9	41.4	42 23.7	+39.5	42.0	43 08.1	+40.2	42.6	43 52.0	+41.0	43.2	44 35.5	+41.7	43.9	45 18.4	+42.5	44.6	60
61	40 45.5	+36.9	39.2	41 31.8	+37.6	39.8	42 17.7	+38.3	40.3	43 03.2	+39.0	40.9	43 48.3	+39.7	41.6	44 33.0	+40.4	42.2	45 17.2	+41.2	42.9	46 00.9	+41.9	43.6	61
62	41 22.4	+36.3	38.2	42 09.4	+37.0	38.7	42 56.0	+37.7	39.3	43 42.2	+38.4	39.9	44 28.0	+39.2	40.5	45 13.4	+39.9	41.2	45 58.4	+40.5	41.9	46 42.8	+41.3	42.6	62
63	41 58.7	+35.7	37.1	42 46.4	+36.4	37.7	43 33.7	+37.1	38.2	44 20.6	+37.8	38.8	45 07.2	+38.5	39.5	45 53.3	+39.2	40.1	46 38.9	+40.0	40.8	47 24.1	+40.8	41.5	63
64	42 34.4	+35.1	36.0	43 22.8	+35.8	36.6	44 10.8	+36.5	37.1	44 58.4	+37.2	37.7	45 45.7	+37.9	38.4	46 32.5	+38.6	39.0	47 18.9	+39.4	39.7	48 04.9	+40.0	40.4	64
65	43 09.5	+34.5	34.9	43 58.6	+35.1	35.5	44 47.3	+35.8	36.0	45 35.6	+36.5	36.6	46 23.6	+37.2	37.2	47 11.1	+38.0	37.9	47 58.3	+38.6	38.6	48 44.9	+39.5	39.3	65
66	43 44.0	+33.7	33.8	44 33.7	+34.4	34.3	45 23.1	+35.1	34.9	46 12.1	+35.8	35.5	47 00.8	+36.5	36.1	47 49.1	+37.2	36.7	48 36.9	+38.0	37.4	49 24.4	+38.7	38.1	66
67	44 17.7	+33.1	32.6	45 08.1	+33.8	33.2	45 58.2	+34.4	33.7	46 47.9	+35.1	34.3	47 37.3	+35.8	34.9	48 26.3	+36.5	35.6	49 14.9	+37.2	36.2	50 03.1	+37.9	36.9	67
68	44 50.8	+32.3	31.5	45 41.9	+32.9	32.0	46 32.6	+33.6	32.6	47 23.0	+34.3	33.1	48 13.1	+35.0	33.7	49 02.8	+35.7	34.4	49 52.1	+36.5	35.0	50 41.0	+37.2	35.7	68
69	45 23.1	+31.6	30.3	46 14.8	+32.2	30.8	47 06.2	+32.9	31.3	47 57.3	+33.6	31.9	48 48.1	+34.2	32.5	49 38.5	+34.9	33.1	50 28.6	+35.6	33.8	51 18.2	+36.4	34.5	69
70	45 54.7	+30.8	29.0	46 47.0	+31.5	29.6	47 39.1	+32.1	30.1	48 30.9	+32.7	30.7	49 22.3	+33.4	31.3	50 13.4	+34.1	31.9	51 04.2	+34.8	32.5	51 54.6	+35.5	33.2	70
71	46 25.5	+30.0	27.8	47 18.5	+30.5	28.3	48 11.2	+31.2	28.8	49 03.6	+31.8	29.4	49 55.7	+32.5	30.0	50 47.5	+33.2	30.6	51 39.0	+33.9	31.2	52 30.1	+34.7	31.9	71
72	46 55.5	+29.1	26.5	47 49.0	+29.7	27.0	48 42.4	+30.3	27.5	49 35.4	+31.0	28.1	50 28.2	+31.6	28.7	51 20.7	+32.3	29.3	52 12.9	+33.0	29.9	53 04.8	+33.6	30.5	72
73	47 24.6	+28.2	25.3	48 18.7	+28.9	25.7	49 12.7	+29.4	26.2	50 06.4	+30.0	26.8	50 59.8	+30.7	27.3	51 53.0	+31.3	27.9	52 45.9	+32.0	28.5	53 38.4	+32.7	29.1	73
74	47 52.8	+27.4	23.9	48 47.6	+27.9	24.4	49 42.1	+28.5	24.9	50 36.4	+29.1	25.4	51 30.5	+29.7	25.9	52 24.3	+30.3	26.5	53 17.9	+31.0	27.1	54 11.1	+31.7	27.7	74
75	48 20.2	+26.3	22.6	49 15.5	+26.9	23.1	50 10.6	+27.5	23.5	51 05.5	+28.0	24.0	52 00.2	+28.6	24.5	52 54.6	+29.3	25.1	53 48.9	+29.9	25.7	54 42.8	+30.6	26.3	75
76	48 46.5	+25.5	21.3	49 42.4	+25.9	21.7	50 38.1	+26.4	22.1	51 33.5	+27.1	22.6	52 28.8	+27.6	23.1	53 23.9	+28.2	23.6	54 18.8	+28.8	24.2	55 13.4	+29.4	24.8	76
77	49 12.0	+24.4	19.9	50 08.3	+24.9	20.3	51 04.5	+25.4	20.7	52 00.6	+25.9	21.2	52 56.4	+26.5	21.6	53 52.1	+27.1	22.1	54 47.6	+27.6	22.7	55 42.8	+28.3	23.2	77
78	49 36.4	+23.4	18.5	50 33.2	+23.9	18.9	51 29.9	+24.4	19.3	52 26.5	+24.8	19.7	53 22.9	+25.4	20.1	54 19.2	+25.8	20.6	55 15.2	+26.5	21.1	56 11.1	+27.0	21.7	78
79	49 59.8	+22.3	17.0	50 57.1	+22.7	17.4	51 54.3	+23.2	17.8	52 51.3	+23.7	18.2	53 48.3	+24.1	18.6	54 45.0	+24.7	19.1	55 41.7	+25.2	19.5	56 38.1	+25.8	20.0	79
80	50 22.1	+21.2	15.6	51 19.8	+21.6	15.9	52 17.5	+22.0	16.3	53 15.0	+22.5	16.7	54 12.4	+22.9	17.1	55 09.7	+23.4	17.5	56 06.9	+23.9	17.9	57 03.9	+24.4	18.4	80
81	50 43.3	+20.1	14.1	51 41.4	+20.5	14.4	52 39.5	+20.8	14.8	53 37.5	+21.2	15.1	54 35.3	+21.7	15.5	55 33.1	+22.1	15.9	56 30.8	+22.5	16.3	57 28.3	+23.0	16.7	81
82	51 03.4	+18.9	12.6	52 01.9	+19.2	12.9	53 00.3	+19.6	13.2	53 58.7	+20.0	13.5	54 57.0	+20.3	13.8	55 55.2	+20.8	14.2	56 53.3	+21.2	14.6	57 51.3	+21.6	15.0	82
83	51 22.3	+17.7	11.1	52 21.1	+18.1	11.4	53 19.9	+18.4	11.6	54 18.7	+18.6	11.9	55 17.3	+19.0	12.2	56 16.0	+19.3	12.5	57 14.5	+19.7	12.9	58 12.9	+20.2	13.2	83
84	51 40.0	+16.5	9.8	52 39.2	+16.7	9.8	53 38.3	+17.0	10.0	54 37.3	+17.4	10.3	55 36.3	+17.7	10.5	56 35.3	+17.9	10.8	57 34.2	+18.3	11.1	58 33.1	+18.5	11.4	84
85	51 56.5	+15.3	8.0	52 55.9	+15.5	8.2	53 55.3	+15.7	8.4	54 54.7	+15.9	8.6	55 54.0	+16.1	8.8	56 53.2	+16.5	9.1	57 52.5	+16.7	9.3	58 51.6	+17.0	9.6	85
86	52 11.8	+14.0	6.5	53 11.4	+14.2	6.6	54 11.0	+14.4	6.8	55 10.6	+14.5	6.9	56 10.1	+14.8	7.1	57 09.7	+14.9	7.3	58 09.2	+15.1	7.5	59 08.6	+15.4	7.7	86
87	52 25.8	+12.7	4.9	53 25.6	+12.8	5.0	54 25.4	+12.9	5.1	55 25.1	+13.1	5.2	56 24.6	+13.3	5.4	57 24.6	+13.4	5.5	58 24.3	+13.6	5.7	59 24.0	+13.7	5.8	87
88	52 38.5	+11.4	3.3	53 38.4	+11.5	3.3	54 38.3	+11.6	3.4	55 38.2	+11.7	3.5	56 38.1	+11.7	3.6	57 38.0	+11.8	3.7	58 37.9	+11.9	3.8	59 37.7	+12.0	3.9	88
89	52 49.9	+10.1	1.6	53 49.9	+10.1	1.7	54 49.9	+10.1	1.7	55 49.9	+10.1	1.8	56 49.8	+10.2	1.8	57 49.8	+10.2	1.9	58 49.8	+10.2	1.9	59 49.7	+10.3	2.0	89
90	53 00.0	+8.7	0.0	54 00.0	+8.7	0.0	55 00.0	+8.7	0.0	56 00.0	+8.6	0.0	57 00.0	+8.6	0.0	58 00.0	+8.6	0.0	59 00.0	+8.5	0.0	60 00.0	+8.5	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 99°, 261°**

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	4 48.3	+48.0	96.4	4 41.5	+48.7	96.5	4 34.7	+49.3	96.6	4 27.8	+49.9	96.6	4 20.8	+50.5	96.7	4 13.8	+51.0	96.8	4 06.6	+51.6	96.9	3 59.4	+52.1	96.9	0
1	5 36.3	+48.1	95.8	5 30.2	+48.7	95.9	5 24.0	+49.3	96.0	5 17.7	+49.8	96.1	5 11.3	+50.4	96.2	5 04.8	+51.0	96.3	4 58.2	+51.5	96.4	4 51.5	+52.0	96.4	1
2	6 24.4	+48.0	95.2	6 18.9	+48.6	95.3	6 13.3	+49.2	95.4	6 07.5	+49.9	95.5	6 01.7	+50.4	95.6	5 55.8	+50.9	95.7	5 49.7	+51.5	95.8	5 43.5	+52.1	95.9	2
3	7 12.4	+47.9	94.6	7 07.5	+48.6	94.7	7 02.5	+49.2	94.8	6 57.4	+49.7	95.0	6 52.1	+50.4	95.1	6 46.7	+50.9	95.2	6 41.2	+51.5	95.3	6 35.6	+52.0	95.4	3
4	8 00.3	+47.9	94.0	7 56.1	+48.5	94.1	7 51.7	+49.1	94.3	7 47.1	+49.8	94.4	7 42.5	+50.3	94.5	7 37.6	+50.9	94.7	7 32.7	+51.4	94.8	7 27.6	+51.9	94.9	4
5	8 48.2	+47.8	93.4	8 44.6	+48.4	93.5	8 40.8	+49.1	93.7	8 36.9	+49.6	93.8	8 32.8	+50.2	94.0	8 28.5	+50.9	94.1	8 24.1	+51.4	94.3	8 19.5	+52.0	94.4	5
6	9 36.0	+47.8	92.8	9 33.0	+48.4	92.9	9 29.9	+49.0	93.1	9 26.5	+49.7	93.3	9 23.0	+50.2	93.4	9 19.4	+50.7	93.6	9 15.5	+51.3	93.8	9 11.5	+51.9	93.9	6
7	10 23.8	+47.7	92.2	10 21.4	+48.4	92.3	10 18.9	+49.0	92.5	10 16.2	+49.5	92.7	10 13.2	+50.2	92.9	10 10.1	+50.8	93.1	10 06.8	+51.3	93.2	10 03.4	+51.8	93.4	7
8	11 11.5	+47.6	91.5	11 09.8	+48.2	91.7	11 07.9	+48.9	91.9	11 05.7	+49.5	92.1	11 03.4	+50.1	92.3	11 00.9	+50.6	92.5	10 58.1	+51.3	92.7	10 55.2	+51.8	92.9	8
9	11 59.1	+47.6	90.9	11 58.0	+48.2	91.1	11 56.8	+48.8	91.3	11 55.2	+49.5	91.6	11 53.5	+50.0	91.8	11 51.5	+50.7	92.0	11 49.4	+51.2	92.2	11 47.0	+51.7	92.4	9
10	12 46.7	+47.4	90.3	12 46.2	+48.1	90.5	12 45.6	+48.7	90.7	12 44.7	+49.3	91.0	12 43.5	+50.0	91.2	12 42.2	+50.5	91.4	12 40.6	+51.1	91.6	12 38.7	+51.7	91.9	10
11	13 34.1	+47.4	89.7	13 34.3	+48.0	89.9	13 34.3	+48.6	90.1	13 34.0	+49.3	90.4	13 33.5	+49.9	90.6	13 32.7	+50.5	90.9	13 31.7	+51.0	91.1	13 30.4	+51.6	91.4	11
12	14 21.5	+47.2	89.0	14 22.3	+47.9	89.3	14 22.9	+48.6	89.5	14 23.3	+49.2	89.8	14 23.4	+49.8	90.1	14 23.2	+50.4	90.3	14 22.7	+51.0	90.6	14 22.0	+51.5	90.8	12
13	15 08.7	+47.1	88.4	15 10.2	+47.9	88.7	15 11.5	+48.5	88.9	15 12.5	+49.1	89.2	15 13.2	+49.7	89.5	15 13.6	+50.3	89.8	15 13.7	+50.9	90.0	15 13.5	+51.5	90.3	13
14	15 55.8	+47.1	87.8	15 58.1	+47.7	88.0	16 00.0	+48.3	88.3	16 01.6	+49.0	88.6	16 02.9	+49.6	88.9	16 03.9	+50.2	89.2	16 04.6	+50.8	89.5	16 05.0	+51.4	89.8	14
15	16 42.9	+46.9	87.1	16 45.8	+47.5	87.4	16 48.3	+48.3	87.7	16 50.6	+48.8	88.0	16 52.5	+49.5	88.3	16 54.1	+50.1	88.6	16 55.4	+50.7	88.9	16 56.4	+51.3	89.2	15
16	17 29.8	+46.8	86.5	17 33.3	+47.5	86.8	17 36.6	+48.1	87.1	17 39.4	+48.8	87.4	17 42.0	+49.4	87.7	17 44.2	+50.0	88.0	17 46.1	+50.6	88.4	17 47.7	+51.2	88.7	16
17	18 16.6	+46.6	85.8	18 20.8	+47.3	86.1	18 24.7	+48.0	86.5	18 28.2	+48.7	86.8	18 31.4	+49.3	87.1	18 34.2	+49.9	87.5	18 36.7	+50.5	87.8	18 38.9	+51.1	88.1	17
18	19 03.2	+46.5	85.1	19 08.1	+47.2	85.5	19 12.7	+47.8	85.8	19 16.9	+48.5	86.2	19 20.7	+49.2	86.5	19 24.1	+49.8	86.9	19 27.2	+50.5	87.2	19 30.0	+51.0	87.6	18
19	19 49.7	+46.3	84.5	19 55.3	+47.1	84.8	20 00.5	+47.8	85.2	20 05.4	+48.4	85.5	20 09.9	+49.0	85.9	20 13.9	+49.7	86.3	20 17.7	+50.2	86.6	20 21.0	+50.9	87.0	19
20	20 36.0	+46.2	83.8	20 42.4	+46.8	84.2	20 48.3	+47.5	84.5	20 53.8	+48.2	84.9	20 58.9	+48.9	85.3	21 03.6	+49.6	85.7	21 07.9	+50.2	86.1	21 11.9	+50.7	86.4	20
21	21 22.2	+46.1	83.1	21 29.2	+46.8	83.5	21 35.8	+47.5	83.9	21 42.0	+48.1	84.3	21 47.8	+48.8	84.7	21 53.2	+49.4	85.1	21 58.1	+50.1	85.5	22 02.6	+50.7	85.9	21
22	22 08.3	+45.8	82.4	22 16.0	+46.5	82.8	22 23.3	+47.2	83.2	22 30.1	+48.0	83.6	22 36.6	+48.6	84.0	22 42.6	+49.3	84.5	22 48.2	+49.9	84.9	22 53.3	+50.5	85.3	22
23	22 54.1	+45.7	81.7	23 02.5	+46.4	82.1	23 10.5	+47.1	82.6	23 18.1	+47.8	83.0	23 25.2	+48.5	83.4	23 31.9	+49.1	83.8	23 38.1	+49.7	84.3	23 43.8	+50.5	84.7	23
24	23 39.8	+45.4	81.0	23 48.9	+46.2	81.4	23 57.6	+46.9	81.9	24 05.9	+47.6	82.3	24 13.7	+48.3	82.8	24 21.0	+49.0	83.2	24 27.8	+49.7	83.7	24 34.2	+50.3	84.1	24
25	24 25.2	+45.3	80.3	24 35.1	+46.0	80.7	24 44.5	+46.8	81.2	24 53.5	+47.4	81.6	25 02.0	+48.1	82.1	25 10.0	+48.8	82.6	25 17.5	+49.4	83.0	25 24.5	+50.1	83.5	25
26	25 10.5	+45.0	79.6	25 21.1	+45.8	80.0	25 31.3	+46.5	80.5	25 40.9	+47.3	81.0	25 50.1	+47.9	81.4	25 58.8	+48.6	81.9	26 06.9	+49.3	82.4	26 14.6	+49.9	82.9	26
27	25 55.5	+44.8	78.8	26 06.9	+45.6	79.3	26 17.8	+46.3	79.8	26 28.2	+47.0	80.3	26 38.0	+47.8	80.8	26 47.4	+48.4	81.3	26 56.2	+49.2	81.8	27 04.5	+49.8	82.3	27
28	26 40.3	+44.6	78.1	26 52.5	+45.3	78.6	27 04.1	+46.1	79.1	27 15.2	+46.8	79.6	27 25.8	+47.5	80.1	27 35.8	+48.3	80.7	27 45.4	+48.9	81.1	27 54.3	+49.6	81.7	28
29	27 24.9	+44.4	77.3	27 37.8	+45.1	77.8	27 50.2	+45.9	78.4	28 02.0	+46.6	78.9	28 13.3	+47.4	79.4	28 24.1	+48.0	79.9	28 34.3	+48.7	80.5	28 43.9	+49.5	81.0	29
30	28 09.3	+44.1	76.6	28 22.9	+44.9	77.1	28 36.1	+45.6	77.6	28 48.6	+46.4	78.2	29 00.7	+47.1	78.7	29 12.1	+47.9	79.3	29 23.0	+48.6	79.8	29 33.4	+49.2	80.4	30
31	28 53.4	+43.8	75.8	29 07.8	+44.6	76.3	29 21.7	+45.4	76.9	29 35.0	+46.2	77.4	29 47.8	+46.9	78.0	30 00.0	+47.6	78.6	30 11.6	+48.3	79.1	30 22.6	+49.0	79.7	31
32	29 37.2	+43.5	75.0	29 52.4	+44.3	75.6	30 07.1	+45.1	76.1	30 21.2	+45.9	76.7	30 34.7	+46.6	77.3	30 47.6	+47.4	77.9	30 59.9	+48.1	78.4	31 11.6	+48.9	79.0	32
33	30 20.7	+43.3	74.2	30 36.7	+44.1	74.8	30 52.2	+44.8	75.4	31 07.1	+45.6	76.0	31 21.3	+46.4	76.5	31 35.0	+47.1	77.1	31 48.0	+47.9	77.7	32 00.5	+48.6	78.3	33
34	31 04.0	+42.9	73.4	31 20.8	+43.8	74.0	31 37.0	+44.6	74.6	31 52.7	+45.3	75.2	32 07.7	+46.1	75.8	32 22.1	+46.9	76.4	32 35.9	+47.6	77.0	32 49.1	+48.3	77.7	34
35	31 46.9	+42.6	72.6	32 04.6	+43.4	73.2	32 21.6	+44.3	73.8	32 38.0	+45.1	74.4	32 53.8	+45.9	75.0	33 09.0	+46.6	75.7	33 23.5	+47.4	76.3	33 37.4	+48.1	76.9	35
36	32 29.5	+42.3	71.8	32 48.0	+43.1	72.4	33 05.9	+43.9	73.0	33 23.1	+44.7	73.6	33 39.7	+45.5	74.3	33 55.6	+46.4	74.9	34 10.9	+47.1	75.6	34 25.5	+47.9	76.2	36
37	33 11.8	+42.0	70.9	33 31.1	+42.8	71.6	33 49.8	+43.6	72.2	34 07.8	+44.5	72.8	34 25.2	+45.3	73.5	34 42.0	+46.0	74.1	34 58.0	+46.8	74.8	35 13.4	+47.6	75.5	37
38	33 53.8	+41.6	70.1	34 13.9	+42.4	70.7	34 33.4	+43.3	71.4	34 52.3	+44.1	72.0	35 10.5	+44.9	72.7	35 28.0	+45.7	73.4	35 44.8	+46.5	74.0	36 01.0	+47.3	74.7	38
39	34 35.4	+41.2	69.2	34 56.3	+42.1	69.8	35 16.7	+42.9	70.5	35 36.4	+43.7	71.2	35 55.4	+44.6	71.9	36 13.7	+45.4	72.6	36 31.3	+46.3	73.3	36 48.3	+47.0	74.0	39
40	35 16.6	+40.8	68.3	35 38.4	+41.7	69.0	35 59.6	+42.5	69.7	36 20.1	+43.4	70.3	36 40.0	+44.2	71.0	36 59.1	+45.1	71.7	37 17.6	+45.8	72.5	37 35.3	+46.7	73.2	40
41	35 57.4	+40.4	67.4	36 20.1	+41.3	68.1	36 42.1	+42.2	68.8	37 03.5	+43.0	69.5	37 24.2	+43.9	70.2	37 44.2	+44.7	70.9	38 03.4	+45.6	71.7	38 22.0	+46.3	72.4	41
42	36 37.8	+39.9	66.5	37 01.4	+40.8	67.2	37 24.3	+41.7	67.9	37 46.5	+42.6	68.6	38 08.1	+43.4	69.3	38 28.9	+44.3	70.1	38 49.0	+45.2	70.8	39 08.3	+46.0	71.6	42
43	37 17.7	+39.5	65.6	37 42.2	+40.4	66.3	38 06.0	+41.3	67.0	38 29.1	+42.2	67.7	38 51.5	+43.1	68.4	39 13.2	+44.0	69.2	39 34.2	+44.7	70.0	39 54.3	+45.7	70.8	43
44	37 57.2	+39.1	64.6	38 22.6	+40.0	65.3	38 47.3	+40.9	66.0	39 11.3	+41.8	66.8	39 34.6	+42.7	67.5	39 57.2	+43.5	68.3	40 18.9	+44.4	69.1	40 40.0	+45.2	69.9	44
45	38 36.3	+38.6	63.6	39 02.6	+39.5	64.4	39 28.2	+40.4	65.1	39 53.1	+41.3	65.9	40 17.3	+42.2	66.6	40 40.7	+43.1	67.4	41 03.3	+44.0	68.2	41 25.2	+44.9	69.0	45
46	39 14.9	+38.0	62.7	39 42.1	+39.0	63.4	40 08.6	+39.9	64.1	40 34.4	+40.8	64.9	40 59.5	+41.7	65.7	41 23.8	+42.6	66.5	41 47.3	+43.6	67.3	42 10.1	+44.4	68.1	46
47	39 52.9	+37.5	61.7	40 21.1	+38.4	62.4	40 48.5	+39.4	63.2	41 15.2	+40.4	63.9	41 41.2	+41.3	64.7	42 06.4	+42.2	65.6	42 30.9	+43.1	66.4	42 54.5	+44.0	67.2	47
48	40 30.4	+37.0	60.6	40 59.5	+37.9	61.4	41 27.9	+38.9	62.2	41 55.6	+39.8	62.9	42 22.5	+40.7	63.8	42 48.6	+41.7	64.6	43 14.0	+42.6	65.4	43 38.5	+43.5	66.3	48
49	41 07.4	+36.4	59.6	41 37.4	+37.4	60.4	42 06.8	+38.3	61.1	42 35.4	+39.2	61.9	43 03.2	+40.2	62.8	43 30.3	+41.1	63.6	43 56.6	+42.1	64.5	44 22.0	+43.0	65.3	49
50	41 43.8	+35.8	58.5	42 14.8	+36.8	59.3	42 45.1	+37.7	60.1	43 14.6	+38.7	60.9	43 43.4	+39.7	61.7	44 11.4	+40.7	62.6	44 38.7	+41.5	63.5	45 05.0	+42.6	64.4	50
51	42 19.6	+35.2	57.5	42 51.6	+36.1	58.2	43 22.8	+37.1	59.0	43 53.3	+38.1	59.9	44 23.1	+39.0	60.7	44 52.1	+40.0	61.6	45 20.2	+41.0	62.5	45 47.6	+41.9	63.4	51
52	42 54.8	+34.6	56.4	43 27.7	+35.6	57.1	43 59.9	+36.5	57.9	44 31.4	+37.5	58.8	45 02.1	+38.5	59.6	45 32.1	+39.4	60.5	46 01.2	+40.4	61.4	46 29.5	+41.4	62.3	52
53	43 29.4	+33.9	55.2	44 03.3	+34.8	56.0	44 36.4	+35.8	56.8	45 08.9	+36.8	57.7	45 40.6	+37.8	58.5	46 11.5	+38.8	59.4	46 41.6	+39.9	60.3	47 10.9	+40.8	61.3	53
54	44 03.3	+33.1	54.1	44 38.1	+34.2	54.9	45 12.3	+35.1	55.7	45 45.7	+36.2	56.5	46 18.4	+37.2	57.4	46 50.3	+38.2	58.3	47 21.5	+39.1	59.2	47 51.7	+40.2	60.2	54
55	44 36.4	+32.5	52.9	45 12.3	+33.4	53.7	45 47.4	+34.5	54.5	46 21.9	+35.4	55.4	46 55.6	+36.4	56.3	47 28.5	+37.5	57.2	48 00.6	+38.5	58.1	48 31.9	+39.5	59.1	55
56	45 08.9	+31.7	51.7	45 45.7	+32.7	52.5	46 21.9	+33.7	53.4	46 57.3	+34.7	54.2	47 32.0	+35.8	55.1	48 06.0	+36.7	56.0	48 39.1	+37.8	57.0	49 11.4	+38.8	57.9	56
57	45 40.6	+30.9	50.5	46 18.4	+31.9	51.3	46 55.6	+32.9	52.2	47 32.0	+34.0	53.0	48 07.8	+34.9	53.9	48 42.7	+36.0	54.8	49 16.9	+37.0	55.8	49 50.2	+38.1	56.7	57
58	46 11.5	+30.1	49.3	46 50.3	+31.2	50.1	47 28.5	+32.1	50.9	48 06.0	+33.1	51.8	48 42.7	+34.2	52.7	49 18.7	+35.2	53.6	49 53.9	+36.3	54.6	50 28.3	+37.3	55.5	58
59	46 41.6	+29.3	48.0	47 21.5	+30.2	48.8	48 00.6	+31.3	49.7	48 39.1	+32.3	50.5	49 16.9	+33.3	51.4	49 53.9	+34.4	52.4	50 30.2	+35.4	53.3	51 05.6	+36.5	54.3	59
60	47 10.9	+28.4	46.8	47 51.7	+29.4	47.6	48 31.9	+30.4	48.4	49 11.4	+31.4	49.3	49 50.2	+32.5	50.1	50 28.3	+33.5	51.1	51 05.6	+34.6	52.0	51 42.1	+35.7	53.0	60
61	47 39.3	+27.5	45.5	48 21.1	+28.5	46.3	49 02.3	+29.5	47.1	49 42.8	+30.5	47.9	50 22.7	+31.5	48.8	51 01.8	+32.6	49.8	51 40.2	+33.7	50.7	52 17.8	+34.7	51.7	61
62	48 06.8	+26.6	44.1	48 49.6	+27.6	44.9	49 31.8	+28.6	45.7	50 13.3	+29.6	46.6	50 54.2	+30.6	47.5	51 34.4	+31.7	48.4	52 13.9	+32.7	49.4	52 52.5	+33.9	50.4	62
63	48 33.4	+25.6	42.8	49 17.2	+26.6	43.6	50 00.4	+27.5	44.4	50 42.9	+28.6	45.2	51 24.8	+29.7	46.1	52 06.1	+30.7	47.0	52 46.6	+31.8	48.0	53 26.4	+32.8	49.0	63
64	48 59.0	+24.7	41.4	49 43.8	+25.6	42.2	50 27.9	+26.6	43.0	51 11.5	+27.6	43.8	51 54.5	+28.6	44.7	52 36.8	+29.6	45.6	53 18.4	+30.7	46.6	53 59.2	+31.9	47.6	64
65	49 23.7	+23.6	40.0	50 09.4	+24.5	40.8	50 54.5	+25.5	41.6	51 39.1	+26.5	42.4	52 23.1	+27.5	43.3	53 06.4	+28.6	44.2	53 49.1	+29.7	45.1	54 31.1	+30.7	46.1	65
66	49 47.3	+22.5	38.6	50 33.9	+23.5	39.4	51 20.0	+24.5	40.1	52 05.6	+25.5	41.0	52 50.6	+26.5	41.8	53 35.0	+27.5	42.7	54 18.8	+28.5	43.7	55 01.8	+29.7	44.6	66
67	50 09.8	+21.5	37.2	50 57.4	+22.4	37.9	51 44.5	+23.3	38.7	52 31.1	+24.3	39.5	53 17.1	+25.3	40.3	54 02.5	+26.4	41.2	54 47.3	+27.4	42.1	55 31.5	+28.5	43.1	67
68	50 31.3	+20.3	35.7	51 19.8	+21.2	36.4	52 07.8	+22.2	37.2	52 55.4	+23.1	38.0	53 42.4	+24.1	38.8	54 28.9	+25.1	39.8	55 14.7	+26.2	40.6	56 00.0	+27.2	41.6	68
69	50 51.6	+19.2	34.2	51 41.0	+20.1	34.9	52 30.0	+21.0	35.7	53 18.5	+21.9	36.4	54 06.5	+22.9	37.3	54 54.0	+23.9	38.1	55 40.9	+25.0	39.0	56 27.2	+26.0	40.0	69
70	51 10.8	+18.0	32.7	52 01.1	+18.9	33.4	52 51.0	+19.7	34.1	53 40.4	+20.7	34.9	54 29.4	+21.7	35.7	55 17.9	+22.6	36.5	56 05.9	+23.6	37.4	56 53.2	+24.7	38.3	70
71	51 28.8	+16.8	31.2	52 20.0	+17.6	31.8	53 10.7	+18.6	32.5	54 01.1	+19.4	33.3	54 51.1	+20.3	34.1	55 40.5	+21.3	34.9	56 29.5	+22.3	35.7	57 17.9	+23.3	36.6	71
72	51 45.6	+15.6	29.6	52 37.6	+16.4	30.3	53 29.3	+17.2	31.0	54 20.5	+18.1	31.7	55 11.4	+19.0	32.4	56 01.8	+19.9	33.2	56 51.8	+20.9	34.0	57 41.2	+21.9	34.9	72
73	52 01.2	+14.3	28.1	52 54.0	+15.1	28.7	53 46.5	+15.9	29.3	54 38.6	+16.7	30.0	55 30.4	+17.6	30.7	56 21.7	+18.5	31.5	57 12.7	+19.4	32.3	58 03.1	+20.4	33.2	73
74	52 15.5	+13.1	26.5	53 09.1	+13.8	27.1	54 02.4	+14.5	27.7	54 55.3	+15.4	28.4	55 48.0	+16.1	29.1	56 40.2	+17.1	29.8	57 32.1	+18.0	30.6	58 23.5	+18.9	31.4	74
75	52 28.6	+11.7	24.9	53 22.9	+12.4	25.4	54 16.9	+13.2	26.0	55 10.7	+13.9	26.7	56 04.1	+14.8	27.3	56 57.3	+15.5	28.0	57 50.1	+16.4	28.8	58 42.4	+17.4	29.6	75
76	52 40.3	+10.4	23.3	53 35.3	+11.1	23.8	54 30.1	+11.8	24.4	55 24.6	+12.5	25.0	56 18.9	+13.2	25.6	57 12.8	+14.1	26.3	58 06.5	+14.8	27.0	58 59.8	+15.7	27.7	76
77	52 50.7	+9.1	21.6	53 46.4	+9.7	22.1	54 41.9	+10.3	22.7	55 37.1	+11.0	23.2	56 32.1	+11.8	23.8	57 26.9	+12.5	24.5	58 21.3	+13.3	25.1	59 15.5	+14.1	25.8	77
78	52 59.8	+7.7	20.0	53 56.1	+8.3	20.5	54 52.2	+9.0	21.0	55 48.1	+9.6	21.5	56 43.9	+10.1	22.2	57 39.4	+10.8	22.6	58 34.6	+11.6	23.3	59 29.6	+12.4	23.9	78
79	53 07.5	+6.3	18.4	54 04.4	+6.8	18.8	55 01.1	+7.4	19.2	55 57.7	+8.0	19.7	56 54.0	+8.7	20.2	57 50.2	+9.3	20.8	58 46.2	+10.0	21.4	59 42.0	+10.6	22.0	79
80	53 13.8	+4.9	16.7	54 11.2	+5.4	17.1	55 08.5	+5.9	17.5	56 05.7	+6.4	18.0	57 02.7	+7.0	18.4	57 59.5	+7.6	18.9	58 56.2	+8.2	19.5	59 52.6	+8.9	20.0	80
81	53 18.7	+3.6	15.0	54 16.6	+4.0	15.4	55 14.4	+4.5	15.8	56 12.1	+4.9	16.2	57 09.7	+5.4	16.6	58 07.1	+6.0	17.1	59 04.4	+6.5	17.5	60 01.5	+7.2	18.1	81
82	53 22.3	+2.1	13.4	54 20.6	+2.5	13.7	55 18.9	+2.9	14.0	56 17.0	+3.4	14.4	57 15.1	+3.8	14.8	58 13.1	+4.3	15.2	59 10.9	+4.8	15.6	60 08.7	+5.3	16.1	82
83	53 24.4	+0.7	11.7	54 23.1	+1.1	12.0	55 21.8	+1.4	12.3	56 20.4	+1.8	12.6	57 18.9	+2.2	12.9	58 17.4	+2.6	13.3	59 15.7	+3.1	13.7	60 14.0	+3.5	14.1	83
84	53 25.1	−0.6	10.0	54 24.2	−0.4	10.2	55 23.2	−0.1	10.5	56 22.2	+0.2	10.8	57 21.1	+0.6	11.1	58 20.0	+0.9	11.4	59 18.8	+1.2	11.7	60 17.5	+1.6	12.1	84
85	53 24.5	−2.1	8.3	54 23.8	−1.9	8.5	55 23.1	−1.6	8.7	56 22.4	−1.3	9.0	57 21.7	−1.1	9.2	58 20.9	−0.8	9.4	59 20.0	−0.5	9.7	60 19.1	−0.1	10.0	85
86	53 22.4	−3.5	6.6	54 21.9	−3.3	6.8	55 21.5	−3.1	7.0	56 21.1	−3.0	7.2	57 20.6	−2.7	7.4	58 20.1	−2.5	7.6	59 19.5	−2.2	7.8	60 19.0	−2.0	8.0	86
87	53 18.9	−4.9	5.0	54 18.6	−4.7	5.1	55 18.4	−4.5	5.2	56 18.1	−4.4	5.4	57 17.9	−4.4	5.5	58 17.6	−4.2	5.7	59 17.3	−4.0	5.8	60 17.0	−3.9	6.0	87
88	53 14.0	−6.3	3.3	54 13.9	−6.3	3.4	55 13.7	−6.1	3.5	56 13.6	−6.0	3.6	57 13.5	−5.9	3.7	58 13.4	−5.9	3.8	59 13.3	−5.8	3.9	60 13.1	−5.6	4.0	88
89	53 07.7	−7.7	1.7	54 07.6	−7.6	1.7	55 07.6	−7.6	1.7	56 07.6	−7.6	1.8	57 07.6	−7.6	1.8	58 07.5	−7.5	1.9	59 07.5	−7.5	1.9	60 07.5	−7.5	2.0	89
90	53 00.0	−9.0	0.0	54 00.0	−9.1	0.0	55 00.0	−9.1	0.0	56 00.0	−9.1	0.0	57 00.0	−9.1	0.0	58 00.0	−9.2	0.0	59 00.0	−9.2	0.0	60 00.0	−9.2	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	4 48.3	−48.1	96.4	4 41.5	−48.7	96.5	4 34.7	−49.3	96.6	4 27.8	−49.9	96.6	4 20.8	−50.4	96.7	4 13.8	−51.1	96.8	4 06.6	−51.5	96.9	3 59.4	−52.1	96.9	0
1	4 00.2	−48.2	97.0	3 52.8	−48.7	97.1	3 45.4	−49.3	97.1	3 37.9	−49.9	97.2	3 30.4	−50.5	97.3	3 22.7	−51.0	97.3	3 15.1	−51.6	97.4	3 07.3	−52.1	97.4	1
2	3 12.0	−48.1	97.6	3 04.1	−48.8	97.7	2 56.1	−49.4	97.7	2 48.0	−50.0	97.8	2 39.9	−50.6	97.8	2 31.7	−51.1	97.9	2 23.5	−51.6	97.9	2 15.2	−52.1	97.9	2
3	2 23.9	−48.2	98.2	2 15.3	−48.8	98.2	2 06.7	−49.4	98.3	1 58.0	−49.9	98.3	1 49.3	−50.5	98.3	1 40.6	−51.0	98.4	1 31.9	−51.6	98.4	1 23.1	−52.1	98.4	3
4	1 35.7	−48.1	98.8	1 26.5	−48.7	98.8	1 17.3	−49.4	98.8	1 08.1	−50.0	98.9	0 58.8	−50.5	98.9	0 49.6	−51.1	98.9	0 40.3	−51.6	98.9	0 31.0	−52.2	98.9	4
5	0 47.6	−48.2	99.4	0 37.8	−48.8	99.4	0 27.9	−49.3	99.4	0 18.1	−49.9	99.4	0 08.3	−50.5	99.4	0 01.5	+51.1	80.6	0 11.3	+51.7	80.6	0 21.2	+52.1	80.6	5
6	0 00.6	+48.2	80.0	0 11.0	+48.8	80.0	0 21.4	+49.4	80.0	0 31.8	+50.0	80.0	0 42.2	+50.5	80.0	0 52.6	+51.1	80.0	1 03.0	+51.6	80.1	1 13.3	+52.1	80.1	6
7	0 48.8	+48.1	79.4	0 59.8	+48.8	79.4	1 10.8	+49.4	79.4	1 21.8	+49.9	79.5	1 32.7	+50.5	79.5	1 43.7	+51.0	79.5	1 54.6	+51.6	79.6	2 05.4	+52.1	79.6	7
8	1 37.0	+48.1	78.8	1 48.6	+48.8	78.8	2 00.2	+49.3	78.9	2 11.7	+50.0	78.9	2 23.3	+50.5	79.0	2 34.7	+51.1	79.0	2 46.2	+51.5	79.0	2 57.5	+52.1	79.1	8
9	2 25.1	+48.2	78.2	2 37.4	+48.7	78.3	2 49.5	+49.4	78.3	3 01.7	+49.9	78.4	3 13.8	+50.4	78.4	3 25.8	+51.0	78.5	3 37.7	+51.6	78.5	3 49.6	+52.1	78.6	9
10	3 13.3	+48.1	77.6	3 26.1	+48.8	77.7	3 38.9	+49.3	77.7	3 51.6	+49.9	77.8	4 04.2	+50.5	77.9	4 16.8	+51.0	77.9	4 29.3	+51.5	78.0	4 41.7	+52.1	78.1	10
11	4 01.4	+48.1	77.0	4 14.9	+48.7	77.1	4 28.2	+49.3	77.2	4 41.5	+49.9	77.2	4 54.7	+50.4	77.3	5 07.8	+51.0	77.4	5 20.8	+51.6	77.5	5 33.8	+52.0	77.6	11
12	4 49.5	+48.1	76.4	5 03.6	+48.6	76.5	5 17.5	+49.3	76.6	5 31.4	+49.8	76.7	5 45.1	+50.4	76.8	5 58.8	+50.9	76.9	6 12.4	+51.4	77.0	6 25.8	+52.0	77.1	12
13	5 37.6	+48.0	75.8	5 52.2	+48.7	75.9	6 06.8	+49.2	76.0	6 21.2	+49.8	76.1	6 35.5	+50.4	76.2	6 49.7	+51.0	76.4	7 03.8	+51.5	76.4	7 17.8	+52.0	76.6	13
14	6 25.6	+48.0	75.2	6 40.9	+48.6	75.3	6 56.0	+49.2	75.5	7 11.0	+49.8	75.6	7 25.9	+50.3	75.7	7 40.7	+50.8	75.8	7 55.3	+51.4	76.0	8 09.8	+51.9	76.1	14
15	7 13.6	+48.0	74.6	7 29.5	+48.5	74.7	7 45.2	+49.1	74.9	8 00.8	+49.7	75.0	8 16.2	+50.3	75.1	8 31.5	+50.9	75.3	8 46.7	+51.4	75.4	9 01.7	+51.9	75.6	15
16	8 01.6	+47.8	74.0	8 18.0	+48.5	74.2	8 34.3	+49.1	74.3	8 50.5	+49.7	74.4	9 06.5	+50.2	74.6	9 22.4	+50.8	74.8	9 38.1	+51.3	74.9	9 53.6	+51.9	75.1	16
17	8 49.4	+47.9	73.4	9 06.5	+48.4	73.6	9 23.4	+49.0	73.7	9 40.2	+49.6	73.9	9 56.7	+50.2	74.0	10 13.2	+50.7	74.2	10 29.4	+51.3	74.4	10 45.5	+51.8	74.6	17
18	9 37.3	+47.7	72.8	9 54.9	+48.4	73.0	10 12.4	+49.0	73.1	10 29.8	+49.5	73.3	10 46.9	+50.1	73.5	11 03.9	+50.7	73.7	11 20.7	+51.2	73.9	11 37.3	+51.7	74.1	18
19	10 25.0	+47.7	72.2	10 43.3	+48.3	72.4	11 01.4	+48.9	72.5	11 19.3	+49.5	72.7	11 37.0	+50.1	72.9	11 54.6	+50.6	73.1	12 11.9	+51.1	73.3	12 29.0	+51.7	73.5	19
20	11 12.7	+47.7	71.6	11 31.6	+48.2	71.8	11 50.3	+48.8	71.9	12 08.8	+49.4	72.1	12 27.1	+50.0	72.4	12 45.2	+50.5	72.6	13 03.0	+51.1	72.8	13 20.7	+51.6	73.0	20
21	12 00.4	+47.5	70.9	12 19.8	+48.2	71.1	12 39.1	+48.8	71.4	12 58.2	+49.3	71.6	13 17.1	+49.9	71.8	13 35.7	+50.5	72.0	13 54.1	+51.0	72.2	14 12.3	+51.5	72.5	21
22	12 47.9	+47.4	70.3	13 08.0	+48.1	70.5	13 27.9	+48.6	70.8	13 47.5	+49.3	71.0	14 07.0	+49.8	71.2	14 26.2	+50.4	71.5	14 45.1	+51.0	71.7	15 03.8	+51.5	72.0	22
23	13 35.3	+47.4	69.7	13 56.1	+47.9	69.9	14 16.5	+48.6	70.2	14 36.8	+49.2	70.4	14 56.8	+49.7	70.6	15 16.6	+50.3	70.9	15 36.1	+50.8	71.2	15 55.3	+51.4	71.4	23
24	14 22.7	+47.2	69.1	14 44.0	+47.9	69.3	15 05.1	+48.5	69.5	15 26.0	+49.0	69.8	15 46.5	+49.7	70.1	16 06.9	+50.2	70.3	16 26.9	+50.8	70.6	16 46.7	+51.3	70.9	24
25	15 09.9	+47.2	68.4	15 31.9	+47.7	68.7	15 53.6	+48.3	68.9	16 15.0	+49.0	69.2	16 36.2	+49.5	69.5	16 57.1	+50.1	69.8	17 17.7	+50.7	70.0	17 38.0	+51.2	70.3	25
26	15 57.1	+47.0	67.8	16 19.6	+47.7	68.0	16 41.9	+48.3	68.3	17 04.0	+48.8	68.6	17 25.7	+49.5	68.9	17 47.2	+50.0	69.2	18 08.4	+50.5	69.5	18 29.2	+51.2	69.8	26
27	16 44.1	+46.9	67.1	17 07.3	+47.5	67.4	17 30.2	+48.1	67.7	17 52.8	+48.8	68.0	18 15.2	+49.3	68.3	18 37.2	+49.9	68.6	18 58.9	+50.5	68.9	19 20.4	+51.0	69.2	27
28	17 31.0	+46.8	66.5	17 54.8	+47.4	66.8	18 18.3	+48.1	67.1	18 41.6	+48.6	67.4	19 04.5	+49.2	67.7	19 27.1	+49.8	68.0	19 49.4	+50.4	68.3	20 11.4	+50.9	68.7	28
29	18 17.8	+46.6	65.8	18 42.2	+47.3	66.1	19 06.4	+47.8	66.4	19 30.2	+48.5	66.8	19 53.7	+49.1	67.1	20 16.9	+49.7	67.4	20 39.8	+50.2	67.8	21 02.3	+50.8	68.1	29
30	19 04.4	+46.5	65.2	19 29.5	+47.1	65.5	19 54.2	+47.8	65.8	20 18.7	+48.3	66.1	20 42.8	+48.9	66.5	21 06.6	+49.5	66.8	21 30.0	+50.1	67.2	21 53.1	+50.7	67.5	30
31	19 50.9	+46.4	64.5	20 16.6	+47.0	64.8	20 42.0	+47.6	65.1	21 07.0	+48.2	65.5	21 31.7	+48.9	65.9	21 56.1	+49.4	66.2	22 20.1	+50.0	66.6	22 43.8	+50.6	67.0	31
32	20 37.3	+46.1	63.8	21 03.6	+46.8	64.1	21 29.6	+47.4	64.5	21 55.2	+48.1	64.9	22 20.6	+48.6	65.2	22 45.5	+49.3	65.6	23 10.1	+49.9	66.0	23 34.4	+50.4	66.4	32
33	21 23.4	+46.1	63.1	21 50.4	+46.7	63.5	22 17.0	+47.3	63.8	22 43.3	+47.9	64.2	23 09.2	+48.5	64.6	23 34.8	+49.1	65.0	24 00.0	+49.7	65.4	24 24.8	+50.3	65.8	33
34	22 09.5	+45.8	62.4	22 37.1	+46.4	62.8	23 04.3	+47.1	63.2	23 31.2	+47.8	63.6	23 57.7	+48.4	63.9	24 23.9	+49.0	64.4	24 49.7	+49.5	64.8	25 15.1	+50.1	65.2	34
35	22 55.3	+45.8	61.7	23 23.5	+46.3	62.1	23 51.4	+47.0	62.5	24 19.0	+47.5	62.9	24 46.1	+48.2	63.3	25 12.9	+48.8	63.7	25 39.2	+49.4	64.1	26 05.2	+50.0	64.6	35
36	23 40.9	+45.5	61.0	24 09.8	+46.1	61.4	24 38.4	+46.7	61.8	25 06.5	+47.4	62.2	25 34.3	+48.0	62.6	26 01.7	+48.6	63.1	26 28.6	+49.2	63.5	26 55.2	+49.8	64.0	36
37	24 26.4	+45.3	60.3	24 55.9	+45.9	60.7	25 25.1	+46.6	61.1	25 53.9	+47.2	61.5	26 22.3	+47.8	62.0	26 50.3	+48.4	62.4	27 17.8	+49.1	62.9	27 45.0	+49.6	63.3	37
38	25 11.7	+45.0	59.6	25 41.8	+45.7	60.0	26 11.7	+46.3	60.4	26 41.1	+47.0	60.9	27 10.1	+47.6	61.3	27 38.7	+48.3	61.8	28 06.9	+48.8	62.2	28 34.6	+49.5	62.7	38
39	25 56.7	+44.8	58.9	26 27.5	+45.5	59.3	26 58.0	+46.1	59.7	27 28.1	+46.7	60.2	27 57.7	+47.4	60.6	28 27.0	+48.0	61.1	28 55.7	+48.7	61.6	29 24.1	+49.3	62.1	39
40	26 41.5	+44.6	58.1	27 13.0	+45.3	58.5	27 44.1	+45.9	59.0	28 14.8	+46.6	59.4	28 45.1	+47.2	59.9	29 15.0	+47.8	60.4	29 44.4	+48.5	60.9	30 13.4	+49.0	61.4	40
41	27 26.1	+44.3	57.4	27 58.3	+45.0	57.8	28 30.0	+45.7	58.3	29 01.4	+46.3	58.7	29 32.3	+47.0	59.2	30 02.8	+47.6	59.7	30 32.9	+48.2	60.2	31 02.4	+48.9	60.7	41
42	28 10.4	+44.1	56.6	28 43.3	+44.7	57.1	29 15.7	+45.4	57.5	29 47.7	+46.1	58.0	30 19.3	+46.7	58.5	30 50.4	+47.4	59.0	31 21.1	+48.0	59.5	31 51.3	+48.6	60.0	42
43	28 54.5	+43.8	55.8	29 28.0	+44.5	56.3	30 01.1	+45.2	56.8	30 33.8	+45.8	57.3	31 06.0	+46.5	57.8	31 37.8	+47.1	58.3	32 09.1	+47.8	58.8	32 39.9	+48.4	59.4	43
44	29 38.3	+43.6	55.0	30 12.5	+44.2	55.5	30 46.3	+44.8	56.0	31 19.6	+45.5	56.5	31 52.5	+46.2	57.0	32 24.9	+46.9	57.5	32 56.9	+47.5	58.1	33 28.3	+48.2	58.6	44
45	30 21.9	+43.2	54.2	30 56.7	+43.9	54.7	31 31.1	+44.6	55.2	32 05.1	+45.3	55.7	32 38.7	+45.9	56.3	33 11.8	+46.6	56.8	33 44.4	+47.3	57.4	34 16.5	+47.9	57.9	45
46	31 05.1	+42.9	53.4	31 40.6	+43.6	53.9	32 15.7	+44.3	54.4	32 50.4	+45.0	55.0	33 24.6	+45.7	55.5	33 58.4	+46.3	56.0	34 31.7	+46.9	56.6	35 04.4	+47.7	57.2	46
47	31 48.0	+42.6	52.6	32 24.2	+43.3	53.1	33 00.0	+44.0	53.6	33 35.4	+44.7	54.2	34 10.3	+45.3	54.7	34 44.7	+46.0	55.3	35 18.6	+46.7	55.9	35 52.1	+47.3	56.4	47
48	32 30.6	+42.3	51.8	33 07.5	+43.0	52.3	33 44.0	+43.7	52.8	34 20.1	+44.3	53.4	34 55.6	+45.1	53.9	35 30.7	+45.7	54.5	36 05.3	+46.4	55.1	36 39.4	+47.1	55.7	48
49	33 12.9	+42.0	50.9	33 50.5	+42.6	51.5	34 27.7	+43.3	52.0	35 04.4	+44.0	52.5	35 40.7	+44.7	53.1	36 16.4	+45.4	53.7	36 51.7	+46.1	54.3	37 26.5	+46.7	54.9	49
50	33 54.9	+41.5	50.1	34 33.1	+42.3	50.6	35 11.0	+43.0	51.2	35 48.4	+43.7	51.7	36 25.4	+44.3	52.3	37 01.8	+45.1	52.9	37 37.8	+45.7	53.5	38 13.2	+46.4	54.1	50
51	34 36.4	+41.2	49.2	35 15.4	+41.9	49.7	35 54.0	+42.6	50.3	36 32.1	+43.3	50.9	37 09.7	+44.0	51.4	37 46.9	+44.6	52.0	38 23.5	+45.4	52.7	38 59.6	+46.1	53.3	51
52	35 17.6	+40.8	48.3	35 57.3	+41.5	48.9	36 36.6	+42.2	49.4	37 15.4	+42.9	50.0	37 53.7	+43.6	50.6	38 31.5	+44.4	51.2	39 08.9	+45.0	51.8	39 45.7	+45.7	52.5	52
53	35 58.4	+40.4	47.4	36 38.8	+41.1	48.0	37 18.8	+41.7	48.5	37 58.3	+42.5	49.1	38 37.3	+43.2	49.7	39 15.9	+43.9	50.3	39 53.9	+44.6	51.0	40 31.4	+45.3	51.6	53
54	36 38.8	+40.0	46.5	37 19.9	+40.6	47.1	38 00.5	+41.4	47.6	38 40.8	+42.0	48.2	39 20.5	+42.8	48.8	39 59.8	+43.5	49.4	40 38.5	+44.2	50.1	41 16.7	+45.0	50.8	54
55	37 18.8	+39.5	45.6	38 00.5	+40.3	46.1	38 41.9	+40.9	46.7	39 22.8	+41.7	47.3	40 03.3	+42.4	47.9	40 43.3	+43.0	48.5	41 22.7	+43.8	49.2	42 01.7	+44.5	49.9	55
56	37 58.3	+39.0	44.6	38 40.8	+39.7	45.2	39 22.8	+40.5	45.8	40 04.5	+41.2	46.4	40 45.7	+41.8	47.0	41 26.3	+42.7	47.6	42 06.5	+43.4	48.3	42 46.2	+44.1	49.0	56
57	38 37.3	+38.6	43.7	39 20.5	+39.3	44.2	40 03.3	+40.0	44.8	40 45.7	+40.6	45.4	41 27.5	+41.5	46.0	42 09.0	+42.1	46.7	42 49.9	+42.9	47.3	43 30.3	+43.6	48.0	57
58	39 15.9	+38.0	42.7	39 59.8	+38.7	43.2	40 43.3	+39.4	43.8	41 26.3	+40.2	44.4	42 09.0	+40.9	45.1	42 51.1	+41.7	45.7	43 32.8	+42.3	46.4	44 13.9	+43.1	47.1	58
59	39 53.9	+37.5	41.7	40 38.5	+38.2	42.2	41 22.7	+39.0	42.8	42 06.5	+39.7	43.4	42 49.9	+40.4	44.1	43 32.8	+41.1	44.7	44 15.1	+41.9	45.4	44 57.0	+42.6	46.1	59
60	40 31.4	+37.0	40.6	41 16.7	+37.7	41.2	42 01.7	+38.4	41.8	42 46.2	+39.1	42.4	43 30.3	+39.8	43.1	44 13.9	+40.6	43.7	44 57.0	+41.3	44.4	45 39.6	+42.1	45.1	60
61	41 08.4	+36.4	39.6	41 54.4	+37.1	40.2	42 40.1	+37.8	40.8	43 25.3	+38.5	41.4	44 10.1	+39.3	42.0	44 54.5	+40.0	42.7	45 38.3	+40.8	43.4	46 21.7	+41.5	44.1	61
62	41 44.8	+35.8	38.5	42 31.5	+36.5	39.1	43 17.9	+37.2	39.7	44 03.8	+38.0	40.3	44 49.4	+38.6	41.0	45 34.5	+39.4	41.6	46 19.1	+40.1	42.3	47 03.2	+40.9	43.0	62
63	42 20.6	+35.1	37.5	43 08.0	+35.9	38.0	43 55.1	+36.6	38.6	44 41.8	+37.3	39.2	45 28.0	+38.1	39.9	46 13.9	+38.7	40.5	46 59.2	+39.6	41.2	47 44.1	+40.3	41.9	63
64	42 55.7	+34.6	36.4	43 43.9	+35.2	36.9	44 31.7	+35.9	37.5	45 19.1	+36.6	38.1	46 06.1	+37.3	38.8	46 52.6	+38.1	39.4	47 38.8	+38.8	40.1	48 24.4	+39.6	40.8	64
65	43 30.3	+33.8	35.2	44 19.1	+34.6	35.8	45 07.6	+35.2	36.4	45 55.7	+36.0	37.0	46 43.4	+36.7	37.6	47 30.7	+37.5	38.3	48 17.6	+38.2	39.0	49 04.0	+39.0	39.7	65
66	44 04.1	+33.2	34.1	44 53.7	+33.8	34.7	45 42.8	+34.6	35.2	46 31.7	+35.2	35.8	47 20.1	+36.0	36.5	48 08.2	+36.7	37.1	48 55.8	+37.4	37.8	49 43.0	+38.2	38.5	66
67	44 37.3	+32.4	32.9	45 27.5	+33.1	33.5	46 17.4	+33.8	34.1	47 06.9	+34.5	34.7	47 56.1	+35.2	35.3	48 44.9	+35.9	35.9	49 33.2	+36.7	36.6	50 21.2	+37.4	37.3	67
68	45 09.7	+31.7	31.7	46 00.6	+32.4	32.3	46 51.2	+33.0	32.8	47 41.4	+33.7	33.4	48 31.3	+34.4	34.1	49 20.8	+35.2	34.7	50 09.9	+35.9	35.4	50 58.6	+36.7	36.1	68
69	45 41.4	+30.9	30.5	46 33.0	+31.5	31.1	47 24.2	+32.2	31.6	48 15.1	+32.9	32.2	49 05.7	+33.6	32.8	49 56.0	+34.3	33.5	50 45.8	+35.1	34.1	51 35.3	+35.8	34.8	69
70	46 12.3	+30.1	29.3	47 04.5	+30.7	29.8	47 56.4	+31.4	30.4	48 48.0	+32.1	30.9	49 39.3	+32.8	31.5	50 30.3	+33.5	32.2	51 20.9	+34.2	32.8	52 11.1	+35.0	33.5	70
71	46 42.4	+29.3	28.0	47 35.2	+29.9	28.6	48 27.8	+30.5	29.1	49 20.1	+31.2	29.7	50 12.1	+31.9	30.2	51 03.8	+32.5	30.9	51 55.1	+33.3	31.5	52 46.1	+34.0	32.2	71
72	47 11.7	+28.4	26.8	48 05.1	+29.0	27.3	48 58.3	+29.7	27.8	49 51.3	+30.3	28.3	50 44.0	+30.9	28.9	51 36.3	+31.6	29.5	52 28.4	+32.3	30.2	53 20.1	+33.0	30.8	72
73	47 40.1	+27.4	25.5	48 34.1	+28.1	25.9	49 28.0	+28.6	26.5	50 21.6	+29.3	27.0	51 14.9	+29.9	27.6	52 07.9	+30.7	28.1	53 00.7	+31.3	28.8	53 53.1	+32.1	29.4	73
74	48 07.5	+26.6	24.1	49 02.2	+27.1	24.6	49 56.6	+27.8	25.1	50 50.9	+28.3	25.6	51 44.8	+29.0	26.2	52 38.6	+29.6	26.7	53 32.0	+30.3	27.3	54 25.2	+30.9	28.0	74
75	48 34.1	+25.6	22.8	49 29.3	+26.2	23.2	50 24.4	+26.7	23.7	51 19.2	+27.3	24.2	52 13.8	+27.9	24.7	53 08.2	+28.5	25.3	54 02.3	+29.2	25.9	54 56.1	+29.9	26.5	75
76	48 59.7	+24.6	21.4	49 55.5	+25.1	21.8	50 51.1	+25.6	22.3	51 46.5	+26.2	22.8	52 41.7	+26.8	23.3	53 36.7	+27.4	23.8	54 31.5	+28.0	24.4	55 26.0	+28.7	25.0	76
77	49 24.3	+23.6	20.0	50 20.6	+24.1	20.4	51 16.7	+24.6	20.9	52 12.7	+25.1	21.3	53 08.5	+25.7	21.8	54 04.1	+26.3	22.3	54 59.5	+26.9	22.8	55 54.7	+27.5	23.4	77
78	49 47.9	+22.5	18.6	50 44.7	+22.9	19.0	51 41.3	+23.5	19.4	52 37.8	+24.0	19.8	53 34.2	+24.5	20.3	54 30.4	+25.1	20.8	55 26.4	+25.6	21.3	56 22.2	+26.3	21.8	78
79	50 10.4	+21.4	17.2	51 07.6	+21.9	17.5	52 04.8	+22.3	17.9	53 01.8	+22.8	18.3	53 58.7	+23.3	18.7	54 55.5	+23.8	19.2	55 52.0	+24.4	19.7	56 48.5	+24.9	20.2	79
80	50 31.8	+20.3	15.7	51 29.5	+20.7	16.0	52 27.1	+21.2	16.4	53 24.6	+21.6	16.8	54 22.0	+22.1	17.2	55 19.3	+22.5	17.6	56 16.4	+23.1	18.0	57 13.4	+23.6	18.5	80
81	50 52.1	+19.2	14.2	51 50.2	+19.6	14.5	52 48.3	+19.9	14.8	53 46.2	+20.4	15.2	54 44.1	+20.7	15.6	55 41.8	+21.2	15.9	56 39.5	+21.6	16.4	57 37.0	+22.1	16.8	81
82	51 11.3	+18.0	12.7	52 09.8	+18.3	13.0	53 08.2	+18.7	13.3	54 06.6	+19.0	13.6	55 04.8	+19.5	13.9	56 03.0	+19.9	14.3	57 01.1	+20.3	14.7	57 59.1	+20.7	15.1	82
83	51 29.3	+16.7	11.2	52 28.1	+17.1	11.4	53 26.9	+17.4	11.7	54 25.6	+17.7	12.0	55 24.3	+18.0	12.3	56 22.9	+18.4	12.6	57 21.4	+18.8	12.9	58 19.8	+19.2	13.3	83
84	51 46.0	+15.6	9.8	52 45.2	+15.8	9.9	53 44.3	+16.1	10.1	54 43.3	+16.4	10.3	55 42.3	+16.7	10.6	56 41.3	+17.0	10.9	57 40.2	+17.3	11.2	58 39.0	+17.7	11.5	84
85	52 01.6	+14.3	8.1	53 01.0	+14.5	8.2	54 00.4	+14.7	8.4	54 59.7	+15.0	8.7	55 59.0	+15.2	8.9	56 58.3	+15.4	9.1	57 57.5	+15.7	9.4	58 56.7	+16.0	9.6	85
86	52 15.9	+13.0	6.5	53 15.5	+13.2	6.6	54 15.1	+13.3	6.8	55 14.7	+13.5	7.0	56 14.2	+13.7	7.1	57 13.7	+14.0	7.3	58 13.2	+14.2	7.5	59 12.7	+14.4	7.8	86
87	52 28.9	+11.7	4.9	53 28.7	+11.8	5.0	54 28.4	+12.0	5.1	55 28.2	+12.1	5.2	56 27.9	+12.3	5.4	57 27.7	+12.3	5.5	58 27.4	+12.5	5.7	59 27.1	+12.7	5.9	87
88	52 40.6	+10.4	3.3	53 40.5	+10.4	3.3	54 40.4	+10.5	3.4	55 40.3	+10.6	3.5	56 40.2	+10.7	3.6	57 40.0	+10.8	3.7	58 39.9	+10.9	3.8	59 39.8	+11.0	3.9	88
89	52 51.0	+9.0	1.6	53 50.9	+9.1	1.7	54 50.9	+9.1	1.7	55 50.9	+9.1	1.8	56 50.9	+9.1	1.8	57 50.8	+9.2	1.9	58 50.8	+9.2	1.9	59 50.8	+9.2	2.0	89
90	53 00.0	+7.7	0.0	54 00.0	+7.6	0.0	55 00.0	+7.6	0.0	56 00.0	+7.6	0.0	57 00.0	+7.6	0.0	58 00.0	+7.5	0.0	59 00.0	+7.5	0.0	60 00.0	+7.5	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°............Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   L.H.A. 98°, 262°

