

THE
NAUTICAL
ALMANAC

FOR THE YEAR

2005

LONDON

Issued by
Her Majesty's
Nautical Almanac Office
by order of the
Secretary of State
for
Defence

WASHINGTON

Issued by the
Nautical Almanac Office
United States
Naval Observatory
under the
authority of the
Secretary of the Navy

LONDON: TSO

2004

A2 ALTITUDE CORRECTION TABLES 10°-90°—SUN, STARS, PLANETS

OCT.—MAR. SUN			APR.—SEPT.			STARS AND PLANETS				DIP				
App. Alt.	Lower Limb	Upper Limb	App. Alt.	Lower Limb	Upper Limb	App. Alt.	Corr ⁿ	App. Alt.	Additional Corr ⁿ	Ht. of Eye	Corr ⁿ	Ht. of Eye	Ht. of Eye	Corr ⁿ
9 33	+10.8	-21.5	9 39	+10.6	-21.2	9 55	-5.3	2005		m		ft.	m	
9 45	+10.9	-21.4	9 50	+10.7	-21.1	10 07	-5.2	VENUS		2.4	-2.8	8.0	1.0	-1.8
9 56	+11.0	-21.3	10 02	+10.8	-21.0	10 20	-5.1	Jan. 1-Sept. 23		2.6	-2.9	8.6	1.5	-2.2
10 08	+11.1	-21.2	10 14	+10.9	-20.9	10 32	-5.0	0		2.8	-3.0	9.2	2.0	-2.5
10 20	+11.2	-21.1	10 27	+11.0	-20.8	10 46	-4.9	60 +0.1		3.0	-3.1	9.8	2.5	-2.8
10 33	+11.3	-21.0	10 40	+11.1	-20.7	10 59	-4.8	Sept. 24-Nov. 14		3.2	-3.2	10.5	3.0	-3.0
10 46	+11.4	-20.9	10 53	+11.2	-20.6	11 14	-4.7	0		3.4	-3.3	11.2	See table	
11 00	+11.5	-20.8	11 07	+11.3	-20.5	11 29	-4.6	0		3.6	-3.4	11.9	←	
11 15	+11.6	-20.7	11 22	+11.4	-20.4	11 44	-4.5	41 +0.2		3.8	-3.5	12.6	m	
11 30	+11.7	-20.6	11 37	+11.5	-20.3	12 00	-4.4	76 +0.1		4.0	-3.6	13.3	20	-7.9
11 45	+11.8	-20.5	11 53	+11.6	-20.2	12 17	-4.3	Nov. 15-Dec. 7		4.3	-3.7	14.1	22	-8.3
12 01	+11.9	-20.4	12 10	+11.7	-20.1	12 35	-4.2	0		4.5	-3.8	14.9	24	-8.6
12 18	+12.0	-20.3	12 27	+11.8	-20.0	12 53	-4.1	0		4.7	-3.9	15.7	26	-9.0
12 36	+12.1	-20.2	12 45	+11.9	-19.9	13 12	-4.0	34 +0.3		5.0	-4.0	16.5	28	-9.3
12 54	+12.2	-20.1	13 04	+12.0	-19.8	13 32	-3.9	60 +0.2		5.2	-4.1	17.4		
13 14	+12.3	-20.0	13 24	+12.1	-19.7	13 53	-3.8	80 +0.1		5.5	-4.2	18.3	30	-9.6
13 34	+12.4	-19.9	13 44	+12.2	-19.6	14 16	-3.7	Dec. 8-Dec. 23		5.8	-4.3	19.1	32	-10.0
13 55	+12.5	-19.8	14 06	+12.3	-19.5	14 39	-3.6	0		6.1	-4.4	20.1	34	-10.3
14 17	+12.6	-19.7	14 29	+12.4	-19.4	15 03	-3.5	29 +0.4		6.3	-4.4	21.0	36	-10.6
14 41	+12.7	-19.6	14 53	+12.5	-19.3	15 29	-3.4	51 +0.3		6.6	-4.6	22.0	38	-10.8
15 05	+12.8	-19.5	15 18	+12.6	-19.2	15 56	-3.3	68 +0.2		6.9	-4.7	22.9		
15 31	+12.9	-19.4	15 45	+12.7	-19.1	16 25	-3.2	83 +0.1		7.2	-4.8	23.9	40	-11.1
15 59	+13.0	-19.3	16 13	+12.8	-19.0	16 55	-3.1	Dec. 24-Dec. 31		7.5	-4.9	24.9	42	-11.4
16 27	+13.1	-19.2	16 43	+12.9	-18.9	17 27	-3.0	0		7.9	-5.0	26.0	44	-11.7