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Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	4 12.4	+48.0	95.6	4 06.5	+48.6	95.7	4 00.5	+49.3	95.7	3 54.5	+49.8	95.8	3 48.3	+50.5	95.9	3 42.2	+50.9	95.9	3 35.9	+51.5	96.0	3 29.6	+52.1	96.1	0
1	5 00.4	+48.0	95.0	4 55.1	+48.6	95.1	4 49.8	+49.2	95.2	4 44.3	+49.8	95.3	4 38.8	+50.4	95.4	4 33.1	+51.0	95.4	4 27.4	+51.5	95.5	4 21.7	+52.0	95.6	1
2	5 48.4	+48.0	94.4	5 43.7	+48.6	94.5	5 39.0	+49.2	94.6	5 34.1	+49.8	94.7	5 29.2	+50.3	94.8	5 24.1	+50.9	94.9	5 18.9	+51.5	95.0	5 13.7	+52.0	95.1	2
3	6 36.4	+47.9	93.8	6 32.3	+48.6	93.9	6 28.2	+49.1	94.0	6 23.9	+49.8	94.1	6 19.5	+50.4	94.2	6 15.0	+50.9	94.3	6 10.4	+51.5	94.5	6 05.7	+52.0	94.6	3
4	7 24.3	+47.8	93.2	7 20.9	+48.5	93.3	7 17.3	+49.1	93.4	7 13.7	+49.7	93.6	7 09.9	+50.3	93.7	7 05.9	+50.9	93.8	7 01.9	+51.4	93.9	6 57.7	+51.9	94.1	4
5	8 12.1	+47.9	92.6	8 09.4	+48.4	92.7	8 06.4	+49.1	92.9	8 03.4	+49.6	93.0	8 00.2	+50.2	93.1	7 56.8	+50.8	93.3	7 53.3	+51.3	93.4	7 49.6	+51.9	93.6	5
6	9 00.0	+47.7	92.0	8 57.8	+48.4	92.1	8 55.5	+49.0	92.3	8 53.0	+49.6	92.4	8 50.4	+50.2	92.6	8 47.6	+50.8	92.7	8 44.6	+51.4	92.9	8 41.5	+51.9	93.1	6
7	9 47.7	+47.7	91.4	9 46.2	+48.3	91.5	9 44.5	+49.0	91.7	9 42.6	+49.6	91.9	9 40.6	+50.1	92.0	9 38.4	+50.7	92.2	9 36.0	+51.3	92.4	9 33.4	+51.8	92.5	7
8	10 35.4	+47.6	90.7	10 34.5	+48.3	90.9	10 33.5	+48.8	91.1	10 32.2	+49.5	91.3	10 30.7	+50.1	91.5	10 29.1	+50.7	91.7	10 27.3	+51.2	91.9	10 25.2	+51.8	92.0	8
9	11 23.0	+47.5	90.1	11 22.8	+48.2	90.3	11 22.3	+48.9	90.5	11 21.7	+49.4	90.7	11 20.8	+50.1	90.9	11 19.8	+50.6	91.1	11 18.5	+51.2	91.3	11 17.0	+51.7	91.5	9
10	12 10.5	+47.5	89.5	12 11.0	+48.1	89.7	12 11.2	+48.7	89.9	12 11.1	+49.4	90.1	12 10.9	+49.9	90.4	12 10.4	+50.5	90.8	12 09.7	+51.1	90.8	12 08.7	+51.7	91.0	10
11	12 58.0	+47.4	88.9	12 59.1	+48.0	89.1	12 59.9	+48.6	89.3	13 00.5	+49.2	89.6	13 00.8	+49.9	89.8	13 00.9	+50.5	90.0	13 00.8	+51.0	90.3	13 00.4	+51.6	90.5	11
12	13 45.4	+47.2	88.2	13 47.1	+47.9	88.5	13 48.5	+48.6	88.7	13 49.7	+49.2	89.0	13 50.7	+49.8	89.2	13 51.4	+50.4	89.5	13 51.8	+51.0	89.7	13 52.0	+51.5	90.0	12
13	14 32.6	+47.2	87.6	14 35.0	+47.8	87.9	14 37.1	+48.5	88.1	14 38.9	+49.1	88.4	14 40.5	+49.7	88.6	14 41.8	+50.3	88.9	14 42.8	+50.9	89.2	14 43.5	+51.5	89.4	13
14	15 19.8	+47.0	87.0	15 22.8	+47.7	87.2	15 25.6	+48.3	87.5	15 28.0	+49.0	87.8	15 30.2	+49.6	88.1	15 32.1	+50.2	88.3	15 33.7	+50.8	88.6	15 35.0	+51.4	88.9	14
15	16 06.8	+47.0	86.3	16 10.5	+47.6	86.6	16 13.9	+48.3	86.9	16 17.0	+48.9	87.2	16 19.8	+49.6	87.5	16 22.3	+50.1	87.8	16 24.5	+50.7	88.1	16 26.4	+51.3	88.4	15
16	16 53.8	+46.8	85.7	16 58.1	+47.5	86.0	17 02.2	+48.1	86.3	17 05.9	+48.8	86.6	17 09.4	+49.4	86.9	17 12.4	+50.1	87.2	17 15.2	+50.7	87.5	17 17.7	+51.2	87.8	16
17	17 40.6	+46.6	85.0	17 45.6	+47.4	85.3	17 50.3	+48.1	85.6	17 54.7	+48.7	86.0	17 58.8	+49.3	86.3	18 02.5	+49.9	86.6	18 05.9	+50.5	86.9	18 08.9	+51.1	87.3	17
18	18 27.2	+46.6	84.3	18 33.0	+47.2	84.7	18 38.4	+47.9	85.0	18 43.4	+48.6	85.4	18 48.1	+49.2	85.7	18 52.4	+49.8	86.0	18 56.4	+50.4	86.4	19 00.0	+51.0	86.7	18
19	19 13.8	+46.4	83.7	19 20.2	+47.1	84.0	19 26.3	+47.7	84.4	19 32.0	+48.4	84.7	19 37.3	+49.1	85.1	19 42.2	+49.7	85.5	19 46.8	+50.3	85.8	19 51.0	+50.9	86.2	19
20	20 00.2	+46.2	83.0	20 07.3	+46.9	83.4	20 14.0	+47.7	83.7	20 20.4	+48.3	84.1	20 26.4	+48.9	84.5	20 31.9	+49.6	84.8	20 37.1	+50.2	85.2	20 41.9	+50.8	85.6	20
21	20 46.4	+46.1	82.3	20 54.2	+46.8	82.7	21 01.7	+47.4	83.1	21 08.7	+48.1	83.5	21 15.3	+48.8	83.9	21 21.5	+49.5	84.2	21 27.3	+50.1	84.6	21 32.7	+50.7	85.0	21
22	21 32.5	+45.9	81.6	21 41.0	+46.6	82.0	21 49.1	+47.3	82.4	21 56.8	+48.0	82.8	22 04.1	+48.7	83.2	22 11.0	+49.3	83.6	22 17.4	+50.0	84.0	22 23.4	+50.6	84.4	22
23	22 18.4	+45.7	80.9	22 27.6	+46.5	81.4	22 36.4	+47.2	81.8	22 44.8	+47.9	82.2	22 52.8	+48.5	82.6	23 00.3	+49.1	83.0	23 07.4	+49.8	83.4	23 14.0	+50.3	83.9	23
24	23 04.1	+45.6	80.2	23 14.1	+46.2	80.7	23 23.6	+47.0	81.1	23 32.7	+47.6	81.5	23 41.3	+48.3	82.0	23 49.4	+49.1	82.4	23 57.2	+49.6	82.8	24 04.4	+50.3	83.3	24
25	23 49.7	+45.3	79.5	24 00.3	+46.1	80.0	24 10.6	+46.8	80.4	24 20.3	+47.5	80.9	24 29.6	+48.2	81.3	24 38.5	+48.8	81.8	24 46.8	+49.5	82.2	24 54.7	+50.2	82.7	25
26	24 35.0	+45.1	78.8	24 46.4	+45.9	79.3	24 57.4	+46.5	79.7	25 07.8	+47.3	80.2	25 17.8	+48.0	80.6	25 27.3	+48.7	81.1	25 36.3	+49.4	81.6	25 44.9	+50.0	82.1	26
27	25 20.1	+45.0	78.1	25 32.3	+45.7	78.6	25 43.9	+46.4	79.0	25 55.1	+47.1	79.5	26 05.8	+47.8	80.0	26 16.0	+48.5	80.5	26 25.7	+49.2	81.0	26 34.9	+49.8	81.5	27
28	26 05.1	+44.7	77.4	26 18.0	+45.4	77.8	26 30.3	+46.2	78.3	26 42.2	+47.0	78.8	26 53.6	+47.6	79.3	27 04.5	+48.3	79.8	27 14.9	+49.0	80.3	27 24.7	+49.6	80.8	28
29	26 49.8	+44.4	76.6	27 03.4	+45.2	77.1	27 16.5	+46.0	77.6	27 29.2	+46.6	78.1	27 41.2	+47.5	78.6	27 52.8	+48.1	79.1	28 03.9	+48.8	79.7	28 14.3	+49.5	80.2	29
30	27 34.2	+44.2	75.9	27 48.6	+45.0	76.4	28 02.5	+45.7	76.9	28 15.8	+46.5	77.4	28 28.7	+47.2	77.9	28 40.9	+48.0	78.5	28 52.7	+48.6	79.0	29 03.8	+49.3	79.5	30
31	28 18.4	+44.0	75.1	28 33.6	+44.7	75.6	28 48.2	+45.5	76.1	29 02.3	+46.3	76.7	29 15.9	+46.9	77.2	29 28.9	+47.7	77.8	29 41.3	+48.4	78.3	29 53.1	+49.1	78.9	31
32	29 02.4	+43.6	74.3	29 18.3	+44.5	74.9	29 33.7	+45.3	75.4	29 48.6	+46.0	76.0	30 02.8	+46.8	76.5	30 16.6	+47.4	77.1	30 29.7	+48.2	77.6	30 42.2	+48.9	78.2	32
33	29 46.0	+43.4	73.5	30 02.8	+44.2	74.1	30 19.0	+44.9	74.6	30 34.6	+45.7	75.2	30 49.6	+46.5	75.8	31 04.0	+47.3	76.4	31 17.9	+47.9	77.0	31 31.1	+48.7	77.5	33
34	30 29.4	+43.1	72.7	30 47.0	+43.9	73.3	31 03.9	+44.7	73.9	31 20.3	+45.4	74.5	31 36.1	+46.2	75.0	31 51.3	+46.9	75.6	32 05.8	+47.6	76.2	32 19.8	+48.4	76.9	34
35	31 12.5	+42.8	71.9	31 30.9	+43.6	72.5	31 48.6	+44.4	73.1	32 05.8	+45.1	73.7	32 22.3	+45.9	74.3	32 38.2	+46.8	74.9	32 53.6	+47.4	75.5	33 08.2	+48.2	76.2	35
36	31 55.3	+42.5	71.1	32 14.5	+43.2	71.7	32 33.0	+44.1	72.3	32 50.9	+44.9	72.9	33 08.3	+45.7	73.5	33 25.0	+46.4	74.2	33 41.0	+47.2	74.8	33 56.4	+48.0	75.4	36
37	32 37.8	+42.1	70.3	32 57.7	+43.0	70.9	33 17.1	+43.8	71.5	33 35.8	+44.6	72.1	33 54.0	+45.3	72.7	34 11.4	+46.2	73.4	34 28.2	+47.0	74.1	34 44.4	+47.7	74.7	37
38	33 19.9	+41.8	69.4	33 40.7	+42.6	70.0	34 00.9	+43.4	70.7	34 20.4	+44.3	71.3	34 39.3	+45.1	72.0	34 57.6	+45.8	72.6	35 15.2	+46.6	73.3	35 32.1	+47.4	74.0	38
39	34 01.7	+41.4	68.5	34 23.3	+42.3	69.2	34 44.3	+43.1	69.8	35 04.7	+43.9	70.5	35 24.4	+44.7	71.2	35 43.4	+45.6	71.8	36 01.8	+46.4	72.5	36 19.5	+47.1	73.2	39
40	34 43.1	+41.0	67.7	35 05.6	+41.8	68.3	35 27.4	+42.7	69.0	35 48.6	+43.6	69.6	36 09.1	+44.4	70.3	36 29.0	+45.2	71.0	36 48.2	+46.0	71.7	37 06.6	+46.8	72.4	40
41	35 24.1	+40.6	66.8	35 47.4	+41.5	67.4	36 10.1	+42.4	68.1	36 32.2	+43.2	68.8	36 53.5	+44.1	69.5	37 14.2	+44.9	70.2	37 34.2	+45.7	70.9	37 53.4	+46.5	71.7	41
42	36 04.7	+40.2	65.9	36 28.9	+41.1	66.5	36 52.5	+41.9	67.2	37 15.4	+42.8	67.9	37 37.6	+43.6	68.6	37 59.1	+44.5	69.4	38 19.9	+45.3	70.1	38 39.9	+46.2	70.9	42
43	36 44.9	+39.8	65.0	37 10.0	+40.7	65.6	37 34.4	+41.6	66.3	37 58.2	+42.4	67.0	38 21.2	+43.3	67.8	38 43.6	+44.1	68.5	39 05.2	+44.9	69.3	39 26.1	+45.8	70.0	43
44	37 24.7	+39.3	64.0	37 50.7	+40.2	64.7	38 16.0	+41.1	65.4	38 40.6	+42.0	66.1	39 04.5	+42.8	66.9	39 27.7	+43.7	67.6	39 50.1	+44.6	68.4	40 11.9	+45.4	69.2	44
45	38 04.0	+38.9	63.1	38 30.9	+39.7	63.8	38 57.1	+40.6	64.5	39 22.6	+41.5	65.2	39 47.3	+42.5	66.0	40 11.4	+43.3	66.7	40 34.7	+44.2	67.5	40 57.3	+45.0	68.3	45
46	38 42.9	+38.3	62.1	39 10.6	+39.3	62.8	39 37.7	+40.2	63.5	40 04.1	+41.1	64.3	40 29.8	+41.9	65.0	40 54.7	+42.9	65.8	41 18.9	+43.7	66.6	41 42.3	+44.6	67.4	46
47	39 21.2	+37.9	61.1	39 49.9	+38.7	61.8	40 17.9	+39.7	62.6	40 45.2	+40.6	63.3	41 11.7	+41.5	64.1	41 37.6	+42.4	64.9	42 02.6	+43.3	65.7	42 26.9	+44.2	66.5	47
48	39 59.1	+37.3	60.1	40 28.6	+38.3	60.8	40 57.6	+39.1	61.6	41 25.8	+40.0	62.3	41 53.2	+41.0	63.1	42 20.0	+41.9	63.9	42 45.9	+42.9	64.8	43 11.1	+43.7	65.6	48
49	40 36.4	+36.7	59.1	41 06.9	+37.7	59.8	41 36.7	+38.6	60.6	42 05.8	+39.6	61.4	42 34.2	+40.5	62.2	43 01.9	+41.4	63.0	43 28.8	+42.3	63.8	43 54.8	+43.3	64.7	49
50	41 13.1	+36.2	58.0	41 44.6	+37.1	58.8	42 15.3	+38.1	59.5	42 45.4	+39.0	60.3	43 14.7	+40.0	61.1	43 43.3	+40.9	62.0	44 11.1	+41.8	62.8	44 38.1	+42.7	63.7	50
51	41 49.3	+35.6	56.9	42 21.7	+36.5	57.7	42 53.4	+37.5	58.5	43 24.4	+38.4	59.3	43 54.7	+39.3	60.1	44 24.2	+40.3	61.0	44 52.9	+41.3	61.8	45 20.8	+42.2	62.7	51
52	42 24.9	+34.9	55.9	42 58.2	+35.9	56.6	43 30.9	+36.8	57.4	44 02.8	+37.8	58.2	44 34.0	+38.8	59.1	45 04.5	+39.7	59.9	45 34.2	+40.7	60.8	46 03.0	+41.7	61.7	52
53	42 59.8	+34.3	54.8	43 34.1	+35.3	55.5	44 07.7	+36.2	56.3	44 40.6	+37.2	57.1	45 12.8	+38.2	58.0	45 44.2	+39.2	58.9	46 14.9	+40.1	59.7	46 44.7	+41.1	60.7	53
54	43 34.1	+33.6	53.6	44 09.4	+34.5	54.4	44 43.9	+35.6	55.2	45 17.8	+36.5	56.0	45 51.0	+37.5	56.9	46 23.4	+38.5	57.8	46 55.0	+39.5	58.7	47 25.8	+40.4	59.6	54
55	44 07.7	+32.9	52.5	44 43.9	+33.9	53.3	45 19.5	+34.8	54.1	45 54.3	+35.9	54.9	46 28.5	+36.8	55.8	47 01.9	+37.8	56.6	47 34.5	+38.8	57.6	48 06.2	+39.9	58.5	55
56	44 40.6	+32.2	51.3	45 17.8	+33.2	52.1	45 54.3	+34.2	52.9	46 30.2	+35.1	53.7	47 05.3	+36.1	54.6	47 39.7	+37.1	55.5	48 13.3	+38.1	56.4	48 46.1	+39.1	57.4	56
57	45 12.8	+31.4	50.1	45 51.0	+32.4	50.9	46 28.5	+33.4	51.7	47 05.3	+34.4	52.6	47 41.4	+35.4	53.4	48 16.8	+36.4	54.3	48 51.4	+37.4	55.2	49 25.2	+38.4	56.2	57
58	45 44.2	+30.7	48.9	46 23.4	+31.6	49.7	47 01.9	+32.6	50.5	47 39.7	+33.6	51.3	48 16.8	+34.6	52.2	48 53.2	+35.6	53.1	49 28.8	+36.7	54.1	50 03.6	+37.7	55.0	58
59	46 14.9	+29.8	47.7	46 55.0	+30.8	48.5	47 34.5	+31.7	49.3	48 13.3	+32.8	50.1	48 51.4	+33.8	51.0	49 28.8	+34.8	51.9	50 05.5	+35.8	52.8	50 41.3	+36.9	53.8	59
60	46 44.7	+29.0	46.4	47 25.8	+29.9	47.2	48 06.2	+31.0	48.0	48 46.1	+31.9	48.8	49 25.2	+32.9	49.7	50 03.6	+34.0	50.6	50 41.3	+35.0	51.6	51 18.2	+36.1	52.5	60
61	47 13.7	+28.1	45.1	47 55.7	+29.1	45.9	48 37.2	+30.0	46.7	49 18.0	+31.0	47.6	49 58.1	+32.1	48.4	50 37.6	+33.1	49.3	51 16.3	+34.2	50.3	51 54.3	+35.2	51.3	61
62	47 41.8	+27.2	43.8	48 24.8	+28.1	44.6	49 07.2	+29.1	45.4	49 49.0	+30.2	46.2	50 30.2	+31.2	47.1	51 10.7	+32.2	48.0	51 50.5	+33.2	49.0	52 29.5	+34.3	49.9	62
63	48 09.0	+26.2	42.5	48 52.9	+27.2	43.3	49 36.4	+28.1	44.1	50 19.2	+29.1	44.9	51 01.4	+30.2	45.8	51 42.9	+31.2	46.7	52 23.7	+32.3	47.6	53 03.8	+33.3	48.6	63
64	48 35.2	+25.3	41.1	49 20.1	+26.3	41.9	50 04.5	+27.2	42.7	50 48.3	+28.2	43.5	51 31.6	+29.1	44.4	52 14.1	+30.2	45.3	52 56.0	+31.3	46.2	53 37.1	+32.4	47.2	64
65	49 00.5	+24.3	39.8	49 46.4	+25.2	40.5	50 31.7	+26.2	41.3	51 16.5	+27.2	42.1	52 00.7	+28.2	43.0	52 44.3	+29.2	43.9	53 27.3	+30.2	44.8	54 09.5	+31.3	45.8	65
66	49 24.8	+23.2	38.4	50 11.6	+24.2	39.1	50 57.9	+25.1	39.9	51 43.7	+26.1	40.7	52 28.9	+27.1	41.5	53 13.5	+28.1	42.4	53 57.5	+29.2	43.3	54 40.8	+30.2	44.3	66
67	49 48.0	+22.2	36.9	50 35.8	+23.1	37.7	51 23.0	+24.1	38.4	52 09.8	+25.0	39.2	52 56.0	+26.0	40.0	53 41.6	+27.0	40.9	54 26.7	+28.0	41.8	55 11.0	+29.1	42.8	67
68	50 10.2	+21.1	35.5	50 58.9	+22.0	36.2	51 47.1	+22.9	36.9	52 34.8	+23.8	37.7	53 22.0	+24.8	38.5	54 08.6	+25.8	39.4	54 54.7	+26.8	40.3	55 40.1	+27.9	41.2	68
69	50 31.3	+20.0	34.0	51 20.9	+20.8	34.7	52 10.0	+21.7	35.4	52 58.6	+22.7	36.2	53 46.8	+23.6	37.0	54 34.4	+24.6	37.9	55 21.5	+25.6	38.7	56 08.0	+26.7	39.7	69
70	50 51.3	+18.9	32.5	51 41.7	+19.7	33.2	52 31.7	+20.6	33.9	53 21.3	+21.4	34.7	54 10.4	+22.4	35.4	54 59.0	+23.4	36.3	55 47.1	+24.4	37.1	56 34.7	+25.4	38.0	70
71	51 10.2	+17.6	31.0	52 01.4	+18.5	31.7	52 52.3	+19.3	32.4	53 42.7	+20.2	33.1	54 32.8	+21.1	33.9	55 22.4	+22.0	34.7	56 11.5	+23.0	35.5	57 00.1	+24.0	36.4	71
72	51 27.8	+16.5	29.5	52 19.9	+17.2	30.1	53 11.6	+18.0	30.8	54 02.9	+19.0	31.5	54 53.9	+19.8	32.2	55 44.4	+20.7	33.0	56 34.5	+21.7	33.8	57 24.1	+22.7	34.7	72
73	51 44.3	+15.2	27.9	52 37.1	+16.0	28.6	53 29.6	+16.8	29.2	54 21.9	+17.5	29.9	55 13.7	+18.4	30.6	56 05.1	+19.4	31.3	56 56.2	+20.2	32.1	57 46.8	+21.2	33.0	73
74	51 59.5	+13.9	26.4	52 53.1	+14.7	27.0	53 46.4	+15.4	27.6	54 39.4	+16.3	28.2	55 32.1	+17.1	28.9	56 24.5	+17.9	29.6	57 16.4	+18.8	30.4	58 08.0	+19.7	31.2	74
75	52 13.4	+12.7	24.8	53 07.8	+13.3	25.3	54 01.8	+14.1	25.9	54 55.7	+14.8	26.6	55 49.2	+15.6	27.2	56 42.4	+16.4	27.9	57 35.2	+17.3	28.6	58 27.7	+18.2	29.4	75
76	52 26.1	+11.3	23.2	53 21.1	+12.0	23.7	54 15.9	+12.7	24.3	55 10.5	+13.4	24.9	56 04.8	+14.1	25.5	56 58.8	+14.9	26.1	57 52.5	+15.8	26.8	58 45.9	+16.6	27.6	76
77	52 37.4	+10.0	21.6	53 33.1	+10.7	22.1	54 28.6	+11.3	22.6	55 23.9	+12.0	23.2	56 18.9	+12.7	23.7	57 13.7	+13.4	24.4	58 08.3	+14.1	25.0	59 02.5	+14.9	25.7	77
78	52 47.4	+8.7	20.0	53 43.8	+9.2	20.4	54 39.9	+9.9	20.9	55 36.0	+10.4	21.4	56 31.6	+11.1	21.9	57 27.1	+11.9	22.6	58 22.4	+12.6	23.2	59 17.4	+13.4	23.8	78
79	52 56.1	+7.3	18.3	53 53.0	+7.9	18.7	54 49.8	+8.4	19.2	55 46.3	+9.0	19.7	56 42.7	+9.6	20.2	57 39.0	+10.2	20.7	58 35.0	+10.9	21.3	59 30.8	+11.6	21.9	79
80	53 03.4	+6.0	16.7	54 00.9	+6.4	17.1	54 58.2	+6.9	17.5	55 55.3	+7.5	17.9	56 52.3	+8.1	18.4	57 49.2	+8.6	18.9	58 45.9	+9.2	19.4	59 42.4	+9.8	20.0	80
81	53 09.4	+4.5	15.0	54 07.3	+5.0	15.4	55 05.1	+5.5	15.7	56 02.8	+5.9	16.1	57 00.4	+6.4	16.5	57 57.8	+7.0	17.0	58 55.1	+7.5	17.5	59 52.2	+8.2	18.0	81
82	53 13.9	+3.2	13.3	54 12.3	+3.5	13.7	55 10.6	+3.9	14.0	56 08.7	+4.4	14.4	57 06.8	+4.8	14.7	58 04.8	+5.3	15.1	59 02.6	+5.8	15.6	60 00.4	+6.3	16.0	82
83	53 17.1	+1.8	11.7	54 15.8	+2.1	12.0	55 14.5	+2.5	12.2	56 13.1	+2.8	12.6	57 11.6	+3.2	12.9	58 10.1	+3.6	13.3	59 08.4	+4.1	13.6	60 06.7	+4.5	14.0	83
84	53 18.9	+0.3	10.0	54 17.9	+0.7	10.2	55 17.0	+1.0	10.5	56 15.9	+1.3	10.8	57 14.8	+1.6	11.1	58 13.7	+1.9	11.4	59 12.5	+2.3	11.7	60 11.2	+2.7	12.0	84
85	53 19.2	−1.0	8.3	54 18.6	−0.8	8.5	55 17.9	−0.6	8.7	56 17.2	−0.3	9.0	57 16.4	0.0	9.2	58 15.6	+0.3	9.5	59 14.8	+0.5	9.7	60 13.9	+0.9	10.0	85
86	53 18.2	−2.5	6.7	54 17.8	−2.3	6.8	55 17.3	−2.1	7.0	56 16.9	−1.9	7.2	57 16.4	−1.7	7.4	58 15.9	−1.5	7.6	59 15.3	−1.2	7.8	60 14.8	−1.0	8.0	86
87	53 15.7	−3.8	5.0	54 15.5	−3.7	5.1	55 15.2	−3.5	5.2	56 15.0	−3.3	5.4	57 14.7	−3.3	5.5	58 14.4	−3.1	5.7	59 14.1	−2.9	5.8	60 13.8	−2.8	6.0	87
88	53 11.9	−5.3	3.3	54 11.8	−5.2	3.4	55 11.7	−5.1	3.5	56 11.5	−5.0	3.6	57 11.4	−4.9	3.7	58 11.3	−4.8	3.8	59 11.2	−4.7	3.9	60 11.0	−4.6	4.0	88
89	53 06.6	−6.6	1.7	54 06.6	−6.6	1.7	55 06.6	−6.6	1.7	56 06.5	−6.5	1.8	57 06.5	−6.5	1.8	58 06.5	−6.5	1.9	59 06.5	−6.5	1.9	60 06.4	−6.4	2.0	89
90	53 00.0	−8.0	0.0	54 00.0	−8.0	0.0	55 00.0	−8.0	0.0	56 00.0	−8.1	0.0	57 00.0	−8.1	0.0	58 00.0	−8.1	0.0	59 00.0	−8.2	0.0	60 00.0	−8.2	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	4 12.4	−48.1	95.6	4 06.5	−48.7	95.7	4 00.5	−49.3	95.7	3 54.5	−49.9	95.8	3 48.3	−50.4	95.9	3 42.2	−51.0	95.9	3 35.9	−51.5	96.0	3 29.6	−52.1	96.1	0
1	3 24.3	−48.1	96.2	3 17.8	−48.7	96.3	3 11.2	−49.3	96.3	3 04.6	−49.9	96.4	2 57.9	−50.5	96.4	2 51.2	−51.0	96.5	2 44.4	−51.6	96.5	2 37.5	−52.0	96.6	1
2	2 36.2	−48.1	96.8	2 29.1	−48.7	96.8	2 21.9	−49.3	96.9	2 14.7	−49.9	96.9	2 07.4	−50.4	97.0	2 00.2	−51.1	97.0	1 52.8	−51.5	97.0	1 45.5	−52.1	97.1	2
3	1 48.1	−48.1	97.4	1 40.4	−48.7	97.4	1 32.6	−49.3	97.5	1 24.8	−49.9	97.5	1 17.0	−50.5	97.5	1 09.1	−51.0	97.5	1 01.3	−51.6	97.6	0 53.4	−52.1	97.6	3
4	1 00.0	−48.1	98.0	0 51.7	−48.8	98.0	0 43.3	−49.3	98.0	0 34.9	−49.9	98.0	0 26.5	−50.5	98.0	0 18.1	−51.0	98.1	0 09.7	−51.6	98.1	0 01.3	−52.1	98.1	4
5	0 11.9	−48.1	98.6	0 02.9	−48.7	98.6	0 06.0	+49.4	81.4	0 15.0	+49.9	81.4	0 24.0	+50.4	81.4	0 32.9	+51.1	81.4	0 41.9	+51.5	81.4	0 50.8	+52.1	81.4	5
6	0 36.2	+48.1	80.8	0 45.8	+48.7	80.8	0 55.4	+49.3	80.8	1 04.9	+49.9	80.9	1 14.4	+50.5	80.9	1 24.0	+51.0	80.9	1 33.4	+51.6	80.9	1 42.9	+52.1	80.9	6
7	1 24.3	+48.2	80.2	1 34.5	+48.7	80.2	1 44.7	+49.3	80.3	1 54.8	+49.9	80.3	2 04.9	+50.5	80.3	2 15.0	+51.0	80.4	2 25.0	+51.5	80.4	2 35.0	+52.0	80.5	7
8	2 12.5	+48.0	79.6	2 23.2	+48.8	79.7	2 34.0	+49.3	79.7	2 44.7	+49.9	79.7	2 55.4	+50.4	79.8	3 06.0	+51.0	79.8	3 16.5	+51.6	79.9	3 27.0	+52.1	80.0	8
9	3 00.5	+48.1	79.0	3 12.0	+48.6	79.1	3 23.3	+49.3	79.1	3 34.6	+49.8	79.2	3 45.8	+50.4	79.2	3 57.0	+50.9	79.3	4 08.1	+51.5	79.4	4 19.1	+52.0	79.5	9
10	3 48.6	+48.1	78.4	4 00.6	+48.7	78.5	4 12.6	+49.2	78.6	4 24.4	+49.9	78.6	4 36.2	+50.4	78.7	4 47.9	+51.0	78.8	4 59.6	+51.5	78.8	5 11.1	+52.0	79.0	10
11	4 36.7	+48.0	77.8	4 49.3	+48.6	77.9	5 01.8	+49.2	78.0	5 14.3	+49.8	78.1	5 26.6	+50.4	78.2	5 38.9	+50.9	78.3	5 51.1	+51.4	78.4	6 03.1	+52.0	78.5	11
12	5 24.7	+48.0	77.2	5 37.9	+48.6	77.3	5 51.0	+49.2	77.4	6 04.1	+49.7	77.5	6 17.0	+50.3	77.6	6 29.8	+50.9	77.7	6 42.5	+51.4	77.8	6 55.1	+51.9	78.0	12
13	6 12.7	+47.9	76.6	6 26.5	+48.6	76.7	6 40.2	+49.2	76.8	6 53.8	+49.8	76.9	7 07.3	+50.3	77.1	7 20.7	+50.8	77.2	7 33.9	+51.4	77.3	7 47.0	+52.0	77.4	13
14	7 00.6	+47.9	76.0	7 15.1	+48.5	76.1	7 29.4	+49.1	76.3	7 43.6	+49.6	76.4	7 57.6	+50.3	76.5	8 11.5	+50.9	76.7	8 25.3	+51.4	76.8	8 39.0	+51.8	76.9	14
15	7 48.5	+47.8	75.4	8 03.6	+48.4	75.5	8 18.5	+49.0	75.7	8 33.2	+49.7	75.8	8 47.9	+50.2	76.0	9 02.4	+50.7	76.1	9 16.7	+51.3	76.3	9 30.8	+51.9	76.4	15
16	8 36.3	+47.8	74.8	8 52.0	+48.4	74.9	9 07.5	+49.0	75.1	9 22.9	+49.6	75.2	9 38.1	+50.1	75.4	9 53.1	+50.7	75.6	10 08.0	+51.2	75.7	10 22.7	+51.7	75.9	16
17	9 24.1	+47.7	74.2	9 40.4	+48.3	74.3	9 56.5	+48.9	74.5	10 12.5	+49.5	74.7	10 28.2	+50.1	74.9	10 43.8	+50.7	75.0	10 59.2	+51.2	75.2	11 14.4	+51.8	75.4	17
18	10 11.8	+47.7	73.6	10 28.7	+48.3	73.7	10 45.4	+48.9	73.9	11 02.0	+49.4	74.1	11 18.3	+50.0	74.3	11 34.5	+50.6	74.5	11 50.4	+51.2	74.7	12 06.2	+51.6	74.9	18
19	10 59.5	+47.6	72.9	11 17.0	+48.2	73.1	11 34.3	+48.8	73.3	11 51.4	+49.4	73.5	12 08.3	+50.0	73.7	12 25.1	+50.5	73.9	12 41.6	+51.0	74.1	12 57.8	+51.6	74.4	19
20	11 47.1	+47.5	72.3	12 05.2	+48.1	72.5	12 23.1	+48.7	72.7	12 40.8	+49.3	72.9	12 58.3	+49.9	73.2	13 15.6	+50.4	73.4	13 32.6	+51.0	73.6	13 49.4	+51.6	73.8	20
21	12 34.6	+47.4	71.7	12 53.3	+48.0	71.9	13 11.8	+48.6	72.1	13 30.1	+49.2	72.4	13 48.2	+49.8	72.6	14 06.0	+50.4	72.8	14 23.6	+50.9	73.1	14 41.0	+51.4	73.3	21
22	13 22.0	+47.3	71.1	13 41.3	+48.0	71.3	14 00.4	+48.6	71.5	14 19.3	+49.2	71.8	14 38.0	+49.7	72.0	14 56.4	+50.3	72.3	15 14.5	+50.9	72.5	15 32.4	+51.4	72.8	22
23	14 09.3	+47.2	70.4	14 29.3	+47.8	70.7	14 49.0	+48.4	70.9	15 08.5	+49.0	71.2	15 27.7	+49.6	71.4	15 46.7	+50.2	71.7	16 05.4	+50.7	72.0	16 23.8	+51.3	72.2	23
24	14 56.5	+47.1	69.8	15 17.1	+47.7	70.0	15 37.4	+48.4	70.3	15 57.5	+49.0	70.6	16 17.3	+49.6	70.8	16 36.9	+50.1	71.1	16 56.1	+50.7	71.4	17 15.1	+51.2	71.7	24
25	15 43.6	+47.0	69.2	16 04.8	+47.6	69.4	16 25.8	+48.2	69.7	16 46.5	+48.8	70.0	17 06.9	+49.4	70.3	17 27.0	+50.0	70.6	17 46.8	+50.6	70.9	18 06.3	+51.2	71.2	25
26	16 30.6	+46.9	68.5	16 52.4	+47.5	68.8	17 14.0	+48.1	69.1	17 35.3	+48.7	69.4	17 56.3	+49.3	69.7	18 17.0	+49.9	70.0	18 37.4	+50.5	70.3	18 57.5	+51.0	70.6	26
27	17 17.5	+46.7	67.9	17 39.9	+47.4	68.1	18 02.1	+48.0	68.4	18 24.0	+48.6	68.8	18 45.6	+49.2	69.1	19 06.9	+49.8	69.4	19 27.9	+50.3	69.7	19 48.5	+50.9	70.0	27
28	18 04.2	+46.6	67.2	18 27.3	+47.3	67.5	18 50.1	+47.9	67.8	19 12.6	+48.5	68.1	19 34.8	+49.1	68.5	19 56.7	+49.6	68.8	20 18.2	+50.3	69.1	20 39.4	+50.8	69.5	28
29	18 50.8	+46.5	66.5	19 14.6	+47.1	66.8	19 38.0	+47.7	67.2	20 01.1	+48.3	67.5	20 23.9	+48.9	67.8	20 46.3	+49.6	68.2	21 08.5	+50.1	68.6	21 30.2	+50.7	68.9	29
30	19 37.3	+46.3	65.9	20 01.7	+46.9	66.2	20 25.7	+47.6	66.5	20 49.4	+48.3	66.9	21 12.8	+48.9	67.2	21 35.9	+49.4	67.6	21 58.6	+50.0	68.0	22 20.9	+50.6	68.3	30
31	20 23.6	+46.1	65.2	20 48.6	+46.8	65.5	21 13.3	+47.4	65.9	21 37.7	+48.0	66.2	22 01.7	+48.6	66.6	22 25.3	+49.3	67.0	22 48.6	+49.8	67.4	23 11.5	+50.4	67.8	31
32	21 09.7	+46.0	64.5	21 35.4	+46.6	64.9	22 00.7	+47.3	65.2	22 25.7	+47.9	65.6	22 50.3	+48.5	66.0	23 14.6	+49.1	66.4	23 38.4	+49.8	66.8	24 01.9	+50.3	67.2	32
33	21 55.7	+45.9	63.8	22 22.0	+46.5	64.2	22 48.0	+47.1	64.6	23 13.6	+47.7	64.9	23 38.8	+48.4	65.3	24 03.7	+49.0	65.7	24 28.2	+49.5	66.1	24 52.2	+50.2	66.6	33
34	22 41.6	+45.6	63.1	23 08.5	+46.3	63.5	23 35.1	+46.9	63.9	24 01.3	+47.6	64.3	24 27.2	+48.2	64.7	24 52.7	+48.8	65.1	25 17.7	+49.4	65.5	25 42.4	+50.0	66.0	34
35	23 27.2	+45.4	62.4	23 54.8	+46.1	62.8	24 22.0	+46.8	63.2	24 48.9	+47.4	63.6	25 15.4	+48.0	64.0	25 41.5	+48.6	64.5	26 07.1	+49.3	64.9	26 32.4	+49.8	65.3	35
36	24 12.6	+45.3	61.7	24 40.9	+45.9	62.1	25 08.8	+46.5	62.5	25 36.3	+47.2	62.9	26 03.4	+47.8	63.4	26 30.1	+48.4	63.8	26 56.4	+49.0	64.3	27 22.2	+49.7	64.7	36
37	24 57.9	+45.0	61.0	25 26.8	+45.7	61.4	25 55.3	+46.4	61.8	26 23.5	+47.0	62.2	26 51.2	+47.7	62.7	27 18.5	+48.3	63.1	27 45.4	+48.9	63.6	28 11.9	+49.5	64.1	37
38	25 42.9	+44.8	60.2	26 12.5	+45.5	60.7	26 41.7	+46.1	61.1	27 10.5	+46.8	61.5	27 38.9	+47.4	62.0	28 06.8	+48.1	62.5	28 34.3	+48.7	62.9	29 01.4	+49.3	63.4	38
39	26 27.7	+44.6	59.5	26 58.0	+45.2	59.9	27 27.8	+45.9	60.4	27 57.3	+46.5	60.8	28 26.3	+47.2	61.3	28 54.9	+47.8	61.8	29 23.0	+48.5	62.3	29 50.7	+49.1	62.8	39
40	27 12.3	+44.3	58.7	27 43.2	+45.0	59.2	28 13.7	+45.7	59.7	28 43.8	+46.4	60.1	29 13.5	+47.0	60.6	29 42.7	+47.7	61.1	30 11.5	+48.3	61.6	30 39.8	+48.9	62.1	40
41	27 56.6	+44.1	58.0	28 28.2	+44.8	58.4	28 59.4	+45.4	58.9	29 30.2	+46.1	59.4	30 00.5	+46.7	59.9	30 30.4	+47.4	60.4	30 59.8	+48.0	60.9	31 28.7	+48.7	61.4	41
42	28 40.7	+43.8	57.2	29 13.0	+44.5	57.7	29 44.8	+45.2	58.2	30 16.3	+45.8	58.7	30 47.2	+46.6	59.2	31 17.8	+47.1	59.7	31 47.8	+47.8	60.2	32 17.4	+48.4	60.8	42
43	29 24.5	+43.5	56.4	29 57.5	+44.2	56.9	30 30.0	+44.9	57.4	31 02.1	+45.6	57.9	31 33.8	+46.2	58.4	32 04.9	+46.9	59.0	32 35.6	+47.6	59.5	33 05.8	+48.3	60.1	43
44	30 08.0	+43.3	55.6	30 41.7	+43.9	56.1	31 14.9	+44.6	56.6	31 47.7	+45.3	57.1	32 20.0	+46.0	57.7	32 51.8	+46.7	58.2	33 23.2	+47.3	58.8	33 54.1	+47.9	59.3	44
45	30 51.3	+42.9	54.8	31 25.6	+43.6	55.3	31 59.5	+44.3	55.8	32 33.0	+45.0	56.4	33 06.0	+45.7	56.9	33 38.5	+46.4	57.5	34 10.5	+47.1	58.0	34 42.0	+47.7	58.6	45
46	31 34.2	+42.6	54.0	32 09.2	+43.4	54.5	32 43.8	+44.1	55.0	33 18.0	+44.7	55.6	33 51.7	+45.4	56.1	34 24.9	+46.0	56.7	34 57.6	+46.7	57.3	35 29.7	+47.4	57.9	46
47	32 16.8	+42.3	53.2	32 52.6	+43.0	53.7	33 27.9	+43.7	54.2	34 02.7	+44.4	54.8	34 37.1	+45.0	55.3	35 10.9	+45.5	55.9	35 44.3	+46.5	56.5	36 17.1	+47.2	57.1	47
48	32 59.1	+42.0	52.4	33 35.6	+42.6	52.9	34 11.6	+43.3	53.4	34 47.1	+44.0	54.0	35 22.1	+44.8	54.5	35 56.7	+45.5	55.1	36 30.8	+46.1	55.7	37 04.3	+46.8	56.3	48
49	33 41.1	+41.6	51.5	34 18.2	+42.3	52.0	34 54.9	+43.0	52.6	35 31.1	+43.8	53.1	36 06.9	+44.4	53.7	36 42.2	+45.1	54.3	37 16.9	+45.8	54.9	37 51.1	+46.5	55.6	49
50	34 22.7	+41.2	50.6	35 00.5	+41.9	51.2	35 37.9	+42.6	51.7	36 14.9	+43.3	52.3	36 51.3	+44.1	52.9	37 27.3	+44.7	53.5	38 02.7	+45.5	54.1	38 37.6	+46.2	54.8	50
51	35 03.9	+40.8	49.7	35 42.4	+41.6	50.3	36 20.5	+42.3	50.8	36 58.2	+43.0	51.4	37 35.4	+43.6	52.0	38 12.0	+44.4	52.6	38 48.2	+45.1	53.3	39 23.8	+45.8	53.9	51
52	35 44.7	+40.4	48.8	36 24.0	+41.1	49.4	37 02.8	+41.8	50.0	37 41.2	+42.5	50.5	38 19.0	+43.3	51.2	38 56.4	+44.0	51.8	39 33.3	+44.7	52.4	40 09.6	+45.4	53.1	52
53	36 25.1	+40.0	47.9	37 05.1	+40.7	48.5	37 44.6	+41.5	49.1	38 23.7	+42.2	49.7	39 02.3	+42.9	50.3	39 40.4	+43.6	50.9	40 18.0	+44.3	51.6	40 55.0	+45.1	52.2	53
54	37 05.1	+39.5	47.0	37 45.8	+40.3	47.6	38 26.1	+41.0	48.1	39 05.9	+41.7	48.7	39 45.2	+42.4	49.4	40 24.0	+43.2	50.0	41 02.3	+43.9	50.7	41 40.1	+44.6	51.4	54
55	37 44.6	+39.1	46.1	38 26.1	+39.8	46.6	39 07.1	+40.5	47.2	39 47.6	+41.3	47.8	40 27.6	+42.0	48.4	41 07.2	+42.7	49.1	41 46.2	+43.5	49.8	42 24.7	+44.2	50.5	55
56	38 23.7	+38.6	45.1	39 05.9	+39.3	45.7	39 47.6	+40.0	46.2	40 28.9	+40.7	46.9	41 09.6	+41.6	47.5	41 49.9	+42.3	48.2	42 29.7	+43.0	48.8	43 08.9	+43.8	49.5	56
57	39 02.3	+38.1	44.1	39 45.2	+38.8	44.7	40 27.6	+39.6	45.3	41 09.6	+40.3	45.9	41 51.2	+41.0	46.5	42 32.2	+41.8	47.2	43 12.7	+42.5	47.9	43 52.7	+43.2	48.6	57
58	39 40.4	+37.6	43.1	40 24.0	+38.3	43.7	41 07.2	+39.0	44.3	41 49.9	+39.8	44.9	42 32.2	+40.5	45.5	43 14.0	+41.2	46.2	43 55.2	+42.0	46.9	44 35.9	+42.8	47.6	58
59	40 18.0	+37.0	42.1	41 02.3	+37.8	42.7	41 46.2	+38.5	43.3	42 29.7	+39.2	43.9	43 12.7	+40.0	44.5	43 55.2	+40.7	45.2	44 37.2	+41.5	45.9	45 18.7	+42.3	46.6	59
60	40 55.0	+36.5	41.1	41 40.1	+37.2	41.6	42 24.7	+37.9	42.2	43 08.9	+38.7	42.9	43 52.7	+39.4	43.5	44 35.9	+40.2	44.2	45 18.7	+40.9	44.9	46 01.0	+41.6	45.6	60
61	41 31.5	+35.9	40.0	42 17.3	+36.6	40.6	43 02.6	+37.4	41.2	43 47.6	+38.0	41.8	44 32.1	+38.8	42.5	45 16.1	+39.6	43.1	45 59.6	+40.4	43.8	46 42.6	+41.2	44.6	61
62	42 07.4	+35.2	38.9	42 53.9	+35.9	39.5	43 40.0	+36.7	40.1	44 25.6	+37.5	40.7	45 10.9	+38.2	41.4	45 55.7	+38.9	42.1	46 40.0	+39.7	42.8	47 23.8	+40.4	43.5	62
63	42 42.6	+34.6	37.8	43 29.8	+35.4	38.4	44 16.7	+36.0	39.0	45 03.1	+36.8	39.6	45 49.1	+37.5	40.3	46 34.6	+38.3	41.0	47 19.7	+39.0	41.7	48 04.2	+39.9	42.4	63
64	43 17.2	+34.0	36.7	44 05.2	+34.6	37.3	44 52.7	+35.4	37.9	45 39.9	+36.1	38.5	46 26.6	+36.9	39.2	47 12.9	+37.6	39.8	47 58.7	+38.4	40.5	48 44.1	+39.2	41.3	64
65	43 51.2	+33.3	35.6	44 39.8	+34.0	36.1	45 28.1	+34.7	36.7	46 16.0	+35.4	37.4	47 03.5	+36.1	38.0	47 50.5	+36.9	38.7	48 37.1	+37.7	39.4	49 23.3	+38.4	40.1	65
66	44 24.5	+32.5	34.4	45 13.8	+33.2	35.0	46 02.8	+33.9	35.6	46 51.4	+34.7	36.2	47 39.6	+35.4	36.8	48 27.4	+36.2	37.5	49 14.8	+37.0	38.2	50 01.7	+37.8	38.9	66
67	44 57.0	+31.8	33.2	45 47.0	+32.5	33.8	46 36.7	+33.2	34.4	47 26.1	+33.9	35.0	48 15.0	+34.7	35.6	49 03.6	+35.4	36.3	49 51.8	+36.1	37.0	50 39.5	+36.9	37.7	67
68	45 28.8	+31.0	32.0	46 19.5	+31.7	32.6	47 09.9	+32.4	33.2	48 00.0	+33.1	33.8	48 49.7	+33.8	34.4	49 39.0	+34.6	35.1	50 27.9	+35.4	35.7	51 16.4	+36.1	36.5	68
69	45 59.8	+30.3	30.8	46 51.2	+30.9	31.3	47 42.3	+31.6	31.9	48 33.1	+32.3	32.5	49 23.5	+33.0	33.1	50 13.6	+33.7	33.8	51 03.3	+34.4	34.5	51 52.5	+35.3	35.2	69
70	46 30.1	+29.4	29.5	47 22.1	+30.1	30.1	48 13.9	+30.7	30.6	49 05.4	+31.4	31.2	49 56.5	+32.1	31.8	50 47.3	+32.8	32.5	51 37.7	+33.6	33.2	52 27.8	+34.3	33.9	70
71	46 59.5	+28.5	28.3	47 52.2	+29.1	28.8	48 44.6	+29.8	29.3	49 36.8	+30.5	29.9	50 28.6	+31.2	30.5	51 20.1	+32.0	31.1	52 11.3	+32.7	31.8	53 02.1	+33.4	32.5	71
72	47 28.0	+27.6	27.0	48 21.3	+28.3	27.5	49 14.4	+28.9	28.0	50 07.3	+29.5	28.6	50 59.8	+30.3	29.2	51 52.1	+30.9	29.8	52 44.0	+31.6	30.4	53 35.5	+32.4	31.1	72
73	47 55.6	+26.8	25.7	48 49.6	+27.3	26.2	49 43.3	+28.0	26.7	50 36.8	+28.6	27.2	51 30.1	+29.2	27.8	52 23.0	+29.9	28.4	53 15.6	+30.7	29.0	54 07.9	+31.4	29.7	73
74	48 22.4	+25.7	24.3	49 16.9	+26.4	24.8	50 11.3	+26.9	25.3	51 05.4	+27.6	25.8	51 59.3	+28.2	26.4	52 52.9	+28.9	27.0	53 46.3	+29.5	27.6	54 39.3	+30.3	28.2	74
75	48 48.1	+24.8	23.0	49 43.3	+25.3	23.4	50 38.2	+26.0	23.9	51 33.0	+26.5	24.4	52 27.5	+27.2	24.9	53 21.8	+27.8	25.5	54 15.8	+28.5	26.1	55 09.6	+29.1	26.7	75
76	49 12.9	+23.8	21.6	50 08.6	+24.3	22.0	51 04.2	+24.8	22.5	51 59.5	+25.5	23.0	52 54.7	+26.0	23.5	53 49.6	+26.6	24.0	54 44.3	+27.3	24.6	55 38.7	+28.0	25.2	76
77	49 36.7	+22.7	20.2	50 32.9	+23.3	20.6	51 29.0	+23.8	21.0	52 25.0	+24.3	21.5	53 20.7	+24.9	22.0	54 16.2	+25.5	22.5	55 11.6	+26.1	23.0	56 06.7	+26.7	23.6	77
78	49 59.4	+21.7	18.7	50 56.2	+22.1	19.1	51 52.8	+22.6	19.5	52 49.3	+23.1	20.0	53 45.6	+23.7	20.4	54 41.7	+24.3	20.9	55 37.7	+24.8	21.4	56 33.4	+25.4	22.0	78
79	50 21.1	+20.5	17.3	51 18.3	+21.0	17.6	52 15.4	+21.5	18.0	53 12.4	+21.9	18.4	54 09.3	+22.4	18.9	55 06.0	+22.9	19.3	56 02.5	+23.5	19.8	56 58.8	+24.1	20.3	79
80	50 41.6	+19.4	15.8	51 39.3	+19.8	16.1	52 36.9	+20.2	16.5	53 34.3	+20.8	16.9	54 31.7	+21.2	17.3	55 28.9	+21.7	17.7	56 26.0	+22.2	18.2	57 22.9	+22.8	18.6	80
81	51 01.0	+18.2	14.3	51 59.1	+18.6	14.6	52 57.1	+19.0	14.9	53 55.1	+19.4	15.3	54 52.9	+19.8	15.7	55 50.6	+20.3	16.1	56 48.2	+20.8	16.5	57 45.7	+21.2	16.9	81
82	51 19.2	+17.1	12.8	52 17.7	+17.4	13.1	53 16.1	+17.8	13.4	54 14.5	+18.1	13.7	55 12.7	+18.5	14.0	56 10.9	+18.9	14.4	57 09.0	+19.3	14.8	58 06.9	+19.8	15.2	82
83	51 36.3	+15.8	11.2	52 35.1	+16.1	11.5	53 33.9	+16.4	11.8	54 32.6	+16.8	12.0	55 31.2	+17.2	12.3	56 29.8	+17.5	12.7	57 28.3	+17.9	13.0	58 26.7	+18.3	13.4	83
84	51 52.1	+14.6	9.3	52 51.2	+14.9	9.5	53 50.3	+15.1	10.1	54 49.4	+15.5	10.4	55 48.4	+15.6	10.6	56 47.3	+16.0	10.9	57 46.2	+16.3	11.2	58 45.0	+16.7	11.5	84
85	52 06.7	+13.3	8.1	53 06.1	+13.5	8.3	54 05.4	+13.8	8.5	55 04.7	+14.0	8.7	56 04.0	+14.3	8.9	57 03.3	+14.5	9.2	58 02.5	+14.8	9.4	59 01.7	+15.0	9.7	85
86	52 20.0	+12.0	6.5	53 19.6	+12.1	6.7	54 19.2	+12.3	6.8	55 18.7	+12.6	7.0	56 18.3	+12.7	7.2	57 17.8	+12.9	7.4	58 17.3	+13.1	7.6	59 16.7	+13.4	7.8	86
87	52 32.0	+10.7	4.9	53 31.7	+10.9	5.0	54 31.5	+11.0	5.1	55 31.3	+11.0	5.3	56 31.0	+11.4	5.4	57 30.7	+11.4	5.5	58 30.4	+11.6	5.7	59 30.1	+11.7	5.9	87
88	52 42.7	+9.3	3.3	53 42.6	+9.4	3.4	54 42.5	+9.5	3.4	55 42.3	+9.6	3.5	56 42.0	+9.7	3.6	57 42.1	+9.8	3.7	58 42.0	+9.8	3.8	59 41.8	+10.0	3.9	88
89	52 52.0	+8.0	1.6	53 52.0	+8.0	1.7	54 52.0	+8.0	1.7	55 51.9	+8.1	1.8	56 51.9	+8.1	1.8	57 51.9	+8.1	1.9	58 51.8	+8.2	1.9	59 51.8	+8.2	2.0	89
90	53 00.0	+6.6	0.0	54 00.0	+6.6	0.0	55 00.0	+6.6	0.0	56 00.0	+6.5	0.0	57 00.0	+6.5	0.0	58 00.0	+6.5	0.0	59 00.0	+6.5	0.0	60 00.0	+6.4	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 97°, 263°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	3 36.4	+48.0	94.8	3 31.3	+48.7	94.9	3 26.2	+49.3	94.9	3 21.1	+49.8	95.0	3 15.8	+50.4	95.0	3 10.5	+51.0	95.1	3 05.2	+51.5	95.1	2 59.8	+52.0	95.2	0
1	4 24.4	+48.0	94.2	4 20.0	+48.6	94.3	4 15.5	+49.2	94.3	4 10.9	+49.8	94.4	4 06.2	+50.4	94.5	4 01.5	+50.9	94.6	3 56.7	+51.4	94.6	3 51.8	+52.0	94.7	1
2	5 12.4	+47.9	93.6	5 08.6	+48.5	93.7	5 04.7	+49.1	93.8	5 00.7	+49.7	93.9	4 56.6	+50.3	93.9	4 52.4	+50.9	94.0	4 48.1	+51.5	94.1	4 43.8	+52.0	94.2	2
3	6 00.3	+47.9	93.0	5 57.1	+48.5	93.1	5 53.8	+49.2	93.2	5 50.4	+49.8	93.3	5 46.9	+50.3	93.4	5 43.3	+50.9	93.5	5 39.6	+51.4	93.6	5 35.8	+51.9	93.7	3
4	6 48.2	+47.9	92.4	6 45.6	+48.5	92.5	6 43.0	+49.1	92.6	6 40.2	+49.7	92.7	6 37.2	+50.3	92.9	6 34.2	+50.9	93.0	6 31.0	+51.4	93.1	6 27.7	+52.0	93.2	4
5	7 36.1	+47.8	91.8	7 34.1	+48.5	91.9	7 32.1	+49.0	92.0	7 29.9	+49.6	92.2	7 27.5	+50.2	92.3	7 25.0	+50.8	92.4	7 22.4	+51.4	92.6	7 19.7	+51.9	92.7	5
6	8 23.9	+47.7	91.2	8 22.6	+48.3	91.3	8 21.1	+49.0	91.5	8 19.5	+49.6	91.6	8 17.7	+50.2	91.8	8 15.8	+50.8	91.9	8 13.8	+51.3	92.0	8 11.6	+51.8	92.2	6
7	9 11.6	+47.7	90.7	9 10.9	+48.4	90.7	9 10.1	+48.9	90.9	9 09.1	+49.4	91.0	9 07.9	+50.2	91.2	9 06.6	+50.7	91.4	9 05.1	+51.3	91.5	9 03.4	+51.8	91.7	7
8	9 59.3	+47.6	89.9	9 59.3	+48.2	90.1	9 59.0	+48.9	90.3	9 58.7	+49.4	90.5	9 58.1	+50.1	90.6	9 57.3	+50.7	90.8	9 56.4	+51.2	91.0	9 55.2	+51.8	91.2	8
9	10 46.9	+47.5	89.3	10 47.5	+48.2	89.5	10 47.9	+48.8	89.7	10 48.1	+49.5	89.9	10 48.2	+50.0	90.1	10 48.0	+50.6	90.3	10 47.6	+51.2	90.5	10 47.0	+51.7	90.7	9
10	11 34.4	+47.5	88.7	11 35.7	+48.1	88.9	11 36.7	+48.8	89.1	11 37.6	+49.3	89.3	11 38.2	+49.9	89.5	11 38.6	+50.5	89.7	11 38.8	+51.1	89.9	11 38.7	+51.7	90.1	10
11	12 21.9	+47.4	88.1	12 23.8	+48.0	88.3	12 25.5	+48.6	88.5	12 26.9	+49.3	88.7	12 28.1	+49.8	89.0	12 29.1	+50.5	89.2	12 29.9	+51.0	89.4	12 30.4	+51.6	89.6	11
12	13 09.3	+47.3	87.4	13 11.8	+48.0	87.7	13 14.1	+48.6	87.9	13 16.2	+49.2	88.1	13 18.0	+49.8	88.4	13 19.6	+50.4	88.6	13 20.9	+51.0	88.9	13 22.0	+51.5	89.1	12
13	13 56.6	+47.1	86.8	13 59.8	+47.8	87.1	14 02.7	+48.5	87.3	14 05.4	+49.1	87.6	14 07.8	+49.8	87.8	14 10.0	+50.3	88.1	14 11.9	+50.9	88.3	14 13.5	+51.5	88.6	13
14	14 43.7	+47.1	86.2	14 47.6	+47.7	86.4	14 51.2	+48.4	86.7	14 54.5	+49.0	87.0	14 57.6	+49.8	87.2	15 00.3	+50.3	87.5	15 02.8	+50.8	87.8	15 05.0	+51.4	88.0	14
15	15 30.8	+47.0	85.5	15 35.3	+47.7	85.8	15 39.6	+48.3	86.1	15 43.5	+49.0	86.4	15 47.2	+49.5	86.6	15 50.6	+50.1	86.9	15 53.6	+50.8	87.2	15 56.4	+51.3	87.5	15
16	16 17.8	+46.8	84.9	16 23.0	+47.5	85.2	16 27.9	+48.1	85.5	16 32.5	+48.8	85.8	16 36.7	+49.5	86.1	16 40.7	+50.1	86.4	16 44.4	+50.6	86.7	16 47.7	+51.2	87.0	16
17	17 04.6	+46.7	84.2	17 10.5	+47.4	84.5	17 16.0	+48.1	84.8	17 21.3	+48.7	85.2	17 26.2	+49.3	85.5	17 30.8	+49.9	85.8	17 35.0	+50.6	86.1	17 38.9	+51.2	86.4	17
18	17 51.3	+46.6	83.6	17 57.9	+47.3	83.9	18 04.1	+47.9	84.2	18 10.0	+48.6	84.5	18 15.5	+49.2	84.9	18 20.7	+49.9	85.2	18 25.6	+50.4	85.5	18 30.1	+51.0	85.9	18
19	18 37.9	+46.5	82.9	18 45.2	+47.1	83.2	18 52.0	+47.8	83.6	18 58.6	+48.4	83.9	19 04.7	+49.2	84.3	19 10.6	+49.7	84.6	19 16.0	+50.4	85.0	19 21.1	+50.9	85.3	19
20	19 24.4	+46.3	82.2	19 32.3	+47.0	82.6	19 39.8	+47.7	82.9	19 47.0	+48.4	83.3	19 53.9	+48.9	83.7	20 00.3	+49.6	84.0	20 06.4	+50.2	84.4	20 12.0	+50.9	84.7	20
21	20 10.7	+46.1	81.6	20 19.3	+46.8	81.9	20 27.5	+47.5	82.3	20 35.4	+48.2	82.7	20 42.8	+48.9	83.0	20 49.9	+49.5	83.4	20 56.6	+50.1	83.8	21 02.9	+50.7	84.2	21
22	20 56.8	+46.0	80.9	21 06.1	+46.7	81.3	21 15.0	+47.4	81.6	21 23.6	+48.0	82.0	21 31.7	+48.7	82.4	21 39.4	+49.3	82.8	21 46.7	+50.0	83.2	21 53.6	+50.6	83.6	22
23	21 42.8	+45.8	80.2	21 52.8	+46.5	80.6	22 02.4	+47.2	81.0	22 11.6	+47.9	81.4	22 20.4	+48.6	81.8	22 28.7	+49.3	82.2	22 36.7	+49.8	82.6	22 44.2	+50.5	83.0	23
24	22 28.6	+45.6	79.5	22 39.3	+46.4	79.9	22 49.6	+47.1	80.3	22 59.5	+47.7	80.7	23 09.0	+48.4	81.2	23 18.0	+49.0	81.6	23 26.5	+49.7	82.0	23 34.7	+50.3	82.4	24
25	23 14.2	+45.4	78.8	23 25.7	+46.1	79.2	23 36.7	+46.8	79.6	23 47.2	+47.6	80.1	23 57.4	+48.2	80.5	24 07.0	+48.9	80.9	24 16.2	+49.6	81.4	24 25.0	+50.2	81.8	25
26	23 59.6	+45.3	78.1	24 11.8	+46.0	78.5	24 23.5	+46.7	79.0	24 34.8	+47.4	79.4	24 45.6	+48.1	79.9	24 55.9	+48.8	80.3	25 05.8	+49.4	80.8	25 15.2	+50.0	81.2	26
27	24 44.9	+45.0	77.4	24 57.8	+45.7	77.8	25 10.2	+46.5	78.3	25 22.2	+47.2	78.7	25 33.7	+47.9	79.2	25 44.7	+48.5	79.7	25 55.2	+49.2	80.1	26 05.2	+49.9	80.6	27
28	25 29.9	+44.8	76.6	25 43.5	+45.6	77.1	25 56.7	+46.3	77.6	26 09.4	+47.0	78.0	26 21.6	+47.7	78.5	26 33.2	+48.4	79.0	26 44.4	+49.1	79.5	26 55.1	+49.7	80.0	28
29	26 14.7	+44.6	75.9	26 29.1	+45.3	76.4	26 43.0	+46.0	76.9	26 56.4	+46.8	77.3	27 09.3	+47.5	77.8	27 21.6	+48.2	78.3	27 33.5	+48.9	78.9	27 44.8	+49.6	79.4	29
30	26 59.3	+44.3	75.1	27 14.4	+45.1	75.6	27 29.0	+45.9	76.1	27 43.2	+46.5	76.6	27 56.8	+47.2	77.2	28 09.8	+48.0	77.7	28 22.4	+48.7	78.2	28 34.4	+49.3	78.7	30
31	27 43.6	+44.1	74.4	27 59.5	+44.8	74.9	28 14.9	+45.6	75.4	28 29.7	+46.4	75.9	28 44.0	+47.1	76.5	28 57.8	+47.8	77.0	29 11.1	+48.4	77.5	29 23.7	+49.2	78.1	31
32	28 27.7	+43.8	73.6	28 44.3	+44.6	74.1	29 00.5	+45.3	74.7	29 16.1	+46.1	75.2	29 31.1	+46.9	75.7	29 45.6	+47.6	76.3	29 59.5	+48.3	76.9	30 12.9	+49.0	77.4	32
33	29 11.5	+43.5	72.8	29 28.9	+44.3	73.4	29 45.8	+45.1	73.9	30 02.2	+45.8	74.5	30 18.0	+46.6	75.0	30 33.2	+47.3	75.6	30 47.8	+48.1	76.2	31 01.9	+48.7	76.7	33
34	29 55.0	+43.3	72.0	30 13.2	+44.1	72.6	30 30.9	+44.8	73.1	30 48.0	+45.6	73.7	31 04.6	+46.3	74.3	31 20.5	+47.1	74.9	31 35.9	+47.8	75.5	31 50.6	+48.6	76.1	34
35	30 38.3	+42.9	71.2	30 57.3	+43.7	71.8	31 15.7	+44.6	72.4	31 33.6	+45.3	73.0	31 50.9	+46.1	73.5	32 07.6	+46.8	74.1	32 23.7	+47.6	74.8	32 39.2	+48.3	75.4	35
36	31 21.2	+42.7	70.4	31 41.0	+43.5	71.0	32 00.3	+44.2	71.6	32 18.9	+45.1	72.2	32 37.0	+45.8	72.8	32 54.4	+46.6	73.4	33 11.3	+47.3	74.0	33 27.5	+48.0	74.7	36
37	32 03.9	+42.3	69.6	32 24.5	+43.1	70.2	32 44.5	+44.0	70.8	33 04.0	+44.7	71.4	33 22.8	+45.5	72.0	33 41.0	+46.3	72.7	33 58.6	+47.0	73.3	34 15.5	+47.8	73.9	37
38	32 46.2	+41.9	68.8	33 07.6	+42.8	69.4	33 28.5	+43.6	70.0	33 48.7	+44.4	70.6	34 08.3	+45.2	71.2	34 27.3	+46.0	71.9	34 45.6	+46.8	72.5	35 03.3	+47.5	73.2	38
39	33 28.1	+41.7	67.9	33 50.4	+42.5	68.5	34 12.1	+43.3	69.1	34 33.1	+44.1	69.8	34 53.5	+44.9	70.4	35 13.3	+45.7	71.1	35 32.4	+46.5	71.8	35 50.8	+47.3	72.5	39
40	34 09.8	+41.2	67.0	34 32.9	+42.0	67.7	34 55.4	+42.9	68.3	35 17.2	+43.8	69.0	35 38.4	+44.6	69.6	35 59.0	+45.4	70.3	36 18.9	+46.1	71.0	36 38.1	+46.9	71.7	40
41	34 51.0	+40.8	66.2	35 14.9	+41.8	66.8	35 38.3	+42.5	67.4	36 01.0	+43.3	68.1	36 23.0	+44.2	68.8	36 44.4	+45.0	69.5	37 05.0	+45.7	70.2	37 25.0	+46.6	70.9	41
42	35 31.8	+40.5	65.3	35 56.7	+41.3	65.9	36 20.8	+42.2	66.6	36 44.3	+43.1	67.3	37 07.2	+43.8	68.0	37 29.4	+44.7	68.7	37 50.9	+45.5	69.4	38 11.6	+46.3	70.1	42
43	36 12.3	+40.0	64.3	36 38.0	+40.9	65.0	37 03.0	+41.7	65.7	37 27.4	+42.6	66.4	37 51.1	+43.4	67.1	38 14.1	+44.3	67.8	38 36.4	+45.1	68.6	38 57.9	+46.0	69.3	43
44	36 52.3	+39.6	63.4	37 18.9	+40.4	64.1	37 44.7	+41.4	64.8	38 10.0	+42.2	65.5	38 34.5	+43.1	66.2	38 58.4	+43.9	67.0	39 21.5	+44.7	67.7	39 43.9	+45.6	68.5	44
45	37 31.9	+39.1	62.5	37 59.3	+40.0	63.2	38 26.1	+40.9	63.9	38 52.2	+41.7	64.6	39 17.6	+42.6	65.3	39 42.3	+43.5	66.1	40 06.2	+44.4	66.8	40 29.5	+45.2	67.6	45
46	38 11.0	+38.7	61.5	38 39.3	+39.6	62.2	39 07.0	+40.4	62.9	39 33.9	+41.4	63.7	40 00.2	+42.2	64.4	40 25.8	+43.1	65.2	40 50.6	+43.9	66.0	41 14.7	+44.8	66.8	46
47	38 49.7	+38.1	60.5	39 18.9	+39.0	61.2	39 47.4	+40.0	62.0	40 15.3	+40.8	62.7	40 42.4	+41.8	63.5	41 08.9	+42.6	64.3	41 34.5	+43.5	65.0	41 59.5	+44.3	65.9	47
48	39 27.8	+37.7	59.5	39 57.9	+38.6	60.3	40 27.4	+39.4	61.0	40 56.1	+40.4	61.7	41 24.2	+41.2	62.5	41 51.5	+42.1	63.3	42 18.0	+43.1	64.1	42 43.8	+44.0	65.0	48
49	40 05.5	+37.1	58.5	40 36.5	+38.0	59.3	41 06.8	+39.0	60.0	41 36.5	+39.8	60.8	42 05.4	+40.8	61.5	42 33.6	+41.7	62.4	43 01.1	+42.6	63.2	43 27.8	+43.5	64.0	49
50	40 42.6	+36.5	57.5	41 14.5	+37.5	58.2	41 45.8	+38.3	59.0	42 16.3	+39.3	59.8	42 46.2	+40.2	60.6	43 15.3	+41.2	61.4	43 43.7	+42.0	62.2	44 11.3	+42.9	63.1	50
51	41 19.1	+36.0	56.4	41 52.0	+36.8	57.2	42 24.1	+37.8	57.9	42 55.6	+38.8	58.7	43 26.4	+39.7	59.5	43 56.5	+40.6	60.4	44 25.7	+41.6	61.2	44 54.2	+42.5	62.1	51
52	41 55.1	+35.3	55.4	42 28.8	+36.3	56.1	43 01.9	+37.3	56.9	43 34.4	+38.1	57.7	44 06.1	+39.1	58.5	44 37.1	+40.0	59.3	45 07.3	+41.0	60.2	45 36.7	+41.9	61.1	52
53	42 30.4	+34.7	54.3	43 05.1	+35.7	55.0	43 39.2	+36.6	55.8	44 12.5	+37.6	56.6	44 45.2	+38.5	57.4	45 17.1	+39.5	58.3	45 48.3	+40.4	59.2	46 18.6	+41.4	60.1	53
54	43 05.1	+34.1	53.2	43 40.8	+35.0	53.9	44 15.8	+35.9	54.7	44 50.1	+36.9	55.5	45 23.7	+37.8	56.4	45 56.6	+38.8	57.2	46 28.7	+39.8	58.1	47 00.0	+40.7	59.0	54
55	43 39.2	+33.3	52.0	44 15.8	+34.3	52.8	44 51.7	+35.3	53.6	45 27.0	+36.2	54.4	46 01.5	+37.3	55.2	46 35.4	+38.2	56.1	47 08.5	+39.1	57.0	47 40.7	+40.2	57.9	55
56	44 12.5	+32.7	50.9	44 50.1	+33.6	51.6	45 27.0	+34.5	52.4	46 03.2	+35.6	53.3	46 38.8	+36.5	54.1	47 13.6	+37.5	55.0	47 47.6	+38.5	55.9	48 20.9	+39.4	56.8	56
57	44 45.2	+31.9	49.7	45 23.7	+32.9	50.5	46 01.5	+33.9	51.3	46 38.8	+34.8	52.1	47 15.3	+35.8	52.9	47 51.1	+36.7	53.8	48 26.1	+37.8	54.7	49 00.3	+38.8	55.7	57
58	45 17.1	+31.2	48.5	45 56.6	+32.1	49.3	46 35.4	+33.1	50.1	47 13.6	+34.0	50.9	47 51.1	+35.0	51.8	48 27.8	+36.1	52.6	49 03.9	+37.0	53.5	49 39.1	+38.1	54.5	58
59	45 48.3	+30.3	47.3	46 28.7	+31.3	48.1	47 08.5	+32.2	48.9	47 47.6	+33.3	49.7	48 26.1	+34.2	50.5	49 03.9	+35.2	51.4	49 40.9	+36.3	52.3	50 17.2	+37.3	53.3	59
60	46 18.6	+29.6	46.0	47 00.0	+30.5	46.8	47 40.7	+31.5	47.6	48 20.9	+32.4	48.4	49 00.3	+33.5	49.3	49 39.1	+34.5	50.2	50 17.2	+35.4	51.1	50 54.5	+36.5	52.1	60
61	46 48.2	+28.6	44.8	47 30.5	+29.6	45.5	48 12.2	+30.6	46.3	48 53.3	+31.6	47.2	49 33.8	+32.5	48.0	50 13.6	+33.5	48.9	50 52.6	+34.6	49.8	51 31.0	+35.6	50.8	61
62	47 16.8	+27.8	43.5	48 00.1	+28.7	44.3	48 42.8	+29.8	45.0	49 24.9	+30.7	45.9	50 06.3	+31.7	46.7	50 47.1	+32.7	47.6	51 27.2	+33.8	48.5	52 06.6	+34.8	49.5	62
63	47 44.6	+26.9	42.2	48 28.8	+27.9	42.9	49 12.5	+28.8	43.7	49 55.6	+29.7	44.5	50 38.0	+30.8	45.4	51 19.8	+31.8	46.3	52 01.0	+32.8	47.2	52 41.4	+33.8	48.1	63
64	48 11.5	+26.0	40.8	48 56.7	+26.8	41.6	49 41.3	+27.8	42.4	50 25.3	+28.8	43.2	51 08.8	+29.7	44.0	51 51.6	+30.8	44.9	52 33.8	+31.8	45.8	53 15.2	+32.9	46.8	64
65	48 37.5	+24.9	39.5	49 23.5	+25.9	40.2	50 09.1	+26.8	41.0	50 54.1	+27.8	41.8	51 38.5	+28.8	42.6	52 22.4	+29.8	43.5	53 05.6	+30.8	44.4	53 48.1	+31.8	45.4	65
66	49 02.4	+24.0	38.1	49 49.4	+24.9	38.8	50 35.9	+25.8	39.6	51 21.9	+26.7	40.4	52 07.3	+27.7	41.2	52 52.2	+28.7	42.1	53 36.4	+29.7	43.0	54 19.9	+30.8	43.9	66
67	49 26.4	+22.9	36.7	50 14.3	+23.8	37.4	51 01.7	+24.7	38.2	51 48.6	+25.7	38.9	52 35.0	+26.7	39.8	53 20.9	+27.6	40.6	54 06.1	+28.7	41.5	54 50.7	+29.7	42.4	67
68	49 49.3	+21.9	35.3	50 38.1	+22.7	36.0	51 26.4	+23.7	36.7	52 14.3	+24.6	37.5	53 01.7	+25.5	38.3	53 48.5	+26.5	39.1	54 34.8	+27.5	40.0	55 20.4	+28.5	40.9	68
69	50 11.2	+20.8	33.8	51 00.8	+21.7	34.5	51 50.1	+22.5	35.2	52 38.9	+23.4	36.0	53 27.2	+24.3	36.8	54 15.0	+25.3	37.6	55 02.3	+26.2	38.5	55 48.9	+27.4	39.4	69
70	50 32.0	+19.6	32.4	51 22.5	+20.4	33.0	52 12.6	+21.3	33.7	53 02.3	+22.2	34.5	53 51.5	+23.1	35.2	54 40.3	+24.1	36.0	55 28.5	+25.1	36.9	56 16.3	+26.0	37.8	70
71	50 51.6	+18.5	30.9	51 42.9	+19.3	31.5	52 33.9	+20.1	32.2	53 24.5	+21.0	32.9	54 14.6	+21.9	33.6	55 04.4	+22.8	34.4	55 53.6	+23.8	35.3	56 42.3	+24.8	36.1	71
72	51 10.1	+17.3	29.3	52 02.2	+18.1	30.0	52 54.0	+18.9	30.6	53 45.5	+19.7	31.3	54 36.5	+20.6	32.0	55 27.2	+21.5	32.8	56 17.4	+22.4	33.6	57 07.1	+23.4	34.5	72
73	51 27.4	+16.0	27.8	52 20.3	+16.8	28.4	53 12.9	+17.6	29.1	54 05.2	+18.4	29.7	54 57.1	+19.3	30.4	55 48.7	+20.1	31.2	56 39.8	+21.0	31.9	57 30.5	+22.0	32.8	73
74	51 43.4	+14.9	26.3	52 37.1	+15.6	26.8	53 30.5	+16.3	27.4	54 23.6	+17.1	28.1	55 16.4	+17.9	28.8	56 08.8	+18.7	29.5	57 00.8	+19.6	30.2	57 52.5	+20.5	31.0	74
75	51 58.3	+13.6	24.7	52 52.7	+14.2	25.2	53 46.8	+15.0	25.8	54 40.7	+15.7	26.4	55 34.3	+16.5	27.1	56 27.5	+17.3	27.8	57 20.4	+18.2	28.5	58 13.0	+19.0	29.3	75
76	52 11.9	+12.3	23.1	53 06.9	+13.0	23.6	54 01.8	+13.6	24.2	54 56.4	+14.3	24.8	55 50.8	+15.0	25.4	56 44.8	+15.8	26.0	57 38.6	+16.6	26.7	58 32.0	+17.5	27.4	76
77	52 24.2	+10.9	21.5	53 19.9	+11.6	22.0	54 15.4	+12.2	22.5	55 10.7	+12.9	23.1	56 05.8	+13.6	23.6	57 00.6	+14.4	24.3	57 55.2	+15.1	24.9	58 49.5	+15.8	25.6	77
78	52 35.1	+9.7	19.9	53 31.5	+10.2	20.3	54 27.6	+10.9	20.8	55 23.6	+11.5	21.4	56 19.4	+12.1	21.9	57 15.0	+12.7	22.5	58 10.3	+13.5	23.1	59 05.3	+14.3	23.7	78
79	52 44.8	+8.3	18.3	53 41.7	+8.8	18.7	54 38.5	+9.3	19.1	55 35.1	+9.9	19.6	56 31.5	+10.5	20.1	57 27.7	+11.2	20.7	58 23.8	+11.8	21.2	59 19.6	+12.5	21.8	79
80	52 53.1	+6.9	16.6	53 50.5	+7.5	17.0	54 47.8	+8.0	17.4	55 45.0	+8.5	17.9	56 42.0	+9.1	18.3	57 38.9	+9.6	18.8	58 35.6	+10.2	19.4	59 32.1	+10.9	19.9	80
81	53 00.0	+5.6	15.0	53 58.0	+6.0	15.3	54 55.8	+6.4	15.7	55 53.5	+6.9	16.1	56 51.1	+7.4	16.5	57 48.5	+8.0	17.0	58 45.7	+8.5	17.5	59 43.0	+9.1	18.0	81
82	53 05.6	+4.2	13.3	54 04.0	+4.5	13.6	55 02.2	+5.0	14.0	56 00.4	+5.4	14.3	56 58.5	+5.8	14.7	57 56.5	+6.3	15.1	58 54.3	+6.8	15.5	59 52.1	+7.3	16.0	82
83	53 09.8	+2.8	11.7	54 08.5	+3.2	11.9	55 07.2	+3.5	12.2	56 05.8	+3.9	12.5	57 04.3	+4.3	12.9	58 02.8	+4.6	13.2	59 01.1	+5.1	13.6	59 59.4	+5.5	14.0	83
84	53 12.6	+1.4	10.0	54 11.7	+1.6	10.2	55 10.7	+2.0	10.5	56 09.7	+2.3	10.8	57 08.6	+2.6	11.0	58 07.4	+3.0	11.4	59 06.2	+3.4	11.7	60 04.9	+3.8	12.0	84
85	53 14.0	0.0	8.3	54 13.3	+0.3	8.5	55 12.7	+0.4	8.7	56 12.0	+0.7	9.0	57 11.2	+1.0	9.2	58 10.4	+1.3	9.5	59 09.6	+1.6	9.7	60 08.7	+1.9	10.0	85
86	53 14.0	−1.4	6.7	54 13.6	−1.2	6.8	55 13.1	−1.0	7.0	56 12.7	−0.8	7.2	57 12.2	−0.6	7.4	58 11.7	−0.4	7.6	59 11.2	−0.2	7.8	60 10.6	+0.1	8.0	86
87	53 12.6	−2.8	5.0	54 12.4	−2.7	5.1	55 12.1	−2.5	5.2	56 11.9	−2.4	5.4	57 11.6	−2.3	5.5	58 11.3	−2.1	5.7	59 11.0	−1.9	5.8	60 10.7	−1.8	6.0	87
88	53 09.8	−4.2	3.3	54 09.7	−4.1	3.4	55 09.6	−4.1	3.5	56 09.5	−4.0	3.6	57 09.3	−3.8	3.7	58 09.2	−3.8	3.8	59 09.1	−3.7	3.9	60 08.9	−3.5	4.0	88
89	53 05.6	−5.6	1.7	54 05.6	−5.6	1.7	55 05.5	−5.5	1.7	56 05.5	−5.5	1.8	57 05.5	−5.5	1.8	58 05.4	−5.4	1.9	59 05.4	−5.4	1.9	60 05.4	−5.4	2.0	89
90	53 00.0	−7.0	0.0	54 00.0	−7.0	0.0	55 00.0	−7.0	0.0	56 00.0	−7.0	0.0	57 00.0	−7.1	0.0	58 00.0	−7.1	0.0	59 00.0	−7.1	0.0	60 00.0	−7.2	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	3 36.4	−48.0	94.8	3 31.3	−48.6	94.9	3 26.2	−49.2	94.9	3 21.1	−49.9	95.0	3 15.8	−50.4	95.0	3 10.5	−50.9	95.1	3 05.2	−51.5	95.1	2 59.8	−52.1	95.2	0
1	2 48.4	−48.1	95.4	2 42.7	−48.7	95.4	2 37.0	−49.3	95.5	2 31.2	−49.8	95.5	2 25.4	−50.4	95.6	2 19.6	−51.0	95.6	2 13.7	−51.6	95.7	2 07.7	−52.0	95.7	1
2	2 00.3	−48.0	96.0	1 54.0	−48.6	96.0	1 47.7	−49.2	96.1	1 41.4	−49.9	96.1	1 35.0	−50.4	96.1	1 28.6	−51.0	96.1	1 22.1	−51.5	96.2	1 15.7	−52.1	96.2	2
3	1 12.3	−48.1	96.6	1 05.4	−48.7	96.6	0 58.5	−49.3	96.6	0 51.5	−49.9	96.7	0 44.6	−50.5	96.7	0 37.6	−51.0	96.7	0 30.6	−51.5	96.7	0 23.6	−52.0	96.7	3
4	0 24.2	−48.1	97.2	0 16.7	−48.7	97.2	0 09.2	−49.3	97.2	0 01.6	−49.8	97.2	0 05.9	+50.4	82.8	0 13.4	+51.0	82.8	0 20.9	+51.6	82.8	0 28.4	+52.1	82.8	4
5	0 23.9	+48.0	82.2	0 32.0	+48.7	82.2	0 40.1	+49.3	82.2	0 48.2	+49.9	82.2	0 56.3	+50.4	82.3	1 04.4	+51.0	82.3	1 12.5	+51.5	82.3	1 20.5	+52.0	82.3	5
6	1 11.9	+48.1	81.6	1 20.7	+48.6	81.6	1 29.4	+49.3	81.7	1 38.1	+49.8	81.7	1 46.7	+50.5	81.7	1 55.4	+51.0	81.7	2 04.0	+51.5	81.8	2 12.5	+52.1	81.8	6
7	2 00.0	+48.0	81.0	2 09.3	+48.7	81.0	2 18.7	+49.2	81.1	2 27.9	+49.9	81.1	2 37.2	+50.4	81.2	2 46.4	+50.9	81.2	2 55.5	+51.5	81.3	3 04.6	+52.0	81.3	7
8	2 48.0	+48.0	80.4	2 58.0	+48.6	80.5	3 07.9	+49.2	80.5	3 17.8	+49.8	80.6	3 27.6	+50.4	80.6	3 37.3	+51.0	80.7	3 47.0	+51.5	80.7	3 56.6	+52.0	80.8	8
9	3 36.0	+48.0	79.8	3 46.6	+48.6	79.9	3 57.1	+49.3	79.9	4 07.6	+49.8	80.0	4 18.0	+50.3	80.1	4 28.3	+50.9	80.2	4 38.5	+51.4	80.2	4 48.6	+52.0	80.3	9
10	4 24.0	+48.0	79.2	4 35.2	+48.6	79.3	4 46.4	+49.1	79.4	4 57.4	+49.7	79.4	5 08.3	+50.4	79.5	5 19.2	+50.9	79.6	5 29.9	+51.5	79.7	5 40.6	+52.0	79.8	10
11	5 12.0	+47.9	78.6	5 23.8	+48.6	78.7	5 35.5	+49.2	78.8	5 47.1	+49.8	78.9	5 58.7	+50.3	79.0	6 10.1	+50.8	79.1	6 21.4	+51.4	79.2	6 32.6	+51.9	79.3	11
12	5 59.9	+47.9	78.0	6 12.4	+48.5	78.1	6 24.7	+49.1	78.2	6 36.9	+49.7	78.3	6 49.0	+50.2	78.4	7 00.9	+50.9	78.6	7 12.8	+51.3	78.7	7 24.5	+51.9	78.8	12
13	6 47.8	+47.9	77.4	7 00.9	+48.4	77.5	7 13.8	+49.1	77.6	7 26.6	+49.6	77.8	7 39.2	+50.3	77.9	7 51.8	+50.7	78.0	8 04.1	+51.4	78.2	8 16.4	+51.8	78.3	13
14	7 35.7	+47.8	76.8	7 49.3	+48.5	76.9	8 02.9	+49.0	77.1	8 16.2	+49.6	77.2	8 29.5	+50.1	77.3	8 42.5	+50.8	77.5	8 55.5	+51.2	77.6	9 08.2	+51.8	77.8	14
15	8 23.5	+47.7	76.2	8 37.8	+48.3	76.3	8 51.9	+48.9	76.5	9 05.8	+49.6	76.6	9 19.6	+50.2	76.8	9 33.3	+50.7	76.9	9 46.7	+51.3	77.1	10 00.0	+51.8	77.3	15
16	9 11.2	+47.7	75.6	9 26.1	+48.3	75.7	9 40.8	+48.9	75.9	9 55.4	+49.5	76.1	10 09.8	+50.0	76.2	10 24.0	+50.6	76.4	10 38.0	+51.2	76.6	10 51.8	+51.7	76.8	16
17	9 58.9	+47.6	74.9	10 14.4	+48.3	75.1	10 29.7	+48.9	75.3	10 44.9	+49.4	75.5	10 59.8	+50.0	75.7	11 14.6	+50.6	75.9	11 29.2	+51.1	76.0	11 43.5	+51.7	76.2	17
18	10 46.5	+47.6	74.3	11 02.7	+48.1	74.5	11 18.6	+48.7	74.7	11 34.3	+49.4	74.9	11 49.8	+50.0	75.1	12 05.2	+50.5	75.3	12 20.3	+51.0	75.5	12 35.2	+51.6	75.7	18
19	11 34.1	+47.4	73.7	11 50.8	+48.0	73.9	12 07.3	+48.6	74.1	12 23.7	+49.3	74.3	12 39.8	+49.9	74.5	12 55.7	+50.4	74.8	13 11.3	+51.0	75.0	13 26.8	+51.5	75.2	19
20	12 21.5	+47.4	73.1	12 38.9	+48.0	73.3	12 56.0	+48.6	73.5	13 13.0	+49.2	73.7	13 29.6	+49.8	74.0	13 46.1	+50.4	74.2	14 02.3	+50.9	74.4	14 18.3	+51.5	74.7	20
21	13 08.9	+47.3	72.5	13 26.9	+47.9	72.7	13 44.6	+48.6	72.9	14 02.2	+49.1	73.1	14 19.4	+49.7	73.4	14 36.5	+50.2	73.6	14 53.2	+50.9	73.9	15 09.8	+51.4	74.1	21
22	13 56.2	+47.2	71.8	14 14.8	+47.8	72.1	14 33.2	+48.4	72.3	14 51.3	+49.0	72.6	15 09.1	+49.7	72.8	15 26.7	+50.2	73.1	15 44.1	+50.7	73.3	16 01.2	+51.3	73.6	22
23	14 43.4	+47.1	71.2	15 02.6	+47.7	71.4	15 21.6	+48.3	71.7	15 40.3	+48.9	72.0	15 58.8	+49.5	72.2	16 16.9	+50.1	72.5	16 34.8	+50.7	72.8	16 52.5	+51.2	73.1	23
24	15 30.5	+46.9	70.5	15 50.3	+47.6	70.8	16 09.9	+48.2	71.1	16 29.2	+48.9	71.4	16 48.3	+49.4	71.6	17 07.0	+50.0	71.9	17 25.5	+50.6	72.2	17 43.7	+51.1	72.5	24
25	16 17.4	+46.9	69.9	16 37.9	+47.5	70.2	16 58.1	+48.1	70.5	17 18.1	+48.6	70.7	17 37.7	+49.3	71.0	17 57.0	+49.9	71.3	18 16.1	+50.5	71.7	18 34.8	+51.0	72.0	25
26	17 04.3	+46.7	69.2	17 25.4	+47.4	69.5	17 46.2	+48.0	69.8	18 06.7	+48.6	70.1	18 27.0	+49.2	70.4	18 46.9	+49.8	70.8	19 06.6	+50.3	71.1	19 25.8	+51.0	71.4	26
27	17 51.0	+46.6	68.6	18 12.8	+47.2	68.9	18 34.2	+47.9	69.2	18 55.4	+48.4	69.5	19 16.2	+49.1	69.8	19 36.7	+49.7	70.2	19 56.9	+50.3	70.5	20 16.8	+50.8	70.9	27
28	18 37.6	+46.4	67.9	19 00.0	+47.1	68.2	19 22.1	+47.7	68.5	19 43.8	+48.4	68.9	20 05.3	+48.9	69.2	20 26.4	+49.5	69.6	20 47.2	+50.1	69.9	21 07.6	+50.7	70.3	28
29	19 24.0	+46.3	67.2	19 47.1	+46.9	67.6	20 09.8	+47.6	67.9	20 32.2	+48.2	68.3	20 54.2	+48.9	68.6	21 15.9	+49.5	69.0	21 37.3	+50.0	69.3	21 58.3	+50.6	69.7	29
30	20 10.3	+46.2	66.6	20 34.0	+46.8	66.9	20 57.4	+47.4	67.3	21 20.4	+48.0	67.6	21 43.1	+48.6	68.0	22 05.4	+49.2	68.4	22 27.3	+49.9	68.7	22 48.9	+50.4	69.1	30
31	20 56.5	+45.9	65.9	21 20.8	+46.6	66.2	21 44.8	+47.3	66.6	22 08.4	+47.9	67.0	22 31.7	+48.6	67.4	22 54.6	+49.2	67.7	23 17.2	+49.7	68.1	23 39.3	+50.4	68.5	31
32	21 42.4	+45.8	65.2	22 07.4	+46.5	65.6	22 32.1	+47.1	65.9	22 56.3	+47.8	66.3	23 20.3	+48.3	66.7	23 43.8	+49.0	67.1	24 06.9	+49.6	67.5	24 29.7	+50.1	67.9	32
33	22 28.2	+45.7	64.5	22 53.9	+46.3	64.9	23 19.2	+46.9	65.3	23 44.1	+47.6	65.7	24 08.6	+48.2	66.1	24 32.8	+48.8	66.5	24 56.5	+49.4	66.9	25 19.8	+50.1	67.3	33
34	23 13.9	+45.4	63.8	23 40.2	+46.1	64.2	24 06.1	+46.8	64.6	24 31.7	+47.4	65.0	24 56.8	+48.1	65.4	25 21.6	+48.6	65.8	25 45.9	+49.3	66.3	26 09.9	+49.8	66.7	34
35	23 59.3	+45.2	63.1	24 26.3	+45.9	63.5	24 52.9	+46.5	63.9	25 19.1	+47.2	64.3	25 44.9	+47.8	64.8	26 10.2	+48.5	65.2	26 35.2	+49.1	65.6	26 59.7	+49.7	66.1	35
36	24 44.5	+45.0	62.4	25 12.2	+45.7	62.8	25 39.4	+46.4	63.2	26 06.3	+47.0	63.6	26 32.7	+47.7	64.1	26 58.7	+48.3	64.5	27 24.3	+48.9	65.0	27 49.4	+49.6	65.5	36
37	25 29.5	+44.8	61.6	25 57.9	+45.4	62.1	26 25.8	+46.1	62.5	26 53.3	+46.8	62.9	27 20.4	+47.4	63.4	27 47.0	+48.1	63.9	28 13.2	+48.7	64.3	28 39.0	+49.3	64.8	37
38	26 14.3	+44.6	60.9	26 43.3	+45.3	61.3	27 11.9	+45.9	61.8	27 40.1	+46.6	62.2	28 07.8	+47.2	62.7	28 35.1	+47.9	63.2	29 01.9	+48.6	63.7	29 28.3	+49.2	64.2	38
39	26 58.9	+44.3	60.1	27 28.6	+45.0	60.6	27 57.8	+45.7	61.1	28 26.7	+46.3	61.5	28 55.0	+47.1	62.0	29 23.0	+47.7	62.5	29 50.5	+48.3	63.0	30 17.5	+48.9	63.5	39
40	27 43.2	+44.1	59.4	28 13.6	+44.8	59.8	28 43.5	+45.5	60.3	29 13.0	+46.1	60.8	29 42.1	+46.8	61.3	30 10.7	+47.4	61.8	30 38.8	+48.1	62.3	31 06.4	+48.7	62.8	40
41	28 27.3	+43.8	58.6	28 58.4	+44.5	59.1	29 29.0	+45.2	59.6	29 59.1	+45.9	60.1	30 28.9	+46.5	60.6	30 58.1	+47.2	61.1	31 26.9	+47.8	61.6	31 55.1	+48.6	62.1	41
42	29 11.1	+43.6	57.8	29 42.9	+44.2	58.3	30 14.2	+44.9	58.8	30 45.0	+45.6	59.3	31 15.4	+46.3	59.8	31 45.3	+47.0	60.4	32 14.7	+47.7	60.9	32 43.7	+48.2	61.5	42
43	29 54.7	+43.2	57.0	30 27.1	+44.0	57.5	30 59.1	+44.6	58.0	31 30.6	+45.4	58.6	32 01.7	+46.0	59.1	32 32.3	+46.7	59.6	33 02.4	+47.3	60.2	33 31.9	+48.1	60.8	43
44	30 37.9	+43.0	56.2	31 11.1	+43.6	56.7	31 43.7	+44.4	57.3	32 16.0	+45.0	57.8	32 47.7	+45.8	58.3	33 19.0	+46.4	58.9	33 49.7	+47.1	59.5	34 20.0	+47.7	60.0	44
45	31 20.9	+42.6	55.4	31 54.7	+43.4	55.9	32 28.1	+44.1	56.5	33 01.0	+44.8	57.0	33 33.5	+45.4	57.6	34 05.4	+46.1	58.1	34 36.8	+46.8	58.7	35 07.7	+47.5	59.3	45
46	32 03.5	+42.4	54.6	32 38.1	+43.0	55.1	33 12.2	+43.7	55.7	33 45.8	+44.4	56.2	34 18.9	+45.1	56.8	34 51.5	+45.9	57.3	35 23.6	+46.6	57.9	35 55.2	+47.2	58.5	46
47	32 45.9	+41.9	53.8	33 21.1	+42.7	54.3	33 55.9	+43.4	54.8	34 30.2	+44.1	55.4	35 04.0	+44.9	56.0	35 37.4	+45.5	56.6	36 10.2	+46.2	57.2	36 42.4	+46.9	57.8	47
48	33 27.8	+41.6	52.9	34 03.8	+42.3	53.4	34 39.3	+43.0	54.0	35 14.3	+43.8	54.6	35 48.9	+44.4	55.1	36 22.9	+45.2	55.7	36 56.4	+45.9	56.4	37 29.3	+46.6	57.0	48
49	34 09.4	+41.3	52.0	34 46.1	+42.0	52.6	35 22.3	+42.7	53.1	35 58.1	+43.4	53.7	36 33.3	+44.2	54.3	37 08.1	+44.8	54.9	37 42.3	+45.5	55.6	38 15.9	+46.3	56.2	49
50	34 50.7	+40.8	51.2	35 28.1	+41.6	51.7	36 05.0	+42.3	52.3	36 41.5	+43.0	52.9	37 17.5	+43.7	53.5	37 52.9	+44.5	54.1	38 27.8	+45.2	54.7	39 02.2	+45.9	55.4	50
51	35 31.5	+40.5	50.3	36 09.7	+41.2	50.8	36 47.3	+42.0	51.4	37 24.5	+42.7	52.0	38 01.2	+43.4	52.6	38 37.4	+44.1	53.2	39 13.0	+44.9	53.9	39 48.1	+45.6	54.6	51
52	36 12.0	+40.0	49.4	36 50.9	+40.7	49.9	37 29.3	+41.4	50.5	38 07.2	+42.2	51.1	38 44.6	+43.0	51.7	39 21.5	+43.7	52.4	39 57.9	+44.4	53.0	40 33.7	+45.1	53.7	52
53	36 52.0	+39.6	48.4	37 31.6	+40.3	49.0	38 10.7	+41.1	49.6	38 49.4	+41.8	50.2	39 27.6	+42.5	50.8	40 05.2	+43.3	51.5	40 42.3	+44.0	52.1	41 18.8	+44.8	52.8	53
54	37 31.6	+39.1	47.5	38 11.9	+39.9	48.1	38 51.8	+40.6	48.7	39 31.2	+41.4	49.3	40 10.1	+42.1	49.9	40 48.5	+42.8	50.6	41 26.3	+43.6	51.2	42 03.6	+44.3	51.9	54
55	38 10.7	+38.7	46.5	38 51.8	+39.4	47.1	39 32.4	+40.2	47.7	40 12.6	+40.8	48.3	40 52.2	+41.6	49.0	41 31.3	+42.4	49.6	42 09.9	+43.2	50.3	42 47.9	+43.9	51.0	55
56	38 49.4	+38.2	45.5	39 31.2	+38.9	46.1	40 12.6	+39.6	46.7	40 53.4	+40.4	47.4	41 33.8	+41.2	48.0	42 13.7	+41.9	48.7	42 53.1	+42.6	49.4	43 31.8	+43.5	50.1	56
57	39 27.6	+37.6	44.6	40 10.1	+38.4	45.1	40 52.2	+39.1	45.7	41 33.8	+39.9	46.4	42 15.0	+40.6	47.0	42 55.6	+41.4	47.7	43 35.7	+42.2	48.4	44 15.3	+42.9	49.1	57
58	40 05.2	+37.1	43.5	40 48.5	+37.8	44.1	41 31.3	+38.6	44.7	42 13.7	+39.4	45.4	42 55.6	+40.1	46.0	43 37.0	+40.9	46.7	44 17.9	+41.6	47.4	44 58.2	+42.4	48.2	58
59	40 42.3	+36.5	42.5	41 26.3	+37.3	43.1	42 09.9	+38.0	43.7	42 53.1	+38.7	44.4	43 35.7	+39.4	45.0	44 17.9	+40.3	45.7	44 59.5	+41.1	46.4	45 40.6	+41.9	47.1	59
60	41 18.8	+36.0	41.5	42 03.6	+36.7	42.0	42 47.9	+37.5	42.7	43 31.8	+38.2	43.3	44 15.3	+38.9	44.0	44 58.2	+39.7	44.7	45 40.6	+40.5	45.4	46 22.5	+41.3	46.1	60
61	41 54.8	+35.3	40.4	42 40.3	+36.1	41.0	43 25.4	+36.8	41.6	44 10.0	+37.6	42.2	44 54.2	+38.4	42.9	45 37.9	+39.2	43.6	46 21.1	+39.9	44.3	47 03.8	+40.7	45.1	61
62	42 30.1	+34.8	39.3	43 16.4	+35.6	39.9	44 02.2	+36.2	40.5	44 47.6	+37.0	41.1	45 32.6	+37.7	41.8	46 17.1	+38.4	42.5	47 01.0	+39.3	43.2	47 44.5	+40.1	44.0	62
63	43 04.9	+34.0	38.2	43 51.8	+34.8	38.8	44 38.4	+35.5	39.4	45 24.6	+36.2	40.0	46 10.3	+37.0	40.7	46 55.5	+37.9	41.4	47 40.3	+38.6	42.1	48 24.6	+39.4	42.9	63
64	43 38.9	+33.4	37.0	44 26.6	+34.1	37.6	45 13.9	+34.9	38.2	46 00.8	+35.6	38.9	46 47.3	+36.4	39.5	47 33.4	+37.1	40.2	48 18.9	+37.9	41.0	49 04.0	+38.7	41.7	64
65	44 12.3	+32.6	35.9	45 00.7	+33.4	36.5	45 48.8	+34.1	37.1	46 36.4	+34.9	37.7	47 23.7	+35.6	38.4	48 10.5	+36.3	39.1	48 56.8	+37.2	39.8	49 42.7	+38.0	40.5	65
66	44 44.9	+32.0	34.7	45 34.1	+32.6	35.3	46 22.9	+33.3	35.9	47 11.3	+34.1	36.5	47 59.3	+34.9	37.2	48 46.9	+35.6	37.9	49 34.0	+36.4	38.6	50 20.7	+37.2	39.3	66
67	45 16.9	+31.1	33.5	46 07.4	+31.9	34.1	46 56.2	+32.6	34.7	47 45.4	+33.3	35.3	48 34.2	+34.0	36.0	49 22.5	+34.8	36.6	50 10.4	+35.6	37.4	50 57.9	+36.4	38.1	67
68	45 48.0	+30.4	32.3	46 38.3	+31.0	32.9	47 28.8	+31.8	33.5	48 18.7	+32.5	34.1	49 08.2	+33.2	34.7	49 57.3	+34.0	35.4	50 46.0	+34.8	36.1	51 34.3	+35.6	36.8	68
69	46 18.4	+29.5	31.1	47 09.6	+30.3	31.6	48 00.6	+30.9	32.2	48 51.2	+31.6	32.8	49 41.4	+32.4	33.4	50 31.3	+33.1	34.1	51 20.8	+33.9	34.8	52 09.9	+34.6	35.5	69
70	46 47.9	+28.7	29.8	47 39.9	+29.3	30.3	48 31.5	+30.0	30.9	49 22.8	+30.8	31.5	50 13.8	+31.5	32.1	51 04.4	+32.3	32.8	51 54.7	+33.0	33.5	52 44.5	+33.8	34.2	70
71	47 16.6	+27.8	28.5	48 09.2	+28.5	29.0	49 01.5	+29.2	29.6	49 53.6	+29.8	30.2	50 45.3	+30.5	30.8	51 36.7	+31.2	31.4	52 27.7	+32.0	32.1	53 18.3	+32.8	32.8	71
72	47 44.4	+26.9	27.2	48 37.7	+27.5	27.7	49 30.7	+28.2	28.2	50 23.4	+28.8	28.8	51 15.8	+29.5	29.4	52 07.9	+30.1	30.0	52 59.7	+31.0	30.7	53 51.1	+31.7	31.4	72
73	48 11.3	+26.0	25.9	49 05.2	+26.6	26.4	49 58.9	+27.2	26.9	50 52.2	+27.9	27.4	51 45.3	+28.6	28.0	52 38.2	+29.2	28.6	53 30.7	+29.9	29.3	54 22.8	+30.7	30.0	73
74	48 37.3	+25.0	24.5	49 31.8	+25.5	25.0	50 26.1	+26.1	25.5	51 20.1	+26.8	26.0	52 13.9	+27.5	26.6	53 07.4	+28.1	27.2	54 00.6	+28.9	27.8	54 53.5	+29.6	28.5	74
75	49 02.3	+23.9	23.1	49 57.3	+24.6	23.6	50 52.2	+25.2	24.1	51 46.9	+25.8	24.6	52 41.4	+26.5	25.1	53 35.5	+27.1	25.7	54 29.5	+27.7	26.3	55 23.1	+28.4	26.9	75
76	49 26.2	+23.0	21.7	50 21.9	+23.5	22.2	51 17.4	+24.0	22.6	52 12.7	+24.6	23.1	53 07.9	+25.3	23.6	54 02.6	+25.8	24.2	54 57.2	+26.5	24.8	55 51.5	+27.2	25.4	76
77	49 49.2	+21.8	20.3	50 45.4	+22.4	20.7	51 41.4	+22.9	21.2	52 37.3	+23.5	21.6	53 33.0	+24.0	22.1	54 28.4	+24.7	22.6	55 23.7	+25.3	23.2	56 18.7	+26.0	23.8	77
78	50 11.0	+20.8	18.9	51 07.8	+21.2	19.3	52 04.3	+21.8	19.7	53 00.8	+22.3	20.1	53 57.0	+22.9	20.6	54 53.1	+23.4	21.1	55 49.0	+24.0	21.6	56 44.7	+24.6	22.2	78
79	50 31.8	+19.7	17.4	51 29.0	+20.1	17.7	52 26.1	+20.6	18.1	53 23.1	+21.0	18.6	54 19.9	+21.5	19.0	55 16.5	+22.1	19.5	56 13.0	+22.7	20.0	57 09.3	+23.3	20.5	79
80	50 51.5	+18.4	15.9	51 49.1	+18.9	16.2	52 46.7	+19.3	16.6	53 44.1	+19.8	17.0	54 41.4	+20.3	17.4	55 38.6	+20.8	17.8	56 35.7	+21.3	18.3	57 32.6	+21.8	18.8	80
81	51 09.9	+17.3	14.4	52 08.0	+17.7	14.7	53 06.0	+18.1	15.0	54 03.9	+18.5	15.4	55 01.7	+19.0	15.7	55 59.4	+19.4	16.1	56 57.0	+19.9	16.6	57 54.4	+20.4	17.0	81
82	51 27.2	+16.1	12.8	52 25.7	+16.4	13.1	53 24.1	+16.8	13.4	54 22.4	+17.2	13.7	55 20.7	+17.5	14.1	56 18.8	+18.0	14.5	57 16.9	+18.4	14.8	58 14.8	+18.9	15.2	82
83	51 43.3	+14.9	11.3	52 42.1	+15.2	11.5	53 40.9	+15.5	11.8	54 39.6	+15.8	12.1	55 38.2	+16.2	12.4	56 36.8	+16.5	12.7	57 35.3	+16.9	13.1	58 33.7	+17.3	13.4	83
84	51 58.2	+13.6	9.7	52 57.3	+13.9	9.9	53 56.4	+14.1	10.2	54 55.4	+14.5	10.4	55 54.4	+14.7	10.7	56 53.3	+15.1	11.0	57 52.2	+15.4	11.3	58 51.0	+15.7	11.6	84
85	52 11.8	+12.3	8.1	53 11.2	+12.5	8.3	54 10.5	+12.8	8.5	55 09.9	+13.0	8.7	56 09.1	+13.3	9.0	57 08.4	+13.5	9.2	58 07.6	+13.8	9.4	59 06.7	+14.1	9.7	85
86	52 24.1	+11.0	6.5	53 23.7	+11.1	6.7	54 23.3	+11.3	6.8	55 22.8	+11.6	7.0	56 22.4	+11.7	7.2	57 21.9	+11.9	7.4	58 21.4	+12.1	7.6	59 20.8	+12.4	7.8	86
87	52 35.1	+9.6	4.9	53 34.8	+9.8	5.0	54 34.6	+9.9	5.2	55 34.4	+10.0	5.3	56 34.1	+10.2	5.4	57 33.8	+10.4	5.6	58 33.5	+10.5	5.7	59 33.2	+10.7	5.9	87
88	52 44.7	+8.3	3.3	53 44.6	+8.4	3.4	54 44.5	+8.5	3.4	55 44.4	+8.6	3.5	56 44.3	+8.6	3.6	57 44.2	+8.7	3.7	58 44.0	+8.9	3.8	59 43.9	+8.9	3.9	88
89	52 53.0	+7.0	1.6	53 53.0	+7.0	1.7	54 53.0	+7.0	1.7	55 53.0	+7.0	1.8	56 52.9	+7.1	1.8	57 52.9	+7.1	1.9	58 52.9	+7.1	1.9	59 52.8	+7.2	2.0	89
90	53 00.0	+5.6	0.0	54 00.0	+5.6	0.0	55 00.0	+5.5	0.0	56 00.0	+5.5	0.0	57 00.0	+5.5	0.0	58 00.0	+5.4	0.0	59 00.0	+5.4	0.0	60 00.0	+5.4	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
         { L.H.A. less than 180°...........Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 96°, 264°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	3 00.4	+48.0	94.0	2 56.2	+48.6	94.0	2 51.9	+49.2	94.1	2 47.6	+49.8	94.1	2 43.2	+50.4	94.2	2 38.8	+51.0	94.2	2 34.4	+51.4	94.3	2 29.9	+52.0	94.3	0
1	3 48.4	+47.9	93.4	3 44.8	+48.6	93.5	3 41.1	+49.2	93.5	3 37.4	+49.8	93.6	3 33.6	+50.4	93.7	3 29.8	+50.9	93.7	3 25.8	+51.5	93.8	3 21.9	+52.0	93.8	1
2	4 36.3	+47.9	92.8	4 33.4	+48.5	92.9	4 30.3	+49.2	93.0	4 27.2	+49.7	93.0	4 24.0	+50.3	93.1	4 20.7	+50.9	93.2	4 17.3	+51.4	93.3	4 13.9	+51.9	93.3	2
3	5 24.2	+47.9	92.3	5 21.9	+48.5	92.3	5 19.5	+49.1	92.4	5 16.9	+49.7	92.5	5 14.3	+50.3	92.6	5 11.6	+50.8	92.7	5 08.7	+51.5	92.7	5 05.8	+52.0	92.8	3
4	6 12.1	+47.9	91.6	6 10.4	+48.5	91.7	6 08.6	+49.1	91.8	6 06.6	+49.7	91.9	6 04.6	+50.3	92.0	6 02.4	+50.9	92.1	6 00.2	+51.3	92.2	5 57.8	+51.9	92.3	4
5	7 00.0	+47.8	91.0	6 58.9	+48.4	91.1	6 57.7	+49.0	91.2	6 56.3	+49.7	91.3	6 54.9	+50.2	91.5	6 53.3	+50.8	91.6	6 51.5	+51.4	91.7	6 49.7	+51.9	91.8	5
6	7 47.8	+47.7	90.4	7 47.3	+48.4	90.5	7 46.7	+49.0	90.6	7 46.0	+49.6	90.8	7 45.1	+50.2	90.9	7 44.1	+50.7	91.0	7 42.9	+51.3	91.2	7 41.6	+51.8	91.3	6
7	8 35.5	+47.7	89.8	8 35.7	+48.3	89.9	8 35.7	+48.9	90.1	8 35.6	+49.5	90.2	8 35.3	+50.1	90.3	8 34.8	+50.7	90.5	8 34.2	+51.3	90.7	8 33.4	+51.8	90.8	7
8	9 23.2	+47.6	89.1	9 24.0	+48.2	89.3	9 24.6	+48.9	89.5	9 25.1	+49.5	89.6	9 25.4	+50.1	89.8	9 25.5	+50.7	90.0	9 25.5	+51.2	90.1	9 25.2	+51.8	90.3	8
9	10 10.8	+47.5	88.5	10 12.2	+48.2	88.7	10 13.5	+48.8	88.9	10 14.6	+49.4	89.1	10 15.5	+50.0	89.2	10 16.2	+50.6	89.4	10 16.7	+51.2	89.6	10 17.0	+51.7	89.8	9
10	10 58.3	+47.5	87.9	11 00.4	+48.2	88.1	11 02.3	+48.8	88.3	11 04.0	+49.4	88.5	11 05.5	+50.0	88.7	11 06.8	+50.5	88.9	11 07.9	+51.1	89.1	11 08.7	+51.7	89.3	10
11	11 45.8	+47.4	87.3	11 48.6	+48.0	87.5	11 51.1	+48.7	87.7	11 53.4	+49.3	87.9	11 55.5	+49.9	88.1	11 57.3	+50.5	88.3	11 59.0	+51.0	88.5	12 00.4	+51.6	88.8	11
12	12 33.2	+47.3	86.6	12 36.6	+48.0	86.9	12 39.8	+48.5	87.1	12 42.7	+49.2	87.3	12 45.4	+49.8	87.5	12 47.8	+50.4	87.8	12 50.0	+51.0	88.0	12 52.0	+51.5	88.2	12
13	13 20.5	+47.2	86.0	13 24.6	+47.8	86.3	13 28.3	+48.6	86.5	13 31.9	+49.1	86.7	13 35.2	+49.7	87.0	13 38.2	+50.4	87.2	13 41.0	+50.9	87.5	13 43.5	+51.5	87.7	13
14	14 07.7	+47.1	85.4	14 12.4	+47.8	85.6	14 16.9	+48.4	85.9	14 21.0	+49.1	86.1	14 24.9	+49.7	86.4	14 28.6	+50.2	86.7	14 31.9	+50.9	86.9	14 35.0	+51.4	87.2	14
15	14 54.8	+47.0	84.7	15 00.2	+47.7	85.0	15 05.3	+48.3	85.3	15 10.1	+48.9	85.5	15 14.6	+49.6	85.8	15 18.8	+50.2	86.1	15 22.8	+50.7	86.4	15 26.4	+51.4	86.6	15
16	15 41.8	+46.9	84.1	15 47.9	+47.5	84.4	15 53.6	+48.2	84.7	15 59.0	+48.9	84.9	16 04.2	+49.4	85.2	16 09.0	+50.1	85.5	16 13.5	+50.7	85.8	16 17.8	+51.2	86.1	16
17	16 28.7	+46.8	83.4	16 35.4	+47.4	83.7	16 41.8	+48.1	84.0	16 47.9	+48.7	84.3	16 53.6	+49.4	84.6	16 59.1	+50.0	84.9	17 04.2	+50.6	85.3	17 09.0	+51.2	85.6	17
18	17 15.5	+46.6	82.8	17 22.8	+47.4	83.1	17 29.9	+48.0	83.4	17 36.6	+48.6	83.7	17 43.0	+49.3	84.0	17 49.1	+49.8	84.4	17 54.8	+50.5	84.7	18 00.2	+51.0	85.0	18
19	18 02.1	+46.5	82.1	18 10.2	+47.2	82.5	18 17.9	+47.8	82.8	18 25.2	+48.5	83.1	18 32.3	+49.1	83.4	18 38.9	+49.8	83.8	18 45.3	+50.3	84.1	18 51.2	+51.0	84.5	19
20	18 48.6	+46.4	81.5	18 57.4	+47.0	81.8	19 05.7	+47.7	82.1	19 13.7	+48.4	82.5	19 21.4	+49.0	82.8	19 28.7	+49.6	83.2	19 35.6	+50.3	83.5	19 42.2	+50.9	83.9	20
21	19 35.0	+46.2	80.8	19 44.4	+46.9	81.1	19 53.4	+47.6	81.5	20 02.1	+48.3	81.9	20 10.4	+48.9	82.2	20 18.3	+49.6	82.6	20 25.9	+50.1	83.0	20 33.1	+50.7	83.3	21
22	20 21.2	+46.0	80.1	20 31.3	+46.7	80.5	20 41.0	+47.5	80.9	20 50.4	+48.1	81.2	20 59.3	+48.8	81.6	21 07.9	+49.4	82.0	21 16.0	+50.1	82.4	21 23.8	+50.6	82.8	22
23	21 07.2	+45.9	79.4	21 18.0	+46.6	79.8	21 28.5	+47.2	80.2	21 38.5	+47.9	80.6	21 48.1	+48.6	81.0	21 57.3	+49.2	81.4	22 06.1	+49.9	81.8	22 14.4	+50.5	82.2	23
24	21 53.1	+45.7	78.7	22 04.6	+46.5	79.1	22 15.7	+47.2	79.5	22 26.4	+47.8	79.9	22 36.7	+48.5	80.3	22 46.5	+49.2	80.8	22 56.0	+49.7	81.2	23 04.9	+50.4	81.6	24
25	22 38.8	+45.6	78.0	22 51.1	+46.2	78.5	23 02.9	+46.9	78.9	23 14.2	+47.7	79.3	23 25.2	+48.3	79.7	23 35.7	+48.9	80.1	23 45.7	+49.6	80.6	23 55.3	+50.3	81.0	25
26	23 24.4	+45.3	77.3	23 37.3	+46.0	77.8	23 49.8	+46.8	78.2	24 01.9	+47.4	78.6	24 13.5	+48.1	79.1	24 24.6	+48.8	79.5	24 35.3	+49.5	80.0	24 45.6	+50.1	80.4	26
27	24 09.7	+45.1	76.6	24 23.3	+45.9	77.1	24 36.6	+46.5	77.5	24 49.3	+47.3	77.9	25 01.6	+48.0	78.4	25 13.4	+48.7	78.9	25 24.8	+49.3	79.3	25 35.7	+49.9	79.8	27
28	24 54.8	+44.9	75.9	25 09.2	+45.7	76.3	25 23.1	+46.4	76.8	25 36.6	+47.1	77.3	25 49.6	+47.8	77.7	26 02.1	+48.4	78.2	26 14.1	+49.1	78.7	26 25.6	+49.8	79.2	28
29	25 39.7	+44.7	75.2	25 54.9	+45.4	75.6	26 09.5	+46.2	76.1	26 23.7	+46.9	76.6	26 37.4	+47.5	77.1	26 50.5	+48.3	77.6	27 03.2	+49.0	78.1	27 15.4	+49.6	78.6	29
30	26 24.4	+44.5	74.4	26 40.3	+45.2	74.9	26 55.7	+45.9	75.4	27 10.6	+46.6	75.9	27 24.9	+47.4	76.4	27 38.8	+48.1	76.9	27 52.2	+48.7	77.4	28 05.0	+49.4	77.9	30
31	27 08.9	+44.2	73.7	27 25.5	+45.0	74.2	27 41.6	+45.7	74.7	27 57.2	+46.5	75.2	28 12.3	+47.2	75.7	28 26.9	+47.9	76.2	28 40.9	+48.6	76.7	28 54.4	+49.3	77.3	31
32	27 53.1	+43.9	72.9	28 10.5	+44.7	73.4	28 27.3	+45.5	73.9	28 43.7	+46.2	74.5	28 59.5	+47.0	75.0	29 14.8	+47.6	75.5	29 29.5	+48.4	76.1	29 43.7	+49.0	76.6	32
33	28 37.0	+43.7	72.1	28 55.2	+44.5	72.7	29 12.8	+45.2	73.2	29 29.9	+46.0	73.7	29 46.5	+46.7	74.3	30 02.4	+47.5	74.8	30 17.9	+48.1	75.4	30 32.7	+48.9	76.0	33
34	29 20.7	+43.4	71.3	29 39.7	+44.1	71.9	29 58.0	+45.0	72.4	30 15.9	+45.7	73.0	30 33.2	+46.4	73.5	30 49.9	+47.2	74.1	31 06.0	+47.9	74.7	31 21.6	+48.6	75.3	34
35	30 04.1	+43.2	70.6	30 23.9	+43.9	71.1	30 43.0	+44.7	71.7	31 01.6	+45.5	72.2	31 19.6	+46.2	72.8	31 37.1	+46.9	73.4	31 53.9	+47.7	74.0	32 10.2	+48.4	74.6	35
36	30 47.3	+42.8	69.7	31 07.8	+43.6	70.3	31 27.7	+44.4	70.9	31 47.1	+45.1	71.5	32 05.8	+46.0	72.1	32 24.0	+46.7	72.7	32 41.6	+47.4	73.3	32 58.6	+48.1	73.9	36
37	31 30.1	+42.5	68.9	31 51.4	+43.3	69.5	32 12.1	+44.1	70.1	32 32.2	+44.9	70.7	32 51.8	+45.6	71.3	33 10.7	+46.4	71.9	33 29.0	+47.2	72.5	33 46.7	+47.9	73.2	37
38	32 12.6	+42.2	68.1	32 34.7	+43.0	68.7	32 56.2	+43.8	69.3	33 17.1	+44.6	69.9	33 37.4	+45.4	70.5	33 57.1	+46.2	71.1	34 16.2	+46.9	71.8	34 34.6	+47.7	72.4	38
39	32 54.8	+41.8	67.3	33 17.7	+42.6	67.9	33 40.0	+43.5	68.5	34 01.7	+44.3	69.1	34 22.8	+45.1	69.7	34 43.3	+45.8	70.4	35 03.1	+46.6	71.0	35 22.3	+47.3	71.7	39
40	33 36.6	+41.4	66.4	34 00.3	+42.3	67.0	34 23.5	+43.1	67.6	34 46.0	+43.9	68.3	35 07.9	+44.7	68.9	35 29.1	+45.5	69.6	35 49.7	+46.3	70.3	36 09.6	+47.1	70.9	40
41	34 18.0	+41.1	65.5	34 42.6	+41.9	66.1	35 06.6	+42.7	66.8	35 29.9	+43.6	67.4	35 52.6	+44.4	68.1	36 14.6	+45.2	68.8	36 36.0	+46.0	69.5	36 56.7	+46.8	70.2	41
42	34 59.1	+40.7	64.6	35 24.5	+41.6	65.3	35 49.3	+42.4	65.9	36 13.5	+43.2	66.6	36 37.0	+44.0	67.3	36 59.8	+44.9	68.0	37 22.0	+45.7	68.7	37 43.5	+46.4	69.4	42
43	35 39.8	+40.3	63.7	36 06.1	+41.1	64.4	36 31.7	+42.0	65.1	36 56.7	+42.8	65.7	37 21.0	+43.7	66.4	37 44.7	+44.5	67.1	38 07.7	+45.3	67.8	38 29.9	+46.1	68.6	43
44	36 20.1	+39.9	62.8	36 47.2	+40.7	63.5	37 13.7	+41.6	64.2	37 39.5	+42.4	64.8	38 04.7	+43.3	65.6	38 29.2	+44.1	66.3	38 53.0	+44.9	67.0	39 16.0	+45.8	67.8	44
45	37 00.0	+39.4	61.9	37 27.9	+40.3	62.6	37 55.3	+41.1	63.2	38 21.9	+42.1	64.0	38 48.0	+42.8	64.7	39 13.3	+43.7	65.4	39 37.9	+44.6	66.2	40 01.8	+45.4	66.9	45
46	37 39.4	+38.9	60.9	38 08.2	+39.9	61.6	38 36.4	+40.7	62.3	39 04.0	+41.5	63.0	39 30.8	+42.5	63.8	39 57.0	+43.3	64.5	40 22.5	+44.1	65.3	40 47.2	+45.0	66.1	46
47	38 18.3	+38.5	60.0	38 48.1	+39.3	60.7	39 17.1	+40.3	61.4	39 45.5	+41.1	62.1	40 13.3	+42.0	62.8	40 40.3	+42.9	63.6	41 06.6	+43.7	64.4	41 32.2	+44.6	65.2	47
48	38 56.8	+38.0	59.0	39 27.4	+38.9	59.7	39 57.4	+39.7	60.4	40 26.6	+40.7	61.2	40 55.3	+41.5	61.9	41 23.2	+42.4	62.7	41 50.3	+43.3	63.5	42 16.7	+44.2	64.3	48
49	39 34.8	+37.4	58.0	40 06.3	+38.3	58.7	40 37.1	+39.2	59.4	41 07.3	+40.1	60.2	41 36.8	+41.0	60.9	42 05.6	+41.9	61.7	42 33.6	+42.8	62.5	43 00.9	+43.7	63.4	49
50	40 12.2	+36.9	57.0	40 44.6	+37.8	57.7	41 16.3	+38.8	58.4	41 47.4	+39.6	59.2	42 17.8	+40.5	60.0	42 47.5	+41.4	60.8	43 16.4	+42.3	61.6	43 44.6	+43.2	62.4	50
51	40 49.1	+36.3	55.9	41 22.4	+37.2	56.7	41 55.1	+38.1	57.4	42 27.0	+39.1	58.2	42 58.3	+40.0	59.0	43 28.9	+40.9	59.8	43 58.7	+41.8	60.6	44 27.8	+42.7	61.5	51
52	41 25.4	+35.8	54.9	41 59.6	+36.7	55.6	42 33.2	+37.6	56.4	43 06.1	+38.5	57.1	43 38.3	+39.4	57.9	44 09.8	+40.3	58.8	44 40.5	+41.3	59.6	45 10.5	+42.2	60.5	52
53	42 01.2	+35.1	53.8	42 36.3	+36.0	54.5	43 10.8	+37.0	55.3	43 44.6	+37.9	56.1	44 17.7	+38.9	56.9	44 50.1	+39.7	57.7	45 21.8	+40.7	58.6	45 52.7	+41.6	59.4	53
54	42 36.3	+34.5	52.7	43 12.3	+35.5	53.4	43 47.8	+36.3	54.2	44 22.5	+37.3	55.0	44 56.6	+38.2	55.8	45 29.9	+39.2	56.7	46 02.5	+40.1	57.5	46 34.3	+41.1	58.4	54
55	43 10.8	+33.8	51.6	43 47.8	+34.7	52.3	44 24.1	+35.7	53.1	44 59.8	+36.6	53.9	45 34.8	+37.6	54.7	46 09.1	+38.5	55.6	46 42.6	+39.5	56.4	47 15.4	+40.4	57.3	55
56	43 44.6	+33.1	50.5	44 22.5	+34.1	51.2	44 59.8	+35.0	52.0	45 36.4	+36.0	52.8	46 12.4	+36.9	53.6	46 47.6	+37.9	54.5	47 22.1	+38.8	55.3	47 55.8	+39.9	56.2	56
57	44 17.7	+32.4	49.3	44 56.6	+33.3	50.0	45 34.8	+34.3	50.8	46 12.4	+35.2	51.6	46 49.3	+36.2	52.5	47 25.5	+37.1	53.3	48 00.9	+38.2	54.2	48 35.7	+39.1	55.1	57
58	44 50.1	+31.7	48.1	45 29.9	+32.6	48.9	46 09.1	+33.5	49.6	46 47.6	+34.5	50.5	47 25.5	+35.4	51.3	48 02.6	+36.5	52.1	48 39.1	+37.4	53.0	49 14.8	+38.4	54.0	58
59	45 21.8	+30.9	46.9	46 02.5	+31.8	47.7	46 42.6	+32.8	48.4	47 22.1	+33.7	49.2	48 00.9	+34.8	50.1	48 39.1	+35.7	51.0	49 16.5	+36.7	51.9	49 53.2	+37.7	52.8	59
60	45 52.7	+30.1	45.7	46 34.3	+31.1	46.4	47 15.4	+32.0	47.2	47 55.8	+33.0	48.0	48 35.7	+33.9	48.9	49 14.8	+34.9	49.7	49 53.2	+35.9	50.6	50 30.9	+36.9	51.6	60
61	46 22.8	+29.3	44.4	47 05.4	+30.2	45.2	47 47.4	+31.1	46.0	48 28.8	+32.1	46.8	49 09.6	+33.0	47.6	49 49.7	+34.0	48.5	50 29.1	+35.1	49.4	51 07.8	+36.1	50.3	61
62	46 52.1	+28.4	43.2	47 35.6	+29.3	43.9	48 18.5	+30.3	44.7	49 00.9	+31.2	45.5	49 42.6	+32.2	46.3	50 23.7	+33.2	47.2	51 04.2	+34.2	48.0	51 43.9	+35.3	49.0	62
63	47 20.5	+27.5	41.9	48 04.9	+28.4	42.6	48 48.8	+29.4	43.4	49 32.1	+30.3	44.2	50 14.8	+31.3	45.0	50 56.9	+32.3	45.9	51 38.4	+33.3	46.8	52 19.1	+34.3	47.7	63
64	47 48.0	+26.6	40.6	48 33.3	+27.5	41.3	49 18.2	+28.4	42.0	50 02.4	+29.4	42.8	50 46.1	+30.4	43.7	51 29.2	+31.4	44.5	52 11.7	+32.3	45.4	52 53.4	+33.4	46.4	64
65	48 14.6	+25.6	39.2	49 00.8	+26.5	39.9	49 46.6	+27.5	40.7	50 31.8	+28.4	41.5	51 16.5	+29.4	42.3	52 00.6	+30.3	43.2	52 44.0	+31.4	44.0	53 26.8	+32.4	45.0	65
66	48 40.2	+24.7	37.8	49 27.4	+25.5	38.6	50 14.1	+26.4	39.3	51 00.2	+27.4	40.1	51 45.9	+28.3	40.9	52 30.9	+29.3	41.7	53 15.4	+30.3	42.6	53 59.2	+31.3	43.6	66
67	49 04.9	+23.6	36.5	49 52.9	+24.6	37.2	50 40.5	+25.4	37.9	51 27.6	+26.4	38.7	52 14.2	+27.3	39.5	53 00.2	+28.3	40.3	53 45.7	+29.3	41.2	54 30.5	+30.3	42.1	67
68	49 28.5	+22.7	35.1	50 17.5	+23.4	35.7	51 05.9	+24.4	36.5	51 54.0	+25.4	37.2	52 41.5	+26.2	38.0	53 28.5	+27.1	38.8	54 15.0	+28.1	39.7	55 00.8	+29.1	40.6	68
69	49 51.2	+21.5	33.6	50 40.9	+22.4	34.3	51 30.3	+23.2	35.0	52 19.2	+24.1	35.7	53 07.7	+25.0	36.5	53 55.6	+26.0	37.3	54 43.1	+27.0	38.2	55 30.0	+27.9	39.1	69
70	50 12.7	+20.4	32.2	51 03.3	+21.2	32.8	51 53.5	+22.1	33.5	52 43.3	+23.0	34.2	53 32.7	+23.9	35.0	54 21.6	+24.8	35.8	55 10.1	+25.7	36.6	55 57.9	+26.8	37.5	70
71	50 33.1	+19.3	30.7	51 24.5	+20.1	31.3	52 15.6	+20.9	32.0	53 06.3	+21.8	32.7	53 56.6	+22.6	33.4	54 46.4	+23.6	34.2	55 35.8	+24.5	35.0	56 24.7	+25.4	35.9	71
72	50 52.4	+18.2	29.2	51 44.6	+18.9	29.8	52 36.5	+19.7	30.5	53 28.1	+20.5	31.1	54 19.2	+21.4	31.9	55 10.0	+22.2	32.6	56 00.3	+23.2	33.4	56 50.1	+24.2	34.2	72
73	51 10.6	+16.9	27.7	52 03.5	+17.7	28.3	52 56.2	+18.5	28.9	53 48.6	+19.2	29.6	54 40.6	+20.1	30.2	55 32.2	+21.0	31.0	56 23.5	+21.8	31.7	57 14.3	+22.7	32.6	73
74	51 27.5	+15.7	26.1	52 21.2	+16.5	26.7	53 14.7	+17.2	27.3	54 07.8	+18.0	27.9	55 00.7	+18.7	28.6	55 53.2	+19.5	29.3	56 45.3	+20.4	30.1	57 37.0	+21.4	30.8	74
75	51 43.2	+14.5	24.6	52 37.7	+15.1	25.1	53 31.9	+15.9	25.7	54 25.8	+16.6	26.3	55 19.4	+17.4	26.9	56 12.7	+18.2	27.6	57 05.7	+19.0	28.3	57 58.4	+19.8	29.1	75
76	51 57.7	+13.2	23.0	52 52.8	+13.9	23.5	53 47.7	+14.6	24.1	54 42.4	+15.2	24.7	55 36.8	+15.9	25.3	56 30.9	+16.7	25.9	57 24.7	+17.5	26.6	58 18.2	+18.3	27.3	76
77	52 10.9	+12.0	21.4	53 06.7	+12.5	21.9	54 02.3	+13.1	22.4	54 57.6	+13.8	23.0	55 52.7	+14.5	23.5	56 47.6	+15.2	24.2	57 42.2	+16.0	24.8	58 36.5	+16.8	25.5	77
78	52 22.9	+10.6	19.8	53 19.2	+11.2	20.3	54 15.4	+11.8	20.8	55 11.4	+12.4	21.3	56 07.2	+13.1	21.8	57 02.8	+13.7	22.4	57 58.2	+14.4	23.0	58 53.3	+15.1	23.6	78
79	52 33.5	+9.3	18.2	53 30.4	+9.8	18.6	54 27.2	+10.3	19.1	55 23.8	+10.9	19.6	56 20.3	+11.5	20.1	57 16.5	+12.2	20.6	58 12.6	+12.8	21.2	59 08.4	+13.5	21.8	79
80	52 42.8	+7.9	16.6	53 40.2	+8.4	17.0	54 37.5	+9.0	17.4	55 34.7	+9.5	17.8	56 31.8	+10.0	18.3	57 28.7	+10.5	18.8	58 25.4	+11.2	19.3	59 21.9	+11.8	19.8	80
81	52 50.7	+6.6	15.0	53 48.6	+7.1	15.3	54 46.5	+7.4	15.7	55 44.2	+7.9	16.1	56 41.8	+8.4	16.4	57 39.2	+9.0	16.9	58 36.6	+9.6	17.4	59 33.7	+10.1	17.9	81
82	52 57.3	+5.2	13.3	53 55.7	+5.5	13.6	54 53.9	+6.0	14.0	55 52.1	+6.4	14.3	56 50.2	+6.9	14.7	57 48.2	+7.3	15.1	58 46.1	+7.8	15.5	59 43.8	+8.3	16.0	82
83	53 02.5	+3.8	11.6	54 01.2	+4.2	11.9	54 59.9	+4.5	12.2	55 58.5	+4.9	12.5	56 57.1	+5.2	12.9	57 55.5	+5.7	13.2	58 53.9	+6.1	13.6	59 52.1	+6.6	14.0	83
84	53 06.3	+2.5	10.0	54 05.4	+2.7	10.2	55 04.4	+3.0	10.5	56 03.4	+3.3	10.7	57 02.3	+3.7	11.0	58 01.2	+4.0	11.3	59 00.0	+4.4	11.7	59 58.7	+4.8	12.0	84
85	53 08.8	+1.0	8.3	54 08.1	+1.3	8.5	55 07.4	+1.6	8.7	56 06.7	+1.8	9.0	57 06.0	+2.0	9.2	58 05.2	+2.3	9.4	59 04.3	+2.7	9.7	60 03.5	+2.9	10.0	85
86	53 09.8	−0.4	6.7	54 09.4	−0.2	6.8	55 09.0	0.0	7.0	56 08.5	+0.2	7.2	57 08.0	+0.4	7.4	58 07.5	+0.7	7.6	59 07.0	+0.9	7.8	60 06.4	+1.1	8.0	86
87	53 09.4	−1.7	5.0	54 09.0	−1.5	5.1	55 09.0	−1.5	5.2	56 08.7	−1.3	5.4	57 08.0	−1.2	5.5	58 08.2	−1.1	5.7	59 07.9	−0.9	5.8	60 07.5	−0.7	6.0	87
88	53 07.7	−3.2	3.3	54 07.6	−3.1	3.4	55 07.5	−3.0	3.5	56 07.4	−2.9	3.6	57 07.2	−2.8	3.7	58 07.1	−2.7	3.8	59 07.0	−2.6	3.9	60 06.8	−2.5	4.0	88
89	53 04.5	−4.5	1.7	54 04.5	−4.5	1.7	55 04.5	−4.5	1.7	56 04.5	−4.5	1.8	57 04.4	−4.4	1.8	58 04.4	−4.4	1.9	59 04.4	−4.4	1.9	60 04.3	−4.3	2.0	89
90	53 00.0	−5.9	0.0	54 00.0	−5.9	0.0	55 00.0	−6.0	0.0	56 00.0	−6.0	0.0	57 00.0	−6.0	0.0	58 00.0	−6.1	0.0	59 00.0	−6.1	0.0	60 00.0	−6.1	0.0	90