16 58	+13.2	-19.1	17 14	+13.0	-18.8	18 01	-2.9	26 +0.5		8.2	-5.1	27.1	46	-11.9
17 30	+13.3	-19.0	17 47	+13.1	-18.7	18 37	-2.8	46 +0.4		8.5	-5.2	28.1	48	-12.2
18 05	+13.4	-18.9	18 23	+13.2	-18.6	19 16	-2.7	60 +0.3		8.8	-5.2	29.2		
18 41	+13.5	-18.8	19 00	+13.3	-18.5	19 56	-2.6	73 +0.2		9.2	-5.3	30.4	ft.	
19 20	+13.6	-18.7	19 41	+13.4	-18.4	20 40	-2.5	84 +0.1		9.5	-5.4	31.5	2	-1.4
20 02	+13.7	-18.6	20 24	+13.5	-18.3	21 27	-2.4	MARS		9.9	-5.5	32.7	4	-1.9
20 46	+13.8	-18.5	21 10	+13.6	-18.2	22 17	-2.3	Jan. 1-July 5		10.3	-5.6	33.9	6	-2.4
21 34	+13.9	-18.4	21 59	+13.7	-18.1	23 11	-2.2	0		10.6	-5.7	35.1	8	-2.7
22 25	+14.0	-18.3	22 52	+13.8	-18.0	24 09	-2.1	60 +0.1		11.0	-5.8	36.3	10	-3.1
23 20	+14.1	-18.2	23 49	+13.9	-17.9	25 12	-2.0	July 6-Sept. 16		11.4	-5.9	37.6	See table	
24 20	+14.2	-18.1	24 51	+14.0	-17.8	26 20	-1.9	Dec. 7-Dec. 31		11.8	-6.0	38.9	←	
25 24	+14.3	-18.0	25 58	+14.1	-17.7	27 34	-1.8	0		12.2	-6.1	40.1	ft.	
26 34	+14.4	-17.9	27 11	+14.2	-17.6	28 54	-1.7	0		12.6	-6.2	41.5	70	-8.1
27 50	+14.5	-17.8	28 31	+14.3	-17.5	30 22	-1.6	41 +0.2		13.0	-6.4	42.8	75	-8.4
29 13	+14.6	-17.7	29 58	+14.4	-17.4	31 58	-1.5	76 +0.1		13.4	-6.5	44.2	80	-8.7
30 44	+14.7	-17.6	31 33	+14.5	-17.3	33 43	-1.4	Sept. 17-Dec. 6		13.8	-6.6	45.5	85	-8.9
32 24	+14.8	-17.5	33 18	+14.6	-17.2	35 38	-1.3	0		14.2	-6.7	46.9	90	-9.2
34 15	+14.9	-17.4	35 15	+14.7	-17.1	37 45	-1.2	34 +0.3		14.7	-6.8	48.4	95	-9.5
36 17	+15.0	-17.3	37 24	+14.8	-17.0	40 06	-1.1	60 +0.2		15.1	-6.9	49.8		
38 34	+15.1	-17.2	39 48	+14.9	-16.9	42 42	-1.0	80 +0.1		15.5	-7.0	51.3	100	-9.7
41 06	+15.2	-17.1	42 28	+15.0	-16.8	45 34	-0.9	0		16.0	-7.1	52.8	105	-9.9
43 56	+15.3	-17.0	45 29	+15.1	-16.7	48 45	-0.8	0		16.5	-7.2	54.3	110	-10.2
47 07	+15.4	-16.9	48 52	+15.2	-16.6	52 16	-0.7	0		16.9	-7.3	55.8	115	-10.4
50 43	+15.5	-16.8	52 41	+15.3	-16.5	56 09	-0.6	0		17.4	-7.4	57.4	120	-10.6
54 46	+15.6	-16.7	56 59	+15.4	-16.4	60 26	-0.5	0		17.9	-7.5	58.9	125	-10.8
59 21	+15.7	-16.6	61 50	+15.5	-16.3	65 06	-0.4	0		18.4	-7.6	60.5		
64 28	+15.8	-16.5	67 15	+15.6	-16.2	70 09	-0.3	0		18.8	-7.7	62.1	130	-11.1
70 10	+15.9	-16.4	73 14	+15.7	-16.1	75 32	-0.2	0		19.3	-7.8	63.8	135	-11.3
76 24	+16.0	-16.3	79 42	+15.8	-16.0	81 12	-0.1	0		19.8	-7.9	65.4	140	-11.5
83 05	+16.1	-16.2	86 31	+15.9	-15.9	87 03	0.0	0		20.4	-8.0	67.1	145	-11.7
90 00			90 00			90 00		0		20.9	-8.1	68.8	150	-11.9
								0		21.4		70.5	155	-12.1

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

ALTITUDE CORRECTION TABLES 0°-10°—SUN, STARS, PLANETS A3

App. Alt.	OCT.—MAR. SUN		APR.—SEPT.		STARS PLANETS
	Lower Limb	Upper Limb	Lower Limb	Upper Limb	
0 00	-17.5	-49.8	-17.8	-49.6	-33.8
0 03	16.9	49.2	17.2	49.0	33.2
0 06	16.3	48.6	16.6	48.4	32.6
0 09	15.7	48.0	16.0	47.8	32.0
0 12	15.2	47.5	15.4	47.2	31.5
0 15	14.6	46.9	14.8	46.6	30.9
0 18	-14.1	-46.4	-14.3	-46.1	-30.4
0 21	13.5	45.8	13.8	45.6	29.8
0 24	13.0	45.3	13.3	45.1	29.3
0 27	12.5	44.8	12.8	44.6	28.8
0 30	12.0	44.3	12.3	44.1	28.3
0 33	11.6	43.9	11.8	43.6	27.9
0 36	-11.1	-43.4	-11.3	-43.1	-27.4
0 39	10.6	42.9	10.9	42.7	26.9
0 42	10.2	42.5	10.5	42.3	26.5
0 45	9.8	42.1	10.0	41.8	26.1
0 48	9.4	41.7	9.6	41.4	25.7
0 51	9.0	41.3	9.2	41.0	25.3
0 54	-8.6	-40.9	-8.8	-40.6	-24.9
0 57	8.2	40.5	8.4	40.2	24.5
1 00	7.8	40.1	8.0	39.8	24.1
1 03	7.4	39.7	7.7	39.5	23.7
1 06	7.1	39.4	7.3	39.1	23.4
1 09	6.7	39.0	7.0	38.8	23.0
1 12	-6.4	-38.7	-6.6	-38.4	-22.7
1 15	6.0	38.3	6.3	38.1	22.3
1 18	5.7	38.0	6.0	37.8	22.0
1 21	5.4	37.7	5.7	37.5	21.7
1 24	5.1	37.4	5.3	37.1	21.4
1 27	4.8	37.1	5.0	36.8	21.1
1 30	-4.5	-36.8	-4.7	-36.5	-20.8
1 35	4.0	36.3	4.3	36.1	20.3
1 40	3.6	35.9	3.8	35.6	19.9
1 45	3.1	35.4	3.4	35.2	19.4
1 50	2.7	35.0	2.9	34.7	19.0
1 55	2.3	34.6	2.5	34.3	18.6
2 00	-1.9	-34.2	-2.1	-33.9	-18.2
2 05	1.5	33.8	1.7	33.5	17.8
2 10	1.1	33.4	1.4	33.2	17.4
2 15	0.8	33.1	1.0	32.8	17.1
2 20	0.4	32.7	0.7	32.5	16.7
2 25	-0.1	32.4	-0.3	32.1	16.4
2 30	+0.2	-32.1	0.0	-31.8	-16.1
2 35	0.5	31.8	+0.3	31.5	15.8
2 40	0.8	31.5	0.6	31.2	15.4
2 45	1.1	31.2	0.9	30.9	15.2
2 50	1.4	30.9	1.2	30.6	14.9
2 55	1.7	30.6	1.4	30.4	14.6
3 00	+2.0	-30.3	+1.7	-30.1	-14.3
3 05	2.2	30.1	2.0	29.8	14.1
3 10	2.5	29.8	2.2	29.6	13.8
3 15	2.7	29.6	2.5	29.3	13.6
3 20	2.9	29.4	2.7	29.1	13.4
3 25	3.2	29.1	2.9	28.9	13.1
3 30	+3.4	-28.9	+3.1	-28.7	-12.9