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	3 00.4	−48.0	94.0	2 56.2	−48.6	94.0	2 51.9	−49.2	94.1	2 47.6	−49.8	94.1	2 43.2	−50.3	94.2	2 38.8	−50.9	94.2	2 34.4	−51.5	94.3	2 29.9	−52.1	94.3	0
1	2 12.4	−48.0	94.6	2 07.6	−48.7	94.6	2 02.7	−49.2	94.7	1 57.8	−49.8	94.7	1 52.9	−50.4	94.7	1 47.9	−51.0	94.8	1 42.9	−51.5	94.8	1 37.8	−52.0	94.8	1
2	1 24.4	−48.0	95.2	1 18.9	−48.6	95.2	1 13.5	−49.3	95.2	1 08.0	−49.8	95.3	1 02.5	−50.4	95.3	0 56.9	−50.9	95.3	0 51.4	−51.5	95.3	0 45.8	−52.0	95.3	2
3	0 36.4	−48.0	95.8	0 30.3	−48.6	95.8	0 24.2	−49.2	95.8	0 18.2	−49.9	95.8	0 12.1	−50.4	95.8	0 06.0	−51.0	95.8	0 00.1	+51.5	84.2	0 06.2	+52.0	84.2	3
4	0 11.6	+48.1	83.6	0 18.3	+48.7	83.6	0 25.0	+49.2	83.6	0 31.7	+49.8	83.6	0 38.3	+50.4	83.6	0 45.0	+50.9	83.6	0 51.6	+51.5	83.7	0 58.2	+52.1	83.7	4
5	0 59.7	+48.0	83.0	1 07.0	+48.6	83.0	1 14.2	+49.3	83.0	1 21.5	+49.8	83.1	1 28.7	+50.4	83.1	1 35.9	+51.0	83.1	1 43.1	+51.5	83.1	1 50.3	+52.0	83.2	5
6	1 47.7	+48.0	82.4	1 55.6	+48.6	82.4	2 03.5	+49.2	82.5	2 11.3	+49.8	82.5	2 19.1	+50.4	82.5	2 26.9	+50.9	82.6	2 34.6	+51.5	82.6	2 42.3	+52.0	82.7	6
7	2 35.7	+48.0	81.8	2 44.2	+48.6	81.8	2 52.7	+49.2	81.9	3 01.1	+49.8	81.9	3 09.5	+50.4	82.0	3 17.8	+50.9	82.1	3 26.1	+51.4	82.1	3 34.3	+52.0	82.2	7
8	3 23.7	+47.9	81.2	3 32.8	+48.6	81.3	3 41.9	+49.2	81.3	3 50.9	+49.8	81.4	3 59.9	+50.3	81.5	4 08.7	+50.9	81.5	4 17.5	+51.5	81.6	4 26.3	+51.9	81.7	8
9	4 11.6	+48.0	80.6	4 21.4	+48.5	80.7	4 31.1	+49.1	80.8	4 40.7	+49.7	80.8	4 50.2	+50.3	80.9	4 59.6	+50.9	81.0	5 09.0	+51.4	81.1	5 18.2	+52.0	81.2	9
10	4 59.6	+47.9	80.0	5 09.9	+48.6	80.1	5 20.2	+49.1	80.2	5 30.4	+49.7	80.3	5 40.5	+50.3	80.4	5 50.5	+50.8	80.5	6 00.4	+51.4	80.6	6 10.2	+51.9	80.7	10
11	5 47.5	+47.8	79.4	5 58.5	+48.4	79.5	6 09.3	+49.1	79.6	6 20.1	+49.7	79.7	6 30.8	+50.2	79.8	6 41.3	+50.8	79.9	6 51.8	+51.3	80.0	7 02.1	+51.9	80.2	11
12	6 35.3	+47.8	78.8	6 46.9	+48.5	78.9	6 58.4	+49.1	79.0	7 09.8	+49.6	79.1	7 21.0	+50.2	79.3	7 32.1	+50.8	79.4	7 43.1	+51.3	79.5	7 54.0	+51.8	79.7	12
13	7 23.1	+47.8	78.2	7 35.4	+48.4	78.3	7 47.5	+49.0	78.6	7 59.4	+49.6	78.6	8 11.2	+50.2	78.7	8 22.9	+50.7	78.9	8 34.4	+51.3	79.0	8 45.8	+51.8	79.2	13
14	8 10.9	+47.7	77.6	8 23.8	+48.3	77.7	8 36.5	+48.9	77.9	8 49.0	+49.5	78.0	9 01.4	+50.1	78.2	9 13.6	+50.7	78.3	9 25.7	+51.2	78.5	9 37.6	+51.8	78.6	14
15	8 58.6	+47.7	77.0	9 12.1	+48.3	77.1	9 25.4	+48.9	77.3	9 38.5	+49.5	77.4	9 51.5	+50.1	77.6	10 04.3	+50.6	77.8	10 16.9	+51.2	77.9	10 29.4	+51.7	78.1	15
16	9 46.3	+47.6	76.3	10 00.4	+48.2	76.5	10 14.3	+48.8	76.7	10 28.0	+49.4	76.9	10 41.6	+49.9	77.0	10 54.9	+50.5	77.2	11 08.1	+51.1	77.4	11 21.1	+51.6	77.6	16
17	10 33.9	+47.5	75.7	10 48.6	+48.1	75.9	11 03.1	+48.7	76.1	11 17.4	+49.4	76.3	11 31.5	+50.0	76.5	11 45.5	+50.5	76.7	11 59.2	+51.1	76.9	12 12.7	+51.6	77.1	17
18	11 21.4	+47.4	75.1	11 36.7	+48.1	75.3	11 51.8	+48.7	75.5	12 06.8	+49.2	75.7	12 21.5	+49.8	75.9	12 36.0	+50.4	76.1	12 50.3	+50.9	76.3	13 04.3	+51.5	76.6	18
19	12 08.8	+47.4	74.5	12 24.8	+47.9	74.7	12 40.5	+48.6	74.9	12 56.0	+49.2	75.1	13 11.3	+49.8	75.3	13 26.4	+50.4	75.6	13 41.2	+51.0	75.8	13 55.8	+51.5	76.0	19
20	12 56.2	+47.2	73.8	13 12.7	+47.9	74.1	13 29.1	+48.5	74.3	13 45.2	+49.1	74.5	14 01.1	+49.7	74.8	14 16.8	+50.3	75.0	14 32.2	+50.8	75.3	14 47.3	+51.4	75.5	20
21	13 43.4	+47.2	73.2	14 00.6	+47.8	73.4	14 17.6	+48.4	73.7	14 34.3	+49.1	73.9	14 50.8	+49.6	74.2	15 07.0	+50.2	74.4	15 23.0	+50.8	74.7	15 38.7	+51.3	75.0	21
22	14 30.6	+47.0	72.6	14 48.4	+47.7	72.8	15 06.0	+48.3	73.1	15 23.4	+48.9	73.3	15 40.4	+49.5	73.6	15 57.2	+50.1	73.9	16 13.8	+50.6	74.2	16 30.0	+51.2	74.4	22
23	15 17.6	+47.0	71.9	15 36.1	+47.6	72.2	15 54.3	+48.2	72.5	16 12.3	+48.8	72.7	16 29.9	+49.5	73.0	16 47.3	+50.0	73.3	17 04.4	+50.6	73.6	17 21.2	+51.2	73.9	23
24	16 04.6	+46.8	71.3	16 23.7	+47.5	71.6	16 42.5	+48.1	71.8	17 01.1	+48.7	72.1	17 19.4	+49.3	72.4	17 37.3	+49.9	72.7	17 55.0	+50.5	73.0	18 12.4	+51.0	73.3	24
25	16 51.4	+46.7	70.6	17 11.2	+47.3	70.9	17 30.6	+48.0	71.2	17 49.8	+48.6	71.5	18 08.7	+49.2	71.8	18 27.2	+49.8	72.1	18 45.5	+50.4	72.5	19 03.4	+50.9	72.8	25
26	17 38.1	+46.6	70.0	17 58.5	+47.2	70.3	18 18.6	+47.9	70.6	18 38.4	+48.5	70.9	18 57.9	+49.1	71.2	19 17.0	+49.7	71.5	19 35.9	+50.2	71.9	19 54.3	+50.9	72.2	26
27	18 24.7	+46.4	69.3	18 45.7	+47.1	69.6	19 06.5	+47.7	69.9	19 26.9	+48.3	70.3	19 47.0	+48.9	70.6	20 06.7	+49.6	71.0	20 26.1	+50.2	71.3	20 45.2	+50.7	71.7	27
28	19 11.1	+46.3	68.6	19 32.8	+47.0	68.9	19 54.2	+47.6	69.3	20 15.2	+48.2	69.6	20 35.9	+48.8	70.0	20 56.3	+49.4	70.4	21 16.3	+50.0	70.7	21 35.9	+50.6	71.1	28
29	19 57.4	+46.1	68.0	20 19.8	+46.7	68.3	20 41.8	+47.4	68.7	21 03.4	+48.1	69.0	21 24.7	+48.7	69.4	21 45.7	+49.3	69.7	22 06.3	+49.9	70.1	22 26.5	+50.5	70.5	29
30	20 43.5	+46.0	67.3	21 06.5	+46.7	67.6	21 29.2	+47.3	68.0	21 51.5	+47.9	68.4	22 13.4	+48.6	68.7	22 35.0	+49.2	69.1	22 56.2	+49.7	69.5	23 17.0	+50.3	69.9	30
31	21 29.5	+45.8	66.6	21 53.2	+46.4	67.0	22 16.5	+47.1	67.3	22 39.4	+47.8	67.7	23 02.0	+48.4	68.1	23 24.2	+49.0	68.5	23 45.9	+49.7	68.9	24 07.3	+50.2	69.3	31
32	22 15.3	+45.6	65.9	22 39.6	+46.3	66.3	23 03.6	+46.9	66.7	23 27.2	+47.5	67.1	23 50.4	+48.2	67.5	24 13.2	+48.8	67.9	24 35.6	+49.4	68.3	24 57.5	+50.1	68.7	32
33	23 00.9	+45.5	65.2	23 25.9	+46.1	65.6	23 50.5	+46.8	66.0	24 14.7	+47.5	66.4	24 38.6	+48.0	66.8	25 02.0	+48.7	67.2	25 25.0	+49.3	67.7	25 47.6	+49.9	68.1	33
34	23 46.4	+45.2	64.5	24 12.0	+45.9	64.9	24 37.3	+46.6	65.3	25 02.2	+47.2	65.7	25 26.6	+47.9	66.1	25 50.7	+48.5	66.6	26 14.3	+49.1	67.0	26 37.5	+49.7	67.5	34
35	24 31.6	+45.0	63.8	24 57.9	+45.7	64.2	25 23.9	+46.3	64.6	25 49.4	+47.0	65.0	26 14.5	+47.7	65.5	26 39.2	+48.3	65.9	27 03.4	+49.0	66.4	27 27.2	+49.6	66.9	35
36	25 16.6	+44.8	63.0	25 43.6	+45.5	63.5	26 10.2	+46.2	63.9	26 36.4	+46.8	64.3	27 02.2	+47.5	64.8	27 27.5	+48.1	65.3	27 52.4	+48.7	65.7	28 16.8	+49.4	66.2	36
37	26 01.4	+44.6	62.3	26 29.1	+45.3	62.7	26 56.4	+45.9	63.2	27 23.2	+46.7	63.6	27 49.7	+47.2	64.1	28 15.6	+48.0	64.6	28 41.1	+48.6	65.1	29 06.2	+49.2	65.6	37
38	26 46.0	+44.3	61.5	27 14.4	+45.0	62.0	27 42.3	+45.7	62.5	28 09.9	+46.3	62.9	28 36.9	+47.1	63.4	29 03.6	+47.7	63.9	29 29.7	+48.4	64.4	29 55.4	+49.0	64.9	38
39	27 30.3	+44.1	60.8	27 59.4	+44.8	61.3	28 28.0	+45.5	61.7	28 56.2	+46.2	62.2	29 24.0	+46.8	62.7	29 51.3	+47.5	63.2	30 18.1	+48.1	63.7	30 44.4	+48.8	64.3	39
40	28 14.4	+43.9	60.0	28 44.2	+44.5	60.5	29 13.5	+45.2	61.0	29 42.4	+45.9	61.5	30 10.8	+46.6	62.0	30 38.8	+47.2	62.5	31 06.2	+47.9	63.0	31 33.2	+48.6	63.6	40
41	28 58.3	+43.5	59.2	29 28.7	+44.3	59.7	29 58.7	+45.0	60.2	30 28.3	+45.7	60.7	30 57.4	+46.3	61.2	31 26.0	+47.0	61.8	31 54.1	+47.7	62.3	32 21.8	+48.3	62.9	41
42	29 41.8	+43.3	58.5	30 13.0	+44.0	59.0	30 43.7	+44.7	59.5	31 14.0	+45.3	60.0	31 43.7	+46.1	60.5	32 13.0	+46.8	61.1	32 41.8	+47.5	61.6	33 10.1	+48.1	62.2	42
43	30 25.1	+43.0	57.7	30 57.0	+43.7	58.2	31 28.4	+44.4	58.7	31 59.3	+45.1	59.2	32 29.8	+45.8	59.7	32 59.8	+46.5	60.3	33 29.3	+47.1	60.9	33 58.2	+47.8	61.5	43
44	31 08.1	+42.6	56.8	31 40.7	+43.3	57.4	32 12.8	+44.1	57.9	32 44.4	+44.9	58.4	33 15.6	+45.5	59.0	33 46.3	+46.2	59.5	34 16.4	+46.9	60.1	34 46.0	+47.6	60.7	44
45	31 50.7	+42.4	56.0	32 24.0	+43.1	56.5	32 56.9	+43.8	57.1	33 29.3	+44.4	57.6	34 01.1	+45.2	58.2	34 32.5	+45.9	58.8	35 03.3	+46.6	59.4	35 33.6	+47.3	60.0	45
46	32 33.1	+42.0	55.2	33 07.1	+42.7	55.7	33 40.7	+43.4	56.3	34 13.7	+44.2	56.8	34 46.3	+44.9	57.4	35 18.4	+45.6	58.0	35 49.9	+46.3	58.6	36 20.9	+47.0	59.2	46
47	33 15.1	+41.6	54.3	33 49.8	+42.4	54.9	34 24.1	+43.1	55.4	34 57.9	+43.9	56.0	35 31.2	+44.6	56.6	36 04.0	+45.3	57.2	36 36.2	+46.0	57.8	37 07.9	+46.7	58.5	47
48	33 56.7	+41.3	53.5	34 32.2	+42.0	54.0	35 07.2	+42.8	54.6	35 41.8	+43.4	55.2	36 15.8	+44.2	55.8	36 49.3	+44.9	56.4	37 22.2	+45.7	57.0	37 54.6	+46.4	57.7	48
49	34 38.0	+40.9	52.6	35 14.2	+41.7	53.1	35 50.0	+42.4	53.7	36 25.2	+43.1	54.3	37 00.0	+43.8	54.9	37 34.2	+44.6	55.5	38 07.9	+45.3	56.2	38 41.0	+46.0	56.8	49
50	35 18.9	+40.5	51.7	35 55.9	+41.2	52.3	36 32.4	+41.9	52.8	37 08.3	+42.8	53.4	37 43.8	+43.5	54.1	38 18.8	+44.2	54.7	38 53.2	+44.9	55.4	39 27.0	+45.7	56.0	50
51	35 59.4	+40.1	50.8	36 37.1	+40.8	51.4	37 14.3	+41.6	52.0	37 51.1	+42.3	52.6	38 27.3	+43.0	53.2	39 03.0	+43.8	53.8	39 38.1	+44.6	54.5	40 12.7	+45.2	55.2	51
52	36 39.5	+39.6	49.9	37 17.9	+40.4	50.4	37 55.9	+41.2	51.0	38 33.4	+41.9	51.7	39 10.3	+42.7	52.3	39 46.8	+43.4	52.9	40 22.7	+44.1	53.6	40 57.9	+44.9	54.3	52
53	37 19.1	+39.2	48.9	37 58.3	+40.0	49.5	38 37.1	+40.6	50.1	39 15.3	+41.4	50.7	39 53.0	+42.2	51.4	40 30.2	+42.9	52.0	41 06.8	+43.7	52.7	41 42.8	+44.5	53.4	53
54	37 58.3	+38.8	48.0	38 38.3	+39.4	48.6	39 17.7	+40.3	49.2	39 56.7	+41.0	49.8	40 35.2	+41.7	50.4	41 13.1	+42.5	51.1	41 50.5	+43.3	51.8	42 27.3	+44.1	52.5	54
55	38 37.1	+38.2	47.0	39 17.7	+39.0	47.6	39 58.0	+39.7	48.2	40 37.7	+40.5	48.8	41 16.9	+41.3	49.5	41 55.6	+42.1	50.2	42 33.8	+42.8	50.9	43 11.4	+43.5	51.6	55
56	39 15.3	+37.7	46.0	39 56.7	+38.5	46.6	40 37.7	+39.2	47.2	41 18.2	+40.0	47.9	41 58.2	+40.8	48.5	42 37.7	+41.5	49.2	43 16.6	+42.3	49.9	43 54.9	+43.1	50.7	56
57	39 53.0	+37.2	45.0	40 35.2	+37.9	45.6	41 16.9	+38.7	46.2	41 58.2	+39.5	46.9	42 39.0	+40.2	47.5	43 19.2	+41.1	48.2	43 58.9	+41.8	48.9	44 38.0	+42.6	49.7	57
58	40 30.2	+36.6	44.0	41 13.1	+37.4	44.6	41 55.6	+38.2	45.2	42 37.7	+38.9	45.8	43 19.2	+39.7	46.5	44 00.3	+40.4	47.2	44 40.7	+41.3	47.9	45 20.6	+42.1	48.7	58
59	41 06.8	+36.0	43.0	41 50.5	+36.8	43.5	42 33.8	+37.6	44.2	43 16.6	+38.3	44.8	43 58.9	+39.1	45.5	44 40.7	+40.0	46.2	45 20.2	+40.7	46.9	46 02.7	+41.5	47.7	59
60	41 42.8	+35.5	41.9	42 27.3	+36.2	42.5	43 11.4	+36.9	43.1	43 54.9	+37.8	43.7	44 38.0	+38.6	44.4	45 20.6	+39.3	45.1	46 02.7	+40.1	45.9	46 44.2	+40.9	46.6	60
61	42 18.3	+34.8	40.8	43 03.5	+35.6	41.4	43 48.3	+36.4	42.0	44 32.7	+37.1	42.7	45 16.6	+37.8	43.3	45 59.9	+38.7	44.0	46 42.8	+39.5	44.8	47 25.1	+40.3	45.5	61
62	42 53.1	+34.2	39.7	43 39.1	+34.9	40.3	44 24.7	+35.6	40.9	45 09.8	+36.4	41.6	45 54.4	+37.3	42.2	46 38.6	+38.1	42.9	47 22.3	+38.8	43.7	48 05.4	+39.7	44.4	62
63	43 27.3	+33.5	38.5	44 14.0	+34.2	39.1	45 00.3	+35.0	39.8	45 46.2	+35.8	40.4	46 31.7	+36.5	41.1	47 16.7	+37.3	41.8	48 01.1	+38.2	42.5	48 45.1	+38.9	43.3	63
64	44 00.8	+32.7	37.4	44 48.2	+33.6	38.0	45 35.3	+34.3	38.6	46 22.0	+35.0	39.3	47 08.2	+35.9	39.9	47 54.0	+36.6	40.6	48 39.3	+37.4	41.4	49 24.0	+38.3	42.1	64
65	44 33.5	+32.1	36.2	45 21.8	+32.7	36.8	46 09.6	+33.5	37.4	46 57.0	+34.3	38.1	47 44.1	+35.0	38.8	48 30.6	+35.9	39.5	49 16.7	+36.7	40.2	50 02.3	+37.5	41.0	65
66	45 05.6	+31.3	35.0	45 54.5	+32.1	35.6	46 43.1	+32.8	36.2	47 31.3	+33.6	36.9	48 19.1	+34.3	37.5	49 06.5	+35.1	38.2	49 53.4	+35.9	39.0	50 39.8	+36.7	39.7	66
67	45 36.9	+30.5	33.8	46 26.6	+31.2	34.4	47 15.9	+32.0	35.0	48 04.9	+32.7	35.6	48 53.4	+33.5	36.3	49 41.6	+34.2	37.0	50 29.3	+35.0	37.7	51 16.5	+35.9	38.5	67
68	46 07.4	+29.7	32.6	46 57.8	+30.4	33.1	47 47.9	+31.1	33.7	48 37.6	+31.8	34.4	49 26.9	+32.6	35.0	50 15.8	+33.4	35.7	51 04.3	+34.2	36.4	51 52.4	+35.0	37.2	68
69	46 37.1	+28.8	31.3	47 28.2	+29.5	31.9	48 19.0	+30.2	32.5	49 09.4	+31.0	33.1	49 59.5	+31.8	33.7	50 49.2	+32.5	34.4	51 38.5	+33.3	35.1	52 27.4	+34.1	35.9	69
70	47 05.9	+28.0	30.0	47 57.7	+28.7	30.6	48 49.2	+29.4	31.2	49 40.4	+30.1	31.8	50 31.3	+30.8	32.4	51 21.7	+31.6	33.1	52 11.8	+32.4	33.8	53 01.5	+33.1	34.5	70
71	47 33.9	+27.1	28.7	48 26.4	+27.7	29.3	49 18.6	+28.4	29.8	50 10.5	+29.1	30.4	51 02.1	+29.8	31.0	51 53.3	+30.6	31.7	52 44.2	+31.3	32.4	53 34.6	+32.2	33.1	71
72	48 01.0	+26.1	27.4	48 54.1	+26.8	27.9	49 47.0	+27.5	28.5	50 39.6	+28.2	29.1	51 31.9	+28.9	29.7	52 23.9	+29.6	30.3	53 15.5	+30.3	31.0	54 06.8	+31.1	31.7	72
73	48 27.1	+25.2	26.0	49 20.9	+25.8	26.6	50 14.5	+26.4	27.1	51 07.8	+27.1	27.7	52 00.8	+27.8	28.2	52 53.5	+28.5	28.9	53 45.8	+29.3	29.5	54 37.9	+30.0	30.2	73
74	48 52.3	+24.2	24.7	49 46.7	+24.8	25.2	50 40.9	+25.4	25.7	51 34.9	+26.0	26.2	52 28.6	+26.7	26.8	53 22.0	+27.4	27.4	54 15.1	+28.1	28.0	55 07.9	+28.9	28.7	74
75	49 16.5	+23.1	23.3	50 11.5	+23.7	23.7	51 06.3	+24.4	24.2	52 00.9	+25.0	24.8	52 55.3	+25.6	25.3	53 49.4	+26.3	25.9	54 43.2	+27.0	26.5	55 36.8	+27.6	27.2	75
76	49 39.6	+22.1	21.9	50 35.2	+22.7	22.3	51 30.7	+23.2	22.8	52 25.9	+23.8	23.3	53 20.9	+24.4	23.8	54 15.6	+25.1	24.4	55 10.2	+25.7	25.0	56 04.4	+26.5	25.6	76
77	50 01.7	+21.0	20.4	50 57.9	+21.5	20.8	51 53.9	+22.0	21.3	52 49.7	+22.6	21.8	53 45.3	+23.2	22.3	54 40.7	+23.9	22.8	55 35.9	+24.5	23.4	56 30.9	+25.1	24.0	77
78	50 22.7	+19.9	19.0	51 19.4	+20.4	19.4	52 15.9	+20.9	19.8	53 12.3	+21.5	20.2	54 08.5	+22.0	20.7	55 04.6	+22.7	21.2	56 00.4	+23.2	21.7	56 56.0	+23.8	22.3	78
79	50 42.6	+18.8	17.5	51 39.8	+19.2	17.8	52 36.8	+19.7	18.2	53 33.8	+20.1	18.7	54 30.5	+20.7	19.1	55 27.1	+21.3	19.6	56 23.6	+21.8	20.1	57 19.8	+22.5	20.6	79
80	51 01.4	+17.5	16.0	51 59.0	+18.0	16.3	52 56.5	+18.5	16.7	53 53.9	+18.9	17.1	54 51.2	+19.4	17.5	55 48.4	+19.9	17.9	56 45.4	+20.4	18.4	57 42.3	+20.9	18.9	80
81	51 18.9	+16.4	14.4	52 17.0	+16.7	14.8	53 15.0	+17.1	15.1	54 12.8	+17.6	15.5	55 10.6	+18.0	15.8	56 08.3	+18.5	16.2	57 05.8	+19.0	16.7	58 03.2	+19.5	17.1	81
82	51 35.3	+15.1	12.9	52 33.7	+15.5	13.2	53 32.1	+15.9	13.5	54 30.4	+16.3	13.8	55 28.6	+16.7	14.2	56 26.8	+17.0	14.5	57 24.8	+17.5	14.9	58 22.7	+18.0	15.3	82
83	51 50.4	+13.9	11.3	52 49.2	+14.2	11.6	53 48.0	+14.5	11.9	54 46.7	+14.8	12.2	55 45.3	+15.2	12.5	56 43.8	+15.6	12.8	57 42.3	+16.0	13.1	58 40.7	+16.4	13.5	83
84	52 04.3	+12.6	9.8	53 03.4	+12.9	10.0	54 02.5	+13.1	10.2	55 01.5	+13.4	10.5	56 00.5	+13.7	10.7	56 59.4	+14.1	11.0	57 58.3	+14.4	11.3	58 57.1	+14.7	11.6	84
85	52 16.9	+11.3	8.2	53 16.3	+11.5	8.3	54 15.6	+11.8	8.5	55 14.9	+12.0	8.8	56 14.2	+12.3	9.0	57 13.5	+12.5	9.2	58 12.7	+12.8	9.5	59 11.8	+13.1	9.8	85
86	52 28.2	+10.0	6.6	53 27.8	+10.1	6.7	54 27.4	+10.3	6.9	55 26.9	+10.5	7.0	56 26.5	+10.7	7.2	57 26.0	+10.9	7.4	58 25.5	+11.1	7.6	59 24.9	+11.4	7.8	86
87	52 38.2	+8.6	4.9	53 37.9	+8.8	5.0	54 37.7	+8.9	5.2	55 37.4	+9.1	5.3	56 37.2	+9.2	5.4	57 36.9	+9.3	5.6	58 36.6	+9.5	5.7	59 36.3	+9.7	5.9	87
88	52 46.8	+7.3	3.3	53 46.7	+7.4	3.4	54 46.6	+7.4	3.5	55 46.5	+7.5	3.5	56 46.4	+7.6	3.6	57 46.2	+7.7	3.7	58 46.1	+7.8	3.8	59 46.0	+7.9	4.0	88
89	52 54.1	+5.9	1.7	53 54.1	+5.9	1.7	54 54.0	+6.0	1.7	55 54.0	+6.0	1.8	56 54.0	+6.0	1.8	57 53.9	+6.1	1.9	58 53.9	+6.1	1.9	59 53.9	+6.1	2.0	89
90	53 00.0	+4.5	0.0	54 00.0	+4.5	0.0	55 00.0	+4.5	0.0	56 00.0	+4.5	0.0	57 00.0	+4.4	0.0	58 00.0	+4.4	0.0	59 00.0	+4.4	0.0	60 00.0	+4.3	0.0	90

| | **53°** | | | **54°** | | | **55°** | | | **56°** | | | **57°** | | | **58°** | | | **59°** | | | **60°** | | | |

S. Lat. { L.H.A. greater than 180° .... Zn=180°−Z
{ L.H.A. less than 180° .... Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 95°, 265°**

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	2 24.4	+47.9	93.2	2 21.0	+48.6	93.2	2 17.6	+49.2	93.3	2 14.1	+49.8	93.3	2 10.6	+50.4	93.4	2 07.1	+50.9	93.4	2 03.5	+51.5	93.4	1 59.9	+52.0	93.5	0
1	3 12.3	+47.9	92.6	3 09.6	+48.5	92.7	3 06.8	+49.1	92.7	3 03.9	+49.8	92.8	3 01.0	+50.3	92.8	2 58.0	+50.9	92.9	2 55.0	+51.4	92.9	2 51.9	+52.0	93.0	1
2	4 00.2	+47.9	92.0	3 58.1	+48.5	92.1	3 55.9	+49.2	92.1	3 53.7	+49.7	92.2	3 51.3	+50.3	92.3	3 48.9	+50.9	92.3	3 46.4	+51.5	92.4	3 43.9	+51.9	92.5	2
3	4 48.1	+47.9	91.4	4 46.6	+48.5	91.5	4 45.1	+49.1	91.6	4 43.4	+49.7	91.6	4 41.6	+50.3	91.7	4 39.8	+50.9	91.8	4 37.9	+51.4	91.9	4 35.8	+52.0	92.0	3
4	5 36.0	+47.9	90.8	5 35.1	+48.5	90.9	5 34.2	+49.1	91.0	5 33.1	+49.7	91.1	5 31.9	+50.3	91.2	5 30.6	+50.9	91.3	5 29.3	+51.3	91.4	5 27.8	+51.9	91.5	4
5	6 23.9	+47.7	90.2	6 23.6	+48.4	90.3	6 23.3	+49.0	90.4	6 22.8	+49.6	90.5	6 22.2	+50.2	90.6	6 21.5	+50.8	90.7	6 20.6	+51.4	90.8	6 19.7	+51.9	91.0	5
6	7 11.6	+47.8	89.6	7 12.0	+48.4	89.7	7 12.3	+49.0	89.8	7 12.4	+49.6	89.9	7 12.4	+50.2	90.1	7 12.3	+50.7	90.2	7 12.0	+51.3	90.3	7 11.6	+51.8	90.5	6
7	7 59.4	+47.7	89.0	8 00.4	+48.3	89.1	8 01.3	+48.9	89.2	8 02.0	+49.6	89.4	8 02.6	+50.1	89.5	8 03.0	+50.7	89.7	8 03.3	+51.3	89.8	8 03.4	+51.8	89.9	7
8	8 47.1	+47.6	88.3	8 48.7	+48.3	88.5	8 50.2	+48.9	88.7	8 51.6	+49.5	88.8	8 52.7	+50.1	89.0	8 53.7	+50.7	89.1	8 54.6	+51.2	89.3	8 55.2	+51.8	89.4	8
9	9 34.7	+47.6	87.7	9 37.0	+48.2	87.9	9 39.1	+48.8	88.1	9 41.1	+49.4	88.2	9 42.8	+50.0	88.4	9 44.4	+50.6	88.6	9 45.8	+51.2	88.7	9 47.0	+51.7	88.9	9
10	10 22.3	+47.5	87.1	10 25.2	+48.1	87.3	10 27.9	+48.8	87.5	10 30.5	+49.4	87.7	10 32.8	+50.0	87.8	10 35.0	+50.6	88.0	10 37.0	+51.1	88.2	10 38.7	+51.7	88.4	10
11	11 09.8	+47.4	86.5	11 13.3	+48.1	86.7	11 16.7	+48.7	86.9	11 19.9	+49.3	87.1	11 22.8	+49.9	87.3	11 25.6	+50.5	87.5	11 28.1	+51.1	87.7	11 30.4	+51.6	87.9	11
12	11 57.2	+47.3	85.9	12 01.4	+48.0	86.1	12 05.4	+48.6	86.3	12 09.2	+49.2	86.5	12 12.7	+49.9	86.7	12 16.1	+50.4	86.9	12 19.2	+51.0	87.1	12 22.0	+51.6	87.4	12
13	12 44.5	+47.3	85.2	12 49.4	+47.9	85.5	12 54.0	+48.5	85.7	12 58.4	+49.2	85.9	13 02.6	+49.7	86.1	13 06.5	+50.3	86.4	13 10.2	+50.9	86.6	13 13.6	+51.5	86.8	13
14	13 31.8	+47.1	84.6	13 37.3	+47.8	84.8	13 42.5	+48.5	85.1	13 47.6	+49.0	85.3	13 52.3	+49.7	85.6	13 56.8	+50.3	85.8	14 01.1	+50.8	86.1	14 05.1	+51.4	86.3	14
15	14 18.9	+47.0	84.0	14 25.1	+47.7	84.2	14 31.0	+48.3	84.5	14 36.6	+49.0	84.7	14 42.0	+49.6	85.0	14 47.1	+50.2	85.3	14 51.9	+50.8	85.5	14 56.5	+51.3	85.8	15
16	15 05.9	+47.0	83.3	15 12.8	+47.6	83.6	15 19.3	+48.3	83.9	15 25.6	+48.9	84.1	15 31.6	+49.5	84.4	15 37.3	+50.1	84.7	15 42.7	+50.7	85.0	15 47.8	+51.3	85.2	16
17	15 52.9	+46.8	82.7	16 00.4	+47.5	83.0	16 07.6	+48.1	83.2	16 14.5	+48.8	83.5	16 21.1	+49.4	83.8	16 27.4	+50.0	84.1	16 33.4	+50.6	84.4	16 39.1	+51.2	84.7	17
18	16 39.7	+46.7	82.0	16 47.9	+47.3	82.3	16 55.7	+48.1	82.6	17 03.3	+48.7	82.9	17 10.5	+49.3	83.2	17 17.4	+49.9	83.5	17 24.0	+50.5	83.8	17 30.3	+51.1	84.2	18
19	17 26.4	+46.6	81.4	17 35.2	+47.3	81.7	17 43.8	+47.9	82.0	17 52.0	+48.5	82.3	17 59.8	+49.2	82.6	18 07.3	+49.9	82.9	18 14.5	+50.4	83.3	18 21.4	+51.0	83.6	19
20	18 13.0	+46.4	80.7	18 22.5	+47.1	81.0	18 31.7	+47.7	81.4	18 40.5	+48.4	81.7	18 49.0	+49.1	82.0	18 57.2	+49.7	82.4	19 04.9	+50.4	82.7	19 12.4	+50.9	83.1	20
21	18 59.4	+46.3	80.0	19 09.6	+47.0	80.4	19 19.4	+47.7	80.7	19 28.9	+48.3	81.1	19 38.1	+48.9	81.4	19 46.9	+49.5	81.8	19 55.3	+50.1	82.1	20 03.3	+50.8	82.5	21
22	19 45.7	+46.1	79.4	19 56.6	+46.8	79.7	20 07.1	+47.5	80.1	20 17.2	+48.2	80.4	20 27.0	+48.8	80.8	20 36.4	+49.5	81.2	20 45.4	+50.1	81.5	20 54.1	+50.6	81.9	22
23	20 31.8	+46.0	78.7	20 43.4	+46.6	79.0	20 54.6	+47.3	79.4	21 05.4	+48.0	79.8	21 15.8	+48.7	80.2	21 25.9	+49.3	80.6	21 35.5	+50.0	81.0	21 44.7	+50.6	81.3	23
24	21 17.8	+45.8	78.0	21 30.0	+46.5	78.4	21 41.9	+47.2	78.8	21 53.4	+47.9	79.2	22 04.5	+48.6	79.6	22 15.2	+49.2	80.0	22 25.5	+49.8	80.4	22 35.3	+50.4	80.8	24
25	22 03.6	+45.6	77.3	22 16.5	+46.3	77.7	22 29.1	+47.1	78.1	22 41.3	+47.7	78.5	22 53.1	+48.3	78.9	23 04.4	+49.0	79.3	23 15.3	+49.6	79.8	23 25.7	+50.3	80.2	25
26	22 49.2	+45.4	76.6	23 02.9	+46.1	77.0	23 16.2	+46.8	77.4	23 29.0	+47.6	77.8	23 41.4	+48.2	78.3	23 53.4	+48.9	78.7	24 04.9	+49.6	79.1	24 16.0	+50.2	79.6	26
27	23 34.6	+45.2	75.9	23 49.0	+46.0	76.3	24 03.0	+46.7	76.7	24 16.6	+47.3	77.2	24 29.6	+48.1	77.6	24 42.3	+48.7	78.1	24 54.5	+49.3	78.5	25 06.2	+50.0	79.0	27
28	24 19.8	+45.1	75.2	24 35.0	+45.7	75.6	24 49.7	+46.5	76.0	25 03.9	+47.2	76.5	25 17.7	+47.9	77.0	25 31.0	+48.5	77.4	25 43.8	+49.2	77.9	25 56.2	+49.8	78.4	28
29	25 04.9	+44.8	74.4	25 20.7	+45.6	74.9	25 36.2	+46.2	75.3	25 51.1	+47.0	75.8	26 05.6	+47.6	76.3	26 19.5	+48.4	76.8	26 33.0	+49.1	77.3	26 46.0	+49.7	77.7	29
30	25 49.7	+44.6	73.7	26 06.3	+45.3	74.2	26 22.4	+46.1	74.6	26 38.1	+46.8	75.1	26 53.2	+47.5	75.6	27 07.9	+48.2	76.1	27 22.1	+48.8	76.6	27 35.7	+49.5	77.1	30
31	26 34.3	+44.3	73.0	26 51.6	+45.1	73.4	27 08.5	+45.8	73.9	27 24.9	+46.6	74.4	27 40.7	+47.3	74.9	27 56.1	+47.9	75.4	28 10.9	+48.7	75.9	28 25.2	+49.3	76.5	31
32	27 18.6	+44.1	72.2	27 36.7	+44.9	72.7	27 54.3	+45.6	73.2	28 11.4	+46.4	73.7	28 28.0	+47.1	74.2	28 44.0	+47.8	74.7	28 59.6	+48.4	75.3	29 14.5	+49.2	75.8	32
33	28 02.7	+43.9	71.4	28 21.6	+44.6	71.9	28 39.9	+45.4	72.5	28 57.8	+46.1	73.0	29 15.1	+46.8	73.5	29 31.8	+47.6	74.1	29 48.0	+48.3	74.6	30 03.7	+48.9	75.2	33
34	28 46.6	+43.6	70.7	29 06.2	+44.4	71.2	29 25.3	+45.1	71.7	29 43.9	+45.8	72.2	30 01.9	+46.6	72.8	30 19.4	+47.3	73.4	30 36.3	+48.0	73.9	30 52.6	+48.7	74.5	34
35	29 30.2	+43.3	69.9	29 50.6	+44.0	70.4	30 10.4	+44.9	70.9	30 29.7	+45.6	71.5	30 48.5	+46.3	72.1	31 06.7	+47.0	72.6	31 24.3	+47.8	73.2	31 41.3	+48.5	73.8	35
36	30 13.5	+43.0	69.1	30 34.6	+43.8	69.6	30 55.3	+44.5	70.2	31 15.3	+45.4	70.7	31 34.8	+46.1	71.3	31 53.7	+46.9	71.9	32 12.1	+47.5	72.5	32 29.8	+48.3	73.1	36
37	30 56.5	+42.7	68.3	31 18.4	+43.5	68.8	31 39.8	+44.3	69.4	32 00.7	+45.0	70.0	32 20.9	+45.8	70.6	32 40.6	+46.5	71.2	32 59.6	+47.3	71.8	33 18.1	+48.0	72.4	37
38	31 39.2	+42.3	67.4	32 01.9	+43.2	68.0	32 24.1	+44.0	68.6	32 45.7	+44.7	69.2	33 06.7	+45.5	69.8	33 27.1	+46.3	70.4	33 46.9	+47.1	71.0	34 06.1	+47.8	71.7	38
39	32 21.5	+42.1	66.6	32 45.1	+42.8	67.2	33 08.1	+43.6	67.8	33 30.4	+44.5	68.4	33 52.2	+45.2	69.0	34 13.4	+46.0	69.7	34 34.0	+46.7	70.3	34 53.9	+47.5	70.9	39
40	33 03.6	+41.7	65.8	33 27.9	+42.5	66.4	33 51.7	+43.3	67.0	34 14.9	+44.1	67.6	34 37.4	+45.0	68.2	34 59.4	+45.7	68.9	35 20.7	+46.5	69.5	35 41.4	+47.2	70.2	40
41	33 45.3	+41.3	64.9	34 10.4	+42.2	65.5	34 35.0	+43.0	66.1	34 59.0	+43.8	66.8	35 22.4	+44.5	67.4	35 45.1	+45.3	68.1	36 07.2	+46.1	68.8	36 28.6	+46.9	69.4	41
42	34 26.6	+40.9	64.0	34 52.6	+41.8	64.6	35 18.0	+42.6	65.3	35 42.8	+43.4	65.9	36 06.9	+44.3	66.6	36 30.4	+45.1	67.3	36 53.3	+45.8	68.0	37 15.5	+46.6	68.7	42
43	35 07.5	+40.6	63.1	35 34.4	+41.3	63.8	36 00.6	+42.2	64.4	36 26.2	+43.0	65.1	36 51.2	+43.8	65.7	37 15.5	+44.6	66.4	37 39.1	+45.5	67.1	38 02.1	+46.2	67.9	43
44	35 48.1	+40.1	62.2	36 15.7	+41.0	62.9	36 42.8	+41.8	63.5	37 09.2	+42.7	64.2	37 35.0	+43.5	64.9	38 00.1	+44.4	65.6	38 24.6	+45.1	66.3	38 48.3	+46.0	67.0	44
45	36 28.2	+39.7	61.3	36 56.7	+40.6	62.0	37 24.6	+41.4	62.6	37 51.9	+42.2	63.3	38 18.5	+43.1	64.0	38 44.5	+43.9	64.7	39 09.7	+44.8	65.5	39 34.3	+45.5	66.2	45
46	37 07.9	+39.3	60.4	37 37.3	+40.1	61.0	38 06.0	+41.0	61.7	38 34.1	+41.9	62.4	39 01.6	+42.7	63.1	39 28.4	+43.5	63.9	39 54.5	+44.3	64.6	40 19.8	+45.2	65.4	46
47	37 47.2	+38.8	59.4	38 17.4	+39.6	60.1	38 47.0	+40.5	60.8	39 16.0	+41.3	61.5	39 44.3	+42.2	62.2	40 11.9	+43.1	63.0	40 38.8	+44.0	63.7	41 05.0	+44.8	64.5	47
48	38 26.0	+38.2	58.4	38 57.0	+39.2	59.1	39 27.5	+40.1	59.8	39 57.3	+41.0	60.6	40 26.5	+41.8	61.3	40 55.0	+42.6	62.0	41 22.8	+43.5	62.8	41 49.8	+44.4	63.6	48
49	39 04.2	+37.8	57.5	39 36.2	+38.7	58.1	40 07.6	+39.5	58.9	40 38.3	+40.4	59.6	41 08.3	+41.3	60.3	41 37.6	+42.2	61.1	42 06.3	+43.0	61.9	42 34.2	+43.9	62.7	49
50	39 42.0	+37.3	56.5	40 14.9	+38.1	57.2	40 47.1	+39.0	57.9	41 18.7	+39.9	58.6	41 49.6	+40.8	59.4	42 19.8	+41.7	60.2	42 49.3	+42.6	61.0	43 18.1	+43.4	61.8	50
51	40 19.3	+36.7	55.4	40 53.0	+37.6	56.1	41 26.1	+38.5	56.9	41 58.6	+39.4	57.6	42 30.4	+40.3	58.4	43 01.5	+41.2	59.2	43 31.9	+42.1	60.0	44 01.5	+43.0	60.8	51
52	40 56.0	+36.1	54.4	41 30.6	+37.1	55.1	42 04.6	+38.0	55.8	42 38.0	+38.8	56.6	43 10.7	+39.7	57.4	43 42.7	+40.6	58.2	44 14.0	+41.5	59.0	44 44.5	+42.5	59.8	52
53	41 32.1	+35.6	53.3	42 07.7	+36.4	54.0	42 42.6	+37.3	54.8	43 16.8	+38.2	55.6	43 50.4	+39.2	56.3	44 23.3	+40.1	57.2	44 55.5	+41.0	58.0	45 27.0	+41.9	58.8	53
54	42 07.7	+34.9	52.2	42 44.1	+35.8	52.9	43 19.9	+36.8	53.7	43 55.1	+37.7	54.5	44 29.6	+38.6	55.3	45 03.4	+39.5	56.1	45 36.5	+40.5	56.9	46 08.9	+41.3	57.8	54
55	42 42.6	+34.2	51.1	43 19.9	+35.2	51.9	43 56.7	+36.1	52.6	44 32.8	+37.0	53.4	45 08.2	+37.9	54.2	45 42.9	+38.9	55.0	46 17.0	+39.8	55.9	46 50.2	+40.8	56.8	55
56	43 16.8	+33.6	50.0	43 55.1	+34.5	50.8	44 32.8	+35.4	51.5	45 09.8	+36.3	52.3	45 46.1	+37.3	53.1	46 21.8	+38.3	53.9	46 56.8	+39.2	54.8	47 31.0	+40.1	55.7	56
57	43 50.4	+32.9	48.9	44 29.6	+33.8	49.6	45 08.2	+34.7	50.4	45 46.1	+35.7	51.2	46 23.4	+36.7	52.0	47 00.1	+37.5	52.8	47 36.0	+38.5	53.7	48 11.1	+39.5	54.6	57
58	44 23.3	+32.2	47.7	45 03.4	+33.1	48.4	45 42.9	+34.1	49.2	46 21.8	+35.0	50.0	47 00.1	+35.9	50.8	47 37.6	+36.9	51.7	48 14.5	+37.8	52.5	48 50.6	+38.8	53.4	58
59	44 55.5	+31.5	46.5	45 36.5	+32.4	47.3	46 17.0	+33.4	48.0	46 56.8	+34.2	48.8	47 36.0	+35.1	49.6	48 14.5	+36.1	50.5	48 52.3	+37.1	51.4	49 29.4	+38.1	52.3	59
60	45 27.0	+30.6	45.3	46 08.9	+31.5	46.1	46 50.2	+32.5	46.8	47 31.0	+33.4	47.6	48 11.1	+34.4	48.4	48 50.6	+35.4	49.3	49 29.4	+36.3	50.2	50 07.5	+37.3	51.1	60
61	45 57.6	+29.8	44.1	46 40.4	+30.8	44.8	47 22.7	+31.7	45.6	48 04.4	+32.6	46.4	48 45.5	+33.6	47.2	49 26.0	+34.5	48.0	50 05.7	+35.5	48.9	50 44.8	+36.5	49.8	61
62	46 27.4	+29.0	42.8	47 11.2	+29.9	43.6	47 54.4	+30.8	44.3	48 37.0	+31.8	45.1	49 19.1	+32.7	45.9	50 00.5	+33.7	46.8	50 41.2	+34.7	47.7	51 21.3	+35.7	48.6	62
63	46 56.4	+28.2	41.6	47 41.1	+29.0	42.3	48 25.2	+30.0	43.0	49 08.8	+30.9	43.8	49 51.8	+31.8	44.6	50 34.2	+32.8	45.5	51 15.9	+33.8	46.4	51 57.0	+34.8	47.3	63
64	47 24.6	+27.2	40.3	48 10.1	+28.2	41.0	48 55.2	+29.0	41.7	49 39.7	+30.0	42.5	50 23.6	+31.0	43.3	51 07.0	+31.9	44.2	51 49.7	+32.9	45.0	52 31.8	+33.9	46.0	64
65	47 51.8	+26.3	38.9	48 38.3	+27.2	39.6	49 24.2	+28.1	40.4	50 09.7	+29.0	41.2	50 54.6	+29.9	42.0	51 38.9	+30.9	42.8	52 22.6	+31.9	43.7	53 05.7	+32.9	44.6	65
66	48 18.1	+25.4	37.6	49 05.5	+26.2	38.3	49 52.3	+27.1	39.0	50 38.7	+28.0	39.8	51 24.5	+29.0	40.6	52 09.8	+29.9	41.4	52 54.5	+30.9	42.3	53 38.6	+31.9	43.2	66
67	48 43.5	+24.4	36.2	49 31.7	+25.2	36.9	50 19.4	+26.1	37.6	51 06.7	+27.0	38.4	51 53.5	+27.9	39.2	52 39.7	+28.9	40.0	53 25.4	+29.9	40.9	54 10.5	+30.9	41.8	67
68	49 07.9	+23.3	34.8	49 56.9	+24.2	35.5	50 45.5	+25.1	36.2	51 33.7	+26.0	36.9	52 21.4	+26.9	37.7	53 08.6	+27.8	38.5	53 55.3	+28.8	39.4	54 41.4	+29.7	40.3	68
69	49 31.2	+22.3	33.4	50 21.1	+23.1	34.1	51 10.6	+24.0	34.8	51 59.7	+24.8	35.5	52 48.3	+25.7	36.3	53 36.4	+26.7	37.1	54 24.1	+27.6	37.9	55 11.1	+28.6	38.8	69
70	49 53.5	+21.2	32.0	50 44.2	+22.1	32.6	51 34.6	+22.8	33.3	52 24.5	+23.7	34.0	53 14.0	+24.6	34.8	54 03.1	+25.5	35.5	54 51.7	+26.4	36.4	55 39.7	+27.4	37.2	70
71	50 14.7	+20.1	30.5	51 06.3	+20.8	31.1	51 57.4	+21.7	31.8	52 48.2	+22.6	32.5	53 38.6	+23.4	33.2	54 28.6	+24.3	34.0	55 18.1	+25.2	34.8	56 07.1	+26.2	35.6	71
72	50 34.8	+19.0	29.0	51 27.1	+19.8	29.6	52 19.1	+20.5	30.3	53 10.8	+21.3	31.0	54 02.0	+22.2	31.7	54 52.9	+23.0	32.4	55 43.3	+24.0	33.2	56 33.3	+24.9	34.0	72
73	50 53.8	+17.8	27.5	51 46.9	+18.5	28.1	52 39.6	+19.3	28.7	53 32.1	+20.1	29.4	54 24.2	+20.9	30.1	55 15.9	+21.8	30.8	56 07.3	+22.6	31.5	56 58.2	+23.5	32.3	73
74	51 11.6	+16.6	26.0	52 05.4	+17.3	26.6	52 58.9	+18.1	27.2	53 52.2	+18.7	27.8	54 45.1	+19.5	28.5	55 37.7	+20.3	29.1	56 29.9	+21.2	29.9	57 21.7	+22.1	30.7	74
75	51 28.2	+15.4	24.5	52 22.7	+16.1	25.0	53 17.0	+16.7	25.6	54 10.9	+17.5	26.2	55 04.6	+18.3	26.8	55 58.0	+19.0	27.5	56 51.1	+19.8	28.2	57 43.8	+20.7	28.9	75
76	51 43.6	+14.2	22.9	52 38.8	+14.8	23.4	53 33.7	+15.4	24.0	54 28.4	+16.1	24.5	55 22.9	+16.8	25.1	56 17.0	+17.6	25.8	57 10.9	+18.4	26.4	58 04.5	+19.2	27.2	76
77	51 57.8	+12.8	21.4	52 53.6	+13.4	21.8	53 49.1	+14.1	22.3	54 44.5	+14.8	22.9	55 39.7	+15.4	23.4	56 34.6	+16.1	24.0	57 29.3	+16.8	24.7	58 23.7	+17.6	25.4	77
78	52 10.6	+11.6	19.8	53 07.0	+12.2	20.2	54 03.2	+12.8	20.7	54 59.3	+13.4	21.2	55 55.1	+14.0	21.7	56 50.7	+14.7	22.3	57 46.1	+15.4	22.9	58 41.3	+16.0	23.5	78
79	52 22.2	+10.3	18.2	53 19.2	+10.7	18.6	54 16.0	+11.3	19.0	55 12.6	+11.9	19.5	56 09.1	+12.4	20.0	57 05.4	+13.1	20.5	58 01.5	+13.7	21.1	58 57.3	+14.5	21.7	79
80	52 32.5	+8.9	16.5	53 29.9	+9.4	16.9	54 27.3	+9.9	17.3	55 24.5	+10.4	17.8	56 21.5	+11.0	18.2	57 18.5	+11.5	18.7	58 15.2	+12.1	19.2	59 11.8	+12.7	19.8	80
81	52 41.4	+7.6	14.9	53 39.3	+8.1	15.3	54 37.2	+8.4	15.6	55 34.9	+9.0	16.0	56 32.5	+9.4	16.4	57 30.0	+9.9	16.9	58 27.3	+10.5	17.4	59 24.5	+11.1	17.9	81
82	52 49.0	+6.2	13.3	53 47.4	+6.6	13.6	54 45.6	+7.0	13.9	55 43.8	+7.5	14.3	56 41.9	+7.9	14.6	57 39.9	+8.3	15.0	58 37.8	+8.8	15.5	59 35.6	+9.3	15.9	82
83	52 55.2	+4.9	11.6	53 54.0	+5.1	11.9	54 52.6	+5.6	12.2	55 51.3	+5.8	12.5	56 49.8	+6.3	12.8	57 48.2	+6.7	13.2	58 46.6	+7.1	13.6	59 44.9	+7.6	14.0	83
84	53 00.1	+3.4	10.0	53 59.1	+3.8	10.2	54 58.2	+4.4	10.5	55 57.1	+4.4	10.7	56 56.1	+4.7	10.8	57 54.9	+5.1	11.3	58 54.2	+5.1	11.6	59 52.5	+5.7	12.0	84
85	53 03.5	+2.1	8.3	54 02.9	+2.3	8.5	55 02.2	+2.6	8.7	56 01.5	+2.9	9.0	57 00.8	+3.0	9.2	58 00.0	+3.3	9.4	58 59.1	+3.7	9.7	59 58.2	+4.0	10.0	85
86	53 05.6	+0.7	6.7	54 05.2	+0.9	6.8	55 04.8	+1.0	7.0	56 04.3	+1.3	7.2	57 03.8	+1.5	7.4	58 03.3	+1.7	7.6	59 02.8	+1.9	7.8	60 02.2	+2.2	8.0	86
87	53 06.3	–0.7	5.0	54 06.1	–0.6	5.1	55 05.8	–0.4	5.2	56 05.6	–0.3	5.4	57 05.3	–0.1	5.5	58 05.0	0.0	5.7	59 04.7	+0.2	5.8	60 04.4	+0.3	6.0	87
88	53 05.6	–2.1	3.3	54 05.5	–2.0	3.4	55 05.4	–2.0	3.5	56 05.3	–1.9	3.6	57 05.2	–1.8	3.7	58 05.0	–1.7	3.8	59 04.9	–1.6	3.9	60 04.7	–1.4	4.0	88
89	53 03.5	–3.5	1.7	54 03.5	–3.5	1.7	55 03.4	–3.4	1.7	56 03.4	–3.4	1.8	57 03.4	–3.4	1.8	58 03.3	–3.3	1.9	59 03.3	–3.3	1.9	60 03.3	–3.3	2.0	89
90	53 00.0	–4.9	0.0	54 00.0	–4.9	0.0	55 00.0	–4.9	0.0	56 00.0	–5.0	0.0	57 00.0	–5.0	0.0	58 00.0	–5.0	0.0	59 00.0	–5.1	0.0	60 00.0	–5.1	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	2 24.4	−48.0	93.2	2 21.0	−48.6	93.2	2 17.6	−49.2	93.3	2 14.1	−49.8	93.3	2 10.6	−50.3	93.4	2 07.1	−50.9	93.4	2 03.5	−51.4	93.4	1 59.9	−52.0	93.5	0
1	1 36.4	−48.0	93.8	1 32.4	−48.6	93.8	1 28.4	−49.2	93.9	1 24.3	−49.7	93.9	1 20.3	−50.4	93.9	1 16.2	−50.9	93.9	1 12.1	−51.5	93.9	1 07.9	−52.0	94.0	1
2	0 48.4	−48.0	94.4	0 43.8	−48.6	94.4	0 39.2	−49.2	94.4	0 34.6	−49.8	94.4	0 29.9	−50.4	94.4	0 25.3	−51.0	94.5	0 20.6	−51.5	94.5	0 15.9	−52.0	94.5	2
3	0 00.4	−48.0	95.0	0 04.8	+48.6	85.0	0 10.0	+49.2	85.0	0 15.2	+49.8	85.0	0 20.5	+50.3	85.0	0 25.7	+50.9	85.0	0 30.9	+51.5	85.0	0 36.1	+52.0	85.0	3
4	0 47.6	+47.9	84.4	0 53.4	+48.6	84.4	0 59.2	+49.2	84.4	1 05.0	+49.8	84.4	1 10.8	+50.4	84.5	1 16.6	+50.9	84.5	1 22.4	+51.4	84.5	1 28.1	+52.0	84.5	4
5	1 35.5	+48.0	83.8	1 42.0	+48.6	83.8	1 48.4	+49.2	83.9	1 54.8	+49.8	83.9	2 01.2	+50.3	83.9	2 07.5	+50.9	84.0	2 13.8	+51.5	84.0	2 20.1	+52.0	84.0	5
6	2 23.5	+47.9	83.2	2 30.6	+48.6	83.2	2 37.6	+49.2	83.3	2 44.6	+49.8	83.3	2 51.5	+50.4	83.4	2 58.4	+50.9	83.4	3 05.3	+51.4	83.5	3 12.1	+51.9	83.5	6
7	3 11.4	+48.0	82.6	3 19.2	+48.5	82.7	3 26.8	+49.1	82.7	3 34.4	+49.7	82.8	3 41.9	+50.3	82.8	3 49.3	+50.9	82.9	3 56.7	+51.4	83.0	4 04.0	+52.0	83.0	7
8	3 59.4	+47.9	82.0	4 07.7	+48.5	82.1	4 15.9	+49.2	82.1	4 24.1	+49.7	82.2	4 32.2	+50.3	82.3	4 40.2	+50.9	82.4	4 48.1	+51.4	82.5	4 56.0	+51.9	82.5	8
9	4 47.3	+47.9	81.4	4 56.2	+48.5	81.5	5 05.1	+49.1	81.6	5 13.8	+49.7	81.7	5 22.5	+50.3	81.7	5 31.1	+50.8	81.8	5 39.5	+51.4	81.9	5 47.9	+51.9	82.0	9
10	5 35.2	+47.8	80.8	5 44.7	+48.5	80.8	5 54.2	+49.0	80.9	6 03.5	+49.7	81.1	6 12.8	+50.2	81.2	6 21.9	+50.8	81.2	6 30.9	+51.3	81.4	6 39.8	+51.9	81.5	10
11	6 23.0	+47.8	80.2	6 33.2	+48.4	80.3	6 43.2	+49.0	80.4	6 53.2	+49.6	80.5	7 03.0	+50.2	80.6	7 12.7	+50.7	80.8	7 22.2	+51.3	80.9	7 31.7	+51.8	81.0	11
12	7 10.8	+47.7	79.6	7 21.6	+48.3	79.7	7 32.2	+49.0	79.8	7 42.8	+49.5	80.0	7 53.2	+50.1	80.1	8 03.4	+50.7	80.2	8 13.5	+51.3	80.4	8 23.5	+51.8	80.5	12
13	7 58.5	+47.7	79.0	8 09.9	+48.4	79.1	8 21.2	+48.9	79.2	8 32.3	+49.6	79.4	8 43.3	+50.1	79.5	8 54.1	+50.7	79.7	9 04.8	+51.2	79.8	9 15.3	+51.8	80.0	13
14	8 46.2	+47.6	78.3	8 58.3	+48.2	78.5	9 10.1	+48.9	78.7	9 21.9	+49.4	78.8	9 33.4	+50.1	79.0	9 44.8	+50.6	79.1	9 56.0	+51.2	79.3	10 07.1	+51.7	79.5	14
15	9 33.8	+47.6	77.7	9 46.5	+48.2	77.9	9 59.0	+48.8	78.1	10 11.3	+49.4	78.2	10 23.5	+50.0	78.4	10 35.4	+50.6	78.6	10 47.2	+51.1	78.8	10 58.8	+51.6	79.0	15
16	10 21.4	+47.5	77.1	10 34.7	+48.1	77.3	10 47.8	+48.7	77.5	11 00.7	+49.4	77.7	11 13.5	+49.9	77.9	11 26.0	+50.5	78.1	11 38.3	+51.0	78.3	11 50.4	+51.6	78.5	16
17	11 08.9	+47.4	76.5	11 22.8	+48.1	76.7	11 36.5	+48.7	76.9	11 50.1	+49.2	77.1	12 03.4	+49.8	77.3	12 16.5	+50.4	77.5	12 29.3	+51.0	77.7	12 42.0	+51.5	77.9	17
18	11 56.3	+47.4	75.9	12 10.9	+47.9	76.1	12 25.2	+48.6	76.3	12 39.3	+49.2	76.5	12 53.2	+49.8	76.7	13 06.9	+50.4	76.9	13 20.3	+51.0	77.2	13 33.5	+51.5	77.4	18
19	12 43.7	+47.2	75.2	12 58.8	+47.9	75.5	13 13.8	+48.5	75.7	13 28.5	+49.1	75.9	13 43.0	+49.7	76.1	13 57.3	+50.2	76.4	14 11.3	+50.8	76.6	14 25.0	+51.4	76.9	19
20	13 30.9	+47.2	74.6	13 46.7	+47.8	74.8	14 02.3	+48.4	75.1	14 17.6	+49.0	75.3	14 32.7	+49.6	75.6	14 47.5	+50.2	75.8	15 02.1	+50.8	76.1	15 16.4	+51.3	76.3	20
21	14 18.1	+47.0	74.0	14 34.5	+47.7	74.2	14 50.7	+48.3	74.5	15 06.6	+49.0	74.7	15 22.3	+49.5	75.0	15 37.7	+50.1	75.3	15 52.9	+50.6	75.5	16 07.7	+51.3	75.8	21
22	15 05.1	+46.9	73.3	15 22.2	+47.6	73.6	15 39.0	+48.2	73.8	15 55.6	+48.7	74.1	16 11.8	+49.5	74.4	16 27.8	+50.0	74.7	16 43.5	+50.6	75.0	16 59.0	+51.1	75.3	22
23	15 52.0	+46.9	72.7	16 09.8	+47.4	73.0	16 27.2	+48.1	73.2	16 44.4	+48.7	73.5	17 01.3	+49.3	73.8	17 17.8	+50.0	74.1	17 34.1	+50.5	74.4	17 50.1	+51.1	74.7	23
24	16 38.9	+46.6	72.0	16 57.2	+47.4	72.3	17 15.3	+48.0	72.6	17 33.1	+48.6	72.9	17 50.6	+49.2	73.2	18 07.8	+49.8	73.5	18 24.6	+50.4	73.8	18 41.2	+50.9	74.2	24
25	17 25.5	+46.6	71.4	17 44.6	+47.2	71.7	18 03.3	+47.8	72.0	18 21.7	+48.5	72.3	18 39.8	+49.1	72.6	18 57.6	+49.7	72.9	19 15.0	+50.3	73.3	19 32.1	+50.9	73.6	25
26	18 12.1	+46.4	70.7	18 31.8	+47.1	71.0	18 51.1	+47.8	71.3	19 10.2	+48.3	71.7	19 28.9	+49.0	72.0	19 47.3	+49.5	72.3	20 05.3	+50.2	72.7	20 23.0	+50.7	73.0	26
27	18 58.5	+46.3	70.0	19 18.9	+46.9	70.4	19 38.9	+47.6	70.7	19 58.5	+48.3	71.0	20 17.9	+48.8	71.4	20 36.8	+49.5	71.7	20 55.5	+50.0	72.1	21 13.7	+50.6	72.5	27
28	19 44.8	+46.2	69.4	20 05.8	+46.8	69.7	20 26.5	+47.4	70.0	20 46.8	+48.0	70.4	21 06.7	+48.7	70.8	21 26.3	+49.3	71.1	21 45.5	+49.9	71.5	22 04.3	+50.6	71.9	28
29	20 31.0	+45.9	68.7	20 52.6	+46.6	69.0	21 13.9	+47.3	69.4	21 34.8	+48.0	69.8	21 55.4	+48.6	70.1	22 15.6	+49.2	70.5	22 35.4	+49.8	70.9	22 54.9	+50.3	71.3	29
30	21 16.9	+45.8	68.0	21 39.2	+46.5	68.4	22 01.2	+47.1	68.7	22 22.8	+47.7	69.1	22 44.0	+48.4	69.5	23 04.8	+49.0	69.9	23 25.2	+49.6	70.3	23 45.2	+50.3	70.7	30
31	22 02.7	+45.7	67.3	22 25.7	+46.3	67.7	22 48.3	+47.0	68.1	23 10.5	+47.6	68.5	23 32.4	+48.2	68.9	23 53.8	+48.9	69.3	24 14.8	+49.5	69.7	24 35.5	+50.1	70.1	31
32	22 48.4	+45.6	66.6	23 12.0	+46.1	67.0	23 35.3	+46.7	67.4	23 58.1	+47.5	67.8	24 20.6	+48.1	68.2	24 42.7	+48.7	68.6	25 04.3	+49.4	69.1	25 25.6	+49.9	69.5	32
33	23 33.8	+45.2	65.9	23 58.1	+45.9	66.3	24 22.0	+46.6	66.7	24 45.6	+47.2	67.1	25 08.7	+47.9	67.5	25 31.4	+48.5	68.0	25 53.7	+49.1	68.4	26 15.5	+49.8	68.9	33
34	24 19.0	+45.1	65.2	24 44.0	+45.8	65.6	25 08.6	+46.4	66.0	25 32.8	+47.1	66.4	25 56.6	+47.7	66.9	26 19.9	+48.4	67.3	26 42.8	+49.0	67.8	27 05.3	+49.6	68.3	34
35	25 04.1	+44.8	64.4	25 29.8	+45.5	64.9	25 55.0	+46.2	65.3	26 19.9	+46.8	65.7	26 44.3	+47.5	66.2	27 08.3	+48.2	66.7	27 31.8	+48.8	67.1	27 54.9	+49.4	67.6	35
36	25 48.9	+44.6	63.7	26 15.3	+45.3	64.1	26 41.2	+46.0	64.6	27 06.7	+46.7	65.1	27 31.8	+47.3	65.5	27 56.5	+47.9	66.0	28 20.6	+48.7	66.5	28 44.3	+49.3	67.0	36
37	26 33.5	+44.3	63.0	27 00.6	+45.0	63.4	27 27.2	+45.7	63.9	27 53.4	+46.4	64.3	28 19.1	+47.2	64.8	28 44.4	+47.8	65.3	29 09.3	+48.4	65.8	29 33.6	+49.0	66.3	37
38	27 17.8	+44.2	62.2	27 45.6	+44.8	62.7	28 12.9	+45.5	63.1	28 39.8	+46.2	63.6	29 06.3	+46.8	64.1	29 32.2	+47.5	64.6	29 57.7	+48.2	65.1	30 22.6	+48.9	65.7	38
39	28 02.0	+43.8	61.4	28 30.4	+44.6	61.9	28 58.4	+45.3	62.4	29 26.0	+46.0	62.9	29 53.1	+46.7	63.4	30 19.7	+47.4	63.9	30 45.9	+48.0	64.5	31 11.5	+48.6	65.0	39
40	28 45.8	+43.6	60.7	29 15.0	+44.3	61.1	29 43.7	+45.0	61.6	30 12.0	+45.7	62.2	30 39.8	+46.4	62.7	31 07.1	+47.0	63.2	31 33.9	+47.7	63.7	32 00.1	+48.4	64.3	40
41	29 29.4	+43.3	59.9	29 59.3	+44.0	60.4	30 28.7	+44.7	60.9	30 57.7	+45.4	61.4	31 26.2	+46.1	61.9	31 54.1	+46.9	62.5	32 21.6	+47.5	63.0	32 48.5	+48.2	63.6	41
42	30 12.7	+43.0	59.1	30 43.3	+43.7	59.6	31 13.4	+44.5	60.1	31 43.1	+45.2	60.6	32 12.3	+45.8	61.2	32 41.0	+46.5	61.7	33 09.1	+47.2	62.3	33 36.7	+47.9	62.9	42
43	30 55.7	+42.7	58.3	31 27.0	+43.5	58.8	31 57.9	+44.1	59.3	32 28.3	+44.8	59.9	32 58.1	+45.6	60.4	33 27.5	+46.3	61.0	33 56.3	+47.0	61.6	34 24.6	+47.7	62.2	43
44	31 38.4	+42.4	57.4	32 10.5	+43.1	58.0	32 42.0	+43.9	58.5	33 13.1	+44.6	59.1	33 43.7	+45.3	59.6	34 13.8	+46.0	60.2	34 43.3	+46.7	60.8	35 12.3	+47.4	61.4	44
45	32 20.8	+42.0	56.6	32 53.6	+42.7	57.1	33 25.9	+43.5	57.7	33 57.7	+44.2	58.3	34 29.0	+45.0	58.8	34 59.8	+45.7	59.4	35 30.0	+46.4	60.0	35 59.7	+47.1	60.7	45
46	33 02.8	+41.7	55.8	33 36.3	+42.5	56.3	34 09.4	+43.2	56.9	34 41.9	+43.9	57.4	35 14.0	+44.6	58.0	35 45.5	+45.3	58.6	36 16.4	+46.1	59.3	36 46.8	+46.8	59.9	46
47	33 44.5	+41.4	55.0	34 18.8	+42.1	55.5	34 52.6	+42.8	56.0	35 25.8	+43.6	56.6	35 58.6	+44.3	57.2	36 30.8	+45.0	57.8	37 02.5	+45.7	58.5	37 33.6	+46.4	59.1	47
48	34 25.9	+40.9	54.0	35 00.9	+41.7	54.6	35 35.4	+42.4	55.2	36 09.4	+43.2	55.8	36 42.9	+43.9	56.4	37 15.8	+44.7	57.0	37 48.2	+45.4	57.7	38 20.0	+46.2	58.3	48
49	35 06.8	+40.6	53.1	35 42.6	+41.3	53.7	36 17.8	+42.1	54.3	36 52.6	+42.8	54.9	37 26.8	+43.6	55.5	38 00.5	+44.3	56.2	38 33.6	+45.1	56.8	39 06.2	+45.8	57.5	49
50	35 47.4	+40.1	52.2	36 23.9	+40.9	52.8	36 59.9	+41.6	53.4	37 35.4	+42.4	54.1	38 10.4	+43.1	54.7	38 44.8	+43.9	55.3	39 18.7	+44.7	56.0	39 52.0	+45.4	56.7	50
51	36 27.5	+39.7	51.3	37 04.8	+40.4	51.9	37 41.5	+41.3	52.5	38 17.8	+42.0	53.1	38 53.5	+42.8	53.8	39 28.7	+43.5	54.4	40 03.4	+44.2	55.1	40 37.4	+45.0	55.8	51
52	37 07.2	+39.3	50.4	37 45.2	+40.1	51.0	38 22.8	+40.8	51.6	38 59.8	+41.6	52.2	39 36.3	+42.3	52.9	40 12.2	+43.1	53.5	40 47.6	+43.9	54.2	41 22.4	+44.6	54.9	52
53	37 46.5	+38.8	49.4	38 25.3	+39.5	50.0	39 03.6	+40.3	50.6	39 41.4	+41.1	51.3	40 18.6	+41.9	51.9	40 55.3	+42.7	52.6	41 31.5	+43.4	53.3	42 07.0	+44.2	54.0	53
54	38 25.3	+38.3	48.5	39 04.8	+39.1	49.1	39 43.9	+39.8	49.7	40 22.5	+40.6	50.3	41 00.5	+41.4	51.0	41 38.0	+42.2	51.7	42 14.9	+43.0	52.4	42 51.2	+43.8	53.1	54
55	39 03.6	+37.8	47.5	39 43.9	+38.6	48.1	40 23.7	+39.4	48.7	41 03.1	+40.1	49.4	41 41.9	+40.9	50.0	42 20.2	+41.7	50.7	42 57.9	+42.4	51.4	43 35.0	+43.2	52.2	55
56	39 41.4	+37.2	46.5	40 22.5	+38.0	47.1	41 03.1	+38.8	47.7	41 43.2	+39.6	48.4	42 22.8	+40.4	49.0	43 01.9	+41.1	49.7	43 40.3	+42.0	50.5	44 18.2	+42.8	51.2	56
57	40 18.6	+36.7	45.4	41 00.5	+37.5	46.1	41 41.9	+38.3	46.7	42 22.8	+39.1	47.4	43 03.2	+39.8	48.0	43 43.0	+40.7	48.7	44 22.3	+41.5	49.5	45 01.0	+42.3	50.2	57
58	40 55.3	+36.2	44.4	41 38.0	+36.9	45.0	42 20.2	+37.7	45.7	43 01.9	+38.4	46.3	43 43.0	+39.3	47.0	44 23.7	+40.1	47.7	45 03.8	+40.9	48.5	45 43.3	+41.7	49.2	58
59	41 31.5	+35.5	43.3	42 14.9	+36.3	44.0	42 57.9	+37.1	44.6	43 40.3	+37.9	45.3	44 22.3	+38.7	46.0	45 03.8	+39.5	46.7	45 44.7	+40.3	47.5	46 25.0	+41.1	48.2	59
60	42 07.0	+35.0	42.3	42 51.2	+35.7	42.9	43 35.0	+36.4	43.5	44 18.2	+37.3	44.2	45 01.0	+38.1	44.9	45 43.3	+38.8	45.6	46 25.0	+39.7	46.3	47 06.1	+40.5	47.1	60
61	42 42.0	+34.2	41.2	43 26.9	+35.1	41.8	44 11.4	+35.9	42.4	44 55.5	+36.6	43.1	45 39.1	+37.4	43.8	46 22.1	+38.3	44.5	47 04.7	+39.0	45.2	47 46.6	+39.9	46.0	61
62	43 16.2	+33.6	40.0	44 02.0	+34.3	40.6	44 47.3	+35.1	41.3	45 32.1	+36.0	42.0	46 16.5	+36.7	42.7	47 00.4	+37.5	43.4	47 43.7	+38.4	44.1	48 26.5	+39.2	44.9	62
63	43 49.8	+33.0	38.9	44 36.3	+33.7	39.5	45 22.4	+34.5	40.1	46 08.1	+35.2	40.8	46 53.2	+36.1	41.5	47 37.9	+36.9	42.2	48 22.1	+37.7	43.0	49 05.7	+38.5	43.8	63
64	44 22.8	+32.2	37.7	45 10.0	+33.0	38.3	45 56.9	+33.7	39.0	46 43.3	+34.5	39.6	47 29.3	+35.3	40.3	48 14.8	+36.1	41.0	48 59.8	+36.9	41.8	49 44.2	+37.8	42.6	64
65	44 55.0	+31.4	36.5	45 43.0	+32.2	37.1	46 30.6	+33.0	37.8	47 17.8	+33.7	38.4	48 04.6	+34.5	39.1	48 50.9	+35.3	39.8	49 36.7	+36.2	40.6	50 22.0	+37.0	41.4	65
66	45 26.4	+30.7	35.3	46 15.2	+31.4	35.9	47 03.6	+32.1	36.6	47 51.5	+33.0	37.2	48 39.1	+33.7	37.9	49 26.2	+34.6	38.6	50 12.9	+35.3	39.4	50 59.0	+36.2	40.1	66
67	45 57.1	+29.8	34.1	46 46.6	+30.6	34.7	47 35.7	+31.4	35.3	48 24.5	+32.1	36.0	49 12.8	+32.9	36.6	50 00.8	+33.7	37.3	50 48.2	+34.5	38.1	51 35.2	+35.4	38.9	67
68	46 26.9	+29.0	32.8	47 17.2	+29.7	33.4	48 07.1	+30.4	34.0	48 56.6	+31.2	34.7	49 45.7	+32.0	35.3	50 34.5	+32.8	36.0	51 22.7	+33.7	36.8	52 10.6	+34.4	37.5	68
69	46 55.9	+28.2	31.6	47 46.9	+28.9	32.1	48 37.5	+29.6	32.7	49 27.8	+30.4	33.4	50 17.7	+31.1	34.0	51 07.3	+31.8	34.7	51 56.4	+32.7	35.4	52 45.0	+33.5	36.2	69
70	47 24.1	+27.2	30.3	48 15.8	+27.9	30.8	49 07.1	+28.7	31.4	49 58.2	+29.3	32.0	50 48.8	+30.2	32.7	51 39.1	+31.0	33.4	52 29.1	+31.7	34.1	53 18.5	+32.6	34.8	70
71	47 51.3	+26.4	28.9	48 43.7	+27.0	29.5	49 35.8	+27.7	30.1	50 27.5	+28.5	30.7	51 19.0	+29.1	31.3	52 10.1	+29.9	32.0	53 00.8	+30.7	32.7	53 51.1	+31.5	33.4	71
72	48 17.7	+25.3	27.6	49 10.7	+26.0	28.1	50 03.5	+26.7	28.7	50 56.0	+27.4	29.3	51 48.1	+28.2	29.9	52 40.0	+28.9	30.6	53 31.5	+29.6	31.2	54 22.6	+30.4	32.0	72
73	48 43.0	+24.4	26.2	49 36.7	+25.1	26.8	50 30.2	+25.7	27.3	51 23.4	+26.3	27.9	52 16.3	+27.0	28.5	53 08.9	+27.8	29.1	54 01.1	+28.6	29.8	54 53.0	+29.3	30.5	73
74	49 07.4	+23.4	24.8	50 01.8	+24.0	25.3	50 55.9	+24.6	25.9	51 49.7	+25.3	26.4	52 43.3	+26.0	27.0	53 36.7	+26.6	27.6	54 29.7	+27.4	28.3	55 22.3	+28.2	28.9	74
75	49 30.8	+22.3	23.4	50 25.8	+22.9	23.9	51 20.5	+23.5	24.4	52 15.0	+24.2	24.9	53 09.3	+24.8	25.5	54 03.3	+25.5	26.1	54 57.1	+26.2	26.7	55 50.5	+26.9	27.4	75
76	49 53.1	+21.3	22.0	50 48.7	+21.8	22.5	51 44.0	+22.4	22.9	52 39.2	+23.0	23.4	53 34.1	+23.6	24.0	54 28.8	+24.3	24.5	55 23.3	+24.9	25.1	56 17.4	+25.7	25.8	76
77	50 14.4	+20.1	20.5	51 10.5	+20.6	21.0	52 06.4	+21.2	21.4	53 02.2	+21.8	21.9	53 57.7	+22.4	22.4	54 53.1	+23.0	23.0	55 48.2	+23.7	23.5	56 43.1	+24.4	24.1	77
78	50 34.5	+19.1	19.1	51 31.1	+19.5	19.5	52 27.6	+20.0	19.9	53 24.0	+20.5	20.4	54 20.1	+21.1	20.8	55 16.1	+21.7	21.3	56 11.9	+22.3	21.9	57 07.5	+22.9	22.5	78
79	50 53.5	+17.8	17.6	51 50.6	+18.3	17.9	52 47.6	+18.8	18.3	53 44.5	+19.3	18.8	54 41.3	+19.8	19.2	55 37.8	+20.4	19.7	56 34.2	+21.0	20.2	57 30.4	+21.6	20.8	79
80	51 11.3	+16.6	16.0	52 08.9	+17.1	16.4	53 06.4	+17.5	16.8	54 03.8	+18.0	17.2	55 01.1	+18.5	17.6	55 58.2	+19.0	18.0	56 55.2	+19.5	18.5	57 52.0	+20.1	19.0	80
81	51 27.9	+15.5	14.5	52 26.0	+15.8	14.8	53 23.9	+16.3	15.2	54 21.8	+16.7	15.5	55 19.6	+17.1	15.9	56 17.2	+17.6	16.3	57 14.7	+18.1	16.8	58 12.1	+18.6	17.2	81
82	51 43.4	+14.1	13.0	52 41.8	+14.5	13.2	53 40.2	+14.9	13.6	54 38.5	+15.2	13.9	55 36.7	+15.6	14.2	56 34.8	+16.1	14.6	57 32.8	+16.5	15.0	58 30.7	+17.0	15.4	82
83	51 57.5	+12.9	11.4	52 56.3	+13.2	11.6	53 55.1	+13.5	11.9	54 53.7	+13.9	12.2	55 52.3	+14.3	12.5	56 50.9	+14.6	12.8	57 49.3	+15.0	13.2	58 47.7	+15.4	13.6	83
84	52 10.4	+11.6	9.8	53 09.5	+11.9	10.0	54 08.6	+12.1	10.3	55 07.6	+12.4	10.5	56 06.6	+12.7	10.8	57 05.5	+13.1	11.1	58 04.3	+13.3	11.4	59 03.1	+13.8	11.7	84
85	52 22.0	+10.3	8.2	53 21.4	+10.5	8.4	54 20.7	+10.8	8.6	55 20.0	+11.0	8.8	56 19.3	+11.3	9.0	57 18.6	+11.5	9.3	58 17.8	+11.8	9.5	59 16.9	+12.1	9.8	85
86	52 32.3	+9.0	6.6	53 31.9	+9.1	6.7	54 31.5	+9.3	6.9	55 31.0	+9.5	7.1	56 30.6	+9.7	7.2	57 30.1	+9.9	7.4	58 29.6	+10.1	7.7	59 29.0	+10.4	7.9	86
87	52 41.3	+7.6	4.9	53 41.0	+7.8	5.1	54 40.8	+7.9	5.2	55 40.5	+8.1	5.3	56 40.3	+8.3	5.5	57 40.0	+8.5	5.6	58 39.7	+8.5	5.8	59 39.4	+8.6	5.9	87
88	52 48.9	+6.2	3.3	53 48.8	+6.3	3.4	54 48.7	+6.4	3.5	55 48.6	+6.4	3.6	56 48.4	+6.6	3.6	57 48.3	+6.7	3.7	58 48.2	+6.7	3.9	59 48.0	+6.9	4.0	88
89	52 55.1	+4.9	1.7	53 55.1	+4.9	1.7	54 55.1	+4.9	1.7	55 55.0	+5.0	1.8	56 55.0	+5.0	1.8	57 55.0	+5.0	1.9	58 54.9	+5.1	1.9	59 54.9	+5.1	2.0	89
90	53 00.0	+3.5	0.0	54 00.0	+3.5	0.0	55 00.0	+3.4	0.0	56 00.0	+3.4	0.0	57 00.0	+3.4	0.0	58 00.0	+3.3	0.0	59 00.0	+3.3	0.0	60 00.0	+3.3	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180° ....Zn=180°+Z }　**LATITUDE SAME NAME AS DECLINATION**　　L.H.A. **94°, 266°**

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LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	° ′	′	°	°
0	1 48.3	+47.9	92.4	1 45.8	+48.5	92.4	1 43.2	+49.2	92.5	1 40.6	+49.8	92.5	1 38.0	+50.3	92.5	1 35.4	+50.9	92.5	1 32.7	+51.4	92.6	1 30.0	+51.9	92.6	0
1	2 36.2	+47.9	91.8	2 34.3	+48.6	91.8	2 32.4	+49.1	91.9	2 30.4	+49.7	91.9	2 28.3	+50.4	92.0	2 26.3	+50.8	92.0	2 24.1	+51.5	92.1	2 21.9	+52.0	92.1	1
2	3 24.1	+47.9	91.2	3 22.9	+48.5	91.3	3 21.5	+49.2	91.3	3 20.1	+49.7	91.4	3 18.7	+50.3	91.4	3 17.1	+50.9	91.5	3 15.6	+51.4	91.5	3 13.9	+52.0	91.6	2
3	4 12.0	+47.8	90.6	4 11.4	+48.5	90.7	4 10.7	+49.1	90.7	4 09.8	+49.8	90.8	4 09.0	+50.2	90.9	4 08.0	+50.9	90.9	4 07.0	+51.4	91.0	4 05.9	+51.9	91.1	3
4	4 59.9	+47.8	90.0	4 59.9	+48.4	90.1	4 59.8	+49.0	90.2	4 59.6	+49.6	90.2	4 59.2	+50.3	90.3	4 58.9	+50.8	90.4	4 58.4	+51.3	90.5	4 57.8	+51.9	90.6	4
5	5 47.7	+47.8	89.4	5 48.3	+48.5	89.5	5 48.8	+49.1	89.6	5 49.2	+49.7	89.7	5 49.5	+50.2	89.8	5 49.7	+50.8	89.9	5 49.7	+51.4	90.0	5 49.7	+51.9	90.1	5
6	6 35.5	+47.8	88.8	6 36.8	+48.4	88.9	6 37.9	+49.0	89.0	6 38.9	+49.6	89.1	6 39.7	+50.2	89.2	6 40.5	+50.7	89.4	6 41.1	+51.3	89.5	6 41.6	+51.8	89.6	6
7	7 23.3	+47.7	88.2	7 25.2	+48.3	88.3	7 26.9	+48.9	88.4	7 28.5	+49.5	88.6	7 29.9	+50.2	88.7	7 31.2	+50.7	88.8	7 32.4	+51.3	88.9	7 33.4	+51.8	89.1	7
8	8 11.0	+47.6	87.5	8 13.5	+48.3	87.7	8 15.8	+48.9	87.8	8 18.0	+49.5	88.0	8 20.1	+50.1	88.1	8 21.9	+50.7	88.3	8 23.7	+51.2	88.4	8 25.2	+51.8	88.6	8
9	8 58.6	+47.6	86.9	9 01.8	+48.2	87.1	9 04.7	+48.9	87.2	9 07.5	+49.5	87.4	9 10.2	+50.0	87.6	9 12.6	+50.6	87.7	9 14.9	+51.2	87.9	9 17.0	+51.7	88.1	9
10	9 46.2	+47.5	86.3	9 50.0	+48.1	86.5	9 53.6	+48.8	86.7	9 57.0	+49.4	86.8	10 00.2	+50.0	87.0	10 03.2	+50.6	87.2	10 06.1	+51.1	87.4	10 08.7	+51.7	87.5	10
11	10 33.7	+47.5	85.7	10 38.1	+48.1	85.9	10 42.4	+48.7	86.1	10 46.4	+49.3	86.3	10 50.2	+49.9	86.4	10 53.8	+50.5	86.6	10 57.2	+51.1	86.8	11 00.4	+51.7	87.0	11
12	11 21.2	+47.3	85.1	11 26.2	+48.0	85.3	11 31.1	+48.6	85.5	11 35.7	+49.3	85.7	11 40.1	+49.9	85.9	11 44.3	+50.5	86.1	11 48.3	+51.0	86.3	11 52.1	+51.5	86.5	12
13	12 08.5	+47.3	84.4	12 14.2	+48.0	84.7	12 19.7	+48.6	84.9	12 25.0	+49.1	85.1	12 30.0	+49.8	85.3	12 34.8	+50.3	85.5	12 39.3	+51.0	85.8	12 43.6	+51.5	86.0	13
14	12 55.8	+47.2	83.8	13 02.2	+47.8	84.0	13 08.3	+48.5	84.3	13 14.1	+49.2	84.5	13 19.8	+49.7	84.7	13 25.1	+50.3	85.0	13 30.3	+50.9	85.2	13 35.1	+51.5	85.5	14
15	13 43.0	+47.1	83.2	13 50.0	+47.8	83.4	13 56.8	+48.4	83.7	14 03.3	+49.0	83.9	14 09.5	+49.6	84.2	14 15.4	+50.3	84.4	14 21.2	+50.8	84.7	14 26.6	+51.4	84.9	15
16	14 30.1	+47.0	82.5	14 37.8	+47.6	82.8	14 45.2	+48.3	83.1	14 52.3	+48.9	83.3	14 59.1	+49.6	83.6	15 05.7	+50.1	83.9	15 12.0	+50.7	84.1	15 18.0	+51.3	84.4	16
17	15 17.1	+46.9	81.9	15 25.4	+47.6	82.2	15 33.4	+48.2	82.4	15 41.2	+48.8	82.7	15 48.7	+49.4	83.0	15 55.8	+50.1	83.3	16 02.7	+50.6	83.6	16 09.3	+51.2	83.9	17
18	16 04.0	+46.7	81.2	16 13.0	+47.4	81.5	16 21.6	+48.1	81.8	16 30.0	+48.7	82.1	16 38.1	+49.3	82.4	16 45.9	+49.9	82.7	16 53.3	+50.6	83.0	17 00.5	+51.1	83.3	18
19	16 50.7	+46.7	80.6	17 00.4	+47.3	80.9	17 09.7	+48.0	81.2	17 18.7	+48.6	81.5	17 27.4	+49.3	81.8	17 35.8	+49.9	82.1	17 43.9	+50.4	82.4	17 51.6	+51.0	82.8	19
20	17 37.4	+46.5	79.9	17 47.7	+47.2	80.3	17 57.7	+47.8	80.6	18 07.3	+48.5	80.9	18 16.7	+49.1	81.2	18 25.7	+49.7	81.5	18 34.3	+50.4	81.9	18 42.6	+51.0	82.2	20
21	18 23.9	+46.3	79.3	18 34.9	+47.0	79.6	18 45.5	+47.7	79.9	18 55.8	+48.4	80.3	19 05.8	+49.0	80.6	19 15.4	+49.6	81.0	19 24.7	+50.2	81.3	19 33.6	+50.8	81.6	21
22	19 10.2	+46.2	78.6	19 21.9	+46.9	78.9	19 33.2	+47.6	79.3	19 44.2	+48.2	79.6	19 54.8	+48.9	80.0	20 05.0	+49.6	80.4	20 14.9	+50.1	80.7	20 24.4	+50.7	81.1	22
23	19 56.4	+46.1	77.9	20 08.8	+46.8	78.3	20 20.8	+47.4	78.6	20 32.4	+48.1	79.0	20 43.7	+48.7	79.4	20 54.6	+49.3	79.8	21 05.0	+50.0	80.1	21 15.1	+50.6	80.5	23
24	20 42.5	+45.9	77.2	20 55.6	+46.5	77.6	21 08.2	+47.3	78.0	21 20.5	+48.0	78.4	21 32.4	+48.6	78.8	21 43.9	+49.3	79.1	21 55.0	+49.9	79.5	22 05.7	+50.5	79.9	24
25	21 28.4	+45.7	76.5	21 42.1	+46.5	76.9	21 55.5	+47.1	77.3	22 08.5	+47.8	77.7	22 21.0	+48.5	78.1	22 33.2	+49.1	78.5	22 44.9	+49.7	78.9	22 56.2	+50.4	79.3	25
26	22 14.1	+45.5	75.9	22 28.6	+46.2	76.3	22 42.6	+47.0	76.7	22 56.3	+47.6	77.1	23 09.5	+48.3	77.5	23 22.3	+48.9	77.9	23 34.6	+49.6	78.3	23 46.6	+50.2	78.8	26
27	22 59.6	+45.4	75.1	23 14.8	+46.1	75.6	23 29.6	+46.7	76.0	23 43.9	+47.4	76.4	23 57.8	+48.1	76.8	24 11.2	+48.8	77.3	24 24.2	+49.5	77.7	24 36.8	+50.0	78.2	27
28	23 45.0	+45.2	74.4	24 00.9	+45.9	74.9	24 16.3	+46.6	75.3	24 31.3	+47.3	75.7	24 45.9	+48.0	76.2	25 00.0	+48.6	76.6	25 13.7	+49.2	77.1	25 26.8	+49.9	77.5	28
29	24 30.2	+44.9	73.7	24 46.8	+45.6	74.2	25 02.9	+46.4	74.6	25 18.6	+47.1	75.1	25 33.9	+47.7	75.5	25 48.6	+48.5	76.0	26 02.9	+49.1	76.5	26 16.7	+49.8	76.9	29
30	25 15.1	+44.7	73.0	25 32.4	+45.5	73.4	25 49.3	+46.2	73.9	26 05.7	+46.9	74.4	26 21.6	+47.6	74.8	26 37.1	+48.3	75.3	26 52.0	+49.0	75.8	27 06.5	+49.6	76.3	30
31	25 59.8	+44.5	72.2	26 17.9	+45.2	72.7	26 35.5	+46.0	73.2	26 52.6	+46.7	73.7	27 09.2	+47.4	74.2	27 25.4	+48.0	74.7	27 41.0	+48.7	75.2	27 56.1	+49.4	75.7	31
32	26 44.3	+44.3	71.5	27 03.1	+45.0	72.0	27 21.5	+45.7	72.5	27 39.3	+46.4	73.0	27 56.6	+47.2	73.5	28 13.4	+47.9	74.0	28 29.7	+48.6	74.5	28 45.5	+49.2	75.0	32
33	27 28.6	+44.0	70.7	27 48.1	+44.8	71.2	28 07.2	+45.5	71.7	28 25.7	+46.3	72.2	28 43.8	+46.9	72.8	29 01.3	+47.7	73.3	29 18.3	+48.3	73.8	29 34.7	+49.0	74.4	33
34	28 12.6	+43.7	70.0	28 32.9	+44.5	70.5	28 52.7	+45.3	71.0	29 12.0	+46.0	71.5	29 30.7	+46.8	72.1	29 49.0	+47.4	72.6	30 06.6	+48.2	73.1	30 23.7	+48.9	73.7	34
35	28 56.3	+43.5	69.2	29 17.4	+44.2	69.7	29 38.0	+45.0	70.2	29 58.0	+45.7	70.8	30 17.5	+46.4	71.3	30 36.4	+47.2	71.9	30 54.8	+47.9	72.5	31 12.6	+48.6	73.0	35
36	29 39.8	+43.2	68.4	30 01.6	+44.0	68.9	30 23.0	+44.7	69.5	30 43.7	+45.5	70.0	31 03.9	+46.3	70.6	31 23.6	+46.9	71.2	31 42.7	+47.6	71.7	32 01.2	+48.3	72.3	36
37	30 23.0	+42.9	67.6	30 45.6	+43.7	68.1	31 07.7	+44.4	68.7	31 29.2	+45.2	69.3	31 50.2	+45.9	69.8	32 10.5	+46.7	70.4	32 30.3	+47.5	71.0	32 49.5	+48.2	71.6	37
38	31 05.9	+42.6	66.8	31 29.3	+43.4	67.3	31 52.1	+44.2	67.9	32 14.4	+44.9	68.5	32 36.1	+45.7	69.1	32 57.2	+46.5	69.7	33 17.8	+47.1	70.3	33 37.7	+47.9	70.9	38
39	31 48.5	+42.2	66.0	32 12.7	+43.0	66.5	32 36.3	+43.8	67.1	32 59.3	+44.6	67.7	33 21.8	+45.4	68.3	33 43.7	+46.1	68.9	34 04.9	+46.9	69.6	34 25.6	+47.6	70.2	39
40	32 30.7	+42.0	65.1	32 55.7	+42.7	65.7	33 20.1	+43.5	66.3	33 43.9	+44.3	66.9	34 07.2	+45.1	67.5	34 29.8	+45.9	68.2	34 51.8	+46.6	68.8	35 13.2	+47.3	69.5	40
41	33 12.7	+41.5	64.3	33 38.4	+42.4	64.8	34 03.6	+43.2	65.5	34 28.2	+44.0	66.1	34 52.3	+44.7	66.7	35 15.7	+45.5	67.4	35 38.4	+46.3	68.0	36 00.5	+47.1	68.7	41
42	33 54.2	+41.2	63.4	34 20.8	+42.0	64.0	34 46.8	+42.8	64.6	35 12.2	+43.6	65.3	35 37.0	+44.4	65.9	36 01.2	+45.2	66.6	36 24.7	+46.0	67.2	36 47.6	+46.8	67.9	42
43	34 35.4	+40.8	62.5	35 02.8	+41.6	63.1	35 29.6	+42.5	63.8	35 55.8	+43.3	64.4	36 21.4	+44.1	65.1	36 46.4	+44.9	65.8	37 10.7	+45.7	66.4	37 34.4	+46.4	67.1	43
44	35 16.2	+40.4	61.6	35 44.4	+41.3	62.3	36 12.1	+42.2	62.9	36 39.1	+42.9	63.6	37 05.5	+43.7	64.2	37 31.3	+44.5	64.9	37 56.4	+45.5	65.6	38 20.8	+46.1	66.3	44
45	35 56.6	+40.0	60.7	36 25.7	+40.8	61.4	36 54.1	+41.7	62.0	37 22.0	+42.5	62.7	37 49.2	+43.3	63.4	38 15.8	+44.1	64.1	38 41.7	+44.9	64.8	39 06.9	+45.7	65.5	45
46	36 36.6	+39.6	59.8	37 06.5	+40.4	60.4	37 35.8	+41.3	61.1	38 04.5	+42.1	61.8	38 32.5	+42.9	62.5	38 59.9	+43.8	63.2	39 26.6	+44.6	63.9	39 52.6	+45.4	64.7	46
47	37 16.2	+39.1	58.9	37 46.9	+40.0	59.5	38 17.1	+40.8	60.2	38 46.6	+41.6	60.9	39 15.4	+42.5	61.6	39 43.7	+43.3	62.3	40 11.2	+44.1	63.1	40 38.0	+45.0	63.8	47
48	37 55.3	+38.6	57.9	38 26.9	+39.4	58.6	38 57.9	+40.3	59.2	39 28.2	+41.2	60.0	39 57.9	+42.1	60.7	40 27.0	+42.9	61.4	40 55.3	+43.8	62.2	41 23.0	+44.6	62.9	48
49	38 33.9	+38.1	56.9	39 06.3	+39.0	57.6	39 38.2	+39.9	58.3	40 09.4	+40.7	59.0	40 40.0	+41.6	59.7	41 09.9	+42.4	60.5	41 39.1	+43.3	61.3	42 07.6	+44.1	62.1	49
50	39 12.0	+37.6	55.9	39 45.3	+38.5	56.6	40 18.1	+39.3	57.3	40 50.1	+40.3	58.0	41 21.6	+41.1	58.8	41 52.3	+42.0	59.5	42 22.4	+42.8	60.3	42 51.7	+43.7	61.1	50
51	39 49.6	+37.1	54.9	40 23.8	+38.0	55.6	40 57.4	+38.9	56.3	41 30.4	+39.7	57.1	42 02.7	+40.6	57.8	42 34.3	+41.5	58.6	43 05.2	+42.4	59.4	43 35.4	+43.2	60.2	51
52	40 26.7	+36.6	53.9	41 01.8	+37.4	54.6	41 36.3	+38.2	55.3	42 10.1	+39.2	56.0	42 43.3	+40.0	56.8	43 15.8	+40.9	57.6	43 47.6	+41.8	58.4	44 18.6	+42.8	59.2	52
53	41 03.3	+35.9	52.8	41 39.2	+36.8	53.5	42 14.5	+37.8	54.3	42 49.3	+38.6	55.0	43 23.3	+39.5	55.8	43 56.7	+40.4	56.6	44 29.4	+41.3	57.4	45 01.4	+42.2	58.2	53
54	41 39.2	+35.3	51.8	42 16.0	+36.3	52.5	42 52.3	+37.1	53.2	43 27.9	+38.0	54.0	44 02.8	+39.0	54.8	44 37.1	+39.9	55.6	45 10.7	+40.8	56.4	45 43.6	+41.6	57.2	54
55	42 14.5	+34.8	50.7	42 52.3	+35.6	51.4	43 29.4	+36.5	52.1	44 05.9	+37.4	52.9	44 41.8	+38.3	53.7	45 17.0	+39.2	54.5	45 51.5	+40.1	55.3	46 25.2	+41.1	56.2	55
56	42 49.3	+34.0	49.6	43 27.9	+34.9	50.3	44 05.9	+35.9	51.0	44 43.3	+36.8	51.8	45 20.1	+37.7	52.6	45 56.2	+38.6	53.4	46 31.6	+39.5	54.3	47 06.3	+40.5	55.1	56
57	43 23.3	+33.4	48.5	44 02.8	+34.3	49.2	44 41.8	+35.2	49.9	45 20.1	+36.1	50.7	45 57.8	+37.0	51.5	46 34.8	+38.0	52.3	47 11.1	+38.9	53.2	47 46.8	+39.8	54.0	57
58	43 56.7	+32.7	47.3	44 37.1	+33.6	48.0	45 17.0	+34.5	48.8	45 56.2	+35.4	49.5	46 34.8	+36.3	50.3	47 12.8	+37.2	51.2	47 50.0	+38.3	52.0	48 26.6	+39.2	52.9	58
59	44 29.4	+32.0	46.1	45 10.7	+32.9	46.9	45 51.5	+33.7	47.6	46 31.6	+34.7	48.4	47 11.1	+35.7	49.2	47 50.0	+36.6	50.0	48 28.3	+37.5	50.9	49 05.8	+38.4	51.8	59
60	45 01.4	+31.2	44.9	45 43.6	+32.1	45.7	46 25.2	+33.0	46.4	47 06.3	+33.9	47.2	47 46.8	+34.8	48.0	48 26.6	+35.8	48.8	49 05.8	+36.7	49.7	49 44.2	+37.7	50.6	60
61	45 32.6	+30.4	43.7	46 15.7	+31.3	44.4	46 58.2	+32.2	45.2	47 40.2	+33.1	46.0	48 21.6	+34.1	46.8	49 02.4	+35.0	47.6	49 42.5	+36.0	48.5	50 21.9	+37.0	49.4	61
62	46 03.0	+29.6	42.5	46 47.0	+30.4	43.2	47 30.4	+31.4	44.0	48 13.3	+32.3	44.7	48 55.7	+33.2	45.6	49 37.4	+34.2	46.4	50 18.5	+35.1	47.2	50 58.9	+36.1	48.1	62
63	46 32.6	+28.7	41.2	47 17.4	+29.7	41.9	48 01.8	+30.5	42.7	48 45.6	+31.5	43.5	49 28.9	+32.4	44.3	50 11.6	+33.3	45.1	50 53.6	+34.3	46.0	51 35.0	+35.3	46.9	63
64	47 01.3	+27.9	40.0	47 47.1	+28.7	40.7	48 32.3	+29.7	41.4	49 17.1	+30.6	42.2	50 01.3	+31.5	42.9	50 44.9	+32.5	43.8	51 27.9	+33.4	44.6	52 10.3	+34.4	45.5	64
65	47 29.2	+27.0	38.6	48 15.8	+27.9	39.3	49 02.0	+28.7	40.1	49 47.7	+29.6	40.8	50 32.8	+30.5	41.6	51 17.4	+31.5	42.3	52 01.3	+32.5	43.3	52 44.7	+33.4	44.2	65
66	47 56.2	+26.0	37.3	48 43.7	+26.9	38.0	49 30.7	+27.8	38.7	50 17.3	+28.7	39.5	51 03.3	+29.6	40.3	51 48.9	+30.5	41.1	52 33.8	+31.5	41.9	53 18.1	+32.5	42.8	66
67	48 22.2	+25.1	36.0	49 10.6	+25.9	36.6	49 58.5	+26.8	37.4	50 46.0	+27.6	38.1	51 32.9	+28.6	38.9	52 19.4	+29.5	39.7	53 05.3	+30.4	40.5	53 50.6	+31.4	41.4	67
68	48 47.3	+24.1	34.6	49 36.5	+24.9	35.3	50 25.3	+25.7	36.0	51 13.6	+26.7	36.7	52 01.5	+27.5	37.5	52 48.9	+28.4	38.3	53 35.7	+29.4	39.1	54 22.0	+30.4	40.0	68
69	49 11.4	+23.0	33.2	50 01.4	+23.9	33.9	50 51.0	+24.7	34.5	51 40.3	+25.5	35.2	52 29.0	+26.5	36.0	53 17.3	+27.4	36.8	54 05.1	+28.3	37.6	54 52.4	+29.2	38.5	69
70	49 34.4	+22.0	31.8	50 25.3	+22.8	32.4	51 15.7	+23.6	33.1	52 05.8	+24.5	33.8	52 55.5	+25.3	34.5	53 44.7	+26.2	35.3	54 33.4	+27.1	36.1	55 21.6	+28.1	36.9	70
71	49 56.4	+21.0	30.3	50 48.1	+21.6	31.0	51 39.3	+22.5	31.6	52 30.3	+23.3	32.3	53 20.8	+24.1	33.0	54 10.9	+25.0	33.7	55 00.5	+26.0	34.5	55 49.7	+26.9	35.4	71
72	50 17.4	+19.8	28.9	51 09.7	+20.6	29.5	52 01.8	+21.3	30.1	52 53.6	+22.1	30.8	53 44.9	+23.0	31.5	54 35.9	+23.8	32.2	55 26.5	+24.6	33.0	56 16.6	+25.6	33.8	72
73	50 37.2	+18.6	27.4	51 30.3	+19.4	28.0	52 23.1	+20.1	28.6	53 15.7	+20.9	29.2	54 07.9	+21.6	29.9	54 59.7	+22.5	30.6	55 51.1	+23.4	31.3	56 42.2	+24.2	32.1	73
74	50 55.8	+17.5	25.9	51 49.7	+18.1	26.4	52 43.2	+18.9	27.0	53 36.6	+19.6	27.6	54 29.5	+20.4	28.3	55 22.2	+21.2	29.0	56 14.5	+22.1	29.7	57 06.4	+22.9	30.5	74
75	51 13.3	+16.3	24.4	52 07.8	+17.0	24.9	53 02.1	+17.7	25.5	53 56.2	+18.3	26.0	54 49.9	+19.1	26.7	55 43.4	+19.9	27.3	56 36.6	+20.6	28.0	57 29.3	+21.5	28.7	75
76	51 29.6	+15.0	22.8	52 24.8	+15.7	23.3	53 19.8	+16.3	23.9	54 14.5	+17.0	24.4	55 09.0	+17.7	25.0	56 03.3	+18.4	25.6	56 57.2	+19.2	26.3	57 50.8	+20.0	27.0	76
77	51 44.6	+13.8	21.3	52 40.5	+14.4	21.7	53 36.1	+15.0	22.2	54 31.5	+15.7	22.8	55 26.7	+16.3	23.3	56 21.7	+17.0	23.9	57 16.4	+17.8	24.6	58 10.8	+18.5	25.2	77
78	51 58.4	+12.6	19.7	52 54.9	+13.0	20.1	53 51.1	+13.7	20.6	54 47.2	+14.2	21.1	55 43.0	+14.9	21.6	56 38.7	+15.6	22.2	57 34.2	+16.2	22.8	58 29.3	+17.0	23.4	78
79	52 11.0	+11.2	18.1	53 07.9	+11.8	18.5	54 04.8	+12.2	19.0	55 01.4	+12.9	19.4	55 57.9	+13.4	19.9	56 54.3	+14.0	20.4	57 50.4	+14.7	21.0	58 46.3	+15.3	21.6	79
80	52 22.2	+9.9	16.5	53 19.7	+10.4	16.9	54 17.0	+10.9	17.3	55 14.3	+11.4	17.7	56 11.3	+12.0	18.2	57 08.3	+12.5	18.6	58 05.1	+13.0	19.1	59 01.6	+13.7	19.7	80
81	52 32.1	+8.6	14.9	53 30.1	+9.0	15.2	54 27.9	+9.5	15.6	55 25.7	+9.9	16.0	56 23.3	+10.4	16.4	57 20.8	+10.9	16.8	58 18.1	+11.5	17.3	59 15.3	+12.1	17.8	81
82	52 40.7	+7.2	13.3	53 39.1	+7.6	13.6	54 37.4	+8.0	13.9	55 35.6	+8.4	14.2	56 33.7	+8.8	14.6	57 31.7	+9.3	15.0	58 29.6	+9.8	15.4	59 27.4	+10.3	15.9	82
83	52 47.9	+5.9	11.6	53 46.7	+6.2	11.9	54 45.4	+6.5	12.2	55 44.0	+6.9	12.5	56 42.5	+7.3	12.8	57 41.0	+7.7	13.2	58 39.4	+8.1	13.5	59 37.7	+8.5	13.9	83
84	52 53.8	+4.5	10.0	53 52.9	+4.8	10.2	54 51.9	+5.1	10.5	55 50.9	+5.4	10.7	56 49.8	+5.7	11.0	57 48.7	+6.1	11.3	58 47.5	+6.4	11.6	59 46.2	+6.8	12.0	84
85	52 58.3	+3.1	8.3	53 57.7	+3.3	8.5	54 57.0	+3.6	8.7	55 56.3	+3.8	8.9	56 55.5	+4.2	9.2	57 54.8	+4.3	9.4	58 53.9	+4.7	9.7	59 53.0	+5.0	10.0	85
86	53 01.4	+1.8	6.7	54 01.0	+1.9	6.8	55 00.6	+2.1	7.0	56 00.1	+2.3	7.2	56 59.7	+2.5	7.3	57 59.1	+2.8	7.6	58 58.6	+3.0	7.8	59 58.0	+3.3	8.0	86
87	53 03.2	+0.3	5.0	54 02.9	+0.5	5.1	55 02.7	+0.6	5.2	56 02.4	+0.8	5.4	57 02.2	+0.9	5.5	58 01.9	+1.0	5.7	59 01.6	+1.1	5.8	60 01.3	+1.4	6.0	87
88	53 03.5	−1.1	3.3	54 03.4	−1.0	3.4	55 03.3	−0.9	3.5	56 03.2	−0.8	3.6	57 03.1	−0.8	3.7	58 02.9	−0.6	3.8	59 02.7	−0.5	3.9	60 02.7	−0.5	4.0	88
89	53 02.4	−2.4	1.7	54 02.4	−2.4	1.7	55 02.4	−2.4	1.7	56 02.4	−2.4	1.8	57 02.3	−2.3	1.8	58 02.3	−2.3	1.9	59 02.3	−2.3	1.9	60 02.2	−2.2	2.0	89
90	53 00.0	−3.8	0.0	54 00.0	−3.9	0.0	55 00.0	−3.9	0.0	56 00.0	−3.9	0.0	57 00.0	−3.9	0.0	58 00.0	−4.0	0.0	59 00.0	−4.0	0.0	60 00.0	−4.0	0.0	90
	53°			54°			55°			56°			57°			58°			59°			60°			