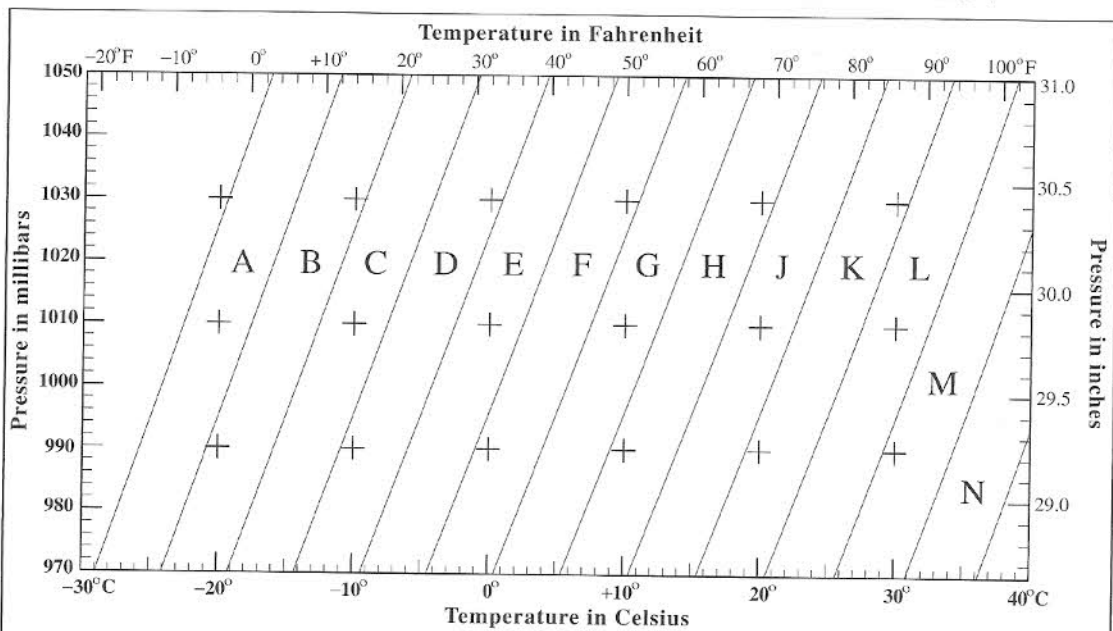
App. Alt.	OCT.—MAR. SUN		APR.—SEPT.		STARS PLANETS
	Lower Limb	Upper Limb	Lower Limb	Upper Limb	
3 30	+3.4	-28.9	+3.1	-28.7	-12.9
3 35	3.6	28.7	3.3	28.5	12.7
3 40	3.8	28.5	3.6	28.2	12.5
3 45	4.0	28.3	3.8	28.0	12.3
3 50	4.2	28.1	4.0	27.8	12.1
3 55	4.4	27.9	4.1	27.7	11.9
4 00	+4.6	-27.7	+4.3	-27.5	-11.7
4 05	4.8	27.5	4.5	27.3	11.5
4 10	4.9	27.4	4.7	27.1	11.4
4 15	5.1	27.2	4.9	26.9	11.2
4 20	5.3	27.0	5.0	26.8	11.0
4 25	5.4	26.9	5.2	26.6	10.9
4 30	+5.6	-26.7	+5.3	-26.5	-10.7
4 35	5.7	26.6	5.5	26.3	10.6
4 40	5.9	26.4	5.6	26.2	10.4
4 45	6.0	26.3	5.8	26.0	10.3
4 50	6.2	26.1	5.9	25.9	10.1
4 55	6.3	26.0	6.1	25.7	10.0
5 00	+6.4	-25.9	+6.2	-25.6	-9.8
5 05	6.6	25.7	6.3	25.5	9.7
5 10	6.7	25.6	6.5	25.3	9.6
5 15	6.8	25.5	6.6	25.2	9.5
5 20	7.0	25.3	6.7	25.1	9.3
5 25	7.1	25.2	6.8	25.0	9.2
5 30	+7.2	-25.1	+6.9	-24.9	-9.1
5 35	7.3	25.0	7.1	24.7	9.0
5 40	7.4	24.9	7.2	24.6	8.9
5 45	7.5	24.8	7.3	24.5	8.8
5 50	7.6	24.7	7.4	24.4	8.7
5 55	7.7	24.6	7.5	24.3	8.6
6 00	+7.8	-24.5	+7.6	-24.2	-8.5
6 10	8.0	24.3	7.8	24.0	8.3
6 20	8.2	24.1	8.0	23.8	8.1
6 30	8.4	23.9	8.2	23.6	7.9
6 40	8.6	23.7	8.3	23.5	7.7
6 50	8.7	23.6	8.5	23.3	7.6
7 00	+8.9	-23.4	+8.7	-23.1	-7.4
7 10	9.1	23.2	8.8	23.0	7.2
7 20	9.2	23.1	9.0	22.8	7.1
7 30	9.3	23.0	9.1	22.7	6.9
7 40	9.5	22.8	9.2	22.6	6.8
7 50	9.6	22.7	9.4	22.4	6.7
8 00	+9.7	-22.6	+9.5	-22.3	-6.6
8 10	9.9	22.4	9.6	22.2	6.4
8 20	10.0	22.3	9.7	22.1	6.3
8 30	10.1	22.2	9.9	21.9	6.2
8 40	10.2	22.1	10.0	21.8	6.1
8 50	10.3	22.0	10.1	21.7	6.0
9 00	+10.4	-21.9	+10.2	-21.6	-5.9
9 10	10.5	21.8	10.3	21.5	5.8
9 20	10.6	21.7	10.4	21.4	5.7
9 30	10.7	21.6	10.5	21.3	5.6
9 40	10.8	21.5	10.6	21.2	5.5
9 50	10.9	21.4	10.6	21.2	5.4
10 00	+11.0	-21.3	+10.7	-21.1	-5.3