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	1 48.3	−48.0	92.4	1 45.8	−48.6	92.4	1 43.2	−49.2	92.5	1 40.6	−49.7	92.5	1 38.0	−50.3	92.5	1 35.4	−51.0	92.5	1 32.7	−51.5	92.6	1 30.0	−52.0	92.6	0
1	1 00.3	−47.9	93.0	0 57.2	−48.6	93.0	0 54.0	−49.1	93.0	0 50.9	−49.8	93.0	0 47.7	−50.4	93.1	0 44.4	−50.9	93.1	0 41.2	−51.4	93.1	0 38.0	−52.0	93.1	1
2	0 12.4	−48.0	93.6	0 08.6	−48.5	93.6	0 04.9	−49.2	93.6	0 01.1	−49.8	93.6	0 02.7	+50.3	86.4	0 06.5	+50.9	86.4	0 10.2	+51.5	86.4	0 14.0	+52.0	86.4	2
3	0 35.6	+47.9	85.8	0 39.9	+48.6	85.8	0 44.3	+49.2	85.8	0 48.7	+49.8	85.8	0 53.0	+50.4	85.9	0 57.4	+50.9	85.9	1 01.7	+51.4	85.9	1 06.0	+52.0	85.9	3
4	1 23.5	+48.0	85.2	1 28.5	+48.6	85.2	1 33.5	+49.2	85.3	1 38.5	+49.7	85.3	1 43.4	+50.3	85.3	1 48.3	+50.9	85.3	1 53.1	+51.5	85.4	1 58.0	+51.9	85.4	4
5	2 11.5	+47.9	84.6	2 17.1	+48.5	84.6	2 22.7	+49.1	84.7	2 28.2	+49.8	84.7	2 33.7	+50.3	84.8	2 39.2	+50.9	84.8	2 44.6	+51.4	84.9	2 49.9	+52.0	84.9	5
6	2 59.4	+47.9	84.0	3 05.6	+48.6	84.0	3 11.8	+49.2	84.1	3 18.0	+49.7	84.2	3 24.0	+50.3	84.2	3 30.1	+50.8	84.3	3 36.0	+51.4	84.3	3 41.9	+51.9	84.4	6
7	3 47.3	+47.9	83.4	3 54.2	+48.5	83.5	4 01.0	+49.1	83.5	4 07.7	+49.7	83.6	4 14.3	+50.3	83.7	4 20.9	+50.8	83.7	4 27.4	+51.4	83.8	4 33.8	+51.9	83.9	7
8	4 35.2	+47.8	82.8	4 42.7	+48.4	82.9	4 50.1	+49.0	83.0	4 57.4	+49.7	83.0	5 04.6	+50.3	83.1	5 11.8	+50.8	83.2	5 18.8	+51.4	83.3	5 25.7	+51.9	83.4	8
9	5 23.0	+47.8	82.2	5 31.1	+48.5	82.3	5 39.1	+49.1	82.4	5 47.1	+49.6	82.5	5 54.9	+50.2	82.6	6 02.6	+50.8	82.7	6 10.2	+51.3	82.8	6 17.6	+51.9	82.9	9
10	6 10.8	+47.8	81.6	6 19.6	+48.4	81.7	6 28.2	+49.0	81.8	6 36.7	+49.6	81.9	6 45.1	+50.2	82.0	6 53.4	+50.7	82.1	7 01.5	+51.3	82.2	7 09.5	+51.8	82.3	10
11	6 58.6	+47.7	81.0	7 08.0	+48.3	81.1	7 17.2	+49.0	81.2	7 26.3	+49.6	81.3	7 35.3	+50.1	81.5	7 44.1	+50.7	81.6	7 52.8	+51.2	81.7	8 01.3	+51.8	81.9	11
12	7 46.3	+47.7	80.4	7 56.3	+48.3	80.5	8 06.2	+48.9	80.6	8 15.9	+49.5	80.8	8 25.4	+50.1	80.9	8 34.8	+50.7	81.1	8 44.0	+51.3	81.2	8 53.1	+51.8	81.4	12
13	8 34.0	+47.6	79.7	8 44.6	+48.3	79.9	8 55.1	+48.8	80.0	9 05.4	+49.4	80.2	9 15.5	+50.0	80.4	9 25.5	+50.6	80.5	9 35.3	+51.1	80.7	9 44.9	+51.7	80.9	13
14	9 21.6	+47.6	79.1	9 32.9	+48.1	79.3	9 43.9	+48.8	79.5	9 54.8	+49.4	79.6	10 05.5	+50.0	79.8	10 16.1	+50.5	80.0	10 26.4	+51.1	80.2	10 36.6	+51.6	80.3	14
15	10 09.2	+47.5	78.5	10 21.0	+48.2	78.7	10 32.7	+48.8	78.9	10 44.2	+49.4	79.0	10 55.5	+49.9	79.2	11 06.6	+50.5	79.4	11 17.5	+51.1	79.6	11 28.2	+51.6	79.8	15
16	10 56.7	+47.4	77.9	11 09.2	+48.0	78.1	11 21.5	+48.6	78.3	11 33.6	+49.2	78.5	11 45.4	+49.9	78.7	11 57.1	+50.5	78.9	12 08.6	+51.0	79.1	12 19.8	+51.6	79.3	16
17	11 44.1	+47.3	77.3	11 57.2	+48.0	77.5	12 10.1	+48.6	77.7	12 22.8	+49.2	77.9	12 35.3	+49.8	78.1	12 47.6	+50.3	78.3	12 59.6	+50.9	78.5	13 11.4	+51.5	78.8	17
18	12 31.4	+47.2	76.6	12 45.2	+47.8	76.8	12 58.7	+48.5	77.1	13 12.0	+49.1	77.3	13 25.1	+49.7	77.5	13 37.9	+50.3	77.8	13 50.5	+50.9	78.0	14 02.9	+51.4	78.2	18
19	13 18.6	+47.2	76.0	13 33.0	+47.8	76.2	13 47.2	+48.4	76.5	14 01.1	+49.0	76.7	14 14.8	+49.6	77.0	14 28.2	+50.2	77.2	14 41.4	+50.7	77.5	14 54.3	+51.3	77.7	19
20	14 05.8	+47.0	75.4	14 20.8	+47.7	75.6	14 35.6	+48.3	75.9	14 50.1	+49.0	76.1	15 04.4	+49.5	76.4	15 18.4	+50.1	76.6	15 32.1	+50.7	76.9	15 45.6	+51.3	77.2	20
21	14 52.8	+47.0	74.7	15 08.5	+47.6	75.0	15 23.9	+48.2	75.2	15 39.1	+48.8	75.5	15 53.9	+49.5	75.8	16 08.5	+50.1	76.1	16 22.8	+50.6	76.3	16 36.9	+51.1	76.6	21
22	15 39.8	+46.8	74.1	15 56.1	+47.4	74.3	16 12.1	+48.1	74.6	16 27.9	+48.7	74.9	16 43.4	+49.3	75.2	16 58.6	+49.9	75.5	17 13.4	+50.6	75.8	17 28.0	+51.1	76.1	22
23	16 26.6	+46.7	73.4	16 43.5	+47.3	73.7	17 00.2	+48.0	74.0	17 16.6	+48.6	74.3	17 32.7	+49.2	74.6	17 48.5	+49.8	74.9	18 04.0	+50.4	75.2	18 19.1	+51.0	75.5	23
24	17 13.3	+46.5	72.8	17 30.9	+47.2	73.1	17 48.2	+47.9	73.4	18 05.2	+48.5	73.7	18 21.9	+49.1	74.0	18 38.3	+49.7	74.3	18 54.4	+50.3	74.6	19 10.1	+50.9	75.0	24
25	17 59.8	+46.5	72.1	18 18.1	+47.1	72.4	18 36.1	+47.7	72.7	18 53.7	+48.4	73.1	19 11.0	+49.0	73.4	19 28.0	+49.6	73.7	19 44.7	+50.2	74.1	20 01.0	+50.7	74.4	25
26	18 46.3	+46.3	71.4	19 05.2	+47.0	71.8	19 23.8	+47.6	72.1	19 42.1	+48.2	72.4	20 00.0	+48.9	72.8	20 17.6	+49.5	73.1	20 34.9	+50.0	73.5	20 51.7	+50.7	73.8	26
27	19 32.6	+46.1	70.8	19 52.2	+46.8	71.1	20 11.4	+47.5	71.4	20 30.3	+48.1	71.8	20 48.9	+48.7	72.2	21 07.1	+49.3	72.5	21 24.9	+50.0	72.9	21 42.4	+50.5	73.3	27
28	20 18.7	+46.0	70.1	20 39.0	+46.6	70.4	20 58.9	+47.3	70.8	21 18.4	+48.0	71.2	21 37.6	+48.6	71.5	21 56.4	+49.3	71.9	22 14.9	+49.8	72.3	22 32.9	+50.4	72.7	28
29	21 04.7	+45.8	69.4	21 25.6	+46.5	69.8	21 46.2	+47.1	70.1	22 06.4	+47.8	70.5	22 26.2	+48.4	70.9	22 45.7	+49.0	71.3	23 04.7	+49.7	71.7	23 23.3	+50.3	72.1	29
30	21 50.5	+45.6	68.7	22 12.1	+46.3	69.1	22 33.3	+47.0	69.5	22 54.2	+47.6	69.9	23 14.6	+48.3	70.3	23 34.7	+48.9	70.7	23 54.4	+49.5	71.1	24 13.6	+50.1	71.5	30
31	22 36.1	+45.5	68.0	22 58.4	+46.1	68.4	23 20.3	+46.8	68.8	23 41.8	+47.5	69.2	24 02.9	+48.1	69.6	24 23.6	+48.8	70.0	24 43.9	+49.4	70.5	25 03.7	+50.0	70.9	31
32	23 21.6	+45.2	67.3	23 44.5	+46.0	67.7	24 07.1	+46.6	68.1	24 29.3	+47.3	68.5	24 51.0	+48.0	69.0	25 12.4	+48.6	69.4	25 33.3	+49.2	69.8	25 53.7	+49.9	70.3	32
33	24 06.8	+45.1	66.6	24 30.5	+45.7	67.0	24 53.7	+46.5	67.4	25 16.6	+47.1	67.8	25 39.0	+47.7	68.3	26 01.0	+48.4	68.7	26 22.5	+49.0	69.2	26 43.6	+49.6	69.7	33
34	24 51.9	+44.8	65.9	25 16.2	+45.6	66.3	25 40.2	+46.2	66.7	26 03.7	+46.9	67.2	26 26.7	+47.6	67.6	26 49.4	+48.2	68.1	27 11.5	+48.9	68.6	27 33.2	+49.5	69.0	34
35	25 36.7	+44.7	65.1	26 01.8	+45.3	65.6	26 26.4	+46.0	66.0	26 50.6	+46.7	66.5	27 14.3	+47.4	66.9	27 37.6	+48.0	67.4	28 00.4	+48.7	67.9	28 22.7	+49.3	68.4	35
36	26 21.4	+44.3	64.4	26 47.1	+45.1	64.8	27 12.4	+45.8	65.3	27 37.3	+46.4	65.8	28 01.7	+47.1	66.2	28 25.6	+47.8	66.7	28 49.1	+48.4	67.2	29 12.0	+49.1	67.7	36
37	27 05.7	+44.2	63.6	27 32.2	+44.8	64.1	27 58.2	+45.5	64.6	28 23.7	+46.3	65.0	28 48.8	+46.9	65.5	29 13.4	+47.6	66.0	29 37.5	+48.3	66.6	30 01.1	+49.0	67.1	37
38	27 49.9	+43.9	62.9	28 17.0	+44.6	63.3	28 43.7	+45.3	63.8	29 10.0	+46.0	64.3	29 35.7	+46.7	64.8	30 01.0	+47.4	65.3	30 25.8	+48.0	65.9	30 50.1	+48.7	66.4	38
39	28 33.8	+43.6	62.1	29 01.6	+44.4	62.6	29 29.0	+45.1	63.1	29 56.0	+45.7	63.6	30 22.4	+46.5	64.1	30 48.4	+47.1	64.6	31 13.8	+47.9	65.2	31 38.8	+48.4	65.7	39
40	29 17.4	+43.3	61.3	29 46.0	+44.0	61.8	30 14.1	+44.8	62.3	30 41.7	+45.5	62.8	31 08.9	+46.2	63.4	31 35.5	+46.9	63.9	32 01.7	+47.5	64.5	32 27.2	+48.3	65.0	40
41	30 00.7	+43.1	60.5	30 30.0	+43.8	61.0	30 58.9	+44.5	61.5	31 27.2	+45.2	62.1	31 55.1	+45.9	62.6	32 22.4	+46.6	63.2	32 49.2	+47.4	63.7	33 15.5	+48.0	64.3	41
42	30 43.8	+42.7	59.7	31 13.8	+43.5	60.2	31 43.4	+44.2	60.7	32 12.4	+45.0	61.3	32 41.0	+45.7	61.9	33 09.0	+46.4	62.4	33 36.6	+47.0	63.0	34 03.5	+47.8	63.6	42
43	31 26.5	+42.4	58.9	31 57.3	+43.2	59.4	32 27.6	+43.9	59.9	32 57.4	+44.6	60.5	33 26.7	+45.3	61.1	33 55.4	+46.1	61.7	34 23.6	+46.8	62.3	34 51.3	+47.4	62.9	43
44	32 08.9	+42.1	58.0	32 40.5	+42.8	58.6	33 11.5	+43.6	59.1	33 42.0	+44.3	59.7	34 12.0	+45.1	60.3	34 41.5	+45.7	60.9	35 10.4	+46.5	61.5	35 38.7	+47.2	62.1	44
45	32 51.0	+41.8	57.2	33 23.3	+42.5	57.7	33 55.1	+43.2	58.3	34 26.3	+44.0	58.9	34 57.1	+44.7	59.5	35 27.2	+45.5	60.1	35 56.9	+46.2	60.7	36 25.9	+46.9	61.4	45
46	33 32.8	+41.4	56.3	34 05.8	+42.1	56.9	34 38.3	+42.9	57.5	35 10.3	+43.6	58.1	35 41.8	+44.4	58.7	36 12.7	+45.1	59.3	36 43.1	+45.8	59.9	37 12.8	+46.6	60.6	46
47	34 14.2	+41.0	55.5	34 47.9	+41.8	56.0	35 21.2	+42.5	56.6	35 53.9	+43.3	57.2	36 26.2	+44.0	57.8	36 57.8	+44.8	58.5	37 28.9	+45.5	59.1	37 59.4	+46.3	59.8	47
48	34 55.2	+40.6	54.6	35 29.7	+41.4	55.2	36 03.7	+42.2	55.8	36 37.2	+42.9	56.4	37 10.2	+43.7	57.0	37 42.6	+44.4	57.6	38 14.4	+45.2	58.3	38 45.7	+45.9	59.0	48
49	35 35.8	+40.2	53.7	36 11.1	+41.0	54.3	36 45.9	+41.7	54.9	37 20.1	+42.5	55.5	37 53.9	+43.2	56.1	38 27.0	+44.1	56.8	38 59.6	+44.8	57.5	39 31.6	+45.5	58.1	49
50	36 16.0	+39.8	52.8	36 52.1	+40.5	53.4	37 27.6	+41.3	54.0	38 02.6	+42.1	54.6	38 37.1	+42.9	55.2	39 11.1	+43.6	55.9	39 44.4	+44.4	56.6	40 17.1	+45.2	57.3	50
51	36 55.8	+39.3	51.8	37 32.6	+40.1	52.4	38 08.9	+40.9	53.0	38 44.7	+41.7	53.7	39 20.0	+42.4	54.3	39 54.7	+43.2	55.0	40 28.8	+44.0	55.7	41 02.3	+44.8	56.4	51
52	37 35.1	+38.9	50.9	38 12.7	+39.7	51.5	38 49.8	+40.5	52.1	39 26.4	+41.2	52.8	40 02.4	+42.0	53.4	40 37.9	+42.8	54.1	41 12.8	+43.6	54.8	41 47.1	+44.3	55.5	52
53	38 14.0	+38.4	49.9	38 52.4	+39.2	50.5	39 30.3	+39.9	51.2	40 07.6	+40.8	51.8	40 44.4	+41.6	52.5	41 20.7	+42.3	53.2	41 56.4	+43.1	53.9	42 31.4	+43.9	54.6	53
54	38 52.4	+37.9	48.9	39 31.6	+38.6	49.6	40 10.2	+39.5	50.2	40 48.4	+40.2	50.8	41 26.0	+41.0	51.5	42 03.0	+41.9	52.2	42 39.5	+42.6	53.0	43 15.3	+43.5	53.7	54
55	39 30.3	+37.3	47.9	40 10.2	+38.2	48.6	40 49.7	+38.9	49.2	41 28.6	+39.8	49.9	42 07.0	+40.6	50.6	42 44.9	+41.3	51.3	43 22.1	+42.2	52.0	43 58.8	+42.9	52.7	55
56	40 07.6	+36.8	46.9	40 48.4	+37.6	47.5	41 28.6	+38.4	48.2	42 08.4	+39.2	48.9	42 47.6	+40.0	49.6	43 26.2	+40.8	50.3	44 04.3	+41.6	51.0	44 41.7	+42.5	51.8	56
57	40 44.4	+36.3	45.9	41 26.0	+37.0	46.5	42 07.0	+37.9	47.2	42 47.6	+38.6	47.8	43 27.6	+39.4	48.5	44 07.0	+40.3	49.3	44 45.9	+41.1	50.0	45 24.2	+41.9	50.8	57
58	41 20.7	+35.7	44.8	42 03.0	+36.5	45.5	42 44.9	+37.2	46.1	43 26.2	+38.1	46.8	44 07.0	+38.9	47.5	44 47.3	+39.7	48.2	45 27.0	+40.5	49.0	46 06.1	+41.3	49.7	58
59	41 56.4	+35.0	43.7	42 39.5	+35.8	44.4	43 22.1	+36.7	45.0	44 04.3	+37.4	45.7	44 45.9	+38.3	46.4	45 27.0	+39.1	47.1	46 07.5	+39.9	47.9	46 47.4	+40.8	48.7	59
60	42 31.4	+34.4	42.6	43 15.3	+35.2	43.3	43 58.8	+35.9	43.9	44 41.7	+36.8	44.6	45 24.2	+37.6	45.3	46 06.1	+38.4	46.1	46 47.4	+39.3	46.8	47 28.2	+40.1	47.6	60
61	43 05.8	+33.7	41.5	43 50.5	+34.5	42.2	44 34.7	+35.4	42.8	45 18.5	+36.1	43.5	46 01.8	+36.9	44.2	46 44.5	+37.8	44.9	47 26.7	+38.6	45.7	48 08.3	+39.5	46.5	61
62	43 39.5	+33.1	40.4	44 25.0	+33.9	41.0	45 10.1	+34.6	41.7	45 54.6	+35.5	42.4	46 38.7	+36.3	43.1	47 22.3	+37.1	43.8	48 05.3	+38.0	44.6	48 47.8	+38.8	45.4	62
63	44 12.6	+32.3	39.2	44 58.9	+33.1	39.9	45 44.7	+33.9	40.5	46 30.1	+34.7	41.2	47 15.0	+35.5	41.9	47 59.4	+36.3	42.6	48 43.3	+37.2	43.4	49 26.6	+38.0	44.2	63
64	44 44.9	+31.6	38.1	45 32.0	+32.3	38.7	46 18.6	+33.2	39.3	47 04.8	+34.0	40.0	47 50.5	+34.8	40.7	48 35.7	+35.7	41.4	49 20.5	+36.4	42.2	50 04.6	+37.3	43.0	64
65	45 16.5	+30.9	36.9	46 04.3	+31.6	37.5	46 51.8	+32.3	38.1	47 38.8	+33.1	38.8	48 25.3	+34.0	39.5	49 11.4	+34.8	40.2	49 56.9	+35.7	41.0	50 41.9	+36.5	41.8	65
66	45 47.4	+30.0	35.6	46 35.9	+30.8	36.2	47 24.1	+31.6	36.9	48 11.9	+32.4	37.5	48 59.3	+33.1	38.2	49 46.2	+33.9	39.0	50 32.6	+34.8	39.7	51 18.4	+35.7	40.5	66
67	46 17.4	+29.2	34.4	47 06.7	+30.0	35.0	47 55.7	+30.7	35.6	48 44.3	+31.4	36.3	49 32.4	+32.3	37.0	50 20.1	+33.1	37.7	51 07.4	+33.9	38.4	51 54.1	+34.8	39.2	67
68	46 46.6	+28.3	33.1	47 36.7	+29.0	33.7	48 26.4	+29.8	34.3	49 15.7	+30.6	35.0	50 04.7	+31.4	35.7	50 53.2	+32.3	36.4	51 41.3	+33.1	37.1	52 28.9	+33.9	37.9	68
69	47 14.9	+27.4	31.8	48 05.7	+28.2	32.4	48 56.2	+28.9	33.0	49 46.3	+29.7	33.7	50 36.1	+30.4	34.3	51 25.4	+31.3	35.0	52 14.4	+32.0	35.8	53 02.8	+32.9	36.5	69
70	47 42.3	+26.6	30.5	48 33.9	+27.2	31.1	49 25.1	+28.0	31.7	50 16.0	+28.7	32.3	51 06.5	+29.5	33.0	51 56.7	+30.3	33.6	52 46.4	+31.1	34.4	53 35.7	+32.0	35.1	70
71	48 08.9	+25.6	29.2	49 01.1	+26.3	29.7	49 53.1	+27.0	30.3	50 44.7	+27.7	30.9	51 36.0	+28.5	31.6	52 27.0	+29.2	32.2	53 17.5	+30.1	33.0	54 07.7	+30.8	33.7	71
72	48 34.5	+24.6	27.8	49 27.4	+25.3	28.3	50 20.1	+25.9	28.9	51 12.4	+26.7	29.5	52 04.5	+27.4	30.1	52 56.2	+28.2	30.8	53 47.6	+28.9	31.5	54 38.5	+29.8	32.2	72
73	48 59.1	+23.6	26.4	49 52.7	+24.2	26.9	50 46.0	+24.9	27.5	51 39.1	+25.6	28.1	52 31.9	+26.3	28.7	53 24.4	+27.0	29.3	54 16.5	+27.8	30.0	55 08.3	+28.6	30.7	73
74	49 22.7	+22.5	25.0	50 16.9	+23.2	25.5	51 10.9	+23.9	26.0	52 04.7	+24.5	26.6	52 58.2	+25.2	27.2	53 51.4	+26.0	27.8	54 44.3	+26.7	28.5	55 36.9	+27.4	29.2	74
75	49 45.2	+21.5	23.6	50 40.1	+22.1	24.1	51 34.8	+22.7	24.6	52 29.2	+23.4	25.1	53 23.4	+24.0	25.7	54 17.4	+24.7	26.3	55 11.0	+25.4	26.9	56 04.3	+26.2	27.6	75
76	50 06.7	+20.4	22.1	51 02.2	+20.9	22.6	51 57.5	+21.5	23.1	52 52.6	+22.1	23.6	53 47.4	+22.8	24.1	54 42.1	+23.4	24.7	55 36.4	+24.2	25.3	56 30.5	+24.9	26.0	76
77	50 27.1	+19.2	20.7	51 23.1	+19.8	21.1	52 19.0	+20.4	21.6	53 14.7	+21.0	22.0	54 10.2	+21.6	22.6	55 05.5	+22.2	23.1	56 00.6	+22.8	23.7	56 55.4	+23.5	24.3	77
78	50 46.3	+18.1	19.2	51 42.9	+18.6	19.6	52 39.4	+19.1	20.0	53 35.7	+19.7	20.5	54 31.8	+20.2	21.0	55 27.7	+20.9	21.5	56 23.4	+21.5	22.0	57 18.9	+22.2	22.6	78
79	51 04.4	+16.9	17.7	52 01.5	+17.4	18.0	52 58.5	+17.9	18.4	53 55.4	+18.3	18.9	54 52.0	+19.0	19.3	55 48.6	+19.5	19.8	56 44.9	+20.1	20.3	57 41.1	+20.7	20.9	79
80	51 21.3	+15.7	16.1	52 18.9	+16.1	16.5	53 16.4	+16.6	16.9	54 13.7	+17.1	17.3	55 11.0	+17.5	17.7	56 08.1	+18.1	18.1	57 05.0	+18.6	18.6	58 01.8	+19.2	19.1	80
81	51 37.0	+14.5	14.6	52 35.0	+14.9	14.9	53 33.0	+15.2	15.2	54 30.8	+15.7	15.6	55 28.5	+16.2	16.0	56 26.2	+16.6	16.4	57 23.6	+17.2	16.9	58 21.0	+17.7	17.3	81
82	51 51.5	+13.2	13.0	52 49.9	+13.5	13.3	53 48.2	+14.0	13.6	54 46.5	+14.3	13.9	55 44.7	+14.7	14.3	56 42.8	+15.2	14.7	57 40.8	+15.6	15.1	58 38.7	+16.1	15.5	82
83	52 04.7	+11.9	11.4	53 03.4	+12.3	11.7	54 02.2	+12.5	12.0	55 00.8	+12.9	12.3	55 59.4	+13.3	12.6	56 58.0	+13.6	12.9	57 56.4	+14.0	13.3	58 54.8	+14.4	13.6	83
84	52 16.6	+10.6	9.8	53 15.7	+10.8	10.1	54 14.7	+11.2	10.3	55 13.7	+11.5	10.5	56 12.7	+11.8	10.8	57 11.6	+12.1	11.1	58 10.4	+12.5	11.4	59 09.2	+12.8	11.7	84
85	52 27.2	+9.2	8.2	53 26.5	+9.5	8.4	54 25.9	+9.7	8.6	55 25.2	+10.0	8.8	56 24.5	+10.2	9.1	57 23.7	+10.5	9.3	58 22.9	+10.8	9.6	59 22.0	+11.1	9.8	85
86	52 36.4	+8.0	6.6	53 36.0	+8.1	6.7	54 35.6	+8.3	6.9	55 35.2	+8.5	7.1	56 34.7	+8.7	7.3	57 34.2	+8.9	7.5	58 33.7	+9.1	7.7	59 33.1	+9.4	7.9	86
87	52 44.4	+6.6	5.0	53 44.1	+6.8	5.1	54 43.9	+6.9	5.2	55 43.7	+6.9	5.3	56 43.4	+7.1	5.5	57 43.1	+7.3	5.6	58 42.8	+7.5	5.8	59 42.5	+7.6	5.9	87
88	52 51.0	+5.2	3.3	53 50.9	+5.2	3.4	54 50.7	+5.4	3.5	55 50.6	+5.5	3.6	56 50.5	+5.6	3.7	57 50.4	+5.6	3.8	58 50.3	+5.7	3.9	59 50.1	+5.9	4.0	88
89	52 56.2	+3.8	1.7	53 56.1	+3.9	1.7	54 56.1	+3.9	1.7	55 56.1	+3.9	1.8	56 56.1	+3.9	1.8	57 56.0	+4.0	1.9	58 56.0	+4.0	1.9	59 56.0	+4.0	2.0	89
90	53 00.0	+2.4	0.0	54 00.0	+2.4	0.0	55 00.0	+2.4	0.0	56 00.0	+2.4	0.0	57 00.0	+2.3	0.0	58 00.0	+2.3	0.0	59 00.0	+2.3	0.0	60 00.0	+2.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z { L.H.A. less than 180° ....Zn=180°+Z **LATITUDE SAME NAME AS DECLINATION** **L.H.A. 93°, 267°**

359

88°, 272° L.H.A.

LATITUDE SAME NAME AS DECLINATION N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°–Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	1 12.2	+47.9	91.6	1 10.5	+48.6	91.6	1 08.8	+49.2	91.6	1 07.1	+49.7	91.7	1 05.3	+50.4	91.7	1 03.6	+50.9	91.7	1 01.8	+51.4	91.7	1 00.0	+52.0	91.7	0
1	2 00.1	+47.9	91.0	1 59.1	+48.5	91.0	1 58.0	+49.1	91.1	1 56.8	+49.8	91.1	1 55.7	+50.3	91.1	1 54.5	+50.8	91.2	1 53.2	+51.5	91.2	1 52.0	+51.9	91.2	1
2	2 48.0	+47.9	90.4	2 47.6	+48.5	90.4	2 47.1	+49.1	90.5	2 46.6	+49.7	90.5	2 46.0	+50.3	90.6	2 45.3	+50.9	90.6	2 44.7	+51.4	90.7	2 43.9	+52.0	90.7	2
3	3 35.9	+47.8	89.8	3 36.1	+48.5	89.9	3 36.2	+49.1	89.9	3 36.3	+49.7	90.0	3 36.3	+50.3	90.0	3 36.2	+50.9	90.1	3 36.1	+51.4	90.2	3 35.9	+51.9	90.2	3
4	4 23.8	+47.8	89.2	4 24.6	+48.5	89.3	4 25.3	+49.1	89.3	4 26.0	+49.7	89.4	4 26.6	+50.2	89.5	4 27.1	+50.8	89.6	4 27.5	+51.3	89.7	4 27.8	+51.9	89.7	4
5	5 11.6	+47.8	88.6	5 13.1	+48.4	88.7	5 14.4	+49.1	88.8	5 15.7	+49.6	88.9	5 16.8	+50.2	88.9	5 17.9	+50.8	89.0	5 18.8	+51.3	89.1	5 19.7	+51.9	89.2	5
6	5 59.4	+47.8	88.0	6 01.5	+48.4	88.1	6 03.5	+49.0	88.2	6 05.3	+49.6	88.3	6 07.1	+50.1	88.4	6 08.7	+50.7	88.5	6 10.2	+51.3	88.6	6 11.6	+51.8	88.7	6
7	6 47.2	+47.7	87.4	6 49.9	+48.4	87.5	6 52.5	+49.0	87.6	6 54.9	+49.6	87.7	6 57.2	+50.2	87.8	6 59.4	+50.7	87.8	7 01.5	+51.3	88.1	7 03.4	+51.9	88.2	7
8	7 34.9	+47.7	86.8	7 38.3	+48.3	86.9	7 41.4	+49.0	87.0	7 44.5	+49.5	87.2	7 47.4	+50.1	87.3	7 50.2	+50.7	87.4	7 52.8	+51.2	87.6	7 55.3	+51.7	87.7	8
9	8 22.6	+47.6	86.1	8 26.6	+48.2	86.3	8 30.4	+48.8	86.4	8 34.0	+49.5	86.6	8 37.5	+50.1	86.7	8 40.9	+50.6	86.9	8 44.0	+51.2	87.0	8 47.0	+51.8	87.2	9
10	9 10.2	+47.6	85.5	9 14.8	+48.2	85.7	9 19.2	+48.8	85.8	9 23.5	+49.4	86.0	9 27.6	+50.0	86.2	9 31.5	+50.6	86.3	9 35.2	+51.2	86.5	9 38.8	+51.7	86.7	10
11	9 57.8	+47.4	84.9	10 03.0	+48.1	85.1	10 08.0	+48.8	85.3	10 12.9	+49.4	85.4	10 17.6	+49.9	85.6	10 22.1	+50.5	85.8	10 26.4	+51.1	86.0	10 30.5	+51.6	86.2	11
12	10 45.2	+47.4	84.3	10 51.1	+48.1	84.5	10 56.8	+48.7	84.7	11 02.3	+49.3	84.9	11 07.5	+49.9	85.1	11 12.6	+50.5	85.3	11 17.5	+51.0	85.4	11 22.1	+51.6	85.6	12
13	11 32.6	+47.4	83.7	11 39.2	+47.9	83.9	11 45.5	+48.6	84.1	11 51.6	+49.2	84.3	11 57.4	+49.9	84.5	12 03.1	+50.4	84.7	12 08.5	+51.0	84.9	12 13.7	+51.6	85.1	13
14	12 20.0	+47.2	83.0	12 27.1	+47.9	83.2	12 34.1	+48.5	83.5	12 40.8	+49.1	83.7	12 47.3	+49.7	83.9	12 53.5	+50.3	84.1	12 59.5	+50.9	84.4	13 05.3	+51.4	84.6	14
15	13 07.2	+47.1	82.4	13 15.0	+47.8	82.6	13 22.6	+48.4	82.9	13 29.9	+49.1	83.1	13 37.0	+49.7	83.3	13 43.8	+50.3	83.6	13 50.4	+50.8	83.8	13 56.7	+51.4	84.1	15
16	13 54.3	+47.1	81.8	14 02.8	+47.7	82.0	14 11.0	+48.4	82.3	14 19.0	+48.9	82.5	14 26.7	+49.5	82.8	14 34.1	+50.2	83.0	14 41.2	+50.8	83.3	14 48.1	+51.4	83.5	16
17	14 41.4	+46.9	81.1	14 50.5	+47.6	81.4	14 59.4	+48.2	81.6	15 07.9	+48.9	81.9	15 16.2	+49.5	82.2	15 24.3	+50.1	82.5	15 32.0	+50.7	82.7	15 39.5	+51.2	83.0	17
18	15 28.3	+46.8	80.5	15 38.1	+47.5	80.8	15 47.6	+48.1	81.0	15 56.8	+48.8	81.3	16 05.7	+49.4	81.6	16 14.4	+50.0	81.9	16 22.7	+50.6	82.2	16 30.7	+51.2	82.5	18
19	16 15.1	+46.7	79.8	16 25.6	+47.4	80.1	16 35.7	+48.1	80.4	16 45.6	+48.7	80.7	16 55.1	+49.3	81.0	17 04.4	+49.9	81.3	17 13.3	+50.5	81.6	17 21.9	+51.0	81.9	19
20	17 01.8	+46.6	79.2	17 13.0	+47.2	79.5	17 23.8	+47.9	79.8	17 34.3	+48.5	80.1	17 44.4	+49.2	80.4	17 54.3	+49.8	80.7	18 03.8	+50.4	81.0	18 12.9	+51.0	81.4	20
21	17 48.4	+46.5	78.5	18 00.2	+47.1	78.8	18 11.7	+47.8	79.1	18 22.8	+48.4	79.5	18 33.6	+49.1	79.8	18 44.1	+49.6	80.1	18 54.2	+50.3	80.5	19 03.9	+50.9	80.8	21
22	18 34.9	+46.3	77.8	18 47.3	+47.0	78.2	18 59.5	+47.6	78.5	19 11.2	+48.3	78.8	19 22.7	+48.9	79.2	19 33.7	+49.6	79.5	19 44.5	+50.1	79.9	19 54.8	+50.8	80.2	22
23	19 21.2	+46.1	77.2	19 34.3	+46.9	77.5	19 47.1	+47.5	77.9	19 59.5	+48.2	78.2	20 11.6	+48.8	78.6	20 23.3	+49.4	78.9	20 34.6	+50.1	79.3	20 45.6	+50.6	79.7	23
24	20 07.3	+46.0	76.5	20 21.2	+46.6	76.9	20 34.6	+47.4	77.2	20 47.7	+48.0	77.6	21 00.4	+48.7	78.0	21 12.7	+49.4	78.3	21 24.7	+49.9	78.7	21 36.2	+50.6	79.1	24
25	20 53.3	+45.8	75.8	21 07.8	+46.6	76.2	21 22.0	+47.2	76.6	21 35.7	+47.9	76.9	21 49.1	+48.5	77.3	22 02.1	+49.1	77.7	22 14.6	+49.8	78.1	22 26.8	+50.4	78.5	25
26	21 39.1	+45.7	75.1	21 54.4	+46.3	75.5	22 09.2	+47.0	75.9	22 23.6	+47.7	76.3	22 37.6	+48.4	76.7	22 51.2	+49.1	77.1	23 04.4	+49.7	77.5	23 17.2	+50.2	77.9	26
27	22 24.8	+45.5	74.4	22 40.7	+46.2	74.8	22 56.2	+46.9	75.2	23 11.3	+47.6	75.6	23 26.0	+48.2	76.1	23 40.3	+48.8	76.5	23 54.1	+49.5	76.9	24 07.4	+50.2	77.3	27
28	23 10.3	+45.3	73.7	23 26.9	+46.0	74.1	23 43.1	+46.7	74.5	23 58.9	+47.4	75.0	24 14.2	+48.1	75.4	24 29.1	+48.7	75.8	24 43.6	+49.3	76.3	24 57.6	+50.0	76.7	28
29	23 55.6	+45.0	73.0	24 12.9	+45.8	73.4	24 29.8	+46.5	73.9	24 46.3	+47.2	74.3	25 02.3	+47.9	74.7	25 17.8	+48.6	75.2	25 32.9	+49.2	75.7	25 47.6	+49.8	76.1	29
30	24 40.6	+44.9	72.3	24 58.7	+45.6	72.7	25 16.3	+46.3	73.2	25 33.5	+47.0	73.6	25 50.2	+47.6	74.1	26 06.4	+48.4	74.5	26 22.1	+49.1	75.0	26 37.4	+49.7	75.5	30
31	25 25.5	+44.7	71.5	25 44.3	+45.4	72.0	26 02.6	+46.1	72.5	26 20.5	+46.8	72.9	26 37.8	+47.5	73.4	26 54.8	+48.1	73.9	27 11.2	+48.8	74.4	27 27.1	+49.5	74.9	31
32	26 10.2	+44.4	70.8	26 29.7	+45.1	71.3	26 48.7	+45.9	71.7	27 07.3	+46.6	72.2	27 25.3	+47.3	72.7	27 42.9	+48.0	73.2	28 00.0	+48.7	73.7	28 16.6	+49.3	74.2	32
33	26 54.6	+44.1	70.0	27 14.8	+44.9	70.5	27 34.6	+45.6	71.0	27 53.9	+46.3	71.5	28 12.6	+47.1	72.0	28 30.9	+47.8	72.5	28 48.7	+48.4	73.1	29 05.9	+49.1	73.6	33
34	27 38.7	+44.0	69.3	27 59.7	+44.7	69.8	28 20.2	+45.4	70.3	28 40.2	+46.2	70.8	28 59.7	+46.9	71.3	29 18.7	+47.5	71.8	29 37.1	+48.3	72.4	29 55.0	+48.7	72.9	34
35	28 22.7	+43.6	68.5	28 44.4	+44.4	69.0	29 05.6	+45.2	69.5	29 26.4	+45.9	70.1	29 46.6	+46.6	70.6	30 06.2	+47.4	71.1	30 25.4	+48.0	71.7	30 43.7	+48.7	72.3	35
36	29 06.3	+43.4	67.7	29 28.8	+44.2	68.2	29 50.8	+44.9	68.8	30 12.3	+45.6	69.3	30 33.2	+46.4	69.9	30 53.6	+47.1	70.4	31 13.4	+47.8	71.0	31 32.6	+48.5	71.6	36
37	29 49.7	+43.1	66.9	30 13.0	+43.8	67.5	30 35.7	+44.6	68.0	30 57.9	+45.4	68.6	31 19.6	+46.1	69.1	31 40.7	+46.8	69.7	32 01.2	+47.5	70.3	32 21.1	+48.3	70.9	37
38	30 32.8	+42.8	66.1	30 56.8	+43.6	66.7	31 20.3	+44.3	67.2	31 43.3	+45.1	67.8	32 05.7	+45.8	68.4	32 27.5	+46.6	69.0	32 48.7	+47.3	69.6	33 09.4	+48.0	70.2	38
39	31 15.6	+42.5	65.3	31 40.4	+43.2	65.9	32 04.6	+44.1	66.4	32 28.4	+44.8	67.0	32 51.5	+45.6	67.6	33 14.1	+46.3	68.2	33 36.0	+47.1	68.8	33 57.4	+47.8	69.4	39
40	31 58.1	+42.1	64.5	32 23.6	+43.0	65.0	32 48.7	+43.7	65.6	33 13.2	+44.5	66.2	33 37.1	+45.2	66.8	34 00.4	+46.0	67.4	34 23.1	+46.7	68.1	34 45.2	+47.5	68.7	40
41	32 40.2	+41.8	63.6	33 06.6	+42.6	64.2	33 32.4	+43.4	64.8	33 57.7	+44.1	65.4	34 22.3	+45.0	66.0	34 46.4	+45.7	66.7	35 09.8	+46.5	67.3	35 32.7	+47.2	68.0	41
42	33 22.0	+41.5	62.8	33 49.2	+42.2	63.4	34 15.8	+43.0	64.0	34 41.8	+43.9	64.6	35 07.3	+44.6	65.2	35 32.1	+45.4	65.9	35 56.3	+46.2	66.5	36 19.9	+46.9	67.2	42
43	34 03.5	+41.0	61.9	34 31.4	+41.9	62.5	34 58.8	+42.7	63.1	35 25.7	+43.4	63.8	35 51.9	+44.3	64.4	36 17.5	+45.0	65.1	36 42.5	+45.8	65.7	37 06.8	+46.6	66.4	43
44	34 44.5	+40.7	61.0	35 13.3	+41.5	61.6	35 41.5	+42.3	62.3	36 09.1	+43.2	62.9	36 36.2	+43.9	63.6	37 02.5	+44.8	64.2	37 28.3	+45.5	64.9	37 53.4	+46.3	65.6	44
45	35 25.2	+40.3	60.1	35 54.8	+41.1	60.8	36 23.8	+42.0	61.4	36 52.3	+42.7	62.1	37 20.1	+43.5	62.7	37 47.3	+44.3	63.4	38 13.8	+45.1	64.1	38 39.7	+45.9	64.8	45
46	36 05.5	+39.9	59.2	36 35.9	+40.7	59.9	37 05.8	+41.5	60.5	37 35.0	+42.3	61.2	38 03.6	+43.2	61.9	38 31.6	+44.0	62.5	38 58.9	+44.8	63.3	39 25.6	+45.6	64.0	46
47	36 45.4	+39.4	58.3	37 16.6	+40.3	58.9	37 47.3	+41.1	59.6	38 17.3	+42.0	60.3	38 46.8	+42.7	61.0	39 15.6	+43.5	61.7	39 43.7	+44.4	62.4	40 11.2	+45.2	63.1	47
48	37 24.8	+38.9	57.3	37 56.9	+39.8	58.0	38 28.4	+40.6	58.7	38 59.3	+41.4	59.4	39 29.5	+42.3	60.1	39 59.1	+43.2	60.8	40 28.1	+44.0	61.5	40 56.4	+44.7	62.3	48
49	38 03.7	+38.5	56.4	38 36.7	+39.3	57.0	39 09.0	+40.2	57.7	39 40.7	+41.1	58.4	40 11.8	+41.9	59.1	40 42.3	+42.7	59.9	41 12.1	+43.5	60.6	41 41.1	+44.4	61.4	49
50	38 42.2	+38.0	55.4	39 16.0	+38.8	56.1	39 49.2	+39.7	56.8	40 21.8	+40.5	57.5	40 53.7	+41.4	58.2	41 25.0	+42.2	58.9	41 55.6	+43.1	59.7	42 25.5	+44.0	60.5	50
51	39 20.2	+37.5	54.4	39 54.8	+38.3	55.1	40 28.9	+39.2	55.8	41 02.3	+40.0	56.5	41 35.1	+40.9	57.2	42 07.2	+41.8	58.0	42 38.7	+42.6	58.8	43 09.5	+43.4	59.6	51
52	39 57.7	+36.9	53.4	40 33.1	+37.8	54.1	41 08.1	+38.6	54.8	41 42.3	+39.6	55.5	42 16.0	+40.4	56.2	42 49.0	+41.3	57.0	43 21.3	+42.2	57.8	43 52.9	+43.0	58.6	52
53	40 34.6	+36.3	52.4	41 10.9	+37.3	53.0	41 46.7	+38.1	53.8	42 21.9	+38.9	54.5	42 56.4	+39.8	55.2	43 30.3	+40.7	56.0	44 03.5	+41.6	56.8	44 35.9	+42.5	57.6	53
54	41 10.9	+35.8	51.3	41 48.2	+36.6	52.0	42 24.8	+37.5	52.7	43 00.8	+38.4	53.5	43 36.2	+39.3	54.2	44 11.0	+40.2	55.0	44 45.1	+41.0	55.8	45 18.4	+42.0	56.6	54
55	41 46.7	+35.2	50.2	42 24.8	+36.0	50.9	43 02.3	+36.9	51.7	43 39.2	+37.8	52.4	44 15.5	+38.7	53.2	44 51.2	+39.6	54.0	45 26.1	+40.5	54.8	46 00.4	+41.4	55.6	55
56	42 21.9	+34.5	49.1	43 00.8	+35.4	49.8	43 39.2	+36.3	50.6	44 17.0	+37.2	51.3	44 54.2	+38.1	52.1	45 30.8	+38.9	52.9	46 06.6	+39.9	53.7	46 41.8	+40.8	54.6	56
57	42 56.4	+33.9	48.0	43 36.2	+34.8	48.7	44 15.5	+35.7	49.5	44 54.2	+36.6	50.2	45 32.3	+37.4	51.0	46 09.7	+38.4	51.8	46 46.5	+39.3	52.6	47 22.6	+40.1	53.5	57
58	43 30.3	+33.2	46.9	44 11.0	+34.1	47.6	44 51.2	+34.9	48.3	45 30.8	+35.8	49.1	46 09.7	+36.8	49.9	46 48.1	+37.7	50.7	47 25.8	+38.6	51.5	48 02.7	+39.6	52.4	58
59	44 03.5	+32.4	45.7	44 45.1	+33.3	46.5	45 26.1	+34.3	47.2	46 06.5	+35.2	47.9	46 46.5	+36.1	48.7	47 25.8	+36.9	49.5	48 04.4	+37.9	50.4	48 42.3	+38.8	51.3	59
60	44 35.9	+31.8	44.6	45 18.4	+32.6	45.3	46 00.4	+33.5	46.0	46 41.8	+34.4	46.8	47 22.6	+35.3	47.6	48 02.7	+36.3	48.4	48 42.3	+37.2	49.2	49 21.1	+38.1	50.1	60
61	45 07.7	+31.0	43.4	45 51.0	+31.9	44.1	46 33.9	+32.7	44.8	47 16.2	+33.6	45.6	47 57.9	+34.5	46.4	48 39.0	+35.5	47.2	49 19.5	+36.4	48.0	49 59.2	+37.4	48.9	61
62	45 38.7	+30.1	42.2	46 22.9	+31.0	42.9	47 06.6	+32.0	43.6	47 49.8	+32.8	44.3	48 32.4	+33.8	45.1	49 14.5	+34.7	45.9	49 55.9	+35.6	46.8	50 36.6	+36.6	47.7	62
63	46 08.8	+29.4	40.9	46 53.9	+30.3	41.6	47 38.6	+31.1	42.3	48 22.7	+32.0	43.1	49 06.2	+32.9	43.9	49 49.2	+33.8	44.7	50 31.5	+34.8	45.6	51 13.2	+35.8	46.4	63
64	46 38.2	+28.5	39.6	47 24.2	+29.3	40.3	48 09.7	+30.2	41.1	48 54.7	+31.1	41.8	49 39.1	+32.1	42.6	50 23.0	+33.0	43.4	51 06.3	+33.9	44.2	51 49.0	+34.8	45.1	64
65	47 06.7	+27.7	38.4	47 53.5	+28.5	39.0	48 39.9	+29.4	39.8	49 25.8	+30.2	40.5	50 11.2	+31.1	41.3	50 56.0	+32.0	42.1	51 40.2	+33.0	42.9	52 23.8	+34.0	43.8	65
66	47 34.4	+26.7	37.1	48 22.0	+27.6	37.7	49 09.3	+28.4	38.4	49 56.0	+29.3	39.2	50 42.3	+30.2	39.9	51 28.0	+31.2	40.7	52 13.2	+32.1	41.6	52 57.8	+33.0	42.4	66
67	48 01.1	+25.8	35.7	48 49.6	+26.6	36.4	49 37.7	+27.4	37.1	50 25.3	+28.3	37.8	51 12.5	+29.2	38.6	51 59.2	+30.1	39.4	52 45.3	+31.0	40.2	53 30.8	+32.0	41.0	67
68	48 26.9	+24.8	34.4	49 16.2	+25.6	35.0	50 05.1	+26.5	35.7	50 53.6	+27.4	36.4	51 41.7	+28.2	37.2	52 29.3	+29.1	37.9	53 16.3	+30.0	38.8	54 02.8	+31.0	39.6	68
69	48 51.7	+23.8	33.0	49 41.8	+24.6	33.6	50 31.6	+25.4	34.3	51 21.0	+26.2	35.0	52 09.7	+27.1	35.7	52 58.4	+28.0	36.5	53 46.3	+29.0	37.3	54 33.8	+29.9	38.1	69
70	49 15.5	+22.8	31.6	50 06.4	+23.6	32.2	50 57.0	+24.4	32.9	51 47.2	+25.2	33.5	52 37.0	+26.0	34.3	53 26.4	+26.9	35.0	54 15.3	+27.8	35.8	55 03.7	+28.7	36.6	70
71	49 38.3	+21.7	30.2	50 30.0	+22.4	30.8	51 21.4	+23.2	31.4	52 12.4	+24.0	32.1	53 03.0	+24.9	32.8	53 53.3	+25.7	33.5	54 43.1	+26.6	34.3	55 32.4	+27.6	35.1	71
72	50 00.0	+20.6	28.7	50 52.4	+21.4	29.3	51 44.6	+22.1	29.9	52 36.4	+22.9	30.6	53 27.9	+23.7	31.2	54 19.0	+24.6	32.0	55 09.7	+25.4	32.7	56 00.0	+26.3	33.5	72
73	50 20.6	+19.5	27.2	51 13.8	+20.2	27.8	52 06.7	+21.0	28.4	52 59.3	+21.7	29.0	53 51.6	+22.5	29.7	54 43.6	+23.3	30.4	55 35.1	+24.2	31.1	56 26.3	+25.0	31.9	73
74	50 40.1	+18.3	25.8	51 34.0	+19.0	26.3	52 27.7	+19.7	26.9	53 21.0	+20.5	27.5	54 14.1	+21.2	28.1	55 06.9	+22.0	28.8	55 59.3	+22.8	29.5	56 51.3	+23.7	30.3	74
75	50 58.4	+17.2	24.3	51 53.0	+17.8	24.8	52 47.4	+18.5	25.3	53 41.5	+19.3	25.9	54 35.3	+19.9	26.5	55 28.9	+20.6	27.2	56 22.1	+21.4	27.8	57 15.0	+22.2	28.6	75
76	51 15.6	+16.0	22.7	52 10.8	+16.6	23.2	53 05.9	+17.2	23.7	54 00.7	+17.9	24.3	54 55.2	+18.6	24.9	55 49.5	+19.3	25.5	56 43.5	+20.1	26.1	57 37.2	+20.9	26.8	76
77	51 31.6	+14.7	21.2	52 27.4	+15.3	21.7	53 23.1	+15.9	22.1	54 18.6	+16.5	22.7	55 13.8	+17.2	23.2	56 08.8	+17.9	23.8	57 03.6	+18.6	24.4	57 58.1	+19.4	25.1	77
78	51 46.3	+13.5	19.6	52 42.7	+14.1	20.1	53 39.0	+14.6	20.5	54 35.1	+15.2	21.0	55 31.0	+15.8	21.5	56 26.7	+16.5	22.1	57 22.2	+17.1	22.7	58 17.5	+17.8	23.3	78
79	51 59.8	+12.2	18.0	52 56.8	+12.7	18.4	53 53.6	+13.2	18.9	54 50.3	+13.8	19.3	55 46.8	+14.4	19.8	56 43.2	+14.9	20.3	57 39.3	+15.6	20.9	58 35.3	+16.2	21.5	79
80	52 12.0	+10.9	16.4	53 09.5	+11.3	16.8	54 06.8	+11.9	17.2	55 04.1	+12.3	17.6	56 01.2	+12.9	18.1	56 58.1	+13.5	18.6	57 54.9	+14.1	19.1	58 51.5	+14.7	19.6	80
81	52 22.9	+9.5	14.8	53 20.8	+10.0	15.2	54 18.7	+10.4	15.5	55 16.4	+11.0	15.9	56 14.1	+11.3	16.3	57 11.6	+11.9	16.8	58 09.0	+12.4	17.2	59 06.2	+13.0	17.7	81
82	52 32.4	+8.3	13.2	53 30.8	+8.6	13.5	54 29.1	+9.0	13.9	55 27.3	+9.4	14.2	56 25.4	+9.9	14.6	57 23.5	+10.3	15.0	58 21.4	+10.8	15.4	59 19.2	+11.3	15.8	82
83	52 40.7	+6.9	11.6	53 39.4	+7.3	11.9	54 38.1	+7.6	12.1	55 36.7	+8.0	12.5	56 35.3	+8.3	12.8	57 33.8	+8.7	13.1	58 32.2	+9.1	13.5	59 30.5	+9.5	13.9	83
84	52 47.6	+5.5	9.9	53 46.7	+5.8	10.2	54 45.7	+6.1	10.4	55 44.7	+6.4	10.7	56 43.6	+6.7	11.0	57 42.5	+7.0	11.3	58 41.3	+7.4	11.6	59 40.2	+7.7	11.9	84
85	52 53.1	+4.2	8.3	53 52.5	+4.3	8.5	54 51.8	+4.6	8.7	55 51.1	+4.9	8.9	56 50.3	+5.2	9.2	57 49.5	+5.5	9.4	58 48.7	+5.7	9.7	59 47.8	+6.1	10.0	85
86	52 57.3	+2.7	6.6	53 56.8	+3.0	6.8	54 56.4	+3.2	7.0	55 56.0	+3.3	7.1	56 55.5	+3.5	7.3	57 55.0	+3.7	7.5	58 54.4	+4.0	7.8	59 53.9	+4.2	8.0	86
87	53 00.0	+1.4	5.0	53 59.8	+1.4	5.1	54 59.6	+1.6	5.2	55 59.3	+1.8	5.4	56 59.0	+2.0	5.5	57 58.7	+2.1	5.7	58 58.4	+2.3	5.8	59 58.1	+2.5	6.0	87
88	53 01.4	0.0	3.3	54 01.3	+0.1	3.4	55 01.2	+0.1	3.5	56 01.1	+0.2	3.6	57 01.0	+0.3	3.7	58 00.8	+0.5	3.8	59 00.7	+0.5	3.9	60 00.6	+0.6	4.0	88
89	53 01.4	–1.4	1.7	54 01.4	–1.4	1.7	55 01.3	–1.3	1.7	56 01.3	–1.3	1.8	57 01.3	–1.3	1.8	58 01.3	–1.3	1.9	59 01.2	–1.2	1.9	60 01.2	–1.2	2.0	89
90	53 00.0	–2.8	0.0	54 00.0	–2.8	0.0	55 00.0	–2.8	0.0	56 00.0	–2.9	0.0	57 00.0	–2.9	0.0	58 00.0	–2.9	0.0	59 00.0	–3.0	0.0	60 00.0	–3.0	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	1 12.2	−47.9	91.6	1 10.5	−48.5	91.6	1 08.8	−49.1	91.6	1 07.1	−49.8	91.7	1 05.3	−50.3	91.7	1 03.6	−50.9	91.7	1 01.8	−51.4	91.7	1 00.0	−52.0	91.7	0
1	0 24.3	−48.0	92.2	0 22.0	−48.6	92.2	0 19.7	−49.2	92.2	0 17.3	−49.7	92.2	0 15.0	−50.3	92.2	0 12.7	−50.9	92.2	0 10.4	−51.5	92.2	0 08.0	−52.0	92.2	1
2	0 23.7	+47.9	87.2	0 26.6	+48.5	87.2	0 29.5	+49.2	87.2	0 32.4	+49.8	87.2	0 35.3	+50.3	87.2	0 38.2	+50.9	87.2	0 41.1	+51.4	87.3	0 44.0	+51.9	87.3	2
3	1 11.6	+47.9	86.6	1 15.1	+48.6	86.6	1 18.7	+49.1	86.6	1 22.2	+49.7	86.7	1 25.6	+50.4	86.7	1 29.1	+50.9	86.7	1 32.5	+51.5	86.8	1 35.9	+52.0	86.8	3
4	1 59.5	+47.9	86.0	2 03.7	+48.5	86.0	2 07.8	+49.2	86.1	2 11.9	+49.7	86.1	2 16.0	+50.3	86.1	2 20.0	+50.9	86.2	2 24.0	+51.4	86.2	2 27.9	+51.9	86.3	4
5	2 47.4	+47.9	85.4	2 52.2	+48.5	85.4	2 57.0	+49.1	85.5	3 01.6	+49.8	85.5	3 06.3	+50.3	85.6	3 10.9	+50.8	85.7	3 15.4	+51.4	85.7	3 19.8	+52.0	85.8	5
6	3 35.3	+47.9	84.8	3 40.7	+48.5	84.9	3 46.1	+49.1	84.9	3 51.4	+49.7	85.0	3 56.6	+50.2	85.1	4 01.7	+50.8	85.1	4 06.8	+51.4	85.2	4 11.8	+51.9	85.3	6
7	4 23.2	+47.8	84.2	4 29.2	+48.5	84.3	4 35.2	+49.1	84.4	4 41.1	+49.6	84.4	4 46.8	+50.3	84.5	4 52.5	+50.9	84.6	4 58.2	+51.3	84.7	5 03.7	+51.9	84.8	7
8	5 11.0	+47.8	83.6	5 17.7	+48.4	83.7	5 24.3	+49.0	83.8	5 30.7	+49.7	83.9	5 37.1	+50.2	84.0	5 43.4	+50.7	84.1	5 49.5	+51.3	84.2	5 55.6	+51.9	84.3	8
9	5 58.8	+47.8	83.0	6 06.1	+48.4	83.1	6 13.3	+49.0	83.2	6 20.4	+49.6	83.3	6 27.3	+50.2	83.4	6 34.1	+50.8	83.5	6 40.8	+51.3	83.6	6 47.4	+51.9	83.8	9
10	6 46.6	+47.7	82.4	6 54.5	+48.3	82.6	7 02.3	+48.9	82.6	7 10.0	+49.5	82.7	7 17.5	+50.1	82.9	7 24.9	+50.7	83.0	7 32.1	+51.3	83.1	7 39.3	+51.8	83.2	10
11	7 34.3	+47.7	81.8	7 42.8	+48.3	81.9	7 51.2	+49.0	82.0	7 59.5	+49.5	82.2	8 07.6	+50.1	82.3	8 15.6	+50.6	82.4	8 23.4	+51.2	82.6	8 31.1	+51.7	82.7	11
12	8 22.0	+47.6	81.1	8 31.1	+48.3	81.3	8 40.2	+48.8	81.4	8 49.0	+49.5	81.6	8 57.7	+50.1	81.7	9 06.2	+50.7	81.9	9 14.6	+51.2	82.1	9 22.8	+51.7	82.2	12
13	9 09.6	+47.5	80.5	9 19.4	+48.2	80.7	9 29.0	+48.8	80.8	9 38.5	+49.4	81.0	9 47.8	+49.9	81.2	9 56.9	+50.5	81.4	10 05.8	+51.1	81.5	10 14.5	+51.7	81.7	13
14	9 57.1	+47.5	79.9	10 07.6	+48.1	80.1	10 17.8	+48.7	80.3	10 27.9	+49.3	80.4	10 37.7	+50.0	80.6	10 47.4	+50.5	80.8	10 56.9	+51.1	81.0	11 06.2	+51.6	81.2	14
15	10 44.6	+47.4	79.3	10 55.7	+48.0	79.5	11 06.5	+48.7	79.7	11 17.2	+49.3	79.9	11 27.7	+49.8	80.1	11 37.9	+50.5	80.3	11 48.0	+51.0	80.5	11 57.8	+51.6	80.7	15
16	11 32.0	+47.3	78.7	11 43.7	+48.0	79.1	11 55.2	+48.6	79.1	12 06.5	+49.2	79.3	12 17.5	+49.8	79.5	12 28.4	+50.3	79.7	12 39.0	+50.9	79.9	12 49.4	+51.5	80.1	16
17	12 19.3	+47.3	78.0	12 31.7	+47.9	78.2	12 43.8	+48.5	78.5	12 55.7	+49.1	78.7	13 07.3	+49.7	78.9	13 18.7	+50.3	79.1	13 29.9	+50.9	79.4	13 40.9	+51.4	79.6	17
18	13 06.6	+47.1	77.4	13 19.6	+47.7	77.6	13 32.3	+48.4	77.9	13 44.8	+49.0	78.1	13 57.0	+49.7	78.3	14 09.0	+50.3	78.6	14 20.8	+50.8	78.8	14 32.3	+51.3	79.1	18
19	13 53.7	+47.1	76.8	14 07.3	+47.7	77.0	14 20.7	+48.3	77.3	14 33.8	+49.0	77.5	14 46.7	+49.5	77.8	14 59.3	+50.1	78.0	15 11.6	+50.7	78.3	15 23.6	+51.3	78.6	19
20	14 40.8	+46.9	76.1	14 55.0	+47.6	76.4	15 09.0	+48.3	76.6	15 22.8	+48.8	76.9	15 36.2	+49.5	77.2	15 49.4	+50.0	77.5	16 02.3	+50.6	77.7	16 14.9	+51.2	78.0	20
21	15 27.7	+46.8	75.5	15 42.6	+47.5	75.7	15 57.3	+48.1	76.0	16 11.6	+48.7	76.3	16 25.7	+49.3	76.6	16 39.4	+50.0	76.9	16 52.9	+50.5	77.2	17 06.1	+51.1	77.5	21
22	16 14.5	+46.7	74.8	16 30.1	+47.4	75.1	16 45.4	+48.0	75.4	17 00.3	+48.7	75.7	17 15.0	+49.3	76.0	17 29.4	+49.8	76.3	17 43.4	+50.5	76.6	17 57.2	+51.0	76.9	22
23	17 01.2	+46.6	74.2	17 17.5	+47.2	74.5	17 33.4	+47.9	74.8	17 49.0	+48.5	75.1	18 04.3	+49.1	75.4	18 19.2	+49.8	75.7	18 33.9	+50.3	76.0	18 48.2	+50.9	76.4	23
24	17 47.8	+46.5	73.5	18 04.7	+47.1	73.8	18 21.3	+47.7	74.1	18 37.5	+48.4	74.5	18 53.4	+49.0	74.8	19 09.0	+49.6	75.1	19 24.2	+50.2	75.5	19 39.1	+50.8	75.8	24
25	18 34.3	+46.3	72.9	18 51.8	+47.0	73.2	19 09.0	+47.6	73.5	19 25.9	+48.3	73.8	19 42.4	+48.9	74.2	19 58.6	+49.5	74.5	20 14.4	+50.1	74.9	20 29.9	+50.7	75.2	25
26	19 20.6	+46.1	72.2	19 38.8	+46.8	72.5	19 56.6	+47.5	72.9	20 14.2	+48.1	73.2	20 31.3	+48.8	73.6	20 48.1	+49.4	73.9	21 04.5	+50.0	74.3	21 20.6	+50.6	74.7	26
27	20 06.7	+46.0	71.5	20 25.6	+46.7	71.8	20 44.1	+47.4	72.2	21 02.3	+48.0	72.6	21 20.1	+48.6	72.9	21 37.5	+49.2	73.3	21 54.5	+49.9	73.7	22 11.2	+50.4	74.1	27
28	20 52.7	+45.9	70.8	21 12.3	+46.5	71.2	21 31.5	+47.1	71.5	21 50.3	+47.8	71.9	22 08.7	+48.5	72.3	22 26.7	+49.1	72.7	22 44.4	+49.7	73.1	23 01.6	+50.3	73.5	28
29	21 38.6	+45.6	70.1	21 58.8	+46.3	70.5	22 18.6	+47.0	70.9	22 38.1	+47.7	71.3	22 57.2	+48.3	71.7	23 15.8	+49.0	72.1	23 34.1	+49.6	72.5	23 51.9	+50.2	72.9	29
30	22 24.2	+45.5	69.4	22 45.1	+46.2	69.8	23 05.6	+46.9	70.2	23 25.8	+47.5	70.6	23 45.5	+48.1	71.0	24 04.8	+48.8	71.4	24 23.7	+49.4	71.9	24 42.1	+50.1	72.3	30
31	23 09.7	+45.3	68.7	23 31.3	+46.0	69.1	23 52.5	+46.6	69.5	24 13.3	+47.3	69.9	24 33.6	+48.0	70.4	24 53.6	+48.6	70.8	25 13.1	+49.3	71.2	25 32.2	+49.8	71.7	31
32	23 55.0	+45.1	68.0	24 17.3	+45.7	68.4	24 39.1	+46.5	68.8	25 00.6	+47.1	69.3	25 21.6	+47.8	69.7	25 42.2	+48.5	70.2	26 02.4	+49.0	70.6	26 22.0	+49.8	71.1	32
33	24 40.1	+44.8	67.3	25 03.0	+45.6	67.7	25 25.6	+46.3	68.1	25 47.7	+47.0	68.6	26 09.4	+47.6	69.0	26 30.7	+48.2	69.5	26 51.4	+49.0	70.0	27 11.8	+49.5	70.4	33
34	25 24.9	+44.7	66.5	25 48.6	+45.4	67.0	26 11.9	+46.0	67.4	26 34.7	+46.7	67.9	26 57.0	+47.4	68.4	27 18.9	+48.1	68.8	27 40.4	+48.7	69.3	28 01.3	+49.4	69.8	34
35	26 09.6	+44.4	65.8	26 34.0	+45.1	66.2	26 57.9	+45.8	66.7	27 21.4	+46.5	67.2	27 44.4	+47.3	67.7	28 07.0	+47.9	68.2	28 29.1	+48.5	68.7	28 50.7	+49.2	69.2	35
36	26 54.0	+44.2	65.0	27 19.1	+44.9	65.5	27 43.7	+45.6	66.0	28 07.9	+46.3	66.5	28 31.7	+46.9	67.0	28 54.9	+47.7	67.5	29 17.6	+48.4	68.0	29 39.9	+49.0	68.5	36
37	27 38.2	+43.9	64.3	28 04.0	+44.6	64.8	28 29.3	+45.4	65.2	28 54.2	+46.1	65.7	29 18.6	+46.8	66.3	29 42.6	+47.4	66.8	30 06.0	+48.1	67.3	30 28.9	+48.7	67.8	37
38	28 22.1	+43.7	63.5	28 48.6	+44.4	64.0	29 14.7	+45.1	64.5	29 40.3	+45.8	65.0	30 05.4	+46.5	65.5	30 30.0	+47.2	66.1	30 54.1	+47.9	66.6	31 17.6	+48.6	67.2	38
39	29 05.8	+43.3	62.7	29 33.0	+44.1	63.2	29 59.8	+44.9	63.7	30 26.1	+45.6	64.3	30 51.9	+46.3	64.8	31 17.2	+47.0	65.3	31 42.0	+47.6	65.9	32 06.2	+48.3	66.5	39
40	29 49.1	+43.1	61.9	30 17.1	+43.9	62.4	30 44.7	+44.5	63.0	31 11.7	+45.3	63.5	31 38.2	+46.0	64.1	32 04.2	+46.7	64.6	32 29.6	+47.4	65.2	32 54.5	+48.1	65.8	40
41	30 32.2	+42.8	61.1	31 01.0	+43.5	61.7	31 29.2	+44.3	62.2	31 57.0	+45.0	62.7	32 24.2	+45.7	63.3	32 50.9	+46.4	63.9	33 17.0	+47.2	64.5	33 42.6	+47.9	65.1	41
42	31 15.0	+42.5	60.3	31 44.5	+43.2	60.8	32 13.5	+44.0	61.4	32 42.0	+44.7	62.0	33 09.9	+45.4	62.5	33 37.3	+46.2	63.1	34 04.2	+46.8	63.7	34 30.5	+47.5	64.3	42
43	31 57.5	+42.2	59.5	32 27.7	+42.9	60.0	32 57.5	+43.6	60.6	33 26.7	+44.4	61.2	33 55.3	+45.2	61.7	34 23.5	+45.8	62.3	34 51.0	+46.6	63.0	35 18.0	+47.3	63.6	43
44	32 39.7	+41.8	58.6	33 10.6	+42.6	59.2	33 41.1	+43.3	59.8	34 11.1	+44.0	60.3	34 40.5	+44.8	60.9	35 09.3	+45.6	61.6	35 37.6	+46.3	62.2	36 05.3	+47.0	62.8	44
45	33 21.5	+41.4	57.8	33 53.2	+42.2	58.4	34 24.4	+43.0	58.9	34 55.1	+43.8	59.5	35 25.3	+44.5	60.1	35 54.9	+45.2	60.8	36 23.9	+46.0	61.4	36 52.3	+46.7	62.1	45
46	34 02.9	+41.1	56.9	34 35.4	+41.9	57.5	35 07.4	+42.6	58.1	35 38.9	+43.4	58.7	36 09.8	+44.1	59.3	36 40.1	+44.9	59.9	37 09.9	+45.6	60.6	37 39.0	+46.4	61.3	46
47	34 44.0	+40.7	56.0	35 17.3	+41.4	56.6	35 50.0	+42.3	57.2	36 22.3	+43.0	57.8	36 53.9	+43.8	58.5	37 25.0	+44.5	59.1	37 55.5	+45.3	59.9	38 25.4	+46.1	60.5	47
48	35 24.7	+40.3	55.1	35 58.7	+41.1	55.7	36 32.3	+41.8	56.3	37 05.3	+42.6	57.0	37 37.7	+43.4	57.6	38 09.5	+44.2	58.3	38 40.8	+44.9	58.9	39 11.5	+45.6	59.6	48
49	36 05.0	+39.9	54.2	36 39.8	+40.7	54.8	37 14.1	+41.4	55.4	37 47.9	+42.2	56.1	38 21.1	+43.0	56.7	38 53.7	+43.8	57.4	39 25.7	+44.6	58.1	39 57.1	+45.3	58.8	49
50	36 44.9	+39.4	53.3	37 20.5	+40.2	53.9	37 55.5	+41.0	54.5	38 30.1	+41.8	55.2	39 04.1	+42.5	55.8	39 37.5	+43.3	56.5	40 10.3	+44.1	57.2	40 42.4	+45.0	57.9	50
51	37 24.3	+38.9	52.3	38 00.7	+39.7	53.0	38 36.5	+40.6	53.6	39 11.9	+41.3	54.2	39 46.6	+42.2	54.9	40 20.8	+43.0	55.6	40 54.4	+43.7	56.3	41 27.4	+44.5	57.1	51
52	38 03.2	+38.5	51.4	38 40.4	+39.3	52.0	39 17.1	+40.1	52.6	39 53.2	+40.9	53.3	40 28.8	+41.7	54.0	41 03.8	+42.4	54.7	41 38.1	+43.3	55.4	42 11.9	+44.1	56.2	52
53	38 41.7	+38.0	50.4	39 19.7	+38.8	51.0	39 57.2	+39.6	51.7	40 34.1	+40.4	52.4	41 10.5	+41.2	53.0	41 46.2	+42.1	53.7	42 21.4	+42.8	54.5	42 56.0	+43.6	55.2	53
54	39 19.7	+37.5	49.4	39 58.5	+38.3	50.0	40 36.8	+39.0	50.7	41 14.5	+39.9	51.4	41 51.7	+40.7	52.1	42 28.3	+41.5	52.8	43 04.2	+42.4	53.5	43 39.6	+43.1	54.3	54
55	39 57.2	+36.9	48.4	40 36.8	+37.7	49.0	41 15.8	+38.6	49.7	41 54.4	+39.3	50.4	42 32.4	+40.1	51.1	43 09.8	+41.0	51.8	43 46.6	+41.8	52.6	44 22.7	+42.7	53.3	55
56	40 34.1	+36.4	47.4	41 14.5	+37.2	48.0	41 54.4	+38.0	48.7	42 33.7	+38.8	49.4	43 12.5	+39.7	50.1	43 50.8	+40.4	50.8	44 28.4	+41.3	51.6	45 05.4	+42.1	52.3	56
57	41 10.5	+35.7	46.3	41 51.7	+36.6	47.0	42 32.4	+37.4	47.6	43 12.5	+38.3	48.3	43 52.2	+39.0	49.0	44 31.2	+39.9	49.8	45 09.7	+40.7	50.5	45 47.5	+41.6	51.3	57
58	41 46.2	+35.2	45.2	42 28.3	+35.9	45.9	43 09.8	+36.8	46.6	43 50.8	+37.6	47.2	44 31.2	+38.5	48.0	45 11.1	+39.3	48.7	45 50.4	+40.1	49.5	46 29.1	+40.9	50.3	58
59	42 21.4	+34.6	44.2	43 04.2	+35.4	44.8	43 46.1	+36.1	45.5	44 28.4	+37.0	46.2	45 09.7	+37.8	46.9	45 50.4	+38.7	47.6	46 30.5	+39.5	48.4	47 10.0	+40.4	49.2	59
60	42 56.0	+33.8	43.0	43 39.6	+34.7	43.7	44 22.7	+35.5	44.4	45 05.4	+36.3	45.1	45 47.5	+37.2	45.8	46 29.1	+38.0	46.5	47 10.0	+38.9	47.3	47 50.4	+39.7	48.1	60
61	43 29.8	+33.2	41.9	44 14.3	+34.0	42.6	44 58.2	+34.8	43.2	45 41.7	+35.6	43.9	46 24.7	+36.4	44.6	47 07.1	+37.3	45.4	47 48.9	+38.2	46.2	48 30.1	+39.1	47.0	61
62	44 03.0	+32.5	40.8	44 48.3	+33.3	41.4	45 33.0	+34.1	42.1	46 17.3	+35.0	42.8	47 01.1	+35.8	43.5	47 44.4	+36.6	44.2	48 27.1	+37.5	45.0	49 09.2	+38.4	45.8	62
63	44 35.5	+31.8	39.6	45 21.6	+32.5	40.2	46 07.1	+33.4	40.9	46 52.3	+34.1	41.6	47 36.9	+35.0	42.3	48 21.0	+35.9	43.1	49 04.6	+36.7	43.8	49 47.6	+37.6	44.7	63
64	45 07.3	+31.0	38.4	45 54.1	+31.8	39.0	46 40.5	+32.6	39.7	47 26.4	+33.4	40.4	48 11.9	+34.3	41.1	48 56.9	+35.1	41.8	49 41.3	+36.0	42.6	50 25.2	+36.8	43.4	64
65	45 38.3	+30.2	37.2	46 25.9	+31.0	37.8	47 13.1	+31.8	38.5	47 59.8	+32.6	39.1	48 46.2	+33.4	39.9	49 32.0	+34.2	40.6	50 17.3	+35.1	41.4	51 02.0	+36.0	42.2	65
66	46 08.5	+29.3	35.9	46 56.9	+30.1	36.5	47 44.9	+30.9	37.2	48 32.4	+31.7	37.9	49 19.6	+32.5	38.6	50 06.2	+33.4	39.3	50 52.4	+34.3	40.1	51 38.0	+35.2	40.9	66
67	46 37.8	+28.6	34.7	47 27.0	+29.3	35.3	48 15.8	+30.1	35.9	49 04.2	+30.9	36.6	49 52.1	+31.7	37.3	50 39.6	+32.6	38.0	51 26.7	+33.3	38.8	52 13.2	+34.2	39.6	67
68	47 06.4	+27.6	33.4	47 56.3	+28.4	34.0	48 45.9	+29.1	34.6	49 35.1	+29.9	35.3	50 23.8	+30.8	36.0	51 12.2	+31.6	36.7	51 59.9	+32.5	37.4	52 47.4	+33.3	38.2	68
69	47 34.0	+26.7	32.1	48 24.7	+27.5	32.7	49 15.0	+28.3	33.3	50 05.0	+29.0	33.9	50 54.6	+29.8	34.6	51 43.8	+30.6	35.3	52 32.5	+31.4	36.1	53 20.7	+32.4	36.9	69
70	48 00.7	+25.8	30.7	48 52.2	+26.5	31.3	49 43.3	+27.2	31.9	50 34.0	+28.0	32.6	51 24.4	+28.8	33.2	52 14.4	+29.6	33.9	53 03.9	+30.5	34.7	53 53.1	+31.3	35.4	70
71	48 26.5	+24.9	29.4	49 18.7	+25.5	29.9	50 10.5	+26.3	30.5	51 02.0	+27.0	31.2	51 53.2	+27.8	31.8	52 44.0	+28.5	32.5	53 34.4	+29.4	33.2	54 24.4	+30.2	34.0	71
72	48 51.4	+23.8	28.0	49 44.2	+24.5	28.5	50 36.8	+25.2	29.1	51 29.0	+26.0	29.7	52 21.0	+26.6	30.4	53 12.5	+27.5	31.0	54 03.8	+28.2	31.7	54 54.6	+29.1	32.5	72
73	49 15.2	+22.8	26.6	50 08.7	+23.5	27.1	51 02.0	+24.1	27.7	51 55.0	+24.8	28.3	52 47.6	+25.6	28.9	53 40.0	+26.3	29.5	54 32.0	+27.1	30.2	55 23.7	+27.9	31.0	73
74	49 38.0	+21.7	25.2	50 32.2	+22.3	25.7	51 26.1	+23.0	26.2	52 19.8	+23.7	26.8	53 13.2	+24.4	27.4	54 06.3	+25.2	28.0	54 59.1	+25.9	28.7	55 51.6	+26.7	29.4	74
75	49 59.7	+20.6	23.7	50 54.5	+21.3	24.2	51 49.1	+21.9	24.7	52 43.5	+22.5	25.3	53 37.6	+23.2	25.9	54 31.5	+23.9	26.5	55 25.0	+24.7	27.1	56 18.3	+25.4	27.8	75
76	50 20.3	+19.5	22.3	51 15.8	+20.1	22.7	52 11.0	+20.7	23.2	53 06.0	+21.4	23.7	54 00.8	+22.0	24.3	54 55.4	+22.7	24.9	55 49.7	+23.4	25.5	56 43.7	+24.1	26.1	76
77	50 39.8	+18.4	20.8	51 35.9	+18.9	21.2	52 31.7	+19.5	21.7	53 27.4	+20.0	22.2	54 22.8	+20.7	22.7	55 18.1	+21.3	23.3	56 13.1	+22.0	23.8	57 07.8	+22.7	24.5	77
78	50 58.2	+17.2	19.3	51 54.8	+17.7	19.7	52 51.2	+18.2	20.1	53 47.4	+18.8	20.6	54 43.5	+19.4	21.1	55 39.4	+20.0	21.6	56 35.1	+20.6	22.2	57 30.5	+21.3	22.8	78
79	51 15.4	+16.0	17.7	52 12.5	+16.4	18.1	53 09.4	+17.0	18.5	54 06.2	+17.5	19.0	55 02.9	+18.0	19.4	55 59.4	+18.6	19.9	56 55.7	+19.2	20.5	57 51.8	+19.8	21.0	79
80	51 31.4	+14.7	16.2	52 28.9	+15.2	16.6	53 26.4	+15.6	16.9	54 23.7	+16.2	17.3	55 20.9	+16.7	17.8	56 18.0	+17.2	18.2	57 14.9	+17.7	18.7	58 11.6	+18.4	19.2	80
81	51 46.1	+13.5	14.6	52 44.1	+13.9	15.0	53 42.0	+14.4	15.3	54 39.9	+14.7	15.7	55 37.6	+15.2	16.1	56 35.2	+15.7	16.5	57 32.6	+16.2	16.9	58 30.0	+16.7	17.4	81
82	51 59.6	+12.2	13.1	52 58.0	+12.6	13.4	53 56.4	+12.9	13.7	54 54.6	+13.4	14.0	55 52.8	+13.8	14.4	56 50.9	+14.2	14.7	57 48.8	+14.7	15.1	58 46.7	+15.1	15.6	82
83	52 11.8	+10.9	11.5	53 10.6	+11.2	11.7	54 09.3	+11.6	12.0	55 08.0	+11.9	12.3	56 06.6	+12.2	12.6	57 05.1	+12.6	13.0	58 03.5	+13.1	13.3	59 01.8	+13.5	13.7	83
84	52 22.7	+9.6	9.9	53 21.8	+9.9	10.1	54 20.9	+10.1	10.3	55 19.9	+10.4	10.6	56 18.8	+10.8	10.9	57 17.7	+11.1	11.1	58 16.6	+11.4	11.5	59 15.3	+11.9	11.8	84
85	52 32.3	+8.3	8.2	53 31.7	+8.5	8.4	54 31.0	+8.8	8.6	55 30.3	+9.0	8.8	56 29.6	+9.2	9.1	57 28.8	+9.5	9.3	58 28.0	+9.8	9.6	59 27.2	+10.1	9.9	85
86	52 40.6	+6.9	6.6	53 40.2	+7.1	6.8	54 39.8	+7.2	6.9	55 39.3	+7.5	7.1	56 38.8	+7.7	7.3	57 38.3	+7.9	7.5	58 37.8	+8.1	7.7	59 37.3	+8.3	7.9	86
87	52 47.5	+5.5	5.0	53 47.3	+5.6	5.1	54 47.0	+5.8	5.2	55 46.8	+5.9	5.3	56 46.5	+6.1	5.5	57 46.2	+6.3	5.6	58 45.9	+6.4	5.8	59 45.6	+6.6	6.0	87
88	52 53.0	+4.2	3.3	53 52.9	+4.3	3.4	54 52.8	+4.4	3.5	55 52.7	+4.4	3.6	56 52.6	+4.5	3.7	57 52.5	+4.6	3.8	58 52.3	+4.7	3.9	59 52.2	+4.8	4.0	88
89	52 57.2	+2.8	1.7	53 57.2	+2.8	1.7	54 57.2	+2.8	1.7	55 57.1	+2.9	1.8	56 57.1	+2.9	1.8	57 57.1	+2.9	1.9	58 57.0	+3.0	1.9	59 57.0	+3.0	2.0	89
90	53 00.0	+1.4	0.0	54 00.0	+1.4	0.0	55 00.0	+1.3	0.0	56 00.0	+1.3	0.0	57 00.0	+1.3	0.0	58 00.0	+1.3	0.0	59 00.0	+1.2	0.0	60 00.0	+1.2	0.0	90