Additional corrections for temperature and pressure are given on the following page.

For bubble sextant observations ignore dip and use the star corrections for Sun, planets and stars.

A4 ALTITUDE CORRECTION TABLES—ADDITIONAL CORRECTIONS

ADDITIONAL REFRACTION CORRECTIONS FOR NON-STANDARD CONDITIONS



App. Alt.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	App. Alt.
00 00	-7.3	-5.9	-4.6	-3.4	-2.2	-1.1	0.0	+1.0	+2.0	+3.0	+4.0	+4.9	+5.9	+6.9	00 00
00 30	5.5	4.5	3.5	2.6	1.7	0.8	0.0	0.8	1.6	2.3	3.1	3.8	4.5	5.3	00 30
01 00	4.4	3.5	2.8	2.0	1.3	0.7	0.0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	01 00
01 30	3.5	2.9	2.2	1.7	1.1	0.5	0.0	0.5	1.0	1.5	2.0	2.5	2.9	3.4	01 30
02 00	2.9	2.4	1.9	1.4	0.9	0.4	0.0	0.4	0.8	1.3	1.7	2.0	2.4	2.8	02 00
02 30	-2.5	-2.0	-1.6	-1.2	-0.8	-0.4	0.0	+0.4	+0.7	+1.1	+1.4	+1.7	+2.1	+2.4	02 30
03 00	2.1	1.7	1.4	1.0	0.7	0.3	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	03 00
03 30	1.9	1.5	1.2	0.9	0.6	0.3	0.0	0.3	0.5	0.8	1.1	1.3	1.6	1.8	03 30
04 00	1.6	1.3	1.1	0.8	0.5	0.3	0.0	0.2	0.5	0.7	0.9	1.2	1.4	1.6	04 00
04 30	1.5	1.2	0.9	0.7	0.5	0.2	0.0	0.2	0.4	0.6	0.8	1.0	1.3	1.5	04 30
05 00	-1.3	-1.1	-0.9	-0.6	-0.4	-0.2	0.0	+0.2	+0.4	+0.6	+0.8	+0.9	+1.1	+1.3	05 00
06	1.1	0.9	0.7	0.5	0.3	0.2	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	06
07	1.0	0.8	0.6	0.5	0.3	0.1	0.0	0.1	0.3	0.4	0.5	0.7	0.8	0.9	07
08	0.8	0.7	0.5	0.4	0.3	0.1	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	08
09	0.7	0.6	0.5	0.4	0.2	0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	09
10 00	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1	0.0	+0.1	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	10 00
12	0.6	0.5	0.4	0.3	0.2	0.1	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.5	12
14	0.5	0.4	0.3	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	14
16	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	16
18	0.4	0.3	0.2	0.2	0.1	-0.1	0.0	+0.1	0.1	0.2	0.2	0.3	0.3	0.4	18
20 00	-0.3	-0.3	-0.2	-0.2	-0.1	0.0	0.0	0.0	+0.1	+0.1	+0.2	+0.2	+0.3	+0.3	20 00
25	0.3	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	25
30	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	+0.1	0.1	0.1	0.1	0.2	0.2	30
35	0.2	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	35
40	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	0.0	0.0	+0.1	0.1	0.1	0.1	0.1	40
50 00	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	+0.1	+0.1	+0.1	50 00

The graph is entered with arguments temperature and pressure to find a zone letter; using as arguments this zone letter and apparent altitude (sextant altitude corrected for index error and dip), a correction is taken from the table. This correction is to be applied to the sextant altitude in addition to the corrections for standard conditions (for the Sun, stars and planets from page A2-A3 and for the Moon from pages xxxv and xxxv).