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z / L.H.A. less than 180°...........Zn=180°+Z   **LATITUDE SAME NAME AS DECLINATION**   **L.H.A. 92°, 268°**

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LATITUDE SAME NAME AS DECLINATION — N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°.............Zn=360°−Z

Dec.	53° Hc	d	Z	54° Hc	d	Z	55° Hc	d	Z	56° Hc	d	Z	57° Hc	d	Z	58° Hc	d	Z	59° Hc	d	Z	60° Hc	d	Z	Dec.
0	0 36.1	+47.9	90.8	0 35.3	+48.5	90.8	0 34.4	+49.2	90.8	0 33.6	+49.7	90.8	0 32.7	+50.3	90.8	0 31.8	+50.9	90.8	0 30.9	+51.4	90.9	0 30.0	+52.0	90.9	0
1	1 24.0	+47.9	90.2	1 23.8	+48.5	90.2	1 23.6	+49.1	90.2	1 23.3	+49.7	90.3	1 23.0	+50.3	90.3	1 22.7	+50.9	90.3	1 22.3	+51.5	90.3	1 22.0	+51.9	90.4	1
2	2 11.9	+47.9	89.6	2 12.3	+48.6	89.6	2 12.7	+49.1	89.7	2 13.0	+49.7	89.7	2 13.3	+50.3	89.7	2 13.6	+50.8	89.8	2 13.8	+51.4	89.8	2 13.9	+52.0	89.9	2
3	2 59.8	+47.9	89.0	3 00.9	+48.5	89.0	3 01.8	+49.1	89.1	3 02.7	+49.7	89.1	3 03.6	+50.3	89.2	3 04.4	+50.9	89.3	3 05.2	+51.4	89.3	3 05.9	+51.9	89.4	3
4	3 47.7	+47.9	88.4	3 49.4	+48.4	88.5	3 50.9	+49.1	88.5	3 52.5	+49.6	88.6	3 53.9	+50.3	88.7	3 55.3	+50.8	88.7	3 56.6	+51.3	88.8	3 57.8	+51.9	88.9	4
5	4 35.6	+47.8	87.8	4 37.8	+48.5	87.9	4 40.0	+49.1	87.9	4 42.1	+49.7	88.0	4 44.2	+50.2	88.1	4 46.1	+50.8	88.2	4 47.9	+51.3	88.3	4 49.7	+51.9	88.4	5
6	5 23.4	+47.8	87.2	5 26.3	+48.4	87.3	5 29.1	+49.0	87.4	5 31.8	+49.6	87.5	5 34.4	+50.2	87.6	5 36.9	+50.8	87.7	5 39.3	+51.3	87.8	5 41.6	+51.9	87.9	6
7	6 11.2	+47.7	86.6	6 14.7	+48.4	86.7	6 18.1	+49.0	86.8	6 21.4	+49.6	86.9	6 24.6	+50.2	87.0	6 27.7	+50.7	87.1	6 30.6	+51.3	87.2	6 33.5	+51.8	87.3	7
8	6 58.9	+47.7	86.0	7 03.1	+48.3	86.1	7 07.1	+48.9	86.2	7 11.0	+49.5	86.3	7 14.8	+50.1	86.5	7 18.4	+50.7	86.6	7 21.9	+51.3	86.7	7 25.3	+51.8	86.8	8
9	7 46.6	+47.6	85.3	7 51.4	+48.3	85.5	7 56.0	+48.9	85.6	8 00.5	+49.5	85.8	8 04.9	+50.1	85.9	8 09.1	+50.7	86.0	8 13.2	+51.2	86.2	8 17.1	+51.8	86.3	9
10	8 34.2	+47.6	84.7	8 39.7	+48.2	84.9	8 44.9	+48.9	85.0	8 50.0	+49.5	85.2	8 55.0	+50.0	85.3	8 59.8	+50.6	85.5	9 04.4	+51.2	85.7	9 08.9	+51.7	85.8	10
11	9 21.8	+47.5	84.1	9 27.9	+48.1	84.3	9 33.8	+48.7	84.4	9 39.5	+49.4	84.6	9 45.0	+50.0	84.8	9 50.4	+50.5	85.0	9 55.6	+51.1	85.1	10 00.6	+51.6	85.3	11
12	10 09.3	+47.5	83.5	10 16.0	+48.1	83.7	10 22.5	+48.8	83.9	10 28.9	+49.3	84.0	10 35.0	+49.9	84.2	10 40.9	+50.5	84.4	10 46.7	+51.1	84.6	10 52.2	+51.7	84.8	12
13	10 56.8	+47.3	82.9	11 04.1	+48.0	83.1	11 11.3	+48.6	83.3	11 18.2	+49.3	83.5	11 24.9	+49.9	83.7	11 31.4	+50.5	83.9	11 37.8	+51.0	84.1	11 43.9	+51.5	84.3	13
14	11 44.1	+47.3	82.2	11 52.1	+48.0	82.5	11 59.9	+48.6	82.7	12 07.5	+49.1	82.9	12 14.8	+49.8	83.1	12 21.9	+50.4	83.3	12 28.8	+50.9	83.5	12 35.4	+51.5	83.7	14
15	12 31.4	+47.2	81.6	12 40.1	+47.8	81.8	12 48.5	+48.5	82.1	12 56.6	+49.1	82.3	13 04.6	+49.7	82.5	13 12.3	+50.3	82.8	13 19.7	+50.9	83.0	13 26.9	+51.4	83.2	15
16	13 18.6	+47.1	81.0	13 27.9	+47.8	81.2	13 37.0	+48.3	81.5	13 45.7	+49.1	81.7	13 54.3	+49.6	81.9	14 02.6	+50.2	82.2	14 10.6	+50.8	82.4	14 18.3	+51.4	82.7	16
17	14 05.7	+47.0	80.3	14 15.7	+47.6	80.6	14 25.3	+48.3	80.8	14 34.8	+48.9	81.1	14 43.9	+49.5	81.4	14 52.8	+50.1	81.6	15 01.4	+50.7	81.9	15 09.7	+51.3	82.2	17
18	14 52.7	+46.9	79.7	15 03.3	+47.6	80.0	15 13.6	+48.3	80.2	15 23.7	+48.8	80.5	15 33.4	+49.5	80.8	15 42.9	+50.1	81.1	15 52.1	+50.6	81.3	16 01.0	+51.2	81.6	18
19	15 39.6	+46.8	79.1	15 50.9	+47.4	79.3	16 01.9	+48.0	79.6	16 12.5	+48.7	79.9	16 22.9	+49.3	80.2	16 33.0	+49.9	80.5	16 42.7	+50.6	80.8	16 52.2	+51.1	81.1	19
20	16 26.4	+46.7	78.4	16 38.3	+47.4	78.7	16 49.9	+48.0	79.0	17 01.2	+48.7	79.3	17 12.2	+49.3	79.6	17 22.9	+49.9	79.9	17 33.3	+50.4	80.2	17 43.3	+51.0	80.5	20
21	17 13.1	+46.5	77.8	17 25.7	+47.2	78.1	17 37.9	+47.9	78.4	17 49.9	+48.5	78.7	18 01.5	+49.1	79.0	18 12.8	+49.7	79.3	18 23.7	+50.4	79.6	18 34.3	+51.0	80.0	21
22	17 59.6	+46.4	77.1	18 12.9	+47.0	77.4	18 25.8	+47.7	77.7	18 38.4	+48.3	78.1	18 50.6	+49.0	78.4	19 02.5	+49.6	78.7	19 14.1	+50.2	79.1	19 25.3	+50.8	79.4	22
23	18 46.0	+46.3	76.4	18 59.9	+47.0	76.8	19 13.5	+47.6	77.1	19 26.7	+48.3	77.4	19 39.6	+48.9	77.8	19 52.1	+49.6	78.1	20 04.3	+50.1	78.5	20 16.1	+50.7	78.8	23
24	19 32.3	+46.1	75.7	19 46.9	+46.8	76.1	20 01.1	+47.5	76.4	20 15.0	+48.1	76.8	20 28.5	+48.8	77.2	20 41.7	+49.3	77.5	20 54.4	+50.0	77.9	21 06.8	+50.6	78.3	24
25	20 18.4	+45.9	75.1	20 33.7	+46.6	75.4	20 48.6	+47.3	75.8	21 03.1	+48.0	76.2	21 17.3	+48.6	76.5	21 31.0	+49.3	76.9	21 44.4	+49.9	77.3	21 57.4	+50.5	77.7	25
26	21 04.3	+45.8	74.4	21 20.3	+46.4	74.8	21 35.9	+47.1	75.1	21 51.1	+47.8	75.5	22 05.9	+48.4	75.9	22 20.3	+49.1	76.3	22 34.3	+49.7	76.7	22 47.9	+50.3	77.1	26
27	21 50.1	+45.6	73.7	22 06.7	+46.3	74.1	22 23.0	+47.0	74.5	22 38.9	+47.6	74.9	22 54.3	+48.4	75.3	23 09.4	+49.0	75.7	23 24.0	+49.6	76.1	23 38.2	+50.2	76.5	27
28	22 35.7	+45.4	73.0	22 53.0	+46.2	73.4	23 10.0	+46.8	73.8	23 26.5	+47.5	74.2	23 42.7	+48.1	74.6	23 58.4	+48.8	75.1	24 13.6	+49.5	75.5	24 28.4	+50.0	75.9	28
29	23 21.1	+45.2	72.3	23 39.2	+45.9	72.7	23 56.8	+46.6	73.1	24 14.0	+47.3	73.5	24 30.8	+48.0	74.0	24 47.2	+48.6	74.4	25 03.1	+49.2	74.9	25 18.5	+49.9	75.3	29
30	24 06.3	+45.0	71.6	24 25.1	+45.7	72.0	24 43.4	+46.5	72.4	25 01.3	+47.2	72.9	25 18.8	+47.8	73.3	25 35.8	+48.5	73.8	25 52.3	+49.2	74.2	26 08.4	+49.8	74.7	30
31	24 51.3	+44.8	70.8	25 10.8	+45.5	71.3	25 29.9	+46.2	71.7	25 48.5	+46.9	72.2	26 06.6	+47.6	72.6	26 24.3	+48.2	73.1	26 41.5	+48.9	73.6	26 58.2	+49.6	74.1	31
32	25 36.1	+44.6	70.1	25 56.3	+45.3	70.5	26 16.1	+46.0	71.0	26 35.4	+46.7	71.5	26 54.2	+47.4	72.0	27 12.5	+48.1	72.4	27 30.4	+48.8	72.9	27 47.8	+49.4	73.4	32
33	26 20.7	+44.3	69.3	26 41.6	+45.1	69.8	27 02.1	+45.8	70.3	27 22.1	+46.5	70.8	27 41.6	+47.2	71.3	28 00.6	+47.9	71.8	28 19.2	+48.5	72.3	28 37.2	+49.2	72.8	33
34	27 05.0	+44.1	68.6	27 26.7	+44.9	69.1	27 47.9	+45.6	69.6	28 08.6	+46.3	70.1	28 28.8	+47.0	70.6	28 48.5	+47.7	71.1	29 07.7	+48.4	71.6	29 26.4	+49.0	72.1	34
35	27 49.1	+43.9	67.8	28 11.6	+44.5	68.3	28 33.5	+45.3	68.8	28 54.9	+46.0	69.3	29 15.8	+46.8	69.9	29 36.2	+47.5	70.4	29 56.1	+48.1	70.9	30 15.4	+48.8	71.5	35
36	28 33.0	+43.6	67.1	28 56.1	+44.4	67.6	29 18.8	+45.1	68.1	29 40.9	+45.8	68.6	30 02.6	+46.5	69.1	30 23.7	+47.2	69.7	30 44.2	+48.0	70.2	31 04.2	+48.7	70.8	36
37	29 16.6	+43.3	66.3	29 40.5	+44.0	66.8	30 03.9	+44.8	67.3	30 26.7	+45.6	67.9	30 49.1	+46.3	68.4	31 10.9	+47.0	69.0	31 32.2	+47.7	69.5	31 52.9	+48.3	70.1	37
38	29 59.9	+43.0	65.5	30 24.5	+43.8	66.0	30 48.7	+44.5	66.5	31 12.3	+45.2	67.1	31 35.4	+46.0	67.7	31 57.9	+46.7	68.2	32 19.9	+47.4	68.8	32 41.2	+48.2	69.4	38
39	30 42.9	+42.7	64.7	31 08.3	+43.5	65.2	31 33.2	+44.2	65.8	31 57.5	+45.0	66.3	32 21.4	+45.7	66.9	32 44.6	+46.5	67.5	33 07.3	+47.2	68.1	33 29.4	+47.9	68.7	39
40	31 25.6	+42.3	63.8	31 51.8	+43.1	64.4	32 17.4	+43.9	65.0	32 42.5	+44.7	65.5	33 07.1	+45.4	66.1	33 31.1	+46.2	66.7	33 54.5	+46.9	67.4	34 17.3	+47.6	68.0	40
41	32 07.9	+42.1	63.0	32 34.9	+42.8	63.6	33 01.3	+43.7	64.2	33 27.2	+44.4	64.7	33 52.5	+45.2	65.4	34 17.3	+45.9	66.0	34 41.4	+46.6	66.6	35 04.9	+47.4	67.2	41
42	32 50.0	+41.7	62.2	33 17.7	+42.5	62.7	33 45.0	+43.3	63.3	34 11.6	+44.1	63.9	34 37.7	+44.8	64.6	35 03.2	+45.5	65.2	35 28.0	+46.4	65.9	35 52.3	+47.1	66.5	42
43	33 31.7	+41.3	61.3	34 00.2	+42.2	61.9	34 28.2	+43.0	62.5	34 55.7	+43.7	63.1	35 22.5	+44.5	63.7	35 48.7	+45.3	64.4	36 14.4	+46.0	65.0	36 39.4	+46.7	65.7	43
44	34 13.0	+41.0	60.4	34 42.4	+41.7	61.0	35 11.2	+42.5	61.6	35 39.4	+43.3	62.3	36 07.0	+44.1	62.9	36 34.0	+44.9	63.6	37 00.4	+45.7	64.2	37 26.1	+46.5	64.9	44
45	34 54.0	+40.6	59.5	35 24.1	+41.4	60.2	35 53.7	+42.2	60.8	36 22.7	+43.0	61.4	36 51.1	+43.8	62.1	37 18.9	+44.6	62.7	37 46.1	+45.3	63.4	38 12.6	+46.1	64.1	45
46	35 34.6	+40.1	58.6	36 05.5	+41.0	59.3	36 35.9	+41.8	59.9	37 05.7	+42.6	60.5	37 34.9	+43.4	61.2	38 03.5	+44.2	61.9	38 31.4	+45.0	62.6	38 58.7	+45.8	63.3	46
47	36 14.7	+39.8	57.7	36 46.5	+40.6	58.4	37 17.7	+41.4	59.0	37 48.3	+42.2	59.7	38 18.3	+43.0	60.3	38 47.7	+43.8	61.0	39 16.4	+44.6	61.7	39 44.5	+45.4	62.5	47
48	36 54.5	+39.3	56.8	37 27.1	+40.1	57.4	37 59.1	+40.9	58.1	38 30.5	+41.7	58.8	39 01.3	+42.6	59.4	39 31.5	+43.4	60.2	40 01.0	+44.2	60.9	40 29.9	+45.0	61.6	48
49	37 33.8	+38.8	55.8	38 07.2	+39.6	56.5	38 40.0	+40.5	57.2	39 12.2	+41.4	57.8	39 43.9	+42.1	58.5	40 14.9	+43.0	59.3	40 45.2	+43.8	60.0	41 14.9	+44.6	60.7	49
50	38 12.6	+38.3	54.9	38 46.8	+39.2	55.5	39 20.5	+40.0	56.2	39 53.6	+40.8	56.9	40 26.0	+41.7	57.6	40 57.9	+42.5	58.3	41 29.0	+43.4	59.1	41 59.5	+44.2	59.8	50
51	38 50.9	+37.9	53.9	39 26.0	+38.7	54.6	40 00.5	+39.5	55.2	40 34.4	+40.4	55.9	41 07.7	+41.2	56.7	41 40.4	+42.0	57.4	42 12.4	+42.9	58.2	42 43.7	+43.7	58.9	51
52	39 28.8	+37.3	52.9	40 04.7	+38.1	53.6	40 40.0	+39.0	54.2	41 14.8	+39.8	55.0	41 48.9	+40.7	55.7	42 22.4	+41.6	56.4	42 55.3	+42.4	57.2	43 27.4	+43.3	58.0	52
53	40 06.1	+36.7	51.9	40 42.8	+37.7	52.5	41 19.0	+38.5	53.2	41 54.6	+39.4	54.0	42 29.6	+40.2	54.7	43 04.0	+41.0	55.5	43 37.7	+41.9	56.2	44 10.7	+42.8	57.0	53
54	40 42.8	+36.2	50.8	41 20.5	+37.0	51.5	41 57.5	+37.9	52.2	42 34.0	+38.7	52.9	43 09.8	+39.7	53.7	43 45.0	+40.5	54.4	44 19.6	+41.4	55.2	44 53.5	+42.2	56.1	54
55	41 19.0	+35.6	49.8	41 57.5	+36.5	50.5	42 35.4	+37.3	51.2	43 12.7	+38.2	51.9	43 49.5	+39.0	52.6	44 25.5	+40.0	53.4	45 01.0	+40.8	54.2	45 35.7	+41.7	55.0	55
56	41 54.6	+35.0	48.7	42 34.0	+35.8	49.4	43 12.7	+36.8	50.1	43 50.9	+37.6	50.8	44 28.5	+38.5	51.6	45 05.5	+39.3	52.4	45 41.8	+40.2	53.2	46 17.4	+41.1	54.0	56
57	42 29.6	+34.4	47.6	43 09.8	+35.2	48.3	43 49.5	+36.0	49.0	44 28.5	+37.0	49.7	45 07.0	+37.8	50.5	45 44.8	+38.8	51.3	46 22.0	+39.7	52.1	46 58.5	+40.6	52.9	57
58	43 04.0	+33.7	46.5	43 45.0	+34.6	47.2	44 25.5	+35.5	47.9	45 05.5	+36.3	48.6	45 44.8	+37.2	49.4	46 23.6	+38.1	50.2	47 01.7	+38.9	51.0	47 39.1	+39.9	51.9	58
59	43 37.7	+33.0	45.4	44 19.6	+33.9	46.0	45 01.0	+34.7	46.8	45 41.8	+35.6	47.5	46 22.0	+36.5	48.3	47 01.7	+37.4	49.1	47 40.6	+38.4	49.9	48 19.0	+39.2	50.7	59
60	44 10.7	+32.3	44.2	44 53.5	+33.1	44.9	45 35.7	+34.0	45.6	46 17.4	+34.9	46.3	46 58.5	+35.8	47.1	47 39.1	+36.7	47.9	48 19.0	+37.6	48.7	48 58.2	+38.5	49.6	60
61	44 43.0	+31.5	43.0	45 26.6	+32.4	43.7	46 09.7	+33.3	44.4	46 52.3	+34.1	45.2	47 34.3	+35.1	45.9	48 15.8	+35.9	46.7	48 56.6	+36.8	47.6	49 36.7	+37.8	48.4	61
62	45 14.5	+30.8	41.8	45 59.0	+31.6	42.5	46 43.0	+32.5	43.2	47 26.4	+33.4	43.9	48 09.4	+34.2	44.7	48 51.7	+35.2	45.5	49 33.4	+36.1	46.4	50 14.5	+37.0	47.2	62
63	45 45.3	+29.9	40.6	46 30.6	+30.8	41.3	47 15.5	+31.6	42.0	47 59.8	+32.6	42.7	48 43.6	+33.5	43.5	49 26.9	+34.3	44.3	50 09.5	+35.3	45.1	50 51.5	+36.3	46.0	63
64	46 15.2	+29.2	39.3	47 01.4	+30.0	40.0	47 47.1	+30.9	40.7	48 32.4	+31.7	41.5	49 17.1	+32.6	42.2	50 01.2	+33.5	43.0	50 44.8	+34.4	43.8	51 27.8	+35.3	44.7	64
65	46 44.4	+28.3	38.1	47 31.4	+29.1	38.7	48 18.0	+29.9	39.4	49 04.1	+30.8	40.2	49 49.7	+31.7	40.9	50 34.7	+32.7	41.7	51 19.2	+33.6	42.5	52 03.1	+34.5	43.4	65
66	47 12.7	+27.4	36.8	48 00.5	+28.2	37.4	48 47.9	+29.1	38.1	49 34.9	+29.9	38.8	50 21.4	+30.8	39.6	51 07.4	+31.7	40.4	51 52.8	+32.6	41.2	52 37.6	+33.6	42.1	66
67	47 40.1	+26.4	35.5	48 28.7	+27.3	36.1	49 17.0	+28.1	36.8	50 04.8	+29.0	37.5	50 52.2	+29.8	38.2	51 39.1	+30.7	39.0	52 25.4	+31.7	39.8	53 11.2	+32.6	40.7	67
68	48 06.5	+25.6	34.1	48 56.0	+26.3	34.8	49 45.1	+27.2	35.4	50 33.8	+28.0	36.1	51 22.0	+28.9	36.9	52 09.8	+29.7	37.6	52 57.1	+30.6	38.4	53 43.8	+31.6	39.3	68
69	48 32.1	+24.5	32.8	49 22.3	+25.4	33.4	50 12.3	+26.1	34.0	51 01.8	+26.9	34.7	51 50.9	+27.8	35.5	52 39.5	+28.7	36.2	53 27.7	+29.6	37.0	54 15.3	+30.5	37.8	69
70	48 56.6	+23.6	31.4	49 47.7	+24.3	32.0	50 38.4	+25.1	32.6	51 28.7	+25.9	33.3	52 18.7	+26.7	34.0	53 08.2	+27.6	34.8	53 57.3	+28.4	35.5	54 45.8	+29.4	36.4	70
71	49 20.2	+22.5	30.0	50 12.0	+23.2	30.6	51 03.5	+24.0	31.2	51 54.6	+24.8	31.8	52 45.4	+25.6	32.5	53 35.8	+26.4	33.3	54 25.7	+27.4	34.0	55 15.2	+28.2	34.8	71
72	49 42.7	+21.4	28.5	50 35.2	+22.2	29.1	51 27.5	+22.9	29.7	52 19.4	+23.7	30.4	53 11.0	+24.5	31.0	54 02.2	+25.3	31.7	54 53.1	+26.1	32.5	55 43.4	+27.1	33.3	72
73	50 04.1	+20.3	27.1	50 57.4	+21.0	27.7	51 50.4	+21.7	28.2	52 43.1	+22.5	28.9	53 35.5	+23.2	29.5	54 27.5	+24.1	30.2	55 19.2	+24.9	30.9	56 10.5	+25.7	31.7	73
74	50 24.4	+19.2	25.6	51 18.4	+19.9	26.2	52 12.1	+20.6	26.7	53 05.6	+21.3	27.3	53 58.7	+22.1	27.9	54 51.6	+22.8	28.6	55 44.1	+23.6	29.3	56 36.2	+24.5	30.0	74
75	50 43.6	+18.1	24.1	51 38.3	+18.7	24.6	52 32.7	+19.3	25.2	53 26.9	+20.0	25.8	54 20.8	+20.7	26.4	55 14.4	+21.5	27.0	56 07.7	+22.3	27.7	57 00.7	+23.0	28.4	75
76	51 01.7	+16.8	22.6	51 57.0	+17.4	23.1	52 52.0	+18.2	23.6	53 46.9	+18.8	24.2	54 41.5	+19.5	24.7	55 35.9	+20.1	25.3	56 30.0	+20.9	26.0	57 23.7	+21.7	26.7	76
77	51 18.5	+15.7	21.1	52 14.4	+16.3	21.5	53 10.2	+16.8	22.0	54 05.7	+17.4	22.6	55 01.0	+18.1	23.1	55 56.0	+18.8	23.7	56 50.9	+19.4	24.3	57 45.4	+20.2	24.9	77
78	51 34.2	+14.4	19.5	52 30.7	+14.9	20.0	53 27.0	+15.5	20.4	54 23.1	+16.1	20.9	55 19.1	+16.7	21.4	56 14.8	+17.4	22.0	57 10.3	+18.1	22.5	58 05.6	+18.7	23.2	78
79	51 48.6	+13.2	18.0	52 45.6	+13.7	18.4	53 42.5	+14.2	18.8	54 39.2	+14.7	19.3	55 35.8	+15.3	19.7	56 32.2	+15.8	20.2	57 28.4	+16.5	20.8	58 24.3	+17.2	21.4	79
80	52 01.8	+11.8	16.4	52 59.3	+12.3	16.8	53 56.7	+12.8	17.2	54 53.9	+13.3	17.6	55 51.1	+13.8	18.0	56 48.0	+14.4	18.5	57 44.9	+14.9	19.0	58 41.5	+15.6	19.5	80
81	52 13.6	+10.6	14.8	53 11.6	+11.0	15.1	54 09.5	+11.4	15.5	55 07.2	+11.9	15.9	56 04.9	+12.3	16.3	57 02.4	+12.9	16.7	57 59.8	+13.4	17.2	58 57.1	+13.9	17.7	81
82	52 24.2	+9.2	13.2	53 22.6	+9.6	13.5	54 20.9	+10.0	13.8	55 19.1	+10.4	14.2	56 17.2	+10.9	14.5	57 15.3	+11.3	14.9	58 13.2	+11.8	15.3	59 11.0	+12.3	15.8	82
83	52 33.4	+7.9	11.6	53 32.2	+8.2	11.8	54 30.9	+8.6	12.1	55 29.5	+9.0	12.4	56 28.1	+9.3	12.7	57 26.6	+9.7	13.1	58 25.0	+10.1	13.5	59 23.3	+10.5	13.8	83
84	52 41.3	+6.6	9.9	53 40.4	+6.9	10.2	54 39.5	+7.1	10.4	55 38.5	+7.4	10.7	56 37.4	+7.7	11.0	57 36.3	+8.1	11.2	58 35.1	+8.4	11.6	59 33.8	+8.8	11.9	84
85	52 47.9	+5.2	8.3	53 47.3	+5.4	8.5	54 46.6	+5.6	8.7	55 45.9	+5.9	8.9	56 45.1	+6.2	9.1	57 44.4	+6.4	9.4	58 43.5	+6.8	9.7	59 42.6	+7.1	9.9	85
86	52 53.1	+3.8	6.6	53 52.7	+4.0	6.8	54 52.2	+4.2	7.0	55 51.8	+4.4	7.1	56 51.3	+4.6	7.3	57 50.8	+4.8	7.5	58 50.3	+5.0	7.7	59 49.7	+5.3	8.0	86
87	52 56.9	+2.4	5.0	53 56.7	+2.5	5.1	54 56.4	+2.7	5.2	55 56.2	+2.8	5.4	56 55.9	+3.0	5.5	57 55.6	+3.1	5.7	58 55.3	+3.3	5.8	59 55.0	+3.5	6.0	87
88	52 59.3	+1.1	3.3	53 59.2	+1.1	3.4	54 59.1	+1.2	3.5	55 59.0	+1.3	3.6	56 58.9	+1.3	3.7	57 58.7	+1.5	3.8	58 58.6	+1.6	3.9	59 58.5	+1.6	4.0	88
89	53 00.4	−0.4	1.7	54 00.3	−0.3	1.7	55 00.3	−0.3	1.7	56 00.3	−0.3	1.8	57 00.2	−0.2	1.8	58 00.2	−0.2	1.9	59 00.2	−0.2	1.9	60 00.1	−0.1	2.0	89
90	53 00.0	−1.7	0.0	54 00.0	−1.8	0.0	55 00.0	−1.8	0.0	56 00.0	−1.8	0.0	57 00.0	−1.9	0.0	58 00.0	−1.9	0.0	59 00.0	−1.9	0.0	60 00.0	−2.0	0.0	90

| | 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° | |

LATITUDE CONTRARY NAME TO DECLINATION   L.H.A. 89°, 271°

Dec	53°			54°			55°			56°			57°			58°			59°			60°			Dec
°	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	Hc	d	Z	°
0	0 36.1	−47.9	90.8	0 35.3	−48.6	90.8	0 34.4	−49.1	90.8	0 33.6	−49.8	90.8	0 32.7	−50.3	90.8	0 31.8	−50.9	90.8	0 30.9	−51.4	90.9	0 30.0	−52.0	90.9	0
1	0 11.8	+47.9	88.6	0 13.3	+48.5	88.6	0 14.7	+49.2	88.6	0 16.2	+49.7	88.6	0 17.6	+50.4	88.6	0 19.1	+50.9	88.6	0 20.5	+51.5	88.6	0 22.0	+51.9	88.6	1
2	0 59.7	+47.9	88.0	1 01.8	+48.6	88.0	1 03.9	+49.1	88.0	1 05.9	+49.8	88.1	1 08.0	+50.3	88.1	1 10.0	+50.9	88.1	1 12.0	+51.4	88.1	1 13.9	+52.0	88.1	2
3	1 47.6	+48.0	87.4	1 50.4	+48.5	87.4	1 53.0	+49.2	87.5	1 55.7	+49.7	87.5	1 58.3	+50.3	87.5	2 00.9	+50.8	87.6	2 03.4	+51.4	87.6	2 05.9	+51.9	87.6	3
4	2 35.6	+47.8	86.8	2 38.9	+48.5	86.8	2 42.2	+49.1	86.9	2 45.4	+49.7	86.9	2 48.6	+50.3	87.0	2 51.7	+50.9	87.0	2 54.8	+51.4	87.1	2 57.8	+52.0	87.1	4
5	3 23.4	+47.9	86.2	3 27.4	+48.5	86.2	3 31.3	+49.1	86.3	3 35.1	+49.7	86.4	3 38.9	+50.2	86.4	3 42.6	+50.8	86.5	3 46.2	+51.4	86.6	3 49.8	+51.9	86.6	5
6	4 11.3	+47.8	85.6	4 15.9	+48.4	85.7	4 20.4	+49.1	85.7	4 24.8	+49.7	85.8	4 29.1	+50.3	85.9	4 33.4	+50.8	86.0	4 37.6	+51.3	86.0	4 41.7	+51.9	86.1	6
7	4 59.1	+47.8	85.0	5 04.3	+48.5	85.1	5 09.5	+49.0	85.2	5 14.5	+49.6	85.2	5 19.4	+50.2	85.3	5 24.2	+50.8	85.4	5 28.9	+51.4	85.5	5 33.6	+51.8	85.6	7
8	5 46.9	+47.8	84.4	5 52.8	+48.4	84.5	5 58.5	+49.0	84.6	6 04.1	+49.6	84.7	6 09.6	+50.2	84.8	6 15.0	+50.8	84.9	6 20.3	+51.3	85.0	6 25.4	+51.9	85.1	8
9	6 34.7	+47.7	83.8	6 41.2	+48.3	83.9	6 47.5	+48.9	84.0	6 53.7	+49.6	84.1	6 59.8	+50.1	84.2	7 05.8	+50.7	84.4	7 11.6	+51.2	84.5	7 17.3	+51.8	84.6	9
10	7 22.4	+47.7	83.2	7 29.5	+48.3	83.4	7 36.4	+49.0	83.4	7 43.3	+49.5	83.5	7 49.9	+50.1	83.7	7 56.5	+50.6	83.8	8 02.8	+51.3	84.0	8 09.1	+51.8	84.1	10
11	8 10.1	+47.6	82.5	8 17.8	+48.2	82.7	8 25.4	+48.8	82.8	8 32.8	+49.4	83.0	8 40.0	+50.1	83.1	8 47.1	+50.7	83.3	8 54.1	+51.2	83.4	9 00.9	+51.7	83.6	11
12	8 57.7	+47.5	81.9	9 06.0	+48.2	82.1	9 14.2	+48.8	82.2	9 22.2	+49.4	82.4	9 30.1	+50.0	82.6	9 37.8	+50.5	82.7	9 45.3	+51.1	82.9	9 52.6	+51.7	83.1	12
13	9 45.2	+47.5	81.3	9 54.2	+48.1	81.5	10 03.0	+48.8	81.7	10 11.6	+49.4	81.8	10 20.1	+49.9	82.0	10 28.3	+50.5	82.2	10 36.4	+51.1	82.4	10 44.3	+51.6	82.6	13
14	10 32.7	+47.4	80.7	10 42.3	+48.1	80.9	10 51.8	+48.6	81.1	11 01.0	+49.3	81.3	11 10.0	+49.9	81.4	11 18.8	+50.5	81.6	11 27.5	+51.0	81.8	11 35.9	+51.5	82.0	14
15	11 20.1	+47.4	80.1	11 30.4	+48.0	80.3	11 40.4	+48.6	80.5	11 50.3	+49.2	80.7	11 59.9	+49.8	80.9	12 09.3	+50.4	81.1	12 18.5	+50.9	81.3	12 27.4	+51.6	81.5	15
16	12 07.5	+47.2	79.4	12 18.4	+47.9	79.6	12 29.0	+48.6	79.9	12 39.5	+49.1	80.1	12 49.7	+49.7	80.3	12 59.7	+50.3	80.5	13 09.4	+50.9	80.8	13 19.0	+51.4	81.0	16
17	12 54.7	+47.2	78.8	13 06.3	+47.8	79.0	13 17.6	+48.4	79.3	13 28.6	+49.1	79.5	13 39.4	+49.7	79.7	13 50.0	+50.3	80.0	14 00.3	+50.8	80.2	14 10.4	+51.4	80.5	17
18	13 41.9	+47.0	78.2	13 54.1	+47.7	78.4	14 06.0	+48.3	78.7	14 17.7	+48.9	78.9	14 29.1	+49.6	79.2	14 40.3	+50.1	79.4	14 51.1	+50.8	79.7	15 01.8	+51.3	79.9	18
19	14 28.9	+47.0	77.5	14 41.8	+47.6	77.8	14 54.3	+48.3	78.0	15 06.6	+48.9	78.3	15 18.7	+49.4	78.6	15 30.4	+50.1	78.8	15 41.9	+50.6	79.1	15 53.1	+51.2	79.4	19
20	15 15.9	+46.8	76.9	15 29.4	+47.5	77.2	15 42.6	+48.1	77.4	15 55.5	+48.8	77.7	16 08.1	+49.4	78.0	16 20.5	+50.0	78.3	16 32.5	+50.6	78.6	16 44.3	+51.1	78.8	20
21	16 02.7	+46.8	76.2	16 16.9	+47.3	76.5	16 30.7	+48.0	76.8	16 44.3	+48.6	77.1	16 57.5	+49.3	77.4	17 10.5	+49.8	77.7	17 23.1	+50.5	78.0	17 35.4	+51.1	78.3	21
22	16 49.5	+46.5	75.6	17 04.2	+47.3	75.9	17 18.7	+47.9	76.2	17 32.9	+48.6	76.5	17 46.8	+49.1	76.8	18 00.3	+49.8	77.1	18 13.6	+50.3	77.4	18 26.5	+50.9	77.7	22
23	17 36.0	+46.5	74.9	17 51.5	+47.1	75.2	18 06.6	+47.8	75.5	18 21.5	+48.4	75.9	18 35.9	+49.1	76.2	18 50.1	+49.7	76.5	19 03.9	+50.3	76.9	19 17.4	+50.8	77.2	23
24	18 22.5	+46.3	74.3	18 38.6	+47.0	74.6	18 54.4	+47.7	74.9	19 09.9	+48.3	75.2	19 25.0	+48.9	75.6	19 39.8	+49.5	75.9	19 54.2	+50.1	76.3	20 08.2	+50.8	76.6	24
25	19 08.8	+46.2	73.6	19 25.6	+46.9	73.9	19 42.1	+47.5	74.3	19 58.2	+48.1	74.6	20 13.9	+48.8	75.0	20 29.3	+49.4	75.3	20 44.3	+50.1	75.7	20 59.0	+50.6	76.1	25
26	19 55.0	+46.0	72.9	20 12.5	+46.7	73.3	20 29.6	+47.4	73.6	20 46.3	+48.1	74.0	21 02.7	+48.7	74.3	21 18.7	+49.3	74.7	21 34.4	+49.8	75.1	21 49.6	+50.5	75.5	26
27	20 41.0	+45.9	72.2	20 59.2	+46.5	72.6	21 17.0	+47.2	73.0	21 34.4	+47.8	73.3	21 51.4	+48.5	73.7	22 08.0	+49.2	74.1	22 24.2	+49.8	74.5	22 40.1	+50.4	74.9	27
28	21 26.9	+45.7	71.5	21 45.7	+46.4	71.9	22 04.2	+47.0	72.3	22 22.2	+47.7	72.7	22 39.9	+48.3	73.1	22 57.2	+49.0	73.5	23 14.0	+49.6	73.9	23 30.5	+50.2	74.3	28
29	22 12.6	+45.5	70.8	22 32.1	+46.2	71.2	22 51.2	+46.9	71.6	23 09.9	+47.6	72.0	23 28.2	+48.3	72.4	23 46.2	+48.8	72.9	24 03.6	+49.5	73.3	24 20.7	+50.1	73.7	29
30	22 58.1	+45.3	70.1	23 18.3	+46.0	70.5	23 38.1	+46.7	70.9	23 57.5	+47.4	71.4	24 16.5	+48.0	71.8	24 35.0	+48.7	72.2	24 53.1	+49.3	72.7	25 10.8	+49.9	73.1	30
31	23 43.4	+45.1	69.4	24 04.3	+45.8	69.8	24 24.8	+46.5	70.3	24 44.9	+47.1	70.7	25 04.5	+47.8	71.1	25 23.7	+48.5	71.6	25 42.4	+49.2	72.0	26 00.7	+49.8	72.5	31
32	24 28.5	+44.9	68.7	24 50.1	+45.6	69.1	25 11.3	+46.3	69.6	25 32.0	+47.0	70.0	25 52.3	+47.7	70.5	26 12.2	+48.3	70.9	26 31.6	+48.9	71.4	26 50.5	+49.6	71.9	32
33	25 13.4	+44.7	68.0	25 35.7	+45.4	68.4	25 57.6	+46.1	68.9	26 19.0	+46.8	69.3	26 40.0	+47.5	69.8	27 00.5	+48.2	70.3	27 20.5	+48.8	70.7	27 40.1	+49.4	71.2	33
34	25 58.1	+44.5	67.2	26 21.1	+45.2	67.7	26 43.7	+45.9	68.1	27 05.8	+46.6	68.6	27 27.5	+47.2	69.1	27 48.7	+47.9	69.6	28 09.3	+48.6	70.1	28 29.5	+49.3	70.6	34
35	26 42.6	+44.2	66.5	27 06.3	+45.0	66.9	27 29.6	+45.7	67.4	27 52.4	+46.4	67.9	28 14.7	+47.1	68.4	28 36.6	+47.7	68.9	28 57.9	+48.5	69.4	29 18.8	+49.1	69.9	35
36	27 26.8	+44.0	65.7	27 51.3	+44.7	66.2	28 15.3	+45.4	66.7	28 38.8	+46.1	67.2	29 01.8	+46.8	67.7	29 24.3	+47.5	68.2	29 46.4	+48.1	68.7	30 07.9	+48.8	69.3	36
37	28 10.8	+43.7	64.9	28 36.0	+44.4	65.4	29 00.7	+45.2	65.9	29 24.9	+45.9	66.4	29 48.6	+46.6	67.0	30 11.8	+47.2	67.5	30 34.5	+48.0	68.0	30 56.7	+48.7	68.6	37
38	28 54.5	+43.5	64.2	29 20.4	+44.2	64.7	29 45.9	+44.9	65.2	30 10.8	+45.6	65.7	30 35.2	+46.4	66.2	30 59.1	+47.1	66.8	31 22.5	+47.8	67.3	31 45.4	+48.4	67.9	38
39	29 38.0	+43.1	63.4	30 04.6	+43.9	63.9	30 30.8	+44.6	64.4	30 56.4	+45.4	65.0	31 21.6	+46.1	65.5	31 46.2	+46.8	66.1	32 10.3	+47.5	66.6	32 33.8	+48.2	67.2	39
40	30 21.1	+42.9	62.6	30 48.5	+43.6	63.1	31 15.4	+44.3	63.6	31 41.8	+45.1	64.2	32 07.7	+45.8	64.7	32 33.0	+46.5	65.3	32 57.8	+47.2	65.9	33 22.0	+47.9	66.5	40
41	31 04.0	+42.5	61.8	31 32.1	+43.3	62.3	31 59.7	+44.1	62.8	32 26.9	+44.8	63.4	32 53.5	+45.5	64.0	33 19.5	+46.3	64.6	33 45.0	+47.0	65.2	34 09.9	+47.7	65.8	41
42	31 46.5	+42.2	60.9	32 15.4	+43.0	61.5	32 43.8	+43.7	62.0	33 11.7	+44.5	62.6	33 39.0	+45.2	63.2	34 05.8	+45.9	63.8	34 32.0	+46.7	64.4	34 57.6	+47.4	65.0	42
43	32 28.7	+41.9	60.1	32 58.4	+42.6	60.6	33 27.5	+43.4	61.2	33 56.2	+44.1	61.8	34 24.2	+44.9	62.4	34 51.7	+45.7	63.0	35 18.7	+46.3	63.7	35 45.0	+47.1	64.3	43
44	33 10.6	+41.5	59.2	33 41.0	+42.3	59.8	34 10.9	+43.1	60.4	34 40.3	+43.9	61.0	35 09.1	+44.6	61.6	35 37.4	+45.3	62.2	36 05.0	+46.1	62.9	36 32.1	+46.8	63.5	44
45	33 52.1	+41.2	58.4	34 23.3	+42.0	59.0	34 54.0	+42.7	59.5	35 24.2	+43.4	60.2	35 53.7	+44.3	60.8	36 22.7	+45.0	61.4	36 51.1	+45.8	62.1	37 18.9	+46.5	62.7	45
46	34 33.3	+40.8	57.5	35 05.3	+41.5	58.1	35 36.7	+42.4	58.7	36 07.6	+43.1	59.3	36 38.0	+43.9	59.9	37 07.7	+44.7	60.6	37 36.9	+45.4	61.3	38 05.4	+46.2	61.9	46
47	35 14.1	+40.3	56.6	35 46.8	+41.2	57.2	36 19.1	+41.9	57.8	36 50.7	+42.8	58.4	37 21.9	+43.5	59.1	37 52.4	+44.3	59.8	38 22.3	+45.1	60.4	38 51.6	+45.8	61.1	47
48	35 54.4	+40.0	55.7	36 28.0	+40.7	56.3	37 01.0	+41.6	56.9	37 33.5	+42.3	57.6	38 05.4	+43.1	58.2	38 36.7	+43.9	58.9	39 07.4	+44.7	59.6	39 37.4	+45.5	60.3	48
49	36 34.4	+39.5	54.8	37 08.7	+40.4	55.4	37 42.6	+41.1	56.0	38 15.8	+41.9	56.7	38 48.5	+42.7	57.3	39 20.6	+43.5	58.0	39 52.1	+44.2	58.7	40 22.9	+45.1	59.4	49
50	37 13.9	+39.1	53.8	37 49.1	+39.8	54.4	38 23.7	+40.6	55.1	38 57.7	+41.5	55.7	39 31.2	+42.3	56.4	40 04.1	+43.1	57.1	40 36.3	+43.9	57.8	41 08.0	+44.6	58.6	50
51	37 53.0	+38.5	52.9	38 28.9	+39.4	53.5	39 04.3	+40.2	54.1	39 39.2	+41.0	54.8	40 13.5	+41.8	55.5	40 47.2	+42.6	56.2	41 20.2	+43.5	56.9	41 52.6	+44.3	57.7	51
52	38 31.5	+38.1	51.9	39 08.3	+38.9	52.5	39 44.5	+39.8	53.2	40 20.2	+40.6	53.9	40 55.3	+41.4	54.6	41 29.8	+42.2	55.3	42 03.7	+43.0	56.0	42 36.9	+43.8	56.8	52
53	39 09.6	+37.6	50.9	39 47.2	+38.4	51.5	40 24.3	+39.2	52.2	41 00.8	+40.0	52.9	41 36.7	+40.8	53.6	42 12.0	+41.7	54.3	42 46.7	+42.5	55.1	43 20.7	+43.5	55.9	53
54	39 47.2	+37.1	49.9	40 25.6	+37.9	50.5	41 03.5	+38.7	51.2	41 40.8	+39.5	51.9	42 17.5	+40.4	52.6	42 53.7	+41.1	53.3	43 29.2	+42.0	54.1	44 04.0	+42.9	54.9	54
55	40 24.3	+36.5	48.9	41 03.5	+37.3	49.5	41 42.2	+38.1	50.2	42 20.3	+39.0	50.9	42 57.9	+39.8	51.6	43 34.8	+40.7	52.3	44 11.2	+41.5	53.1	44 46.9	+42.3	53.9	55
56	41 00.8	+35.9	47.8	41 40.8	+36.7	48.5	42 20.3	+37.6	49.1	42 59.3	+38.4	49.8	43 37.7	+39.2	50.6	44 15.5	+40.1	51.3	44 52.7	+40.9	52.1	45 29.2	+41.8	52.9	56
57	41 36.7	+35.3	46.7	42 17.5	+36.2	47.4	42 57.9	+36.9	48.1	43 37.7	+37.8	48.8	44 16.9	+38.7	49.5	44 55.6	+39.5	50.3	45 33.6	+40.4	51.1	46 11.0	+41.2	51.9	57
58	42 12.0	+34.7	45.7	42 53.7	+35.5	46.3	43 34.8	+36.4	47.0	44 15.5	+37.2	47.7	44 55.6	+38.0	48.4	45 35.1	+38.9	49.2	46 14.0	+39.7	50.0	46 52.2	+40.6	50.8	58
59	42 46.7	+34.0	44.6	43 29.2	+34.8	45.2	44 11.2	+35.7	45.9	44 52.7	+36.5	46.6	45 33.6	+37.3	47.3	46 14.0	+38.2	48.1	46 53.7	+39.1	48.9	47 32.8	+40.0	49.7	59
60	43 20.7	+33.3	43.4	44 04.0	+34.2	44.1	44 46.9	+35.0	44.8	45 29.2	+35.9	45.5	46 11.0	+36.7	46.2	46 52.2	+37.6	47.0	47 32.8	+38.5	47.8	48 12.8	+39.4	48.6	60
61	43 54.0	+32.7	42.3	44 38.2	+33.5	42.9	45 21.9	+34.3	43.6	46 05.1	+35.1	44.3	46 47.7	+36.0	45.1	47 29.8	+36.9	45.8	48 11.3	+37.7	46.6	48 52.2	+38.6	47.5	61
62	44 26.7	+31.9	41.1	45 11.7	+32.7	41.8	45 56.2	+33.6	42.5	46 40.2	+34.4	43.2	47 23.7	+35.3	43.9	48 06.7	+36.1	44.7	48 49.0	+37.1	45.5	49 30.8	+37.9	46.3	62
63	44 58.6	+31.2	39.9	45 44.4	+32.0	40.6	46 29.8	+32.8	41.3	47 14.6	+33.7	42.0	47 59.0	+34.5	42.7	48 42.8	+35.4	43.5	49 26.1	+36.2	44.3	50 08.7	+37.2	45.1	63
64	45 29.8	+30.4	38.7	46 16.4	+31.2	39.4	47 02.6	+32.0	40.0	47 48.3	+32.8	40.7	48 33.5	+33.7	41.5	49 18.2	+34.5	42.2	50 02.3	+35.5	43.0	50 45.9	+36.3	43.9	64
65	46 00.2	+29.5	37.5	46 47.6	+30.3	38.1	47 34.6	+31.1	38.8	48 21.1	+32.0	39.5	49 07.2	+32.8	40.2	49 53.7	+33.8	41.0	50 37.8	+34.6	41.8	51 22.2	+35.5	42.6	65
66	46 29.7	+28.7	36.2	47 17.9	+29.5	36.8	48 05.7	+30.4	37.5	48 53.1	+31.2	38.2	49 40.0	+32.0	38.9	50 26.5	+32.8	39.7	51 12.4	+33.7	40.5	51 57.7	+34.7	41.3	66
67	46 58.4	+27.9	34.9	47 47.4	+28.7	35.6	48 36.1	+29.4	36.2	49 24.3	+30.2	36.9	50 12.0	+31.1	37.6	50 59.3	+31.9	38.4	51 46.1	+32.8	39.1	52 32.4	+33.7	40.0	67
68	47 26.3	+26.9	33.6	48 16.1	+27.7	34.2	49 05.5	+28.5	34.9	49 54.5	+29.3	35.6	50 43.1	+30.1	36.3	51 31.2	+31.0	37.0	52 18.9	+31.9	37.8	53 06.1	+32.7	38.6	68
69	47 53.2	+26.0	32.3	48 43.8	+26.7	32.9	49 34.0	+27.5	33.5	50 23.8	+28.3	34.2	51 13.2	+29.2	34.9	52 02.2	+30.0	35.6	52 50.8	+30.8	36.4	53 38.8	+31.7	37.2	69
70	48 19.2	+25.1	30.9	49 10.5	+25.8	31.5	50 01.5	+26.6	32.2	50 52.1	+27.3	32.8	51 42.4	+28.1	33.5	52 32.2	+28.9	34.2	53 21.6	+29.8	35.0	54 10.5	+30.7	35.8	70
71	48 44.3	+24.1	29.6	49 36.3	+24.8	30.2	50 28.1	+25.5	30.8	51 19.4	+26.3	31.4	52 10.5	+27.0	32.1	53 01.1	+27.9	32.8	53 51.4	+28.7	33.5	54 41.2	+29.6	34.3	71
72	49 08.4	+23.0	28.2	50 01.1	+23.7	28.7	50 53.6	+24.4	29.3	51 45.7	+25.2	29.9	52 37.5	+26.0	30.6	53 29.0	+26.7	31.3	54 20.1	+27.5	32.0	55 10.8	+28.4	32.8	72
73	49 31.4	+22.0	26.8	50 24.8	+22.7	27.3	51 18.0	+23.4	27.9	52 10.9	+24.1	28.5	53 03.5	+24.8	29.1	53 55.7	+25.6	29.8	54 47.6	+26.4	30.5	55 39.2	+27.2	31.2	73
74	49 53.4	+20.9	25.3	50 47.5	+21.5	25.8	51 41.4	+22.2	26.4	52 34.1	+23.0	27.0	53 28.3	+23.6	27.6	54 21.3	+24.4	28.2	55 14.0	+25.2	28.9	56 06.4	+25.9	29.6	74
75	50 14.3	+19.7	23.9	51 09.0	+20.4	24.4	52 03.6	+21.0	24.9	52 57.1	+21.7	25.4	53 51.9	+22.4	26.0	54 45.7	+23.1	26.5	55 39.2	+23.9	27.1	56 32.3	+24.7	27.8	75
76	50 34.0	+18.7	22.4	51 29.4	+19.3	22.9	52 24.6	+19.9	23.4	53 18.8	+20.5	23.9	54 14.3	+21.2	24.4	55 08.8	+21.8	25.0	56 03.1	+22.6	25.7	56 57.0	+23.3	26.3	76
77	50 52.7	+17.4	20.9	51 48.7	+18.0	21.3	52 44.5	+18.6	21.8	53 39.3	+19.2	22.3	54 35.5	+19.8	22.8	55 30.6	+20.5	23.4	56 25.7	+21.2	24.0	57 20.3	+21.9	24.6	77
78	51 10.1	+16.3	19.4	52 06.7	+16.8	19.8	53 03.1	+17.3	20.2	53 59.3	+17.9	20.7	54 55.3	+18.5	21.2	55 51.1	+19.2	21.7	56 46.9	+19.7	22.3	57 42.2	+20.4	22.9	78
79	51 26.4	+15.1	17.8	52 23.5	+15.5	18.2	53 20.4	+16.0	18.6	54 17.2	+16.5	19.1	55 13.8	+17.1	19.5	56 10.3	+17.7	20.0	57 06.6	+18.2	20.6	58 02.6	+18.9	21.1	79
80	51 41.5	+13.8	16.3	52 39.0	+14.2	16.6	53 36.4	+14.7	17.0	54 33.7	+15.2	17.4	55 30.9	+15.7	17.9	56 28.0	+16.2	18.3	57 24.8	+16.9	18.8	58 21.5	+17.5	19.3	80
81	51 55.3	+12.5	14.7	52 53.2	+13.0	15.0	53 51.1	+13.4	15.4	54 48.9	+13.9	15.8	55 46.6	+14.3	16.1	56 44.2	+14.8	16.6	57 41.7	+15.3	17.0	58 39.0	+15.8	17.5	81
82	52 07.8	+11.2	13.1	53 06.2	+11.6	13.4	54 04.5	+12.0	13.7	55 02.8	+12.3	14.1	56 00.9	+12.8	14.4	56 59.0	+13.2	14.8	57 57.0	+13.7	15.2	58 54.8	+14.2	15.6	82
83	52 19.0	+9.9	11.5	53 17.8	+10.2	11.8	54 16.5	+10.6	12.0	55 15.1	+11.0	12.3	56 13.7	+11.3	12.7	57 12.2	+11.7	13.0	58 10.7	+12.1	13.4	59 09.0	+12.5	13.7	83
84	52 28.9	+8.6	9.9	53 28.0	+8.9	10.2	54 27.1	+9.1	10.4	55 26.1	+9.4	10.6	56 25.0	+9.8	11.0	57 23.9	+10.1	11.2	58 22.8	+10.5	11.5	59 21.5	+10.8	11.8	84
85	52 37.5	+7.2	8.3	53 36.9	+7.4	8.4	54 36.2	+7.7	8.7	55 35.5	+8.0	8.9	56 34.8	+8.2	9.1	57 34.0	+8.5	9.4	58 33.3	+8.8	9.6	59 32.3	+9.1	9.9	85
86	52 44.7	+5.9	6.6	53 44.3	+6.1	6.8	54 43.9	+6.3	6.9	55 43.5	+6.4	7.1	56 43.0	+6.6	7.3	57 42.5	+6.8	7.5	58 42.1	+7.0	7.7	59 41.4	+7.3	7.9	86
87	52 50.6	+4.5	5.0	53 50.4	+4.6	5.1	54 50.2	+4.7	5.2	55 49.9	+4.9	5.3	56 49.3	+5.3	5.5	57 49.3	+5.3	5.8	58 49.1	+5.4	5.8	59 48.7	+5.6	6.0	87
88	52 55.1	+3.2	3.3	53 55.0	+3.2	3.4	54 54.9	+3.3	3.5	55 54.8	+3.4	3.6	56 54.7	+3.4	3.7	57 54.6	+3.5	3.8	58 54.5	+3.7	3.9	59 54.3	+3.7	4.0	88
89	52 58.3	+1.7	1.7	53 58.2	+1.8	1.7	54 58.2	+1.8	1.7	55 58.2	+1.8	1.8	56 58.1	+1.9	1.8	57 58.1	+1.9	1.9	58 58.1	+1.9	1.9	59 58.0	+2.0	2.0	89
90	53 00.0	+0.4	0.0	54 00.0	+0.3	0.0	55 00.0	+0.3	0.0	56 00.0	+0.3	0.0	57 00.0	+0.2	0.0	58 00.0	+0.2	0.0	59 00.0	+0.2	0.0	60 00.0	+0.1	0.0	90

| 53° | 54° | 55° | 56° | 57° | 58° | 59° | 60° |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   L.H.A. 91°, 269°