UT	VENUS -3.8			MARS +1.2		JUPITER -2.4		SATURN -0.1		STARS						
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
S U N D A Y	27 00	156 55.5	183 55.5 S12 31.4	231 15.4 S23 14.0	319 50.2 S 5 36.6	44 20.0 N21 54.2	Acamar	315 23.3 S40 17.3								
	01	171 58.0	198 55.0 30.3	246 16.0 13.9	334 52.8 36.5	59 22.5 54.3	Achernar	335 31.7 S57 12.9								
	02	187 00.5	213 54.5 29.2	261 16.5 13.7	349 55.5 36.4	74 25.1 54.3	Acrux	173 16.4 S63 07.6								
	03	202 02.9	228 53.9 . . 28.2	276 17.0 . . 13.6	4 58.1 . . 36.3	89 27.7 . . 54.3	Adhara	255 17.4 S28 58.8								
	04	217 05.4	243 53.4 27.1	291 17.5 13.4	20 00.7 36.2	104 30.3 54.3	Aldebaran	290 56.9 N16 31.2								
	05	232 07.9	258 52.8 26.0	306 18.1 13.3	35 03.4 36.2	119 32.8 54.3										
	06	247 10.3	273 52.3 S12 25.0	321 18.6 S23 13.1	50 06.0 S 5 36.1	134 35.4 N21 54.4	Alioth	166 25.6 N55 55.7								
	07	262 12.8	288 51.8 23.9	336 19.1 12.9	65 08.7 36.0	149 38.0 54.4	Alkaid	153 03.5 N49 17.0								
	08	277 15.3	303 51.2 22.8	351 19.6 12.8	80 11.3 35.9	164 40.6 54.4	Al Na'ir	27 52.1 S46 56.3								
	09	292 17.7	318 50.7 . . 21.7	6 20.2 . . 12.6	95 13.9 . . 35.8	179 43.1 . . 54.4	Alnilam	275 52.9 S 1 11.9								
	10	307 20.2	333 50.1 20.7	21 20.7 12.5	110 16.6 35.8	194 45.7 54.4	Alphard	218 02.2 S 8 40.9								
	11	322 22.7	348 49.6 19.6	36 21.2 12.3	125 19.2 35.7	209 48.3 54.4										
	12	337 25.1	3 49.1 S12 18.5	51 21.7 S23 12.1	140 21.9 S 5 35.6	224 50.8 N21 54.5	Alphecca	126 16.4 N26 41.5								
	13	352 27.6	18 48.5 17.4	66 22.3 12.0	155 24.5 35.5	239 53.4 54.5	Alpheratz	357 50.7 N29 07.1								
	14	7 30.0	33 48.0 16.4	81 22.8 11.8	170 27.1 35.4	254 56.0 54.5	Altair	62 14.8 N 8 52.6								
	15	22 32.5 48 47.5 . . 15.3	96 23.3 . . 11.7	185 29.8 . . 35.3	269 58.6 . . 54.5	Antares	353 22.3 S42 16.9									
	16	37 35.0 63 46.9 14.2	111 23.9 11.5	200 32.4 35.3	285 01.1 54.5											
	17	52 37.4 78 46.4 13.1	126 24.4 11.3	215 35.0 35.2	300 03.7 54.6											
	18	67 39.9 93 45.9 S12 12.1	141 24.9 S23 11.2	230 37.7 S 5 35.1	315 06.3 N21 54.6	Arcturus	146 01.4 N19 09.1									
	19	82 42.4 108 45.3 11.0	156 25.4 11.0	245 40.3 35.0	330 08.8 54.6	Atria	107 42.2 S69 02.1									
	20	97 44.8 123 44.8 09.9	171 26.0 10.9	260 43.0 34.9	345 11.4 54.6	Avior	234 20.4 S59 31.6									
	21	112 47.3 138 44.3 . . 08.8	186 26.5 . . 10.7	275 45.6 . . 34.9	0 14.0 . . 54.6	Bellatrix	278 38.9 N 6 21.3									
	22	127 49.8 153 43.7 07.8	201 27.0 10.5	290 48.3 34.8	15 16.6 54.7	Betelgeuse	271 08.2 N 7 24.5									
23	142 52.2 168 43.2 06.7	216 27.5 10.4	305 50.9 34.7	30 19.1 54.7												
M O N D A Y	28 00	157 54.7	183 42.7 S12 05.6	231 28.1 S23 10.2	320 53.5 S 5 34.6	45 21.7 N21 54.7	Canopus	263 58.8 S52 42.1								
	01	172 57.2	198 42.1 04.5	246 28.6 10.0	335 56.2 34.5	60 24.3 54.7	Capella	280 44.0 N46 00.4								
	02	187 59.6	213 41.6 03.4	261 29.1 09.9	350 58.8 34.5	75 26.8 54.7	Deneb	49 36.4 N45 17.6								
	03	203 02.1	228 41.1 . . 02.3	276 29.7 . . 09.7	6 01.5 . . 34.4	90 29.4 . . 54.8	Denébola	182 39.9 N14 32.5								
	04	218 04.5	243 40.5 01.3	291 30.2 09.5	21 04.1 34.3	105 32.0 54.8	Diphda	349 02.6 S17 57.7								
	05	233 07.0	258 40.0 12 00.2	306 30.7 09.4	36 06.8 34.2	120 34.5 54.8										
	06	248 09.5	273 39.5 S11 59.1	321 31.2 S23 09.2	51 09.4 S 5 34.1	135 37.1 N21 54.8	Dubhe	193 58.5 N61 43.4								
	07	263 11.9	288 38.9 58.0	336 31.8 09.0	66 12.0 34.0	150 39.7 54.8	Elnath	278 20.8 N28 36.9								
	08	278 14.4	303 38.4 56.9	351 32.3 08.9	81 14.7 34.0	165 42.2 54.9	Eltanin	90 49.3 N51 28.9								
	09	293 16.9	318 37.9 . . 55.8	6 32.8 . . 08.7	96 17.3 . . 33.9	180 44.8 . . 54.9	Enif	33 53.8 N 9 53.7								
	10	308 19.3	333 37.4 54.8	21 33.4 08.5	111 20.0 33.8	195 47.4 54.9	Fomalhaut	15 31.4 S29 35.9								
	11	323 21.8	348 36.8 53.7	36 33.9 08.4	126 22.6 33.7	210 49.9 54.9										
	12	338 24.3	3 36.3 S11 52.6	51 34.4 S23 08.2	141 25.3 S 5 33.6	225 52.5 N21 54.9	Gacrux	172 08.0 S57 08.4								
	13	353 26.7	18 35.8 51.5	66 34.9 08.0	156 27.9 33.5	240 55.1 54.9	Gienah	175 58.8 S17 34.3								
	14	8 29.2 33 35.3 50.4	81 35.5 07.9	171 30.6 33.5	255 57.6 55.0	Hadar	148 57.1 S60 23.7									
	15	23 31.6 48 34.7 . . 49.3	96 36.0 . . 07.7	186 33.2 . . 33.4	271 00.2 . . 55.0	Hamal	328 08.4 N23 29.2									
	16	38 34.1 63 34.2 48.2	111 36.5 07.5	201 35.8 33.3	286 02.8 55.0	Kaus Aust.	83 52.6 S34 23.0									
	17	53 36.6 78 33.7 47.1	126 37.0 07.4	216 38.5 33.2	301 05.3 55.0											
	18	68 39.0 93 33.2 S11 46.0	141 37.6 S23 07.2	231 41.1 S 5 33.1	316 07.9 N21 55.0	Kochab	137 18.7 N74 07.7									
	19	83 41.5 108 32.6 45.0	156 38.1 07.0	246 43.8 33.0	331 10.5 55.1	Markab	13 45.2 N15 13.8									
	20	98 44.0 123 32.1 43.9	171 38.6 06.8	261 46.4 33.0	346 13.0 55.1	Menkar	314 22.0 N 4 06.5									
	21	113 46.4 138 31.6 . . 42.8	186 39.2 . . 06.7	276 49.1 . . 32.9	1 15.6 . . 55.1	Menkent	148 15.2 S36 23.7									
	22	128 48.9 153 31.1 41.7	201 39.7 06.5	291 51.7 32.8	16 18.2 55.1	Miaplacidus	221 40.6 S69 44.3									
23	143 51.4 168 30.5 40.6	216 40.2 06.3	306 54.4 32.7	31 20.7 55.1												
T U E S D A Y	1 00	158 53.8	183 30.0 S11 39.5	231 40.7 S23 06.2	321 57.0 S 5 32.6	46 23.3 N21 55.2	Mirfak	308 50.0 N49 53.0								