LATITUDE SAME NAME AS DECLINATION

N. Lat. { L.H.A. greater than 180° .....Zn=Z / L.H.A. less than 180°............Zn=360°−Z

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	0 00.0	+47.9	90.0	0 00.0	+48.5	90.0	0 00.0	+49.1	90.0	0 00.0	+49.7	90.0	0 00.0	+50.3	90.0	0 00.0	+50.9	90.0	0 00.0	+51.4	90.0	0 00.0	+52.0	90.0	0
1	0 47.9	+47.9	89.4	0 48.5	+48.6	89.4	0 49.1	+49.2	89.4	0 49.7	+49.8	89.4	0 50.3	+50.3	89.5	0 50.9	+50.9	89.5	0 51.4	+51.5	89.5	0 52.0	+51.9	89.5	1
2	1 35.8	+47.9	88.8	1 37.1	+48.5	88.8	1 38.3	+49.1	88.9	1 39.5	+49.7	88.9	1 40.6	+50.3	88.9	1 41.8	+50.8	88.9	1 42.9	+51.4	89.0	1 43.9	+52.0	89.0	2
3	2 23.7	+47.9	88.2	2 25.6	+48.5	88.2	2 27.4	+49.1	88.3	2 29.2	+49.7	88.3	2 30.9	+50.3	88.4	2 32.6	+50.9	88.4	2 34.3	+51.4	88.5	2 35.9	+51.9	88.5	3
4	3 11.6	+47.9	87.6	3 14.1	+48.5	87.6	3 16.5	+49.1	87.7	3 18.9	+49.7	87.8	3 21.2	+50.3	87.8	3 23.5	+50.8	87.9	3 25.7	+51.4	87.9	3 27.8	+51.9	88.0	4
5	3 59.5	+47.8	87.0	4 02.6	+48.5	87.1	4 05.6	+49.1	87.1	4 08.6	+49.7	87.2	4 11.5	+50.3	87.3	4 14.3	+50.8	87.3	4 17.1	+51.3	87.4	4 19.7	+51.9	87.5	5
6	4 47.3	+47.8	86.4	4 51.1	+48.4	86.5	4 54.7	+49.1	86.6	4 58.3	+49.6	86.6	5 01.8	+50.2	86.7	5 05.1	+50.8	86.8	5 08.4	+51.4	86.9	5 11.6	+51.9	87.0	6
7	5 35.1	+47.8	85.8	5 39.5	+48.4	85.9	5 43.8	+49.0	86.0	5 47.9	+49.6	86.1	5 52.0	+50.2	86.2	5 55.9	+50.8	86.3	5 59.8	+51.3	86.4	6 03.5	+51.9	86.5	7
8	6 22.9	+47.7	85.2	6 27.9	+48.3	85.3	6 32.8	+48.9	85.4	6 37.5	+49.6	85.5	6 42.2	+50.1	85.6	6 46.7	+50.7	85.7	6 51.1	+51.3	85.9	6 55.4	+51.8	86.0	8
9	7 10.6	+47.7	84.6	7 16.2	+48.4	84.7	7 21.7	+49.0	84.8	7 27.1	+49.5	84.9	7 32.3	+50.1	85.1	7 37.4	+50.7	85.2	7 42.4	+51.2	85.3	7 47.2	+51.7	85.5	9
10	7 58.3	+47.6	83.9	8 04.6	+48.2	84.1	8 10.7	+48.8	84.2	8 16.6	+49.5	84.4	8 22.4	+50.1	84.5	8 28.1	+50.6	84.7	8 33.6	+51.2	84.8	8 38.9	+51.8	85.0	10
11	8 45.9	+47.6	83.3	8 52.8	+48.2	83.5	8 59.5	+48.9	83.6	9 06.1	+49.4	83.8	9 12.5	+50.0	84.0	9 18.7	+50.6	84.1	9 24.8	+51.1	84.3	9 30.7	+51.7	84.4	11
12	9 33.5	+47.5	82.7	9 41.0	+48.1	82.9	9 48.4	+48.7	83.0	9 55.5	+49.4	83.2	10 02.5	+50.0	83.4	10 09.3	+50.6	83.6	10 15.9	+51.1	83.8	10 22.4	+51.6	83.9	12
13	10 21.0	+47.4	82.1	10 29.1	+48.1	82.3	10 37.1	+48.7	82.5	10 44.9	+49.3	82.6	10 52.5	+49.9	82.8	10 59.9	+50.4	83.0	11 07.0	+51.1	83.2	11 14.0	+51.6	83.4	13
14	11 08.4	+47.3	81.5	11 17.2	+48.0	81.7	11 25.8	+48.6	81.9	11 34.2	+49.2	82.1	11 42.4	+49.8	82.3	11 50.3	+50.4	82.5	11 58.1	+51.0	82.7	12 05.6	+51.6	82.9	14
15	11 55.7	+47.3	80.8	12 05.2	+47.9	81.0	12 14.4	+48.6	81.3	12 23.4	+49.2	81.5	12 32.2	+49.8	81.7	12 40.7	+50.4	81.9	12 49.1	+50.9	82.1	12 57.2	+51.4	82.4	15
16	12 43.0	+47.2	80.2	12 53.1	+47.8	80.4	13 03.0	+48.4	80.7	13 12.6	+49.0	80.9	13 22.0	+49.6	81.1	13 31.1	+50.3	81.4	13 40.0	+50.8	81.6	13 48.6	+51.4	81.8	16
17	13 30.2	+47.1	79.6	13 40.9	+47.8	79.8	13 51.4	+48.4	80.1	14 01.6	+49.0	80.3	14 11.6	+49.6	80.5	14 21.4	+50.1	80.8	14 30.8	+50.8	81.1	14 40.0	+51.3	81.3	17
18	14 17.3	+46.9	78.9	14 28.7	+47.6	79.2	14 39.8	+48.2	79.4	14 50.6	+48.9	79.7	15 01.2	+49.5	80.0	15 11.5	+50.1	80.2	15 21.6	+50.7	80.5	15 31.3	+51.3	80.8	18
19	15 04.2	+46.9	78.3	15 16.3	+47.5	78.6	15 28.0	+48.2	78.8	15 39.5	+48.8	79.1	15 50.7	+49.4	79.4	16 01.6	+50.1	79.7	16 12.3	+50.6	79.9	16 22.6	+51.2	80.2	19
20	15 51.1	+46.8	77.6	16 03.8	+47.4	77.9	16 16.2	+48.1	78.2	16 28.3	+48.7	78.5	16 40.1	+49.3	78.8	16 51.7	+49.9	79.1	17 02.9	+50.5	79.4	17 13.8	+51.0	79.7	20
21	16 37.9	+46.6	77.0	16 51.2	+47.3	77.3	17 04.3	+47.9	77.6	17 17.0	+48.6	77.9	17 29.4	+49.2	78.2	17 41.6	+49.8	78.5	17 53.4	+50.4	78.8	18 04.8	+51.0	79.1	21
22	17 24.5	+46.5	76.3	17 38.5	+47.2	76.6	17 52.2	+47.8	77.0	18 05.6	+48.4	77.3	18 18.6	+49.1	77.6	18 31.4	+49.7	77.9	18 43.8	+50.3	78.2	18 55.8	+50.9	78.6	22
23	18 11.0	+46.3	75.7	18 25.7	+47.0	76.0	18 40.0	+47.7	76.3	18 54.0	+48.4	76.6	19 07.7	+49.0	77.0	19 21.1	+49.6	77.3	19 34.1	+50.2	77.7	19 46.7	+50.8	78.0	23
24	18 57.3	+46.2	75.0	19 12.7	+46.9	75.3	19 27.7	+47.6	75.7	19 42.4	+48.2	76.0	19 56.7	+48.8	76.4	20 10.7	+49.4	76.7	20 24.3	+50.0	77.1	20 37.5	+50.6	77.4	24
25	19 43.5	+46.1	74.3	19 59.6	+46.7	74.7	20 15.3	+47.4	75.0	20 30.6	+48.0	75.4	20 45.5	+48.7	75.7	21 00.1	+49.4	76.1	21 14.3	+50.0	76.5	21 28.1	+50.6	76.9	25
26	20 29.6	+45.9	73.6	20 46.3	+46.6	74.0	21 02.7	+47.2	74.4	21 18.6	+48.0	74.7	21 34.2	+48.6	75.1	21 49.5	+49.1	75.5	22 04.3	+49.8	75.9	22 18.7	+50.4	76.3	26
27	21 15.5	+45.7	73.0	21 32.9	+46.4	73.3	21 49.9	+47.1	73.7	22 06.6	+47.7	74.1	22 22.8	+48.4	74.5	22 38.6	+49.1	74.9	22 54.1	+49.7	75.3	23 09.1	+50.3	75.7	27
28	22 01.2	+45.6	72.3	22 19.3	+46.3	72.6	22 37.0	+46.9	73.0	22 54.3	+47.6	73.4	23 11.2	+48.3	73.8	23 27.7	+48.9	74.3	23 43.8	+49.5	74.7	23 59.4	+50.1	75.1	28
29	22 46.8	+45.3	71.6	23 05.6	+46.0	72.0	23 23.9	+46.8	72.4	23 41.9	+47.4	72.8	23 59.5	+48.1	73.2	24 16.6	+48.7	73.6	24 33.3	+49.4	74.1	24 49.5	+50.0	74.5	29
30	23 32.1	+45.2	70.8	23 51.6	+45.9	71.3	24 10.7	+46.6	71.7	24 29.3	+47.3	72.1	24 47.6	+47.9	72.5	25 05.3	+48.6	73.0	25 22.7	+49.2	73.4	25 39.5	+49.9	73.9	30
31	24 17.3	+45.0	70.1	24 37.5	+45.7	70.5	24 57.3	+46.3	71.0	25 16.6	+47.0	71.4	25 35.5	+47.7	71.9	25 53.9	+48.4	72.3	26 11.9	+49.0	72.8	26 29.4	+49.7	73.3	31
32	25 02.3	+44.7	69.4	25 23.2	+45.4	69.8	25 43.6	+46.2	70.3	26 03.6	+46.9	70.7	26 23.2	+47.5	71.2	26 42.3	+48.2	71.7	27 00.9	+48.9	72.2	27 19.1	+49.5	72.6	32
33	25 47.0	+44.5	68.7	26 08.6	+45.3	69.1	26 29.8	+45.9	69.6	26 50.5	+46.6	70.0	27 10.7	+47.4	70.5	27 30.5	+48.0	71.0	27 49.8	+48.7	71.5	28 08.6	+49.3	72.0	33
34	26 31.5	+44.3	67.9	26 53.9	+45.0	68.4	27 15.7	+45.8	68.8	27 37.1	+46.5	69.3	27 58.1	+47.1	69.8	28 18.5	+47.8	70.3	28 38.5	+48.4	70.8	28 57.9	+49.1	71.4	34
35	27 15.8	+44.0	67.1	27 38.9	+44.7	67.6	28 01.5	+45.4	68.1	28 23.6	+46.2	68.6	28 45.2	+46.9	69.1	29 06.3	+47.6	69.6	29 26.9	+48.3	70.2	29 47.0	+49.0	70.7	35
36	27 59.8	+43.8	66.4	28 23.6	+44.5	66.9	28 46.9	+45.3	67.4	29 09.8	+45.9	67.9	29 32.1	+46.7	68.4	29 53.9	+47.4	68.9	30 15.2	+48.1	69.5	30 36.0	+48.7	70.0	36
37	28 43.6	+43.5	65.6	29 08.1	+44.3	66.1	29 32.2	+45.0	66.6	29 55.7	+45.8	67.2	30 18.8	+46.4	67.7	30 41.3	+47.1	68.2	31 03.3	+47.8	68.8	31 24.7	+48.5	69.4	37
38	29 27.1	+43.2	64.8	29 52.4	+44.0	65.3	30 17.2	+44.7	65.9	30 41.5	+45.4	66.4	31 05.2	+46.2	66.9	31 28.4	+46.9	67.5	31 51.1	+47.6	68.1	32 13.2	+48.3	68.7	38
39	30 10.3	+42.9	64.0	30 36.4	+43.6	64.5	31 01.9	+44.4	65.1	31 26.9	+45.2	65.6	31 51.4	+45.9	66.2	32 15.3	+46.7	66.8	32 38.7	+47.3	67.4	33 01.5	+48.1	68.0	39
40	30 53.2	+42.7	63.2	31 20.0	+43.4	63.7	31 46.3	+44.2	64.3	32 12.1	+44.9	64.9	32 37.3	+45.6	65.4	33 02.0	+46.3	66.0	33 26.0	+47.1	66.6	33 49.6	+47.7	67.2	40
41	31 35.9	+42.3	62.4	32 03.4	+43.1	62.9	32 30.5	+43.8	63.5	32 57.0	+44.5	64.1	33 22.9	+45.3	64.7	33 48.3	+46.1	65.3	34 13.1	+46.8	65.9	34 37.3	+47.6	66.5	41
42	32 18.2	+41.9	61.5	32 46.5	+42.7	62.1	33 14.3	+43.5	62.7	33 41.5	+44.3	63.3	34 08.2	+45.1	63.9	34 34.4	+45.7	64.5	34 59.9	+46.5	65.1	35 24.9	+47.2	65.8	42
43	33 00.1	+41.6	60.7	33 29.2	+42.4	61.3	33 57.8	+43.2	61.9	34 25.8	+44.0	62.5	34 53.3	+44.7	63.1	35 20.1	+45.5	63.7	35 46.4	+46.2	64.3	36 12.1	+46.9	65.0	43
44	33 41.7	+41.3	59.8	34 11.6	+42.0	60.4	34 41.0	+42.8	61.0	35 09.8	+43.5	61.6	35 38.0	+44.3	62.3	36 05.6	+45.1	62.9	36 32.6	+45.9	63.6	36 59.0	+46.7	64.2	44
45	34 23.0	+40.8	59.0	34 53.6	+41.7	59.6	35 23.8	+42.4	60.2	35 53.3	+43.3	60.8	36 22.3	+44.0	61.4	36 50.7	+44.8	62.1	37 18.5	+45.6	62.7	37 45.7	+46.3	63.4	45
46	35 03.8	+40.5	58.1	35 35.3	+41.3	58.7	36 06.2	+42.1	59.3	36 36.6	+42.8	59.9	37 06.3	+43.7	60.6	37 35.5	+44.4	61.2	38 04.1	+45.2	61.9	38 32.0	+46.0	62.6	46
47	35 44.3	+40.1	57.2	36 16.6	+40.8	57.8	36 48.3	+41.6	58.4	37 19.4	+42.5	59.1	37 50.0	+43.2	59.7	38 19.9	+44.1	60.4	38 49.3	+44.8	61.1	39 18.0	+45.6	61.8	47
48	36 24.4	+39.6	56.2	36 57.4	+40.5	56.9	37 29.9	+41.3	57.5	38 01.9	+42.0	58.2	38 33.2	+42.9	58.8	39 04.0	+43.6	59.5	39 34.1	+44.5	60.2	40 03.6	+45.2	61.0	48
49	37 04.0	+39.1	55.3	37 37.9	+39.9	55.9	38 11.2	+40.8	56.6	38 43.9	+41.7	57.2	39 16.1	+42.4	57.9	39 47.6	+43.3	58.6	40 18.6	+44.0	59.4	40 48.8	+44.8	60.1	49
50	37 43.1	+38.7	54.4	38 17.8	+39.6	55.0	38 52.0	+40.3	55.6	39 25.6	+41.1	56.3	39 58.5	+42.0	57.0	40 30.9	+42.8	57.7	41 02.6	+43.6	58.5	41 33.6	+44.5	59.2	50
51	38 21.8	+38.3	53.4	38 57.4	+39.0	54.0	39 32.3	+39.9	54.7	40 06.7	+40.7	55.4	40 40.5	+41.5	56.1	41 13.7	+42.3	56.8	41 46.2	+43.2	57.5	42 18.1	+44.0	58.3	51
52	39 00.1	+37.7	52.4	39 36.4	+38.5	53.0	40 12.2	+39.4	53.7	40 47.4	+40.2	54.4	41 22.0	+41.1	55.1	41 56.0	+41.9	55.9	42 29.4	+42.7	56.6	43 02.1	+43.5	57.4	52
53	39 37.8	+37.1	51.4	40 14.9	+38.0	52.0	40 51.6	+38.8	52.7	41 27.6	+39.7	53.4	42 03.1	+40.5	54.1	42 37.9	+41.4	54.9	43 12.1	+42.2	55.6	43 45.6	+43.1	56.4	53
54	40 14.9	+36.7	50.4	40 52.9	+37.5	51.0	41 30.4	+38.3	51.7	42 07.3	+39.1	52.4	42 43.6	+40.0	53.1	43 19.3	+40.8	53.9	43 54.3	+41.7	54.7	44 28.7	+42.5	55.5	54
55	40 51.6	+36.0	49.3	41 30.4	+36.9	50.0	42 08.7	+37.7	50.7	42 46.4	+38.6	51.4	43 23.6	+39.4	52.1	44 00.1	+40.3	52.9	44 36.0	+41.1	53.7	45 11.2	+42.0	54.5	55
56	41 27.6	+35.5	48.3	42 07.3	+36.3	48.9	42 46.4	+37.2	49.6	43 25.0	+38.0	50.3	44 03.0	+38.9	51.1	44 40.4	+39.7	51.8	45 17.1	+40.6	52.6	45 53.2	+41.5	53.5	56
57	42 03.1	+34.8	47.2	42 43.6	+35.7	47.9	43 23.6	+36.5	48.5	44 03.0	+37.4	49.3	44 41.9	+38.2	50.0	45 20.1	+39.1	50.8	45 57.7	+40.0	51.6	46 34.7	+40.9	52.4	57
58	42 37.9	+34.2	46.1	43 19.3	+35.0	46.8	44 00.1	+35.9	47.5	44 40.4	+36.7	48.2	45 20.1	+37.6	48.9	45 59.2	+38.5	49.7	46 37.7	+39.4	50.5	47 15.6	+40.2	51.3	58
59	43 12.1	+33.5	45.0	43 54.3	+34.4	45.6	44 36.0	+35.2	46.3	45 17.1	+36.1	47.1	45 57.7	+37.0	47.8	46 37.7	+37.9	48.6	47 17.1	+38.7	49.4	47 55.8	+39.5	50.2	59
60	43 45.6	+32.8	43.8	44 28.7	+33.6	44.5	45 11.2	+34.5	45.2	45 53.2	+35.4	45.9	46 34.7	+36.2	46.7	47 15.6	+37.1	47.5	47 55.8	+38.0	48.3	48 35.4	+39.0	49.1	60
61	44 18.4	+32.1	42.6	45 02.3	+32.9	43.3	45 45.7	+33.8	44.0	46 28.6	+34.6	44.7	47 10.9	+35.6	45.5	47 52.7	+36.4	46.3	48 33.8	+37.4	47.1	49 14.4	+38.2	47.9	61
62	44 50.5	+31.4	41.5	45 35.2	+32.2	42.1	46 19.5	+33.0	42.8	47 03.2	+33.9	43.6	47 46.5	+34.7	44.3	48 29.1	+35.7	45.1	49 11.2	+36.5	45.9	49 52.6	+37.5	46.8	62
63	45 21.9	+30.5	40.3	46 07.4	+31.4	40.9	46 52.5	+32.3	41.6	47 37.1	+33.1	42.3	48 21.2	+34.0	43.1	49 04.8	+34.8	43.9	49 47.7	+35.8	44.7	50 30.1	+36.6	45.5	63
64	45 52.4	+29.8	39.0	46 38.8	+30.6	39.7	47 24.8	+31.4	40.4	48 10.2	+32.3	41.1	48 55.2	+33.1	41.8	49 39.6	+34.1	42.6	50 23.5	+34.9	43.4	51 06.7	+35.9	44.3	64
65	46 22.2	+28.9	37.8	47 09.4	+29.8	38.4	47 56.2	+30.6	39.1	48 42.5	+31.4	39.8	49 28.3	+32.3	40.6	50 13.7	+33.1	41.3	50 58.4	+34.1	42.2	51 42.6	+35.0	43.0	65
66	46 51.1	+28.1	36.5	47 39.2	+28.8	37.1	48 26.8	+29.7	37.8	49 13.9	+30.6	38.5	50 00.6	+31.4	39.3	50 46.8	+32.3	40.0	51 32.5	+33.2	40.8	52 17.6	+34.1	41.7	66
67	47 19.2	+27.1	35.2	48 08.0	+28.0	35.8	48 56.5	+28.7	36.5	49 44.5	+29.6	37.2	50 32.0	+30.5	37.9	51 19.1	+31.3	38.7	52 05.7	+32.2	39.5	52 51.7	+33.1	40.3	67
68	47 46.3	+26.3	33.9	48 36.0	+27.0	34.5	49 24.3	+27.9	35.2	50 14.1	+28.6	35.8	51 02.5	+29.5	36.6	51 50.4	+30.4	37.3	52 37.9	+31.3	38.1	53 24.8	+32.2	38.9	68
69	48 12.6	+25.3	32.5	49 03.0	+26.1	33.1	49 53.1	+26.8	33.8	50 42.7	+27.7	34.5	51 32.0	+28.5	35.2	52 20.8	+29.3	35.9	53 09.2	+30.2	36.7	53 57.0	+31.1	37.5	69
70	48 37.9	+24.3	31.2	49 29.1	+25.0	31.8	50 19.9	+25.8	32.4	51 10.4	+26.6	33.1	52 00.5	+27.4	33.8	52 50.1	+28.3	34.5	53 39.4	+29.1	35.2	54 28.1	+30.0	36.1	70
71	49 02.2	+23.3	29.8	49 54.1	+24.0	30.4	50 45.7	+24.8	31.0	51 37.0	+25.5	31.6	52 27.9	+26.3	32.3	53 18.4	+27.2	33.0	54 08.5	+28.0	33.8	54 58.1	+28.9	34.6	71
72	49 25.5	+22.2	28.4	50 18.1	+23.0	28.9	51 10.5	+23.6	29.5	52 02.5	+24.4	30.2	52 54.2	+25.2	30.8	53 45.6	+26.0	31.5	54 36.5	+26.9	32.2	55 27.0	+27.8	33.0	72
73	49 47.7	+21.2	26.9	50 41.1	+21.8	27.5	51 34.1	+22.6	28.1	52 26.9	+23.3	28.7	53 19.4	+24.1	29.3	54 11.6	+24.8	30.0	55 03.4	+25.6	30.7	55 54.8	+26.4	31.4	73
74	50 08.9	+20.0	25.5	51 02.9	+20.7	26.0	51 56.7	+21.4	26.6	52 50.2	+22.1	27.1	53 43.5	+22.8	27.8	54 36.4	+23.6	28.4	55 29.0	+24.4	29.1	56 21.2	+25.2	29.8	74
75	50 28.9	+18.9	24.0	51 23.6	+19.6	24.5	52 18.1	+20.2	25.0	53 12.3	+20.9	25.6	54 06.3	+21.6	26.2	55 00.0	+22.3	26.8	55 53.4	+23.1	27.5	56 46.4	+23.8	28.2	75
76	50 47.8	+17.9	22.5	51 43.2	+18.3	23.0	52 38.3	+19.0	23.5	53 33.2	+19.6	24.0	54 27.9	+20.3	24.6	55 22.3	+21.0	25.2	56 16.5	+21.7	25.8	57 10.3	+22.5	26.5	76
77	51 05.6	+16.5	21.0	52 01.5	+17.1	21.4	52 57.3	+17.7	21.9	53 52.8	+18.4	22.4	54 48.2	+19.0	23.0	55 43.3	+19.6	23.5	56 38.2	+20.3	24.1	57 32.8	+21.1	24.8	77
78	51 22.1	+15.4	19.5	52 18.6	+15.9	19.9	53 15.0	+16.4	20.3	54 11.2	+17.0	20.8	55 07.2	+17.6	21.3	56 02.9	+18.3	21.9	56 58.5	+18.9	22.4	57 53.9	+19.6	23.0	78
79	51 37.5	+14.1	17.9	52 34.5	+14.6	18.3	53 31.4	+15.1	18.7	54 28.2	+15.6	19.2	55 24.8	+16.2	19.6	56 21.2	+16.8	20.1	57 17.4	+17.4	20.7	58 13.4	+18.1	21.2	79
80	51 51.6	+12.8	16.3	52 49.1	+13.3	16.7	53 46.5	+13.8	17.1	54 43.8	+14.3	17.5	55 41.0	+14.7	17.9	56 38.0	+15.3	18.4	57 34.8	+15.9	18.9	58 31.5	+16.5	19.4	80
81	52 04.4	+11.6	14.7	53 02.4	+12.0	15.1	54 00.3	+12.4	15.4	54 58.1	+12.8	15.8	55 55.7	+13.4	16.2	56 53.3	+13.8	16.6	57 50.7	+14.3	17.1	58 48.0	+14.9	17.6	81
82	52 16.0	+10.2	13.1	53 14.4	+10.6	13.4	54 12.7	+11.0	13.8	55 10.9	+11.4	14.1	56 09.1	+11.8	14.5	57 07.1	+12.3	14.9	58 05.0	+12.8	15.3	59 02.9	+13.2	15.7	82
83	52 26.2	+8.9	11.5	53 25.0	+9.2	11.8	54 23.7	+9.6	12.1	55 22.3	+9.9	12.4	56 20.9	+10.3	12.7	57 19.4	+10.7	13.0	58 17.8	+11.1	13.4	59 16.1	+11.5	13.8	83
84	52 35.1	+7.6	9.9	53 34.2	+7.9	10.1	54 33.3	+8.1	10.4	55 32.2	+8.4	10.6	56 31.2	+8.7	10.9	57 30.1	+9.1	11.2	58 28.9	+9.4	11.5	59 27.6	+9.9	11.9	84
85	52 42.7	+6.2	8.3	53 42.1	+6.4	8.5	54 41.4	+6.7	8.7	55 40.7	+6.9	8.9	56 39.9	+7.2	9.1	57 39.2	+7.4	9.4	58 38.3	+7.8	9.6	59 37.5	+8.0	9.9	85
86	52 48.9	+4.9	6.6	53 48.5	+5.0	6.8	54 48.1	+5.2	7.0	55 47.6	+5.4	7.1	56 47.1	+5.7	7.3	57 46.6	+5.9	7.5	58 46.1	+6.1	7.7	59 45.5	+6.4	8.0	86
87	52 53.8	+3.4	5.0	53 53.5	+3.5	5.1	54 53.3	+3.7	5.2	55 53.0	+3.9	5.4	56 52.8	+4.0	5.5	57 52.5	+4.2	5.6	58 52.2	+4.4	5.8	59 51.9	+4.5	6.0	87
88	52 57.2	+2.1	3.3	53 57.1	+2.2	3.4	54 57.0	+2.3	3.5	55 56.9	+2.3	3.6	56 56.8	+2.4	3.7	57 56.7	+2.5	3.8	58 56.5	+2.6	3.9	59 56.4	+2.7	4.0	88
89	52 59.3	+0.7	1.7	53 59.3	+0.7	1.7	54 59.3	+0.7	1.7	55 59.2	+0.8	1.8	56 59.2	+0.8	1.8	57 59.2	+0.8	1.9	58 59.1	+0.9	1.9	59 59.1	+0.9	2.0	89
90	53 00.0	−0.7	0.0	54 00.0	−0.7	0.0	55 00.0	−0.7	0.0	56 00.0	−0.8	0.0	57 00.0	−0.8	0.0	58 00.0	−0.8	0.0	59 00.0	−0.9	0.0	60 00.0	−0.9	0.0	90

Dec.	53° Hc	53° d	53° Z	54° Hc	54° d	54° Z	55° Hc	55° d	55° Z	56° Hc	56° d	56° Z	57° Hc	57° d	57° Z	58° Hc	58° d	58° Z	59° Hc	59° d	59° Z	60° Hc	60° d	60° Z	Dec.
0	0 00.0	+47.9	90.0	0 00.0	+48.5	90.0	0 00.0	+49.1	90.0	0 00.0	+49.7	90.0	0 00.0	+50.3	90.0	0 00.0	+50.9	90.0	0 00.0	+51.4	90.0	0 00.0	+52.0	90.0	0
1	0 47.9	+47.9	89.4	0 48.5	+48.6	89.4	0 49.1	+49.2	89.4	0 49.7	+49.8	89.4	0 50.3	+50.3	89.5	0 50.9	+50.9	89.5	0 51.4	+51.5	89.5	0 52.0	+51.9	89.5	1
2	1 35.8	+47.9	88.8	1 37.1	+48.5	88.8	1 38.3	+49.1	88.9	1 39.5	+49.7	88.9	1 40.6	+50.3	88.9	1 41.8	+50.8	88.9	1 42.9	+51.4	89.0	1 43.9	+52.0	89.0	2
3	2 23.7	+47.9	88.2	2 25.6	+48.5	88.2	2 27.4	+49.1	88.3	2 29.2	+49.7	88.3	2 30.9	+50.3	88.4	2 32.6	+50.9	88.4	2 34.3	+51.4	88.5	2 35.9	+51.9	88.5	3
4	3 11.6	+47.9	87.6	3 14.1	+48.5	87.6	3 16.5	+49.1	87.7	3 18.9	+49.7	87.8	3 21.2	+50.3	87.8	3 23.5	+50.8	87.9	3 25.7	+51.4	87.9	3 27.8	+51.9	88.0	4
5	3 59.5	+47.8	87.0	4 02.6	+48.5	87.1	4 05.6	+49.1	87.1	4 08.6	+49.7	87.2	4 11.5	+50.3	87.3	4 14.3	+50.8	87.3	4 17.1	+51.3	87.4	4 19.7	+51.9	87.5	5
6	4 47.3	+47.8	86.4	4 51.1	+48.4	86.5	4 54.7	+49.1	86.6	4 58.3	+49.6	86.6	5 01.8	+50.2	86.7	5 05.1	+50.8	86.8	5 08.4	+51.4	86.9	5 11.6	+51.9	87.0	6
7	5 35.1	+47.8	85.9	5 39.5	+48.4	85.9	5 43.8	+49.0	86.0	5 47.9	+49.6	86.1	5 52.0	+50.2	86.2	5 55.9	+50.8	86.3	5 59.8	+51.3	86.4	6 03.5	+51.9	86.5	7
8	6 22.9	+47.7	85.2	6 27.9	+48.3	85.3	6 32.8	+48.9	85.4	6 37.5	+49.6	85.5	6 42.2	+50.1	85.6	6 46.7	+50.7	85.7	6 51.1	+51.3	85.9	6 55.4	+51.8	86.0	8
9	7 10.6	+47.7	84.6	7 16.2	+48.4	84.7	7 21.7	+49.0	84.8	7 27.1	+49.5	84.9	7 32.3	+50.1	85.1	7 37.4	+50.7	85.2	7 42.4	+51.2	85.3	7 47.2	+51.7	85.5	9
10	7 58.3	+47.6	83.9	8 04.6	+48.2	84.1	8 10.7	+48.8	84.2	8 16.6	+49.5	84.4	8 22.4	+50.1	84.5	8 28.1	+50.6	84.7	8 33.6	+51.2	84.8	8 38.9	+51.8	85.0	10
11	8 45.9	+47.6	83.3	8 52.8	+48.2	83.5	8 59.5	+48.9	83.6	9 06.1	+49.4	83.8	9 12.5	+50.0	84.0	9 18.7	+50.6	84.1	9 24.8	+51.1	84.3	9 30.7	+51.7	84.4	11
12	9 33.5	+47.5	82.7	9 41.0	+48.1	82.9	9 48.4	+48.7	83.0	9 55.5	+49.4	83.2	10 02.5	+50.0	83.4	10 09.3	+50.6	83.6	10 15.9	+51.1	83.8	10 22.4	+51.6	83.9	12
13	10 21.0	+47.4	82.1	10 29.1	+48.1	82.3	10 37.1	+48.7	82.5	10 44.9	+49.3	82.6	10 52.5	+49.9	82.8	10 59.9	+50.4	83.0	11 07.0	+51.1	83.2	11 14.0	+51.6	83.4	13
14	11 08.4	+47.3	81.5	11 17.2	+48.0	81.7	11 25.8	+48.6	81.9	11 34.2	+49.2	82.1	11 42.4	+49.8	82.3	11 50.3	+50.4	82.5	11 58.1	+51.0	82.7	12 05.6	+51.6	82.9	14
15	11 55.7	+47.3	80.8	12 05.2	+47.9	81.0	12 14.4	+48.6	81.3	12 23.4	+49.2	81.5	12 32.2	+49.8	81.7	12 40.7	+50.4	81.9	12 49.1	+50.9	82.1	12 57.2	+51.4	82.4	15
16	12 43.0	+47.2	80.2	12 53.1	+47.8	80.4	13 03.0	+48.4	80.7	13 12.6	+49.0	80.9	13 22.0	+49.6	81.1	13 31.1	+50.3	81.4	13 40.0	+50.8	81.6	13 48.6	+51.4	81.8	16
17	13 30.2	+47.1	79.6	13 40.9	+47.8	79.8	13 51.4	+48.4	80.1	14 01.6	+49.0	80.3	14 11.6	+49.6	80.5	14 21.4	+50.1	80.8	14 30.8	+50.8	81.1	14 40.0	+51.3	81.3	17
18	14 17.3	+46.9	78.9	14 28.7	+47.6	79.2	14 39.8	+48.2	79.4	14 50.6	+48.9	79.7	15 01.2	+49.5	80.0	15 11.5	+50.1	80.2	15 21.6	+50.7	80.5	15 31.3	+51.3	80.8	18
19	15 04.2	+46.9	78.3	15 16.3	+47.5	78.6	15 28.0	+48.2	78.8	15 39.5	+48.8	79.1	15 50.7	+49.4	79.4	16 01.6	+50.1	79.7	16 12.3	+50.6	79.9	16 22.6	+51.2	80.2	19
20	15 51.1	+46.8	77.6	16 03.8	+47.4	77.9	16 16.2	+48.1	78.2	16 28.3	+48.7	78.5	16 40.1	+49.3	78.8	16 51.7	+49.9	79.1	17 02.9	+50.5	79.4	17 13.8	+51.0	79.7	20
21	16 37.9	+46.6	77.0	16 51.2	+47.3	77.3	17 04.3	+47.9	77.6	17 17.0	+48.6	77.9	17 29.4	+49.2	78.2	17 41.6	+49.8	78.5	17 53.4	+50.4	78.8	18 04.8	+51.0	79.1	21
22	17 24.5	+46.5	76.3	17 38.5	+47.2	76.6	17 52.2	+47.8	77.0	18 05.6	+48.4	77.3	18 18.6	+49.1	77.6	18 31.4	+49.7	77.9	18 43.8	+50.3	78.2	18 55.8	+50.9	78.6	22
23	18 11.0	+46.3	75.7	18 25.7	+47.0	76.0	18 40.0	+47.7	76.3	18 54.0	+48.4	76.6	19 07.7	+49.0	77.0	19 21.1	+49.6	77.3	19 34.1	+50.2	77.7	19 46.7	+50.8	78.0	23
24	18 57.3	+46.2	75.0	19 12.7	+46.9	75.3	19 27.7	+47.6	75.7	19 42.4	+48.2	76.0	19 56.7	+48.8	76.4	20 10.7	+49.4	76.7	20 24.3	+50.0	77.1	20 37.5	+50.6	77.4	24
25	19 43.5	+46.1	74.3	19 59.6	+46.7	74.7	20 15.3	+47.4	75.0	20 30.6	+48.0	75.4	20 45.5	+48.7	75.7	21 00.1	+49.3	76.1	21 14.3	+50.0	76.5	21 28.1	+50.6	76.9	25
26	20 29.6	+45.9	73.6	20 46.3	+46.6	74.0	21 02.7	+47.2	74.4	21 18.6	+48.0	74.7	21 34.2	+48.6	75.1	21 49.5	+49.1	75.5	22 04.3	+49.8	75.9	22 18.7	+50.4	76.3	26
27	21 15.5	+45.7	73.0	21 32.9	+46.4	73.3	21 49.9	+47.1	73.7	22 06.6	+47.7	74.1	22 22.8	+48.4	74.5	22 38.6	+49.1	74.9	22 54.1	+49.7	75.3	23 09.1	+50.3	75.7	27
28	22 01.2	+45.6	72.3	22 19.3	+46.3	72.7	22 37.0	+46.9	73.0	22 54.3	+47.6	73.4	23 11.2	+48.3	73.8	23 27.7	+48.9	74.3	23 43.8	+49.5	74.7	23 59.4	+50.1	75.1	28
29	22 46.8	+45.3	71.6	23 05.6	+46.0	72.0	23 23.9	+46.8	72.4	23 41.9	+47.4	72.8	23 59.5	+48.1	73.2	24 16.6	+48.7	73.6	24 33.3	+49.4	74.1	24 49.5	+50.0	74.5	29
30	23 32.1	+45.2	70.8	23 51.6	+45.9	71.3	24 10.7	+46.6	71.7	24 29.3	+47.3	72.1	24 47.6	+47.9	72.5	25 05.3	+48.6	73.0	25 22.7	+49.2	73.4	25 39.5	+49.9	73.9	30
31	24 17.3	+45.0	70.1	24 37.5	+45.7	70.5	24 57.3	+46.3	71.0	25 16.6	+47.0	71.4	25 35.5	+47.7	71.9	25 53.9	+48.4	72.3	26 11.9	+49.0	72.8	26 29.4	+49.7	73.3	31
32	25 02.3	+44.7	69.4	25 23.2	+45.4	69.8	25 43.6	+46.2	70.3	26 03.6	+46.9	70.7	26 23.2	+47.5	71.2	26 42.3	+48.2	71.7	27 00.9	+48.9	72.2	27 19.1	+49.5	72.6	32
33	25 47.0	+44.5	68.7	26 08.6	+45.3	69.1	26 29.8	+45.9	69.6	26 50.5	+46.6	70.0	27 10.7	+47.4	70.5	27 30.5	+48.0	71.0	27 49.8	+48.7	71.5	28 08.6	+49.3	72.0	33
34	26 31.5	+44.3	67.9	26 53.9	+45.0	68.4	27 15.7	+45.8	68.8	27 37.1	+46.5	69.3	27 58.1	+47.1	69.8	28 18.5	+47.8	70.3	28 38.5	+48.4	70.8	28 57.9	+49.1	71.4	34
35	27 15.8	+44.0	67.1	27 38.9	+44.7	67.6	28 01.5	+45.4	68.1	28 23.6	+46.2	68.6	28 45.2	+46.9	69.1	29 06.3	+47.6	69.6	29 26.9	+48.3	70.2	29 47.0	+49.0	70.7	35
36	27 59.8	+43.8	66.4	28 23.6	+44.5	66.9	28 46.9	+45.3	67.4	29 09.8	+45.9	67.9	29 32.1	+46.7	68.4	29 53.9	+47.4	68.9	30 15.2	+48.1	69.5	30 36.0	+48.7	70.0	36
37	28 43.6	+43.5	65.6	29 08.1	+44.3	66.1	29 32.2	+45.0	66.6	29 55.7	+45.8	67.2	30 18.8	+46.4	67.7	30 41.3	+47.1	68.2	31 03.3	+47.8	68.8	31 24.7	+48.5	69.4	37
38	29 27.1	+43.2	64.8	29 52.4	+44.0	65.3	30 17.2	+44.7	65.9	30 41.5	+45.4	66.4	31 05.2	+46.2	66.9	31 28.4	+46.9	67.5	31 51.1	+47.6	68.1	32 13.2	+48.3	68.7	38
39	30 10.3	+42.9	64.0	30 36.4	+43.6	64.5	31 01.9	+44.4	65.1	31 26.9	+45.2	65.6	31 51.4	+45.9	66.2	32 15.3	+46.7	66.8	32 38.7	+47.3	67.4	33 01.5	+48.1	68.0	39
40	30 53.2	+42.7	63.2	31 20.0	+43.4	63.7	31 46.3	+44.2	64.3	32 12.1	+44.9	64.9	32 37.3	+45.6	65.4	33 02.0	+46.3	66.0	33 26.0	+47.1	66.6	33 49.6	+47.7	67.2	40
41	31 35.9	+42.3	62.4	32 03.4	+43.1	62.9	32 30.5	+43.8	63.5	32 57.0	+44.5	64.1	33 22.9	+45.3	64.7	33 48.3	+46.1	65.3	34 13.1	+46.8	65.9	34 37.3	+47.6	66.5	41
42	32 18.2	+41.9	61.5	32 46.5	+42.7	62.1	33 14.3	+43.5	62.7	33 41.5	+44.3	63.3	34 08.2	+45.1	63.9	34 34.4	+45.7	64.5	34 59.9	+46.5	65.1	35 24.9	+47.2	65.8	42
43	33 00.1	+41.6	60.7	33 29.2	+42.4	61.3	33 57.8	+43.2	61.9	34 25.8	+44.0	62.5	34 53.3	+44.7	63.1	35 20.1	+45.5	63.7	35 46.4	+46.2	64.3	36 12.1	+46.9	65.0	43
44	33 41.7	+41.3	59.8	34 11.6	+42.0	60.4	34 41.0	+42.8	61.0	35 09.8	+43.5	61.6	35 38.0	+44.3	62.3	36 05.6	+45.1	62.9	36 32.6	+45.9	63.6	36 59.0	+46.7	64.2	44
45	34 23.0	+40.8	59.0	34 53.6	+41.7	59.6	35 23.8	+42.4	60.2	35 53.3	+43.3	60.8	36 22.3	+44.0	61.4	36 50.7	+44.8	62.1	37 18.5	+45.6	62.7	37 45.7	+46.3	63.4	45
46	35 03.8	+40.5	58.1	35 35.3	+41.3	58.7	36 06.2	+42.1	59.3	36 36.6	+42.8	59.9	37 06.3	+43.7	60.6	37 35.5	+44.4	61.2	38 04.1	+45.2	61.9	38 32.0	+46.0	62.6	46
47	35 44.3	+40.1	57.2	36 16.6	+40.8	57.8	36 48.3	+41.6	58.4	37 19.4	+42.5	59.1	37 50.0	+43.2	59.7	38 19.9	+44.1	60.4	38 49.3	+44.8	61.1	39 18.0	+45.6	61.8	47
48	36 24.4	+39.6	56.2	36 57.4	+40.5	56.9	37 29.9	+41.3	57.5	38 01.9	+42.0	58.2	38 33.2	+42.9	58.8	39 04.0	+43.6	59.5	39 34.1	+44.5	60.2	40 03.6	+45.2	61.0	48
49	37 04.0	+39.1	55.3	37 37.9	+39.9	55.9	38 11.2	+40.8	56.6	38 43.9	+41.7	57.2	39 16.1	+42.4	57.9	39 47.6	+43.3	58.6	40 18.6	+44.0	59.4	40 48.8	+44.8	60.1	49
50	37 43.1	+38.7	54.4	38 17.8	+39.6	55.0	38 52.0	+40.3	55.6	39 25.6	+41.1	56.3	39 58.5	+42.0	57.0	40 30.9	+42.8	57.7	41 02.6	+43.6	58.5	41 33.6	+44.5	59.2	50
51	38 21.8	+38.3	53.4	38 57.4	+39.0	54.0	39 32.3	+39.9	54.7	40 06.7	+40.7	55.4	40 40.5	+41.5	56.1	41 13.7	+42.3	56.8	41 46.2	+43.2	57.5	42 18.1	+44.0	58.3	51
52	39 00.1	+37.7	52.4	39 36.4	+38.5	53.0	40 12.2	+39.4	53.7	40 47.4	+40.2	54.4	41 22.0	+41.1	55.1	41 56.0	+41.9	55.9	42 29.4	+42.7	56.6	43 02.1	+43.5	57.4	52
53	39 37.8	+37.1	51.4	40 14.9	+38.0	52.0	40 51.6	+38.8	52.7	41 27.6	+39.7	53.4	42 03.1	+40.5	54.1	42 37.9	+41.4	54.9	43 12.1	+42.2	55.6	43 45.6	+43.1	56.4	53
54	40 14.9	+36.7	50.4	40 52.9	+37.5	51.0	41 30.4	+38.3	51.7	42 07.3	+39.1	52.4	42 43.6	+40.0	53.1	43 19.3	+40.8	53.9	43 54.3	+41.7	54.7	44 28.7	+42.5	55.5	54
55	40 51.6	+36.0	49.3	41 30.4	+36.9	50.0	42 08.7	+37.7	50.7	42 46.4	+38.6	51.4	43 23.6	+39.4	52.1	44 00.1	+40.3	52.9	44 36.0	+41.1	53.7	45 11.2	+42.0	54.5	55
56	41 27.6	+35.5	48.3	42 07.3	+36.3	48.9	42 46.4	+37.2	49.6	43 25.0	+38.0	50.3	44 03.0	+38.9	51.1	44 40.4	+39.7	51.8	45 17.1	+40.6	52.6	45 53.2	+41.5	53.5	56
57	42 03.1	+34.8	47.2	42 43.6	+35.7	47.9	43 23.6	+36.5	48.5	44 03.0	+37.4	49.3	44 41.9	+38.2	50.0	45 20.1	+39.1	50.8	45 57.7	+40.0	51.6	46 34.7	+40.9	52.4	57
58	42 37.9	+34.2	46.1	43 19.3	+35.0	46.8	44 00.1	+35.9	47.5	44 40.4	+36.7	48.2	45 20.1	+37.6	48.9	45 59.2	+38.5	49.7	46 37.7	+39.4	50.5	47 15.6	+40.2	51.3	58
59	43 12.1	+33.5	45.0	43 54.3	+34.4	45.6	44 36.0	+35.2	46.3	45 17.1	+36.1	47.1	45 57.7	+37.0	47.8	46 37.7	+37.9	48.6	47 17.1	+38.7	49.4	47 55.8	+39.6	50.2	59
60	43 45.6	+32.8	43.8	44 28.7	+33.6	44.5	45 11.2	+34.5	45.2	45 53.2	+35.4	45.9	46 34.7	+36.2	46.7	47 15.6	+37.1	47.5	47 55.8	+38.0	48.3	48 35.4	+39.0	49.1	60
61	44 18.4	+32.1	42.6	45 02.3	+32.9	43.3	45 45.7	+33.8	44.0	46 28.6	+34.6	44.7	47 10.9	+35.6	45.5	47 52.7	+36.4	46.3	48 33.8	+37.4	47.1	49 14.4	+38.2	47.9	61
62	44 50.5	+31.4	41.5	45 35.2	+32.2	42.1	46 19.5	+33.0	42.9	47 03.2	+33.9	43.6	47 46.5	+34.7	44.3	48 29.1	+35.7	45.1	49 11.2	+36.5	45.9	49 52.6	+37.5	46.8	62
63	45 21.9	+30.5	40.3	46 07.4	+31.4	40.9	46 52.5	+32.3	41.6	47 37.1	+33.1	42.3	48 21.2	+34.0	43.1	49 04.8	+34.8	43.9	49 47.7	+35.8	44.7	50 30.1	+36.6	45.5	63
64	45 52.4	+29.8	39.0	46 38.8	+30.6	39.7	47 24.8	+31.4	40.4	48 10.2	+32.3	41.1	48 55.2	+33.1	41.8	49 39.6	+34.1	42.6	50 23.5	+34.9	43.4	51 06.7	+35.9	44.3	64
65	46 22.2	+28.9	37.8	47 09.4	+29.8	38.4	47 56.2	+30.6	39.1	48 42.5	+31.4	39.8	49 28.3	+32.3	40.6	50 13.7	+33.1	41.3	50 58.4	+34.1	42.1	51 42.6	+35.0	43.0	65
66	46 51.1	+28.1	36.5	47 39.2	+28.8	37.1	48 26.8	+29.7	37.8	49 13.9	+30.6	38.5	50 00.6	+31.4	39.3	50 46.8	+32.3	40.0	51 32.5	+33.2	40.8	52 17.6	+34.1	41.7	66
67	47 19.2	+27.1	35.2	48 08.0	+28.0	35.8	48 56.5	+28.7	36.5	49 44.5	+29.6	37.2	50 32.0	+30.5	37.9	51 19.1	+31.3	38.7	52 05.7	+32.2	39.5	52 51.7	+33.1	40.3	67
68	47 46.3	+26.3	33.9	48 36.0	+27.0	34.5	49 25.2	+27.9	35.2	50 14.1	+28.6	35.8	51 02.5	+29.5	36.6	51 50.4	+30.4	37.3	52 37.9	+31.3	38.1	53 24.8	+32.2	38.9	68
69	48 12.6	+25.3	32.5	49 03.0	+26.1	33.1	49 53.1	+26.8	33.8	50 42.7	+27.7	34.5	51 32.0	+28.5	35.2	52 20.8	+29.3	35.9	53 09.2	+30.2	36.7	53 57.0	+31.1	37.5	69
70	48 37.9	+24.3	31.2	49 29.1	+25.0	31.8	50 19.9	+25.8	32.4	51 10.4	+26.6	33.1	52 00.5	+27.4	33.8	52 50.1	+28.3	34.5	53 39.4	+29.1	35.2	54 28.1	+30.0	36.1	70
71	49 02.2	+23.3	29.8	49 54.1	+24.0	30.4	50 45.7	+24.8	31.0	51 37.0	+25.5	31.6	52 27.9	+26.3	32.3	53 18.4	+27.2	33.0	54 08.5	+28.0	33.8	54 58.1	+28.9	34.6	71
72	49 25.5	+22.2	28.4	50 18.1	+23.0	28.9	51 10.5	+23.6	29.5	52 02.5	+24.4	30.2	52 54.2	+25.2	30.8	53 45.6	+26.0	31.5	54 36.5	+26.9	32.2	55 27.0	+27.8	33.0	72
73	49 47.7	+21.2	26.9	50 41.1	+21.8	27.5	51 34.1	+22.6	28.1	52 26.9	+23.3	28.7	53 19.4	+24.1	29.3	54 11.6	+24.8	30.0	55 03.4	+25.6	30.7	55 54.8	+26.4	31.4	73
74	50 08.9	+20.0	25.5	51 02.9	+20.7	26.0	51 56.7	+21.4	26.6	52 50.2	+22.1	27.1	53 43.5	+22.8	27.8	54 36.4	+23.6	28.4	55 29.0	+24.4	29.1	56 21.2	+25.2	29.8	74
75	50 28.9	+18.9	24.0	51 23.6	+19.6	24.5	52 18.1	+20.2	25.0	53 12.3	+20.9	25.6	54 06.3	+21.6	26.2	54 59.9	+22.3	26.8	55 53.4	+23.1	27.5	56 46.4	+23.9	28.2	75
76	50 47.8	+17.8	22.5	51 43.2	+18.3	23.0	52 38.3	+19.0	23.5	53 33.2	+19.6	24.0	54 27.9	+20.3	24.6	55 22.3	+21.0	25.2	56 16.5	+21.7	25.8	57 10.3	+22.5	26.5	76
77	51 05.6	+16.5	21.0	52 01.5	+17.1	21.4	52 57.3	+17.7	21.9	53 52.8	+18.4	22.4	54 48.2	+19.0	23.0	55 43.3	+19.6	23.5	56 38.2	+20.3	24.1	57 32.8	+21.1	24.8	77
78	51 22.1	+15.4	19.5	52 18.6	+15.9	19.9	53 15.0	+16.4	20.3	54 11.2	+17.0	20.8	55 07.2	+17.6	21.3	56 02.9	+18.3	21.9	56 58.5	+18.9	22.4	57 53.9	+19.5	23.0	78
79	51 37.5	+14.1	17.9	52 34.5	+14.6	18.3	53 31.4	+15.1	18.7	54 28.2	+15.6	19.2	55 24.8	+16.2	19.6	56 21.2	+16.8	20.1	57 17.4	+17.4	20.7	58 13.4	+18.1	21.2	79
80	51 51.6	+12.8	16.3	52 49.1	+13.3	16.7	53 46.5	+13.8	17.1	54 43.8	+14.3	17.5	55 41.0	+14.7	17.9	56 38.0	+15.3	18.4	57 34.8	+15.9	18.9	58 31.5	+16.5	19.4	80
81	52 04.4	+11.6	14.7	53 02.4	+12.0	15.1	54 00.3	+12.4	15.4	54 58.1	+12.8	15.8	55 55.7	+13.4	16.2	56 53.3	+13.8	16.6	57 50.7	+14.3	17.1	58 48.0	+14.9	17.6	81
82	52 16.0	+10.2	13.1	53 14.4	+10.6	13.4	54 12.7	+11.0	13.8	55 10.9	+11.4	14.1	56 09.1	+11.8	14.5	57 07.1	+12.3	14.9	58 05.0	+12.8	15.3	59 02.9	+13.2	15.7	82
83	52 26.2	+8.9	11.5	53 25.0	+9.2	11.8	54 23.7	+9.6	12.1	55 22.3	+9.9	12.4	56 20.9	+10.3	12.7	57 19.4	+10.7	13.0	58 17.8	+11.1	13.4	59 16.1	+11.5	13.8	83
84	52 35.1	+7.6	9.9	53 34.2	+7.9	10.1	54 33.3	+8.1	10.4	55 32.2	+8.5	10.6	56 31.2	+8.7	10.9	57 30.1	+9.1	11.2	58 28.9	+9.4	11.5	59 27.6	+9.9	11.9	84
85	52 42.7	+6.2	8.3	53 42.1	+6.4	8.5	54 41.4	+6.7	8.7	55 40.7	+6.9	8.9	56 39.9	+7.2	9.1	57 39.2	+7.4	9.4	58 38.3	+7.8	9.6	59 37.5	+8.0	9.9	85
86	52 48.9	+4.9	6.6	53 48.5	+5.0	6.8	54 48.1	+5.2	7.0	55 47.6	+5.4	7.1	56 47.1	+5.7	7.3	57 46.6	+5.9	7.5	58 46.1	+6.1	7.7	59 45.5	+6.4	8.0	86
87	52 53.8	+3.4	5.0	53 53.5	+3.5	5.1	54 53.3	+3.7	5.2	55 53.0	+3.9	5.4	56 52.8	+4.0	5.5	57 52.5	+4.2	5.5	58 52.2	+4.3	5.8	59 51.9	+4.5	6.0	87
88	52 57.2	+2.1	3.3	53 57.1	+2.2	3.4	54 57.0	+2.3	3.5	55 56.9	+2.3	3.6	56 56.8	+2.4	3.7	57 56.7	+2.5	3.8	58 56.5	+2.6	3.9	59 56.4	+2.7	4.0	88
89	52 59.3	+0.7	1.7	53 59.3	+0.7	1.7	54 59.3	+0.7	1.7	55 59.2	+0.8	1.8	56 59.2	+0.8	1.8	57 59.2	+0.8	1.9	58 59.1	+0.9	1.9	59 59.1	+0.9	2.0	89
90	53 00.0	−0.7	0.0	54 00.0	−0.7	0.0	55 00.0	−0.7	0.0	56 00.0	−0.8	0.0	57 00.0	−0.8	0.0	58 00.0	−0.8	0.0	59 00.0	−0.9	0.0	60 00.0	−0.9	0.0	90

| | 53° | | | 54° | | | 55° | | | 56° | | | 57° | | | 58° | | | 59° | | | 60° | | | |

S. Lat. { L.H.A. greater than 180° ....Zn=180°−Z
{ L.H.A. less than 180° ....Zn=180°+Z

LATITUDE SAME NAME AS DECLINATION   **L.H.A. 90°, 270°**

No entries for contrary name appear on this page.