	01	173 56.3	198 29.5 38.4	246 41.3 06.0	336 59.7 32.5	61 25.9 55.2	Nunki	76 06.5 S26 17.5								
	02	188 58.8	213 29.0 37.3	261 41.8 05.8	352 02.3 32.5	76 28.4 55.2	Peacock	53 29.7 S56 43.2								
	03	204 01.2	228 28.5 . . 36.2	276 42.3 . . 05.6	7 05.0 . . 32.4	91 31.0 . . 55.2	Pollux	243 35.3 N28 00.9								
	04	219 03.7	243 27.9 35.1	291 42.9 05.5	22 07.6 32.3	106 33.6 55.2	Procyon	245 06.3 N 5 12.7								
	05	234 06.1	258 27.4 34.0	306 43.4 05.3	37 10.3 32.2	121 36.1 55.2										
	06	249 08.6	273 26.9 S11 32.9	321 43.9 S23 05.1	52 12.9 S 5 32.1	136 38.7 N21 55.3	Rasalhague	96 12.6 N12 33.1								
	07	264 11.1	288 26.4 31.8	336 44.4 04.9	67 15.6 32.0	151 41.2 55.3	Regulus	207 50.1 N11 56.5								
	08	279 13.5	303 25.9 30.7	351 45.0 04.8	82 18.2 31.9	166 43.8 55.3	Rigel	281 18.2 S 8 11.8								
	09	294 16.0	318 25.3 . . 29.6	6 45.5 . . 04.6	97 20.9 . . 31.9	181 46.4 . . 55.3	Rigil Kent.	140 00.7 S60 51.2								
	10	309 18.5	333 24.8 28.5	21 46.0 04.4	112 23.5 31.8	196 48.9 55.3	Sabik	102 20.1 S15 44.0								
	11	324 20.9	348 24.3 27.4	36 46.6 04.2	127 26.2 31.7	211 51.5 55.4										
	12	339 23.4	3 23.8 S11 26.3	51 47.1 S23 04.1	142 28.8 S 5 31.6	226 54.1 N21 55.4	Schedar	349 48.8 N56 34.0								
	13	354 25.9	18 23.3 25.2	66 47.6 03.9	157 31.5 31.5	241 56.6 55.4	Shaula	96 30.9 S37 06.5								
	14	9 28.3 33 22.8 24.1	81 48.1 03.7	172 34.1 31.4	256 59.2 55.4	Sirius	258 39.3 S16 43.4									
	15	24 30.8 48 22.2 . . 23.0	96 48.7 . . 03.5	187 36.8 . . 31.3	272 01.8 . . 55.4	Spica	158 37.9 S11 11.4									
	16	39 33.2 63 21.7 21.9	111 49.2 03.3	202 39.4 31.3	287 04.3 55.4	Suhail	222 57.0 S43 27.3									
	17	54 35.7 78 21.2 20.8	126 49.7 03.2	217 42.1 31.2	302 06.9 55.5											
	18	69 38.2 93 20.7 S11 19.7	141 50.3 S23 03.0	232 44.7 S 5 31.1	317 09.4 N21 55.5	Vega	80 43.6 N38 46.9									
	19	84 40.6 108 20.2 18.6	156 50.8 02.8	247 47.4 31.0	332 12.0 55.5	Zuben'ubi	137 12.5 S16 03.9									
	20	99 43.1 123 19.7 17.5	171 51.3 02.6	262 50.0 30.9	347 14.6 55.5											
	21	114 45.6 138 19.2 . . 16.4	186 51.8 . . 02.4	277 52.7 . . 30.8	2 17.1 . . 55.5											
	22	129 48.0 153 18.6 15.3	201 52.4 02.3	292 55.3 30.7	17 19.7 55.5											
23	144 50.5 168 18.1 14.2	216 52.9 02.1	307 58.0 30.7	32 22.2 55.6												
Mer. Pass. 13 m											SHA		Mer. Pass.			
v -0.5 d 1.1											v 0.5 d 0.2		v 2.6 d 0.1		v 2.6 d 0.0	
											h m		h m		h m	
											33 43.4		73 33.4		8 34	
											162 58.9		2 36			
											247 27.0		20 55			

